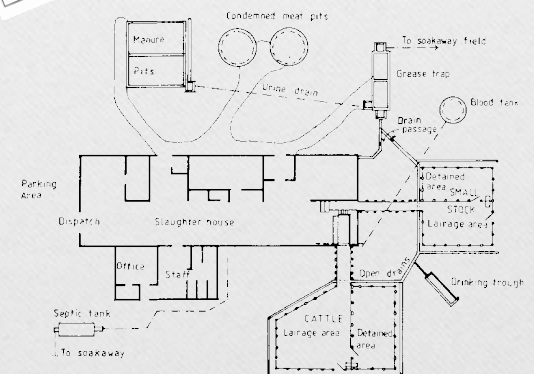
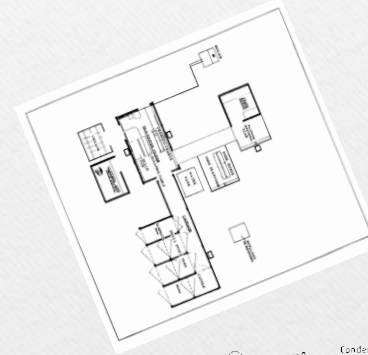


# Abattoir - materials, designs and layout

# Principles of construction

- Absolute need-expansive affair
- Multiple abattoir-religion
- Slaughter capacity
- Experienced people
- Primary goal
- Economics
- facilities





# Hygienic principles

- Separation between clean and dirty area
- Unidirectional processed floor
- Pest proof window
- No cracks in floor and walls
- Away from human dwelling
- Closer to animal production area
- Separate slaughter for different species
- Different entrance and dispatch area



Through put-number of animals to be  
slaughtered per hour or per day

Slaughter capacity- livestock unit  
(LU)

1 LU= 1 cattle= 2 pigs= 3 calves= 5  
sheep

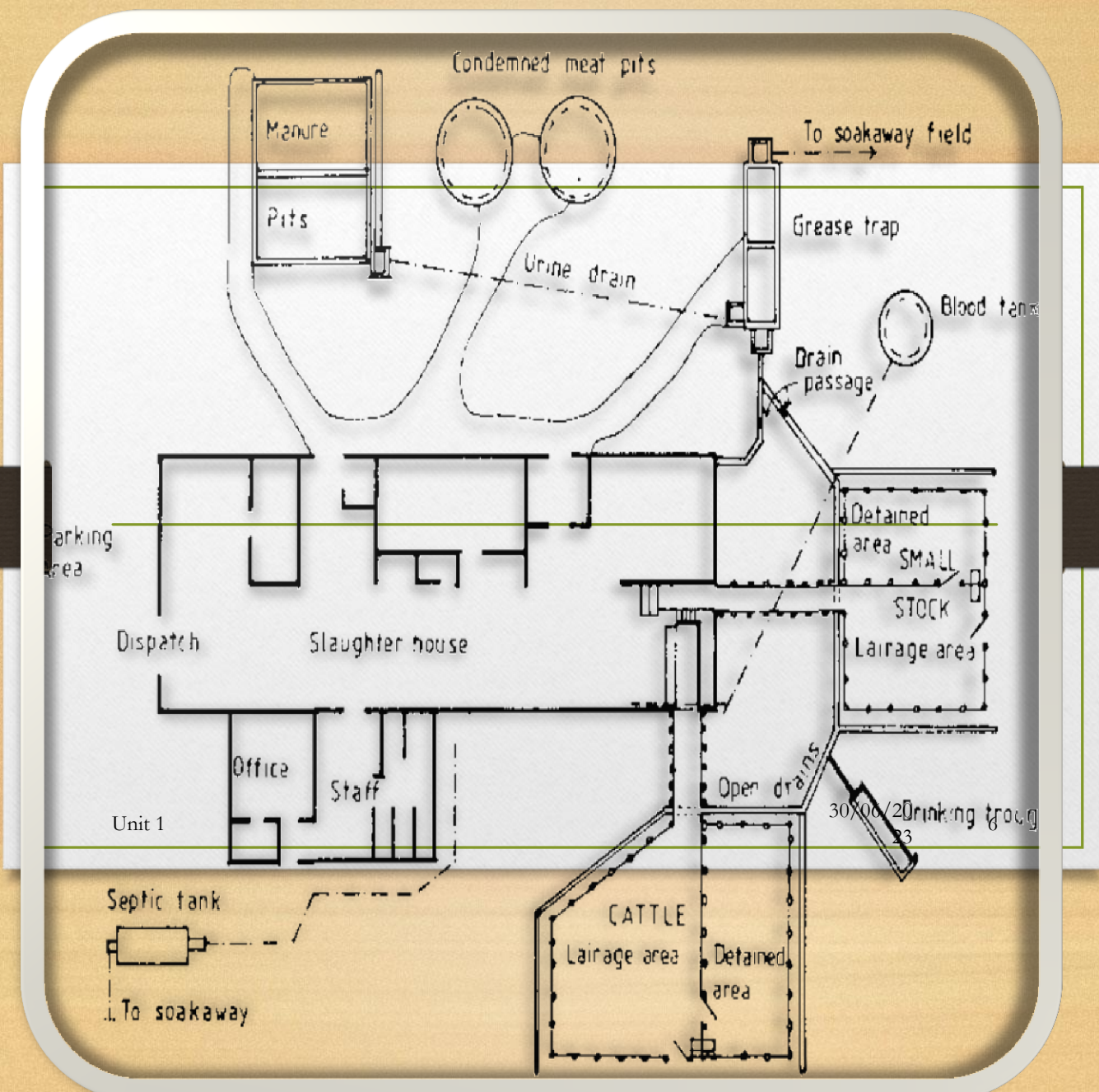




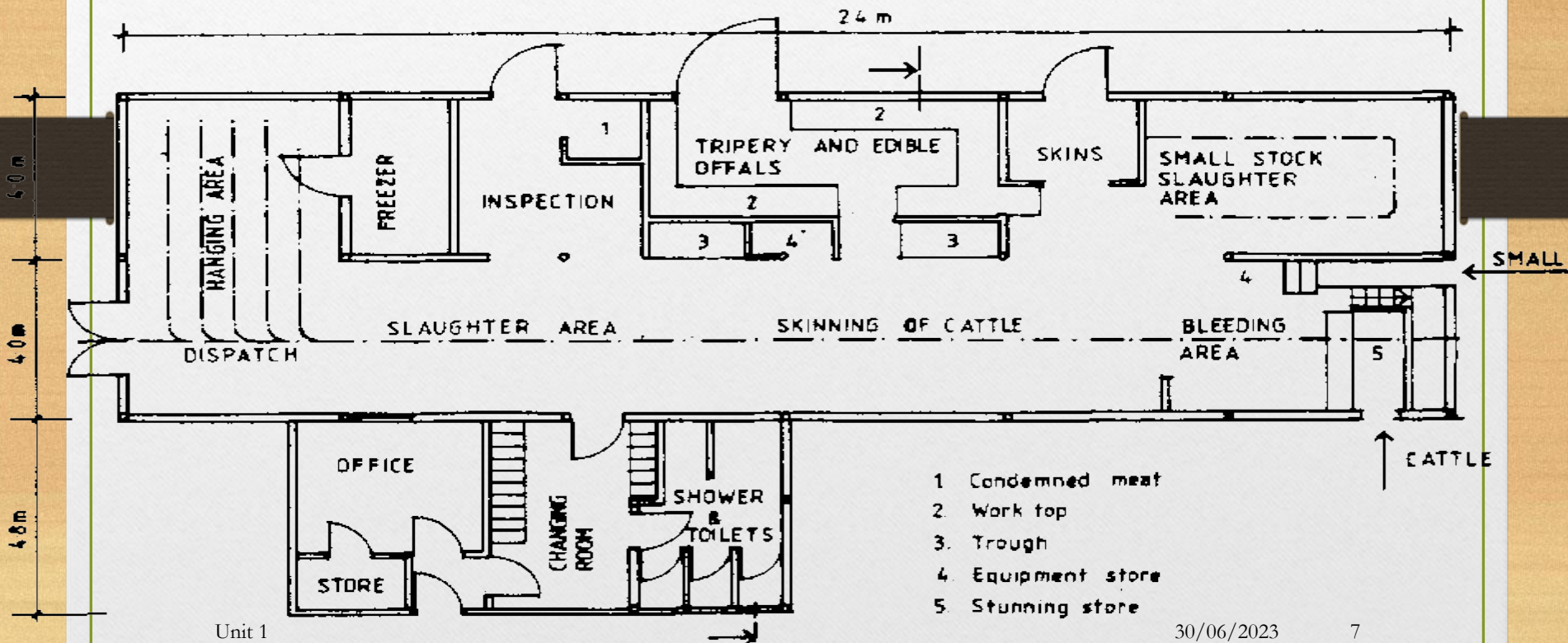
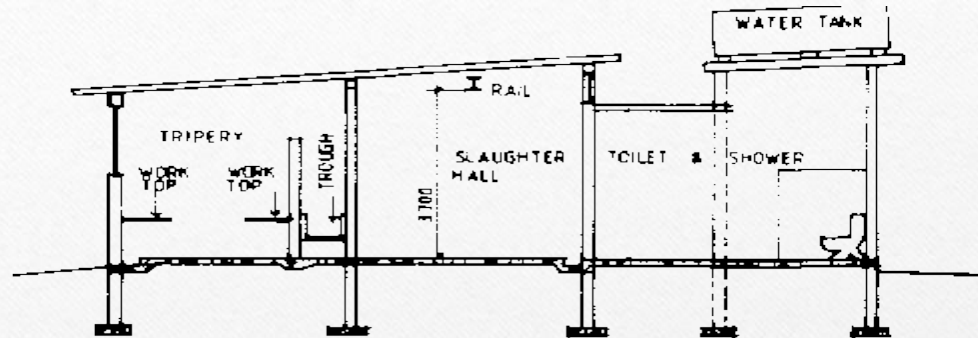
# Size of abattoir

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- **Small abattoir- 1-2 acres, upto 30000 LU per year**
- **Medium abattoir- 2-4 acres, upto 50000+ LU per year**
- **Large abattoir- 4-6 acres, > 1 lakh LU per year**



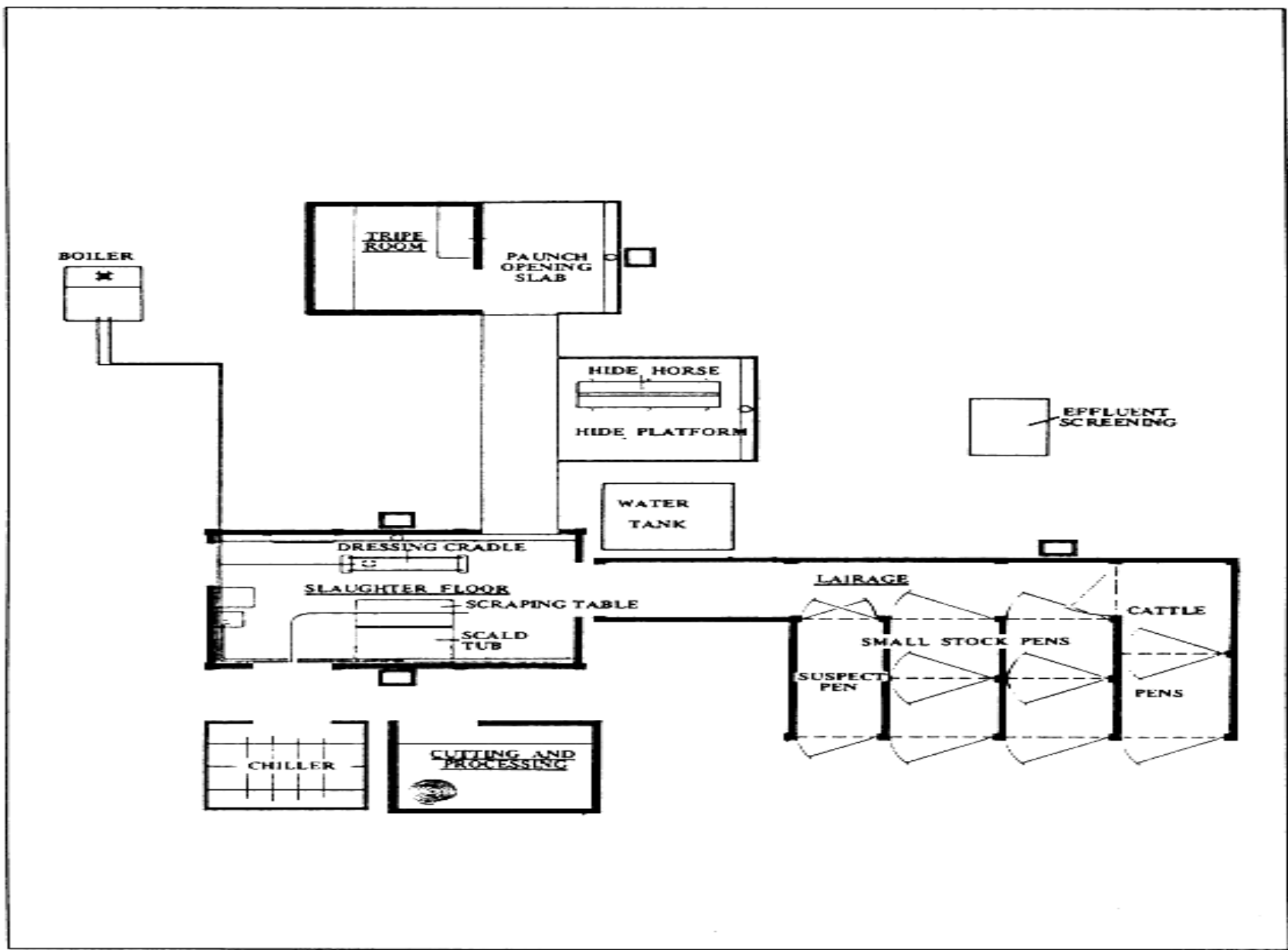




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# Site of abattoir

- Away from human dwelling (45 km from airport)
- Contiguity with uncongested roads
- Main municipal water supply
- Electricity supply
- Facility for municipal sewage
- No water logging and free from flood



- **Cheap labor**
- **Proximity of public transport system**
- **Site free from pollution of other industries**
- **Good availability of raw material**
- **Future expansion**





# Three types of site:

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- **Urban site-** should be avoided
- **Nominated industrial site-** good facilities but problems of other industries and future expansion
- **Rural site-** no availability of basic constituents

# Construction of abattoir

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- Clearance / licenses by state animal husbandry
- NOC from environmental ministry
- Approval for electricity, water supply, labor, appropriate of weight and measures
- Environmental impact assessment from environmental ministry during construction and operational phase
- License from APEDA for export purpose



# Facilities in abattoir

- Receiving area
- Adequate lairage
- Slaughter hall
- Emergency slaughter hall
- Blood room
- Suspect meat room
- Condemned meat room
- Weighing cabin
- Processing room



- 
- **Edible offals room**
  - **Inedible offals room**
  - **Room for emptying stomach and intestine**
  - **Gut and tripe dressing room**
  - **Hide room**
  - **Storing room for horns, hooves, bristles**







- 
- Exclusive room for veterinarian
  - Maintenance room
  - Veterinary laboratory
  - Cold storage room
  - First aid room
  - Changing room
  - Toilets
  - Canteen/dinning room
  - Bins/ trolley washing room

# Water supply

- Portable and non portable water supply
  - Red coating of pipes for non portable water
  - No leakage and no drainage of blood to water
  - proper storage and purification facilities
  - 15 psi and hot water at 82°C
  - For slaughtering area only:
    - cattle-272liters
    - pigs-454 liters
    - sheep/goat-45 liters
- (+ 25% extra for each)





# Electricity

- 3 phase industrial supply
- Stand by generator facility
- Electrical steam boiler for hot water supply



## Ventilation

- Essential for hygiene to avoid dampening, rusting of equipments
- To avoid accumulation of heat and condensation of moisture
- Facility of extractors and ventilators
- Screened openings

# Drainage

- In wet area- slope should be 1:50
- Below the rails, valley- slope 1:20
- 1 drain for every 40 square meters
- Drainage should be in proper trap figures to prevent escape of gases, insects and to avoid entry of meat and bone pieces



## Equipments

- Non rusted materials
- If wooden, proper lamination





# Lightening

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- Adequate natural and artificial light
- Direct solar rays should be avoided
- Monochromatic light
- Intensity of light:

# Inspection area- 540 lux at 50 foot candela

# Working area- 220 lux at 20 foot candela

# Other areas- 110 lux at 10 foot candela

(Measurement of light from 0.9 meter / 3 feet)

# Floor and wall finishes

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- Capable of easily cleaned and sanitized
- Ceiling should be laminated
- Made up of non slippery, non absorbent and non toxic material
- No sharp corners
- Finishing with tiles upto 3 meter height
- Floor of reinforced concrete, epoxyfloors, industrial tiles
- Walls of tiles, stainless steel or Al sheets



# Receiving area

- Non slippery, adequate space
- Unloading vehicle and unloading ramp height should be equal
- Separation of bullying and aggressive animals
- Sufficient time to move forward, no beating
- No sudden moving objects, curved path instead of straight path
- Near to vehicle washing area



# Lairage

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- Main objective to provide rest and to accumulate the animals before slaughter
- Near to receiving area
- Proper ventilation and light supply
- Feeding of animals if kept for longer period
- Ad libitum water supply
- Prime importance to animal natural behavior



- **Stock density:**

**Cattle- 2.3 m<sup>2</sup>/ animal**

**pig- 0.6 m<sup>2</sup>/ animal**

**heavy pig (>100kg)- 0.7 m<sup>2</sup>/animal**

- **Cattle-7.6m×6.0m for 20-25 cattle, gate should be 2.4 m wide**



- For sheep- 0.9 m height and 0.9 m wide
- Cattle and sheep can be housed under one roof but not pigs
- Pig-pens should be long and narrow, fine water spray





# Slaughter hall

- Provision of stunning, slaughter and dressing
- Open hall with generous floor space
- 2 types of system:
  1. booth/ floor system
  2. over head rail system:
    - A. Gravity rail system
    - B. Intermittent power system
    - C. Continuous power system
    - D. Canpak system



- 
- **Gravity rail system**- carcass moves through gravity by pitch of the rail and stopped at particular point, lowest through put
  - **Intermittent power system-lever** will carry the carcass as per the predetermined time, power is supplied, 10-75 cattle/hour
  - **Continuous power system**- no stoppage, mechanically more complex, 40-120 cattle/hour
  - **Canpak system**- by Canada packers ltd., carcass suspended by runner. 50-150 cattle/hour



## Emergency /casualty slaughter

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# For acute pain, fracture, acute tympanitis, dislocation and chronic cases like downer's cow syndrome, hip dislocation

# Connected and nearer to suspect meat room and by products room

# From animal welfare point of view.

## Chilling room

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- # Immediately after slaughter, to ante room for 10-15 minutes for drainage of blood and water, then to chilling room
- # To attain  $<7^{\circ}\text{C}$  and  $\text{pH}<6.0$
- # Series of chilling rooms instead of one
- # Temperature  $0-4^{\circ}\text{C}$ , RH-88-92%, air velocity-3-5m/sec.
- # Floor- smooth, impervious, easily clean and sanitized
- # Walls- no tiles, made up of laminated GI sheets







- **detained meat room**
  - #adjacent to slaughter hall
  - #Also in communication with condemned room and by product room
  - #Near to laboratory
- **Condemned meat room**
  - # direct communication with detained and by products room
- **Hide and skin store room**
  - #here flesching machine for removal of meat, fat etc from hide
  - # chute- long cylindrical pipe of stainless steel with large diameter, to transfer some material by vacuum suction without human handling

- **Gut and tripe room**

- # Transfer of stomach and intestine through paunch conveyor

- # Paramentiere- big drums, having rough surface with sodium carbonate and hot water for scalding of rumen, reticulum etc to remove mucous lining

- **Red offals room**

- # Tongue, heart, messator muscle, liver etc.

- # Washing, cleaning, reexamination and processing





- **Edible fat room**

#Fat obtained by gut and tripe room are stored till dispatch and used for edible purpose

- **Inedible room**

#Denotes rendering unit

#Should be away from edible and processing area

#Also the materials unfit for human consumption is processed here, except hides and skins



# Cutting room

- Also known as processing room/ deboning room
- Temperature 10-12°C, RH-60-70%
- Well lightened large room for working of 400-500 people
- Floor and walls should be smooth, impervious, easy to clean and sanitize





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- **Freezing room**

- #Temperature maintained at  $-30$  to  $-34^{\circ}\text{C}$

- #Objective to keep the meat temperature at  $-18^{\circ}\text{C}$

- #Instead of one large, series of small freezer to reduce the heat load

- **Dispatch area**

- #Under Indian conditions no chilling or freezing

- #Maintained at  $12^{\circ}\text{C}$

- #Docking system, where vehicle will come and remain in close contact with area's entrance



- **Dry goods store**

#Storage for packaging material, tapes, chemicals, meat additives etc.

#Avoid pest infestation



- **Manure bay (pit)**

#Located away from slaughter hall and nearer to the lairage and animal holding pen

#Stomach and intestinal materials are processed along with manure or separately

#Impervious walls and appropriate drainage



# Facilities for personals

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- Cloak/shower/toilet area
- Locker facilities, small prayer hall
- Laundry facilities
- First aid room
- Communication facilities
- Canteen /dinning area
- Security arrangement

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- **Exclusive veterinarian room**

- #Well equipped lockable room for exclusive use of veterinary services

- #Hand washing, shower facilities, locker for clothing

- **Veterinary laboratory**

- #All facilities for water analysis, nutritional, microbial and biochemical analysis

- #Mainly for tuberculosis, anthrax, parasitic condition

- #For pig/ horse, mainly trichinellosis

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