

# Employee Survey to Determine Movement Ease for Grow-Finish Pig Cadavers On-Farm using a Sked, Deer Sled and Modified Deer Sled

## A.S. Leaflet R3348

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### Summary and Implications

The National Pork Board provides guidance about humane swine handling through the Pork Quality Assurance Plus and Transport Quality Assurance programs. While this guidance is useful, questions remain on best practices and design of handling tools with reference to moving non-ambulatory grow-finish pigs. The objective of this project was to test a sked, deer sled, and modified deer sled as a suitable handling tools for moving grow-finish pig cadavers as a model for non-ambulatory market-weight pigs. On-farm testing was accomplished using three pig cadavers (59, 91, 98 kg) to evaluate handling tool effectiveness based on an employee handling tool survey. For statistical analysis, the employee handling tool survey data was evaluated descriptively. Each employee was considered an experimental unit. Surveys were obtained from all five employees for all cadaver tasks. Rolling, positioning and repositioning cadavers, and moving from home- to hospital pen were all ranked as easy or very easy. Restraining the cadavers onto the sked was ranked as very easy and three employees commented on the ease of clipping the buckles. While the deer sled was ranked as difficult or neutral on restraining the cadavers. All employees commented on adding similar restraints as the sked's, because the deer sled's string restraints took time to secure. Size and weight of the sked and deer sled were ranked as easy, while the modified deer sled was ranked as very easy. Although employees ranked the modified deer sled similarly to the sked and deer sled, they commented that without restraint

straps the modified deer sled would not be a preferred handling tool to move non-ambulatory market-weight pigs.

### Introduction

The National Pork Board provides guidance about humane swine handling through the Pork Quality Assurance Plus and Transport Quality Assurance programs. Building on these educational programs, the Common Swine Industry Audit established criteria concerning willful acts of abuse and neglect. This topic can result in automatic audit failure and prohibits “[d]ragging of conscious animals by any part of their body except in the rare case where a non-ambulatory animal must be moved for a life threatening situation. Non-ambulatory pigs may be moved by using a drag mat.” This audit point has provoked discussion among swine extension agents, producers and veterinarians. Discussion has included, what defines a “life-threatening” situation? Would an auditor and the producer agree on life threatening? If moved, is it in compliance with CSIA? Do drag mats work? Preliminary work concluded that a rubber farrowing mat was unsatisfactory as a drag mat for finisher pigs because it was too heavy, the pig kept sliding off and it tore very easily. These findings suggest there is an opportunity to identify other handling tools that consider practical logistics, worker safety and non-ambulatory market-weight pig welfare. Therefore, the objective of this study was to test a sked, deer sled, and modified deer sled as suitable handling tools for moving grow-finish pig cadavers on farm as a model for non-ambulatory market-weight pigs.

### Materials and Methods

This protocol was approved by the Iowa State University Institutional Review Board Committee for Humans Subject Research (Approval #18-003). Due to ethical considerations, on-farm testing of the handling tools was accomplished using pig cadavers.

**Animals, facilities and cadaver tasks:** This study was conducted on a commercial grow-finish site situated in Central Iowa. Three commercial crossbred (PIC) pig cadavers (59 kg, 91 kg and 98 kg) were utilized. Prior to euthanasia, body weights were collected using a weigh scale (Raytec WayPig 300; AGRISales Inc., Ceresco, NE) and BW were rounded up to whole numbers. For cadaver tasks, two empty pens were designated as the start (home pen) and end (hospital pen). The pens were fully slatted (slat width 15.2 cm x slat gap 2.5 cm). The alley was partially slatted with a concrete center (width 13.9 cm x length 60.9 m). The

distance between the home- and hospital pen was 59.2 m. The cadaver was positioned with its head towards the outside wall of the barn 3.5 m from the alleyway gate and 2 m away from the right pen divider. At the start of each cadaver task, the employee was asked to roll the cadaver onto the handling tool and move it from the home- to hospital pen. For all employees, the cadaver tasks were performed using the medium, light, and then heaviest cadaver.

**Handling tools:** A HMH sked rescue system (SKED), deer sled (SLED) and modified deer sled (MDS) were evaluated (Figure 1).

**Figure 1. Handling tools to be used on-farm when moving pig cadavers**

**Figure 1a. SKED**



**Figure 1b. SLED**



**Figure 1c. MDS**



The handling tools were modified prior to being used on-farm. The modification process of the SKED, SLED and MDS took approximately 10 min, 5 min, and 35 min respectively.

**Employee enrollment:** Five employees participated. Employees completed a self-reported questionnaire before the start of the study (Table 1).

**Table 1. Employee demographics on the commercial grow-finish farm from a study evaluating the sked, deer sled, and modified deer sled to move grow-finish pig cadavers from home-to hospital pen**

Measure	Employees				
	1	3	4	5	6
Gender	Female	Male	Male	Male	Male
Age (yrs)	30	23	35	30	60
Height (cm)	160.2	182.9	182.9	195.6	180.3
Weight (kg)	63.5	83.9	113.4	111.1	90.7
Years*	10	1	15	30	20

\*Experience measured as direct observation of or participation in working on a pig farm site

**Measures**

Handling tool order per employee was determined before going on-farm using a complete randomization for the first cadaver, partial randomization for the second cadaver, and the remaining handling tool was assigned to the third cadaver. Each employee moved the three cadavers once per handling tool.

**Employee handling tool evaluation:** During each resting period (defined as period between moving handling tools from home- to hospital pen), employees were asked to evaluate each handling tool. The handling tools were moved three times per employee, once per cadaver weight. This resulted in 45 completed surveys. Comments were also solicited for each question to collect qualitative data.

**Statistical analysis:** The employee handling tool survey data was evaluated descriptively and will be presented as an average of the five employees.

**Results and Discussion**

**Employee handling tool evaluation:** Rolling, positioning and repositioning cadavers, and moving from home- to hospital pen were all ranked as easy or very easy. Restraining the cadavers onto the SKED was ranked as very easy and three employees commented on the ease of clipping the buckles. While the SLED was ranked as difficult or neutral on restraining the cadavers. All employees commented on adding similar restraints as the SKED's, because the SLED's string restraints took time to secure. Size and weight of the SKED and SLED were ranked as easy, while the MDS was ranked as very easy. Although employees ranked the MDS similarly to the SKED and SLED, they commented that without restraint straps the MDS would not be a preferred handling tool to move non-ambulatory market-weight pigs (Table 2).

**Conclusion**

In conclusion, this research would not support the MDS in its current form as a handling tool due to no restraints. No restraints led to cadavers sliding off the MDS during

movement and with this movement cadaver legs and heads caught in alley gates. These issues prevented a smooth forward motion transition. This research does support the use of the SKED and SLED as practical handling tools to move grow-finish pig cadavers and shows promise as useful handling tools to move non-ambulatory market-weight pigs' on-farm.

### **Acknowledgments**

Iowa Pork Producers Association supported this work. Support from the Department of Animal Science, College of Agriculture and Life Sciences at Iowa State University and USDA for partial funding of Dr. Johnson's salary. The authors would like to the five employees at Iowa Select Farms for assistance in data collection and use of the farm site.

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**Table 2. Employee (n = 5) swine non-ambulatory handling tool (HT) simulation evaluation<sup>1</sup>**

Questions <sup>2</sup>	Handling tool								
	SKED			SLED			MDS		
	Cadaver weight (kg)								
	59	91	98	59	91	98	59	91	98
	Mean (SD)								
1. Rate HT for <sup>3</sup> :									
a) Rolling cadaver from home pen floor onto HT	4.6 (0.5)	4.2 (1.3)	4.0 (0.7)	4.6 (0.5)	4.4 (0.5)	4.2 (0.8)	4.8 (0.4)	4.4 (0.8)	4.6 (0.5)
b) Restraining cadaver onto HT	4.4 (0.9)	4.2 (1.1)	4.2 (0.8)	3.4 (1.1)	3.0 (0.1)	3.0 (1.2)	NA <sup>4</sup>	NA	NA
2. Positioning ease of cadaver onto HT <sup>5</sup> :									
a) Home pen	4.6 (0.5)	4.2 (0.8)	4.4 (0.5)	4.6 (0.5)	4.2 (0.8)	4.2 (0.4)	4.8 (0.4)	4.2 (0.8)	4.2 (0.8)
b) Alley	4.4 (0.5)	4.2 (0.8)	4.0 (0.7)	4.2 (0.8)	4.2 (0.8)	4.0 (0.7)	4.6 (0.5)	3.6 (1.3)	4.0 (1.0)
3. Rate HT for <sup>6</sup> :									
a) Moving HT in home pen towards gate	4.6 (0.5)	4.2 (0.4)	4.0 (0)	4.6 (0.5)	4.6 (0.5)	4.4 (0.5)	4.8 (0.4)	4.4 (0.5)	4.4 (0.5)
b) Moving HT out of home pen and into alley	4.4 (0.9)	4.4 (0.5)	3.8 (0.4)	4.6 (0.5)	4.4 (0.9)	4.2 (0.8)	4.4 (0.9)	3.8 (0.4)	3.8 (1.1)
c) Moving HT down the alley to hospital pen	4.6 (0.5)	4.2 (0.4)	4.0 (0)	4.6 (0.5)	4.6 (0.5)	4.4 (0.5)	4.8 (0.4)	3.8 (0.8)	4.4 (0.5)
4. Rate HT for <sup>7</sup> :									
a) HT size to move cadaver	4.6 (0.5)	3.8 (0.8)	4.0 (0.7)	4.4 (0.5)	4.2 (0.8)	4.0 (0.7)	4.8 (0.4)	4.8 (0.4)	4.6 (0.9)
b) HT weight to move cadaver	4.2 (0.8)	4.2 (0.4)	3.8 (0.8)	4.4 (0.5)	4.4 (0.5)	4.2 (0.4)	4.8 (0.4)	5.0 (0)	4.8 (0.4)

<sup>1</sup>Simulation occurred using pig cadavers weighing 59 kg, 91 kg and 98 kg

<sup>2</sup>The scoring was done using a 5 point scale (5= very easy, 4= easy, 3= neutral, 2= difficult and 1= very difficult) for questions one through four.

<sup>3</sup>Employees scored each HT from very easy to very difficult on a) rolling cadaver from home pen floor onto HT and b) restraining cadaver onto HT.

<sup>4</sup>No results for restraining cadavers onto MDS, due to the handling tool not having restraints.

<sup>5</sup>Employees scored each HT from very easy to very difficult on positioning ease of cadaver onto HT in a) home pen and b) alley.

<sup>6</sup>Employees scored each HT from very easy to very difficult on movement ease with cadaver from a) home pen towards the gate, b) out of home pen and into alley (when the end of HT lined up with the start of the alley) and c) down alley and into the hospital pen (when the end of HT was fully inside the hospital pen).

<sup>7</sup>Employees scored the HT from very easy to very difficult on the a) HT size to move cadaver from home pen to the hospital pen and b) HT weight to move cadaver from home pen to the hospital pen.