
PHILIPPINE AGRICULTURAL ENGINEERING STANDARD PAES 525:2012
Slaughterhouse Equipment – Overhead Rail System for Poultry Dressing/Slaughtering Plant –
Specifications

Foreword

The formulation of this national standard was initiated by the Agricultural Machinery Testing and Evaluation Center (AMTEC) under the project entitled “Development of Technical Standards for Poultry Dressing/Slaughtering Plant” which was funded by the Department of Agriculture – National Meat Inspection Service (DA-NMIS)

This standard has been technically prepared in accordance with PAES 010-2 – Rules for the Structure and Drafting of International Standards.

The word “shall” is used to indicate mandatory requirements to conform to the standard.

The word “should” is used to indicate that among several possibilities one is recommended as particularly suitable without mentioning or excluding others.

In preparation of this standard, the following documents/publications were considered:

PAES 020:2005 General – Metrication Guidelines

PAES 316:2002 Engineering Materials – Metal Bars, Pipes, and Tubes – Specifications

PAES 511:2007 Slaughterhouse Equipment – Overhead Rail System for Hogs – Specifications

PAES 517:2007 Slaughterhouse Equipment – Overhead Rail System for Large Ruminants - Specifications

Mead, G.C. 2004.*Poultry meat processing and quality*. Woodhead Publishing in Food Science and Technology. Woodhead Publishing Limited. Cambridge England

Sams, Alan R. *Poultry meat processing*. Department of Poultry Science, Texas A&M University. CRC Press. 2001

Small Poultry Abattoir Operation, www.humdeyn.co.za/Abattoir.pdf. <Accessed May 02, 2012>

Poultry Slaughterhouse

http://www.zhauns.com/pdf/CHICKEN_POULTRY_SLAUGHTER_HOUSE.pdf <Accessed May 02, 2012>

Guidelines on Chicken Slaughtering and Chicken Meat Handling in Small Scale Chicken Slaughterhouses. Directorate of Veterinary Public Health Directorate General of Livestock Services Ministry of Agriculture. 2006

1 Scope

This standard specifies the requirements for fabrication, installation and performance of overhead rail system for poultry animals and carcasses such as chicken, geese, turkeys, ducks, ostriches, and others.

2 References

The following normative documents contain provisions, which, through the references in this text, constitute provisions of this National Standard:

AWS D1.1:2000	Structural Welding Code – Steel
PAES 102:2000	Agricultural Machinery – Operator’s Manual – Content and Presentation
PAES 103:2000	Agricultural Machinery – Method of Sampling
PAES 526:2012	Slaughterhouse Equipment – Overhead Rail System for Poultry Dressing/Slaughtering Plant – Methods of Test

3 Definitions

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

3.1

bleeding

process of removing the blood from the poultry animal after stunning

3.2

carcass

body of dressed/slaughtered poultry animal after defeathering, evisceration, and removal of head and feet

3.2.1

warm carcass

newly dressed/slaughtered poultry animal

3.3

chain

series of two or more connected metal links wherein the trolley is attached to facilitate its movement in the rail

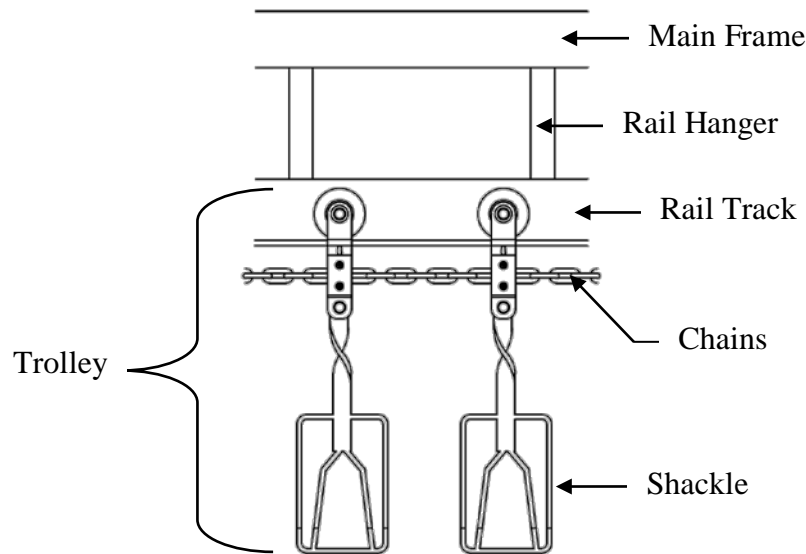


Figure 1. Overhead rail system for poultry dressing/slaughtering plant

3.4

chilling

process done by lowering the temperature of the carcasses within 4 °C to 0 °C to reduce microbial growth to a level that will maximize its shelf life

3.5

corbel

horizontal protruding rectangular block from the columns of the building that gives support to the main frame

3.6

defeathering

plucking

process of removing the feathers from the skin of poultry animal after scalding to prepare its meat for food

3.7

evisceration

process of removing the internal organs on the abdominal and thoracic cavities

3.8

load capacity

maximum load capacity of rail expressed in kilogram per linear length

3.9

overhead rail system

system that consists of main frame, rail hangers, rails, trolleys, and shackles which is used to transfer poultry animals or carcasses from one processing stage to another during dressing/slaughtering (Fig. 1)

3.9.1

overhead rail track

welded and suspended rectangular bars or tubular/round bars that serves as guide for trolley wheels during operation of overhead rail system

3.9.2

overhead rail frame

solid horizontal beam preferably metal where rail track is securely fastened through the rail hanger

3.9.3

overhead rail hanger

supports and holds the rail tracks suspended from the overhead rail frame

3.9.4

overhead shackle

solid metal used to hold and hoist the poultry animals and carcasses through the legs or head

3.9.5

overhead trolley

suspended metal assembly with one (1) or two (2) wheels used to carry or transport the shackled poultry animals or carcasses

3.10

poultry

birds that are usually domesticated for their eggs, meat and feathers (e.g. chicken, geese, turkeys, ducks, and ostriches)

3.11

rail height

distance measured from top of the rail to the finish floor line

3.12

rail spacing

center to center distance between parallel rail tracks

3.13

scalding

process of subjecting poultry animals into steam or hot water to loosen feathers from its skin prior to defeathering

3.14

sprocket-wheel

wheels with teeth, cogs or sprockets that mesh and engage a chain with attached trolley passing over it

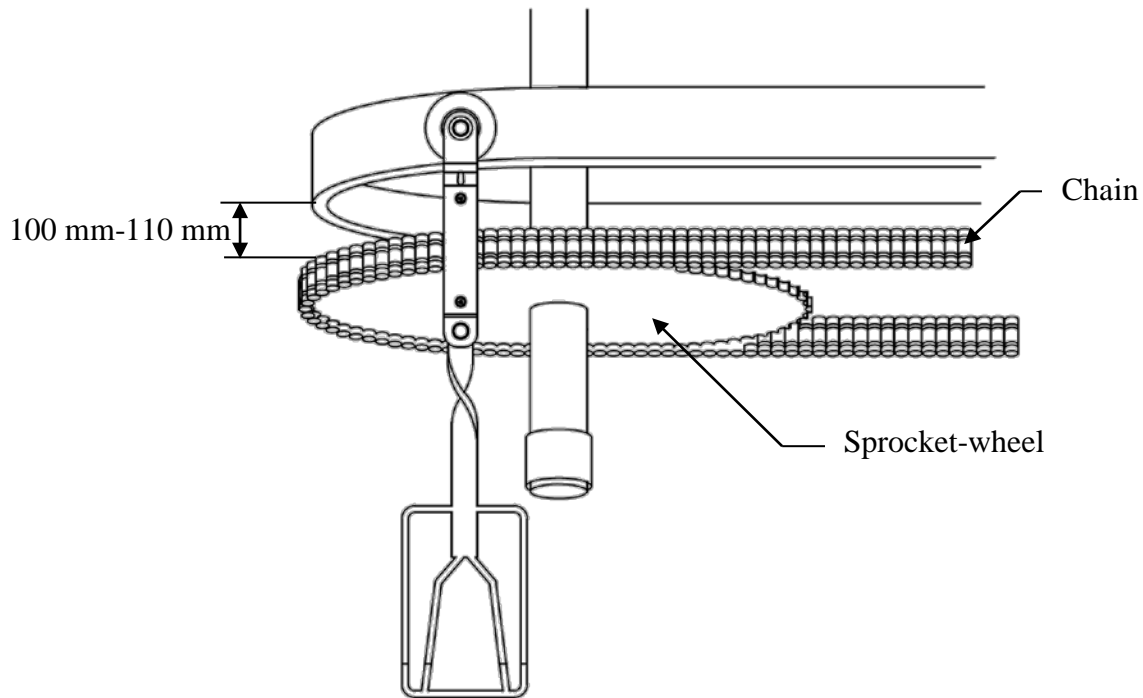


Figure 2. Sprocket-wheel in an overhead rail system

3.15

stunning

process of rendering the poultry animal unconscious

3.16

track size

track diameter

specified dimensions of rail track (L x W if rectangular or diameter if tubular), expressed in millimeters

4 Classification

Classification of the overhead rail system shall be according to the following:

4.1 Type of Rail Tracks

4.1.1 Monorail

Overhead rail system that consists of a single rail track provided for one-wheel trolley.

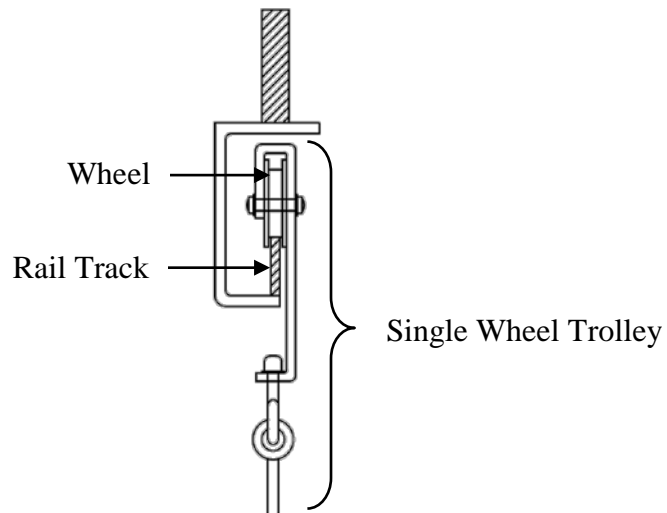


Figure 3. Monorail track

Monorail type of overhead rail system shall be further classified according to rail shape:

4.1.1.1 Rectangular

A rail using rectangular bar for its track.

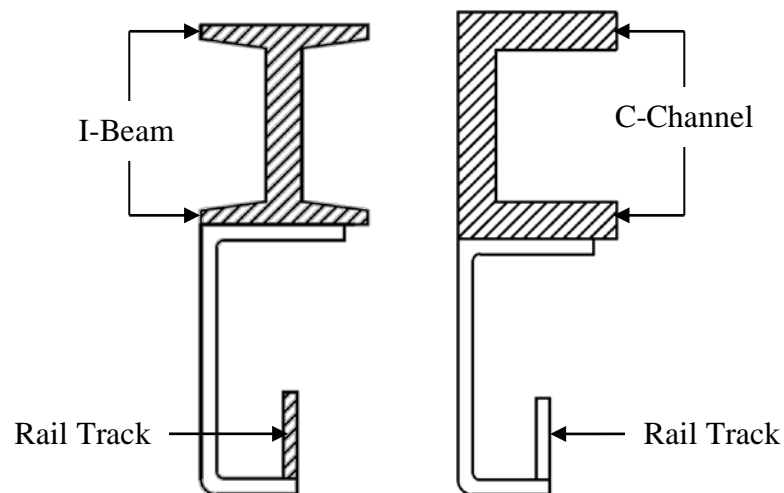


Figure 4. Rectangular rail track

4.1.1.2 Cylindrical

A rail using tubular or round bar material for its track.

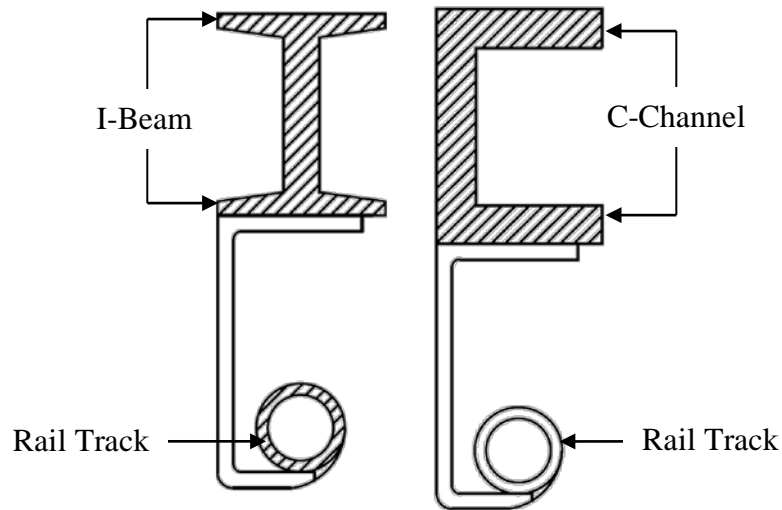


Figure 5. Cylindrical rail track

4.1.2 Double rail

Overhead rail system that consists of two-rail track provided for two wheel trolley.

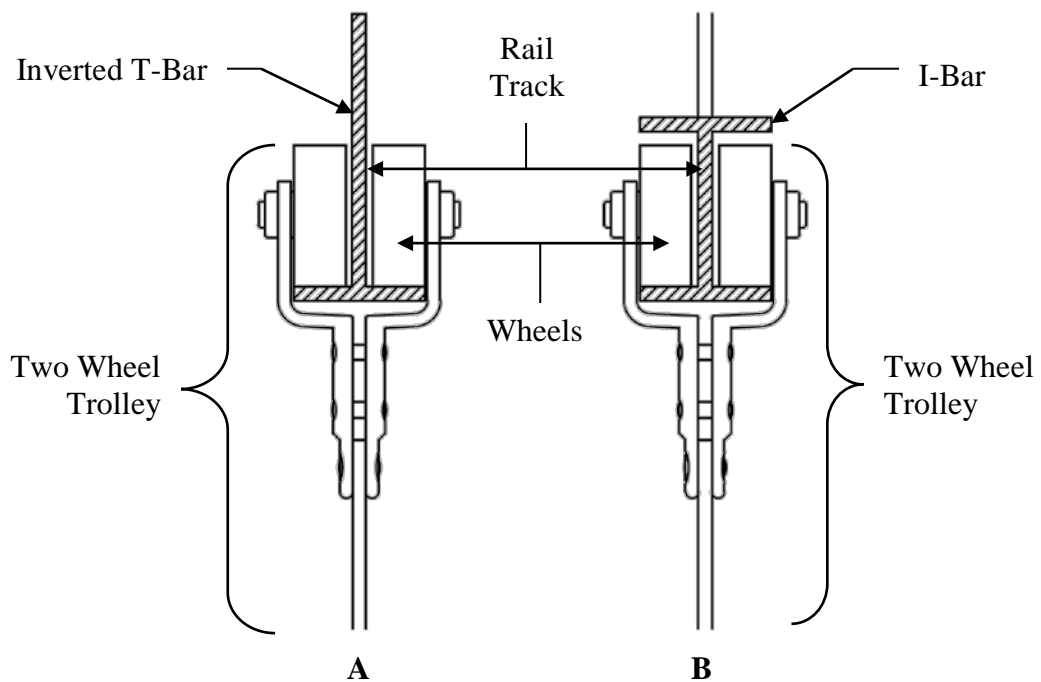


Figure 6. Double rail track. (A) Inverted T-bar; (B) I-bar

4.2 Type of Shackles

4.2.2 Single shackling point

Type of shackle wherein the head of the poultry animal or carcass can be attached to the shackling point.

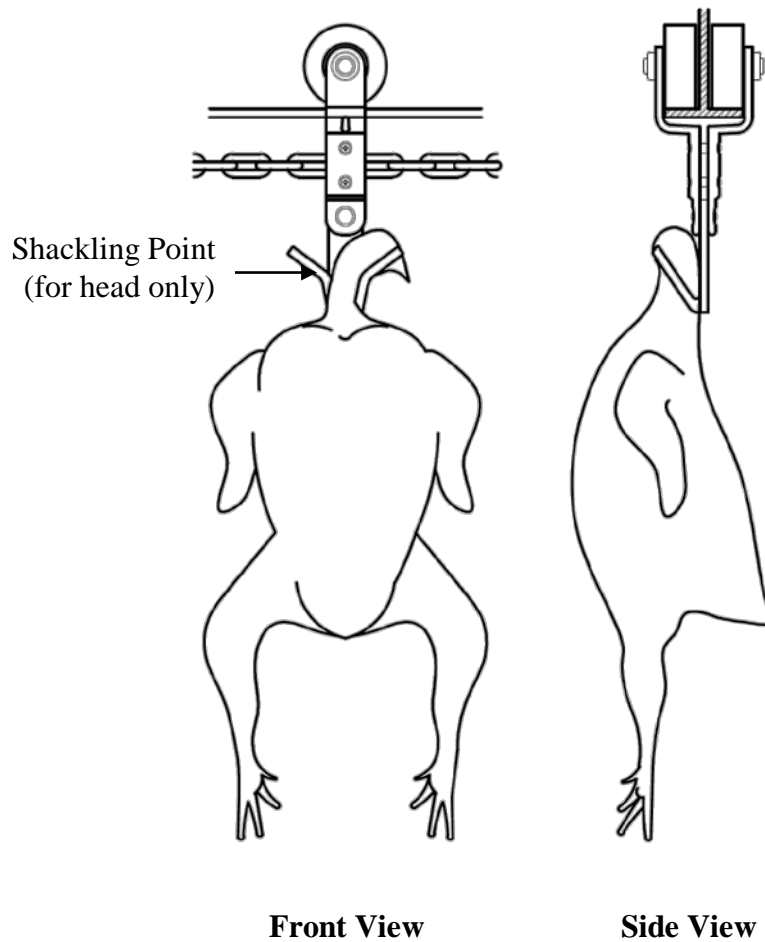


Figure 7. Shackle with single shackling point

4.2.1 Two shackling points

Type of shackle wherein two feet of the poultry animal or carcass can be attached to the shackling point.

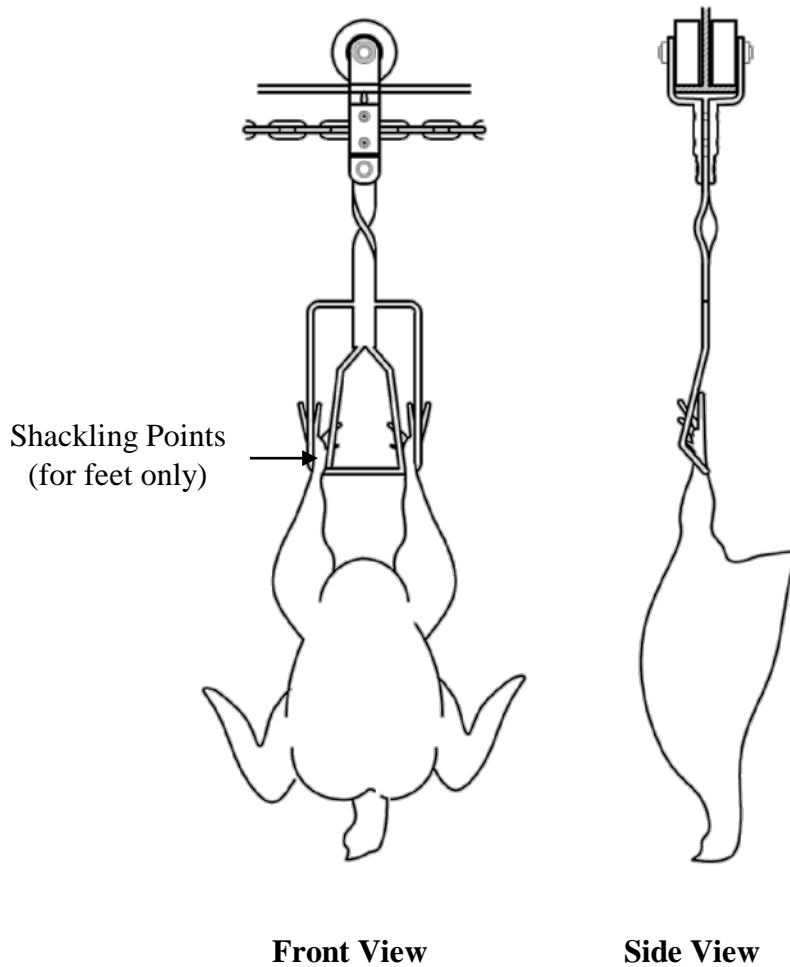


Figure 8. Shackle with two shackling points

5 Principle of Operation

5.1 Intermittent

- 5.1.1** The poultry animals shall be shackled and hoisted to the overhead rail system for stunning, and bleeding.
- 5.1.2** After bleeding, the poultry animals shall be unloaded to the overhead rail system for tank scalding and drum defeathering.
- 5.1.3** After defeathering, the carcasses shall be loaded to the overhead rail system for evisceration, and removal of feet and head.
- 5.1.4** Carcasses shall be manually unloaded from overhead rail system for chilling.

5.2 Continuous

- 5.2.1** The poultry animals shall be manually shackled and hoisted to the overhead rail system for stunning, bleeding, automatic scalding and defeathering.
- 5.2.2** After defeathering, carcasses shall be further moved along the rail for evisceration, and removal of feet and head.
- 5.2.3** Carcasses shall be manually unloaded from the overhead rail system for chilling.

6 Manufacturing Requirements

- 6.1** Generally, the overhead rail system shall have a minimum load of 15 kg (33 lb.) per linear meter. The parts of the overhead rail system shall be made of steel and readily serviceable.
- 6.2** The main frame shall be properly finish coated for protection against corrosion. It shall be made of steel I-beam with at least 160 mm x 80 mm x 18 kg/m (6.3 in x 3.15 in. x 1 lb/in) or C-channel with at least 160 mm x 65 mm x 18 kg/m (6.3 in x 2.56 in. x 1 lb/in). Moving or sliding parts shall not be painted.
- 6.3** The rail track when rectangular shall have no sharp edges to avoid flaking off unto product and grinding down the inside groove of the wheels. The rail track shall be made of fully welded flat bars, angle bars or GI pipes.
- 6.4** Rail hanger/bracket shall be made of flat or round bar. Materials used and distance between rail hangers shall be designed for purposes of avoiding and eliminating vibration and bending. Maximum distance between hangers shall be 600 mm (23.6 in.).
- 6.5** Parts of a trolley of the overhead rail system shall be made of non-corrosive materials (e.g. stainless steel grade 304). Spacing between trolleys for poultry animals and carcasses shall be 200 mm. to 250 mm. (7.9 in. to 9.8 in.) and 140 mm. to 180 mm. (5.5 in. to 7.1 in.), respectively.
- 6.6** Shackles shall be able to hold the poultry animals or carcasses through its feet or head during dressing/slaughtering. It shall be made of non-corrosive materials (e.g. stainless steel grade 304). The round bar for shackles shall be 6 mm to 7 mm (0.236 in. to 0.276 in.). Shackles with two shackling points shall have width of 140 mm to 160 mm (5.5 in. to 6.3 in.).
- 6.7** Overhead rail system shall be able to support the maximum weight of poultry animals or carcasses per meter as specified by the manufacturer.
- 6.8** Chain and sprocket shall be made of non-corrosive material (e.g. stainless steel grade 304). Spacing between sprockets shall be 2.5 m to 3.5 m (8.2 ft. to 11.5 ft.). Distance between upper edge of sprocket and bottom edge of rail shall be 100 mm to 110 mm (3.9 in. to 4.3 in.).

7 Installation Requirement

- 7.1 The poultry animals or carcasses shall be at least one (1) meter (3.28 ft.) away from the walls, columns and other equipment or facilities that may cause contaminations.
- 7.2 Overhead rail shall be securely attached to frames or corbel as shown in Figures 9 and 10 to avoid failure during operation.

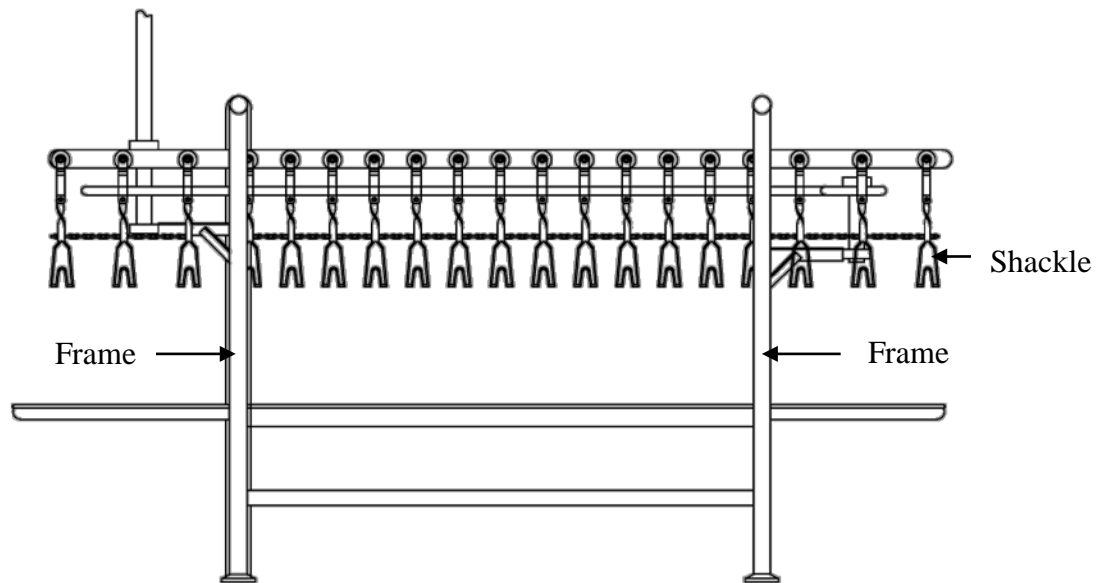


Figure 9. Overhead rail system attached frames bolted on the floor

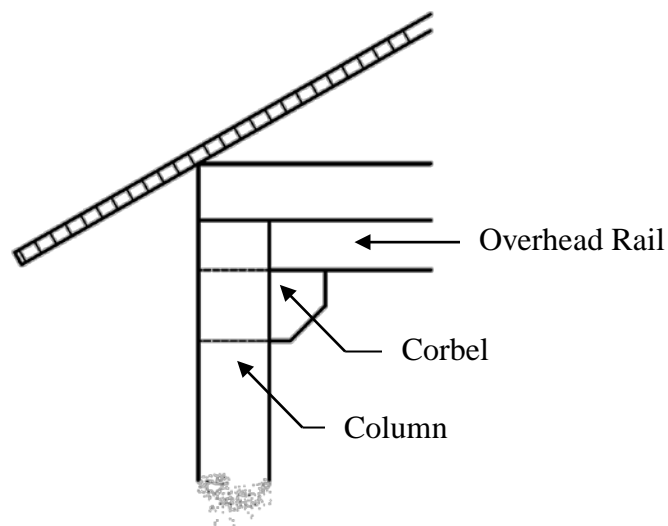


Figure 10. Overhead rail system attached to corbel

- 7.3** Columns shall withstand the maximum load requirement to support the roof, dead loads and live loads derived from the poultry animals or carcasses. For corbels, it shall support the maximum cantilever load developed by the main rail frame and load of the suspended poultry animals or carcasses.
- 7.4** Rail height shall be sufficient to prevent suspended carcasses from contacting the floor. Height of poultry animals or carcasses shall be at least one (1) meter (3.28 ft.) from the floor.

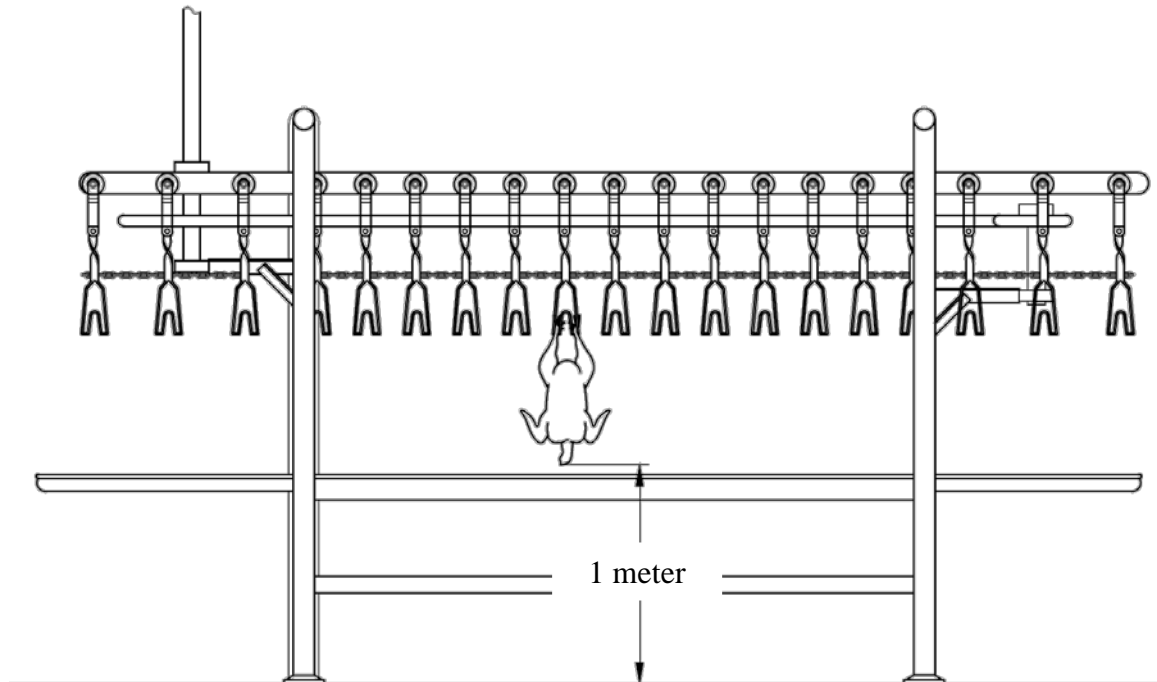


Figure 11. Minimum height of poultry animal or carcass when suspended to overhead rail system

- 7.5** Idler shall be provided to avoid sagging of chains.

8 Performance Requirements

- 8.1** Overhead rail system shall support a minimum load of 15 kg (33 lb.) per linear meter. Rail system linear speed reduction (with and without load) shall be at most 10%.
- 8.2** The overhead rail system shall be able to move the poultry animals and carcasses with minimal vibration. There shall be no sagging and failure on the rail system. Maximum track vibration shall be 1 g.
- 8.3** Speed of overhead rail system shall be 0.6 m/min to 1.4 m/min (1.97 to 4.6 ft/min).

9 Safety, Workmanship and Finish

9.1 Safety

- 9.1.1** Rail systems shall be securely attached on frames or columns preferably to corbels with no movement from its base.
- 9.1.2 For motor driven overhead rail system, the following shall be the requirements:**
 - 9.1.2.1** Double pole switch shall be installed to totally disconnect the overhead rail system from the power source.
 - 9.1.2.2** There shall be proper insulation and shall have provision for proper grounding.
 - 9.1.2.3** Safety fuse or power overload breakers shall be integrated in the power control system.
 - 9.1.2.4** Double insulated cord (e.g. royal cord) shall be used.
 - 9.1.2.5** Pilot light and sound emitting device shall be provided for power signal notification. Emergency power shut-off button shall also be provided.

9.2 Workmanship

- 9.2.1** All welded parts shall be smoothly polished and shall pass visual inspection criteria (AWS D1.1). Welded joints shall not be less than 4 mm (1/8 inch) side fillet welded. Undercut shall not exceed 2 mm (1/16 inch) for any length of weld.
- 9.2.2** The overhead rail system shall be free from manufacturing any defects.
- 9.2.3** Grease points for lubrication of mechanical parts shall be provided.
- 9.2.4** Sealed type bearings should be used.

9.3 Finish

- 9.3.1** The whole overhead rail system shall be smooth free from sharp edges or surfaces.
- 9.3.2** Surface of the shackles and parts that are in contact with the carcasses shall not be painted.

10 Maintenance

- 10.1** An operator's manual which conforms to PAES 102, shall be provided.
- 10.2** Greasing of mechanical parts shall be done regularly.
- 10.3** A set of manufacturer's standard tools required for maintenance shall be provided.

11 Warranty of Construction and Durability

- 11.1** The overhead rail system's construction shall be rigid and durable without any major breakdown on its components within one (1) year after installation and acceptance by the consumer.
- 11.2** Warranty shall be provided for parts and services within one (1) year after installation and acceptance by the consumer.

12 Testing

The overhead rail system to be tested shall be tested in accordance with PAES 526.

13 Marking and Labelling

- 13.1** Each overhead rail system shall be marked in English with the following information using a plate, stencil or by directly punching it at the most conspicuous part:
 - 13.1.1** Name, address and contact number of manufacturer
 - 13.1.2** Country of manufacture (if made in other country)/ "Made in the Philippines" (if manufactured locally)
 - 13.1.3** Brand name or Registered trademark of the fabricator (optional)
 - 13.1.4** Model and/or Serial Number
 - 13.1.5** Maximum weight capacity
- 13.2** Other additional markings shall be provided and shall include the name and address of the importer, if imported (optional)
- 13.3** Safety precaution markings shall be provided. Marking shall be stated in English and Filipino and shall be printed in red color with a white background.
- 13.4** The markings shall be securely fastened and shall be all weather resistant. Under normal cleaning procedures, it shall not fade, discolor, crack or blister and shall remain legible.