Going Hot-Shot Free: Tips to Improve Hog Handling

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Areas to Discuss

• Provide an overview of transport losses in market weight pigs
• Review the effects of electric prod use on stress responses and transport losses in finishing pigs
• Discuss practical tips to improve hog handling during loading
• Share key learnings from a large production system that has implemented a “hot-shot” free policy

Overview of Transport Losses in Market Weight Pigs

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Transport Losses: Definitions

• Dead on arrival (DOA):
  – A pig that died during transport
• Dead in Yard (DIY) or Dead in Pen (DIP)
  – A pig that died after unloading (usually in the lairage pen)
• Non-ambulatory pig:
  – A pig unable to move or keep up with contemporaries
  – Subjects, slows, suspects, cripples, and stressors
• Transport losses:
  – The sum of dead and non-ambulatory pigs at the plant

Classifying Non-ambulatory Pigs

Fatigued (Stress related)
Injured (Structure/Injury related)

The Fatigued Pig Syndrome

- Signs of acute stress
  - Open mouth breathing
  - Skin discoloration
  - Abnormal vocalizations
  - Muscle tremors
- Metabolic state of acidosis
  - High blood lactate (32.2 vs. 11.1 mmol/L)
  - Low blood pH (7.11 vs. 7.35)
  - High body temperature?
- Majority recover with 2-3 h rest
- 98% are HAL-1843 negative

Why are transport losses important?

- Transport losses represent many growing concerns to the U.S. swine industry:
  - Animal welfare priority
  - Increased regulations
  - Economic losses

U.S. Incidence of Transport Losses

- Dead pigs at the plant
  - 2008 national statistics: 0.20% (FSIS, 2009)
- Non-ambulatory pigs at the plant
  - Data summarized on 23 field trials in the U.S. (Ritter et al., 2009)
  - Non-ambulatory pigs prior to weigh scale: 0.44%
  - Majority of non-ambulatory pigs classified as fatigued

Economic Impact of Transport Losses

- Ritter et al., 2009
  - Transport losses cost the U.S. swine industry ~$46 million in 2006
  - This translates to approximately $0.44 per pig marketed

Proposed Legislation (2007)

- Downed Animal Protection Act (H.R. 661 & S. 394)
  - Allows the Secretary of Agriculture to enforce regulations for handling and disposition of non-ambulatory livestock
  - Prevents movement of non-ambulatory livestock while animals are conscious
  - Requires non-ambulatory livestock to be humanely euthanized
  - Prohibits non-ambulatory livestock from entering the food chain
- Bill is being reviewed by U.S. House and Senate Ag subcommittees
- If this bill passes, fatigued and injured pigs will have zero value!

Multi-factorial Problem

- People Factors
  - Handling
- Transportation Factors
  - Floor Space
- Plant Factors
  - Genetics
  - Pig Factors
  - Environmental Factors
  - Wait at the Plant
  - Pre-sorting
- Facility Design Factors
  - Pig Factors
  - Transportation Factors
  - Floor Space
  - Environmental Factors
  - Season
**Transport Losses - Summary**

- Transport losses represent growing animal welfare, legal, and economic concerns to the U.S. swine industry
- ~0.6% of all pigs transported die or become non-ambulatory
- Transport losses are a multi-factorial problem
- It is well established that transport losses are increased by:
  - Aggressive handling with electric prods
  - Porcine stress syndrome (stress gene)
  - Crowding pigs during transport
  - Extreme weather conditions

**Effects of electric prod use on stress responses and transport losses in market weight pigs**

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**Common Pig Handling Tools**

<table>
<thead>
<tr>
<th>At the Farm</th>
<th>At the Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sorting Board</td>
<td>Flag</td>
</tr>
<tr>
<td>Livestock Paddle</td>
<td>Livestock Paddle</td>
</tr>
<tr>
<td>Electric Prod (Hot Shot)</td>
<td>Witch's Cape</td>
</tr>
</tbody>
</table>

**Handling Intensity**

- Benjamin et al., 2001
  - Compared moving pigs with aggressive or gentle handling
  - Aggressive: pigs moved rapidly with hot shots
  - Gentle: pigs moved at their own pace with plastic cane

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Gentle Handling</th>
<th>Aggressive Handling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectal temperature, °F</td>
<td>104.9a</td>
<td>106.6b</td>
</tr>
<tr>
<td>Blood lactate, mmol/L</td>
<td>4.0a</td>
<td>25.2b</td>
</tr>
<tr>
<td>Fatigued pigs, %</td>
<td>0.0a</td>
<td>20.4b</td>
</tr>
</tbody>
</table>

*Means with different superscripts differ

**Recent Work**

- Correa et al., 2010
  - Evaluated the effects of three different moving devices during loading on the behavior, physiology, and meat quality traits of market weight pigs

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric prod</td>
<td>Used electric prods and sorting boards</td>
</tr>
<tr>
<td>Paddle</td>
<td>Used paddles and sorting boards</td>
</tr>
<tr>
<td>Compressed air</td>
<td>Paddle treatment plus compressed air on the chute</td>
</tr>
</tbody>
</table>

Electric Prod vs. Paddle Results

• Electric prods increased:
  – Number of slips / falls
  – Pig vocalizations (# and duration)
  – Heart rate during loading
  – Fatigued pigs (2.5% vs. 0%)
  – Other carcass bruise types (excludes fighting and mounting)
  – Incidence of blood splash in hams

• Electric prods decreased the following handling parameters:
  – Number of turn attempts
  – Number of stops
  – Loading time by ~50%

• Minimal differences were observed between handling methods for blood lactate and plasma CPK values at stunning

• Compared to paddles, electric prods:
  – Had no effect on ultimate pH of the Longissimus muscle
  – Increased ultimate pH of Adductor and Semimembranosus muscles


Electric Prod - Summary

• It is well documented that aggressive handling with electric prods increases transport losses

• Replacing electric prods with plastic paddles can reduce slips/falls during handling, transport losses, carcass bruising, and blood splash, but this comes at the expense of increased loading times

• Therefore, there currently is not a perfect alternative to the hot shot!

• Need to identify methods that improve the efficacy and loading efficiencies of paddles without adversely affecting pig well-being

Practical tips to improve hog handling during loading

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Going Hot-Shot Free – First Step

• Track and monitor usage
• Identify challenging areas

Identifying Target Areas

• 2/3 of our shocks occur at the door
• 1/3 of our shocks occur on the chute
• Less than 2% occur on truck ramp
Going Hot-Shot Free – Second Step

• Make pigs easier to handle

Acclimate pigs to walking in aisles prior to loading

Our target - once in the nursery and once in finisher

Solid Front Pens

Remove Restrictions

Loading Pad Wider than Door
Going Hot-Shot Free – 3\textsuperscript{rd} Step

- Reduce stress and fatigue on the pigs
- PRE-SORT

Pre-sorting prior to Loading

- Pigs are moved to the front of the barn into holding pens.
- Pigs are given a REST period of 10 min to 1 hr to recover.
- Especially beneficial to pigs from the back end of the barn and to pigs going into the top deck
- Breaks up the “marathon”

Going Hot-Shot Free – 4\textsuperscript{th} Step

- Focus on Handling

Pre-Sorting Procedures

- Pigs are moved to the front of the barn into holding pens.
- Pigs are given a REST period of 10 min to 1 hr to recover.
- Especially beneficial to pigs from the back end of the barn and to pigs going into the top deck
- Breaks up the “marathon”

Bubble Concept

- Worked with Nancy Lidster
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- Pigs respond to our ACTIONS
- Starts with your position in the pen. This position determines which direction the pigs will circle past and sets up the “pressure” on the pigs.
- Flow pigs along gate line with your position. Pigs want us on their side to watch as they move away from the pressure.
**Bubble Concept**

- Move your position forward towards the opening to hold pigs along gate line taking only the number needed.

**Movement Concept**

- Starts with the position of your hurdle and spacing between you and the pig. This position determines where the attention of the pig will be focused. Either on you or on where they are going.
- Opening the hurdle reduces the threat to the pig by allowing them to see what is applying “pressure”.
- Close the hurdle when the pigs turn on you. Work the pig to re-direct, then establish the spacing, and open the hurdle again.

**Movement Concept**

- Pigs will constantly keep an eye on you, or other people, or distractions. Your position and spacing applies the “pressure”.
- Too much space and you lose pressure. Not enough space and the pressure is too much creating the pig to balk.
- Work to keep the focus off of you and on where the pig is supposed to be going.

**Bubble Concept**

- Keep adequate spacing between you and the pigs to maintain the bubble out of the pen. Closing the gap too far and the pig’s attention diverts back to you instead of where they are going.
- Too much space and you lose “pressure” on the pig and he’ll stop. Close the space to re-apply the pressure.

**Movement Concept**

- Minimize paddle contact
- Paddle use directs the pigs attention to you creating a distraction and reduces effectiveness when used constantly
- Paddle use closes the space between you and the pig creating balk

**Practical Tips – Summary**

- Track and monitor
  - Identify critical areas to improve
  - Chart progress making it a whole team effort
- Acclimate pigs to aisles and barn preparation
  - Easier to handle
- Pre-sort
  - Reduce stress and fatigue
- Handling
  - Pigs react to our actions. Bubble and Movement concepts
Key learnings from implementing a “hot-shot” free policy in a large production system

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Large System Implementation

• Marketing Strategies
  – 1 cut 3-weeks pre-barn dump
    • 165 head
    • At least 2 heaviest pigs from every pen
  – Complete barn dump
    • Many of the same principles that have already been discussed
    • Small groups, staging pens, solid pen fronts at the door, sort off pen, etc.

Large System Implementation

• Large System Implementation
  – Additional techniques…
    • Dedicated crews of 4 to 6 people
      • Fully equipped with all necessary items.
    • Lighting on chute and truck
      • Trucks are prewired and loadout crews have lights available if the barn is not appropriately equipped.
    • Rattle cans
      • Progression from traditional tools.
      • Most effective for movement and lowest risk for the animal
      • No paddles, sort sticks, etc. at any point in the process

Large System Implementation

• Implementation
  – Complete removal of all hot shots at one time
  – Systematic approach to improvement
    • Allow crews to develop/improve processes
  – Monitoring
    • Animal Welfare/Handling Audits
      • Internal and 3rd party
    • Feedback from the processing plant
      • Scald tank shows all

Overall Summary

• Transport losses represent growing animal welfare, legal, and economic concerns to the U.S. swine industry
• ~0.6% of all pigs transported die or become non-ambulatory
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Overall Summary

• Replacing electric prods with plastic paddles can reduce slips/falls during handling, transport losses and carcass defects, but this comes at the expense of increased loading times
• Therefore, we need to identify methods that improve the loading efficiencies of paddles without adversely affecting pig well-being
Overall Summary

- Practical tips to improve pig handling include:
  - Track electric prod use and identify areas for improvement
  - Acclimate pigs to the aisle prior to loading
  - Remove distractions
  - Provide additional lighting
  - Pre-sort pigs prior to loading
  - Understand and apply the bubble and movement concepts
  - Move pigs in small groups

Overall Summary

- Key lessons learned from implementing a “hot-shot free” policy in a large production system include:
  - Rattle cans appear to be the most effective handling tool
  - Go 100% hot-shot free at the start (no phase out)
  - Allow loading crews to develop / improve processes
  - Monitor processes through audits and plant feedback