SNS COLLEGE OF ALLIED HEALTH SCIENCES- COIMBATORE 35

DEPARTMENT : RADIOGRAPHY AND IMAGNG TECHNOLOGY

SUBJECT : GENERAL PHYSICS, RADIATION PHYSICS AND PHYSICS OF DIAGNOSTIC RADIOLOGY

PAPER : PAPER II

TOPIC : 7.1 RADIOGRAPHIC ILLUMINATORS

DARK ROOM

- A darkroom is a film processing room.
- The processing of a radiographic film is carried out in the darkroom, where the latent image of the film is converted into the visible image.
- It is completely dark because the normal light is excluded.
- The radiographic films are made of light- sensitive materials, so the normal light is excluded, and artificial safe light is allowed, which provides safe and efficient film processing without fogging of the film.

LOCATION

- The darkroom should be located close to the X-ray room.
- If there are one or more X-ray rooms in The Radiology department, the darkroom should be located in the middle of these rooms.
- It should be sited away from damp and hot areas it should never be situated in a hot or damp basement.

DARK ROOM DESIGN

STRUCTURE

- The Ideal darkroom should have 10 square feet of floor area and 10-11 feet of ceiling height.
- Space is required to house the necessary equipment for film processing.

WALLS

- The walls of the darkroom should be light-colored and covered with chemical-resistant ceramic tiles, which provide an adequate reflection of safelight during the film processing.
- The walls which are adjacent to the X-ray room should be 150 mm thick, made of concrete or 225 mm of solid bricks, and well-plastered, which is equivalent to 2 mm lead.
- If the walls are not thick, they should be lined with lead sheets. It will protect and prevent the x-radiation from the adjacent X-ray room.

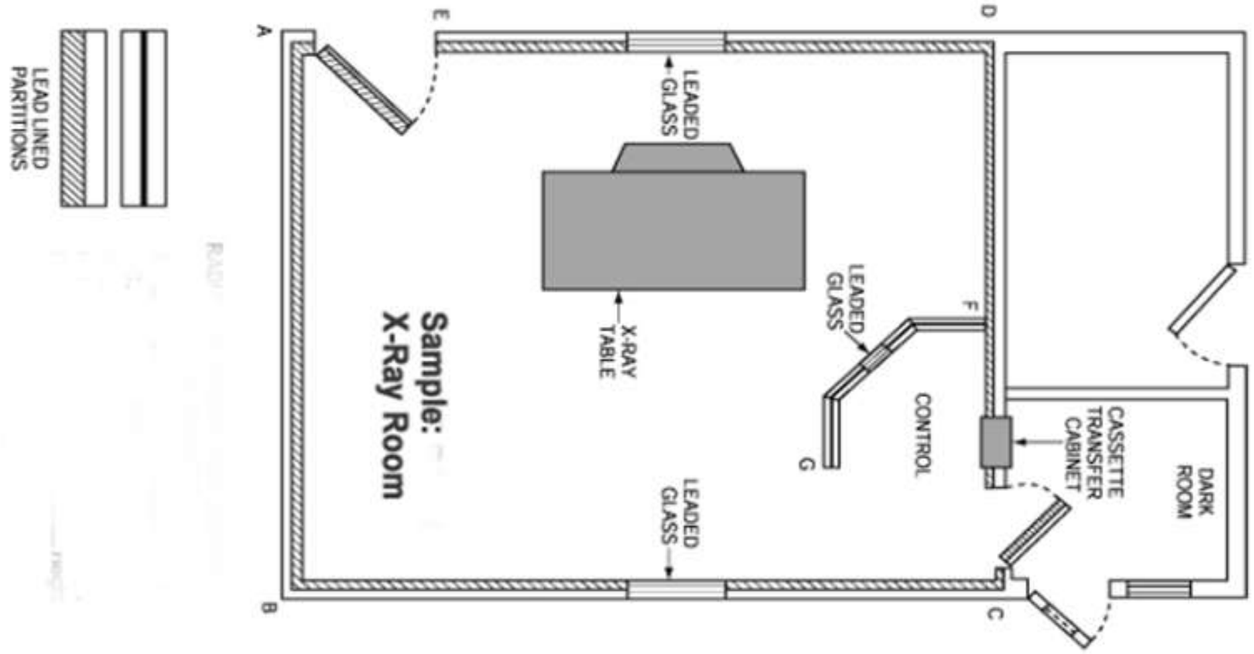
FLOOR

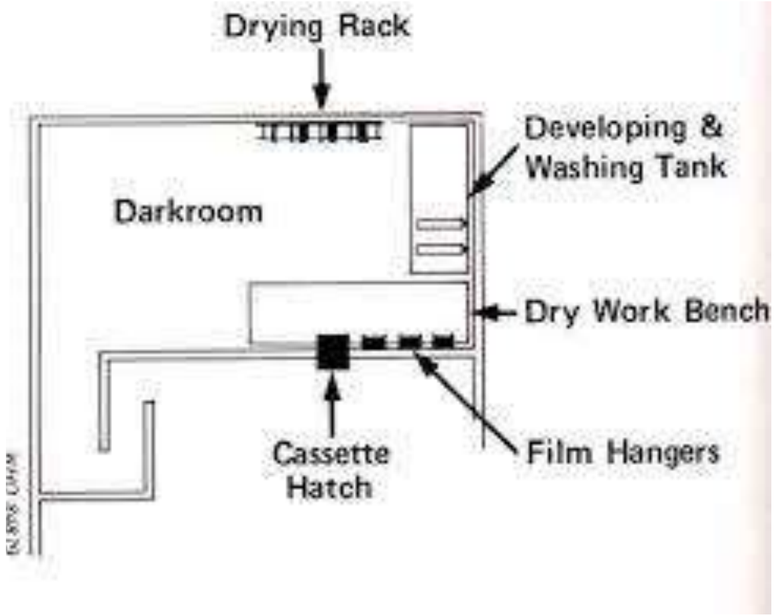
- The floor of the darkroom should be flat and smooth. Commonly the floor is made of Porcelain tiles because it is durable, chemical resistant and easy to clean.

PASS BOX

- The pass box is wall-mounted and attached to the X-ray room.
- It has two light-proof interlocked metallic door which opens into a dark room and X-ray room.
- The pass box is used to transfer the cassette to and from the darkroom.
- It is also called cassette transfer cabinet or hatches.
- It has two sections one is for an exposed cassette, and the other is for an unexposed cassette.

DARK ROOM LAYOUT





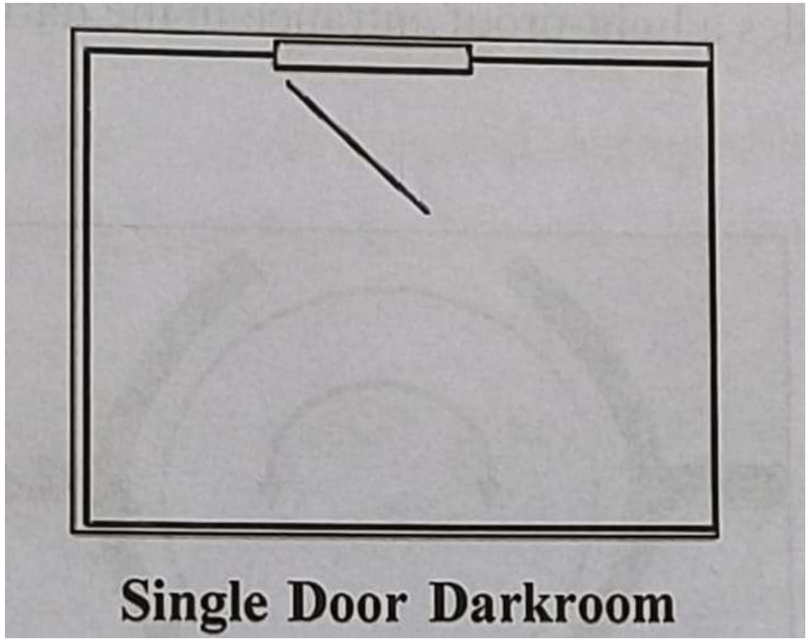
DARK ROOM DOORS

DOORS

- The doors should have a safe and secure entrance.
- The most common entrances for the darkroom are-

SINGLE DOOR

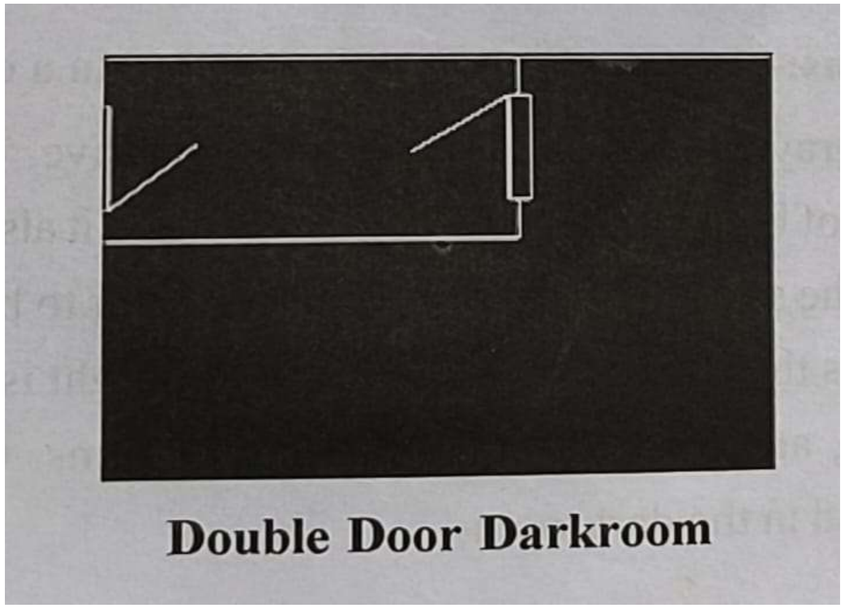
- It is the simplest type of entrance.
- The darkroom has only one door for entrance and exit.
- This type of door can cause accidental light exposure to films during the processing.
- The single type door entrance must be light-tight and have an interlock system.



DARK ROOM DOORS

DOUBLE DOOR

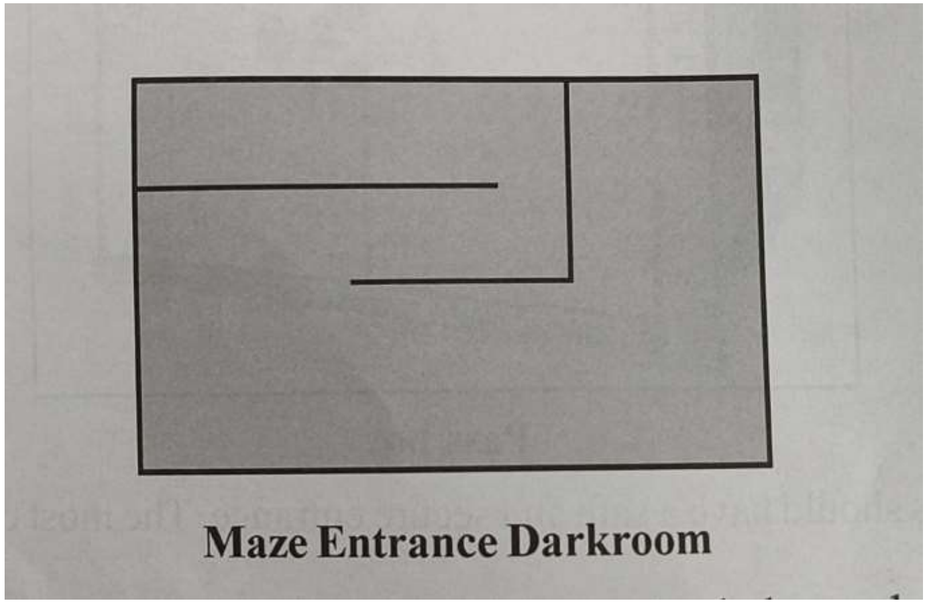
- This type of entrance has two doors with a small porch in between.
- Both doors have an electric interlock system.
- One door cannot be opened until the other is closed.
- It is a safe entrance while the film is processed



DARK ROOM DOORS

MAZE OR LABYRINTH ENTRANCE

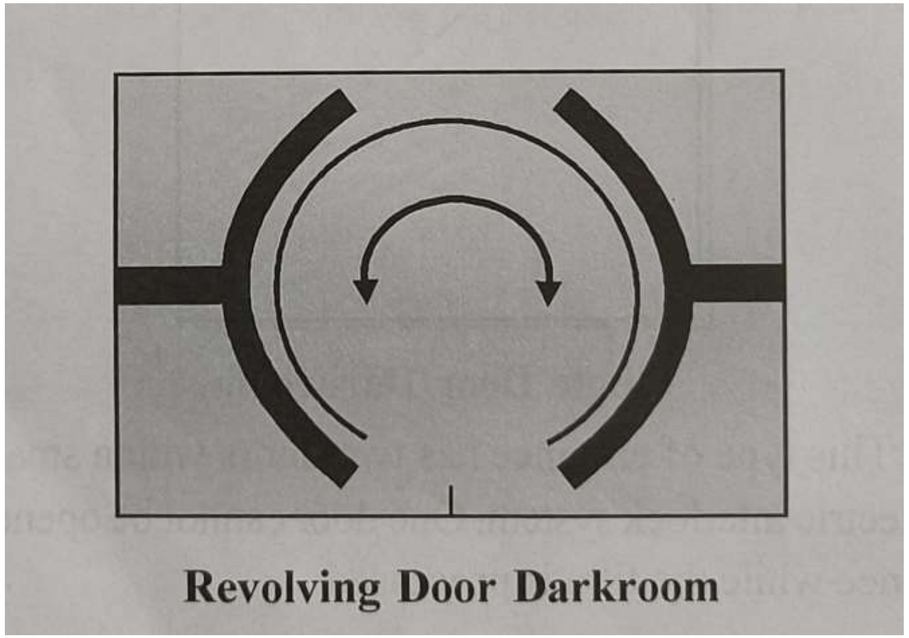
- The maze entrance has two parallel passages and a facing wall.
- It is an L-shaped entrance without doors.
- The passages are painted black to prevent light.
- The personal can enter and exit from the darkroom during the film processing.
- It traps the light effectively and provides safe film processing.
- This type of entrance occupies too much space.



DARK ROOM DOORS

REVOLVING DOOR

- It is the rotating type entrance.
- The darkroom has only one rotating door system for entrance and exit.
- It consists of two black cylinders.
- The outer cylinder is fixed, but the inner is revolving.
- It provides easy and instant access in the darkroom.
- It occupies little space and provides a light-proof entrance in the darkroom, but it is a very expensive system.



Revolving Door Darkroom

DARK ROOM ILLUMINATIONS

DARKROOM ILLUMINATIONS

- Two modes of lighting is used in a dark room.

SAFE LIGHT

- The X-ray films are light and color sensitive.
- The safelight provides a non- sensitive wavelength of light that does not fog the film and it also provides proper illumination for the processing.
- The safelight must have a proper filter to block unwanted wavelength of the light and prevents the film from fogging.
- The safelight is required for film processing, general illumination, and loading and unloading of films.
- Commonly two types of safe illuminations are used in the darkroom-

DARK ROOM ILLUMINATIONS

INDIRECT SAFE LIGHT

- It is directed towards the ceiling of a dark room so the ceiling reflects the light back, which provides general illumination in the darkroom.
- The safelight must have a proper filter and a proper light source. The 60-watt bulb is used in indirect safe lighting.

DIRECT SAFE LIGHT

- It is situated near the film processing system. The light from the safe lamp directly falls onto the work area.
- The safelight must have a proper filter and a proper light source.
- The safelight must be placed a minimum of a distance of 4 feet (1.2 meters) away from the film processing and loading/unloading area.
- The 25-watt bulb is used in direct safe lighting for the distance of 1.2 meters and less than 1 meter, a 15-watt bulb is used.

DARK ROOM ILLUMINATIONS

FILTER TRANSMISSION GRAPHS

- It is a graph of safelight that states the visible band which is transmitted by the filter.
- When the light is passed through the filters, the specific wavelength of light is absorbed by the filters.
- During film processing, a suitable filter is used according to the color sensitivity of films.

AMBER FILTER

- (Kodak 6B filters, orange in color) is suitable for the blue light-sensitive film.

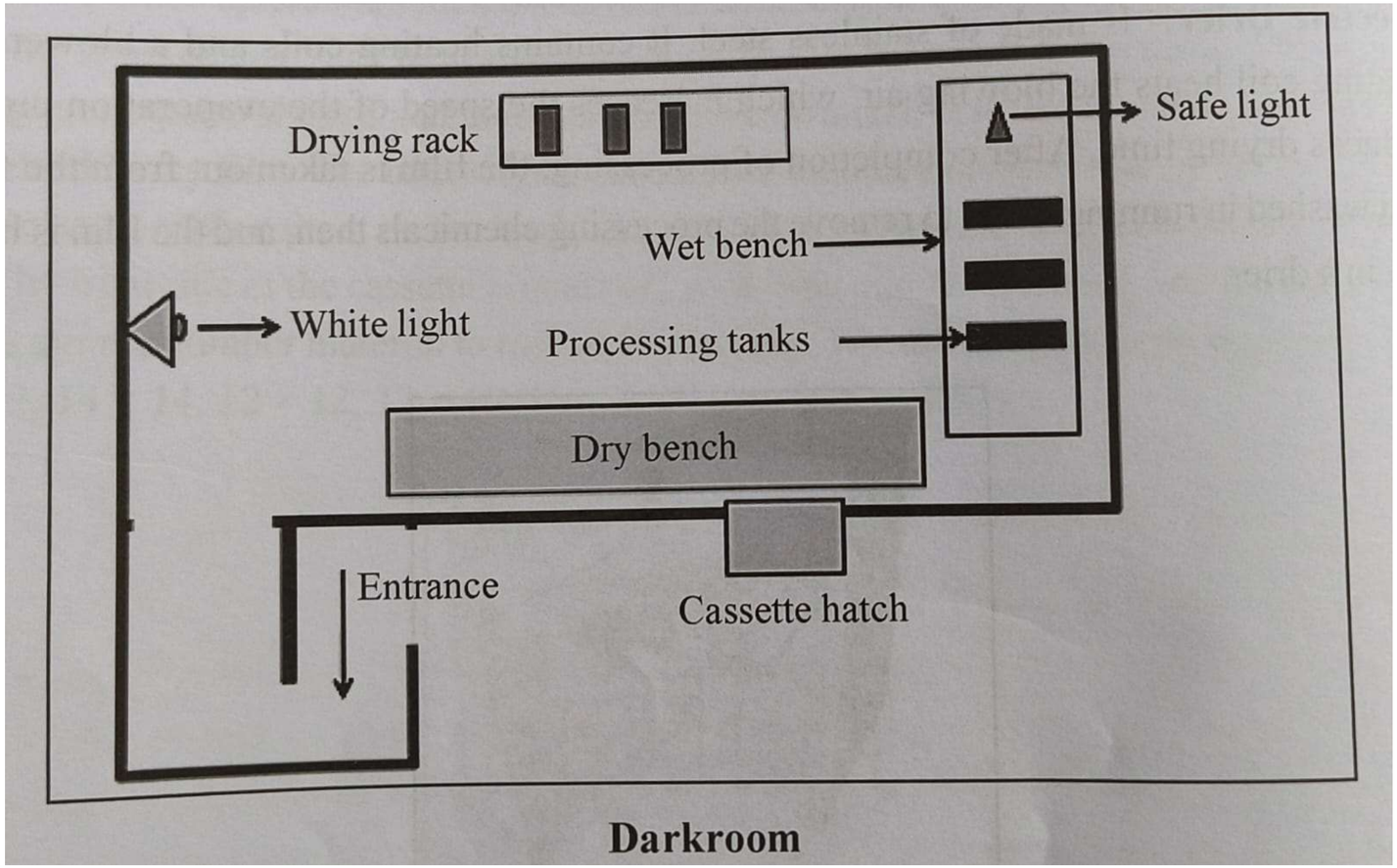
THE RED FILTER

- (GBX filters, cherry red color) is suitable for the orthochromatic (green light-sensitive) film.
- Panchromatic films are color-sensitive films, so these films are processed in complete darkness.

WHITE LIGHTING

- The darkroom also has a white light source. It is required for cleaning of the darkroom, maintenance of the processing solution and Service of automatic film procedure.
- The 60-watt bulb is used as a White lighting source.

DARK ROOM


Drying rack
Safe light
Wet bench
White light
Processing tanks
Dry bench
Entrance
Cassette hatch
Darkroom

DARK ROOM ILLUMINATIONS

KEY POINTS FOR THE DARKROOM PRACTICE

1. The darkroom must be big enough, according to the workload and type of processing and also have sufficient space to accommodate the dry bench, wet bench, and film processing equipment.
2. The darkroom should be completely light-proof to avoid film fog.
3. It should have a safe and secure entrance.
4. The wall should be made radiation-proof and made of solid concrete.
5. The walls and roof should be painted with white paint for a good reflection of safe light.
6. The darkroom should have appropriate safe lighting and white lighting for film processing and cleaning
7. The Safelights should have the correct wattage bulb, filters and be located at least 3 feet from the work area.
8. The dark should have proper ventilation, a perfect drainage system, and have a clear and continuous hot and cold running water supply.
9. The darkroom floor should be cleaned regularly.
10. The washing and rinsing water tanks must be changed every day.

DARK ROOM ILLUMINATIONS

KEY POINTS FOR THE DARKROOM PRACTICE

11. The darkroom should have sufficient storage space for films and processing solutions.

12. The darkroom should have a proper ventilation system, safe and reliable electric supply.

13. The temperature and humidity of the darkroom should be maintained.

14. The Quality Control and the Quality Assurance test should be carried out regularly.

15. The developer and fixer solution should be stirred every day and changed frequently depending upon the workload.

16. Warning light should be located at the entrance to indicate when the room is in use for Processing.

17. The unexposed radiographic films should be stored in a cool, dry area and shielded from radiation and light.

18. The films must be handled with clean, dry hands and touched only at the corners. The wet hand can cause unnecessary marks on the film and intensifying screens.

INTERROGATIONS

1. What is illuminators ?
2. Define safe light in dark room
3. Explain the different types of doors in dark room

REFERENCES

1. Radiographic latent image processing – W. E. J McKinney

2.Diagnostic Radiography – A concise practical Manual – Glenda J. Bryan (4th edn),

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THANK YOU