Final Report

Bandsaw Safety Program – optimising new and old saws

Full Project Title

Project Code
2020-1062

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Date Submitted
16/5/2022

Published by
AMPC

Date Published
16/5/2022

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1.0 Executive Summary

The Australian meat processing sector has an unfortunate history of being one of the more dangerous sectors in Australia where injury count per hours worked is the measure deployed. The industry has developed a bandsaw safety system to reduce the severity of injury and in most cases eliminate injury. Nolan has a quandary with this solution. In order to increase employee health and mental wellbeing and to increase operational efficiency, Nolan 20 years ago invoked self-managed rotational job small working teams. This results in operational staff rotating around the four bandsaws in the boning room. How does Nolan (and staff) manage risks to staff if two bandsaws are the newer risk reduced saws and two remain older saws (as no safe saw models are available for two of the saws) and ensure operations retain the right level of cognitive awareness required for both the old and new saws during the same day.

This project has aimed at installing two new safety saws and leave two existing saws, for which a safety solution currently does not exist. Both the new and the old saws will have additional 'in your face' indication of whether they are the new or the old saw. Staff were evaluated over a period of time as to whether the safety level indicators deployed consciously reminded them of the risk level associated with each saw.

2.0 Introduction

To assess Workplace Safety around health and safety and mental well being – specifically around the use of Band Saws in a meat processing environment. A comparison was made across a number of issues relating to blade stop technology and standard band saws used in the same working environment. Whilst industry understands that blade stop technology is a safer option for operators, this project focused on operator complacency when both types of saws are used in the same environment. The project looked at implementation of and initial training of operators, adequate signage to advise operators on the degree of risk involved in comparative saws and an analysis of outcomes around operator safety. This project highlighted and further emphasised our belief that blade stop technology would increase operator complacency around the risks in the operation of a bandsaw. The project also highlighted that blade stop technology does prevent serious injury.

3.0 Project Objectives

This project evaluated how to operate a meat processing facility with a mixture of newer 'safe' saws and older style saws that do not currently have a 'safer' alternative model on the market. The outcomes will:

1. Ascertain what is the best approach to alerting an operator as to the type of saw they are using, in a conscious but non-distracting way.
2. Engage/interview operational staff in both the design of the awareness solution and success of implemented solutions as to the effectiveness of the desired outcome.

4.0 Methodology

Purchase two new ‘Safe’ saws and modify them with a suitable virtual sign. Fit virtual sings to the two older and remaining saws. Interview staff over a three-month period as to the effectiveness of the virtual signs (and alter design as applicable).

1. Purchase two new ‘Safe” saws.
2. Investigation, including staff involvement in design and purchase of virtual signs.
3. Modification of new and existing saws.
4. Evaluate the results and work with operators to determine the root cause of incidents.

5.0 Project Outcomes

This project has delivered the evaluation and learnings of utilising virtual signs for bandsaws (and by default other operations) in ensuring a non-distracting conscious awareness of operational dangers is vigilant within operational staff. The learnings are as follows.

1. Virtual signs projected onto a Bandsaw table create a distractive environment which only heightens the risk of injury.
2. Operator inclusion early in the procurement of equipment is vital to get staff buy-in.
3. When cutting certain bones (like aitch bones), the operator technique requires their hand to be quite close to the section of blade protected by the pneumatic blade guard posing no risk due to no exposed blade. This section of the blade though is protected by the visual camera which is causing some false trips.
4. Due to the Bladestop detection circuit, every time an operator leans onto a metallic surface which is bonded to the main earthing system of the building the saw will trip. This is problematic as due to the nature of a Boning room most surfaces are constructed from Stainless Steel and are bonded due to being a wash down area. Secondly, we are trying to make jobs more ergonomic by bringing the product to saw operators and taking it away with conveyors which the operators need to lean towards.
5. It has been determined the operator’s perceived risk is lower once Bladestop bandsaws are introduced into the room. This leads to further near misses and operators attempting riskier tasks.

5.1 Boning Room Lighting

The Boning Room Lighting is provided by ceiling mounted 240W LED fittings at 5000K. Our highest customer standard (which is greater than the Australian Standard) requires the lighting for inspection to be greater than 1000lux and working benches greater than 600lux. There is no requirement for Lighting colour in a Boning Room. During the design stages of our Boning Room, we elected to treat all areas as inspection to give some flexibility later if room re-arrangement was required. We currently achieve 1048lux at the bandsaw table.

5.2 Lighting Trial

Using operator feedback as a measure, we trialled different colour lighting onto the bandsaw table. See appendix 1 for photos of the 2 trials.

2000K light trial.

- The light on a clean table is visible
- By lighting up a section of table away from the work zone distracts the operator from where they should be focusing
- Slight reflectiveness could cause injury

4000K light trial.

- The light is less visible than a 2000K light on the table. (2000K is a more yellow light than the ambient lighting in the room)
- The light was slightly less distracting than the 4000K lighting
- The light was more reflective from the stainless bench when clean creating a potential risk to the operator

5.3 Build up of Fats and Proteins

Towards the end of a shift, we repeated the Lighting trial to get and understanding what the implications would be from having built up proteins on the bandsaw tables. We found once again that the 2000K light was more visible, but due to the uneven surface and different colours present (light grey, yellow, red and white) it was quite hard to view the light and text would be near impossible. See appendix 2 for photos of this trial

5.4 Text Size and Signage

We took a sample sheet of paper into the bandsaw and checked text size against readability. It was found that to achieve a readable text it would need a minimum text size of 24mm. See appendix 3 and 4 for a photo of this.

5.5 Machine Vibration

We undertook an experiment to understand what would happen when a bearing failed. This would cause a bit of vibration in the idle wheel which would extend to the light. This vibration causes the light to flicker on the bandsaw table. Operator feedback on this was that it creates another distraction for the operator.

5.6 Fault Log and Operator review

A process improvement group was formed with their focus primarily being to provide training and direction into the room, recording data on trip reasons and providing process improvements. See sample of fault logs in Appendix 5. These faults where compared to the incident and near miss reports to determine the root causes. By doing this it exposed some training opportunities and also exposed some machinery floors.

5.7 Machine Failure

There has been many faults and machine failures throughout the trial period.

1. It has been found that the on-board pc which allows you to remotely review the fault logs is not fit for purpose in a Boning room environment.

2. The drive coupling and bandsaw wheel shaft design is not “Strong enough” to take the inertia of braking the blade faster than the motor can de-accelerate.
3. The Bandsaws consistently get air pressure faults even when the pneumatic lines exceed the specifications. We have also had one maximiser failure during the warranty period.
4. The curly chord plugs kept failing creating a loose item risk in a food manufacturing process. New plugs are being trialled now.

The supplier is working through these problematic items in an attempt to get their Bandsaws to a better operating standard.

6.0 Discussion

Through trials and data analysis the following results were obtained.

1. The use of virtual signs on a high-risk piece of equipment like a bandsaw created more distraction to the operator. This lowered their concentration levels and as such providing a higher level of risk.
2. By introducing a ‘Safe’ saw into our Boning Room, it lowered the safety culture around the use of Bandsaws. Team members started becoming more complacent and in fact ended up touching the blade more regularly than a conventional saw, albeit the severity of the injury was much less.
3. The manufacturer of the saws has some work to do around the reliability of the Bandsaws and components within.

7.0 Conclusions / Recommendations

Recommendation

- Where alternate bandsaws are being used in the same environment – hard signage is recommended to enhance operator awareness around safety aspects of the saw
- Increase awareness, across industry, that blade stop technology is only an added level of PPE
- Increase awareness, across industry, blade stop technology does not eliminate risk to operators

8.0 Bibliography

Nil.

9.0 Appendices

9.1 Appendix 1

Light colour trials with different Kelvin levels

5000K light trial

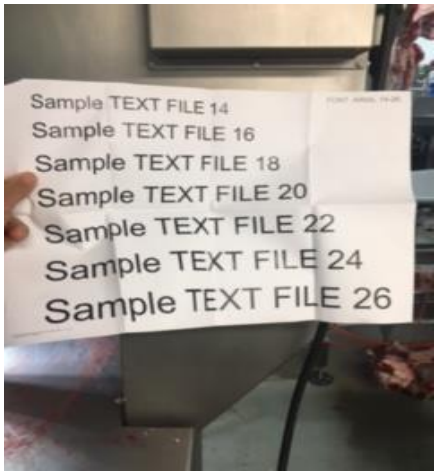
2000K light trial

9.2 Appendix 2

Bandsaw table after production showing the soiling

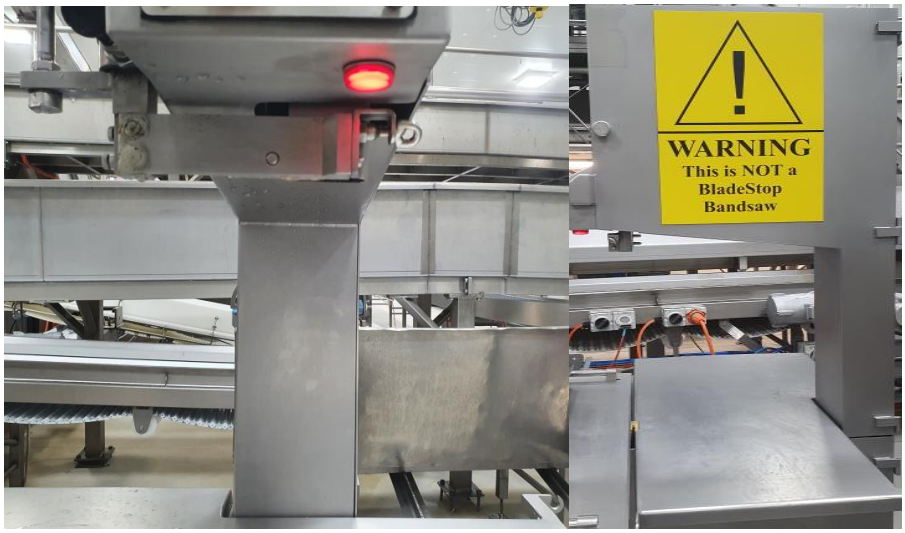
9.3 Appendix 3

Text size trial to determine visibility



9.4 Appendix 4

Installed lighting and signage to help distinguish which Bandsaw is being operated



9.5 Appendix 5

Fault Log Count for Machine 1

Air pressure low fault	43
Brake contactor fault	1
Capacitor bank charge maximum time fault	2
Critical fault cleared	2
Daily test BladeStop in 0ms, 11 trips	15
Event log cleared	2
Frame Signal Feedback Critical Fault	1
GloveCheck table slot not visible or lens obscured	8
Maintenance Warning Reset	3
Mechanism test 0 (65533ms), 0 trips	1

Motor run fault: Motor did not start/stop with signal	3
Operator strap signal lost fault	152
Safety relay tripped: door, table or bin sensor not made	54
Saw frame signal feedback fault	16
Saw motor started	1
Saw powered up: BladeStop mode selected, 0 trips	23
Trigger count corrupted: 65535 Reset to 0	2
Trigger count set to 0	9
Triggered BladeStop in 1ms, 84 trips	8
Triggered GloveCheck in 2ms, 64 trips	148