



final report

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Design of a Mark 3 cattle restraining box meeting Middle East standards

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Abstract

Cattle restraint during ritual slaughter is a global issue, one that Meat and Livestock Australia and LiveCorp continue to improve through research and development.

The Mark 3 restraining box is the next stage in design development following the Mark 2 restraining box and can be used with or without stunning. This box introduces the use of a 3-phase, 2-tonne electric hoist for a lift of approximately 0.8 of a metre. As with the Mark 2 box it complies with AQIS (1988) guidelines that the slaughtered animal is held greater than 0.3 metre from the floor surface.

The AutoCAD drawings accompanying this report will assist with the construction of a prototype box in the country of choice, with supervision.

Executive summary

The main objective of this project was to continue to improve the design of cattle equipment suitable for use in overseas markets where Australian cattle are slaughtered. The Mark 3 restraining box is different from the earlier Mark 1 and 2 boxes as it is designed to lift the animal in a smooth sided, "V-shaped" restraint. This box utilises a 3-phase, 2-tonne electric hoist for a maximum lift of approximately 0.8 of a metre. As with the Mark 2 box it complies with AQIS (1988) guidelines that the slaughtered animal is held greater than 0.3 metre from the floor surface.

Features built into the design of this restraining box include:

- Cattle can be restrained for traditional slaughter or stunned prior to slaughter.
- It is mainly fabricated from steel plate, folded and welded to increase the strength.
- Design of the restraining box follows regulatory guidelines (AQIS 1988) for equipment in a food processing area and considers ease of cleaning.
- Meets OIE guidelines (Article 3.7.5.3 in OIE Terrestrial Animal Health Code, 2007).
- The design allows for the collection of an individual animal's blood.
- The slaughtered animal will slide onto a wheeled cradle rather than the floor.
- Hot dipped galvanizing to increase the working life of the equipment.
- Manufacture will be readily achievable in most countries.

The Mark 3 restraining box has been tested via computer modelling. Further comment and scrutiny from industry is required prior to moving to fabrication.

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1 Background

Stunning and restraining boxes in Australia's live export markets have been supported by the Australian livestock export industry and the Australian Government since the early 1990s. This project was instigated as the next stage in the ongoing development of cattle restraint in our livestock export markets. The new design is a result of many hours spent observing ritual slaughter and focuses on improving both animal welfare and operator safety.

2 Project objective

The project objective was to produce design drawings and a three dimensional model for a Mark 3 cattle restraining box for implementation into Australian livestock export markets that:

- is automated;
- incorporates simplicity of operation;
- is robustly designed;
- maximises animal welfare outcomes; and
- is comparatively inexpensive to build and operate.

In addition, the design of the Mark 3 cattle restraining box was to incorporate the following features:

1. Will be affordable to slaughterhouses in live export markets.
2. Include the use of pneumatics, hydraulics or electricity, as necessary, to help automate the restraining and slaughter processes, thereby reducing the demands and risks to operators.
3. Be a hot dipped galvanised finish.
4. Will be able to restrain cattle at slaughter that have a live weight range from 400kg – 750kg.
5. Will restrain cattle on a table 30cm from the floor surface to comply with USDA regulations.
6. Will be compliant with OIE guidelines.
7. Able to be manufactured in Australia or overseas.
8. Design of a restraining box that will minimise bruising and stress during restraint and slaughter.

3 The Mark 3 box

The operation of the box is as follows:

1. Cattle enter the box through the Guillotine gate at the rear of the box.
2. Once the animal is inside the box the electric hoist is engaged - first action of the hoist is to reduce the off side V, which is hinged panel. When it hits a stopper it will then lift the box, it will not clamp the animal's legs. The near side V is fixed in place.
3. The hoist will lift the box and will be disengaged by the operator when the animal's feet leave the floor (lift of ~0.4 m). A standard 3 phase hoist can lift at 5-6 metres per minute.
4. Two soft ropes are attached manually, one on the near side fore foot and another on the near side rear foot. The ropes are tied off to steel cleats, one at the rear of the box the other at the front of the box.
5. The hoist is re-engaged and the box lifted to 0.8 m.
6. At the completion of hoisting the box will tilt 107° to the left with the help of guides and rollers.

7. The animal will slide to the end of the ropes.
8. The near side of the box is 2.1 metres high and the off side of the box 1.6 metres high, the purpose of the difference is that the animal will still be partially in the box with only the head and neck exposed. This will be safer for the slaughtermen and the animal as it will restrict the animal's movement, and reduce the risk of harm.
9. After slaughter, a wheeled trolley [dehiding cradle] can be positioned parallel to the box allowing the animal to slide on to the cradle and be moved to the dehiding area.

Operator safety has been addressed when fixing the ropes to the two near side feet of the cattle, as the feet of the cattle will be raised from the floor. The rope can then be slipped under the animal's feet with minimum risk of being kicked.

The design of the Mark 3 box is documented in the mechanical drawings and three dimensional diagrams contained in Appendix 1. It is recommended that this report be circulated for peer review and industry consideration prior to construction of a prototype.

4 Bibliography

AQIS (1988) Construction and equipment guidelines for export meat, <http://www.daff.gov.au/aqis/export/meat/elmer-3>.

OIE (2007) Terrestrial Animal Health Code. 3 Provisions relevant to restraining and containing animals.

Dr Temple Grandin's Web Page (www.grandin.com), articles include:

- Design of restraining systems
- Ritual Slaughter (Kosher and Halal)

5 Appendix 1: Mark 3 design drawings

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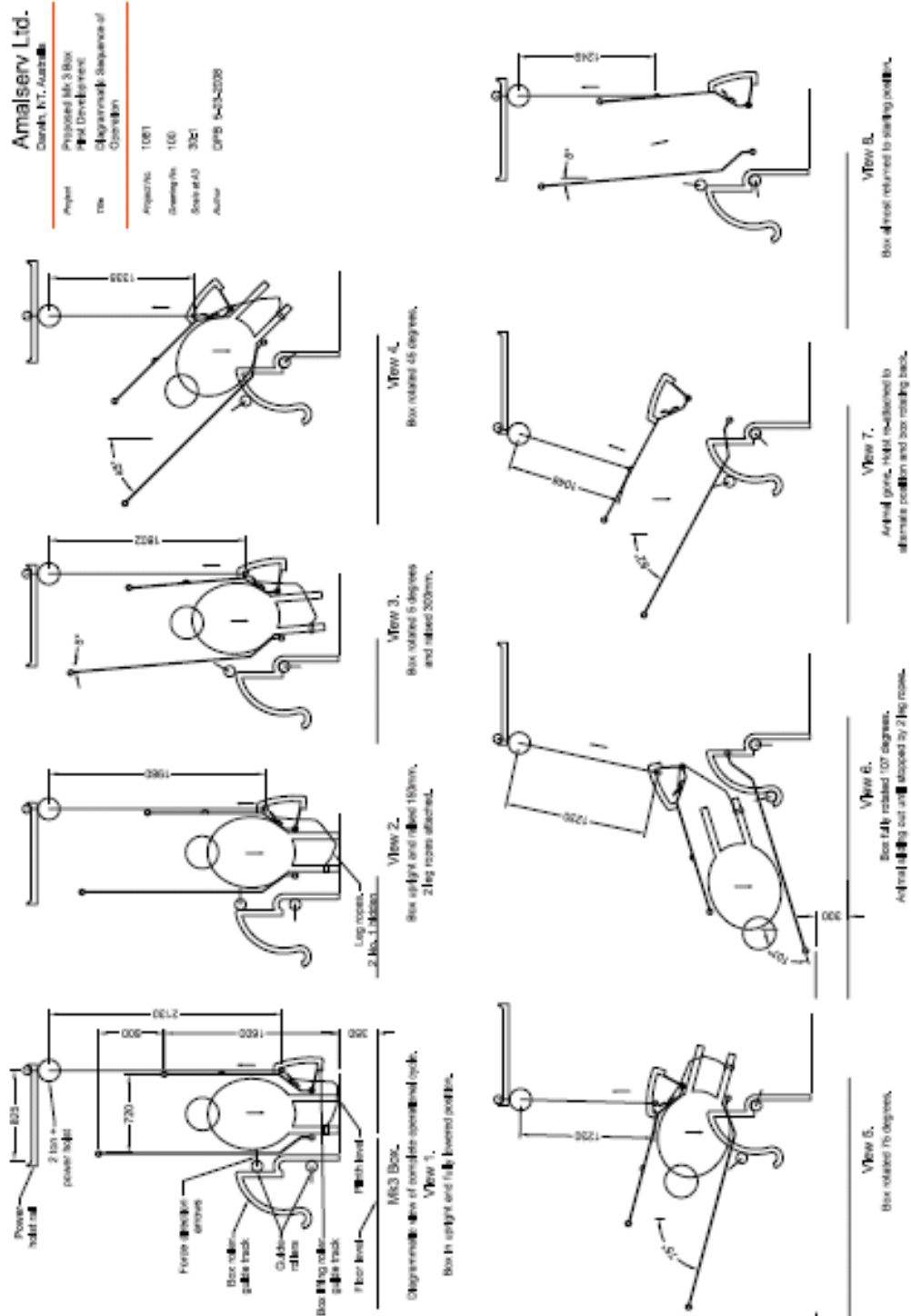


Figure: 1. Diagrammatic sequence of events

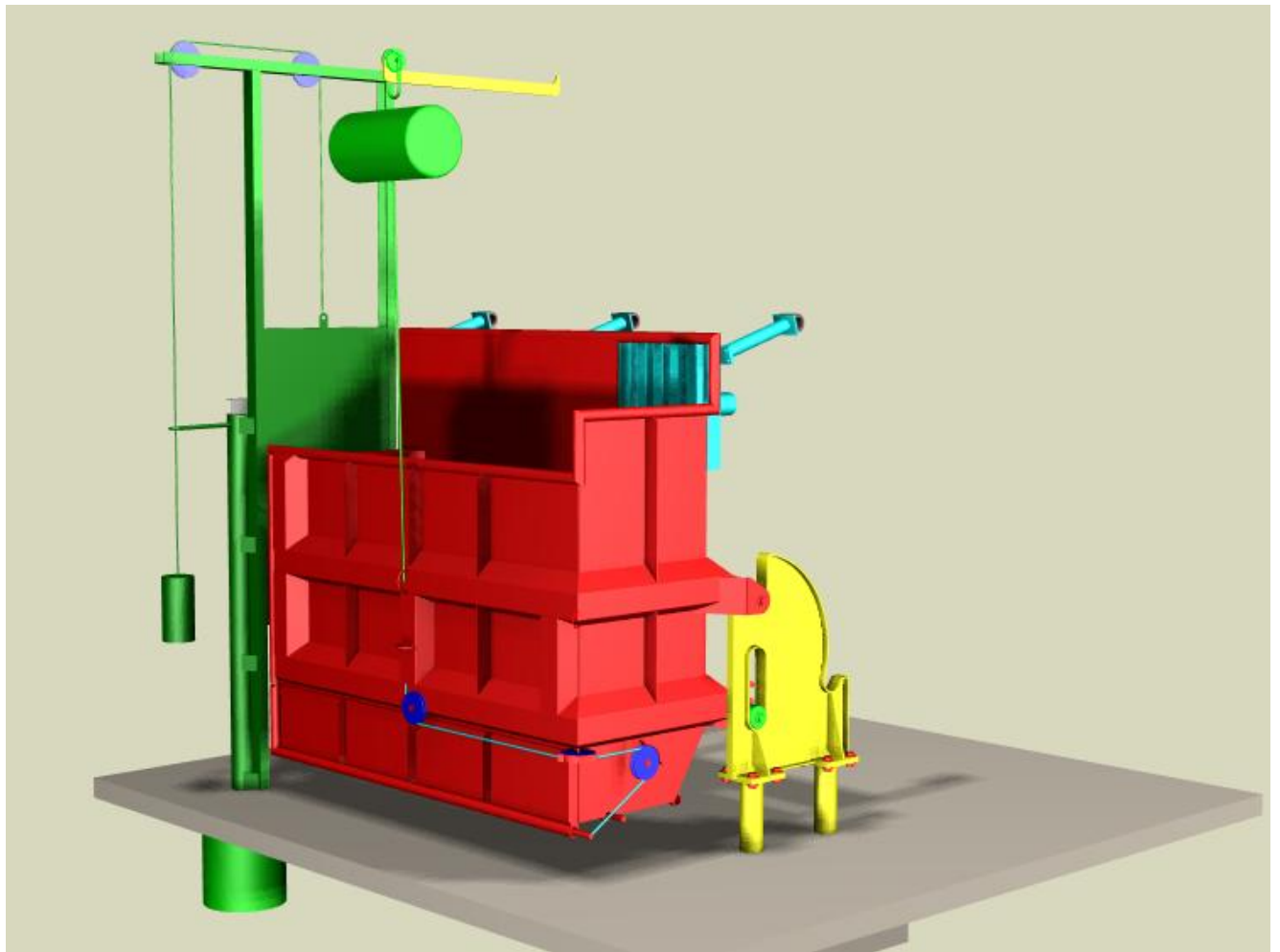


Figure: 2. Offside front view of box

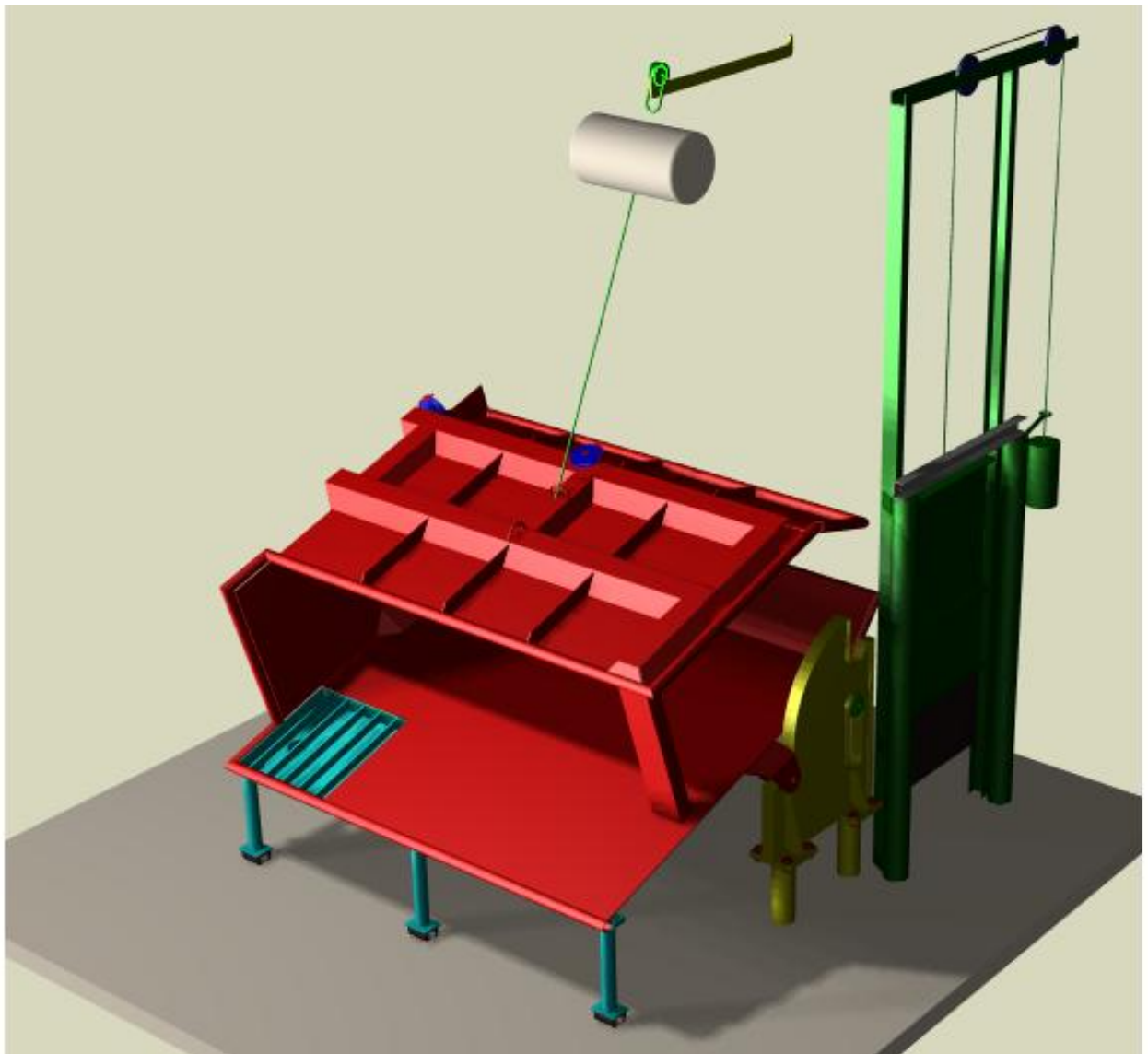


Figure: 3 rear view of tilted box showing blood collector

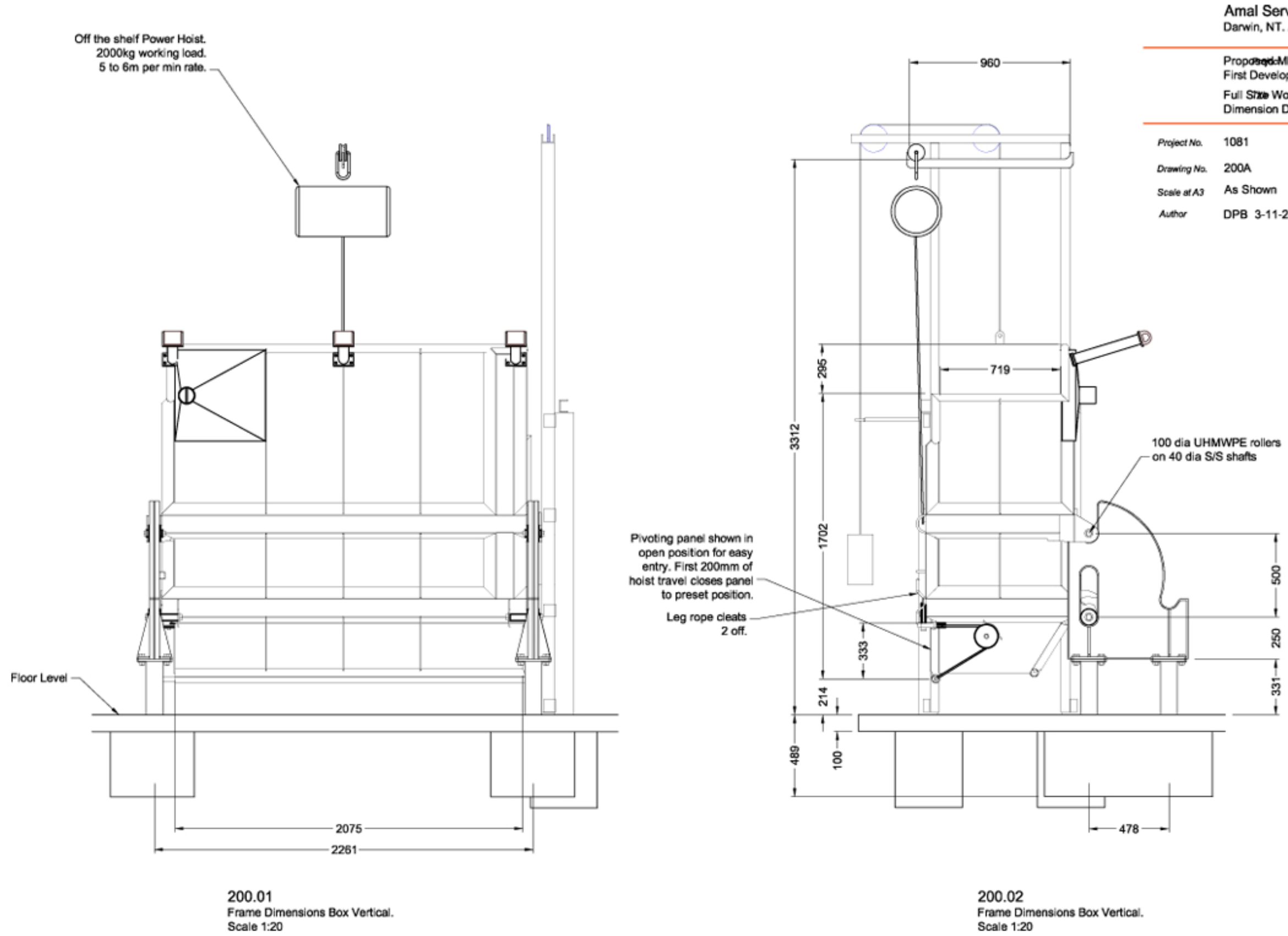


Figure: 4. Mark 3 box dimensions, box vertical.

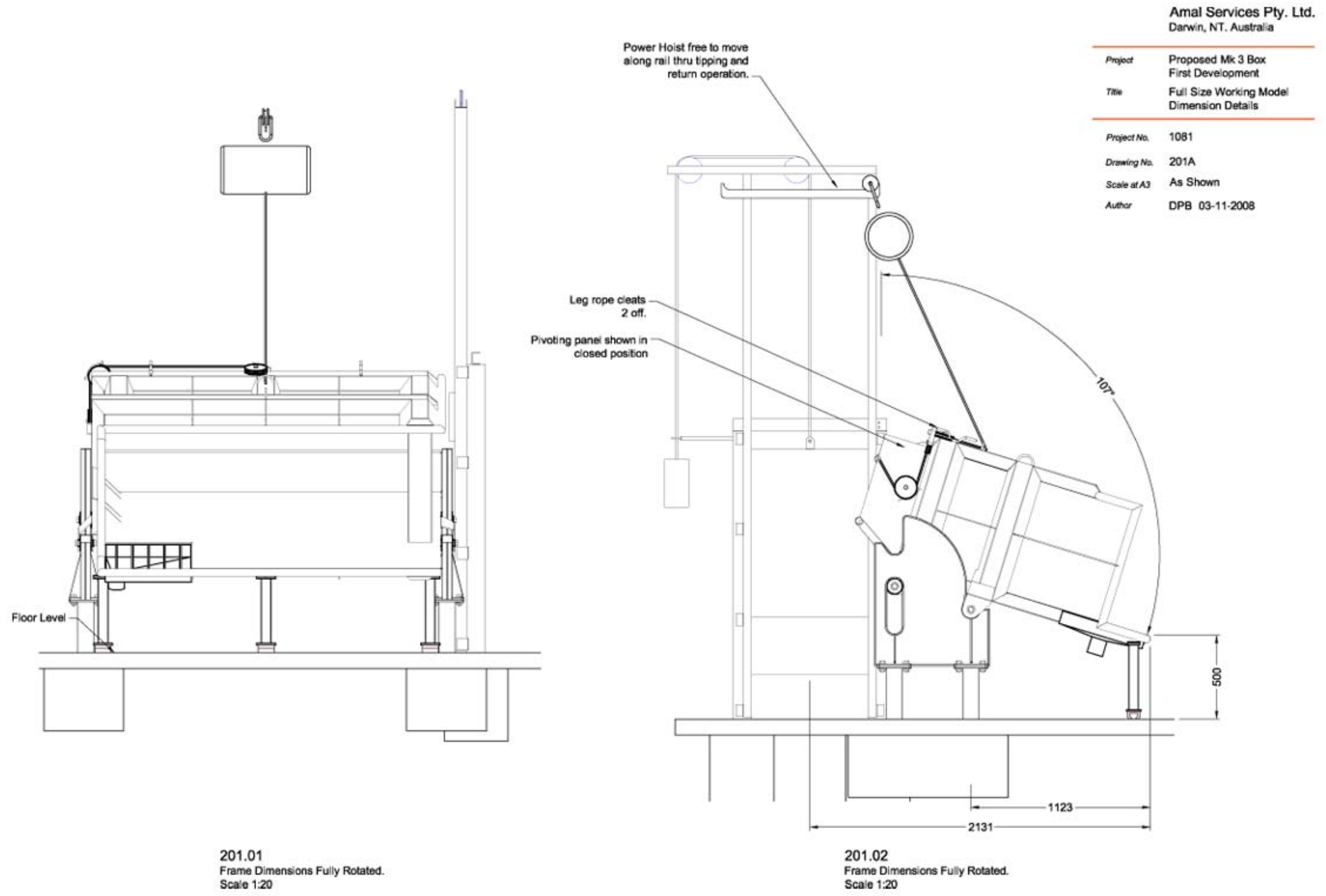


Figure 5: Mark 3 box dimensions, fully rotated.