

Gamification of Beef Scribing

Remote Operations (Gamification) – Stage I

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1.0 Executive Summary

AMPC's 2020-2025 Strategic Plan has identified the following priorities for the red meat processing industry across both Advance Manufacturing and People and Culture:

- Removing staff from dangerous operations, via Hands-Off processing (Adv. Mft.),
- Carcase Primal Profitability Optimisation, via accurate processing (Adv. Mft.)
- Digitisation, via acquiring product information and leveraging data insights (Adv. Mft.),
- Attraction, via demonstration and developing a wide range of operations (People & Culture),
- Retention, via improving working conditions and making tasks exciting (People & Culture),
- Development, via developing tasks that require higher skills and intellect – operational & technical (People & Culture),
- Safety and Wellbeing, via reducing the high-risk nature of processing operations (People & Culture), are all foci of AMPC, and that this one innovation theme will aim to make a significant impact upon all seven.

Remote Operations (Gamification) – Stage I Project was launched as one of the first key steps in achieving this plan. As part of this, Virtually There Training was one of four companies commissioned to design and develop a gaming solution / proof of concept to demonstrate how gamification could positively contribute to industry. Virtually There's solution was a fully immersive virtual reality training module that taught participants the basic skills required for beef scribing. Based on the positive response from industry, it was decided to commission a second phase of the project, involving the development of a 3D interactive online version of the virtual reality Beef Rib Scribing module.

The objectives of the online project were the same as those for the VR training: to drive public engagement around potential careers in the meat processing industry; provide immediate benefits to industry through innovative training aimed at improving skills and worker health and safety; and to contribute to the future development of semi and full automation solutions for the meat processing industry. However, an online version was briefed to increase accessibility for those who did not have access to VR equipment.

The specific deliverables of the program were as follows:

- Develop a training and assessment interface for beef scribing and demonstrate the operational system to AMPC staff.
- Develop a 'gamer' option for the interface that enables competitions to be undertaken within the interface.
- Recommendations on future developments – additional target activities (e.g. meat inspection), timeframe, budget, third party inputs, expected interface.

It is envisaged that this program will deliver both immediate and future potential benefits to the meat industry, including:

1. Increased engagement and interest amongst the general public around careers in the meat industry.
2. Increased engagement by industry members around innovative approaches to deliver training to drive improved capability and better OH&S outcomes.
3. Provide a practical and immediately actionable training program for beef scribing that will improve operator capability and increase safety by providing training before the operator is placed on the floor with dangerous equipment.
4. Contribute to the development of both part and full automation solutions for meat processing in the future

2.0 Introduction

The Beef Rib Online Scribing training module is part of the **Remote Operations (Gamification) – Stage I Project** ('The Project'). Phase I of the project, completed in May 2021, involved the design and development of a fully immersive virtual reality training module that taught participants the basic skills required for beef scribing. Based on the positive response from industry, it was decided to commission a second phase of the project, involving the development of a 3D interactive online version of the virtual reality Beef Rib Scribing module.

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- Develop a 'gamer' option for the interface that enables competitions to be undertaken within the interface.
- Recommendations on future developments – additional target activities (e.g. meat inspection), timeframe, budget, third party inputs, expected interface.

3.0 Project Objectives

The objectives of this programs are:

1. to drive public engagement around potential careers in the meat processing industry;
2. provide immediate benefits to industry through innovative training aimed at improving skills and worker health and safety;
3. to contribute to the future development of semi and full automation solutions for the meat processing industry.
4. increase accessibility for those who did not have access to VR equipment.

4.0 Methodology

The Project involved four phases:

Design phase:

- Review the scribing process developed for VR and get feedback from stakeholders on any builds / improvements
- AMPC sign off on environment outline to be built

Build phase:

- Build 'carcass scoring training stage broken down into 2 stages'
 - Briefing: display carcasses showing where 4 score lines should be placed (i.e. model carcass; real carcass)
 - Practice: display 1-2 carcasses and allow participant to practice as many times as they want by tracing over pre determined 'ideal scoring lines' or free hand and seeing their score real time.

- Build 'carcass gaming' stage
 - build a gaming module that incorporates a series of time based execution challenges for carcass scoring
 - The participant is randomly presented 5-6 different carcasses and has to mark where the scribe lines should go on each.
 - 4 scribing cuts to be made on each carcass
 - 30 sec per carcass.
 - Each carcass is presented one at a time as if traveling down a boning chain.
 - Participant is scored based on the location of their cuts versus the spec (% accuracy and time to complete)
 - Participants get immediate feedback on their performance when cutting each carcass plus a total average score for all 6 carcasses.
 - The 'ideal' scribing lines can be overlaid on each carcass at the end to show the participant where they can improve

Deployment phase

- Following completion of the module, Virtually There will work with AMPC to demonstrate the technology at industry events: join innovation managers on plant visits; communication through AMPC social media channels
- Create industry collaboration hubs between AMPC, processors, and other industry bodies (i.e AUS-MEAT, AMIC, etc) to develop and deploy future training modules using VR/AR technologies.

5.0 Project Outcomes

The following outcomes were delivered at the end of the project:

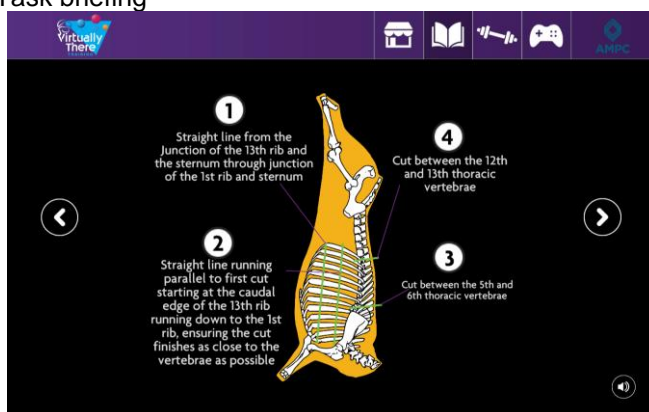
- 6.0 Wed based, 3D, interactive online beef rib scribing training module: a fully interactive training module delivered via the web and accessible on computers (i.e. widely available, low cost access)

<https://www.virtuallytherevr.com/Apps/BeefScribing/>

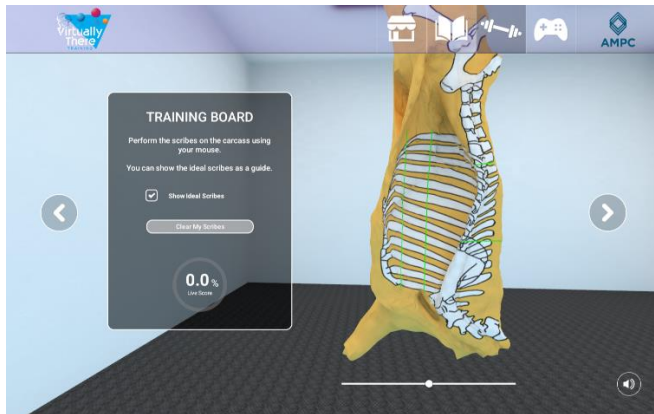
(hold alt and click to launch game in browser)

- 7.0 Training incorporated the following stages:

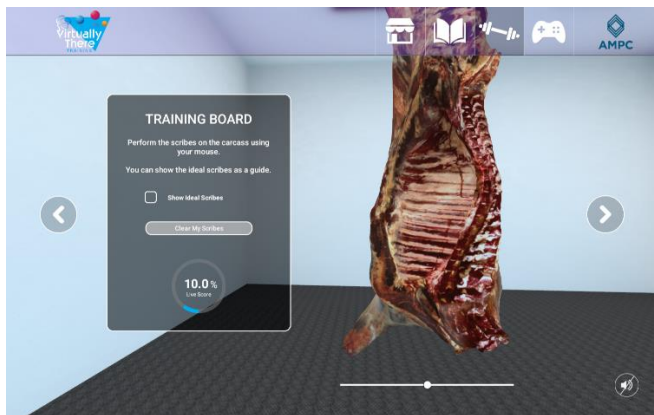
1. Task briefing



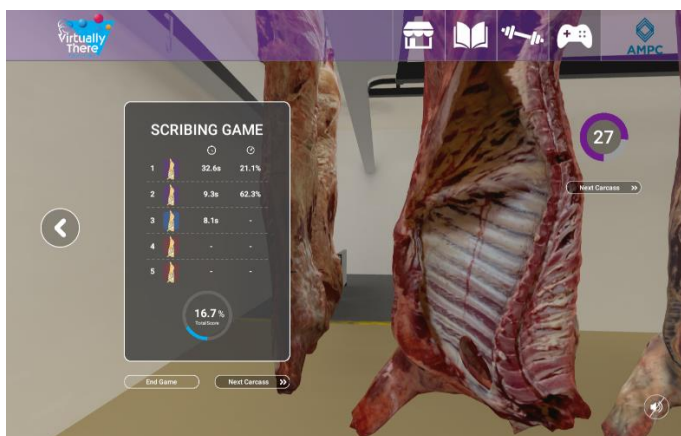
2. Carcass marking (with and without guide lines)



3. Scribing practice (with and without guide lines)



4. Scribing task (gamification): 5 carcasses, 30 seconds per carcass, scored based on accuracy against guide lines within +/- 10mm and time take.



8.0 Proposal for launch and scale of research platform

1. Host all AMPC interactive training modules on Virtually There Training management platform
2. Promote with schools, colleges, universities and non-member stakeholders
3. Small fee charged for access
4. Data collected and published
 - 8.4.1 User organisations
 - 8.4.2 Participants
 - 8.4.3 Number of sessions started
 - 8.4.4 Number of sessions completed
 - 8.4.5 Skill improvement (score change) over time
 - 8.4.6 Survey pre / post use to measure engagement and industry perception

9.0 Discussion

Immediate development and deployment of a comprehensive suite of training modules

AMPC's 2020-2025 Strategic Plan identifies both within the Advance Manufacturing and People and Culture programs that:

- Removing staff from dangerous operations, via Hands-Off processing (Adv. Mft.),
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- Digitisation, via acquiring product information and leveraging data insights (Adv. Mft.),
- Attraction, via demonstration and developing a wide range of operations (People & Culture),
- Retention, via improving working conditions and making tasks exciting (People & Culture),
- Development, via developing tasks that require higher skills and intellect – operational & technical (People & Culture),
- Safety and Wellbeing, via reducing the high-risk nature of processing operations (People & Culture), are all foci of AMPC, and that this one innovation theme will aim to make a significant impact upon all seven.

Of these, the immersive and online interactive training developed as part of the **Remote Operations (Gamification) – Stage 1 Project** has demonstrated its potential to deliver immediate benefits to industry around the key objectives of Attraction, Retention, Development and Safety.

The potential for the use of VR/AR immersive training can be seen by the level of interest and inquiry across multiple stakeholder groups since the initial demonstration at Beef2021, during multiple processor roadshows and at the recent exhibition at the Northern IMCJ Conference in Rockhampton April 2022. Specifically, the following opportunities have been identified:

- High Schools and TAFE colleges: interest in gaining access to training modules as part of their course work. (Attraction)
- Processors: interest in developing a range of modules to train existing and future workforce (Retention, Development, Safety).
- Government: interest in accessing training modules as part of their skilling up of remote workforce (meat safety)
- Community: interest from disabled workforce providers and indigenous communities to provide more flexible, engaging and intuitive training modules

10.0 Conclusions / Recommendations

The initial immersive and online interactive training programs developed under this R&D project have clearly demonstrated the potential benefits for interactive training systems for the meat processing industry. Interest from key stakeholders within the industry is high, with a number of processor initiated projects in discussion. There are a number of quick wins possible by partnering key industry players to develop a suite of training modules that meet specific training and OH&S needs of multiple stakeholders today. These modules and the data they will collect can then be used to inform and shape future automation initiatives as industry attempts to replicate dangerous and repetitive tasks through automation.

11.0 Bibliography

NA

12.0 Appendices

NA