



final report

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Robotic Front Sani Vac at Castricum Bros, Dandenong Victoria

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Executive Summary

The Front Vac San system was installed and commissioned at Castricum Bros in Dandenong Vic during the period October to December 2009. This followed installations of Vac San Systems at Peel Valley and Burrangong. Improvements were made to:

- The tooling
- Guarding
- Safety Mat Platforms
- Sensors

building on knowledge gained from the previous installations. The system was commissioned during December and was running in production until Castricum began their current production break.

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1 Background

The first Forequarter Vac San system was developed and installed at Peel Valley Exporters in June 2008, a second Forequarter Vac San system was commissioned to be developed and installed at Gundagai Meat Processors (GMP) in mid 2010, this system is a dual robot variation of the forequarter Vac San project. The installation of the Front Vac San system at Castricum Bros is the third unit contracted with MLA but has been installed prior to the GMP system due to modifications being made to the GMP plant.

The Forequarter Vac San 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 15 sites have the potential to benefit from this innovative technology.

2 Project Objectives

The objectives of this project were;

- MAR to further develop the robotic forequarter vac san solution for the industry and satisfy the speed and accuracy and process criteria's specified by Castricum Bros
- MAR to provide a documented 'project risk assessment' for review as part of the initial design of the system
- Testing and proving the solution at MAR in controlled environment via Factory Acceptance Tests prior to installation
- Implement into the processing facility a fully functional Forequarter Robotic Vac San System
- Commission and trial robot to achieve client specifications
- Train operations and maintenance staff to competency in maintaining and operating equipment.
- Provide full documented reports of the systems success and challenges for dissemination and promotion to industry.

3 Results and Discussion

The Robotic Front Sani Vac System was installed and commissioned at Castricum Bros in Dandenong Vic during October and November 2009. The images in Fig. 1 and 2 show the installed system:



Fig.1



Fig.2

Following are the main improvements that were made to the system following learning's from the installation of the Front Vac San at Peel Valley as well as installation of the Rear Vac Sans at Peel Valley and Burrangong.

- Tool modifications
- Improvements in guarding to avoid cracking
- No hinged platforms for safety mats
- Sensor modifications

3.1. Tool Modifications

Modifications made to the tool have improved the compliance of the tool thus reducing the 'pushing' effect of the tool on the carcase. This in turn has resulted in greater stability of the carcase and hence a more accurate Vac Saning process. This modification has also reduced the weight and complexity of the tool allowing the system to

- operate at a faster cycle time
- reduce the torque out errors experienced at Peel Valley
- reduce potential 'catch' points on the tool

The 'old' tool is shown in Fig.3



Fig.3

The 'new' tool is shown onsite in Fig.1 above with a closer view shown in Fig 4 below.



Fig.4

3.2. Guarding Improvements

Modifications were made to the method of securing the Perspex guarding in place. It can be seen below in Figures 5 and 6 that the guarding is retained by a 'holder' rather than a clamp allowing the Perspex the ability to expand and contract in line with temperature changes during cleaning without causing cracking. This is an improvement in the old method of holding the Perspex where it was securely bolted into position which resulted in cracking of the Perspex as it expanded and contracted due to temperature changes.



Fig.5



Fig.6

3.3. Platform Upgrades

For the previous installations at Peel Valley and Burrangong, the safety mats had been mounted onto hinged platforms. This allowed the safety mats to be relatively low to the ground and allowed them to be lifted for cleaning as shown in figures 8 and 9 below.



Fig.8



Fig.9

This has caused issues with faults occurring with the safety switches required to ensure the platform was in the lowered position before production commenced. For the installation at Castricum Bros, a change was made to mount the safety mats on fixed platforms shown in Figure 10. The platforms were raised higher off the ground to enable cleaning underneath and are fixed in position, hence avoiding the issues with safety switches previously encountered.



Fig.10

Problems were encountered however when the system went into production. The operation that follows the Front Vac San is the removal of the oesophagus, the operator performing this operation is required to throw the off cuts into the head cutter hole on the opposite side of the Front vac san system. Many of these off cuts landed on the safety mat eventually causing the mat to trip. In addition, on occasions when the head cutter failed to fully remove the head, the action of the head on the safety mat would cause it to trip.

After consultation with Castricum's management and safety officer, it was decided that the mat would be removed and additional guarding added to maintain the safety level required.

3.4. Sensing Upgrades

Due to issues with water ingress into sensors on installations at Peel Valley and Burrangong, sensors have now been placed inside enclosures, as shown in Figure 12 below, 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 will also assist in eliminating any erroneous readings that may be experienced due to the water and steam from the vac san tool.



Fig.12

4 Success in Achieving Objectives

MAR successfully achieved the 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 at Peel Valley and Burrangong and further developed and improved the Robotic Forequarter Vac San solution.
- 2) MAR has achieved the speed accuracy and process criteria specified by Castricum Bros.
- 3) A project Risk Assessment was submitted as part of MS1 for this project.
- 4) The system was tested at MAR and then installed, tested, trialled and commissioned onsite at Castricum Bros.
- 5) Operators and maintenance staff were trained in the operation and maintenance of the system.
- 6) Status and Milestone 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.

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

Benefits to be achieved by utilization and continued development of the Robotic Front Vac San System include:

- Improvements in OH&S;
 - Reduction of risk to operator strain of injury from the size, weight and repetitive tasking
 - Removal of dangerous operational practices
- Consistency;
 - Robotic mounting and control of the Sani Vac process improves accuracy and repeatability over manual systems
 - Improved sensing technology (laser) and software allows carcase 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.
- Line Speed:
 - The system can operate at line speed >10 carcasses/min.
- Species:
 - The Front Sani Vac 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 Peel Valley 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 Front Vac San system that has been installed at Castricum Bros is a success and MAR would recommend adoption of this system in further plants.