

# Safety harnesses

Development of rise and fall platform recirculating harness attachment

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2023-1034

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# 1.0 Executive Summary

## Overview of Project

The project undertaken aimed to provide a safety solution to reduce the risk of injury from falling of a rise and fall platform (R&FP) using harnesses. This summary provides a concise overview of the project's objectives, approach, outcomes, insights, and conclusions, and recommendations.

## Project Objectives

The primary objectives of the project were:

1. Satisfies fall restraint requirements
2. Allows Boners Recirculate behind without any need to detach and re-attach
3. Does not encumber, but improves ergonomic performance and postural support where possible
4. Allows for quick, single handed attachment and detachment
5. Allows for early cut out
6. Is reliable, durable, corrosion resistant, and acceptably non-shedding of particulate material
7. Preferably not complicated nor high maintenance
8. Can be mounted on and within the size constraints of the R&FP
9. Does not inhibit throwing of bones onto the bones belt
10. Does not add excessively to the platform weight
11. Does not create other safety problems

## Approach

To achieve the project objectives, we adopted the following approach:

- Engaged an engineering company to develop a solution.
- Engineering company created a 3D model concept.
- A prototype was developed and tested in workshop.
- 'Tweaked' prototype.
- Trialled prototype in production and received feedback.
- Modifications based on feedback and assessment.
- Installation across all R&FP

## Project Outcomes and Insights

### Project Outcomes

The project yielded solution that delivered the following key outcomes:

1. Satisfies fall restraint requirements
2. Allows Boners Recirculate behind without any need to detach and re-attach
3. Does not encumber, but improves ergonomic performance and postural support where possible
4. Allows for quick, single handed attachment and detachment
5. Allows for early cut out
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### Conclusions

In conclusion, the project has successfully addressed its objectives, and the findings contribute significantly to the industry and organisations knowledge base.

### Results and findings for industry benefit

The project results and finding have direct implications for Greenham members and the wider industry. Key takeaways include:

- A safety solution which reduces the risk for Boners while ensuring that they can continue to perform their tasks without interruption allowing for inexperienced boners to learn.

## 2.0 Introduction

To reduce the risk of injury from falling off a Rise and Fall Platform (R&FP), harnesses are required to be worn. This is now conventional in the meat industry.

Covid has seriously impacted labour availability at Greenham Moe, requiring high levels of first-time training. This leads to a mix of experienced and in-experienced boners on R&FP at one time and sometimes a supervisor as well. Boners follow left to right carcass movement on the platform to complete their task. Upon completion of a carcass, Boners re-circulate behind other working boners. Inexperienced Boners take longer, limiting throughput rate, as they use the full R&FP length to complete their tasks. Experienced Boners complete their tasks earlier and 'cut-out' early in recirculation, thus boning more carcass than learners.

The purpose of this project is to reduce the risk of injury from falling off a rise and fall platform (R&FP) using harnesses. In addressing this objective, we aim to:

1. Satisfies fall restraint requirements
2. Allows Boners Recirculate behind without any need to detach and re-attach
3. Does not encumber, but improves ergonomic performance and postural support where possible
4. Allows for quick, single handed attachment and detachment
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The research project is driven by the need to provide a mechanism that allows a harness tether attachment, with minimal ergonomic encumbrance, for the recirculating boner path and early 'cut-out', is quite novel and challenging and thus requires research and development towards a solution.

## 3.0 Project Objectives

The objective is to:

1. Satisfies fall restraint requirements
2. Allows Boners Recirculate behind without any need to detach and re-attach
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## 4.0 Methodology

H.W. Greenham & Sons has engaged with external approved suppliers to develop a racetrack rail that the boners will clip to and allow the to pass each other without unclipping while still being able to bone. This will provide safety for the boners so they can not fall from the height of the stands. With the aim of delivering the below outputs:

1. 3D Concept sketches of racetrack and bobbins
2. Manufacturing drawings
3. Prototype #1
4. Safety Assessment #1
5. Prototype #1B – may not be required
6. Safety Assessment #2
7. Prototype 2
8. Safety Assessment #3
9. Four recirculating harness systems fitted to remaining R&FP
10. Upgrades to prototypes #1 (1B) and Prototype #2
11. End of project safety assessment #4
12. End of project report

### 4.1 Initial Engagement with Meateng

Meateng has been approached to develop a solution. An initial site visit to Moe to inspect the boning rise and fall platform was conducted.

Meateng proposed a concept of an overhead flat stainless steel plate at approximately door lintel height above the deck height of the R&FP and fixed to and moving with the R&FP. In plan view, the flat plate would have an approximately 30mm wide slot in the shape of the required recirculating path with the cut-out intersections. The flat plate needed to have gussets on top to support the internal remaining plate sections, that otherwise would fall way. This creates the required slot. Meateng has called this the 'Racetrack'. Within the Racetrack slot, is to be a flat captive disk, called the 'Bobbin' with an eye-bolt/nut through the centre to attach a carabiner on the end of an adjustable length harness tether. In proposing this concept Meateng acknowledge that they have not seen this before, let alone seen it working. Notwithstanding, of all the concepts that have been considered, the Racetrack Bobbin seems to have the potential to satisfy the objectives, albeit requiring design, prototyping, refinement and development.

### 4.2 Conceptual Model

Concept sketches were prepared by Meateng and sent to the plant team for approval. A team meeting to review the concept sketch was conducted.

### 4.3 Sliding Bobbin

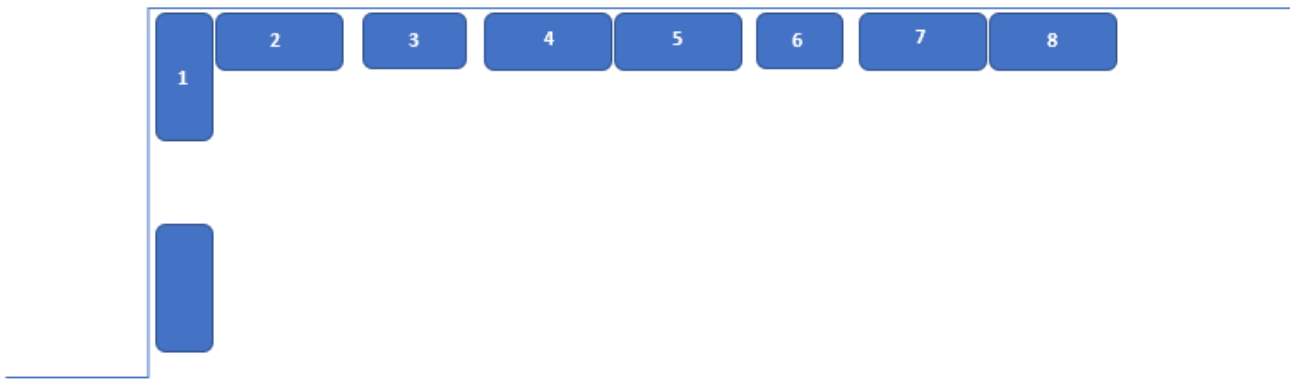
The sliding bobbin proposed for the concept is a ultra-high molecular weight polyethylene material. The bobbins were designed and manufactured by MeatEng. The original design of the bobbins didn't slide well and the bobbin design was slightly amended. The updated design had a slightly larger circumference and the grooves squared out by the on-plant maintenance team.



### 4.3 Rise and Fall Platforms

All rise and fall platforms at Moe work independently of each other. However, there is typically multiple boners doing similar cuts and therefore may only work on every 3<sup>rd</sup> or 4<sup>th</sup> carcass going down the boning chain. This means that boners typically cross over each other. Furthermore, boners at Moe could also cross over platforms for their next carcass. Therefore, both factors needed to be taken into consideration in the initial concepts. It has also been identified as part of the project where boners cross over platforms, for the race-track design to work it would require certain platforms to rise and fall together. The following platforms have been identified as platforms that need to be modified to safely rise and fall together:

- Platform 1&2
- Platform 4&5
- Platform 7&8



## 5.0 Project Outcomes

### 5.1 Milestone 1

Progress achieved during the milestone:

- An initial meeting to confirm project objectives and approach has been completed.
- 3D concept model and drawings have been completed.

### 5.2 Milestone 2

Progress achieved during the milestone:

- A prototype has been developed.
- The prototype #1 trialled in Greenham workshop and modifications occurred based on initial assessments.
- The prototype has been installed in production on platform 3
- Trials with employees utilising harnesses have commenced.
- Feedback and improvements identified.
- Conducted a safety assessment.

### 5.3 Milestone 3

Progress achieved during the milestone:

- 3D Concept sketches of racetrack and bobbins
- Manufacturing drawings
- Safety Assessment
- Four Recirculating Harness Systems Fitted to remaining R&FP
- Upgrades to prototypes
- End of project safety assessment

### 5.4 Project Budget

Milestone	Fees	Expenses	Total
1	\$22,000.00	\$14,497.38	\$36,497.38
2	\$10,000.00		\$10,000.00
3	\$39,000.00	\$52,000.00	\$91,000.00

## 6.0 Discussion

### 7.1 Prototype 1 – Workshop Phase

Prototype 1 was set up in the workshop to refine any assessment made. Initially it was observed that the bobbins didn't slide as originally planned. The onsite maintenance teams modified the bobbins under the guidance of MeatEng. Figure 1 shows prototype 1 set up in the maintenance workshop.



Figure 1: Prototype 1 in the maintenance workshop

### 7.2 Prototype 1 – Trial Phase

Prototype 1 has been commissioned on platform 3 on the boning chain. It is currently being trialled while boning cows to minimise the effects of slowing down production. The racetrack is currently not in use all the time. Prototype 1 has been modified twice since it has been installed on the boning chain. Once maintenance had installed the racetrack at the recommended height of 2.1m from the floor, it was soon observed that the boners were hitting their heads on the racetrack and therefore, a modification raise the height was completed. Furthermore, after the racetrack was raised, it was observed that the racetrack was too far forwards for the boners to effectively move. The second modification was to shift the platform back in position. Figure 2 shows the racetrack in action at the processing facility.

Observations made by maintenance since the 2 modifications include:

- Inertia reels need a bit more tension to slide the bobbin (currently being investigated) – not enough resistance in the strap to go around the corner.
- Inertia reels don't have to be as long.

Production feedback included:

- Bobbins get stuck and don't roll smoothly – question whether should try a bearing or something along those lines – investigating what else is out there. Try tighter reel first so that pulls the bobbin along. Bearings – moving part and if one fails out can end up anywhere.

An initial safety assessment was completed. It has been identified that original inertia reels are not suitable. On observation the reels letting the strap go out before grabs, like a seat belt. It has been identified by both maintenance and safety that there is a need to trial tighter reels or have fixed straps.



Figure 2: Prototype 1 installed into the boning room on platform. Inertia reels extending as movement occurs.

### 7.3 Risk assessment

A company risk assessment has been completed for the boning stands. By implementing the system, the plant has reduced the risk being extreme risk, requiring immediate action to low risk, being managed by routine procedures.

### 7.4 Video of Recirculating Harness in action

A video of the recirculating harness system in action is attached.

## 7.0 Conclusions

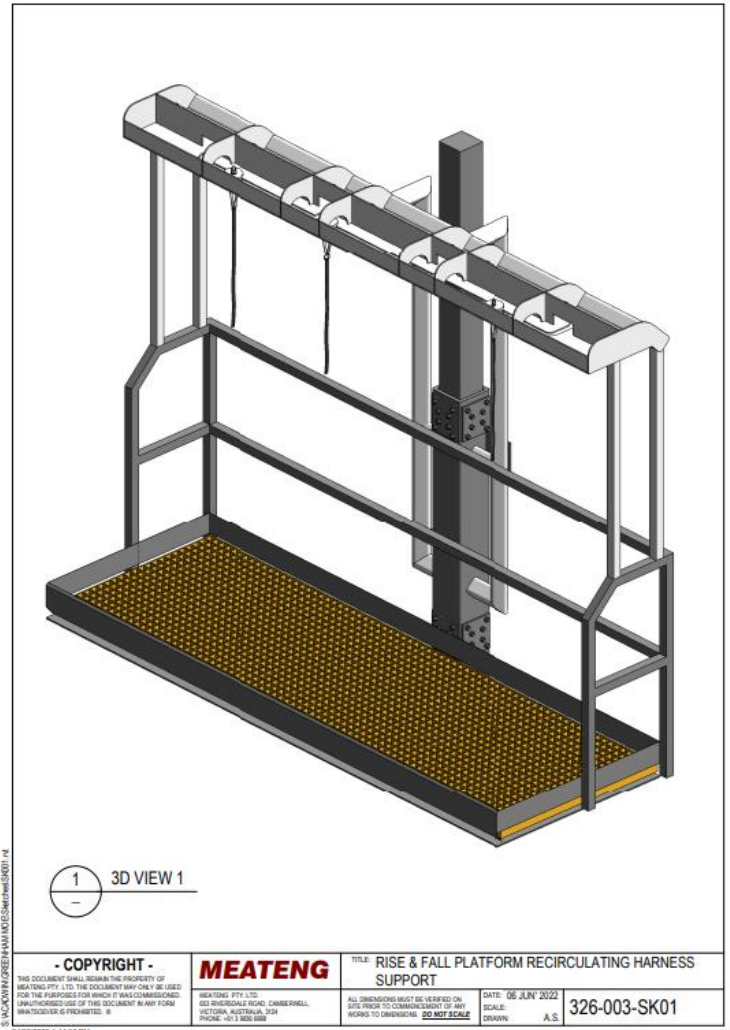
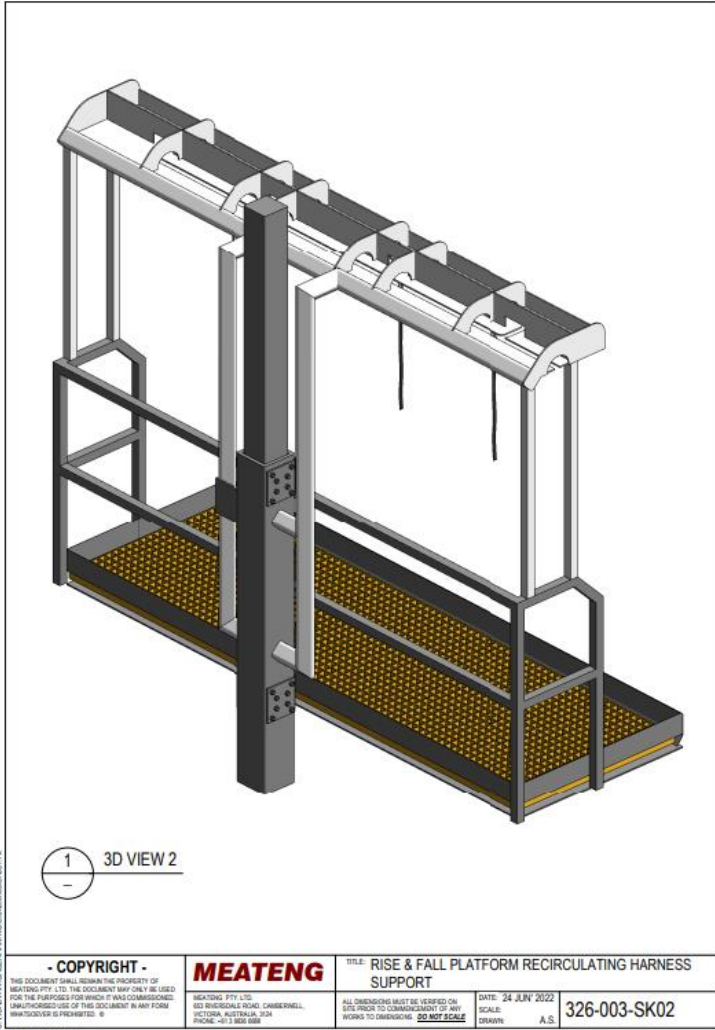
The project was successful at designing, developing, and implementing a method that reduces the risk of injury from falling off a R&FP.

The project delivered a system that:

1. Satisfies fall restraint requirements
2. Allows Boners Recirculate behind without any need to detach and re-attach
3. Does not encumber, but improves ergonomic performance and postural support where possible
4. Allows for quick, single handed attachment and detachment
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10. Does not add excessively to the platform weight
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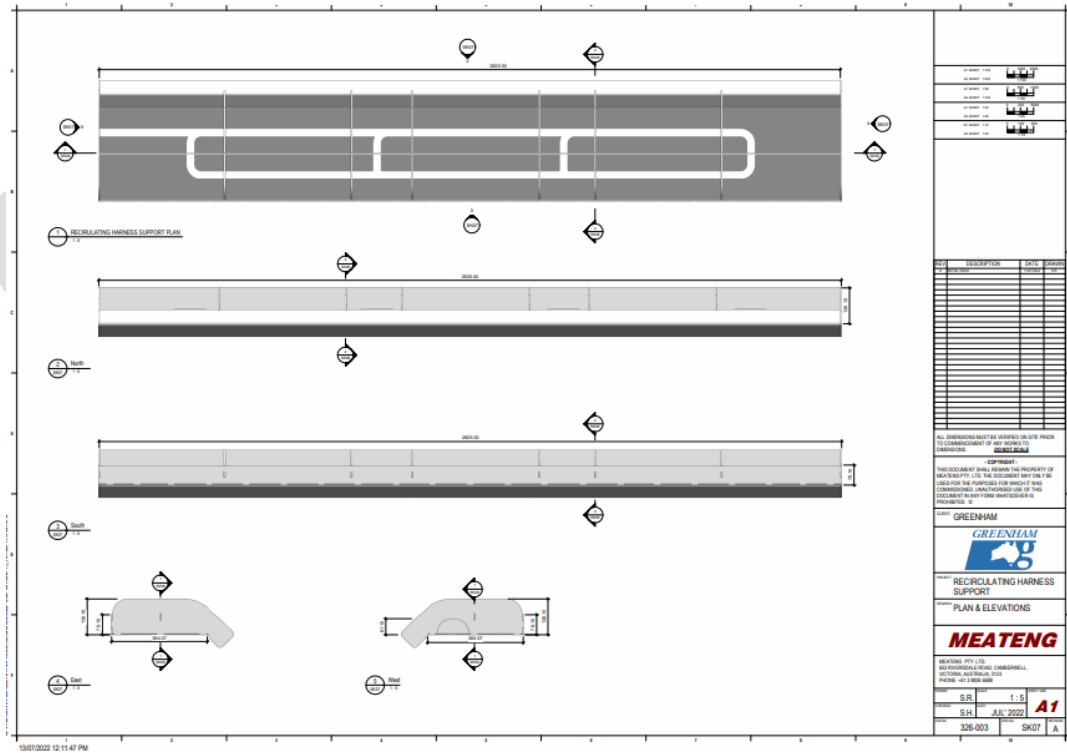
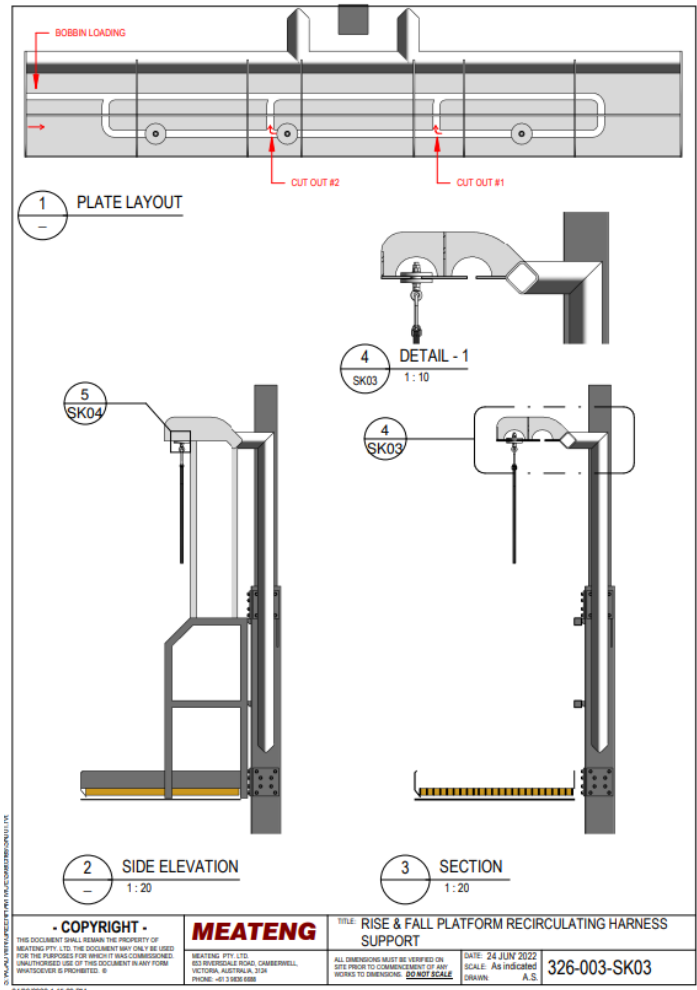
# 8.0 Appendices

## 8.1 Appendix 1 – Platform Drawings

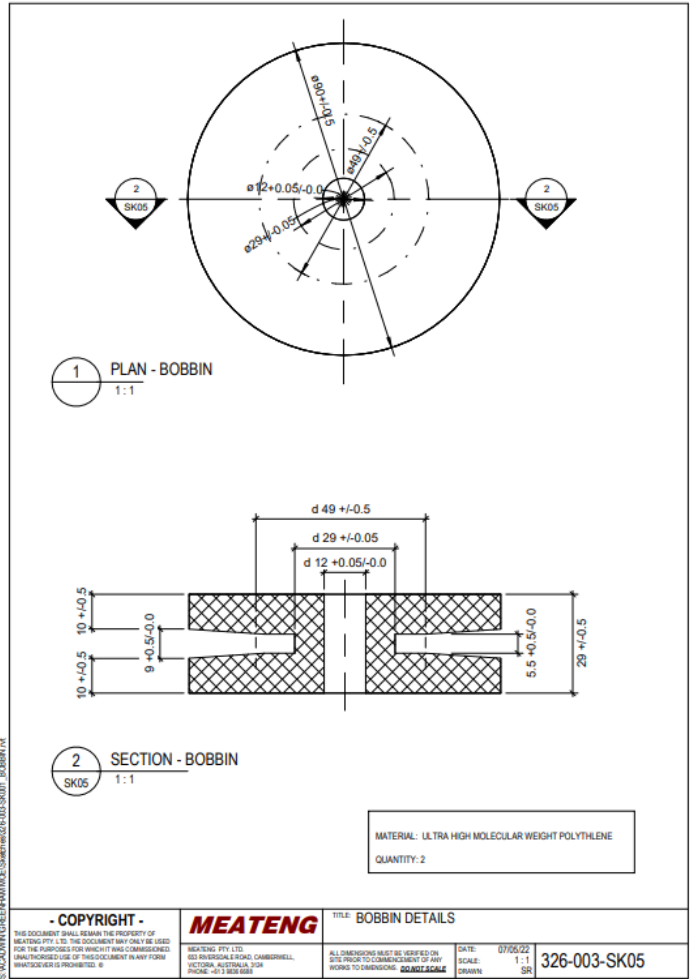
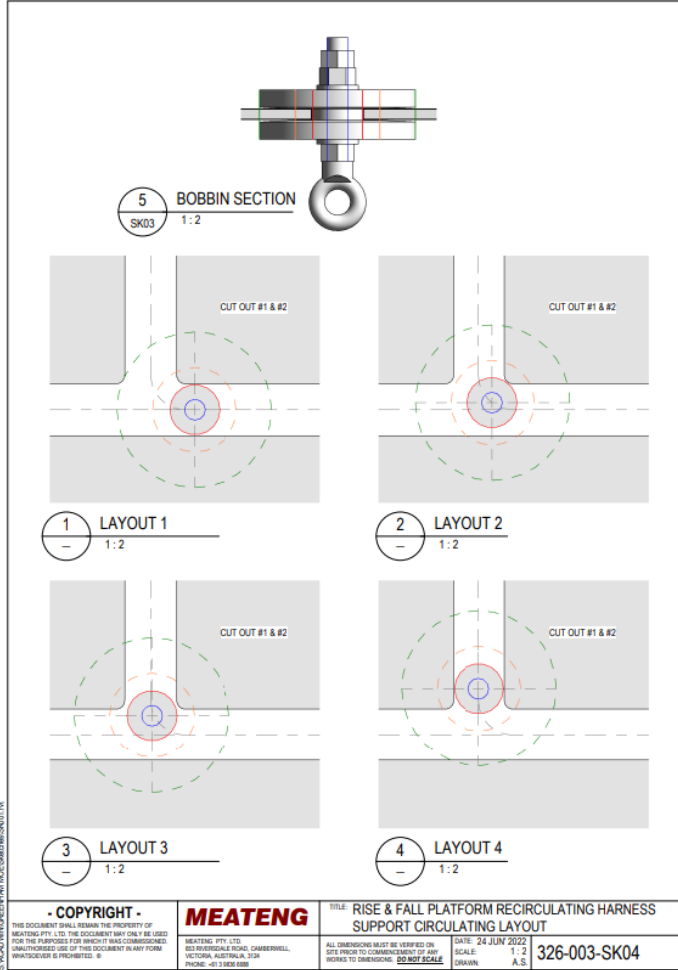




## 8.2 Appendix 2 – Racetrack down

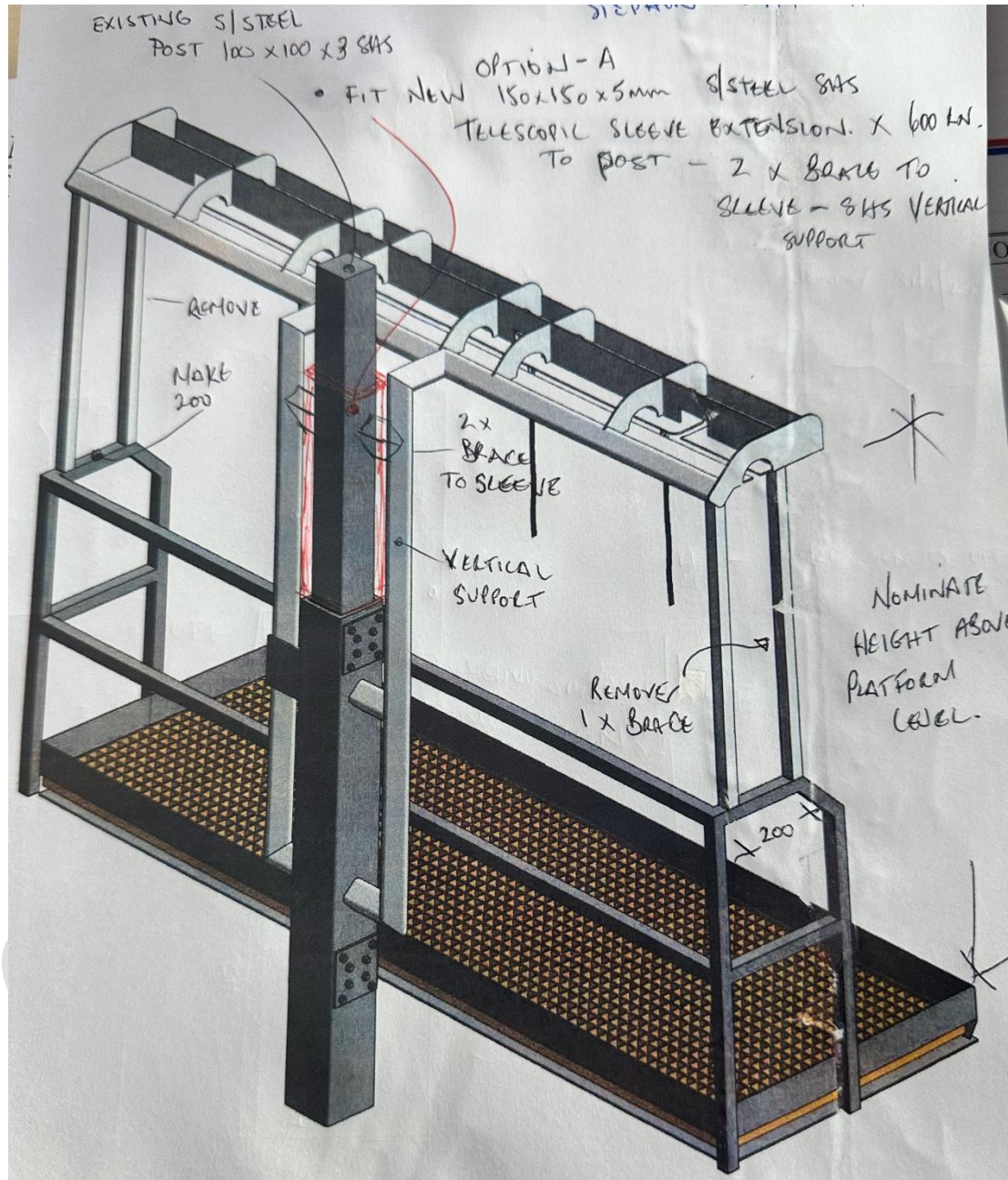


### 9.3 Appendix 3 – Bobbin Design





## 9.4 Appendix 4 – Initial drawings



## 9.5 Appendix 5 – Risk Assessment



Health & Safety Management System

GG-HSMS-307.3  
 Hazard Identification Risk Assessment and Management (HIRAM)  
 HIRAM Document Number: DXXXXXXX

Date Assessment Commenced: XXXXXX

Workplace Location: XXXXXX – XXXXXX  
 Plant Description: XXXXXX

Assessor(s):

Activity / Product / Service	Aspect / Hazard	Impact	Probability	Consequence	Risk Rating	Risk Controls	Action Required	Risk Rating after Risk Controls
(Without Risk Control)	(Without Risk Control)	(Without Risk Control)	Likelihood of Hazard Causing Injury / Loss	Most Likely Outcome				
Boning Stand	Working with knives. Manual handling. Slipping due to wet area.	Lacerations, slips, trips	Likely	Moderate	H	PPE to be worn Kevlar and rubber glove on both hands. Mesh glove on non-dominant hand. Hearing protection. Nonslip approved gumboots. Person trained into correct knife use. Platform set at different heights to enable particular boning cut to be done at comfortable height between waist and shoulder.	WI and correct procedures to be followed PPE has been issued at induction	L
	Working at heights, potential to fall slip off stand. Photo 1	Fall injuries, crush, trip, impact injuries.	Likely	Major	E	Racetrack to be manufactured and mounted on each stand to allow staff to move around with harness supporting movement to ensure if there is a slip / fall then the fall will be stopped using a Fall restraint Photo 2	Engineers to be appointed to design and help build and fit racetrack with weight rated chains	L
	Head knock from moving from stand to stand at different levels	Impact injury	Possible	Minor	L	Hard hat to be worn by all personnel	Hard hat to be included in PPE Register	L

Approved by:  
 Document Title:  
 Controlled Document:

Group General Manager - Operations  
 Boning stand  
 Yes

Issue Date:  
 Status:

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Health & Safety Management System

GG-HSMS-307.3  
Hazard Identification Risk Assessment and Management (HIRAM)  
HIRAM Document Number: DXXXXXXXX

XXXXXXXXXXXX



Photo 1



Photo 2 Racetrack Fitted

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Photo 3 Staff able to move with Fall arrest on.

Photo 4 Below Staff able To move and cross behind Without unhooking



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HIRAM Document Number: DXXXXXXXX



Pic 4

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Hazard Identification Risk Assessment and Management (HIRAM)  
HIRAM Document Number: DXXXXXXXX

**. Personnel involved in discussion around improvement**

- Andrew Chippendale (WHS Manager)
- Greg Greenshields (Plant Manager)
- Jack Dorrington (Boning Room Manager)
- Frankie Owen (Boning Room Supervisor)
- Craig Mcguigan (Maintenance Manager)
- Meateng – Stephen Harvey (Contracted Engineer)
- Boning Staff and HSR

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Health & Safety Management System

GT-HSMS-307.3  
 Hazard Identification Risk Assessment and Management (HIRAM)  
 HIRAM Document Number: xxxxx

Date Commenced: xxxxxxxx

**1. REVIEW AND MONITOR CONTROL MEASURES:**

- |                                                                                   |                          |                                     |
|-----------------------------------------------------------------------------------|--------------------------|-------------------------------------|
| <b>a. Review the Immediate Control Measures</b>                                   | <b>Yes</b>               | <b>No</b>                           |
| i. Will the control measure(s) introduce a new hazard?                            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| If no, continue                                                                   |                          |                                     |
| If yes, complete a new risk assessment to determine other control measures needed |                          |                                     |
| ii. Is the revised control measure(s) effective?                                  | <input type="checkbox"/> | <input type="checkbox"/>            |
| If yes, continue                                                                  |                          |                                     |
| If no, complete a new risk assessment to determine other control measures needed  |                          |                                     |
|                                                                                   |                          |                                     |
| <b>b. Monitor the Immediate Control Measures:</b>                                 | <b>Yes</b>               | <b>No</b>                           |
| (review within 1 month of implementing control measure)                           |                          |                                     |
| i. Does the short term control measure continue to be effective?                  | <input type="checkbox"/> | <input type="checkbox"/>            |
| If yes, can assessment be finalised.                                              | <input type="checkbox"/> | <input type="checkbox"/>            |
| If no, complete a new risk assessment to determine other control measures needed  |                          |                                     |

**Comments:**

xxxxxxxx.

Risk Assessment Finalized By: Andrew Chippendale

Date: 1/9/23

Approved by: Group General Manager - Operations  
 Document Title: Boning stand  
 Controlled Document: Yes

Issue Date: July 2021  
 Status: Version 1



Date Commenced: xxxxxxxx

**Control Levels to be followed**

1. Eliminate any risk to health or safety associated with construction work.
2. Reduce the risk to health or safety by any one or any combination of the following:
  - ✓ Substituting a new activity, procedure, plant, process or substance
  - ✓ Isolating persons from the hazard, such as barricading, fencing or guard railing, or
  - ✓ Using engineering controls, such as mechanical or electrical devices
3. Use administrative controls, such as changing the way the work is done
4. Provide appropriate personal protective equipment.

**Working from Height Hierarchy of Controls**

Use highest level where possible

- Level 1 Undertake the work on the ground or from a solid construction.
- Level 2 Undertake the work using a passive fall prevention device
- Level 3 Undertake the work using a work-positioning system
- Level 4 Undertake the work using a fall-arrest system

After considering all the above, if no reasonably practicable control measure has been identified, a level 5 control may be used.

- Level 5 Undertake the work from ladders or implement an administrative control.

**Risk Assessment Tool**

**Likelihood of Hazard Causing Loss – Probability**

Descriptor	Description
Certain	Is expected to occur in all circumstances.
Almost certain	Is expected to occur in most circumstances.
Likely	Will probably occur in most circumstances.
Possible	Might occur at some time.
Unlikely	Could occur at some time, but less possible.
Rare	May occur only in exceptional circumstances

**Impact – Consequence**

Descriptor	Description
Insignificant	No injuries, low financial loss
Minor	First aid treatment, on-site release immediately contained, medium financial loss.
Moderate	Medical treatment required, on-site release contained with outside assistance, high financial loss
Major	Extensive injuries, loss of production capability, off-site release with no long-term detrimental effects, major financial loss.

**Risk Rating Matrix**

Likelihood / Probability	Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Certain	M	H	E	E	E
Almost certain	M	H	H	E	E
Likely	L	M	H	E	E
Possible	L	L	M	H	E
Unlikely	L	L	M	H	H
Rare	L	L	M	M	H

**LEGEND**

- E = extreme risk, immediate action required
- H = significant risk, senior management attention needed
- M = moderate risk; management responsibility must be specified
- L = low risk; manage by routine procedures

Approved by: Group General Manager - Operations  
 Document Title: Boring stand  
 Controlled Document: Yes

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 Status:

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