"Rethinking the way we load pigs"

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"A North American focus on achieving humane, safe & effective livestock transport"

Defining the Issue

- "At the farm, major factors impacting behavioral and physiological responses of the pig during transport include genetics, slaughter weight, environmental conditions (temperature and humidity), health status, marketing strategy, time off feed, pre-transport experiences, **facility design**, and nature of **handling during loading**" (Ritter et al., 2005).

Impact on OUR industry???

- Welfare of our animals as well as the safety of our farm and plant personnel is an obligation that the pork industry needs to accept and work diligently to improve.

Terminology

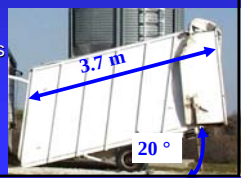
- Loading System
  - Traditional chute [T]
  - Prototype loading gantry [P]
- Pull
  - First pull [FP]
  - Closeout pull [CO]

Null Hypothesis

- Loading system does not influence welfare, transportation and packing plant losses of finisher pigs.

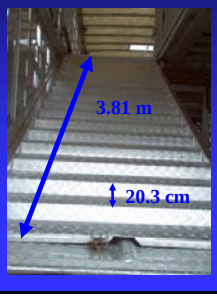
Traditional loading chute [T]

- External ramp to bottom deck
  - Covered steel portable chute
  - 3.7 m with swivel ends
    - Approximately 20°
    - 80 cm width
  - Cleats
    - 3.8 cm height
    - 20.3 cm between cleats

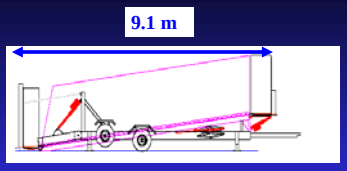


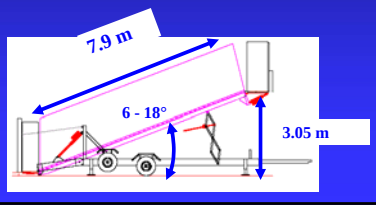
Internal Trailer Ramp

- Internal ramp to upper deck
  - Pull down, aluminum diamond plate
  - 3.8 m with 23° angle
  - Rounded cleats
    - 4.5 cm height
    - 20.3 cm between cleats



Prototype Loading Gantry [P]





Prototype Loading Gantry [P]

- Unique dock bumper system
  - Cover material will expand up to 500 percent
  - Bubble effect, compresses to trailer & facility
  - Eliminates air & light

Prototype Loading Gantry [P]

Prototype Loading Gantry [P]

Flooring

- Animal movement area
  - Vanberg epoxy
    - "G-diamond grit"
  - Stair step
    - 17.2 cm tread width
    - 5.1 cm step height

- Human return walkway
  - "Slip-not" medium grit aluminum safety floor

Lighting & Sidewalls

Prototype Loading Gantry [P]

Barns

Trailer Design

Performance

Methods; Experiment 1

- Midwest over July 2006 – October 2007
- 211 semi loads of crossbred finisher pigs
  - Average weight = 116.6 ± 5.4 kg
  - From a single finishing site
- Dataset 1
  - Two loading systems
  - FP
  - No Paylean

Methods; Experiment 2

- Midwest over June 2006 – January 2007
- 340 semi loads of crossbred finisher pigs
  - Average weight =118.5 ± 6.1 kg
  - From a single finishing site
- Dataset 2
  - Two loading systems
  - CO
  - Paylean

Performance Measures

- COA – crippled on arrival
- SOA – stressed on arrival
- DOA – dead on arrival
- CIP – crippled in plant
- SIP – stressed in plant
- DIP – dead in plant
- Total crippled, stressed and dead
- Total losses

Statistical Analysis

- Least square means – Proc GLIMMIX procedure of SAS
- Fixed effect – loading system
- Random effect – date (complex)
- Linear covariate – number of pigs shipped

Results

	First Pull [FP]		
Measure	T	P	P-value
COA	0.05 ± 0.02	0.02 ± 0.02	0.33
SOA	0.62 ± 0.10	0.48 ± 0.09	0.29
DOA	0.33 ± 0.07	0.21 ± 0.05	0.16
CIP	0.01 ± 0.01	0.00 ± 0.01	0.58
SIP	0.28 ± 0.06	0.24 ± 0.06	0.59
DIP	0.31 ± 0.05	0.19 ± 0.05	0.37
Total Crippled	0.06 ± 0.06	0.02 ± 0.02	0.27
Total Stressed	0.93 ± 0.13	0.73 ± 0.11	0.23
Total Dead	0.64 ± 0.09	0.42 ± 0.07	0.06
Total Losses	1.61 ± 0.18	1.15 ± 0.15	0.03

Results

	Closeout Pull [CO]		
Measure	T	P	P-value
COA	0.02 ± 0.01	0.01 ± 0.01	0.41
SOA	0.62 ± 0.10	0.48 ± 0.09	0.19
DOA	0.18 ± 0.03	0.17 ± 0.04	0.86
CIP	0.03 ± 0.01	0.00 ± 0.00	0.11
SIP	0.19 ± 0.04	0.20 ± 0.05	0.86
DIP	0.17 ± 0.04	0.13 ± 0.04	0.49
Total Crippled	0.05 ± 0.02	0.01 ± 0.01	0.06
Total Stressed	0.80 ± 0.11	0.67 ± 0.11	0.29
Total Dead	0.36 ± 0.06	0.33 ± 0.07	0.74
Total Losses	1.19 ± 0.15	0.99 ± 0.15	0.21

Conclusions

- This investigation has provided insight to changes in facility design that may ultimately lead to the minimization of some stressors that pigs are exposed to at the time of marketing.
- Results indicate that pigs loaded on the P chute during the FP have fewer total deads and total losses.

Animal Handling

Methods; Experiment 1

- Midwest over November 2006 – August 2007
- 44 semi loads of crossbred finisher pigs
  - Average weight = 118.9 ± 6.1 kg
  - From a single finishing site
- Dataset 1
  - Two loading systems
  - FP
  - No Paylean

Methods; Experiment 2

- Midwest over November 2006 – August 2007
- 30 semi loads of crossbred finisher pigs
  - Average weight = 117.6 ± 5.7 kg
  - From a single finishing site
- Dataset 2
  - Two loading systems
  - CO
  - Paylean

Measures Evaluated

- Electric prod use
- Slips
- Falls
- Vocalizations
- Piling

Statistical Analysis

- Least squares means – Proc MIXED procedure SAS
- Fixed effect of - loading system
- Random effect of – date (complex)
- Linear covariate – number of pigs shipped

Results

	First Pull [FP]		
Measure	**T**	**P**	**P-value**
Electric Prod	161.59 ± 14.05	96.25 ± 12.86	0.01
Slips	247.91 ± 20.53	96.02 ± 18.93	0.01
Falls	100.42 ± 9.14	20.18 ± 8.34	0.01
Vocalization	138.06 ± 12.12	69.08 ± 11.10	0.01
Pile Ups	3.59 ± 0.48	0.01 ± 0.47	0.01

Results

	Closeout [CO]		
Measure	**T**	**P**	**P-value**
Electric Prod	188.23 ± 10.50	108.12 ± 12.86	0.01
Slips	302.48 ± 23.22	106.02 ± 25.74	0.01
Falls	115.37 ± 13.93	24.75 ± 15.65	0.01
Vocalization	140.44 ± 7.64	79.21 ± 9.40	0.01
Pile Ups	4.63 ± 0.39	0.10 ± 0.47	0.01

Conclusions

- Results indicate that pigs loaded on the P chute experience fewer prods, slips, falls, vocalizations and pile ups.

Implications

- This investigation has provided insight to changes in facility design that may ultimately lead to the minimization of some stressors that pigs are exposed to at the time of marketing.

Implications

- As an industry we need to be proactive in taking a “whole systems” approach to solving the problem, which may include components of facility design and management.

Acknowledgements

- National Pork Board
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