DESIGN AND CONSTRUCTION OF SLAUGHTERHOUSE (20 – 50 Heads Hogs and 5 – 10 Heads Large Animals Capacity)

GUIDEBOOK

Department of Agriculture
NATIONAL MEAT INSPECTION SERVICE
1 SCOPE

This guidebook specifies the general design and construction requirement of slaughterhouse for swine with a capacity of 20-50 heads and for large animals (Cattle & Carabao) with capacity of 5-10 heads. The guidebook defines the general requirement to operate a facility and establishment engaged in primary production and post-harvest stages of meat supply chain. Thus, specific requirements for the Animal Welfare Act and Good Manufacturing Practices (GMP) are considered accordingly.

2. DEFINITIONS

For the purpose of this guidebook, the following definitions shall apply:

2.1 Slaughterhouse
Any building or place used for killing of animals where the flesh is intended for human consumption, typical situation and floor plan of a slaughterhouse is illustrated in Annex A

2.2 Stunning pen
Compartment which is suitable for confining only one animal at a time while it is being stunned and which is so constructed as to confine, without discomfort, to prevent any substantial movement of the animal forward, backward or sideway

2.3 Stunning
Renders an animal insensible before it is killed

2.4 Sticking
Severance of the major blood vessels in the neck or immediately anterior to the heart by means of a knife and “stuck” shall be construed accordingly.

2.5 Bleeding
Remove as much blood from the carcass as possible before further handling

2.6 Scalding
Lowering of animal into steam to prepare skin for dehairing

2.7 Dehairing
Removal of the hair of the carcass

2.8 Gambrelling
Suspending the carcass for particular operation

2.9 Singeing
Cleaning the carcass by burning the hair
2.10 **Evisceration**
Process of removing the internal organs in the abdominal and thoracic cavities

2.11 **Dressing**
Preparation of carcass after evisceration, ready for storage or sale

2.12 **Splitting**
Dividing carcass into parts

2.13 **Carcass**
All parts including viscera of slaughtered cattle, sheep, goats or swine that may be used for human consumption.

2.14 **Meat**
Edible part of the muscle of cattle, sheep, goats or swine

2.15 **Offal**
Part of internal organs of a slaughtered animal

2.15.1 **Green offal**
Digestive tract of ruminants such as the stomach, or the intestines which still contain fecal matter.

2.15.2 **Black offal**
Digestive tract of swine such as the stomach, or the intestine which still contain fecal matter.

2.16 **Retained meat**
Meat requiring further examination as declared by a veterinary inspector after veterinary examination

2.17 **Condemned meat**
Meat which is unfit for human consumption as declared by a veterinary inspector after veterinary examination

2.18 **Gut or tripe**
Black or green offal

2.19 **Licensing by the DA**
The process by which DA FSRAs approve an application, of a person, corporation, cooperative, agriculture or fishery establishment, or other judicial persons, for authority to operate an establishment or to engage in any activity in the primary production and postharvest animal and plant food inputs. It includes facilities involved in activities
related to agrochemicals and other inputs in the primary and postharvest stages of production. The approval will require proving capability to operate facility or establishment or to engage in activities in the primary production and postharvest stages of the food supply chain and covered by the license.

2.20 **Finished Floor Level**
The finished level of the upper surface of the floor inclusive of all services, ducting and the like.

3 **CLASSIFICATION**

3.1. **Single “A” Slaughterhouse**
Those facilities and procedures of minimum adequacy that the livestock and fowls slaughtered therein are suitable for distribution and sale only within the city or municipality where the slaughterhouse is located.

3.2. **Double “A” Slaughterhouse**
Those with facilities and operational procedures sufficiently adequate that the livestock and fowls slaughtered therein are suitable for sale in any market domestic.

3.3. **Triple “A” Slaughterhouse**
Those with facilities and operational procedures appropriate to slaughter livestock and fowls for sale in any market domestic or international.

4 **LOCATION**

4.1 The site shall be on a higher level than its surroundings (at least 800mm above road level).

4.2 The slope, terrain, foundation and soil conditions on the site shall be suitable for the construction of substantial, and permanent buildings.

4.3 The site shall be located far from any building used for human habitation, and from any factory, public place (at least 200 meters) and should be free from dust, odor, smoke and other contaminants.

4.4 Slaughterhouse shall be at least 10 meter away from the river bank as provided in the Sanitation Code of the Philippines.

4.5 The site shall have a continuous supply of potable water to meet the required amount of water (14 liters/head for hogs and 227 liters for large animals) for slaughtering and other related use.

4.6 There shall be an available electrical power supply (single phase) at the site.
4.7 Provision of accessible road networks for transport to and from the slaughterhouse

4.8 The effective site area of slaughterhouse facility including its amenities shall be two thousand (2,000) square meters minimum and shall be fenced.

5 SLAUGHTERING PROCESS FLOW

5.1 The basic process flow for slaughtering of hogs and large animals are shown in Figures 1 and 2.

<table>
<thead>
<tr>
<th>INPUT</th>
<th>PROCESS</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pigs, Water</td>
<td>Delivery, Lairage (6 – 12 hrs holding time)</td>
<td>Manure, Odor Wastewater</td>
</tr>
<tr>
<td>Water, Electricity</td>
<td>Stunning, Bleeding (15secs interval, Allow 7 mins bleeding time)</td>
<td>Blood Wastewater</td>
</tr>
<tr>
<td>Water, Energy</td>
<td>Scalding (Water Temp. 59° C)</td>
<td>Blood Emissions, Odor, Wastewater</td>
</tr>
<tr>
<td>Water, Propane Gas, Energy, Electricity</td>
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<td>Water</td>
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<td>Water</td>
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<tr>
<td>Water</td>
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<td>Fat, Wastewater</td>
</tr>
<tr>
<td>Water, Cleaning Agents, Disinfectants</td>
<td>Cleaning/Sanitation (After Operation)</td>
<td>Solid Wastes Wastewater Chemicals</td>
</tr>
</tbody>
</table>
Figure 1. Process Flow Diagram of Hog Slaughtering

**INPUT**
- Large Animal
- Water

**PROCESS**
- Delivery, Lairage (6 – 12 hrs holding time)
- Ante Mortem Inspection
- Stunning, Bleeding
- Hide Removal
- Head Removal
- Evisceration
- Post Mortem Inspection
- Splitting
- Washing
- Weighing/Dispatch
- Cleaning/Sanitation (After Operation)

**OUTPUT**
- Manure, Wastewater Odor
- Condemned animals
- Blood Emissions, Wastewater
- Hides Emissions, Wastewater
- Head, Blood Emissions, Wastewater
- Blood, Intestines Stomach, Pluck set Fat, Odor, Wastewater
- Condemned Parts And Carcasses
- Fat, Blood, Bones, Spinal cord Emissions Wastewater
- Fat, Wastewater Meat scraps
- Solid Wastes Wastewater Chemicals
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Figure 2. Process Flow Diagram of Large Animal Slaughtering

Note: These process flow are the bases for the design and construction of slaughterhouses. Thus, traditional and/or cultural practices by people in the different parts of the country have not been integrated.

6 STRUCTURAL REQUIREMENT

6.1 Foundation

6.1.1 The site shall be elevated to at least 800mm above the adjacent ground. The fill material shall be compacted thoroughly by rolling or pounding.

6.1.2 Structural footing design shall conform to the existing National Building Code.

6.2 Columns

Columns or other structural members located in areas where product contact may occur shall be constructed from, or sheathed in, durable, non-porous, easily washable materials.

6.3 Floors

6.3.1 Floor shall be non-slippery concrete finish, thus tiles are not recommended for the slaughtering area.

6.3.2 Hog Line

6.3.2.1. Elevation for bleeding area should be 0.70m from the finished floor line (FFL), dehairing area is 0.90m from the finished floor line (FFL), for dispatch area 0.80m from the finished ground line. Refer to Figure 3.

Figure 3.
6.3.3 Large Animals Line

6.3.3.1 Elevation of stunning should be 0.90m from the finished floor line (FFL), and dehiding, evisceration & dispatch area should be 0.80m from the finished ground line, respectively. Refer to Figure 4.

![Figure 4](image)

6.3.4 The floor slope shall be at least three (3) degrees towards open canal with stainless grating.

6.3.5 Coving between floors to wall shall be provided with diameter of 75mm as reflected in Figure 5.
6.3.6 Drainage canal shall not be located along the equipment line.

6.4 Walls

6.4.1 Internal wall surfaces shall be durable and easy to clean, that is smooth-finish light color paint

6.4.2 Wall partition between hog stunning area and cattle bleeding area shall be at least 2.00 meters high.

6.4.3 All wall tops and ledges shall slope at 45 degrees. Refer to Figure 6.

Figure 6.

6.4.4 It shall be coved at wall-to-wall junctions with a minimum radius of 75mm.

6.4.5 Use light color paint in the interior walls.

6.5 Roof

6.5.1 The roof structure should be made of painted steel trusses. Roof shall have monitor equipped with steel louver and double-screened.

6.5.2 Roofing materials should be made of galvanized steel and other forms of steel sheeting with corrosion resistant coatings.

6.5.3 Clip edges of roofing onto concrete walls for climate resiliency. Refer to Figure 4.
6.5.4 Roof vents, when provided, shall be properly screened.

6.6 Ceilings

6.6.1 No ceiling required in the slaughtering area.

6.6.2 Offices, toilets and entrance of workers should have ceiling of at least 2.70m from the finish floor line.

6.6.2 Roof eves shall be provided with ceiling for insect proofing.

6.6.3 Ceiling shall be made up of plywood or other equivalent materials.

6.7 Windows and Openings

6.7.1 Windows at the stunning and bleeding area shall be double-screened and shall be at least 0.6 m high and 0.40m from the bottom of roof beam

6.7.2 Steel casement windows for offices shall be 1.20m high x 1.60m width located at 0.90m above the finished floor line. For sliding windows, provide steel grills for security purposes.

6.7.3 Channel window in hogs slaughtering area to offal room measures 0.60m wide x 0.60m high located at 0.70m from the finished floor line and shall be provided with plastic curtains of 50-50 overlap.

6.7.4 Channel window in cattle slaughtering area should be 0.80m wide x 0.60m high from the finished floor line to allow the entry of paunch into the offal room and shall be provided with plastic curtains of 50-50 overlap.

6.7.5 Channel window in cattle slaughtering area should be 0.60m wide x 0.60m high located along the lavatory of the offal room for red offal and shall be provided with plastic curtains of 50-50 overlap.

6.7.6 Offal rooms shall be provided with windows for ventilation purposes measuring 0.60m high located at 1.20m from the finish floor line

5.7.7 Fixed clear tempered glass window in all offices such as Meat Inspector’s office and/or Administrative Office is required to view the slaughtering process.

6.8 Doors and Jambs

6.8.1 Dispatch doorway shall be at least 1.5m wide equipped with roll-up door.

6.8.2 Doors shall be constructed of rust-resistant material and fitted with screens.
6.8.3 Dispatch doors, entrance doors, offal cleaning door shall have a plastic curtain with 50-50 overlap.

6.8.4 Yellow plastic curtains shall be used for doors and windows facing exterior while white plastic curtains shall be used indoor.

6.8.5 Offices shall be provided with panel doors while comfort rooms and locker rooms shall be provided with PVC doors.

6.8.6 Hinges shall be made of rust-resistant material.

6.8.7 Jambs shall be made of concrete.

6.9 Drainage

6.9.1 Waste water drainage canal outside the slaughterhouse building to the waste water facility shall be covered with detachable concrete cover.

6.9.2 Drainage canal inside the slaughterhouse working area shall be 0.20m wide x 0.20m high on the average with 2% slope towards the waste water treatment facility and should be covered.

6.9.3 The catch basin shall be provided with detachable corrosion-resistant strainer and shall be accessible to daily cleaning.

6.9.4 The paunch contents shall be dispensed directly to collection containers outside the slaughterhouse building.

6.9.5 Comfort rooms sewer line shall be separated from the slaughtering sewer line.

6.10 Water Supply

6.10.1 All water lines inside the slaughterhouse shall be of galvanized pipe schedule 40.

6.10.2 All water lines in the working area shall be installed overhead and equipped with pressurized hose with nozzle which is extended one foot above the finished floor line.

6.10.3 There shall be elevated stainless/food grade material water tank with a capacity of 4000 liters.

6.10.4 There shall be power wash at the holding pen for cleaning purposes of trucks and another power wash at the slaughtering area.
6.10.5 The number of water nozzle in the slaughter floor shall have a minimum of nine (9) nozzles. Refer to Figure 7.

7 FUNCTIONAL REQUIREMENTS

7.1 Holding pen

7.1.1 Holding pen shall be provided with chute/raceway and drovers walk directed to the stunning box/restrainer.

7.1.2 Pens shall be made of masonry or metal construction (1.2m H for hogs and 1.5m H for large animals).

7.1.3 There shall be provision for separate pen for suspect animals.

7.1.4 There shall be provision for restraining chute for pregnancy diagnosis.

7.1.5 There shall be provision for shower in every pen and drinking nipple for hogs.

7.1.6 Flooring shall maintain 2% slope towards drainage canal.

7.1.7 The finished floor line shall be 0.80m above the finished ground line.

7.1.8 Provide shower before entering the chute

7.1.9 Unloading bays should be provided with ramp for humane handling of live animals.
7.1.10 Hog Chute

The chute should be 1.0m high, 0.35m at the base and 0.45m at the top opening. Refer to Figure 8.

![Figure 8](image1.png)

7.1.11 Large Animals Chute.

The chute should be 1.50m high, 0.60m at the base and 1.0m at the top opening with drovers walk at the side. Refer to Figure 9.

![Figure 9](image2.png)
7.2 Stunning Area

A. Hogs

7.2.1 Hog Restraining Box should be provided wherein the floor level is aligned with the base of the chute. Refer to Figure 10.

![Figure 10](image)

B. Large Animals

7.2.2 Knocking Pen Door installed 0.90m above the finished floor line provided with a space measuring 0.60m W x 3.40m L for butcher. Refer to Figure 11.

![Figure 11](image)
7.3 Sticking and Bleeding Area

A. Hog
7.3.1 Bleeding and sticking platform shall have a blood trough that directly leading to blood collector.

B. Large Animals
7.3.2 The bleeding table for large animals shall at least 1.5m wide and shall have a smooth impervious surface such as stainless steel. Refer to Figure 12.

![Figure 12](image)

7.4 Inspection area

7.4.1 Inspection station area for carcass should be provided after evisceration for hogs and after quartering for large animal with an illumination of 540 lux (50 foot candle) in inspection points.

7.4.2 Hand dip/tool dip, hand washing facilities and water outlets shall be provided in strategic location.

7.4.3 Inspection table for offal with hanger shall be provided.

7.4.4 Labeled condemned receptacle shall be provided for condemned meat/offal.

7.5 By-products room

7.5.1 By-products room shall be provided for temporary storage of hides, feet, head and tail.
7.6 **Gut Room/Tripery**

7.6.1 For white offal, a separate area shall be provided for the emptying and cleaning.

7.6.2 Illumination of 320 lux (30 foot candle) in all work rooms shall be provided.

7.7 **Meat Hanging Area**

7.7.1 Meat Hanging Area shall be.

7.8 **Retained/Suspect Carcass Rail**

7.8.1 A Retain rail shall be provided for suspected carcasses.

7.9 **Dispatch area**

7.9.1 The dispatch area shall be adequate in space and shall allow orderly and efficient loading of meat.

7.9.2 Electronic weighing scale shall be provided.

7.10 **Personnel area**

7.10.1 **Toilet and Shower Room**

7.10.1.1 The construction shall be smooth, hard impervious materials such as glazed tile or smooth, troweled cement plaster, with properly drained floors.

7.10.1.2 There shall be provision of shower facilities and lavatories

7.11 **Changing/Locker room**

7.11.1 Changing/locker room shall be separated but accessible directly with Wash rooms.

7.11.2 Individual lockers shall be provided for employees

7.11.3 All lockers shall be made of metal or wood.

8 **MESS ROOM/CANTEEN**

8.1 There shall be provision for a separate area for eating outside the slaughterhouse Building.
8.2  Inspector office

8.2.1  The minimum office space requirement shall be 5sq. meter for one inspector and 1.4sq. meter for each additional inspector.

8.2.2  There shall be provision for lockable cabinet and adjoining toilet.

8.2.3  There shall be provision for fixed glass window for viewing.

8.3  Administration office

8.3.1  The minimum office space requirement shall be 5sq. meter for one office personnel and 1.40 sq. meters for each additional personnel.

8.3.2  There shall be provision for locker cabinet and adjoining toilet.

8.3.3  There shall be provision for fixed glass window for viewing.

9  MANAGEMENT PRACTICES

9.1  Sanitation

9.1.2  Foot bath shall be provided before entering the working area. Foot bath shall be 4-6 inches depth with plug and drain.

9.1.3  Hand-washing facilities (knee operated) shall be provided along the workers entrance to the slaughterhouse and offal cleaning rooms and shall be capable of supplying water and directly drained. Location shall be located where the personnel can readily wash their hands and beside the footbath. Liquid or other dispensable type of soap shall be provided.

9.1.4  Hand-dips utilizing an approved sanitizing agent with rinsing facilities shall be provided.

9.1.5  Boots washing facility area shall be provided with faucets in both offal rooms and at the workers entrance.

9.1.6  Transport vehicles unloading cleaning area shall be provided beside the holding pen with faucets.

9.1.7  Wheel bath shall be provided and constructed at the entrance gate measuring 6” H x 3m W x 3m L. Wheel sprayer is recommended in the absence of wheel bath.

9.2  Waste disposal

9.2.1  All solid waste shall be collected daily and disposed to identified dumpsite.
ANNEXES
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