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Lecture title: Meat plant construction and operation

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Summary: The local authority owns the buildings and also responsible for certain essential services such as sanitation ,feeding of animals in the lairage , provision of meat inspection service

Methods of stunning:

1- Direct blow to skull using a club or poleaxe.

The blow must be dealt with precision and force, so that the skull is immediately smashed, causing instantaneous unconsciousness. In cattle the aiming point is in the middle of the forehead in line with the ears, where the skull is thinnest. Horses have thinner skulls and are therefore easier to stun by this method. In sheep and goats the brain is more easily reached from the back of the neck.

A bolt held in the correct position by the mask is driven into the animal's brain by a hammer blow. The device is usually fitted with a spring which returns the bolt to its original position.

a- Free bullet

fired from a pistol into the skull is effective but unsafe. This method has been used on horses and cattle.

b- Captive-bolt pistols

Fitted with a blank cartridge are effective on cattle and sheep but not pigs whose skulls are thicker . After firing, the bolt returns to its original position in the pistol.

The bolt may or may not be designed to penetrate the skull. With penetrating types the brain becomes contaminated with hair, dirt and bone fragments. If brains are to be saved as edible tissue then the non-penetrating type with a mushroom-shaped head should be used.

2- Electrical stunning :

An electric current of high frequency , low voltage (60–80 V) is passed through the brain of an animal for a few seconds to produce unconsciousness.

Head tongs are suitable for pigs and sheep but not for cattle. The electrodes carried on the ends of the tongs must be accurately placed .

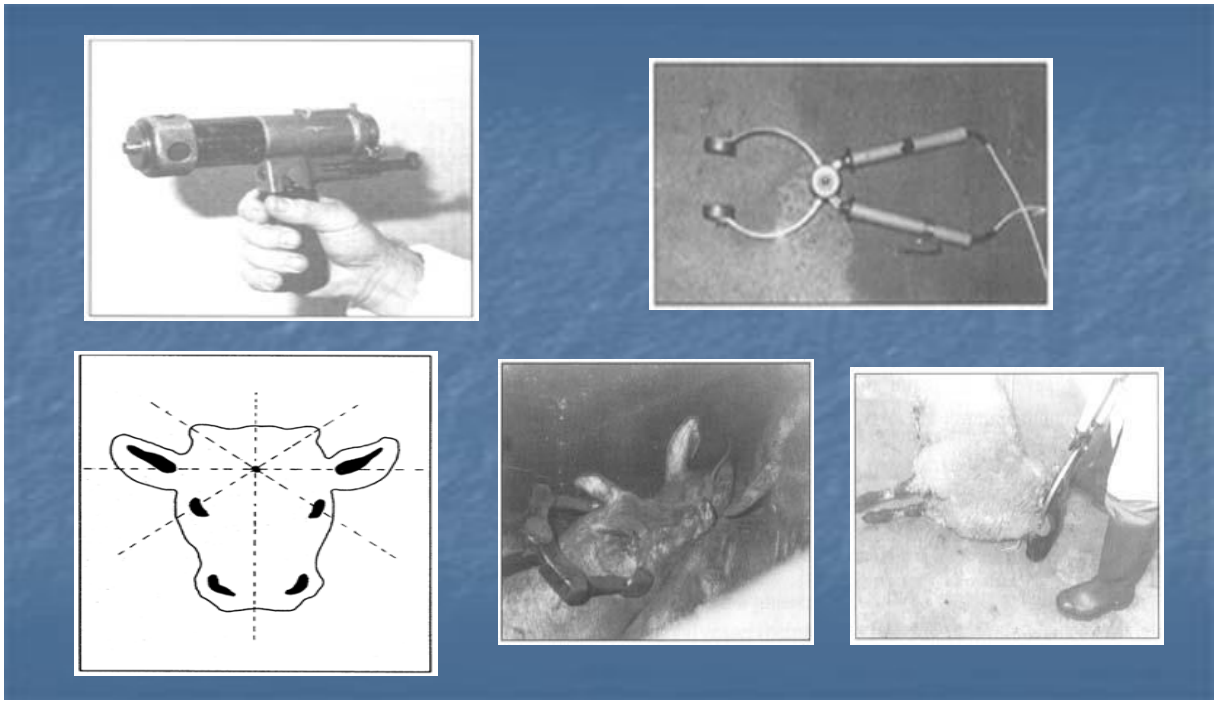
Places where the skull is thick must be avoided. Electrical contact is impeded by hair and caked mud.

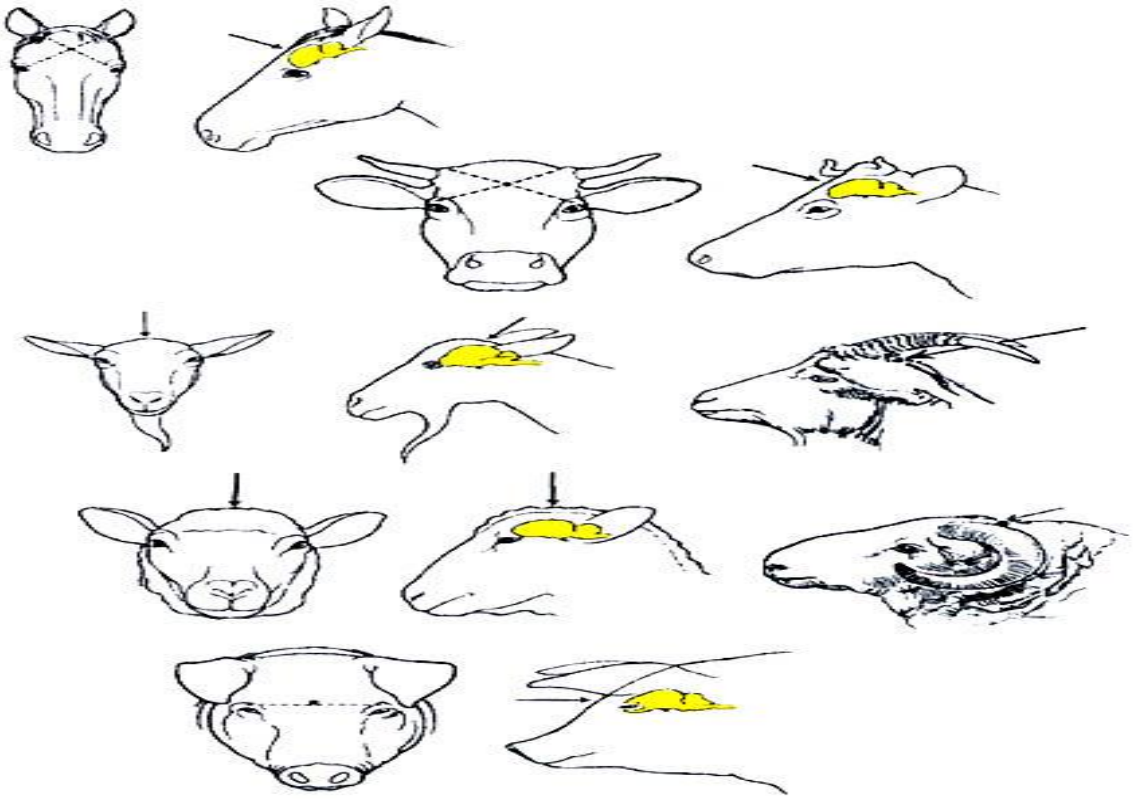
Water or brine will improve contact but the head must not be completely wet otherwise the current will have a short-circuit path avoiding the brain. The electrodes must be applied with strong pressure.

3- Carbon dioxide stunning

It is used only in large pig abattoirs. Pigs are induced into a chamber and exposed to a concentration of 85 percent CO2 for about 45 seconds.

Although effective for anaesthetizing sheep, it is impractical because of large amounts of CO2 collecting in the wool and affecting operators on the killing line.





Bleeding after stunning

The objectives of bleeding are to kill the animal with minimal damage to the carcass and to remove quickly as much blood as possible as blood is an ideal medium for the growth of bacteria.

Sticking, severing the major arteries of the neck, should immediately follow stunning. Care must be taken not to puncture the chest cavity or it will fill with blood.

Bleeding on a rail

The most hygienic system of bleeding and dressing is to shackle the animal immediately after stunning, then hoist it on to a moving rail.

The animal is stuck while being hoisted to minimize the delay after stunning. Bleeding continues until the blood flow is negligible when carcass dressing should begin without further delay .

Horizontal bleeding

Horizontal bleeding is claimed to give faster bleeding rates and a greater recovery of blood.

This may be due to certain organs and blood vessels being put under pressure when animals are hoisted, thus trapping blood and restricting the flow. Bleeding on the floor is very unhygienic.

Bleeding without stunning

The Jewish and Muslim religions forbid the consumption of meat which was killed by any method other than bleeding. Since it is difficult to guarantee that all animals will recover consciousness after being stunned by any particular method, stunning is not generally allowed. There are exceptions, however. Some communities do accept low-voltage electrical stunning.

Ritual slaughter may be less humane than sticking after stunning , because animals are fully conscious at the time of sticking,. To reduce the suffering operators must be a successful cut or severing all the veins and arteries is made quickly at the first attempt.

3-Emergency slaughter hall :

This is actually a small abattoir with a Lairage for up to four cattle ,a slaughter hall and hanging room .It should be situated near to the suspect meat detention room and should also be in direct communication with the by-products department if one is provided .diseased or suspected animals must segregated and lairaged apart from other animals.

4- Refrigeration accommodation:

The slaughterhouses provided with sufficient large chilling or refrigerating rooms ,fresh meat must be chilled immediately after the post-mortem inspection and kept at a constant temperature of not more than 7˚C for carcasses and cuts or 3C for offal .the carcasses must be hung in such away as to allow free movement of cold air around them ,rail spacing should be 0.9 m for beef 0.5 m for sheep. the minimum space between carcasses on rails should be 0.3-0.4 m. It is vital that chill and freezer doors be close-fitting and that they be provided with an internal opening device to avoid personnel being closed in the rooms.

5- Detained meat room :

Carcasses detained for further examination should be routed by a special rail to the detained meat room which should located adjacent to the main slaughter hall inspection points in order to identified and diagnosed the disease , from this detained meat room the overhead rail must reconnect with the main slaughter line for direction of carcasses either to the chill room or to the condemned meat room .it is

important that there should be ample space for the examination of carcasses which ,being hot at this stage ,should not be allowed to touch each other

6- Condemned meat room :

In order to arrange for proper sorting and holding of material unfit for human consumption prior to dispatch ,adequate space ,refrigeration and drainage with durable and lockable container and weighing facilities are essential .

7- Hide and skin store :

As for by-product handling ,gravity feeding of hides and skins is easer if the slaughter hall floor is on the higher level ,and connected with various by-products departments by stainless steel chutes.

8- Gut and tripe room :

The initial separation and emptying of stomachs and intestine is normally carried out in the gut and tripe room ,subsequent processing of stomachs and intestine should take place in a separate unit.

9- Offal room :

Offal should be trimmed and then placed in a chill or freezing room depending on the system of disposal. offal for edible purpose must be held at a temperature not exceeding 3C .

10-Edible fat room :

This is a completely separate holding room ,usually situated near the gut room and where edible fat is held
pending dispatch.

11-Cutting room

The hygienic procedure undertaken with initial carcass dressing are continued in the cutting room .

During the cutting process the temperature of the building must not exceed 10 º C and the room must have sufficient refrigeration accommodation to keep meat at an internal temperature of not more than 7 º C . There must also be a a thermometer installed in the cutting room .

Adequate facilities are necessary in the form of suitable equipment ,an adequate supply of hot potable water to keep the whole area hygienic and waste disposal system that meets hygiene requirements.

12-Inedible area

All material unfit for human consumption with exception of hide or skin, should be sited away from edible areas.

One of the difficulties associated with the inedible area is the arrangement for handling items such as omasums after separation from cattle paunches

Since improper handling of these organs can result in unhygienic conditions.

13-Fresh meat dispatch area

The fresh meat dispatch area be sited away from the dirty Part and access to it restricted to vehicles associated with Meat and offal for human consumption.

A system whereby the meat plant rails coordinate with those of the meat transport vehicles is of great value efficiently and hygienically loading meat for delivery.

There must be protection against pests of various kinds as well as stops to prevent damage to plant walls.

14-Manure bay

This should be sited near the Lairage on the dirty side of the plant , in some cases stomach and intestinal material is handled along with manure or it may be processed .Size and design depend mainly on throughput .

Disposal of waste material must be carried out with out greeting objectionable conditions.

15- Laboratory

In the larger premises a well equipped laboratory is essential not only for the preliminary diagnosis of animal disease but also to maintain the overall hygiene standards .

These premises are very often also utilized for the training of meat inspectors and other employees .

16-Vehicle washing.

17-Veterinary office