Designing a knock box for the smaller packing facility: one structure for bison, cattle, swine, sheep, and goats

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Project Introduction

• Client: Tonkawa Processing Corp.
  • Tonkawa, OK
  • Local processor of bison, cattle, swine, sheep, and goats

• Project scope: Designing and fabricating a knock box able to restrain a wide range of livestock species.
Design Constraints

- **Safety**
  - Swinging gates vs. pulley system
  - Hydraulic vs. manual system

- **Efficiency**
  - Accessibility to livestock’s hind feet
  - Ease of cleaning

- **Variety of Species**
  - Bison
  - Cattle
  - Swine
  - Sheep
  - Goats

- **Budget**
  - $5000
Methods: Combining Different Elements

• Head gate
  • Catch gate vs. crash gate

• Side panel
  • Tilted or straight?
  • Squeeze component or fixed?

• One or two rear gates?

• Side gate
  • Single panel or cutout gates?

Fig. 1 Stationary head gate  Fig. 2 Vertical squeeze panel  Fig. 3 Two rear gates
Final Design

- Crash gate
- Tilted side panel
  - Squeeze component by slack adjuster
- Single rear gate, additional front gate
- Swinging side gate
  - Two gates opening inward from side gate
Moving Forward

• Fabrication status: Materials ordered, en route
• Design subject to alterations during fabrication
• Upon completion, transported to Tonkawa
Significance of Design

• Problem: Smaller processing facilities often process a diverse size of livestock but lack the space for two different sized chutes

• Solution: This design is essentially a 2-in-1 chute- full size for cattle and bison, and adjusted size for swine, sheep, and goats
## Acknowledgements

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