



日本中央競馬会
特別振興資金助成事業

(Promotional brochure)

Manual for Handling Swine with Animal Welfare Considerations at Pork Export Facilities and Guidance on Facility Improvements (Q&A)

March 2025

Japan Meat Technology Institute

Pig Handling Manual

1. Outline

To ensure animal welfare at pork export facilities, it is important that pigs must be properly handled to prevent injuries or stress throughout the entire process – transportation from the farm to the slaughterhouse, arrival at the slaughterhouse, unloading, lairages, guidance from the lairages to the stunning room, proper fixing during stunning, proper stunning and bleeding practices. It is important to handle pigs in an appropriate manner that minimizes stress and prevents harm to the animals.

Therefore, based on the "Technical Guidelines for the Management of Livestock animals by species" published by the Ministry of Agriculture, Forestry and Fisheries in July 2023, the "Animal Welfare Rules for Slaughter" and the "Eyes on Animals (2024 edition)" of the WOAH, the following handling methods are recommended.

Some of the pictures in this manual are borrowed from the reports produced by the animal welfare organization "Eyes on Animals", the Netherlands.

2. Animal welfare consideration handling of pigs at pork export facilities (including transportation of pigs from farms)

(1) Transportation from farm to slaughterhouse

In transporting pigs from farms to slaughterhouses, it is important to handle them with care and to transport them in a manner that minimizes negative effects caused by temperature, humidity, and other factors. Although the Export Guidelines for Pork do not specify transportation from farm to slaughterhouse, the following are recommended based on the "Technical Guidelines for the Transportation of Livestock Animals" provided by the Ministry of Agriculture, Forestry and Fisheries in accordance with the international standards of the WOAH.

Basic check points

- ☐ All the people who are involved in the transportation of pigs should understand the importance and necessity of handling the animals carefully and ensuring a comfortable environment.

- ☐ The total time required for transportation should be kept to a minimum.
- ☐ Communicate with the destination in advance to ensure that the waiting time for pigs in the truck is minimized including the time required for unloading.
- ☐ Prepare the contact list, manual, etc. to respond to emergencies such as delays caused by sudden bad weather, vehicle accidents, etc.

Transport Preparation

- ☐ Be sure to check the health, injuries, etc. of pigs prior to transport to ensure that they are suitable for transport and do not require feeding and water, etc.
- ☐ In case of long distances, be sure that the animals are properly fed, get water, and rest prior to transport.
- ☐ The structure of the truck beds, etc. should be constructed suitable for the breed, age, and weight of the pigs for the transportation (the ceiling height ensures that the pigs can stand normally and that there is enough space for adequate ventilation).
- ☐ The total number of pigs should be loaded to meet the space per pig is adequate.
- ☐ The trucks, etc. used for transporting pigs are kept clean by washing and disinfecting the parts that come into contact with pigs before transportation. The trucks are designed to prevent excreta leaking out of the trucks, etc. during transportation.
- ☐ In prior to transportation, the waiting area of the facility should be constructed properly (such as width of aisles, height of walls and fences, safe and ante-slip floors, no obstacles or protrusions, etc.) for the pigs.

Loading

- ☐ Pigs should not receive any unnecessary stress, etc.
- ☐ Enough workers (animal handling workers) are secured according to the number of pigs.
- ☐ When guiding pigs, the pain-inducing tools, (e.g., electric rods) or methods (e.g., whipping, twisting) are not used.
- ☐ Pigs are never thrown, dragged, or dropped.

Transportation of pigs

- ☐ When pigs are transported over long distances, they are observed from time to time throughout transportation.
- ☐ Adequate ventilation is maintained during transportation, including when trucks and other vehicles are parked or stopped.
- ☐ Noise and odors are minimized or prevented as much as possible.
- ☐ Measures should be taken to regulate heat (e.g., preventing direct sunlight, ventilation, scheduling transportation during the night, etc.) and cold (e.g., preventing drafts) to maintain appropriate temperatures as much as possible.
- ☐ The trucks, etc. used for transporting pigs are disinfected when entering the facilities.

(2) Arrival at slaughterhouse and unloading

① Anti-slip and inclination of unloading places, etc.

- ☐ To prevent pigs from slipping and falling when unloading them from trucks, the slopes are provided with cleats or other materials. And the slopes should not be too steep, and the side panels or other materials are installed to prevent falling from the sides.
- ☐ The environment of the facility, including vehicles for unloading, ramps, etc., is designed to eliminate risks to pigs.
- ☐ Floors, aisles, ramps, and other facility features are structured to ensure pigs remain secure and do not fall or drop.

(Example from Denmark)



(Side board to prevent falls)



(Slope pier)

- ☐ In case a pig's health condition gets worse or is injured during transportation, it should be separated from other pigs whenever possible. If necessary, appropriate action should be taken after consulting with a veterinarian, etc.

②Handling of pigs during unloading

- ☐ Stress, pain, etc. experienced by pigs upon arrival at lairages should be minimized as much as possible.
- ☐ To prevent stress to the pigs caused by unloading delays, the process should be completed promptly, with careful advance planning of truck arrival time and other logistical issues.
- ☐ Make sure that pigs get water as soon as possible after they are unloaded.
- ☐ Since pigs are sensitive to temperature, the workers should make efforts to control temperature through ventilation, etc.
- ☐ Unloading areas and driveways should provide adequate lightning to help pigs navigate. (Lairage areas and driveways should maintain a lighting level of 110 Lux, as pigs naturally move from dark to light areas. Also, LEDs are preferred to prevent flickering.
- ☐ The obstacles in unloading areas and raceways should be minimized (shadows, floor changes, puddles, drains, hoses or work clothes hanging on the walls, moving objects, loud or sudden noises, etc.) to prevent pigs from stopping, hesitating, or turning around.
- ☐ Pigs should not be forcibly pushed forward, instead, workers should allow them to move at their own pace. Workers should remain calm and patient, guiding the pigs with gentle voices and slow movements. Shouting, kicking, or any actions that cause fear or distress should be avoided. Pigs should be handled with care and moved into small groups.
- ☐ The pain-inducting tools or methods that may cause stress must not be used to move pigs. For example, forceful beating, flogging, twisting, pushing the sensitive areas, pulling the head, ears, tail, etc., or prodding with sharp instruments, etc., by limbs or instruments.
- ☐ Tools used for guiding pigs, such as e boards, flags, plastic paddles, etc. used to guide the pigs must be non-stressful to the pigs.
- ☐ Electric rods should not be used daily. Their use of electric rods should

be limited to one time and only to the buttocks of pigs that absolutely refuse to move forward. Using electric rods on sensitive parts of the pig (such as eyes, mouth, ears, anus, genitals, udder, etc.) are strictly prohibited.

- ☐ To prevent injuries from slips and falls, pigs should not be driven at a pace exceeding their normal walking speed.
- ☐ If pigs frequently stop, hesitate, or turn back, the facility should be examined for potential structural issues such as steep slopes, shadows, uneven flooring, loud noises, etc. and necessary improvements should be made.

(Guidance by board, paddle, etc.)



(3) Lairages

- ☐ The environment of the lairages where ante-mortem inspections take place is designed to ensure pigs are not exposed to harm.
- ☐ Pigs must remain in the lairage for at least 2 hours before slaughter, as recommended by the Animal Welfare Model Code of Practice for Slaughter in Australia, 2001) to calm pigs that must have been stressed during the transport.
- ☐ When moving pigs, workers handle equipment in a manner that minimizes agitation and unnecessary distress.
- ☐ Based on pig's behavior (moving from dark to light areas), the lairage and driveways should be illuminated at 110 lux. (LEDs are preferred to prevent flickering.)
- ☐ Clean water must always be freely available to pigs.
- ☐ If the duration between the last feeding and slaughter exceeds normal feeding interval, pigs should be provided with feed. If transport time is



(Recessed drinking cup fixed in the walls, Denmark)

unknown and pigs are not slaughtered within 12 hours of arrival at the slaughterhouse, the pigs must be fed.

- ☐ Excessive or sudden noises (e.g., from alarms and other equipment/machinery) should be minimized.
- ☐ Lairage floors should be an anti-slip surface

(Example of non-slip floor)



(Photo: Eyes on Animals)

- ☐ Lairages are kept free of sharp objects to prevent injuries to pigs.
- ☐ Lairages should provide sufficient space for all pigs to lie down simultaneously, move freely, and avoid aggressive interactions. (A minimum of 0.78 m² per pig is recommended) (see Eyes on Animals).
- ☐ The area in the lairages where pigs undergo anti-mortem inspections should be well lit (above 110 lux at 0.9 m above the floor) (Refer to the Guidelines for Slaughterhouse Facilities and Equipment)

However, after anti-mortem inspections are completed, lighting should be standardized and gradually reduced to 110 lux to help calm the pigs. Instead of illuminating the entire area with a single light switch, lights should be adjusted sequentially.



(Photo: Eyes on Animals)

- ☐ The unfamiliar pigs of different sexes, sizes, etc. should be separated to prevent fighting.
- ☐ The pigs should be moved into small groups (a maximum of 15 pigs is recommended). (See Eyes on Animals)

- ☐ To maintain an appropriate lairages environment, measures should be taken to address temperature-related stress. When heat stress is observed, cooling methods such as fans or mist spraying should be used. For cold stress, drafts should be prevented, and heating should be provided (the temperature in the lairages should be maintained at around 20° C).

(Pigs experience heat stress when temperature exceed 25° C (77° F))



(Pigs suffering from heat stress (foam and saliva around the mouth))

(Photo: Eyes on Animals)



(Shocked, unable to stand up, pigs)

(Cold stress occurs when temperatures drop below 12° C.)



(Cold-stressed pigs tend to huddle closely together and crowded around each other)

(Photo: Eyes on Animals)

- ☐ Sick pigs or pregnant pigs should be prioritized for slaughter separated from other pigs.

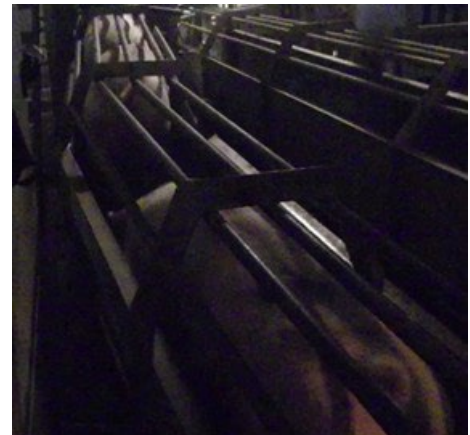
(4) Driveway to the stunning device, belly loading conveyor, etc.

- ☐ Based on the behavior of pigs (moving from dark to light areas), lairages and the raceways should be illuminated at 110 lux while stunning areas beyond them should be well-lit. (At least 220 lux, preferably 300 lux or more)
- ☐ The driveways and other areas must be kept free from sharp protrusions to prevent injuries to pigs.
- ☐ The floor should be anti-slip surface to prevent pigs from slipping and falling.
- ☐ To facilitate smooth movement toward the driveway, the color and the

materials of the flooring should be uniformed.

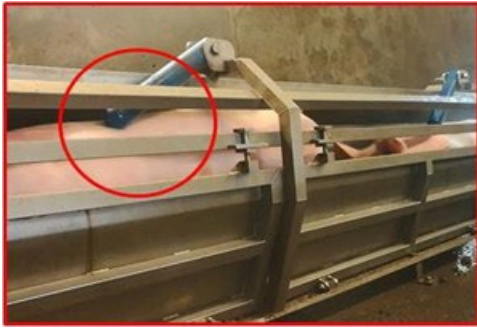
- ☐ When guiding pigs to the electric stunning device (whether via a single-file driveway or belly-belt conveyor), stimulation and pain, etc. must be minimized.
- ☐ If the workers are visible to the pigs (in the front), the pigs will not move forward. The driveway should be designed so that the workers cannot be seen (walls, shading sheets, etc.). The workers should guide the pigs to move forward from the rear of the herd and allow the pigs to enter the driveway on their own.
- ☐ If pigs do not enter the single file driveway or belly-belt conveyor, or if they make squealing noises that indicate distress, an improvement should be considered.

(Stress indicators include (1) screaming, (2) reluctance of pigs to go forward, and (3) attempts to move backward.)

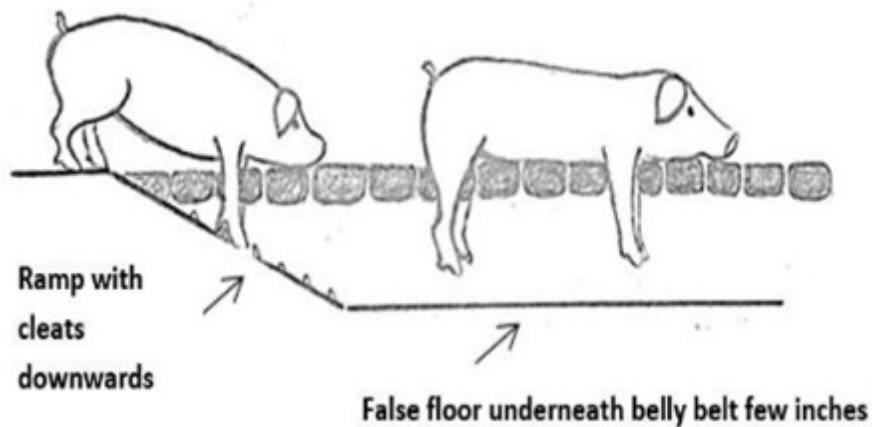


【If you understand the behavior of pigs, you can let them move forward naturally.】

- * If the leader moves forward, the pigs will follow and move forward as a herd.
- * Response to light: Pigs look at the brighter side and move toward the brighter side = If you darken the closer and lighten the front, the pigs will move forward.



(When the ceiling of the raceway hits the pig's back, the pig feels trapped and does not want to go forward.)



Source: Eyes on Animals

(5) Electric stunning device

- ☐ The stunning equipment is suitable for pigs.
- ☐ A single electric stunning effectively renders the pig unconscious and ensures it remains unconscious until the blood is released.
- ☐ The animals get enough water before slaughter, as dehydration can lead to stunning failures due to reduced conductivity of the current.
- ☐ The biggest challenge in stunning is ineffective—specifically ensuring the appropriate current is applied to the brain to immediately induce consciousness
- ☐ Electric stunning failures result from improper electric attachment of electrodes, poor contact, arcing, resistance to electricity due to dirt on pig's surfaces, dirt or corrosion of electrodes, low voltage or low current, etc. Regular checks and maintenance are essential to ensure proper functioning.
- ☐ The stunning process is carried out correctly.



(Automatic electric stunning device)

(Photo: Eyes on Animals)

(Effective stunning can be verified through key indicators as: the pig should show no attempt to stand, no blinking, no response to nose or ear pinching, no autonomous breathing, and no vocalization.

- ☐ The manufacturers' instructions for operating electrical stunning devices should be properly followed.

(electrical parameters (current intensity, waveform, voltage, frequency), minimum contact time, maximum duration from stunning to sticking, monitoring system should be in place to assess contact time, voltage, current, with warning mechanism installed to alert operators of any improper if the device is functioning properly.)

CHECK FOR CONSCIOUSNESS

Make sure the animal is unconscious before sticking.

no blinking (spontaneous or when the eyes are touched)

no response to pinching of the nose or ear

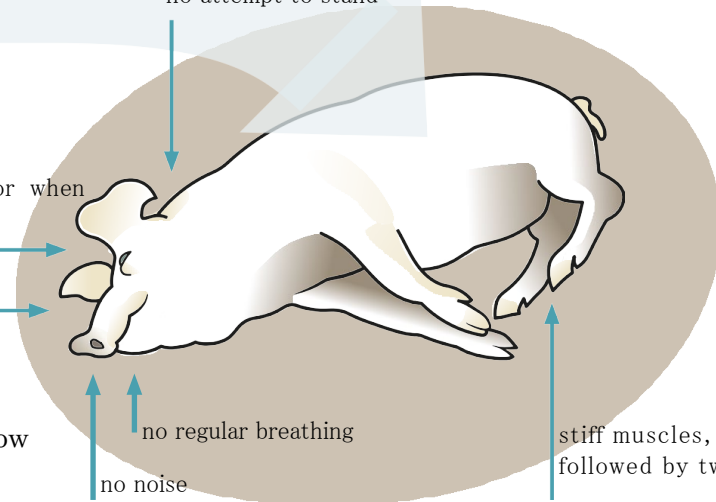
Source: Adapted from EU "How to stun pigs"

no attempt to stand

no regular breathing

no noise

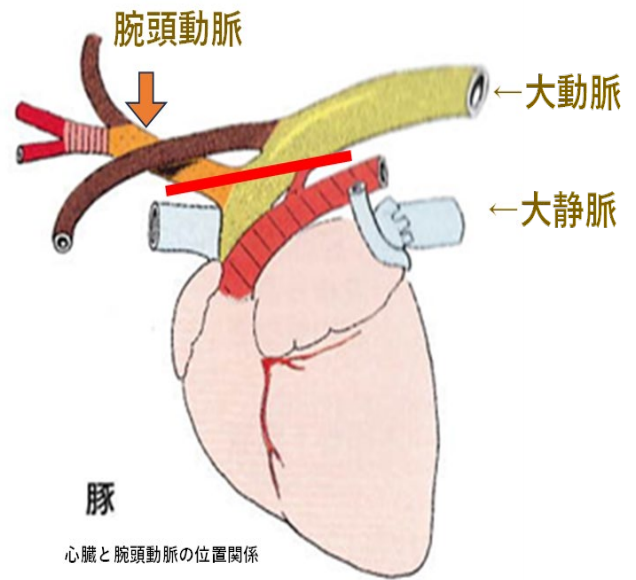
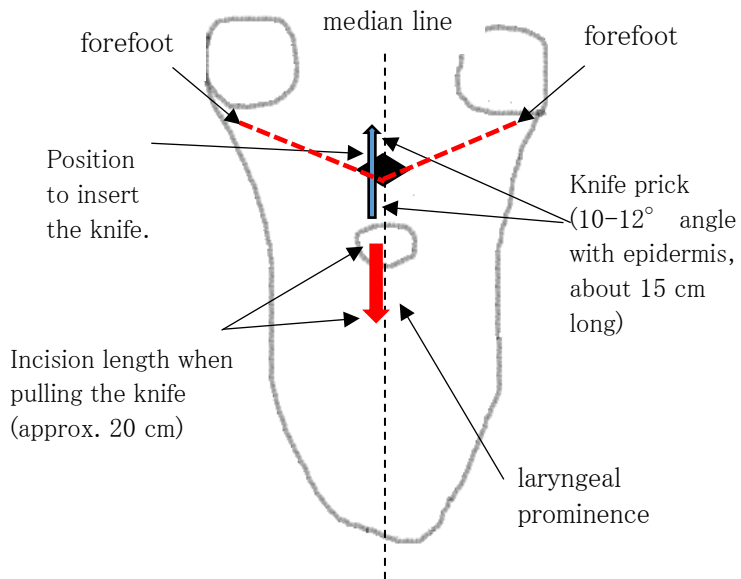
stiff muscles, followed by twitching legs



- ☐ If the stunning fails, the animal should be re-stunned immediately.

(6) Bleeding

- ☐ The interval between stunning and sticking should be as short as possible to prevent the pig from regaining consciousness before death. ("Ideally, ten seconds or less.")
- ☐ Before proceeding, verify the pig remains unconscious.
- ☐ Cutting the aorta is crucial for effective bleeding. (It is important to sever the aorta. At a minimum, the brachiocephalic artery should be severed to ensure proper bleeding.)



出典：カラーアトラス獣医解剖学
増補改訂第2版

- ☐ Ensure fresh blood (red blood) is gushing from the aorta following the appropriate knife operation. (Guidelines for bleeding, etc.: ensures 2.5 liters or more within 10 seconds)
- ☐ Ensure pigs are confirmed dead before the fabrication process begins.

(Reference) Prohibited acts

The following practices are prohibited by the WOAH's International Standard ("Article 7.5 Animal Welfare at Slaughter" of the Terrestrial Code), as amended in May 2024

- ☐ Crushing, twisting, or breaking the tail of a pig
- ☐ Using instruments, applying pressure, or using irritating substances on any part of the pig in a way that causes injury to any part of the pig
- ☐ Beating pigs with large sticks, pointed sticks, pipes, stones, wires, leather belts, or other instruments
- ☐ Kicking, throwing, or dropping pigs
- ☐ Pigs should never be lifted, dragged; by specific body parts (such as the tail, head, horns, ears, limbs, wool or hair, etc.)
- ☐ Dragging pigs using any means (chains, ropes, or human hands, etc.) and pulling the pig by any part of its body
- ☐ Pigs should not be allowed to walk on other pigs.
- ☐ Touching sensitive parts (such as eyes, mouth, ears, anogenital area, breast or abdomen, etc.)

- ☐ The following methods are unacceptable practices for handling conscious pigs under all circumstances:
 - Restraining pigs solely by mechanically tightening their legs or feet (including tying the limbs together or lifting one or more limbs off the ground)
 - Breaking a pig's leg, severing a leg tendon, or blinding the pig
 - Severing the spinal cord with a dagger or similar tool
 - Applying electric currents that do not reach the brain
 - Suspending or lifting a pig by its legs or feet
 - Severing the brain stems through the orbit or skull
 - One or more handlers jumping on or lying on the pig's back to force the pig to sit or lie down
 - Using a trip-floor box designed to tip pigs over
- ☐ Breaking the neck of a conscious pig during breeding is also strictly prohibited.

3. Reference materials

- (1) "Measures for Animal Welfare in Relation to the Handling Guidelines for Pork Exports to Hong Kong and Facility Approval Standards, etc. Based on the Handling Guidelines for Pork Exports to Hong Kong and the Handling Guidelines for Poultry Meat Exports to Hong Kong" (NHI Ordinance No. 0323-1 dated March 23, 2022, and 3 Livestock Industry No. 1994) (see attached reference material).
- (2) "Animal Welfare at Slaughter" regulations of the World Organisation for Animal Health (WOAH)
https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/?id=169&L=1&htmlfile=chapitre_aw_slaughter.htm
- (3) Technical guidelines for the transportation of livestock
<https://www.maff.go.jp/j/chikusan/sinko/230726.html#guidelines>
- (4) Technical guidelines on feeding management, etc. for each livestock species (pigs)
<https://www.maff.go.jp/j/chikusan/sinko/230726.html>
- (5) A look at slaughterhouses from a pig's perspective: (Eyes on Animals 2024)
<https://www.jamti.jp/pdf/tech06-24.pdf>

"Animal Welfare Initiatives Related to the Handling Guidelines for Pork Exports to Hong Kong and Facility Accreditation Standards Based on the Handling Guidelines for Pork

New facilities exporting to Hong Kong are required by the Hong Kong government to stipulate the details of their animal welfare efforts and procedures, and to submit an "Animal welfare monitoring plan" in the facility registration form to be submitted to the Hong Kong government.

(Notice of Grounds)

Notification by the Director of the Food Surveillance and Safety Division, Ministry of Health, Labour and Welfare (Yakushoku Shokuhin Kanpo No. 0323-1); Notification by the Director of the Meat and Egg Division, Ministry of Agriculture, Forestry and Fisheries (3 Livestock Products No. 1994) (March 23, 2022).

Animal Welfare Initiatives for the Handling of Pork Exports to Hong Kong and Facility Accreditation Criteria Based on the Handling Guidelines for Pork Exports to Hong Kong and the Handling Guidelines for Poultry Meat Exports to Hong Kong".

Exports to Hong Kong and Poultry Meat Exports to Hong Kong".

Swine Slaughterhouse Requirements

(1) Transportation and delivery to slaughterhouses	• Unloading from the transport vehicle should take place as soon as possible upon arrival at the slaughterhouse. • The delivery to the lairages should be carried out by herd whenever possible. • Efforts should be made to minimize stimulation, pain, etc. inflicted on pigs when they are brought to the lairages.
(2) Handling at lairages	• Lairages shall always try to keep the water supply available.
(3) Driving to slaughtering pen	• Stimulation, pain, etc. inflicted on pigs when driving pigs into slaughter pens should be minimized as much as possible.
(4) Stunning	• Efforts should be made to render the pig unconscious through proper restraint and stunning, ensuring that

	the unconscious state is maintained until the breeding operation begins. • After stunning, blood should be released as quickly as possible by cutting the brachiocephalic artery at once or by other appropriate methods. • The equipment used for stunning must be regularly serviced to ensure optimal performance is maintained.
(5) Others	• If a slaughter inspector identifies inhumane handling, during the slaughtering process, follow their instructions and improve the handling method accordingly.

Guidelines for Facility Improvements (Q&A)

1 Unloading

(Q1-1) How the angle and structure of the facility ramp should be improved when unloading from the truck?

(Answer)

The ramp should be free of sharp edges or protrusions that could cause pain.

Nearly a horizontal ramp or one with a slight upward slope is preferable

Danish standards allow maximum allowable slope of 10 degrees (or up to 20 degrees if side rails are installed).

The North American Meat Association guidelines recommend that the slope should not exceed 20 degrees.

The height difference between the truck bed and the ramp should be 15 cm or less. If the difference exceeds this, a staircase should be installed. (the recommended step: 8 cm in height, 30 cm in length).



Slope with variable height



There is no height difference between the loading ramp and the cargo bed.

(Q1-2) What methods can be used for preventing slipping?

(Answer)

Use materials or methods that reduce the risk of slipping on the ramp.

Possible measures include installing anti-slip bars or using steel strips or rubber as the ramp's flooring material.

Non-slip (example)



Anti-slip mat: Photo from Denmark

(Q1-3) What measures can be taken to prevent falls?

(Answer)

A possible measure to prevent falls is the use of horizontal boards (gates).

Side plate (example)



Side panel: Photo from Denmark

(Q1-4) What key considerations should a truck driver follow during unloading?

(Answer)

Unload promptly upon arrival.

Ensure pigs are moved in groups, ensuring that no pig is left alone on the truck.

For pigs that do not move voluntarily, avoid using an electric prod, instead, guide them gently using your hands, a board, or a paddle.

Guiding pigs using hands and boards (example)



Loading: pigs

Photo from Denmark

(Q1-5) How can an unloading area be designed to accommodate varying truck height?

(Answer)

One possible solution is to install a riser on the platform.

A riser (example)



A riser is installed – Example of Facility A

2 Structure of the lairages

(Q2-1) What should be appropriate pen size, pen walls, and height design?

(Answer)

<Size of the pen>

Pigs should have enough space to stand, sleep, and turn around comfortably.

According to Danish standards.

- ① No more than 15 animals should be kept in a group.
- ② Pigs from different herds or farms should not be mixed (to prevent fighting)
- ③ There must be sufficient space for all pigs to lie down.
- ④ The recommended housing density is 0.5–0.6 m²/pig for those weighing up to 100 kg, and 0.9–1.2 m²/pig for those weighing 150 kg or more.

According to North American Meat Institute guidelines:

- Housing density should be 0.55 m² per pig for 114 kg pigs.
- For mature sows, the recommended space is 1.03–1.12 m² per pig.
- For sows, the space requirement is 3.74 m² per pig.

Eyes on Animals recommends:

- Enough space for all pigs to lie down.
- A minimum of 0.78 m² per pig for hogs weighing 110 kg.
- At least 1.1 m² per pig for sows

<Design of the pen, height>

Walls should be made of sturdy concrete and should block pigs' view of people.

In Denmark, the standard wall height is 1.5 to 1.6 meters, while in Japan, Facility B structures have walls 1.1 meters high.

Whenever possible, the adjacent pens should not be visible to each other through the wall structure. To achieve this purpose, doors made of hard plastic are preferable. However, steel frames with inset steel plates that serve a blindfold function are also acceptable.

Pen (example)



Photo of the pen: Example of Facility B

(Q2-2) What are the specifications for anti-slip measures and slope gradient?

(Answer)

Pigs have difficulty recognizing depth and distance, which can cause stress when the floor has variations in color or material. Therefore, it is preferable to maintain a uniform color and material for flooring.

Additionally, the floor should be anti-slip (e.g., broom finishers or textured surface, etc.) and free of visual obstacles (e.g., coats draped over fences, hanging chains, shadows, puddles, reflections of light, etc.).

Flooring materials (e.g.)



Trench cutting Photo: Eyes on animals

(Q2-3) How should the water supply equipment be designed?

(Answer)

Pigs should always have access to fresh drinking water.

Drinking water equipment should be built into the wall to prevent injuries to the pigs.

Drinking water facilities (example) *Located in the center of the pen for easy access.



Photo: Denmark



Photo: U.S.A.

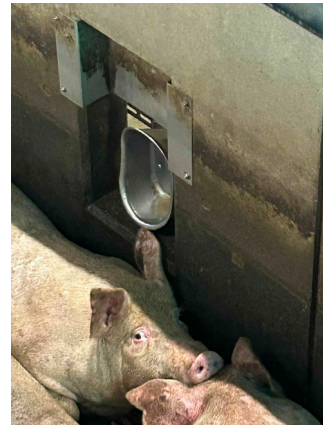


Photo: Example of Facility C

(Q2-4) How should feed management be considered?

(Answer)

In the EU, animals must be fed if they are not slaughtered within 12 hours.

In the U.S., animals must be fed if they are not slaughtered within 24 hours.

(Q2-5) What should the lighting conditions be for lairages?

(Answer)

Based on the pig's behavior (moving from dark to light), lairage areas and driveways should be illuminated at 110 lux. (LED lights are preferred to prevent flickering.)

Green is considered a calming color for pigs and is less likely to create shadows on the floor.

In a calm environment, pigs typically lie down and become quiet within approx. 20 minutes.

Green lighting (example)



Green lighting

Photo: Eyes on Animals

(Q2-6) What level of brightness (lux) do you prefer for lighting?

(Answer)

Pigs have a habit of moving from dark to light areas and dislike dark or shadowy places.

The light should be bright enough to work without being too glaring for the pigs, and if the entire pen is illuminated with uniform lighting, there will be no difference between light and dark, and the animals will not be distracted.

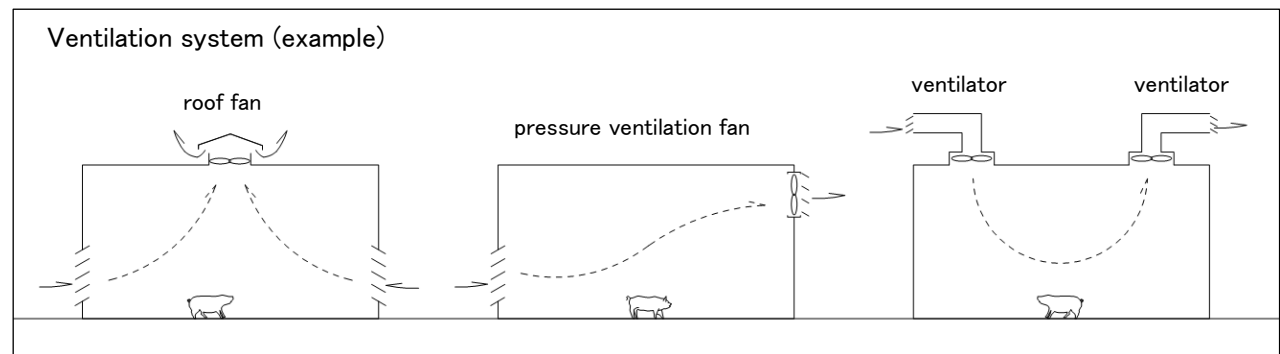
The Enforcement Regulations of the Slaughterhouse Law stipulate that necessary illumination must be ensured, and the "Guidelines for Facilities and Equipment of Slaughterhouses" stipulate that the brightness of anti-mortem inspection area should be 110 lux or higher.

Pigs tend to move from dark to light areas, so lighten the destination.

(Q2-7) Where and how should the ventilation system be installed?

(Answer)

Depending on the shape of the building, it is preferable to position the intake and exhaust vents as far apart as possible to ensure airflow circulates effectively throughout the structure. Basically, efficient ventilation can be achieved by installing air intake at the lower level and exhaust vents on the upper level. If airflow becomes stagnant, using a conveyor fan is recommended to improve air circulation.



(Q2-8) What methods do you use to prevent noise?

(Answer)

Swine are sensitive to noise, and it is desirable to reduce the noise of motors, hydraulic machines, blows, and reverberations.

Please take noise reduction measures, such as attaching rubber to doors that make noise.

Rubber on door (example)



rubber

Photo: Eyes on Animals

3 Driveway (driving animals)

(Q3-1) How should the driveway wall be constructed?

(Answer)

Since pigs tend to settle down easily in passageway with sturdy side walls, the walls should be solid enough to prevent agitation caused by the presence of people.

According to Danish standards, the walls should be made from durable concrete.

Pigs resting while lying down (example)



Photo: from Denmark

(Q3-2) What should be the optimal structure, width and height of the raceway to ensure a smooth flow of movement while preventing visibility of the surrounding area?

(Answer)

The driveway should be wide enough to allow three to four pigs to walk side by side.

To ensure smooth movement, sharp 90-degree bends must be avoided, and consistency in colors and materials should be maintained.

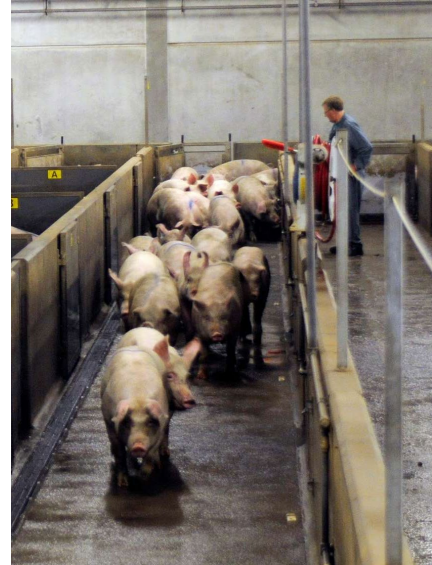
According to Danish standards, the wall height should be between 1.5 to 1.6 meters to prevent pigs from being seeing nearby people. Eyes on Animals recommends using an offset step to naturally guide pigs from a wider aisle into a single-row driveway with gradually reducing group sizes.

On the driveway, if pigs can see workers in the direction they are moving forward, they may hesitate to proceed. To address this, installing a sufficient height of visual barrier – such as two layers of shade cloths – can effectively block their view and encourage smoother movement.

Driveway (Example)



Driveway: Photo from Denmark



Driveway: Photo from Denmark



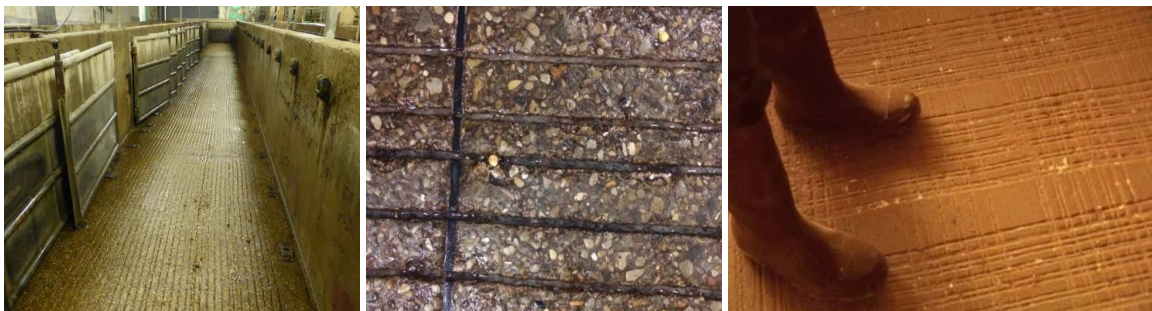
Off set step: Photo from Eyes on animals

(Q3-3) What type of structure should be implemented to prevent slipping on driveways?

(Answer)

As with pens, driveways should be equipped with anti-slip flooring materials and grooving surfaces to prevent slipping.

Flooring materials (e.g.)



Trench cutting: Photo from Eyes on Animals

(Q3-4) What is the optimal color for the floor and walls of the driveway be?

(Answer)

The floor material and color along with the walls of the pen, should remain consistent and unchanged.

(Q3-5) How should the guidance device be installed?

(Answer)

It is preferable to guide them in as natural a manner as possible.

When installing a guiding device, set it at a speed that allows pigs to move naturally and prevents injury. Additionally, the device should be equipped with a manual switch to enable immediate stopping when necessary.

Guiding devices (e.g.)



Photo: Example of Facility D

(Q3-6) How bright should driveway lighting be?

(Answer)

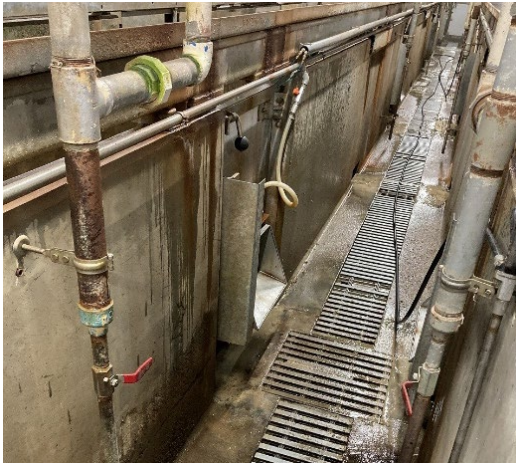
Since pigs tend to move from dark to light areas, a brightness level of around 110 lux is ideal, and it is effective to brighten the direction where the pigs are headed

(Q3-7) What kind of drainage structure is best to prevent water accumulation? Additionally, is there a way to avoid having drainage outlets in the aisle?

(Answer)

A drainage ditch should not be installed in the driveway, as pigs tend to stop when there is a drainage ditch in the driveway where the pigs walk. In Denmark, drainage ditches are placed parallel to the driveway instead.

Drainage channel (example) *Located outside of the raceway.



Drainage gutter Photo: Example of Facility E



Behavior of a pig attention to the drainage ditch

Photo: Eyes on animals

4 Stunning

(Q4-1) The structure of the stunning device: In the case of the belly-loading conveyor system, pigs hesitate to move forward in front of the conveyor, what structural improvement should be made to ensure smooth loading and movement?

(Answer)

In the electric stunning area where the pigs move before they get on the belly-loading conveyor, they may hesitate to move forward, stop or even retreat. One of the main reasons for this is poor lighting ahead of the driveway and pigs cannot see their feet, which causes anxiety and fear.

As a countermeasure, it is important to illuminate the floor of the approaching area efficiently. Ideally, green lighting – known for its calming effect – should be used, positioned along the side walls to eliminate shadows. Additionally, installing a pseudo-floor that gives the illusion of a continuous surface ahead can help reassure the pigs and encourage smoother movement.

(Q4-2) Are there any improvement measures if a pigs' backs touches the top of the frame (cage) in the driveway?

(Answer)

If pigs' backs contact the top of the frame on a single-track driveway, they may become uncomfortable and refuse to move forward. To prevent this, ensure that the frame is high enough to avoid any contact with their backs.

Frame (Example)

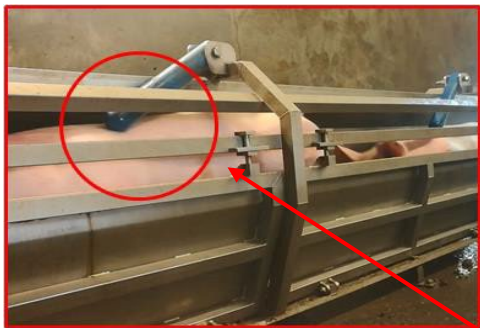
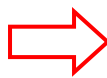


Photo: Eyes on Animals



Necessary to ensure that the pig's back does not touch.

The top of the driveway is hitting the pig's back.

(Promotional brochure)

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