VERSION 4

TQA™

TRANSPORT QUALITY ASSURANCE® HANDBOOK

A quality assurance program designed specifically for TRANSPORTERS, PRODUCERS AND HANDLERS of pigs.

pork checkoff® Transport Quality Assurance®

pork.org | 800.456.PORK

Table of Contents

TQA MISSION:

To continuously build a culture of protecting and promoting animal well-being through training and certification of animal handlers and transport personnel, using current industry-proven techniques which will lead to quality pork products and provide consumer confidence in the US pork industry.

Introduction

Transport Quality Assurance® - Building Trust for a Stronger Industry

In business, many trends come and go. But one constant that will never change is the need to earn the trust of your customers. For the pork industry, and all businesses involved in the food chain, earning and maintaining the trust of our customers - retail, foodservice and the consuming public - has never been more challenging. This fact, combined with our industry's desire to conduct our business according to high ethical standards and best practices, led to the development and evolution of the Transport Quality Assurance (TQA) program. Originally launched in 2002, TQA has undergone three revisions to provide the most current, science-based information on humane handling and transport of pigs to over 25,000 handlers and transporters in the industry. The TQA program helps pig transporters, producers and handlers define best practices for handling, moving and transporting pigs and the potential impacts those actions can have on pig well-being and/or pork quality.

We Care: Making our Industry Stronger

There has been a growing interest among food-chain customers and the general public with the way food is produced. Recognizing these concerns must be addressed to better position the industry's track record of responsibility, pork industry leaders launched the We Care initiative. The We Care initiative seeks ongoing improvement in the pork industry's production practices, building upon and promoting to those outside the industry its strong record of responsible farming. TQA is a critical component of the We Care initiative and is a clear demonstration of the industry's commitment to responsible farming and continuous improvement. At the heart of this commitment is a statement of ethical principles which asks each and every member of the pork industry to commit to:

- Produce safe food
- Protect and promote animal well-being – including proper handling and transport at all phases of production
- Ensure practices to protect public health
- Safeguard natural resources in all of our practices
- Provide a work environment that is safe and consistent with our other ethical principles
- Contribute to a better quality of life in our communities

The Right Thing to Do. For Your Business. For Your Industry.

TQA is a clear demonstration of how the pork industry promotes and implements responsible practices when handling and transporting pigs. Not as a result of regulation or mandate, but rather as an acknowledgement that adhering to good production practices is a good business decision and is the right thing to do. The spirit of continuous improvement - always striving to do better - is a mindset that has long been embraced by pork industry stakeholders. When the industry is responsible and proactive, every stakeholder - including pig handlers and transporters - benefits. Producer leadership urges all those involved in the movement and transport of pigs to recognize that we all share a duty to demonstrate responsible pork industry practices. Full participation in the TQA program and implementation of the recommendations are critical to building our customer trust while continuing to enhance the integrity of the pork industry.

The Role of Handlers and Transporters.

Pig handlers and transporters play a key role in the pork production process. Handling and transporting the pigs in our care are essential elements to the multi-site pork production model that is currently used in the United States today. The pork production system involves not only moving animals from the farm to the market or harvest facilities, but it also involves handling and moving an animal several times throughout the production cycle. Animals are often moved and handled for purposes of:

- Routine daily care
- Treatment of an illness or injury
- Reproduction
- Relocation to another production phase and location/site
- Marketing

The figure below illustrates the animal-flow through a typical pork production system. Each arrow in the illustration is a point where pig/handler interactions can occur through handling and transportation.

Pig Flow in a Typical Pork Production System

No matter what segment of the pork production system, the actions of a handler or transporter can have a significant impact on pig well-being, health, biosecurity and pork quality.

Animal Well-Being

The conditions under which pigs are handled and transported can have a direct impact on their well-being. Research has shown that using good animal handling practices benefit the pig, the handler and the industry. For the pig, good animal handling can result in the reduction or elimination of stressful experiences and therefore better well-being. For the handler, good animal handling generally results in easier pig movement which means better well-being and less frustration for the animal handler. Other benefits to the animal handler include a decrease in transport losses, reduced time to load and unload pigs, reduced weight loss and better meat quality. Becoming a TQA Certified Handler demonstrates your commitment to promote and protect pig well-being to our customers and consumers. Incidents of poor animal handling or abuse are ethically wrong and unacceptable. It is important to remember that an individual's actions, both positive and negative, can have a direct impact upon themselves, the company they represent and possibly the entire U.S. pork industry.

Animal Health and Biosecurity

Healthy animals are essential to a successful pork production operation and are better able to fully express their lean genetic potential. Diseases can be introduced into herds through the loading and transportation processes and through the introduction of new pigs into the herd. Preventing disease movement and introduction makes it imperative that handlers, both in production facilities and those driving trucks, take the necessary steps and follow biosecurity protocols to minimize the spread of disease agents and ensure the health of the animals they interact with.

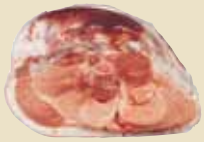
Pork Quality

Improper handling and transport of pigs is one of the largest profit-reducing issues facing the pork industry today. Most losses typically result from the events immediately before, during and after transport of the pigs. Evidence of improper handling and/or transport can be seen through:

- Carcass losses resulting from trimming off bruises
- Pale, soft and exudative meat (PSE)
- Dark, firm and dry meat (DFD)

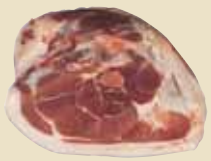
Estimates show that bruises alone can cost the U.S. Pork Industry millions of dollars per year and overall pork quality defects total several hundred million dollars annually.

COLOR - TEXTURE - EXUDATION



PSE **Pale pinkish gray, very Soft and Exudative. Undesirable appearance and shrinks excessively.**

RFN **Reddish pink, Firm and Non-exudative. “IDEAL”. Desirable color, firmness and water-holding capacity.**



DFD **Dark purplish red, very Firm and Dry. Firm and sticky surface, high water-holding capacity.**

Expectations of TQA Certified Handlers

TQA Certified Handlers are expected to uphold the ethical principles of We Care everyday. Whether handling pigs on the farm or transporting them, TQA Certified Handlers have a responsibility to:

- Protect food safety
- Protect and promote pig well-being
- Protect public health
- Safeguard natural resources
- Promote a safe work environment
- Contribute to the communities in which we live and operate

1 HANDLING

Using proven pig handling and movement practices will help contribute to a safe and positive experience for the pigs and the handler. Human injuries happen more often when people are handling animals than during any other activity performed in pork production. Understanding basic pig behavior, proper handling practices and using proper handling equipment will help animal handling be a safe activity for all.

BASIC PIG BEHAVIOR

Good animal handling practices start with the handler having a good understanding of pig behavior. A significant portion of a pig's behavior can be attributed to natural instinct and is further impacted by the age, gender, health status, environment and previous experiences of the pig. Understanding a pig's basic behavior can help:

- Facilitate animal handling
- Reduce stress
- Reduce risks to a handler's personal safety
- Reduce losses due to skin injuries, bruises, fatigue and even death

The main instinctive behaviors of a pig that a handler should understand, and use to his or her advantage when possible, include:

- Fight or flight response
- Following/herd instinct

Fight or Flight Response

When confronted with a perceived threat to its well-being, a pig must make the decision to flee or fight. The general characteristics of a pig make it an animal that is typically prey and more suited to flee, or escape, rather than to fight. This flight tendency can be used to the handler's advantage, especially when the handler understands three critical concepts:

- Flight Zone
- Point of Balance
- Blind Spot

When these concepts are not used, or are used incorrectly, pigs can easily be injured when trying to escape, either through contact with another pig or pigs, or through contact with an object in their environment such as a gate, feeder or chute. Visual gaps between pens, alleys, ramps, gates, chutes or other places can appear to be an escape route to a pig and can result in injuries to the pig and/or cause balking.

The flight zone is an imaginary circle around an animal that it considers its individual space.

- When a handler enters a pig's flight zone the pig will move away. If the pig does not see an escape route, it may attempt to turn around (if necessary) and run past the handler
- The size of the flight zone is determined by the pig's familiarity with humans and will vary from pig to pig
- A completely tame animal has no flight zone - a handler can walk directly up to it and touch it
- Handlers should work with an animal from the edge of its flight zone

continued on next page ▶

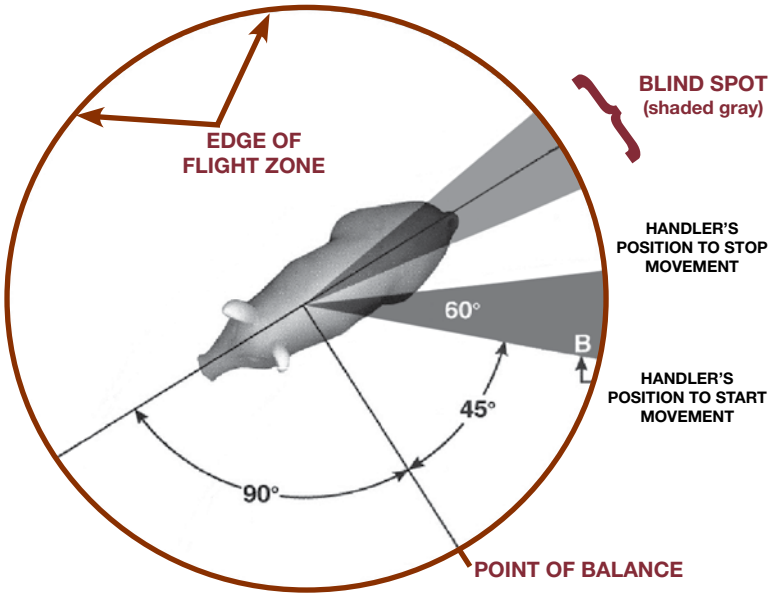
The point of balance is located at a pig's shoulder. If a handler enters a pig's flight zone, the pig will move:

- Forward if the handler approaches from behind the point of balance
- Backwards if the handler approaches from in front of the point of balance

Common error – Attempting to move a pig forward in a chute when a handler is in front of the pig's point of balance.

The blind spot exists because a pig's eyes are on the sides of its head and a pig's field of vision is approximately 310 degrees leaving a blind spot directly behind it.[1] This blind spot means that a handler cannot rely on a visual reaction to get a pig to move when standing directly behind it.

The figure below shows the flight zone, point of balance and blind spot of a pig. To facilitate pig movement, handlers should work from the edge of the flight zone behind the point of balance in the area labeled as B in the figure.



A Pig's Flight Zone, Point of Balance and Blind Spot

Following/Herding

Pigs instinctively like to stay together, in visual and/or physical contact with each other. This instinctive behavior also causes pigs to want to follow each other in order to maintain that contact. This following behavior can be an advantage when moving pigs of any age or size. Examples where this is effective include when a handler is moving pigs:

- Up or down a ramp or chute
- Through hallways
- Into or out of a pen or room

Environment

During movement, a pig may come across unfamiliar or distracting elements within its environment. These elements can cause pigs to slow, stop or change direction of movement. Pigs typically slow, stop or change direction (or balk) when they encounter something new or unfamiliar such as changes in:

- Floor surface (e.g. transition from concrete alley to wooden chute)
- Footing/traction (e.g. wet, slippery chute or loose cleats)
- Temperature (e.g. moving from a warm building to an outdoor chute/ramp on a cold day)
- Lighting – pigs move best from dark areas to lighter areas, not from light to dark

Other things that may be unfamiliar or distracting and cause pigs to balk include:

- People in their path or peripheral vision area
- Drafts or wind
- Shadows
- A beam of light shining through a crack or opening
- Equipment, trash or other objects in their path or hanging on gating (e.g. feed cart in alley)
- Loud or sudden noises
- Water puddles or drain grates
- Shiny/reflective objects or surfaces
- Change in color of equipment/gates
- Change in height of flooring, a step up into a pen or chute, etc.
- Moving or flapping objects
- Doorways that may change the width of the alley
- Other animals (e.g. pigs, dogs, cats)

PEOPLE: PIG INTERACTIONS

It is important to understand the potential effects that human interactions have on pigs and pig behavior. A person's intentions are not always understood by the pig and this may create fear and/or a negative reaction to a handler.[2] Additionally, pigs that have had regular, positive interactions with people will typically be less fearful and easier to handle.[3] Slowly walking pens on a daily basis will help pigs become used to positive interactions with people. This will train the pigs to quietly get up and calmly move away from the handler. Pigs can recall previous experiences and if they have had a bad handling experience in the past they may be more difficult to handle the next time. This previous experience may relate specifically to a human interaction or it may relate to a piece of equipment such as a loading chute.

Handlers should act calmly and avoid sudden movement, loud noises and other actions that may frighten or excite pigs. This includes shouting or creating excessive noise with other handlers when working as a team to move pigs. Pigs should be moved at their normal walking pace. Aggressive handling should be avoided as it can lead to injured or stressed pigs. Research indicates that more than 20 percent of aggressively-handled market hogs can become injured, stressed or fatigued compared to 0 percent of those handled properly.[4]

continued on next page ▶

Aggressive handling includes things such as:

- Overuse, or improper use, of electric prods
- Loud noises and yelling
- Moving pigs too fast
- Moving too many pigs per group
- Overcrowding pigs in chutes, ramps and alleyways
- Rough physical contact

Willful acts of neglect or abuse are unacceptable. Willful neglect and abuse are defined as acts outside of normally accepted production practices that intentionally cause pain and suffering. The National Pork Board strongly encourages anyone with knowledge of possible animal abuse or neglect to report these actions immediately to the proper responsible persons. If a willful act of abuse is observed, immediately intervene to stop the situation if reasonably and safely possible. Discuss the situation with the appropriate authority (owner, manager, receiving crew, etc.). Companies have animal-welfare policies that clearly define how these situations are to be handled and reported. Transporters and handlers should be familiar with these policies as committing willful acts of abuse or failure to report witnessing a willful act of abuse may be grounds for termination of employment. Each state has laws that address animal cruelty, and therefore willful acts of abuse can be punishable by law.

HANDLING PIGS OF VARIOUS TYPES AND SIZES

Basic handling protocols apply to nearly all pigs but requirements for certain sizes and types of pigs differ and specific techniques may need to be used.

Handling BREEDING STOCK

Breeding stock (sows, gilts and boars) are the largest and most powerful pigs a handler will work with and handlers should use extra caution when moving these animals. A sorting board should be used when attempting to turn or stop a large animal. The handler should not use his or her body alone. If the animal appears aggressive or agitated, it may be safer for the handler to move out of the way than to risk potential injury.

Additionally, breeding stock are the most unpredictable animals, especially boars. Boars are particularly aggressive and most unpredictable when exhibiting mating behaviors, such as when they are being used for estrus detection. **Boars are especially dangerous because their tusks can cause injury so handlers should use extra caution and never turns their back to a boar.** Sows can be aggressive as well, especially when they perceive their litter are being threatened (e.g. such as during piglet processing or weaning). In addition to their reproductive behaviors, pigs of breeding age require extra caution just because of their sheer body mass. Therefore, it is important for these pigs to be familiar with positive human interactions.

Moving breeding females and boars in and out of pens and/or individual housing units can be a challenge even to the best handlers. There are many techniques that can be used based on what is known about pig behavior. For example, when trying to move a sow into a farrowing stall she may resist because she sees her path is blocked by the stall end being closed. This may be overcome by leaving the stall door open and having someone close it when she enters the stall, but before she can move out the far end.

These large animals also can cause injury, to people or pigs, through sudden movement of their heads or by pinning the handler between the pig and a fixed object such as a gate or feeder. Often this type of injury is a result of the handler's arm or leg being in the wrong place at the wrong time. An example may be a crushing or pinching injury to a hand or foot when a pig closes a gate with its body.

Handling PIGLETS

Handling piglets can present a safety challenge to the handler. Piglets have sharp teeth and can bite the handler when they are picked up. The sow may also attempt to bite the handler when he or she reaches into the stall to grab a piglet.

Piglets can either be moved by herding or by picking them up and moving them by hand or with a cart. Piglets should be picked up by holding under the rib cage or by grabbing a rear leg, above the hock, and then gently setting the piglets into a cart, alleyway or pen. Piglets may squirm and wiggle when picked up so care should be used so that they are not dropped. **Piglets should not be tossed or thrown.** When being held for an extended period of time, piglets should be held under the rib cage next to the handler's body or by both rear legs using two hands.

Handling NURSERY AND FINISHER PIGS

Nursery and finisher pigs grow rapidly and quickly become too large to lift and/or hold.

When sorting and moving these pigs, it is often the best practice to work in pairs and have one person work the pen gate while the other sorts the pigs with a sorting board. This is especially true when finished pigs are being sorted for load-out as the first pigs may be reluctant to leave their pen mates.

Handlers should rely on a sorting board instead of their bodies to turn or stop large finishing pigs. A bifold panel is a particularly useful device as it creates a corralling effect, reduces an escape route for the pig and increases safety for the handler. If an animal appears aggressive or agitated, it may be safer for the handler to move out of the way than to risk a potential injury.

GROUP SIZES

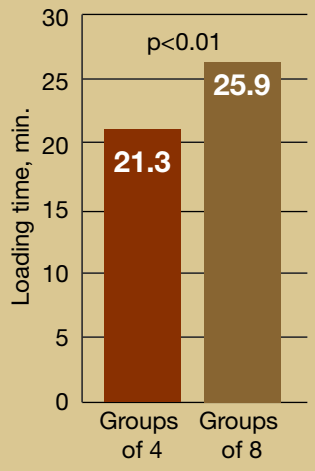
Pigs should be moved in groups large enough to be efficient for the production system, but small enough to be safe for the pigs and the handler(s). Groups of finished pigs and breeding stock should be small enough so that the handler can always maintain control of the lead pig. Additionally, research indicates that reducing finish pig group size from 8 to 4 pigs during loading significantly decrease the amount of time to load the trailer and the percentage of dead and non-ambulatory pigs at the farm and slaughter plant.[5] The suggested group sizes are based on best industry practice but facility design and conditions of the environment and/or animals may require adjustment to group size.

Suggested group sizes by pig type.

Pig type/size	Suggested group size
Weaned piglets	20
Nursery pigs	20
Finished/Market pigs	3-5
Sows/Gilts	1-5*
Boars	1-5*

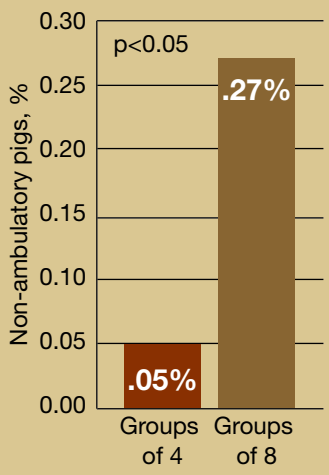
**Depending upon temperament and safety conditions, may require moving individually.*

Figure 1: Effects of group size during loading on loading time.*



*Refers to the amount of time required to load a trailer deck (n=87 pigs)

Figure 2. Effects of group size during loading on non-ambulatory pigs at the farm.



HANDLING TOOLS/EQUIPMENT

There are many different pieces of handling and sorting equipment on the market, or that can be easily made on the farm, to help you sort or move pigs in a safe, humane and efficient manner.

Handling equipment is effective by providing barriers or stimuli including:

- Physical barrier (e.g. sorting board)
- Visual barrier (e.g. matador's cape)
- Auditory stimulus (e.g. rattle/shaker paddle)
- Visual stimulus (e.g. nylon flag)

Most of these tools are effective for a specific situation and should not be used for others. For example, a plastic rattle/shaker paddle may be effective for moving weaned piglets from the farrowing room to the nursery, but is not a tool to use when moving a boar to his pen after he completes a round of estrus detection.

The use of an electric prod is a stressful event.

- Numerous research studies have shown that increased use of an electric prod increases stress in pigs so use of electric prods should be avoided or absolutely minimized
- Never prod a pig in sensitive areas such as eyes, nose, anus, testicles, etc.
- If regular use of an electric prod is needed, evaluate your handling procedures and facilities
- An electric prod should not be the primary tool for moving pigs and should only be used as a last resort

If it is necessary to use a prod, it should be applied to the back of the pig behind the shoulder[6] and the duration of the shock should not exceed one second. The pig should be allowed time to respond before another shock is given. Electric prods should not be used in the pen[7].

Willful acts of neglect or abuse are unacceptable. Willful neglect and abuse are defined as acts outside of normally accepted production practices that intentionally cause pain and suffering. This includes, but is not limited to, malicious hitting or beating an animal or using an electric prod in sensitive areas such as eyes, nose, anus, testicles, etc.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

To determine what PPE is required, the handler should conduct a hazard assessment. Walk through the tasks required during loading, transport and unloading. Then, considering the equipment to be used, make a list of potential injuries that could occur. Develop a list of PPE that should be used by the handler to help protect him or her from those injuries. Typically, the minimum amount of PPE a handler should consider when handling pigs is a pair of safety-toed boots and a sorting board. Handlers operating inside a truck/trailer should also consider wearing knee pads and/or shin guards and a bump helmet to protect themselves from possible injury due to contact with the trailer's surfaces.

All handlers should also consider using these PPE items, depending upon the hazard assessment and company protocols:

- Dust mask
- Eye protection
- Hearing protection
- Gloves

Acceptable equipment to use when handling pigs

SORTING BOARD/ PANEL	The most versatile tool is typically the sorting board or sorting panel and can be a single or bifold panel. A sorting board can provide both a physical and a visual barrier. When using a sorting panel make sure to use the ground as an anchor, don't try to hold back a pig with the board wedged against your legs/knees.	
PLASTIC RATTLE/ SHAKER PADDLE	The rattle/shaker paddle can provide auditory and visual stimuli. Shaker cans or bottles can also be used. Rattle paddles can also be used to gently tap an animal, but should not be raised higher than shoulder level.	
NYLON FLAG	A nylon flag is an effective visual stimuli in many cases, especially with larger pigs. Used correctly, it can draw a pig's attention, as well as block its visual path.	
MATADOR'S CAPE	A matador's cape can be effectively used as visual barrier with nearly all pigs. Its main use is as a tool to block a pig's vision and provide the illusion of a dead-end.	
PLASTIC RIBBONS ON A STICK	Ribbons can be used as visual stimuli and when waved/flapped can help create distraction so that the pig moves in the opposite direction.	
ELECTRIC PROD	An electric prod should be the tool of last resort. It should only be used when absolutely necessary and only following strict guidelines as previously listed.	

NOTES:

2 JOURNEY PLANNING

A pig may be loaded onto a truck, transported then unloaded several times during its life. Safety practices need to be followed during each of these moves. A four-way interaction between animals, handlers, facilities and transport vehicles occurs during loading and unloading. Each of these components must be understood by the handler in order for safe and efficient loading and unloading to occur.

PLANNING

Proper preparation is critical when loading and unloading. It is important to have a clear plan and all handlers involved should understand the plan. It is a best practice to load and unload as a team with each individual handler having predetermined roles and responsibilities.

For example, have a clearly defined team lead that has the necessary authority to make decisions during the loading process, including whether or not to load or unload a specific animal. When loading finished market pigs a pair of handlers may work to sort, or cut, the correct number of pigs from a pen into the alley, a third handler moves them down the alleyway to the doorway of the building, and a fourth handler moves them up the chute onto the truck. Understanding roles and following through with the team plan makes moving animals easier and helps reduce confusion and the potential for animal and/or worker stress during the handling process.

It is important for everyone to be aware of the timelines and follow them. If a delay occurs, this change in the timeline needs to be communicated to all involved in the transport process, including the people at the origination and destination points.

Also keep in mind that the loading/unloading plan should follow biosecurity protocols.

Facilities and Equipment

Facilities should be properly designed and constructed, and in good repair, with functional equipment in place before loading or unloading pigs. Designs that provide consistency of width from alleyway to the truck are ideal because the hourglass effect of a smaller doorway or chute is eliminated. This chapter provides recommendations for facility designs that facilitate easy pig movement. However, there may be other configurations that are also effective but may require different handling skills to prevent animals from balking, jamming or becoming stressed.

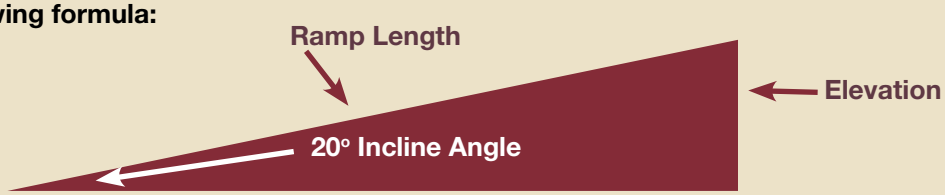
Alleyways and Doorways

When building a new finishing barn, the width of the alleyway is an important design component for animal handling. Alleyways should be 3-feet wide to accommodate moving three to five finishing pigs of current market weight (~260 lbs.). This will allow two pigs to walk side by side without jamming, thereby reducing stress and speeding up the movement of pigs. Doorways should be at least the same width as the alleyway and the door should open completely to eliminate pinch points. Avoid thresholds on the floor of the doorway to reduce balking.

Ramps and Chutes

Proper design and function of ramps and chutes are to reduce the incidence of slips and falls. The correct angle of incline on ramps is very important to promote successful pig movement. Conditions of the environment and ramp design are factors that may influence the ability of pigs to use a ramp. As a general guideline, ramps should be 20 degrees or less. Pigs have difficulty climbing steep inclines, so lower angled ramps are much easier for pigs to use.

To determine how long a ramp needs to be to achieve the desired angle, use the following formula:



Elevation ÷ 0.34202 = Ramp Length for 20 degrees ramp angle

Because most ramps are a fixed length, and trailers are typically a fixed height, it may be useful to be able to calculate whether the angle of the ramp exceeds the suggested maximum ramp angle. To determine whether the angle of a ramp exceeds recommendations, using the known length and elevation, use the following formula:

If Elevation ÷ Ramp Length < 0.34202 the incline angle is less than 20 degrees

Example: Elevation = 3.75 feet Ramp Length = 8 feet
3.75 feet ÷ 8 feet = 0.46875
0.46875 > 0.34202 so the incline angle **IS NOT** acceptable

Recommended Chute Lengths

Elevation from bottom to top of chute	Length of ramp for 20° slope
1 ft	5 ft
2 ft	10 ft
3 ft	15 ft
4 ft	20 ft
5 ft	25 ft
6 ft	30 ft
7 ft	35 ft
8 ft	40 ft

The following items are critical to proper ramp and chute design:

- Concrete ramps should have stair steps and nonslip surfaces to provide traction and help avoid slipping. It is recommended that the steps should have a 2.5-inch rise and a 10-inch tread
- Ramps for market and adult hogs should have cleats spaced eight inches apart
- Ramps for piglets and nursery pigs should have cleats spaced three inches apart
- Ramps should have a flat dock at the top for pigs to step onto when they exit the truck and before they enter the ramp
- Curves are preferred over sharp turns and angles to facilitate pig movement – A pig views a 90-degree turn as a dead end and may stop or try to turn around

Maintenance and repair of ramps is also important.

- Sharp, protruding or otherwise injurious items should be removed or repaired
- Broken or missing cleats should be repaired or replaced
- Moving parts such as cables, pulleys and hinges should be inspected regularly and maintained as necessary
- Ramps and chutes should be kept free of trash, debris and other potential distractions
- Chutes should have adequate lighting to aid in the movement of pigs

Several options for proper chute designs may exist. One particular source recommends a double-width chute type allowing two pigs to move side-by-side at the same time. A double-width chute should be 36 inches wide and have solid outer walls. A single-width design should be 16-18 inches in width and have solid sides.[6] The chute width may need to vary depending upon the size of pig being moved to prevent pigs from jamming.

Transport Trailer

Trailers should be kept in good repair and should be kept clean. The trailer should have non-slip solid flooring to prevent the animals from slipping and falling. All gating and doors should open and close freely and must be able to be secured shut and not have gaps where pigs can get their head or legs stuck or fall out of the truck. Internal ramps should function properly and extend all the way to the floor. There should be no sharp or protruding objects in the trailer that may injure the pigs.

SCHEDULING

Communication between the transporter and the loading and unloading locations is essential. It is important that all loads are scheduled regardless of the type or size of pigs. For example, it doesn't matter if you are delivering finished pigs to the harvest plant or a load of nursery pigs to a finishing site. The goal of everyone involved in scheduling transportation is to minimize the amount of time pigs must be on a trailer. Not following scheduled delivery times can cause backups at the plants, which result in increased waiting times for other drivers and pigs.

The following items will help minimize transport stress on the pigs and reduce the potential for negative impacts on pork quality:

- Maintain a steady pace on the road
- Minimize the total number of stops
- Avoid sudden stops, starts and sharp turns
- Follow the delivery schedule closely

continued on next page ▶

CHECKLIST

The transporter should consider completing a preparation/loading/unloading checklist for each load of pigs. This checklist may include actions to consider in preparation for arrival at the loading location and those used at the site, while in transit and at the unloading location. A sample checklist is shown below:

√	Preparation	√	Loading	√	Unloading
❑	Fuel, oil and other fluids at appropriate levels	❑	Instructions for entering site/location are known including biosecurity protocols	❑	Instructions for entering site/location are known including biosecurity protocols
❑	Truck and trailer lights operational	❑	Bill of lading	❑	Sort board/other handling tools ready and used properly
❑	Tractor (inside and out) and trailer clean and disinfected	❑	Health papers (if necessary)	❑	Clean boots and clothing available
❑	Vehicle paperwork current including insurance and registration cards	❑	Truck, cab, trailer clean and disinfected	❑	Disinfectant available
❑	Load paperwork in order including pick-up and drop-off addresses, directions and telephone contact information	❑	Weather conditions accounted for	❑	Unloading conditions are safe for handlers and pigs
❑	Weather-appropriate bedding available in trailer	❑	Sort board/other handling tools ready and used properly	❑	Pigs are not crowded when unloaded
❑	Water/cooling systems working in trailer (if appropriate)	❑	Clean boots and clothing available	❑	Pigs are not allowed back on the truck once they enter the chute
❑	Vent holes, nose vents, slots covered/uncovered appropriate for weather	❑	Disinfectant available	❑	Paperwork signed and copies delivered
❑	Trailer in proper repair so as not to cause injury to animals or handlers	❑	Container for dirty clothing and boots	❑	Container for dirty clothing and boots
❑	Clothing available for transporter and appropriate for biosecurity conditions	❑	Loading conditions are safe for handlers and pigs		
❑	Phone numbers to contact in case of emergency or delay	❑	Pigs are not crowded during loading or when in the trailer		
		❑	Pigs are not allowed back into facility once they enter the chute or truck		

3 LOADING, UNLOADING AND TRANSPORTATION

Transportation may be a stressful event in the life of a pig and is thought to be the most influential pre-harvest factor affecting final pork quality. Transportation involves factors that could be perceived as stressful to a pig such as unfamiliar noises and vibrations, rounding corners, changes in speed (acceleration/deceleration) and potential temperature extremes. Handlers and transporters should implement procedures that make transportation as safe and humane as possible. Before loading a truck it should be correctly prepared for its journey including determining loading density, proper setup for weather conditions and scheduling of transport.

LOADING AND UNLOADING PIGS OF VARIOUS SIZES

Most basic loading and unloading protocols are similar and apply to nearly all pigs, but requirements for certain sizes and types of pigs differ and specific techniques may need to be used.

Some common points to remember when loading and unloading pigs, regardless of size, include:

- The handler should use the pigs' flight zone to get the animals to go where the handler desires
- Use proper handling tools to help move the pigs. An electric prod should not be the primary handling tool. IF absolutely necessary, use according to the guidelines provided in Chapter 1
- Pigs should be moved in the correct group sizes (Chapter 1). For example, do not unload an entire trailer compartment at one time
- Getting the first pig in a group moving to enter a chute when loading or unloading may be the most challenging, once the leader is moving the other pigs may move easier due to the "follow the leader" herd instinct
- Use the proper handling tools to help move the pigs (Chapter 1)
- **Do not load any ill, injured or fatigued pigs onto a truck.** It is the position of the National Pork Board that any pig unable to walk, is ill or significantly injured, should not be transported to market channels. Where the likelihood of recovery is low, even with treatment, the pig should be humanely euthanized. The driver has the ability and the right to refuse any ill, injured or fatigued pig onto a truck
- Pigs that become ill, injured or fatigued should be handled according to the protocols denoted in Chapter 4

Loading and Unloading FINISHED PIGS

Finished or market pigs are usually 260 pounds or more. The handler should use the pigs' flight zone to get the finished pigs to go where the handler desires. Handlers should rely on a sorting board instead of their bodies to turn or stop market pigs. If an animal appears aggressive or agitated, it may be safer for the handler to move out of the way than to risk a potential injury. Some points to consider when loading and unloading finished pigs:

- Watch for signs of fatigue, including open-mouthed breathing, inability to move and splotchy skin as described in Chapter 5
- An electric prod should not be the primary handling tool. If absolutely necessary, use according to the guidelines provided in Chapter 1
- Use proper handling tools as described in Chapter 1

continued on next page ▶

Loading and Unloading WEANED PIGLETS AND NURSERY PIGS

Weaned piglets are sometimes moved directly from a farrowing room to a nursery or a wean-to-finish facility off-site. Nursery pigs, also known as feeder pigs, typically weigh ~40 pounds or more when moved to finishing facilities. These piglets and pigs must be given extra time and moved carefully so they are not injured. Some points to consider when loading and unloading piglets and nursery pigs:

- Use extra care and allow extra time for these pigs to move up, or down, the ramp and chute
- Avoid excessive noises such as yelling or banging on the truck or wall to rush and crowd pigs into or out of the truck and into the chute during movement
- Electric prods are unnecessary with weaned piglets and nursery pigs and should be avoided
- Use proper handling tools as described in Chapter 1

Loading and Unloading BREEDING STOCK

Breeding animals are typically reared off-site and are transported to a breeding herd as a gilt or boar. When they are culled, or removed from the breeding herd, they must then be moved to market. Moving these large, sexually mature pigs can sometimes present a challenge. Some points to consider when loading and unloading breeding stock:

- These pigs are most likely being mixed with unfamiliar animals which may result in aggression. Handlers should be careful not to be in the pigs' way if aggression occurs
- When breeding stock is unloaded into an unfamiliar facility, allow the animals extra time to explore and become comfortable, do not rush them
- Boars may need to be loaded individually, and/or penned separately once on the truck, to prevent injury from fighting
- It is unacceptable to cause physical damage to the snout of a boar as a means to reduce aggression
- If tusk trimming must be done, at least 0.8 inch of tusk should be left beyond the gumline to avoid cutting into the nerves and pulp of the tooth. A dehorning wire to saw through the tusks will reduce the occurrence of the tooth splintering[9]
- Remember, these animals are typically larger than the average finisher pig. Do not load them in the same compartment with finisher pigs
- An electric prod should not be the primary handling tool. If absolutely necessary, use according to the guidelines provided in Chapter 1

TRANSPORT SPACE RECOMMENDATIONS

Overcrowding pigs on a trailer is an easy and preventable mistake. This costly error can put an animal's safety at risk and cause losses to the producer and the harvester. A perceived saving in transportation costs is far outweighed by the possibility of reduced pork quality, compromised animal well-being or even death.

Overcrowding is never a viable option when transporting animals. Signs of overcrowding may include piling, excessive squealing or panting. Gates should be able to close without having to force the pigs into the space. Once a gate is closed, watch to see if the pigs have room to stand without climbing on top of each other. Listen for pigs that are squealing due to being stepped on or crowded. If overcrowding is suspected, reduce the number of head per compartment. Pigs in overcrowded conditions will quickly overheat and begin panting and open-mouth breathing and may become injured, fatigued or even die.

Review these standard transport space recommendation statements:

- Generally, space allowances should be such that pigs can lie down and stand up, in their normal position
- On short trips of less than four hours pigs may prefer to stand. Pigs need space to lie down on longer trips. If there is not enough room, pigs may compete for floor space, generating heat, noise and stress
- The trailer should have compartments with gates or dividers with working latches to limit the number of pigs in each given area
- Weather conditions and animal size should be considered when determining the number of animals to load

The transport space recommendation table shows the recommended space per pig under normal weather conditions (not hot or cold extremes). Transport losses are minimized at these recommendations, but optimal floor space is dependent upon temperature, trailer design, compartment size, etc. Changes in loading density need to be made to accommodate the weight of the pig or weather conditions. The need for these cahnges may outweigh transport costs and number of pigs left in the barn on a given day for the benefit of the animal's well-being. Research has shown that increasing loading density also increases transport losses.

TRANSPORT SPACE RECOMMENDATIONS

Average Weight (lbs.)	Square Feet Per Head
12	0.65[10]
50	1.53
100	2.32
150	2.95
200	3.48
250	4.26
300	4.79
350	5.48
400	6.39

WEATHER CONDITIONS

Improper preparation for various weather conditions, especially temperature extremes, costs the U.S. pork industry millions of dollars annually. Handlers and transporters are responsible for understanding the effects of weather on pigs undergoing transport and how to protect pigs during weather extremes.

Cold Weather

Freezing temperatures and wind chills are very dangerous to the safety of pigs. In cold temperatures, overcrowded pigs that cannot seek the protection of bedding from wind and low temperatures are potentially subject to frostbite. Frostbite can result from wind, but it may also occur from being pressed against the metal side of the truck. Newly weaned piglets and nursery pigs are especially susceptible to cold temperature extremes. The following measures are precautions to be taken to help ensure the well-being and safety of pigs being transported:

- Insert grain slats in farm trucks
- Close nose vents
- Use panels to protect pigs from crosswinds
- Block or plug a portion of the ventilation holes/slots
- Keep pigs dry
- Load fewer pigs per load
- Provide extra bedding (wood shavings, wheat straw, corn stover, etc.)

The following table illustrates recommended truck set-up procedures for finished pigs during temperature extremes.[11] These are based on best industry practice but may not be appropriate for every geographical location.

Truck Setup Procedures During Temperature Extremes *(Market Hogs)*			
Air Temp	**Bedding**	**Side-Slats**	
<10° F	Heavy (4 bags)	90 percent Closed	10 percent Open*
10-19° F	Medium (3 bags)	75 percent Closed	25 percent Open*
20-39° F	Medium (3 bags)	50 percent Closed	50 percent Open
40-49° F	Light (2 bags)	25 percent Closed	75 percent Open
> 50° F	Light** (2 bags)	0 percent Closed	100 percent Open

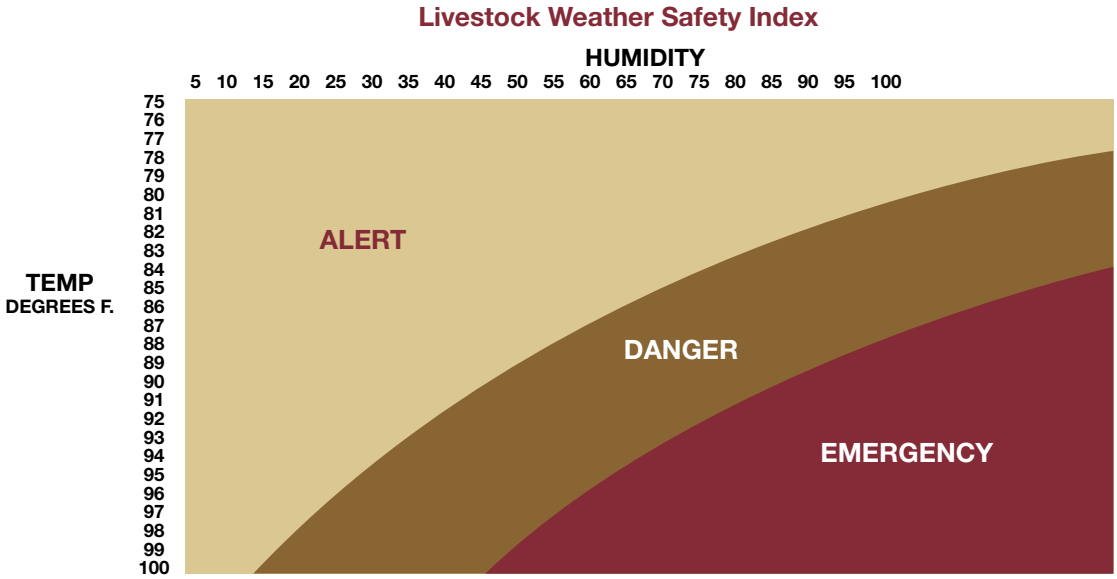
* Minimum openings are needed for ventilation even in the coldest weather.
** Consider using wet bedding if it is not too humid and trucks are moving.

Hot Weather

Hot weather and high humidity can be deadly to pigs due to their lack of functional sweat glands. The following measures are special precautions to be taken to help keep your pigs cool and to help ensure the well-being and safety of pigs you are transporting during hot weather conditions:

- Remove grain slats from farm trucks
- Open nose vents
- Unplug ventilation holes/slots
- Adjust loading density of pigs in the truck
- Schedule transportation early in the morning or at night
- Provide wet shavings to help cool pigs when the temperature is over 60° F (15° C)
- If the temperature is over 80° F (27° C) sprinkle pigs with water after loading but prior to departure. Use a large droplet spray, not a mist. Do not pour large amounts of cold water on an overheated pig as the shock may kill it.
- Be prepared to adjust to rapid temperature fluctuations such as the first warm day(s) of spring
- Do **not** bed pigs with straw in hot weather
- Load and unload promptly to avoid heat buildup
- Load fewer pigs per load

Refer to the livestock weather safety index (below) prior to loading.



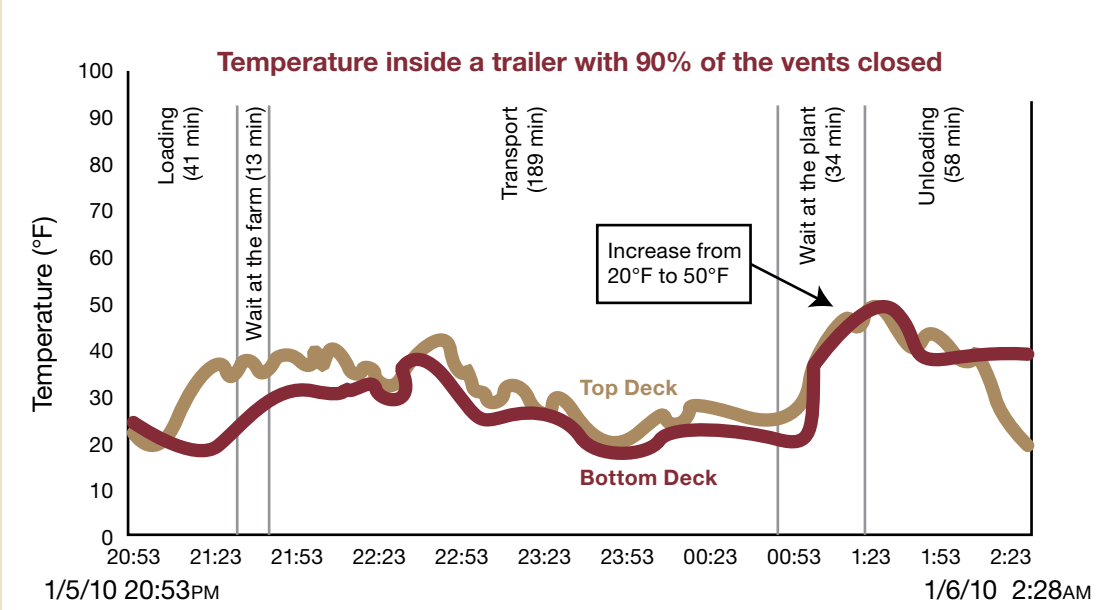
It is the transporter's responsibility to protect pigs during all weather conditions. It may become necessary for transporters to adjust trailer ventilation during the journey due to changing weather conditions. This may be true for long journeys across geographical regions or for spring and fall days that have wide temperature variations. Side boards or plugs should be added or removed accordingly to prevent the pigs becoming too hot or cold.

STOPPING

It is imperative that pigs be transported in a humane, safe and timely manner. Stopping with a loaded trailer, especially during extreme temperature conditions, should be avoided to help prevent unnecessary increases in stress and death loss. Trailers utilize passive ventilation and only have air flow when the trailer is perpendicular to prevailing winds or when the trailer is moving.

- Trucks should continue in motion during extreme weather conditions (unless it is impossible for safety or other reasons)
- If pigs cannot be unloaded upon arrival in hot weather continue driving, if possible, to generate air flow for the pigs until they can be unloaded
- Utilize water sprinklers and fan banks at the packing plant to circulate air through waiting trailers
- Do not park near other animal transporters due to the potential for reduced air flow and the increased risk of disease transfer
- If stopped during hot weather, slats and hole covers must be removed to allow for additional air flow and water sprinklers in the trailer activated

When there is no air flow, the body temperature of the pigs will cause the internal trailer to increase rapidly as shown in the graph below[12].



NOTES:

4 FITNESS OF THE PIG

FITNESS TO TRANSPORT

All pigs that are scheduled for transport should be evaluated by a handler for fitness to travel. If a pig is found to be unfit it should not be loaded, instead it should be segregated for treatment or humane euthanasia.

The following list provides some examples of animals that are unfit to be transported, including, but not limited to:[13]

- Those that are sick, injured, weak, disabled or fatigued
- Those that are unable to stand unaided and bear weight on each leg
- Those that are blind in both eyes
- Those that cannot be moved without causing them additional suffering
- Newborns with an unhealed navel
- Pregnant animals which would be in the final 10 percent of the gestational period at the planned time of unloading (They may be transported short distances using special care)
- Females traveling without young who have given birth within the past 48 hours
- Those whose body condition would result in poor welfare because of the expected climatic conditions

It is the position of the National Pork Board that any pig unable to walk, is ill or significantly injured, should not be transported to market channels. Where the likelihood of recovery is low, even with treatment, the pig should be humanely euthanized. Any pig that becomes fatigued should be moved to a resting area in an appropriate manner. A fatigued pig is defined as having temporarily lost the ability to walk but has a reasonable expectation to recover full locomotion with rest. A resting area helps enable recovery by minimizing competition for feed and water and provides the opportunity for monitoring.

FITNESS CONCERNS

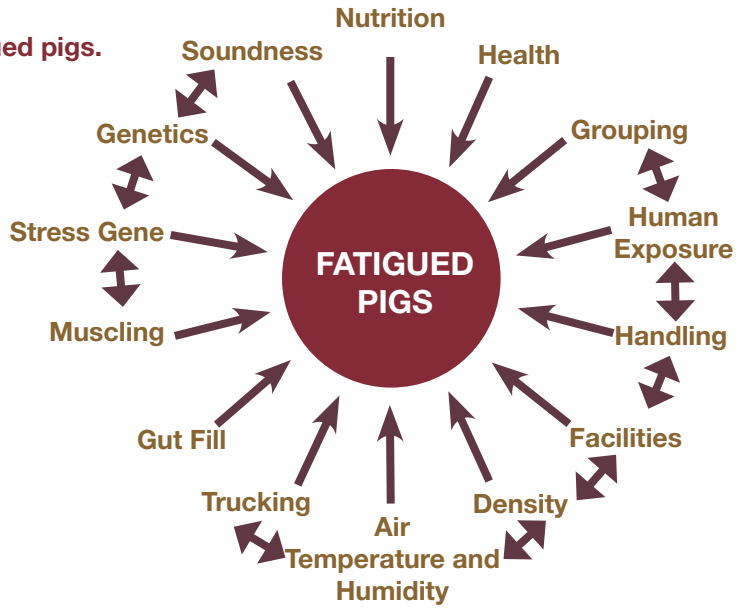
Loading and unloading processes can be stressful events in the life of a pig. As described in Chapter 1, inappropriate handling techniques (aggressive handling), causing excessive stress and muscle exertion during loading and/or unloading, can exacerbate the stressfulness of this situation and potentially cause serious health problems and even death.[14] Several of the most common concerns are heat stress, increased heart rate and heart failure, porcine stress syndrome (PSS) and fatigued pigs.

Fatigue

Fatigued pigs are defined as pigs that have temporarily lost the ability or the desire to walk but have a reasonable expectation to recover full locomotion with rest. Fatigued pigs typically have an acid-base imbalance due to excessive muscle exertion which makes the blood more acidic in nature. This condition is commonly referred to as metabolic acidosis and can cause pork quality defects resulting in meat that is of low quality and of significantly less value to the industry than normal pork.

continued on next page ▶

Factors that can lead to fatigued pigs.



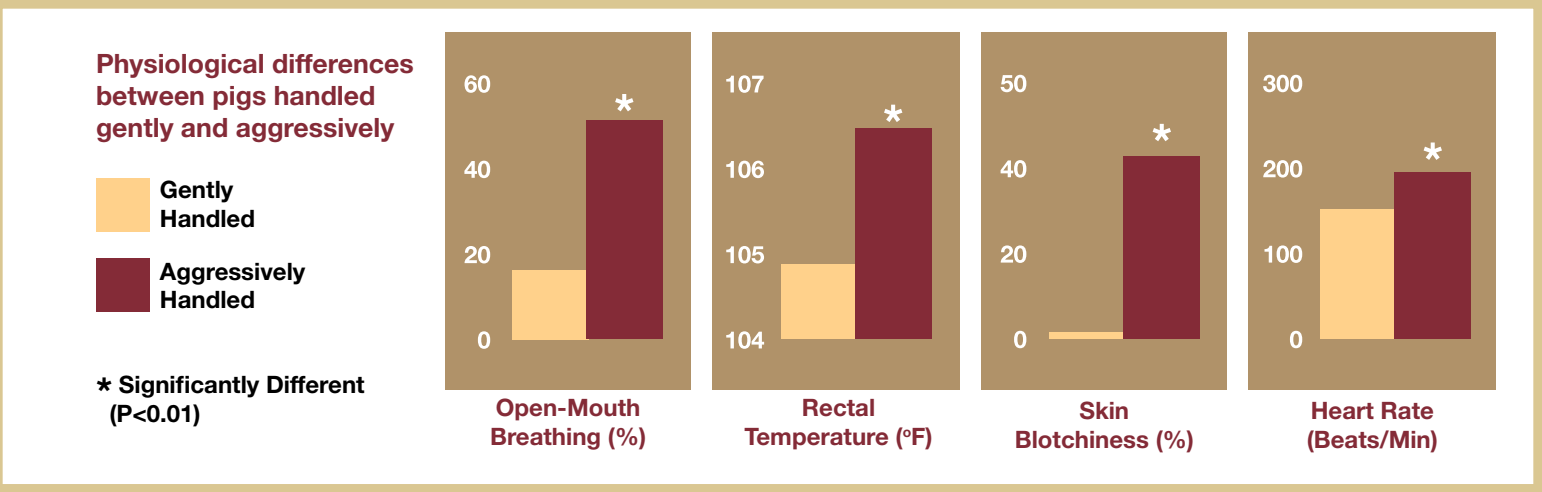
This diagram illustrates many of the contributing factors that can lead to injured, stressed or fatigued hogs. Take note of the factors that can be controlled by the producer, handler or transporter. Each of these factors can be controlled or manipulated by one or more persons involved in the handling and movement of the pigs.

When a pig experiences stress during handling or transport, it will display open-mouth breathing, skin discoloration or both. If the stress is not removed or if additional stressors are introduced, the pig will become reluctant to move, make abnormal vocalizations, develop muscle tremors, or some combination of these signs. At this stage, the pig may become overwhelmed by the accumulation of stress, in which case the pig will collapse and become nonambulatory, and, in extreme cases, death may ensue[15]. Therefore, transporters and handlers must be able to identify the following signs of stress and take the appropriate action(s) when needed.

- **Open-mouth breathing (panting)**
- **Vocalization (squealing)**
- **Blotchy skin**
- **Stiffness**
- **Muscle tremors**
- **Reluctance to move**

Additionally, a pig's heart rate and rectal temperature increase when excessively stressed or muscles are overexerted.

The graphs on the next page depict physiological differences between pigs handled gently and aggressively. Gentle handling consisted of moving pigs at a slow and calm pace with a plastic cane, whereas aggressive handing involved moving pigs rapidly with electric prods[4].



Heat Stress

Heat stress occurs when the pig's body temperature rises to a level it cannot control through its normal panting mechanism. A pig in distress will be making deep, gasping sounds. This pig should be attended to immediately or it will die. Do not make this pig move, allow it to rest. Gently sprinkle the animal with cool water. Do not pour large amounts of cold water on the pig as the shock may kill it.

Heart Failure

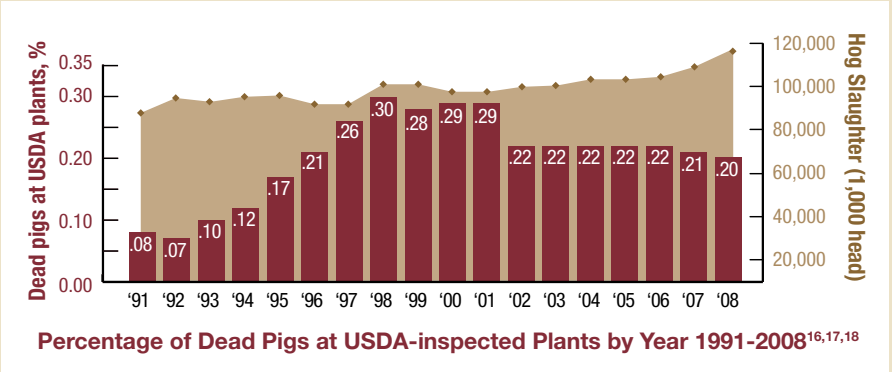
Signs of imminent heart failure occur suddenly; the pig collapses, its breathing is rapid, and the pig's ears and snout turn blue. This pig should be attended to immediately or it will die. Separate it from any other pigs and allow it to rest. Further stress will likely strain the pig's heart to the failure point and the pig will die. It may be one hour or longer before the pig recovers enough to be able to stand.

Porcine Stress Syndrome (PSS)

Porcine Stress Syndrome is an inherited disorder that can occur in pigs that carry the halothane gene. Animals with this genetic defect are extremely sensitive to stress and must be handled with extra care. When a PSS pig is stressed its body temperature rises, its skin develops red blotches, it collapses and its muscles become rigid. Immediate treatment is required using the same techniques as for a heat-stressed pig. Due to selective breeding, this gene is rarely present in the pigs found in today's commercial herds.

Total Transport Losses

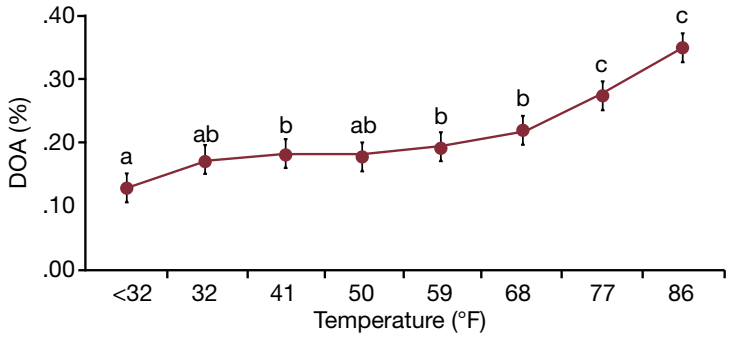
Transport losses refer to those pigs that die (DOA) or become non-ambulatory during handling or transport. For finishing pigs, it is estimated that 0.7% of those transported to market either die (~ 0.22%) or become non-ambulatory (0.44%).[19] This graph shows the change in the incidence of pigs that die on the way or at the plant as compared to the number of pigs slaughtered annually. It is important to note the progress of the industry to date.



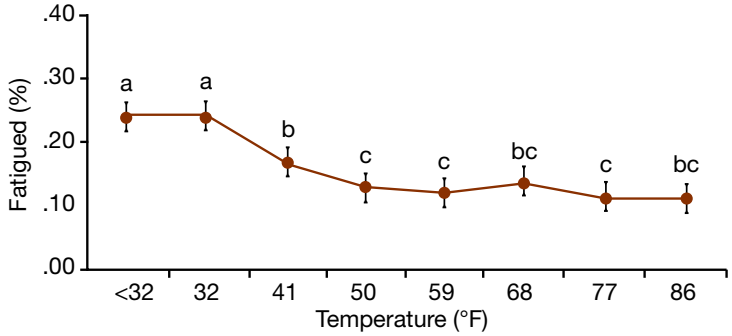
Percentage of Dead Pigs at USDA-inspected Plants by Year 1991-2008[16,17,18]

continued on next page ▶

To further reduce the incidence of transport losses, it is important to be able to understand why and when they occur. While temperature is not always the primary cause for pigs becoming DOA or non-ambulatory, it can be an additional stressor. Following is a chart that shows the impact of temperature on the incidence of transport losses.[20] This means that DOA's are most likely to occur June through September and non-ambulatory pigs are most likely to occur September through February.



Percentages of pigs dead on arrival (DOA), and down on trailer or before weighing (fatigued) during their transport to the processing plant at different temperatures. Mean values with different letters are significantly different at P<0.05



MANAGING ILL, INJURED OR FATIGUED PIGS

Prevention, preparation and prompt action are keys to the proper handling of pigs. What causes a pig to become a fatigued pig is not well understood although it is known that good production practices, along with proper handling, reduce the incidence of fatigued pigs.

Prevention and Preparation

- Pigs that are ill, injured or fatigued must be handled in a humane manner
- Proper handling and movement of ill, injured or fatigued animals should be included in the general handling and movement policy of production, transportation and harvest operations
- Producers should seek to prevent illness and injuries by feeding nutritionally sound diets, maintaining effective health programs, providing good facilities, handling pigs properly and selecting genetically and structurally sound breeding stock
- A resting area can help ill, injured or fatigued pigs recover by minimizing competition for feed and water and provides the opportunity for monitoring
- Pigs that appear healthy but have a history of health or respiratory problems may be more susceptible to handling and transport stress and should be handled with extra care.

Loading

- The position of the National Pork Board is that any animal that is unable to walk, is ill or significantly injured should not be transported to market channels. Where the likelihood of recovery is low, even with treatment, the animal should be humanely euthanized
- Transporters have the right and responsibility to deny entrance of pigs exhibiting symptoms of illness, a severe injury (e.g. a broken leg) or fatigue onto a truck

Transportation

- Safety and well-being should be a primary concern when transporting pigs
- Transport can be a stressful time for pigs and even healthy animals can lose up to 5 percent of their body weight during a 4-hour transport[21]
- Pigs that become ill, injured or fatigued during transport should be segregated upon arrival and care given for their special needs
- Any animal that becomes ill, injured or fatigued during transportation to a harvest facility should be handled in a manner that is consistent with the recommendations found in the Animal Handling Guidelines published by the American Meat Institute[27]

Unloading

- Advise the receiver of any ill, injured or fatigued animals on the transport vehicle before it is unloaded
- Never throw cold water on an animal that has collapsed from over exertion. If used, water should be applied as a sprinkle
- At no time is it acceptable for a live pig to be dropped to the ground from a transport door
- At no time is it acceptable to drag a live pig
- Transporters should ask the receiving location personnel for assistance to move or euthanize any ill, injured or fatigued animals that may be on the truck

Moving an Ill, Injured or Fatigued Pig for Treatment, Rest or Recovery

- Handling methods for moving ill, injured or fatigued pigs should include equipment appropriate for the size, age and condition of the animal. When pigs become too large to be carried in a safe manner, proper tools for moving these animals should be used
- Efforts should be taken to not exacerbate and/or cause an injury to the animal. From worker safety and animal handling perspectives it is recommended that a minimum of two individuals handle ill, injured or fatigued pigs

Tools for Moving Ill, Injured or Fatigued Pigs

- Stretchers – A stretcher requires two people to gently roll the animal onto it. Handlers should hold/push at the flank and under the forelegs. To prevent dislocation and bruising the animal's legs should not be held
- Sleds – Tip the sled onto its side and roll the pig into the sled. A second handler may need to help hold the sled while the pig is rolled into it. The animal is more likely to allow itself to be pulled in the sled if it is laying on its side rather than its stomach. If a pig is rolled onto its stomach it may stand up and jump out of the sled
- Hand Carts – A cart can be modified with an enlarged platform and back board. The platform is slid under the pig or the pig is rolled onto the platform. The cart can then be tilted back to move the pig. A second handler should be present to assist in loading and steadying the pig on the platform
- Mechanized Equipment – If a skid-steer loader is used, the pig should be rolled into the bucket using the same techniques previously described. It is recommended that two handlers be used, one to operate the machine and one to roll the pig into the bucket. Loaders should be equipped with a special lid attachment on the bucket to prevent the pig from jumping or falling out. As in all other methods, the pigs must be off-loaded by gently rolling or lifting them out of the bucket. Loading pigs into the bucket using a wall, partition or fence is not acceptable

NOTES:

5 BIOSECURITY

Swine diseases cause economic losses to pork producers. Porcine reproductive and respiratory syndrome (PRRS) alone cost the industry over $560 million dollars annually according to a study published in 2005. Add in the losses from other diseases such as circovirus (PCVAD), swine influenza virus and Mycoplasma, and the dollars lost continue to add up. Producers also face risks to their bottom line in the event that a foreign animal disease such as foot-and-mouth disease (FMD) or Classical Swine Fever is introduced. Both of these are highly contagious diseases that will result in the loss of export markets for pork and pork products and restrict the local and interstate movement of pigs until the disease is contained and eradicated.

THE BIOSECURITY MINDSET

Pork producers face daily challenges to maintain and improve the health of their herds. This is no small task considering the numerous opportunities for diseases to enter a herd. However, in the face of these risks lie opportunities for those involved in pork production to come together to play critical roles in disease prevention.

The people and companies that transport pigs play an important role in the profitability of the pork industry. Whether it is transporting pigs to harvest or moving pigs between farms with two- or three-site production, transportation services are vital to the industry today.

All stakeholders involved in pork production from producers and their employees to veterinarians and transporters need to focus on developing a biosecurity mindset that will help them make good decisions when it comes to practices that reduce the risk of disease introduction and spread.

The mindset begins with people understanding that they have a personal responsibility to do their part regardless of their role in pork production. All movement of pigs, people, vehicles and equipment on and off a production site provide the opportunity for a disease to infect a site, especially when steps to reduce the risk are not taken, or ignored. Those who become complacent because “nothing bad has happened yet” or have not seen the direct effects of a disease outbreak continue to represent one of the greatest risks to herd heath. Practicing good biosecurity is not hard but it is often viewed as inconvenient, resulting in protocols being ignored and corners being cut putting herds at risk.

Developing a biosecurity mindset and accepting responsibility are ways that value is added to the pork industry. The incorporation, enforcement and level of biosecurity procedures differ by site and management. The lack of biosecurity protocols does not mean it should be ignored. Protocols that are provided for transportation biosecurity should be abided by regardless of the level of enforcement. In the absence of a defined protocol, good biosecurity practices should still be incorporated by transporters to reduce the risk of disease spread between herds. A clean truck, trailer and transporter go a long way towards reducing the risk of disease spread and should always be considered the best option in the absence of a defined protocol. The transporter should also observe any downtime as required by loading and unloading locations.

The economic effects of an FMD outbreak in the United States has been estimated at 14 billion dollars or 9.5 percent of U.S. farm income. Losses in gross revenue for live swine and pork in the U.S. were estimated at 34 percent and 24 percent respectively.

Paarlberg, P.L., Lee, J.G., and Seitzinger, A.H. (2002).

Potential revenue impact of an outbreak of foot-and-mouth disease in the United States. Journal of the American Veterinary Medical Association, 220(7):988-992.

continued on next page ▶

Diseases Like to "Hitch a Ride"

When present in a herd the organisms that cause disease in pigs (bacteria, viruses and parasites) do a pretty good job of taking advantage of situations where they can "hitch a ride" to the next herd. Many organisms can survive in organic matter (shavings, manure and water) carried on boots, clothing, tires, undercarriages, trailers, shovels, sorting panels and people. It is very important to understand that diseases can move between herds the same way as pigs, people, vehicles and equipment move between herds.

Think of Every Site as Being Different

There are many different strains of porcine respiratory and reproductive syndrome (PRRS). That means that the PRRS virus on one site may not be the same strain on another site even if they are both in the same production system. The potential variation of disease organisms in a herd combined with production practices, like vaccination, used to protect herd health is one of the reasons that separate herds are considered to have a separate health status. One of the primary goals of biosecurity is to prevent a change in a herd's health status caused by disease introduction. Trucks, trailers and drivers that enter a site clean help to reduce the risk of disease spread between sites.

Animal Concentration Points, Commingling and Backhauling Livestock Increase Risk

When pigs are moved to concentration points such as buying stations, packing plants and exhibitions, there is an increased risk for the contamination of trucks, trailers and drivers with organic materials that contain disease-causing organisms. Cleaning, disinfecting and drying trailers and cleaning of tractors as well as strict attention to driver biosecurity practices that prevent boots, coveralls and hands contaminated with organic materials from exposing other sites are particularly important.

BASIC GUIDELINES FOR SANITATION, DISINFECTION, DRYING AND DOWNTIME

Cleaning

Proper cleaning prior to disinfection is a key method of preventing the introduction of disease on the farm. The truck and trailer must be thoroughly cleaned, washed, disinfected and completely dried after being unloaded and before being loaded again. All equipment including the trailer should be free of visible manure, shavings or dirt prior to disinfection. Different cleaning products and wash soaps are available to help break up the fats and other organic materials in a more timely manner than just using water alone.

Basic Cleaning Protocol

1. Remove (scrape/sweep) all manure, bedding and other debris from the trailer
2. Soak prior to washing to reduce wash time
3. Remove, clean and disinfect panels used to protect animals during cold temperatures
4. Use hot water to wash and a high-pressure power washer for best results
5. Wash all cracks and crevices, make certain to spray floor support members
6. Wash the top deck first then the bottom deck, always
7. Wash the undercarriage, wheels, floor mats, pens, storage boxes and driving/handling aides
8. Remove excess water from the truck/trailer by parking on a 2-3 percent slope (minimum for proper wastewater drainage) when finished washing
9. Remove any trash and vacuum interior of the tractor cab
10. Wipe down or spray disinfectant on the floor mats and steering wheel
11. Keep only clean and unused clothing and equipment in the cab of the tractor. Keep new trash bags handy for storage of all used items and place in the side box located on the trailer after use.

Disinfection

Disinfectants should be used on trucks and trailers after they have been cleaned because organic materials will inactivate and reduce the effectiveness of most disinfectants. It is important to choose the appropriate disinfectants based on the diseases that you are trying to prevent. Disinfectants should also be chemically compatible with any cleaning product or wash soap that is being used. Different chemicals can either reduce the effectiveness of the disinfectant or produce a harmful chemical reaction when combined. It is also essential to following label directions when using disinfectants to ensure the disinfectant is being used at the proper concentration, temperature and the appropriate contact times are being observed. Failure to select and use disinfectants properly will decrease their effectiveness in disease prevention and can pose a risk to human health.

Drying and Heat

Drying helps support the inactivation of disease agents. Supplemental heat is becoming popular at some truck washes as a means to disinfect trailers. Heat delivered to a trailer at the appropriate temperature and over the right period of time can be effective against many swine diseases. Trucks and trailers should be cleaned, disinfected and allowed to dry completely before being loaded with a new group of pigs.

RESOURCES

Resources pertaining to biosecurity and livestock production can be found online at *pork.org* and at the National Biosecurity Resource Center at *biosecuritycenter.org.* Transporters can find guidance on boot disinfection, actively search for disinfectants by manufacturer, disinfectant class or by disease, or locate truck washes by State. Additional information on biosecurity can be found online at Iowa State Center for Food Security and Public Health at *cfsph.iastate.edu.*

NOTES:

6 EMERGENCY RESPONSE PLAN

Even though the goal of each transporter is to get the animals to their destination safely and in a timely manner, risk factors do exist with each load transported. Transporters must not only make themselves aware of these risk factors, but they must also have a plan in place to deal with them if they should occur. By being prepared, the transporter will be able to respond in an effective manner and lessen the impact of the delay or accident on the animals and on themselves.

TRANSPORTER'S RESPONSIBILITIES IN AN EMERGENCY

Even in the event of an emergency, transporters have a responsibility towards the animals, the company and the U.S. pork industry. These responsibilities include:

- Being aware and prepared to handle emergencies
- Ensuring the transporter's personal safety and an awareness of public safety
- Responding to the situation professionally
- The well-being and humane treatment of the animals
- The protection of company property (e.g. the animals, equipment)
- Projecting a positive perception of the company and the industry

EMERGENCY PLANS FOR DELAYS

Ideally, pigs will arrive at their destination in a timely manner with minimal added stress. Unfortunately, during the movement of pigs, many situations can arise that can cause a load to be delayed. These delays can include: weather, traffic issues, motor vehicle accidents, road construction, mechanical breakdowns or plant shutdowns. Remember, the goal of everyone involved in the scheduling process (producer, transporter, director of procurement and dispatcher) is to minimize the time that pigs must remain on a trailer.

Prevention

Some delays can be avoided if the transporter is prepared ahead of time.

- Investigate the travel route before departure to determine if road construction is in progress
- Check the weather conditions on the route. Avoid driving during bad weather if possible
- Perform routine maintenance and inspect the tractor-trailer before each trip
  a. If there are any mechanical or structural issues, they must be repaired before beginning the trip
  b. If the vehicle has just returned from repair, ensure all repairs were performed adequately
- Avoid rush-hour traffic when possible
- Listen to local radio stations and CB radios for traffic and road conditions along the route

continued on next page ▶

Preparedness

All transporters need to be prepared for what they will do in each of the situations listed previously. Preparedness may not only help avoid a delay, but may also shorten the length of an unavoidable one.

- Establish and understand company policy of what to do in the case of a delay
- Become familiar with alternate routes in case of traffic delays or road construction
- Have the contact numbers for the destination (e.g. plant, farm)
- Have tools/parts available on the truck to repair minor mechanical problems
- Identify locations and contact numbers for auctions and fairgrounds located along the transport route where pigs could be unloaded during an emergency

If a delay occurs

- The well-being and safety of the animals must be considered at all times. It is the transporter's responsibility to do his or her best to keep the animals comfortable and safe
- During any delay, the transporter must constantly monitor the comfort and condition of the pigs
- Animals must be protected from extreme weather conditions. In cold weather, when possible, the trailer should be parked in an area that provides protection from the wind. Extra weather boards should be added, if necessary and if available, to keep wind or freezing rain off pigs. In high temperature conditions, when possible, the trailer should be parked in an area that provides shade and allows for a breeze to pass through the sides of the trailer. If water is available, wet the pigs to keep them cool. If water is unavailable and weather conditions require wetting of the pigs, the transporter may be able to contact the local fire department to have them come and wet the pigs with water from a fire truck
- The transporter should contact the origination and the destination contact to inform them of the nature of the delay and determine the best plan of action for themselves and for the well-being of the animals
- In the case of a mechanical breakdown of the tractor, determine the nature of the breakdown and estimate how long the repairs will take. If the repairs cannot take place at the site of the breakdown or they will take an extended period of time, arrange for another tractor to be sent to take the trailer. Numerous factors need to be taken into consideration when determining how long pigs can safely be left on a stationary trailer:
    - Weather – (e.g. Pigs will do fine on a trailer for four hours in cool, low humidity weather. In extreme summer heat and humidity, they will experience heat stress quite quickly.) See Chapter 3 for the livestock weather safety index
    - Fitness of the animals
    - Age of animals
    - Time already off food and water (e.g. The pigs have been in the transportation process for 18 hours)
    - Location of the delay (e.g. rural area vs. freeway)
    - Time of day
    - Safety of animals at current location

- If the problem is with the trailer, or if the unit is a straight truck, and it cannot be repaired on the road, the pigs must be transferred to another unit to complete the journey. There are several considerations when transferring animals to another trailer:
  - Assess the safety of the location. If it is a heavy-traffic area or on a narrow road, have the unit towed to a safe area for transfer if possible
  - Can another semi-trailer maneuver close enough to do an end-to-end load or will a portable loading ramp be needed requiring the pigs to be off-loaded into an open area and then reloaded? There may be circumstances where only smaller stock trailers can get to the disabled unit
  - If the pigs must be off-loaded and reloaded, ensure proper containment is available to hold the pigs between trailers
  - Before any action takes place, call the local police or fire department for assistance with traffic
- In the instance of plant shutdowns:
  - Keep in contact with the plant dispatcher
  - The processor will most likely communicate to producers and transporters that they need to postpone deliveries and prevent long waits at the plant when possible
  - In most instances, the plant may provide guidance as well as equipment to keep loaded pigs as comfortable as possible
  - The length of the plant shutdown will help determine the appropriate course of action
- In the case of road construction, the transporter should investigate if there are any alternate routes. If there is concern about the well-being of the pigs, the transporter should contact the local authorities and explain the animal situation in an attempt to gain permission to move through or receive assistance to turn around
- If the delay is caused by bad weather or poor road conditions, the truck should be pulled over in a safe area, preferably where the animals will be protected from as much of the weather as possible. The transporter should park the truck as far away from other traffic as possible to reduce the risk of other vehicles hitting the unit

ACCIDENTS

Unfortunately, motor vehicle accidents involving livestock do happen. These incidents are extremely dangerous and stressful for transporters, first responders and the animals. By being prepared for an accident before it happens, and understanding how to effectively respond to an incident involving livestock, the well-being and safety of all involved will improve dramatically. Economic losses can also be greatly reduced when everyone involved is prepared for an accident and they are able to respond in an efficient and effective manner.

Commercial Livestock Transportation Accident Statistics[22]

- **59 percent of accidents occurred between 12:00 Midnight and 9:00 a.m.**
- **27 percent of the accidents documented were swine. Of these, 80 percent involved finished/market hogs**
- **84 percent of the trailers rolled on the right-hand side**
- **80 percent were single-vehicle accidents**
- **85 percent were caused by transporter error**

continued on next page ▶

Accident Prevention

The results of a recent study of commercial livestock transportation accidents lead to the conclusion that most of the accidents are caused by transporter fatigue.[22] Due to weather conditions, plant scheduling, transporter shortages and relocation distances, it is often necessary for livestock to be moved during the late evening and early morning hours. Road crash numbers have shown that though there are fewer transporters on the road between midnight and 6 a.m., transporters are more likely to have accidents during this time period. Additionally, a study in Australia showed that fatigue is more of a problem on country roads, than towns or cities.[23] Other accident causes include transporter distractions, speed/poor driving habits and inadequate vehicle maintenance.

Preventing Transporter Fatigue - *Fatigue management is the responsibility of both the transporter and management. In order to manage fatigue, it must first be understood.*

Fatigue is defined by the loss of alertness (slower reflexes), drowsiness (feeling sleepy), falling asleep, poor memory and irritability (more reactive). It is caused by body-clock conflict, poor sleep patterns, long work hours and poor-health factors. Research shows that night-shift transporters get about two hours of sleep less per day than day-shift transporters do.

The following tips can help to prevent fatigue:

1) Ensure sufficient sleep is obtained each day. Seven and one-half hours is commonly recognized as the normal amount of required sleep. A short night's sleep should be made up for the next night by sleeping a little longer. Transporters should work with management to provide a schedule that allows for the proper amount of sleep. The only cure for fatigue is sleep
2) Ensure a good sleep environment at home. Keep rooms cool, turn off the phone, wear earplugs and block out daylight with dark shades or a sleep mask
3) Stick to regular sleep and wake periods – even on days off
4) Eat a balanced diet and have regular meal times. Drink plenty of water and exercise. Regular medical check-ups are important
5) If a transporter feels too drowsy to drive, he/she should pull over and contact the dispatcher and/or the plant to inform them of the situation
6) If feeling drowsy, take frequent breaks to stop and stretch for 5 minutes. This is also a good time to do a quick check of the animals on board
7) Do not take over-the-counter stimulants to ease drowsiness
8) Keep the truck cab comfortable, but not too warm. Heat may make a person feel tired. Allow fresh air into the cab and turn on the radio or play music

9) **Learn to recognize the signs of fatigue**
   - a. **Cannot keep head up**
   - b. **Eyes won't stay open or go out of focus**
   - c. **Drift over the center line or the shoulder line**
   - d. **Thoughts wander**
   - e. **Miss a road sign, exit or a gear**
   - f. **Don't remember passing certain landmarks or towns**
   - g. **See things that are not there**
   - h. **Reflexes begin to slow**

Speed and Careless Driving

- Speed must be monitored at all times. Posted speed limits should be observed and speeds adjusted for current road, weather and traffic conditions
- Do not tailgate, play road games with other transporters, pass illegally or attempt to beat traffic lights or railroad crossings
- A transporter must always be aware of the hazards of driving on farm roads as they are often narrow, with soft shoulders that may collapse under the weight a heavy truck. Do not allow the truck or trailer to get too close to the edge of the ditch while driving down the road or turning in or out of driveways
- Erratic driving and cornering at high speeds can cause the animals to shift. This shift in weight can cause the trailer to tip. Extra caution should be taken on highway entrance and exit ramps.

Transporter Distractions

- The transporter must be alert at all times to his/her driving and those driving nearby
- Distractions must be avoided at all times. This includes, but is not limited to, eating, drinking, talking on the phone, reading, texting and reaching for items on the floor or across the seat

Preparation

In order to be properly prepared for an accident, each transport vehicle should contain the following:

- Emergency contact sheet with 24-hour phone numbers for dispatch, destination point and insurance companies
- Emergency warning devices (e.g. flares, emergency triangles)
- Camera
- Accident information sheet
- Company accident policy sheet/Standard Operating Procedures, if one exists
- Fire extinguisher
- Spill kit

continued on next page ▶

In the Event of an Accident

If uninjured and able to do so, the transporter should:

1. Call 911 if the accident occurs on a public roadway or if emergency assistance is required for an on-farm accident. Advise operator of:
   - The location of the accident
   - The fact that you have animals on-board
   - The status of any loose animals
   - Any known hazards
2. Set out emergency warning devices within 10 minutes of accident
3. Call the designated company contact. If the company has a dispatch checklist for accidents, proceed through list. If not, inform the dispatcher of the location of the accident, if there are any injuries, condition of animals, position of trailer, number of vehicles involved and if first responders are on scene yet
4. Call other designated contacts according to company protocol. These could include but are not limited to the insurance companies for the cargo and the vehicle and the destination, and provide them with the same information
5. If the tractor and/or trailer are damaged and unable to move, proceed to point 6. If damage is minor, the trailer is upright and there are no injuries, take photos and record names and addresses of other people involved and witnesses
6. Herd any loose pigs from the road and gather them in an area as far away from traffic as possible
7. Locate accident reporting kit and camera. Take photos of accident as soon as possible. Photographs should include photos of road conditions, vehicle damage, trailer position, the overall accident scene, skid marks, curves, intersections and where the vehicle left the road (if it did)
8. Provide as much protection and comfort for the animals as possible
9. Release statements only to people of authority. The transporter must remember that at this point he or she is the most visible company and pork industry representative and the transporter must conduct himself or herself as such
10. When first responders arrive, the transporter should advise them of accident details including any human injuries, the status of any loose animals, any known hazards and the company's emergency response plan. If available, the transporter should let the authorities know if a company rescue trailer and animal handling personnel are on the way and their estimated time of arrival. Transporters must respect the chain of command at all times

EMERGENCY CONTACT SHEET EXAMPLE:

911 is a standard service nearly everywhere and will typically result in faster service than calling the police, fire or an ambulance directly.

EMERGENCY CONTACTS

Police _____ **911**
Fire _____ **911**
Ambulance _____ **911**
Company Dispatch _____
24-Hour Accident/Emergency Line _____
Plant _____
Other Common Destination _____
Insurance Company _____
Other _____

7 LAWS, REGULATIONS AND AUDITS

Transporters must understand and follow laws and regulations governed by federal, state and local authorities including the Department of Transportation (DOT), Food Safety and Inspection Service (FSIS) and United States Department of Agriculture (USDA).

TRANSPORTATION OF ANIMALS: 28-HOUR LAW

The following list contains a few pertinent sections of the Transportation of Animals statute from the U.S. Code that deals with the maximum time animals may be held in a transport vehicle without being unloaded for food, water and rest. 49 USC Sec. 80502[24]

Sec. 80502

(a) Confinement.

(1) Except as provided in this section, a rail carrier, express carrier, or common carrier (except by air or water), a receiver, trustee, or lessee of one of those carriers, or an owner or master of a vessel transporting animals from a place in a State, the District of Columbia, or a territory or possession of the United States through or to a place in another State, the District of Columbia, or a territory or possession, may not confine animals in a vehicle or vessel for more than 28 consecutive hours without unloading the animals for feeding, water, and rest.

(2) Time spent in loading and unloading animals is not included as part of a period of confinement under this subsection.

(b) Unloading, Feeding, Watering and Rest.

Animals being transported shall be unloaded in a humane way into pens equipped for feeding, water, and rest for at least 5 consecutive hours. The owner or person having custody of the animals shall feed and water the animals. When the animals are not fed and watered by the owner or person having custody, the rail carrier, express carrier, or common carrier (except by air or water), the receiver, trustee, or lessee of one of those carriers, or the owner or master of a vessel transporting the animals -

(1) Shall feed and water the animals at the reasonable expense of the owner or person having custody, except that the owner or shipper may provide food;

(2) Has a lien on the animals for providing food, care, and custody that may be collected at the destination in the same way that a transportation charge is collected; and

(3) Is not liable for detaining the animals for a reasonable period to comply with subsection (a) of this section.

(c) Nonapplication.

This section does not apply when animals are transported in a vehicle or vessel in which the animals have food, water, space and an opportunity for rest.

continued on next page ▶

(d) Civil Penalty.
A rail carrier, express carrier, or common carrier (except by air or water), a receiver, trustee, or lessee of one of those carriers, or an owner or master of a vessel that knowingly and willfully violates this section is liable to the United States Government for a civil penalty of at least $100 but not more than $500 for each violation. On learning of a violation, the Attorney General shall bring a civil action to collect the penalty in the district court of the United States for the judicial district in which the violation occurred or the defendant resides or does business.

FSIS inspectors have been instructed to identify livestock that appear exhausted or dehydrated upon arrival. They may ask the transporter or plant to provide documentation of transport duration and compliance with the 28-Hour Law.

HUMANE SLAUGHTER OF LIVESTOCK ACT

The following list contains a few of pertinent sections of the Humane Slaughter of Livestock Act as described by the regulations in 9 CFR 313.[25]

Sec. 313.50 *Tagging of equipment, alleyways, pens, or compartments to prevent inhumane slaughter or handling in connection with slaughter.*

When an inspector observes an incident of inhumane slaughter or handling in connection with slaughter, he/she shall inform the establishment operator of the incident and request that the operator take the necessary steps to prevent a recurrence. If the establishment operator fails to take such action or fails to promptly provide the inspector with satisfactory assurances that such action will be taken, the inspector shall follow the procedures specified in paragraph (a), (b), or (c) of this section, as appropriate.

(a) If the cause of inhumane treatment is the result of facility deficiencies, disrepair, or equipment breakdown, the inspector shall attach a “U.S. Rejected” tag thereto. No equipment, alleyway, pen or compartment so tagged shall be used until made acceptable to the inspector. The tag shall not be removed by anyone other than an inspector. All livestock slaughtered prior to such tagging may be dressed, processed, or prepared under inspection.

(b) If the cause of inhumane treatment is the result of establishment employee actions in the handling or moving of livestock, the inspector shall attach a “U.S. Rejected” tag to the alleyways leading to the stunning area. After the tagging of the alleyway, no more livestock shall be moved to the stunning area until the inspector receives satisfactory assurances from the establishment operator that there will not be a recurrence. The tag shall not be removed by anyone other than an inspector. All livestock slaughtered prior to the tagging may be dressed, processed, or prepared under inspection.

Sec. 313.1 *Livestock pens, driveways and ramps.*

(a) Livestock pens, driveways and ramps shall be maintained in good repair. They shall be free from sharp or protruding objects which may, in the opinion of the inspector, cause injury or pain to the animals. Loose boards, splintered or broken planking, and unnecessary openings where the head, feet, or legs of an animal may be injured shall be repaired.

(b) Floors of livestock pens, ramps, and driveways shall be constructed and maintained so as to provide good footing for livestock. Slip-resistant or waffled-floor surfaces, cleated ramps and the use of sand, as appropriate, during winter months are examples of acceptable construction and maintenance.

(d) Livestock pens and driveways shall be so arranged that sharp corners and direction reversal of driven animals are minimized.

Sec. 313.2 *Handling of livestock.*

(a) Driving of livestock from the unloading ramps to the holding pens and from the holding pens to the stunning area shall be done with a minimum of excitement and discomfort to the animals. Livestock shall not be forced to move faster than a normal walking speed.

(b) Electric prods, canvas slappers, or other implements employed to drive animals shall be used as little as possible in order to minimize excitement and injury. Any use of such implements which, in the opinion of the inspector, is excessive, is prohibited. Electrical prods attached to AC house current shall be reduced by a transformer to the lowest effective voltage not to exceed 50 volts AC.

(d) Disabled livestock and other animals unable to move.

(1) Disabled animals and other animals unable to move shall be separated from normal ambulatory animals and placed in the covered pen provided for in Sec. 313.1(c).

(2) The dragging of disabled animals and other animals unable to move, while conscious, is prohibited. Stunned animals may, however, be dragged.

(3) Disabled animals and other animals unable to move may be moved, while conscious, on equipment suitable for such purposes; e.g., stone boats.

"Once a vehicle carrying pigs enters an official slaughter establishment's premises, the vehicle is considered to be a part of that establishment's premises. The animals within that vehicle are to be handled in accordance with section 313.2 of the Humane Slaughter of Livestock Act." [26]

continued on next page ▶

HARVEST PLANT AUDITS

To help ensure good animal well-being during transport and harvest, pigs must be handled by well-trained people. Given that people can manage what they measure, several auditing systems have been put in place to assess (numerically) if there are **people** problems, **animal** problems, or a **facility** problem.

The American Meat Institute has developed audit criteria for animal handling and slaughter at the harvest plant. Auditors will evaluate trailers arriving and unloading at the plant as well as animal handling and slaughter in the plant. The criteria that will be evaluated include:[27]

1. Plant transportation policy and preparedness for receiving animals
    a. Plant has written animal welfare policy for transporters
    b. Plant provides extreme temperature management tools (water, fans, etc.)
    c. Have arrival-management process that minimizes waiting time at the plant
    d. Emergency plans in place for animals in transit
    e. Written policy for immobile and fatigued animals and tools available for handling
    f. Acceptable handling tools available and utilized as needed
    g. Availability of acceptable euthanasia tools
    h. Maintenance records for euthanasia equipment, proper storage and employee training for euthanasia
    i. Gates in unloading area swing freely, latch securely and have no sharp protrusions
    j. Non-slip flooring
    k. Unloading area and ramps in good repair (e.g. no broken cleats, holes or gaps)
    l. Adequate lighting in the unloading area
    m. Staff available for receiving animals
2. Set-up and Loading of Trailer
    a. Compartments are gated
    b. Trailer loaded at proper density
    c. Incompatible animals segregated when required (e.g. boars and sows)
3. Timeliness of Arrival of the Truck and Trailers and Animal Unloading
    a. Time between trailer arrival and start of unloading
4. Condition of Trailer
    a. Trailer is properly aligned with the unloading area
    b. Trailer has solid flooring that is non-slip
    c. Gates and doors open freely and can be secured shut
    d. Internal ramps function properly and extend all the way to the floor
    e. No sharp or protruding objects that can injure the animals
    f. Bedding in the trailer for insulation and to prevent slipping
    g. Winter side slats or plugs are in place at recommended levels

5. Falls
    a. Counting the number of animals that fall in the unloading area (all four limbs are on the unloading ramp or dock)
    b. Temperament of the livestock (normal moving or difficult to move)
    c. The person doing the unloading did so quietly and calmly
6. Electric Prod Use
    a. Measure the number of times an electric prod was used in the unloading area (all four limbs are on the unloading ramp or dock)
    b. Did the driver use the electric prods on the livestock in the trailer, through the sides or roof of the trailer?
    c. Were rattle paddles, sort boards, flags, or other handling tools used incorrectly?
7. Condition of the Animal
    a. Number of compromised animals on the trailer
    b. Number of non-ambulatory pigs on the trailer
    c. Number of pigs with severe injuries (broken legs, bleeding gashes, or deep, visible cuts, prolapses, and body pressure sores
    d. Number of fatigued pigs
    e. Number of pigs with frostbite
    f. Number of dead animals on the trailer
    g. Plant communication back to the origination site
    h. Number of animals considered emaciated or in poor body condition
8. Willful Acts of Abuse – defined as:
    a. Dragging a conscious, non-ambulatory animal
    b. Intentionally applying prods to sensitive parts of the animal such as eyes, ears, nose, anus or testicles
    c. Deliberate slamming of gates on livestock
    d. 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)
    e. Hitting or beating an animal
    f. Live animals frozen to the floor or sides of the trailer

FINISHING PIG LOAD-OUT ASSESSMENT

The following assessment has been developed for use during finishing pig load-out. It can be used as a tool to help identify areas of improvement in animal handling skills, equipment and facilities, and transport preparation. This assessment begins in the barn just prior to load-out and ends at the farm gate. When completed, any assessment results marked in the shaded boxes should be reviewed and addressed with the drivers and animal handlers.

Preparation	**YES**	**NO**
1. Valid TQA certification for Driver: Valid TQA certification for Load crew		
2. Driver has the following records in their cab: Emergency action plan Contact info for origination/dispatch Contact info for destination/dispatch Bill of lading Offload/rest plan if to be transported longer than 28 hours		
3. Load crew is prepared and ready to load at scheduled time		
4. Driver is prepared to load at scheduled time of pick-up		
5. Driver knows the scheduled delivery time		
6. Does the driver leave within 15 minutes after loading?		
7. Load crew knows the plan for how to handle pigs that become non-ambulatory in the loading process		
8. It is predetermined how many pigs (determined by trailer dimensions, pig weight and weather conditions) will be loaded onto the trailer		
9. Driver is aware of biosecurity protocol of the site		
Facilities/Equipment	**YES**	**NO**
10. Facilities (including alleyway, flooring, chute, and ramp) are in good state of repair so as not to cause injury to the pigs Comment on areas:		
11. Trailer (including sides, flooring, ramps and gates) is in good state of repair so as not to cause injury to the pigs Comment on areas:		
12. Does the driver have the trailer boarded according to TQA recommendations and plant policy?		
13. Does the driver know the plant requirements for boarding and bedding?		
14. Water is available for misting on the trailer if necessary due to weather conditions		
Handling/Loading	**YES**	**NO**
15. Pigs are moved at a normal walking pace		
16. Does everyone loading pigs have a panel?		
17. Are electric prods the only handling tool being used? Is the electric prod being used incorrectly? Are electric prods used in the pens?		
18. Are handling tools/equipment used correctly?		
19. Pigs are handled gently (no overuse, or improper use of electric prods; no loud noises and yelling; not moving pigs too fast; not moving too many pigs per group; overcrowding pigs in chutes, ramps and alleyways; and no rough physical contact)		
20. Are any pigs that are unable to walk, are ill or are significantly injured transported to market channels?		
21. Are there areas (i.e. lighting, shadows, contrast, temperature, transitions, wind, etc.) that cause pigs to balk during the loadout process? Comment on areas:		

FINISH PIG LOAD-OUT ASSESSMENT (continued)

22. Do more than 1% of the pigs handled fall during loading? Falling is defined as when a pig loses an upright position suddenly in which part of the body other than the limbs touches the ground.		
In-Transit	**YES**	**NO**
23. Driver has the ability to adjust trailer ventilation during the journey if necessary (boards are adjustable/removable, plugs are not)		
Willful Acts of Abuse	**YES**	**NO**
24. Were any willful acts of abuse observed? Willful abuse is defined as acts outside of normally accepted production practices that intentionally cause pain and suffering including, but not limited to: - prodding in sensitive areas (eyes, ears, genitals, rectum, nose) - dropping or driving live animals from a suspended height - deliberate slamming of gates, doors, etc. on animals - purposeful driving of livestock on top of non-ambulatory or dead animals - malicious hitting/beating an animal		

TERMS

Ambulatory: a pig that is able to stand unaided and can bear weight on each leg.

Biosecurity: practices that reduce the risk of disease introduction and spread.

Dead on Arrival (DOA): pigs that die before or upon arrival at the plant.

Ethical Principles: U.S. pork producers' commitment to produce safe food, protect and promote animal well-being, safeguard natural resources in all of their practices, ensure their practices protect public health, provide a work environment that is safe and consistent with their other ethical principles, and contribute to a better quality of life in their communities.

Euthanasia: the humane process whereby the pig is rendered insensible, with minimal pain and distress, until death.

Handler: Anyone who is in physical contact with a pig and interacts with it in a manner that causes the pig to move. This includes Transporters when they are physically moving pigs on foot instead of driving a vehicle.

Fatigued: A fatigued pig is defined as having temporarily lost the ability to walk but has a reasonable expectation to recover full locomotion with rest.

Flight zone: an imaginary circle around an animal that it considers its individual space.

Food Safety and Inspection Service (FSIS): A branch of the U.S. Department of Agriculture that is responsible for inspecting all pigs and sanitation levels at packing plants.

Non-ambulatory: a pig that is unable to stand unaided and bear weight on each leg.

Point of balance: is located at a pig's shoulder. If a handler enters a pig's flight zone, the pig will move: forward if the handler approaches from behind the point of balance; backwards if the handler approaches from in front of the point of balance.

Transport losses: Transport losses refer to those pigs that die (DOA) or become non-ambulatory during handling or transport.

Transporter: An individual animal handler who controls a piece of equipment that transports pigs, including truck drivers, tractor drivers using a hog cart, etc.

We Care Initiative: A joint effort of the Pork Checkoff, through the National Pork Board, and the National Pork Producers Council which helps demonstrate that producers are accountable to established ethical principles and animal well-being practices.

Willful acts of neglect or abuse: Willful neglect and abuse are defined as acts outside of normally accepted production practices that intentionally cause pain and suffering. This includes, but is not limited to, malicious hitting or beating an animal or using an electric prod in sensitive areas such as eyes, nose, anus, testicles, etc.

REFERENCES

1 Prince, J.H. (1977). The eye and vision. In: M.J. Swenson (Ed.). Dukes' Physiology of Domestic Animals. Cornell University Press, Ithaca, N.Y. p. 696-712.

2 Gonyou, H.W. (2000). Behavioural principles of animal handling and transport. in T. Grandin (Ed.), *Livestock Handling and Transport.* p. 11-18.

3 Mateo, J.M., et.al. (1991). Effects of differential handling on the behavior of domestic ewes. *Appl. Anim. Behav. Sci.* 32:45.

4 Benjamin, M.E., et.al. (2001). Effect of animal handling method on the incidence of stress response in market swine in a model system. *J. Anim. Sci.* 79:279.

5 Berry, N. et al., (2009). Effects of moving market-weight pigs in different group sizes during loading on stress response and transport losses at the packing plant. *Proc. Of the Midwest Animal Science Meetings:* 5.

6 McGlone, JJ., et al., (2004). Case study: moving devices for finishing pigs: efficacy of electric prod, board, paddle, or flag. *Prof. Anim. Sci.* 20: 518-523.

7 Ritter, M. (2008). Practical Pig Handling Tips to Minimize Stress During Loading at the Farm. In: Hog Handling Update: Tips for Better Pig Handling: Issue 6.

8 *www.grandin.com*. Accessed November 19, 2007.

9 Bovey, K., et al., (2009). An examination into the innervations and condition of mature boar tusks at slaughter. Campbell Centre for the Study of Animal Welfare Factsheet #1.

10 Sutherland, M.A., et. al. (2007). Space requirements of weaned pigs during transportation. *J. Anim. Sci.* 85:365.

11 McGlone, J.J. (2004). Handling During Transport. Presented at the AMI Meetings in Kansas City, MO

12 Ellis, M. and M. Ritter, (2006). Impact of season on production: transport losses. Proc. 2006 Allen D. Leman Swine Conference: 205-207.

13 World Organisation for Animal Health (OIE). (2007). Appendix 3.7.3 Guidelines for the transport of animals by land.

14 Canadian Agri-Food Research Council. (2001). Recommended code of practice for the care and handling of farm animals–transportation.

15 Ritter, M., et al., (2005). The fatigued pig syndrome. *J. Anim. Sci.* 83(Suppl. 1):258

16 "Market swine condemned ante-mortem for deads in USDA-inspected plants for the calendar years of 1991 to 2006." 2007. Food Safety Inspection Service. FOIA Case 07-148.

17 "Market swine condemned ante-mortem for deads in USDA-inspected plants for the calendar year of 2007." 2008. Food Safety Inspection Service. FOIA Case 08-120.

18 "Market swine condemned ante-mortem for deads in USDA-inspected plants for the calendar year of 2008." 2009. Food Safety Inspection Service. FOIA Case 09-00071.

19 Ritter, M.J., et al., (2009). Transport Losses in Market Weight Pigs: I. A Review of Definitions, Incidence, and Economic Impact. *Prof. Anim. Sci.* 25: 404-414.

20 Sutherland, M.A., et al., (2009). Effects of variations in the environment, length of journey and type of trailer on the mortality and morbidity of pigs being transported to slaughter. *Vet. Rec.* 165, 13-18.

21 McGlone, J.J., et al., (1993). Shipping stress and social status effects on pig performance, plasma cortisol, natural killer cell activity, and leukocyte numbers. *J. Anim. Sci.* 71:888-896.

22 Woods, J. (2007). Commercial Livestock Truck Accidents

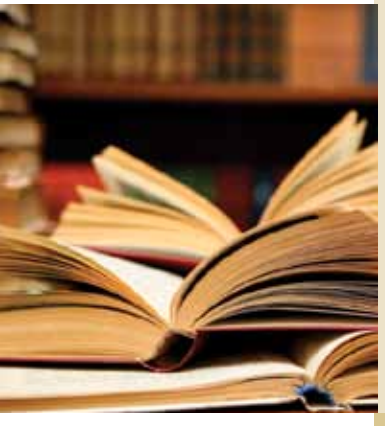
23 Government of Australia. (May 2004). Staying Alert at the Wheel

24 Transportation of Animals. Internet site, *http://uscode.house.gov*

25 Humane Slaughter of Livestock. Internet site, *www.fsis.usda.gov*

26 FSIS Directive 6900.2 Revision 1. Internet site, *www.fsis.usda.gov/Regulations_&_Policies/6000_Series-Slaughter_Inspection/index.asp*

27 AMI Foundation. 2010. Recommended Animal Handling Guidelines & Audit Guide: A systematic Approach to Animal Welfare. *www.animalhandling.org.* Accessed October 12, 2010.





National Pork Board
1776 N.W. 114th St.
Des Moines, IA 50325 USA

#04752-01/08