Upgrade of an existing mark II cattle restraining box for ritual slaughter

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Abstract

Cattle restraint for ritual slaughter is a global issue, one that Meat & Livestock Australia and LiveCorp continue to improve through research and development. In October 2004 Project LIVE.309 was completed with the development of a prototype mark II cattle restraining box, a box that evolved from the earlier Mark I box. Whilst the original Mark 1 box has delivered welfare benefits to cattle slaughtered in Indonesia, the Mark II box addressed the market need for a restraining box that was able to restrain a slaughter animal on a table 30 cm from the floor surface (the USDA standard for export).

There were two noticeable design issues in the prototype mark II box:

1. Torsion springs used in the design will ultimately loose their tension after time making it difficult for the box to return to the upright position.
2. The operation of the mark II box requires ropes to be fixed to the two near side feet of the cattle, as one side of the box is closed.

These two issues have been addressed in the current project.

Executive summary

The objective of the project was to upgrade the design of the prototype mark II cattle restraining box. This prototype box utilised 4 torsion springs to return the restraining box to the upright position ready for reloading. It was observed that the torsion springs became less effective over time.

A mechanical engineer has designed a counterweight to replace the springs and also improved the positioning of the bearings on the axle. As the counterweight is basically concrete there will be an opportunity to increase or decrease the weight for final tuning. CAD drawings of the revised design have also been produced.

Key features of this project also include:

- An effort has been made to minimise the amount of mild steel in the design to reduce the cost of fabrication.
- The project included the design of a device to simplify the catching of the cattle's feet inside the box. This device could be developed to replace the hand held lasso in the existing Mark 1 boxes as some stockmen are reluctant to put ropes on by hand. This device will be constructed of hard plastic and stainless steel and will have a detachable handle.
- A hydraulic cattle restraining box recently installed in Egypt had a CIF cost of €120,000, while a mark II cattle box could be fabricated for A$22,000. There would be additional costs to install both boxes.

The mark II box is designed to restrain cattle from a varied weight range and size on a table to facilitate ritual slaughter. The box can also assist with the collection of blood, an issue that is becoming increasingly important in developing countries whom are aware of the high biological oxygen demand (BOD) of blood.

Contents

1 Background

Stunning and restraining boxes in our live export markets have been supported firstly by AMLC and MLA since before 1991. This was driven by a need to make improvements to methods of restraint and slaughter in some markets and address public concerns for the welfare of Australian cattle slaughtered in overseas markets.

2 Project objectives

1. Address and rectify the design issues of the mark II box in relation to the torsion springs and leg restraints.
2. Complete AutoCAD drawings to enable clear communication of the design of the restraining box to builders and users of this equipment.

3 Methodology

3.1 Restraining box

After initial meetings in Brisbane the project team have been able to finalise the drawings, with the additional aid of scanning, emailing PDF's, JPEG's and AutoCAD files.

3.2 Foot catcher

Many cattleman and industry professionals were interviewed in the past 8 years to improve the task of fitting a rope to the two near side feet of cattle in a restraining box. After correlating the information a design has been finalised and a prototype prepared for testing. This foot catcher will allow the closure of gaps in the nearside of the mark II box, gaps that might let an animal's leg come out with the potential to cause injury to the animal.

4 Results and discussion

The AutoCAD drawings for the upgraded mark II box have been completed and the final drawings are shown in Figures 1-7 (Appendix 1). The Project team can advise any potential builders of a mark II box whether in Australia or overseas, and the AutoCAD files are included on a CD at the back of this report.

The drawings have also been completed for the foot catcher as shown in Figures 8-11 (Appendix 2). Initial enquiries to an engineering firm in New Zealand suggest that it would cost A$2,000 to make 4 prototype pieces and after the moulds are finalised it may be able to be produced for A$100 per pair.

Enquires need to be made with MLA as who might be suitable to make a prototype for testing in Australia.

There is some confusion in the countries that support ritual slaughter as to the differences between a 'restraining' and 'stunning' box. To avoid this confusion, equipment that restrains cattle prior to slaughter should be termed a 'restraining box' as it translates well. Where cattle are stunned in a box prior to slaughter the equipment should be termed a 'stunning box'. The term 'knocking box' should not be referred to as it is abattoir slang.

5 Bibliography

Guidelines for the Slaughter of Animals OIE [World Organisation for Animal Health] Terrestrial Animal Health Code [2007]

Dr Temple Grandins Web Page, articles include:

- Design of restraining systems
- Ritual Slaughter

6 Appendix 1: Modified mark II box

Figure 1: The Prototype mark II box showing torsion springs that returned the table to the upright position

Figure 2: mark II Box showing counterweight replacing torsion springs

Figure 3: Near side view box open with counterweight

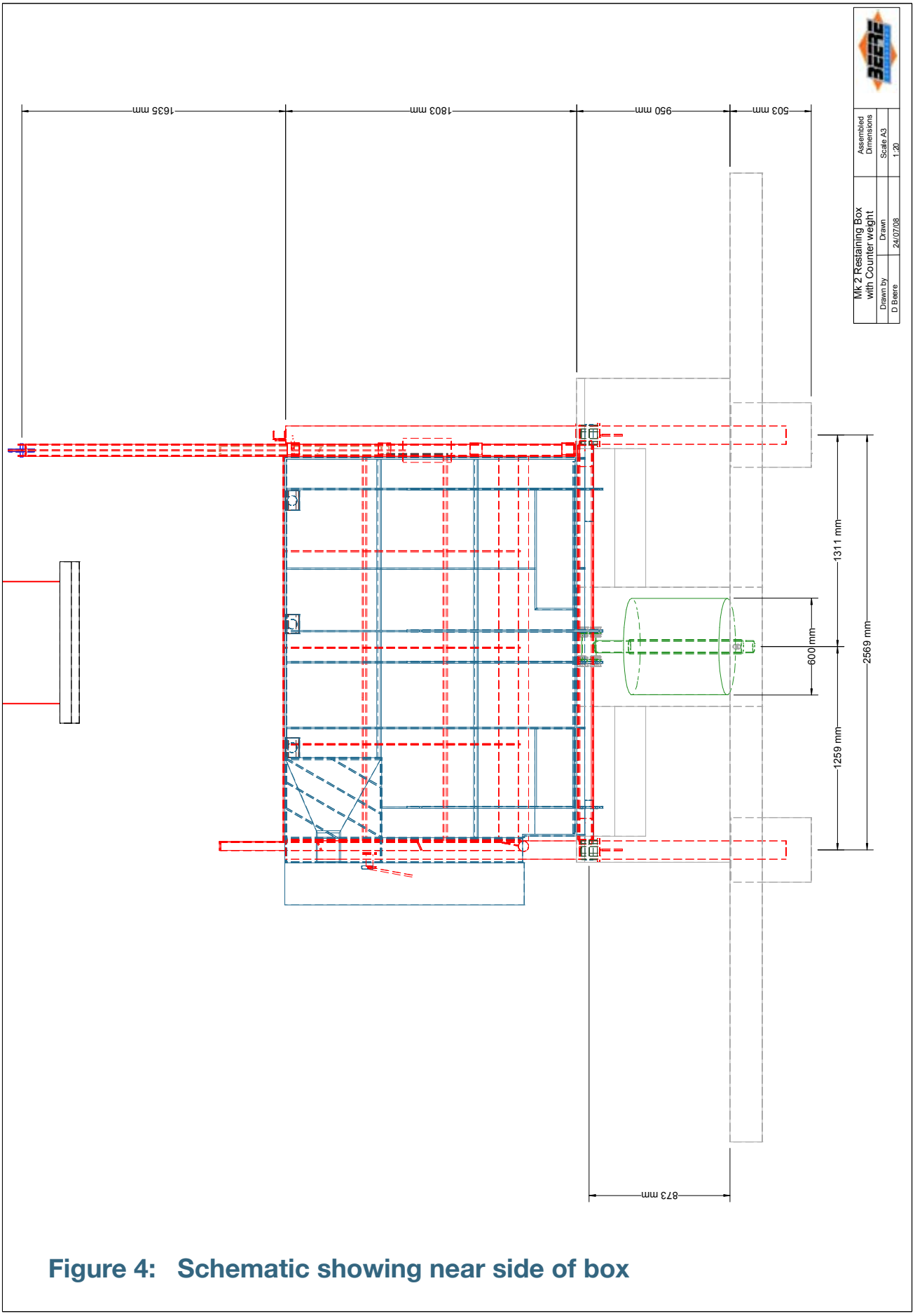


Figure 4: Schematic showing near side of box

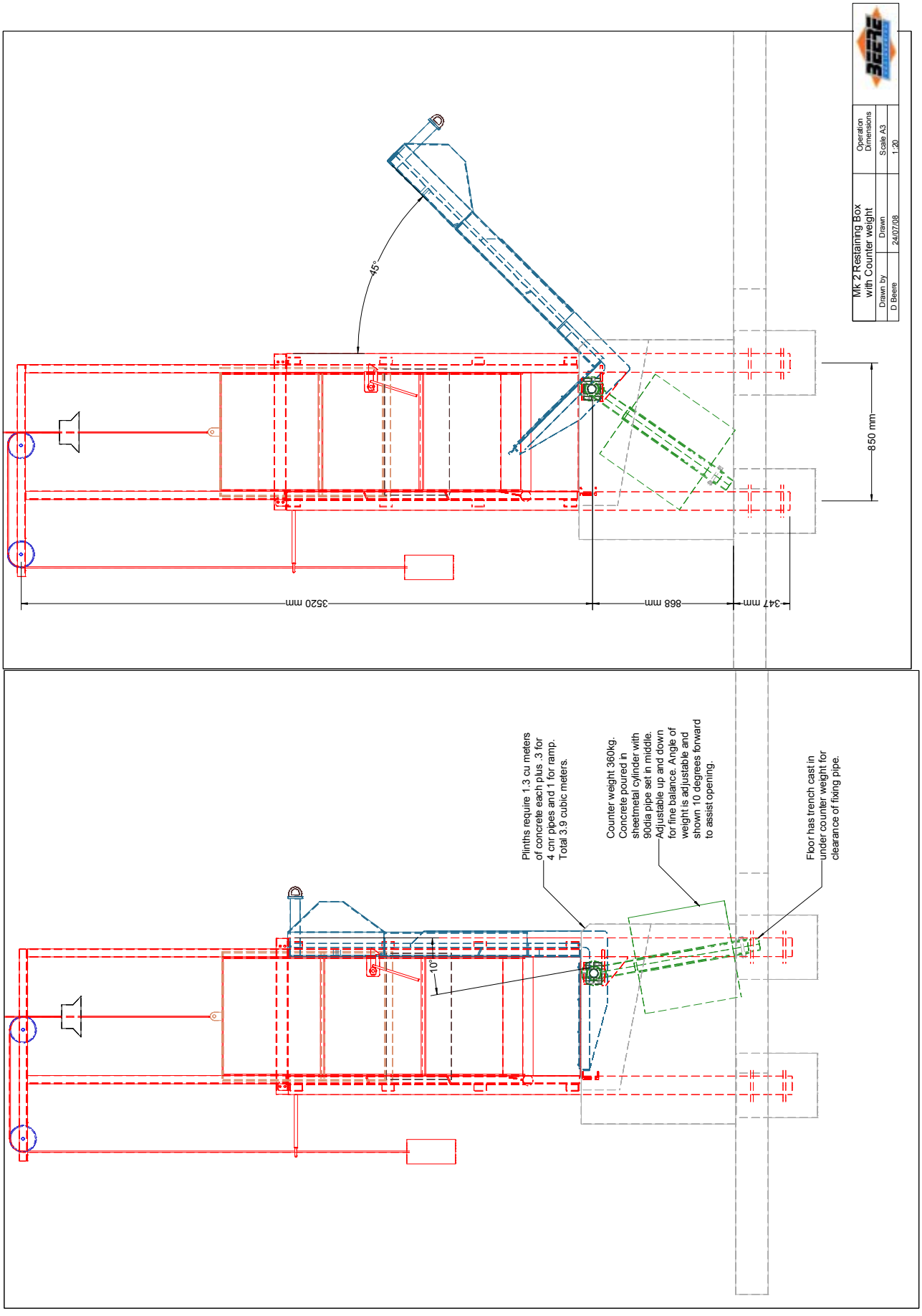


Figure 5: Schematic showing concrete requirements

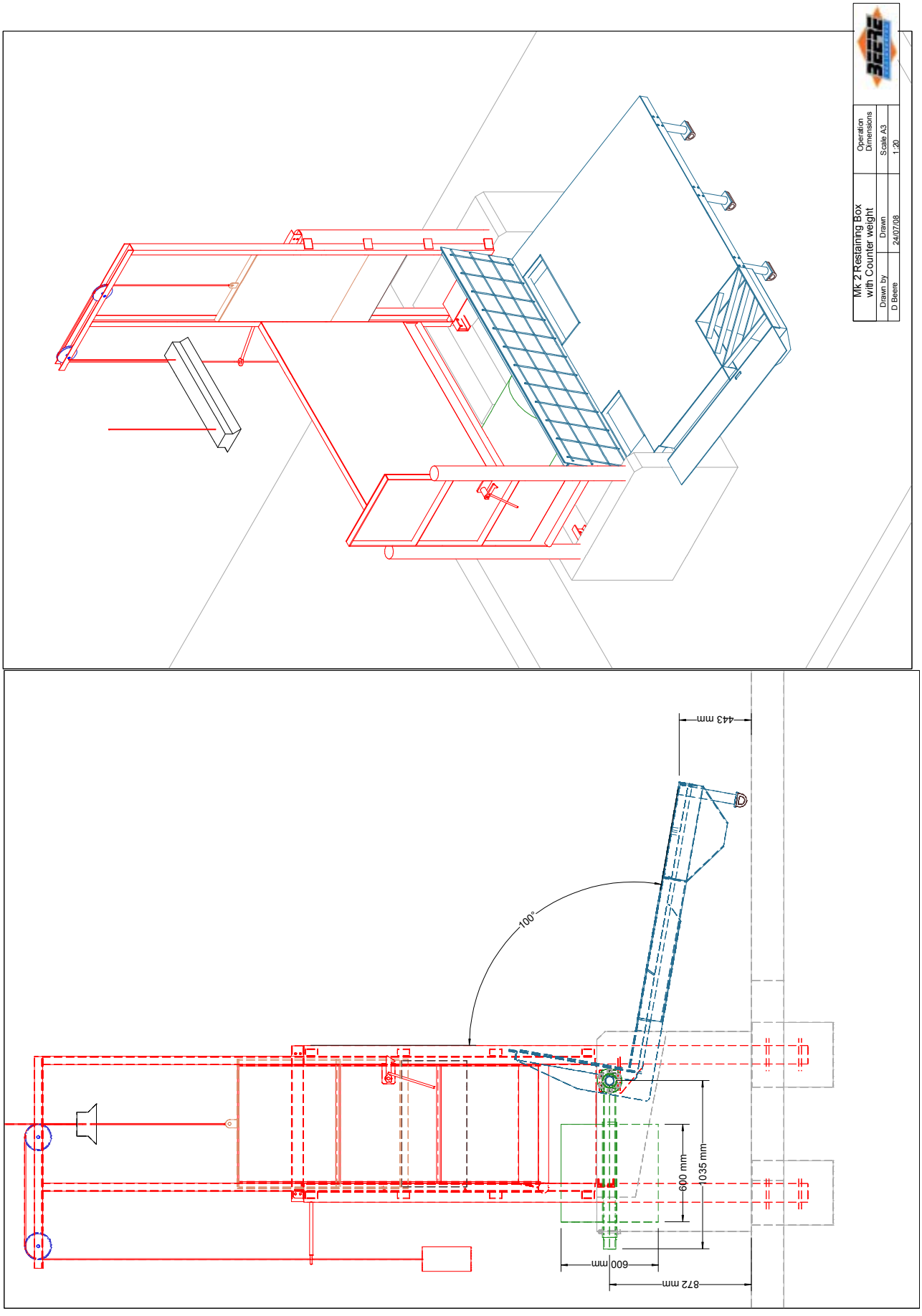


Figure 6: Schematic showing dimensions

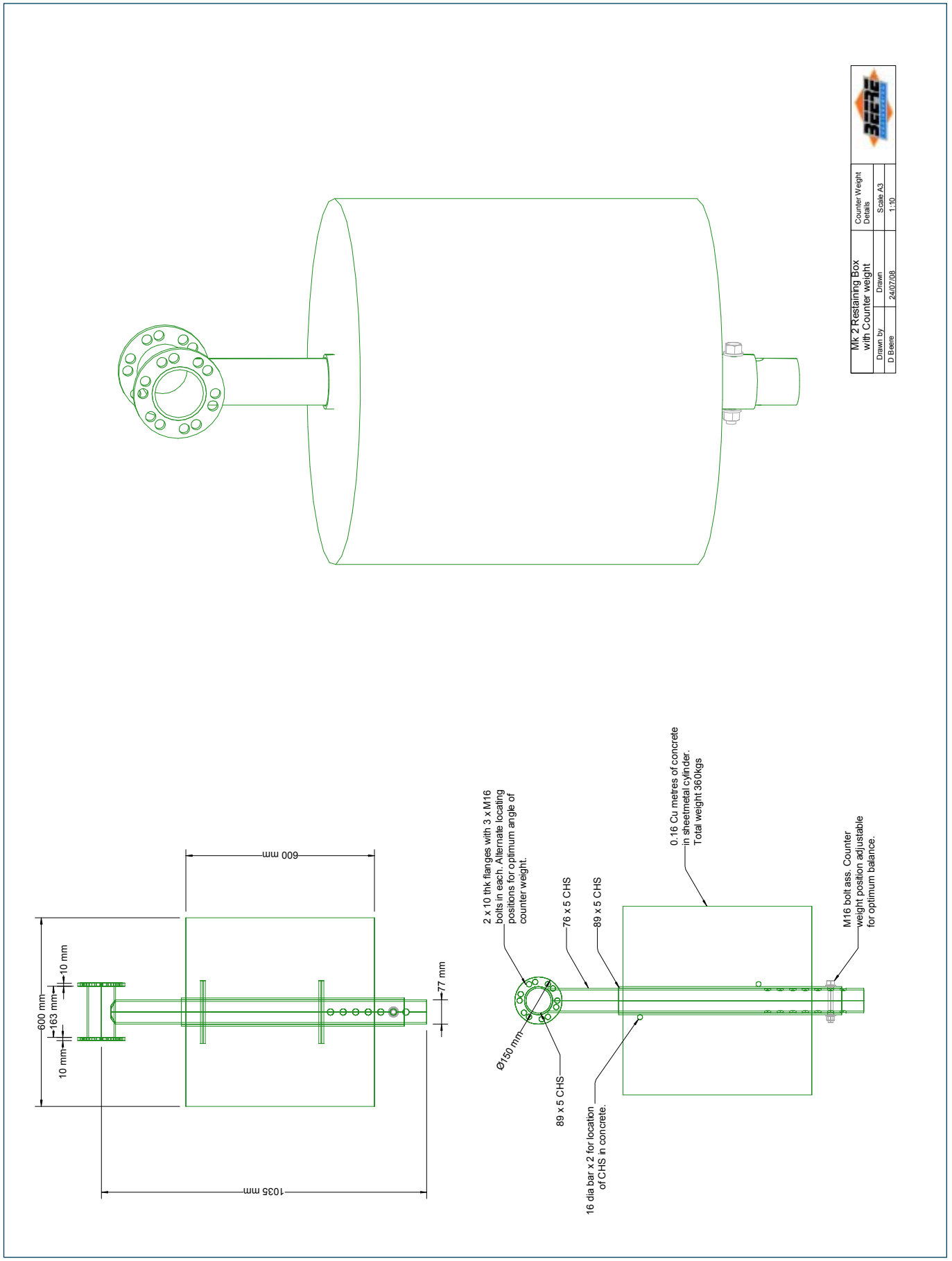


Figure 7: Schematic giving details of counterweight and mounting points

7 Appendix 2: Foot catcher

Please note: that the foot catcher that has been developed for the mark II box could have a number of other applications:

- Use in existing Mark 1 boxes where the rope skills are not good
- General cattle yard applications

The foot catcher can be manufactured from high grade plastic [UHMP] and food grade stainless steel [316 stainless steel].

All sharp edges will be rounded and smoothed at manufacture.

The handle is detachable; a strong soft rope is fitted to the eye on the foot catcher, the wing nut is to release the grip.

Figure 8: Top view of newly developed foot catcher

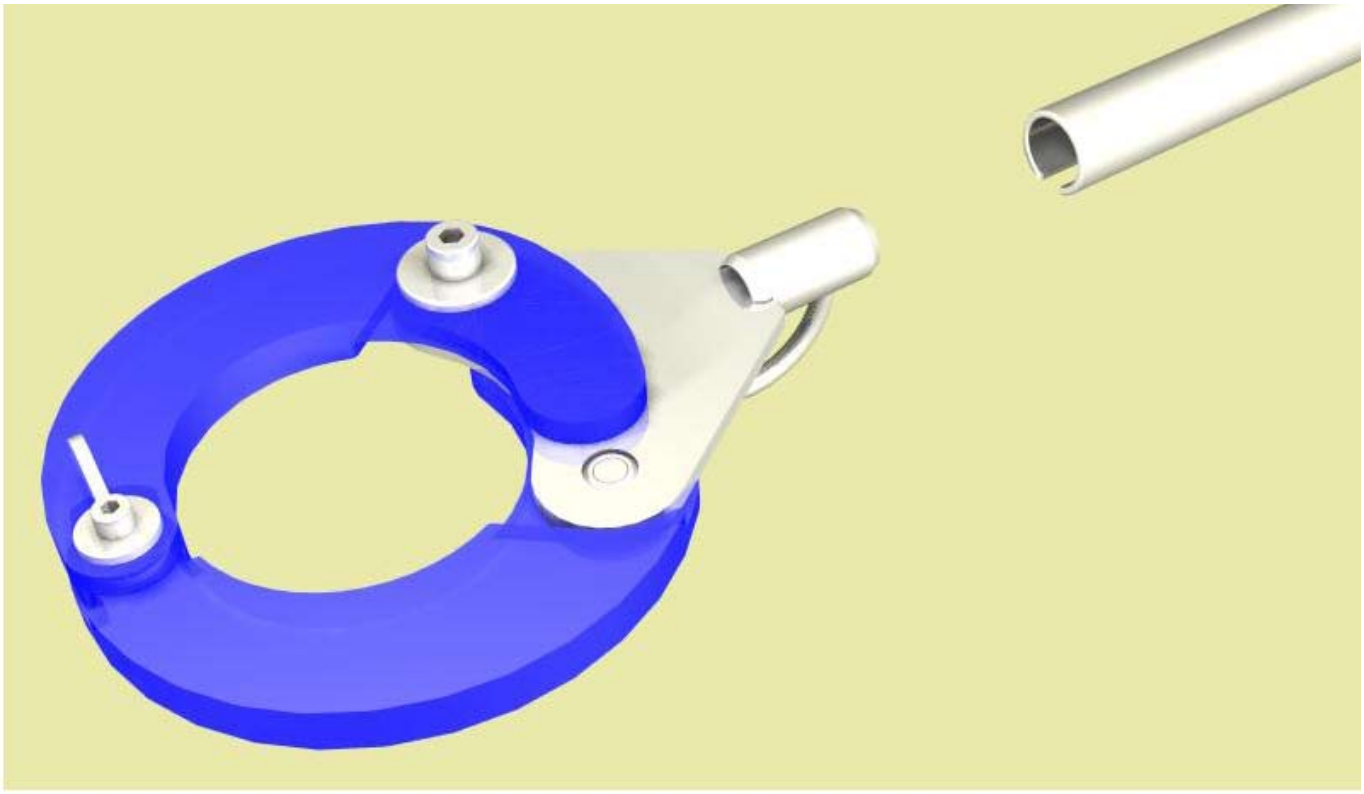


Figure 9: Closed foot catcher with detachable handle

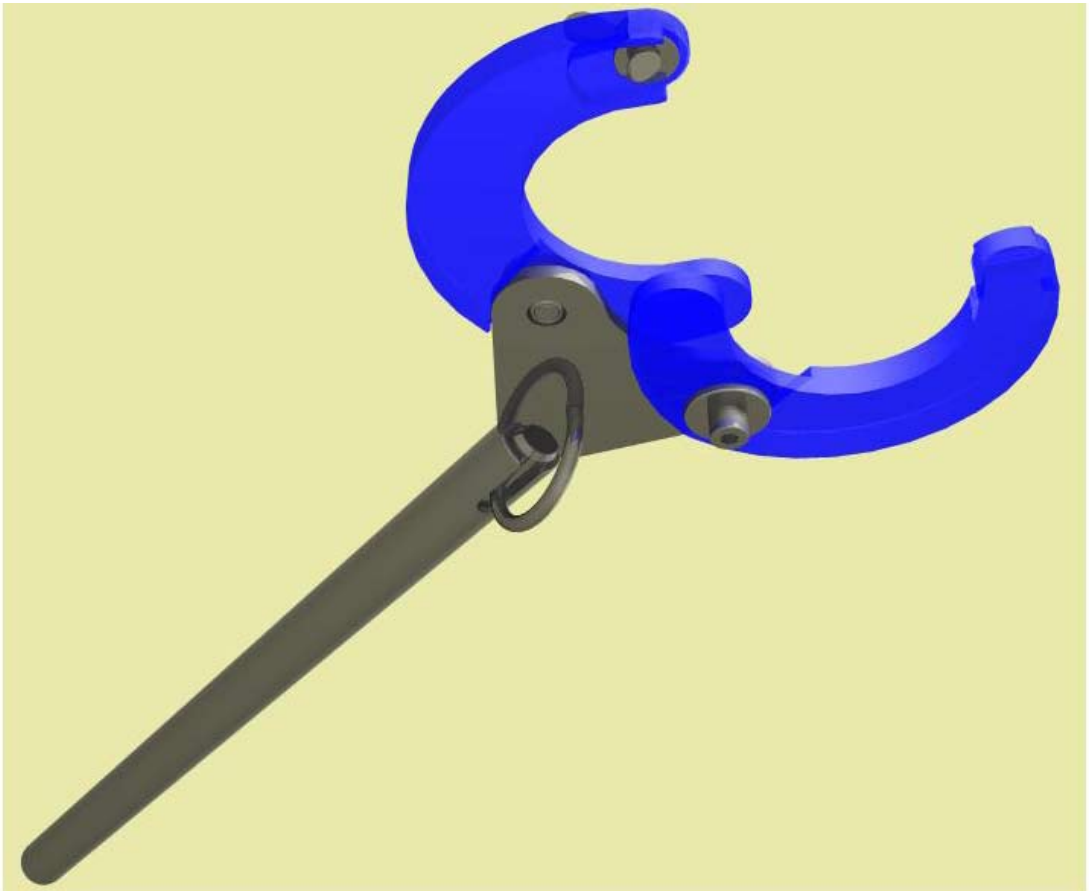


Figure 10: Ventral view of foot catcher

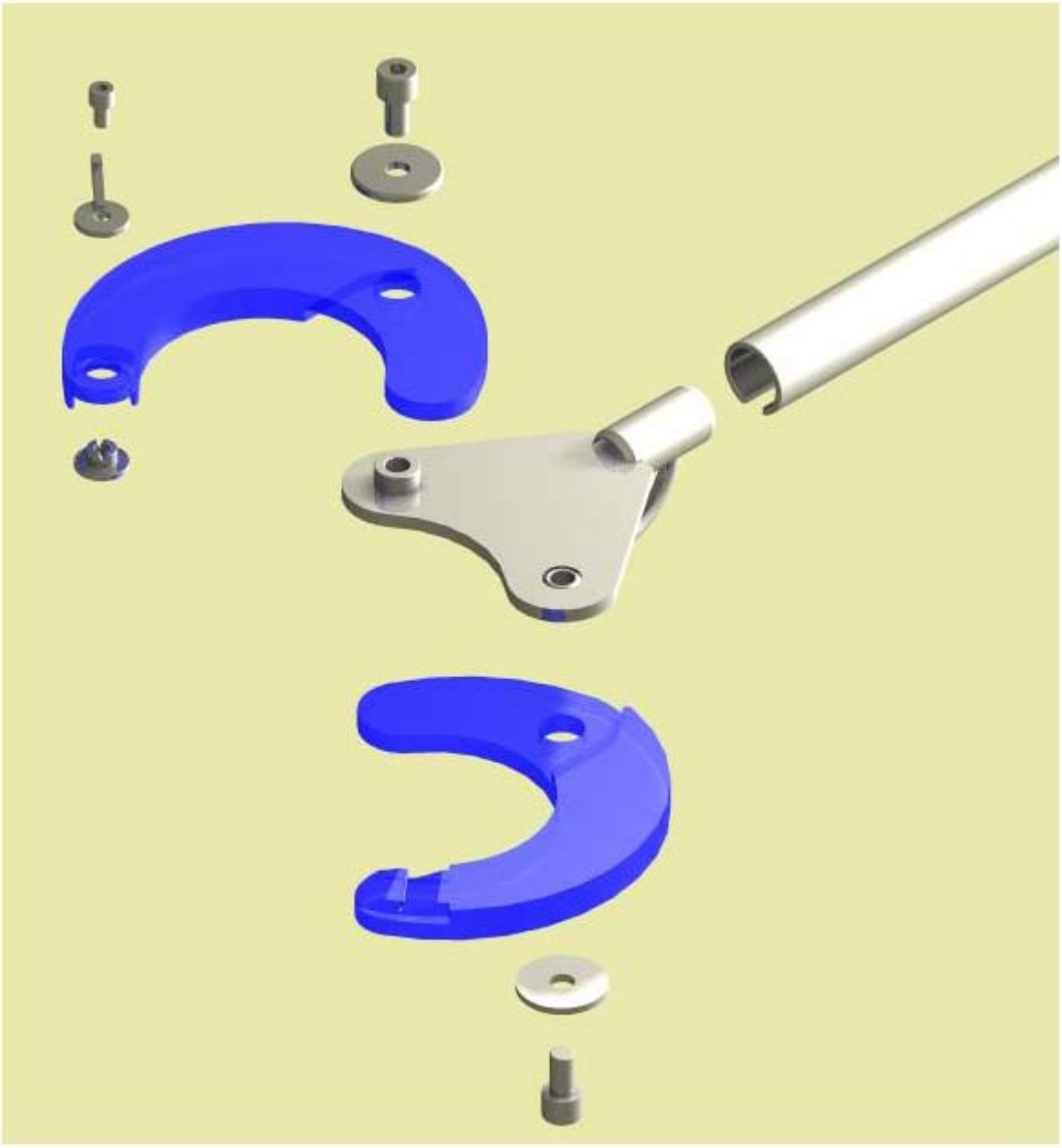


Figure 11: Exploded view of foot catcher showing parts.

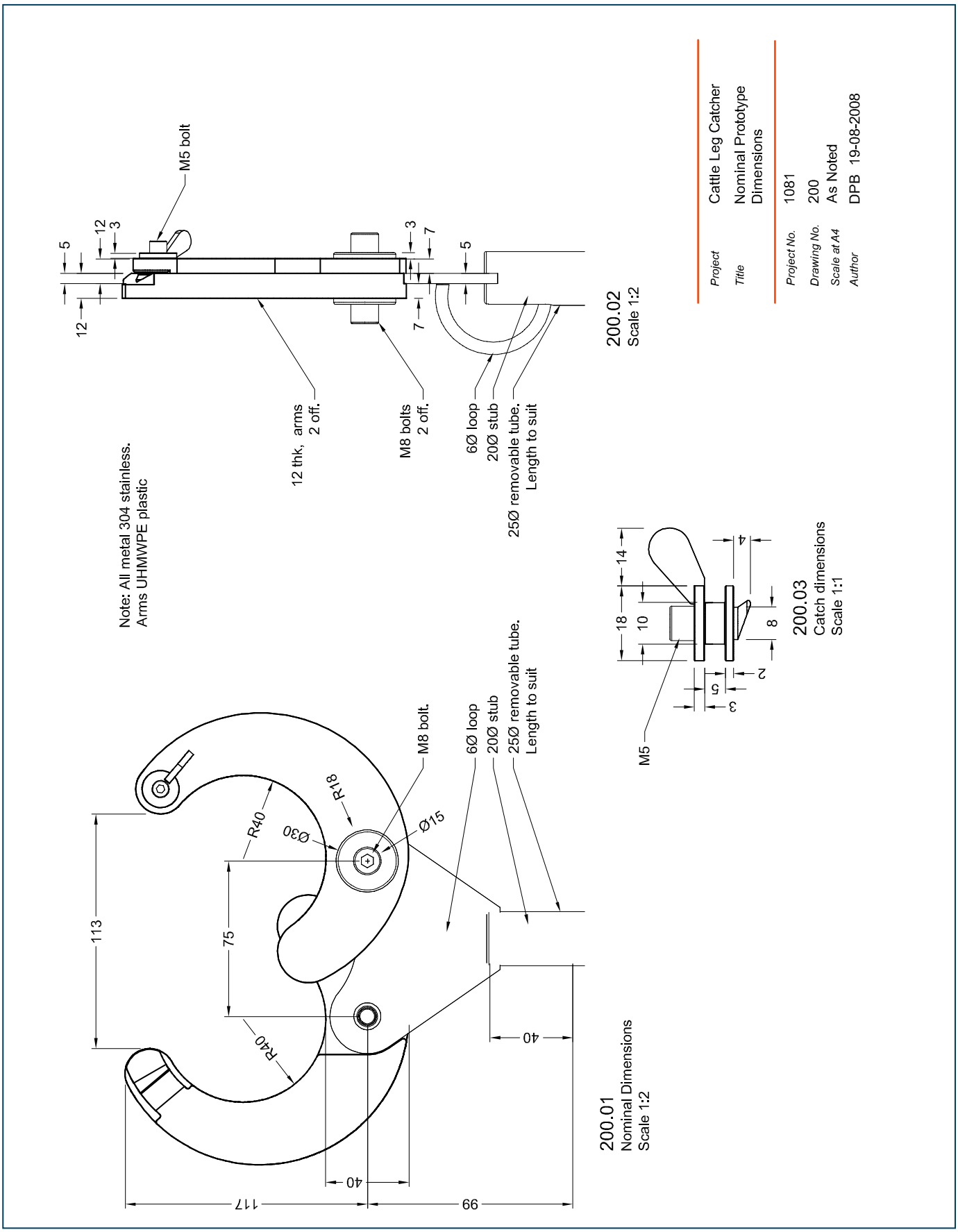
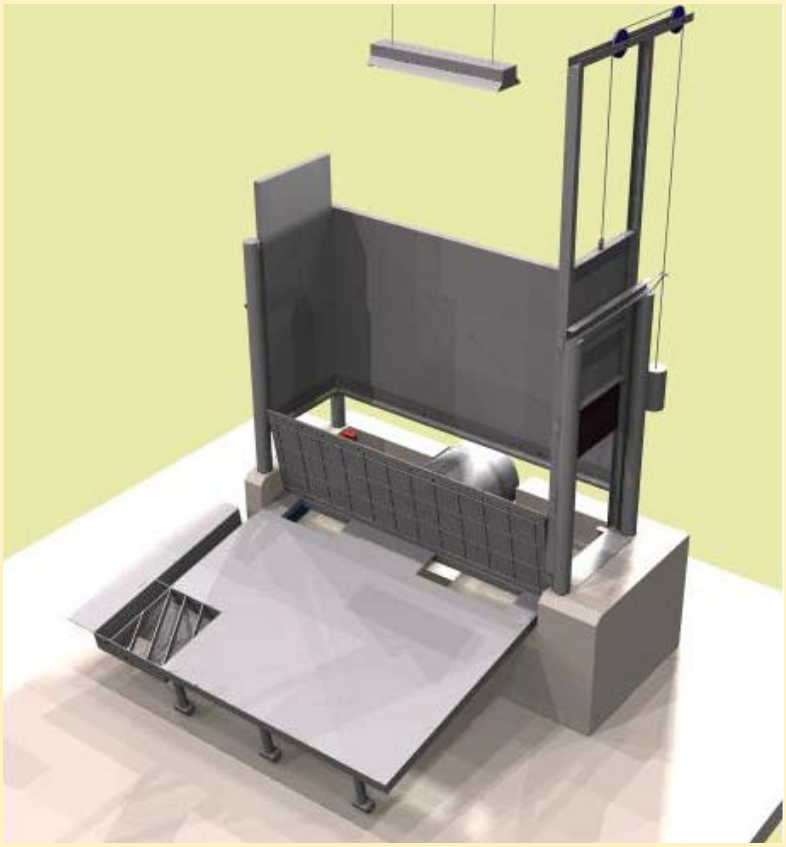


Figure 12: Cattle leg catcher - Nominal prototype dimensions

Notes

Upgrade of existing mark II cattle restraining box for ritual slaughter is a Joint Livestock Export program initiative from MLA and LiveCorp



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