

**2010
EDITION**

Recommended Animal Handling Guidelines & Audit Guide:

A Systematic Approach to Animal Welfare

Published by

AMI Foundation
AMERICAN MEAT INSTITUTE

Written by

Temple Grandin, Ph.D.
Professor of Animal Science
Department of Animal Science
Colorado State University

With

American Meat Institute Animal Welfare Committee

Certified and Accredited by the Professional Animal Auditors Certification Association



TABLE OF CONTENTS

| | |
|---|------------|
| Executive Summary and Historical Perspective..... | 1 |
| Chapter One: Transportation and Offloading..... | 4 |
| Section 1: Temperature Management..... | 5 |
| Section 2: Pen Space and Facility Layout..... | 9 |
| Chapter Two: Recommended Animal Handling Guidelines..... | 11 |
| Section 1: Recommended Livestock Handling Principles..... | 11 |
| Section 2: Livestock Driving Tools..... | 15 |
| Section 3: Proper Design and Use of Restraint..... | 16 |
| Section 4: Recommended Stunning Practices..... | 18 |
| Section 5: Religious Slaughter (Kosher and Halal)..... | 26 |
| Section 6: Recommended Handling of Disabled or Crippled Livestock..... | 28 |
| Chapter Three: Transportation Audit Guidelines..... | 30 |
| Section 1: Auditor Instructions and Information..... | 30 |
| Section 2: Scoring..... | 30 |
| Core Criteria 1: Plant Transportation Policy and Preparedness for Receiving Animals..... | 31 |
| Core Criteria 2: Set-up and Loading of Trailer..... | 34 |
| Core Criteria 3: Timeliness of Arrival of the Truck and Trailer and Animal Unloading..... | 35 |
| Core Criteria 4: Condition of Trailer..... | 37 |
| Core Criteria 5: Falls..... | 38 |
| Core Criteria 6: Electric Prod Use..... | 38 |
| Core Criteria 7: Condition of Animal..... | 39 |
| Chapter Four: Auditing Animal Handling and Stunning..... | 42 |
| Core Criteria 1: Effective Stunning..... | 42 |
| Core Criteria 2: Bleed Rail Insensibility..... | 44 |
| Core Criteria 3: Falling..... | 45 |
| Core Criteria 4: Vocalization..... | 46 |
| Core Criteria 5: Electric Prod Use..... | 48 |
| Core Criteria 6: Willful Acts of Abuse..... | 49 |
| Core Criteria 7: Access to Water..... | 49 |
| Scoring of Very Small Plants..... | 49 |
| Chapter Five: Official AMI Foundation Audit Forms..... | 51 |
| Transportation Audit Form..... | 52 |
| Cattle Slaughter Audit Form..... | 70 |
| Pig Slaughter Audit Form..... | 78 |
| Sheep Slaughter Audit Form..... | 88 |
| Chapter Six: Troubleshooting Guide..... | 96 |
| Chapter Seven: Worker Safety Tips for Animal Handlers and Stunners..... | 101 |
| References..... | 103 |
| Appendix..... | 107 |

INTRO

EXECUTIVE SUMMARY AND HISTORICAL PERSPECTIVE

The Humane Methods of Slaughter Act of 1958 was the first federal law governing the handling of livestock in meat plants. The 1958 law applied only to livestock that were slaughtered for sale to the government. In 1978, the Humane Methods of Slaughter Act was reauthorized and covered all livestock slaughtered in federally inspected meat plants. As a result of the Act, federal veterinarians are in meat packing plants continuously, monitoring compliance with humane slaughter regulations. Additional guidance is found in the Code of Federal Regulations and in specific USDA regulations and notices.

The American Meat Institute Foundation (AMIF) has a demonstrated commitment to voluntary animal handling programs that go above and beyond regulatory requirements.

In 1991, the American Meat Institute (AMI) published *Recommended Animal Handling Guidelines for Meat Packers*, the first voluntary animal welfare guidelines for meat packing operations. Authored by Temple Grandin, Ph.D., of Colorado State University, the illustrated guidelines offered detailed information about optimal handling of animals, how to troubleshoot animal handling problems in packing plants, how to stun animals effectively and maintain equipment thoroughly and how to move non-ambulatory animals while minimizing stress. The guidelines were implemented widely by members of the meat packing industry.

In 1997, Dr. Grandin developed a new document called *Good Management Practices (GMPs) for Animal Handling and Stunning*. The new document detailed measurable, objective criteria that could be used to evaluate the well-being of livestock in meat packing plants. Self-audits using the criteria were recommended in an effort to identify and address any problems and sustain continuous improvement. When the GMPs were developed and implemented, they were envisioned as a tool for use voluntarily by meat companies. In the years that followed, major restaurant chains began developing animal welfare committees and conducting audits of their meat suppliers. They utilized the AMIF *Good Management Practices* as their audit tool. Beginning in 1999, compliance with AMIF's GMPs became part of many customer purchasing specifications.

In 2004, AMI Animal Welfare Committee determined that the two animal welfare documents should be merged into a single, updated document that included official AMIF audits for pig, cattle and sheep slaughter. Official forms can be recognized by the use of the official AMIF logo. The forms can be reformatted to suit corporate needs, but any change to the numerical criteria on the forms would make the audit inconsistent with the AMIF audit. The merged document was released in 2005. In 2007, the document was updated based upon feedback from the field and key clarifications were added. The AMI Animal Welfare Committee also recommended that the audits include measurement of slips and falls.

Relative to other areas of scholarly research, only limited basic research has been conducted in the area of animal welfare. The objective criteria in the document were developed based on survey data collected over time in plants throughout the United States. The AMI Animal Welfare Committee, together with Dr. Temple Grandin, have determined what "targets" are reasonably achievable when plants employ good animal handling and stunning practices.

AMIF’s audit guidelines recommend that companies conduct both internal (self-audits) weekly and third party audits annually using the following AMI Core Criteria:

Effective Stunning

Hot Wanding (Pigs only)

Bleed Rail Insensibility

Falls

Vocalizations

Electric Prod Use

Most critical are Willful Acts of Abuse (Egregious Acts).

Any willful act of abuse is grounds for automatic audit failure. Willful acts of abuse include, but are not limited to: 1) Dragging a conscious, non-ambulatory animal; 2) intentionally applying prods to sensitive parts of the animal such as the eyes, ears, nose, anus or testicles; 3) deliberate slamming of gates on livestock; 4) malicious driving of ambulatory livestock on top of one another either manually or with direct contact with motorized equipment. This excludes loading a non-ambulatory animal for transport.; 5) hitting or beating an animal; or 6) live animals frozen to the floor or sides of the trailer. In sheep operations, lifting an animal by the wool or throwing a sheep also is an act of abuse.

The Committee acknowledges, however, that audits represent a “snapshot in time.” Many variables can impact audit outcomes, especially when live animals are involved. These can include:

- **Change in plant personnel.** It may take time for a new employee to become as skilled an animal handler as more experienced employee. However, willful acts of abuse can NEVER be tolerated.
- **Breed, age and gender of livestock.** These factors all can affect temperament.
- **Previous handling or lack of handling and human contact at the farm level.** Animals that are accustomed to seeing people generally are less skittish at the plant.
- **Weather.** Livestock sometimes react to weather or seasonal changes, like a thunderstorm.
- **Auditor influence.** Auditors play a critical role in the assessment of humane handling and must have the appropriate-expertise and the ability to interact with plant personnel during the audit.

For these reasons, audits should be considered a process and trends should be considered along with each specific audit result to determine if results are an anomaly or a pattern. A plant’s proposed corrective/preventive measures and follow-up also should be considered.

The numeric criteria in the audit were developed based upon pooled audit data and the professional judgment of the author with input from the reviewers. While it is essential to set numeric targets, the mere act of auditing, measuring and tracking will help companies manage more effectively and will contribute toward improved animal welfare.

Just as plants strive for continuous improvement based on new practices and information, so, too, the AMIF will strive for continuous improvement and refinement of this document. The general recommendations and the audit criteria are based on real data and observation. However, as additional research is completed and new information is generated, the AMIF will seek to improve and update these documents.

Ethical, Regulatory and Economic Benefits

Optimal livestock handling is extremely important to meat packers for obvious ethical reasons. Once livestock – cattle, pigs and sheep—arrive at packing plants, proper handling procedures are not only important for the animal’s well-being, they can also mean the difference between profit and loss. Research clearly demonstrates that many meat quality benefits can be gained through careful, quiet animal handling. In addition, the Humane Slaughter Act of 1978, the regulations that evolved from it, as well as more than two decades of FSIS Directives and Notices, dictate strict humane handling and slaughtering standards for packing plants. This booklet provides practical information that can be used to develop animal

handling programs and to train employees in the principles of good animal handling practices.

Management Commitment

A key factor in establishing and maintaining optimal animal handling and stunning in plants is a clearly communicated management commitment to animal handling. Top management must play an active role. This commitment can include:

- An animal welfare mission statement that is widely circulated and/or posted visibly in various places in a plant.
- A program of ongoing monitoring and measurement of animal handling and stunning practices and outcomes (See Chapter 2).
- Regular internal training and providing opportunities to attend outside training programs.
- Recognition and/or rewards for jobs well done. These can take variety like simple mentions in a company newsletter, a congratulatory email or memo, the opportunity to attend the AMI Animal Care & Handling Conference, a pizza party or a small cash award for actions above and beyond the call of duty.

This manual provides employees and managers with information that will help them improve both handling and stunning. Proper animal handling is not only an important ethical goal, it helps also ensure that the industry operates safely, efficiently and profitably.

Managing the transportation of livestock involves many variables. Managing these variables may include careful temperature management, driving practices, trailer design and maintenance and the actual loading and unloading process result in enhanced livestock welfare and improved meat quality.

The following items should be considered when transporting livestock.

Maintenance—Trailers should be kept in good repair, should be kept clean (which is especially helpful in preventing pig skin blemishes) and should have non-slip floors that provide additional traction.

Truck Driving Practices—Careful truck driving helps prevent bruises, shrink and injuries. Sudden stops and acceleration that is too rapid increases injuries and stress. Selection of routes that are the most direct, but which minimize time on unpaved roads and avoidance of potholes will also provide benefits. Dead on Arrival (DOA) and Stunned on Arrival (SOA) numbers increase dramatically when a vehicle is stopped. Drivers should be encouraged to keep loads moving.

Design—It is essential that semi-trailers have sufficient height between decks to prevent back injuries. To comply with environmental regulations, truck floors should be leak proof to prevent urine and manure from dripping onto the highway and plugs should be cleaned out.

Loading—Research shows that overloading livestock trucks can increase bruising, dead or injured animals and poor meat quality.

In 2010, the Federation of Animal Sciences Societies (FASS) released new transportation space guidelines in “Guide for the Care and Use of Agricultural Animals in Research and Teaching.” These space requirements offer sound guidance to ensure welfare.

In 2010, the Federation of Animal Sciences Societies (FASS) released new transportation space guidelines in “Guide for the Care and Use of Agricultural Animals in Research and Teaching.” These space requirements offer sound guidance to ensure welfare.

| HANDLING AND TRANSPORT | | | | | | |
|-------------------------------------|------------|-------------|-------------------|--------------------|--------------------|--------------------|
| Species | Average BW | | Area per animal | | | |
| | (kg) | (lb) | (m ²) | | (ft ²) | |
| Cattle (calves) | 91 | 200 | 0.32 | 3.5 | | |
| | 136 | 300 | 0.46 | 4.8 | | |
| | 182 | 400 | 0.57 | 6.4 | | |
| | 273 | 600 | 0.80 | 8.5 | | |
| | | | Horned | | Hornless | |
| | | | (m ²) | (ft ²) | (m ²) | (ft ²) |
| Cattle (mature fed cows and steers) | 364 | 800 | 1.0 | 10.9 | 0.97 | 10.4 |
| | 455 | 1,000 | 1.2 | 12.8 | 1.1 | 12.0 |
| | 545 | 1,200 | 1.4 | 15.3 | 1.4 | 14.5 |
| | 636 | 1,400 | 1.8 | 19.0 | 1.7 | 18.0 |
| Small pigs | 4.54 | 10 | 0.060 | 0.70 | | |
| | 9.07 | 20 | 0.084 | 0.90 | | |
| | 13.60 | 30 | 0.093 | 1.00 | | |
| | 22.70 | 50 | 0.139 | 1.50 | | |
| | 27.20 | 60 | 0.158 | 1.70 | | |
| | 31.20 | 70 | 0.167 | 1.80 | | |
| | 36.30 | 80 | 0.177 | 1.90 | | |
| | 40.80 | 90 | 0.195 | 2.10 | | |
| | | | Winter | | Summer | |
| | | | (m ²) | (ft ²) | (m ²) | (ft ²) |
| Market swine and sows | 45 | 100 | 0.22 | 2.4 | 0.30 | 3.0 |
| | 91 | 200 | 0.32 | 3.5 | 0.37 | 4.0 |
| | 114 | 250 | 0.40 | 4.3 | 0.46 | 5.0 |
| | 136 | 300 | 0.46 | 5.0 | 0.55 | 6.0 |
| | 182 | 400 | 0.61 | 6.6 | 0.65 | 7.0 |
| | | | Shorn | | Full fleece | |
| | | | (m ²) | (ft ²) | (m ²) | (ft ²) |
| Sheep | 27 | 60 | 0.20 | 2.1 | 0.21 | 2.2 |
| | 36 | 80 | 0.23 | 2.5 | 0.24 | 2.6 |
| | 45 | 100 | 0.26 | 2.8 | 0.27 | 3.0 |
| | 55 | 120 | 0.30 | 3.2 | 0.31 | 3.4 |
| | | | Dimensions | | Area | |
| | | | (m) | (ft) | (m ²) | (ft ²) |
| Loose horses | 250 to 500 | 550 to 1100 | 0.7 × 2.5 | 2.3 × 8.2 | 1.75 | 18.8 |
| Foals <6 mo | | | 1.0 × 1.4 | 3.3 × 4.6 | 1.4 | 15.2 |
| Young horses 6–24 mo | | | 0.76 × 2.0 | 2.5 × 6.6 | 1.2 | 16.5 |
| | | | 1.2 × 2.0 | 3.9 × 6.6 | 2.4 | 25.8 |

¹Adapted from data of Grandin (1981, 2007c); Cregier (1982); Whiting and Brandt (2002); Whiting (1999); ILAR Transportation Guide (2006); and National Pork Board (2008) *Trucker Quality Assurance Handbook*.

To view a larger chart, see page 107

Section 1: Temperature Management

Temperature extremes can be harmful to livestock, but careful planning and temperature mitigation strategies can protect livestock. If you must load and travel in the danger zone to emergency index areas, load densities should be reduced 10 to 15 percent.

Cold Weather Temperature Management for Pigs

Freezing temperatures and wind chills can be dangerous as well, particularly for pigs. The combination of cold ambient temperatures and wind speed can create significant wind chill.

For example, if a truck is moving at 40 miles per hour (64 km per hour) in 40°F (4°C) weather, animals can be exposed to a wind chill that makes it feel to the pigs like it is 10°F (12°C). Rain can exacerbate these extremes. Wind protection should be provided when the air temperature drops below 50°F or 10°C or when wind chill factors are present during transport.

The following chart offers guidance for truck set-up procedures during temperature extremes.

Truck Set-Up Procedures During Temperature Extremes

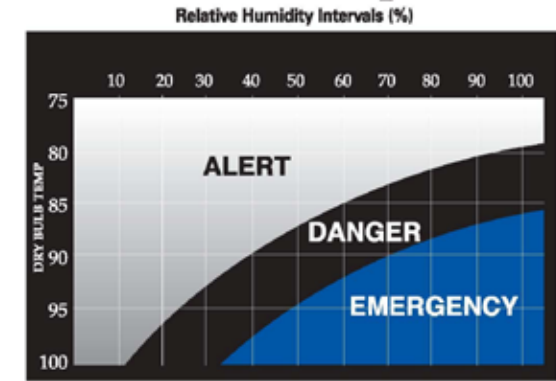
| Air Temp (F) | Bedding | Side Slats | |
|--------------|---------|------------|-----------|
| Less than 10 | Heavy | 90% closed | 10% open* |
| 10 – 20 | Medium | 75% closed | 25% open* |
| 20 – 40 | Medium | 50% closed | 50% open |
| 40 – 50 | Light | 25% closed | 75% open |
| More than 50 | Light** | 0% closed | 100% open |

*Minimum openings are needed for ventilation even in the coldest weather
 **Consider using sand or wetting bedding if it is not too humid and trucks are moving

Source: National Pork Board, Trucker Quality Assurance Handbook

The chart on page six offers rough guidelines for the space that should be provided per running foot of truck floor for various pig weights when temperatures are below 75°F (24°C). When the Livestock Weather Safety Index is in the “Alert” condition, load 10 to 20 percent fewer pigs. Pigs that will travel more than 12 hours may need more space.

Livestock Weather Safety Index



Heat Stress Chart—The chart provides a guide for plant managers and truckers to help reduce heat stress of livestock. Hazard to the animal increases when both temperature and humidity increase. When conditions are in the alert zone, truckers need to be careful to keep livestock cool. When conditions get into the danger and emergency zone, try to shift loading schedules to avoid the hottest part of the day. Problems with heat stress in pigs may start as low as 60°F (16°C.) Source: NIAA

Cold Temperature Management for Cattle, Veal and Sheep

While cattle and sheep are less sensitive than pigs to cold weather, it is still important to manage temperatures to protect animals and ensure meat quality.

Keeping livestock dry is essential to protecting them from wind chill. Veal calves also are particularly temperature sensitive and require special care during transport. Take care in cooler temperatures (below 60°F/16°C) to provide straw bedding and plug some air holes so in trucks so the calves do not become too cold. Also, it is critical to keep calves dry. Wetting a calf is the equivalent of lowering the outside temperature by 40-50°F (22-28°C).

The charts below offers rough guidelines for the space that should be provided. These charts offer two approaches to calculating space: based upon square foot needed for various weights or per running foot of truck floor (based on 92-inch truck width) for various cattle, calf and sheep weights.

Recommended Truck Loading Densities

(Source: National Institute for Animal Agriculture)

| Feedlot Fed Steers Or Cows, Avg. Wt. | Horned or Tipped or more than 10 percent Horned and Tipped | No Horns (polled) |
|---|---|---------------------------|
| 800 lbs. (360 kg) | 10.90 sq. ft. (1.01 sq m) | 10.40 sq. ft. (0.97 sq m) |
| 1000 lbs. (454 kg) | 12.80 sq. ft. (1.20 sq m) | 12.00 sq. ft. (1.11 sq m) |
| 1200 lbs. (545 kg) | 15.30 sq. ft. (1.42 sq m) | 14.50 sq. ft. (1.35 sq m) |
| 1400 lbs. (635 kg) | 19.00 sq. ft. (1.76 sq m) | 18.00 sq. ft. (1.67 sq m) |
| Lambs and Sheep | Shorn | Full Fleece |
| 60 lbs. (27 kg) | 2.13 sq. ft. (0.20 sq m) | 2.24 sq. ft. (0.21 sq m) |
| 80 lbs. (36 kg) | 2.50 sq. ft. (0.23 sq m) | 2.60 sq. ft. (0.24 sq m) |
| 100 lbs. (45 kg) | 2.80 sq. ft. (0.26 sq m) | 2.95 sq. ft. (0.27 sq m) |
| 120 lbs. (54 kg) | 3.20 sq. ft. (0.30 sq m) | 3.36 sq. ft. (0.31 sq m) |

Truck Space Requirements for Cattle

(Cows, range animals or feedlot animals with horns or tipped horns; for feedlot steers and heifers without horns, increase by 5 percent)

| Avg. Weight | Number of cattle per running foot of truck floor (92 in. internal truck width or 233.7 cm.)* |
|-------------------|---|
| 600 lbs. / 272 kg | .9 |
| 800 lbs. / 363 kg | .7 |
| 1,000 / 453 kg | .6 |
| 1,200 / 544 kg | .5 |
| 1,400 / 635 kg | .4 |

Examples (1,000 lb. cattle):

44 foot single deck trailer – 44 X 0.6 = 26 head horned, 27 head polled.
44 ft. possum belly (four compartments, 10 ft. front compartment; two middle double decks, 25 ft. each; 9 ft. rear compartment, total of 69 ft. of lineal floor space) - 69 X .06 = 41 head of horned cattle and 43 head of polled cattle.

Measure the total linear footage of floor space in YOUR truck.

*In metric, this is the number of animals in each 31 cm. long segment of truck length.

Truck Space Requirements for Calves

(Applies to all animals in the 200 to 450 lb. / 90-203 kg. weight range)

| Avg. Weight | Number of calves per running foot of truck floor (92 inch or 233.7 cm. internal truck width)* |
|-------------------|--|
| 200 lbs. / 90 kg | 2.0 |
| 250 lbs. / 113 kg | 1.8 |
| 300 lbs. / 136 kg | 1.6 |
| 350 lbs. / 159 kg | 1.4 |
| 400 lbs. / 181 kg | 1.2 |
| 450 lbs. / 204 kg | 1.1 |

Examples (450 lb. calves)

44 ft. single deck trailer - 44 X 1.1 = 48 head 44 ft. double deck trailer - 88 X 1.1 = 97 head.

*In metric, this is the number of animals in each 31 cm. long segment of truck length.

Truck Space Requirements for Sheep

(Use for slaughter sheep, load 5 percent fewer if sheep have heavy or wet fleeces.)

| Avg. Weight | Number of sheep per running foot of truck floor (92-in. or 233.7 cm. internal truck width)* |
|------------------|--|
| 60 lbs. / 27 kg | 3.6 |
| 80 lbs. / 36 kg | 3.0 |
| 100 lbs. / 45 kg | 2.7 |
| 120 lbs. / 54 kg | 2.4 |

Example (120 lb. sheep)

44 ft. triple deck trailer - 44 X 3 X 2.4 = 317 shorn sheep, 302 wooly sheep.

*In metric, this is the number of animals in each 31 cm. long segment of truck length.

Hot Weather Management for Pigs

Ensuring that pigs are hydrated prior to transport is extremely important. Hydration also can help prevent heat stress. Hot weather and humidity are deadly to pigs because they do not have functioning sweat glands. Therefore, special precautionary measures must be taken in hot weather conditions.

Use the following procedures to keep animals cool and eliminate unnecessary transport losses during extreme weather conditions.

1. Adjust your load conditions during temperature extremes and reduce load densities.
2. If possible, schedule transportation early in the morning or at night when the temperature is cooler and relative humidity is lower.
3. Never bed livestock with straw during hot weather, i.e. when the temperature is over 60°F (15°C), use wet sand or small amounts of wet shavings to keep pigs cool. Deep bedding in the summer may increase death losses.
4. If the temperature is 80°F (27°C) or higher, wet pigs with water prior to loading at buying stations or on the farm (use a coarse heavy spray but not mist).
5. Remove grain slats from farm trucks.

6. Open nose vents.
7. Unplug ventilation holes and remove panels.
8. Load and unload promptly to avoid heat buildup.
9. Pigs are very sensitive to heat stress. Problems with heat stress may start to occur at 60°F (16°C). At 90°F (32°C) death losses almost double compared to 60°F (16°C).

Stockyards at packing plants should have sufficient capacity so that animals can be promptly unloaded from trucks and provided cover. Heat builds up rapidly in a stationary vehicle. If trucks can not be unloaded, they may need to keep driving until they can.

Pig condition in lairage should be monitored as temperatures begin to exceed 70°F (21°C). Facilities should be available procedures and equipment for wetting pigs with water when necessary. For maximum cooling effect, the sprinklers should have a spray coarse enough to penetrate the hair and wet the skin. Sprinklers that create a fine mist can increase humidity without penetrating the hair and should not be used. Sprinklers should be used intermittently to allow evaporative effects to cool animals.

If it is not possible to follow these recommendations and protect the animals during hot conditions, make every effort to postpone the shipment until weather moderates.

When postponing is impossible, trucks should be kept moving and drivers should not be allowed to stop with a loaded trailer for an extended period of time unless interventions such as water or fans can be utilized. When the truckers reach the plant, livestock must be unloaded promptly. Heat and humidity become extremely critical at or above 80°F (27°C) and 80 percent humidity or greater.

Hot Weather Management for Cattle, Calves, Sheep and Goats

During hot weather, cattle, calves, sheep, and goats should be hauled in early morning or at night whenever possible. It is important to keep trucks moving and avoid any unnecessary stops. In addition, livestock should be unloaded promptly upon arrival at a plant and water should be provided.

Developing an Emergency Livestock Management Plan

It is essential that plants have an emergency livestock management plan in place. Each plant should assess potential vulnerabilities based on geographic location, climate and other issues that would require swift action to assure animal welfare. In the event of a long plant breakdown, snow storm, natural disaster, building damage, fire, tornado or other line stoppage, procedures should be in place to stop additional truck loads of livestock arriving at the plant. For animals that cannot be returned to the farm of origin, there should be a designated place, such as an auction yard or stockyard, where they can be unloaded and provided adequate facilities.

The plan should address:

- How food and water will be provided.
- How electricity can be provided through backup generators should power be lost.
- What housing will be provided to livestock should housing become uninhabitable.
- How animals will be evacuated in an emergency.

The plan should be kept in a visible location and should be reviewed at least annually.

The plant also should develop a contingency plan for truckers that may, for example, state that trucks should keep driving under certain conditions until unloading can occur or, if they park at a plant, that fans or water be used to keep the internal truck temperature at an optimal level.

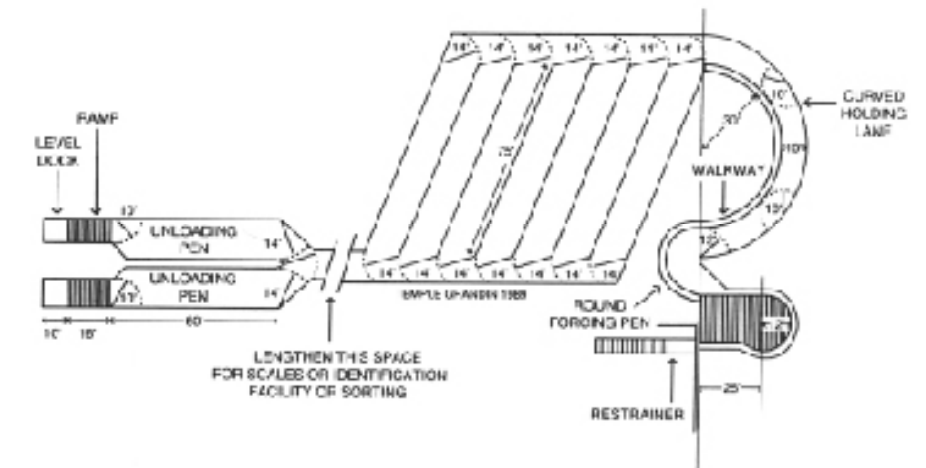
Section 2: Pen Space and Facility Layout

To improve meat quality, pigs should be rested two hours prior to stunning. When possible, animals should be kept in their transport groups. In large plants, pens should be designed to hold one or two truckloads. A few smaller pens will also be required for small lots.

Pen space allocations may vary depending upon weather conditions, animal sizes and varying holding times. As a rough guideline, 20 sq. feet (1.87 sq. m) should be allotted for each 1,200-pound (545 kg) steer or cow and six sq. feet (.55 sq. m) per pig. Sows will require 11-12 sq. feet (1.03 – 1.12 sq. m) and boars require 40 sq. feet (3.74 sq. m). (Source: Swine Care Handbook, National Pork Board, 2003). Small sheep require five sq. feet and large sheep require six sq. feet. These stocking rates will provide adequate room for “working space” when animals are moved out of the pen. If the animals are stocked in the pen more tightly, it will be more difficult for the handler to empty the pen. The recommended stocking rates provide adequate space for all animals to lie down (9CFR313.2(e)).

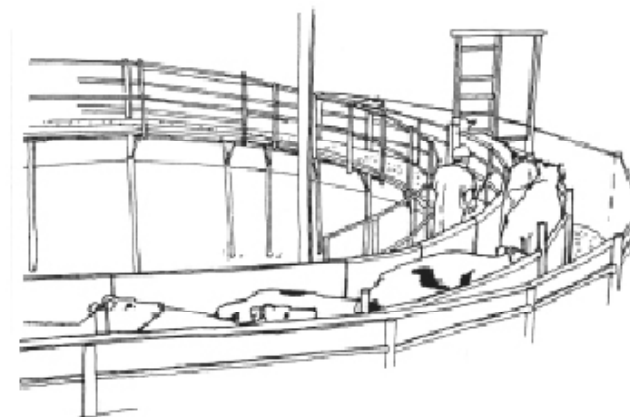
Recommended Handling Facility Layout

This diagram illustrates a modern cattle stockyard and chute system. Animal movement is one-way and there is no cross traffic. Each long narrow pen holds one truckload. The animals enter through one end and leave through the other. The round crowd pen and curved chute facilitate movement of cattle to the stunner.



Facility Layout

Modern cattle facilities have many good features. The unloading ramps have a 10-foot (3 m) level dock for the animals to walk on before they go down the ramps. Each unloading pen can hold a full truck load. Unloading pens are recommended for both pig and cattle facilities to facilitate prompt unloading. Long, narrow diagonal pens eliminate sharp corners and provide one-way traffic flow.



A well-designed, curved chute with solid sides for cattle.

The round crowd pen and curved single file chute take advantage of the natural tendency of cattle to circle. A curved chute is more efficient for cattle because it takes advantage of their natural circling behavior. It also prevents them from seeing the other end while they are standing in the crowd pen. A curved chute should be laid out correctly. Too sharp a bend at the junction between the single file chute and the crowd pen will create the appearance of a dead end. In fact, all species of livestock will balk if a chute looks like a dead end.

As a guideline, the recommended radii (length of crowd gate) are: Cattle, 12 feet; (3.5 m) pigs, 8 feet (2.5 m) and sheep, 8 feet (2.5 m). The basic layout principles are similar for all species, but there is one important difference. Cattle and sheep crowd pens should have a funnel entrance and pig crowd pens must

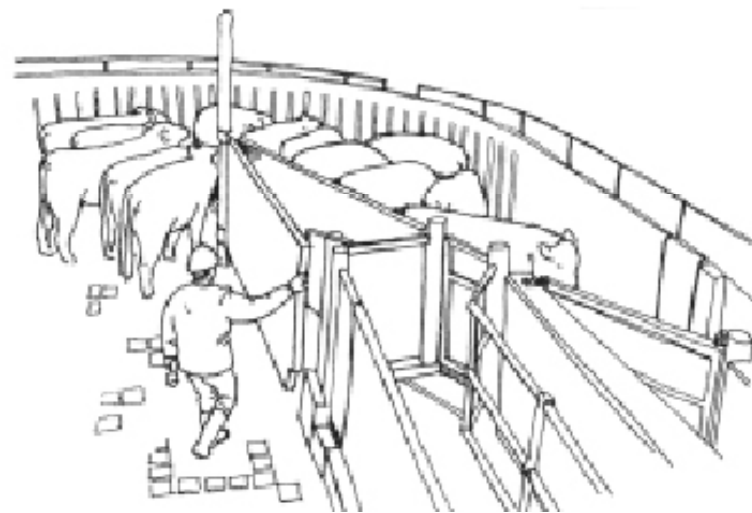
have an abrupt entrance. Pigs will jam in a funnel. A crowd pen should never be installed on a ramp because animals will pile up in the crowd pen. If ramps have to be used, the sloped portion should be in the single file chutes. In pig facilities, level stockyards and chute systems with no ramp are most effective. Pork facilities should be designed on the level with the slope or grade sufficient for drainage only.

Unloading Animals Properly

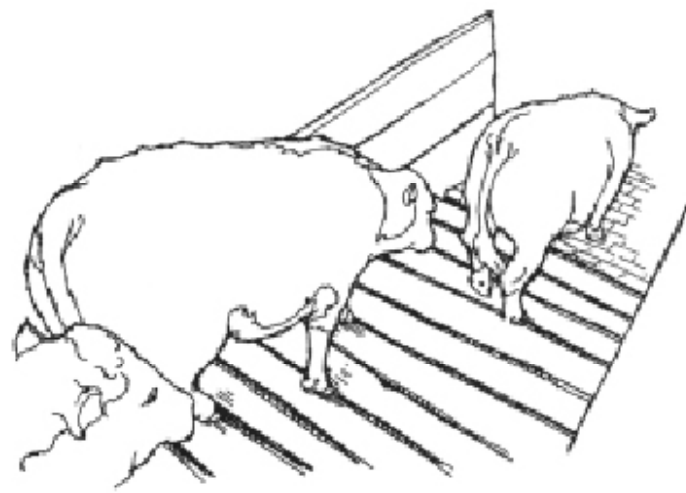
For all species, a plant should have sufficient unloading capacity so trucks can be unloaded promptly. Unloading ramps should have a level dock before the ramps go down so that animals have a level surface to walk on when they exit the truck. A good target for the slope of the ramp is no more than 20° (It may go up to 25° if the ramp is adjustable). With concrete ramps, stair steps are recommended because they provide better traction than cleats or grooves when ramps become dirty.

Attempting to rush livestock during unloading can be a major cause of bruises, particularly loin bruises. Management should closely supervise truck unloading. For cattle, the recommended stair step dimensions are 3 ½ inch (10 cm) rise and a 12-inch (30 cm) long tread. If space permits, an 18-inch (45 cm) long tread will create a more gradual ramp. For market pigs, a 2 ½ inch (6.5 cm) rise and a 10-inch (26 cm) tread works well. On adjustable ramps, cleats with 8 inches (20 cm) of space between them are recommended. All flooring and ramp surfaces should be non-slip to avoid injury.

Truck drivers should seldom need to use an electric prod, also termed a hot shot, to unload a truck.

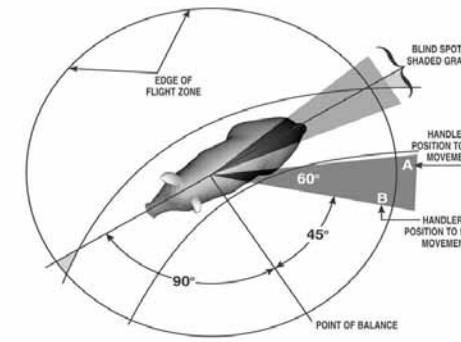


Round crowd pen with correct number of cattle



Well-designed unloading ramp

2 CHAPTER II: RECOMMENDED ANIMAL HANDLING GUIDELINES

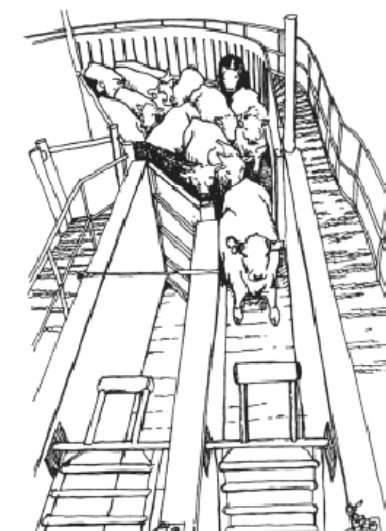


(Photo courtesy of the National Pork Board's TQA Handbook)

Flight Zone Diagram – This diagram shows the correct positions for the handler to move livestock. To make an animal go forward, he should work on the edge of the flight zone in positions A and B. The handler should stand behind the point of balance to make an animal go forward and in front of the point of balance at the shoulder to make an animal back up.

Understanding Flight Zone and Point of Balance

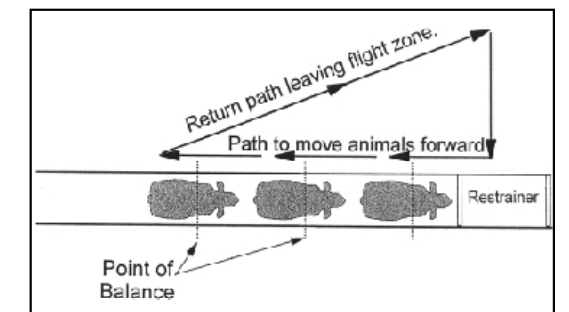
Handlers who understand the concepts of flight zone and point of balance will be able to move animals more easily. The flight zone is the animal's personal space and the size of the flight zone is determined by the wildness or tameness of the animal. Completely tame animals have no flight zone and people can touch them. Other animals will begin to move away when the handler penetrates the edge of the flight zone. If all the animals are facing the handler, the handler is outside the flight zone.



Cattle move into single file, following the leader.

Section 1: Recommended Livestock Handling Principles

The principles of good livestock handling are similar for the different species. All livestock are herd animals and will become agitated when separated from the others. If a lone animal becomes agitated, place it with other animals where it is likely to become calmer. Never get in the crowd pen or other confined space with one or two agitated, excited livestock.

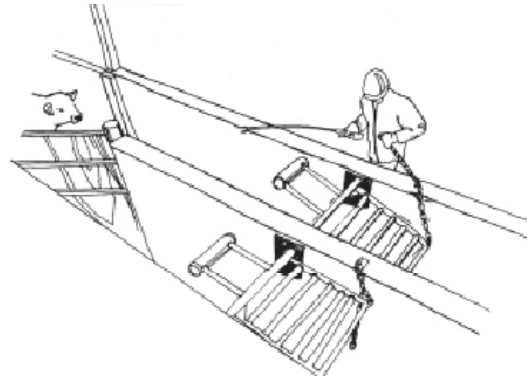


Cattle will move forward when the handler passes the point of balance at the shoulder of each animal. The handler walks in the opposite direction along side the single file race.

To keep animals calm and move them easily, the handler should work on the edge of the flight zone. The handler penetrates the flight zone to make the animals move and he backs up if he wants them to stop moving. The best positions are shown on the diagram. The handler should avoid the blind spot behind the animal's rear. Deep penetration of the flight zone should be avoided.

Animals become upset when a person is inside their personal space and they are unable to move away. If cattle turn back and run past the handler while they are being driven down a drive alley in the stockyard, overly deep penetration of the flight zone is a likely cause. If animals start to turn back away from the handler, the handler should back up and increase distance between him and the animals. Backing up must be done at the first indication of a turn back.

If a group of animals balks at a smell or a shadow up ahead, be patient and wait for the leader to cross the shadow. The other animals will follow. If cattle rear up in the single file chute, back away from them. Do not touch them or hit them. They are rearing in an attempt to increase the distance between themselves and the handler. They will usually settle down if left alone.



Holding a one-way gate open to facilitate cattle entry into the chute.

Point of Balance

The point of balance is at the animal's shoulder. All species of livestock will move forward if the handler stands behind the point of balance. They will back up if the handler stands in front of the point of balance. Many handlers make the mistake of standing in front of the point of balance while attempting to make an animal move forward in a chute. Groups of cattle or pigs in a chute will often move forward without prodding when the handler walks past the point of balance in the opposite direction of each animal in the chute. If the animals are moving through the chute by themselves, leave them alone. It is not necessary and not recommended to prod every animal; often they can be moved by lightly tapping.

Moving Animals

Livestock will follow the leader and handlers need to take advantage of this natural behavior to move animals easily. Animals will move more easily into the single file chute if partially empty with animals inside still visible to those entering.

This partially empty chute provides room to take advantage of following behavior. Handlers are often reluctant to do this because they are afraid gaps will form in the line and slow the process. But once a handler learns to use this method, he will find that keeping up with the line will be easier. As animals enter the crowd pen, they will head right up the chute. Calm animals are easier to move than excited animals. Pigs hauled for a short, 15-minute trip may be more difficult to unload because they have not had sufficient time to calm down after being loaded on the farm. It takes 20 to 30 minutes for excited pigs or cattle to calm down.

One of the most common mistakes is overloading the crowd pen that leads to the single file chute. The crowd pen and the staging alley between the crowd pen and the yards should be filled half full so that animals have room to turn. The key is to allow "looseness" of animals within a pen as wedging them tightly into any area will create resistance to moving forward.

Handlers must also be careful not to push the crowd gate up too tightly on the animals. It often works best to leave the crowd gate on the first notch and to let the animals flow into the single file chute. This will work after all the distractions have been removed from a facility. The crowd pen should become the "passing through" pen. The crowd gate may be used to follow the animals and should never be used to forcibly push them. The handler should concentrate on moving the leaders into the chute instead of pushing animals at the rear of the group. One-way or sliding gates at the entrance to the single file chute must be open when livestock are brought into the crowd pen. Cattle will balk at a closed gate.

One-way flapper gates can be equipped with a rope to open them by remote control from the crowd pen. When the crowd pen is operated correctly, electric prods can usually be eliminated and non-electric driving aids such as flags, paddles and sticks with streamers can be used. Animals can easily be turned with these aids. To turn an animal, block the vision on one side of its head with the aid. If the leader balks at the chute entrance, a single touch with the prod may be all that is required. Once the leader enters, the rest of the animals will follow.

Some highly excitable pigs are difficult to drive at the packing plant. These animals squeal, bunch and pile up, and it can be difficult to make these pigs separate and walk up the chute. Highly excitable pigs can have severe pale, soft, exudative

tissue or PSE due to agitation during handling, even though these pigs are negative on the genetic test for the halothane gene. Research also shows that excessive use of electric prods in the stunning chute increases tough meat in beef and lowers meat quality in pigs. Careful, quiet handling during the last few minutes before slaughter is very important.

Excitability problems can be reduced and pigs will be easier to drive if people walk through the finishing pens at least once a week. The person should walk quietly in a different random direction each time to train the pigs to get up quietly and flow around them. This can be done during a routine task like checking feeders. Playing a radio in the finishing barn also gets the animals accustomed to different kinds of sounds.

Preventing Injuries, Bruises and Falls

Non-slip flooring is essential to prevent falls and crippling injuries. Humane, efficient handling is very difficult on slick floors because animals can become agitated and excited when they lose their footing. All areas where livestock walk should have a non-slip surface. Existing floors can be roughened with a concrete grooving machine as long as the pattern is sufficiently deep. Grooves that are 1/4" x 1/4" x 1/4" have proven successful through other approaches and also may be used. For pigs, steel bars may be used as long as they are flush with the floor. Concrete flooring also can be used on weight scales to prevent slipping.

For cattle, on scales, crowd pens and other high traffic areas, a grid of one-inch steel bars will provide secure footing. Construct a 12-inch (30 cm) by 12-inch (30 cm) grid and weld each intersection. Use heavy rod to prevent the grid from bending. Non-slip flooring is particularly important in stunning boxes and restrainer entrances. Examples of non-slip flooring include textured concrete, grooving and rubber mats.

New concrete floors for cattle should have an 8-inch (20 cm) diamond or square pattern with deep 1-inch (2.5 cm) grooves. For pigs and sheep, stamp the pattern of raised expanded metal into the wet concrete. A rough broom finish is not sufficient as it will become worn smooth. It is also essential to use the right concrete mix for maximum resistance to wear.



A good sample of non-slip flooring.

Smooth Edges and Surfaces—Gates, fences and chutes should have smooth surfaces to prevent bruises. Sharp edges with a small diameter, such as angle irons, exposed pipe ends and channels will cause bruises. Round pipe posts with a diameter larger than 3 inches (8 cm) are less likely to bruise. Vertical slide gates in chutes should be counter-weighted to prevent back bruises. The bottom of these gates should be padded with cut tires or conveyor belting. The gate track should be recessed into the chute wall to eliminate a sharp edge that will bruise.

In pork plants, the bottom 18 inch (46 cm) to 24 inch (61 cm) of a vertical slide gate (guillotine) can be cut off and replaced with a curtain made from conveyor belting. The pigs will not attempt to go through the curtain. This change will prevent back injuries if the gate is closed on a pig. Pressing up against a smooth flat surface such as a concrete chute fence will not cause bruises. However, a protruding bolt or piece of metal will damage hides and bruise the meat. Bruise points can be detected by tufts of hair or a shiny surface. Contrary to popular belief, livestock can be bruised moments before slaughter until they are bled. The entrance to the restrainer should be inspected often for broken parts with sharp edges.

Horned Cattle -- Surveys show that groups of horned cattle will have twice as many bruises as polled (hornless) cattle. A few horned animals can do a lot of damage. Cutting off the horn tips will not reduce bruising because the animal still has most of its horn length.



This bad bruise point could cause damage to both hide and meat.

Improving Animal Movement

Calm animals are easier to handle and move than excited animals. Animals can become agitated very quickly, but it can require 20 to 30 minutes for them to become calm again. Calm animals will move naturally through well-designed systems with a minimum of driving and prodding. To keep animals calm, take the following steps:

- ✓ Handlers should be quiet and calm. Yelling, banging on walls with paddles and arm-waving will excite and agitate animals.
- ✓ When handling sheep, never, ever grab or lift the animal by the wool.
- ✓ Use lighting to your advantage. Animals tend to move from a darker area to a more brightly lit area and may refuse to enter a dark or shadowy place. Lamps can be used to attract animals into chutes. The light should illuminate the chute up ahead. It should never glare directly into the eyes of approaching animals. Another approach is illuminating the entire chute area. This approach eliminates patches of light and dark which may confuse animals. Animals may be difficult to drive out of the crowd pen if the pen is brightly illuminated by sunlight and the chute is inside a darker building. Another common lighting problem is that a handling system may work well when lamps are new, but the animals will balk more and more as the lamps dim with age. Experiment with portable lights to find the most efficient and consistent lighting.
- ✓ Eliminate visual distractions. Get down in the chutes to see them from the animal's perspective. Livestock balk at shadows, puddles of water or any object that stands in their way, from a coffee cup to a piece of paper. A drain or a metal plate running across an alley can cause animals to stop and should be located outside the areas where animals walk. Flapping objects, such as a coat hung over a fence or a hanging chain, will also make livestock balk. Install shields or strips of discarded conveyor belting to prevent animals from seeing movement up ahead as they approach the restrainer or stunning box.
- ✓ Redirect air flow. Air hissing and ventilation drafts blowing in the faces of approaching animals can seriously impede movement. Ventilation systems may need to be adjusted.
- ✓ Use solid sides in chutes and crowd pens leading up to chutes. Solid sides in these areas help prevent animals from becoming agitated when they see activity outside the fence – such as people. Cattle tend to be calmer in a chute with solid sides. The crowd gate on the crowd pen should also be solid to prevent animals from attempting to turn back towards the stockyard pens they just left.
- ✓ Reduce noise. Animals are very sensitive to noise. Reducing high-pitched motor and hydraulic system noise along with banging or reverberation can improve animal movement. Clanging and banging metal should be reduced and hissing air should be muffled. Excessive loud yelling and banging on equipment should be discouraged.
- ✓ Move animals in small groups – When cattle and pigs are being handled, the crowd pen and the staging areas which lead up to the crowd pen should never be filled more than 75 percent full. Do not push crowd gates up tight against the animals as cattle and pigs need room to turn. For sheep, large groups may be moved and the crowd pen can be filled all the way up. When a group of animals is particularly difficult to move, reduce the group size.
- ✓ Spray water from above or behind. When wetting pigs in the chute, be sure not to spray the animal's face with water because they will back up.



Hose may cause balking.



An animal looks at a sun spot and stops.



Piglets are hesitant to walk on new floor - they will be easier to drive if allowed to explore the new floor first.



Even yellow tape can frighten cattle because it is unfamiliar to them.

Section 2: Livestock Driving Tools



Moving pigs with a plastic paddle and a large flag.

Electric prods should be used sparingly to move livestock and should not be a person's primary driving tool. In most plants, the only location an electric prod is needed is at the entrance to the stun box or restrainer. Cattle and pigs can often be moved along a chute when the handler walks by them in the opposite direction of desired movement, taking advantage of the point of balance at the animal's shoulder. Electric prods should only be picked up and used on a resistant animal and then put back down. Certainly, the need for electric prod use can vary depending on breeds of animals, production practices on the farm, gender, the group of animals, the day and the handling system used.

Many well-managed plants have totally eliminated electric prods in the holding pens and the crowd pen that leads to the single file chute. In beef plants with well-trained handlers, survey data showed that up to 95 percent of the animals could be moved through the entire plant without the use of an electric prod. Plants should strive to use the electric prod on 25 percent or fewer cattle, pigs and 5 percent or fewer sheep. Plants that use prods on five percent or fewer cattle and pigs are achieving excellent scores. A well-designed plant that has eliminated distractions and other handling impediments detailed above can greatly reduce electric prods, though they may not be entirely eliminated.

Substitutions for electric prods are possible in many instances. They include plastic paddles, witches capes, sticks with nylon flags on the end, or large flags for pigs. Plastic streamers or garbage bags attached to a stick also can be used. Cattle can be easily turned and moved in the crowd pen by shaking the streamers near their heads. For moving pigs, a large flag on a short handle or rattle paddle work well. Rattles work well for moving sheep. Some plants may use "lead" animals which include other sheep or goats as an animal handling tool. These animals are trained to go on trailers and lead the other sheep off or to enter pens and lead sheep up chutes.



Moving cattle with a flag.

Flags can be made from lightweight plasticized tarp material and can vary in size from 20 inches x 20 inches to 30 inches x 30 inches (50 cm x 50 cm to 76 cm x 76 cm). Lightweight sorting boards can be used to move livestock, and they are effective for unloading pigs. In addition, a relatively new vibrating prod that does not use electrical stimulus is showing promise in moving animals with a minimum of stress. Motorized vehicles should never be used to drive livestock.

Using Proper Electric Prod Voltage

USDA regulations require that electric prods have a voltage of 50 volts or less. For pigs, they should use between 18 and 32 volts. If most livestock bellow or squeal in direct response to being touched with the electric prod, the power may need to be reduced. Prods which have sufficient power to knock an animal down or paralyze it must not be used. Electric prods must never be applied to sensitive parts of the animal such as the eyes, ears, mouth, nose, genitals, udders or anus. In practical terms, the prod should not be used on the animal's head. Prods should not be used on non-ambulatory or disabled livestock.

When used, electric prods must never be wired directly to house current. A transformer must be used; a doorbell transformer works well for pigs. Fifty volts is the maximum voltage for prods hooked to an overhead wire. Many managers have removed wired-in prods and use only battery-operated prods.

The prod voltage for pigs should be lower than for cattle, which can help reduce both PSE and blood spots in the meat. The voltage required to move an animal will vary depending on the wetness of the animal and the floor. Battery-operated prods are best for livestock handling because they provide a localized directional stimulus between two prongs. Prods also should have an off switch and not be on constantly.

Electric prods for pigs should have the voltage low enough that it does not consistently produce a “bark” or “squeal” in pigs or a “moo” or a “bellow” in cattle, but still enough of a voltage to be a persuasion. The voltage required to move an animal will vary depending upon the wetness of the animal and the floor. The prod voltage for pigs should be lower than that used with cattle. This helps reduce both PSE and blood spots in the meat.

International standards from the World Organization for Animal Health (OIE 2008) state that electric prods should be limited to battery operated prods. They should not be used on horses, on calves less than two weeks of age or on piglets (OIE 2008).

Electric prods are ineffective on sheep, as the wool insulates the shock of a properly applied prod. This lack of response could lead handlers to prod animals in sensitive areas such as the anus or vulva, which is considered a willful act of abuse. Additionally, the application of the electric prod can cause damage to the pelt. Current international animal welfare guidelines recommend that electric prods not be used in sheep. As a result, electric prods should be a tool of last resort and used only when absolutely necessary.

Section 3: Proper Design and Use of Restraints

Pigs and cattle should enter a restraint device easily with a minimum of balking. Correcting problems with animal restraint devices can also help reduce bruises and meat quality defects such as blood splash. The basic principles of low stress restraint which will minimize vocalization and agitation are:

Field of Vision:

- For cattle, block the animal’s vision with shields so that they do not see people or objects that move while they are entering the restrainer. Install metal shields around the animal’s head on box-type restrainers to block the animal’s vision.
- Block the animal’s vision of an escape route until it is fully held in a restraint device. This is especially important on restrainer conveyors. A flexible curtain made from discarded conveyor belts at the discharge end of the conveyor works well. Cattle often become agitated in a conveyor restrainer if they can see out from under the solid hold down cover before their back feet are off the entrance ramp. Extending the solid hold down cover on a conveyor restrainer will usually have a calming effect and most animals will ride quietly. Solid hold-downs can also be beneficial for pigs on conveyor restrainers.

Facilities:

- Provide non-slip flooring in box-type restrainers and a non-slip, cleated entrance ramp on conveyor restrainers. Animals tend to panic and become agitated when they lose their footing. Stunning boxes should have a non-slip floor.
- The restraint device must be properly lighted. Animals will not enter a dark place or a place where direct glare from a light is blinding them. To reduce balking at the entrance of a conveyor restrainer, install a light above the entrance. The light should be above the lead-up chute. It should illuminate the entrance of the restrainer, but it must not glare into the eyes of approaching animals. Lighting over the top of the conveyor in the restrainer room will help induce cattle to raise their heads for the stunner. Light coming up from under a conveyor restrainer should be blocked with a false floor to prevent animals from balking at the “visual cliff effect.”
- Restraint systems should be equipped with a long, solid hold-down rack to prevent rearing. For cattle, the hold-down should be long enough so that the animal is fully settled down onto the conveyor before it emerges from under it. This hold-down should not press on the animal’s back. It is a visual barrier.

- Eliminate air hissing and other distractions such as clanging and banging. Refer to the section on distractions.
- Restraint devices should not have sharp edges that dig into an animal. Parts that contact the animal should have smooth rounded surfaces and be designed so that uncomfortable pressure points are avoided.

Optimum Pressure

- The restraint device must apply sufficient pressure to provide the feeling of being held, but excessive pressure that causes pain should be avoided. Install a pressure regulator on a pneumatic or hydraulic system to reduce the maximum pressure that can be applied. Very little pressure is required to hold an animal if it is fully supported by the device. If an animal bellows or squeals in direct response to the application of pressure, the pressure should be reduced. A restraint device must either fully support an animal or have non-slip footing so the animal can stand without slipping. Animals panic if they feel like they may fall.
- Restraint devices should hold fully sensible animals in a comfortable, upright position. Shackling and hoisting, shackling and dragging, trip floor boxes and leg clamping boxes are not acceptable. Restrainers that rotate animals on their backs are used rarely in glatt Kosher operations in the United States, but more commonly in glatt Kosher operations in South America and Europe. For information on using and auditing these devices, refer to: www.grandin.com (Ritual Slaughter Section).
- Restraint devices must have controls that enable the operator to control the amount of pressure that is applied. Different sized animals may require differing amounts of pressure. Hydraulic or pneumatic systems should have controls that enable a cylinder on the device to be stopped in mid-stroke.
- Parts of a restrainer device operated by pneumatic or hydraulic cylinders that press against the animal’s body should move with a slow steady motion. Sudden jerky motion excites animals. On existing equipment, install flow control valves to provide smooth steady movement of moving parts that press against the animal.
- Never hold an animal in a head restraint device for more than a few seconds. The animal should be stunned or ritually slaughtered immediately after the head holder is applied. Head restraint is much more aversive (disliked by the animal) than body restraint. Animals can be held in a comfortable body restraint for longer periods. The animal’s reaction should be observed. If the animal struggles or vocalizes, it is an indication that the device is causing discomfort.
- On V conveyor restrainers, both sides should move at the same speed. To test this, mark each side with tape or a crayon. After three revolutions the marks should be no more than 4 inches different or the width of one slat.
- It is possible to modify existing restraint devices to lower vocalization and agitation scores. Balking at the entrance is also easy to reduce. Most of the modifications that would reduce animal agitation and vocalizations can be installed at a minimum expense. Floor grating, lighting and shields to block vision are examples of some relatively inexpensive, but effective, modifications.
- Restraint devices that use a floor that suddenly drops, as opposed to a pneumatically controlled false floors, are not acceptable.
- If a stunning box is used, it should be narrow enough to prevent the animal from turning around. The floor should be non-slip so the animal can stand without losing its footing. It is much easier to stun an animal that is standing quietly. Only one animal should be placed in each stunning box compartment to prevent animals from trampling each other.

General Handling:

- If an animal is walking into the restrainer by itself, do not poke it with an electric prod. Center track systems require less prodding to induce cattle to enter. Workers need to break the “automatic prod reflex” habit. Prods should be a tool of last resort, not a primary driving aid.

Section 4: Recommended Stunning Practices

Good stunning practices are also required to achieve compliance with federal humane slaughter regulations. Good stunning also promotes animal welfare and meat quality. When stunning is done correctly, the animal feels no pain and it becomes instantly unconscious. Stunning an animal correctly also results in better meat quality. When using electric stunning systems, improper stunning will cause blood spots in the meat and bone fractures.

Reduce Noise in Stunning Area

Because animals are so sensitive to noises, it is important to reduce noise in the stunning area in particular. Calm animals facilitate accurate and effective stunning. As in other areas, mufflers can be used on air valve exhausts or they can be located outside. Rubber stops on gates can be used to stop clanging and braking devices on the shackle return improve safety and reduce noise.

In addition, consider replacing small diameter with large diameter plumbing, which makes less noise, and replace pumps with quieter ones. Rubber hose connections between the power unit and metal plumbing will help prevent power unit noise from being transmitted throughout the facility. Any new equipment that is installed in animal holding or stunning areas should be engineered for quietness.

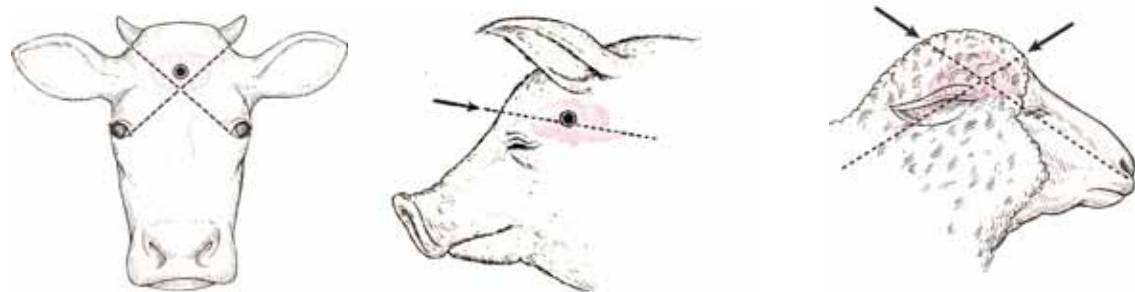
Captive Bolt Stunning

To produce instantaneous unconsciousness, the bolt must penetrate the brain with a high concussive impact. The correct positions for stunner placement are shown in the diagram. For cattle, the stunner is placed on the middle of the forehead on an "X" formed between the eyes and the base of the horns. Stunning 2 cm. above the intersection of the X is also very effective. If a non-penetrating mushroom-head stunner is used, accurate aim is very critical to achieve instantaneous insensibility. A head-holding device may be needed to position the head for non-penetrating captive bolt.

If an aggressive sow or boar becomes loose and threatens the welfare of other livestock or workers, a snout snare may be used to restrain the animal for captive bolt stunning. Snares may also be used when pigs are agitated or exhibit constant head movement that makes it impossible to ensure an accurate stun. Snares should not be used as a regular means of restraint for sows and boars.

For sheep, a captive bolt is placed on the top of the head. This position is more effective for sheep because they have a very thick skull over the forehead. For pigs, the captive bolt is placed on the forehead.

A good stunner operator learns not to chase the animal's head. He takes the time to aim and get one good, effective shot. The stunner must be placed squarely on the animal's head. All equipment manufacturers' recommendations and instructions must be followed. Pneumatic stunners must have an adequate air supply. Low air pressure is one cause of poor stunning. The pressure gauge on the compressor should be checked to make sure that the stunner is receiving the air pressure recommended by the manufacturer. Heavy pneumatic stunners should be equipped with an ergonomic handle to aid positioning.



The pictures above show proper captive bolt placement to facilitate complete penetration of the brain tissue, represented in pink. Effective captive bolt placement is determined by drawing an X from one ear to the opposite eye and vice versa. The bolt placement should be approximately above the center of the X.

Captive Bolt Maintenance and Design

The most common cause of poor captive bolt stunning is poor maintenance of the captive bolt stunners. Stunners must be cleaned and serviced per the manufacturer's recommendations to maintain maximum hitting power and to prevent misfiring or partial firing. If a "test stand" to measure bolt velocity is available, daily use is strongly recommended for plants that use captive bolt stunners as their primary method of stunning. For small plants, periodic, but not daily use, is acceptable.

A verified maintenance program where a mechanic signs off each day that he/she has tested the stunners is recommended. If a plant shoots a captive bolt stunner on a particular day, it has to be taken apart and cleaned. If a gun is not shot for a week, it should be cleaned. Small plants should wipe down the captive bolt gun after each use.



Well-designed cattle stunning box.

Another major cause of failure to render animals insensible with one shot is a poor ergonomic design of bulky pneumatic stunners. Aversive methods of restraint, which cause five percent or more of the cattle or pigs to vocalize, must not be used as a substitute for improvements in gun ergonomics. Ergonomics for stunning in a conveyor or restrainer can be improved with a handle extension on the stunner and hanging the pneumatic stunner on an angle.

It is important to keep stunner cartridges dry and the correct cartridge strength must be used. For long-term storage beyond a day's supply, store cartridges in a room with low humidity such as an office. Damp cartridges which have not been stored properly will cause poor stunning. A day's supply of cartridges may be stored in the stunning area.

Another cause of missed captive bolt shots is an overworked or fatigued operator. Scoring at the end of the shift will pinpoint this problem. In some large plants two stunner operators may be required. Rotating the stunner operator to other jobs throughout the day may help prevent errors caused by fatigue.

Initial application of the stunner must induce insensibility. A second application of the stunner is acceptable as a security measure provided that the auditor has had the opportunity to confirm insensibility after the initial stunner application.

Using electrical devices that restrain an animal, but do not cause insensibility is not acceptable. Several scientific studies have shown that it is highly aversive. Vocalization scoring is impossible in electrically immobilized animals because paralysis prevents vocalization. Electrical immobilization must not be confused with electric stunning. Properly done, electric stunning passes high amperage current through the brain and induces instantaneous insensibility by inducing a grand mal epileptic seizure. Electrical immobilization keeps a sensible animal still by paralyzing the muscles. It does not induce epileptiform changes in an electroencephalogram (EEG) which would indicate that a grand mal epileptic seizure had occurred.

Electric Stunning of Pigs and Sheep



Electric head-to-back cardiac arrest stunner placed in the correct position on a pig in V restrainer.

To produce instantaneous, painless unconsciousness, sufficient amperage (current) must pass through the animal's brain to induce a grand mal epileptic seizure. Insufficient amperage or a current path that fails to go through the brain will be painful for the animal. It will feel a large electric shock or heart attack symptoms, even though it may be paralyzed and unable to move. When electric stunning is done correctly, the animal will feel nothing. Animals that are dehydrated also may have high electrical resistance and be difficult to stun.

There are two types of electric stunning: head only stunning, which is reversible, and head-to-back cardiac arrest stunning, which stops the heart. When head-only stunning is used, the signs of a grand mal epileptic seizure can be easily observed. The first phase is a still, rigid (tonic) phase, followed by vigorous kicking (clonic) phase. If the animal is not bled, it will return to sensibility when the kicking phase stops.

When head only stunning is used with scissors type tongs, the electrodes may be either placed on the forehead or clamped around the sides of the head like ear muffs. Pigs should be wetted prior to stunning. Electrodes also may be placed in a "top to bottom" position on top of the head and below the jaw. When a wand with two stationary electrodes is used, they may be placed either on the forehead or in the hollow behind the ears. Stunning tongs and wands must never be placed on the neck. The stunning wand must be applied to the animal for at least two to three seconds to stun properly. Stunners should be equipped with a timer. Pigs and sheep that are stunned with a head only stunner for a minimum of two seconds must be bled within a maximum interval of 30 seconds to prevent them from regaining consciousness. Both practical experience and scientific research shows that a shorter interval of 15 seconds is strongly recommended.

Small plants may achieve cardiac arrest stunning by first applying the tongs to the head to induce insensibility and then immediately reapply to the chest. Most large plants use cardiac arrest head to back or head to side-of-body stunning. It produces a still carcass that is safer and easier to bleed. Cardiac arrest stunning requires the use of a restraining device to prevent the animal from falling away from the stunning wand before it receives the complete stun. Cardiac arrest stunning kills the animal by electrocution.

When cardiac arrest stunning is used, one electrode must be placed on either the forehead or in the hollow behind the ears. The other electrode is placed on either the back or the side of the body. The head electrode should not be allowed to slide back onto the neck or onto the pig's jowls. Placement is critical. If the head electrode is placed too far back, it can miss the brain. To prevent return to sensibility after head-only stunning, the stunning tong can be reapplied to the chest. This will stop the heart.

Meat packers should use amperage, voltage and frequency settings, which will reliably induce unconsciousness. Both properly and improperly stunned cardiac arrested animals can look similar. Current flow through the spine masks the epileptic seizure and a clear, rigid and kicking phase cannot be easily observed. Properly stunned cardiac arrested animals sometimes have kicking back legs.

To prevent bloodspots in the meat and pain to the animal, the wand must be pressed against the animal before the button is pushed. The operator must be careful not to break and re-make the circuit during the stun. This causes the animal's muscles to tense up more than once and bloodspots may increase. If the stunning wand is energized before it is in full contact with the pig, the pig will squeal. This is called "hot wandling." This is detrimental to pig welfare and is likely to increase blood spots in the meat. Stunning wands and wiring should be checked often for electrical continuity. A worn switch may break the circuit enough to cause bloodspots.

Electrodes must be kept clean to provide a good electrical contact. Operators must never double stun animals or use the stunning wand as a prod.

Electrical Specifications for Electric Stunning of Pigs and Sheep

Electric stunning equipment must operate within the electrical parameters that have been verified by scientific research to induce instantaneous insensibility.

Modern stunning circuits use a constant amperage design. The amperage is set and the voltage varies with the pig or sheep's resistance. Older style circuits are voltage regulated. These circuits are inferior because they allow large amperage surges, which can fracture bones and cause blood splash. The distance between the head electrode and the back electrode should not exceed 14 inches (35 cm.). The most modern sheep stunners from New Zealand use water jets to conduct electricity down through the wool.

Amperage—Scientific research has shown that an electric stunner must have sufficient amperage to induce a grand mal seizure to insure that the animal will be made instantly insensible. Insufficient amperage can cause an animal to be paralyzed without losing sensibility. For market pigs (180 - 200 lbs. / 82-91 kg.—not mature sows or boars) a minimum of 1.25 amps is required (Stunning market pigs with less than 1.25 amps should not be permitted unless the results of lower amperages are verified by either electrical or neurotransmitter recordings taken from the brain). Large sows (more than 350 lbs. / more than 160 kg.) will require 2 or more amps. If lower amperages are used, the stunner may induce cardiac arrest, but the animal will feel the shock because the seizure was not induced. For sheep a minimum of one amp is required. These amperages must be maintained for a minimum of one second to give instant insensibility.

The Council of Europe (1991) and the OIE (2008) recommend the above minimum amperages. Some plants stun animals below the Council of Europe recommended minimum amperages in an attempt to reduce blood spots in the meat. Since only a one-second application at 1.25 amps is required to induce instant insensibility in market pigs, it is the author's opinion that plants should be permitted to use circuits that lower the amperage setting after an initial, one second stun at 1.25 amps for pigs and one amp for sheep. Plants should also be encouraged to use electronic constant amperage electronic circuits that prevent amperage spiking. Both practical experience and research has shown that these types of circuits greatly reduce petechial hemorrhages (blood spots).

Voltage—There must be sufficient voltage to deliver the recommended minimum amperage; 250 volts is the recommended minimum voltage for pigs to ensure insensibility. Amperage is the most important variable to measure. The voltage that will be required will depend on the type of stunner, the wetness of the animal and whether or not it is dehydrated. For sheep, a minimum of one amp is required.

Frequency—Research has shown that too high an electrical frequency will fail to induce insensibility. Research indicates that insensibility is most effectively induced at frequencies of 50 cycles. Frequencies from 2000 to 3000 hz failed to induce instant insensibility and may cause pain. However, in pigs weighing less than 200 lbs (80 kg), research has shown that a high frequency 1592 hz sine-wave or 1642 hz square wave head; only stunning at 800 ma (0.80 amp) would induce seizure activity and insensibility in small pigs. One disadvantage is that the pigs regained sensibility more quickly compared to stunning at 50 to 60 cycles. The pigs in this experiment weighed one-third less than comparable U.S. market pigs and this probably explains why the lower amperages were effective.

Equipment is commercially available for stunning pigs at 800 hz applied across the head by two electrodes and a second stun with 50 to 60 hz from head to body. Research has shown that 800 hz is effective when applied by two electrodes across the head.

Research has shown that stunning pigs with frequencies higher than 50 to 60 cycles is effective. This is the type of stunning used in many large U.S. pork slaughter plants. In this experiment, the pigs were stunned with a head only applicator. High frequency stunning has never been verified to induce instant insensibility when applied as a single stun with a head to body electrode.

Vocalization as an Indicator of Stress

Vocalizations immediately prior to stunning, such as squeals in pigs, and moos and bellows in cattle can be signs of discomfort and stress. To prevent vocalizations the electrodes must be in firm contact with the animal prior to being energized.

Squealing of pigs during electric stunning can be more frequent in plants that have return to sensibility problems. Research conducted in commercial pork slaughter plants where squealing was measured with a sound meter indicated that the intensity of pigs squealing in the stunning chute area is correlated with physiological measures of stress and poorer meat quality. Another study determined that the intensity of pig squeals is correlated with discomfort. In cattle, vocalizations were associated with painful or stressful events such as missed stuns, electric prods, slips and falls and excessive pressure from a restraint device.

Cattle and pigs will vocalize when something causes pain or fear. Sheep as a species tend to remain silent when they are in pain or frightened. Vocalization scoring should not be used in sheep.

Due to natural vocalization behavior, vocalization scoring is not recommended for sheep.

Electric Cattle Stunning

Unlike pigs and sheep, electrical stunning of cattle may require a two-phase stun. Due to the large size of cattle, a current should first be applied across the head to render the animal insensible before a second current is applied from the head to the body to induce cardiac arrest. Modern systems may have a third current to reduce convulsions. A single 400 volt, 1.5 amp current passed from the neck to the brisket failed to induce epileptic form changes in the brain. Observations in plants outside the U.S. indicate that a single current passed from the middle of the forehead to the body appears to be effective. Research is needed to verify this. To insure that the electrodes remain in firm contact with the bovine's head for the duration of the stun, the animal's head must be restrained in a mechanical apparatus. Due to the high electrical resistance of cattle hair, the electrode should be equipped with a water system to provide continuous wetting during the stun.

The OIE (2008) requires a minimum of 1.5 amps applied across the head to induce immediate epileptiform activity in the electro-encephalogram (EEG) of large cattle. Typical stunning systems in the U.S. are 60 hz. Modifications are not recommended that would result in higher initial frequencies. The frequency may rise after the initial application. A frequency of 60 or 50 cycles should be used unless higher frequencies are verified in cattle by either electrical or neurotransmitter measurements taken from the brain. A more recent study has shown that 1.15 amps sinusoidal AC 50 Hz applied for one second across a bovine's head is effective to induce insensibility (Wotton et al., 2000). A longer application is usually required to depolarize the spine to reduce kicking (up to 15 seconds).

CO₂ Stunning Parameters

According to CFR 9, Section 313.5, CO₂ stunning may be used in swine to induce death or to result in a state of surgical anesthesia. These states are dependent on the relationship between exposure time and CO₂ concentration, and systems will produce pigs in both states. Research and the manufacturer recommendations show that the concentrations of CO₂ for pigs should be at least 90 percent, and never less than 80 percent. Lower levels of 70 percent CO₂ were stressful to pigs particularly at induction. Concentration and dwell time in CO₂ must be documented (9CFR313.5). If concentrations are lower, then dwell times must be longer.

Handlers must be careful not to overload the gondolas (elevator boxes) that hold groups of pigs. In a properly loaded gondola, the pigs must have sufficient room to stand without being on top of each other. Handlers must never overload the gondolas by forcing pigs to jump on top of each other. Pigs should not be overcrowded, but gondolas or other conveyances should also not be under-filled.

In the scientific literature, there are conflicting results on how pigs react to the induction of CO₂ anesthesia. Some genetic types of pigs actively attempt to escape from the container when they first sniff the gas and others respond with a calm anesthetic induction. Other research has observed that the reaction of pigs to CO₂ was highly variable. A Dutch researcher found that the excitation phase occurred prior to the onset of unconsciousness. Australian researchers found that being shocked with an electric prod was more aversive (disliked) than inhaling CO₂.

Research in people indicates that genetics affect the aversiveness of CO₂ inhalation. Genetics may be a contributing factor and may require a different gas mixture or other adjustment. Observations in several plants indicate that elimination of the stress (Halothane) gene may reduce problems with stressful anesthetic induction. The gas parameters for each plant should be evaluated by gas concentration and insensibility after stunning. In most systems, the induction phase is not visible but where it is, the gas mixture is not acceptable if the pigs have excessive excitation or escape movements. It is normal to have vigorous kicking and convulsions after the pig falls over.

In evaluating gas stunning, one must look at the entire system, which includes the handling system and the gas mixture. One advantage of gas stunning is that these systems can be designed to eliminate the need for pigs to line up in single file chutes, which is contrary to their natural behavior.

It should be noted that it is important to strive for optimal loading density for pigs in gondolas when CO₂ systems are used. Pigs should not be overcrowded, but gondolas or other conveyances should also not be under-filled. Some automated CO₂ units use powered (automatic) gates. Powered gates may be used to move animals by making contact with them. Powered gates for moving animals must never cause an animal to fall and they should never be used to skid or slide animals.

Roughly 0.019 ft (.001765 sq.m), which is approximately .019 x 265 lbs. average weight, of usable gondola space/lb body weight should approximately determine the maximum number of animals loaded into the gondola at various body weights. This will ensure that pigs can stand without being on top of one another.

For example, for a gondola measuring 9'1.5"x4' wide, a good, approximate target for loading densities would be:

| | |
|------------------|----------|
| 240 lbs and less | = 8 head |
| 240-275 | = 7 head |
| 275-320 | = 6 head |
| 320-385 | = 5 head |

How to Determine Insensibility

In both captive bolt and electrically stunned animals, kicking will occur. Ignore the kicking and look at the head. To put it simply, **THE HEAD MUST BE DEAD**. When cattle are shot with a captive bolt, it is normal to have a spasm for 5 to 15 seconds. After the animal is rolled out of the box or hung up, its eyes should relax and be wide open.

When pigs are stunned using CO₂ to induce surgical anesthesia, some animals may have slow limb movement or gasping. This is permissible. However, there must be no spontaneous eye blinking, righting reflex or response to a painful stimulus applied to the nose.

| Signs of a Properly Stunned Animal by Stunning Method | | | | | | | | | |
|---|--|-------------------|---|---|---|--------------|---|---|---|
| | Head | Tongue | Back | Eyes | Limbs | Vocalization | Respiration | Tail | Response to pain |
| Cattle -- captive bolt | Must appear dead, hang straight and floppy | Straight and limp | Hanging straight, no righting reflex | No natural blinking. Wide open, blank stare, no response to touch; nystagmus absent | Uncoordinated kicking of hind legs acceptable, no righting reflex present | None | Rhythmic breathing (ribs moving in and out at least twice) is absent. Agonal gasping not acceptable. | Relaxes shortly after being on the rail | A pinch or pinprick may be applied to nose only and no response should be observed. |
| Cattle -- electric | Must appear dead, hang straight and floppy | Straight and limp | Hanging straight, no righting reflex | Eyes may vibrate (nystagmus), but no natural blinking | Uncoordinated kicking of hind legs acceptable, no righting reflex present | None | Agonal gasping like a fish out of water normal. Rhythmic breathing (ribs moving in and out at least twice) is absent. | Relaxes shortly after being on the rail | A pinch or pinprick may be applied to nose only and no response should be observed. |
| Pigs -- CO ₂ | Must appear dead, hang straight and floppy | Straight and limp | Hanging straight, no righting reflex | No natural blinking | Uncoordinated kicking of hind legs acceptable, no righting reflex present | None | Agonal gasping like a fish out of water normal. Rhythmic breathing (ribs moving in and out at least twice) absent. | Relaxes shortly after being on the rail | A pinch or pinprick may be applied to nose only and no response should be observed. |
| Pigs -- electric | Must appear dead, hang straight and floppy | Straight and limp | Hanging straight, no righting reflex | Eyes may vibrate (nystagmus), but no natural blinking | Uncoordinated kicking of hind legs acceptable, no righting reflex present | None | Agonal gasping like a fish out of water normal. Rhythmic breathing (ribs moving in and out at least twice) is absent. | Relaxes shortly after being on the rail | A pinch or pinprick may be applied to nose only and no response should be observed. |
| Pigs -- captive bolt | Must appear dead, hang straight and floppy | Straight and limp | Hanging straight, no righting reflex | No natural blinking. Wide open, blank stare, no response to touch; nystagmus absent | Uncoordinated kicking of hind legs acceptable, no righting reflex present | None | Rhythmic breathing (ribs moving in and out at least twice) is absent. Agonal gasping not acceptable. | Relaxes shortly after being on the rail | A pinch or pinprick may be applied to nose only and no response should be observed. |
| Sheep -- electric | Must appear dead, hang straight and floppy | Straight and limp | Due to anatomical differences in sheep, back may not hang completely straight; no righting reflex | Eyes may vibrate (nystagmus), but no natural blinking | Uncoordinated kicking of hind legs acceptable, no righting reflex present | None | Agonal gasping like a fish out of water normal. Rhythmic breathing (ribs moving in and out at least twice) is absent. | Relaxes shortly after being on the rail | A pinch or pinprick may be applied to nose only and no response should be observed. |

To view a larger chart, see page 108

Below are the signs of a properly stunned animal (refer also to adjacent chart).

- The legs may kick, but the head and neck must be loose and floppy like a rag. A normal spasm may cause some neck flexing, generally to the side, but the neck should relax and the head should flop within about 20 seconds. Check eye reflexes if flexing continues. Animals stunned with gas stunning equipment should be completely limp and floppy, though animals may exhibit slow limb movement and gasping. Agonal gasping (like a fish out of water) is a sign of a dying brain when CO₂ and electric stunning are used.
- The tongue should hang out and be straight and limp. A stiff curled tongue is a sign of possible return to sensibility. If the tongue goes in and out, this may be a sign of partial insensibility.
- For all methods of stunning, when cattle and pigs are hung on the rail, their head should hang straight down and their backs must be straight. They must NOT have arched back righting reflex. When a partially sensible animal is hung on the rail it will attempt to lift up its head. Sometimes the head will flop up momentarily when a back leg kicks. This should not be confused with a righting reflex. Due to differences in the anatomy, sheep that are properly stunned and are insensible may not hang with their head straight down. However, the heads should be limp and floppy.
- When captive bolt is used, the eyes should be wide open with a blank stare. There must be no eye movements. Immediately after electrical stunning, the animal will clamp its eyes shut, but they should relax into a blank stare. Agonal gasping like a fish out of water must be absent.
- When captive bolt is used, the animal must NEVER blink or have an eye reflex in response to touch. In electrically stunned pigs, eye movements can be misinterpreted when untrained people indiscriminately poke at the eyes. It is often best to observe without touching the eye. For all stunning methods if the animal blinks with a natural blink where the eye closes and then re-opens, it is not properly stunned. If you are not sure what a natural blink looks like, look at live animals in the yards (lairage) before assessing insensibility.

- If an electrically stunned animal blinks within five seconds after stunning, this is a sign that the amperage is too low. In electrically stunned animals, blinking should be checked within five seconds and after 60 seconds. In most plants, blinking will not be found immediately after stunning because the plant is using the correct amperage. After it has been verified that the amperage is set correctly, the most important time to observe for signs of return to sensibility is 60 seconds after electrical stunning. This provides time for the eyes to relax after the rigid (tonic) and kicking (clonic) phases of the epileptic seizure. Checking for signs of return to sensibility after bleeding ensures that the animal will not recover.
- For all stunning methods, if the animal blinks with a natural blink, it is not properly stunned. If you are not sure what a natural blink looks like, look at live animals in the yards (lairage) before assessing insensibility.
- Rhythmic breathing where the ribs move in and out must be absent. Intermittent gasping like a fish out of water is a sign of a dying brain and is acceptable after electrical or gas stunning. A twitching nose (like a rabbit) may be a sign of partial sensibility. It is important not to confuse gasping with rhythmic breathing.
- In captive bolt-stunned animals, insensibility may be questionable if the eyes are rolled back or they are vibrating (nystagmus). Nystagmus is permissible in electrically stunned animals, especially those stunned with frequencies higher than 50 to 60 cycles.
- Shortly after being hung on the rail, the tail should relax and hang down.
- No response to a nose pinch or a needle prick to the nose. When testing for response to a painful stimulus the pinch or prick must be applied to the nose to avoid confusion with spinal reflexes. Animals entering a scald tub must not make a movement that is in direct response to contact with the hot water. For all types of stunning, this is an indicator of possible return to sensibility.
- No vocalizations (moo, bellow or squeal).

Ensuring Insensibility Following Electric Stunning

Adequate electrical parameters for cardiac arrest stunning cannot be determined by clinical signs, because cardiac arrest masks the clinical signs of a seizure. Measurement of brain function is required to verify any new electrical parameters that may be used in the future. Common causes of a return to sensibility after electric stunning are:

- Wrong position of the electrode
- Amperage that is too low
- Poor bleed out, or
- Poor electrode contact with the animal

Other factors that may contribute to poor electrical stunning are: dirty electrodes, insufficient wetness, electrode contact area that is too small, animal dehydration, dirty animals and long hair or wool. Interrupted contact during the stun may also be a problem. For all species, processing plants with an excessively long stunning to bleed time are more likely to have return to sensibility problems. Electrodes must be cleaned frequently to ensure a good electrical connection. The minimum cleaning schedule should be once a day. For personal safety, the electrode wand must be disconnected from the power supply before cleaning.

Order of the events indicating return to sensibility in head only electrically stunned pigs (In CO₂ stunned pigs, the order of the first two events is reversed):

1. Corneal reflexes in response to touch (not recommended for electric stunning).
2. Return of rhythmic breathing – ribs move in and out at least twice.
3. Spontaneous natural blinking without touching like live animal in the yards.
4. Response to a painful stimulus such as pricking the nose with a pin.

5. Righting reflex and raising the head.
6. Fully conscious and sensible. Complete return to sensibility can occur within 15 to 20 seconds.

Stunning to Bleed Interval

Captive Bolt—Both penetrating and non-penetrating captive bolts are effective. However, non-penetrating bolts will cause less damage to the brain (Finnie et al., 2000). Practical experience has shown that for non-penetrating captive bolts to be effective the aim must be more precise. Animals stunned with a non-penetrating captive bolt should be bled within 20 seconds and there is no maximum stun to bleed interval for penetrating captive bolt (OIE 2008). If it is impossible to bleed the animal in the recommended time frame, the stunned animal may be pithed by inserting a steel rod into the captive bolt hole to destroy additional brain tissue and prevent the return to sensibility.

Electric Cardiac Arrest—Sixty seconds maximum. All large plants are already using less than this interval.

Head Only Reversible Electric—Fifteen seconds is strongly recommended (Blackmore and Newhook, 1981), 30 seconds maximum (Hoenderken, 1983). Scientific research clearly shows that pigs will start returning to sensibility after 30 seconds when stunned by the head only method. When frequencies of greater than 50 to 60 hz are used, these times may need to be shortened. When head only electric stunning is used for cattle or sheep the animal should be bled within 10 seconds. The OIE guideline states that they should be bled within 20 seconds (OIE 2008).

Preventing Bloodsplash (Bloodspots)

Gentle handling prevents damage to small blood vessels caused by excited animals jamming against each other or equipment.

- ✓ Minimize time to bleeding after stunning to minimize meat damage.
- ✓ Electric prod usage should be kept at a minimum.
- ✓ Animals should never be left in the restrainer system during breaks and lunch.

Be sure that one side of a V restrainer does not run faster than the other. This causes stretching of the skin that damages blood vessels.

- ✓ Double stunning should be kept to a minimum.
- ✓ Do not slide the wand on the pig when the wand is energized.
- ✓ The slats on the V restrainer and hold-down rack and chutes should be insulated to prevent current leakage, which can cause bloodsplash.
- ✓ Rapid temperature fluctuations and periods of extremely hot weather can greatly increase the incidence of bloodsplash. In these circumstances, plants should take extra care in handling animals to minimize bloodsplash problems.

Section 5: Religious Slaughter (Kosher and Halal)

Cattle, calves, sheep or other animals that are ritually slaughtered without prior stunning should be restrained in a comfortable upright position. For both humane and safety reasons, plants should install modern upright restraining equipment whenever possible. Shackling and hoisting, shackling and dragging, trip floor boxes and leg clamping boxes should never be used. In a very limited number of glatt Kosher plants in the United States and more commonly in South America and

Europe, restrainers that position animals on their backs are used. For information about these systems and evaluating animal welfare, refer to www.grandin.com (Ritual Slaughter Section).

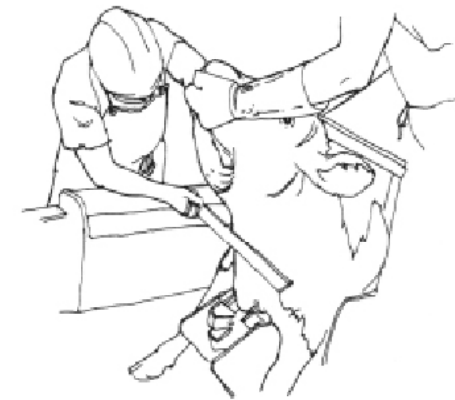
The throat cut should be made immediately after the head is restrained (within 10 seconds). Small animals such as sheep and goats can be held manually by a person during ritual slaughter. Plants that conduct ritual slaughter should use the same scoring procedures except for stunning scoring, which should be omitted in plants that conduct ritual slaughter without stunning.

Cattle vocalization percentages should be five percent or less of the cattle in the crowd pen, lead up chute and restraint device. A slightly higher vocalization percentage is acceptable because the animal must be held longer in the restraint device compared to conventional slaughter. A five percent or less vocalization score can be reasonably achieved. Scoring criteria for electric prod use and slipping on the floor should be the same as for conventional slaughter.

Animals must be completely insensible before any other slaughter procedure is performed (shackling, hoisting, cutting, etc.) If the animal does not become insensible, it should be stunned with a captive bolt gun or other apparatus and designated as non-Kosher or non-Halal.

ASPCA Pen—This device consists of a narrow stall with an opening in the front for the animal's head. After the animal enters the box, it is nudged forward with a pusher gate and a belly lift comes up under the brisket. The head is restrained by a chin lift that holds it still for the throat cut. Vertical travel of the belly lift should be restricted to 28 inches (71.1 cm) so that it does not lift the animal off the floor. The rear pusher gate should be equipped with either a separate pressure regulator or special pilot-operated check valves to allow the operator to control the amount of pressure exerted on the animal. Pilot operated check valves enable the operator to stop the air cylinders that control the apparatus at mid-stroke positions.

The pen should be operated from the rear toward the front.



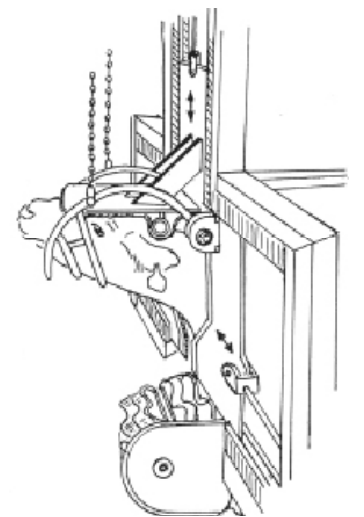
Restrainer system for religious slaughter of calves and sheep

Head restraint is the last step. The operator should avoid sudden jerking of the controls. Many cattle will stand still if the box is slowly closed up around them and less pressure will be required to hold them. Ritual slaughter should be performed immediately after the head is restrained (**within 10 seconds of restraint**).

An ASPCA pen can be easily installed in one weekend with minimum disruption of plant operations. It has a maximum capacity of 100 cattle per hour and it works best at 75 head per hour or less. A small version of this pen could be easily built for calf plants.

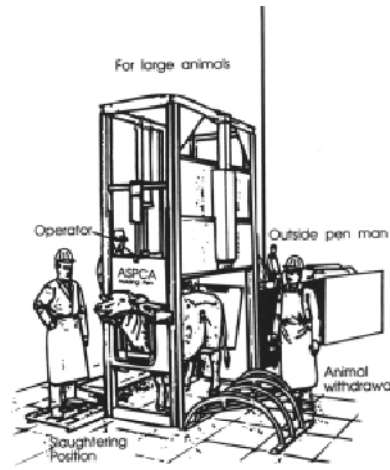
Conveyor Restrainer Systems—Either V restrainer or center track restrainer systems can be used for holding cattle, sheep or calves in an upright position during shehita or Halal slaughter. The restrainer is stopped for each animal and a head holder positions the head for the ritual slaughter official. For cattle, a head holder similar to the front of the ASPCA pen can be used on the center track conveyor restrainer. A bi-parting chin lift is attached to two horizontal sliding doors.

Small Restrainer Systems—For small locker plants that ritually slaughter a few calves or sheep per week, an inexpensive rack constructed from pipe can be used to hold the animal in a manner similar to the center track restrainer. Animals must be allowed to bleed out and become completely insensible before any other slaughter procedure is performed (shackling, hoisting, cutting, etc.).



Center track restrainer being used for ritual slaughter.

Section 6: Recommended Handling of Disabled or Crippled Livestock



ASPCA Pen for religious slaughter of cattle

Aggressive handling can lead to injured, stressed or fatigued livestock. Although non-ambulatory animals (sometimes called “downers, fatigued, slows or subjects”) represent a small fraction of all livestock arriving at packing plants, they are significant because they require special attention in the areas of handling, transporting, holding pens and inspection.

Since December 30, 2003, all non-ambulatory cattle arriving at packing plants are to be condemned. Non-ambulatory pigs may be slaughtered if inspected and passed by a USDA veterinarian.

Non-Ambulatory Cattle

Many incidents of non-ambulatory cattle can be prevented by better management at the dairy or ranch. If non-ambulatory cattle arrive on trucks, offload ambulatory cattle first, taking care not to drive ambulatory cattle over non-ambulatory animals. Non-ambulatory cattle should be stunned with a captive bolt stunner on the truck and disposed of.

Cattle that become non-ambulatory must be euthanized and condemned. If after euthanizing blood gets on the chute, wash it off to prevent balking.

Mounting activity and animal fights can cause injuries that can cause animals to become non-ambulatory. This is a problem especially with bulls and boars. Bulls that are mounting other animals should be placed in separate pens. Mounting by bulls is a common cause of bruises and crippling injuries on cows. Producers need to work to reduce the occurrence of non-ambulatory animals that are caused by either poor management or neglect.



A well-designed cart for moving crippled livestock.

Non-Ambulatory Pigs

There are two basic types of non-ambulatory pigs. The first type is those that are in a poor physical state before leaving the farm, often older breeding stock. Another type is a fatigued pig that becomes non-ambulatory. According to the National Pork Board, a fatigued pig is defined as having temporarily lost the ability to walk, but has a reasonable expectation to recover full locomotion with rest. These animals are often called “NANIs” or “non-ambulatory, non-injured.” Many of these animals can recover and walk independently if given time to rest.

Trucks carrying disabled pigs should unload ambulatory animals first taking care not to compromise the non-ambulatory animals. If a non-ambulatory pig impedes unloading, it should be properly removed before continuing with the unloading process. Ambulatory pigs must not be driven over non-ambulatory pigs. Delayed unloading can cause death losses and downer animals due to extreme temperatures, exposure and stress.

To offload a non-ambulatory pig from a truck, unloaders should use the process that creates as little stress as possible on the animal. Live pigs must never be dropped to the ground from a truck. In some cases, a slide board or cripple cart may be helpful. Animals may be rolled onto a wide piece of conveyor belting that has been stiffened on one end with metal bars to prevent curling when the belting with the animal on it is dragged. The board can then be dragged off the truck and the animal loaded into a suitable mechanical device for transport to an inspection area.

Federal humane slaughter regulations prohibit dragging of downed or crippled livestock in the stockyards, crowd pen or stunning chute. This also includes pushing, pulling and scooting (if the animal is stunned, it may be dragged). By using slideboards, sleds and cripple carts, animals can be transported humanely and efficiently to a pen or other area where they can be examined by an inspector, stunned and moved to slaughter. In order to prevent further injury to non-ambulatory animals by equipment or other animals, minimal movement may be required to roll the animal or slide it onto carts and other devices. The stress of this movement must be weighed against the potential harm to the animal if it is not moved promptly. In pig plants, the stunning chute should be equipped with side doors so that non-ambulatory pigs can be easily removed.

It is important that water and shelter be provided to injured and non-ambulatory livestock. Feed must be provided for any livestock held at a plant for more than 24 hours.

Inspection and Slaughtering Considerations

Cattle that are non-ambulatory must be euthanized and may not be slaughtered for human consumption.

Non-ambulatory or subject pigs are held in a designated location for additional ante-mortem inspection. At that time, they may be passed for inspection, condemned or segregated and slaughtered as U.S. Suspect (9CFR309.2).

Once the USDA inspector has examined the animal, plants should identify the earliest possible point in the production when that animal may be slaughtered “separately.” This separation point should be discussed with the USDA inspector. It should be noted that plants need not always wait until the end of a shift to slaughter a segregated animal. Waiting can prolong a disabled animal’s suffering. Plants and inspectors should cooperate to ensure non-ambulatory pigs are slaughtered as soon as possible after arrival.

At cattle plants, non-ambulatory cattle arriving on trucks should be humanely euthanized on the truck and removed from the truck for disposal. Some cattle may be deemed suspect and yet still be ambulatory. These cattle should be moved to separate pens for examination by USDA inspectors.

3 CHAPTER III: TRANSPORTATION AUDIT GUIDELINES

Introduction

This chapter on transportation of livestock covers the principles of good animal handling practices during the receiving and unloading of livestock at processing facilities for beef, swine and sheep.

Auditor Instructions and Information

This audit is intended to monitor and verify the welfare of animals arriving at meat packing facilities. It is the responsibility of third party auditors to:

1. Arrange with plant management the best time to perform the audit to ensure the plant will be receiving animals and a representative audit sampling can be acquired.
2. Establish with plant management the location of the unloading area and to what areas the audit will be limited. The unloading area parameters would include the trailer holding or staging area, the trailer itself (only when auditing the condition of the trailer or if the trailer meets requirements for the ambient temperature) and the immediate unload area (i.e. up to the exit gate of the unloading alley or to the gating of the first alley off the trailer). Due to design variance between plants, this will need to be established by plant management and respected by the auditor. The balance of the handling and stunning areas will be covered in the facility audit.
3. The auditor must in no way impede the unloading of animals. The auditor must find a place to stand that will not cause the animals to balk and where the auditor will be safe. The auditor must not enter the trailer while the animals are being unloaded.
4. For swine, it is recommended that all auditors participate in the National Pork Board's "Transport Quality Assurance" (TQA™) program or a similar program that covers other species to educate themselves on the current transportation practices and guidelines for that species.
5. There may be core criteria points that will not be applicable to the plant the auditor is auditing. It is the responsibility of the auditor to meet with management and review the core criteria and their applicability before conducting the audit.
6. Some of the core criteria will be dependent on animal type, trailer style, plant design or regional climatic differences. Choose the points that apply to the animal type or trailer being auditing.
7. There are secondary items listed within the core criteria. These items allow for specific comments or observations and are to be noted on the audit sheet, but will not be scored as part of the audit criteria. They are intended to provide a broader understanding of the plant and the transporters.
8. The number of trailers audited will be determined before beginning the audit. The auditor will base the audit results on the trailers that were actually audited, not on trailers they may have observed that were not part of the selected audit sampling. No less than two trailers and no more than five trailers should be audited and scored per audit.

Note: In addition to annual third party audits, weekly internal transportation audits are recommended.

Scoring

Core Criteria 1 applies to the plant only. It is to be scored only once during the audit. The pass or fail for this core criterion is based on the percentage of audit points received out of the total possible.

Core Criteria 2-7 apply to individual trailers only. Each trailer will have an individual score sheet to be used for each load audited. At the end of the audit, the total points for the loads will be added together to obtain the final scoring for each of the core criteria. The average of the trailers scored will serve as the overall score.

Core Criteria 1: Plant transportation policy and preparedness for receiving animals

This Core Criteria audits the plant's animal welfare policies for transportation and preparedness for receiving animals. It is only scored once during an audit. The following are explanations of each of the applicable points to be scored during the audit:

1. **Plant has written animal welfare policy for transporters.** Plants must have a written animal welfare policy for transporters hauling animals to their plants. For transportation of swine, the policy can be an in-house policy, one that strictly references the National Pork Board's TQA™ program, or a combination of both. For other species, an in-house policy, a recognized species-specific program, or a combination of the two can be used.
2. **Plant provides extreme temperature management tools (water, fans, etc.).** For swine, one of these environmental management tools must be available to transporters to assist in alleviating heat-related welfare problems pigs can encounter in transport during extreme temperatures. A plant can provide water to mist a trailer; however, in cases of high relative humidity additional mist or water can actually further increase the humidity within the trailer. The plant may also provide fans that blow air through the trailers or they may have a policy in place that keeps the trailers moving if it is unable to unload the trailers promptly.

When cattle and sheep are stressed in extreme heat conditions, they are more likely to become non-ambulatory, sick and *even die*. Temperatures of 100° F (37.8° C) or higher pose a significant risk to stressed cattle. If cattle must be hauled at times of high temperatures and humidity, all precautions should be taken to avoid having to stop. Cold weather can also be stressful to cattle. Freezing rain is especially dangerous and cattle and sheep should be protected from the wind (Transport Beef Quality Assurance Program).

If sheep must be hauled at times of high temperatures, air movement, dampened bedding and other such management tools are methods by which stress can be reduced during transportation. If the truck and trailer must stop for more than just a few minutes, the vehicle should be parked in an area where shade and natural ventilation are sufficient to prevent animals from overheating (Sheep Care Guide, American Sheep Industry Association). Cold weather can also be stressful to sheep and just like with heat, the trailer should be stationary for only a short period of time and the sheep protected from the wind.

The tools provided may vary depending on the infrastructure and geographical location of the plant, the current weather conditions, and the species.

3. **Have arrival management process that minimizes waiting time at the plant.** Plants should have a policy in place that will assist in minimizing waiting times at plant. A scheduling system that allows a specific number of loads to arrive at a given time period works for most plants. Plants should have the lairage space and personnel to meet the requirements of the loads they are accepting.
4. **Emergency plans in place for animals in transit.** Plants should provide written policy that outlines their company plan or policy for loaded trailers in transit that may be involved in but not limited to: accidents, mechanical breakdowns, plant shutdowns, or traffic delays. This policy may include, but not be limited to: radio/call trucks to keep moving until requested by plant to arrive, request trucks to park where animals can be kept comfortable, or request crews to postpone loading of animals on farm.
5. **Written policy for immobile* and fatigued** animals and tools available for handling.** The plant must have a written policy for the handling of immobile and fatigued animals on trailers. They must also provide equipment for employees or transporters to humanely handle both immobile and fatigued animals. This equipment can include, but not be limited to sleds, stretchers, hand carts and mechanized equipment.



Sled

* Immobile pigs are pigs that refuse to get up, are unable to stand unaided and are unable to bear weight on two of its legs (Source: National Pork Board).

** Fatigued pigs are pigs that have temporarily lost the ability or the desire to walk but have a reasonable expectation to recover full locomotion with rest (Source: National Pork Board).

6. **Acceptable handling tools available and utilized as needed.** The plant must have handling tools available for plant staff and may have available handling tools for transporters to assist in unloading of livestock. As part of internal training, plants should have a procedure on the proper use of handling tools. These tools may include, but not be limited to, rattle paddles, sort boards, witches capes, or nylon flags. A handling tool should never be used in any manner other than the normal intended use of the tool. Electric prods should be a tool of last resort used only when absolutely necessary. Handlers should not be constantly carrying prods. The electric prod should be picked up only when necessary and then put away. Tools cannot have parts that may directly injure the animal in any way. This includes but is not limited to sharp ends or edges that will harm the animal.

For sheep, some plants may use “lead” animals which include other sheep or goats as an animal handling tool. These animals are trained to go on the trailer and lead the other sheep off. Electric prods are ineffective on sheep as the wool insulates the shock of a properly applied prod. This lack of response could lead handlers to prod animals in sensitive areas such as the anus or vulva which is considered a willful act of abuse. Additionally, the application of the electric prod can cause damage to the pelt. Current international animal welfare guidelines recommend that electric prods not be used in sheep. As a result, electric prods should be a tool of last resort and used only when absolutely necessary.



Sort Board



Rattle Paddle



Witch's Cape



Nylon Flag



Lead Sheep

7. **Availability of acceptable euthanasia tools.** Euthanasia tools acceptable for pigs include captive bolt guns, electric stunning systems, firearms, CO₂, or barbiturates. Captive bolt guns, firearms, or barbiturates are acceptable for cattle and sheep. One of these appropriate euthanasia tools an employee trained on the use of these tools must be available at all times when livestock are being received.

8. **Maintenance records for euthanasia equipment, proper storage and employee training for euthanasia.** Captive bolt guns must be cleaned each day but only on days of use. Cleaning frequency and preventative maintenance should be per the manufacturer’s recommendations and instructions. However, days of non-use do not require cleaning. The equipment and ammunition must be stored in a dry place. Employees must be trained in the company’s euthanasia policy and the application of the mode of euthanasia. Documentation of cleaning, maintenance and training must be provided.

9. **Gates in unloading area swing freely, latch securely and have no sharp protrusions.** Gates should have smooth edges to prevent bruising. There should be no protruding parts on the gates that may directly injure the livestock in any way. Gates should swing freely and latch securely to keep animals in the pen. Gates should never be slammed shut on an animal passing through it.

10. **Non-slip flooring.** Examples of non-slip flooring include textured concrete, grooving and rubber mats. The unloading area should have non-slip flooring to allow the livestock to maintain good footing and to prevent slipping and falling.

11. **Unloading area and ramps in good repair (e.g. no broken cleats, holes or gaps).** The unloading area should be properly maintained and in good repair. There should be no broken cleats, holes, or gaps where livestock can get stuck or be directly injured. The ramp and the unloading area must also be clean enough (avoid excess manure, bedding, etc.) to prevent slips and falls. In winter weather conditions, the unloading area must be free of ice. The unloading area should have no sharp edges that can injure the animals.

12. **Adequate lighting.** The lighting in the unloading area should help facilitate movement of the animals. Inadequate, excessively bright and/or uneven lighting can impede the unloading and movement of animals. The unloading area must have lighting if plant does nighttime unloading.

13. **Staff available for receiving animals.** Plant staff should be available to receive animals during normal plant receiving hours. If transporters are scheduled to arrive after normal hours of operation, a plant employee should be available by phone to assist transporters if necessary. The after hours contact number should be made available to the transporters.

SCORING:

- Excellent** – 13 of the criteria met
- Acceptable** – 11 or 12 of the criteria met
- Not Acceptable** – 8 to 10 of the criteria met
- Serious Problem** – 7 or fewer of the criteria met

Transporter Audit

Trailer Number

In this space you can enter the sequence number of the trailers audited or the truck number if applicable.

Total Number of Livestock on Board

This is the total number of animals on the trailer being audited. This number can be obtained from the plant staff or transporter. Once this number is obtained there is no need to count the animals as they come off the trailer.

Types of Trailers



Straight Trailer



Pot Belly/Drop Center Trailer



Farm/Livestock Trailer

If transporting swine, has the driver completed the National Pork Board's TQA™ program?

This area is to note whether a driver is currently certified in National Pork Board's TQA™ training program.

Core Criteria 2: Set-up and Loading of Trailer

Compartments gated – for swine only

In a standard commercial swine trailer, all gates should be closed to segregate compartments. There may be trailers with special sectional gating or freight gating where closure of all gates will not be required or even possible. If there are questions regarding the type of gating in the trailer, please discuss with the driver.

If the auditor is unable to see if all the gates are closed, obtain the information from the driver or from the plant staff that are unloading the trailer. If all the gates are not closed, note the reason on the audit form (i.e. broken gate).

Trailer Loaded at Proper Density

The auditor may visually observe the trailer. Signs of overcrowding for pigs may include: piling, excessive squealing, panting or open mouth breathing. Signs of overcrowding for cattle and sheep may include: vocalization, animals not settled or animals standing on each other. With the gates closed, the livestock must have enough room to stand without climbing on top of each other. When there is a question about overcrowding, please reference the transport space recommendations in this guide.

Incompatible animals segregated when required?

This prevents the more aggressive animals from injuring other animals in the trailer. Examples of appropriate segregation include keeping aggressive, intact males from females and significantly larger animals from smaller ones. Animals that are fit for transport, but may be weak or compromised, should be loaded on the back of the trailer so they do not have to travel as far to load and unload from the trailer.

SCORING:

For swine, each of the three criteria (gating, loading density, and animal segregation) are worth 1 point each, for a total of 3 points for this core criteria. For cattle and sheep, each of the two criteria (loading density and animal segregation) are worth 1 point each, for a total of 2 points for this core criteria. The totals for all trailers audited will be added up at the end of the audit to determine final score.

Excellent – 95% or greater of trailers set up and loaded properly.

Acceptable – 90 to 94.9% of trailers set up and loaded properly.

Not Acceptable – 85 to 89.9% of trailers set up and loaded properly.

Serious Problem – less than 85% of trailers set up and loaded properly.

Example: 5 swine trailers were audited for a possible total of 15 points. (5 trailers x 3 pts each)

#1 – 3 pts

#2 – 3 pts

#3 – 3 pts

#4 – 2 pts

#5 – 3 pts

Total = 14 pts

14/15 = 0.93 or 93%

Core Criteria 3: Timeliness of Arrival of the Truck and Trailers and Animal Unloading

The timely arrival and prompt unloading of livestock is crucial to animal welfare. The risk to the welfare of the animals is even greater during extreme temperatures. Ideally, unloading will begin within a half hour of arrival and all animals will be completely unloaded within an hour.

The plant, producer, transporter and load-out crew all have responsibilities in the timeliness of unloading. Some plants schedule the arrival of trailers for unloading to ensure a steady flow of livestock arriving at the plant and to prevent back-ups. The scheduler normally gives the transporters a window of time for arrival. For example, some may schedule within an hour window (i.e. arrive between 3pm and 4pm), while other plants may provide a bigger window for arrival (i.e. arrive between 12pm and 3pm). Some plants may instruct the driver to load at a specific time on the farm so that they can estimate the time of arrival based on average loading time and distance to plant. There may be circumstances where trucks are delayed due to road closures, power outages, bad weather, or poor road conditions. Some animals load on the farm with more difficulty than others. There may be a delay in the delivery of these animals to insure proper loading is accomplished at the farm.

There are many variables in the delivery of livestock to an establishment. In some cases, even with a good scheduling program, there can be several trailers arriving at the same time, which results in a delay of the unloading. These reasons may include inclement weather, the arrival of several trailers at one time, slow down or shut down of plant production, lairage at capacity, unavailability of receiving staff, arrival of trailer before or after receiving hours or difficulty unloading livestock. If there is a delay in unloading, the auditor should note what caused the delay.

Transporters also have a responsibility in ensuring the timeliness of unloading. Drivers should do their best to arrive during their scheduled times – arriving early or late can lead to a delay in the unloading of the trailer or those who are arriving on time. If a driver is loading at a farm or auction with other transporters, the driver should practice “load and leave.” This means the driver should leave immediately after the loading of the trailer occurs. When scheduling trailers, the plants count on the driver to depart immediately following loading. This allows the trailers to arrive in staggered intervals versus all at once. If a transporter is going to be late, it is their responsibility to call the plant and notify them of their new estimated time of arrival. If it appears that the driver will be arriving more than an hour before or after their scheduled time, they should call the plant to notify them of their new estimated time of arrival. There may be circumstances where livestock are held on trailers at an off-site location to prevent a backup of trailers at the plant. Though this practice may be implemented occasionally, it is discouraged, especially during extreme weather conditions.

SCORING:

For scoring the unloading process at the plant, the time begins as soon as the trailer arrives at the plant premises and stops when the first animal walks off the trailer. The plant will receive the full 4 points if unloading of the trailer is started within 60 minutes of its arrival at the plant. Points will then be deducted for each 30 minutes past the 60 minutes it takes to start unloading. Actual arrival time and time to unload (from when the first animal steps off the trailer until the last animal walks off) will be noted separately as secondary items.

Pigs should be unloaded within 60 minutes, especially under extreme hot or cold weather conditions and at plants where there are no weather mitigation systems such as fan banks, sprinkler systems, or shades available. For cattle and sheep, animals should be unloaded within 60 minutes when the Livestock Weather Safety Index enters the Danger Zone. At other times, they should be unloaded within two hours.

Plant begins unloading within:

| | |
|--------------------------------|-------------------|
| 60 minutes of arrival | Full 4 points |
| 61 – 90 minutes | 3 out of 4 points |
| 91 – 120 minutes | 2 out of 4 points |
| ≥ 120 minutes (with reason) | 1 out of 4 points |
| ≥ 120 minutes (without reason) | 0 out of 4 points |

The totals for all trailers audited will be added up at the end of the audit to determine final score.

Excellent – 95% or greater of trailers unloaded properly.

Acceptable – 90 to 94.9% of trailers unloaded properly.

Not Acceptable – 85 to 89.9% of trailers unloaded properly.

Serious Problem – less than 85% of trailers unloaded properly.

Example: 5 trailers audited at a plant. 20 possible points (5 trailers x 4).

#1 – 4 pts
#2 – 4 pts
#3 – 3 pts
#4 – 4 pts
#5 – 3 pts

Total = 18 pts 18/20 = 0.9 or 90%

Secondary Item: Arrival of trailer to plant

The time at which the trailer arrives on plant premises is the official time of arrival. Please record the arrival time of the trailer.

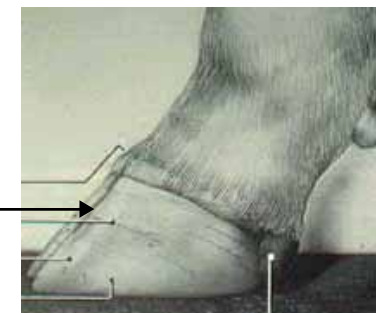
Secondary Item: Amount of time it took to unload the trailer once unloading began

Please record the actual time it took to unload the animals. This will assist in providing a broader understanding of the unloading process. Timing begins from when the first animal steps off the trailer until the last animal walks off.

Core Criteria 4: Condition of Trailer

In order for animals to travel and unload under optimum welfare conditions, the trailer must be properly maintained, in road-worthy condition and prepared for the climatic conditions of the journey. Each of these criteria can be visibly verified during the unloading process and are worth one point each. The audit provides criteria for both commercial trailers and farm trailers. The auditor will only use the criteria points that are applicable to that type of trailer.

- Trailer properly aligned with the unloading area.** As the transporter backs up they must be properly aligned with the unloading ramp/dock. Driver should realign the trailer prior to unloading if it is not aligned properly. Some plants will utilize transfer mats or flippers to cover gaps. There must be no gaps between the dock/ramp and the bottom of the trailer exit. There must be no gaps between the back end of the trailer and the side walls of the unloading area where livestock can get stuck.
- Non-slip, solid flooring.** The trailer must be outfitted with non-slip flooring to minimize slips and falls of the animals. Examples of non-slip flooring would include, but not limited to, rubber mats, stamped tread, sand, shavings, steel reinforcement rods, etc. There must be no holes in the flooring or items that can cause an animal to trip. With stamped tread, the tread should provide non-slip flooring.
- Gates and doors open freely and can be secured shut.** All gates and roller doors on trailers should open and close freely. They must be able to be safely secured shut and not have gaps or spaces where livestock can get their heads or legs stuck.
- Internal ramps function properly and extend all the way to the floor.** Internal ramps must be able to be lowered down easily and secured into place when not in use. They must reach all the way to the floor of the trailer and set level unless they are aligning with an adjustable chute. They must have non-slip flooring or steps and no holes or gaps where the animals can get stuck or injured.
- No sharp or protruding objects that can injure the animals.** There can be no sharp or protruding objects on the trailer that may injure the livestock. This includes on gates, pass through areas, trailer walls, the floor or ramps - anywhere that the animal may come in contact with the object.



Manure should not exceed the height of the hoof of the cattle where the hoof meets the hairline (coronary band).

6. Bedding in the trailer for insulation and to prevent slipping. Since pigs lie down during transportation, bedding is provided to absorb excess urine, manure, and to prevent standing liquid. Bedding provides warmth in cold weather insulating the pigs from potential frostbite and the metal from the trailer. Typically, cattle and sheep do not lie down during transportation so there is no bedding requirement. However, ideally standing manure should be kept at a minimal level to prevent falling, utilizing the height of the hoof where the hoof meets the hairline (see picture) as a guideline. If the height of the manure is above the hoof hairline, monitor cattle as they move to observe for any falling (there should not be any falling).

Each plant should have bedding requirements as part of their plant's animal welfare transportation policy. This allows for the climatic differences within each region to be recognized. Since determining the exact amount of bedding in the trailer is difficult from an auditing prospective, this item is worth one point if bedding is present in the trailer (swine only). After swine have trampled bedding, it is almost impossible to accurately measure bedding amounts or depth at the plant. Bedding amounts can be easily measured at the farm before the swine are loaded. (For pigs, Reference Trailer Set-Up Procedures During Temperature Extremes in Chapter 1 of plant audit).

- Winter side slats or plugs are in place at recommended levels.** Each plant should have winter protection requirements as part of their plant's animal welfare transportation policy. This policy allows for the climatic differences within all regions to be recognized. (For pigs, Reference Trailer Set-Up Procedures During Temperature Extremes in Chapter 1).

SCORING:

Each criterion is worth one point for a total of 7 possible points per trailer. Scores for all the trailers audited will be added together for a final audit score.

Excellent – 95% or greater of trailers audited are in proper condition.

Acceptable – 90 to 94.9% of trailers audited are in proper condition.

Not Acceptable – 85 to 89.9% of trailers audited are in proper condition.

Serious Problem – less than 85% of trailers audited are in proper condition.

Example: 5 trailers are audited. 35 points possible (5 trailers x 7 pts)

Trailer #1 6 pts

Trailer #2 7 pts

Trailer #3 7 pts

Trailer #4 5 pts

Trailer #5 7 pts

Total points = 32 pts 32/35 = 0.91 or 91%

Core Criteria 5: Falls

Falls are to be scored in the unloading area only after all four of the animal's limbs are on the unloading ramp or dock. Slips will be scored as a secondary criterion and tallied under this core criterion. Please refer to **Chapter 4, Core Criteria 3** for additional information and a scoring guide for falls. Additional secondary criteria for the transportation audit are below and should be noted on the audit form accordingly.

Secondary Item: Temperament of the livestock (Normal Moving or Difficult to Move)

Temperament of the livestock can be noted in this area to assist in providing additional information on the unloading of the livestock. Animals can have a desire to get off the trailer without any persuasion. If there is a high incidence of slips or falls and the animals are noted as excitable, then a temperament problem is the likely reason for the slips and falls. If there is a high incidence of slips and falls and the animals are noted as being docile, it is more likely that poor footing is the problem.

Secondary Item: Did the person doing the unloading do so quietly and calmly? (Yes or No)

This allows the auditor to note the behavior of the handler during the unloading process. If, during the unloading process, the handler excessively yells or screams, bangs on the trailer, or appears to be rough and impatient during handling this should be noted. These comments may assist in explaining excessive slips and falls and helps note the attitude of the handler.

Core Criteria 6: Electric Prod Use

Electric prod use is to be scored in the unloading area only after all four of the animal's limbs are on the unloading ramp or dock. Touching an animal with a prod is scored whether the prod is energized or not. Please refer to **Chapter 4, Core Criteria 5** for additional information and a scoring guide for electric prod use. Additional secondary criteria for the transportation audit are below and should be noted on the audit form accordingly.

Secondary Item: Does the plant have a “No Electric Prod Use” policy posted? (Yes or No)

Plants will all have an individual policy on electric prod use. Note here if the plant has a policy posted for no electric prod use in the unloading area.

Secondary Item: Do the people unloading have an electric prod in their hands? (Yes or No)

Note here whether the person(s) doing the unloading are carrying electric prods in their hands. There may be situations where the plant has a “no electric prod use policy” posted, but a driver chooses to use their own electric prod. The auditor should describe clearly what the driver and animal handling personnel are doing.

Secondary Item: Did the driver use the electric prods on the livestock in the trailer, through the sides or roof of the trailer? (Yes or No)

During unloading, you may observe a driver using an electric prod inside the trailer, placing an electric prod through the side slats or punch holes of a trailer or from the roof hatches to encourage the movement of the livestock out of the trailer. Since it is very difficult to judge exactly which animals and how many of them are being prodded, it can only be noted as a secondary item, but usage should be noted. It is important to note this to provide a complete report of the unloading process.

Secondary Item: Were rattle paddles, sort boards, flags, or other handling tools used incorrectly? (Yes or No)

See Core Criteria 1 for acceptable handling tools. These are tools designed to assist in unloading and moving of animals. Incorrect use of handling tools may include, but is not limited to, striking the animal with the tool (a strike is when the hand of the handler rises above their shoulders), or hitting the animal or abusing the animal with malicious intent.

Core Criteria 7: Condition of Animal

Fitness for transport is one of the biggest welfare issues during transport. An animal must be fit enough to endure the normal stress of transport. Animals that are compromised are more likely to become fatigued, injured, immobile, or die during transport. Other factors that may affect fitness during transport include weather, trailer condition, other animals, driver skill, genetics, footing and length of journey. Compromised animals are scored in this core criterion.

Compromised Animals - Animals will be observed during unloading for fitness. Animals considered compromised are defined below. Tally compromised animals in the column provided on the audit sheet. An animal can only be counted once as compromised.

Non-Ambulatory Pigs, Cattle, and Sheep – Non-ambulatory pigs are pigs that refuse to get up, are unable to stand unaided and are unable to bear weight on two of its legs (Source: National Pork Board). All animals that are not able to walk will be scored as non-ambulatory.

Severe Injuries in Pigs, Cattle and Sheep – Examples of severe injuries for pigs include broken legs, bleeding gashes or deep, visible cuts, prolapses (larger than a baseball or dark in color and necrotic), and body pressure sores. For cattle and sheep severe injuries include broken legs, bleeding gashes or deep, visible cuts, prolapses and severe cancer eye. For sheep, be sure to exclude superficial shearing cuts that go no deeper than the skin layer.

Fatigued Pigs/Heat Stressed Cattle and Sheep – Fatigued pigs are pigs that have temporarily lost the ability or the desire to walk but have a reasonable expectation to recover full locomotion with rest (Source: National Pork Board). Cattle and sheep experiencing heat stress will make exhibit open-mouthed panting and may be reluctant to move.

Frostbite (SWINE ONLY) – Visible signs of frostbite include purple/dark pink patches on the skin which is especially apparent on light colored pigs will be scored. This may occur during extreme cold temperatures (see Weather Safety Index).

Calving or lambing (CATTLE AND SHEEP ONLY) – Animals that have or are in the process of delivering on the trailer.

SCORING:

All compromised animals are tallied together for all loads. The total is then divided by the total number of animals audited.

SWINE:

Excellent – Less than 1% compromised animals on the trailer at arrival.

Acceptable – 1 to 2.9% compromised animals on the trailer at arrival.

Not Acceptable – 3 to 4% compromised animals on the trailer at arrival.

Serious Problem – greater than 4% compromised animals on the trailer at arrival.

CATTLE/SHEEP:

Excellent – Less than 1% compromised animals on the trailer at arrival.

Acceptable – 1 to 1.9% compromised animals on the trailer at arrival.

Not Acceptable – 2 to 3% compromised animals on the trailer at arrival.

Serious Problem – greater than 3% compromised animals on the trailer at arrival.

Swine Example: 5 trailers are audited. 925 total pigs audited on all 5 trailers.

| | <i>Compromised</i> |
|-------------------|-------------------------------------|
| <i>Trailer #1</i> | <i>3 pigs</i> |
| <i>Trailer #2</i> | <i>1 pigs</i> |
| <i>Trailer #3</i> | <i>6 pigs</i> |
| <i>Trailer #4</i> | <i>2 pigs</i> |
| <i>Trailer #5</i> | <i>4 pigs</i> |
| Totals | 16 pigs $16/925 = 0.017$ or 1.7% |

Secondary Item: Number of dead animals on the trailer.

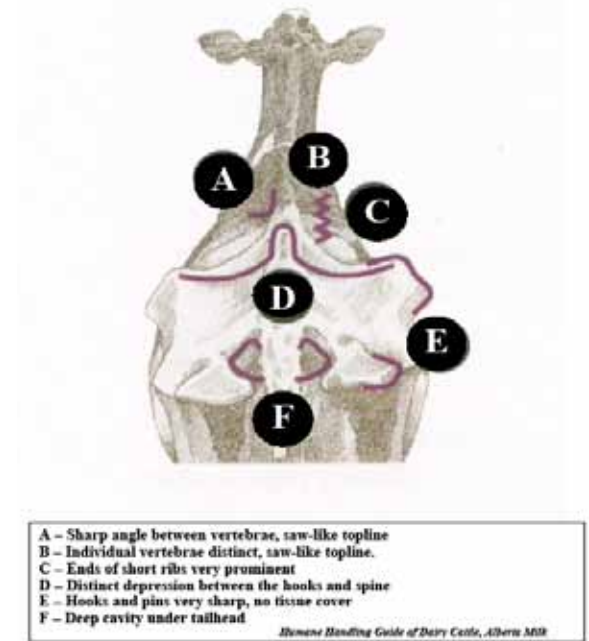
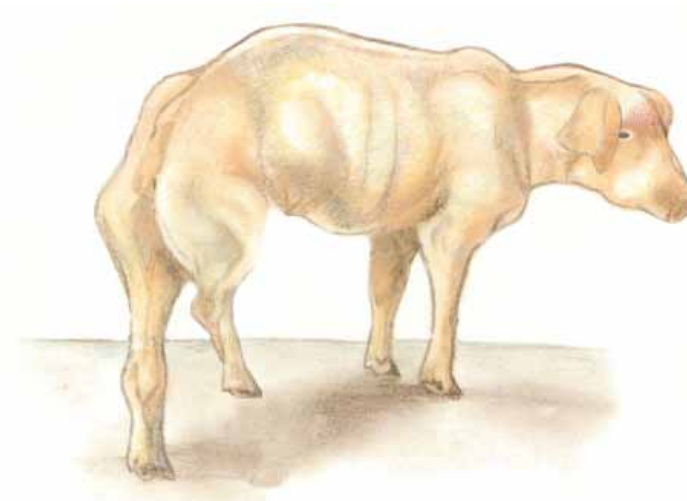
Dead on Arrivals (DOAs) are animals that are dead on the trailer. This does not include animals that are euthanized after arrival at the plant. Animals that require euthanasia would be classified as compromised. DOAs will be tallied here and noted on the final audit report, but not scored.

Secondary Item: Does the plant have a method for communicating back to the site of trailer loading?

Infrequently, trailers arrive at plants containing excessive number of DOAs or animals in other such compromised situations. Plants should have a practice of communicating these issues back to the producer or site of loading so they can make corrections or address issues with the truck driver. If such conditions occur, please note this on the audit form.

Secondary Item: Were any of the animals unloaded considered emaciated or in poor body condition?

This secondary item is specific for plants receiving cull animals. Emaciated pigs will be extremely narrow in the loin, have a hollow flank area, their ribs and backbones that can be easily seen. Cattle in poor body condition will be extremely thin and emaciated; their ribs and backbones can be easily seen. The severely thin attributes of these animals compromise their mobility, cause severe weakness and lead to debilitation. These animals will be tallied here and noted on final audit report but not scored.



Secondary Item: Did any of the cattle have poor udder conditions?

This secondary item is specific for plants receiving cull cattle (dairy and beef). Poor udder condition is defined as udders that descend more than 3 inches (7.6 cm) below the hock, significantly push out against the rear legs causing difficulty of movement and highly distended udders which cause obvious pain/distress to the cow. Cows with poor udder conditions will be tallied here and noted on final audit report but not scored.



8. Willful Acts of Abuse

Any willful act of abuse is grounds for automatic audit failure. Willful acts of abuse include, but are not limited to: 1) Dragging a conscious, non-ambulatory animal; 2) intentionally applying prods to sensitive parts of the animal such as the eyes, ears, nose, anus or testicles; 3) deliberate slamming of gates on livestock; 4) malicious driving of ambulatory livestock on top of one another either manually or with direct contact with motorized equipment. This excludes loading a non-ambulatory animal for transport.; 5) hitting or beating an animal; or 6) live animals frozen to the floor or sides of the trailer. In sheep operations, lifting an animal by the wool or throwing a sheep also is an act of abuse.

4 CHAPTER IV: AUDITING ANIMAL HANDLING AND STUNNING

“You manage what you measure.” That is certainly true when it comes to assuring optimal animal welfare. A number of objective criteria can be used to measure animal welfare in packing plants. By measuring welfare indicators regularly, problems can be detected and continuous improvement achieved.

This chapter details the objective criteria to use in evaluating livestock humane handling in meat plants. The AMIF recommends conducting audits at least weekly and varying those audit days and times during shifts to assess the role that employee experience, behavior and fatigue may play in animal handling and stunning.

AMIF is committed to an audit program that is simple to conduct. Audits that are easy to understand and execute are more likely to be conducted with greater frequency and fewer errors. Each of AMIF’s objective criteria is designed to measure a multitude of potential issues. For example, counting slips and falls can assess whether a ramp is too steep, whether animals are being driven too aggressively and whether a floor may be too slippery and need re-grooving. Measuring vocalization levels will indicate if prods are being overused, if restrainers are too small for livestock, and a host of other issues. Each of these individual items need not be evaluated on audits if the core criteria scores are within the target range, but notes may be taken to indicate which factors may have contributed to the score.

If a score falls below the acceptable range specified in these guidelines, plant management should take steps to correct the problem. The results of the “1996 Survey of Stunning and Handling in Federally Inspected Beef, Pork, Veal and Sheep Slaughter Plants” (sponsored by USDA’s Animal and Plant Health Inspection Service) indicated that the recommended minimum acceptable levels specified in this guide are reasonably achievable. Additional data collected during audits of beef and pork plants have further verified that the minimum standards are attainable.

This chapter includes the AMIF transporation, pig, cattle, and sheep slaughter audit forms that can be used as part of a corporate animal welfare program.

Core Criteria 1: Effective Stunning

Effective Captive Bolt Stunning of Cattle

When evaluating the effectiveness of captive bolt stunning, the auditor monitors whether or not an animal is rendered insensible with a single shot.

Score a minimum of 100 animals in large plants and 50 in plants that process 50 to 99 per hour. In very small plants, which process less than 50 animals per hour, score one hour of production. For a more accurate assessment in small plants, data collected over a period of time should be averaged.

Excellent – 99 to 100 percent instantly rendered insensible with one shot

Acceptable – 95 to 98 percent instantly rendered insensible with one shot

Not Acceptable – 90 to 94 percent instantly rendered insensible with one shot

Serious Problem – less than 90 percent instantly rendered insensible with one shot

If one-shot efficacy falls below 95 percent, immediate action must be taken to improve the percentage. Note that shots in the air where the animal is not touched do not count as missed shots. If the stunner bolt makes any visible mark or injury on the animal, a missed shot is counted. Touching with the outer housing that surrounds the bolt does not count as a missed shot. Some plants routinely shoot animals twice to insure insensibility. In this situation, the auditor must examine the animal for return to sensibility before the second shot is applied. This is necessary to insure that the stunner is capable of rendering 95 percent or more of the animals insensible with a single shot.

Effective Electrical Stunning of Pigs and Sheep

When evaluating effective electrical stunning, the auditor monitors the correct placement of stunning wands and tongs. If head only stunning is used, the tongs must be placed so that the current passes through the brain. Tongs may be placed on both sides of the head or one tong on the top and the other on the bottom of the head. Another scientifically verified location for head only stunning with a stunner with two fixed prongs is to place the prongs on either the hollow behind both ears or on the forehead. Stunning tongs or wands must never be placed on the neck because the current will bypass the brain.

For cardiac arrest stunning of pigs and sheep with a single stunning current, one electrode must be placed on the body and the other one must be placed either on the forehead, side of the head, top of the head, or in the hollow behind the ear. The head electrode must never be placed on the neck because this would cause the current to bypass the brain. Electrodes must not be applied to sensitive areas such as inside the ear or in the eye or anus. Electrodes must be placed firmly against the animal because breaking electrical contact during the stun may reduce the effectiveness of the stun. In addition, it is essential that electrodes be fully energized only after they are in full and firm contact with animals. If electrodes are energized and then applied, animals will squeal. This is called “hot wandling.” No more than one percent of animals should vocalize due to hot wandling. Hot wandling should not be measured for sheep because they do not vocalize when they are hurt.

Score a minimum of 100 pigs or sheep in large plants that process more than 100 animals per hour and 50 in plants that process 50 to 99 per hour. In very small plants score one hour production. Use the whole numbers for 100 and 50 animal audits. For data collection on large numbers of animals, the fractional percentages can also be used.

| Effective Electrical Stunning of Pigs and Sheep | | |
|---|--|---|
| Rating | Placement Criteria | Vocalization due to placement of energized wand |
| Excellent | 99.5 to 100 percent correct placement | No vocalization |
| Acceptable | 99.4 percent to 99 percent correct placement | 1 percent or less |
| Not Acceptable | 98 to 96 percent correct placement | 2-3 percent |
| Serious Problem | Less than 96 percent correct placement | more than 4 percent |

CO₂ Stunning of Pigs

The efficacy of CO₂ and other types of gas stunning methods is determined when insensibility is scored. The core criterion is that the animal remains insensible after exiting the chamber. However, the gondola or other conveyance for moving animals into the gas system must also be evaluated for animal handling. The gondolas, elevator boxes or other apparatus used for moving the animals in and out of the gas must not be overloaded.

Score 50 gondolas in large plants that process more than 500 pigs per hour per CO₂ machine to determine the percentage of gondolas (elevator boxes) that are overloaded. In small plants score 25 gondolas. A gondola or elevator is to be scored as overloaded if there is not sufficient space for the animals to stand or lie down without being on top of each other. Score on a per gondola basis:

Excellent – No gondolas are overloaded on a 50 gondola audit

Acceptable – Four percent or less of gondolas are overloaded

Not Acceptable – More than four percent are overloaded

Serious Problem – The person moving the animals forces one or more pigs to jump on top of the other pigs in the gondolas with an electric prod or by hitting, shoving or kicking.

For gas systems where the animals ride head to tail on a continuous conveyor that does not have separate animal compartments, do not use this scoring system. Omit this score and score the percentage of animals prodded with an electric prod. Electric prod scoring is discussed in another section of these guidelines.

Stunning to Bleed Interval

This parameter does not have to be measured for welfare reasons unless non-penetrating captive bolt or head only reversible electric stunning is used. To avoid return to sensibility, animals stunned with a non-penetrating captive bolt should be bled promptly, but no longer than 20 seconds after stunning.

Core Criteria 2: Bleed Rail Insensibility

Properly stunned animals should not display signs of sensibility hanging on the bleed rail. Auditors should monitor a minimum of 100 animals in large plants and look for signs of partial sensibility, like eye reflexes, nose twitches or the righting reflex. When a 100 animal audit is performed, 100 percent must be rendered insensible. There is a zero tolerance for beginning any slaughter procedure such as skinning the head, leg removal or scalding on an animal that shows any sign of return to sensibility. It must be immediately re-stunned.

The signs of returning to sensibility for all types of stunning are: 1) rhythmic breathing (score if the ribs moved in and out at least twice), 2) vocalizations while hanging on the bleed rail, 3) a stiff, curled tongue; 4) eye blinking like a live animal in the yards; 5) arched back righting reflex with the head bent straight back; and 6) response to a pin prick on the nose. Apply to nose only. Any one or combination of these signs represents a sensible animal. Animals will sometimes have a sideways neck flexion that relaxed in a few seconds. This must not be confused with a righting reflex.

All species should have a limp, floppy head. Cattle and pigs should hang straight on the rail and have a floppy head. Sheep may hang with a raised head due to differences in anatomy, but their heads must be floppy. A head that flops upward for a brief moment when the legs kick should not be confused with a righting reflex in which an animal is clearly trying to remove itself from the rail. Uncoordinated limb movements should be ignored. If the tongue is hanging straight out and is limp and soft, the animal is definitely insensible. Gasping like a fish out of water is a sign of a dying brain and should be ignored. However, twitching noses, or the tongue moving in and out, are signs of a possible return to sensibility.

Touching the eye and observing the corneal reflex is a good method for determining insensibility in animals stunned with captive bolt. Touching an electrically stunned pig's eye may cause it to pop open suddenly, which may be misinterpreted as a blink. The person scoring insensibility should look for spontaneous, natural blinks. A pig that blinks spontaneously would be scored as sensible. Nystagmus, or vibrating eyelids, is a sign of a poor stun in captive bolt stunned animals. However, in electrically stunned animals, it is permissible to have some animals with vibrating lids or eyes.

While no sensible animal should be observed hanging on the bleed rail during a 100-head audit, on rare occasions, it is possible that a sensible animal will be observed. Use these figures when evaluating plant performance over time by averaging the scores of many audits. When a second application of the stunner is done in any location before the animal is hoisted, it is counted as a second shot. It is not counted as a sensible animal on the bleed rail.

Cattle Insensibility

Excellent – 1 per 1,000 or less
Acceptable – 1 per 500 or less

Pig and Sheep Insensibility

Excellent – 1 per 2,000 or less
Acceptable – 1 per 1,000 or less

For all of the species: Dressing procedures such as skinning, scalding, limb removal, etc. should never be performed on an animal showing any sign of a return to sensibility. The animal **MUST** be restunned.

Core Criteria 3: Falling

Good animal welfare and quiet calm handling is impossible if animals slip or fall on the floor. All areas where animals walk should have non-slip footing. Animals should be observed during all phases of handling from the crowd pen to the stunning chute, and if slipping or falling is observed, steps should be taken to correct the problem. Because survey results indicate that the greatest slipping and falling problems were in the stunning chute area, scoring should be done in this area. Because of concerns about falling at unloading, falling should also be measured here.

It is important to be clear about the definitions of falls. They are as follows:

A fall occurs when an animal loses an upright position suddenly in which a part of the body other than the limbs touches the ground. All falls that occur in a stun box or restrainer before stunning or religious slaughter are counted as falls. Equipment that is designed to cause falling before stunning or religious slaughter should not be used.

Scoring of Falling in the Unloading Area (All Species)— In large plants where multiple vehicles are continuously unloaded, 100 cattle, pigs or sheep should be scored. For cattle, unloading is continuously observed until 100 cattle from three different vehicles are scored. For pigs and sheep where a large truck holds more than 100 animals, a minimum of two vehicles should be observed. Fifty animals are scored from each truck. For all species, an equal number of animals from each deck should be scored. Vehicles should be scored in the order of arrival at the unloading ramp.

In small plants where vehicles are not continuously unloaded, a single vehicle should be scored. If no vehicle arrives, the score sheet is marked “unloading not observed.”

Excellent – No falling

Acceptable – Fewer than one percent falling (body touches floor)

Not Acceptable – More than one percent falling down

Serious Problem – Five percent or more falling down

Scoring of Falling in the Stunning Chute Area (All Species)— Score a minimum of 50 animals in large plants. In most plants that have non-slip flooring, falling seldom occurs. In fact, problems with slipping or falling are usually either a big problem or almost no problem. Formal scoring should be done if slipping or falling is observed.

Score in the restrainer entrance, stunning box, lead up chute, crowd pen and in the final loading pen where pigs move into a gondola or other conveyance for gas stunning. Observation without formal scoring should be made in the stockyard pens and scales.

Excellent – No falling

Acceptable – Fewer than one percent falling (body touches floor)

Not Acceptable – More than one percent falling down

Serious Problem – Five percent or more falling down

Core Criteria 4: Vocalization

Cattle Vocalization Scoring in the Crowd Pen, Lead-up Chute, Stunning Box or Restraint Device

Vocalization is an indicator of cattle discomfort during handling, restraint and stunning.

Score a minimum of 100 animals in large plants and 50 in smaller plants. For data collection on large numbers of animals, the fractional percentages can be used. A single animal that vocalizes more than once is counted as one vocalizer.

Excellent – One percent or less of the cattle vocalize

Acceptable – Three percent or less of the cattle vocalize

Not Acceptable – Between three and 10 percent vocalize

Serious Problem – More than 10 percent vocalize

Where a head holder is used, five percent vocalization is acceptable.

Cattle should be stunned immediately after they enter a stun box or restrainer. Isolated animals will often vocalize. The author has observed that vocalization scoring is very efficient for identifying plants with cattle handling or equipment problems. Vocalization scoring works well in packing plants because cattle are stunned quickly after they are restrained.

When vocalization is being evaluated, cattle from more than one feedlot or ranch should be observed. There are variations in the tendency of some cattle to vocalize. To make the scoring simpler, each animal should be classified as either a vocalizer or a non-vocalizer.

Cattle vocalizations are tabulated in the crowd-pen, lead-up chute, restrainer and stun box. All vocalizing animals in the stun box, restrainer or religious slaughter box are scored. Vocalizing animals in the crowd-pen and lead-up chute are scored only during active handling when the handler is moving the animals. Vocalizations occurring in the yards should not be tabulated because cattle standing quietly in the yards will often vocalize to each other.

Vocalization Scoring of Pigs

Because it is impossible to count individual pig squeals when a group of pigs is being handled, vocalization scoring of individual pigs can only be conducted in the restrainer, stun box or group stunning pen. A group of pigs that excessively squeals should be assessed to identify the cause.

It is important to count squeals only and not grunts. The U.S. Department of Agriculture (USDA) defines a squeal as an extended sound (0.5 - 2.0 sec.) of both high amplitude and high frequency produced with an open mouth, indicative of a high level of excitement, fear, or pain. Score only the squeals that can be determined to be provoked by equipment or humans. Squealing that occurs when pigs root under each other or jump on top of each other is counted **if** provoked by electric prods, yelling, poking or hitting the pigs. If there is no way to identify the cause of a vocalization, it should **not** be counted.

During handling, there are six major causes of provoked squeals/vocalizations that include, but are not limited to:

1. Electric prod use
2. Sharp edges
3. Sores or poor body condition
4. Pressure from the hold-down rack
5. Sides of a v-restrainer moving at different speeds, and
6. Hitting or poking livestock.

If you cannot determine a cause, the squeal should be treated as unprovoked. Vocalizations caused by hot wanding a pig are scored as part of the stunning score. Do not score them as part of the pig handling vocalization score.

Score pig squeals after the most posterior part of the hind end is past the restrainer entrance. The definition of the restrainer entrance for different types of equipment is listed below.

1. **V conveyor restrainer** – The entrance point is located on the outer circumference of the slats where they turn around the sprocket (pivot).
2. **Center track conveyor restrainer** – The entrance point is located at the point where the conveyor emerges from the housing and is exposed. In the unlikely event that a pig squeals because both legs and feet get on one side of the center track, the squeal would be counted.
3. **Stun box** – The entrance point is located on the inside surface of the tailgate.
4. **Group floor stunning** – The entrance point is the gate where the pigs enter the stunning pen. Score after the pigs enter and the gate is closed.

Another simple method for monitoring continuous improvement within a plant is estimating the percentage of time that the entire stunning room is quiet. As each pig is stunned, the person doing the scoring checks off whether or not the room was quiet. The score is the percentage of stunning cycles where the room was quiet. When CO₂ stunning is evaluated, a stunning cycle consists of the time to fill a gondola. Because vocalization scores can vary by auditor, number of pigs and by room acoustics, **room vocalization scores are difficult to compare across plants and should not be measured by third party auditors. This is for internal use only.**

However, one can conclude that a plant that has continuous, constant squealing may have pig welfare problems. This method is excellent for internal plant monitoring over time.

Criteria for Vocalization of Pigs in Conveyor Restrainers

Do not score grunts, squeals that can be attributed to a misapplied stun wand or squeals that appear unprovoked by humans or by equipment. Score a minimum of 100 pigs in large plants and 50 pigs in smaller plants.

Excellent – Two percent or less of the pigs squeal.

Acceptable – Five percent or less of the pigs squeal due to the restrainer; none due to a misapplied stunner.

Not Acceptable – Six percent or more squeal in the restrainer.

Serious Problem – 10 percent or more squeal in the restrainer.

When 50 or less pigs are scored, a single squealing pig is acceptable. When more data is collected and averaged, use the five percent level for an acceptable rating.

Criteria for Room Vocalization

(Should be used in internal audits only and not compared across plants)

Score a minimum of 100 pigs in large plants and 50 pigs in smaller plants.

Acceptable – 50 percent or more of the time the room is quiet.

Vocalization Scoring of Sheep

Observations at a sheep slaughter plant indicated that vocalization during handling is not an effective measure of handling problems in sheep. Sheep walking quietly up the stunning chute often vocalized to each other. Sheep which balked and had to be pushed by a person never vocalized. This is a species difference between cattle and sheep and neither the presence nor absence of vocalization should be used as a measure.

Core Criteria 5: Electric Prod Use

Reducing the use of electric prods will improve animal welfare. Shocking livestock with electric prods significantly raises heart rate, open mouth breathing and many other physiological measures.

Revisions to this standard are based on data collected from 26 plants that were audited by McDonald's during 1999 and 2000 (www.grandin.com). In 2000, 68 percent of the plants used no electric prods in the crowd pen and 62 percent used an electric prod on fifteen percent or less of the pigs at the restrainer entrance. For purposes of auditing, touching livestock with an electric prod is counted whether the prod is energized or not.

Core Criteria 5: Electric Prod Scoring Criteria for Cattle

Percentages of Animals Prodded

| | |
|-----------------|--------------------|
| Excellent | 5 percent or less |
| Acceptable | 25 percent or less |
| Not Acceptable | 26 to 49 percent |
| Serious Problem | 50 percent or more |

Core Criteria 5: Electric Prod Scoring Criteria for Pigs Entering In Single File in Either Electric or CO₂ Systems

Percentages of Animals Prodded

| | |
|-----------------|--------------------------|
| Excellent | 10 percent or less |
| Acceptable | 25 percent or less |
| Not Acceptable | 26 percent to 79 percent |
| Serious Problem | 80 percent or more |

Core Criteria 5: Electric Prods Scoring for Pigs With CO₂ /Group Stunning Systems– (No Single File Chute) or Systems Where Pigs Are Stunned on the Floor in Groups

Percentages of Animals Prodded

| | |
|-----------------|---------------------|
| Excellent | 0 percent |
| Acceptable | 5 percent or less |
| Not Acceptable | 6 to 10 percent |
| Serious Problem | 11 percent ore more |

Core Criteria 5: Electric Prod Scoring of Sheep

Percentages of Animals Prodded

| | |
|-----------------|-------------------------|
| Excellent | 0 percent |
| Acceptable | 5 percent or less |
| Not Acceptable | 6 percent to 10 percent |
| Serious Problem | 11 percent or more |

Note: Electric prods should only rarely be used on sheep. The only place they should be used is at the restrainer entrance on large sheep that refuse to enter. The OIE (2008) international slaughter guidelines state that electric prods should not be used on sheep. There are some very large sheep that are difficult for a person to push manually into the restrainer. A single application of an electric prod may be required to move them.

Core Criteria 6: Willful Acts of Abuse/Egregious Acts

Any willful act of abuse is grounds for automatic audit failure. Willful acts of abuse include, but are not limited to: 1) Dragging a conscious, non-ambulatory animal; 2) intentionally applying prods to sensitive parts of the animal such as the eyes, ears, nose, anus or testicles; 3) deliberate slamming of gates on livestock; 4) malicious driving of ambulatory livestock on top of one another either manually or with direct contact with motorized equipment. This excludes loading a non-ambulatory animal for transport.; 5) hitting or beating an animal; or 6) live animals frozen to the floor or sides of the trailer. In sheep operations, lifting an animal by the wool or throwing a sheep also is an act of abuse.

Core Criteria 7: Access to Water

All livestock should have access to clean water in holding pens (lairage) in plants. Each pen should have a water trough, water nipples (in the case of pigs) or other water source. If livestock are non-ambulatory, plants should provide shallow water pans, buckets or water sources within easy reach of livestock. Active handling areas such as unloading pens, staging alleys and crowd pens do not require access to water unless livestock are held for more than 30 minutes in those areas.

Scoring of Very Small Plants

Small beef plants that process 25 or fewer beef cattle per hour may need adjustments in scoring due to small sample size and differences in cattle behavior. Ideally, 50 or more cattle should be scored, but this is often not practical in a plant that processes 5 to 10 cattle per hour.

Typically, even in very small pig plants, a larger number of pigs will be available. If larger numbers are available even in very small pig plants, they should be used to improve the reliability of the audit.

For a plant's own internal audit, data should be pooled and averaged. Pooled small data sets can be scored per the American Meat Institute Foundation's guidelines.

When an outside auditor audits a small plant, sometimes only 10 to 20 cattle are observed. If one stun were missed, the plant would not achieve the 95 percent acceptable score. If passing or failing the stunning audit is based on a single small data set, one miss should be permitted. However, on pooled data, the 95 percent first shot efficacy score must be maintained. On small data sets of 10 to 20 cattle, all cattle (100 percent) must be rendered insensible prior to hoisting to pass the audit.

In very small beef plants with line speeds of less than 25 cattle per hour, the animals may stand for long periods in the single file chute (race) and "talk" to each other. Their "talking" vocalizations are not scored. "Talking" vocalizations in the handling system occur more often at slow line speeds. An animal should be scored as a vocalizer if the vocalization is associated with:

1. Poking with an electric prod.
2. Slipping or falling.
3. Vocalizing in the stun box.
4. Poking by sharp edges on equipment.
5. Hitting with a gate.
6. Excessive pressure from a restraint device.
7. Missed stuns.
8. Physical abuse by a person.
9. Signs of agitation such as rearing, jumping, repeated backing up in the single file race or frantic attempts to escape.
10. Isolation of a single animal away from other cattle.

Conclusion

An acceptable level of animal welfare can be maintained if scores for the core criteria for stunning, animal insensibility, slipping and falling, vocalization and electric prod use are in the acceptable range. Scoring performance on these variables is simple and easy to do under commercial plant conditions.

In conclusion, managers must be committed to good animal welfare. Plants that have managers who insist on good handling and stunning practices tend to have better results. Positive and negative feedback also is very important. You manage the things that you measure, which is why auditing is important. Maintaining good handling and stunning practices requires continuous measurement, monitoring and management.

5 CHAPTER V: OFFICIAL AMI FOUNDATION AUDIT FORMS

Official AMI Foundation Audit Forms are included in the following section and are indicated with the AMI Foundation logo. These forms are dated. Updates to these forms may be made based upon new information and user feedback.

Any updated forms will be posted on www.animalhandling.org

Transportation Audit Form: Cattle

Date: _____

Name and auditing company: _____

Plant location: _____

Plant contact: _____

Number of trucks audited: _____

Temperature/weather conditions: _____

Core Criteria 1: Plant transportation policy and preparedness for receiving animals.

- 1. Plant has written animal welfare policy for transporters. _____ / 1
- 2. Plant provides extreme temperature management tools. _____ / 1
- 3. Have arrival management process that minimizes waiting time at the plant. _____ / 1
- 4. Emergency plans in place for animals in transit. _____ / 1
- 5. Written policy for immobile and fatigued animals and tools available for handling. _____ / 1
- 6. Acceptable handling tools available and utilized as needed. _____ / 1
- 7. Availability of acceptable euthanasia tools. _____ / 1
- 8. Maintenance records for euthanasia equipment, proper storage and employee training for euthanasia. _____ / 1
- 9. Gates in unloading area swing freely, latch securely and have no sharp protrusions. _____ / 1
- 10. Non-slip flooring. _____ / 1
- 11. Unloading area and ramps in good repair. _____ / 1
- 12. Adequate lighting. _____ / 1
- 13. Staff available for receiving animals. _____ / 1

Total for Core Criteria 1: _____ / 13

COMMENTS FOR CORE CRITERIA 1

Each truck is scored using this individual audit score sheet for Core Criteria 2 – 7. At the end of the audit, the points for each load will be added together to obtain the final score for each of the core criteria.

Trailer #: _____ Total # of animals on trailer: _____

Type of Trailer: Straight Trailer Drop Center/Pot Belly Trailer Farm Trailer Other

Cattle Type (circle all that apply): Fed Cattle Cull Dairy Cows Cull Beef Cows Mature Bulls

Core Criteria 2: Set-up and Loading of trailer.

Trailer loaded at proper density _____ / 1

Incompatible animals segregated when required _____ / 1

Total for Core Criteria 2: _____ / 2

COMMENTS FOR CORE CRITERIA 2

Core Criteria 3: Timeliness of arrival of the truck and trailer and animal unloading.

Time truck/trailer arrives to plant: _____ Time first animal unloads: _____

Total time to begin unloading: _____

Total for Core Criteria 3: _____ / 4

COMMENTS FOR CORE CRITERIA 3

Core Criteria 4: Condition of Trailer

- 1. Trailer properly aligned with the unloading area. _____ / 1
- 2. Non-slip, solid flooring. _____ / 1
- 3. Gates and doors open freely and can be secured shut. _____ / 1
- 4. Internal ramps function properly and extend all the way to the floor. _____ / 1
- 5. No sharp or protruding objects that can injure the animals. _____ / 1
- 6. No manure over the level of the hoof. _____ / 1
- 7. Winter side slats or plugs are in place at recommended levels. _____ / 1

Total for Core Criteria 4: _____ / 7

COMMENTS FOR CORE CRITERIA 4

Core Criteria 5: Falls

Total number of falls (tally falls here): _____

COMMENTS FOR CORE CRITERIA 5

Core Criteria 6: Electric Prod Use

Total number of animals electrically prodded (tally electric prod use here): _____

COMMENTS FOR CORE CRITERIA 6

Core Criteria 7: Condition of Animal

Non-ambulatory animals (tally here): _____

Severely injured animals (tally here): _____

Heat-stressed animals (tally here): _____

Calving (tally here): _____

Total for Core Criteria 7: _____

COMMENTS FOR CORE CRITERIA 7

Core Criteria 8: Willful Acts of Abuse

Any willful act of abuse is grounds for automatic audit failure. Willful acts of abuse include, but are not limited to: 1) Dragging a conscious, non-ambulatory animal; 2) intentionally applying prods to sensitive parts of the animal such as the eyes, ears, nose, anus or testicles; 3) deliberate slamming of gates on livestock; 4) malicious driving of ambulatory livestock on top of one another either manually or with direct contact with motorized equipment. This excludes loading a non-ambulatory animal for transport.; 5) hitting or beating an animal; or 6) live animals frozen to the floor or sides of the trailer. In sheep operations, lifting an animal by the wool or throwing a sheep also is an act of abuse.

COMMENTS FOR WILLFUL ACTS OF ABUSE

Cattle Transportation Audit Form - Final Scoring

| Core Criteria | Total on all trucks | Total number of animals audited or total points available | Actual % | Pass or Fail |
|--|---------------------|---|----------|--------------|
| Core Criteria 1 Plant Audit | | 13 | | |
| Core Criteria 2 Set up and loading | | (# of trucks x 2) | | |
| Core Criteria 3 Timeliness of arrival and unloading | | (# of trucks x 4) | | |
| Core Criteria 4 Condition of trailer | | (# of trucks x 7) | | |
| Core Criteria 5 Falls | | (Total # of falls) | | |
| Core Criteria 6 Electric Prod Use | | (Total # electrically prodded) | | |
| Core Criteria 7 Condition of Animals | | (Total # of compromised animals) | | |
| Core Criteria 8 Any willful acts of abuse observed? | | (Yes or No) | | |
| Notes: _____ | | | | |
| _____ | | | | |
| _____ | | | | |
| Passed all numerically scored criteria? Yes or No | | | | |
| Notes: _____ | | | | |
| _____ | | | | |
| _____ | | | | |

Auditor Signature _____ Date _____

Secondary Items from Audit

Secondary Item within Core Criteria 3:

Time first animal unloads: _____ Time last animal unloads: _____

Total unload time: _____

Provide comment on trailers that may have experienced problems or lengthy unloading times:

Secondary Items within Core Criteria 5:

1. Total number of slips (tally slips here): _____

2. Temperament of livestock (circle one): Normal Moving Difficult to Move

Note any problems or comments on livestock temperament. For example there may have been a high number of slips on one load and the temperament of the animals may have been a factor:

3. Did the person doing the unloading do so quietly and calmly? Yes or No

Comments on the attitude and behavior of those unloading the livestock here. As an example, their temperament may be correlated to the number of slips and falls:

Secondary Items within Core Criteria 6:

1. Does the plant have a “No Electric Prod Use” policy posted? Yes or No

2. Do the people unloading have electric prods in their hands? Yes or No

3. Did the driver use an electric prod in or through the sides or roof of the trailer? Yes or No

4. Were rattle paddles, sort boards, flags, or other handling tools used incorrectly? Yes or No

Comment on the use of electric prods here and if acceptable handling tools were used incorrectly:

Secondary Items within Core Criteria 7:

1. Number of dead animals on the trailer (tally animals here): _____

2. Does the plant have a method for communicating back to the site of trailer loading? Yes or No

3. Were any of the animals unloaded considered emaciated or in poor body condition? Yes or No
If yes, tally the number of animals here: _____

4. Did any of the cattle have poor udder conditions? Yes or No
If yes, tally the number of animals here: _____

Comment on the number of dead or emaciated animals or animals with poor udder conditions on the trailer:

Auditor Signature: _____ Date: _____

Transportation Audit Form: Swine

Date: _____

Name and Auditing Company: _____

Plant location: _____

Plant contact: _____

Number of trucks audited: _____

Temperature/weather conditions: _____

Core Criteria 1: Plant transportation policy and preparedness for receiving animals.

- 1. Plant has written animal welfare policy for transporters. ___ / 1
- 2. Plant provides extreme temperature management tools. ___ / 1
- 3. Have arrival management process that minimizes waiting time at the plant. ___ / 1
- 4. Emergency plans in place for animals in transit. ___ / 1
- 5. Written policy for immobile and fatigued animals and tools available for handling. ___ / 1
- 6. Acceptable handling tools available and utilized as needed. ___ / 1
- 7. Availability of acceptable euthanasia tools. ___ / 1
- 8. Maintenance records for euthanasia equipment, proper storage and employee training for euthanasia. ___ / 1
- 9. Gates in unloading area swing freely, latch securely and have no sharp protrusions. ___ / 1
- 10. Non-slip flooring. ___ / 1
- 11. Unloading area and ramps in good repair. ___ / 1
- 12. Adequate lighting. ___ / 1
- 13. Staff available for receiving animals. ___ / 1

Total for Core Criteria 1: ___ / 13

COMMENTS FOR CORE CRITERIA 1

Each truck is scored using this individual audit score sheet for Core Criteria 2 – 7. At the end of the audit, the points for each load will be added together to obtain the final score for each of the core criteria.

Trailer #: _____ Total # of animals on trailer: _____

Type of Trailer: Straight Trailer Drop Center/Pot Belly Trailer Farm Trailer Other

Swine Type (circle all that apply): Market Pigs Cull Sows Mature Boars

Has the driver completed the National Pork Board's TQA™ program? Yes or No

Core Criteria 2: Set-up and Loading of trailer.

Compartments gated ___ / 1

Trailer loaded at proper density ___ / 1

Incompatible animals segregated when required ___ / 1

Total for Core Criteria 2: ___ / 3

COMMENTS FOR CORE CRITERIA 2

Core Criteria 3: Timeliness of arrival of the truck and trailer and animal unloading.

Time truck/trailer arrives to plant: _____ Time first animal unloads: _____

Total time to begin unloading: _____

Total for Core Criteria 3: ___ / 4

COMMENTS FOR CORE CRITERIA 3

Core Criteria 4: Condition of Trailer

1. Trailer properly aligned with the unloading area. ___ / 1

2. Non-slip, solid flooring. ___ / 1

3. Gates and doors open freely and can be secured shut. ___ / 1

4. Internal ramps function properly and extend all the way to the floor. ___ / 1

5. No sharp or protruding objects that can injure the animals. ___ / 1

6. Bedding in the trailer for insulation and to prevent slipping. ___ / 1

7. Winter side slats or plugs are in place at recommended levels. ___ / 1

Total for Core Criteria 4: ___ / 7

COMMENTS FOR CORE CRITERIA 4

Core Criteria 5: Falls

Total number of falls (tally falls here): _____

COMMENTS FOR CORE CRITERIA 5

Core Criteria 6: Electric Prod Use

Total number of animals electrically prodded (tally electric prod use here): _____

COMMENTS FOR CORE CRITERIA 6

Core Criteria 7: Condition of Animal

Non-ambulatory animals (tally here): _____

Severely injured animals (tally here): _____

Heat-stressed animals (tally here): _____

Frostbitten animals (tally here): _____

Total for Core Criteria 7: _____

COMMENTS FOR CORE CRITERIA 7

Core Criteria 8: Willful Acts of Abuse

Any willful act of abuse is grounds for automatic audit failure. Willful acts of abuse include, but are not limited to: 1) Dragging a conscious, non-ambulatory animal; 2) intentionally applying prods to sensitive parts of the animal such as the eyes, ears, nose, anus or testicles; 3) deliberate slamming of gates on livestock; 4) malicious driving of ambulatory livestock on top of one another either manually or with direct contact with motorized equipment. This excludes loading a non-ambulatory animal for transport.; 5) hitting or beating an animal; or 6) live animals frozen to the floor or sides of the trailer. In sheep operations, lifting an animal by the wool or throwing a sheep also is an act of abuse.

COMMENTS FOR WILLFUL ACTS OF ABUSE

Swine Transportation Audit Form - Final Scoring

| Core Criteria | Total on all trucks | Total number of animals audited or total points available | Actual % | Pass or Fail |
|--|---------------------|---|----------|--------------|
| Core Criteria 1 Plant Audit | | 13 | | |
| Core Criteria 2 Set up and loading | | (# of trucks x 2) | | |
| Core Criteria 3 Timeliness of arrival and unloading | | (# of trucks x 4) | | |
| Core Criteria 4 Condition of trailer | | (# of trucks x 7) | | |
| Core Criteria 5 Falls | | (Total # of falls) | | |
| Core Criteria 6 Electric Prod Use | | (Total # electrically prodded) | | |
| Core Criteria 7 Condition of Animals | | (Total # of compromised animals) | | |
| Core Criteria 8 Any willful acts of abuse observed? | | (Yes or No) | | |

Notes: _____

Passed all numerically scored criteria? Yes or No

Notes: _____

 Auditor Signature

 Date

Secondary Items from Audit

Secondary Item within Core Criteria 3:

Time first animal unloads: _____ Time last animal unloads: _____

Total unload time: _____

Provide comment on trailers that may have experienced problems or lengthy unloading times:

Secondary Items within Core Criteria 5:

1. Total number of slips (tally slips here): _____

2. Temperament of animals (circle one): Normal Moving Difficult to Move

Note any problems or comments on livestock temperament. For example there may have been a high number of slips on one load and the temperament of the animals may have been a factor:

3. Did the person doing the unloading do so quietly and calmly? Yes or No

Comments on the attitude and behavior of those unloading the livestock here. As an example, their temperament may be correlated to the number of slips and falls:

Secondary Items within Core Criteria 6:

- 1. Does the plant have a "No Electric Prod Use" policy posted? Yes or No
- 2. Do the people unloading have electric prods in their hands? Yes or No
- 3. Did the driver use an electric prod in or through the sides or roof of the trailer? Yes or No
- 4. Were rattle paddles, sort boards, flags, or other handling tools used incorrectly? Yes or No

Comment on the use of electric prods here and if acceptable handling tools were used incorrectly:

Secondary Items within Core Criteria 7:

1. Number of dead animals on the trailer (tally animals here): _____

2. Does the plant have a method for communicating back to the site of trailer loading? Yes or No

3. Were any of the animals unloaded considered emaciated or in poor body condition? Yes or No
If yes, tally the number of animals here: _____

Comment on the number of dead or emaciated animals on the trailer:

Auditor Signature

Date

Transportation Audit Form: Sheep

Date: _____

Name and auditing company: _____

Plant location: _____

Plant contact: _____

Number of trucks audited: _____

Temperature/weather conditions: _____

Core Criteria 1: Plant transportation policy and preparedness for receiving animals.

- | | |
|---|---------|
| 1. Plant has written animal welfare policy for transporters. | ___ / 1 |
| 2. Plant provides extreme temperature management tools. | ___ / 1 |
| 3. Have arrival management process that minimizes waiting time at the plant. | ___ / 1 |
| 4. Emergency plans in place for animals in transit. | ___ / 1 |
| 5. Written policy for immobile and fatigued animals and tools available for handling. | ___ / 1 |
| 6. Acceptable handling tools available and utilized as needed. | ___ / 1 |
| 7. Availability of acceptable euthanasia tools. | ___ / 1 |
| 8. Maintenance records for euthanasia equipment, proper storage and employee training for euthanasia. | ___ / 1 |
| 9. Gates in unloading area swing freely, latch securely and have no sharp protrusions. | ___ / 1 |
| 10. Non-slip flooring. | ___ / 1 |
| 11. Unloading area and ramps in good repair. | ___ / 1 |
| 12. Adequate lighting. | ___ / 1 |
| 13. Staff available for receiving animals. | ___ / 1 |

Total for Core Criteria 1: _____ / 13

COMMENTS FOR CORE CRITERIA 1

Each truck is scored using this individual audit score sheet for Core Criteria 2 – 7. At the end of the audit, the points for each load will be added together to obtain the final score for each of the core criteria.

Trailer #: _____ Total # of animals on trailer: _____

Type of Trailer: Straight Trailer Drop Center/Pot Belly Trailer Farm Trailer Other

Sheep Type (circle all that apply): Fed Lambs Cull Ewes Mature Rams

Core Criteria 2: Set-up and Loading of trailer.

Trailer loaded at proper density _____ / 1

Incompatible animals segregated when required _____ / 1

Total for Core Criteria 2: _____ / 2

COMMENTS FOR CORE CRITERIA 2

Core Criteria 3: Timeliness of arrival of the truck and trailer and animal unloading.

Time truck/trailer arrives to plant: _____ Time first animal unloads: _____

Total time to begin unloading: _____

Total for Core Criteria 3: _____ / 4

COMMENTS FOR CORE CRITERIA 3

Core Criteria 4: Condition of Trailer

- | | |
|--|---------|
| 1. Trailer properly aligned with the unloading area. | ___ / 1 |
| 2. Non-slip, solid flooring. | ___ / 1 |
| 3. Gates and doors open freely and can be secured shut. | ___ / 1 |
| 4. Internal ramps function properly and extend all the way to the floor. | ___ / 1 |
| 5. No sharp or protruding objects that can injure the animals. | ___ / 1 |
| 6. No manure over the level of the hoof. | ___ / 1 |
| 7. Winter side slats or plugs are in place at recommended levels. | ___ / 1 |

Total for Core Criteria 4: _____ / 7

COMMENTS FOR CORE CRITERIA 4

Core Criteria 5: Falls

Total number of falls (tally falls here): _____

COMMENTS FOR CORE CRITERIA 5

Core Criteria 6: Electric Prod Use

Total number of animals electrically prodded (tally electric prod use here): _____

COMMENTS FOR CORE CRITERIA 6

Core Criteria 7: Condition of Animal

Non-ambulatory animals (tally here): _____

Severely injured animals (tally here): _____

Heat-stressed animals (tally here): _____

Lambing (tally here): _____

Total for Core Criteria 7: _____

COMMENTS FOR CORE CRITERIA 7

Core Criteria 8: Willful Acts of Abuse

Any willful act of abuse is grounds for automatic audit failure. Willful acts of abuse include, but are not limited to: 1) Dragging a conscious, non-ambulatory animal; 2) intentionally applying prods to sensitive parts of the animal such as the eyes, ears, nose, anus or testicles; 3) deliberate slamming of gates on livestock; 4) malicious driving of ambulatory livestock on top of one another either manually or with direct contact with motorized equipment. This excludes loading a non-ambulatory animal for transport.; 5) hitting or beating an animal; or 6) live animals frozen to the floor or sides of the trailer. In sheep operations, lifting an animal by the wool or throwing a sheep also is an act of abuse.

COMMENTS FOR WILLFUL ACTS OF ABUSE

Sheep Transportation Audit Form - Final Scoring

| Core Criteria | Total on all trucks | Total number of animals audited or total points available | Actual % | Pass or Fail |
|--|---------------------|---|----------|--------------|
| Core Criteria 1 Plant Audit | | 13 | | |
| Core Criteria 2 Set up and loading | | (# of trucks x 2) | | |
| Core Criteria 3 Timeliness of arrival and unloading | | (# of trucks x 4) | | |
| Core Criteria 4 Condition of trailer | | (# of trucks x 7) | | |
| Core Criteria 5 Falls | | (Total # of falls) | | |
| Core Criteria 6 Electric Prod Use | | (Total # electrically prodded) | | |
| Core Criteria 7 Condition of Animals | | (Total # of compromised animals) | | |
| Core Criteria 8 Any willful acts of abuse observed? | | (Yes or No) | | |

Notes: _____

Passed all numerically scored criteria? Yes or No

Notes: _____

 Auditor Signature Date

Secondary Items from Audit

Secondary Item within Core Criteria 3:

Time first animal unloads: _____ Time last animal unloads: _____

Total unload time: _____

Provide comment on trailers that may have experienced problems or lengthy unloading times:

Secondary Items within Core Criteria 5:

1. Total number of slips (tally slips here): _____

2. Temperament of livestock (circle one): Normal Moving Difficult to Move

Note any problems or comments on livestock temperament. For example there may have been a high number of slips on one load and the temperament of the animals may have been a factor:

3. Did the person doing the unloading do so quietly and calmly? Yes or No

Comments on the attitude and behavior of those unloading the livestock here. As an example, their temperament may be correlated to the number of slips and falls:

Secondary Items within Core Criteria 6:

1. Does the plant have a “No Electric Prod Use” policy posted? Yes or No

2. Do the people unloading have electric prods in their hands? Yes or No

3. Did the driver use an electric prod in or through the sides or roof of the trailer? Yes or No

4. Were rattle paddles, sort boards, flags, or other handling tools used incorrectly? Yes or No

Comment on the use of electric prods here and if acceptable handling tools were used incorrectly:

Secondary Items within Core Criteria 7:

1. Number of dead animals on the trailer (tally animals here): _____

2. Does the plant have a method for communicating back to the site of trailer loading? Yes or No

3. Were any of the animals unloaded considered emaciated or in poor body condition? Yes or No
 If yes, tally the number of animals here: _____

Comment on the number of dead or emaciated animals on the trailer:

Auditor Signature: _____

Date: _____

CATTLE AND CALVES SLAUGHTER AUDIT FORM

Date: _____ Time: _____

Plant: _____ Auditor: _____

Weather: _____ Line Speed: _____

Stunner Type: _____ Operator: _____

Plant Contact Name: _____ Phone: _____

Email: _____ Establishment No.: _____

CORE CRITERIA 1: EFFECTIVE STUNNING — Conventional Only

Score 100 cattle in plants with line speeds greater than 100 cattle per hour. Fifty cattle should be audited in slower plants processing 50 to 99 head of cattle or calves per hour. In plants that process less than 50 per hour, score one hour of production. Ninety-five percent accuracy is required for a passing score. If audit is conducted in a religious slaughter facility, skip to Core Criteria 2.

It can be helpful to note observations about missed stuns using the following guide:

- X = stunned correctly
- G = stunning failed due to apparent lack of maintenance
- A = missed stun due to poor aim

Animal Number:

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Stun Efficacy Percent _____

Notes:

CORE CRITERIA 2: BLEED RAIL INSENSIBILITY — Conventional and Religious

Any sensible animal on the bleed rail constitutes an automatic audit failure. Score the same number of animals for stunning scoring. It is CRITICAL that animals showing signs of a return to sensibility be restunned immediately. There is “zero tolerance” for beginning any procedures like skinning the head or leg removal on any animal that shows signs of a return to sensibility. However, it is important to complete the audit and note observations about insensibility using the following guide:

- X = completely insensible; no signs of return to sensibility
- E = eyes moved when touched
- BL = blinking
- RB = rhythmic breathing
- VO = vocalization
- RR = righting reflex/animal attempts to lift head
- ST = stiff curled tongue (this must occur with another one of the criteria above in order to fail this criteria)

Note signs of sensibility observed by animal number:

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent Insensible _____

Notes:

CORE CRITERIA 3: ANIMALS FALLING DOWN — Conventional and Religious

3A: If you are also using the transportation audit the same day, you may transfer your score here. Count the number of cattle that slip or fall during unloading. Falling is a core criteria slipping is a secondary criteria. In large plants where multiple vehicles are continuously unloaded, 100 cattle from three different vehicles are scored. For all species, an equal number of animals from each deck should be scored. Vehicles should be scored in the order of arrival at the unloading ramp. In small plants where vehicles are not continuously unloaded, a single vehicle should be scored. If no vehicle arrives, the scoresheet is marked “unloading not observed.” One percent or fewer cattle should fall.

- X = no slipping or falling
- F = fell S = slipped

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent falling _____ For recording as a secondary item: Percent slipping _____

Note where falling occurred:

Notes:

3B: Count the number of cattle that 1) slip and 2) fall during handling in any of the following locations: crowd pen, single file chute, barns, alleys or stunning box. Falling is a core criteria and slipping is a secondary criteria. A slip is recorded when a knee or hock touches the floor. In cattle stun boxes and the single file chute, a slip should be recorded if the animal becomes agitated due to multiple short slips. A fall is recorded if the body touches the floor. One percent or fewer falls is required for a passing score.

X = no slipping or falling F = fell S = slipped

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent falling _____ For recording as a secondary audit item: Percent slipping _____

Note where falling occurred:

Notes:

CORE CRITERIA 4: VOCALIZATION — Conventional and Religious

Monitor the number of cattle that vocalize (provoked by stress or agitation) in the crowd pen, lead-up chute stunning box or restrainer. Vocalizing animals in the crowd-pen and lead up chute are scored during active handling. All vocalizations in the stun box or restrainer are counted. Score an animal as a vocalizer if it makes any audible vocalization. Three percent or less of cattle should moo or bellow. In Kosher or Halal operations or any operation using a head holder, up to five percent vocalization is acceptable for a passing score. It is helpful to note the possible cause of vocalization using the codes below:

X = non-vocalizer P = prod
 S = stun F = fell or slipped
 U = unknown cause R = restrainer
 M = missed stuns SE = sharp edges
 UN = unprovoked

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent vocalizing: _____

Notes:

CORE CRITERIA 5: ELECTRIC PROD USE — Conventional and Religious

Monitor the percentage of 100 cattle prodded with an electric prod at the restrainer entrance. Twenty-five percent or fewer cattle should be prodded for passing score. If multiple employees use prods, score 100 animals passing by each employee. Add the percentages together to determine final score. Note whether or not a prod was used for each animal and the apparent reason for prod use:

X = moved quietly without an electric prod
 P = electric prod used without apparent reason
 B = electric prodded in response to balking

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent prodded _____ Percent balking _____

Notes:

CORE CRITERIA 6: WILLFUL ACTS OF ABUSE — Conventional and Religious

Any willful act of abuse is grounds for automatic audit failure. Willful acts of abuse include, but are not limited to: 1) Dragging a conscious, non-ambulatory animal; 2) intentionally applying prods to sensitive parts of the animal such as the eyes, ears, nose, anus or testicles; 3) deliberate slamming of gates on livestock; 4) malicious driving of ambulatory livestock on top of one another either manually or with direct contact with motorized equipment. This excludes loading a non-ambulatory animal for transport.; 5) hitting or beating an animal; or 6) live animals frozen to the floor or sides of the trailer. In sheep operations, lifting an animal by the wool or throwing a sheep also is an act of abuse.

Were any willful acts of abuse observed?

Yes ____ No ____

If yes, detail incident(s) below:

Notes:

CORE CRITERIA 7: ACCESS TO WATER — Conventional and Religious

Observe access to water. Do animals in all holding pens (for a period of 30 minutes or longer) where active handling is occurring have access to clean drinking water?

Yes ____ No ____

Notes:

Final Scoring – Cattle and Calves Audit

| Core Criteria | Passing Score | Actual Score |
|--|------------------------------------|--------------|
| Core Criteria 1: Effective Stunning | 95% or greater accuracy | _____ |
| Core Criteria 2: Bleed Rail Insensibility | 100% insensible | _____ |
| Core Criteria 3: Falls | | |
| 3A: Truck Unload | 1% or less falls | _____ |
| 3B: In Plant | 1% or less falls | _____ |
| Core Criteria 4: Vocalization | 3% or less | _____ |
| | 5% or less with head-holder/ritual | _____ |
| Core Criteria 5: Prod Use | 25% or less prodded | _____ |
| Core Criteria 6: Willful Acts of Abuse | No willful acts of abuse | _____ |
| Core Criteria 7: Access to Water | Yes – water provided | _____ |
| Plant passed all core criteria? | Yes ____ No ____ | |

 Auditor signature Date

Secondary Audit Items

These items may be helpful in gathering general information about a facility. However, because they involve a high degree of subjectivity and because they are almost impossible to score objectively, they should not be used in determining whether a facility passes or fails an audit.

1. Does the facility have a documented training program for its employees or use an outside training program to teach the principles of good animal handling?
Yes ____ No ____
2. Does the facility have a protocol that is written or widely understood for handling non-ambulatory animals?
Yes ____ No ____
3. Are facility personnel trained in handling non-ambulatory animals?
Yes ____ No ____
4. Do employees inspect the facility weekly and document for repair any damage or sharp protrusions that may injure animals?
Yes ____ No ____
5. Does the facility provide special training to stunner operators to ensure proper equipment use and stunning efficacy?
Yes ____ No ____
6. Does the facility have a protocol for stunning equipment maintenance?
Yes ____ No ____
7. Does the facility train its personnel and have a written procedure or protocol about how to handle a sensible animal on the bleed rail?
Yes ____ No ____
8. Is non-slip flooring provided throughout the facility?
Yes ____ No ____ Slipping score (3% or less): ____
9. Are non-electrical devices the primary tool used to move livestock?
Yes ____ No ____
10. Do crowd pens generally appear to be less than 75 percent full?
Yes ____ No ____
11. If mounting behaviors were observed, are animals that chronically mount removed from the pen?
Yes ____ No ____ NA ____
12. Does the company perform internal audits at least weekly?
Yes ____ No ____
13. Does the company have an emergency management plan for livestock on file?
Yes ____ No ____
14. The percentage of animals that slipped: _____
Percentage in stunning area: _____
Percentage during truck unloading: _____

Final Scoring

Plant passed all core criteria: Yes ____ No ____

Were any acts of abuse observed? _____ Plant passed all secondary criteria: Yes ____ No ____

If no on secondary, include notes related to secondary audit items:

PIG SLAUGHTER AUDIT FORM

Date: _____ Time: _____

Plant: _____ Auditor: _____

Weather: _____ Line Speed: _____

Stunner Type: _____ Operator: _____

Plant Contact Name: _____ Phone: _____

Email: _____ Establishment No.: _____

CORE CRITERIA 1: STUNNING

Effective Electrical Stunning – Pigs

Electrodes must be applied properly to pigs to achieve effective stunning. Score 100 pigs in plants with line speeds greater than 100 per hour. Fifty pigs should be audited in slower plants that process 50 to 99 pigs per hour. In plants that process less than 50 per hour, score one hour of production. A score of 99 percent accurate placement of stunning electrodes is required for passing score.

The following coding should be used:

X = electrode placed correctly W = wrong placement

Animal Number:

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent correct placement: _____

Notes:

Amperage

Is the stunner set at a minimum of 1.25 amps for market weight pigs and two amps for sows?

Yes _____ Volts _____ Stun Time in Sec. _____
No _____ Amps _____

Hot Wanding

Score 100 pigs in the restrainer. Measure the percentage that vocalize due to application of fully energized electrodes. No more than one percent of animals may vocalize due to hot wanding.

Animal Number:

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent hot wanded: _____

Notes:

CORE CRITERIA FOR CO₂ SYSTEMS: OVERLOADING OF GONDOLAS

Score 50 gondolas in large plants that process 500 or more pigs per CO₂ machine per hour to determine the percentage of gondolas (elevator boxes) that are overloaded. In small plants score 25 gondolas. A gondola or elevator is to be scored as overloaded if there is not sufficient space for the animals to stand or lie down without being on top of each other. No more than four percent of gondolas may be overloaded for a passing score. Score on a per gondola basis:

Gondola Number:

| | | | | |
|----|----|----|----|----|
| 1 | 11 | 21 | 31 | 41 |
| 2 | 12 | 22 | 32 | 42 |
| 3 | 13 | 23 | 33 | 43 |
| 4 | 14 | 24 | 34 | 44 |
| 5 | 15 | 25 | 35 | 46 |
| 7 | 17 | 27 | 37 | 47 |
| 8 | 18 | 28 | 38 | 48 |
| 9 | 19 | 29 | 39 | 49 |
| 10 | 20 | 30 | 40 | 50 |

Percent overloaded _____

* For gas systems where the animals ride head to tail on a continuous conveyor that does not have separate animal compartments, do not use this scoring system. Omit this score and score the percentage of animals prodded with an electric prod.

Notes:

CORE CRITERIA 2: INSENSIBILITY ON THE BLEED RAIL

Any sensible animal on the bleed rail constitutes an automatic audit failure. Score the same number of animals for stunning scoring. It is CRITICAL that animals showing signs of a return to sensibility be restunned immediately. There is "zero tolerance" for beginning any procedures like skinning the head or leg removal on any animal that shows signs of a return to sensibility. However, it is important to complete the audit and note observations about insensibility using the following guide:

- X = completely insensible; no signs of return to sensibility
- BL = blinking – do not count a vibrating eye as a blink; only natural blinks like those that might be observed in the yards should be documented
- RB = rhythmic breathing
- VO = vocalization no matter how small
- RR = righting reflex/animal attempts to lift head while hanging on the rail

Note signs of sensibility observed by animal number:

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent Insensible _____

Notes:

CORE CRITERIA 3: ANIMALS FALLING DOWN

3A: If you are also using the transportation audit the same day, you may transfer your score here. Count the number of pigs that slip or fall during unloading. Falling is a core criteria and slipping is a secondary criteria. In plants where a large truck holds more than 100 animals, a minimum of two vehicles should be observed. For all species, an equal number of animals from each deck should be scored.

Vehicles should be scored in the order of arrival at the unloading ramp. In small plants where vehicles are not continuously unloaded, a single vehicle should be scored. If no vehicle arrives, the score sheet is marked "unloading not observed." One percent or fewer pigs should fall.

X = no slipping or falling F = fell S = slipped

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Note where falling occurred:

Percent falling _____ For recording as a secondary audit item: Percent slipping _____

Notes:

3B: Count the number of pigs that 1) slip and 2) fall during handling in the crowd pen, single file chute, barns, alleys or stunning box. One percent or fewer pigs may fall and three percent or fewer pigs may slip for a passing score. A fall is recorded if the body touches the floor. Even slight slipping should be noted. If flooring results in slight slipping for most animals, this can result in fear or agitation and should be corrected. Falling is a core criteria and slipping is a secondary criteria.

X = no slipping or falling F = fell S = slipped

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Note where falling occurred:

Percent falling _____ For recording as a secondary audit item: Percent slipping _____

Notes:

CORE CRITERIA 4: PIG VOCALIZATION DURING ELECTRIC OR CAPTIVE BOLT STUNNING

Vocalization — Electric Stunning or CO₂ Systems With a Restrainer

Monitor the number of pigs that squeal in the restrainer. Score only squeals determined to be provoked by humans or equipment. Pigs that are provoked to squeal should not exceed 5%. It is helpful to note the possible cause of squeals using the codes below. Do not count hot wandering in this section because it is a stunning measurement:

| | | | | | | | | | |
|----|--|-----------------------|----------------------------|----|----|----|----|----|-----|
| | X = non-vocalizer F = fell or slipped | P = prod O = other | S = stun R = Restrainer | | | | | | |
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent vocalizing: _____

Room Vocalization – All Stunning Systems — FOR INTERNAL AUDITS ONLY:

Count the number of stunning cycles where squealing is heard. Count 100 stunning cycles. Note: there is a high degree of variability due to room acoustics and human factors. This criterion cannot be compared across plants, but is effective in monitoring internal performance. Fewer than 50 percent of the stunning cycles should have squealing.

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent vocalizing: _____

Notes:

CORE CRITERIA 5: ELECTRIC PROD USE

Electric or CO₂ Stunning Systems Where Pigs Enter in Single File

Monitor the percentage of 100 pigs prodded with an electric prod at the restrainer entrance. Twenty-five percent or less of pigs may be prodded for a passing score. Note whether or not a prod was used for each animal and the apparent reason for prod use. If multiple employees use prods, score 100 animals passing by each employee. Add the percentages together to come up with a final score:

X = moved quietly without an electric prod
P = electric prod used without apparent reason
B = electric prodded in response to balking

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent prod use _____

Percent balking _____

Notes:

CO₂ Systems where pigs enter a CO₂ chamber in groups and electric stunning systems where pigs are stunned on the floor in groups.

Monitor the percentage of 100 pigs prodded with an electric prod when animals are being moved into a gondola or when electric stunning occurs on the floor in a group setting. Five percent or less of pigs may be prodded for a passing score. Note whether or not a prod was used for each animal and the apparent reason for prod use. If multiple employees use prods, score 100 animals passing by each employee. Add the percentages together to come up with a final score:

X = moved quietly without an electric prod
P = electric prod used without apparent reason
B = electric prodded in response to balking

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent prod use _____

Percent balking _____

Notes:

CORE CRITERIA 6: WILLFUL ACTS OF ABUSE

Any willful act of abuse is grounds for automatic audit failure. Willful acts of abuse include, but are not limited to: 1) Dragging a conscious, non-ambulatory animal; 2) intentionally applying prods to sensitive parts of the animal such as the eyes, ears, nose, anus or testicles; 3) deliberate slamming of gates on livestock; 4) malicious driving of ambulatory livestock on top of one another either manually or with direct contact with motorized equipment. This excludes loading a non-ambulatory animal for transport.; 5) hitting or beating an animal; or 6) live animals frozen to the floor or sides of the trailer. In sheep operations, lifting an animal by the wool or throwing a sheep also is an act of abuse.

Were any willful acts of abuse observed?

Yes _____ No _____

Notes:

CORE CRITERIA 7: ACCESS TO WATER

Observe access to water. Do animals in all holding pens (for a period of 30 minutes or longer) where active handling is occurring have access to clean drinking water?

Yes _____ No _____

Notes:



Final Scoring – Pig Audit

| Core Criteria | Passing Score | Actual Score |
|---|--------------------------------------|--------------|
| Core Criteria 1: Effective Stunning | 1% or less inaccurate wand placement | _____ |
| | 1% or less hot wanded | _____ |
| | 4% or less overloaded gondolas | _____ |
| Core Criteria 2: Bleed Rail Insensibility | 100% insensible | _____ |
| Core Criteria 3: Falls | | |
| 3A: Truck Unload | 1% or less falls | _____ |
| 3B: In Plant | 1% or less falls | _____ |
| Core Criteria 4: Vocalization | 5% or less | _____ |
| *Do not count when CO ₂ systems are in use | | |
| Core Criteria 5: Prod Use | 25% or less (single file) | _____ |
| | 5% or less (group system) | _____ |
| Core Criteria 6: Willful Acts of Abuse | No willful acts of abuse | _____ |
| Core Criteria 7: Access to Water | Yes – water provided | _____ |
| Plant passed all core criteria? | Yes _____ No _____ | |

Auditor signature

Date

Secondary Audit Items

These items may be helpful in gathering general information about a facility. However, because they involve a high degree of subjectivity and because they are almost impossible to score objectively, they should not be used in determining whether a facility passes or fails an audit.

1. Does the facility have a documented training program for its employees or use an outside training program to teach the principles of good animal handling?
Yes ____ No ____
2. Does the facility have a protocol that is written or widely understood for handling non-ambulatory animals?
Yes ____ No ____
3. Are facility personnel trained in handling non-ambulatory animals?
Yes ____ No ____
4. Do employees inspect the facility weekly and document for repair any damage or sharp protrusions that may injure animals?
Yes ____ No ____
5. Does the facility provide special training to stunner operators to ensure proper equipment use and stunning efficacy?
Yes ____ No ____
6. Does the facility have a protocol for stunning equipment maintenance?
Yes ____ No ____
7. Does the facility train its personnel and have a written procedure or protocol about how to handle a sensible animal on the bleed rail?
Yes ____ No ____
8. Is non-slip flooring provided throughout the facility?
Yes ____ No ____ Slipping score (3% or less): ____
9. Are non-electrical devices the primary tool used to move livestock?
Yes ____ No ____
10. Do crowd pens generally appear to be less than 75 percent full?
Yes ____ No ____
11. If mounting behaviors were observed, are animals that chronically mount removed from the pen?
Yes ____ No ____ NA ____
12. Does the company perform internal audits at least weekly?
Yes ____ No ____
13. Does the company have an emergency management plan for livestock on file
Yes ____ No ____
14. The percentage of animals that slipped: _____
Percentage in stunning area: _____
Percentage during truck unloading: _____

Final Scoring

Plant passed all core criteria: Yes ____ No ____

Were any acts of abuse observed? _____ Plant passed all secondary criteria: Yes ____ No ____

If no on secondary, include notes related to secondary audit items:

SHEEP SLAUGHTER AUDIT FORM

Date: _____ Time: _____
 Plant: _____ Auditor: _____
 Weather: _____ Line Speed: _____
 Stunner Type: _____ Operator: _____
 Plant Contact Name: _____ Phone: _____
 Email: _____ Establishment No.: _____

Note: Sheep naturally vocalize. Therefore vocalization scoring is omitted as a criterion for this audit. Hot wanding also is omitted as a criterion.

CORE CRITERIA 1: EFFECTIVE STUNNING — Conventional Only

Captive Bolt Stunning

Ninety-five percent or more sheep must be stunned effectively with a single shot. It can be helpful to note observations about missed stuns using the following guide:

- X = stunned correctly
- G = stunning failed due to apparent lack of maintenance
- A = missed stun due to poor aim

Animal Number:

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent of sheep stunned effectively with a single shot: _____

Notes:

Electric Stunning — proper application of electrodes to sheep

Electrodes must be applied properly to sheep to achieve effective stunning. Score 100 sheep. A score of 99 percent accurate placement of stunning electrodes is required for passing score. The following coding should be used:

X = electrode placed correctly W = wrong placement

Animal Number:

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent correct placement: _____

Is the stunner set at a minimum of 1 amp?

Yes _____ No _____

Notes:

CORE CRITERIA 2: INSENSIBILITY ON THE BLEED RAIL — Conventional and Religious

Any sensible animal on the bleed rail constitutes an automatic audit failure. It is CRITICAL that animals showing signs of a return to sensibility be restunned immediately. There is “zero tolerance” for beginning any procedures like skinning the head or leg removal on any animal that shows signs of a return to sensibility. However, it is important to complete the audit and note observations about insensibility using the following guide:

- X = completely insensible; no signs of return to sensibility
- BL = blinking – do not count a vibrating eye as a blink; only natural blinks like those that might be observed in the yards should be documented
- RB = rhythmic breathing
- VO = vocalization no matter how small
- RR = righting reflex/animal attempts to lift head while hanging on the rail

Note signs of sensibility observed by animal number:

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent Insensible _____

Notes:

CORE CRITERIA 3: ELECTRIC PROD USE — Conventional and Religious

Monitor the percentage of 100 sheep prodded with an electric prod. Since OIE (2008) guidelines state the electric prods should not be used on sheep, electrical prod use must be confined to a single electric prod at the restrainer entrance. The electric prod should only be used on stubborn, large sheep that are too big to be pushed by a person into the restrainer. Electric prod use should be 5% or less and only at the restrainer entrance.

- X = moved quietly without an electric prod
- P = electric prod used without apparent reason
- B = electric prodded in response to balking

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Percent prod use _____

Percent balking _____

Notes:

CORE CRITERIA 4: ANIMALS FALLING DOWN — Conventional and Religious

3A: Count the number of sheep that 1) slip and 2) fall during handling in the crowd pen, single file chute, barns, alleys or stunning box. Falling is a core criteria and slipping is a secondary criteria. One percent or fewer sheep may fall. A fall is recorded if the body touches the floor. Even slight slipping should be noted.

X = no slipping or falling F = fell S = slipped

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Note where falling occurred:

Percent falling _____ For recording as a secondary item: Percent slipping _____

Notes:

3B: **If you are also using the transportation audit the same day, you may transfer your score here.** Count the number of sheep that slip or fall during unloading. In plants where a large truck holds more than 100 animals, a minimum of two vehicles should be observed. For all species, an equal number of animals from each deck should be scored. Vehicles should be scored in the order of arrival at the unloading ramp. In small plants where vehicles are not continuously unloaded, a single vehicle should be scored. If no vehicle arrives, the score sheet is marked “unloading not observed.” One percent or fewer may fall.

X = no slipping or falling F = fell S = slipped

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 11 | 21 | 31 | 41 | 51 | 61 | 71 | 81 | 91 |
| 2 | 12 | 22 | 32 | 42 | 52 | 62 | 72 | 82 | 92 |
| 3 | 13 | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 |
| 4 | 14 | 24 | 34 | 44 | 54 | 64 | 74 | 84 | 94 |
| 5 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 |
| 6 | 16 | 26 | 36 | 46 | 56 | 66 | 76 | 86 | 96 |
| 7 | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 |
| 8 | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 | 98 |
| 9 | 19 | 29 | 39 | 49 | 59 | 69 | 79 | 89 | 99 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

Note where slipping/falling occurred:

Percent falling _____ For recording as a secondary item: Percent slipping _____

Notes:

CORE CRITERIA 6: WILLFUL ACTS OF ABUSE — Conventional and Religious

Any willful act of abuse is grounds for automatic audit failure. Willful acts of abuse include, but are not limited to: 1) Dragging a conscious, non-ambulatory animal; 2) intentionally applying prods to sensitive parts of the animal such as the eyes, ears, nose, anus or testicles; 3) deliberate slamming of gates on livestock; 4) malicious driving of ambulatory livestock on top of one another either manually or with direct contact with motorized equipment. This excludes loading a non-ambulatory animal for transport.; 5) hitting or beating an animal; or 6) live animals frozen to the floor or sides of the trailer. In sheep operations, lifting an animal by the wool or throwing a sheep also is an act of abuse.

Were any willful acts of abuse observed?

Yes _____ No _____

Notes:

CORE CRITERIA 7: ACCESS TO WATER — Conventional and Religious

Observe access to water. Do animals in all holding pens (for a period of 30 minutes or longer) where active handling is occurring have access to clean drinking water?

Yes _____ No _____

Notes:

Final Scoring – Sheep Audit

| Core Criteria | Passing Score | Actual Score |
|--|--|--------------|
| Core Criteria 1: Effective Stunning | 95% or greater accuracy — captive bolt | _____ |
| | 99% or greater accurate placement — electric | _____ |
| Core Criteria 2: Bleed Rail Insensibility | 100% insensible | _____ |
| Core Criteria 3: Falls | | |
| 3A: Truck Unload | 1% or less falls | _____ |
| 3B: In Plant | 1% or less falls | _____ |
| Core Criteria 4: Prod Use | 5% or less | _____ |
| Core Criteria 5: Willful Acts of Abuse | No willful acts of abuse | _____ |
| Core Criteria 6: Access to Water | Yes – water provided | _____ |
| Plant passed all core criteria? | Yes _____ No _____ | |

Auditor signature

Date

Secondary Audit Items

These items may be helpful in gathering general information about a facility. However, because they involve a high degree of subjectivity and because they are almost impossible to score objectively, they should not be used in determining whether a facility passes or fails an audit.

1. Does the facility have a documented training program for its employees or use an outside training program to teach the principles of good animal handling?
Yes ____ No ____
2. Does the facility have a protocol that is written or widely understood for handling non-ambulatory animals?
Yes ____ No ____
3. Are facility personnel trained in handling non-ambulatory animals?
Yes ____ No ____
4. Do employees inspect the facility weekly and document for repair any damage or sharp protrusions that may injure animals?
Yes ____ No ____
5. Does the facility provide special training to stunner operators to ensure proper equipment use and stunning efficacy?
Yes ____ No ____
6. Does the facility have a protocol for stunning equipment maintenance?
Yes ____ No ____
7. Does the facility train its personnel and have a written procedure or protocol about how to handle a sensible animal on the bleed rail?
Yes ____ No ____
8. Is non-slip flooring provided throughout the facility?
Yes ____ No ____ Slipping score (3% or less): ____
9. Are non-electrical devices the primary tool used to move livestock?
Yes ____ No ____
10. Do crowd pens generally appear to be less than 75 percent full?
Yes ____ No ____
11. If mounting behaviors were observed, are animals that chronically mount removed from the pen?
Yes ____ No ____ NA ____
12. Does the company perform internal audits at least weekly?
Yes ____ No ____
13. Does the company have an emergency management plan for livestock on file
Yes ____ No ____
14. The percentage of animals that slipped: _____
Percentage in stunning area: _____
Percentage during truck unloading: _____

Final Scoring

Plant passed all core criteria: Yes ____ No ____

Were any acts of abuse observed? _____ Plant passed all secondary criteria: Yes ____ No ____

If no on secondary, include notes related to secondary audit items:

Finding Distractions That Hinder Easy Movement

Problem: Animal refuses to move through an alley, chute or race.

Possible Causes:

If animals refuse to move through an alley, chute or race, there may be a very simple solution. Once the area is clear, step into the race to see what distractions may be hindering movement. Any one of these items on the following list may cause animals to stop moving or back up and prevent a properly designed facility from working efficiently. In some facilities, two or three different distractions must be removed before animals will move easily. Often, identifying the problem requires trial and error.

Look for:

- Sparkling reflections on puddles that can be eliminated by moving a ceiling lamp.
- Reflections on smooth metal that can be minimized through lighting changes.
- Chains that jiggle and can be fastened.
- Metal clanging or banging that can be secured. Rubber stops can be used on gates, for example, to prevent clanging.
- High pitched noises and other loud or reverberating noises that can be silenced.
- Air hissing, which can be silenced with mufflers or piped outside.
- Air drafts blowing toward approaching animals, which can be redirected away from them.
- Clothing hung on the fence that can be removed.
- Moving piece of plastic that can be secured or removed.
- Fan blade movement. Install a shield to block the animals' view.
- Seeing people moving up ahead. Install a shield so approaching animals cannot see them.
- Small object on the floor such as a coffee cup, hose or paper.
- Changes in flooring and texture, which can be made uniform.
- Drain grate on the floor, which can be moved to another location outside races.
- Sudden changes in the color of equipment or flooring. Colors with high contrast like yellow are the worst. Use of single colors on floors and walls can facilitate movement.
- Race entrance is too dark. Animals prefer to move from a darker place to a brighter place.
- Bright light such as blinding sun. Animals will move from a darker place to a brighter place, but they will not move toward blinding light. Examples of blinding light are looking into the sun or a bare light bulb.
- One-way and back-up gates. Install them two to three body lengths away from the crowd pen. Equip the one-way gate near the crowd pen with a remote controlled rope so that they can be held open when the single file race is filled. Many facilities have too many backup gates. Try tying them open.

Resolving Problems in Center Track Conveyor Restrainer Systems and V Belt Restrainer Systems for Cattle, Pigs, and Sheep

Problem: Animal stops at entrance and refuses to enter.

Possible Causes:

1. Hold-down rack is too low and the animal bumps its shoulder as it enters. Raise hold-down so that there is approximately 4 in. (10 cm) of clearance for the tallest animal. The hold down should be solid to block vision.
2. Entrance is too dark – install a light that illuminates the entrance. The light must not shine in an approaching animal's eyes.
3. Slick Floor – Animals panic when they slip. Weld rods to floor to provide a non-slip floor. The entrance ramp into the restrainer must be non-slip.
4. Entrance ramp missing – Reinstall entrance ramp. See diagrams on www.grandin.com. Forcing an animal to jump into a restrainer frightens it.
5. Leg spreader is too wide and it bumps the inside of the animals' legs. This problem only occurs in center track restrainers. See diagrams on www.grandin.com.
6. No False Floor - on all types of restrainers, animals will be afraid to enter if they see a steep drop off (visual cliff) below the restrainer. Install a solid false floor approximately six inches (15 cm) below the feet of the largest animal. See diagrams on www.grandin.com.
7. No belly rails – on center track restrainers belly rails keep the animal centered over the leg spreader bar. See diagrams on www.grandin.com.
8. Distractions in plant – install a curtain at the exit end of the restrainer. Look through the Restrainer and see if you can see distractions such as moving conveyor, a yellow apron or sparkling reflections on a moving piece of equipment.
9. Broken sharp edges in entrance – repair or replace entrance parts. Plant should do pre-operations check daily on restrainers to ensure entrance is in good repair.

If an animal is walking into the restrainer by itself, do not poke it with an electric prod. Center track systems require less prodding to induce cattle to enter it. Workers need to break the “automatic prod reflex” habit.

Resolving Problems in Center Track Conveyor Restrainer Systems and V Belt Restrainer Systems for Cattle, Pigs and Sheep

Problem: Animals struggle in the restrainer

Causes:

1. V conveyor sides run at different speeds. Both sides must run at the same speed. To test this, mark each side with tape or a crayon. After three revolutions the marks should be no more than 4" different or the width of one slat.
2. Hold down too short – on all types of restrainers, the animal must be completely restrained and riding on the conveyor with its feet off the entrance ramp BEFORE its head emerges from under the hold down. The principle is blocking vision until the animal is fully restrained.
3. Broken slats and other parts – sharp edges that stick into animals will cause struggling. On the center track restrainer, the metal guides along the conveyor must not be bent. Replace broken or bent slats. Slat must line up and provide a smooth continuous surface.
4. Hold-down too high – This is most likely to be a problem when small animals are handled. Install a rubber curtain made from conveyor belting on the discharge end of the hold down rack to block the vision of smaller animals.
5. Adjustable sides not centered - Struggling is more likely to occur if the adjustable sides of the center track conveyor push the animal to one side and make it feel off balance. Adjustable sides should be at the same setting on both sides.

Resolving Electrical Stunning Problems

Problem: Animal blinks within five seconds after stunning

Possible Causes:

1. Electrode is placed in the wrong position and the electrical current fails to go through the brain. The animal blinks because the stunner failed to induce a grand mal epileptic seizure that is required to induce instant insensibility.
2. The electrical amperage may be too low. Even though the electrode is in the correct position, there is not enough current passing through the brain to induce a grand mal epileptic seizure. The amperage and/or voltage should be checked and may need to be increased.
3. High electric resistance of the animal. This is especially a problem in old sows or dehydrated animals.
4. Electrode contact area is too small or the electrodes are dirty. Increase surface area of electrode or clean them.
5. The animal is too dry, which results in high electrical resistance. This is most likely to be a problem in cattle or sheep and continuous wetting during the stun may be required in these two species.

Problem: The initial stun appears to be done correctly but the animal blinks or shows other signs of return to sensibility 30 to 90 seconds after stunning.

Possible Causes:

1. The stunning-to-bleed interval is too long. This is especially a problem with head only reversible stunning. The solution is to shorten the interval between stunning and bleeding.
2. Poor bleeding if an animal shows a sign of return to sensibility after it has been bled. This can occur in cardiac arrested animals because there are always a few animals in which the heart is not stopped. Training of the person doing the bleeding will usually solve this problem.
3. Poor initial contact results in the animal receiving a stunning time that is too short. A common cause is a fatigued operator.
4. Interrupted contact – The stunning wand or tongs may bounce or slide during the stun and result in a stunning time that is too short. Poor design of the stunning wand is a likely cause. An other cause can be an overloaded stunner operator who is stunning more animals than he can easily handle.
5. Placement of the head electrodes in the wrong position on the head. Reposition the electrodes so that the electrical current will pass through the brain.

Resolving Captive Bolt Stunning Problems

Possible Reasons for Poor Stunning

1. Stunner has not been maintained. A dirty stunner will lose bolt velocity. High bolt velocity is required for an effective stun.
2. Damp cartridges for a cartridge fired stunner. Cartridges must be kept in a dry place. Cartridges should not be stored long-term in the slaughter room. However, it is acceptable to store cartridges needed for that day's production in the slaughter room.
3. An overheated cartridge fired stunner will lose bolt velocity. Rotate cartridge fired stunners to prevent overheating.
4. Worn cylinder bore on a pneumatic stunner. Even when the stunner has been serviced correctly, the machined cylinder bore eventually wears out and the stunner will lose hitting power. At this point the stunner will have to be replaced. A clean air supply will help prevent cylinder wear.
5. Poor ergonomics of bulky pneumatic stunners. Adding additional handles will aid positioning. When a pneumatic stunner is used with a conveyor restrainer, it is often easier to position the stunner if it is hung from the balancer on a 30-degree angle.
6. Stunner operator chases the animal's head. The operator should be trained to wait for the animal to stop moving and then position the stunner. Chasing the head will result in poor stunning.
7. Excited animals. Careful quiet handling and driving of animals into the stun box or restrainer will provide calm animals that are easier to stun correctly.
8. Air pressure too low to power a pneumatic stunner. Use the air pressure setting recommended by the manufacturer. This usually requires a dedicated compressor, which powers only the stunner.
9. Slick floor in stunning box causes cattle to become agitated.
10. Poor placement. Stunner is not placing the captive bolt square against the center of the head or not placing the bolt in the "X" between the base of the horn (poll) and the eye.

Resolving CO₂ Stunning Problems

Problem: Stunning Ineffective, animals not completely insensible

Possible Causes:

1. Low CO₂ concentration. Increase the gas concentration.
2. Exposure time is too short. Slow down the number of pigs which are moved through the system.
3. The time between the exit from the CO₂ chamber and bleeding is too long. To prevent recovery from the anesthesia, bleed the animals more quickly. This is most likely to be a problem in small CO₂ machines that have a short gas exposure time.
4. Poor bleeding technique. If animals show signs of return to sensibility after bleeding, the person doing the bleeding may need more training.

7 CHAPTER VII: WORKER SAFETY TIPS FOR ANIMAL HANDLERS AND STUNNERS

Working with livestock in a plant setting can be challenging and unpredictable. It is essential that safety be a priority when handling and stunning animals. Below are a series of safety tips that can help protect employees.

Livestock Facility and Trucking

1. If prods are wired into the house current, they must always be wired through a transformer.
2. Man gates and other devices must be installed so people can easily escape from agitated cattle. This is especially important for areas with solid fences. In concrete fences, toeholds can be formed in the walls.
3. Be alert around the unloading dock. A truck driver backing in may not be able to see you.
4. Handle cattle quietly. Excited animals are more likely to cause accidents.

Electric Stunning of Sheep and Pigs

1. The stunner operator's station must be kept dry.
2. The operator should wear rubber boots and stand on non-conductive plastic grating.
3. The restrainer frame and worker walkway structure should be grounded to a perfect ground. However, the side of the restrainer that the stunner operator can touch should be covered with heavy insulating materials such as a plastic meat cutting board.

Captive Bolt Stunning

1. Cartridge-fired stunners must ALWAYS be uncocked before they are set down.
2. NEVER, EVER throw a cartridge-fired stunner to another person.
3. Inspect latches on stunning boxes to make sure they latch securely. Before the next animal is admitted to the box, check the latch.
4. All guards must be kept in place over exposed pinch points that could be easily touched by employees during normal operation of the restrainer system equipment.
5. If a worker has to get inside a restrainer conveyor system to unjam it, lock it out first to prevent somebody else from turning it on.
6. Cartridge-fired stunners must always be kept unloaded when they are carried away from the stunning area.
7. Good maintenance is essential with pneumatic stunners to prevent excessive recoil, which can strain and injure the operator's hands, arm or back.
8. The use of a cartridge gun holder is considered a best practice. Do not lay a gun on the edge of a stun box.

Safe Livestock Handling

1. A single, lone, agitated animal can be very dangerous and may cause injury during handling. Many serious cattle handling injuries are caused by a single agitated animal.
2. Escaped cattle must never be chased. An animal that is loose on the plant grounds will return to the stockyard if it is left alone. If an animal gets loose inside the plant, employees should stay quiet while one designated person either stuns it or eases it out a door.
3. Stay out of the blind spot behind the rear end of large livestock. If they cannot see you, they are likely to kick you.
4. Install a safety fence consisting of upright posts around the cattle shackling area to prevent cattle from entering other parts of the plant.
5. Do not try to stop an animal that is running back from a group as a person may be injured.

Religious Slaughter Practices

Shackling and hoisting unstunned cattle and calves can be very dangerous. It has caused many serious accidents. In one plant, replacement of the shackle hoist with a restrainer resulted in a dramatic reduction in accidents. Shackling and hoisting of live sheep is also hazardous.

REFERENCES:

- Anil, A.M. and McKinstry, J.L. 1992. The effectiveness of high frequency electrical stunning in pigs. *Meat Sci.* 31:481-491.
- Anil, M.H. and McKinstry, J.L. 1998. Variations in electrical stunning tong placements and relative consequences in slaughter pigs. *Vet. J.* 155:85-90.
- Becerril-Herrera, M., Alonso-Spilsbury, M., Lemus-Flores, C., Guerrero-Legarreta, I., Hernandez, A., Ramirez-Necochea, R., and Mota-Rojas, D. 2009. CO₂ Stunning may compromise swine welfare compared to electrical stunning. *Meat Sci.* 81:233-237.
- Bellodi, L., Giampaolo, P., Caldriola, D., Arancro, C., Bertani, A., and DiBelle, D. 1998. CO₂ induced panic attacks: A twin study. *Amer. J. Psychiatry.* 155:1184-1188.
- Benjamin, M.E., Gonyou, H.W., Ivers, D.L., Richardson, L.F., Jones, D.J., Wagner, J.R., Seneriz, R. and Anderson, D.B. 2001. Effect of animal handling method on the incidence of stress response in market swine in a model system. *J. Anim. Sci.* 79(Suppl. 1):279. (Abstr.).
- Berghaus, A. and Troeger, K. 1998. Electrical stunning of pig's minimum current flow time required to induce epilepsy at various frequencies. *International Congress of Meat Sci. and Tech.* 44:1070-1073.
- Blackmore, D.K. 1988. Quality control of stunning. *Proc. of the Int'l. Congress of Meat Sci. and Tech.* CSIRO, Brisbane, Australia.
- Blackmore, D.K. and Peterson G.V. 1981a. Stunning and slaughter of sheep and calves in New Zealand. *New Zealand Vet J.* 29:99-102.
- Blackmore, D.K. and Newhook, J.C. 1981b. Insensibility during slaughter of pigs in comparison to other domestic stock. *New Zealand Vet. J.* 29:219-222.
- Blackmore, D.K. and Newhook, J.C. 1983. The assessment of insensibility in sheep, calves and pigs during slaughter. In: G. Eikelenboom (Ed). *Stunning Animals for Slaughter.* Boston: Martinus Nijhoff Publishers. pp. 13-25.
- Cook, C.J. 1992. *Stunning Science, a guide to better electrical stunning.* Meat Industry Research Conf. MIRINZ, Hamilton, New Zealand.
- Cook, C.J., Devine, C.E. and Gilbert K.V., et al. 1991. Electroencephalograms and electrocardiograms in young bulls following upper cervical vertebrae to brisket stunning. *New Zealand Vet. J.* 39:121-125.
- Croft, P.S. 1952. Problems with electrical stunning. *Vet. Record.* 64:255-258.
- Dodman, N.H. 1977. Observations on the use of the Wernberg dip-lift carbon dioxide apparatus for pre-slaughter anesthesia pigs. *Br. Vet. J.* 133:71-80.
- Dunn, C.S. 1990. Stress reaction of cattle undergoing ritual slaughter using two methods of restraint. *Vet. Record.* 126:522-525.
- Edwards, L.N. 2009. *Understanding the relationships between swine behavior, physiology, meat quality, and management to improve animal welfare and reduce transit losses within the swine industry.* Dissertation, Colorado State University, Fort Collins, CO.
- Finnie, J.W., Blumbergs, P.C., Manavis, J., Summersides, G.E. and Davies, R.A. 2000. Evaluation of brain damage from penetrating and non-penetrating captive bolt using lambs. *Aust. Vet. J.* 78:775-778.

Forslid, A. 1987. Transient neocortical, hippocampal and amygdaloid EEG silence induced by one-minute inhalation of high concentration CO₂ in the swine. *Acta Phys. Scand.* 130:1-10.

Gilbert, K.V., Cook, C.J. and Devine, C.E. 1991. Electrical stunning in cattle and sheep: Electrode placement and effectiveness. *Proc. 37th Int. Congress Meat Sci. and Tech.* Kulmbach, Germany. pp.245-248.

Grandin, T. 1985/1986. Cardiac arrest stunning of livestock and poultry. In: Fox M.W., Mickley, L.D. (eds.) *Advances in Animal Welfare Science*, Boston: Martinus Nijhoff Publishers. pp. 1-30.

Grandin, T., Curtis, S.E., and Widowski, T.M. and Thurman, J.C. 1986. Electro-immobilization versus mechanical restraint in an avoid-avoid choice test. *J. An. Sci.* 62:146-1480.

Grandin, T. 1988. Behavior of slaughter plant and auction employees towards animals. *Anthro-zoo.* 1:205-213.

Grandin, T. 1988. Possible genetic effect on pig's reaction to CO₂ stunning. *Proc. Intl. Congress of Meat Sci. and Tech.* Brisbane, Australia. 34:96-97.

Grandin, T. 1991a. *Recommended Animal Handling Guidelines for Meat Packers*, Washington, D.C., American Meat Institute.

Grandin, T. 1991b. Principles of abattoir design to improve animal welfare. In: J. Matthews (Editor) *Progress in Agricultural Physics and Engineering*, Wallingford, Oxon CAB International UK, CAB International. pp.279-304.

Grandin, T. 1993a. Report on Handling and Stunning Practice in Canadian Meat Packing Plants, conducted for Agriculture Canada, The Canadian Federation of Humane Societies and the Canadian Meat Council.

Grandin, T. 1994. Euthanasia and slaughter of livestock. *J. of Am. Vet. Med. Assoc.* 204:1354-1360.

Grandin, T. and Regenstein, J.M. 1994. *Religious Slaughter and Animal Welfare: A Discussion for Meat Scientists*, Meat Focus International, March, Wallingford, Oxon, UK, CAB International. pp. 115-123.

Grandin, T. 1995. Restraint of livestock, *Proc. of the Animal Behavior and the Design of Live-stock and Poultry Systems International Conference*, Northeast Regional Agricultural Engineering Service, Cornell University, Cooperative Extension, Ithaca, NY. pp. 208-223.

Grandin, T. 1996. Factors that impede animal movement at slaughter plants. *J. Am. Vet. Med. Assoc.* 209:757-759.

Grandin, T. 1997. Survey of Handling and Stunning in Federally Inspected Beef, Pork, Veal and Sheep Slaughter Plants. ARS Research Project No. 3602-32000-002-08G, USDA.

Grandin, T. 1998a. Objective scoring on animal handling and stunning practices in slaughter plants. *J. Am. Vet. Med. Assoc.* 212:36-39.

Grandin, T. 1998b. The feasibility of using vocalization scoring as an indicator of poor welfare during slaughter. *Appl. Anim. Behavior Sci.* 56:121-128.

Grandin, T. 2007c. Handling and Welfare of livestock in slaughter plants. In: Grandin, T. (ed.) *Livestock Handling and Transport*, Wallingford, Oxon, UK, CAB International. pp.329-353.

Grandin, T. 2000a. Effect of animal welfare audits of slaughter plants by a major fast food company on cattle handling and stunning practices. *J. Am. Vet. Med. Assoc.* 216:848-851.

Grandin, T. 2001a. Solving return to sensibility problems after electrical stunning in commercial pork slaughter plants. *J. Am. Vet. Met. Assoc.* 219:608-611.

Grandin, T. 2001b. Cattle vocalizations are associated with handling and equipment problems at beef slaughter plants. *Appl. Anim. Behavior Sci.* 71:191-201.

Grandin, T. 2001c. Ante mortem handling and welfare. In: Hui, Y.H., Nip, W.K., Rogers, R.W. and Young, O.A. (ed.) *Meat Science and Applications*, Marcel Dekker, NY, pp. 221-253.

Grandin, T. 2005/2007. Progress and challenges in animal handling and slaughter in the U.S. *Appl. Anim. Behavior Sci.* 100:129-139.

Gregory, N.G. 1988. Humane slaughter, in *Proceedings, 34th. Int. Cong., Meat Sci. Technol. Workshop on stunning live-stock.* Brisbane, Australia.

Gregory, N.G. and Wotton, S.B. 1984. Sheep slaughtering procedures. III. Head to back electrical stunning. *British Vet. J.* 140:570-575.

Gregory, N.G. 1993. *Slaughter technology. Electrical stunning of large cattle*, Meat Focus International, Wallingford, Oxon, U.K. CAB International. 2:32-36.

Gregory, N.G. 1994. Preslaughter handling, stunning and slaughter. *Meat Sci.* 36:45-46.

Gregory, N.G. 2001. Current profiles during electrical stunning. *Intl. Congress of Meat Sci. and Tech.* 46:368-369.

Gregory, N.G. 2008. Animal welfare at markets and during transport and slaughter. *Meat Sci.* 80:2-11.

Griez, E., Zandbergen, J. and Pols, J. 1990. Response to 35percent CO₂ as a marker of panic and severe anxiety. *Am. J. Psychiatry.* 147:796-797.

Hambrecht, E., Eissen, J.J., Newman, D.J., Smits, C.H.M., den Hartog, L.A., and Vestegen, M.W.A. 2005a. Negative effects of stress immediately before slaughter on pork quality are aggravated by suboptimal transport and lairage conditions. *J. An. Sci.* 83:440-448.

Hambrecht, E., Eissen, J.J., Newman, D.J., Verstegen, M.W. and Hartog, L.A. 2005b. Preslaughter handling affects pork quality and glycoytic potential of two muscles differing in fiber type organization. *J. An. Sci.* 83:900-907.

Hoenderken, R. 1983. Electrical and carbon dioxide stunning of pigs for slaughter. In: ikelenboom, G. (ed) *Stunning of Animals for Slaughter*, Boston: Martinus Nijhoff Publishers. pp. 59-63.

Hartung, J., Nowak, B., Waldmann, K.H., and Ellerbrock, S. 2002. CO₂ stunning of slaughter pigs, Effects of EEG, catecholamines and clinical reflexes. *Deutsche Tierarztliche Wochenschrift.* 109:135-139.

Jongman, E.C., Barnett, J.L. and Hemsworth, P.H. 2000. The aversiveness of carbon dioxide stunning in pigs and a comparison of CO₂ crate vs. the V restrainer. *Appl. Anim. Behavior Sci.* 67:67-76.

Lambooy, E. 1985. Electro-anesthesia or electro immobilization of calves, sheep and pigs, by Fenix Stockstill. *Vet. Quarterly.* 7:120-126.

Lambooj, B., Gerard, S., Merkus, M., Vorse, N.V. and Pieterse, C. 1996. Effect of low voltage with a high frequency electrical stunning on unconsciousness in slaughter pigs. *Fleischwirtschaft.* 76:1327-1328.

Lanier, J.L, Grandin, T., Green, R.D., Avery, D. and McGee, K. 2000. The relationship between reaction to sudden intermittent movements and sounds and temperament. *J. An. Sci.* 78:1467-1474.

OIE. 2008. *Terrestrial Animal Health Code, Chapter 7.5. Slaughter of Animals.* World Organization for Animal Health. Paris, France.

Pascoe, P.J. 1986. Humaneness of electro-immobilization unit for cattle, Am. J. Vet. Res. 10:2252-2256.

Raj, A.B., Johnson, S.P., Wotton, S.B. and McInstry, J.L. 1997. Welfare implications of gas stunning of pigs. The time to loss of somatosensory evoked potentials and spontaneous electrocorticograms of pigs during exposure to gases. Veterinary Rec. 153:329-339.

Rushen, J. 1986. Aversion of sheep to electro-immobilization and physical restraint. Appl. Anim. Behavior Sci. 15:315-324.

Troeger, K. and Woltersdorf, W. 1989. Measuring stress in pigs during slaughter. Fleischwirtsch. 69(3):373-376.

Van de Wal, P.G., 1978. Chemical and Physiological Aspects of Pig Stunning in Relation to Meat Quality - A Review. Meat Sci. 2:19-30.

Velvarde, A., Ruiz de la Torre, J.L., Stub, C., Diestre, A., and Manteca, X. 2000. Factors affecting the effectiveness of head only electrical stunning in sheep. Vet. Rec. 147:40-43.

Warner R.D., Ferguson D.M., Cottrell J.J. and Knee B.W. 2009. Acute stress induced by the preslaughter use of electric prodders causes tougher beef meat. Austr. J. of Exp. Ag. 47:782-788.

Wrrington, P.D. 1974. Electrical stunning: A review of literature. Veterinary Bulletin. 44:617- 633.

Warriss, P.D., Browth, S.N. and Adams, S.J.M. 1994. Relationships between subjective and objective assessments of stress at slaughter and meat quality in pigs. Meat Sci. 38:229-340.

Waynert, D.E. and Stookey, J.M. 2000. Vocal behavior in cattle. The animal's commentary on its biological process and welfare. Appl. Anim. Behavior Sci. 67:15-33.

Wenzlawowicz, M.V., Schutte, A., Hollenbon, K.V., Altrock, A.V., Bostelman, N. and Roeb, S. 1999. Field study on the welfare and meat quality aspects of Midas pig stunning device. Fleischwirtschaft. 2:8-13.

White, R.G., DeShazer, J.A. and Tressler, C.J., Borchner, G.M., Davey, S., Warninge, A., Parkhust, A.M., Milanuk, M.J. and Clems. E.T. 1995. Vocalizations and physiological response of pigs during castration with and without anesthetic. J. An. Sci. 73:381-386.

Wotton, S.B., Gregory, N.B. and Parkman, I.D. 2000. Electrical stunning of cattle. Vet. Record. 147:681-684.

APPENDIX:

HANDLING AND TRANSPORT

Table 5-2. Recommended minimum area allowances in transportation accommodations for groups of animals used in agricultural research and teaching¹

| Species | Average BW | | Area per animal | | | |
|-------------------------------------|------------|-------------|-------------------|--------------------|--------------------|--------------------|
| | (kg) | (lb) | (m ²) | | (ft ²) | |
| Cattle (calves) | 91 | 200 | 0.32 | | 3.5 | |
| | 136 | 300 | 0.46 | | 4.8 | |
| | 182 | 400 | 0.57 | | 6.4 | |
| | 273 | 600 | 0.80 | | 8.5 | |
| | | | Horned | | Hornless | |
| | | | (m ²) | (ft ²) | (m ²) | (ft ²) |
| Cattle (mature fed cows and steers) | 364 | 800 | 1.0 | 10.9 | 0.97 | 10.4 |
| | 455 | 1,000 | 1.2 | 12.8 | 1.1 | 12.0 |
| | 545 | 1,200 | 1.4 | 15.3 | 1.4 | 14.5 |
| | 636 | 1,400 | 1.8 | 19.0 | 1.7 | 18.0 |
| | Small pigs | 4.54 | 10 | 0.060 | 0.70 | |
| | 9.07 | 20 | 0.084 | 0.90 | | |
| | 13.60 | 30 | 0.093 | 1.00 | | |
| | 22.70 | 50 | 0.139 | 1.50 | | |
| | 27.20 | 60 | 0.158 | 1.70 | | |
| | 31.20 | 70 | 0.167 | 1.80 | | |
| | 36.30 | 80 | 0.177 | 1.90 | | |
| | 40.80 | 90 | 0.195 | 2.10 | | |
| | | | Winter | | Summer | |
| Market swine and sows | 45 | 100 | 0.22 | 2.4 | 0.30 | 3.0 |
| | 91 | 200 | 0.32 | 3.5 | 0.37 | 4.0 |
| | 114 | 250 | 0.40 | 4.3 | 0.46 | 5.0 |
| | 136 | 300 | 0.46 | 5.0 | 0.55 | 6.0 |
| | 182 | 400 | 0.61 | 6.6 | 0.65 | 7.0 |
| | | | Shorn | | Full fleece | |
| Sheep | 27 | 60 | 0.20 | 2.1 | 0.21 | 2.2 |
| | 36 | 80 | 0.23 | 2.5 | 0.24 | 2.6 |
| | 45 | 100 | 0.26 | 2.8 | 0.27 | 3.0 |
| | 55 | 120 | 0.30 | 3.2 | 0.31 | 3.4 |
| | | | Dimensions | | Area | |
| | | | (m) | (ft) | (m ²) | (ft ²) |
| Loose horses | 250 to 500 | 550 to 1100 | 0.7 × 2.5 | 2.3 × 8.2 | 1.75 | 18.8 |
| Foals <6 mo | | | 1.0 × 1.4 | 3.3 × 4.6 | 1.4 | 15.2 |
| Young horses 6-24 mo | | | 0.76 × 2.0 | 2.5 × 6.6 | 1.2 | 16.5 |
| | | | 1.2 × 2.0 | 3.9 × 6.6 | 2.4 | 25.8 |

¹Adapted from data of Grandin (1981, 2007c); Cregier (1982); Whiting and Brandt (2002); Whiting (1999); ILAR Transportation Guide (2006); and National Pork Board (2008) *Trucker Quality Assurance Handbook*.



1150 Connecticut Avenue, NW | 12th Floor | Washington, DC 20036
 Phone 202.587.4200 • Fax 202.587.4300

www.amif.org
www.animalhandling.org

Signs of a Properly Stunned Animal by Stunning Method

| | Head | Tongue | Back | Eyes | Limbs | Vocalization | Respiration | Tail | Response to pain |
|---------------------------------|---|-------------------|---|--|--|--------------|--|--|---|
| Cattle -- -- captive bolt | Must appear dead, hang straight and floppy | Straight and limp | Hanging straight, no righting reflex | No natural blinking. Wide open, blank stare, no response to touch; nystagmus absent | Uncoordinated kicking of hind legs acceptable; no right- ing reflex present | None | Rhythmic breathing (ribs moving in and out at least twice) is absent. Agonal gasp- ing not acceptable. | Relaxes shortly after being on the rail | A pinch or pinprick may be applied to nose only and no response should be observed. |
| Cattle -- electric | Must appear dead, hang straight and floppy | Straight and limp | Hanging straight, no righting reflex | Eyes may vibrate (nys- tagmus), but no natural blinking | Uncoordinated kicking of hind legs acceptable; no right- ing reflex present | None | Agonal gasping like a fish out of water normal. Rhythmic breathing (ribs mov- ing in and out at least twice) is absent. | Relaxes shortly after being on the rail | A pinch or pinprick may be applied to nose only and no response should be observed. |
| Pigs -- CO ₂ | Must appear dead, hang straight and floppy | Straight and limp | Hanging straight, no righting reflex | No natural blinking | Uncoordinated kicking of hind legs acceptable; no right- ing reflex present | None | Agonal gasping like a fish out of water normal. Rhythmic breathing (ribs mov- ing in and out at least twice) is absent. | Relaxes shortly after being on the rail | A pinch or pinprick may be applied to nose only and no response should be observed. |
| Pigs -- electric | Must appear dead, hang straight and floppy | Straight and limp | Hanging straight, no righting reflex | Eyes may vibrate (nys- tagmus), but no natural blinking | Uncoordinated kicking of hind legs acceptable; no right- ing reflex present | None | Rhythmic breathing (ribs moving in and out at least twice) is absent. Agonal gasp- ing not acceptable. | Relaxes shortly after being on the rail | A pinch or pinprick may be applied to nose only and no response should be observed. |
| Pigs -- captive bolt | Must appear dead, hang straight and floppy | Straight and limp | Hanging straight, no righting reflex | No natural blinking. Wide open, blank stare, no response to touch; nystagmus absent | Uncoordinated kicking of hind legs acceptable; no right- ing reflex present | None | Rhythmic breathing (ribs moving in and out at least twice) is absent. Agonal gasp- ing not acceptable. | Relaxes shortly after being on the rail | A pinch or pinprick may be applied to nose only and no response should be observed. |
| Sheep -- electric | Must appear dead, hang straight and floppy | Straight and limp | Due to anatomical differences in sheep, back may not hang completely straight; no righting reflex | Eyes may vibrate (nys- tagmus), but no natural blinking | Uncoordinated kicking of hind legs acceptable; no right- ing reflex present | None | Agonal gasping like a fish out of water normal. Rhythmic breathing (ribs mov- ing in and out at least twice) is absent. | Relaxes shortly after being on the rail | A pinch or pinprick may be applied to nose only and no response should be observed. |