



FEEDING STALLS

A Guide for Managing Sows

A GUIDE FOR MANAGING SOWS WITH FEEDING STALLS

Authors: Lee Johnston, University of Minnesota; Jennifer Brown, Prairie Swine Center; Yuzhi Li, University of Minnesota; Tom Parsons, University of Pennsylvania; Tim Safranski, University of Missouri; Yolande Seddon, Prairie Swine Center

INTRODUCTION

Every animal caretaker has an ethical responsibility to provide proper care for pigs at each stage of their lives. Providing proper care and managing sows during gestation can be challenging, but is important for the well-being of the sow and her future litter. Poor management of sows in gestation can lead to injuries, reduced sow well-being, cause lower conception and farrowing rates, and contribute to smaller litter sizes. Understanding sow behavior, facility design, and how the two interact can help caretakers provide better care for the sows and a safer workplace for themselves.

The feeding stall system is a non-gated, competitive feeding system that provides individual feeding spaces for sows housed in groups. Feed may be delivered to these feeding spaces in one drop or through use of a trickle feeding system. A key component is the distinct division of the feed trough/eating area whereby individual portions of feed can be delivered to an area the width of the partitions. The distinct division of the eating area is established by head length, shoulder length, half-body length or full body length partitions.

This guide addresses current best practices for managing sows with feeding stalls as learned through research and on-farm experience. The guide consists of three sections: 1) summary of management techniques and husbandry skills needed for successful sow management, 2) a checklist for daily barn inspections, and 3) troubleshooting scenarios designed to facilitate discussion and to encourage the sharing of ideas among caretakers in the barn.

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EQUIPMENT MAINTENANCE

Equipment maintenance should be performed on a regular basis to ensure that equipment functions properly. When performing maintenance, the following areas should be checked:

1. Feeding

- There is one feeding stall for every sow in the pen.
- Individual feeders or feed troughs are in good repair.
 - » Feeders do not have holes that will leak feed or sharp edges that will injure sows.
 - » Cuts or abrasions on the sows' heads are a sign of sharp edges or protrusions.
 - » If injuries are present, check all surfaces of the feeder (inside and outside) to find sharp edges or protrusions and make repairs.
- Feed drops function properly and deliver the desired quantity of feed.
 - » Check feed drops daily.
 - » Collect feed from randomly-selected drops and weight monthly or when major changes in feed formulation occur to verify the correct quantity of feed is being delivered.
- If feed drops are controlled by a timer, drops should occur when desired.
 - » Monitor the duration of time that feed is dispensed to ensure settings are correct and the timer and dispensing systems are working properly.
- The feed augers, motors and feed bins function properly.
 - » The presence of expected feed in dispensing boxes suggests augers, motors, and feed bins are operating properly.
 - » Monthly inspection for excessive wear will help avoid untimely breakdowns and emergency repairs.

2. Watering

- Water flow rate for nipple or cup waterers is sufficient for sows.
 - » Water flow rate should be at least one pint per 30 seconds (about 4 cups/min).
 - » Waterers need to be checked daily and cleaned if necessary.
- A sufficient number of watering locations are available for the number of animals in the pen.
 - » There should be at least two waterers per pen located far enough apart so a dominant sow cannot control access to both waterers.
 - » For groups larger than 10 sows, consider at least one waterer per 12 to 15 sows.
- All sows are getting water if a common trough waterer is used.
 - » Feed dams sometimes prevent water from reaching all sows along the common trough. Check for feed dams daily and clear any blockage.
 - » If troughs have intermittent water supplied, make sure sows at the end of the trough receive adequate water (volume and duration) for the given season.

EQUIPMENT MAINTENANCE



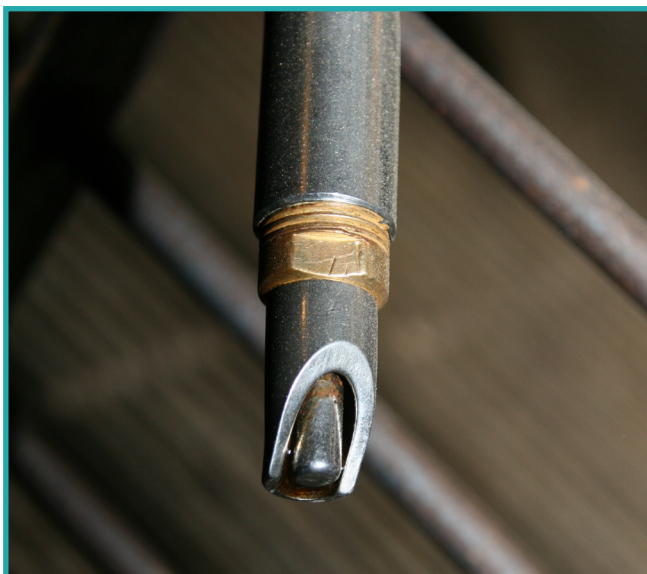
Feeding Stall/Space



Removing Feed Dam



Trough Feeder and Waterer



Nipple Waterer

EQUIPMENT MAINTENANCE

3. Penning/Gating

- Stall dividers and pen partitions are in good repair with no broken bars or sharp edges that could injure sows.
 - » Cuts or abrasions on the sows' bodies are a sign of sharp edges or protrusions.
 - » If injuries are present, check all equipment exposed to sows to find sharp edges or protrusions and make repairs.
- Gate latches are in good working order.
 - » Latches need to be secure and easy to operate without creating pinch points that may injure caretakers.
- Gating legs and feet are properly anchored to floor.
- Ends of feeding stalls are securely anchored to floor.

4. Flooring

- Slats are in good repair with no broken edges or holes to injure sows' feet or legs.
 - » Inspect floors daily for broken slats or other breaches in the flooring material.
- Solid laying areas should be dry and clean. Dirty or wet areas may be a sign of a water leak or a ventilation issue.

5. Cooling systems

- Drip nozzles used for cooling sows in stalls during weaning and breeding are located to drip water onto the front shoulder area of the sow.
- Sprayer nozzles for cooling sows in pens are located in the proper area.
- Dripper or sprayer nozzles work properly and are not plugged.
 - » Dry areas under some nozzles when nearby areas are wet suggest a nozzle is plugged.
- Controllers are set correctly and function properly.
 - » The controller should correctly activate the drippers or sprayers at the desired temperature and interval. A hand-held digital thermometer is helpful when checking the controller settings.
- Evaporative cooling pads correctly function to cool air entering the gestation building.
 - » Observe all areas of the cooling pads while operating to determine whether some areas of the pads are dry.
 - » Openings in the water supply pipe provide an adequate flow of water to saturate the entire cooling pad. If needed, unplug clogged openings.
 - » Allow cooling pad to dry for a minimum of 4 hours each night to reduce algae growth.
 - » Check water filter at least monthly and remove sediment buildup.
 - » Algae growth on cooling pads can be reduced by:
 - Adding a chemical for algae control.
 - Shading the pad from direct sunlight.
 - » Mineral buildup on pads can be reduced by:
 - Ensuring water is uniformly distributed along the length of the pad.
 - Increasing water flow rate over the pad to wash the pad.
 - » Periodically clean and flush the storage tank, pump, and water distribution system.

EQUIPMENT MAINTENANCE



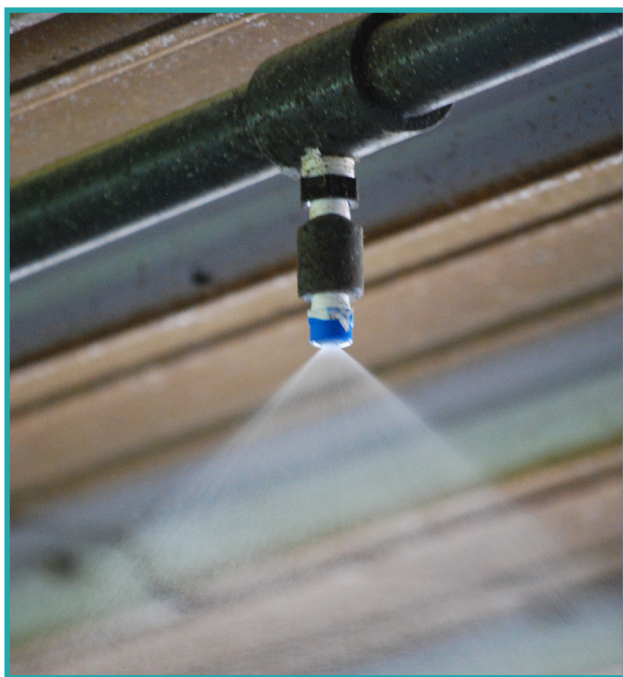
Good Slatted Flooring



Evaporative Cooling Pad



Clean Solid Laying Area



Drip/sprayer Nozzle

BEHAVIOR AT MIXING

When sows are housed as a group, they are housed in either a static group or a dynamic group. Sows housed in a static group are all placed into the group on the same day. No additional sows are ever added to the group for the remainder of their gestation. Sows housed in a dynamic group have new sows added or removed either each week or every few weeks. Regardless of the group type, sows will fight at the time of mixing.

Minimizing fighting among sows is critical for maintaining their well-being and performance. Excessive fighting at mixing can cause severe injuries and reduce reproductive performance. Gestating sows are especially susceptible to stressors from 6 to 28 days after mating, so mixing during this period can result in pregnancy failure or smaller litter sizes. Fighting to establish a social order is an instinctive behavior in sows. Understanding this behavior, what to expect, and how to minimize fighting at mixing can minimize associated losses.

1. What to expect at time of mixing

Sows generally begin fighting immediately after being mixed with unfamiliar sows. Fighting is intense during the first few hours, but reduces dramatically after 1 to 2 days. A stable group can be formed in one week. Wrestling and biting are the main forms of fighting. Dominant sows are more involved in fighting, but low-ranking sows usually sustain more injuries.

Consequences of fighting may include:

- Skin scratches or bleeding from bite marks;
- Panting due to increased body temperature;
- Lameness, especially if floors are slippery or if animals get toes caught in slats;
- Reluctance of submissive sows to compete for food, water, or good resting areas;
- Loss of pregnancy, small litter sizes, or no return to estrus.

2. How to minimize fighting

- Sows can remember each other for up to 6 weeks, so whenever possible group sows that were housed in the same pen during their previous gestation.
- Lightly spread some feed on solid floor areas before moving sows into the pen to distract sows from fighting. This may not be practical with large groups or insufficient amount of solid flooring.
- Mix sows after they have been fed to reduce fighting.
- Observe sows frequently during the first few hours after mixing, when fighting is most intense. Fights usually last from 1 second to 2 minutes. Identify bully sows involved in prolonged fights longer than 5 minutes and consider removing them if aggression persists.
- Scraping the pen and assuring floors are dry before mixing can help to reduce slipping. Sows that fall on slippery floors during fighting may injure their limbs and become lame.
- Pay extra attention to sows that are badly beaten up to ensure they are not lame and that they get up to eat daily the first few days after mixing.
- Check for vulva biting. High frequency of bitten vulvas suggests problems with feeders, drinkers, gilts eating too slow when housed with sows, interval of time between dispensing of feed, or overcrowding.
- Make sure every sow has access to drinkers during the first few days after mixing, especially during hot weather. Dominant sows may block the drinkers so that other sows cannot get access to water.
- If sows are repeatedly being injured during fighting due to protruding nipple drinkers, consider installing water cups.
- Providing distractions (e.g. PVC pipe, chains etc.) also can reduce fighting.

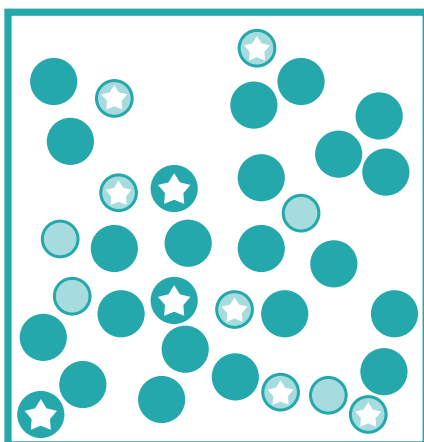
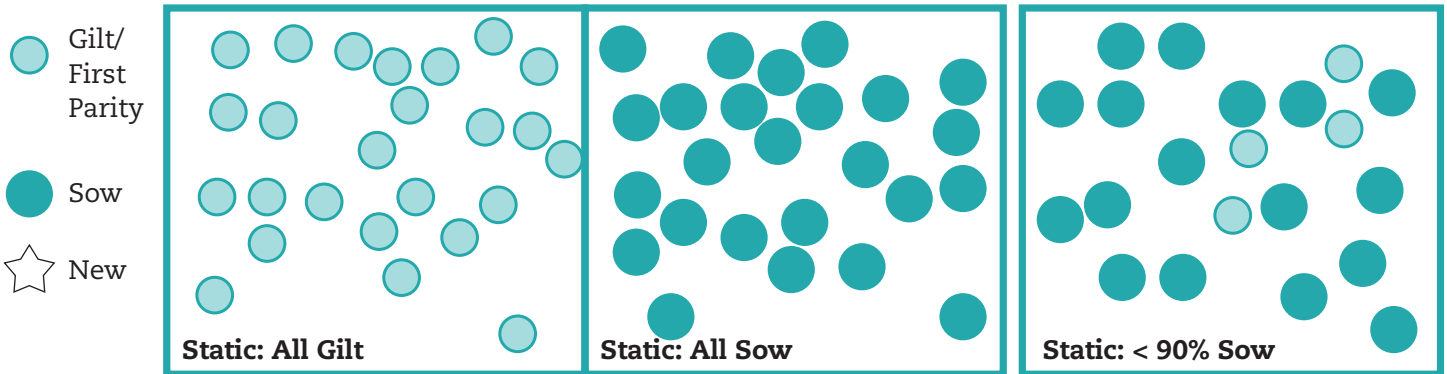
BEHAVIOR AT MIXING

For static groups:

- Not every sow is involved in fighting in large groups. Fights typically involve dominant sows attacking low-ranking sows.
- Low-ranking sows are more likely to be injured during fighting and have more skin scratches. They tend to lie in less desirable areas, such as on wet slats with air drafts.
- Solid partitions or partial walls in the pen will provide hideouts for sows to escape and can reduce fighting and injuries.
- Sort sow groups by size and parity to reduce bullying of low-ranking sows.
- Gilts and first-parity sows are nearly always submissive to older sows, so place gilts and first-parity sows in a separate group from older parities.
- If sorting by weight and parity is not possible, maintain the number of young sows (parity 1) above 10% of the group to help protect young sows from being bullied and becoming injured.
- Move young sows into the pen before older sows to help young sows acclimate to their new environment and remain competitive.

For dynamic groups:

- Fighting will occur each time a new group of sows is introduced, so reducing frequency of mixing will reduce fighting.
- Most fights involve new sows, and new sows usually receive more injuries from fighting than resident sows. To reduce injuries to the new group of sows:
- Keep the size of a new group between 10 to 30% of the total dynamic group to help the new sows compete with resident sows.
- When the size of a new group is larger than 40% of the total dynamic group, mix the new group of sows in a separate pen before introducing them to the dynamic pen.
- Dynamic group sizes of 100 sows or more provides an opportunity for timid animals to escape from aggressive sows because of increased pen size and number of animals in the pen.
- Removing sows from the dynamic pen usually does not trigger much fighting.



Dynamic: New group is 10-30%



Sows Fighting



Skin Scratches From Fighting During Mixing

CARETAKER SAFETY

A safety risk to caretakers is getting hands, arms or legs pinched between a sow and the bars of a stall or partition. Be aware of this risk and consider how to approach sows so that a sudden movement by the sow will not trap a part of your body and cause injury. Placing a sort board between you and the sow can provide some protection.

Consider working in pairs to accomplish management tasks whenever possible. If one person is injured, the other can provide assistance or seek additional help. Pay close attention to all sows in the pen, especially if someone else is working in the same pen. If working in pairs is not possible, let others know where you are working and carry an approved communication device such as a cell phone or two-way radio to call for help if needed.

Sows and heat-check boars can become aggressive. Have a readily accessible escape route should a boar or sow become aggressive. Avoid tight corners and always carry a sort board to provide some protection.

Routine animal-care tasks can pose possible safety hazards to the caretaker.

1. Daily observation and walking the pens

- Risk of being stepped on, knocked over, or tripped is greater just after sows are mixed compared to when stable groups have been established.
- Be aware of fighting sows and other pen mates that may join the fight. Never attempt to interfere with sows during a fight.
- Be aware of sows in heat or coming into heat because they are less predictable. They may injure caretakers as the sows try to mount other sows.
- Sow activity increases the chances of caretaker trips, slips, and falls.
- Wear protective footwear with steel-toe protection and non-slip soles to avoid injury from being stepped on and slipping.
- Always carry a sorting board when entering a pen.

2. Sow health care

- Be careful when vaccinating unrestrained sows because they may exhibit avoidance behavior.
- Any injections or treatment of sows can agitate the sow and possibly pen mates (particularly if snout snares are used) and cause sows to become aggressive.
- The process of replacing ear tags may agitate the group and cause sows to become aggressive.
- Needle-sticks are a danger to caretakers when sows are mobile and unrestrained.

3. Heat checking and mating

- Use a sorting board when moving sows and boars for heat checking. Some boars may aggressively attack a sorting board, so take extreme caution. If this occurs, the boar should be culled.
- Sows can be persistent in mounting behaviors. If heat checking or mating sows in pens, be aware of other sows wanting to mount the sow being inseminated.
- Be particularly cautious working around boars that have tusks.

4. Pregnancy diagnosis

- Be aware of slip, trip and fall hazards around sows, especially when wearing ultrasound goggles.
- Caretakers new to using ultrasound equipment need to take special care in adjusting their vision so they can move around the barn without tripping or falling.
- When checking an individual sow, other sows in the pen may bump or push the caretaker.
- Perform pregnancy diagnosis while sows are eating for ease and safety.

CARETAKER SAFETY

5. Moving sows

- All movement of sows must be in accordance with the handling guidelines described in PQA Plus and TQA. All caretakers need to be certified in these programs for efficient and safe movement of sows.
- Always use a sort board to move sows. Sort boards provide a physical and visual barrier that is very useful in moving sows.
- Understand and use pig movement behaviors when sorting sows from a group.
- Be aware that sows showing extreme avoidance behavior have the potential to knock down people.
- Be cautious of the caretaker's legs getting pinched or injured as sows move down alleys, especially when multiple sows move side-by-side.

6. Euthanasia and sow mortality

- If possible, sows should be moved from the pen to an open area for euthanasia.
- If the sow is non-ambulatory, work in pairs to move sows safely and humanely to the euthanasia area. Do not drag conscious sows. Use a device such as a sled, cart or dolly to minimize the risk of injury to the caretaker and to maximize comfort of the sow.
- Use a mechanical device (cart/winch/dolly) to move dead sows and to avoid back strain.

7. Equipment repair/maintenance

- If the feed delivery system fails, the gilts and sows will need to be fed by hand.
- Repetitive motion injuries and back strain may occur if hand-feeding sows (unlikely on most farms).
- Be cautious of pinching hands or crushing body parts with a heavy feed cart when hand-feeding.



**Mechanical Cart for
Carcass Removal**



Feed Cart



Needle-Stick Prevention



Protective Footwear

INDIVIDUAL SOW OBSERVATION

Daily observation of individual sows is an important part of animal care and allows for early detection of problems. The easiest way to identify problems is by noticing changes in sow condition and behavior. Observations should be part of the daily routine.

1. General observation

- To avoid missing sows, develop a consistent plan to walk through the barn and scan each pen. For example, scan the edges of each pen and then across the central areas to ensure all areas are examined.
- Observe all pens every day during feeding and once during the afternoon. The afternoon observation could be combined with regular work tasks and completed when the sows are active.
- During feeding times, ensure all sows are up and actively eating.
 - » Observe sows for lameness, injuries or sickness because these sows may not get up to eat or may have difficulty getting to the feeder.
 - » Mark those sows that need further attention.
- Check for sows lying hidden behind solid pen partitions.
- Note groups of sows in each area of the pen, including where and how they are lying. Observe if any sows are lying separated from the rest or are lying in muck, as this can indicate a problem due to sickness or injury.
- Observe how sows are standing. Check for presence of discharge or blood on the floor or on sows, and scan for obvious injuries.
- Record the number of animals with problems in each pen group. This will help build a database of the incidence of problems arising in the herd.
- Initial a daily sow monitoring record sheet for each room/pen group to document that sow observations are being performed.
- Assign sow observation tasks to a designated individual to ensure consistency of checks. All observers should receive training on the monitoring routine.

2. Monitoring for sows off-feed

- Check that all sows are standing up and feeding during the dispensing of feed.
- Mark any sows that are not up and eating.
- Return at the next feeding time to see whether marked sows ate. Thoroughly examine any sows that still have not eaten, and take action if necessary.

INDIVIDUAL SOW OBSERVATION



Sows and Solid Pen Partitions



Keep a Daily Record

BODY CONDITION SCORING

Body condition is a critical factor affecting the reproductive success, health and longevity of sows. Both thin and fat sows contribute to reduced productivity and economic efficiency of the herd. Therefore, maintaining sows in an optimal weight range, with minimal fluctuations in body condition throughout the productive life of the sow, is an important management goal.

Body condition scoring is a simple management tool for accurately assessing the body condition of sows. Regular body condition scoring should be part of the routine management of the breeding herd, and can help determine whether the feeding management of sows is effective. Monitoring sow body condition can help identify feed dispensing problems and whether additional feed needs to be allotted to the pen.

1. How to perform body condition scoring

- Both a visual and a physical assessment of the sow is required. The spine, ribs, hips, and pin bones should not be visible but they should be easy to feel. (Figure 1).
- Sows should be standing for the assessment. If lying down, urge the sow to stand.
 - » This task often can be conducted while sows are eating because they are already standing.
 - » If scoring when sows are in a stall, stand out of the stall and behind the sow.
 - » When scoring loose sows, calmly and quietly approach the sow from her side, not head. Stand to one side of the sow facing the tail.
 - » A good relationship between the sow and caretaker is important for loose sows to remain calm and to stand during condition scoring. Take time daily to walk the pens and interact with the sows to help them feel relaxed in your presence.
 - » Approach nervous sows or gilts in a crouching position (Figure 2). This is less threatening and can allow you to get closer to the loose sows.
- Begin with the physical assessment: using the fingertips or palms of both hands, reach over the sow to firmly press the hip bone, pin bones and top of spine (Figures 3, 4 & 5).
- Stand back from the sow and visually assess her condition based on the appearance of her hindquarters in accordance with the 1 to 5 scale (Figure 6).
- Based on the physical and visual assessment, assign individual sows a score of 1 to 5.
- Half scores, such as 2.5, may be used if this helps to increase accuracy.
- Record the condition on the sow's record card.

2. When to monitor body condition

- Score sows at breeding, at pregnancy checking and at least once during gestation, commonly at 80 days of gestation.
- Allow sufficient time between scoring and farrowing for adjustments in the feed ration to affect condition before farrowing.
- Condition scores should range between 2.5 and 3, with at least 80% of sows having a condition score of 3.
- Combine the scoring with other routine jobs (such as breeding and pregnancy checking) to improve work efficiency.

3. What body condition scores mean

- Large variations in body condition within a pen indicate there is a problem with feed distribution.
- If sows are housed in breeding stalls for 4 to 5 weeks after service, the sows should be fed an appropriate amount of feed to get them in the correct body condition before entering the group pen environment.
- Because the feeding stall system is a competitive feeding system, base the total amount of feed per sow on the amount required to maintain all the sows in the group.
- Sows with a condition score of 1 should be a rare occurrence (<1%). Sows with condition score 1 may need to be removed from the group for additional supplementary feeding to improve body condition.
- Group sows by condition to help determine the appropriate quantity of feed to dispense to meet the needs of the group.

BODY CONDITION SCORING

4. Points to remember

- When possible, perform body condition scoring with a second caretaker to develop consistency of scoring.
- Have a third party, such as the herd veterinarian, periodically check consistency of scoring.
- Periodically review the percentage of sows falling into each score category to help identify problems related to feed allowance.
- Both underfeeding and overfeeding are undesirable. Feed is the greatest production expense. Overfeeding sows is economically inefficient and also can lead to reduced sow productivity.
- Separate thin and overweight sows at grouping because these sows require different feed management.
- Monitor regularly throughout gestation to ensure all sows are receiving sufficient feed.
- Promptly remove from the pen any sows that cannot compete and that are losing weight.

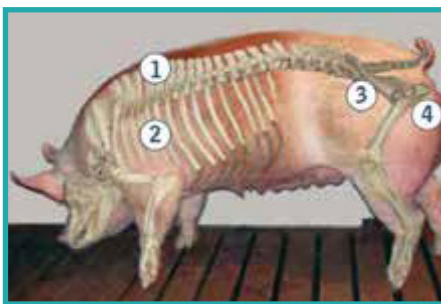


Figure 1.
Sow Bone Structure.
1-spine,
2-ribs,
3-hip bone
4-pin bone



Figure 2. A technique for approaching nervous sows or gilts in loose housing.



Figure 3.
Feeling for fat cover over the hip bones of the sow.








Figure 4.
Feeling the top of the spine .



Figure 5.
Feeling for fat cover over the pin bones of the sow (Photo: Don Levis)

Figure 6. Body Condition Scoring

Image					
Score	1	2	3	4	5
Condition	Emaciated	Thin	Ideal	Fat	Obese
Detection of Ribs, Back Bone, "H" Bones and Pin Bones	Obvious	Easily detected with pressure	Barely felt with firm pressure	None	None

Taken from "Assessing Sow Body Condition" by R.D.Coffey, G.R. Parker, and K.M. Laurent (ASC-158; 1999)

IDENTIFYING LAMENESS

Lameness is a concern because it usually involves a painful condition. Lameness can be more visible in group-housed sows than those in stalls because they are more active. Lameness also can be more prevalent in groups due to aggression among sows. Therefore, it is important to assess and treat sows for lameness and minimize the negative effects on productivity and longevity.

1. Observation and scoring for lameness

- During daily walking of the pens, observe sows carefully to identify signs of lameness. Signs include shortened stride, swaggering of hindquarters while walking, reduced weight bearing on the affected limb, reluctance to move or get up, arched spine when walking or standing, and obvious head nods when walking.
- Ideally, two people should be present. One to move the sow and one to observe and score movement.
- Observe sows as they walk over an area with good flooring. Slatted floors may be used, but clean, solid floors are best.
- Sows may be stiff from lying, so ensure the sow has walked several feet before beginning your assessment.
- Walk the sow for a distance of 10-20 feet and observe her movement.
- Evaluate the severity of lameness using a scale of 0 to 4 (Table 1).

2. Treating lame sows

- When a lame sow is identified (score of 1 or greater), examine the affected limb(s) to determine the cause and appropriate treatment.
- Common causes include cuts to the leg, abscesses, swollen joints, or hoof lesions. If no lesion is present, internal joint problems may be responsible.
- The treatment of affected sows will depend on the cause and severity of lameness and the farm's Standard Operating Procedure (SOP).
 - » Sows scoring 2 or 3 may benefit from removal to a treatment pen with the addition of rubber mats to promote recovery.
 - » Sows scoring 3 or 4 should not be transported, but should be moved to a treatment pen if possible. All efforts should be made to avoid mixing sows in the lame pen to reduce fighting among these sows.
- Depending on the sow's condition and treatment options, severely lame or non-ambulatory sows may need to be euthanized following protocols developed in consultation with the herd veterinarian.

IDENTIFYING LAMENESS

Table 1. Lameness score scale

Lameness Score	Description
0	Sow moves freely and uses all 4 limbs and feet evenly
1	Sow shows weight-shifting activities away from affected limb when standing but shows little or no lameness or limping when walking
2	Sow obviously shifts weight away from affected limb when standing and shows limping or adaptive behavior when walking (head bob, arched back, hindquarter swagger, quickened step on affected limb, or shortened stride)
3	Sow is reluctant to stand and/or walk, obvious limp and adaptive behaviors when walking (head bob, arched back, hindquarter swagger, quickened step on affected limb, or shortened stride)
4	Sow is non-weight bearing on the affected limb when standing or walking
Scale adapted from: Karriker et al., 2013. <i>J. Anim. Sci.</i> 91: 130-136 and Nalon et al., 2014. <i>Animal</i> 8(4): 650-659	

MONITORING ANIMAL HEALTH

Monitoring animal health is a key part of daily observations. Early identification of ill or injured sows is important for effective treatment and for maintaining good health in the herd.

1. Identifying sick animals

- Animal behavior is typically the most cost effective and time efficient approach to identifying a sick animal.
- Observation of changes from their normal behavior is the key to finding a sick animal.
- Daily observation of all animals is required to understand what is normal and to be able to identify changes when they occur.
- Identification of sick animals can be complicated because sows can move around within the pen or barn.
- Typically, the best time to look for health problems is shortly after the feed has been dispensed.
- Pay attention to individual animals to ensure adequate individual animal care.
- Mark suspect or affected animals to make repeated observations easier.
- Most commonly observed behavior changes include:
 - » Failure to eat part or all of their daily ration;
 - » Failure to rise or walk, or an abnormal posture when standing;
 - » Pilo-erection – fuzzy pig look associated with fever;
 - » Abnormal gait when walking;
 - » Changes in laying posture or changes in the location within the pen where the animal normally lies. Also look for isolation from pen mates.
- Sick animals will be found often in the less desirable areas of the pen that are typically wet or drafty.

2. Diagnosing the problem

- Further diagnosis of a sow's problem is critical to ensure that she receives the most appropriate care and treatment.
- Lameness can be diagnosed by abnormal gait, failure to bear weight on a limb, or inability to rise (see **Identifying Lameness** section for more details).
- Other conditions in sows tend to be much more sporadic in occurrence.
- It is sometimes useful to take the sow's rectal temperature to see if the animal has a fever (normal temperature is 102.0 F) and to help identify animals with an infection.
- Sneezing, coughing, or reddening about the eyes is often associated with disease of the respiratory tract.
- Abnormal posture, head tilt or evidence of constant head banging is indicative of neurologic disease.
- A pale animal often suggests there has been internal blood loss following a gastric ulcer or ileitis.
- Blood, scratches, cuts, healing wounds and other injuries can result from aggression among sows.
- Mucous discharge found on the slats behind the sow or coming from the animal's vulva often indicates a reproductive tract infection.
- Dry, hardened or pellet-like feces suggests the animal is not drinking enough water.
- Loose or poorly formed feces may be indicative of a sudden dietary change or the development of gastro-intestinal disease.
- Blood on the sow's hind legs or afterbirth or fetuses in the pen reflect a recent abortion/pregnancy loss. Finding afterbirth or fetuses can be challenging because they may have been eaten by other sows, been stepped through the slats, or the aborting sow may have relocated.

MONITORING ANIMAL HEALTH

- Dynamics of group-housed animals make it more difficult to associate discharges, abortions or changes in feces with specific animals.
- Veterinary consultation may be required for accurate diagnosis of some problems.

3. Treatment

- Treatment is an important step toward fixing the animal's specific ailment and helping to ensure that she stays in the herd.
- Develop treatment plans for specific ailments in conjunction with the herd veterinarian.
- Record all treatments on a treatment sheet.
- Clearly identify individual animals receiving treatment.
- Mark withdrawal dates for all drugs administered to a sick sow on the treatment sheet to ensure she is not sent to slaughter prematurely.
- An animal may need to be moved to a treatment pen depending upon the severity of the ailment, whether the animal can remain competitive in the pen, or the required treatment.
- If an animal's ailment can be managed in the existing pen it is best to do so.
- Administering treatments:
 - » Treatments usually involve injections, or in rarer cases, oral administration.
 - » Sows may need to be restrained for treatment and the administration of routine health care.
 - » Repeated treatments are more likely to require restraint or immobilization. Corner the sick animal along a fence line with a sorting board or snare the sow. Timing this with feeding may simplify the task.
 - » Follow all basic good production practices as outlined in PQA Plus when administering injections. Take additional care to ensure caretaker safety.
 - » Treat animals for the full treatment course as specified by the farm SOP to maximize her chance of recovery. Animals not responding to treatment will need to be euthanized.



Treatment Pen



Maintain Treatment Records

4. Routine health maintenance practices

Most farms also carry out other basic health maintenance activities during gestation that include:

- Pre-farrowing immunization to improve colostrum quality at farrowing.
 - » It is relatively easy to approach most sows to give a single injection in pens where the animals have regular, positive human interactions.
 - » Static groups are common in feeding stall systems. It is relatively easy to vaccinate whole pens of sows at one time, particularly at feeding time.
- Non-invasive manipulations such as body condition scoring (see Body Condition Scoring section for more details).
- Pregnancy diagnosis (see Pregnancy Detection section for more details).

HEAT DETECTION AND ARTIFICIAL INSEMINATION

Detection of heat, or estrus, is important for determining the correct time to mate gilts or weaned sows and to reduce non-productive days in sows that return to estrus post-mating. Depending on the barn design and management of breeding within the herd, breeding may take place in stalls or in a pen specifically designed for estrus detection and insemination.

1. General information about heat detection

- Be aware of sow behavior at all times as estrus may be identified when performing other tasks. Greatest success is achieved when sows are comfortable around people.
- Perform heat detection at a set time daily.
- Perform heat detection on recently weaned sows and on all sows 18 to 24 days post-mating to detect return to estrus. Many farms check for late returns (i.e. after 42 days) by walking the pens and observing sows' physical appearance and behavior.
- Sows show estrus more reliably if detection of estrus is performed in the morning with mature boars.
- Wait at least one hour after feeding so sows can be focused on the boar rather than feed.
- Sows display estrus in response to pheromones from the boar's saliva. It is important to consider actions to enhance the likelihood of her being stimulated by his smell.
- Ensure boar exposure is a novel event at the time of detection of estrus; muscle fatigue occurs when sows stand in estrus for prolonged periods (refractoriness).
- Use mature heat-check boars that are at least 10 months of age. The best boars for heat checking actively chant, chomp and produce saliva.
- Best results occur if sows have not seen, heard or smelled a boar for 1-2 hours before detection of estrus.
- Walk the boar 'into the wind' to avoid refractoriness. This is especially relevant in tunnel-ventilated barns.
- Do not smoke during estrus detection.
- Record observations and mark sows to assure each is checked daily.
- Some farms mate sows at detection of estrus. If this is practiced, carry semen and catheters during estrus detection for the anticipated number of sows to be mated.
- Use sorting boards, tethers, carts or robots when handling or moving boars to assure safety. Boars are capable of injuring people so remain vigilant in attention to the boar at all times and always use proper safety tools. Often, boars can be trained to signals.

2. Heat detection in stalls

Some farms choose to heat check and inseminate in stalls prior to group housing sows.

- Assure each sow has fence-line nose-to-nose contact with the boar. The time for a sow to exhibit a standing response is highly variable, so duration of boar exposure should be two minutes.
- Have at least one person located behind the sow during heat detection. While the boar is in front of the sow, this person will determine if the sow is receptive to boar stimuli by applying pressure to the sow's back, massaging flanks, and checking the vulva for color and discharge.
- If heat checking rows of sows facing each other, consider refractoriness. Either have people heat-checking behind each row simultaneously or check the second row 1 to 2 hours after the first.
- When applying back pressure and flank massage be aware of stall bars to avoid crushing hands (see **Caretaker Safety** section for more details).

3. Heat detection in groups

- Establish an insemination area where small groups of recently weaned sows are moved for estrus detection and insemination. The design of the insemination area will depend on the number of caretakers present. This area typically includes a heat checking/breeding area and a holding pen.
- Artificial insemination of sows in their home pen can be difficult and places caretakers at risk of injury due to estrus activities by other sows (mounting sow, nosing sow's flank).
 - » If several sows in a large group are expressing estrus at the same time, some sows may become refractory to boar stimuli before the sow can be artificially inseminated.
 - » Working with small groups of sows during mating allows for focus on the insemination process. Move sows into smaller pens or sort into the aisle.

HEAT DETECTION AND ARTIFICIAL INSEMINATION

- The minimum number of caretakers needed to heat check in a group pen is the number of boars plus 1
 - At least one person will work with the sow to determine if she is receptive to boar stimuli by applying pressure to the sow's back, massaging flanks, and checking the vulva for color and discharge.
 - Allow fence-line access to boars or move boars into the sow pen to provide maximum exposure to sight, sound, and smell of boars and to assure nose-to-nose contact for each sow.
 - Prevent the boar from actually mounting sows unless the intent is to allow natural mating or to collect the boar by hand. Heat-check boars should be collected once per week to help maintain their sexual behavior.
 - If one boar is used instead of several, boar rotation needs to be more frequent (30 to 60 minutes maximum in most cases). Duration of boar use depends on sexual activity of the individual boar. Warm weather will fatigue boars quicker than cool weather.
-



Boar with Tether and Robot



Fence-Line Nose-To-Nose Contact



Performing Heat Detection in Stalls



Performing Heat Detection in Pens

PREGNANCY DETECTION

Confirming pregnancy status is important for planning farrowing accommodations and eliminating or re-mating open sows to reduce non-productive days. Open sows normally show estrus 21 days post-mating if they did not conceive. Sows presumed pregnant are often confirmed pregnant via real-time ultrasound pregnancy diagnosis. To confirm pregnancy:

- Identify sows that are 24 to 30 days post mating.
- Have a plan for how to manage sows that are found not pregnant.
- Carry an adequate supply of gel and assure the ultrasound battery is fully charged.
- Real-time ultrasound machines have fragile elements. The crystals in the probe are the most sensitive to damage so take care to avoid damage. Some caretakers strap the probe to their wrist during use to prevent dropping it on the floor.
- Apply gel to the probe. Carefully place the probe on her flank, pointing forward toward the uterus and avoiding the urinary bladder. To confirm pregnancy, look for black circles corresponding to the fluid around developing fetuses.
- Record pregnancy status and mark sows accordingly.

1. Confirming pregnancy in stalls

- Pregnancy diagnosis involves placing your hand between the sow and the side of the stall. Avoid injuries by talking to the sow and placing a hand on her rump so she knows you are there.
- Step into stalls or lean over the back gate.
- To avoid injury and the need to step into each stall, it is possible to create a guide for the probe. Tape the probe to a bent piece of PVC pipe so the probe can be pointed toward the uterus from outside the stall.

2. Confirming pregnancy in groups

- Sows are able to move freely and can pose a risk to caretaker safety (see Caretaker Safety section for more details).
- Greatest success is achieved when sows are comfortable with people so that sows are not trying to get away during the ultrasound process.
- Perform pregnancy diagnosis when sows are calm, for example after feeding. Diagnosis can be performed on sleeping sows without disruption if good technique is used.
- Consider having sorting pens available for open sows or sort open sows into the aisle to facilitate re-mating or culling.
- If housed in dynamic groups, mark sows ahead of time for safety and to preserve ultrasound battery life.
- If housed in static groups, ultrasound each sow and mark as pregnant or open. Once completed, sort and move all open sows from the pen.



Ultrasounding for Pregnancy Detection

HANDLING FALL-OUT SOWS

Sows identified as open either at the time of routine pregnancy diagnosis or sows that later abort are referred to as fall-outs. Some farms also use the term for sows that are unable to compete in a group or become lame, sick, injured or thin. Each farm will need to decide whether the sow is to be re-mated or culled, but in either case it is likely the sow will be moved to a new location in the barn.

1. Removing sows from a static group

- If very early or late in pregnancy, consider the potential impact of removal and associated aggression that occurs with re-establishment of social status. Aggression has the least impact during the middle trimester.
- Adjust feed dispensers to account for the removed sows.

2. Removing sows from a dynamic group

- Replace removed sows from the dynamic group if appropriate. If fewer than ten animals need to be removed/added consider waiting until the group size grows.
- Adjust feed dispensers to account for the removed sows.



Adjusting Feeder Box

MANAGING VENTILATION

Ventilation will have an immediate and long-term impact on sow well-being and performance. If signs of ventilation issues are identified, it is important to take corrective actions to solve the problems.

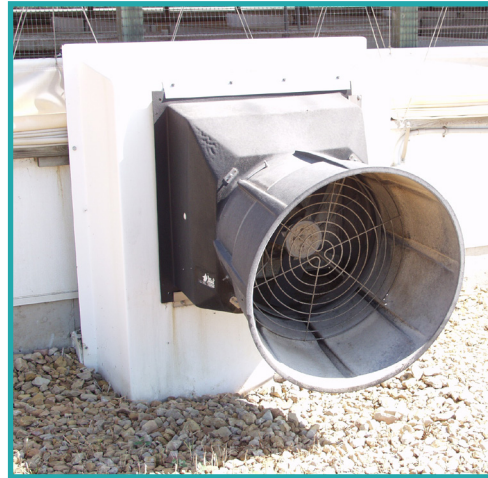
1. Daily observations and actions

- Observe animals daily for signs of discomfort due to improper ventilation, heating or cooling.
 - » Signs include animals that are huddling together, lying on their bellies, shivering, panting, are excessively sprawled out, or nosing water out of the trough for cooling.
- Observe facility daily and look for signs of improper ventilation, heating or cooling. Look for:
 - » Excessively cold drafts that can be felt while walking through pens and buildings.
 - » During winter months, ice/frost on north walls due to air leaks.
 - » Wet barn floors due to a lack of air movement.
 - » Animals defecating in the wrong area of pen due to improper air distribution.
 - » Wet or damp gating or water dripping off the ceiling due to high humidity in barn, insufficient air flow and improper air temperature.
 - » High ammonia concentration (25 ppm or greater) due to low ventilation rate, mucky floors, pit fans that are not working, or a manure pit that is too full.
 - » Rooms that are too hot or too cold.
 - » Evaporative cooling pads that are dry or have dry spots when they should be wet.
 - » An air leak allowing air to by-pass evaporative pad.
 - » Curtains that have large holes due to a lack of rodent control.
- Observe daily for signs that ventilation, heating or cooling components are not working correctly. Look for the following problems:
 - » Fans are not running when set to be working.
 - » Fan shutters are stuck closed when the fan is running or open when the fan is not running.
 - » Floors or walls are wet.
 - » Humidity in the air is higher than expected.
 - » Soffit air inlets are plugged.
 - » Air inlets in the ceiling or wall are improperly set and causing bad distribution of air.
 - » Air inlets are open within five feet of a running fan.
 - » Dead air spots are detected within the room.
 - » Air outlets on a non-mechanical ventilated building are improperly set preventing exit of a proper quantity of air.
 - » Inadequate water flow or a plugged water source is causing the evaporative pads to be completely dry or dry in spots.
 - » Heaters are operating when a first-stage ventilation fan is running due to improper setting (need 1.5°F offset).
 - » Air temperature within the building is wrong due to thermostats being dirty, set wrong, or the sensor placed in the wrong location. In addition to observing behavior of pigs, get a thermometer reading daily to check for appropriate temperature.
 - » In mechanically ventilated buildings, check manometer for appropriate static pressure.
 - » Spray cooling nozzles are plugged.
 - » Intermittent spray cooling system is not operating at the desired temperatures.

MANAGING VENTILATION



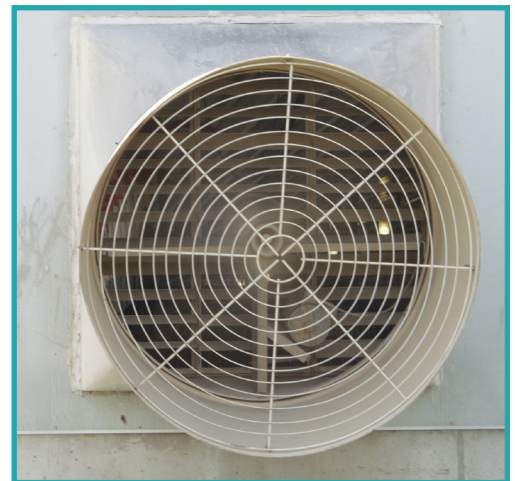
Thermostats



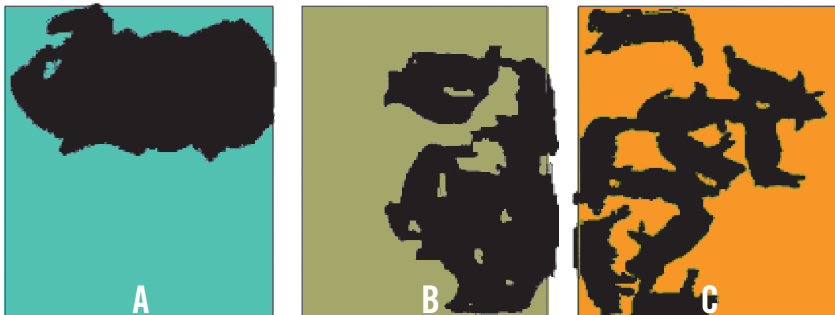
Pit Fan

Thermoregulatory Laying Postures of Swine

The images portray the normal thermoregulatory laying postures of pigs in an environment with three different air temperatures. Take note of the pigs in relation to each other, as well as the amount of free space within the pen. *Image A* depicts a pen of 10 pigs in an environment with cold air temperature. These pigs huddle very close together in a dense pile in one area of the pen. *Image B* depicts a pen of 10 pigs in an environment with ideal air temperature. These pigs have body contact with each other but do not pile excessively. *Image C* depicts a pen of 10 pigs in an environment with hot air temperature. These pigs spread out throughout the pen and avoid physical contact with other pigs in the pen.



Barn Fan



Taken from Shao et al., 1997, in volume 40 of the Transactions of the American Society of Agricultural Engineers.

MANAGING VENTILATION

2. Routine maintenance tasks

- Weekly
 - » Check that alarm systems are working correctly.
 - » During the summer months, check all components of the evaporative pad cooling system for functionality.
 - » Check rodent bait stations.
- Quarterly
 - » Clean fan blades, shutters, grill, motors and controls of fans in animal areas.
 - » Make sure all fans are working and shutters open and close freely.
 - » Clean manure pit fan blades, shutters, motors, fan housing and controls.
 - » Make sure all manure pit fans are working and shutters open and close freely.
 - » Replace excessively worn fan belts on belt-driven fans.
 - » Grease fan bearings as needed.
 - » Clean attic/soffit air inlets that are partially plugged with debris.
 - » Check that indoor air inlets are working.
 - » Check that curtain controllers are working.
 - » Check that the emergency drop system for curtains is working.
 - » Check that curtains do not have holes due to rodents.
 - » Check that curtains do not have air leaks due to the top of the curtain sagging or air leaks at curtain pockets.
 - » Check the curtain cable for broken strands.
 - » Check for other types of unplanned entry of air (i.e. leaks around doors and windows).
 - » With respect to season of year, check that the heating and cooling system is working properly.
 - » Check the entire building and ventilation system for air leaks when using air filters for disease control.
 - » Check that the emergency generator is working correctly.
 - » The person in-charge of the ventilation system should be informed when adjustment to ventilation settings are needed.
- Yearly
 - » Clean and repaint chipped areas on fan blades, fan housing and shutters to prevent further corrosion.

MANAGING VENTILATION



Weekly Check: Rodent Bait Stations



Weekly Check: Evaporative Cooling Pad



Quarterly Check: Air Inlets



Quarterly Check: Curtains

DAILY GUIDE FOR WALKING BARN: FEEDING STALLS

This guide is intended to provide a list of items to evaluate during daily barn inspections. It is not intended to be a decision tree for diagnosing problems.

General Approach: The daily walk-through of sow barns will be most effective if you develop a pattern of observation that becomes routine. The pattern of observation for each sow or pen will be similar, but the starting point for the walk through the barn should vary from day to day. This allows you to see sows and facilities from a different angle and at a different time each day. The primary focus of the daily walk-through must be the condition, health, and behavior of the sows. This will help you to diagnose problems with other components of the housing system. Every animal must be inspected every day to accomplish complete and effective animal care.

1. Sow Condition/Behavior (These also apply to gilts and boars in the barn.)

- Is the sow standing up and active around feeding time with an alert, bright appearance?
- Are all sows in a feeding stall and eating at feeding time?
- Is there feed left in any of the feed stations, troughs or feeders?
- Are the sows in good body condition?
- Are the sows behaving normally considering the time of day?
- Are there any skin lesions or injuries that appear to be new compared to the previous day? Are vulva bites present?
- Are there sows showing signs of lameness?
- Are there any unusual discharges from the sow's vulva?
- Are there sows in heat? Are there sows riding each other?
- Are there aggressive sows coming into or going out of heat that are harassing other sows?
- Are sows getting injured due to activities related to sows in heat?
- Are sows squealing and acting restless?
- Are there any sows that seem to be loners and not interacting with the group? (Observed outside of normal feeding times.)
- Are sows lying on top of each other or huddled together or sprawled out?
- Are some sows dominating the waterers? This is especially important in hot weather.

DAILY GUIDE FOR WALKING BARNs: FEEDING STALLS

2. Equipment

- Are all waterers or drinkers clean and have an adequate water flow rate?
- Are all the feeder boxes filling properly and dispensing the daily ration of feed?
- Is all the tubing from the feed box to the feed trough intact and not plugged?
- Are there any damaged sections of flooring causing problems with animal well-being or caretaker safety?
- Are there damaged partitions, feeding stall partitions, or gates that could injure sows?
- Are there worn or damaged feeders that could injure sows or waste feed?
- Do cooling spray nozzles function properly and turn on/off at the proper temperatures? Are sows drying between periods of spray cooling?

3. Environmental management in rooms

- Is the air temperature in the room appropriate for the season?
- Are there any odd sounds from fans, augers, heaters, etc.?
- Are floors wet and drafty where sows lay? Are floors slippery?
- Does the air in the room smell fresh, or is it stuffy with high ammonia and dust levels?
- Are fans for minimum ventilation operating?
- Are shutters closed on non-operating fans?
- Are appropriate fans operating considering the time of day and season of the year?
- Is the heater running? Should it be running?
- Are air inlets functioning properly?
- Did the sidewall curtain(s) open when expected?
- Is the evaporative pad cooling system operating properly considering the time of day and season of the year?

4. Manure handling system

- How much capacity is left in under-floor pits?
- Are pits too full for pit ventilation to work properly?
- Do pull-plug pits need to be emptied?
- Are under-floor scrapers working properly?

TROUBLESHOOTING SCENARIOS: FEEDING STALLS

Here are several real-life scenarios designed to foster thought and to facilitate discussion of issues facing caretakers of sows housed in pens with feeding stalls.

<p>Scenario 1:</p> <p>Three days ago, you moved a group of sows into pen 3. This morning you observe several sows with bleeding toes and torn dew claws.</p>	<ul style="list-style-type: none">• Why is this problem occurring?• How would you correct this problem?
<p>Scenario 2:</p> <p>A new group of sows were moved into a pen two weeks ago. The group consisted of 5 gilts and 20 third- and fourth-parity sows. During your daily walk through the barn, you notice that many sows continue to have fresh scratches on their necks and shoulders.</p>	<ul style="list-style-type: none">• Why is this problem occurring?• How would you correct this problem?• How would you prevent this problem from reoccurring?
<p>Scenario 3:</p> <p>You walk the pens during feeding time and you observe one sow not in a feeding stall. Instead, she is lying in the corner.</p>	<ul style="list-style-type: none">• Identify possible reasons why the sow is not eating?• How do you assess the sow to determine why she is not eating?• What would you do to make sure she eats in the future?

TROUBLESHOOTING SCENARIOS: ELECTRONIC SOW FEEDING

<p>Scenario 4:</p> <p>You observe that some sows in pen 2 appear to be losing body condition. They had a body condition score of 3 when they were moved into the pen three weeks ago. Now, they look more like a body condition score of 2.</p>	<ul style="list-style-type: none">• Identify reasons these sows are losing body condition.• How would you correct this problem?
<p>Scenario 5:</p> <p>While walking through the east end of the gestation building, you notice sows are starting to urinate and defecate on the solid part of the floor on the north side of the alley in pen 10.</p>	<ul style="list-style-type: none">• Why is this problem occurring?• How would you correct this problem?• What would you do to prevent the problem from reoccurring?
<p>Scenario 6:</p> <p>The outdoor temperature is 90 degrees Fahrenheit and there are dry spots on the evaporative cooling pad.</p>	<ul style="list-style-type: none">• Why does the evaporative pad have dry spots?• How would you correct this problem?



National Pork Board

1776 NW 114th St
Clive, IA 50325
pork.org • 800-456-7675

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This message funded by America's Pork Producers and the Pork Checkoff. #04933 12/2016