UNIT-01
ROLE OF HOUSEKEEPING IN HOSPITALITY OPERATION

Structure

1.1 Introduction

The guestroom is the main product of a hotel, as it contributes to more than 50 per cent of the total sales, making the profit percentage from room sales very high. The 'sale' of a room means leasing the room for occupation for 24 hours at a pre-determined cost. Thus, a room sold on a particular day earns revenue for that day, and then it can be sold again, and again. Rooms are sometimes referred to as 'highly perishable commodities' as rooms not sold for the day lose out on the revenue for that day. In addition to earning revenues, guestrooms also have a role in the image-building of the hotel. Guests may stay in a hotel for pleasure, convenience, or from necessity. Whatever the reason for the stay, the will always expect a certain standard of service and comfort. It is hence essential for each and every hotel employee to understand the importance of a guestroom for a guest. The housekeeping staff, in particular, has the responsibility of making the guestroom 'a home away from home' for the guest.

1.2 Objectives

At the end of this lesson, students should be able to

Demonstrate appropriate skills, and show an understanding of the following:

- Role of housekeeping
- Layout of housekeeping
- Organizational structure of housekeeping department
- Duties and responsibilities of each housekeeping staffs.

1.3 Role of Housekeeping in Hospitality Industry

The aim of all Hotels or establishments that offer accommodation is to provide their customers with clean, attractive, comfortable and welcoming surroundings that offer

value for money. Nothing sends a stronger message than cleanliness in a hospitality industry. No level of service, friendliness or glamour can equal the sensation a guest has upon entering a spotless, tidy and conveniently arranged room. Both management and guest consider keeping the place clean and in good order a necessity, for a hotel to command a fair price and to get repeat business.

A survey carried out showed 63% travelers rated cleanliness and appearance as their first priority in their choice of hotels. The housekeeping department takes pride in keeping the hotel clean and comfortable so as to create a 'home away from home'. Good housekeeping is considered as the backbone of accommodation sector as its main aim is to provide a clean comfortable, safe and aesthetically appealing environment.

Housekeeping is an operational department of the hotel. It is responsible for cleanliness, maintenance, aesthetic upkeep of rooms, public areas, back areas and surroundings.

A hotel survives on the sale of rooms, food, beverage, and other minor services like laundry, health clubs, health spa, sightseeing, shopping arcades etc. The sale of rooms constitutes a minimum of 50% of these sales.

Thus a major part of hotels margin of profit comes from room sales because a room once made can be sold over and over again. However, the days when the room remains unsold there is a total loss of revenue. To this extent, rooms are more perishable than food. The housekeeping budget typically accounts for 20% of the properties total operating expenditure. The largest element of operating cost in the housekeeping department is labour. The effort that the housekeeping department makes in giving a guest a desirable room has a direct bearing on the guest experience in the hotel.

Guest rooms are the heart of the hotel. Unless the décor is appropriate, the air odour free, furnishing and upholstery is spotlessly clean the hotel may loose a guest as a potential customer. The housekeeping department not only prepares the clean guestroom on a timely basis for the guests who are arriving but also cleans and maintains everything in the hotel so that the property is fresh and attractive as the day it opens for business. The housekeeping thus contributes in a big way towards the overall reputation of a property. It is a 24 hour and 365 day operation. Scientific housekeeping demands the employment of the most effective cleaning materials and procedures, attention to purchasing the most suitable linen supplies, maintenance of decorative area under the housekeeping department purview and proper organization and supervision.

Other than hotels, professional housekeeping service is very much in demand in hospitals, cooperate buildings, airports, airlines, cruisers, banks shopping arcade. Since most such organizations prefer to outsource these functions, contract housekeeping is becoming a lucrative entrepreneurship venture these days.

1.4 Responsibilities of Housekeeping Department

- To achieve the maximum possible efficiency in ensuring the care and comfort of the guests.
- Establish a welcoming atmosphere and ensure courteous, reliable service from all the staff of the department.
- Ensure a high standard of cleanliness and general upkeep in all areas for which the department is responsible.

- Provide linen in rooms, food service areas etc and maintain an inventory for the same.
- To provide uniforms for all the staff and maintain adequate inventory for the same.
- Cater to the laundry requirement, staff uniforms and guest clothing.
- Deal with the lost and found articles. This ensures the smooth running of the department.
- To resist in the maintenance of the building while contributing to a safe and healthy environment.
- To provide and maintain the floral decorations and landscaped areas of the hotel.
- To select the right contractor and ensure that the quality of work is maintained.
- To coordinate the renovation of the property as and when required in consultation with the management and the interior designer.
- To coordinate with the purchase department of the guest supplies, cleaning agents, equipments, linen, carpets and other items used in the hotel.
- To ensure training control and supervision of all staff attached to the department.
- To establish a good working relationship with other departments.
- To ensure that safety and security regulations are made known to all the staff of the department.
- To keep the G.M and administrator informed of all matters requiring special attention.

Brand loyalty: Resident guest may be loyal to a particular chain of hotels or properties. E g. Holiday Inn, Hyatt, etc. Change of brand loyalty can be explained as a matter of habit, maximization of value to price or past experience with service since it is difficult to explain pre purchased information about services. Consumers may be reluctant to change brands as they are uncertain. Guest also become brand loyal as they realize that repeat patronage to a particular property gives them personalize service and greater satisfaction of their needs. This is due to the fact that guest is recognized as his needs are known by the staff.

Decreasing brand loyalty may be due to:

- The availability of individual brands only in certain locations. This forces the client to choose another brand. In this way the consumer learns about competing brands and is able to make a more realistic evaluation of the kind of brand he would like to patronize.
- Travel writers give useful tips about different hotels, their services and comfort of stay.
- Travel agents also help in giving information about different hotels.
- Trade magazines often do monthly assessments of different hotels.

1.5 Importance of the Guestrooms to a Guest

It is extremely important to understand the expectations of a guest when he/she pays to stay in a room. People nowadays travel a lot more than they did earlier, and the expectations from hotels are constantly on the rise. In such a scenario, continuous analysis of guest expectations becomes necessary. Given that a hotel is often referred

to as 'a home away from home', there would be similarities in a guest's expectations from a hotel and from a home. These similarities would dictate that the guestrooms be neat, hygienic, comfortable, private, and above all, safe. The most important consideration here is staff needs to understand and respect the guest's expectations from the guestroom and the hotel staff.

Primarily, a neat room is the basic minimum expectation of any guest, and the staff needs to ensure this by laying out fresh linen and presenting a clean room on a daily basis. The room should not only be attractive, but also comfortable and functional. Hotel guests expect a high degree of cleanliness, leading to a hygienic environment to stay in. For instance, guest that the hotel has provided them a sanitized toilet when they see a disinfected paper strip on the toilet seat. The 'basic necessities' in a guestroom are constantly varying. Nowadays these may include Internet and Wi-Fi connectivity, channel music, television, temperature control, and so on. Guests also expect that they will not be disturbed often and that the location of the rooms would be such that they have a good view. Safety, as we have already mentioned, is a key factor with regard to guestrooms - guest would like the guestroom location to be safe and not accessible to one and all. The doors of a guestroom should have a double locking system operable from inside, along with strict control measures in the hotel with regard to the handling of guestroom keys and master keys. Fire-exit layouts being placed in the rooms is a necessity as well. Irrespective of its location, a guestroom should also offer easy access to other guest service areas, such as restaurants, gymnasiums, swimming pools, and so on, with clear directions to and from the room or elevator being posted in corridors.

The guest would also expect to be able to get in touch with ancillary departments providing other services to guests from the room itself. The various services- such as room service, restaurants, housekeeping, valet, and so on- should be clearly indicated with explanation and intercom numbers in the literature on the house rules and in the information kits placed in each guestroom.

1.6 Areas of responsibility of housekeeping department

Guestrooms / Floors: Room attendants and floor supervisors are responsible for the cleanliness maintenance and security of guestrooms and surrounding areas.

Public Areas: Front of the house areas (E.g. swimming pools, parking area, club, food service area etc.)

Back of the house areas (E.g. Staff canteen, service elevator, locker rooms, administrative canteen, laundry, linen rooms, basement, store except kitchen which is cleaned by the kitchen stewards)

Linen and Uniform rooms: The housekeeping department is responsible for its functioning for the repairs and renewal of linen and for maintenance of proper inventory and stock records of all linen items. Linen includes room linen, food service linen, soft furnishings, uniforms, bed and bath linen.

Laundry: OPL (On Premises Laundry): If the laundry is on premises then the guest laundry from the rooms is directly collected and delivered by the laundry ballet. However all hotel linen is first collected in the linen room and then sent to the laundry for washing. OPL (off premises laundry) is the laundry of both the guest and linen

which is done by the external laundry. All the linen including the guest laundry is collected in the linen room from it is sent to the external laundry for washing. The washed linen including the guest laundry is collected at the linen from where it is sent to the guest rooms and other service points.

Resident Guests: They are given their service by room attendance and they are not charged for it. Some hotels have a shoeshine machine in the corridor.

Florist: It could either be given out for contract or be a part of the responsibility of the housekeeping department. An employee of the housekeeping department would be required to do the flower arrangements in the lobby, guestrooms, restrooms, restaurants. Any banquet requirements like a backdrop for a wedding are done on contract.

Extra Room Complimentary & Supplies: Iron, first-aid, hot water bags, ice bags, thermometer, hair dryer etc are given out for guest use at no extra cost. However a request for extra beds should be routed through the Front office since the guest would be charged extra for it.

1.7 Layout of Housekeeping Department

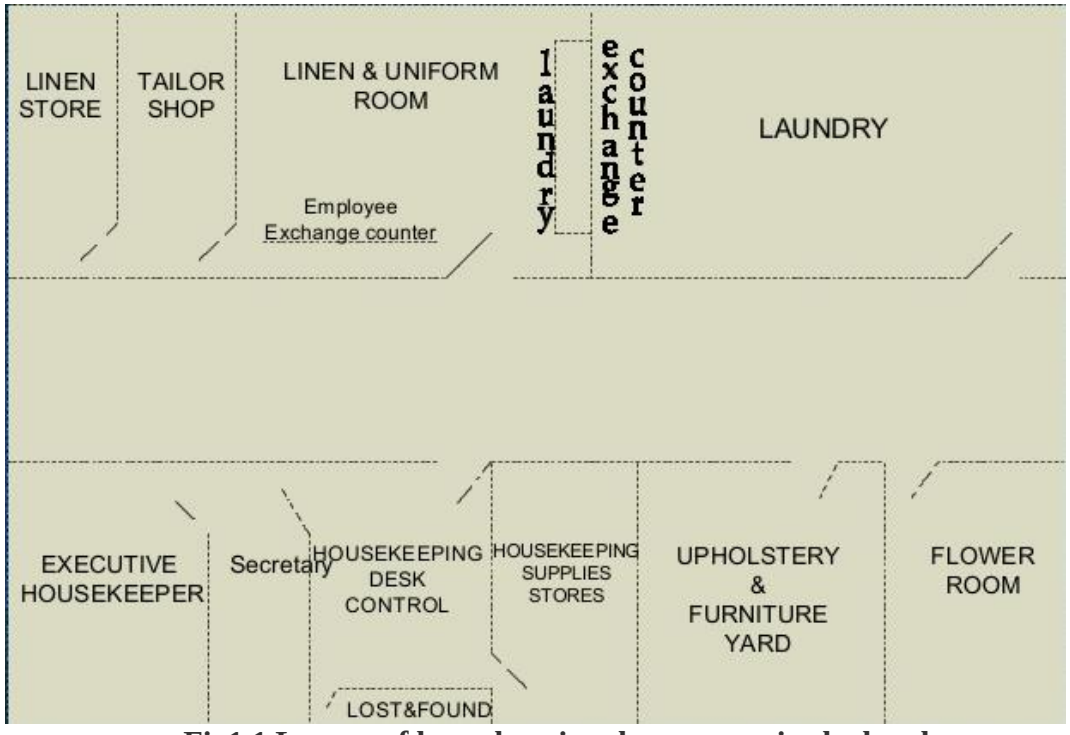

Fig1.1 Layout of housekeeping department in the hotel

Layout of housekeeping department in the hotel:

- Housekeeping department should be in such place which is accessible to all the employees.
- Housekeeping department should be in that area which is at the back side of the hotel, not disturbing any guests.
- Housekeeping department should be in the ground floor which must be able to hold heavy equipments.

- Housekeeping department should be in such place which is away from general traffic.
- Housekeeping department should be in the convenient place to keep the different equipments used.

The layout of the department indicates the different areas and subdivisions in the department. The layout of the department depends on following factors;-

- Total number of Guestrooms
- No. of outlets and banquets
- Amount of manpower required

1.8 Different Sections in Housekeeping Department

Executive Housekeeper's office: An Executive housekeeper has to plan, counsel, brief and meets her subordinates. It should preferably be a glass paneled office so as to give her / him a view of what is happening outside the office. The office should be leaded by a cabin for the secretary who would control movement into the house keeper's office.

Desk control room: This room acts as a nerve system center for coordination and communication with the front office and other departments. The desk control room should have a large notice board to pin up staff schedules and day to day instructions. The desk control room is the point where all staff report for duty and check out at the duty end.

Linen room: This is the room where current linens are stored for issue and receipt. The room should be large airy and free from heat and humidity. It should have adequate shelves, easily accessible to stack all linen. It should be secured and offer no possibilities of pilferage. The linen room should have a counter, across which the exchange of linen takes place. The room should preferably be adjoining the laundry so as to supply linen to and from the laundry.

Linen room store: This room stores the stock of new linen & cloth materials for uniform, etc. the stock maintained should be enough to replenish the whole hotel at a time. However, these stocks are only touched when the current linen in circulation falls short due to shortage, damage or loss. The room should be cool and dry with ample shelves, generally 6" above the ground.

Uniform room: This room stocks the uniform in urgent use. It is possible that smaller hotel may choose to combine the uniform room with the linen room. A separate uniform room really depends upon the volume of uniforms in circulation. The only difference will be that the uniform room would have adequate hanging facilities as many uniforms are best maintained when hung.

Tailor's room: This room is kept for house tailors who attend to the stitching and patch-up work of linen and uniforms. Room is avoided if the mending and the stitching jobs are done in contract basis.

Lost and found section; This section should be small and airy with cupboards to store guest articles lost and may be claimed later.

Flower room: This should be air conditioned room to keep flowers fresh. The room should have work table, a sink with water supply and all necessary tools required for flower arrangement.

Laundry: This is an important section under housekeeping which is responsible for cleaning of all fabrics used in hotel. The section should be adjacent to linen room so as to avoid excessive steps. Laundry should ensure the cleanness and drying of all guest clothes, employee uniforms and linen to the best assured standard.

1.9 Organizational Structure of Housekeeping Department

Organization is a process of identifying and grouping the work to be performed, defining and delegating responsibility and authority ad establishing relationships for the purpose of enabling people to work more effectively in accomplishing objectives. If the whole establishment has to work as one unit, it is important that there are clear lines of authority and good lines of communication. The organizational structure of housekeeping department – whether in a small, medium or large hotel – is depicted using an organization chart. An organization chart is a schematic representation of the relationship between position within an establishment, showing where each position fits into the overall organization and illustrating the division of responsibility and lines of authority. The organizational structure of the housekeeping department mainly depends on the activities and the size of the hotel. The charts below show the organizational of structure of the large and medium sized hotels. In the small hotels one or more jobs are integrated and handled by the few housekeeping personnel's.

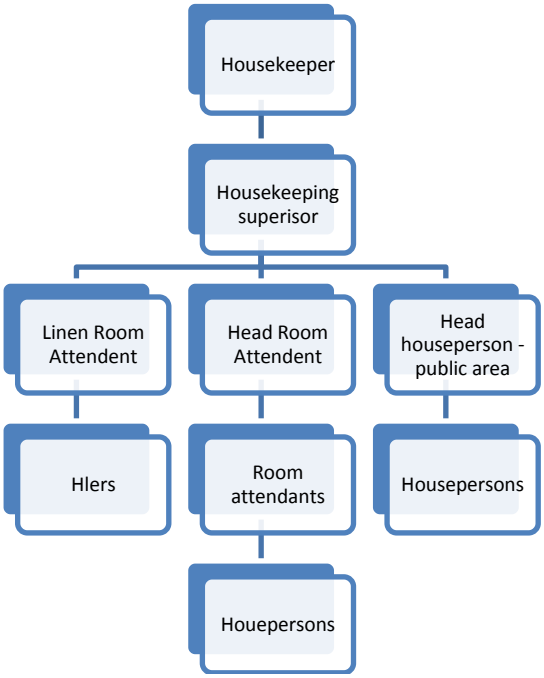

Figure 1.2 Organization chart of housekeeping department of small hotel

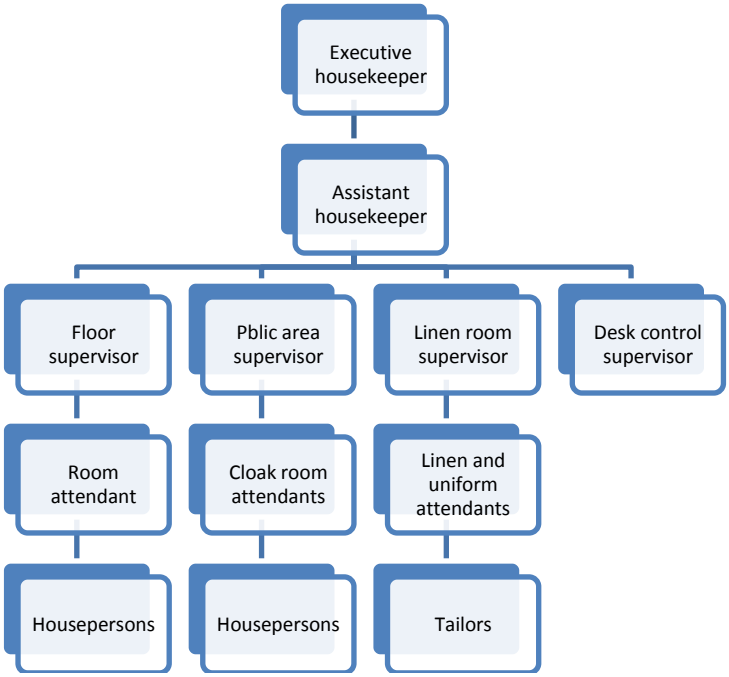

Figure 1.3 Organization chart of the housekeeping department in a medium sized hotel.

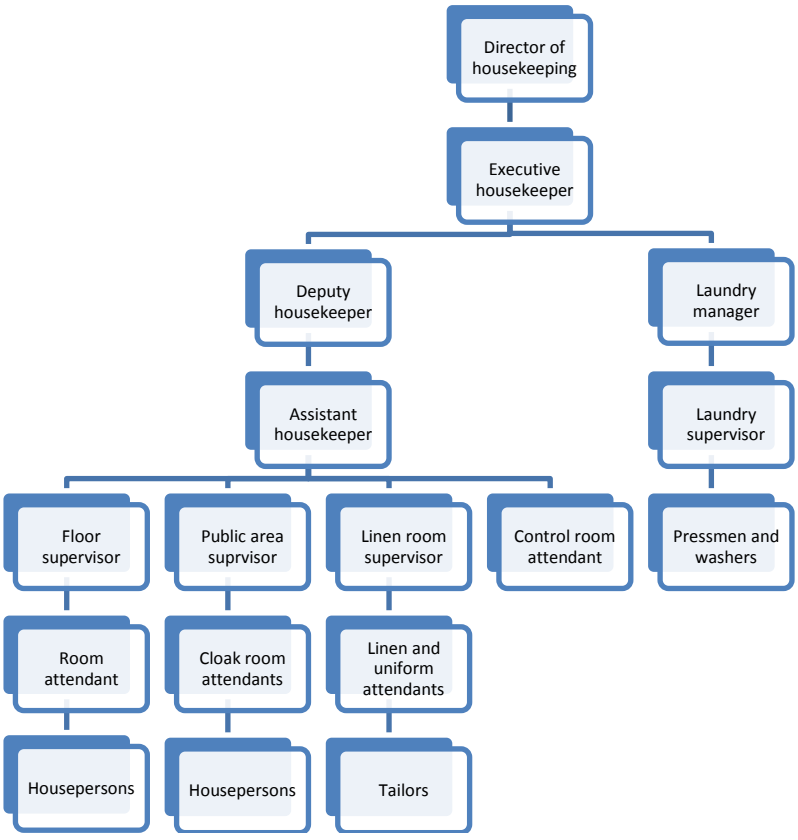

Figure 1.4 Organization chart of the housekeeping department in a large hotel.

1.10 Duties and Responsibilities of Housekeeping

EXECUTIVE HOUSEKEEPER

Job Purpose

Reporting to the Rooms Division Manager, the Executive Housekeeper contributes to guest comfort and ensures the daily cleaning and tidying of all the hotel bedrooms and any public areas. He/she also monitors the financial performance of the Housekeeping department operation and the efficiency of the linen service.'

Key Responsibilities

Customer Focus

- To implement the consistent delivery of superior customer service through the Customer Service Program.
- To ensure that the department creates a professional impression to customers and team members.
- To review and act on Customer Service Reports relevant to your areas of responsibility to achieve positive and consistent results.
- To review and act on customer feedback relevant to your areas of responsibility. This to include customer complaints and compliments.
- To ensure routine maintenance is carried out in your areas of responsibility, reporting any damage and wear and tear, ensuring bedroom faults are rectified promptly.
- To organize and set up on-going deep clean schedules.

Business Awareness

- To be fully aware of budgeted and actual departmental financial targets. This to include revenue, stock levels, average spends and departmental profits.
- To be fully aware of departmental budgeted and actual payroll costs and manage by allocating labor resources in line with forecasted and actual business levels, through productivity ratios and payroll management.
- To be fully aware of and control departmental operating costs in line with forecasted business levels.
- To control all linen stocks and levels, ensuring linen costs are controlled in accordance with hotel procedures.
- To assist with the control of purchasing in department by effective use of S.A.P.

Specific Job Accountabilities

- To ensure efficient stores procedures, ensuring cleaning materials and guest supplies are adequate and stock levels in accordance with hotel business.
- To carry out stock takes as required.
- To ensure all charges are raised for laundry and dry cleaning services, where appropriate.
- To assist with the preparation of Housekeeping budgets.
- To update price comparisons of all Housekeeping sundry items.
- To maintain good effective working relationships with linen/laundry suppliers where appropriate.

Growing the Business

- To positively approach sales opportunities in order to maximize hotels revenue and exceed budgeted targets.
- To suggest promotional opportunities to enhance hotel and department performance.

- To ensure all department team members are sales focused.

People Management

- To lead and create a team environment which promotes good employee morale and ensures a high level of commitment and pride in the hotel.
- To ensure effective communication with your team by holding regular briefing sessions and attending all management meetings.
- To carry out quality planned training and development in a systematic and professional way in order to meet the needs of the business and assist in individual team members personal development.
- To ensure training is recorded and all team members follow the Company Induction Programme.
- To compile the department Training Plan to meet the hotel business objectives and develop team members.
- To carry out performance reviews for team members every six months, following company guidelines.
- To set clear objectives for departmental team members, linked with the hotel's Business plan.
- To co-ordinate the recruitment of new departmental team members up to supervisory level, in line with the Company Recruitment Policy.
- To continuously coach and counsel colleagues.
- To review the success of training in meeting objectives.
- To correct unacceptable behaviour and performance in line with the company disciplinary procedures.

Controlling the Environment

- To ensure the department operates effectively on a day to day basis, ensuring company standards are met and delivered consistently with attention to detail. This to include ensuring shift controls and procedures are adhered to.
- To comply with your responsibilities under the Regulatory Reform (Fire Safety) Order 2005 as detailed in the QMH Fire Safety Management System, a copy of which can be found in each hotel or accessed on the intranet.
- To comply with statutory and company requirements for Health and Safety, Food Safety, Risk Assessment, Licensing Laws, Disability and ensure all employment legislation is strictly adhered to and team members are trained accordingly.
- To review and co-ordinate action on Hygiene Audits in order to enhance the environment and achieve positive consistent results.

Other

- To act as the Hotel Guest Relations Manager as required, ensuring a professional and friendly service throughout the hotel.
- To keep yourself informed of the hotel goals and objectives and those of other departments, maximizing the role you play in delivering the hotel budgeted targets.
- To implement an effective key control system in department, thus ensuring the security of all housekeeping keys.
- To operate I.T. systems in line with company standards.
- To be fully aware of and adhere to security procedures laid down.
- To ensure the department actively maintains and supports Investors in People procedures and practices in order to ensure re-recognition.
- To attend training when required.

- To be fully aware of and strictly adhere to Fire, Bomb and Health and Safety procedures.
- To be fully aware of and comply with hotel and company rules and regulations as identified in the team member handbook.

Entry requirements Skills

- Management: Managing priorities, the ability to listen, stress management, team motivation.
- Recruitment
- Ability with figures and ability to manage a cost centre
- Sensibility to customers and able to deal face-to-face with guests
- Ability to deliver training at all levels
- Understanding of IT issues in relation to Housekeeping
- Attention to detail: working carefully within the minimum time
- Team working
- The ability to take the initiative
- Good physical resilience
- Organization and thoroughness: preparing bedrooms in the minimum length of time whilst respecting internal hotel procedures
- Discretion: not disturbing guests

Qualifications

- Significant experience as an Executive Housekeeper
- Fluency in a second language would be an advantage

ASSISTANT HOUSEKEEPER

Job Purpose

To contribute to guest comfort and ensure the daily cleaning and tidying of all the hotel bedrooms and any public areas.

To also monitor the operation efficiency of the linen service

Key Responsibilities

- To ensure that high standards of cleanliness are maintained throughout the hotel, with the supervision and inspection of all guest rooms and areas.
- To be fully aware of all hotel services and activities.
- To allocate areas of cleaning on a daily basis fairly, in accordance with hotel procedures and hotel business.
- To ensure all guest and team members laundry and dry cleaning is processed in accordance with hotel procedures, charges are raised and documentation completed for hotel audit procedures.
- To be fully aware of the mini bar procedures (where appropriate)
- To be fully aware of linen procedures and assist with linen stock takes as required.
- To order, receive and issue cleaning materials and carry out stock takes as required.
- To ensure the correct use of cleaning agents on all surfaces.
- To assist with the periodic cleaning of areas as requested.
- To be fully aware of, and strictly adhere to, security procedures laid down by the hotel and company. This to include keys, stock, cash and property.
- To record and report all faults and damage arising to Maintenance.
- To ensure all housekeeping equipment is used safely and effectively.

- To ensure on all occasions you observe safe and hygienic working practices in order to satisfy Health and Safety at Work and other statutory legislation.
- To assist with the housekeeping operation as necessary, i.e. servicing of guest rooms etc.
- To record, report and process lost property according to hotel procedures.
- To assist with the training of team members in order to encourage and obtain maximum commitment. This to include recording of training, Induction and National Vocational Qualifications.
- To review the performance of team members where this forms part of your responsibility.
- To consistently deliver superior customer service through our Customer Service Programme
- To be aware of and strictly adhere to fire procedure precautions and bomb threat procedures as laid down by the hotel and company in order to satisfy statutory legislation.
- To comply with your responsibilities under the Regulatory Reform (Fire Safety) Order 2005 as detailed in the QMH Fire Safety Management System, a copy of which can be found in the hotel or accessed on the intranet
- To attend training when required
- To be fully aware of and adhere to Health and Safety and fire procedures
- To be fully aware of and comply with hotel and company rules and regulations as identified in the team member handbook.

Entry Requirements

Skills

- Attention to detail: working carefully within the minimum time
- Team working
- The ability to take the initiative
- Good physical resilience
- Organisation and thoroughness: preparing bedrooms in the minimum length of time whilst respecting internal hotel procedures
- Discretion: not disturbing guests

Qualifications

- Significant experience in Housekeeping
- Fluency in a second language would be an advantage

HOUSEKEEPING SUPERVISOR

Title: Floor supervisor/Public area supervisor
Reports to: Deputy Housekeeper
Directly supervise: Housekeeping employees allotted to her area of Activity
Coordinates with: Front office, maintenance department, desk supervisor, laundry and linen room supervisor

Scope of the job:

Responsible for keeping her entire area of responsibility clean, maintenance free and ensuring a high level of service

General duties of supervisor

The general duties and responsibilities of supervisors are as follows

- To ensure the staff are aware of their hours of work and they adhere to the planned duty roaster.
- To make any adjustment necessary in their off days in consultation with the concerned employees.
- To instruct the staff in cleaning routines and schedules.
- To regularly fill up the maintenance check-lists and inventories after the complete physical check.
- To liaise with the maintenance department for any maintenance work required in guest rooms or public areas and to initiate the work order forms.
- To inspect the record of room status regularly and co-ordinate with the reception desk
- To issue the relevant keys, keep track of them and get them safely back.
- To check the stock regularly, take delivery of stocks and issue supplies to the attendants.
- To supervise the staff involved in the cleaning and setting up of banquet halls (function areas), meeting rooms and other event venues.
- To arrange for the induction and for the training of the staff.
- To inform the employees of staff welfare schemes and other facilities

The House keeping department usually has the following supervisory positions:

1. Floor supervisor
2. Public area supervisor
3. Control desk supervisor
4. Linen room supervisor
5. Laundry supervisor
6. Night supervisor

Specific responsibilities (floor supervisor)

- Assigns duties to housemen, room boys/maids
- Supervise corridor, guest rooms in that section
- Check par stock of linen and guest supplies, timely delivery of linen to the laundry
- Submit performance appraisals periodically
- Check all safety systems on floor (fire extinguisher, smoke detector)
- Releasing check out rooms on time/at the earliest
- Taking rooms on red slip
- Making maintenance jobs and follow ups
- Ensures rooms are ready with special care e.g. VIP
- Special requests for long staying guests to be attended
- Identification of supplies
- Checking of floor pantries
- Record lost and found items as per norms
- Liaison with security on security aspects on guest floor e.g. Gambling
- Account for movement of linen on floor
- Prepares housekeeping occupancy list for front office
- Co-ordinates room service for clearance of food trays and other items
- Check the serviceability of equipments on the floor
- Responsible for all equipments on that floor
- Responsible for behavior of room boys/maids in floor

Specific responsibilities (Public Area supervisor)

- Daily supervision of public areas
- Allocation of duties for public area for cleaning in various shifts and areas
- Making maintenance complaints and follow ups
- Planning periodic cleaning schedule
- Co-coordinating with contract cleaners
- Ensures banquet halls are clean on time
- Train new recruits
- Submit performance appraisals of staff working under
- Account for furniture movement if any
- Check and control equipments

Specific responsibilities (Desk supervisor)

- All queries, complaints and requests of guest to be attended and to be directed accordingly
- It is a centre of communication with other departments
- Responsible of issue of keys, pagers, mobiles
- Maintains all records
- Leave adjustments/relievers for areas
- Takes care of floral arrangement ordering
- Enters occupancy in consolidated slip and sends to front office
- Prepare duty register daily after checking duty chart
- Extra work schedule is handed to all staff
- Makes weekly indents and collects the same from sales department
- Records all messages for executive housekeeper or other staff and intimates
- Informs check out rooms to respective supervisor and clears the same to front office
- Handle all computer records
- Ensures to collect any extra item (guest loan item) given to guest

Specific responsibilities (Night Supervisor): The night supervisor reports to the assistant housekeeper. He supervises all night staff engaged in the cleaning of public areas and guestrooms in hotel. His/her duties are:-

- Ensure all public areas are thoroughly cleaned at night when the traffic is low.
- Plan order of work and direct staff accordingly.
- Ensure submission of room attendant's reports and room status reports.
- Provide guest supplies and attend guest requests in the night like providing water bottles, extra beds, towels etc.
- Report safety and security hazards.

Specific responsibilities (Linen Room Supervisor/ Linen Keeper): The linen room supervisor reports to assistant housekeeper. His/her duties are:-

- Responsible for entire hotels linen.
- Send dirty linen from laundry after checking.
- Check laundered linen before giving it for ironing.
- Provide linen to the various departments
- Maintain register of linen movements and check linen regularly
- Supervise ironing and laundering of linen of the hotel
- Supervise work of linen room attendants and tailors

- Make suggestions related to replacement purchases and give requirements of linen to executive housekeepers.

Laundry Supervisor: He/she is in charge of the functioning of the laundry in the absence of laundry manager. He must have the knowledge of all the aspects of the laundry equipment, chemicals and fabrics.

Specific responsibilities (Uniform Room Supervisor): The uniform room supervisor reports to the assistant housekeeper. He/ she is responsible for maintenance of hotel staff uniforms. His/her duties are:-

- Responsible for providing clean, serviceable uniforms to the staff.
- Keep an inventory control of various uniforms in various stages of use
- Set budget for procurement of uniforms and materials required for uniform

JOB DESCRIPTION OF ROOM/PUBLIC AREA ATTENDANT

Scope: To provide a high cleaning standard in guest rooms, corridors, pantries and staircases assigned

Specific responsibilities (Room attendant)

- Cleaning of a given number of rooms.
- Provide a high level of service standards
- Interacts with guests and personnel of the hotel in an efficient and friendly manner
- Follow periodical cleaning schedules
- Responsible for equipping all rooms with linen, amenities in the guest rooms
- Use proper cleaning products
- Reports maintenance complaints to the desk and floor supervisor
- Reports any loss or damage
- Maintain high level of hygiene
- Afternoon shift (responsible for turn down service and late checkouts)

Head House person:

He /she reports to the public area supervisor. His/her duties are:-

- Supervises work allotted to the housemen in public areas.
- Supervise work of people who clean carpets, wall washers, and window washers.
- Supervise work of chandelier cleaners, vacuum cleaning machine operators.

House persons:

They report to the head house persons or the public area supervisor. His/her duties are:-

- Shift furniture in public areas.
- Clear the garbage's.
- Polish all brassware in public areas
- Clean all doors, windows and ventilators.
- Clean fire fighting equipments.
- Clean the shafts and terraces.
- Clean chandeliers, draperies and other hard to reach areas in public areas.

Linen Room attendant/ Linen Room Maid: Linen room attendants report to linen room supervisor. His/her duties are:-

- Stacking sheets, pillowcases, towels, tablecloths, napkins in different stacks.
- Issue clean linen on clean- for- soiled basis.
- Place soiled linen in containers and send these to laundry.
- Examine and counts each linen item when sends to laundry and again on return.
- Send torn articles to seamstress for repair.
- Maintain proper records of discards and determine percentage of discards.

10) Uniform Room attendant: A uniform room attendant reports to uniform room supervisor. His/her duties are:

- Issue clean uniforms while receiving soiled ones
- Send soiled uniforms for laundering.
- Send torn uniforms to seamstress for mending.
- Keep count of uniforms.
- Shelve laundered uniforms after verifying types of articles.
- Count and record linen.

Storekeeper: A storekeeper reports to senior floor or linen room supervisor. His/her duties are:-

- Control the stock of equipment
- Issue equipment and cleaning materials as per demand.
- Prepare requisitions for materials required.
- Coordinate with purchase department for procurement of approved materials.

Tailors, seamstress and upholsterers: They report to the Linen Room Supervisor. His/her duties are:-

- Mending and stitching uniforms, linen, upholstery etc.
- Alteration of uniforms if required.
- Refurnish all damaged upholstery.
- Repair guest clothes if required.
- Calculate materials required for uniforms and upholstery and purchase accordingly.

Horticulturist: Many large hotels have their own horticulturist, who report to assistant housekeeper. He / she leads a team of gardener in maintaining landscaped gardens of the hotel as well as in supplying flowers from gardens for flower arrangements in the hotels. Flowers are used largely to enhance aesthetic appeal of various areas of the hotel.

Head Gardener:

- He reports to the horticulturist and maintains landscaped areas and gardens in the hotel. His/her duties are:-
- Brief, schedule, and allot duties.
- Purchase plant seeds, plantings.
- Purchase and supervise usage of manure and fertilizers.
- Maintain watering schedules of plants and attend problems regarding watering schedules.

- Maintain and prepare indoor plants for the hotel.
- Supervise and maintaining the lawns.
- Ensure gardeners are handling equipments and tools efficiently.

Gardeners: Gardeners report to the head gardener or the horticulturist. They keep landscaped areas, lawns and gardens clean and aesthetically beautiful. His/her duties are:-

- Dig landscaped areas and maintain them.
- Plant saplings and seeds
- Water gardens as per schedules.
- Maintain plant nursery and green house.
- Prepare potted flowers and potted plants.

Florist: Florists employ their own florist. Providing attractive flower arrangements for the entire hotel is their responsibility. They report to the horticulturist . His/her duties are:-

- Collect fresh flowers from gardeners every day.
- Purchase flowers from dealers.
- Prepare different flower arrangements for different areas- lobbies, front office, restaurants, guestrooms, banquet halls etc.
- Treat cut flowers so that they last longer.
- Maintain flower arrangements by changing water, etc .
- Responsible for flower arranging equipments and equipments, accessories etc.
- Train the assistant florist.

Laundry Manager: He/she is in charge of the laundry and Laundry Manager reports to the Director of housekeeping. He/she is responsible for entire functioning of laundry and dry cleaning unit. He /she should have good knowledge of fabrics and chemicals and laundry machines.

Dry cleaner and washers: He/ she is in charge of dry cleaning of the hotel linen and guest clothing and washer does the laundering of the linen, uniforms and guest clothing.

Laundry workers: They are the staff of laundry who perform following duties;-

- Spot stained fabrics before loading them into washing machines.
- Load soiled linen into washing machines, feed in the right amount of detergent and other laundering chemicals.
- Load washed linen into dryers.
- Clean equipments after use.
- Sort soiled linen according to fabric types, colors, degree of soiling.
- Transport soiled linen from linen room to laundry and fresh linen from laundry to linen room.

Valet/ Runners: "Valet service" means that they take care of guest laundry. They report to the linen room supervisor. They are responsible for collecting soiled guest laundry and delivering fresh guest laundry.

CHECK YOUR PROGRESS

Q1. Write short notes about the importance of housekeeping.

Q2. What are the duties and responsibilities of a Public Area Supervisor?

Q3. Name some important positions in the Housekeeping Department.

1.11 Summary

The success of the hotels depends solely on their staffs. For providing excellent and quality service, lot of effort has to be made towards organizing and training the housekeeping staffs. The largest work force of the hotel is in the housekeeping department. The organizational structure of the housekeeping department mainly depends on the activities and the size of the hotel. Generally, the housekeeping department shall have staffs like Executive Housekeeper, Assistant Housekeeper, Uniform Room Supervisor, Uniform Room Attendants, Linen Room Supervisors, Linen Room Attendants, Tailor / Seamstress, Helpers, Floor Supervisor, Public Area Supervisor, Room Attendants, Head Houseman, Desk Control.

1.12 Key Terms

Hierarchy Categorization of a group of people according to ability or status

Mending Clothes and other articles that must be repaired

Corridors A narrow hallway, passageway, or gallery, often with rooms or apartments opening onto it.

Arcade A series of arches supported by columns, piers, or pillars, either freestanding or attached to a wall to form a gallery

Mopping Applying hot bitumen with a mop or mechanical applicator on the felt of a built-up roof membrane, on a roof-deck, or the like.

Perfumeries A substance that emits and diffuses a fragrant odor, especially a volatile liquid distilled from flowers or prepared synthetically

Lobbies A lobby is a room in a building which is used for entry from the outside.

Upholstery Fabric, stuffing, and other materials used in upholstering

Napkins A piece of cloth or absorbent paper used at table to protect the clothes or wipe the lips and fingers.

Synergetic Working together toward a common end.

1.13 Bibliography

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1.14 Terminal Questions

1. Briefly describe the duties and responsibilities of the housekeeping staffs.
2. Enumerate the importance of the housekeeping department.
3. Explain in detail the duties and responsibilities of the Executive Housekeeper and Uniform / Linen Room Supervisor
4. What is the ideal staff requirement for the housekeeping department?
5. What is the role of an Executive Housekeeper in a hotel?
6. Enumerate the functions of housekeeping department.
7. Define housekeeping and explain the various types of housekeeping.
8. Explain the different sections of housekeeping department with their functions

UNIT 02
HOUSEKEEPING PROCEDURE

Structure

2.1 Introduction

The housekeeping department is a backbone of the hotel. It is responsible for the cleanliness, maintenance aesthetic upkeep the rooms clean can for table for guest. The housekeeping department is responsible to keep the following areas clean and tidy. A part from the cleaning task, the housekeeping is also responsible for handling keys of each floor; in addition it manages the laundry, which is after at same places considered as a sub- department of housekeeping.

The housekeeping department not only prepares clean guestrooms on a timely basis for arriving guest, but also cleans and maintains ever thing in the hotel so that the property is as fresh and attractive as the day it opened for business. It is rightly said that housekeeping is a 24x7x365 operation.

2.2 Objectives

After reading this unit, you should be able to:-

- Appreciate the importance and role of the housekeeping control desk.
- List the forms formats and registers maintained at the control desk.
- Explain the importance and various aspects of linen control.
- Understand the types of laundries and the planning and layout of an on-premises laundry.
- Understand list the public areas in a hotel.
- Describe the procedure of bed- making and discuss the daily cleaning of guestrooms.

2.3 Control Desk

This is the main communication centre of the Housekeeping. It is from here that all information is sent out and received concerning the department. It is the house centre for co-ordination with the front office, banquet, Room service and maintenance etc. the desk control room should have a desk and a chair with more than one telephone. It should have a large notice board to pin up staff schedules, day to day information, instruction etc. The desk control room is the point where all staff report for duty and checkout at the duty end. It would normally adjoin the Housekeeper's office. The main job of housekeeping control desk is to maintain the smooth communication process in order to complete daily housekeeping operations. The general rules of control desk are as follows:-

Importance of Housekeeping Control Desk: The housekeeping control desk is the hub or a single point of contact for all hotels' housekeeping staff. At the control desk, the new information is fetched and it is distributed among the relevant staff. As the housekeeping work is mainly oriented towards providing the best service to the guests, this department needs to work towards sharing information without any communication gaps. This desk also needs to ensure that the coordination among the housekeeping staff and with all other departments of the hotel goes smooth.

Functions of Housekeeping Control Desk: The hotel housekeeping performs the following functions:

- Collecting all requests made by the guests.
- Briefing the staff about the routine or special event preparation before the staff turns up their sleeves.
- Assigning routine duties / changed duties to the housekeeping staff.
- Collecting work reports from staff.
- Collecting check-out room number and updating it to the floor supervisor.
- Handling key cabinet that contains the keys of all floors' master keys and housekeeping store keys.
- Maintaining various records of forms and registers.
- Recording all room number especially of the groups.
- Maintaining daily weekly cleaning schedule.
- Preparing duty roster of journal housekeeping staff and supervisors.
- Maintenance of record on daily basic.

2.3.1 Important Registers Maintained by Housekeeping

1. **Weekly Cleaning Register:** The weekly cleaning schedule is set out by the floor supervisor who controls their activity through a Register

Weekly Cleaning Register

Room No.	Brass	Bathroom Tiles	Window Panes	Balcony	Hard to reach Areas edge of door
101	Done/ date				
102	Done/ date				
103	Done/date				
104					

Figure 2.1 Weekly Cleaning Register

2. **Babysitting Register**: Babysitting is provided as a service by housekeeping department for guest who have small baby or children the guest requiring the service contact the HK Control desk

Babysitting Register

Room No.	Date & Time	Guest Name No. & age of baby	Time of Baby sitting		Sign Of H.K. Staff	Remark
			From	To		

Figure 2.2 Babysitting Register

3. **Store Indent Book:** The store indent book is kept at the control desk so that the supervisors may indent for housekeeping supplies that are required by the GRAS.

Store Indent Book

Date:----------

Store Indent Sheet

S.NO	Indented Items	Quantity indented	Quantity Issued with Remarks
Made by:……..			
Approved By:…….		Storekeeper:……	

Figure 2.3 Store Indent Book

4. **Key Control Register**: This is one of the most important register maintained at the control desk. It is a part of the Key Security System to be followed by the H.K. Department. Each employee who is handed over a key, any key, from the key cabinet is supposed to sign for it in a key control seat in the register.

Date:…….. **Key Control Sheet**

Key Code	Name	Signature	Time out	Issued by	Time in	Sign	Received

Figure 2.4 Key Control Registers

5. **Logbook:** Log book is used to record all messages that staff from an earlier shift 1 to convey to the employee on the next shift.

Log Book

Shift…….. Time…… Date……

Log Entries

Signature of The Desk Attendant

…….

Figure 2.5 Log book

6. **Memo book**: This book is used for recording all the maintenance work for which the housekeeping department initiated work orders.

Memo Book

Work Order No	Date	Description of maintenance work	Location /room no	Reported by	Job completed on	Sign of supervisor

Figure 2.6 Memo Book

7. **Guest Message Register:** The housekeeping control desk is responsible for taking these guest messages and passing them onto the concerned staff. The message could be about the provision of certain guest loan items for a request for a second service.

Guest Message Register

Date:……

Shift:……...

S.No.	**Room No.**	**Message**	**Given**	**Given By**	**Time To**	**Action Taken**	**Sign**

Figure 2.7 Guest Message Register

8. **Carpet Shampoo Register:** This record the Carpet cleaning task that has been followed recording each such project as it is completed.

Carpet Shampoo Register						
Date & Time	**Location**	**Attendant**	**Date of Last Cleaning**	**Type of Carpet**	**Sign of Attendant**	**Sign of Supervisor**

Figure 2.8 Carpet Shampoo Register

9. **Room Inspection Checklist File:** Room checklist should be developed for all the areas that the housekeeping department is responsible for cleaning and maintaining the ideal checklist itemize all surfaces and articles,lays down and Standards of cleanliness to be achieved and allows space for supervisors to indicate checks and record any observation.

Room Checklist

Name of Items	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**	**109**	**Remark**
Door										
Locks										
Light										
Air vent										
Mirror										
TV										
…..										

Figure 2.9 Room Checklist

10. **Key history register**: The record of all key lost in the housekeeping department and those for which new keys are duplicated are being used.

11. **Leave Application Form:** Leave application forms are stocked at the control desk so that they are easily accessible to employee who wishes to take leave.

12. **Accident Report Form:** An Accident Report form is filled up when any employee or Guest meets with an accident on the hotel premises.

13. **Room status reports file**: The room reports is prepared in triplicate by the housekeeping department each shift as an independent check on occupancy. This report is prepared by the floor supervisor and sent to the control desk to make a consolidated report of all floor and sent to the front office. After matching the report with their room occupancy. In case of discrepancies the front office should make up physical check of that room to establish the correct occupancy status. The room report is basically a list of room numbers against which the housekeeping supervisor indicates by a prescribe code and status of a particular room.

Room Report

Date……
Shift……..

Room No.	No of pax	Status	Room No	No of Pax	Status
101			201		
102			202		
103			203		
104			204		
105			205		
106			206		
107			207		
108			208		
109			209		
110			210		
111			211		
112			212		
113			213		
114			214		
115			215		
116			216		
117			217		
118			218		
119			219		
120			220		

Figure 2.10 Room Status Report

2.3.2 Duty roster and Work schedule

Duty roster specify the allotment of jobs of duty and days off for each employee to make for an even there of duties the Roaster should be rotated every 4 weeks

Advantage of duty roster: The major advantages of duty roaster are as under:

- The exact number of staff required to be on duty at any given Occupancy.
- That staff working hours are as per their employment contract.

- Knowledge of which employees are present on the premises in any emergencies.

Duty roster file: The duty roster is filled for information if required by anyone in the department. Ref table 2.1

Sample Duty Roaster

Staff Name	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Pooja	Off (R)	7-4	7-4	7-4	7-12 5-9	7-4	7-4
Shivam	7-4	Off (R)	7-12 5-9	7-4	7-4	7-4	7-4
Manoj	7-4	7-12 5-9	Off (R)	7-4	7-4	7-4	7-4
Haniza	7-12 5-9	7-4	7-4	Off (R)	7-4	7-4	7-4
Khurshed	7-4	7-4	7-4	7-12 5-9	Off (R)	7-4	7-4
Zainab	7-4	7-4	7-4	7-4	7-4	Off (R)	7-12 5-9
Jacob	7-4	7-4	7-4	7-4	7-4	7-12 5-9	Off (R)
Braking Timing :- Coffee Break-15 mint, Lunch -45 min, Dinner -30 min.							

Table 2.1 Duty Roaster

Work schedule: - A work schedule is a document that lists the actual work to be carried out by an employee in the particular shift and the time frame in which to undertake each task. The document includes the following points.

1. The position of the employee.
2. That time at which the employee has to perform the allotment task.
3. Time for tidying equipment and closing up.

Sample Work Schedule For A Houseman

Time	Position:- Houseman Activity Area: Lobby
7:00 am 7:00 am 9:30 am 10:00 am 10:15 am 01:30 pm 02:15 pm 03:45 pm 04:00 pm	Report to work: Collect Equipment and supplies. • Clean glass doors, Dry –mop floor porch area and others area. • Vacuum clean carpets. • Dry-mop floor, clean glass windows, sweep porch area, Damp-mop the entrance area. • Break for lunch. • Damp –dust lounge area, dry- mop floors. • Wash and put away cleaning equipment and suppliers, report back to the head houseman. • Go off duty.

Table 2.2 Work Schedule

2.3.3 Briefing and Debriefing

Briefing: - Briefing is the process facilitates a two-way communication between the management and the staff. Being the managerial staff will hold briefing session for all employees at the beginning of a work shift the activities carried out by the employee in the morning shift are described in the section. Usually this is the time at which grooming standards are checked before allocating job to the staff. The following may be communicated in the course of a briefing session of 10 minutes:

- Job allocation
- Any VIP in the hotel
- Checking of grooming and personal hygiene
- Appreciation of work wall done on earlier shift

Debriefing: - This session, same as to the briefing at the staff of a shift May include the following:

- Discussion problem faced by any in staff member
- Sharing experience and inciting ideas to tackle any particular common problem
- Handover of any incomplete work to the stuff on the next shift
- Checking the next day's duty Roaster

After the debriefing the morning shift employee proceeds to the uniform exchange counter to exchange a solid uniform for fresh ones for the next working day.

2.4 Linen Room

Linen is the housekeeping department second, largest expense. If it is well maintained correctly laundered and properly stored its lift can be extended. The linen room is the central department for all hotel linen and this is the place from where clean articles of linen distributed throughout the hotel. The bulk of clean linen is stored here. The leading room performs as a storage point and distribution centre for issuing clean linen the leaning room is generally handled by the supervisor of housekeeping department. There are two types of linen room found in a hotel:

A. **Centralized linen room:-** where all leading are maintained in small manner and central point.

B. **Decentralized linen room** from where support and facilities are provided to floor pantries for issuing floor line as pair stock.

Par stock in the minimum linen and uniform required to meet the daily demands so or to assure smooth operation. Housekeeping maintains a circulation of per stocks of 4 set in following manner:

- Make 1 Change In Each Cycle
- Make 1 Change In Hotel Laundry.
- Make 1 Change In Floor Linens Room.
- Make 1 Change In Linen Room.

This circulation of Par stock should be followed by the housekeeper to fulfill requirement.

Linen Exchange: Linen is provided for rooms and Food and Beverage areas following one of new three procedures:-

1. **Fresh –for- soiled/one for one:** This is a simple method of linen exchange. Fresh linen is provided only if an equivalent soiled article is given back. The advantage in this method is that there need be no record format even through fresh for soiled or one for one is the simplest exchange.
2. **Set amount:** In this system, a set amount of linen is provided on a daily basis.
3. **Requisitions:** This method of linen exchange is mostly used for banquet linen where the requirements may vary from day to day. A Requisition slip filled in on the basis of which linen is provided.

Room linen exchange procedure: The floor supervisor counts up the soiled linen form the floor and centers the count into the room linen control form. This form is prepared in duplicate and sent along with the soiled linen to the linen room. The linen room/laundry supervisor again counts up the soiled linen and stamps 'received' on the form. One copy of this home is returned to the floor, the 2nd and 3rd copy are filled at the linen room and the laundry respectively. The linen room supervisor issue fresh linen on one- for one basis, filling out the linen exchange form and sign it.

Room Linen Exchange Form
Floor…….. Date…….
Time……...

Linen item	Soiled Linen Received	Fresh Linen Issued	Balance	Remarks
Sheet				
Bed Cover				
Blankets				

Signature of Floor Supervisor Signature of Linen Room Supervisor

Figure 2.11 Room linen Exchange Form

Room Linen Control Form				
Linen item	**Amount of Soiled Linen Sent by floors**	**Amount of Soiled Linen Received by Linen Room**	**Amount of Fresh Linen Issued to floors**	**Balance**
Sheets				
Pillow Slips				
Bed Cover				
Blankets				

Signature Of Floor Supervisor **Signature Of Linen Room Supervisor** **Signature Of Linen Room Supervisior**

Figure 2.12 Room Linen Control Form

Restaurant Linen Exchange Procedure: An F&B employee bring the soiled linen to the linen room. The Linen room, staffs checks the soiled linen for damages. All items are accounted and verified with the count in the F&B linen exchange from the fresh linen is issued and the details are also entered in the linen exchange register.

F&B Linen exchange register				
Description	**Par Stock**	**Soiled**	**Fresh Linen**	**Difference to be rectified**
Table cloth				
Frills				
Napkins				
Time ……			**Date……..**	
Linen Room Supervisor			**Captain in Charge**	
……			**……**	

Figure 2.13 &B Linen Exchange Register

Linen: The words 'linen' or 'house linen' is used collectively to describe all launderable items maintained, stored and issued for guest by the house keeping department

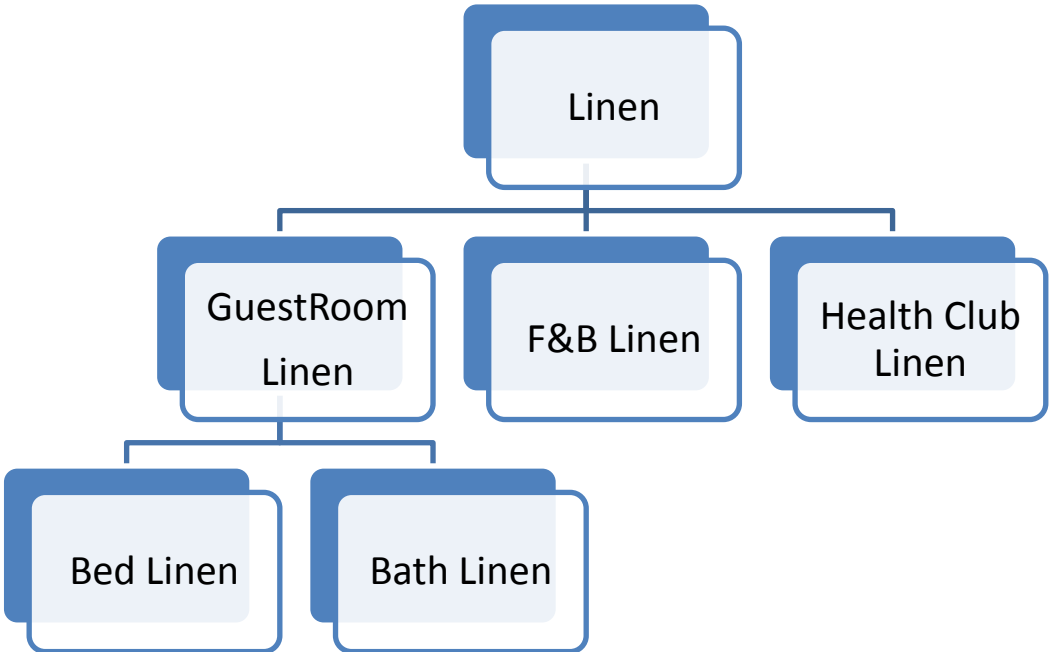

Figure 2.14 Types of Linen

Bed Linen	**Types**	**Sizes in Inches**	**Sizes in cm**
Sheet	Single	72x108	180x270
	Standard Single	80x117	203x295
	Double	90x108	225x270
	Queen Size	108x117	270x295
	King Size	117x126	295x315
Crinkles sheet	Single	72x108	180x270
	Double	90x108	225x270

Pillow cases	Standard	20x30	50x75
	King Size	20x36	50x96
Blankets	Single	70x100	175x250
	Double	90x100	225x250
	Queen –size	100x117	250x295
Duvet covers	Single	55x80	135x200
	Double	70x75	175x190
Bed spread	May be fitted or throw- our spread	Varies with bed size should just touch the floor.	
Mattress Protectors	Single or double according to bed	Slightly shorter than the sheets	

Table2.3 Type and sizes of bad linen

Bath Linen	**Size in Inches**	**Size in cm**
Bath sheet	40x70	100x75
Bath towels	30x50	75x135
Face towels	20x40	50x100
Hand towels	15x24	38x60
Wash cloths	12x12	30x30
Bath mats	24x36	60x90
Note:- A wide variation is often found in size, since products all offer across American, British, Indian markets.		

Table2.4 Title sizes of bath linen

Table linen	**Specifications**	**Size in Inches**
Table Cloth (Square)	2-Seater table	36x36
	4-Seater table	54x54
	6-Seater table	63x63
	8-Seater table	72x72
Table cloth (Rectangular)	6-Seater table	52x72
	8-Seater table	90x72
Napkins / Signets		18x18
		24x24

Table2.5 Table Linen Sizes

Health club linen:- This category include a few limited type of linen. The health club linen may include some both towels, a few bath sheets and some hand and/or face towels, along with few sheets for the massage tables

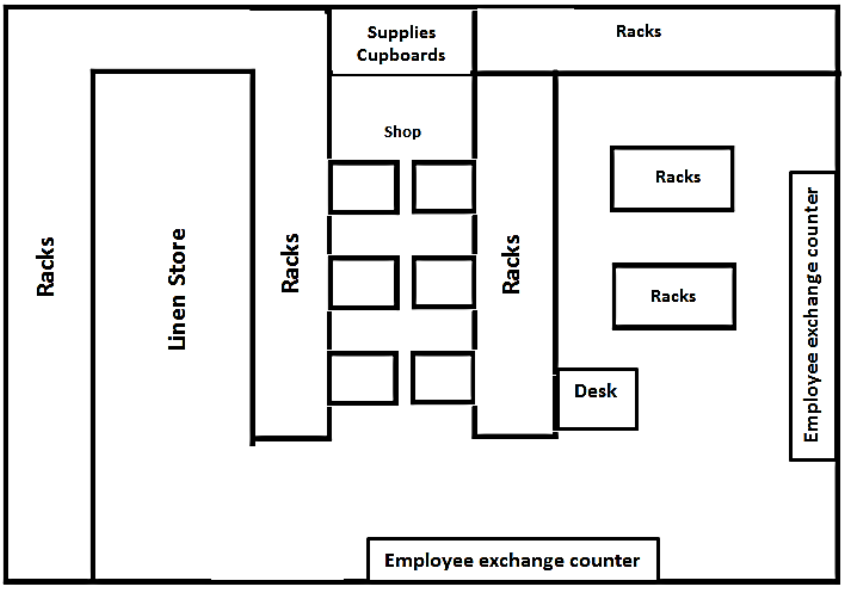

Figure 2.15 Layout of Linen Room

2.5 Housekeeping Store/ Supply Room

This room should be under the direct supervision of the executive housekeeping and should be used to store all powers cleaning equipment such as scrubbing and polishing machines and vacuum cleaners and their accessories. The room should also be used to contain one week's supply of cleaning materials such as soaps, detergents and polishes and one week's supply of small cleaning tools such as map handles, map heads, and sponges, chamois brooms, brushes, carpet sweepers bucket etc. This room should also carry a week supply of guest room standard supply including soap, matches, stationary, toilet paper, face tissue, laundry bag etc. All of these items should be neatly arrange on the labelled shelf so that replacement are always kept in the same location this room should be stopped weekly from the journalist oh by written requisition. If the housekeeper retainer copy of the requisition or request that the store room return the duplicate requisition with each item properly priced, she will be in the better position to control her departmental cost and to assist in the formation of forecast of supplies consumption.

Hotel XYZ
Store Requisition Form
Date…….
Item required as……. Items Indented on:……

S.No.	Name of Item	Stock in Hand	Quantity Intended	Quantity Issued	Remark

……. ……..
Signature of housekeeper Sig. of Storekeeper

Figure 2.16 Store Requisition Form

2.6 Supervision in Housekeeping

Good supervision leads to efficient work using the correct cleaning agent, equipment, and procedures. Good supervisors will themselves have through, up to date and practical knowledge of cleaning agents, equipment and methods, so that junior staff members respect them and their abilities.

The housekeeping department usually has the following supervisory position:-

- Floor supervisor
- Public area supervisor
- Linear room supervisor
- Uniform rules Supervisor
- Night supervisor
- Control desk supervisor
- Laundry supervisor

General duties of a supervisor:

The general duties responsibilities of supervisor are as follows:-

- To ensure that staff are aware of their hours of work and that they adhere to the planned duty Roaster.
- To instruct the staff in cleaning routine and schedules.
- To regularly fill up the cleaning and maintenance checklist and inventories after a complete physical check.
- To co-ordinate with the maintenance department for any maintenance work required in guest room or public areas.
- To inspect and record room status regularly and co-ordinate with the reception desk.
- To be responsible for following the correct procedure in dealing with the lost and found article when employees hand these in.
- To check the stock regularly, take delivery of stocks, and issue supplies to attendants.
- To coordinate with the staff other departments in a way that shows respect for their skills and abilities.

Functions of supervisors: Following are the most important functions that a supervisor is responsible for in the housekeeping department:

1. **Guess Room Inspection**: This is a planned, systematic process in which guestroom are checked for cleanliness and maintenance and accordingly approved for occupancy by supervisors. The supervisors inspect guestrooms keeping in mind that there last look will be the guest first look will be the guest first look at the room. "An eye for the detail" is the most important aid to supervisors inspecting guestrooms, the supervisor inspect for anything that is not up to the hotel standards before the guest finds them amiss. The executive housekeeper should develop an efficient checklist to help supervisor in this aspect of their work.
2. **Inspection checklist:** Checklist should be developed for all the areas that the housekeeping department is responsible for cleaning and maintaining. The ideal checklist itemizes all surfaces and articles, Lays down the standards of cleanliness to be achieved and allow space for supervisors to indicate and record any observation.
3. **Inspection of V.I.P. rooms**: V.I.P. rooms are checked personally by the assistant housekeeper or executive housekeeper. The guest room is opened and

looked over to gauge how it will be seen by the V.I.P. Guest when he/she enters the room. The room should smell fresh, with no bad orders. The toilet bowl should be checked and running damp cotton swap under the rim. The housekeeper should check that all the V.I.P amenities are in Place.

4. **Handling guest complaints:** Guest often Express their displeasure when certain situations or services at the hotel or not to their satisfaction.

Types of guest complaints: There are primarily four types of guests complaints that employees in a hotel come across.

- Technical/ mechanical.
- Service Related
- Attitudinal.
- Unusual.

Dealing with complaints: Some guidelines are given below.

- Listen with concern and empathy.
- Stay calm; avoid responding with hostility or defensiveness.
- Take notes, writing down the facts saves time if someone else must get involved. also guest will tend to slow down if they are speaking faster so that you can write, which help them calm down too.
- Tell the guest what can be done. Offers choices, however, do not promise the Impossible nor exceed your authority.
- Monitor the progress of corrective action.

2.7 Rules of a Guest Floor

There are certain rules to be followed by housekeeping staff as they go about their work on the guest floor. The most essential and usual are:-

- The staff should be friendly and polite to guest, greeting them according to the time of the day.
- A GRA should not knock on a door or try to access guest room when "do not disturb" card is displayed on the door knob".
- GRA should follow the standard procedure for entering a guestroom. A GRA should knock softly on the door with the knockless and announce in the study, soft voice "Housekeeping".
- In case the guest answers the knock, GRA should introduce him and ask if they would like their room serviced. If yes GRAshould proceed to clean the room.
- GRA should keep the door wide open when cleaning.
- The staff should not leave any kind of notes for guests.
- The staff should communicate with each other in low tones on the guest floor.
- The staff should keep an eye open for any suspicious and untoward activity being indulged in by guest on the guest floor.
- The Staff should at no time argue with a guest, however unreasonable he she may be they should refer the problem to a superior when such a situation presents itself.

2.8 Key Control

Key Control is the process of reducing guest property theft and other security-related incident by careful monitoring and tracking the use of key in the hospitality operation.

if there is no key-card lock system, the following policies should be considered for key control:-

Coding: A few precautions to take while coding are as follow:-

- Room keys must not have any form of tag that identifies the hotel.
- Keys must not have room number on them
- Key must be identified by numeric or alphanumeric code.

Issuing Keys: The basic precautions for all keys, there is more stringent security for keys with higher access.

Guest room keys: When keys are given upon registration, the guest room number must not be spoken aloud if there are others within hearing range room numbers should be shown to the guest in writing with a reminder that they should note it down if a guest check in pocket is not used. Explain to the guest that the coding system is for their protection.

Master and Sub master keys: All section master keys, Room master keys, Grand master keys, emergency master keys should be signed out each time they are taken return noted in it keys counter seat.

Date:……..

Key Control Sheet

Key Code	Name	Signature	Time out	Issued by	Time in	Sign	Received

Figure 2.17 Key Control Sheet

Custody of Keys: These are precautions to be taken while the key is with guest or employee after being issued as per the correct procedure

- Employees should not be allowed to loan the key assigned to them to one another.
- Employee should hand Over-keys whenever they leave the property.

Changing Locks and Keys: Whenever a new key is made or a new lock is fitted, certain precaution are necessary.

- A record must be kept of how many keys are made for each room and when they are made. The general manager must review the record on weekly basis, initialing and dating the key-making log is time he or she reviews it.
- The general manager must instruct the maintenance staff either to rekey a lock or to exchange room locked around within a housekeeping section.
- A log must be kept of all locks swaps and re-keying.

Loss of Keys: This is a time when particular vigilance must be exercised.

- If a master key is lost under circumstances that may result in a guest being at risk, the entire section should be re-keyed. If a section is being Re –keyed, also considered a king and new Grandmaster and emergency key so that, in effect, a phased re-key of the entire Hotel is accomplished if it has been some time since this was last done.
- The general manager or somebody he or she delegates the responsibility to must cross index all incident of theft, missing property, damage, and so on as follows:
- Room number on location, watch out for locks that has been moved.
- Names of potentially implicated in employees It may discourage that room thefts never occur when so and so is off, or that they occurred, regardless of the room number, when so and so was working in maintenance or housekeeping.

Smart cards: Smart card is a generic term for a card the size and thickness of a credit or debit card that is embedded with microprocessor chip. The chip itself has "intelligence" by way of computational power similar to that of early personal computers. These powerful computing capabilities make Smart Card much more secure than the other types of card presently in use. They can handle encryption techniques that protect the information stored in the card. In July 1998 the Hilton New York and Towers became the first hotel to install alocking system fully integrated with true smart card capacity.

Keys and their Control:- The housekeeping is usually responsible for more he's than any other department head.

Types of Keys:- The housekeeping department is primary concern with the following category of keys.

- **Emergency Key**: This key opens the entire door in the property, even those that the guest has double locked. It should be stored in a secure place such as the hotels safe, only the journal manager or security officer can access.
- **Master Keys:** These keys open all guest room doors that are not doubled locked.
- **Grandmaster Key:** This key open all hotel guest room data double locked and often all housekeeping storage room as well this key can be used in emergency situation it is kept under locked and key at the front desk of hotel.
- **Sub Master Keys**: These keys open all room in one work section of the hotel. A supervisor maybe you should more than one Key of this type as he or she may be required to inspect the work of more than one GRA.
- **Floor Master Key:** The GRA given this Key to open the room he or she is a sign to clean on a floor key opens all rooms on a particular floor that are not double locked.
- **Guest Room Key:** These are keys to guest upon their registration. The guest room keys open a single guest room so long as it is not doubled locked.
- **Supply Keys:** This key is used within the servicing sector of the hotel by the supervisory. Level staff to ensure that stocks and equipment star stored away when not in use.
- **Card Keys:** Many hotels nowadays use the card keys system. This type of room locking mechanism uses regular door locked and special plastic card that act as key to unlock the door. The plastic card looks like credit card with holes

punched in the room some have a magnetic strip instead of holes. The system uses computer that codes the card to lock and unlock the doors.

2.9 Cleaning Guest Rooms

Cleaning is the removal of dust, dirt, foreign matter, tarnish, and stains from various surface with the aid of certain cleaning agent and equipment. Cleaning is carried out for following reasons"-

Aesthetic appeal:- The environment is made attractive an appealing.

Hygiene:- Effective, frequent cleaning control the growth and reproduction of pathogenic bacteria and other germs.

Maintenance:- Surface and article, however good in quality will have along functional life only when they are cleaning on a regular basis.

Safety: Cleaning is done for safety again health hazards fire hazards and slip hazards.

Types of soil:- Soil is the collective term for deposit of dust, dust, dirt, foreign matter tarnish and stains.

- **Dust:-** This is composed of loose particle deposited from the air.
- **Dirt:-** This implies dust held together firmly by moisture grease on rough surfaces.
- **Tarnish:-** this is the discolouring on a metal or a alloy surface caused by chemical reaction with certain substances found in air, water and food stuffs.
- **Stain:-** This is the discoloration caused on a hard and soft surface by a substance containing dyes, protein, acid, stains are difficult to remove by routine cleaning processes.
- **Foreign matter:-** These maybe dead flowers, contents of waste paper baskets ashtray, as well as stains from the deposition of foreign substances.

Principles of cleaning:- The basic rule to follow in any kind of cleaning activity.

- Soil should be removed without harming the surface being cleaned all the surrounding surface.
- The cleaning process should be efficient, using a minimum of equipment, cleaning agent, labour and time.
- Cleaning should proceed from high to low.
- Suction cleaning should be prepared over sweeting where ever possible.
- Sweeping should be done before dusting, and dusting before suction cleaning.
- Noise levels while cleaning should be kept as low as possible.
- Stains would be removed as soon as they occur
- The cleaner should take all safety precautions while cleaning. In particular, cleaning agent and equipment should be stocked neatly to one side.
- After the cleaning process is over, all equipment should be washed or wiped as applicable dried understood properly.

Procedure For Room Cleaning:- The room attendant carries the room attendant slip to the assigned floor, cleaning of the guest room is the responsibility of the housekeeping attendant assigned to various guest floor .Normally check out room is given priority for cleaning since they can be made available for sale only after cleaning. The golden rule for the sequence of cleaning rooms is departure room,

vacant room, than occupied or stay over room flow chart of various activity involved is given.

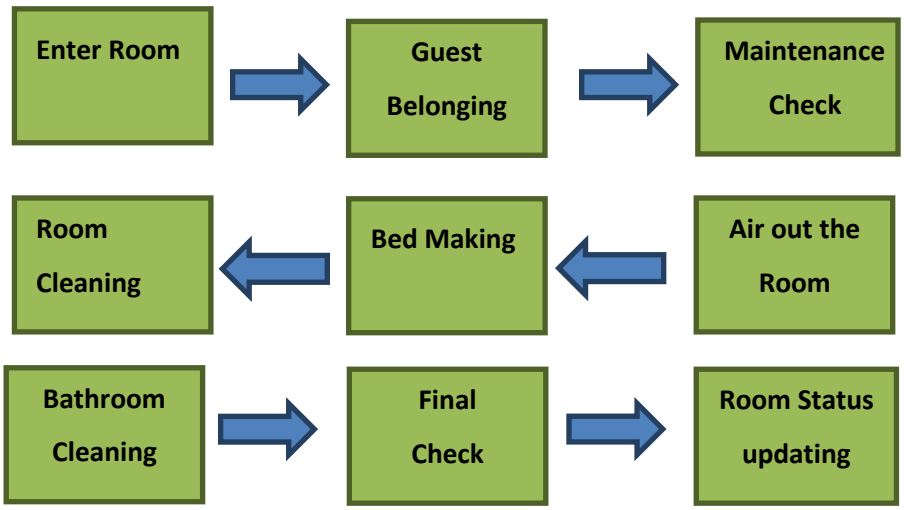

Figure 2.18 Room cleaning procedures

Cleaning of an occupied room:-The cleaning process of an occupied room is given below:-

- The attendant should always knock on the door or ring the bell before entering the guest room announcing "housekeeping" even if the room is vacant or checked out. In occupied rooms the guest will usually hang a "please clean my room" sign on the door knob.
- One should never knock if there is a "do not disturb" sign on the door. If the sign is there the GRA should make an entry in the checklist and proceed to the next room.
- After knocking, the GRA should wait for few minutes and repeat. If there is no response the floor master key can be used to enter the room.
- If the guest awake or answer the attendance should ask whether he or she may clean the room. if the guest agrees, they should proceed with the cleaning or else ask the guest when he would like the room to be cleaned.
- While cleaning the room the "housekeeping cleaning the room" sign is hung on the door knob.
- The trolley is wheeled near the room and kept as close to the wall of a corridor as possible to avoid impeding the passage of the guests.
- Ventilate the room by drawing back the drapes and opening the window, while drawing back the curtains, check the curtain ring.
- Remove room- service trays and used tea trays.
- Switch on all electronics item such as lights fan, A.C, T.V, etc. to check that they are in working order. Switch off after the check.
- Empty ash drays waste paper baskets and the sani bin from the bathroom into the trash bag on the cart.

Cleaning the guest room:- follow systematic method by starting at the door and cleaning surfaces as you move clockwise or anti clockwise and always clean from higher to lower levels.

- Damp-dust the door and all the door fixture.

- Damp-dust the mini bar and replenish bridges and snacks that have been consume.
- Damp dust the dark luggage rack.
- Damp duster the dressing tables, drawer and lighting fixture around or near it.
- Clean the mirror.
- Damp dust the bedside table.
- Dry dust lamp shades and bulbs of bed side lamps.
- Damp-dust all the fixture accessories in the guest room.
- Damp-dust chairs and tables, vacuum furniture.
- Vacuum the carpet edges and floor baseboard.
- Clean windows frames glass planes if required.
- Damp-dust the headboard of the bed.
- Damp- dusts the telephone and disinfects the mouth piece and the handle of the receiver.
- Vacuum and mop the floors.
- Replenish the bedroom supply if required and place them as per the hotel policy.

Making the bed:-

- Clean sheet and blankets are taken from trolley and kept to one side.
- Soiled linen are removed and put in the soiled linen bag in the trolley.
- The pillows and blanket are removed and kept on the sofas.
- The mattress protector is checked for any stain or damage. The mattress protector is then straightened so that there are no wrinkles.
- The bottom sheet is spread on the mattress so that equal amount of the sheet falls either side of the bed.
- The bottom sheet is mitred on the headboard side of the bed.
- The top sheet (wrong side up) is placed with the board hem on the head board side of the bed and taken till had of the mattress.
- The blankets is placed 4 inches below the top sheet (Second Sheet) on the bed.
- The crinkle sheet (night sheet) is spread on the top of the blanket.
- The top sheet (second sheet) is then folded over the blanket and the crinkle sheet it should then be folded again to ensure on 8 inches difference between the fold and the head of the mattress.
- Than a foot fold of 4 inches is made at the bottom and tucked in the blanket and sheet from bottom of the bed and sides (mitre fold).
- The bed spreads place on ensuring that the seams and side are aligned with edge of the bed and that it falls equally on all sides.
- The bed spread is than folded down from the head leaving enough room to cover the pillows.
- The pillow slips is checked to see that they are clean, if clean, pillow cases are put on by grasping the pillow firmly in the middle I pushing in to the cover.
- The pillows are placed with the open side in the centre.
- The bedspread is slipped over the pillows.
- The latest trend is that instead of blankets duvets are used with duvet cover only the first bed sheet is used instead of three bed sheets.

Cleaning the bathroom:-

- The light and exhaust is turned on and soiled towels removed.

- The trash and as tray is emptied and the container wiped and disinfected.
- The wc is flushed and the wc cleaner applied around the bowl. It is allowed to stand for same time.
- The bathroom tiles, bathtub and washbasin are pre- sprayed with bathroom cleaner.
- The washbasin and counter is scrubbed using a sponge.
- Wall tiles is scrubbed with a sponge and bathroom cleaner starting from the bath area and going around the bathroom, under counter, door surface, around the tub, wc bowl, outside all ledges.
- The bathtub, soap dish, etc. is scrubbed.
- All taps and showerheads are cleaned.
- Both side of shower curtain specially the bottom where mildew accumulates are cleaned.
- The inside of the wc is cleaned property with a we brush. One should make sure to clean under the rim and remove all the stains in the bowl and flush the toilet.
- The toilet seat and cover is washed, taking care to clean under the seat and around, the hinges.
- The sink and vanity area is them cleaned, ensuring that no water splashes or overflows drain.
- All the soapy areas are rinsed.
- All scrubbed surfaces are wiped dry with a clean duster.
- All mirrors /faucets are polished.
- The telephone is cleaned and disinfected.
- The door of the room is cleaned from front and behind.
- All toiletries and towels are replaced.
- Finally the floor is wiped.
- A final check of the bathroom and guestroom is carried out, from the point of view of the guest, all lights are turned off, the A.C. is left as the guest had set it and GRA rechecks to see whether if any things have been omitted.

Cleaning of checkout room:-A check out room is one from which the guest has left settling his/her account, returning the room keys, and departing the hotel. The cleaning of check out room must be a little more thorough than cleaning an occupied room. The procedure of "entering the guest room explained for an occupied room does not apply to a check out room. But if you are in doubt at any, time does follow the procedure given above for entering an occupied guest room. All the cleaning tasks for an occupied room apply to the cleaning of a checkout room too. Additional task may be:-

- Check for any item left behind by the guest who has departed. On finding such articles follow the processor for dealing with lost and found article.
- Remove any cobwebs or dust from the ceilings.
- Wipe-out drawer and closets from inside check coat hanger and replenish supplies.
- Suction – clean the carpet.
- Suction- clean all soft furnishings.
- Check whether any maintenance work is needed.

- Before leaving. Take one last look around the room, keeping in mind that your lost look will be the guest's first look at the room.

Cleaning of a vacant room:-

A vacant room is one in which no guest has slept the previous height and which is not yet occupied this room would have already been serviced earlier when the last guest to have stayed in it departed from it this a vacant room needs only a light dusting and check of all electric appliances. In the bathroom, the wc should be flushed. In the event of a vacant room having unoccupied for a long time, how else, it may need to be cleaned in the manner of a vacated room. A GRA should also look for signs of illegal occupation in the night by checking is the bed has been slept in, the bathroom supplies used, etc.

Turn – down Service/ Evening Service:-

The turn- down service is provided by the housekeeping dept. in the evening shift at hotels. Turn – down refers to making the bed ready for sleeping in by removing any bed spread or duvet and turning down the covers. Along with this function, a few other tasks are carried out in the evening to make the guestroom environment conducive to and comfortable for a good night's sleep. To provide the turn- down service a GRA enters the guestroom early in the evening to replenish supplies and turn down the beds. The procedure is given below.

- Follow the usual procedure of announcing your business and entering the guestroom.
- Empty and damp- dust tray, replace match box, and generally tidy the room empty the wastepaper basket. These tasks should be boor before turning down the sheet on the bed. The following steps are involved in turning down the sheets:-
    - Removed the bedspread gently by folding it neatly in a three – way fold and put it away in the cabinet or cupboard.
    - Turn back the top sheet, the blanket and the crinkle sheet on one side in one operation to make a triangle fold. Turn down the sheet on the side the guest in most likely to use.
    - Fluff up the pillows for the turn-down service, the cotton pillow is placed on top and the foam pillow billow it.
- Place the breakfast knob card on the pillow also by way of a "good night" wish, a flower, bud or chocolate may be placed on the pillow.
- Hang any scattered – about cloth left by the guest in the cupboard.
- Replace used glasses and replenish water jugs.
- Adjust the air conditioner controls.
- Replenish the bathroom supplies.
- Switch off all light except the bid side lamp to create a welcoming glow around the bed.
- Exit and lock the door if the guest is expected later.

Second Service: Second service is provided on the special request of a guest after the guestroom has been already earlier in the day.

Second service may involve the following tasks:-

- Removing room- service trays and used plates dishes.
- Emptying and damp- dusting ash trays waste basket.
- Mopping the floor in the sitting area.

- Making the bed if required.
- Replacing glasses and refilling water jugs.
- Cleaning the bathroom thoroughly including the toilet bowl and placing the disinfected toilet strip.
- Replacing soiled linen with fresh.
- Spraying an air freshner if the room has any residual Adour of food or cigarette smoke.
- Recording the service provided appropriately so that it may be added to the guests bill.

Dirty dozen

There are certain areas in the room or bathroom which may be forgotten or invisible to the room attendant and tend to accumulate dust. Such areas are normally hidden from a guest's eye. However, its cleanliness reflects the standard of cleaning of the hotel. Experience shows that the following areas are overlooked and appropriately called the 'dirty dozen'.

- Air-conditioning ducts and diffuser grills.
- Top of the door edges and ceiling.
- Top of picture frames.
- Area above pillow racks.
- Rear surface of doors.
- Interior surfaces of drawers
- Beneath the grab-bar and dresser table.
- Behind the WC bowl- the S-trap.
- Faucet nozzle filter.
- In the toilet roll niche.
- Under bathroom counters
- Toilet vents.

2.10 Cleaning Public Area

The public areas in a hotel such as entrances, lobbies, lounges the front disk, guest corridors , elevators, swimming pools, the spa, and health club. A neat and clean public area is reflective of the cleanliness standards the rough out the hotel property, because guests see these area first and from an overall impression of the hotel based upon these. The housekeeping department is responsible for the cleanliness and maintenance of these public areas in the hotel. All cleaning and maintenance activities for these areas are scheduled for low – traffic and for the night many hotel get their public areas cleaned by contractors. The cleaning routine can be divided into daily, weekly, monthly and periodic tasks.

Daily cleaning daily cleaning task includes dusting, brooming, emptying ashtrays and bins, suction cleaning upholstery mopping hard floors cleaning glass purposes arranging Flowers and cleaning toilet area.

Weekly cleaning weekly cleaning task includes disturbing had floor the single testing and wiping light fixture cleaning and polishing of hard surface is and vacuuming carpet

- ❖ Monthly cleaning monthly discover search activities as the spray cleaning and popping of law and polishing of furniture and other wood work

- Periodic cleaning Periodic task include washing wall stripping repolishing or re-sealing floors shampooing carpet and washing window cleaning swimming pool area etc.
- cleaning of entrance the guest get there first impression of the hotel from the entrance lobby some hotels may have elaboratedor domestic design feature at the entrance cleaning which may be a difficult for the housekeeping department cleaning and maintenance task for this area.
- The door mats and runners must be vacuum cleaner daily to remove the dust and grit
- in the rainy season and during time of heavy traffic cleaning of mats twice a day
- the floor at the entrance has to the mopped frequently throught the day
- plants at the entrance should be watered when required
- glass door should be cleaned twice a day and where public traffic is high the frequency of cleaning may have to be even three or four times daily
- Dirt, greace and stuff mark on the floor frame should be dump dusted with an alkaline Ditergent and water and rewiped with clean water
- wooden door should the dump dusted once daily the natural detergents should be used with water for damp dusting once a week to avoid the buildup of layers of dust
- brass knobs and handles should be polished weekly

Lobbies these are area provided as a common meeting point for Guest near the reception. It is important to note that hotel lobbies and lounges are cleaned in the same way

Daily cleaning the daily task should be scheduled so that the lobby may be cleaned with the least in convinence to guest

- Ash Trayssand urns and waste paper baskets should be emptied and dump dusted if required
- flower arrangements should be attended to Daily and indoor plants watered as required
- Glass surface and Windows should be cleaned with glass cleaner daily
- carpet area should be suction cleaned daily to remove immediately.
- Any stain on the carpet or upholstery should be removed immediately
- Hand floor must be mopped or vacuumed daily
- Furniture should be damp-dusted
- Telephone must be damp dusted with disinfectant solution and wiped dry duster

Periodic cleaning these should be scheduled on periodic basis for once in a week once in a month once in 6 months or once in year.

- High-level dusting, to clean ceiling and other hard-to reach areas such as tops of fans and cornices, should be done once in a week.
- Chandeliers may be brought down and clean once in 6 months
- Carpet should be shampooed once in a month.
- Blinds and Curtains should be Suction Cleaned weakly.

Front desk:- All arriving guest are registered to their home from here and many enquiries are made here. The cleaning should be done at non-peak hours so as not to interrupt the flow of business. The cleaning task for the lobby applies to the front desk as well.

- Empty waste paper basket as and when required in the day.
- Damp- dusts the desk, taking care to wipe under the telephone wires and computer cables. The front panel of the desk should be damp- dusted and a neutral detergent should be detergent should be used to remove scuff mark from guest shoes.
- All the railing and fixtures should be damp- dusted.
- Brass item should be polished according to the schedule.
- Damp- dusts all the telephones with a disinfectant solution and wipe with a dry duster twice daily.
- Damp-dust the computer component and fax machines and then wipe with a dry duster daily.
- Suction- cleans the carpet under the desk.
- Damp-wipe the furniture, upholstered furniture should be suction- cleaned with an upholstery attachment.

Elevators:- the necessary signboards indicating that cleaning is Bing carried out must be displayed prominently. Elevator doors are usually made of steel and they may be covered with wooden panels. Steel doors show grease mark from fingers easily. Elevators should be cleaned daily and a more thorough cleaning may be done on a periodic bases.

- Damp- dust the steel doors, inside and out using a neutral detergent solution and then wipe clean water. Dry with a clean duster.
- Damp-dust the inside wall panel, door panels and control panels.
- Suction-clean the elevator floor if carpeted if it is hard flooring, map the floor.
- Lightly damp-dust the ceiling and light fixtures. These may be thoroughly cleaned periodically.
- Clean any air- conditioning or ventilation duct using a suction cleaner.
- The company that installed he elevator must regularly service the elevator checking for any technical fault.

Staircases: Staircases should be cleaned when there is least traffic. The appropriate way to clean staircases is to divide them in to half-length way and clean one half at a time.

- Carpet should be suction- cleaned daily and any stain attended to immediately.
- Hard- floored staircases should be suction- cleaned and then damp-mopped. They can be scrubbed weekly with a deck scrubber using a neutral detergent.
- While cleaning the floor, the vertical risers of each step should be cleaned as well as the treads.
- Damp-dust the wall skirting weekly.
- Damp-dust the banisters and handrails daily.

Guest corridors:- a long corridor should be divided in to half lengths so that the cleaned. The cleaning tasks for guest corridors are listed below.

- The carpet should be vacuum- cleaned daily. It also needs to be shampooed once in six months.
- The wall skirting or baseboards all along the corridor should be cleaned.
- Any finger mark or smudge on he walls should be spat- cleaned. Thorough cleaning of wall may be done weekly.

- ❖ Sprinklers installed as part of a fire fighting system should be checked and cleaned.
- ❖ Fire-buckets should be dusted daily and filled with fresh sand once a month.
- ❖ Lights and lighting fixture should be checked and damp- dusted.
- ❖ A.C vents should be cleaned weekly.
- ❖ The exit and entrance doors on the corridor should be damp- dusted on the both sides and the tracks cleaned.

Cleaning of Banquet Halls:- these may be used for dinners, conferences, convention, exhibitions etc. when banquet halls have booking for several fiction on the same day, cleaning them becomes more of a challenge. A larger I work force and good organization will be required on such days. The cleaning process includes daily cleaning tasks and weekly cleaning tasks.

- ❖ Sweep and map the floor area well before the event. If the area carpeted, a vacuum cleaner should be used , spot-clean the carpet if any stain is present.
- ❖ Dapm-dust or suction clean the furniture.
- ❖ Table cloths, chair cover and decorative bows should be replaced if dirty.
- ❖ The walls only need to be spot cleaned in case of standees, otherwise they me washed periodically.
- ❖ Flower arrangements, mineral water, glasses and other specific requirements such as note pads and pencils should be provided and arranged neatly in place.

Cleaning of Dining Rooms:- housekeeping may be responsible for main training the dining areas in conjunction with the service staff of the dining room. The housekeeping department tasks on the tasks of the thorough weekly cleaning, whereas the service staff are responsible for the daily cleaning and maintenance. Housekeeping is also responsible for the supply of clean table linen and for the collection of dirty linen the cleaning tasks here include.

- ❖ Vacuuming the carpeted areas moving out the dining chairs to clean under the tables.
- ❖ Damp- dusting the furniture daily, polishing wooden furniture once a month.
- ❖ Wiping all glass surfaces with a glass- cleaner.
- ❖ Spot- cleaning the walls.
- ❖ Checking and cleaning the lighting fixtures.
- ❖ Following the regular schedule of pest control.

Cleaning of Health Club:- All hotels have an exclusive area for guest to exercise and work out in, perhaps using exercise equipment. The equipment found in health club include treadmills, Bench presses rowing machines, cycling machines, dumbbells etc. the cleanliness of the whole area including the equipment is the housekeeping departments responsibility. The tasks involved are;

- ❖ Damp- dusting all furniture, wooden furniture should be polished monthly.
- ❖ Cleaning all glass surfaces, including windows and mirrors.
- ❖ Checking and damp- dusting all lighting fixtures.
- ❖ Sweeping and mopping a hard floor.
- ❖ Removing soiled linen such as bath towels, hand towels etc. and replacing with fresh once.

Swimming Pools, Spas and Changing Room:- the primary concerns in cleaning swimming pools are water clarity and water chemistry control. Water clarity results

from effective filtration to remove all particulate matter. Water for swimming and involves the maintenance of a bacteria in the pool water. If water is too alkaline, the sides and bottom of the pool will become slipping.
Ozone treatment also makes the pool water clear. Sparkling and attractive. It does not affect the neutral PH of water.
The daily cleaning tasks of the housekeeping department with regard to swimming pools, spas and changing rooms also involve:-

- Cleaning any glass surface.
- Emptying wastepaper baskets.
- Damp- dusting any furniture.
- Sweeping and mopping floor surfaces.
- Spot- cleaning the walls.
- Checking and cleaning lighting fixtures.
- Removing soiled linen and replacing with fresh ones.
- Replenishing toiletries.

Public Restrooms:- this refers to the washrooms and toilets meant for use by the general public, washrooms may have elaborate upholstered furniture. The sanitary fitting commonly found in washrooms are we urinals, vanity unity unit or wash basin public restrooms need to be cleaned thoroughly twice a day at the minimum.
The daily cleaning processes for these are the same as followed in a guest bathrooms the weekly cleaning of Wcs involves the use of an alkaline detergent. In case of heavily soiled and stained Wcs with a lime- scale problem, acid cleaners need to be used. Toilet cleaner should be applied to all the inner surfaces of the urinal and allowed to stand for 10 minutes. Any derbies from the drainage channel should be removed. While the cleaner is lift to sit, clean the surrounding surface walls and the outer part of the urinal bowl thoroughly and flush to rinse away the cleaner.

2.11 Laundry

The 'Laundry' can be defined as a place where the washing and finishing of clothes and other washable articles are carried out.

Types of Laundries: A hotel any operate its laundry service through the following types of laundries:

Commercial/Off-site/Contracted Laundries: These cater to hotel on contractual basis. The contract specifies the rate for laundering different articles of linen, the time taken for laundering and so on. Usually the soiled linen are laundered and delivered back to the hotel within 24-48 hours. The laundries may however hold back 3-5 per cent of the soiled linen for stain removal and other special treatments. Contract laundry are a good option if the hotel does not want to make a heavy investment in setting up its own laundry or has space constraints.

Advantages to the Hotel - The advantages of Contract Laundries are as follows:

- No capital outlay
- Little technical expertise required
- Labour costs are saved

Disadvantages to the Hotel - The disadvantages of Contract Laundries are as follows:

- Less control over standards
- Delivery and collection delays
- Higher stock requires as it takes a longer time for the whole process to complete a single laundry cycle, including transportation
- Loss of articles may increase
- Extra cost for special treatment

On Premises/On-Site/In-House Laundry: An On Premises Laundry (OPL) is hotel's own laundry, situated on its premises. It can be run be run by the management or managed on a contract. Many hotels make this heavy investment to provide quality service to guests. More care is taken while laundering in-house since it is the direct responsibility of the hotel. Services are faster, a maximum of 8 hours to return laundered articles, hence par stocks are reduced. There is a better supervision, better control and hence a longer life of linen. There are a fewer chances of pilferage since the linen do not leave the premises. However, a contingency plan must be made, to be implemented in case of equipment failure.

Advantages to the Hotel - The advantages of OPLs are as follows:

- No losses or 'softfalls' of missing articles are likely to occur
- Less stock required as the cycle is quicker
- Can cover emergency requirement
- Is a capital assest

Disavantages to the Hotel - The disadvantages of OPLs are as follows:

- The initial capital investment is high
- Higher labour cost
- Technical expertise or special managemnet is required
- High cost of maintenance, repairs and overheads

Laundromats: These are self service laundries usually found in motels. Laundromats may be utilised by using coin slots to pay by the load or by making a fixed monthly payment. In some resorts, long-stay guests too can use the equipment.

Planning an OPL: The decision of whether to include a laundry on the premises should ideally be made during the initial planning stage for the facility. If this is not done, considerable cost may be incurred to change the plumbing and electrical system later. Hot water, cold water, steam, gas, large sewer drains and water lines are essential plumbing considerations. Hot water of temperatures between 160^{o} Celsius to 180^{0} Celsius should be available for sanitising the machines. Both 110 volts (for equipment manufactured in Europe).

Location : The laundry should, if at all possible, be easily accessible from thelinen room so that heavy bundles of laundry can be easily transported from one location to another. It should be located away from the guest areas, however, because of acoustic reasons, Vibration and Humidity problems anticipated in a laundry. It should preferably be along the outside wall of building to provide adequate venting. Moreover, the laundry should be located so that it can be operated and/or used by both men and women.

Size: The rule of thumb for hotel laundries is 7sq.ft. Per room (not including soil storage). For soil storage, 1 cubic foot for every 3.6kg (up to a height of 4 feet) is

usually allotted, though it is difficult to state an optimum size because of individual institutions' needs.

Ventilation: This is essential to exhaust moisture-Laden air from the dryers outof the laundry room. Laundry room also require adequate ventilation through regular doors or windows to take in a supply of fresh air equal to the air amount of air removed from the room through exhaust fans or similar.

Equipment section: Laundry equipment must be considered to initial cost, life expectancy, maintenance and depreciation. Overhead cost of utilities such as elcetricity , water and gas need to be considered.

Wet laundry must be moved from the washer-cum-extractor to the dryer, while dry laundry must be moved to storage shelves and hence to shower areas and 'equipment issues' areas. To facilitate these transfers, utility baskets, hampers and carts must be provided. A workable (4ft x 6ft)with castor wheels on the legs is very convenient for folding towels or other laundry. It can be moved about the room as needed too. Tehre shopuld be a cupboards or bins as well, for the storage of detergents, soaps, bleaches and other cleaning agents.

Labour: The rule of thumb for a small institutional laundry is that one person should be able to handle a weight of about 36kg an hour.

Other Costs: Costs of laundry aids such as soap, bleach, detergents and other chemicals should be estimated and considereation should be given as to how bulk quantities of other supplies will be stored.

Layout of Laundry

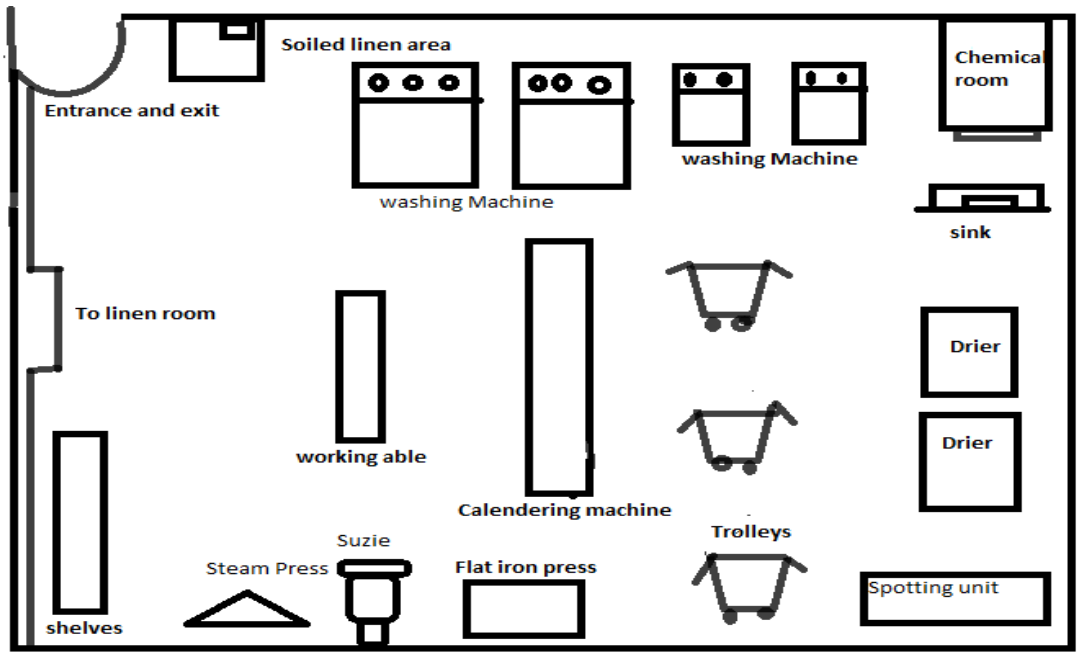

Figure 2.19 Layout of Laundry

The Laundry Operation Flow Chart: The cycle includes the following steps:

- ❖ Collecting soiled linen

- Sorting
- Washing
- Extracting
- Finishing
- Folding
- Storing
- Transporting in use area
- Transporting to laundry
- Collecting soiled linen

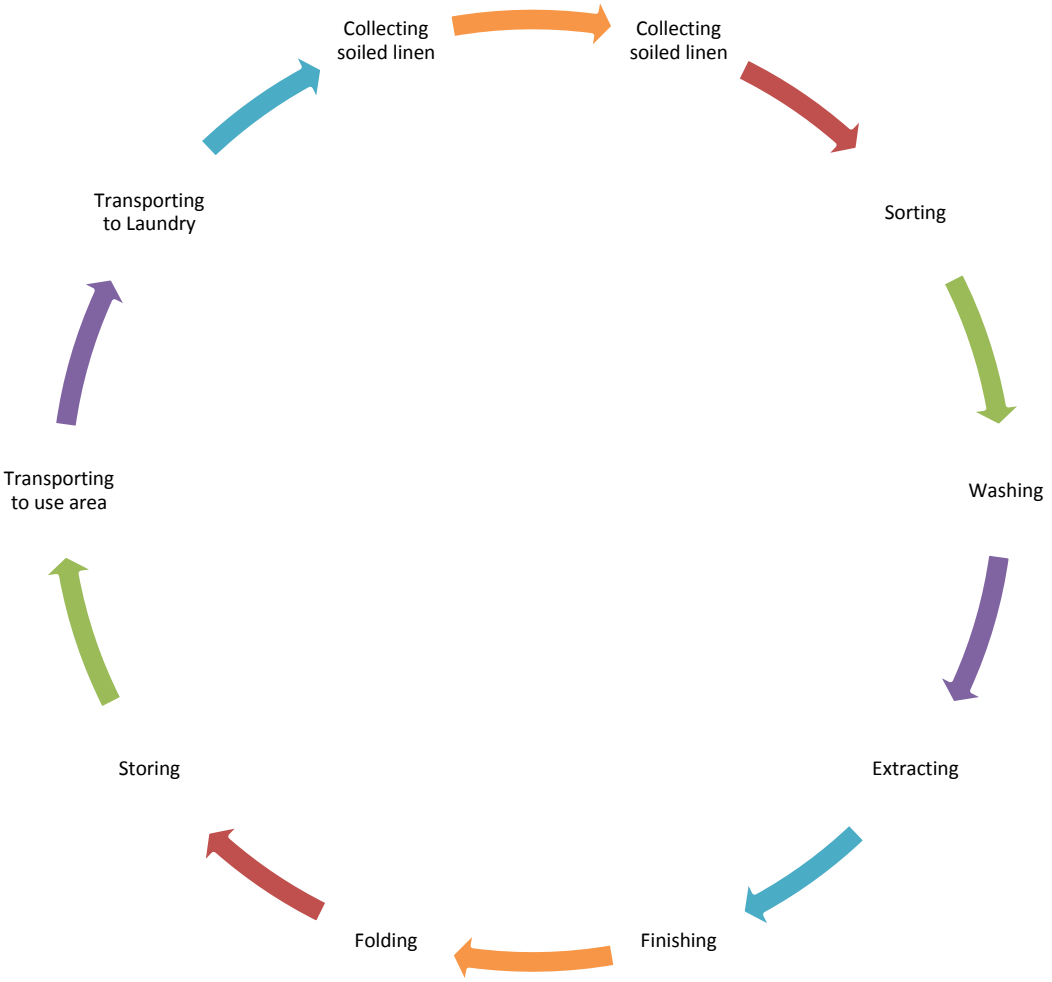

Figure 2.20 Laundry Cycle

Collecting Soiled Linen: Room attendants; collect the soiled linen in the soiled linen bag, attached to the housekeeping department cart. Putting linen directly into into the soiled linen bag prevents room attendants from using towels, sheets and other items to clean spillage and other dirt. Public area linen are brought to the laundry by respective departments.

Transporting soiled linen to the Laundry: Linen is carried by hand or in a laundry cart. Linen chutes on each floor is also used for transporting of linen.
Sorting: The laundry has a sorting area, large enough to hold and sort a day's linen. Soiled linen is sorted according to the degree of soil and type of fabric. Both types of sorting help to prevent unnecessary wear and damage to linen.

Washing: The laundry should weigh the load before putting it into a machine, to ensure that the machine is not overloaded. Most laundries rely on chemicals, which are used in the machine to clean the linen. Washing consists of nine steps:

1. Flush;
2. Break;
3. Suds;
4. Intermediate rinse;
5. Bleach;
6. Rinse;
7. Intermediate extract;
8. Sours;
9. Extract

Before washing, soaking is done overnight in detergent for heavy soiling.

- **Flush** – This wets the linen using little or no chemicals and remove water soluble dirt, medium water temperature is used. This stage takes 1-3 minute extractions also occur.
- **Break** – A highly alkaline soil loosening product is used before the suds stage. Used on heavily soiled linen only, medium water is used for 4-5 minutes.
- **Suds** – This is the actual wash cycle to which the detergent is added. The action of detergent together with the movement of the drum and the water temperature cause the dirt to be removed. This stage take 5-8 minutes.
- **Intermediate rinse/ carryover suds** – This is the first rinsing stage which removes the soil and alkalinity to help bleach work more effectively. This stage take 2-5 minutes.
- **Bleach** – Bleach is popular laundry aid and helps detergent to remove soils and stains. Through oxidisation, Laundry bleaches convert soil into more soluble, colourless or dispersible particles than can be removed by detergent and carried away in the wash water. The two general oxidising types are Sodium Hypochlorite (also called chlorine or liquid household bleach) and oxygen. Sodium Hypochlorite oxygen bleaches should not be used together. The benefits of both are lost when combined. Colour removers, considered reduced bleaches, are also products in the bleaches category. This stage takes 5-8 minutes.
- **Rinse** – This is the final rinsing stage where all the detergent, bleaches etc. is removed with the help of water. This stage takes 1.5-3 minutes.
- **Intermediate extract** – High speed-spin removes detergent and from linen. This stage take 1.5-2 minutes.
- **Sour and soft or starch/sizing** – It is the final conditioning of the linens at medium temperature. Starch is added to stiffen cotton fabric: sizing is added to polyester blend. Starching or sizing replaces the sour softer step. This stage takes 3-5 minutes.
- **Extract** – A high speed of spin removes excess moisture. Additional cycles may be used. This stage takes 2-12 minutes.
- **Finishing** – Finishing gives linen a wrinkle free appearance. A steam cabinet or tunnels are often used to dry the articles to give the fabrics a wrinkle free look.
- **Drying**–Items that are generally include towels and washcloths. After drying, the items should be removed immediately and folding.

- **Transporting lines to use area**–After the entire cycle is over the linen is returned to the various outlets on a basis of dirty for clean.

Laundry Equipment: Sophisticated machinery is needed in laundries to cope with the various types of fabrics and other items to be laundered, dried and pressed, given the huge amount of laundry to be completed in a given time period. The type and amount of equipment should be chosen keeping in mind the amount of linen to be processed by the laundry.

Laundering Equipment: Laundering equipment include washing machines, washer-cum-centrifuge and extractors, hydro-extractors and dryers.

Washing Machines – Those used in hotel laundries are typically of the tumbler type. There capacities typically vary from 7 to 200 kg. The wash barrels of those used in hotels are usually of stainless steel. Machines with a capacity of 100kg or more, generally have a drum that has two or three compartments. These are also referred to as 'Tunnel Washing Machines'. The unit may end – loading or front loading.

Figure: 2.21 Washing Machine

Washing machines with microprocessors are computer controlled. Most automatic washing machines have detergent and solution dispensing capabilities. The executive housekeeper should ensure that all maintenance procedures are followed and the machine is used as per instructions.

Washer-cum-Centrifuge and Extractors : These machines range in capacity from 7 to 300 kg. They may operate on steam or electricity or even a combination of the two.

Figure 2.22 Washer-Cum-Centrifuge and Extractoe

Hydro-Extractors: These are large centrifuges, ranging in capacity from 7 to 70 kg. A typical hydro-extractor. The basket is made of stainless steel. They are electrically operated. Clothes from the washer are put into a hydro-extractor to remove about 50-75 per cent of excess water. The water is extracted from the washed linen by means of centrifugal force or by the application of pressure.

Dryers – These are units of tumbler-type equipment meant to remove moisture from damp, tightly packed linen (that have come out of hydro-extractors) by tumbling them in a rotating cylinder through which heated air passes. They are generally used for no-iron articles and towels as these linen do not require pressing. The heated air may be produced by electricity, gas or steam.

Pressing Equipment

Storing (Ironing)

Figure 2.23 Flat Press

- **Steam press** – These are hand press used for small items.
- **Flat press** – These are generally used by hotels that are not able to afford calendaring machines to press linen like bed-sheets pillow covers, etc.
- **Suzy's** – A Suzie is an inflammable shape on to which folds e.g. a blazer is placed and which are then filled with steam, so drying and pressing out creases of the blazer. It is also known as body hot blower. In some hotels instead of Suzy body press – collar, cuff, sleeves are used.
- **Calendaring machine**–This is a very large machine consisting of several and heated well-padded roller which iron the article as it passes through, only that article are calendar and a large calendar will be wide enough to take a double bed sheet all, that pieces of linen bed sheet, pillow slip, table cloths and serviettes can be ironed in this machine. After ironing articles are folded by hand or by a folding machine.

Figure 2.24 Folding Machine

- **Folding Machines** – Folding machines do not fold the linen as such but aid the worker in doing so. The machines hold down one end of the linen to be folded so that the workers can fold it more easily.

Dry-cleaning equipment: These are similar to washing machines of the tumbler type. They are available in a wide range of capacities. They are steam-powered or electrically operated. They carry washing, extracting, drying and deodorising in a continuous process. Solvent filtration and distillation are carried out in a closed system.

Carts, Trolleys and Sacks: These are used for the transfer of clean linen from the laundry to the linen room to the floor pantries and so on. Linen carts and trolleys may be made of aluminium or steel.

❖ What are the points to be considered while purchasing laundry equipment?

- To get first and information from people who have used the machines.
- The quality of the process while dealing with uniform and guest laundry.
- How compact or bulky the equipment is, as the extend of space required will depend on this.
- The efficiency and the actual production of the machine when compared to the rated capacity.
- The consumption of various utilities such as steam, electricity and hot and cold water. There are machines available which save more energy than others.
- The servicing and maintenance requirement and breakdown frequency as to how expensive are the spare parts.
- The training needs to be imparted to staff to make best utilization of the features offered by the equipment.

Valet Service: By Valet Service the hotel takes care of the guest laundry needs. A laundry valet is a staff who works for the laundry and so he takes around on the guest floor, two or three times in the morning and collect all the clothes from various rooms in separate laundry bags with appropriate information as to how many pieces of clothes to be washed/pressed or dry cleaned. He is also responsible to return the clean clothes back to the guestrooms. Hotels that provide valet service are often quicker and promote more goodwill. Most important, however revenue, the valet service generates. An efficient valet service generates and helps in defray the overall laundry cost, offering valet service required, the housekeeping department to setup its own laundry business. To support the business it must:

- Set time for laundry pickup and delivery.
- Determine how laundry will deliver the guestrooms.
- Figure bills to be attached to clean laundry.
- Determine the hotel liability policy in accordance with state and local laws.
- Handles lost and damage article.
- Field guest comments and complaints.

Laundry Agents or Aids: Laundry ‘aids’ are the material used to improve laundering results (bleaches, optical whiteners) or to accomplish specific functions or effects (soaks, stain removers, softeners, stiffeners)
The important laundry agents or aids are water, laundry soaps and detergents, stiffening agents, bleaches, alkaline agents, acid agents, organic solvents and absorbents.

LAUNDRY SOAPS AND DETERGENTS

SOAP: ‘Soap’ is technically also a type of detergent and is the most widelyused fabric cleaner ‘soaps’ are the sodium, salts of fatty acids and are widely made by reacting natural oils with sodium hydroxide or another caustic alkali. All soaps contain water but not more than 30 per centis good soaps.
While selecting laundry soaps, the following criteria must be kept in mind:

- The soap should be of a clear, pale colour as dark-coloured soaps may contain impurities that aren’t easily visible.

- The soap should feel firm when passed. If it feels soft, it may contain excessive amount of water and will be wasteful in use.
- A good laundry soap dries to form a firm, unspeckled surface. Soaps that develop white crystals on the surface should not be used, as this shows an excess of harmful alkalis.

DETERGENTS: Soap-free detergents have properties similar to soap- such as foaming, wetting and cleaning – but they are able to make soluble salts out of the calcium, magnesium and other metal salts that make water 'hard' and render ordinary soap insoluble. Detergents and soaps act by lowering the surface tension of water.

FABRIC STIFFENERS AND SOFTENERS

Fabric softeners are added with sours in the final wash cycle. Softeners make fabrics suppler and easier to finish.

Stiffening: A certain amount of crispness in fabrics given a fresh look. This crisp appearance is obtained by using stiffeners. Commonly the term 'starching' is used for the process, even though the stiffening agent may be something more than starch.
Softening – Fabric tend to start feeling harsh after repeated laundering. This is due to the build-up of salts (present in hard water) on the fibres during the last rinse of the washing process. Softness can be imparted to these fabrics using chemical softeners in alaundry process. Softeners coat the fibres of the fabric and make them softer and fluffier.

Bleaches: The chemical are capable of whitening fabrics and removing stains by destroying pigmented matter. They also disinfect and deodorize. Their action of combating yellowing and discolouring is due to chemical reaction – it is generally oxidation but vary sometimes be reduction. Various types of bleaches are:

Oxidising bleaches – These bleaches release oxygen, which combines with the stains to form a colourless compound. The bleach should be left in contact with the fabric only until the stain is removed or else the fabric will be weakened.

Open air sunlight – This is the world's oldest and cheapest method of bleaching. Hanging clothes out in the sun to dry keeps white clothes sparkling. Sunlight bleaching can also be used for stain removal for bleaches cotton and linen fabrics.

Sodium Hypochlorite (Javelin water)
Sodium chlorite
Hydrogen peroxide
Sodium per borate
Potassium permanganate
Bleaching powder

ALKALINE AGENTS/ ALKALINE BUILDERS

Washing soda (Sodium Carbonate, $Na_2Co_310H_2o$) - This is the most commonly used additive in detergents. It is used along with soap to improve the cleaning power of soap, particularly on the boil. Washing soda also softens water and emulsifies grease stains. It is used for removing vegetable stains and scorch marks in particulars.

Borax (Sodium Tetraborate, $Na_2B_4O_7.10H_2O$) – This compound occurs naturally and is sold as a white powder. It is mildly alkaline substance, readily soluble in cold water and can be used safely on any fibre. The alkalinity is useful in removing acid stains. The addition of borax to starch solution (in 1:16 ratio) prevents its scorching or browning at the high temperature used for finishing collars.

Ammonium Hydroxide (NH_4OH) – This is sometimes purchased as a concentrated solution. It must be used with care as its pungent vapours may cause coughing and choking. Ammonia is a strong alkali, capable of yellowing silk and wool, making colours bleed and in the time tenderising the fabric.

ACID AGENTS

Oxalic Acid – This is a poison and should be kept in a jar labelled as such. It is sold in the form of white crystals. Its uses include the removal of obstinate fruit stains, bleaching of brown stains left after the potassium permanganate and removal of the tannin base of the ink stains together with hydrogen peroxide.

Salt of Lemon – This is a compound of potassium oxalate and oxalic acid, referred to as potassium bi-noxalate. It is also called 'salt of sorrel'. It is used in the same way and in the same proportion as oxalic acid.

Acetic Acid – This is one of the most important acids in use in the laundry. Acetic acid is sold in several strengths, glacial acetic acid being the strongest and purest. It should not be stored in metal vessels but only in glass enamelware or earthenware vessels. A weak solution of vinegar is used as a steeping bath to remove excessive bluing agents and as a neutralising agent.

ORGANIC SOLVENT

Cleaning Benzene (C_6H_6) or Petrol – This is obtained from the distillation of shale oil or petroleum. It is highly inflammable and should be kept or used indoors in large quantities; ofcourse, it must never be used, even in small quantities, near an open fire either. It is valuable for removing stains containing grease.

Carbon Tetrachloride (CCl_4) – This is more expensive than cleaning benzene but similar in action and has the advantage of being non-flammable.

Methylated Spirit – This is ethyl alcohol (C_2H_5OH) mixed with methyl alcohol (CH_3OH), which makes it poisonous. It is solid coloured with a violet dye to draw attention to this fact. Although not a very good solvent, it can be used to remove sealing wax, silver nitrate and silver stains.

Paraffin - This is a mixture of hydrocarbons. It is a white, waxy solid obtained as a residue from the distillation of petroleum and shale.

Turpentine ($C_{10}H_{16}$) – This solvent is more expensive than paraffin. It has s distinctive smell and is both inflammable and violate. It acts as a solvent for grease, vanish, paint and printer's ink.

Check Your Progress

Q.1 List the points to be kept in mind while daily cleaning an occupied room.

Q2. What are the advantages of using duty roaster?

Q3. Name any two important register maintained by housekeeping control desk

2.12 Summary

This chapter describes the importance and functions of the housekeeping control desk. The housekeeping control desk is the nerve centre of all communication from and to the housekeeping department. The document and files maintained at control desk are discussed in detailed**.** Rooms and public areas must be cleaned and serviced each day. All rooms and public areas should present a fresh pleasing appearance and provide comfortable conditions for those using them. Daily maintenance removes dirt, accumulation of which is dangerous for health as it forms breeding ground for germs.

Day to day care encourage high standard of work. It allows the time allocated for special cleaning to be spent out to full advantage.

A system of key control is essential to the security of a lodging property. All keys whether metal or electronic should be adequately controlled. Most lodging establishments use emergency keys, master keys and guestroom keys. In this lesson, we also looked into various aspects of the linen room planning, layout, location and activities. We further learnt about the inventory maintenance and its functioning. Detailed information relating to selection criteria for linen, Also in this lesson, we dealt in detail with the supply of various linen items to the guest rooms, their retrieval after use, their laundering and recycling.

It is essential to ensure a continuous supply of linen, which is well laundered, so that hotel operations can be carried out smoothly and efficiently. The principles of laundering are: removal of dirt and stains from the linen articles and restoring linen articles to their original appearance as far as possible. A commercial or off-premises laundry refers to laundering activities performed outside the establishment. An on-premises laundry refers to laundering activities carried on within the hotel by staff employed.

2.13 Key words

Asset A valuable item that is owned

Bathmats A mat used in front of a bathtub or shower, as to absorb water or prevent slipping.

Burglar A thief who enters a building with intent to steal.

Bleach A chemical agent used for bleaching

Chute An inclined trough, passage, or channel through or down which things may pass.

Candlewick A soft heavy cotton thread similar to that used to make wicks for candles.

Casements A window sash that opens outward by means of hinges.

Chamber Maid A maid who is employed to clean and care for bedrooms room attendant.

Cheese Compact mass of hydro-extracted cloths

Emergency Key The key used to open all guestrooms, even when they are double locked.

Fortify Make strong and secure.

Grand Master Key Key that opens all locks in a hotel (including Laundry and linen rooms).

Key Card A plastic card which stores digital signature that is used to control locks.

Master Key A key which is designed to open a set of Locks.

Weary Causing fatigue; tiresome

Sanctuary Something that physically protects, especially from danger

Master Key A key that opens every one of a given set of locks.

Wardrobe A tall cabinet, closet, or small room built to hold clothes.

Soiled Covered or stained with or as if with dirt or other impurities.

Skips Elasticised net bags used in the collection of soiled / dirty linen for transport

Suzie Used for articles like coats. The coat is put on to a dummy, passed steam to remove wrinkles and then hot air circulated to remove moisture.

Stain A discolored or soiled spot or smudge

Soiled Covered or stained with or as if with dirt or other impurities.

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2.15 Terminal questions

1. Explain in detail about control desk.
2. Write in detail about the various types of keys.
3. What are the registers found in House-keeping department? - Explain
4. Explain the room cleaning and maintenance procedure in a 5 star hotel.
5. Write in detail about spring cleaning.
6. What do you mean by Par Stock? Explain its importance.
7. What are the equipments required in a linen room? - Explain.

8. Define stock taking. Write down the methods and principles involved in stock taking.
9. Draw a plan for the layout of a Linen Room of a three-star hotel having 100 rooms.
10. List the important factors to be kept in mind when designing the storage space for linen in the Linen Room.
11. Create a 10-point checklist for reducing damage to hotel linen.
12. What is the purpose for linen stocktaking? Explain the procedure with the format of a stock register.
13. Taking into consideration the size of the hotel, give two other salient features which will affect the quantity of linen purchased.
14. Explain the complete procedure involved in cleaning an occupied room?
15. Why is it important to clean a vacant room?
16. Differentiate between evening service and turn down services
17. What is the difference between an occupied bed and an unoccupied bed?
18. What are key points relating to bed making?
19. What are the guiding principles in key control systems?
20. Explain the laundry process in detail.
21. What are the various laundry aids used in the OPL in the hotels?
22. Explain the classification of bleaches and discuss a few important bleaches

UNIT-03
INTERIOR DESIGN

Structure

3.1 Introduction

A interior design describes a group of various yet related projects that involve turning an interior space into an effective setting for the range of human activities that are to take place there It is the arrangement of line, direction, form, shape, colour, and texture and arranging them aesthetically and tastefully. Interior decoration is the art of creating a pleasant atmosphere in the living room with the addition of a complex of furnishings, art, and crafts, appropriately combined to achieve a planned result or design. These arts and crafts have to be well maintained by the housekeeping department. Decorating flowers is a creative and stimulating art which often carries a message or theme. Flowers and indoor plants add colour and beauty to a room.

It is of two types:-

- Structural design
- Decorative design

Structural Design is suitable to the purpose for which the objects are made. All objects have structural design. It must fulfil the following requirements:

- Design must be suited to its purpose
- It must have correct proportions
- It must be simple
- The material used must be suitable to its purpose.

Decorative design makes the structural design more beautiful .A design added to increase the beauty of an article is called decorative design. It requires:

- Decoration must be used in moderation
- It should be placed at structural points to strengthen the shape of the object
- It should enrich and not interfere with the structural design.

A design should not only be beautiful but also have individuality, character, style and utility e.g.-chair.

3.2 Objectives

After reading this unit the learner will able to:

- Describe a significant role played by colour in interior decoration.
- Explain the importance of lighting.
- Plan window treatment for various kind of window.
- Enumerate the various kinds of beds, mattresses and bedding.

3.3 Elements of Design

Design elements are the basic units of a visual image. These elements include:
The 3 f's: Form, Follows and Function are known as the 3 f's of Design. Form refers to what something looks like, and function refers to how it works.

Space: Space is the area provided for a particular purpose. It may have two dimensions (length and width, such as a floor, or it may have three dimensions (length, width, and height). Space includes the background, foreground and middle ground. Space refers to the distances or areas around, between or within components of a piece. There are two types of space: positive and negative space. Positive space refers to the space of a shape representing the subject matter. Negative space refers to the space around and between the subject matter.

Line: Line is the basic element that refers to the continuous movement of a point along a surface, such as by a pencil or brush. The edges of shapes and forms also create lines. It is the basic component of a shape drawn on paper. Lines and curves are the basic building blocks of two dimensional shapes like a house's plan. Every line has length, thickness, and direction. There are curved, horizontal, vertical, diagonal, zigzag, wavy, parallel, dash, and dotted lines.

Colour: Colour is seen either by the way light reflects off a surface or in colours light sources. Colour and particularly contrasting colour is also used to draw the attention to a particular part of the image. There are primary colours, secondary colours, and tertiary colours. Complementary colours are colours that are opposite to each other on the colour wheel. Complementary colours are used to create contrast. Analogous colours are colours that are found side by side on the colour wheel. These can be used to create colour harmony. Monochromatic colours are tints and shades of one colour. Warm colours are a group of colours that consist of reds, yellows, and oranges. Cool colours are group of colours that consist of purples, greens, and blues.

Shape: A shape is defined as an area that stands out from the space next to or around it due to a defined or implied boundary, or because of differences of value, colour, or texture. They can be geometric or organic. Shapes in hotel decor and interior design can be used to add interest, style, theme to a design like a door. Shape in interior design depends on the function of the object like a kitchen cabinet door. Natural shapes forming patterns on wood or stone may help increase visual appeal in interior design. In a landscape, natural shapes, such as trees contrast with geometric such as houses.

Texture: Texture is perceived surface quality. In art, there are two types of texture: tactile and implied. Tactile texture (real texture) is the way the surface of an object actually feels. Examples of this include sandpaper, cotton balls, tree bark, puppy fur, etc. Implied texture is the way the surface of an object looks like it feels. The texture may look rough, fizzy, gritty, but cannot actually be felt. This type of texture is used by artists when drawing or painting.

Form: Form is any three dimensional object. Form can be measured, from top to bottom (height), side to side (width), and from back to front (depth). Form is also defined by light and dark. There are two types of form, geometric (man-made) and natural (organic form). Form may be created by the combining of two or more shapes. It may be enhanced by tone, texture and colour. It can be illustrated or constructed.

Value: Value is an element of art that refers to the relationship between light and dark on a surface or object and also helps with Form. It gives objects depth and perception. Value is also referred to as tone.

3.3.1 Principles of Design

The elements of art are line, form, colour and texture. This must be handled within conformity with certain principles and laws that govern their use if beauty is to result. Every art field has certain guidelines that are to be followed and the same is applicable in planning of interiors.

Scale and proportion: By habit, the human eye becomes accustomed to definite dimensions in daily life. Some of these dimensions are fixed for convenience. Proportion is the law of relationship, which demands that all space divisions should be pleasingly related to each other and to the whole. The Greeks developed a great deal of calculations about space distribution and a scale of space relationships. These skills are used even today. The normal ratios are 2:3, 3:5 and 5:8. These forms are equal divisions. A square room is more difficult to arrange and uninteresting to live in. Rooms should be preferably furnished with smaller furniture types and consistent patterns. The furniture should be in proportion to the size and height of the room and its architectural features.

Balance: It is the principle of design, which produces a feeling of restfulness and contentment. Balance deals with quantity or number in the arrangement, colour and distribution of pattern or plain surfaces. Balance is the result of equalisation of attraction on either side of a central point. Balance can be attributed to colours, texture, pattern and light. There are two types of balance:

- Formal Balance

- Informal Balance

Formal Balance: Formal or symmetrical balance occurs when objects of equal size and weight are placed on each side and at equal distance from the centre. When they are identical, the balance is symmetrical.

Informal Balance: Informal or asymmetrical balance results when objects are arranged in such a way that a large one nears the centre, smaller ones away from the centre. Both types of balances are attractive. Formal represents intellect while informal represents feelings. This also has emotional significances.

Rhythm: This is the principle of design that suggests connected movement in a pleasant manner. It can be obtained through a repetition of light, forms, and colours or through a progression of rise or continuous line movement. Rhythm is achieved through repetition, progression, transition, opposition and radiation.

Emphasis: It is the principle of design that centres interest on the most important thing in the arrangement in a room. Emphasis may be centred on a painting, fireplace, window treatment or furniture grouping. All other parts must be subordinated to the interesting point. It is better to understand emphasised rather than over emphasized. Emphasis can be created at any point in the room. Dramatic use of art components creates emphasis i.e. Large and unusual forms, different surface patterns, more light elsewhere and unusual texture and contrasting colours.

3.4 Colour

Colour establishes an aesthetic connection between objects and set of mood. The study of colour may be approached from any of the five angles i.e physiologist, chemists, physicist and psychologists or people who works with pigments. Of the many theories of colour two are in common use. These are generally known as the Prang system and Munsell system.

Dimension of Colours: When the average person thinks of color, he or she usually considers the aesthetic aspects of color such as the shade and whether it's light or dark; or a cool or warm tone. There are three properties or qualities that develop the 3-dimensional color space concept- distint as the length, breath and thickness of an object.

Hue: Hue represents the color itself—red, yellow, blue, etc. If you were to take the visible spectrum—red, orange, yellow, blue, indigo and violet—and place each color in a circle. The colour of an object is determined by the wavelengths of the light reflect. An object appears black when all the wavelengths are absorbed and white when all reflected.

Value: It is the one dimension of color space that can stand alone. Value represents the lightness or darkness of a given hue the value ranges from 0 for pure black to 10 for pure white. In the absence of hue you would simply have black, white or shades of gray.

Tint is the term used to describe a hue that has been lighted in value from its normal value. Pink is tint of red. Tints are achieved by mixing white with a pigment or by using a pigment in a dilute form to allow for the white of the ground to show through.

Shade is the term used to describe a hue that has been darkened in value from its normal value. That your coat is not true blue but some blend of blue with other colors. Maroon is a shade of red. Shades are achieved by mixing black with a pigment. **Note-** This use of the term shade is specific to color theory. In common usage a "shade" is usually a variation in color of a hue. To say "your coat is a nice shade of blue" usually means

Intensity/Chrome: It refers to the purity of a hue and the brightness or dullness of a color Intensity is also known as **Chroma** or **Saturation**. The highest intensity or purity of a hue is the hue as it appears in the spectrum or on the color wheel. A hue reduced in intensity is called a **Tone**. A tone is a hue with reduced or dulled strength.

WARM AND COOL COLORS

Warm colors in the most general terms, are related to the *yellow/red* side of the **color wheel** chart. They attract attention and are generally perceived as energetic or exciting. **Cool colors,** on the other hand, sit on the *blue/green* side of the color wheel; they are generally perceived as soothing and calm.

Figure 3.1 Prangs' colour wheel

The 12-part colour wheel is based on the three **primary colours** (red, yellow and blue) placed evenly around a circle. Between the three primaries are the **secondary colours** (green, orange and violet), which are mixtures of the two primaries they sit between. The **tertiary colours** fall between each primary and secondary. Between yellow and orange, for example, is yellow orange; between blue and violet is blue violet and so on. All the colours around the outside of the colour wheel are called **saturated colours**. They contain no black, no white and none of their complimentary or opposite colour.

Munsell sytem: When the average person thinks of color, he or she usually considers the aesthetic aspects of color such as the shade and whether it's light or dark; or a cool or warm tone. However, A.H. Munsell saw color in terms of its relationship to other colors, which led him to develop his 3-dimensional color space concept. He described color space using objects with which most people would be familiar, such as a "color tree" to teach and communicate color with greater understanding and clarity**.**

3.4.1 Colour Scheme

Colour is a very potent feature in interior design because it evokes almost immediate response from the eye and can produce both physical and psychological reaction. Designers can work wonders with colour and colour combinations if they have a good knowledge of colour and its effects.

A good decorator always combines both value and practicality to evolve a scheme, which will work to the best advantage of the interiors. Standard colour harmonies are divided into two main groups:

1. Similar or Related Harmonies
2. Contrasting or Complimentary Harmony

Similar or related harmonies: Selecting colours that are close to each other on the colour wheel produces related harmony. This includes two types of schemes

- monochromatic
- analogous schemes.

Monochromatic harmony indicates the selection of one colour or hue. Different values must contrast in a single colour harmony. This scheme is quite safe, effective, and peaceful in small areas. However, tends to get tiresome and monotonous, if carried out in an entire room. Additional interest may be created by providing contrasts and combining textures through various surfaces.

Analogous scheme is produced by a combination of adjacent hues that have one hue in common. The analogous are a combination of primary or secondary colours with two intermediate colours on either side of it. This scheme is quite restful and shows greater varieties.

Contrasting or complimentary harmony: Combining colours that are opposite to each other and far away on the colour wheel produces complimentary harmony. They should differ in value and intensity.
This group includes different types:

- Complimentary harmony
- Double complimentary harmony
- Split complimentary harmony
- Triad harmony
- Accented Neutral Harmony

Complimentary Harmony: This is obtained by using colours lying opposite each other on the colour wheel e.g. Blue and orange with yellow and violet etc. This type of harmony provides a richer effect of colour than related harmony. It can be successfully used for rooms, window displays and outdoors. It should have strong colour intensity.

Double Complimentary Harmony: In this scheme, two directly adjacent colours and their complimentary colours are used together for a double complimentary harmony e.g. Yellow and yellow green with red and red violet. In using this scheme, the outstanding view should contain the largest amount of colours, that is, the dullest of all the colours. The next may be a little bright but should be partially neutralised. The fourth colour, which is used in the least quantity, should have the brightest intensity.

Split Complimentary Harmony: It is the combination of primary or intermediate colours on either side of the colour wheel; compliment yellow with red violet and blue violet, blue with red orange and yellow orange, red with blue green and yellow green etc. A true split complimentary scheme is a harmony of similar colours with a note of contrasting colours. The amount of different values and intensities should be adjusted to prevent a shocking effect.

Triad Harmony: This is a combination of any three colours that form on equilateral triangle on the colour wheel. It requires careful treatment and can provide the richest and most interesting harmony. But if not carefully planned, it can have a very irritating effect e.g. Red yellow blue orange, violet & green and red violet blue green and yellow orange.

Accented Neutral Harmony: It is a harmony in which the largest area of the room will be neutralised with a smaller area in a brighter colour.

EMOTIONAL IMPACT OF COLOUR

How Colour Affects Mood: Relying strictly on the colour wheel to make decorating decisions leaves an important factor out of the equation: the moods that colours can create. The colours you live with really do influence your emotions. Some palates lighten and brighten your mood while others pacify or purify. We respond to colour with our hearts, not just our heads, so it's important to choose wisely. Understand that colours behave in three basic ways -- active, passive, and neutral -- and you can easily match every room's colours to your personal desires and taste and to the room's purpose.

Active Colours: On the warm side of the colour wheel, active colours include yellow, orange, and red. These advancing, extroverted hues stand out to greet and sometimes dominate. They inspire conversation and an upbeat attitude. Red, the most intense, pumps the adrenaline like no other hue. Small doses of the fire-engine hue wake up an entry or turn up the heat on a hearthside den. Golden or lemony yellows -- good for home offices and kitchens -- unleash creative juices.

Passive Colours: The cool colours - blue, green, and purple - will pacify, staying quietly in the background to calm and restore depleted spirits. They're ideal for bedrooms or private retreats, but if yours is a cold climate, you may want to work in some sunny accents for warmth and contrast.

Neutral Colours: Neutralizers are the "uncolors": browns, beiges, greys, whites, and taupe. They neither activate nor pacify but combine and cooperate, bridging together different rooms and colours. They're good transitions on woodwork, trim, hallways, and functional spaces like kitchens and baths, but even living rooms can benefit. Darker neutrals tone down other colours; crisp white intensifies them.

Colour Language: Curious about how colour influences mood? Here are a few examples:

Pink: soothes, acquiesces; promotes affability and affection.

Yellow: expands, cheers; increases energy. It is warm but not over bearing. Cream and light tans are suitable background colours.

White: purifies, energizes, unifies; in combination, enlivens all other colours.

Black: disciplines, authorizes, strengthens; encourages independence.

Orange: cheers, commands; stimulates appetites, conversation, and charity. Beige and tan are favoured as background colours.

Red: empowers, stimulates, dramatizes, competes; symbolizes passion. It is the strongest of colours and is associated with danger. When reduced to a tint of pink it losses its intensity and becomes milder and delicate. As a shade, red may give a warm brown.

Green: balances, normalizes, refreshes; encourages emotional growth. It is associated with nature, health and well-being. It provides dignity and solidity.

Purple: comforts, spiritualises; creates mystery and draws out intuition.

Blue: relaxes, refreshes, cools; produces tranquil feelings and peaceful moods. It is associated with simplicity, purity, truth and meditation. It stimulates intellectual activity but in the extreme, it could lead to depression.

Violet: It is the colour of tension and ambiguity. It represents sensitivity, subtlety and has lavender in playful and magical. Deep violet should be used with caution.

A combination of colours from the three families i.e. Warm, cool and neutral in a correct balance will provide attractive and comfortable interiors. Colours may also have an advancing or receding effect. Warm colours tend to appear closer than their actual distance while cool colours tend to have a receding effect. Spaces can be made to seem larger or smaller through choice of colours and shape. A long narrow space can be made to seem less long and less narrow through the use of warm colours on either ends and cool colours on the sides. A low ceiling will seem less oppressive in light colours where as a high ceiling will appear lower in dark tones.

3.4.2 Functional Consideration in Colour Scheme

The function of the place should be manifested through the colour harmony. The maintenance availability and cost must be considered. Light colours are soiled easily and may prove to be more expensive in terms of time and money. In private areas, it is important to create a personalised colour atmosphere. In a room shared by many groups, preference should prevail, e.g. Restaurants, lobby and other public places. Sub divide a room into the following areas of colour distribution - dominant area (walls, floor and ceilings) medium area (draperies, upholstery, furniture and bed spreads), small furniture (cushions, pillows and table cloths), accent areas (accessories, paintings, lamp shades etc.)

According to the law of chromatic distribution, the largest area should be covered with a neutralised colour. As the area reduces in size, chromatic intensity may be proportionally increased. Any two hues may be used if they are at the proper degree of neutralisation. They should preferably contrast in their values, e.g. Like walls and dark floor where the draperies and upholstery are of an intermediate value. Contrast

creates interest; neutral colours are formal while brighter values are more informal. A neutralised colour appears more neutral in small areas than in larger areas.
Colours selection is influenced by climate, orientation activity and preference. In hotels, entrances, lobbies and front desk areas invite the use of strong colours to make a positive first impression. Lobbies and lounges can have warm colours to support comfort but cooler tones in warm climate. All the schemes should be generally agreeable to the guest. Corridors leading to guest room should be given a lively colour treatment. In bedrooms, intense colour must be avoided on ceilings and large wall areas. Restaurants may fail by using insensitivity to colour since appetite is influenced by light and colour. Black, grey, blue and violet should be avoided.

3.5 Lighting

Light is an essential element of every interior scheme and should be given special attention in the initial plan of each room. Sufficient and conveniently planned outlets should be an integral part of architectural planning. Planning of artificial light presents a major problem, as it requires both aesthetic and practical considerations. The average room lighting equipments and fixtures must be consistent with the style of the décor and must consistently contribute to the character and atmosphere of the room.

3.5.1 Types of Lighting

Natural: Day light provides natural light and varies according to the position of the sun and time of the day. Light is necessary for colour visibility. Textures are also influenced by light absorbed or reflected by them.

Artificial: These are of two types:

- Incandescent
- Fluorescent

Incandescent Lighting: In this type of lighting tungsten filament is sealed in a glass bulb and heated to a point at which it glows. The glass bulbs are usually made of standard lined glass/heat resistant borosilicate glass, which permits higher voltage used for outdoor lighting. Same bulbs are finished with an acid solution from inside which etches the glass and gives a frosted effect.

Fluorescent Lighting: This consists of sealed glass tubes, which contains mercury and halogen glass. It has electrodes at each end and on the inside, the tube is coated with a florescent material containing phosphorous. When a current is passed, the mercury vapour emits ultra violet light which is converted into visible light by the phosphorous on the inside surface of the tube. The lifespan of the incandescent lamp would be 750-2000 hrs and of a fluorescent light 1800-20000 hrs. Fluorescent lamps are suited for lower ceiling application and general lighting. They provide diffused light.

CONSIDERATION IN LIGHTING SELECTION

Function: The function of lighting must be evaluated in terms of quantity and quality of vision. The primary goal is visual clarity and to safeguard guest.

Safety: Safety is important in light consideration since improper lighting could prove hazardous to persons working in a particular area. Staircases require adequate lightings to prevent accidents. Proper wiring insulations and earthing should also be considered for safety.

Beauty: A close relationship exists between the type of lighting and appearance of colour. Wrong colour choices reduce the effectiveness of well-planned schemes. The designer should use brightness/ contrast to create visual interest. Interior lighting should be an integral part of the total designing of the area.

METHODS OF LIGHTING

Architectural lighting: It supplies functional lighting and is good for contemporary rooms.

- **Valence Lighting:** A historical fluorescent tube is placed behind a valence board, carting up light which reflects and then down, shining on the drapery by providing both direct and indirect light.
- **Cornice Lighting:** A cornice is insulated in ceiling and directs the light downward. It can provide a dramatic effect on drapery, wall covering and pictures.
- **Covered Lighting:** Covered lighting consists of placing a series of continuous fluorescent tubes in a group or placed at one or more walls of a room.
- **Soffit Lighting:** This is a method of direct lighting in which the illumination from the light source is built into the underside of soffits or beams used in staircases, reception, lounges etc.
- **Luminous Lighting:** This is recessed lighting to light up a particular area e.g. Kitchens, utility areas, bathrooms etc.

Non Architectural Lighting: This consists of the light reflected from walls and ceilings. Portable lamps may also be used for general overall light or localised light.

Other Lighting: Table lightings, point source, accent diffused and ambient lighting.

Lighting Systems: Types of lightings my be classified by the manner in which the light rays are directed on the object to be illuminated.

Direct Lighting: It is a type of light that is produced by most table and floor lamps. The light is directed downwards and the ceiling receives reflected light. This light produces sharp shadows and some times a glare. Direct lighting is usually combined with other types of lighting according to the requirements e.g. Spot lightings.

Indirect Lighting: In this type of lighting, the light is directed to the ceiling or walls from which it is reflected into the rooms. The immediate light source is secluded from view. Overall, room illumination with indirect lighting will diffuse or shadow less with low, less, light source brightness. When used above, indirect lighting is flat and uninteresting without shadows. It is suitable for general lighting of the covered valence and cornice fitting. Other lighting systems are semi direct and semi indirect lighting.

3.5.4 Light Fittings

- **Dimmers:** These are combined with on and off switches and control the level of lights on & off at one certain time or at different times in different rooms. Several dimmers can be attached to a single control.
- **Anti Burglar:** These lights function on a time switch which turn the lights on and off at a certain time or at different times in different rooms.
- **Door Switch**: This light is set in the doorframe and gets turned on when the door is opened.
- **Photo Cell Control:** Light sensitive units can replace switches at the entrance where a photocell card needs to be installed to activate the lights.
- **Full Fittings or Pendant Lights:** These are fitted over dining tables, billiards table and for spot lighting. The control switch may be a finger tap switch provided at the table.

LIGHTING FOR DIFFERENT AREAS IN HOTELS

Entrance Halls: Entrance halls should look interesting and the lighting should be in keeping with the atmosphere of the place. During the day, an entrance can appear dull and dim if one comes from outside. The light in the hall should be bright enough at the reception desk, on display boards etc. Care should be taken to avoid glare but the light should be sufficient for the guest to be able to read clearly.

Lounge Area: In the lounge area, a chandelier or a general light fitting may be fixed to provide overall light. Cornice lighting may be fixed to reflect on the ceiling, coved lighting may be provided by using wall brackets and other fittings. When there is a false ceiling, the light may come in through the gaps in the ceiling or through glass panels fitted in the ceiling. Lamp fittings here are concealed and only the light is reflected. The atmosphere of the lounge should be comfortable and restful. Localised lights may be used if necessary and portable fittings may be provided. In case of an area attached to a cafeteria, higher degree of illumination may be necessary for quick service.

Restaurants: In restaurants, subdued lighting is generally perfected specially at heights. General lighting is normally used for banquets. Fluorescent lightings may also be used. The effect of lighting on the colour of food should be considered.

Corridors: Subdued lighting may be required in corridors but gloom should be avoided and the guest should be able to see the room number clearly. Placement of light should not be very far from each other. Cornice or ceiling lights are quite appropriate.

Stairs: Stairs should be well lit to prevent accidents. The lights can be set along the wall or just below the handrail. In case of overhead light, fittings should be placed at the end of each flight of stairs.

Bedroom: Bedrooms do not generally require general lighting but adequate lighting should be provided in different parts of the room. The light should not be too bright. A general wall light, a table lamp, bedside lights are the standard light. Lights should be controlled at the door as well as the headboard of the bed to prevent accidents or to have the guest enter into a darkened room. Bedside lights may be mounted on to the wall or fixed as table lamps. They should be placed sufficiently high to enable the guest to read a book. Dressing table light should provide sufficient light to illuminate the face and not the mirror. Pelmet lights can be fixed which illuminates the curtain and giving a soft glow around the window area. The wardrobe built in cupboards should have one light inside to enable guests to see the contents clearly. This light may be fixed to the ceiling of the wardrobe.

Bathroom: In a bathroom, safety is of prime importance. The fittings must be safe with vapour and water proof fittings. All electrical fittings and equipment should have dual switches which can be controlled from outside. Plastic or glass is preferred to metal. An emergency light that operates independently of the main supply should be provided which comes on during power failure. This light should be placed in staircases corridors and exit entrances.

Impact of Lighting on Mood and Atmosphere

The selection of lighting systems, light intensity, its colour and the accessories used influence the mood and atmosphere of the room. Lighting in the bedroom should be warm and relaxing. Yet, it should be bright enough to observe the articles in the room. Light of low wattage and medium wattage is suitable. Using dimmer switches can change the atmosphere and mood. A series of down lighters and wall washers will be suitable to light up the room and prevent glare to the occupants. Subsidiary lighting by the telephone, mirror, coats rack may be necessary. In a restaurant, a relaxing mood can be created by using pelmet lights and pendent lamps above the table. The light should be dim around the people, but with medium wattage over the food.

Passageways should be visible. Candlelight may also be used to create a romantic ambience. Bright pools of light alternating with shadows provide a warm welcome. Lights in office area must provide general light as well as spot lighting on the table. Reading lights should be situated behind the user at the top left hand side.

3.6 Window treatment

A **window treatment** is an interior decorating element placed on, in, around or over a window. Often, a goal of professional window treatment is to install the elements which enhance the aesthetics of the window and the room.

3.6.1 Types of Window Treatment

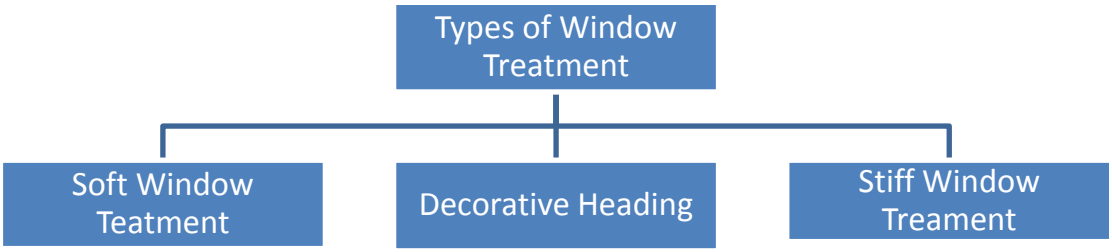


Figure3.2 Types of window treatment

Soft Window Treatments: Soft window treatments comprise curtains, valances, swags, etc. Curtains often contribute more to the atmosphere of the room than any other item of furnishing. Plain, heavy curtains falling down to the floor can be used o create a formal setting. Short curtains made of light, brightly patterned fabrics are used to create an informal, relaxed atmosphere. Apart from creating the desired atmosphere, curtains give flexible control over privacy, heat, light and to some extent noise. The various fabric used for making curtains are cotton, linen, rayon, glass fibres, acrylic and silk for luxurious setting. Care should be taken to minimize their exposure to sunlight and airborne soils, as these reduce the curtains' functional life.
Good curtains are usually lined and heavy curtains re interlined. The lining helps the curtain to drape well and protect them for sunlight and airborne dust.
Curtains fulfill several important functions :

- They give flexible control over privacy, heat, light.
- They soak up noise in proportion to the area they cover, the thickness of the fabric and the depths of the folds.
- They can add colour an pattern to the décor.
- They cover bareness and furnish a room even without furniture.
- They can change the apparent size of a room or conceal architectural flaws.

TYPES OF CURTAINS
Glass curtains: These are made of sheer fabrics of simple straight-line covering the entire window area with draperies.

Sash curtains: These are made of sheer fabrics and lightweight material with decorative ruffles. They are fixed on the frame or wall by special fixtures.
Casement curtains: These cover the entire window and have casing at both top and bottom

Criss cross curtains: Wide panels are mounted on walls so that they overlap on the top and are tied back.

Café Curtains: Short curtains that cover the portion of a window often hung on decorative rods by means of rings.

Cottage curtains: These are combination of café and sash curtains.

Tier curtains: Two or more horizontal rows of short curtains, which are mounted on rods so that they overlap.

Tie back: Either one panel can be ti back to one side or both the panels an be tied back to two sides. They are often tied back to the window frame.

Vertical draw curtain: These are mounted on traverse tracks so that they can be drawn open.

Vertical drop curtain: These are curtains, which move up and down and are found in theatres and cinema halls.

DECORATIVE HEADINGS

Curtain headings and accessories We shall now look at the various headings and accessories used with curtains.

Pelmets and cornices: Cornices are box-like shapes used at the top horizontal portion of the drapery treatment to hide the poles and other hardware.

Valances: These are made of fabric that has been pleated, scalloped or ruffled. They should never exceed one-sixth of the window's height and should be about 8-12 inches in depth.

Swag and Tail curtains: These are heading at the top of the curtains and form an integral part of the decoration. This is generally meant to hide the curtain headings.

Drapery cranes: These are the appropriate hardware to use where installations have to be flexible.

Traverse and decorative rods: These are used in conjunction with runners, which are hooked onto the curtain. They come in many types. The conventional traverse rod is used with classic pleated draperies that pull away from the centre to either side.

Curtain rods: This is a very old curtain-hanging tradition. They come in many beautiful and durable designs, with a wide range of length options. Spacers in curtain rods extend outward from the wall for depth or to accommodate multiple rods. Both rod-pocket and tab- top curtains can be difficult to open or close on telescoping curtain rods. While hidden by many medium-weight and heavyweight materials, rods are visible through sheer curtains, and ring-top

Measurement and Installation of curtains: Curtains are fixed to the track by rings or hook and drop to the floor or windowsill. The fabric for the curtain should be a large piece hanging in folds with the entire pattern visible. It is better to avoid fabrics with white background in large establishments. The general width of the material may be 90 cms, 120 cms, 150 cms or more. The curtain width should be a minimum of one and half times the track width. Lining the curtain helps to protect from dirt or sunlight and provides good drape. Silk fabrics are expensive and usually used in luxury establishments in public areas and suites. Brocades, damasks, velvet's and a variety of weaves may be used. For the bedroom, a lighter material like cotton, linen, chintz, satin etc may be used. In bathrooms, a heavy window does not require curtains but nylon, plastic and glass fibre material are often used for shower curtains. Plastics may easily dry but may tear easily.

General points in curtain construction

- Velvet and pile fabric should hang with the pile running downwards.
- 15-30 cms should be allowed for hem and turning on each curtain.
- For floor length curtains, it should be 1. ould be one and half times or 2 times the width of the track.
- The curtain heading may be gathered, pleated or held with tapes.
- Lining should be fixed at the top and side of the curtain but not attached at the hem.
- Hems and sides should be hand sewn but 5 - 2.5 cms. above floor level to prevent friction.
- The minimum width for any curtain sh
- not machine stitched.
- Heavy curtains may have weights or chains at the hem to improve the hang.
- Flame retardant fabrics should be used in public rooms.
- Draw cords or curtain controls should be used to pull the curtain.

3.6.2 Selection of Window Treatment

When it comes to decorating, there is one element in the room that is often forgotten, and that is the **window treatments**. Most people will purchase curtains as an afterthought, something that needs to go up but doesn't really matter. The problem is the window treatments do matter and it should be an active decision when you are designing your decor. Selecting the right *window curtains* can be surprisingly complex. If you choose the wrong type or the wrong color, it can completely ruin the design that you have. Finding the best curtains for your room can lead to a flow in style that will have any professional interior designer borrowing from your idea for future projects. If you are trying to select window treatments for your home but are unsure of where to start, there are a few pointers that will help make finding the right window curtains much easier.

Keep the curtains in the room: This is actually a mistake that many people make. They find a curtain style and they put the same curtains into every room whether it looks good with the decor or not. The simple fact is each room can have different curtains, unless you are working with an open floor concept

Understand your privacy: One of the more popular window treatments that you can find are sheer drapes. While these are wonderful in many different areas, they are not

the best style of drape to purchase if you want to have a little privacy since you can see through most sheer drapes. Bedrooms should never have sheer drapes solely, and neither should bathrooms for that matter. Instead, pair them with a darker drape or window covering that does just that; covers.

Understand the lighting: When it comes to windows, not all of them produce the same amount of lighting and this will affect the type of drapes that you use. Drapes that are heavy can block out a lot of light and this works well in a bedroom, especially bedrooms that offer amazing views of the sunrise. Sheer drapes are excellent for sun rooms that don't need a lot of privacy. Sheers provide a light airy feel that work wonderfully in many spaces. When you know the amount of light coming through the window, you can plan accordingly.

3.7 Bed and Bedding

A bed is a piece of furniture or location primarily used as a place to rest, relax, nap or sleep. To make beds more comfortable, the top layer is frequently a mattress. Originally these were bags of straw for most people and filled with fluffy, feathers of birds for the wealthy. Eventually new filling materials such as cotton, silk cotton and artificial fillers became common. In modern times most mattresses use springs, solid foam, latex, water, or air. As time passes on more and more people are looking for a better medium to sleep, since people spend a large percentage of time in life in a bed. It has become a more recent realization for many, to attribute health deteriorations to what they lay on. Water resilient fibers (natural and synthetic), latex, synthetic foams and a combination of a huge range of different spring technologies are used in the manufacture of beds. For greater head support, most people use a pillow, placed at the top of a mattress. Also used is some form of covering blanket to provide warmth to the sleeper, often bed sheets, a quilt, or a duvet.
Also, some people prefer to dispense with the box spring and bed frame, and replace it with a platform bed style. This is more common in Europe.

Construction of beds
Most beds consist of following parts:

A Frame: on which the spring and mattress rest this is usually a rectangular, metal or wooden framework, some having raised edge all around o that the mattress fits in and is held in place.

A Base: which may be made of open coiled spring, wire mesh or laminated wooden strips to provide resilience and support.

A Mattress: which lies on the top of the spring and provides extra padding.

A Headboard: made of painted or varnished wood or an upholstered type. In most hotels, headboards are not part of the beds. They are typically mounted on the wall behind the beds and not on the frames. The main objective of the headboard is to protect the wall from developing greasy stains from a guest's head. To fulfill this purpose, the headboard must rise up to 30-45 cm above the top of the mattress.

A Footboard: usually made of wood or metal and lower in height than the headboard

BED FRAMES

There are basically two types of bed frames:

1. **Platform Frames/ Box Frames:** These are usually made from wood. They provide the bed spring and mattress with a platform or box on which to rest. While platform frames are raised off the floor by feet, box frames lie tight to the floor.

2. **Metal Frames:** These consist of four length of angle iron with a metal leg attached to each corner. Larger beds also have two cross bars added for extra support. These metal legs may have castor or furniture glides attached to them.

Base spring: Spring add resiliency and durability to the bed. They are made by j wire spring or coils together and covering them with padding. There are primarily four types of spring constructions:

1. **Box Spring:** The coils for these are made of heavy gauge steel. Box springs are mounted on a wood frame and covered with a pad.
2. **Metal Coil Spring:** These may be arranged in two layers. The springs on the bottom are tightly coiled for good support. The top are loosely coiled for resilience.
3. **Flat Bed Spring:** The strips of metal attached length wise to a frame with helical hooks. These hooks are small coils with hooks at both ends.
4. **Stretched spring:** These are in the form of highly coiled springs attached to the frame on one side and resilient thick metal wires on the other side. The wire crisscross each other and cover the middle of the frame with the spring lying on the sides.

3.7.1 Types of Beds

1. **Cribs:** These are available as guest loan items in hotel and usually collapsible to save storage space. They should have adequate locking mechanisms to ensure that they do not collapse when the infant or a child is put to sleep in them.

2. **Rollway Zed Beds:** Zed beds get their name from their three-part folded frame resembling the letter 'Z'. These can be rollway beds on roller or castors. They generally have a thin latex foam mattress that rest on a base of stretched springs attached to rectangular folded frame.

3. **Sofa Beds:** These provide extra seating by day and a bed by night.

4. **Murphy or Sico Beds:** These beds fold up to into the wall, giving the impression of a book shelf, a wardrobe or a cabinet. Rooms with these types of beds can be used for meetings by day and a bedroom a night.

5. **Canopy Bed:** A canopy bed is a decorative bed somewhat similar to a four-poster bed. Canopy is supported by four-posters.

6. **Trundled Bed:** A **Tuckle bed** (or **trundle bed**) is a bed that are stored under a normal bed and that can be wheeled out for use by visitors.

7. **Bunk Bed:** A **Bunk bed** is a type of bed in which one bed frame is stacked on the top of another.

8. **Loft Bed:** A **loft bed** is an elevated bed similar to a bunk bed but without the lower beds-freeing floor space for other furniture (such as a desk) which might be built into loft bed.

9. **Hammock:** A **hammock** is a sling mode of fabric, rope or netting, suspended between two points used for swinging, sleeping or resting.

3.8 Mattresses

An ideal mattress should give support and at the same time conforms to the body contours. When choosing mattresses, it should be kept in mind that they should be at least 6 inches longer than the average sleeper's height.
Construction of mattress: Consist of Three components:

Ticking/Upper Layer: It is the thick protective fabric and covers inn side off mattress. It can be made of cotton, polyester and stain.

Topper: It is the soft foam stitched along with inner side of ticking for better support.

Core/Filling: Cotton foam, Jute, Cotton fibre, Kapok.

3.8.1 Types of Mattresses

There are primarily five of mattresses:

Interior-Spring Mattress: These mattresses have a liner layer of springs between layers of insulation and padding. Interior spring mattresses are of three types:
Open-Spring Mattresses: These have hourglass-shaped wire coiled sandwiched between wire frames.

Pocketed-Spring Mattresses: The springs in these are cylindrical and each is enclosed in a fabric or a foam pocket.

Continuous-Spring Mattresses: In these, the springs are made from wire that is linked and interweaved in a wire-mesh like pattern.

Latex or Foam Rubber Mattress: These are made from synthetic rubber that is whipped into foam with a chemical setting agent while in a semi-liquid state and poured into heated moulds. In the moulds, the foam gets shaped set and vulcanized without losing any of its tiny air cells.

Solid Stuffed Mattresses: These mattresses are made by filling a ticking with padding. The padding may be in the form of animal hair, cotton, kapok, wool, coil or flock.

Plastic Mattress: These are made from polyethene and vinyl foam. They are non-absorbent and resistant o attack by month and other pests.

Water Mattresses: These resemble interior-spring mattress in appearance. Well designed ones have water filled cells in the centre of the mattress. These cells are covered with vinyl-covered urethane foam.

SELECTION OF MATTRESSES: The following attributes must be checked when selecting mattress:

Firmness: The firmness should be consistent across all parts of mattress.

Construction: Most expensive mattress typically has a damask ticking, thicker padding higher coil counts and a cushion swin into the mattress.

Softness: Mattress should be soft and contact points; if not body will begin to ache, causing one to turn and not sleep well.

Appearance: Examine the colour, fabric and stitch pattern to assess quality.

Ticking: This is a mattress outer most layer. Most are made of cotton-polyester or vinyl. Vinyl is used in cheaper mattresses. The blanket sticking should be sturdy, with a weight of at least 170 gms per square inch.

Quilting and Top Padding: Most mattress have a few layer of padding attached to the ticking.
Insulated Padding: This padding lies directly on the top of the spring to prevent them from being felt.

Coil Count: There should e more than 300 coils with a minimum of 13 gauges wire full size version.

Handle: Most mattresses include handles to use when positioning the mattress. They are not meant for carrying the fall weight.

Box Spring (foundation): Box Spring foundations provide extra softness and comfort. They can be simply a wooden frame covered with board.

Care and maintenance

- Alternately rotating and flipping the mattress on a periodic basis can help minimize body impression.
- Use mattress handles for rotating.
- Foam mattress do not need turning; however the single layers one may be turned.
- The mattress and base should be cleaned with a soft brush every month.
- Do not use vacuum cleaner on a daily basis.
- Check for tears, distorted springs or any other damage periodically.
- Five mattress fresh air and allow them to breathe for 15 minutes-other guestroom cleaning tasks may be complete during this time.
- Use mattress protector.
- Use trolley for shifting mattresses.

DUVETS/ QUILTS: Provides a warm light bed covering but are quite expensive initially. They may be used as such or given a fabric covering. Satin, polyester, silk and good quality fabrics are suitable for the top layer of the quilts. Less slippery material like satin or linen may be used for under layer to prevent slipping. Duvets have become increasingly popular in hotels and are fast replacing the blanket, especially on double beds. They consist of a filling sandwiched or stitched in a fabric case with a changeable cover. The fillers may be duck/goose down, a feather mix or a combination of the two. The down feathers are the small, fluffy feathers. Although they are warmer, professional cleaning is necessary and they are heavier and more expensive than their synthetic counterparts. The synthetic filling is usually polyester fibres. These duvets are lighter and can be washed in large-capacity washing machines. Even if the establishment uses natural fillings to provide the best degree of comfort, a small stock of duvets filled with man-made fibres should be made available for anyone who has an allergy to the natural product. It is essential for the duvet to have an outside cover. Changing a duvet cover is a skill which is developed with practice. To save laundry costs and labour, it is advisable to provide a covering sheer in conjunction with the duvet cover. Though it is common to have all of them in white, the duvet cover, the bottom sheet and valance could be part of the colour scheme of the guest room.

Care and maintenance of Duvets and quilts:

- Mend any tar and damage as soon as possible. Remove stains and grease marks immediately by dry-cleaning.
- Follow the manufacturer's instructions for regular cleaning of duvets and quilts.
- Always use duvets and quilts with easily launder able covers, so that these can be removed and washed separately.
- The cover of a duvet should be 2-4 inches larger than duvet on each side to give it room to expand. Smooth out duvets and quilts with a light hand while making the bed. When storing feather filled quilts and duvets use moth-repellent chemicals.

Pillows and Bolsters: The best and most expensive pillows are filled with down. Others have a mixture of down and feathers and some are filled with manmade fibres. Foam pillow are suitable for people allergic to dust and feathers. Feather pillows don't last long. Foam pillows may also last for 10 years. Kapok, the cotton like fibre from the seeds of the silk-cotton tree, was earlier used as a filling for pillows; but it is not used for pillows in hotels now since kapok –filled pillows cannot be laundered or dry-cleaned. Bolsters are elongated pillow used on settees, divans and beds. In the past, they sometimes formed an under-pillow; but they are not use on the bed any more.

Care and maintenance of Pillow and bolsters:

- Dust and shake pillow lightly before making the bed
- Any damage to the ticking should be repaired immediately
- If the pillows have the synthetic filling, they may be washed individually on a regular basis. Pillows with natural filling should be dry-cleaned when necessary.
- Latex and foam pillow can be wiped clean.

Bedspread/Bedcover/Counterpane: These are purchased, considering appearance, durability and size. The colour and print should match the décor, and soil should not show easily. The fabric should drape well and not crease easily (quilted for this purpose). The durability of the fabric is judged by the effect of laundering and constant use. The life expectancy may be totally disregarded in order to meet with a certain decorative colour scheme. Readymade bedcovers lack individuality so they are usually stitched and a number of styles are possible. Bedcovers should be interchangeable wherever possible.

Care and maintenance of Bedspread/Bedcover/Counterpane:

- Any damage should be repaired as soon as it is detected.
- Conventional blankets should be laundered or dry-cleaned when necessary.
- Stains grease marks should be removed by spot-cleaning or dry-cleaning.
- On a daily basis, while making the bed, gently shake out the blankets

Cushion: It may be used to increase the comfort of chairs and sofas and provide colour pattern and texture to the room. They may be fitted to form a seat or a back; or may be used loosely as scatter cushions. Shapes may vary from square, rectangular, circular, triangular, semi-circular to bolsters, which are elongated pillows. They will be filled with down, feathers, kappa, rubber, polyfill, urethane foam, thermo coal ball, silk cotton, foam plastic etc.

Care and maintenance

Cushions require constant attention

- Shake and tidy frequently
- Repair when necessary
- Brush and suction clean regularly
- Remove covers and wash or dry clean.

3.10 Flower arrangement

Flower arrangement is a design of beauty. It is essentially a decorative piece and should be the centre of attraction. An arrangement can be composed of only flowers and or foliage or in combination with vegetables and fruits. Flower arrangements have an ability to introduce a personal touch in an otherwise staid and impersonal hotel room. Arrangements can be used in lobbies, restaurants, suites etc. Guests appreciate flowers for the freshness they bring to the surroundings. Arrangements need not be reserved only for parties or special occasions. They can be used regularly depending upon the season and the theme. Unconventional and dry material can also be used to make arrangements which are more economical and last longer.

3.10.1 Principles of Flower Arrangement

The principles of design are applicable to flower arrangement as well. Design determines the structural pattern of the arrangement. It consists of the relationship between the flowers, foliage and containers. Any design can be produced i.e. suitable to the occasion and the surroundings. Design is determined by site of placement, function and materials available. Arrangements may have also to be two sided or all round.

Balance: Materials should be placed to give a feeling of stability. Form and colour are important aspects of balance.

a) **Formal balance or Symmetrical Balance:**
In this type, both sides have equal material on either side of the central line. The flowers should have equal visual weight and colour.

b) **Informal or Asymmetrical Balance**
In this, two sides are not equal but still have equal visual weight. Dark colours give an effect of more weight than light colours. They should be centred low in the arrangement. Lighter colours give an impression of lightness and are more suitable towards the outer and upper ends of arrangement.

Scale: It means proportion and relationship of the various parts of the composition. The plant material has to be in proportion with the container used and the sealing of the plant items with each other must be kept in mind along with the site and function. A flower arrangement is of good proportion when it is of right side for the container and placement.

Rhythm: Rhythm can be described as a sense of movement, which flows through the main lines of the arrangement. The purpose of it is to direct once eyes along it so that the shape of the entire composition is followed and understood. In flower arrangement this is achieved by grading flowers and arranging foliage, leaning towards the sides. These lines partly decide the design of arrangement.

Focal Point: It is the central point of arrangement where emphasis is obtained by large accented flowers, group of flowers or use of darker colours.

Harmony and Unity: Ensure that the materials are suitable for the site and the occasion. The colours of the flowers and the container should blend with each other easily or provide a pleasing contrast with each other and with the background. Unity of materials is necessary to view the arrangement without any distraction from the main line of movement.

Basic ingredients

- Mechanics
- Equipment
- Containers
- Bases
- Accessories
- Plant material
- Support

Mechanics: These are items used to keep flowers, foliage, and stems in place within the container. Mechanics must be fixed securely and should be hidden from view.
Examples – florists' foam (oasis), pin holders (Japanese term – kenzan), chicken wire, prong, adhesive clay and tape, florist cone.

Floral foam, also called **oasis**, is a cellular plastic material, available in two types – green foam and brown/grey foam.

Pin-holders, also called **kenzan or needle-point holders**, is a series of sharply pointed pins are firmly held in a solid lead base, to hold thick and heavy stems securely by impaling them on the pins.

Chicken wire, also called **'wire mesh' or 'wire netting'**, is a fine- gauge wire used to cover floral foam blocks in large displays.

Prong is the simplest type of floral foam anchor. It is a small plastic disc with four vertical prongs. The base of the prong is attached to the container with adhesive clay and the floral foam is pressed down onto the prongs.

Florist's cone, also called a '**flower tube'** or '**flower funnel'**. It acts like a miniature vase. It is used in large arrangements, where foliage or flowers need to be placed above their stem height.

Equipment: This includes tools used to ensure t hat a satisfactory arrangement of plant material is created within the container.
Examples – bucket, scissors, knife, watering can, mister, wire cutter, cocktail sticks, turn, wire, floral tape, candle holder, cut flower preservatives, and secateurs.

Mister: It is a hand- held spray bottle to produce a fine mist of water droplets to keep an arrangement look fresh in warm weather.

Secateurs: They are used to cut through thick and woody stems
Cocktail sticks or a tooth pick: It is used to make holes in florists' foam for a soft stem of flower.

Cut-flower preservatives: It is a bactericide, available in powder or liquid form, to prevent slime and smell from developing in the vase water, plus sugar to prolong the life of fresh flowers. A preservative can be made in-house by adding 3 teaspoons of sugar and 1 drop of bleach to half a litre of water.

Containers: These are receptacles that hold the flower arrangement. They may or may not be hidden by the plant material. The container must be waterproof and neutral colours such as soft grey, dull brown, off-white, or earth colours are most suitable because they are inconspicuous and do not detract attention from flowers displayed. Theme and simplicity should be kept in mind while choosing the design of the container.
Example – vases and jugs, basket, bowls and trays, wreath frame etc.

Bases: An object that is placed underneath the container to protect the surface of the support and/or to add to the beauty of the display is called a base.
Example – table mat, tree section, wood base, stone base, and oriental base.

Support: This refers to the structure on which the container stands.
Example – tables, sideboards, alcoves, and shelves.

Other equipments: Florists tape, foam, water spray, rubber bands, tooth picks, thin wire, rocks, pebbles, accessories like birds, butter flies, figurines, sheds etc. A sink, running water and working surface with storage area must be provided.

PLANT MATERIALS: These can be divided into 3 basic types-
Flowers (dominant/ focal/ point material) : This consists of bold flowers or clusters of small showy blooms. The dominant material provides a centre of interest.

Example – Gerbera, Chrysanthemum, lilies, Anthurium, Tulips, Poppies, Roses, Dahlias, and Daffodils.

Fillers (secondary material) : This consists of smaller flowers and all sorts of leaves and foliage that are used to cover the mechanics and edges of the container and also provide added interest and colour to the display.
Example – Asters, Ivy, Button Chrysanthemum, Carnations, Gypsophila (Baby's breath), Limonium and Marguerites.

Foliages (line material) : This consists of tall stems, flowering spikes, or bold leaves that are used to create the basic framework or skeleton. This line material may be straight or curved and it sets the height and width of the finished arrangement.
Examples – Gladioli, birds of paradise, golden rods, larkspur, asparagus ferns, palms, tuberoses, and Peruvian lilies.

Accessories: These are non-plant materials included in or placed alongside the arrangement. Their purpose in generally decorative but could be functional at times. Accessories are added to the design for extra interest or to 'stretch' the flowers when they are in short supply.
Example – miniature dolls, hats, ribbons, beads, painted wire, wooden fruit shapes, silk flowers and foliage, candles, driftwood, shells, idols, interesting pebbles etc.

Care and conditioning of flowers: A flower or leaf cut from a plant has a short, though beautiful, life. It is possible to prolong this for a little while by a few methods. Flower arrangers use the term '**conditioning**' to refer to the preparation of cut plant materials for a long life, the filling of stems with water, and prevention of wilting.

1. A bucket of water at room temperature should be carried into the garden and the cut flowers should be immediately plunged into it. This helps retain their moisture for a longer period of time.
2. Plant material should be cut at a slant, using sharp scissors or knife, either early in the morning or after sunset. At this time, they are crisp and filled with moisture.
3. As a general rule, it is best to cut flowers before they reach maturity.
4. Carry cut flowers in a heads-down position so that heavy-headed flowers will not snap off.
5. Wrap the flowers in newspaper till the neck of the flowers. Plunge this bunch into a bucket of water for 3-4 hours or overnight to condition. This is called '**hardening'**. In case of foliage, submerge them in water for about 2 hours.
6. Use a good pruning knife or scissors to make clean, slanting cuts, causing minimal damage or bruising to the little ducts in the stem which carry water.
7. Make slanting cuts in stems rather than straight ones – preferably underwater, as this helps expose a larger surface area for water suction by the stems.
8. When stems are woody, they may be cut crushed or split at the end, e.g. cherry, etc.
9. To revive wilting flowers, snip off half an inch of the stem underwater and plunge in a deep container of water. Dead flowers should be cut off.
10. Re-cut any stem that has been left out of water, doing this underwater if possible and removing about 2 inches of the stem.
11. To reduce underwater decay, strip the stems of all foliage and thorns that fall below the waterline

12. Never place a fresh flower arrangement where it will be exposed to direct draughts from a fan or window. To prevent dehydration, keep cut flowers away from direct sunlight and large appliances as well.
13. Do not put flowers near a bowl of citrus fruits as they emit ethylene gas when ripening, which causes wilting of flowers.
14. Prolong the freshness of the arrangement by spraying with lukewarm water from a mister morning and night.
15. Change the water every day if the arrangement is meant to last a while. Never use chilled water, as cut stems fare best in warm water of about 45 degree Celsius.
16. Listerine, ammonia, charcoal, salt, lemonade, sugar, camphor, aspirin added in small amounts to the water, or commercial cut-flower preservatives slows down bacterial growth, thus prolonging the life of flowers.
17. Use clean containers to prevent premature fouling and bacterial growth. Do not use aluminium containers for flowers.
18. Every 3 days, re-cut the stems, clean the vase, completely replace the water, and add more preservative.

3.10.2 Styles of Flower Arrangement

Based on angle

All-round arrangements: This arrangement is designed to be seen from all sides and is therefore chosen for a table or a room centerpiece.

Facing arrangement/ flat-back arrangement

It is designed to be seen only from the front and perhaps from the sides. It is therefore chosen for placement on a shelf or sideboard.

Based on the space present in the arrangement

Mass style: Little or no space is enclosed within the boundary of the arrangement. This style is originated in Europe.

Line style : In this style, open spaces within the boundary of the arrangement are the main feature. Most of the display is line material. The basic feature of a line design is limited use of plant material with support often provided by a pin holder.

Triangular shape: It is a popular shape for symmetrical arrangements. The first step is to establish lines of height and width, usually with flowers or foliage of finer form or paler colour. The next step is to establish a focal point of interest with large or darker-colored flowers. Fill in with flowers of varied stem lengths, grouping colours.
Left triangle- It is made in a shallow container with consecutive stem along the left side. Right triangle- like the left triangle arrangement, but the tallest stem on the right side of the container with consecutive stem.

Vertical line: A very tall arrangement placed in long and cylindrical flower vase using a very long stemmed flower like torch lilies.

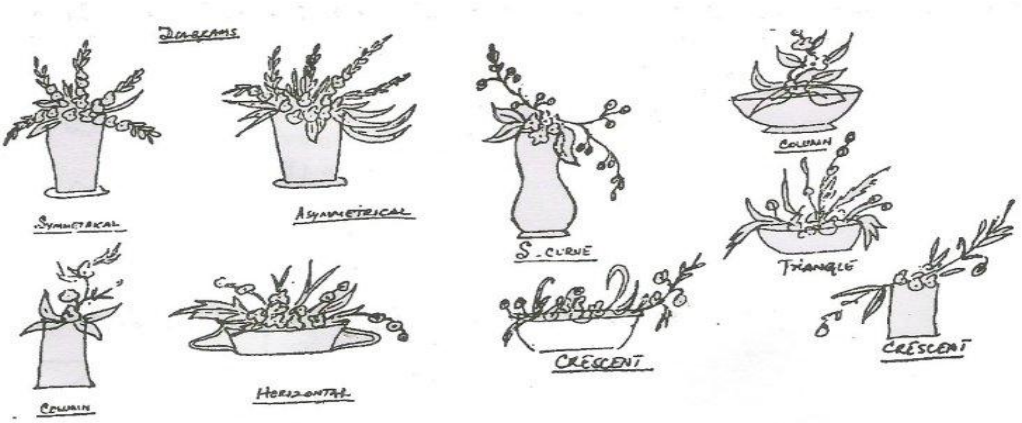
Line mass style : In this style, some open space is present within the boundary of the arrangement.

Circular shape: or round shape, is an arrangement in which flowers are arranged in circular designs.

Crescent shape: it is asymmetrical and formal arrangement which requires more skill and experience.

Fan shape: The fan or horizontal shape is a good line to follow when designing flowers for the centre of the table. It is a low arrangement, symmetrical and thus attractive from every angle.

Hogarth or 'S' shape : This style was pioneered by an 18th century painter, William Hogarth. This is a very graceful and easier to make arrangement when curved branches and pliable stems are used. After establishing the S shape with these, flowers are filled in at the centre and just above and below the rim of the tall container.



Different shapes of flower arrangement

IKEBANA (Japanese/ Oriental flower arrangement): The word literally means '*making flowers live'* in Japanese. This Japanese style has been practiced for thousands of years. These arrangements are more than an aesthetic grouping of plant materials. They are symbolic representations of an ideal harmony that exists between earthly and eternal life. In each arrangement, there is an imaginary triangle. Its tallest line represents 'heaven'. Facing and looking towards heaven is 'man'. The lowest line, looking up to both, is 'earth'. In all such arrangements, Heaven, man and earth are represented by means of three main branches.

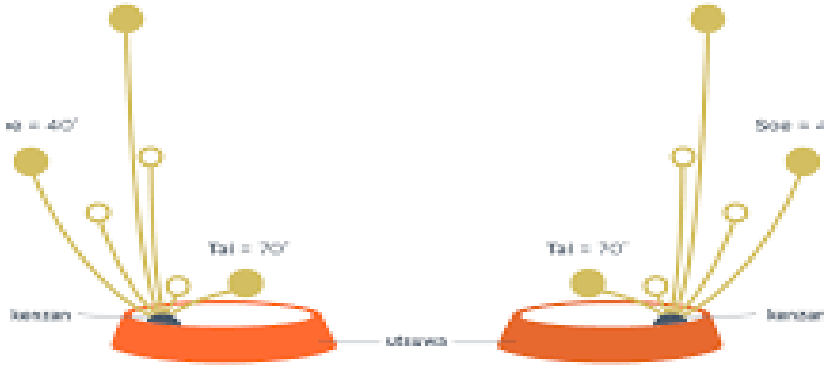
Shin*:* The main spray, is the tallest and symbolizes heaven; it ends to the central axis of the vase. This stem should be 1 1/2 to 2 1/2 times the height of the container.

See: The second highest stem represents man. It provides width to the arrangement and is about three-fourth the height of the tallest spray. This stem forms an angle of about 45 degree with the rim of the container.

Hikae: The lowest spray denotes earth. This branch is about half as tall as the one signifying man and extends very little beyond the diameter of the container, forming an angle of about 115 degrees with the rim of the container. It is placed opposite the branch signifying man and is used to balance the arrangement.

- The Japanese use tall vases as well as low bowls.

- They always use an odd number of flowers, as they believe that odd numbers are lucky as well as more aesthetic. Thus, in all arrangements, three, five, or seven flower sprays are used.
- There is no overcrowding and all the plant materials are seen as separate units, but as a part of the whole.
- There are various schools of oriental flower arrangement.



Ikebana style

OHARA School is the most popular one. In this school-

- When a flat or low container is used, it is called a ***moribana*** style. ***Moribana*** is an informal arrangement in a shallow container in which a pin-holder is used as mechanics. Landscapes are portrayed or large, colourful flowers are displayed.
- When a tall vase without a pin-holder is used, the arrangement is said to be in the ***hikae*** style.
- A formal arrangement, basically a triangular one is called the ***seika*** style which has strict rules governing the lengths and angles of the stems.
- A floating arrangement is called ***ukibana***.
- A basket arrangement is ***morimano***.
- A classical arrangement in a tall cylindrical vase with a flowing and natural effect is called ***nagerie***.

Miscellaneous style -

- Parallel style/ European style
- Landscape style
- Foliage arrangement
- Dried flower arrangement

Essentials in flower arrangement

1. A good design
2. Right shape
3. Colour of the container
4. Flower composition
5. Accessories in the arrangement

While starting the arrangement, make a definite mental plan. Design on the basic form in such a way that taller and wider material goes first in a definite leading line. Locate the focal point low and near the centre. Let the plant material partially cover the container. Avoid even number of flowers except in a formal arrangement. Keep the height of flowers 1/2 times the width of container. Place tall arrangements in tall containers but low containers can be used for both kinds of arrangements. Two items must never appear at the same height. Stems can be bent to obtain curves in the

arrangement. Avoid crossing of stems and observe the reflection of the arrangement in a mirror.

Use of dry material in flower arrangement: A dry flower arrangement is a long lasting arrangement that is made by using dried flower material. Most dry material can be collected in autumn. Examples of the materials for such arrangements are stems of barley, oats, rice etc. Pine cones, wood roses, bull roses, onion seed heads, poppy seed heads, corn cobs, lichen, wired shaped roots, dried grass, feathers, sea weed, dried lotus, Cyprus palm etc. This material can be treated with a coat of varnish, paint or silver and gold wash. Accessories like marbles, coloured glass, bits of metals or strips of metal foil, dried berries, feathers, pebbles, drift wood, ribbons, thremocoal balls, candles, bells, glass balls can be used.

Flower arrangement is a very old art. Making up of a good flower arrangement requires a lot of creativity and one can develop this art through study and experimentation with different plant materials.

Flower arrangement may be defined as the art of organizing and grouping together plant materials (flowers, foliage, twigs, etc.) to achieve harmony of form, colour, and texture, thereby adding cheer, life, and beauty to the surroundings.

Styles of flower arrangement on the basis of effect

- **Formal arrangement** –this is symmetrical and precise.
- **Semi-formal arrangement** – this is more or less symmetrical in outline, but not in the details of arrangement
- **Informal arrangement** – this is asymmetrical and 'free'.
- **Modern or abstract or free-style arrangement** – these have no fixed rules for correct proportions. These arrangements do not have a definite geometric outline; instead the emphasis is on line and space. The individual beauty of each piece of plant material is emphasized instead of the beauty of an outline shape or a mass.

Common flowers and foliage

Flowers –

1. Roses
2. Arum lilies
3. Gladioli
4. Dahlias
5. Chrysanthemums
6. Gerberas
7. Tulips
8. Asters
9. Carnations
10. Freesias
11. Tuberoses
12. Lotuses
13. Anthurium
14. Birds of paradise
15. Marigold
16. Orchids
17. Petunias
18. Hibiscus
19. Poppies
20. Camellia

21. Peonies
22. Hydrangea
23. Snowdrops
24. Gypsophila (baby's breath)
25. Bottle brush
26. Hollyhocks
27. Geraniums
28. Daisies
29. Spider lilies
30. Water lilies

Foliag

1. True fern
2. Asparagus fern
3. Palm leave
4. Umbrella Palm
5. Goldenrod
6. Copper beech
7. Pine
8. Bamboo
9. Ivy
10. Boxwood

Flower arrangements in hotels: In hotels, flowers are used extensively. Various types of arrangements are chosen, as appropriate to the area and occasion. Medium-sized 'round' arrangements are often provided at the guest relations executives' desk in the lobby and on coffee tables in the lounges. In most five star hotels, one can see huge, spectacular arrangements in the lobbies. Restaurants generally have bud vases on each table, with one or two flowers in them. Table arrangements for conferences must be low so that guests may see over them. At informal banquets, large arrangements may be seen. At wedding banquets, wall arrangements using gerberas are very popular nowadays. On special occasions and festivals, some hotels even make beautiful traditional flower carpets for the lobby.
Flowers are used for decorating various areas in the hotel like restaurants, reception area, lobby area, rooms etc. They provide a cheerful appearance and colour to the room. The arrangement should blend with the décor of the room. It should be suited to the occasion and location.

Arrangements for VIP Rooms: Arrangements here offer a great variety in design and imagination. The placement will vary according to the type of room and its décor. The writing table, bedside table or coffee table should be used for placing tall arrangements. The flowers used in rooms should not attract insects.

Flower arrangements for reception area: The reception desk is the first area that the guest comes in contact with. This desk becomes part of the lounge or lobby. Arrangements should lend character and cheerfulness to the surroundings. They should blend with the décor. Roses, tuberoses and gladioli, chrysanthemums, carnations etc are most suitable. The arrangement may be two-dimensional since it needs to be viewed by the guest.

Buffet Table: Flower arrangements on buffet table act as centrepieces and focus of attention. The basic rules of arrangements in dining area should be followed and a

multi- tier arrangement of a combination with fruits and carved vegetables can be made. Flowers used should not have a strong smell. Theme arrangements can be made in theme restaurants.

Banquet Table: A banquet is a formal sit down service and the flower arrangement must also follow a formal pattern. The colour should blend harmoniously with the décor of the banquet hall. A table that is large with a seating capacity of 15-20 guests, should have at least 4-5 small arrangements. These should be low and all round. Flower arrangement for special banquets like wedding banquets or in honour of VIP guests should be formal and usually monochromatic.

Coffee Table: For a coffee table a low mass arrangement that can be viewed from all sides is suitable. Few large flowers combined with tiny blossoms are appropriate. Arrangements can be informal and relaxing.

3.11 Summary

Successful integration of interior design and decoration leads to achievement of the ultimate goals of beauty, expressiveness and functionalism in hotel design. Good taste is appreciated by all. In interior decoration, colour is an important tool, it can be used in various ways. Other important aspect of interior decoration is lighting. Lighting has both functional and aesthetic significance. The function of various types of window treatment has been outlined. Flower arrangement has been described in the concluding section.

CHECK YOUR PROGRESS

Q1. What is interior decoration?

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Q2. Write a short account on any five types of bed.

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Q3. What are the elements of interior design?

3.12 Key terms

Contrast- Difference in colour and light between parts of an image is called contrast.

Crease A line made by pressing, folding, or wrinkling.

Flower bloom/blossom: full open stage of a flower or plant.

Flower bud: half or not opened stage of a flower.

Foliage: green or brown leafy material used in a flower arrangement.

Latex: It is a colloidal suspension of very small polymer particles in water and is used to make rubber.

Mattress: A usually rectangular pad of heavy cloth filled with soft material or an arrangement of coiled springs, used as or on a bed.

Resilient: Having the quality of springing back to a former position.

Searing: it means drying up the leaves and flowers

Shearing: cutting the stem or leaves of flowers.

Tints: A light values that are made by mixing a colour with white.

3.13 Bibliography

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3.14 Terminal Questions

1. Define the following terms;
   Hue, Tint, Value, Shade
2. What are the dimensions of colors?
3. Discuss the Prang's colour system with the help of colour wheel.
4. Classify the different types of colour schemes and discuss each category in detail.
5. How does the location of a flower arrangement affect the 'principles of design'?
6. Define interior designing and interior decoration. What are their objectives?
7. Explain the use of elements of design in hotels.
8. Discuss the principles followed to achieve good interior design.
9. Explain the design features to be followed in flower arrangement
10. Describe the Japanese way of arranging flowers.
11. What are the different types of lighting?
12. What are the methods used in lighting? Explain each with example.
13. What are the difference between Incandescent and Fluorescent light?

UNIT 04
CLEANING SCIENCE

Structure

4.1 Introduction

Housekeeping should provide a safe and healthy environment for residents and visitors, and cleaning of common spaces plays a vital role. By definition, cleaning is the removal of unwanted matter, dust and dirt and contaminants, the prevention of soiling;. The proverbial godliness attached to cleanliness is one of the basic criteria for a satisfied guest to return to a hotel. A professional and well-run housekeeping department is key to running a successful hotel operation. Cleanliness is important for many reasons, not the least of which is the impact it has on guests, as well as keeping long term maintenance costs down. The housekeeping staffs have the most direct contact with the guests' rooms and therefore, are the key to ensuring that the guests have a comfortable and pleasant stay. The importance and influence of the housekeeping department in developing repeat clientele cannot be over emphasised. Cleanliness, safety and security are three of the highest requirements of the travelling public. T he various cleaning agents, cleaning equipments and cleaning procedures are discussed in this lesson.

4.2Objectives

At the end of this lesson, students should be able to demonstrate appropriate skills, and show an understanding of the following:

- Cleaning agents and Cleaning equipments.
- Use cleaning agents and equipment safely and properly

- Describe the best cleaning method to use for a particular application
- Discuss the method of cleaning and maintaining metal surfaces.

4.3 Cleaning agents

A cleaning agent removes or assists in removing or removes physically or chemically any soil from the surface. Dust being composed of loose particles, is removed comparatively easily by the use of various piece of equipment; dirt, however, owing to its adherence to surfaces by means of grease or moisture requires the use of cleaning agents as well as equipment if it is to be removed efficiently; and a knowledge of different types is important so that deterioration of surfaces is prevented.

4.3.1 Choice of Cleaning Agent

With a variety of cleaning agents in the market, the housekeeper should remember that a great deal of time, effort and money can be wasted by wrong choice as well as possible deterioration of articles and surfaces. Cleaning agents are chemicals and the housekeeper should have some knowledge of cleaning science if they are to be chosen and used correctly. The following points maybe taken into consideration when choosing cleaning agents; -

- Mild cleaning agents are generally preferred for cleaning as they are less injurious.
- Strong chemicals and abrasives may be easy to clean and the surface would look better, but on the long run it may damage the surface.
- Cleaning agents have to be purchased in manageable containers as bulk purchases could cause congestion in stores. The containers must have reliable lids, corks as defective ones could result in wastage due to evaporation.
- Strong smelling agents like paraffin must be avoided due to the offensive smells they lend to the environment.
- Pollutant free / less polluting cleaning agents should be used to protect not only the hotel staff and guests but also people at large.

Classification of Cleaning Agents

Cleaning agents are classified according to the principle method by which soil or stains are removed from the surface. This will be determined by their composition.
The principle classes are:

1. Water
2. Detergents
3. Abrasives
4. Degreasers
5. Acid cleaners
6. Organic solvents
7. Other cleaning agents

Water: Water is the simplest cleaning agent and some form of dirt will be dissolved by it; but normally it is a poor cleaning agent if used alone. It becomes effective only if used in conjunction with some other agent, e.g. a detergent. Water serves to:

- Carry the cleaning materials to the soil
- Suspend the soil
- Remove the suspended soil from the cleaning site

- Rinse the detergent solution from the surface

Water has poor power of detergency because:

- It has high surface tension and forms droplets
- It has little wetting power
- It is repelled by oil and grease
- If shaken within oil the emulsion does not prevent formation of large droplets
- It has low surfactant effect (surface active agent)
  Hardness: Hard water contains calcium and magnesium salts which will inhibit cleaning of material in the following ways –
- In combination with soap the salts form insoluble scum which reduces the efficiency of the soap and makes rinsing difficult
- Calcium combines with fat in the soil to form a soapy substance which adheres strongly to the surface
- The calcium and magnesium salts tend to cause flocculation (tendency to cause soil that is suspended in water, to redeposit on the surface being cleaned)
- Hardness of water also causes premature aging of fabrics, causes scale and fur to be deposited in machines and pipes.

Hard water can be softened by –

- Addition of soda
- Addition of water softener based on sodium sequin – carbonate
- Water softening units, e.g. permuted.

Detergent: Detergents are those cleaning agents, which contain significant quantities of a group of chemicals known as 'Surfactants' (chemicals which have water and soil attracting properties). A number of other chemicals are frequently included to produce detergents suitable for a specific use.

A good detergent should –

- Reduce the surface tension of water so that the cleaning solution can penetrate the soil
- Emulsify soil and lift it from the surface
- Be soluble in cold water
- Be effective in hard water and wide range of temperature.
- Be hard on surface that has to be cleaned. Clean quickly and with little agitation.
- Suspend soil in a cleaning solution, and once the soil is removed, to hold it in suspension and not let it redeposit.
- Rinse easily and leave no streaks or scum
- Be economical to user
- Be harmless to the skin and article.
- Be bio-degradable

CHEMICAL COMPOSITION OF DETERGENT

Surfactants: They are chemicals, whose molecules when dissolved in water possess, water seeking end (hydrophilic) and a water-repelling end (hydrophobic). The molecules disperse through water and reduce the surface tension of water by overcoming the forces of attraction between the water molecules, thus allowing the water and surfactant molecule to penetrate the soil and surface.

Builders: They are alkaline chemicals that influence the effectiveness of a cleaning agent in one or both of the following ways -

- They sequester (combine with) calcium ions in hard water to form water-soluble salts, thus preventing the adverse effects of calcium.
- They enhance the emulsifying by increasing the pH value of the solution and dispersing properties of the detergent

Builders in general can cause damaging effect on many surfaces, e.g. chrome, aluminum, wool, silk, paint, wood, linoleum. It may constitute up to 30% of heavily built powdered detergents and helps in softening water too.

Foaming agents increase or stabilize the foam formed by a detergent. Foaming can be used to surfactant activity, the level of foam depending on the amount of surfactant active in a cleaning solution, e.g. ethanol amides.

Suspending agents increase the amount of soil that can be held in suspension in the cleaning solution, e.g. sodium carboxymethyl cellulose.

Bleaches will break down with oxidation, those stains that have not been removed from the surface by surfactants or builders. Sodium per borate, oxidizing weak bleach is frequently included in detergents intended for washing textiles.

Bulking agents contribute to the volume of detergent powders, e.g. sodium sulphate.

Conditioning agents ensure that the granules in the detergent powder are crisp, firm and dry.

Whiteners cause absolute ultra-violet light to transmit as visible white light.

Enzymes are complex proteins that break down organic substances, e.g. blood stains, food stains, etc. they are effective at 30 to 50 degrees C and are inactivated at temperatures above 60 degrees

Anticorrosive agents inhibit the formation of water films on the surface. Chemical reactions resulting in corrosion are generally dependant on the presence of water, e.g. sodium silicate.

Perfumes and dyes are included to increase consumer acceptability, but increase the risk of allergic reactions.

Germicides are also added sometimes to prevent growth of bacteria and fungus.

Abrasives: The cleaning action of abrasives depend on the presence of fine particles which when rubbed over a soiled hard surface, dislodges the soil, removes tarnishing and surface scratches from meat surfaces. Abrasives can be divided into –

- Hard surface cleaners
- Metal polishes.

Abrasives depend on their rubbing or scratching action to clean dirt from hard surfaces. The extent to which they will rub or scratch a surface depends on the nature of the abrasive material and on the size and shape of the particles. The use of abrasive will depend on the surface to be cleaned and the type of dirt to be removed. Whenever possible fine abrasives should preferred to coarser ones. E.g. glass, sand, emery paper, steel wool, nylon pads, powdered pumice, feldspar, calcite, fine ash, precipitated

whiting, filtered chalk, jeweler's rouge (fine abrasive), etc. they are available in natural, liquid, paste or powdered form.

TYPES OF ABRASIVES

Fine Abrasives: These include precipitated whiting (filtered chalk) and jeweler's rouge (a pink oxide of iron) used for shining silver. They are also constituents of commercial silver polishes.

Medium abrasives: these include rotten stone, salt, scouring powder and scouring paste. Scouring powders are made up of fine particles of pumice mixed with soap/ detergent, and alkali and a little bleach.

Hard / coarse abrasives: these include bath bricks, sandpaper, pumice, steel wool, and emery paper. Glass paper, calcite, sandpaper, fine ash, emery powder and paper, jeweler's rouge, powdered pumice, precipitated whiting (filtered chalk). Ground limestone, sand, steel wool and nylon scourers are some commonly used abrasives.
Abrasives are usually not used alone in cleaning agents. For example, a cream or paste meant for cleaning utensils contain about 80 % of finely ground limestone, along with other substances such as bleaches, anionic surfactants, alkaline builders, and perfumes.

Degreasing agents: They usually consist of strong alkalis, which can dissolve proteins and emulsify and disperse grease and similar substance. They are based on caustic soda or sodium met silicate. Sodium carbonate (washing soda) can also be used. They are basically used as stain removers and for clearing blocked drains, cleaning ovens and other industrial equipment. Extreme care should be taken in their use as they have high pH.

Acids and toilet cleansers: Cleaning agents with acidic properties react with water-soluble chemical deposits to produce water-soluble salts. Acids dissolve metals and are hence used to remove metal stains such as water stains in baths, hard water deposits around taps, tarnish on silver, copper and brass, etc. **Weak acids include citric acid** (lemon juice), acetic acid (vinegar). They are used for removing tarnish from copper and brass and mild water stains in baths. **Strong acids** are oxalic acid, phosphoric acid, hydrochloric acid, and sulphuric acid.

ACID	**pH**	**USES**
Concentrated HCL	1	Removing stubborn hard- water deposits.
Dilute HCL	1	Removing stubborn scales and deposits from sanitary ware. Removing excess cement from newly cemented tiled areas.
Oxalic	2	removing stubborn hard- water deposits
Acetic acid	3	Removing tarnish and stains from metals such as copper and brass. Neutralizing alkalis are used in cleaning for preventing colors from running during washing.
Sodium and sulphate	5	Removing hard-water deposits and scales from toilets.

Table 4.1 Acid and their use

Acids can cause further staining on metals if it is not washed off quickly, and may spoil the glaze on sanitary fitments. Toilet cleansers rely on their acid content to clean and keep the W/C pan hygienic and remove metal stains. They can be crystalline, powdered or liquid. **Powdered toilet** cleanser consists of a soluble acidic powder, chlorinated bleach, finely ground abrasive (to help when a brush is used) and an effervescing substance, which helps to spread the active ingredient throughout the water. **Liquid toilet cleansers** are a dilute solution of hydrochloric acid, and should be used with great care, because the concentration may cause damage to the surface of the pan, it's surrounding areas, and to the person using it (if the liquid is spilt).

Alkalis: These are used as cleaning agents in the form of liquids and powders. They are particularly useful in the laundry. Very strong alkalis should be used with utmost caution as they are corrosive and toxic. These are called caustic alkalis. Many alkalis act as bleaches. Caustic soda- based cleaning agents are used to clear blocked drains and to clean ovens and other industrial equipment.

ALKALIS	**pH**	**USES**
Sodium hydroxide (caustic soda)	14	Removing stubborn grease from ovens and equipments.
Ammonia	11	Removing stubborn grease
Sodium carbonate	10	Used as an alkalis builder in synthetic and soapy detergents. Clearing blocked drains
Sodium Per-borate	10	Removing stains and whitening due to bleaching action at higher temperature (above 40.C)
Sodium Hypo-chlorite	9	Removing stains and whitening due to bleaching action on various types of surfaces. Acts as disinfectant.
Sodium Bi-carbonate	8	Removing stubborn grease from smooth, delicate surfaces. Removing stains such s tea, coffee and fruit juice.
Sodium Per-borate (borax)	8	Removing stubborn grease from smooth, delicate surfaces. Removing stains such s tea, coffee and fruit juice.

Table 4.2 Alkalis and their use

Organic solvents: These are chemicals that dissolve fat, oil, grease, wax or similar compounds from different surface, e.g. methylated spirit, white spirit (turpentine substitute), carbon tetrachloride. The former two are highly inflammable while carbon tetrachloride is harmful if inhaled, and hence should never be used in a closed area. Many are used for routine stain removal. They are harmful to skin and some surfaces and are fire hazardous.

Polishes: They do not necessarily clean but produce a shine by providing a smooth surface from which light is reflected evenly. They do this by smoothing out any unevenness on the surface of the article, in many cases by forming a thin layer of wax on the surface, thus giving some protection.

Metal polishes: These remove the tarnish resulting from the attack on the metal by certain compounds and some foodstuffs. They are of two basic types, one for hard metal and other for soft. Either type maybe liquid or paste. Liquid polish is a fine abrasive waxed with grease solvent, and sometimes with an acid, e.g. plate powder, precipitated whiting, jeweler's rouge, mentholated spirit, and ammonia. Abrasive when rubbed on the surface of the metal provides friction to remove the tarnish and produce a shine.

Floor polishes –They are of two basic types

- Spirit based and
- Water based.

Spirit based polishes contain a blend of mainly natural waxes, dispersed in a spirit solvent. They may be in paste or liquid form and contains silicon, but too high a silicon content makes the floor slippery. The buildup of polish can be removed by loosing the wax finish with spirit and slight abrasion, and then picking up the loosened wax with a damp cloth mop. It is suitable for flooring those are harmed by water like wood, cork, linoleum, and magnesite.

Water-based polished are emulsions in which fine particles of natural and synthetic waxes are dispersed in water. They are suitable for use on thermoplastic, rubber, PVC, asphalt and combination floors as spirits can affect them. They can also be used on sealed flooring of wood, cork, magnesite and linoleum. Water-based polishes are always liquid but maybe fully buff able, semi-buff able or dry bright. The build-up polish can be removed by loosening the wax synthetic resin with hot water and alkali – no detergent. Floor polishes are floor waxes and have to be subjected to rough traffic. A more lasting surface can be obtained by use of a floor seal, with or without water based polish applied on it. Seals are semi-permanent materials, which renders the floor impermeable and protects it from dirt, stains and other foreign matter. They are not polishes.

Furniture polishes are intended for wooden furniture and fittings. They are protective finishes, which provide the surface of the furniture with a thin layer of wax or resin. This layer gives protection against abrasion, absorption of spillages and a smooth surface from which light maybe reflected to give a shine or sheen. It consists of waxes dissolved in varying amount of spirits. They are of four types –

i. Paste wax polish – high proportion of wax plus silicon
ii. Cream polish – greater amounts of spirit to give a cleaning action.
iii. Liquid polish – have great proportion of spirit requiring no buffing.
iv. Spray polish – also has high proportion of spirit.

Floor sealers: These are applied to flooring surfaces as a semi- permanent finish that acts as a protective barrier by preventing the entry of dirt, gems and liquid, grease, stains and bacteria. They prevent scratching and provide an easily maintainable surface. The right type of seal should be applied to each type of floor for effective

protection and an attractive appearance. According to their functions, floor sealers can be finishing protective or combination of both.

Types of floor sealers

1. **Oleo-resinous sealers**: they are used for imparting an attractive surface gloss penetrating the floor darkening the color and highlighting the grain of wood floors.
2. **One-pot plastic sealers:** they are used on wood, wood- composition, cork and magnesite floors.
3. **Two-pot plastic sealers:** they are also used on wood, wood- composition, cork and magnetite floors.
4. **Pigmented sealers:** these may be used on concrete, wood, wood-composition, magnesite, asphalt, and stone floors.
5. **water-based seals**: these may used on marble , terrazzo, magnesite, linoleum, rubber, thermoplastic tiles, PVCs, asphalt, concrete, stone-, and quarry tiles.

Bleaches: Bleaches used for cleaning purposes are generally alkaline stabilized solutions of sodium hypochlorite and are useful for stained sinks, W/C pans, etc, but they must never be mixed with other types of toilet cleansers. They whiten and have germicidal properties. Great care should be taken to prevent spotting on other surfaces.

Dis-infectants and de-odorants: Disinfectants, antiseptics and de-odorants are not strictly cleaning agents, but are often used during the cleaning operations. Disinfectants kill bacteria; antiseptics prevent bacterial growth and are frequently diluted disinfectants. Use of disinfectants should not be necessary if the cleaning methods are correct.

TYPES OF DISINFECTANTS

Disinfectants can be categorized in terms of their chemical action and compositions

Phenols: these are hydroxyl derivatives of the aromatic hydrocarbon benzene. They are used in dilute or high concentrations to disinfect surfaces in hospitals especially .in hotels, diluted phenols are used with their sharp smell masked by other additives.

Halogens: the elements chlorine and iodine may be used as disinfectants .Chlorine is used both as bleach and as a disinfectant on many surfaces .Iodine is not often used to disinfectant surfaces because it tends to leave brown stains.

Quaternary ammonium compounds: these are cationic surfactants useful as bactericides.

Natural pine oils: pine oils are obtained from pine trees. They are germicidal to some extent, but are mainly added changing formulation for their pleasant smell.

Deodorants mask unpleasant smells by either combining chemically with the particle causing smell, or by their smell being pre-dominant. This is not required where there is good ventilation and thorough cleaning.

They are used in restrooms, guestrooms, guest bathrooms, cloakrooms and public areas such as lobbies. Some deodorizers leave no trace of a perfume cover- up. They are usually available as aerosol sprays, Liquids, powders and crystalline blocks.

Window or glass cleansers Window cleansers consist of water-miscible solvents, often isopropyl alcohol, to which small quantities of surfactants and possibly an alkali are added to improve the polishing effect of the cleanser. Some also contain fine abrasives. Most glass cleaners are available as sprays or liquid. They are sprayed directly onto windows, mirrors and other glass surfaces or applied on with a soft cloth and rubbed off using a soft, lint- free glass cloth. An inexpensive glass cleaner that can be readily made in the housekeeping department is soft water to which some vinegar is added can be used with old newspaper.

ABSORBENTS

They carry out the action by absorbing the stain or grease. They are used only when the quantity of stain is too much. E.g. starch powder, fuller's earth, bran, French chalk powder, etc.

4.3.3 Storage of Cleaning Agents

Cleaning agents with a longer shelf life are usually bought in bulk because of the reduced costs that accrue from the economics of scale. other agents are bought and replenished periodically .storage of cleaning agents is crucial and the various points to be kept in mind .the points are listed below:

1. Ensure that the storage racks are strong and with selves. Heavier containers must be kept on the bottom shelf.
2. The store should be kept clean and well-ventilated at all times.
3. Ensure that the lids are tightly fitted.
4. When issuing cleaning agents use appropriate dispensers and measuring apparatus.
5. Ensure that no residual deposits of cleaning agent are left around the rims of the containers.
6. Avoid spillage, if a spill occurs, clean it up immediately.
7. Follow a systematic procedure for rotating stocks.
8. Organic solvents, strong reagents, polishes should be kept away from heat sources.
9. Check stock regularly .the store should be locked when not in use.

CHECK YOUR PROGRESS I

Q1. What is detergent? What are the properties of an ideal detergent?

Q2. Discuss water as a cleaning agent.

4.4 Cleaning Equipments

To keep the hotel clean and hygienic, various equipments and supplies are used. No work can be done without proper equipment. It is important that the housekeeper makes a careful selection of equipment based on necessity and suitability for use in a hotel industry, appropriate design and required size, rugged construction and finish, ease and availability of maintenance, low initial and operating costs, on-the-job tested performance, safety, are consumables, and equipment is reusable. Thus, floor machines, brooms, mops, vacuum machines, etc, are categorized as equipment, whereas cleaning agents are supplies. There are mainly two types of cleaning equipments, viz.

a. Manual cleaning equipments and
b. Mechanical cleaning equipments.

4.4.1 Manual Equipment

Manual equipment can include all types of equipment that clean or aid in the cleaning process by directly using manoeuvre, operation and energy of employees.

BRUSHES

These may be designed to remove dry or wet and ingrained dust and dirt from hard or soft surfaces.

Basic parts of a brush: The basic parts of a brush are as follows**.** They are:

- Bristles
- Head Stock
- Handle

Bristles: These may be of animal, vegetable or manmade origin. Horsehair, nylon and polypropylene are commonly used to make bristles for cleaning brushes. In general, the finer, softer bristles are best for smooth and hard surfaces. The harder the bristles, the softer the surface on which the brush should be used, exception being toilet brushes and brushes found on all-purpose flour machines. Bristles, if not maintained properly, have a tendency to bend, splay or fall out of the stock. Bristles should be closely set in tufts and the stock well covered with tufts.

Head stock: This is the part of the brush into which the bristles are inserted. The stock may be of wood, metal, or plastic. A good brush is one that has a sturdy stock.

Handle: Brush handles may be detachable or non-detachable. Detachable handles must be fixed firmly in place on the stock when the brush is in use.

Types of brushes: Three main types of brushes are used for cleaning surfaces.
Hard brushes: Hard brushes have bristles that are fairly stiff and well spaced out. They are most suitable for the removal of heavy soil and litter from carpets and for cleaning rough surfaces.

Soft brushes: Soft brushes have bristles that are fairly flexible and set close together. These help to remove loose soil and litter on hard, smooth surfaces. Such brushes may be designed to dust carpets and furniture, too, especially those made of cane, wicker and bamboo.

Scrubbing brushes: Scrubbing brushes have short, coarse bristles designed for use on surfaces that have become stained and heavily ingrained with dirt. These brushes should only be used to remove stubborn, heavy soiling from small areas that are difficult for a scrubbing machine to access. Long handled scrubbing brushes, called deck scrubbers or T-scrubbers, are useful for cleaning larger areas as well as corners.

Brushes are also classified on basis of their function:

Toilet brushes: These are WC brushes, radiator brushes and Johnny mops.

Bottle brushes: These are used for cleaning overflow vents in wash basins and tubs.

Cloth scrubbers: These are used for scrubbing clothes.

Deck scrubbers: These are used for cleaning large areas.

Carpet brushes: These are used for brushing carpets.

Fig4.1 types of brushes

Upholstery brushes: These are used to loosen out dust embedded between the fabric fibres in upholstered chairs and sofas

Feather brushes: These are brushes with feathers, for light dusting.

Care and cleaning of brushes: Brushes should be gently tapped on a hard surface to loosen dust and debris after the cleaning process. Frequent wash with water is avoidable since the brushes may lose some of their stiffness in this way. If they must be washed frequently, the final rinse should be in cold saline water to help the bristles regain their stiffness. Brushes should be cleaned of all fluff and threads before washing. They may then be rinsed in warm, mild soapy water. A disinfectant should be added to the water used for rinsing toilet brushes. . The best way would be to hang the brushes bristles downward. When possible, dry brushes in the sun or open air. To extend the life of the brush, apply lacquer to the stock and handle with an oil-can and allow to harden.

BROOMS

Sweeping brooms consist of long bristles gathered together and inserted into a handle. The bristles of a broom may be made of grass, corn or coconut fibres. Depending on the type, brooms may be used for removing dust or dirt in large areas.

Types of brooms: As with brushes, brooms may be classified into 3 main categories:

Soft-bristled brooms: Soft bristled brooms such as corn-fibre brooms, grass brooms and whisk brooms are used on smooth floors. A good soft broom has comparatively fewer split ends and any splits that do form are short.

Hard/Coarse-bristled brooms: Brooms such as yard brooms and coconut fibre brooms are used on course surfaces, especially outdoors.

Wall brooms: These are also called ceiling brooms or Turk's heads. They have a soft head and long handle, usually made of cane. These brooms are used to remove cobwebs as well as dust from cornices, ceilings and high ledges.

Care and cleaning of brooms: Brooms should be shaken free of dust and fluff. Never store them standing on their bristles, or the bristles will bend out of shape, resulting in inefficient cleaning. Store brooms either lying horizontally or hanging bristles downward. Never use soft brooms on wet surfaces. Stiff brooms such as coconut-fibre brooms can be used on wet surfaces but must be cleaned afterward thoroughly in saline water and dried in the sun before cleaning.

Box Sweepers: These are also called carpet sweepers and are used for sweeping up dust and litter from soft floor coverings as well as rugs and carpets. They are ideal for the removal of spills and for light cleaning of small carpeted areas. A box sweeper consists of a friction brush that revolves when the equipment is pushed manually over the carpet bottom to facilitate emptying after use. Choose sweepers with a wide base that is low enough to be pushed under furniture and that will clean close to a wall. In sweepers meant to clean hard floors as well as soft floor coverings, the brush can be lowered to the floor to sweep.

Care and cleaning of box sweepers: The friction brush should be kept clean; else the efficiency of the equipment will be seriously impaired. After the cleaning process, the dustpans should be emptied of all the collected dust.

MOPS

Basically they are of two types

a. Dry Mops
b. Wet/damp mops:

Dry Mops: Also called dust control mops, these are designed to remove soil and debris from floors, walls and ceilings without raising and dissipating dust. These mops generally consist of a handle to which a metal frame is attached. The mop head is either inserted into the frame or stretched over it, according to the type.

Types of dry mops: There are 4 principle types of dry mops.

Mops with impregnated fringes: These mops consist of dense cotton fringes, approximately 15 cm in length, inserted into a metal frame of 15-120 cm length. These mops are usually pre-impregnated or will require impregnation by soaking in or spraying with mineral oil or a synthetic impregnating fluid. The dust is held onto the mops by the oil.

Impregnated mop sweepers: These mops consist of a double-hinged frame and are thus called 'V-sweepers' of 'scissor-action sweepers'. The mops can be pre-impregnated or may require impregnation before each use. Following impregnation, sufficient time must be allowed for the mineral oil to cure the fibres; else the mop will leave a film of oil on the cleaned surface due to improper curing. To be effective, an impregnated mop must also be manoeuvred correctly. It should be worked in long, even strokes in a continual movement, keeping the mop head in contact with the surface all the time. This way, maximum dust collection and minimum dust dissipation is ensured.

Static mops: These mops consist of acrylic, nylon or polyester strands fixed to a backing stretched over a metal frame. When in use, the fringes splay out to form a large surface area, holding dust by means of a static charge that builds up on the fringe. Static mops are more easily maintained than impregnated mops.

Disposable mops: These mops consist of a handle with a soft pad at the end, onto which a cheap cotton or synthetic material is affixed. The material has properties enabling it to attract and hold dust. The fabric is held in place by clips or a special tape and is usually

Care and cleaning of dry mops: Shake mops well after use outdoors. The mop head should be easily detachable so they can be frequently washed in hot water with detergent. The use of soap-free detergent will prevent the formation of scum that clogs the fibres of the head. The mop must be worked up and down in at least 2 changes of clean, hot water. The clean mop should then be tightly squeezed out, shaken well to get rid of excess moisture and left to dry in open air. Once dry, the mops may need to be re-impregnated.

Wet/damp mops: These mops are used in conjunction with buckets for the removal of dirt adhering to a surface. The mop heads can be made of cotton, sponge or any other fibre capable of absorbing moisture well.

Types of damp mops: There are 4 types of damp mops available:

Do-all mops: These mops consist of strands of twisted cotton fixed to a circular metal plate, which in turn is fixed to a stock.

Kentucky mops: These mops consist of cotton strands fixed to a length of cotton fabric which is in turn inserted into a flat metal stock. They are available in weights ranging from 330g to 670g. The strands may be stitched together or unstitched. The former are less likely to tangle, can be laundered more easily and are likely to last longer than unstitched mops.

Foss mops: These consist of a dense cotton fringe inserted into a heavy metal stock. They are available in a wide range of weights.

Sponge mops: These consist of cellulose sponge fixed to a replaceable, lever-controlled head, hinged for wringing out and attached to a long handle. Using a sponge mop is one of the easiest ways to wash a hard floor. Short handled sponge mops are also available for cleaning windows.

Squeegee: A squeegee consists of a long metallic handle and a wooden or rubber blade to remove excess water from a surface being cleaned It is effective when followed by mopping with a damp mop. A smaller version called the window squeegee is used for wiping away water from windows after washing.

Care and cleaning of damp mops: Take mops outdoors after use and shake well to remove excess moisture. Then these mops may be washed in the same way as dry mops. Detachable heads are easier to clean and maintain. However, drying is the most important part of mop care as bacteria require moisture to multiply. A disinfectant to discourage their growth is effective only for a short period of time, so leaving them damp means letting germs breed. Damp mops should be renewed as soon as there are signs of wear. They should be stored in such a way that air is allowed to circulate around the mop head. Never use disinfectant or bleach with a cellulose sponge head. Wash and rinse sponge heads after use, squeeze out excess water and dry well. Store the sponge head by hanging.

CLOTHS

Various cloths are used extensively in wet and dry cleaning by housekeeping staff. For efficient and correct usage, cloths may be colour-coded and the staff well-trained.

Types of cloths: A variety of cloths are available for specific purposes.

Dusters and cloth mittens: These are meant for dusting and buffing. Soft, absorbent plain or checked cotton material or yellow flannelette of up to 15 sq. Cm is ideal for

dusters. When used for damp dusting, they must be sprayed with a fine mist of water or dusting solution. Cloths may be impregnated with a mineral oil instead. Dusters must be folded several times into a hand-sized pad before use so as to provide a number of clean surfaces and avoid spreading dirt again to a clean surface instead.

Swabs and wipes: These are all-purpose cloths made of soft, absorbent material. They are used for wet cleaning and damp dusting of all surfaces above floor level. They are also used for cleaning sanitary fittings such as bathtubs and wash basins. Wipes include loosely woven or knitted cotton cloths and non-woven cloths. Synthetic sponges may also be grouped under this category. They are available in various sizes and shapes. Sponges are better than cloths for washing walls, woodwork, glass and upholstery.

Floor cloths: Floor cloths are bigger, thicker and made of coarser cotton material than all-purpose swabs. They are used to wipe WC pedestals and remove spills from floors.

Scrim: This is a loosely woven linen material resembling fine sackcloth. Scrim, because of its high absorbency and lint-free nature, is often used instead of chamois leather for cleaning windows and mirrors.

Glass cloths: Glass cloths are made up of linen tow yarns and do not leave behind lint. They can therefore be used for wiping mirrors and drinking glasses. These must not be confused with fabrics made from glass fibres (glasscloth).

Rags and polishing cloths: Rags are disposable cloths usually obtained from the sewing room or bought by the sack from tailors. They are used for applying polish or strong cleaning agents are disposed off when dirty. Polishing cloths need to have a fleecy napped surface and pieces of flannel are ideal.

Wet cloths: Wet cloths need to be very absorbent and of a manageable size, so that they can be wrung out by hand easily during cleaning. They are used for mopping large floor areas.

Chamois leather: Real chamois leather is the skin of the chamois goat antelope, but now various cheaper imitations are available. These simulated chamois leathers are usually skivers, that is, split sheepskin. Chamois leather can be used wet for cleaning windows and mirrors; when dry; it is used as a polishing cloth for silver and other metals. It is also ideal for wiping squeegee blades.

Dust sheets: Dust sheets are made of any thin cotton material, being about the size of a single sheet. Discarded bed sheets or curtains from the linen room are ideal for use as dust sheets. They are used to cover floors, furniture or other articles during spring cleaning or decorating.

Druggets: These are made up of coarse linen, fine canvas or clear plastic. They may be the size of a carpet square or runner. They are placed on the floor in doorways to prevent excessive dirt being tracked in or out during bad weather and during redecorating projects. They are sometimes placed in the passage between the kitchen and dining area to catch spills and debris.

Hearth and bucket cloths: These are made up of thick fabrics and used to protect the carpet and flooring when a fireplace is being cleaned or placed under buckets to prevent marks on the surface they are kept on. They also catch splashes of water.
Care and cleaning of cloths: Good care of cloths is important for efficient cleaning and longer life. Care and cleaning recommendations for various types of cloths are given in Table 7.1.

CLOTH	CARE AND CLEANING
Dusters and cloth mittens	Wash, rinse and dry thoroughly after use. If cloth mittens are impregnated with mineral oil after washing, keep them covered or they will attract dust.
Swabs and wipes	Wash in hot detergent water, rinse and dry thoroughly after use. Those used on WCs should be disinfected after washing.
Floor cloths	Wash in hot detergent water, rinse, disinfect (as floors may harbour many germs) and dry thoroughly.
Scrim	Wash, rinse and dry after use.
Glass cloths	Wash, rinse and dry after use.
Rags and polishing cloths	Rags should be disposed off after use. Polishes with a strong odour may contain flammable chemicals and storing rags and polishing cloths used in their application may prove a fire hazard.
Wet cloths	Wash in hot detergent water, rinse and dry thoroughly. Disinfect periodically to prevent them from becoming unhygienic.
Chamois leather	If not maintained properly, leather gets cracked and is damaged easily. Remove excess dirt from it with newspaper. Wash only when necessary, in plain cold water. Rinse and either store damp or dry flat. When dry, rub to soften the leather again.
Dust sheets	Shake well outdoors after use. Wash, rinse and dry when necessary. Fold neatly and store when not in use.
Druggets	Shake well by tapping on the ground outdoors, if made of plastic. Use a hard brush to clean away stubborn dirt from cloth. Wash rinse and dry canvas and linen ones frequently. Plastic ones can be damp wiped instead.
Hearth and bucket cloths	Shake well after use. Wash, rinse and dry thoroughly after use. Use a hard brush to clean away stubborn soiling.

Table 4.3: Cloth care & cleaning recommendations

CONTAINERS: Work becomes much easier and efficient if the staff is given appropriate containers in which to carry, transport, collect and store supplies and other items.
Types of containers: The various types of containers used are:

Buckets: These may be made of plastic or galvanised iron. Plastic buckets are more popular these days as they are lighter in weight, quieter to use and easier to clean. Buckets to be used with mops may have one or two sections and may have a wringer device that can be detached for easy cleaning.

Basins and bowls: These are used to carry small amounts of water, cleaning solutions and powders for cleaning small areas.

Dustpans: These are used in conjunction with a broom or brush for gathering dust. They may be made of plastic or metal, plastic ones being the usual choice these days. Dustpans with long handles that eliminate stooping are ideal.

Dustbins: These bins may be made of plastic or wood. Some properties also use jute or wicker bins. Individual dustbins in guestrooms may be lined with a disposable inner lining made of recycled paper or plastic. These bins must be emptied and wiped daily. They should be washed once a week.

Sani-bins: These are metal or plastic bins with lids. They are found in toilets for the collection of soiled sanitary towels. They should be lined with plastic or paper bags for easy cleaning. The bins must be emptied and wiped daily for reasons of hygiene.

Spray bottles: These are lightweight containers that deliver a fine mist or cleaning solution through a fine nozzle, particularly used for spray cleaning. It is essential that the nozzle is properly adjusted and free from any blockage. The nozzle must be kept clean, by spraying clean, pure water through it after every use.

Polish applicator trays: These are used in conjunction with a polish applicator mop for polishing floors with a liquid polish. They should be labelled with the kind of polish that they hold. Cleaning them after use is difficult. Pour any excess polish back into the polish container. Soak the tray in a small amount of solvent used to remove that particular type of polish. Wipe with rags and store.

Hand caddies: Also called 'cleaners' boxes', these were originally made of wood or metal but are nowadays usually made of plastic. They consist of a box with a handle and fitted tray. They are used by room attendants for carrying cleaning supplies from room to room for guestroom cleaning. After each shift, they must be cleaned and topped up with replacement supplies for use in the next shift.

Carts and trolleys: These are more useful than hand caddies when a large amount of supplies and items are to be carted or replaced. They are ideal for the efficient removal and carriage of smaller pieces of cleaning equipment, cleaning agents, linen and rubbish. They eliminate the time wasted in assembling equipment at the work location or moving them from one place to another. The various kinds of carts and trolleys that may be used in the housekeeping department are discussed here.

Maid's cart/Room attendant's cart: Also called a room attendant's trolley, maid's cart or chambermaid's trolley, this is perhaps the most significant piece of equipment in the housekeeping department. It is like a giant tool box; stocked with everything necessary to service a guestroom effectively such carts available are now made of metal, but sometimes wooden carts may be in use. The cart should be spacious enough to carry all the supplies needed for a GRA to complete half a day's room assignments. Since the cart is large and may be heavily loaded, it must be easily manoeuvrable as well. The ideal cart would have fixed wheels at one end and castor-wheels at the other. The cart should be well organised so that the GRAs do not have to waste time in searching for supplies or make frequent trips back to the supply room. Also if the cart is not stacked neatly, it will look very unsightly when in the guests' view. There is usually one such cart for each room section and it is stored in the floor pantry along with other housekeeping supplies.

Janitor's trolley: This is used for carting and storing cleaning supplies. It is used during the cleaning of public areas or any special cleaning projects scheduled for guestrooms. It includes a detachable trash bag and a place for storing cleaning agents and small pieces of cleaning equipment.

Mop-wringer trolley: This piece of equipment consists of a mop and one or twin buckets with an attached wringer, all mounted on a trolley with caster wheels. It may have provision for holding cleaning agents as well as a trash bag.

Linen trolley: These are used for the transfer of clean linen from the laundry to the linen room or from the linen room to the floor pantries and so on. Linen trolleys may be made of aluminium or steel.

Laundry sacks: These, in fact, may or may not be mobile (and hence may not necessarily be trolleys). They may be made of wicker, fibreglass or plastic. A very popular choice is the one made of tough cotton with drawstrings, as it can be washed frequently.

Cleaning and care of trolleys: All carts and trolleys need to be kept clean, wiped daily and stored in a locked, dry, well-ventilated area when not in use. A thorough cleaning may be done once a week. The wheels may be oiled during this cleaning. Carts or trolleys should never become general dumping grounds when not in use.

4.4.2 Mechanical Equipment

The various pieces of mechanical equipment used in the housekeeping department are usually powered by electricity or gas. The staff should be well-trained in the operation of these equipments since incorrect usage will not only lead to inefficient cleaning but may also become a safety hazard.

Vacuum cleaners/ Suction cleaners: Vacuum cleaners remove debris and soil and/or water from a surface by suction. All vacuum cleaners work on the same operating principle. In all types, motor drives an impeller, which sucks in air through an inlet, creating a difference in pressure between the air within and outside the machine. Air drawn in from the inlet passes through and out of the machine. Air drawn in from the inlet passes through and out of the machine. Usually the air is sucked in together with soil, debris or water. The dust is collected into a container provided, which may be within the body of the machine (as in cylindrical and canister models) or on the outside in the form of a bag (as in upright models). The dust-collecting apparatus in the heavy duty models used in hotel properties usually consists of 2 types of dust bags. The inner bag is made of disposable paper and the outer one is made of fabric.

Types of vacuum cleaners: Various types of vacuum cleaners are available.

Dry vacuum cleaners: These are used for removing dust and small pieces of debris from floors, upholstery, furnishings, walls and ceilings. Those using a flexible hose come with attachments, such as a floor-cleaning head, a power head, a crevice-cleaning head, an upholstery-cleaning head, a dusting head and extension tubes.Many variations of the dry vacuum cleaner are in use:

Electric brooms: These are very lightweight vacuums without a motor-driven beater brush. They are used only for light vacuuming and for touch-ups on carpets and hard floors. In other words, they come in handy when a full vacuuming is required.

Dustettes: These are small, lightweight vacuum cleaners used for cleaning curtains, upholstery edges, mattresses, computers and music systems. They clean by brushing and suction and are very easy to handle. The may be carried in hand or strapped to the back of the operator.

Backpack vacuums: These are very efficient to clean high, hard-to-reach areas. The vacuum unit in these machines can easily be strapped to the back of the operator. These machines have hand-held wands that come with various attachments for flexibility in cleaning. They are ideal for use on curtains, drapes and ceiling corners. These vacuums are also referred to as piggyback vacuums.

Upright vacuums: These vacuums are the ones more frequently seen in hotels. The main body of the vacuum lies horizontal on the floor and is driven by a single motor. The dust-bag is outside the machine's main body. There is a belt-driven beater brush to facilitate removal of dust from thick-pile carpets. In an improved variation, there is a dual-motor system – one motor drives the beater brush and the other provides the suction. The machine also has a built-in hose for cleaning corners and upholstery. This machine is most suitable for use on large carpeted areas.

Cylindrical vacuums: These have no rotating brushes and work by suction only. The term 'suction cleaner' is generally used for these kinds of vacuum cleaners. A filter-cum-diffuser is fitted at the outlet which removes fine dust and micro-organisms from the flow of air passing through the outlet. The filter-cum-diffuser also reduces air disturbance and noise. The dust-bag is inside the cylindrical body of the vacuum cleaner. A flexible hose along with the different attachments is used to clean a variety of surfaces. These are the type commonly used by GRAs in guestroom cleaning.

Pile-lifter vacuums: These vacuum cleaners are used to groom long-pile carpets. They lift up the carpet pile that has become packed down and restore their vertical orientation. It is especially useful before shampooing the carpet, more so if the soiling is heavy.

Fig4.4 different types of vacuum cleaners

Centralized vacuum: In this type of unit, suction is generated at one point in the building. Meanwhile, soiling can be removed at vacuum points somewhere else in the building by suitable nozzles connected to detachable flexible hoses. The collected dirt is then conveyed by a network of pipes to a central container. This unit is expensive to install and is generally done at the building construction stage. The advantages of this kind of system are :

- It is extremely hygienic, since all the dust is carried away from the point of cleaning.
- Maintenance costs are usually lower.
- Operative fatigue is lower.
- There are no frayed flexes to repair and no individual machines to go wrong.

Wet-and-dry vacuum cleaners: These are extremely useful in hotel housekeeping operations. They can pick up spills and excess wash water when on the wet mode. When on the dry mode, they help in removal of dust and debris. In hotels, these machines are usually used in their wet mode to pick up spills. They are also required when large areas of floors are being stripped of polish and cleaned. They have a flexible hose with attachments such as a squeegee head. The waste water collects in a tank that needs to be emptied after use. A variation of this is the large tank-type vacuum cleaners. These are also called canister-type or industrial vacuum cleaners. They can be used for dry and wet pick-up or both. The waste water is scooped up by a squeegee attachment through a nozzle and travels back into the tank. They are used for cleaning large areas when time is a constraint. They are ideal for cleaning lobbies, banquet halls and restaurants.

Fig4.5 Dry and wet vacuum Cleaner

Care and storage: Vacuum cleaners will give maximum cleaning efficiency when they are maintained well. Housekeeping staff need to be trained in the care and maintenance of the machines. The wheels of the machine need to be oiled periodically. After use, the dust bags should be checked and emptied. If the machine is operated with the dust bags full, cleaning will not be operated, the machine may heat up too much and the bags may get damaged. Wipe the casing daily and check the hose and flex before use. Clean the attachment heads after each use. Check the filter after use. If the machine is meant for dry suction only, never use it to clear even a little amount of water, else the dust bags will get damaged. In case of wet vacuums, the bucket should be washed, rinsed and dried. The squeegee should be wiped clean and replaced whenever necessary. The hose needs to be rinsed out, the casing and wheels wiped and the filter checked after use. The wheels need oiling periodically. The hoses should be stored hanging on hooks. The tubes and attachment heads of a dry vacuum cleaner should be stored in boxes, drawers of shelves. The hoses and attachment heads of wet vacuum cleaners should be stored off the ground on a rack, in a well-ventilated place

General-purpose floor machines (scrubbing and polishing machines)
These are designed for scrubbing, buffing, burnishing, scarifying and spray maintenance.

Scrubbing: The bristle tips of a brush or the surface of a pad abrade and cut the soiling to remove it.

Buffing: The bristle tips of a brush or the surface of a pad create a high-gloss finish on the floor surface. In case of a surface on which a polish has been applied, it will involve generation of a local heat to harden waxes and resins.

Burnishing: The tips of a brush or the surface of a pad abrade and cut the floor surface to create a smooth surface with a glossy finish. In case of a polished surface, it will involve the removal of a surface layer of polish.

Scarifying: The bristle tips or edge of a cutting tool, cut into impacted soiling and remove it by means of a chisel-like action.

Spray cleaning : This is similar to spray cleaning, but the term is applied to the maintenance of floors where a buffable or semi-buffable polish has been applied and the bristle tips of a brush or the surface of a pad remove both soiling and the surface layer of polish to leave a smooth, glossy surface. Resins and waxes in the maintenance product form part of the restored finish. These machines consist of one large or several small brushes that revolve and scrub the floor. Water and detergent are released from a tank attached to the machine. These machines can be used for shampooing carpets, polishing floors and spray maintenance. Such general-purpose machines are preferred in many establishments as the machine can be put to greater use due to its versatility. In some machines, coloured, abrasive nylon pads replace the scrubbing brushes. For normal-speed machines:

Care and storage of general-purpose machines: The brushes and pads should never be left on the machine after cleaning. The brushes should be detached after cleaning. The fluff should be removed from them after washing. Wash, rinse and dry wet ones after use. The dry ones should be washed occasionally, but dust should be tapped away after use regularly. The pads should be washed, rinsed and dried thoroughly. The tanks should be emptied, washed and dried. The wheels and casing should be wiped after use. The wheels need oiling periodically. The flex should be checked for any fraying before each use. Brushes and pads should be stored in a well-ventilated area, preferably on airing racks or hooks. They should not be kept flat on the ground. The tops of the tanks may be loosely fitted during storage.

Wet-extraction systems:
These machines are used to restore the surface appearance of carpets, upholstery and curtains. They remove the more deeply embedded soilage not easily removed by suction cleaning. They are also useful in the application of soil-retardant finishes on carpets.

Types of wet-extraction systems: There are various types of wet-extraction systems.

Hot-water extraction machines: These are machines with no rotary action. They carry a tank for hot water and detergent, which are used for deep cleaning carpets. The hot water and detergent are shot into the carpet from high-pressure spray nozzles. The dirt is thus flushed to the surface and this, along with the soiled water is removed by suction into a container in the machine.

Solvent extraction machines: These machines are primarily used for cleaning upholstery and curtains and to a lesser extent for carpets.

Carpet shampoo machines: These machines, as indicated by the name, are designed for the deep cleaning of carpets that are heavily soiled.

Types of carpet shampoo machines: There are 4 broad groups of these machines:

Steam-extraction machines: Though these machines are universally called steam extraction machines, there is in fact no generation of steam and the cleaning agents are simply hot water and detergent. Hot water containing the detergent is injected at a prescribed rate and subsequently extracted by a wet vacuum system built into the machine.

Cylindrical-brush dry-foam machines: This system has a cylindrical brush that scrubs that scrubs and picks up in one pass, the foam generated by the machine.

Rotary-brush wet-shampoo machines: A rotary brush cleaner in conjunction with a wet shampoo is employed for the cleaning of carpets here. The machine comes with a range of accessories including vacuum and drying equipment.

Small rotary-brushes wet-shampoo machines: This is also a rotary brush cleaner, but employs 2 brushes instead of 1 and is somewhat smaller than the rotary-brush wet-shampoo machine.

Scrubber-drier

These machines remove debris, soiling and/or water. They are suitable for large areas where mechanical sweeping, scrubbing and drying are required.

Types of scrubber-drier-sweepers: The various types available are as follows:

Power sweepers: These are self-propelled or manually propelled machines designed to remove debris and loosen soiling from roads, pavements, carpets and large areas of hard flooring.

Pedestrian-driven sweepers: These feature a battery or mains-operated rotating broom that carries dirt back into a hopper. A side-broom suction unit and filters may be included.

Petrol or gas-driven sweepers: These have petrol or a gas-powered engine to drive a suction unit and brush. Soiling is brushed back into the inflow and collected in a large cloth sack situated behind the motor. These machines are suitable for the sweeping of pavements, car parks and similar heavy-traffic areas.

Self-propelled sweepers: These machines may be petrol, gas or battery-powered. The power is transferred to the drive wheels and a rotating broom, which carries soiling away from a surface.

Such machines typically contain:

- A side broom to carry debris from the floor edges into the path of the main broom.
- A water spray or suction with the side broom to prevent rising of dust clouds.
- A high volume suction-unit that sucks or blows air through a filter as dust or dirt is deposited in the hopper.
- A filter shaker or air-flow reverser to prevent blockages.

4.4.3 Selection of Equipments

The housekeeper has a great responsibility when choosing equipment since a poor choice can prove less efficient than desired and more costly than it should be. It‟s necessary to be able to justify its use in terms of saving time and labor, hence the saving of money and it‟s efficiency in obtaining a good result

Quality and durability: quality and durability of equipment should be checked before selection of any equipment. Quality of equipment can be found from the organization that has already used these machines. We can get a feedback from them if it is satisfactory. Then we can purchase the machine

Reliability: reliability of a supplier to meet the deadline of time that the equipment should be supplied of time that the equipment should be supplied on time

Purpose of the equipment: this is a very important point to be kept in mind before purchasing any equipment. It should be very clear that for what the equipment is being purchased, what would be its use and function and also where it will be used

Transportation: transportation on time to replenish stock. That is gathering information whether the supplier has enough facilities to transport the equipment or not. Therefore it is better to have a contract with the local office equipment should be light when balanced and easy to manipulate. Availability of future stock so that there is no problem for more stock or replacement of spare parts

Knowledge: knowledge in term of usage. People handling the equipment should be educated and the equipment must be one which can be easily operated

Cost factor: whether the organization is capable of spending so much or not on the basis of the equipments are chosen

4.4.4 Care and Storage of Equipments

Preventive maintenance: a preventive check of the all housekeeping equipment should be done at least once a month, the preventive check can be done in the maintenance department or the dealers of the equipment by conducting preventive maintenance we can ensure the machine would lost longer and would be noise free.

Proper handling of the machine: it should be cleaned and dried after use to avoid from rusting. The bags and filters of the machine should be changed as and when required.

Training: the staff should be trained when the new equipment’s are introduced to the departments are introduced to the department. All the staff should be taught the operation of new equipment’s so that misuse of equipment’s can be avoided.

Storage: the equipment should be stored in a damp free atmosphere to prevent from rusting and the stores to be well ventilated.

The machines should be labeled for easy identification**.**

Stock records: should be maintained to keep check on the number of the equipment's being purchased and stored, the number of equipment's discarded and the number of equipment's in use.

Certain rules: certain rules must be followed regarding issue of stock e.g. A dry can be fixed for issue of stocks so all the staff of the department are aware of the new equipment's that is being introduced into the department.

Expensive equipments: expensive equipment"s should be covered with polythene and kept in place to avoid rusting if not in used.

Equipment inventory: monthly inventory of equipments is very important to have a record for the type, number and upkeep of the equipment

Maintain logs:maintain log for equipment that is issued by the housekeeping staff or borrowed by other department.

Check your progress II

Q1. What is the types of commonly used cleaning agents? Name them.

Q2.What are the two types of cleaning equipments?

Q3.What are the three important expectations of guests in a hotel?

4.5 Composition, care and cleaning of metals

Metals are found in various forms, in different areas, in all hospitality establishments. It forms the whole or some part many fixture, fittings and items of furniture. Most commonly used metals are:

- Silver
- Steel
- Copper
- Bras
- Bronze,
- Aluminium
- Iron

These metals may be used in door and window fittings, wall panels, light fittings, sanitaryware, restaurant cutlery, cooking utensils, guestroom accessories (such as ashtrays, vases, and picture frames), and furniture (such as beds, chairs, and tables). Most metal surfaces get tarnished, scratched, or rusted unless treated or protected. These metals may be used in door and window fittings, wall panels, light fittings, sanitaryware, restaurant cutlery, cooking utensils, guestroom accessories (such as ashtrays, vases, and picture frames), and furniture (such as beds, chairs, and tables). Most metal surfaces get tarnished, scratched, or rusted unless treated or protected.

4.5.1 Protective Finishes on Metals

Painting: Paint may be applied to steel and wrought iron to make them look decorative. Paint also prevents exposure of the metal surface to air containing oxygen and moisture. Before painting, the metal must be cleaned to remove surface dust and any traces of rust. Any damage to the paintwork should be repaired immediately.

Electroplating: This is done using the process of electrolysis. In this process, protective or decorative metals such as chromium, zinc, tin, silver or gold are deposited on brass, steel, or copper. It is a very durable finish.

Galvanizing: In this process, the base metal usually steel or iron is coated with a layer of zinc to avoid corrosion. This is not used as a decorative finish. Rather, galvanizing makes the article more durable. It is a treatment extensively used for buckets, dustbins, and sinks.

Enameling: In this process, molten glass is applied to metal surfaces such as steel and iron, which later sets to form a transparent, tough, smooth, and easily cleaned surface. The enamel may 'craze' (crack on the surface) on wear, however.

Lacquering: In this process, shellac dissolved in alcohol is coated over brass or copper to reduce tarnishing.

Anodizing: This is another electrolytic treatment by which aluminium is protected from corrosion. It also acts as a decorative finish by enhancing the appearance of aluminium. Anodized aluminium is now extensively used for door and window fittings.

Tin-plating: In this process, steel or copper is dipped into molten tin to render it corrosion resistant.

Plastic-coating: Plastics can be coated over steel and iron for colour coding (as in pipes) or for decorative purposes.

4.5.2 Commonly used Metals and Alloys

SILVER: This soft, malleable, ductile metal has a brilliant sheen when well polished. Small amounts of the metal in elemental form occur naturally in the earth, but most of the silver we use is extracted from silver ores. Silver is chemically unaffected by pure water, pure air, and a majority of food stuffs, but gets scratched easily if pure. Silver is used as the plating in electroplated nickel silver, for making cutlery, utensils, vases, and decorative artifacts.

Types of Silver

a. Sterling silver
b. Silver plated (EPNS)

Sterling Silver: Sterling silver is an alloy containing 92.5 per cent silver, and the rest is mainly copper. Sterling silver is more expensive than silver-plated alloy and for this reason is seldom used in hotels.

Silver-Plated (EPNS): Table silver or ‘silverware’ is usually made of silver-plated alloy by plating ‘blanks’ of nickel silver alloy. ‘Nickel silver’ does not contain any silver at all; It (Nickel Silver) is a term for alloys that look like silver (being white metal) and made of nickel, copper, and often (but not always) brass, along with a few other metals for added strength and shine.

Cleaning Procedures: Silver needs to be cleaned and polished on a regular basis. When it gets tarnished, more complex cleaning methods have to be employed.

Following are the cleaning & polishing methods for silver:

i. Regular Cleaning
ii. Silver Dip
iii. Polivit or Aluminium-Soda method
iv. Burnishing Machine
v. Plate-Powder Method

I. Regular Cleaning

- Wash the article in a hot solution of synthetic detergent, scrubbing with a piece of cotton cloth.
- Then rinse in clean boiling water in an enameled tray.
- A sheet of alunimium and some soda can be placed in the tray.
- Once the articles are clean, drain the water away and wipe dry while it is still warm, rubbing hard with a lint-free linen cloth or chamois leather.

II. Silver-Dip Method

- A silver dip solution is used when tarnished silver is to be cleaned.
- It is usually a pink coloured liquid based on an acid solution of a compound into which the articles are immersed completely for removal of tarnish.
- The silver should remain in the liquid for a very short time, the articles should be lifted out, washed with warm water and dried.
- While working with silver dip, stainless steel containers should not be used since the dip attacks steel.
- Enamel or plastic containers must be used instead.
- Silver dip should not be used too frequently on the silver, either, since it is harder on silver because of a chemical reaction between the silver and the liquid that can corrode the metal.
- However, many establishments use silver dip frequently since it is faster than other methods.

III. Polivit Method

- Polivit is an aluminium metal sheet containing holes, which is best used in an enamel bowl or galvanized iron bowl.
- The polivit is placed in the bowl together with some soda.
- The silver to be cleaned is then put into the bowl, ensuring that at least the one piece of silver has contact with the polivit.
- Sufficient boiling water is poured into the bowl to cover the silver being cleaned has contact with the polivit.
- A chemical reaction takes place between the polivit, soda, boiling water and silver which causes the tarnish to be lifted.
- After 2-4 minutes, silver should be removed from the bowl and placed into the 2nd bowl of boiling and then rinsed.
- On removal from the second bowl the silver is allowed to drain and then polished with a clean cloth and then dried with a tea cloth.

IV. Burnishing Machine

- This is a revolving drum with a safety shield. In this revolving drum, highly polished steel balls are immersed in a detergent solution with silver articles.
- The machine rotates and the friction from the steel balls polishes the silver.
- These articles are then rinsed into hot water and dried.
- The burnishing machine is used for polishing large quantities of silver articles.
- Care should be taken to keep the ball bearings covered with water when not in use, since they rust rapidly otherwise.
- Plate-Powder Method
- This pink powder should be mixed with just enough methylated spirit to make a smooth paste.
- Alternatively water may be used; but methylated spirit is preferred since it evaporates faster and the silverware is then available for polishing much more quickly.
- The smooth paste is rubbed thoroughly onto the silver article with a clean rag and left to dry. It is then rubbed off with rags.
- The article should now be rinsed well in boiling water and buffed with a clean cloth.
- Though this method is time consuming but it gives a good result.

STEEL: Steel is an alloy of iron. The alloy contains mainly iron and carbon; other materials are found in small quantities. It is used in the form of pressed chrome steel for the manufacture of baths, sinks, and so on. Stainless steel is used in making cutlery, protective paneling, sanitary ware, furniture, trays, and cooking utensils. Steel is sometimes galvanized or enameled to prevent corrosion. If an enameled steel surface gets stained, it can be washed with a mild liquid abrasive.

Types of steel commonly used

i. Chrome Steel
ii. Stainless Steel
iii. Galvanized Steel

Chrome Steel: Steel is coated with chromium for manufacturing taps, bath handles, shower fittings, and so on. These can become spotted with water marks or get greased, but they do not tarnish.

Stainless Steel: This is steel to which 8-25 per cent of chromium has been added, making it corrosion-resistant. Stainless steel is tough, durable, and can take a mirror-polished finish. It is used in making cutlery, sinks, WCs, and so on. For spoons and forks, steel containing 18 per cent chromium and 8 per cent nickel is generally used. However, even stainless steel can be harmed by silver-dip solutions, acidic solutions, salt-vinegar mixtures, and excessive heat.

Galvanized Steel: Steel may be coated with zinc (galvanized) to prevent tarnishing. This kind of steel is used for making buckets.

Cleaning Procedures: Stainless steel is washed in a hot solution of synthetic detergent using a soft nylon scrubber, rinsed with clean water and immediately dried thoroughly with a linen cloth. The use of harsh abrasives should be avoided as they

may scratch the surface. **Chrome steel and galvanized steel** are wiped or washed with synthetic detergent solution, stains removed with soft steel-wool, the articles rinsed with clean water, and buffed with a linen cloth. For cleaning greasy stains, **sodium bicarbonate** can be used on all types of steel.

COPPER: This metal with an orange-brown shade has a light sheen of its own. It is used for wall paneling and counter tops in bars and restaurants; bowls, vases, and urns in lobbies and guestrooms; and utensils in the kitchen. Copper is even used in cutlery and serving dishes in some ethnic Indian restaurants. Copper cookware should be lined with tin or nickel for protection, as the copper may react adversely with some foods.

Cleaning Procedure

- Copper is washed in warm water and then rubbed with a mixture of salt, fine sand, and vinegar, using rags, to clean.
- It is then rinsed in warm water and dried with a smooth cloth. A thin coat of vegetable oil is applied to the surface to retard further tarnish.
- In case of heavily tarnished copper, a weak ammonia solution will remove the greenish deposits on the surface.

BRASS: This is a golden-brown alloy of copper and zinc. It is used in making door and window fittings, stair rods and railings, foot rails in bars, taps, ashtrays, and ornaments. Brass tarnishes and scratches easily. To avoid this, brass fixtures are usually lacquered.

Cleaning Procedure

- To clean brass articles, remove surface dirt with a duster and rub the article with a paste made of white flour, salt, and vinegar in equal parts.
- This will remove mild tarnish. Make sure to rub away all the mixture.
- Corroded brass should be treated with spirit of salt (hydrochloric acid) and then rinsed thoroughly.
- Polish with Brasso, using damp rags or cotton
- A long-term hard-metal polish can also be used on brass.

BRONZE\ GUN METAL: This is a brown alloy of copper and tin. It is used primarily in making works of art and medals. It does not tarnish easily.

Cleaning Procedure

- To clean a bronze article, wash well with water and then apply a mixture of one part muriatic acid and two parts water with a piece of flannel.
- Allow the solution to dry and then polish the bronze well with vegetable oil.

ALUMINUM: This silvery, lightweight metal is highly malleable, and ductile. It is used to make light fittings, and other utensils. Aluminum is not tarnished by air. It is, however, damaged by soda and other alkalis as well as stained by acids. It also scratches and bends easily.

Cleaning Procedure

- To clean aluminum, wash in a hot solution of synthetic detergents, using soft steel-wool to scrub.
- Use mild abrasives only in the case of difficult stains.

- Discoloration in saucepans can be removed by boiling a solution of water and lemon juice in them, rinsing and then drying.
- In case of aluminum showpieces, some liquid wax polish may be applied to maintain the gloss.

IRON: This silver-white metal of great strength is used in making furniture, buckets, dustbins, and cookware. Iron can be forged or cast. Wrought iron is iron that has been forged, that is, it has been shaped by heating in fire and then hammering while hot. Cast iron is a hard alloy of iron, carbon, and silicon that has been cast in a mould. Non-enameled cast iron is flame and oven proof.

Maintenance

- Utensils made of cast iron need to be seasoned before first use to prevent rusting.
- Before seasoning, the article has to be washed in mild soap and water, then thoroughly dried.
- Seasoning is done by rubbing the inside surface with vegetable oil and heating in a slow oven for about two hours.
- Enameled cast-iron utensils do not need seasoning and are easier to clean.
- If handled carelessly, however, the enamel may chip away.
- If the utensils are put under cold water immediately after use, while still hot, the enamel may gain flake off.
- Therefore, before cleaning, allow the utensil to cool gradually.
- Cleaning Procedure
- Unprotected iron should be washed only when necessary and then thoroughly dried.
- Galvanized iron needs regular washing and thorough drying.
- Rust can be removed from galvanized items with fine steel-wool dampened with oxalic acid.
- Do not store iron in damp areas.
- Before long-term storage, coat with oil or black lead (graphite).

PEWTER: Pewter is a metal alloy that is used to produce home decor items, jewelry, and tableware.Made mostly from tin. Pewter can also consist of copper, antimony, bismuth, and lead. A malleable alloy, pewter can be molded, hammered, stamped, spun, or casted to create figurines, objects, or charms. Elements like stained or fused glass, ceramic, or enamel can be incorporated into a composite pewter piece to complement the pewter's appearance.

Types and Finishes

To regulate the quality of pewter, oversight organizations were formed to standardize the metal's composition into a number of purity grades. The techniques used to fashion pewter grew more varied as time passed as metalworkers developed finishes that could be applied over any grade of pewter to dramatically changed its appearance. Identifying the grade and finish of a pewter piece is the first step in determining the best cleaning method to use.

Pewter grade	**Also known as...**	**Composition**	**Uses**
First	Fine metal	99% tin and	Tableware, drinkware, and jewelry

Grade		1% copper	
Second Grade	Trifle	96% tin and 4% lead	Holloware like sugar bowls, platters, and pitchers
Third Grade	Lay metal	85% tin and 15% lead	Any other application other than food-related items and jewelry

Table4.4 types of finishes on Pewter

Pewter Finishes: Pewter objects often have a finish applied which could be one of three types:
Polished finish: Polished pewter is the most common and has a smooth, shiny surface which can withstand more frequent cleaning than satin or oxidized finishes.
Satin finish: Satin pewter has a rough, grainy appearance with a dull sheen that should not be removed to brighten the look of the piece.
Oxidized finish. Oxidized pewter has a darkening solution applied to it to achieve an aged look intentionally.

Pewter Care and cleaning: Preventative measures should be implemented whenever handling pewter to prevent damage or staining. Pewter has a very low melting point of 450 degrees Fahrenheit, so never place pewter items in the oven, on a heat source like a hot plate or stove, or near an open flame. Acids and sulfur can cause pitting or staining on pewter, so foods with high levels of acid or sulfur, like citrus, eggs, or salad dressings, should be washed off pewter items immediately after use. Washing pewter by hand is preferred over using a dishwasher.

Polished Pewter: Polished pewter is a popular finish because it is very smooth and shiny. This reflectiveness, however, also makes this finish vulnerable to scratches and the appearance of dust or grime. Of the three types of pewter finishes, polished pewter is the one that requires the most cleaning.

- **Professional Polish**: Polishes designed specifically for all metals can be used to clean pewter in a safe and effective way. Before using, look at the manufacturer recommendations which should accompany all metal polish and follow the instructions carefully to produce the best results.
- **Homemade Pewter Polish**: Most of the ingredients needed for this method are easily found around the house, with the exception of rottenstone and linseed oil. Rottenstone is another name for decomposed lime and is sold in powder form.

Satin Finish Pewter: Routine cleaning consists of washing the pewter piece in warm water with a mild dish soap and a sponge. Once a year, however, it could be put through a thorough cleaning process that includes using very fine steel wool to get rid of any dust or grime. Start off with washing the pewter piece with warm water, a sponge, and mild dish soap, then dry completely. Buff the surface of the pewter lightly with the steel wool, making sure to rub in the direction of the pewter's grain, until the whole piece has been covered. Rinse the piece again in warm water and dry with a soft towel.
Oxidized Pewter: Oxidized pewter pieces, which have a dark finish, are the easiest pieces to clean. Simply wash with warm water and mild dish detergent using a sponge. Dry with a soft cloth when finished.

Check your progress III

Q1. Classify steel with their uses.

Q2. What is EPNS? How it is cleaned and polished?

4.6 Summary

Cleaning Agents are substances, usually in liquid form, that are used to remove dirt, including dust, stain, bad smell and clutter in solid surfaces. Purposes of using cleaning agents include health, beauty, elimination of offensive odor, and to avoid the spreading of dirt and contaminants to oneself and others. Some cleaning agents can kill bacteria and clean at the same time. Various types of cleaning agents are used for cleaning the various hotel area. The different types of cleaning agents are: solvent, detergents and soaps, abrasive (fine abrasive, medium abrasive and hard abrasive), liquid cleaning agents, washing soda, soda-bars, powders and flakes, window cleansers, acids and alkali, absorbents, paraffin oil, polishes, disinfectants, antiseptics and deodorants. To keep the hotel clean and hygienic various equipments are used. There are mainly two types of cleaning equipments, viz.manual cleaning equipments and mechanical cleaning equipments.

The correct choice and quality of equipment could save costs, reduce fatigue and ensure efficiency in overall operations. Proper storage of equipments help increasing the life of the
equipments.

4.7 Key Words

Abrasive: Substances or chemicals that depend on their rubbing or scratching action to clean dirt from hard surfaces.

Buffing: Polishing by low speed polishing machine.

Cleaning agent: Substances, natural and synthetic used to assist the cleaning process

ESPN: Table silver or 'silverware' is usually made of silver-plated alloy by plating 'blanks' of nickel silver alloy. 'Nickel silver' does not contain any silver at all.

Jewellers'rough: A pink oxide of iron used as a fine abrasive, for polishing silver and so on.

Dusttetes: These are small, lightweight vacuum cleaners used for cleaning curtains, uphoistry, carpet edges, mattress etc.

Hard water: Water that contains more than 60 ppm (part per million) of calcium and magnesium.

Tarnish: This is a discoloring or deposition on a metal or alloy surface caused by chemical reaction with certain substances found air, water and food stuff.

Hand caddy: Also called 'cleaners' boxes', these were originally made of wood or metal but are nowadays usually made of plastic. They consist of a box with a handle and fitted tray.

Chamois leather: Real chamois leather is the skin of the chamois goat antelope, but now various cheaper imitations are available. These simulated chamois leathers are usually skivers, that is, split sheepskin.

Rottenstone: The another name for decomposed lime and is sold in powder form.

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4.9 Terminal Questions

1. What are the protective finishes applied on metals?
2. What are the points that need to be kept in mind while selecting cleaning equipments?
3. What is cleaning agent? Discuss their classification and write a short note eassy describing each category briefly.
4. How housekeeping inventories classified?
5. Categorized with suitable diagram and describe in brief the types of equipments used by housekeeping staff.
6. Categorized with suitable diagram and describe in brief the types of equipments used by housekeeping staff.
7. What are cleaning agents? Explain any five in detail.
8. Describe the room attendant's cart with labelled diagram.
9. List the rules that need to be adopted while storing the cleaning equipments

UNIT-05
FURNITURE, FITTINGS AND CARPETS

Structure

5.1 Introduction

Furniture can be a product of design and is considered a form of decorative art. In addition to furniture's functional role, it can serve a symbolic or religious purpose Wall coverings maybe purely decorative, in which case, ability to bring colour, pattern, texture, light or shade to the room maybe of the greatest importance. On the other hand the covering maybe required to give an easily cleaned and hygienic surface. Floor is important aspect of interior decoration. Floors are both functional and decorative and play an important part in the cleaning and maintenance program of any hotel. They cover a large area and are subjected to a great deal of wear and tear.

The word textile is derived from the Latin term “texture” for woven fabrics. Thus by textiles we understand those objects which have been prepared by weaving. Textile has an important bearing on our daily lives and everyone needs to know about textiles as we use them in some way or the other. Yarns are produced by twisting or spinning of the textile fibres and in turn fabric is a structure produced by interlacing or interloping of the yarns. There are certain terms which are used very often in the study of textiles that are to be understood first.

A “fibre “ are product capable of being woven or otherwise made into fabric. These fibres are of many types. Soft furnishing are piece of items that are both necessary for comfort and convenience as well as decorative, providing colour, pattern and texture to the room. Soft furnishings include fibres that are used for curtains, loose covers, cushions, bedspreads and quilts. Some articles in addition provide warmth and comfort. Each article is subjected to variable amount of wear and tear.

5.2 Objectives

After reading this unit the learner will able to:

- Understand the types of furniture basically the use of wooden furniture in hotels.
- To get knowledge of all types of wall covering uses, advantages and disadvantages.

- Understand the different type of floor finishes especially carpets.
- To get vast knowledge of fibres and fabrics and
- Some knowledge of soft furnishing.

5.3 Furniture

Furniture refers to movable objects intended to support various human activities such as seating and sleeping. Furniture is also used to hold objects at a convenient height for work as horizontal surfaces above the ground, such as tables and desks, or to stores things. Furniture can be a product of design and is considered a form of decorative art. In addition to furniture's functional role, it can serve a symbolic or religious purpose. It can be made from many materials, including metal, plastic, and wood. Furniture can be made using a variety of woodworking joints which often reflect the local culture.

SELECTION OF FURNITURE

Comfort: office furniture should be comfortable. Comfortable furniture will result in increased efficiency of the employees

Aesthetic Appeal – Purchase furniture that complements the existing décor with the color scheme. It should enhance the overall appearance of your interiors. A good design elevates the mood of both employees and guest and keeps their stress levels low.

Design: design of furniture relates with height and width, color, number of drawers, and so on. No matter what, furniture should support the space and must facilitate the works done.

Cost: cost of furniture is a very important factor to be considered before selecting any machine. The furniture should be within the budget of an office

Durability: office furniture should be made up of steel rather than wood because steel furniture is compatible and lost lasting. Office furniture can be expensive and it is not possible to purchase new furniture every year because it doesn't even support the space. Therefore, the furniture to be purchased must be free from problem of breakage.

Multiple uses: furniture should be usable for numerous purposes in the office.

Safety: office furniture should be safe. Glass topped and sharp cornered furniture are relatively unsafe.

Saving space: choice of furniture also depends upon the space occupied by furniture. Such furniture should be selected which would occupy minimum office space. Bulky and space occupying furniture indirectly add office cost.

Portability: the furniture being portable can be easily shifted from one room to another, one building to another and form one location to another.

TYPES OF FURNITURE

There are primarily four types of furniture fond I hotel guest room based on way they are placed.

Free-standing furniture: The furniture that can be rearranged whenever necessary but the disadvantage is that they accumulate dust behind, above and beneath them. E.g. chairs, tables, beds etc.

Cantilevered furniture: These types of furniture's fitted to the wall on brackets so there is no legs.

Built-in furniture: The piece of furniture is fitted ad fixed into architectural space. Usually their cost is incorporated into the building cost. Since built in furniture has no gap behind, above or below so cleaning is minimized. However, the disadvantage is that once built in the particular piece of furniture cannot be moved, thus reducing its flexibility.

Fitted furniture: Though the terms built-in and fitted are often used interchangeable. Fitted furniture is made to fit into existing alcoves, thereby saving space. The room appears more spacious and streamline when fitted furniture.

Based on other characteristics, furniture may also be categorized as follows:

Antique furniture: It includes pieces from an earlier period. It is often crafted out of wood and its age, condition, unique features and rarity determine how collectible the piece is and therefore, how high its value. Genuine antiques are, by definition, at least 100 years old considered an antique.

Upholstery: Upholstery with fabrics and its techniques had been mastered by the end of the 17^{th} century, by borrowing splendid material and lavish trimmings. Initially these were detachable loose covers, which were later converted to fixed upholstery. These wrappings were supposed to be removed when the furniture was used. Tapestries, furniture and carpets beside silk damasks and velvets were mostly produced in France and Italy.

Modular furniture: These types of furniture are based on standardise measurement or module, so that different pieces can be joint together with verity of ways. One of the major benefits of modular furniture is, it can be resembled and dismantled whenever required in short period of time.

USES OF WOOD IN FURNITURE MAKING

There are two types of wood in use hard wood & soft wood

- Hard wood
- Soft wood

Hard wood: It is strong and is used for Hardwood, being harder and heavier, tends to be sturdier and longer-lasting. Additionally, hardwoods are more resistant to decay than softwoods. The biggest drawback for quality hardwood is its high cost. They include teak, mahogany, oak walnut and beech.

Soft wood: Softwood is also generally more pliable, making it an easier material to work with and hence cheaper to manufacture. However, due to its lack of density, it can scratch and damage more easily. Consequently, softwood furniture needs more

care than hardwood. Such as pine, dell and fir are used for construction of furniture, subfloor, joints, ceilings, broom handles, etc., where the wood is either covered up or out of public view.

WOOD PRODUCTS

These are less expensive as compared to solid wood items. The most commonly used ones include: -

Plywood – It is made by bonding together a number of thin sheets (piles) of wood (usually hardwood) in such a way that the grain of one sheet lies at right angles to those on either side of it. It can be bent to any shape during manufacture and may have as many as nine piles. It's very strong and maybe covered with plastic laminate or a hardwood veneer.

Chipboard – It is used extensively for worktops, wardrobes, chests of drawers, etc. and nearly always has a wood veneer or plastic laminate. It is heavy and strong but flexible. It is made by mixing wood chips with a synthetic resin adhesive.

Hardboard – It is more flexible than chipboard and much thinner. Made from compressed brown fireboard, it is smooth on one side with a mesh texture on other. Hardboard is used as a backing for wardrobes, base of drawers, door panels, backing for pictures, base for floor tiles, etc.

Block boards – This consists of strips of wood between veneers. The inner strips of wood are fairly thick (up to 30 mm) making it a strong material usually used for making shelves and table tops.

Wood products are nearly always faced with a plastic laminate, sun mica, Formica or wood veneer. Hence they should be cleaned according to their outer surface. However all of them will deteriorate if excessive amount of water is allowed to penetrate.

PROTECTING WOOD SURFACES

Unprotected wood surfaces will absorb moisture, which causes the grains to swell and so creates gap into which dirt and germs can fall and become trapped when it dries. Liquids such as coffee and wine leave a stain on the surface, which is difficult to remove, and scratching is difficult to avoid, particularly on floors. The following are the most commonly found methods of protection and maybe referred to as *wood finishes*.

Cellulose lacquer – This is fairly durable matt applied to solid timber furniture during manufacture. It should be dusted and wiped with a damp cloth and then dried with a soft one. Cream or spray polish may be applied to give a gloss finish. Heat, water and solvents will cause damage.

French polish – This is also easily damaged by heat, water and solvents. Deterioration is caused by light and atmosphere in general. French polishing is produced by rubbing the solid wooden surface with a solution of Shellac (a dark red resin) and methylated spirits. It should be dusted daily and polished in the way of the grain. Occasionally cream, liquid or paste polish maybe applied to remove light soiling and improve the gloss.

Oil – Solid wooden furniture can be given a matt protective finish by rubbing the surface with a mixture of oil (usually linseed oil) and resin. This process gives very

little protection although it will help to reduce the absorption of water. Daily dusting is essential. Marks can be removed by lightly rubbing with very fine steel wool. About twice a year the surface should be rubbed with a mixture of equal quantities of turpentine and raw linseed oil. Proprietary polishes should be avoided.

Paint – This is very widely used on furniture, window frames, doorframes, skirting, staircase railings, etc. Gloss paint is tougher than matt or silk and will withstand more frequent washings. All painted wood surfaces should be dusted daily and wiped with a synthetic detergent solution or solvent weekly. Spray or cream polishes can be used to retain the shine or gloss on surfaces. Heat, alkalis and abrasives easily damage paint.

Resin (varnish*)* – Natural and synthetic resins such as polyesters, melamine and polyurethane are used extensively on wooden furniture, window frames, skirting, floors and staircases. The finish maybe glossy or matt and is frequently applied to furniture made from chipboard. Resin is extremely tough and will resist heat, water, solvents and abrasives; but once damaged by scratching or chipping, it is very difficult to repair. Dusting should be done regularly. Cream or spray polish should be applied on glossy surface after damp wiping. Matt surface should be rubbed up occasionally using a mixture of 500ml turpentine, 100ml boiled linseed oil and 500ml vinegar.

Wax (bees wax) – This is applied on solid wood surfaces. It provides an attractive finish, exposing the pattern of the wood, but is easily damaged by heat, water and solvents. Waxed surfaces should be dusted daily and cleaned weekly with cream and liquid polish.

REMOVING STAIN FROM WOODEN SURFACES

Alcohol stain – Polish well. If the stain persists rub along the grain with a metal polish or a mixture of linseed oil and cigarette ash.

Burns (black marks) – Rub with metal polish. For wax or oil finishes, rub the mark hard with turpentine.

Heat marks (white rings) – Rub with turpentine in the direction of the grain.

Ink – Dab with vinegar, leave for 2-3 hrs, then wipe. If unsuccessful, use a matchstick or cotton wool and carefully dab with hypochlorite bleach, immediately wiping with a clean cloth or absorbent paper.

Scratches – Mask with similar coloured wax crayon, shoe polish or liquid polish dye.

Watermarks – Rub with turpentine in the direction of the grain. If the stain persists, rub with metal polish, followed with suitable furniture polish.

CANE, WICKER AND BAMBOO

These are names given to items made from thick grasses (bamboo), palms (cane), willow sheets (wicker). They have similar characteristics to timber products but are usually woven or plaited into chairs, tables, headboards, etc. They are easily damaged and regular cleaning is necessary. Cleaning includes brushing or vacuuming everyday and wiping approximately once a week with a solution of warm water and washing soda or solution of 5ml borax in 50-ml water. Both methods should be followed by

rinsing with cold water in strands. Oil or wax polish maybe applied to polished surfaces. Items used for food items should not be polished e.g. breadbaskets.

5.4 WALL COVERINGS

Wall coverings maybe purely decorative, in which case, ability to bring colour, pattern, texture, light or shade to the room maybe of the greatest importance. On the other hand the covering maybe required to give an easily cleaned and hygienic surface. The choice is very wide and the style should suit the purpose, furnishing and the architectural aspects of the room.

SELECTION OF WALL COVERING

Contribution to décor: The colour, texture and pattern will influence the apparent warmth and dimension of the room and the level and type of illumination used. The type of room, its existing size and decoration must be considered.

Ease of cleaning: Smooth, hard, impervious surface, preferably light coloured can be cleaned easily whereas textured surfaces tend to attract and hold dust

State of existing surface: Textured and patterned finishes can be used to mask poor surface Resistance to abrasion and knocks: - Hard surfaces will be best for this purpose.

Stain resistance: A non-porous surface has more resistance than porous ones.

Durability: Surfaces subject to abuse, knocks, stains and abrasion require finishes that are resistant, can be cleaned easily, inexpensively restored or repaired whenever required.

Life expectancy: Where décor of the room is intended to change relatively frequently, less expensive finishes are appropriate.

Insulation: How-much-ever possible finishes with good sound insulation properties should be selected.

Cost: While comparing cost of different finishes, not only should the cost of the material and its application be considered; but also the cost of its damage restoration and expected frequency of complete redecoration should be borne in mind.

TYPES OF WALL COVERINGS

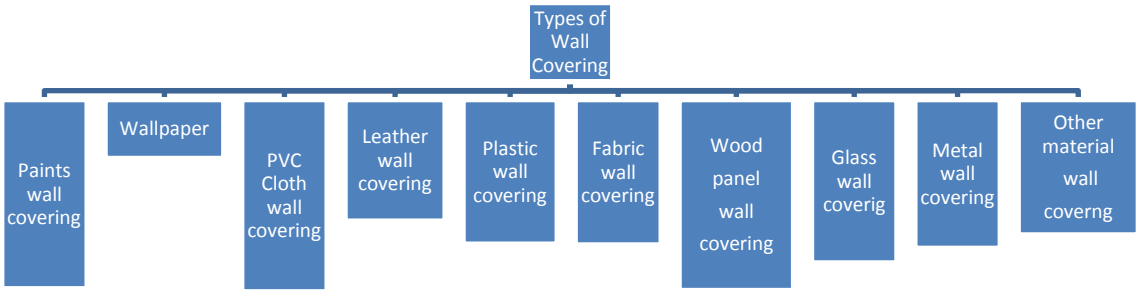

Figure 5.1 Types of Wall Covering

Paints and lacquers

Paints can be applied to almost any surface providing it is free from water, grease or dust and is of sound construction. E.g. plaster must be smooth, hard and not flaking from the underlying plaster or brickwork. As wall covering paints offer a wide choice of types, colors, degrees of gloss and designs (murals can be painted). For window frames and sills, door and skirting boards, slightly glossy paint is required so that along with providing a contrast in colour and texture to the main wall finish, it acts as a protective coating, and thus contributing to décor of the room. It is relatively cheap, easily applied and cleaned and can give a textured and multicolored effect. The only disadvantage is that it shows soils (especially for matt paints) and wall imperfections (in gloss paints) more readily than any other wall covering.

Paints are typically mixture of four ingredients: pigments, additives, binders and solvents. Pigments are colors; additives give the paints the special properties such as resistance to rust and fungus. Binders hold the paints together. Solvents enable the brushing and rolling easier. Depending on the binders or vehicles used, paints can be broadly classified into two classes:

1 **Water base**

2. Solvents based

WATER BASED

Paints in these types the contents are mixed with water only. The various types of water based paints are

Lime wash - These are color washes based on lime (calcium hydroxide), inorganic alkalis, fast pigments, and few other additives. White wash are lime wash without pigments.

Distemper- This is superior to lime wash and is available in a wide range of color. It consists of powered chalk, some coloring pigment and glue mixed with water. It is economical even in new buildings.

Emulsion paints – They are water thinned but are based on dispersions of synthetic resins (e.g. polyvinyl acetate). They are tough, washable and wear resistant; and available in varying degrees of sheen, from matt, to semi–gloss, to silk finish. They are quick drying, low in odor and very suitable for redecoration of rooms, which cannot remain long out of use.

Cement - This types of paints consist of white cement, alkali fast pigments, accelerators, and other additives. It is available as dry power and can be found in several shades. It is economical, water resistant and durable in damp surfaces.

SOLVENT BASED PAINTS

These are generally made of six constituent. Base, filler, coloring pigments, vehicle, solvent and dryer.

The base: it is generally metallic oxide in powered form and is chief constituent of the paints. They may be white lead, red lead, zinc oxide, iron oxide etc

The filler: Cheap pigments added to the paints to reduce its cost.

Coloring pigments: A white or coloring pigment mixed into to get desire shades.

Vehicle: It is liquid acts as binders for the various pigments.

Solvent: It is a liquid that thins the consistency of the paints and evaporates when it applied to the surface so that it may solidify. Turpentine, pure oils, petroleum, spirit etc are used as solvent.

Dryer: one of the groups of materials containing metallic compounds that are used in small amounts for accelerating the drying of the paint film

The different types of solvent based paints available are:

Alloy paints – They are based on synthetic resins combined with vegetable oil such as linseed oil. The conventional types were natural resins, which are still used in primers and undercoat paints. Alloyed paints are generally easier to apply and have better durability and wearing properties than any other type. Polyutherene and silicone are sometimes included to give more scratch resistant surface. They are available in gloss, silk and flat finishes.

Multicolored paints – They are usually dispersions of cellulose colors in water. Each colour is present in separate "blobs "or "spots". The resulting effect depends on number of different colors, degree of contrast between them and the size and distribution of spots. This paint should be applied by spraying. It is extremely hardwearing and the multicolor effect helps in hiding irregularities and imperfections. It is usually applied on walls of corridors, sanitary accommodations, and similar areas, to give a stain and abrasion resistant finish, which can be washed and cleaned regularly.

Textured or Plastic paints – They are usually plaster based and are intended to give a textured or relief effect on surface. The texture is obtained by working over the material after application and while it is still wet, using combs, palette, knives, strippers, etc. Some are self-colored while others may require painting when they dry. The modern types are based on heavy-bodied synthetic resin emulsion and may be applied by spraying directly on the concrete or similar surfaces; thus eliminating the need of plaster.

Micro porous paints – they have a rubberized base which gives little gloss but offers elasticity and allowing movement when the surface expands or contracts.

Aluminum paints – Theses are use for painting wood and metal surface. Aluminum powder forms the base in this type of paint.

Anti-corrosive paints – They are generally used as metal-protection paints for preserving metallic structure against the adverse effect of whether fumes, corrosive chemicals, etc.

Bituminous paints – They are also used for waterproofing and protecting iron and steel. These paints usually consist of asphalt, bitumen and pitch dissolved in spirit or naphtha. These paints deteriorate when exposed on the direct rays of the sun.

Bronze paints – These types of paints is used for painting for interior or exterior metallic surfaces. Aluminum bronze, copper powder is the pigment use in this types of paints.

Enamel paints – This type of paint is made by adding pigments such as white lead or (Pb) or zinc white to a varnish. O drying, it forms a smooth glossy relatively hard and permanent film that is thin but solid. These paints are used both for interior and exterior.

Oil paints – This type of paint can be used for almost all surfaces, from wood and masonry to metal fabrics. Oil paints basically consists of two components – a base and a vehicle

CHARACTERISTICS OF GOOD PAINTS

The characteristics of good paint are:

- It should stick to the surface well and should be able to seal the porous plaster.
- Its consistency should provide easy workability.
- The thickness of the pint film should be adequate for good protection and décor of surface.
- The paint film should dry rapidly.
- The dry paint film should be able to with stand the effects of adverse weather for long time, without losing the gloss.
- It should offer resistance o cracking and flaking.
- It should possess good moisture maintenance.
- Its colour should not fade with the passage of time.

WALLPAPER

They may be smooth or have a textured surface effect. This may be done by superimposing or interlacing of other substance to give a rough surface, or by clever designing when visual effect gives an apparent depth (dimensional effect). Smooth finishes are more resistant to dust and dirt than rough ones, but generally stains show more in smooth finishes.

The pattern maybe floral, geometric, abstract, striped, etc. The choice depends on the room's aspect, height, size and use of room. Large patterned papers tend to overpower and tend to make the room appear smaller than it actually is. Wastage is also higher as patterns have to be cut to match each other. In addition to conventional wallpapers, now many paper-backed materials are also available, e.g. fabrics, wood, veneers, plastic, etc.

The main types are :

Surface printed paper – A pattern is applied to the surface of the paper by hand printing and machine printing.

Screen-printing- A wide range of colors and designs are produced with usually a smooth surface finish. The cost is related to the design and the method of reproduction. The paper is not washable and damp wiping must be undertaken with great care. It can be easily soiled and stained.

Sponge able paper – They are specially treated during manufacturing to withstand water. They are similar in all other aspects to surface printed paper.

Washable papers – Similar to surface printed papers, but has a plastic coating giving it good stain resistance and enabling it to withstand washing.

Anaglypta – It's an embossed paper that is relatively inexpensive. Used to cover poor surfaces, it is normally painted after hanging. Its stain resistance and wash ability depends on the type of paint applied.

Lincrusts – A heavily embossed paper that may have a plastic coating, containing a paper backed textured composition and frequently stimulating wood paneling.

Oatmeal papers (wood chip) – Wooden floor or chips are sandwiched between two layers of paper. Its properties are similar to anaglypts paper.

Flock papers – A raised patterned pile is fixed by adhesive to a paper backing. The piles maybe cotton, silk, wool or synthetic. It attracts and holds dust and is expensive. The surface of the paper maybe damp wiped.

Metallic papers – Paper printed with gold or other metallic powder.

Food grain paper – Photographic reproduction of various food grains waxed during manufacture.

Paper backed hessians – Strands of hessians fixed to a paper backing to give the appearance of a hessian coverings. It is not washable but surface can be damp wiped. It is easily stained and damaged by abrasion. It's available in large variety of colors.

Paper backed woven grasses – Pieces of grass are fixed by adhesives to a backing of paper or silk.

Paper backed wools – Fine or coarse strands of wool in natural colors or bright dyes are laid in a parallel fashion on a paper backing. They give a warm effect and provide good insulation.

Advantages of wallpaper:

- Contribution to décor
- Ability to cover poor surfaces
- Insulation

Disadvantages of wallpaper:

- Costly
- Limited use
- Not abrasive resistant
- Stains easily
- Difficult to clean
- Cannot be easily restored
- Not very durable

PVC Cloths

They are woven cotton finished with a layer of PVC, and are used to form decorative panels on walls or doors. It maybe plain or quilted, involving the use of a foam stuffing and fixed by adhesive or metal studs. It produces a luxurious effect, improves sound and thermal insulation but is expensive and difficult to repair satisfactorily.

Leather wall coverings

They are extremely expensive but very decorative. They maybe padded and studded with brass studs. They are usually not used to cover the whole wall. It's effect wherever required can be stimulated with plastics.

Plastic wall coverings

They are available in large variety. Owing to their abrasion resistance, they are more hard wearing and easily cleaned than any other covering. As they are non-porous, tendency for growth of moulds is higher. Therefore, adhesive should contain fungicides, or fungicidal wash should be applied on the wall prior to applying the wall covering.

The various types are:

Paper backed vinyl – The vinyl may have the appearance of almost any material. E.g. silk, tweed, hessian, cork, grass paper, wood, stone or brick.

Fabric backed vinyl – Similar in appearance to the paper backed ones but is more durable.

Vinyl flock paper- These are velvet piles of flock, mostly synthetic, stuck in patterns over the back ground vinyl wallpaper.

Plastic wall tiles – Imitating ceramic tiles.

Laminated plastic – As a veneer or surface board, melamine is the resin frequently used during manufacture of these plastic laminates which may stimulate wood paneling. E.g.Formica.

Expanded polyutherene – It is used in sheets or tiles on walls and coiling to give heat and sound insulation, and helps eliminate condensation. It can be painted with emulsion paint or covered with paper. Spirits dissolves it and hence if oil paint is to be applied on it, it has to be lined with paper and given a coat of emulsion paint to act as a buffer. Polyutherene is inflammable, and hence it has to be treated to avoid fire risks.

FABRIC WALL COVERINGS

It is possible to cover the wall surface with any fabric and its durability will depend on the type of fiber and the weave used during its manufacture. Fabrics used as wall coverings can be divided into two categories – Woven fabrics, e.g. hessian (used as wallpaper)

Hangings, e.g. tapestries, oriental carpets, drape. Fabrics chosen should not be liable to sag, buckle or stretch when hung permanently on the wall and should not collect excessive dust or dirt. Wild silk or other beautiful fabric maybe padded for heat and

sound insulation but silks and tapestries are expensive, and thus found only in luxurious establishments only. Hessian, linen and some acetate viscose fabrics are cheaper and used more extensively. Fabrics are subject to attack by moths and mildew, hence proper proofing should be done.

WOOD PANELING

Wood used for paneling are usually hard, well seasoned and of a decorative appearance. Most commonly types used are oak, mahogany, teak, etc. it may cover the wall from corner to corner. It may be solid or veneered and finished with wax polish, French polish or lacquer. It will last for years with little maintenance, providing precautions are taken in respect of dry rot and rot worm, though initial installing cost will be high. Wood paneling is usually found in entrance halls, staircases, assembly halls, boardrooms and restaurant.

GLASS WALL COVERING

Glass can be used in the form of decorative tiles, mosaics, bricks or full sheet. Glass bricks allow light to pass through the wall itself. Colored opaque glass sheets or tiles maybe used in bathrooms. Mirror tiles are used to reflect light and to alter the apparent size of the room or corridor. Sometimes antique mirror tiles are used to give a duller surface with lesser reflection. Large uniform mirrors maybe used to cover the whole wall like over a vanity unit or dressing table or on a corridor wall. A glassless mirror is also available which is lighter (almost $1/5^{th}$ the weight of the conventional mirror), does not form mist and will not shatter if dropped. It consists of polyester film, vacuum coated with aluminum and mounted on a flat frame.

METAL WALL COVERING

Metals may be used as wall coverings for their hygienic qualities. Copper and anodized aluminum are decorative and maybe used in areas such as bars where metals in combination with rows of bottles and interesting lighting create an impressive effect. Stainless sleet is used in tile form in kitchens where they present a durable, easily cleaned, hygienic surface. Metal skirting boards cover edges between wall and floor surfaces. Metal foil can be elegantly and sparingly used as a wall covering. Foil is available in variety if colors.

OTHER MATERIALS

Various flooring materials can also be used as wall coverings. They provide different colors, patterns and texture. Though expensive, they are hardwearing and abrasion resistant. The various types are: -

- Linoleum
- Cork (in tiles or sheets)
- Carpets
- Marble
- Terrazzo
- Ceramic tiles
- Granite
- Bricks & stones (these can be used for exterior wall and left unplastered. Also used in fireplaces and chimney breasts to give a Decorative finish.)

Types	Method of Cleaning
Wall carpet, felt, flock (paper-baked), grass, cloth, hessian and jute, linen, silk	Brush down with a soft, long-handled all brush or use a vacuum cleaner with a brush attachment. To remove stains, dust lightly with white talc on cotton wool; leave for a few hours; then brush off. Do not use dry-cleaning reagents or upholstery cleaners, as they may cause discoloration and shrinkage here.
Flock (vinyl-backed)	Wipe the sponge wrung out in warm water. Do not rub flock.
Leather	Refer Unit 4 for cleaning techniques for different types of leather.
Paint-emulsion	Wipe down with sponge wrung out in mild detergent solution. Then wipe with cold water.
Paint-glossy silk-finish vinyl	Wash wall from bottom upwards using a sponge wrung out in mild detergent solution; wipe residue with cold water, working from the top down. If necessary, scrub gloss paint with a soft brush.
Polyurethane varnish	Wipe with a piece of chamois leather wrung out in mild detergent solution. Occasionally spray lightly with furniture polish (from an aerosol can) and rub down with soft cloth.
Tiles-aluinium and ceramic	Wipe down with sponge wrung out in mild detergent solution; rinse well. Dry with chamois leather. Clean grouting with a soft brush dipped in bleach solution and rinse.
Wallpaper	Brush or lightly vacuum; then gently sponge away marks with a mild detergent solution. For grease stains, dab on white talc lightly with cotton wool and brush off after a few hours
Wallpaper-washable vinyls	Wipe down with a sponge wrung out in mild detergent solution.
Wood paneling	Brush or vacuum and rub clean with soft duster. Periodically apply teak oil or cream. Do not use wax polish.

Table 5.1 Cleaning procedures of wall covering

Protection

Life expectancy of a wall covering or finish can be increased and the cost of cleaning, Maintenance and restoration reduced in several ways:

- Selection of finish should be suitable for the degree of spoilage, abuse and damage expected.

- Select a covering that does not hold and attract dust, can be easily cleaned and restored if damage or stained.
- Use a more durable and easy to clean and maintain surface for the lower part of the wall.
- Use plastic sheets on less durable surfaces that are subjected to staining and knock.
- Use doorstoppers to prevent damage to surfaces behind the door.
- Use kick plates to protect the lower part of the door.
- Treat porous surfaces with soil retardant finish.

Check your progress I

Q1. What is Screen-printing wall paper?

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Q 2. Write some advantages and disadvantages of using wall paper.

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5.5 Floor and Floor Finishes

Floors are important aspect of interior decoration. Floors are both functional and decorative and play an important part in the cleaning and maintenance program of any hotel. They cover a large area and are subjected to a great deal of wear and tear. Clean and well-kept floors indicate the standard of cleanliness throughout the establishment. Ease of cleaning in relation to the type and amount of soiling Sound and heat insulation Nature and condition of sub floor. Floor surfaces cover a large area of the room and are subjected to constant wear. They are expensive and replace less frequently than other furnishings. Improperly laid floors or damaged floors can cause accidents and damage to the equipment. Floor surfaces must be comfortable and quiet besides contributing to the décor of the room. The traffic in the area and utility of the room must also be considered.

SUB-FLOORS

Floor surfaces are divided into two types hard and soft floors. A sub floor is laid below the floor surface which may be made of soft wood or hard board. It should be free from dampness, dirt and unevenness. This protects the top floor. In large modern

buildings the subfloor is often made of concrete but in older and smaller buildings it consists of soft wooden boards, nailed to wooden joints.

SELECTION OF FLOOR FINISHES

Appearance: Colour, pattern and texture of the floor surfaces should be compatible to the size, décor and activity of the room. Pale colours provide a cool appearance of warmth. Patterned surfaces add interest to the room.

Comfort: Foot fatigue should be reduced by use of soft resilient surfaces. Floor surfaces should not be noisy or slippery.

Durability: Grit, dragging of furniture and placement of equipment or circulation of heavy traffic should not damage the floor surface. They should also not be affected by the cleaning reagents and food spillages.

Life Expectancy:

Since floor surfaces are not changed frequently, they are expected to last for longer time.

Safety:

Safety to the guests and occupants must be considered. Fire resistance, slip resistance and accident proof surfaces must be selected.

Ease of Cleaning:

Ease of maintenance and cleaning costs must be considered while selecting them.

Cost: The cost of floor surface cost of lying and maintenance should be considered before selection.

Types of Floor Finishes

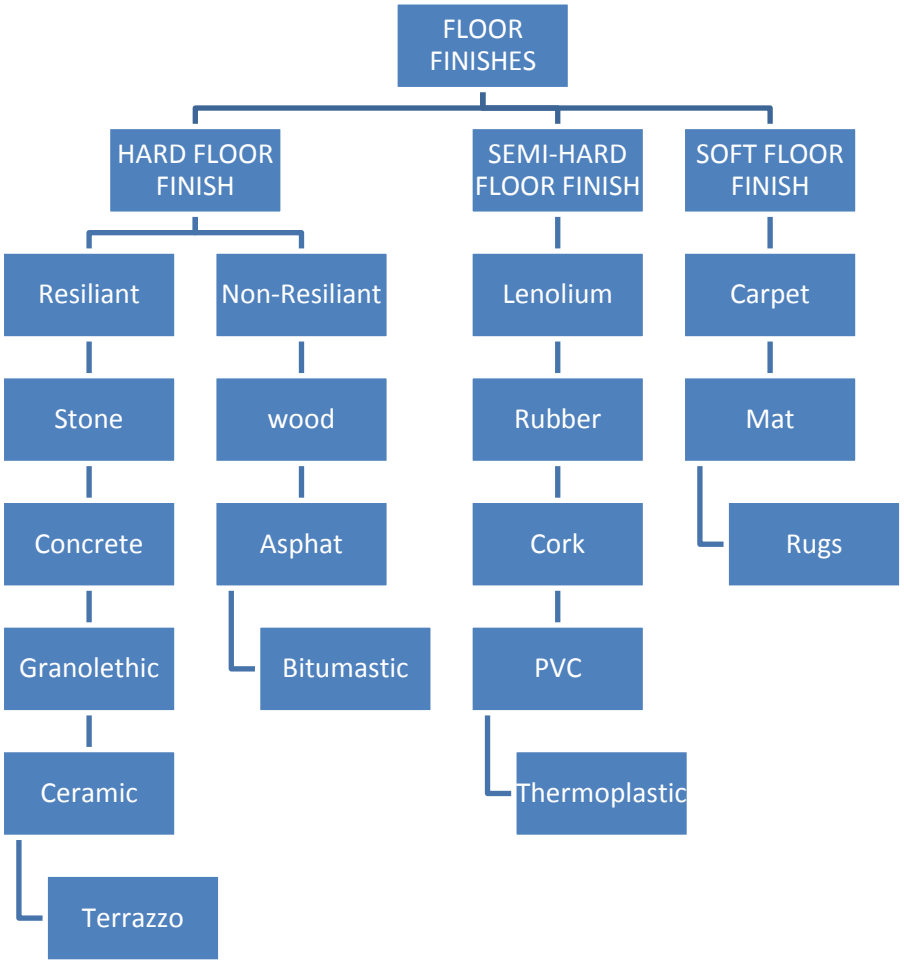

Fig5.1 Types of floor finishes

Hard floor finishes: Hard floors are usually sealed to give a non-absorbent, semi permanent gloss or finish which will wear off in time. Seal is applied on clean and dry floor. Before re-sealing any remaining seal has to be stripped off. This is done with a chemical stripper, except in the case of wood and cork where sanding is done. In order to preserve the seal, polish should be applied to seal flooring. Polishes are usually spirit or water based. Spirit based floor polishes may be paste or liquid and require buffing when dry to produce a shine. Water based polishes are liquid and dries after application to give a shiny surface.

NON RESILIENT HARD FLOOR FINISHES

Stone: The natural stone are available in slab form, is usually cut in tiles from quarried blocks of the stone or rocks. Floors made from marble & granite is expensive and hard on feet. Provides beautiful flooring material that has a timeless, elegant quality. They referred as hard floors because they offer no resilience, are cold underfoot and noisy in comparison to other types of floors. The various types of stone commonly used are: marble, slate, quartzite, sand stone, granite etc.

Concrete: It is composed of cement and sand. Pigments may be added to provide colour. This floor can withstand large weights but is damaged by acids and alkalis. It is suitable for stores, sub-floors, laundry, staircase etc. Concrete is extremely porous, hard and soiled easily. A scale may be applied to make it stain resistant. These floors are suitable in halls, lounges, corridors, and bathrooms and as tabletops.

Granolithic: it is hard floor finish of graded granite chips set in cement. It is used for basement corridors, storerooms, stairways and laundry. The final surface is hard-wearing and its appearance is improved if the surface is polished. It is usually laid in tile form.

Terrazzo: This is also a hard floor finish, consisting of a mixture of marble and other decorative chipping set in fine cement that can be colored. Marble is a rock (limestone) mainly found in Italy, and maybe white, black, green or brown. When used as flooring it is laid in slabs. Marble is very expensive; terrazzo being only chips of marble is much cheaper. To prevent slipperiness self-polishing emulsions are applied. Terrazzo is used in foyers, cloakrooms and kitchens.

Ceramics: Ceramic tiles are made of clay and fired at high temperature. They are hand or machine made, glazed and unglazed. Shapes of the tiles may be square, rectangular or hexagonal. Tiles are waterproof and impervious to cleaning liquid. They are commonly used in bathrooms, kitchens, laundry, canteens, bars etc. These floors are hard, noisy and tire the feet. Ceramic floors should not be polished since that would make it dangerously slippery.

Glazed ceramic tile Glazed ceramic tiles are made from special ceramic clay in two operations Biscuits the body of tile is made and fired at 1200 To 1300 c Glazed Biscuits are then coated with glazed, decorations etc.

Vitrified tile When Special Clay is mixed with quartz and feldspar and burned to very high temperatures. These extra ingredients melt, creating a glass element inside the tile. This glass component makes the vitrified files very hard and resistant to any type of absorption. This word ‘Vitrified Tiles’ is simply a type tile with very low water

absorption. And this property makes vitrified tiles acid/alkali/chemical resistant, impairs a greater strength & makes it stain resistant.

Vitrified tile Full body vitrified tiles: This type of vitrified tiles has color all the way throughout the body (thickness) of the tile. Because of this scratches are less noticeable in this type of tiles. Full body vitrified tiles are formed with the paint mixture pre-added while making the body. It is called Glazed Vitrified Tiles (GVT). Main advantage with GVT is it offers option of making any type of design/art work that is only possible in this type of vitrified tiles. Much type of textures (like wooden, bamboo slate or stone) are possible in GVT.

RESILIENT HARD FLOOR FINISHES

Wood: Wood Floors There is nothing quite as attractive as the warmth and richness of wood floors. Most hardwood floors are made from oak, but other popular woods include ash, beech, birch, hickory, maple, teak, and walnut. In addition to its attractiveness, hardwood floors are extremely durable if they are properly finished and maintained. Unfinished wood floors will quickly deteriorate under even light use, as wood is an extremely porous material. Unfinished woods are susceptible to dirt lodging in the grains, splintering of the wood fibers abrasions caused by normal foot traffic, and of course, moisture, the bane of wood floors. Too much moisture will cause a wood floor to warp, while too little humidity will cause wood floors to shrink and crack. To help forestall damage, most wood floors made today receive factory applied finish. Tung oil and carnauba wax are then applied to seal the wood. Wood Floors since there is a degree of resiliency in even the hardest of hardwood floors, precautions should be taken to protect the floor from furniture legs that may dent the flooring. The types of wood flooring are outlined below:

Wood Parquet flooring: It is a floor composed of short strips or blocks of wood forming a pattern, sometimes with inlays of other woods or other materials. Parquet flooring is a series of wood flooring pieces that create a geometric design. Parquet offers a variety of design options. Timber used for Parquet floor is Jati & Kempis.

Plywood: These are made into tiles that can be used to stimulate wood parquet but are generally called ‘parquet’ these days even when laid simply to resemble a board floor. Various ready-patterned tiles in herringbone, basket weave or strip are available. Plywood parquet tiles are not durable in areas of heavy wear. It is supplied in various squares from 9inches to 3ft.

Hard wood strips: These are high-quality wood flooring made of hardwoods. A well maintained hardwood floor improves with age. Hardwood blocks vary in thickness from ¾ inch to 1 ¼ inch and the size may be up to 12 x 3 inches. The strips used are up to 4inches wide and are carved to have a tongue and groove.

Asphalt tiles: they are composed of asbestos fibres, pigments, inert fillers, bound with asphalt in the case of a darker verities and with some other resinous binder in the case of lighter colors.

Bitumastic flooring: This is a joint less, low cost flooring and consist of a type of asphalt roll onto a sold sub floor in a hot plastic state. It is soft in texture, though the appearance is that of a hard floor. It is normally black, brown and red in colour. It is also used in as moisture-proof membrane to protect other flooring against dampness. Howe ever, it is damage by heat and heavy weigh

SEMI HARD FLOOR FINISHES

Linoleum: This is made up of lignum, i.e. flax and ileum in oil. Ground corkwood, linseed oil and resins (gum) are pressed on to jute backing. This is prepared in sheet or tile form. Linoleum may crack if laid on poor quality sub floor. It is hard wearing, resilient and warm, but may peel, rot and gets destroyed by alkalis. The thickness varies from 2mm to 6mm. Linoleum flooring is also available in form of tiles. Linoleum flooring should be laid over an effective damp-proof area. Its properties included in a remarkable degree of resiliency. Next to cork and rubber, and of course, padded carpeting, linoleum is considered to have the greatest degree of resiliency. Linoleum was quite durable, was resistant to oil and grease, and do not shrink. The negative aspects of linoleum were that it is highly susceptible to water. The linoleum would absorb water and would then soften, causing it to lose its abrasion resistance and become more susceptible to indentation.

Rubber: Rubber floors are usually made by a combination of natural and synthetic rubber. They may be laid in sheets or tile form. They may be coloured and mottled with inlaid patterns. The floor is hard wearing, resilient, quiet and waterproof. It is non-slip and may be grease resistant. Damage may occur due to alkalis, acids and spirits. One major advantage is that they are quite resilient and will remain resilient over a considerable temperature range. They are not affected by mould, bacteria and pest infestation. It is commonly used in kitchens, bathrooms, health clubs, near swimming pools etc. Rubber Floors All modern rubber floors are made from synthetic rubber
such as styrene butadiene rubber (SBR). Rubber tiles are cured or vulcanized by the application of heat. Rubber floors are nonporous, waterproof surfaces. Rubber flooring is susceptible to alkaline, oils, grease, solvents, ultraviolet light, and ozone in the air.

Vinyl Floors: There are several types of vinyl floorings and tiles. The major varieties include vinyl composition tiles, homogeneous or flexible vinyl tiles, and laminated vinyl flooring. Laminated vinyl flooring is less expensive to manufacture than vinyl composition or homogeneous vinyl floors. The low initial cost may be deceiving, however, for once the top wear layer is worn through, the floor will have to be replaced. Some laminated floorings are only guaranteed for three years with moderate use. The cost of laminated vinyl flooring will vary in proportion to the thickness of the top vinyl wear layer. Vinyl Floors In addition to the vinyl resins, vinyl composition tiles contain mineral fillers such as asphalt and pigments. Homogeneous vinyl tiles may either be flexible or solid, and it has become the preferred standard for resilient tile flooring. It is practically unaffected by moisture, oils, and chemical solvents. Vinyl is made from asbestos, fibres, mineral pigments and PVC. They are very hygienic and deal in hospitals, kitchens, dining area, nurseries, common rooms, lifts etc. They are water and oil resistant and can be made slip resistant. They are damaged by cleaning gels, high temperature and acids.

Thermoplastic: These are made of asphalt, fibres, mineral fillers and pigments or synthetic resins with vinyl binder. The tiles are usually dark coloured and quite durable. They have good thermal insulation and are resistant to water. They are damaged by heat, acids and alkalis. They are useful in canteens, corridors, shops and offices. PVC may be added to make hard thermoplastic more flexible.

Cork: Cork tile is made from the outer bark of oak trees. The cork is ground into large granules, mixed with synthetic resins, and pressed into sheets, which are then cut into tiles. Contemporary cork tiles for floors usually have a top layer of clear vinyl applied to them. This vinyl layer protects the cork from staining and wear. Cork tiles traditionally have had limited application in industrial or institutional settings. One reason is that cork is susceptible to staining because it is one of the most porous of all floor coverings. Another limitation is that it is not durable; it is highly susceptible to abrasion. Cinders, sand, and gravel tracked on to a cork floor will severely shorten its life span. Finally, it is expensive.

Floor type	**Method**
Asphalt composition, bitumastic, thermoplastic	Sweep and damp-mop daily. Occasionally apply self shine polish. Never use wax polishes, as the spirit in them will damage the surface. Remove marks by rubbing lightly with ire wool; then wipe over with a sponge wrung out in warm water and proceed to polish
Cement/concrete/clay or quarry tiles, stone and brick	Sweep and dry-mop daily. Periodically wash or scrub with detergent suds. May be sealed to make the floor non-slip and resistant to dust, oil water and grease. Polish quarry tiles with liquid tile polish or self-shine tile polish
Glazed tiles, Terrazzo	Sweep or dry-mop daily; or wipe down with mild detergent solution. Avoid all abrasive cleaner.
Cork	Sweep or damp-mop daily. Wax polish periodically. If sealed, use self-shine polish occasionally.
Linoleum	Sweep or dry-mop daily or wipe with cloth wrung out in warm water and detergent. Polish with wax or self-shin polish o use a combination cleaner-cum-polisher.
Marble	Sweep or dry-mop daily. Wash with soft cloth wrung out in warm water and detergent. Rinse well and dry. Remove light stains with mild abrasive, lemon juice or vinegar; rinse off and dry.
Rubber	Sweep and dry-mop daily. Apply self-shine polish weekly until pores are filled and non-absorbent. Wash only hen very dirty and do not over wet. Avoid oil or spirit based sealants and wax polishes.
Vinyl, vinyl asbestos, matt PVC, felt-backed vinyl	Sweep or dry-mop daily. Wash when needed with cloth wrung out in warm soapy water. Polish with self-shine finisher or combination cleaner-cum-polisher. Avoid oil-based sealant, spirit-based cleaners and solvents. To remove

	marks, rub gently with wire wool.
Wood, wood blocks, wood mosaic, hardwood strips, plywood parquet.	Sweep daily and occasionally mop or wash. If unsealed, apply wax polish periodically if sealed, damp-mop and buff with dry mop. Use self-shine polish periodically.

Table5.2 cleaning methods of different types of flooring

SOFT FLOOR COVERING

Soft floors are used for variety in colour, texture and design. They are warm, durable, quiet, slip resistant and economical. Various types of colourings may be used in different areas depending upon cost of maintenance, cost of installation, attractiveness and use. Soft floor coverings commonly consist of two types: Carpets and Rugs.

Carpets: Carpets are used extensively in hotels and institutional establishment. The type of carpet selected will depend upon the suitability and traffic in the area. They may be used in bedrooms, lounges, TV rooms, restaurants, office and corridors. A good quality carpet should be able to withstand spillages, cigarette ash and grit. They must also be resilient to heavy furniture.

Rugs and matting: Rugs may be used on floors where wall-to-wall carpeting is not advisable. In heavy traffic areas, rugs can be turned over to neutralize wear and tear. They can be rolled and removed for cleaning and modifications in arrangement. Rugs may be used to control noise and add colour or pattern to the floor. They are made of cotton, wool or blended with synthetic material.

Matting is used in corridors, building entrances, around swimming pools and outdoors to prevent heavy soiling and provide noise control in the area coir, cotton and filtered fibres are most common.

CARPET CONSTRUCTION

Carpets consist of three layers: a pile, a background and an underlay. The pile is held into the backing with knots and adhesives.

Under lay: The underlay acts as a shock absorber between the backing and the sub floor. It makes the carpet softer and provides insulation. Underlay may be made of felt, rubber, foam or jute with polypropylene backing.

Backing: Natural materials like jute, hemp, glue and starch are used along with resin, synthetic rubber and polypropylene to form the backing. A secondary backing may be added to improve resilience.

Pile: The carpet pile absorbs most of the wear. It is called the face of the carpet; this is the part which is seen on the surface. It should be strong and resilient, shrink- proof, moth proof and flameproof. The fibre such as wool and cotton, silk is used. The carpet pile is generally made of blends of fibres.Carpets can be produced with several different kinds of pile.

TYPES OF PILING

Cut Pile: In these types of carpets, the ends are cut on the surface of the carpet. The pile may be short and smooth or long and shaggy. It may also be cut long and short.

Looped Pile: It is uncut and may be tufted. It could be shaggy or smooth.

Cut and Looped Pile: This is a combination pile used in pattern carpets.

TYPES OF CARPET

Woven Carpets: Some of the highest quality carpets are made of weaving method. The pile and backing woven together so they lock into the position. Here, the pile and backing is produced simultaneously. The pile is secured with a knot and is therefore very strong. The pile may be either cut or uncut. This type of weave gives a sculptured effect E.g. Axminster carpets, carpets. Woven carpets are expensive but very durable and are used in hotel reception areas, corridors, dining area, bedrooms, lounges etc.

Types of woven carpets: Wilton carpets; they may be produced as patterned, cord, Brussels, or plain. Axminster carpets; There are three types of Axminster carpets. They are Spool, gripper, chenille.

Oriental carpets

Wilton carpets

Pattern Wilton Carpets: These are woven on the jacquard looms which draw up one thread at a time to form the pile while the remainder stay hidden in the backing giving strength, warmth and resilience. Up to five colours may be used in the carpet construction.

Plain Wilton carpets: These are not woven on the jacquard looms only one colour is used, they have extra jute threads called 'stuffer' added to the backing to compensate for lack of the spare coloured yarn as filling.

Cord: These are plain Wilton carpet with uncut pile.

Brussels: These carpets are patterned Wilton carpets with an uncut pile.

Axminster carpets: this carpets are woven in such a way that the pile is entirely on the surface. The pile is longer and less close than Wilton carpets. They are of three types.

Spool Axminster: this is the most popular Axminster carpets and a single piece can have an unlimited numbers of colours in the pattern. The carpet is woven in such a manner that the pattern is visible o both the side.

Gripper Axminster; Same as spool Axminster carpets but the difference being the maximum eight colours only.

Chenille Axminster carpets: In French Chenille refers to a "caterpillar". The carpet is soft and thick, giving a pile a segment look like a caterpillar.

Hand Made Carpets/ Oriental carpets

These are traditional carpets, backed by centuries of excellence in manufacture. They are functional as well as aesthetic. They have a long life, durability and richness of weave and design. They are made by knotting pieces of yarn on to a backing weave.

NON WOVEN CARPET

Tufted Carpets: These are cheaper than woven carpets and forms 50% of the carpets produced. These are made by inserting tufts into a backing and securing with latex. The pile is looped, cut or combination. The carpet manufactured by this technique is very fast and comes in various dimensions. They are commonly used in hotels and institutions. Care is necessary to prevent over wetting which may damage the adhesive.

Needle Loom: These carpets have no pile but are made by needle punching and entangling a mixture of fibres through a backing fabric and coating it with resin. Nylon, jute and polypropylene are used. Heat may be applied to fix the fibres.

Bonded Pile: In this type of carpet, the pile is compacted and bonded to an adhesive backing. Shortcut pile, loops, cords or electrostatic flocking may be used. Application of heat causes firm bonding.

Electro statically flocked carpets: Bonding is also used for flocked carpets, which have thousands of small fibres electro statically bonded to an adhesive-coated backing.

Knitted Carpets: these carpets are produced by interlacing yarns I the series of connected loops. As in woven carpets, the pile and backing are produced simultaneously. Multiple sets of needles interlace the pile, backing and stitching yarns together in one operation.

Laying of carpets: Carpets in hotels and institutions are fitted from wall to wall and along the skirting. The carpets may be fixed by using glue or narrow strips of wood, which are tacked to the wall or sunken into a recessed area in the floor carpets along staircases must be fixed permanently with metal tacks to prevent accidents. Special treatments like flame proofing, moth proofing, water resistance and anti static treatment may be given to carpets to improve their function of durability and ease of maintenance. Disinfectant solutions may be also added in carpet treatment.

Care and maintenance: Carpets are easily soiled and damaged. They require regular and frequent care. Daily attention must be provided to remove stains and dirt from carpets. Dust, dirt, grit, organic substances and cigarette ash may cause damage. Furniture indentation and cigarette ash, residue shampoo and pests may damage the pile. Spot cleaning of stains immediately is essential to prevent penetration and built up stains. Dry suction, vacuum cleaning must be done every day to remove surface dust and grit. Scraps of paper, pins and other wastes must be brushed away before vacuuming. Shampooing of carpets is essential periodically. The frequency depends upon the type of traffic and nature of carpets. Most housekeeping departments may call for contract cleaning. Carpets must be tested before shampooing. Hand shampooing is very tiresome and ineffective. It is suitable for corners and stairs. Liquid or dry foam shampoo may be used. This traps the dirt and loosens it from the pile. Special brushes help to clean from the pile. Special brushes help to clean the pile. Spot cleaning of stains using apt reagents may be necessary before shampooing. Use diluted agents to prevent damage. Freshly spilt liquids can be absorbed or squirted with a soda siphon.

Shampooing: Carpet shampoo machine use one of the two types of shampoos: liquid ad dry foam. Shampoos are anionic synthetic detergents and should be diluted in the correct measures for optimal performance. Liquid shampoos produce very little foam but tend to leave a residue that traps dirt, making it necessary to shampoo the carpet frequently. Dry-foam shampoos are actually also liquids, but they leave dry foam on the surface of the carpet after application- hence the name. The foam loosens and lifts out the dirt, holding it on the surface of the carpet pile until it can be removed by dry section. Dry-foam shampoos contain some solvent in addition to the detergent to assist in the removal of solvent-soluble dirt. Carpets cleaned with a dry-foam shampoo require less drying time as well. Carpet shampoo machines are used to dispense both types f shampoos. A cylindrical brush woks the foam into the pile of the carpet.

Hot-water extraction this is done by a hot-water extraction machine. The machine uses a shampoo solution that does not form foam It injects the solution under high pressure through the pile to the back of the carpet, where it emulsifies and looses dirt and grease. Simultaneously, the machine sucks up the solution along with the now suspended dirt and grease. The use of a wet-suction machine after shampooing greatly accelerates the drying time. The dirty solution is deposited into a tank, from which it is discarded later. After the cleaning process, the carpet is left slightly damp and requires a very short drying time.

Dry powdering In this method, a powder containing absorbents such as sawdust, solvent and drying agents is sprinkled on the carpet and left or several minutes. The powder absorbs the grease and dirt and is removed with the help of a dry-suction cleaner. Waterborne dirt is removed by use of such a powder, therefore this method is not very efficient. The method cannot be strictly considered a deep-cleaning method in fact and should be used only in conjunction with the other carpet-cleaning methods.

CHECK YOUR PROGRESS II

Q1.What is the component of carpet?

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Q2. Discuss the factors to be considered while choosing flooring in hotel.

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5.6 Fibers and Fabrics

The word textile is derived from the Latin term “texture” for woven fabrics. Thus by textiles we understand those objects which have been prepared by weaving. Textile has an important bearing on our daily lives and everyone needs to know about textiles as we use them in some way or the other. To understand about textiles the study of textiles will help to a great extent when we buy textile materials this knowledge will prevent us from making mistakes and we will be able to purchase good quality materials. There is a growing demand for textiles and clothing by people of all walks of life.

Yarns are produced by twisting or spinning of the textile fibres and in turn fabric is a structure produced by interlacing or interloping of the yarns. There are certain terms which are used very often in the study of textiles that are to be understood first. Most of the fabrics we use for various purposes are woven that means they are constructed by interlacing sets of yarns that run along lengthwise and crosswise directions. Each yarn is made up of several fibres therefore it is essential to know or to define the terms like fibre, yarns and fabrics.

A “fibre “is defined as any product capable of being woven or otherwise made into fabric. It is smallest visible unit of textile product. A fibre can be defined as a “pliable” hair like strand that is very small in diameter in relation to its length”. Fibres are the fundamental units or the building blocks used in the making of textile yarns and fabrics. Thus fibres are the essential components and basic units and are an essential component for making yarns. These fibres are of many types.

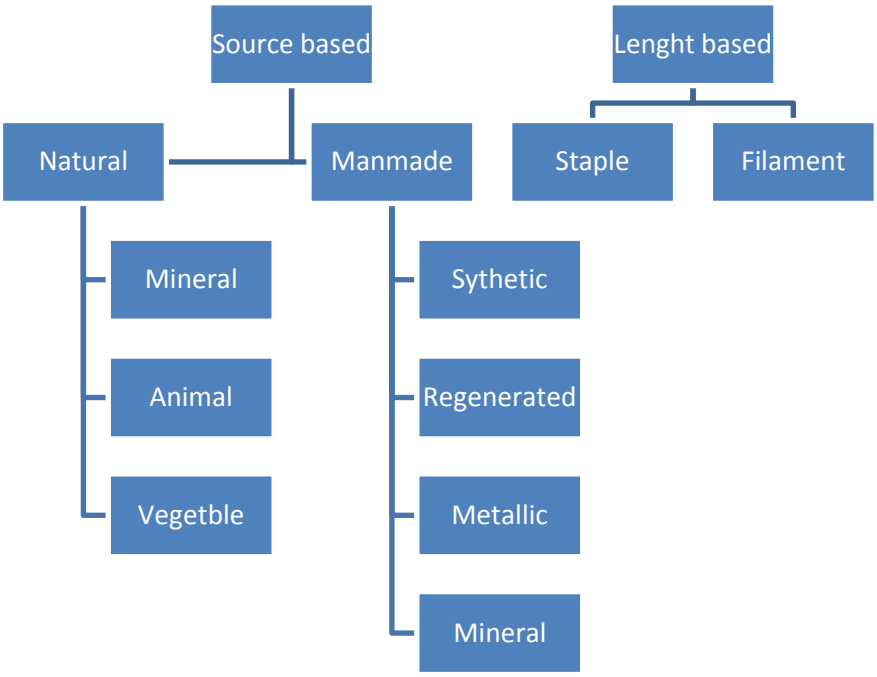

Fig5.2 Classification of textile fibres

According to the source from which textile fibres are obtained fibres are broadly classified into two ways.

I. Source base classification
II. Length base classification

SOURCE BASE CLASSIFICATION

Vegetable fibres or cellulosic fibres: The fibres that are derived from plants are called vegetable fibres. The basic material of all plant life is cellulose. These cellulose fibres have certain common properties like low resilience, high density, and good conductor of heat. They are highly absorbent and are resistant to high temperature. Cotton flax, jute, ramie are some of the examples of vegetable fibres. E.g. Cotton, Linen, Kapok, Jute and Hemp

Animal fibres: The fibres which are obtained from animals are called animal fibres. Wool and silk are common examples of animal fibres. They are made up of protein molecules. Animal fibres have high resiliency but weak when wet because they are bad conductors of heat. E.g. Silk, wool

Mineral fibres: They are the inorganic materials shaped in to fibres and are mainly used in the fire proof fabrics. Asbestos is the example of mineral fibre. Mineral fibres are fire proof, resistant to acids and are used for industrial purposes E.g. Asbestos

Man made fibres: These refer to those fibres that are not naturally present in nature and are made artificially by man. Man made fibres have high strength, strong when wet low moisture absorption characteristics. Examples of manmade fibres are viscose rayon, acetate rayon, nylon, polyester etc. Depending on raw material chosen for making of the fibres they are classified as cellulosic fibres, protein fibres and synthetic fibres.

Regenerated fibres – These fibres are made from extremely small cotton fibres or any other fibre source such as wood pulp, milk protein, etc. Chemicals are used to dissolve these and the solution is then converted into solid fibres. Examples are rayon (cellulose out of viscose/acetate/triacetate) of different types, casein fibre (from milk) and soya bean fibre.

Synthetic fibres - These are made using various petrochemical products. Nylon, acrylic and polyester are all synthetic fibres. It is advisable to use garments made of natural fibres which are eco-friendly in nature. Sometimes synthetic fibres may cause allergies if worn next to skin. Sources of commonly used natural and manmade fibres are presented

Metallic fibres- These are produced from metals such as gold, silver, and aluminum obtained by mining and refining.

LENGTH BASE CLASSIFICATION

Staple Fibres: Natural or manmade or short length fibres which measures in inches or fraction of inch example 3/4 inch to 18 inches except silk all other natural fibres are staple fibres. Staple fibres are of limited length.

Filament: Long continuous fibres strands of indefinite length measured in yards or meters fibres of continuous length long enough to be used in fabric as such Natural

silk filament is 360-1200 meters. Synthetic filaments can be made many kilometers long. The only natural fibre available is silk.

GENERAL PROPERTIES OF TEXTILE FIBRES

Texture: It is the tactile sensation experienced when hand is passed over a surface. Staple fibres and fabrics made from staple are lightly rough while filaments and fabrics made from filaments fibres are smooth.

Resilience: It means that when fibre is compressed and later when the pressure is released. It will tend to return to its original shape. Resistance to compression varies from fibre to fibre. This quality causes the fabric to be wrinkle resistant with the resistance varying according to the degree of elasticity inherent in the fibre. Wool has outstanding resiliency while it is poor in cotton.

Luster: It is seen when light reflected from a surface. It is more subdued than shine. Silk and synthetics have luster than cellulosic fibres. In fact synthetics have high luster which is purposefully removed during spinning.

Static Electricity: It is generated by the friction of a fabric when it is rubbed against itself or other objects. If the electrical charge that is not conducted away, it tends to build up on the surface and when fabric comes in contact with a good conductor a shock or transfer occurs. This transfer may sometimes produce sparks. This is more feel during hot and humid conditions.

Crimp: Wool fibre is more or less wavy and has twists. This waviness is termed as **crimp**. Finer the wool more will be the crimps in it. Marino wool will have 30 crimps per inch while coarse wool has only one or two. This property of having crimps gives elasticity to the fibre.

Elasticity: It is the ability of stretched material to return immediately to its original size.

Difference between cellulose and synthetic fibres: Among natural fibres available cotton, wool and silk are the most commonly used fibres for making fabrics. Among artificial fibres rayon, nylon and polyester are popular. The following are 5+the differences between vegetable fibres and synthetic fibres. Difference between vegetable and synthetic fiber.

S. No.	Cellulosic fibres	Synthetic fibres
1.	Low resiliency: Fabric wrinkles unless any finishing is given	High resiliency: Less wrinkles after washing and wearing
2.	High water absorbency: Comfortable for summer wears, good for towel, hand kerchief and diapers.	Low moisture absorption: Easily washable and easy spot removing.

3.	Cellulosic fibres are good conductors of heat.eg: Cotton is a better conductor of heat but less than that	Synthetic fibres are also good conductors of heat they melt with hot or ironic touch with hot objects.
4.	Identification: Cellulose fibres ignite quickly, burns freely with smoke and have an afterglow and after burning forms and a grey feathery ash.	Identification: Readily burns and melts giving a distinct plastic burning odour.
5.	Cellulosic fibres have high affinity for dyes.	Identification: Readily burns and melts giving a distinct plastic burning odour.
6.	Cellulosic fibres are resistant to moth but less susceptible to mildew hence damp clothes should not be stored.	Highly resistant to moths, mildew and insects.
7.	Cellulosic fibres need ironing at low temperatures .E.g.: wool	Synthetic fibres are adjusted with high heat settings. Hence it is good for embossed designing and easy for plant setting.
8.	Susceptible to strong mineral and organic acids stains that require acid treatment should be rapidly removed.	Synthetic fibres are adjusted with high heat settings. Hence it is good for embossed designing and easy for plant setting.

Table5.3 Difference between cellulose and synthetic fibres.

IDENTIFICATION OF FIBRE THROUGH NON–TECHNICAL TEST

Identification of fibres by visual test and feel of the fabric: By now, you know the names and some basic properties of fibres obtained from different sources. On the basis of this knowledge can you identify the fabric you are buying? Yes, to some extent you can. If you remember the characteristics of a fibre then you will also know the properties of the fabric made out of it because the fabric will have the same properties. Look for these properties in the fabric and add to this your personal experiences like touch, feel and visual inspection of the fabric. Chances are that you will be able to name the fabric. In the follow we are presenting to you some of the typical characteristics of different fabrics. If you examine visually, these will help you to recognize the fabric/ fibres.

Fibres	Appearance	Touch	Feel	Care required
Cotton	dullinappearance but lustrous when starched	feels smooth and soft to touched	gives a cool feeling	Wrinkle easily more if it is starched
Linen	low to medium luster	soft and smooth texture	gives a warm feeling	wrinkles easily
Jute	dull	rough and hairy texture	gives a warm and rough feeling	does not wrinkle easily
Wool	medium to low luster, poor quality has no luster	soft, smooth and absorbent, also bulky to look at	warm to touch	does not wrinkle easily
Silk	delicate looking and lustrous	smooth, soft and light	warm to touch	does not wrinkle easily
Rayon	can be lustrous or without it	soft and shinny but heavier than silk	gives cool feeling	wrinkles easily
Synthetic fibres	can be dull, semi dull or lustrous acrylic fibre look like wool	heat sensitive, soften and melt on application of heat	most fabrics feel warm	Able to withstand friction and to do wrinkle hence easy to care

Table5.4 Characteristics of Different Fabrics which help Identification.

Identification of fibres using burning test: Burning test tells us about the composition of fibres. i.e., whether the fibres of a fabric are from a plant and animal source or are man-made. Follow the steps mentioned below to conduct the burning test: Take out a few strands of fibres from a yarn or a fabric and then burn them with the help of a candle flame or a match stick. Observe the following points and record your observations:

The behavior of the fibres **on approaching the flame, in the flame, on burning, and the residue left after burning.** Since different types of fibres have specific burning pattern, one can recognize them accordingly.

Fibre	Near flame	Type of burning/flame	Odour of burning	Residue
Cellulosic fibre – cotton, linen, jute, rayon, etc.	catches fire easily	continue to burn with a bright fame	burning paper like smell	light, feathery, grayish/black smooth ash
Protein fibres – wool, silk	smolder and burn	slow flickering flame, sizzle and curl	Burning hair or feathers like smell	silk-crisp dark ash, wool-dark, irregular, crushable bead
Synthetic fibre – nylon,	shrink on approaching	soften, melt and burn	mixed smell of chemicals	hard, black uncrushable

polyester, acrylic, etc.	flame			bead

Table5.5 Burning tests for Identification of fibres

VEGETABLE FIBRES OR CELLULOSIC FIBRES

Cotton: Cotton is obtained plant source and it is classified as a natural material as it is obtained from the seeds of cellulose seed fibre staple fibre measuring 10- 65mm in length and white to beige in color in its natural state. It is composed basically of a substance called cellulose. As cotton occupies 50% of the consumption of fibres by weight in the world it is called as the king of all fibres. Cotton is the fabric for every home and is the most widely produced of textile fabrics today. It has now been proved that India was the first country to manufacture cotton. Among the recent findings at Mohenjo-Daro were a few scrapes of cotton sticking to the side of a slivers vase. Cotton is the white downy covering of the seed grown in the pods. The cotton plant grown in the tropics needs a climate with 6 months of summer weather to blossom and produce pods. The cotton fibre is the shortest of all the textile fibres. Its length varies from 8/10 of an inch to 2 inches. Cotton with short length fibres is technically known as "short staple". The one with the long fibres is called "long staple" and it more used since it is used for making fine qualities of cloth. Long staple is especially suitable as it is easy to spin and produces a strong smooth yarn. It is also suitable for mercerization a finishing process used to improve the absorbency, strength and luster of fibre.

Manufacture of Machine made cotton

Cotton pods
|
Ginning (Removal of Seeds)
|
Lap Formation
|
Carding
|
Doubling --> Combing
|
Drawing
|
Roving
|
Spinning

PREPARATION:

Ginning: The fibres are first removed from seeds in a gin. This process is called ginning. Every bit of the cotton fibre is used in the manufacture. The fibre mass is then compressed into bales and shipped into spinning mills. The short ends left on the seeds after the longer fabric. Fibres have been removed are used in the production of rayon, plastics, dynamite and many other by products, which are then used in the production of seed oil, hydrogenated fats, soaps and cosmetics.

Forming the laps: In the step dirt from cotton fibre is removed and fibres are made in to a soft roll or lap. Then several laps are combined into one.

Carding: These fibres are drawn together to form a loose rope called sliver.

Doubling: Slivers are combined here for uniformity.

Combing: This process is continuation and refinement of carding process. All cotton yarns for fabrics are carded but not all are combed. Yarns that are combed are finer even and free from all woody stalk of the plant. They are used for finer quality fabrics such as voile and organdie. Fabrics made from these fabrics are expensive too. The slivers are called carded slivers.

Drawing: The sliver is then combined, smoothened and stretched. The slivers may be drawn reduced further in size and given a slight twist by a process called roving in which the slivers is passed through rollers and wound on to bobbins set into spindles. It is done in a speed frame.

Roving: The bobbins are placed on the roving frame where further drawing and twisting takes place until the cotton stock is about a pencil lead in diameter.

Spinning: Done on the spinning frame where the stock passes through sets of high speed rollers and gives the yarn of desired thickness.

Weaving and dying: The yarn is then knitted or woven in any one of the variety of weaves and structures. Warp yarns are usually more strongly twisted than filling yarns since they must withstand greater strain in weaving and finishing.
Dye stuffs may be applied to raw cotton, yarn or piece goods.

Finishing: It includes starching, calendaring, sanforizing, mercerizing or other finishes as it is necessary for the particulars use for which the cloth is intended. These finishes may be applied to yarns but are usually applied to fabric. The fabrics may be given these special finishes before or after dyeing.

CHARACTERISTIC OF COTTON

Structure: The cotton fibre is short (1/2 inch -2 long inch) and cylindrical or tubular as it grows. The cotton fibre is essentially cellulose consisting of carbon, hydrogen and oxygen. Bleached cotton is almost pure cellulose raw cotton contains about 5% of impurities.

Strength: Cotton fibre is relatively strong which is due to the intricate structure and 70% crystalline.

Elasticity: Cotton is relatively inelastic because of its crystalline polymer system and for this reason cotton textile wrinkle and crease readily.

Hygroscopic moisture: Cotton does not hold moisture so well as wool or silk but absorbs it and so feels damp much more quickly. It also rapidly spreads throughout the material.

Electrical property: The hygroscopic nature ordinarily prevents cotton textile materials from developing static electricity.

Absorbency: As cotton has cellulose it is a good absorbent of fibre.

Thermal properties
Cotton fibres have the ability to conduct heat energy, minimizing any destructive heat accumulation thus they can withstand hot ironing temperature.

Drape ability: Cotton does not have good body to drape well in shape. The type of construction of the fabric may improve this property.

Resilience: Cotton wrinkles easily some wrinkle resistant finishes may reduce this property.

Luster: The natural cotton has no pronounced luster. This can be improved by the mercerization
finish of the cotton (that is sodium hydroxide treatment).

Shrinkage: The fibre itself does not shrink but cotton fibre which has been stretched in the finishing process tends to relax back creating shrinkage.

Heat conductivity: Cotton is the better conductor of heat than wool or silk but not as good as rayon.

Action of acids and alkalis
Strong acids will destroy the fibres immediately. Dilute inorganic acids will weaken the fibre and if left dry will rot it. Therefore after treatment with acidic solutions cotton articles should be thoroughly rinsed in water. They are affected very little by organic acids. They are also quite resistant to alkalis even to strong caustic alkalis at high temperature and pressure. In 8% NaOH cotton fibres swells, spirals, twisted uncoil and shrink and become thicker. The resultant fibre is smoother, lustrous, and stronger and has increased water and dye absorption.
Effect of bleaching: These have no effects until used in uncontrolled conditions and with heat.

Affinity to dyes: Cotton takes in dyes better than linen but not as readily as silk and wool. If a mordant is used cotton is easy enough to dye mordant colors, direct or substantive dyes should be applied to the cotton.

FABRICS IN COTTON
Flannelette and flannel: A soft napped cotton fabric its warmth in wear is due to the fact that the nap traps a layer of air between the body and the cold outside. In composition it is the same as ordinary cotton, but treatment in weaving makes it very inflammable. For this reason attempts have been made to make it fireproof by saturating the fibre with metallic salt, but in general fire proofing does not withstand washing.

Organdie: A thin light fabric in plain weave with a very stiff finish. It is made from good quality combed yarn. The yarn is made from long staple cotton and is spun is

with many twists. This along with the finishing process produces its characteristic transparent crispness. The aim is to give a permanent finish. The fabric is used for summer and evening wear.

Muslin: This is a cool, very light, and plain weave cloth also used for summer wear. The name derives from the city of Mosul where the fabric was first made muslins wear not always plain, silk and even gold stripes woven in when made in Mosul but as cotton was grown more plentifully and the women could spin yarns of great fineness, cotton yarns gradually super seeded silk.

Finishes for cotton

The resin and the non resin finishes give the cotton some easy and minimum care features of as synthetics. Advances in anti bacterial mildew resistant and flame resistant treatments have improved the effectiveness of the performances of cotton in various end uses. Regular finishes like singeing for smoothness mercerization for strength, luster and affinity for dyes, sizing and calendaring for luster, maximum stiffness body and smoothness. Special finish like sanforizing for maximum pre shrinking, crease resistant, anti bacterial finishes, mildew and rot treatment napping for softness, warmth, absorbency and moth repellent treatment are common.

Fibre Blends

Among the various types of blends available in market today polyester, cotton terycotton, silk, linen cotton, viscose rayon and cotton and nylon.

Reasons of blending are:

To facilitate processing.
To improve properties like dimensional stability.
To produce better performance.
To improve texture, hand or feel appearance of fabrics.
To produce multi color fabrics.
To reduce cost.

CONSUMER DEMAND FOR COTTON

Versatility: Cotton can serve for food (cotton seed products) for clothing and for shelter. Cotton fibre can be spun alone or it can be blended with other textile fibres such as linen, wool, silk, viscose rayon, polyester, nylon. It serves the purpose of clothing or apparel, home furnishing and industrial fabrics by giving comfort, durability, fashion and ease for care etc.

Durability: Due to natural twist cotton spins so well that it can be twisted very tightly. Hence tightly twisted yarns produce durable fabrics.

Comfort: Cotton conducts heat away from the body and allows the cooler temperature outside to reach the body, so it is a cool material for summer or tropical wear. Knitted cotton is used as comfortable wear.

Fashion rightness: Fashion designers of various countries have considered cotton glamorous enough to include in their collections.

Ease of care: The factors of light, laundering, ironing and perspiration are common consideration in color fastness to cotton.

Economy or price: Cotton materials are flexible to fit into all types of economic group. By products of cotton are used for many purposes.

MAJOR USES

Cotton is used for home furnishing: Towels are most common as it is high in absorbency, wide range of colors, wash ability and durability. Sheets and pillow cases are mostly blends of cotton with polyester or made of pure cotton. Drapes, curtains and upholstery fabrics are made of cotton and its blends. Since cotton can be autoclaved at high temperatures, absorbency, wash ability and low static build up are important factors for use of cotton in hospitals. Industrial uses include book bindings, luggage and hand bags, shoes and, slippers, tobacco cloth, woven wiping cloths as and wall covering fabrics.

Wide range of wearing apparels: blouses, shirts, dresses, children wear, active wear, separates swimwear, suits, jackets, skirts, pants, sweaters, hosiery, bedspreads, comforters, throws, sheets, towels, table cloths, table mats, napkins.

Linen: Elegant, beautiful, durable, the refined luxury fabric. Linen is the strongest of the vegetable fibers and has 2 to 3 times the strength of cotton. Linen table cloths and napkins have been handed down generation to generation. Not only is the linen fiber strong, it is smooth, making the finished fabric lint free.

Linen is from flax, a bust fiber taken from the stalk of the plant. The luster is from the natural wax content. Creamy white to light tan, this fiber can be easily dyed and the color does not fade when washed. Linen does wrinkle easily but also presses easily. Linen, like cotton, can also be boiled without damaging the fiber.

Highly absorbent and a good conductor of heat, this fabric is cool in garments. However, constant creasing in the same place in sharp folds will tend to break the linen threads. This wear can show up in collars, hems, and any area that is iron creased during the laundering. Linen has poor elasticity and does not spring back readily.

Manufacturing of linen: Linen is yarn, and fabric made from flax fibres. Before linen can be produced, the fibre has to be first removed from the flax plant. Linen manufacturing is a complicated and lengthy process which requires great skill at each stage of production:

- Cultivating Flax
- Rippling & Retting
- Scutching & Hackling
- Spinning

Cultivating Flax: Linen is a natural yarn or fabric which comes from the fibres of the stalk of the flax plant. To get the most from the fibre, the textile flax is not cut, but pulled from the ground to preserve the long, full length of the fibres which run the entire length of the plant (80/120cm). After this the flax is allowed to dry, the seeds are removed, and is then retted.

Rippling: This is where the seeds are taken off the plant. Rippling involved combing the seeds off with a coarse comb.

Retting: The flax fibres are held together in the stems by woody material and cellular tissue, and retting is where the deseeded crop of flax straw is subjected to a controlled chemical or biological treatment to make the fibre bundles are easier to separate from the woody part of the stem. Flax can be:

> **Water-retted**: Water-retting is where the flax plants after pulling are tied up in sheaves and put in special dams or ponds for one to two weeks. This method can cause pollution. Today this method is seldom used in Europe, and water retting is more normally carried out in controlled conditions in tanks.
>
> **Dew-retted**: dew-retting the flax straw is spread on the ground after pulling and left in the fields for 2 to 8 weeks, depending on the weather. This is the most common method in Western Europe, and is less expensive than water-retting in tanks.
>
> **Wooden vat retting**: the stems are steeped in water at a temperature of 70 to 90 in a vat until the stem got soft. The stem than removed from the water, and to loosen the stalk the fibre are passed through rollers by a method known as Pownall process.

Breaking and Scutching: This is a mechanical operation which, by breaking and beating the flax straw, separates the textile fibres in the stem of the plant from the woody matter which is then used for the manufacture of chipboard. No part of the flax plant is wasted. Fibres are then hackled (combed) to separate long line and short tow fibres.

Hackling: Line fibres then go through a process where they are drafted and doubled, until a rove (a slightly twisted sliver of flax fibre) has been formed. They then undergo the wet spinning process. Line fibres produce fine, strong yarn. Short tow fibres are dry spun and a heavy, coarse yarn results, ideal for use as furnishing fabrics, heavier apparel and knitwear

Spinning: This rove is then spun into a yarn but during this process it is soaked in warm water, which softens the natural gummy substances contained in the yarn and permits the individual fibrils within each fibre to slide in relation to each other, thus producing a very fine and regular yarn. This is called "wet spinning".

CHARACTERISTICS OF LINEN

Physical properties of linen fibers are given below:

Tensile Strength: Linen is a strong fiber. It has a tenacity of 5.5 to 6.5 gm/den. The strength is

Moisture Regain (MR %): Standard moisture regain is 10 to 12%.

Effect of Heat: Linen has an excellent resistance to degradation by heat. It is less affected than cotton fiber by the heat.

Effect of Acids: Linen fiber is damaged by highly densified acids but low dense acids does not affect if it is wash instantly after application of acids.

Effects of Alkalis: Linen has an excellent resistance to alkalis. It does not affected by the strong alkalis.

Effects of Bleaching Agents: Cool chlorine and hypo-chlorine bleaching agent does not affect the linen fiber properties.

Effect of Organic Solvent: Linen fiber has high resistance to normal cleaning solvents.

Dyes: It is not suitable to dye. But it can be dye by direct and vat dyes.

MAJOR USES

Apparel: Dresses, suits, separates, skirts, jackets, pants, blouses, shirts, children's wear etc.

Home Fashion: Curtains, draperies, upholstery, bedspreads, table linens, sheets, dish towels etc.

ANIMAL FIBRES

SILK: Silk is considered as "Queen of all textile fibres" as it has beauty and elegance and good properties of performance. Silk is the natural protein fiber obtained from silk worm cocoons. Japan is known for producing best variety of silk. India produces different varieties of silk and is famous for hand woven silk textiles. There is a tremendous silk production increase in recent years. The production of silk is called Sericulture. To obtain quality and quantity of silk rearing conditions are controlled carefully throughout the life cycle of silk moth. These are two types of silk mulberry or cultivated silk and wild silk. Cultivated silk is creamy silk white or yellowish white in color. White wild silk color range from brownish to golden yellow in color. Sericulture or silk production has a long and colorful history unknown to most.

MANUFACTURING OF SILK

Rearing of silk-worm: Silk worms feed on mulberry tree leaves and therefore for rearing them, the growing of mulberry trees is the first essential step. These are grown by the agriculturists. Silk worms have a short life of only about two months and during which these pass through the following four stages1. Egg 2.worm or larvae 3. Pupa and 4. moths. Silk worms are made to lay eggs on specially prepared paper for this purpose. The eggs can be stored in cold storage for six weeks. Eggs are collected and kept at low temperature until they are hatched. Eggs take ten days to hatch Emerged caterpillars of ant head size are fed on fresh mulberry leaves. At this stage the worm needs special care bamboo trays with straw mats are provided for them. When the caterpillar is about eight weeks old it secretes a viscous fluid from two glands on its head which oozes out from the common opening near its mouth. The fluid is called 'fibroin'. At the same time it also secretes a gummy kind of fluid called 'sericin' which passes through the same opening. The fibroin gets hardened when

exposed to air. The silk worm spins around itself to form a cocoon. The cocoon contains 2000 to 4000 yards of reel able silk. For separating the silk thread from the cocoons they are immersed in hot water. This immersion also kills the warm inside. Then the cocoons are dries and stored.

Reeling: The process of unwinding the filament from the cocoon is called reeling. The care and skill in the reeling operation prevents defects in the raw silk. As the filament of single cocoon is too fine for commercial use, three to ten strands are usually reeled at a time to produce the desired diameter of raw silk thread.

Throwing: As the fibres are combined and pulled on to the reel, twist can be inserted to hold the filaments together. This is called as throwing and the resulting yarn is 'thrown yarn'. This yarn later goes to weaving or knitting industry based the type of yarn produced.

Spinning: Short ends of silk fibres from the outer and inner edges of the cocoons and from broken cocoons and spun into yarns in a manner similar to that used for cotton. This is called spun silk.

Degumming: Sericin or gum up to 30% of the weight of the silk fibre. It is not usually removed until after the cloth is woven because serves as warp sizing that protects the yarns from mechanical injury during weaving. Sericin remains on the fibre during reeling and throwing before finishing, the gum is removed by boiling the fabric in soap and water. The presence of gum and sericin increases the tendency for the silk to water spots on fabrics when ironed.

Bleaching: Silk thread is treated with hydrogen peroxide.

Finishing: Silk fabrics require very few finishes because they have natural luster, softness and drapability.

Weighting of silk: When silk is boiled to remove the excess of natural gum or sericin it looses weight. This loss of weight is replaced through treatment by metals like tin, aluminum etc in water solutions. These are not removed by washing. Weighted silk is not durable because sunlight and perspiration weakens fibres. Heavy weighting causes silk to crack.

VARIOUS TYPES OF SILK

Wild silk: Silk produced by moths of species other than bombyx mori. It is brown in color more uneven and coarser. It is usually called Tussar silk.

Waste silk or silk noil: Short ends of spun yarns or in blends with cotton or wool. Sometimes it is called waste silk.

Dupion: Silk yarns made from two cocoons that have been formed in an interlocked manner. The yarn is uneven, irregular and large than regular filaments. It is used in making shantung and duppioni.

Raw silk: Silk that has not had any degumming.

Spun silk: Yarns made from short fibres from pierced cocoons and short ends and outside and inside the edges of cocoons.

CHARACTERISTICS OF SILK

Strength: Silk is the strongest natural fibre. It has a tenacity of 2.4 to 5.1 grams per denier. More over smoothness of the silk filament yarn reduces the problem of wear from abrasion. The strength of the spun silk yarns depends on the length of silk staple.

Shape and appearance: Silk filaments are very fine and long. They frequently measure about 1000 to 1300 yards in length. The width of the silk is from 9 to 11 microns.

Elasticity: It is an elastic fibre and its elasticity varies as it is natural fibre. Silk fibre may be stretched from 1/7 to 1/5 its original length before breaking. Cultivated degummed silk viewed longitudinally under a microscopic, resembles a smooth transparent rod under microscope. Silk in the gum has rough irregular surface.

Resilience: Silk retains the shape and resists wrinkling rather well. This is more in fabrics made from pure silk rather than spun silk or weighted silk.

Drapability: Silk has a pliability and suppleness' that aided by its elasticity and resilience gives it excellent drapability.

Heat conductivity: Since silk is a protein fibre. It is a non conductor of heat like wool. Hence it is used for winter apparel.

Absorbency: The good absorptive property of silk also contributes to its effect in warmer atmosphere. Silk generally absorbs about 11% of its weight in moisture which makes silk for easy dying and printing.

Shrinkage: Due to the filament in length, smooth surface silk have normal shrinkage which can be easily restored by ironing at moderate heat and damp conditions.

Resistance to mildew: Silk will not be affected by mildew unless left for time in damp state or under extreme conditions of tropical dampness.

Reaction to alkalis: Silk is not as sensitive as wool to alkalis. It may be affected in concentrations and high temperatures. Cold concentrated solutions of alkali such as soda or caustic potash has slight action on silk. Heated solution dissolved silk.

Reaction to acids: Concentrated mineral acids dissolve faster than wool. Organic acids do not harm them while medium concentrated HCL will dissolve silk.
Affinity for dyes: Silk has very good affinity for acid dyes but light fastness is unsatisfactory.

Reaction to bleach: Strong bleaches contain sodium hypochlorite will deteriorate silk. Mild bleaches like sodium perborate and hydrogen peroxide may be used with normal caution.

USES OF SILK

Silk is an expensive luxury fabric used for making different garments. Silk is used primarily in apparel and home furnishing items because of its appearance and cost. Silk is extremely versatile and can be used to create a variety of fabrics from sheer chiffons to heavy beautiful brocades and velvets. Because of silk absorbency it is appropriate for warm weather wear. Because of its low conductivity it is used for cold weather wear, also in furnishing silk is often blended with other fibres to add soft luster for furnishing fabric. Occasionally expensive hands made rugs are made from silk.

WOOL: Wool has the one of the first fibres to be converted into fabric. Wool fibre grows from skin of sheep. It is composed of protein known as keratin. It is crimp and has scales on its surface depending upon the breed of sheep. The natural protein fibre consists of amino acids. Wool has 19 amino acids, keratin, protein and other organic acids. Man uses wool as clothing in the very early stages of human history. The primitive man is used it in the form of skin of certain animals to protect as well as to decorate his body. Man then discovered the use of hair of sheep after interlocking and twisting them together under pressure and thus hair of sheep were used in making fabrics the interlocking of woolen fabrics is known as felting. Wool was probably known to the primitive man as he used sheep skin to cover his body even before the discovery of other fibres. Wool is yellowish white fibre and has medium luster. It is considered to be weak fibre than many other fibres however other properties such as resiliency and elasticity compensate for low strength.

Structure of wool: When the wool is fibre is untwisted it shows a kinky appearance. The length varies from 1,1/2 to 18 inches, the long fibres are coarser than short fibres. When observed under microscope the surface of the fibre seems to be consisted to scales irregular of shape and slightly overlapping like scales of fish.

Classification of wool

Merino wool: Merino sheep produce the best quality wool which is originated from Spain.

Classification by fleece

Lamb's wool: The first fleece sheared from lamb about six to eight months old is known as lamb's wool. This is in fine quality and soft texture.

Hogget wool: Wool obtained from sheep of 12 to 14 months old that has not been previously shorn.

Pulled wool: When sheep is slaughtered for meat the wool is pulled called as pulled wool.

Cotty wool: Very poor grade wool.

Weather wool: Any fleece clipped after the first shearing is called weter wool.

Manufacturing of Wool

Shearing: Sheep are generally shorn of their fleeces in spring but the time of shearing differs in different parts of the world. Machine clippers remove the fleece faster and closer than hand clippers. Superior wool variety comes from the sides and shoulders where it grows longer, finer and softer is treated as good quality fleece. Wool from the chest, belly and shanks is treated as a second fleece.

Sorting and grading: Skilled workers do wool sorting. Each grade is determined by type, length, fineness, elasticity and strength. Separating of fibre by touch and sight.

Scouring: Washing of raw wool is an alkaline solution is known as scourcing. The wool is treated with warm water, soap, mild solution of soda ash or other alkali to remove dirt in the fibres. If the raw wool is not sufficiently clear of vegetable, substance after scouring is put through the carbonizing bath.

Carding: The carding process introduces the classification of woolen yarns and worsted yarns. It makes the fibre parallel and some amount of dirt is removed due to straightening of fibres. Fibres are used for the worsted yarn are more straightened than the wool yarns.

Garnetting: Recycled wool fibres are obtained by separately reducing the unused and used fibrous mass by a picking and shredding process called garnetting.

Dyeing: If the wool is to be dyed in raw stock it is dyed at this stage. Some wool fabrics piece dyed, some are yarn or skin dyed and some are top dyed.

Gelling and combing: The carded wool which is to be made into worsted yarn is put through gilling and combing operations. The geilling process removes the shorter staple and straightens the fibre. This process removes short fibres from 1 to 4 inch length places the long fibre as parallel as possible and further cleans the fibre by removing any remaining loose impurities.

CHARACTERISTICS OF WOOL

Strength: It is stronger than silk. When wet wool looses about 25% of its strength. Longer the fibre the greeter will be the strength of yarn.

Resiliency: Wool is highly resilient and comes to its original shape when hanged after wrinkled or created.

Stretchability: Wool is highly elastic. It is about 10 to 30% stretched when dry and 40 to 50% when wet upon receiving pressure upon drying it readily regains its original dimensions.

Shrink ability: Wool is resistant shrinkage. However long exposure to moisture may cause shrinkage.

Effect of friction: Friction will soften the wool fibre especially when wet and thus is advantageous in maintaining smooth, soft texture of fabrics.

Crimps: Wool fibre is more or less wavy and has twists. This waviness is termed as 'crimp'. Finer the wool the more will be the crimps in it. Merino wool has 30 crimps per inch while coarse wool has one or two.

Effect of moisture: Wool is the most hygroscopic in nature. It can absorb up to 50% of its weight and carry up to 20% weight, without giving the feeling of being wet. Upon drying it losses moisture slowly preventing rapid evaporation thus avoiding chilling feel to the user.

Heat conductivity: Wool fibre is a part is a poor conductor of heat and therefore the fabrics made from the fibre are considered most suitable as winter wear.

Effect of heat: Low heat has no effect but strong heat weakens the fibre and destroys the colour of the fibre.

Action of acids: Dilute acids have little effect but either hot or concentrated acids weaken or dissolve the wool fibres.

Action of alkalis: Alkalis tend to make while wool yellowish, strong solutions of sodium carbonate when heated destroys the fibre sodium hydroxide is highly injurious to the wool fibre. However borax and ammonia have no harmful influence on wool.

Action of bleaching agents: Strong bleaching agents like hypochlorite have harmful effects on wool, Potassium permanganate, sodium peroxide and hydrogen peroxide however can safely be used for bleaching and stain removal.

Finishes given to wool: Felting, fulling, moth proofing, crabbing, decanting, London shrinking, napping, singeing and steaming.

Wool blends: Wool polyester, wool acrylic, wool nylon, silk and wool.

USES OF WOOL

The majority of wool (72.8%) is used in apparel, home furnishing account for 15-45%, industrial uses 6 to 7% and exports 5%, wool accounts for 3.3% of all fibres for apparel. The most important use of wool is for apparel coats, jackets, suits, dresses, skirts, slacks made from woven fabrics of varying weights and knitted fabrics'. All these gives the warmth garments and with good tailored look. In the home furnishing area the major use of wool is in carpets and rugs where wool is used more, cover to the carpets and warm in the rugs. Blends of different synthetic fibres with wool for suiting materials are increasingly important. This result in fabrics that are more appropriate in warmer conditions. Polyester is the most important fibre used in blending with wool.

MAN-MADE FIBERS: A rayon fiber was the first man-made composed of pure cellulose the substance of which is the man constituent of cell walls of trees and cotton. Rayon fibers are made from cellulose that has been reformed or regenerated. Consequently, these fibers are identified as "regenerated cellulose fibers". Because of its luster and soft hand feel, it resembled silk and came to be known as "artificial silk". However it is more like cotton in its chemical composition

Rayon: Robert Hooke, the English naturalist, had prophesied the production of a fiber such as rayon, the first of the manmade fibers long ago in 1664. He believed that it was possible to make an "artificial glutinous composition" much resembling, if not fully like silk worm secretion George Audemars, a Swiss chemist, discovered how to make cellulose nitrate. In 1884, count Hilaire de hardonnet produced the first man made textile fibers from nitro cellulose. He is known as "father of Rayon". Wood Rayon is produced in many ways. Viscose Rayon is popular among customers. It is made from pulp and cotton linters. The other is cellulose rayon (acetate rayon) in the chemist terminology; rayon and acetate are not synthetic because natural materials-cotton, linters and wood pulp are used in their manufacture, rather than chemical elements.

Source of Rayon: Rayon is an artificial, man-made or synthetic fibre made from cellulose. Commercially rayon was produced about 48 years back. Rayon produced at that time was very lustrous they were given this name which means "reflecting the rays of sun". The main objective in manufacturing rayon was to provide a cheap substitute for silk. India has been importing rayon fabrics and rayon yarn.

Manufacture of Rayons: All types of rayon are made from cellulose. There are main four main procedures by which cellulose is transformed into rayon. They are

i. The nitrocellulose process
ii. The cuprammonium process
iii. The viscose process
iv. The cellulose acetate process.

The general principles of rayon yarn production involve the following steps.

a. To treat cellulose chemically for rendering from it a liquid
b. To force the liquid through fine holes
c. To change from liquid stream into solid cellulose filaments.

The nitrocellulose process: In this, cotton is reduced to nitrocellulose by treating cotton with sulphuric and nitric acid. This gives an inflammable material. This material is dissolved in ether and the fluid is force through tiny holes into air. The ether evaporates and a fine thread is obtained, which is treated with sodium hydrosulphide to render it non-flammable.

The cuprammonium process: This process has been used since 1897**.** In this process, cotton linters are used. These are firs boiled in soda and soda-ash and then are bleached with chlorine. These are dissolved in a solution of copper sulphate and ammonium hydroxide. This liquid is left for ageing or ripening. This is then passed through fine jets into a solution of dilute acid when it is turned into regenerated cellulose filament. This filament is stretched to form a fine thread.

The viscose process: This process was discovered in 1892, but the yarn was commercially produced a few years later. In this process spruce chips are used. These are first bleached and then steeped in caustic soda to form alkali cellulose. It is treated with carbon bi-sulphide to form cellulose xanthate and is dissolved in dilute caustic soda solution. This is kept for ageing until a thick fluid is formed, which is known as viscose This fluid is forced through fine jets into a coagulating solution of dilute sulphuric acid which regenerates the cellulose into a continuous fibre. This process is largely used in the manufacture of rayons. If a dull appearance is desired, small

proportion of a white opaque pigment (usually titanium dioxide) is added to the viscose solution.

The cellulose acetate process: This process has been commercially developed since 1918 although the process was discovered half a century earlier in 1869.
In this process cotton inters are treated with solution of acetic anhydride and acetic acid. This acetic acid combines with cellulose o form celluloseacetate. This is kept for ageing until it is ripened. This ripened product is washed with cold water when the cellulose acetate separates into white flakes. The flakes are dissolved in acetone and filtered. This solution is then forced through fine holes in hot air. The acetone evaporates and leaves a fine fibre of cellulose acetate.

CHARACTERISTICS OF RAYON FIBRE

Strength: The tensile strength of viscose rayon is greater than that of wool but is only half as great as silk. Viscose rayon is also weaker than cotton and its strength is reduced to 40 to 70 percent when wet. Yet it produces fairly durable, economical and serviceable fabric whose smoothness of surface favorably withstands with friction of wear

Elasticity: Viscose rayon has greater elasticity than cotton but less than wool and silk. While viscose rayon fabrics have some inherent extensibility, undue strain might cause them to sag or even burst.

Heat Conductivity: Viscose rayon is a good conductor of heat and is therefore appropriate for summer clothing like cotton.

Absorbency: Viscose rayon is one of the most absorbent of all textiles. It is more absorbent than cotton or linen, but less than wool and silk.

Reaction to Bleaches: Household bleaches containing sodium hypo chlorite, sodium perborate or hydrogen peroxide may be safely used.

Shrinkage: Viscose rayon fabrics tend to shrink more than cotton fabrics. Spun Viscose rayon fabrics shrink more, which can be given a shrink resistant finish, such as Sanforset.

Effect of Heat: Viscose rayon is pure cellulose fiber which burns as cotton. When ironing, only moderately hot temperature must be used.

Reaction to Alkaline: Concentrated solutions of alkalies disintegrate Viscose rayon. A mild soap with lukewarm water is recommended in washing rayons.

Reaction to Acids: Being pure cellulose, the fabric is disintegrated by hot dilute and cold concentrated acids similar to that of cotton.

Affinity of Dyes: Viscose rayon fabrics absorb dye evenly and can be dyed with a variety of dyes, like acid, chrome, and disperse.

USES OF RAYON FIBER

Apparel: Accessories, blouses, dresses, jackets, lingerie, linings, millinery, slacks, sports shirt, sportswear, suit, ties, work clothes.

Home and hotel Furnishings: Bed spreads blankets, curtains, draperies, sheets, slipcovers, table clothes, upholstery.

Industrial Uses: Industrial products, medical products, non-woven products.

Other Uses: Feminine hygiene products.
It's used in industrial wipes, medical supplies, including bandages, diapers, sanitary napkin, and tampons in non-woven fabrics.

POLYESTER FIBER: Polyester is a synthetic fiber invented in 1941. The first polyester fiber is known as 'Dacron' in America and 'Terylene' in Britain. Later various types of polyesters are produced. Terylene fiber is made by synthesizing terephthalic acid and ethylene glycol. The ground work for development of polyester fiber is done by W.H. Carothers. Polyester fiber is the long chain polymer produced from elements derived from coal, air, water and petroleum. Polyester is a thermoplastic fiber and has good strength. It melts in flame and forms a grey hard non-crushable bead. It is an easy care fabric and can be easily washed. Polyester fiber looks like a smooth, glass rod similar to Nylon. If delustered it shows black spotted appearance. The length, width, shape and luster of the polyester fibers are controlled during manufacture to suit a specific end use. It is mostly blended with other fibers to improve its absorbency and to lower static electricity.

Method of Manufacture: Generally each company produces its own variety of polyester through there are likely modifications under specific trademarks. E.g.: PET (Principle raw material is ethylene diamine and terepthalic acid) obtained from petroleum and PCDT polyester.

Spinning of Fiber: The molten polymer is rigorously maintained at airtight condition, as oxygen will affect its stability. The viscous melt is extruded through spinneret, and the filaments are subsequently drawn into desired polyester fiber. Variations in production process depend on desired end results.

Types of Polyester Yarn
The diameter of the polyester yarn is determined by;

a. The rate extrusion of filaments from the spinneret.
b. The number of spinneret holes and therefore the number of filaments
c. The rate of drawing of filaments. The yarn comes in a wide range of diameter and staple lengths. The yarns are produced basically, as monofilament, multifilament and spun and sometimes the textured yarns are also produced.

Characteristics of Polyester:
Shape and Appearance: These fibers are generally round and uniform. The fiber is partially transparent and white to slightly off -white in colour.

Strength: The PET polyesters are in general, stronger. Polyester is found in industrial uses and the highly durable fabrics.

Elasticity: Polyester fibers do not have high degree of elasticity. In general polyester fiber is characterized as having a high degree of stretch resistance, which means that polyester fabrics are not likely to stretch out of shape too easily.

Resilience: Polyester fibers have high degree of resilience. Not only does a polyester fabric resist wrinkling when dry, it also resists wrinkling when wet.

Drapability: Fabrics of polyester filament have satisfactory draping quality. Polyester spun yarn is flexible and softer, thereby draping quality is improved.

Heat Conductivity: Fabrics of polyester filament are good conductors of heat. Polyester staple does not provide greater insulation in the yarns and fabrics. One of the reasons for apparel greater warmth of polyester is its low absorbency.

Absorbency: Polyester is one of the least absorbent fibers. This low absorbency has important advantages- they will dry very fast, suited for water repellent purposes, such as rain wear and they do not stain easily.

Dimensional Stability: If the polyester is properly heat set, it will not shrink, nor stretch when subjected to boiling water, boiling cleaning solvents or ironing temperatures that are lower than heat setting temperatures.

Shrinkage: Polyester fabrics shrink as much as 20 %during wet-finishing operations and they are generally heat set in later treatments. They have excellent dimensional stability.

Cleanliness and Wash ability: Since polyester fibers are generally smooth, has low absorbency, many stains lie on surface, and are easily washed, by hand or machine but oil stains are very hard to remove.

CHEMICAL PROPERTIES

Reaction to Alkalies: At room temperature, polyesters has good resistance to weak alkalies and fair resistance to strong alkali. It reduces with increase in temperature and alkalies concentration.

Reaction to Acids : Depending upon type, polyester has good resistance to mineral and organic acids. Highly concentrated solutions at high temperatures cause degradation. E.g.: Sulphuric Acid.

Effects of Bleaches: Fabrics of polyester may be safely bleached, because polyesters have good resistance to deterioration to household bleaches. If the polyester have optical brightener, bleaching is not necessary.

Effect of Heat: Ironing should be done at low temperature. It gets sticky at 4400 F.

Effect of Light: Polyester has good resistance to degradation by sunlight. Over prolonged use, gradual deterioration of fiber occurs.

Affinity for Dyes: Polyesters are dyed with appropriate disperse, developed dyes at high temperatures producing a good range of shades and color fastness.

Resistance to Perspiration Polyesters has no loss of strength from continued contact with either acid or alkaline perspiration.

Polyester Blends: Polyester cotton blend, polyester wool blend, polyester rayon, polyester silk blend, polyacetate blend, , polyester and nylon are some common blends.

4.2.3 Uses of Polyester

The most important uses of the polyester is in "woven fabrics". The blended fabrics are attractive, durable and comfortable, retain their appearance well and easy care. The first use of staple polyester was in tropical suiting for men's summer suits. The suits were light in weight and machine washable.

Polyester and polyester blends are also used in home-furnishings, sheets, blankets, bed spreads, curtains that match bed spreads, mattress ticking, and table clothes. They are used in upholstery fabrics; polyester carpets have a softer hand than nylon carpets. Spun yarn is used in knitted fabrics. Here polyester with cotton blends is used. The other important use where it is used is as fiber fill. Used in pillows, comforters, bedspreads, other quilted households and apparels, winter jackets etc.
Non-woven fabrics are the fourth important use of the polyester fabrics e.g.: fusible interfacings, pillow covers, mattress interlining etc. It has many industrial uses too in pile fabrics, tents, ropes, cording, fishing line, cover stock for disposable diapers, garden hoses, sails, seat belts, filter fabrics used in road buildings, fertilizer bags, in medicinal field for artificial arteries, veins and hearts.

FINISHES

Introduction: Finish is defined as anything that is done to fibre, yarn or fabric to change its appearance. The finish often determines the fabric care required. Finishing alters the surface of a fabric and therefore its look and feel. Fabrics or garments generally have to be finished to make the material presentable and attractive. It is often the finish which increases the sales value of the textile goods finish is usually applied to fabrics. As yarn and fabrics comes from the spinner weaver and knitter they are often in unfinished condition. The material may also be soiled and have oil stains. In fact, materials fresh from their manufacture are referred to as being in a grey or brown state. The finishing processes are required make the materials attractive They also improve their serviceability.

Classification of finishes: Finishes are classified on several basis the newly constructed fabrics as they come out of the loom are called grey goods. This does not mean that the colors of the fabrics are grey, but it simply means that any unfinished fabric must pass through various finishing process to make them suitable for end use. The aims of the finishing process are:

1. To make the material attractive.
2. To improve suitability and utility.
3. To produce variety.
4. To give weight.

Finishes are classified in to two types

1. Mechanical
2. Chemical

Dyeing is sometimes considered part of the finishing process. It can be sometimes be carried out at the same time that the fabric is straightened and brought to its desired finish, width and length for other processes, the fabric must be dried first and then lightly damped for the final finishing treatment. The most common finishing process is listed below. The list is not a sequence nor all are the processes used on all kinds of fabrics. Some fabrics go through more than one process while each fabric is given its own characteristic finish.

MECHANICAL

Beetling: This process produces luster and softness and gives te fabric a firm, leathery feel. Earlier it was done by beating the surface with wooden mallets, but now a machine with a number of steel hammer is used. The fibres are flattened, the weaves are closed and thus the desired lustrous effect is produced.

Calendaring: Calendaring is essentially an ironic process. Most fabrics (and yarns too) become stiff board like when wet and dried under tension. Running the fabric through a calendar removes the stiffness and makes it quite soft. At the same time calendaring flattens the yarns and makes it so lustrous. The process consists of applying a lot of pressure by passing the cloth between cylinders of heavy weight of compressed cotton and steel. Rayon fabrics are not calendared as as cotton or linen, but silk often requires fairly heavy calendaring some calendars use waxy calendars substances to give added luster in addition to friction treatment by steam heated pressure cylinders. Calendaring flattens and close the threads of the fabric to give it the required smooth feel and appearance. The finish depends chiefly on pressure, temperature and moistures.

Shearing/ brushing: This process removes the short fibers from the cloth coming off a loom. The cloth is first passed over one or two stream heated copper cylinders to remove moisture and to raise a nap. The projecting fibres are then singed (burnt) by passing the cloth over a hot plate or through a gas flame at high speed, leaving the cloth with a smooth surface. It is immediately put into water to remove any sparks.

Tentering: To bring a fabric to the right width it is passed through a 20-90 feet long tentering machine. The cloth is carried through the machine by two moving chains of clips or pins one on each side which grip the selvedge firmly. Tentering is an important and necessary operation because the fabric has been pulled in length during bleaching, dyeing and drying and is therefore generally narrower than the required finished length. In order that the stretching may takes place easily, the cloth is slightly dampened or steamed. After stretching it is passed through a hot air chamber to dry and set at this width.

Moireing : One of the most interesting surfaces is the 'moire' finish. A cloth with a filling wiser rib weave is run between rollers engraved with many lines and thus given a watered effect. On acetate clothes. The finish will remain in good condition after the fabrics are laundered. Rayons are given resin treatment to set the design.
Embossing: The fabric is passed between heated rollers that imprint or emboss the design on the fabric. This design is less expensive than a woven design.

Glazing: After the fabrics are bleached, dyed or printed they may be given a stiff polished or glazed surface. Starch glue or resin may be used to stiffen the fabric. Then smooth hot rollers that generate friction are applied since the advent of resins in the finishing field permanent finish gaze can be applied to chintz and other muslins.

Sanforizing: Many fabric shrink after their first wash. The process ensures less than 1% shrinkage for fabric after washing. The process is carried out by passing the pre shrunk fabric between a thick cloth and surface of a steam heated roller.

Napping: The warmth and softness of wool flannel or a brushed wool sweater is due in part to the fuzzy soft surface called nap. It is the process of raising short fibers of cloth to the surface by means of revolving cylinders with metallic points. Cotton and synthetic fabrics of spun yarns may be napped to resemble wool in texture. Generally yarns used in the fabric should have low twist.

Filling Finishes: The aim of the use filling or sizing agents on fabrics are:

i. To stiffen the fabric
ii. To soften it
iii. To impart to it a body and weight
iv. To give it a glazed smooth finish

Sizing, stiffing and starching: To increase the weight, body crispiness, stiffness and luster cotton and polyester blends are stiffed. Generally starch, glue, wax, casein, clay etc are used. It is not a permanent finish.

Weighting of silk and wool: weighting is the term used for filling in silk and wool. The filling agents are metallic salts.

Silk: it is weighted either at the yarn stage or as woven material. It is also weighted during the process of dyeing by adding weighting substances to the dye. The usual weighting substances used are tin chloride and tannate Fibres absorb salt and swell. These are not removed by washing. Heavily weighted silk has a poor wearing quality.
Wool: wool is weighted with magnesium chloride so that the cloth absorb more moisture and its weight is thus increased

CHEMICAL PROCESS

Mercerizing: Applying the caustic soda under controlled conditions gives cotton fabrics a silky luster and beautiful sheen. It also gives the cloth a greater affinity for coloring matters for especially deeper, brighter shades with dye stuff. The cloth is impregnated with an 18-20% solution of caustic soda for one half of two minutes at room temperatures. The cloth is stretched while saturated and then washed out while it is still in tension. The treatment produces a permanent change in the structure of the cotton fiber.

Parchment zing: These are the permanent finishes on cotton and still remain of great importance. They were discovered by John Mercer in 1844. The higher concentration of the sulphuric acid produces the parchmentsing effects. Parchmentsing acid probably gelatinizes the surface of the cotton and causes the fibers of cohere some extent.

Creping: It is a chemical process by the treatment caustic soda on fabrics. The soda paste is applied to fabrics in a definite design of strips or figure. The parts to which the paste is applied shrinks leaving the other parts unshrunk. Thus the creped material will produced.

Burnt out finish: Burnt out finish gives transparent effect possible on blended fabrics only looks different from others. Forms opaque woven designs against a transparent back ground.

Starch less finish: To reduce the use of starch for a crisp finish that can be durable for repeated washings. Cottons are treated with resins. This starchless finish is permanent and does not dissolves in laundering.

Wash and wear: Permanent starch less finish can be used on curtains, draperies, sheer cottons for apparel. It is used on organdy, lawn, voile and other sheet cottons.

Bleaching: Bleaches are used to render colored or discolored fabrics white. Bleaches are used in laundering to remove stains that do not respond to normal washing. Bleaches should not be used as cleansers. It is not possible to bleach dirty laundry. Bleaching agents can be divided into two classes:

1. Oxidizing bleach
2. Reducing bleach.

Oxidizing bleach supply oxygen that combines with stains to form a colorless compound. Normal as well as stained fabrics can be oxidized so the bleach must be in contact with the fabric only till the stain is removed. Longer contact will weaken the fabric.

Reducing bleaches work by removing oxygen from the colorings matter of the stain.

YARNS, YARN MAKING AND FABRIC CONSTRUCTION

A **yarn** is a long continuous length of interlocked fibres. Strands of fibres are brought closer to each other by twisting. Twists impart strength to the fibre strand which is then termed as a yarn. It is suitable for the production of fabrics, thread for sewing, crocheting, knitting, embroidery and/or rope making. A **thread** is a highly twisted and smooth strand of fibre. It is used for sewing, embroidery, etc.

Spinning of yarns: Do you know how a yarn is made? Yes, you guessed it right, a yarn is spun. Spinning is the process by which a group of fibres is pulled, drawn and twisted together to make a yarn. Do you remember Mahatma Gandhi and his *charkha*

or the spinning wheel? Mahatma Gandhi, would daily take a hand full of cotton and spin it into a yarn on his *charkha*. He promoted *charkha* during India's freedom struggle as a symbol of self-reliance and a source of income.

A traditional spinning wheel *(charkha)*: A *charkha* is for hand spinning. The yarn spun on a *charkha* can have different thickness. Thick yarn is used for floor coverings, medium thickness for upholstery items and fine quality yarn is used for making dress material. Different types of fibres - cotton, wool, hemp and silk are spun on *charkha* in the villages in many states of India.

Twists given to fibre strands for formation of a yarn can be either **'S-twist'** (clockwise) or **'Z-twist'** (anticlockwise). The quality and strength of yarn is affected by the number of twists in inch. Lesser the number of twists per inch, bulkier and less strong is the yarn and more the number of twists, finer and stronger is the yarn. Figure 10.5 shows S and Z twists and Figure 10.6 shows number of turns in a yarn.

Spinning by Machine: Both, the fibres as well as filaments are spun into yarns that are then used for different end uses. Fibres available in the filament form are first cut into short lengths and then made into yarns called spun yarns. Various steps followed for making yarns are:

I. **Cleaning:** When the natural fibres are harvested or collected, these contain dry leaves, stems, seeds, dirt and unwanted materials that are removed during cleaning.

II. **Carding:** The fibres sometimes get matted and stick to each other. Carding machine opens and arranges the fibres in a parallel manner. The carded web of fibres is turned into a soft rope called **sliver**.

III. **Combing:** It is an optional step used for making fine quality yarn. Carded slivers are combed to separate long and short fibres with the help of series of combs. Cleaning, carding and combing steps are omitted while making spun yarns from cut filaments of synthetic fibres. For these synthetic fibres only spinning and winding is done.

IV. **Spinning:** Carded and combed slivers are further drawn and spun into yarns. The yarn is a single strand but may be plied into several strands:

V. **Winding:** The yarn is wound into various packages according to the weight or length of the yarn and its end use. Some of the common yarn packages for fabric construction are- ball (yarns for hand knitting), reels or bobbins for sewing embroidery and hanks, cones, etc.. Balls reels of sewing reels of embroidery yarn hanks cone thread. After spinning, a specific length of yarn is wound in the form of packages called balls, reels, hanks, cones, etc., depending on the weight or length of yarn and its end use.

Classification of Yarns: Yarns simple novelty knotted yarn, loop yarn single strand ply/multi-strand slub yarn, feather yarn.

The yarns may be classified into two groups:

i) Simple yarns
ii) Novelty yarns

Simple Yarn: In the construction of simple yarn, only one kind of fibre is used. The manner in which the fibres are twisted will be the same throughout the yarn. Yarns are known as simple, ply or cable, depending upon the number of strands they contain

Single Strand Yarn: In this, a number of fibres are twisted together into a continuous length. The yarn consists of one kind of fibre and of one colour. This type f yarn is the one usually found in most standards fabrics for clothing and household use.

Ply Yarn: Two or more than to yarns are twisted together to form ply yarn. These are known as multiple strand yarn. If two single strands are twisted together, the resulting yarn is known as two-ply yarn, if three are twisted together, three-ply yarn and so on.

Novelty Yarns: The contrition of these yarns is of a complex nature and is varied in any ways. These yarns are usually ply yarns of different kinds of fibres or of different colours and are irregular rather than smooth. Single strand yarn of different colours, sizes or fibres may be twisted together to form one complex yarn. Another variety is brought about I this kind of yarn by varying tension or sped after intervals of certain length- thus, allowing one part to loop or twist around another. Novelty yarns are also constructed from simple yarn by varying the amount of twist. The complex type of novelty yarn is used with two objects in view, one is to combine different fibres e.g. cotton and rayon may be blended with or covered by wool and silk. This lowers the cost of production. The other purpose to produce novelty yarns for the construction of novelty yarn, at least one or single yarns are used, one forms the foundation yarn known as a *base* or the *core* and the other, the *effect* yarn, which is wound or looped around the first one. A third yarn called binder yarn is often used to fasten or tie the effect yarn to the foundation yarn. These types of yarns are mostly used for drapery and upholstery fabrics.

FABRIC CONSTRUCTION

Weaving and knitting, the two most popular methods of fabric construction have been discussed in detail here.

Weaving: Cotton multiple strand yarn fibres do not break easily thickness synthetic. Weaving is interlacing of two sets of yarns –warp and weft at 90o angles to each other. Straight yarns in fabric are known as **warp** yarns. Horizontal yarns are known as **weft** yarns. Along the length of the woven fabric, on both sides, end yarns are woven very densely and the portion is named as **selvedge**. It does not allow the fabric yarns to come out from the lengthwise edge. The portion between the two selvedges is the body of the fabric.

Basic Weaves: Weaves are broadly classified as **basic and novelty weaves.** Most of fabrics are produced in **basic weaves**, which are of three types- **plain, twill and satin weave.**

a. **Plain weaves** - Plain weave is also known as homespun, tabby or taffeta weave. It is the easiest to weave where one weft yarn alternatively moves over one and under another warp yarn. Maximum

production of fabric is done in plain weave. It is inexpensive weave, most suitable for printing and embroideries. To see the variations of the weave, note the fabrics like muslin, cambric, hand spun and hand woven khaddar, organdy, poplin, voile, etc.

b. **Twill weaves -** It is woven on three to four harness loom. In this, one weft yarn moves over two and under one warp yarn. Twill woven fabric is distinguished by a continuous diagonal line called wale. Variation in diagonal lines produces various designs of twill. Twill weave is woven tightly, that is why it is suitable for work clothes and for men's clothes. Examples of Twill woven fabrics are gabardine, tweed, denim, jean, etc.

c. **Satin weaves -** It is woven on five to twelve harness looms. If woven on a five harness loom, one weft yarn passes under 4 warp yarns and goes over one warp.

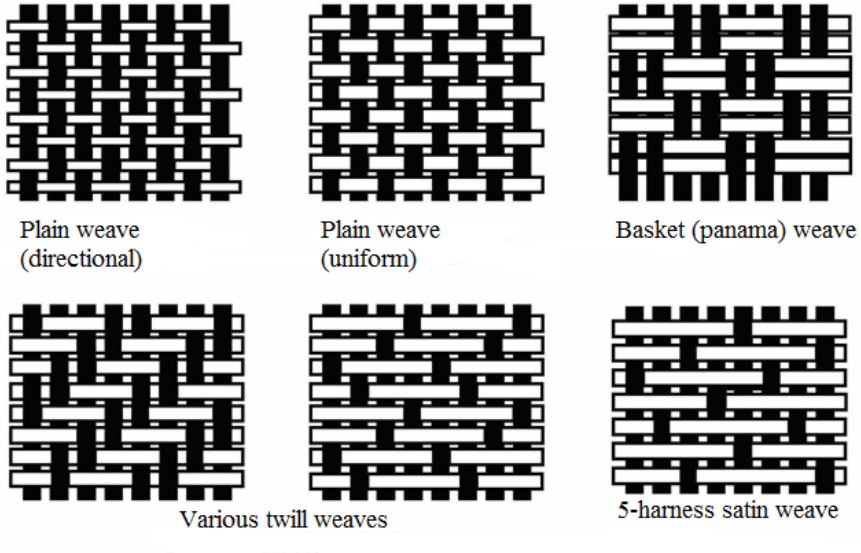

Fig5.3 Different types of weaves

Knitting: Knitting is the process of formation of loops of yarns and drawing of new loops through those formed previously (interloping). Depending on the types of knitting, it either moves right to left or left to right (weft knitting) or the yarns run lengthwise (warp knitting). Hand knitting is the most common example of weft knitting, though it is also done on machines to make many types of sweaters, T-shirts, socks, etc. Warp knitting is only possible on machines.

End use of different fabrics: When you go to a shop, you give specification of the fabric you want, to the salesperson, often you go to different shops to buy fabric or readymade garments. In other words, shops usually specialize in the type of items they sell. This way it is easy for you to find what you want and the shop can also stock good variety of related products.

Since you have already studied about the properties of various types of fibres, yarns, fabrics and weaves, it will be easy for you to use this knowledge to recognize fabrics and choose them for the end use in your mind.

CHECK YOUR PROGRESS III

Q1. What is filament fibre?

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Q2. Explain the meaning of finishes.

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5.7 Soft Furnishings

Soft furnishing are piece of items that are both necessary for comfort and convenience as well as decorative, providing colour, pattern and texture to the room. Soft furnishings include fibres that are used for curtains, loose covers, cushions, bedspreads and quilts. Some articles in addition provide warmth and comfort. Each article is subjected to variable amount of wear and tear.

Types of soft furnishing

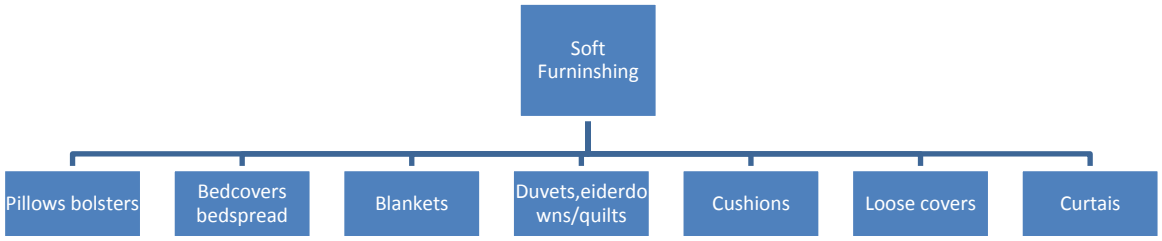

Fig 5.4 Types of soft furnishing

Duvets/ Quilts: Provides a warm light bed covering but are quite expensive initially. They may be used as such or given a fabric covering. Satin, polyester, silk and good quality fabrics are suitable for the top layer of the quilts. Less slippery material like satin or linen may be used for under layer to prevent slipping.

Duvets have become increasingly popular in hotels and are fast replacing the blanket, especially on double beds. They consist of a filling sandwiched or stitched in a fabric case with a changeable cover. The fillers may be duck/goose down, a feather mix or a combination of the two. The down feathers are the small, fluffy feathers. Although they are warmer, professional cleaning is necessary and they are heavier and more expensive than their synthetic counterparts. The synthetic filling is usually polyester fibres. These duvets are lighter and can be washed in large-capacity washing machines. Even if the establishment uses natural fillings to provide the best degree of comfort, a small stock of duvets filled with man-made fibres should be made available for anyone who has an allergy to the natural product. It is essential for the duvet to have an outside cover. Changing a duvet cover is a skill which is developed with practice. To save laundry costs and la bour, it is advisable to provide a covering sheer in conjunction with the duvet cover. Though it is common to have all of them in white, the duvet cover, the bottom sheet and valance could be part of the colour scheme of the guest room.

Care and maintenance of Duvets and quilts:

- Mend any tar and damage as soon as possible. Remove stains and grease marks immediately by dry-cleaning.
- Follow the manufacturer's instructions for regular cleaning of duvets and quilts.
- Always use duvets and quilts with easily launder able covers, so that these can be removed and washed separately.
- The cover of a duvet should be 2-4 inches larger than duvet on each side to give it room to expand. Smooth out duvets and quilts with a light hand while making the bed. When storing feather filled quilts and duvets use moth-repellent chemicals.

Pillows and bolsters: The best and most expensive pillows are filled with down. Others have a mixture of down and feathers and some are filled with manmade fibres. Foam pillow are suitable for people allergic to dust and feathers. Feather pillows don't last long. Foam pillows may also last for 10 years. Kapok, the cotton like fibre from the seeds of the silk-cotton tree, was earlier used as a filling for pillows; but it is not used for pillows in hotels now since kapok –filled pillows cannot be laundered or dry-cleaned. Bolsters are elongated pillow used on settees, divans and beds. In the past, they sometimes formed an under-pillow; but they are not use on the bed any more.

Care and maintenance of Pillow and bolsters:

- Dust and shake pillow lightly before making the bed
- Any damage to the ticking should be repaired immediately
- If the pillows have the synthetic filling, they may be washed individually on a regular basis. Pillows with natural filling should be dry-cleaned when necessary.
- Latex and foam pillow can be wiped clean.

Bedspread/Bedcover/Counterpane: These are purchased, considering appearance, durability and size. The colour and print should match the décor, and soil should not show easily. The fabric should drape well and not crease easily (quilted for this purpose). The durability of the fabric is judged by the effect of laundering and constant use. The life expectancy may be totally disregarded in order to meet with a

certain decorative colour scheme. Readymade bedcovers lack individuality so they are usually stitched and a number of styles are possible. Bedcovers should be interchangeable wherever possible.

Care and maintenance of Bedspread/Bedcover/Counterpane:

- Any damage should be repaired as soon as it is detected.
- Conventional blankets should be laundered or dry-cleaned when necessary.
- Stains grease marks should be removed by spot-cleaning or dry-cleaning.
- On a daily basis, while making the bed, gently shake out the blankets

Cushion: It may be used to increase the comfort of chairs and sofas and provide colour pattern and texture to the room. They may be fitted to form a seat or a back; or may be used loosely as scatter cushions. Shapes may vary from square, rectangular, circular, triangular, semi-circular to bolsters, which are elongated pillows. They will be filled with down, feathers, kappa, rubber, polyfill, urethane foam, thermo coal ball, silk cotton, foam plastic etc.

Care and maintenance: Cushions require constant attention

- Shake and tidy frequently
- Repair when necessary
- Brush and suction clean regularly
- Remove covers and wash or dry clean.

Curtains: Windows dressing is essential to enhance or obscure the shape of the window and improve the style and décor of the window and room. It provides privacy and thermal insulation, controls light, and helps in sound reduction. This can be achieved by the use of curtains. The line, colour, pattern and texture contribute to character and atmosphere of the room. Selection of fibre should be done with regard to its resistance to fading, abrasion, drape, dimensional stability and flame resistance. The exposure to sunlight and airborne soiling should be considered. Lining of curtains helps to reduce damage of fading and rotting. Curtains are subjected to abrasion by being pulled and drawn, brush against, rub along a floor or window frames and being laundered. The abrasion resistance depends upon the type of fibre selected and fabric construction. Loosely woven material tends to loose drape and constant hand drawing may cause loss of shape. Further references see Unit 3.

5.8 Summary

As we know the housekeeping department is responsible of maintenance and aesthetic upkeep of the entire hotel but apart from that housekeeping also look after the interior of the hotel which includes floor finishes, wall covering, furniture, soft furnishing and many others. The chapter also discussed fibres and fabric construction. A student of housekeeping operation should have a fundamental knowledge of fibres, weaves, and finishes and so on.

5.9 Key Terms

Antiques: It includes pieces from an earlier period. Genuine antiques are, by definition, at least 100 years old considered an antique.

Backing: Natural materials like jute, hemp, glue and starch are used along with resin, synthetic rubber and polypropylene to form the backing. A secondary backing may be added to improve resilience.

Built in furniture: The piece of furniture is fitted ad fixed into architectural space, usually their cost is incorporated into the building cost.

Castor: these are the wheel fixed at the base or to the legs of furniture and equipment to make them mobile.

Cork: Cork tile is made from the outer bark of oak trees. The cork is ground into large granules, mixed with synthetic resins, and pressed into sheets, which are then cut into tiles.

Dado: A strong or more easily cleaned material used to surface the lower part of the wall approximately upto 150 cm height from the floor.

Duvet: quilts filled with down feathers or synthetic fibres.

Pile: The carpet pile absorbs most of the wear. It is called the face of the carpet, this is the part which is seen on the surface.

Under lay: The underlay acts as a shock absorber between the backing and the sub floor. It makes the carpet softer and provides insulation. Underlay may be made of felt, rubber, foam or jute with polypropylene backing.

5.10 Bibliography

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5.11 Terminal Questions

1. What factors would you keep in mind while selecting carpets for the banquet hall of a 5-star hotel?
2. What are the different treatments given to walls before painting for the paints to last long?
3. How are the carpets classified?
4. What is floor finishes? How will you care and maintain different floor finishes?
5. Classify the various types of guest room furniture.