



final report

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Robotic brisket cutter at Gundagai Meat Processors, Gundagai, NSW

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Executive Summary

The Robotic Brisket Cutting System was installed and commissioned at Gundagai Meat Processors at Gundagai, NSW, during the period of November 2010 through February, 2011. This followed installations of Brisket Cutting Systems at Peel Valley, Burrangong, and Castricum Bros in Dandenong Vic. Building on knowledge gained from these previous installations, improvements were made to:

- Tooling
- Guarding & Fencing
- Safety Mat Platforms
- Instrumentation
- Electrical design
- Process Design

The system was commissioned during January/February 2011. The agreed upon scope of work/functionality between the client and MAR was achieved. Post-install/commissioning and sign off , the client has expressed interest in making modifications to the sterilization cycle and fencing. MAR is acting upon these requests.

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1 Background

The first Automated Brisket Cutter system was developed and installed at Peel Valley Exporters in June 2008. MAR installed two Brisket Cutters in 2009 at Burrangong Meat Processors and Castricum Brothers. The system installed at Gundagai is the fourth system developed and has been in full production since the 3rd week of January.

The Automated Brisket Cutter systems being built are part of a 4 stage approach to finalising the development of fully functional automated system in preparation for commercialisation of the development.

Significant changes in design and concept have taken place and are set to continue through continuous improvement of the system design with plant variations, equipment, technology and learning's influencing each stage of the development. Upon completion of each development MAR will commercialise technology for the industry and it is estimated that a minimum of 20+ sites are the potential market for this innovation

2 Project Objectives

- MAR will further develop the robotic brisket cutter solution for the industry and satisfy the speed, accuracy, and process criteria's specified by the client.
- MAR will provide a documented Project risk assessment for review as part of the initial design of the system.
- Test and prove the solution at MAR in controlled environment via FAT prior to installation
- Implement into the processing facility a fully functional robotic brisket cutting system
- Commission and trial robot to achieve client specifications
- Train operations and maintenance staff to competency in maintaining and operating equipment.
- Provide to MLA for industry dissemination and promotional purposes full documented reports of the systems success and challenges.

3 Results and Discussion

The Robotic Brisket Cutting System was installed and commissioned at GMP, Gundagai, NSW, during the period November 2010 to February, 2011. The images in Fig. 1 and 2 show the installed system:



Fig.1 Brisket Saw installed at GMP (shown without blade attached)



Fig.2 Brisket Saw seen from cell exit

3.1. Tool Selection

The tooling selected is very similar to the tool installed at Castricum Brothers in Dandenong. This design was chosen for the following:

- Simplicity of attaching the tool to the robot
- Simplicity of use and maintenance with the spring assembly
- User-friendly for cleaning practices
- Overall weight of the tool for ease of robot load and possible removal for maintenance

The two images below show the design of the tool. Here it can be seen that leaf springs reduce the complexity of the guard-tension mechanism in comparison to the old design which incorporated a relatively complex arrangement.

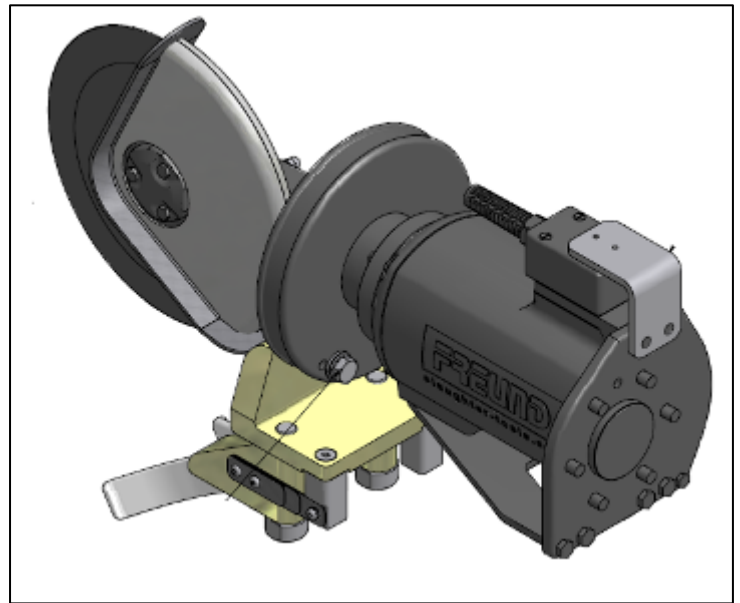


Fig.3 Brisket Saw Tool Design

3.2. Guarding Improvements

Past installations have used clear Perspex sheets attached to a Stainless Steel frame work to guard the robot cell. Issues have been experienced at Peel Valley that have seen the Perspex crack and splinter as a result of the hot water cleaning and chemicals used. This prompted MAR to move away from the Perspex sheeting and replace this with perforated stainless steel sheets which are capable of standing up to the rigorous abattoir environment. The image below shows the guarding around the cell at GMP, as can be seen the visibility into the cell with this guarding is still very good.



Fig. 4 Cell Perforated guarding installed at GMP

3.3. Safety Platforms and Mats

The Safety Platform selection is a design that has been used in recent abattoir installs by MAR. A Balluff safety mat is fixed to a stainless steel platform and secured around the edges with a stainless steel trim. The platform is then fixed permanently to the floor at an adequate height to enable proper cleaning underneath the platform.

The following figures show the Safety Platforms installed at GMP.

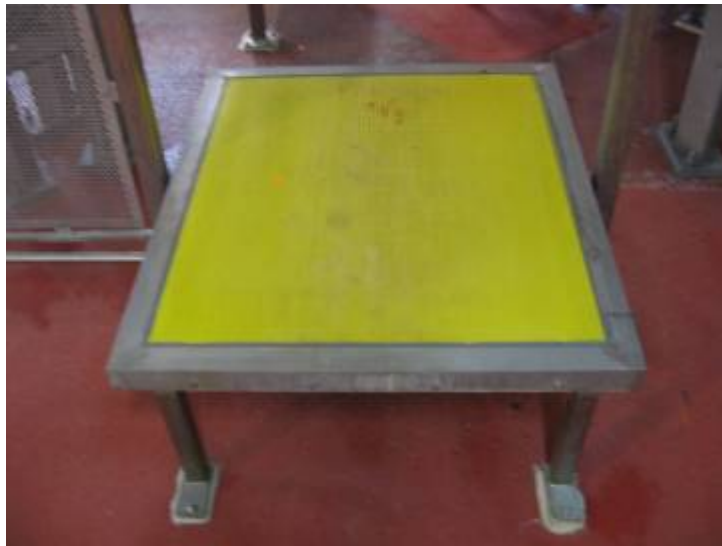


Fig. 5 Entry and exit safety mat platforms at GMP

3.4. Sensing

Due to issues with water ingress into sensors in past abattoir installs, sensors have now been placed inside enclosures to protect them from the high pressure wash down water. In addition the sensors are mounted at a higher position relative to the carcass due to gambrel design and line speed. This also assists in eliminating any erroneous readings that may be experienced due to the water and steam from the vac san tool.

The following figure shows the sensors used (in their enclosures) at GMP.



Fig. 6 Sensors mounted at GMP

4 Success in Achieving Objectives

MAR has successfully achieved the following objectives set out in Section 2 of this document.

- 1) As can be seen from the descriptions in Section 3, MAR has built on knowledge gained from past installations, and further developed and improved the Robotic Brisket Cutting Solution.
- 2) A project Risk Assessment was submitted as part of MS1 for this project.
- 3) The system was tested at MAR and then installed, tested, trialed and commissioned onsite at Gundagai Meat Processors.
- 4) Operators and maintenance staff were trained in the operation and maintenance of the system.
- 5) Status reports have been provided throughout the course of the project and this report, along with the accompanying videos and photos complete the documentation requirements for this project.

Hence this project has achieved the objectives set out in the initial agreement and GMP have signed off MAR's Site Acceptance Document. MAR is working with GMP post sign off on improving the following items:

- Improvements to Sani Vac tooling to eliminate protein build up
- Modifying the Brisket Saw sterilizing tank to combat excess steam condensation
- Modifying the fencing to eliminate carcass neck rub

5 Impact on Meat and Livestock Industry – now & in five years time

Benefits to be achieved by utilization and continued development of the Robotic Brisket Cutting System include:

- Improvements in OH&S;
 - Elimination of risk of operator strain injury from the size, weight and repetitive tasking
 - Elimination of dangerous operational practices
- Consistency;
 - Robotic mounting and control of the Brisket Cutting process improves accuracy and repeatability over manual systems
 - Improved sensing technology (laser) and software allows carcass variations to be identified providing a platform to implement variable robot positioning and paths.
- Labour cost:
 - The system will replace 1 unit of labour per shift.
- Species:
 - The Robotic Brisket Cutting System is suitable for use in lamb, sheep and goat processing

Reliability and accuracy, along with processing speed which are critical to the success and acceptance of this technology have been achieved throughout this project.

Production levels at plants such as GMP justifies the investment in a robotic system and the recent inclination for Australian processing plants to participate in robotic developments shows the trend the industry is following towards further automation. This is fuelled by acute shortages in labour supply, which will likely get worse in the future.

6 Conclusions and Recommendations

It is evident from the discussion above that the Robotic Brisket Cutting System that has been installed at Gundagai Meat Processors is a success. MAR would recommend adoption of this system in further plants.