



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?

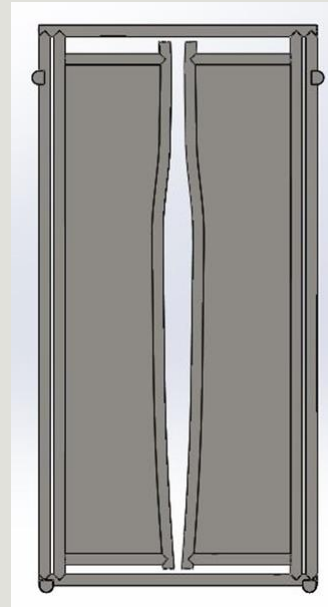


Fig. 1 Stationary head gate

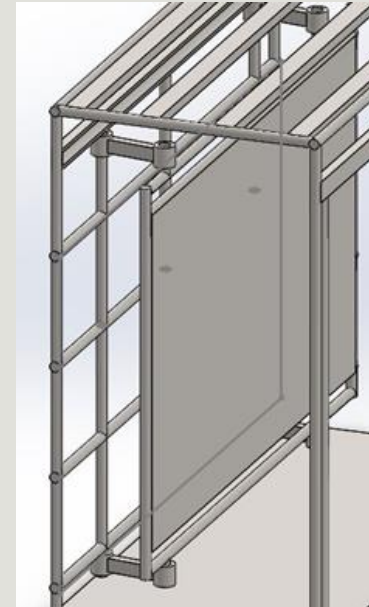


Fig. 2 Vertical squeeze panel

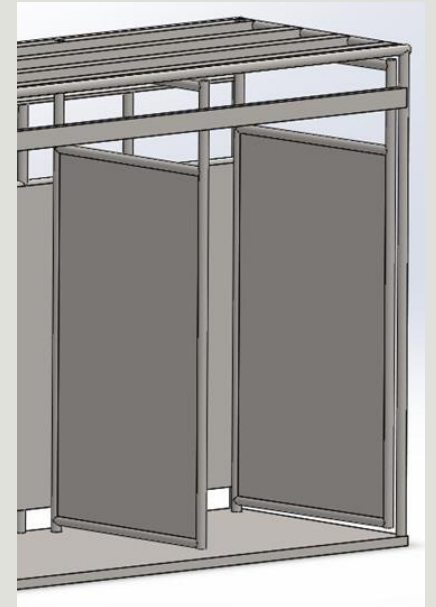
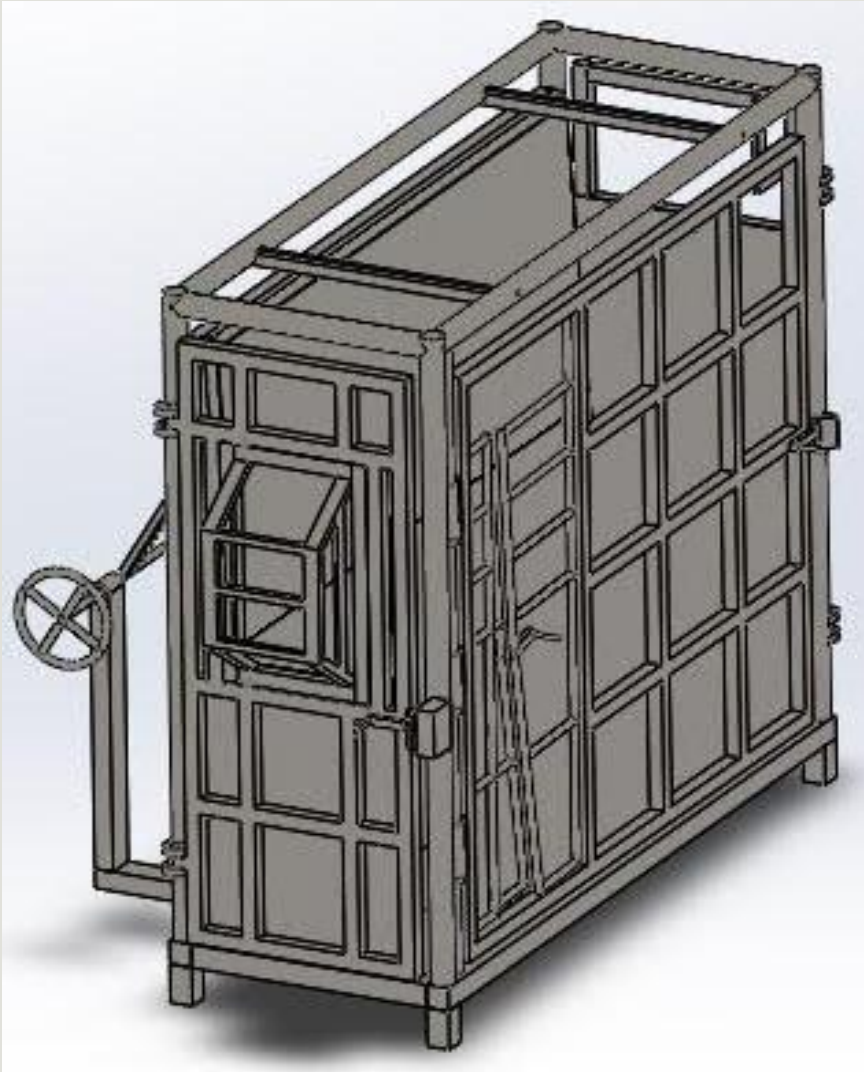


Fig. 3 Two rear gates



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





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