



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 : 6.1 AUTOMATIC PROCESSING



AUTOMATIC FILM PROCESSOR



- Nowadays film processing is done automatically, which provides consistent and uniform quality radiographs.
- An automatic processor run the film sequentially through the developer, fixer and washing solutions.
- The total developing time is only 90 s.
- The automatic processor consists of a number of separate but interrelated systems.
- They are
 1. Transport system,
 2. Temperature control system,
 3. Circulation system,
 4. Replenishment system, and
 5. Dryer system





AUTOMATIC FILM PROCESSOR



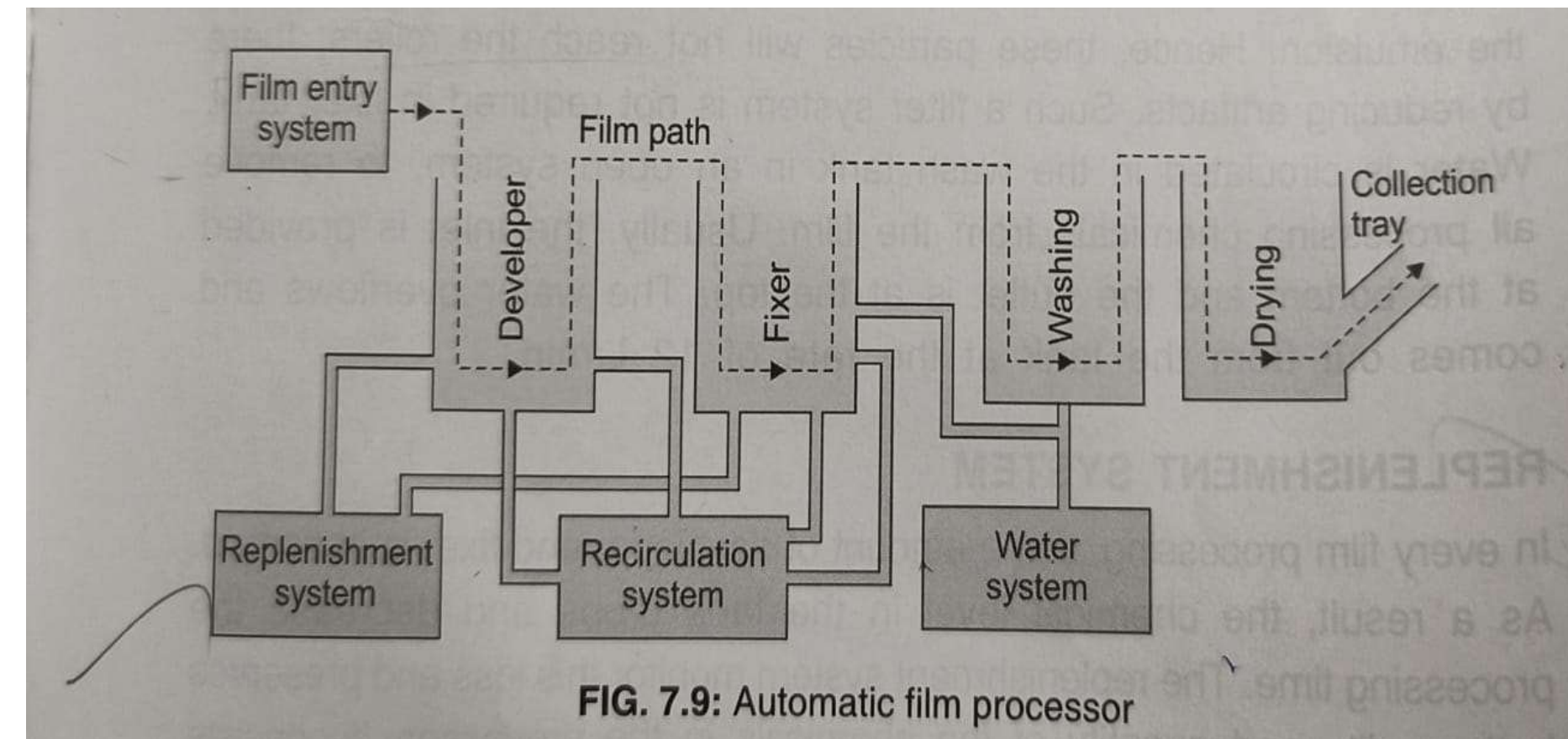
TRANSPORT SYSTEM

- The transport system consists of feed tray, entrance rollers, micro- switch, roller assembly, transport racks and drive motor.
- The roller assembly consists of transport rollers, master roller and planetary roller.
- The film is inserted into the feed tray in the darkroom.
- The shorter dimension of the film should always be against the side rail, to maintain proper replenishment rate.
- The transport rollers (1 in dia.) are in pairs, opposite to one another and keep the film in correct path.
- The master roller (3 in dia.) helps the film to turn around with the help of planetary rollers and guide shoes.
- A crossover rack helps the film to move from one tank to another.
- A drive motor with 10-20 rpm transfers power to transport rack and drivers and rollers through belt and pulley or chain and sprocket or gears.
- The transport system also control the time to which the film is immersed in the chemical. The micro switch controls the replenishment rate of the processing chemicals.

AUTOMATIC FILM PROCESSOR

TEMPERATURE CONTROL SYSTEM

- Temperature of the developer, fixer and water should be maintained precisely.
- The developer and wash water should be maintained at 35°C and 32°C, respectively.
- Hence, a heating element controlled by a thermocouple is provided for each tank.





AUTOMATIC FILM PROCESSOR



CIRCULATION SYSTEM

- The developer and fixer chemicals should be mixed by agitation, to have constant temperature.
- The circulation system pumps the chemicals continuously, and provides agitation in each tank.
- In the developer, the circulation system filter the particles of 100 μm size released by the emulsion.
- Hence, these particles will not reach the rollers, there by reducing artifacts.
- Such a filter system is not required in fixer tank.
- Water is circulated in the wash tank in an open system, to remove all processing chemicals from the film.
- Usually, the inlet is provided at the bottom and the outlet is at the top.
- The water overflows and comes out from the tank at the rate of 12 L/min.



AUTOMATIC FILM PROCESSOR



DRYER SYSTEM

- The dryer system consists of blower, heater, ventilation ducts, drying tubes, and an exhaust system.
- This system work on negative air pressure and absorbs moisture from the film.
- The blower sucks the room air and blows on the heating coils (2500 W).
- The temperature of the air entering system is monitored by a thermocouple.
- The drying tubes are positioned on both sides of the film and the hot moist air is vented out.
- The automatic processor is very much suitable to a busy X-ray department.
- It reduces the processing time (90 s), and improves the efficiency, work flow and image quality.



AUTOMATIC FILM PROCESSOR



ADVANTAGE

- The automatic processor will reduce film processing time and improve the radiographic quality.
- It also improves the film processing capacity.
- The transportation of films from one solution to the next is to take place without any effort.

PROCESSING CYCLE

- It is a time for a film to get processed and dried in an automatic processor.
- The processing cycle of the processor is 90-115 seconds.
- Development time maybe 25 to 30 seconds.
- Fixing time maybe 15 to 30 seconds
- Washing time maybe 15 to 30 seconds.
- Drying time may be seconds 30 seconds



AUTOMATIC FILM PROCESSOR



MAINTENANCE OF AUTOMATIC PROCESSOR

- The processor is switched off if it is not to be used.
- Before start-up, the fixer and developer tank levels should be checked.
- The water supply and replenishing pump should be checked.
- The processing chemicals should have the correct operating temperature.
- The rollers should be cleaned and the hard deposits from rollers should be removed.
- Before processing, two or three waste films should be passed through the rollers to clean the roller from dust and dirt particles.
- Before making a fresh processing solution, all exhausted solutions should be drained and cleaned.
- The operation manuals should be followed, provided by the manufacturer.



INTERROGATIONS



1. Automatic film processor consists of ?
2. Define processing cycle
3. Maintenance of automatic film processor



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