



final report

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MAR bung evacuation tool trials

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Abstract

Recent tool trials conducted under “P.PIP.0157” to evaluate a pork de-bunging tool for use in the Australian Lamb Industry highlighted potential benefits available if a tool could be manufactured to remove/evacuate bung colon faecal contents.

Unfortunately those trials proved that the evacuation process of the de-bunging tool did not empty the colon to a satisfactory level as it does for pigs.

The intention of this trial was to manufacture a bung evacuation tool, connect to the de-bunging tool evacuation system on trial at Gundagai Meat Processors and to evaluate its efficiency for conducting this process.

Trials completed under this project proved inconclusive, however based upon the potential benefits to be gained further modifications to the tool and further trials are being completed with the assistance of Gundagai Meat Processors outside the scope of this project to further evaluate the concept.

The potential benefits that could be attained should a suitable evacuation tool be developed include:

- Elimination of consumables currently used to seal the bung colon, (paper, plugs, clips)
- Potential to automate the bung evacuation process
- Reduced labour by 1 operator per working shift if system is automated
- Reduced contamination compared to current practices
- OH&S – reduced injuries and accidents
- Improved processing efficiencies with less rework due to consistent and repeatable operations

Executive summary

Currently MAR is evaluating possible manually operated and automated solutions to perform the following small stock slaughter process operations.

- Bung Cutting (ringing)
- Bung Evacuation

Recent tool trials conducted under “P.PIP.0157” to evaluate a pork de-bunging tool for use in the Australian Lamb Industry highlighted potential benefits available if a tool could be manufactured to remove/evacuate bung colon faecal contents.

The purpose of project “P.PIP.0157” was to assess the suitability of the pig de-bunging tool manufactured by Freund Germany to be used for sheep processing. Participating plants that agreed to take part in the project both by offering a trial site location and funding were Gundagai Meat Processors and Wammco Katanning.

The scope of that project was only to test the pig off-the-shelf tool but one of the outcomes revealed that a modified design of this tool or a separately designed tool could be developed to remove sheep pellets as these trials proved that the evacuation process of the de-bunging tool did not empty the colon to a satisfactory level as it does for pigs.

The intention of these trials was to manufacture a prototype bung evacuation tool, connect to the pork de-bunging tool evacuation system on trial at Gundagai Meat Processors and to evaluate its efficiency for conducting this process.

MAR manufactured a prototype tool and with the assistance of Gundagai Meat Processors this tool was then tested on their processing floor. Initially trials were completed using the Freund Bung Cutter tool vacuum system before different setup combinations were trialled using other vacuum systems and modifying the tool over a number of weeks.

Trials completed under this project proved inconclusive, however based upon the potential benefits to be gained further modifications to the tool and further trials are being completed with the assistance of Gundagai Meat Processors outside the scope of this project to further evaluate the concept.

The potential benefits that could be attained should a suitable evacuation tool be developed include:

- Elimination of consumables currently used to seal the bung colon, (paper, plugs, clips)
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1 Background

1.1 Industry Consultation

MAR discussions with industry have highlighted valid benefits of evacuating the bung rather than plugging, clipping or tying the colon as per current practices.

1.2 How did the project “come about”?

Trials conducted under “P.PIP.0157” indicated that the evacuation process of the de-bunging tool is not emptying the colon to a satisfactory level. The scope of that project was only to test an off-the-shelf tool developed for pig slaughtering. One of the outcomes revealed that a modified design of this tool or a new separate tool could be developed to remove sheep pellets from the colon.

1.3 What currently happens and why does it need changing?

No manually operated tool or automated solution is available for sheep processing.

Development of a manually operated tool or automation solution for evacuating the bung will eliminate the following;

- requirement of skilled labour
- use of consumables such as clips, plugs and paper to plug colon currently
- contamination through spilled bung contents
- retain work and rework effecting yield

1.4 What alternatives have been investigated or are available?

The combined bung cutter and evacuation tool used for pig processing has been trialled with limited success with regards to bung evacuation. MLA along with Fletcher's did develop a urine evacuation system in the past but not a faecal evacuation system.

1.5 What happens in other industries?

Hand tools and automated systems are currently available for pig processing using a de-bung tool.

1.6 Experimentation / Investigation work to date

Trials conducted under “P.PIP.0157” to evaluate a pork de-bunging tool for use in the Australian Lamb Industry.

1.7 Potential Benefits

The potential benefits that could be attained should a suitable evacuation tool be developed include:

- Elimination of consumables currently used to seal the bung colon, (paper, plugs, clips)
- Potential to automate the bung evacuation process
- Reduced labour by 1 operator per working shift if system is automated
- Reduced Contamination compared to current practices
- OH&S – reduced injuries and accidents
- Improved processing efficiencies with less rework due to consistent and repeatable operations

2 Project objectives

The intention of these trials was to manufacture a prototype bung evacuation tool, connect it to the pork de-bunging tool evacuation system on trial at Gundagai Meat Processors and to evaluate its efficiency for conducting this process.

Outlined Objectives

- Purchase of materials, build and setup of bung evacuation tool for trials
- Test the manually operated tool on a processing line utilising equipment installed on-site for the current bung cutter trials
- Document and video the trials

3 Methodology

3.1 Project Progression

After initial manufacture and setup of the tool at MAR Silverwater, equipment was delivered to Gundagai Meat Processors where representatives from MAR and Gundagai Meat Processors setup the equipment for testing.

A series of tests and trials were completed over a number of weeks with the following variables:

- Initial prototype tool design
- Modified tool design to include larger diameter throat
- Use of Freund (Bung Cutter) vacuum system
- Use of GMP installed Vac San vacuum systems
- Various hose lengths and diameters
- Tool setup prior to final puller
- Tool setup prior to Bung Cutter and after final puller
- Tool setup in the Bleed Conveyor area
- Water flushing off/on and at various flow

Trials completed under this project proved inconclusive, however based upon the potential benefits to be gained further modifications to the tool and further trials are being completed with the assistance of Gundagai Meat Processors outside the scope of this project to further evaluate the concept.

Throughout the process of these trials MAR received assistance from Gundagai Meat Processors during setup, equipment testing and performing modifications to the tool on-site as required.

As of April/May 2009 Gundagai Meat Processors will continue to trial modified versions of the evacuation tool in the coming months with input from MAR to further evaluate this potential process improvement for the industry.

MAR greatly appreciate and would like to thank GMP for their input and assistance with this project

3.2 System Setup at GMP

Components for the test system included:

- MAR Freund Vacuum System (on trial at GMP for Bung Cutter Operation)
- GMP installed Vac San Vacuum System
- MAR designed and manufactured Bung Evacuation Tool
- Various combinations of hose pipes, clamps and connectors



The above equipment was installed at GMP for the trials and reconfigured during different stages of the trials.

4 Results and discussion

4.1 General discussion

MAR manufactured a prototype tool with the assistance of Gundagai Meat Processors where this tool was tested on the processing floor.

Initial trials were completed using the Freund Bung Cutter tool vacuum system. Before different setup combinations were trialed using other vacuum systems and modifying the tool over a number of weeks.

The above trials were completed to address and answer the following:

- Can a manually operated vacuum tool be developed to sufficiently remove pellets from the bung
- Is current Freund vacuum system installed on trial GMP capable
- Can the process be completed at rates to maintain production requirements
- If manual tool can be developed, what is the potential for automation of this process



Indication of bung contents/pellets

Trials completed under this project proved inconclusive, however based upon the potential benefits to be gained further modifications to the tool and further trials are being completed with the assistance of Gundagai Meat Processors outside the scope of this project to further evaluate the concept.

Details from the results of these trials follow.

4.2 Bung Evacuation Trials

After initial manufacture and setup of the tool at MAR Silverwater, equipment was delivered to Gundagai Meat Processors where representatives from MAR and Gundagai Meat Processors setup the equipment for testing.

- Sam Barton – GMP
- Peter McDonald – GMP
- Stuart Shaw – MAR
- Harry Schulz – MAR

Trials were conducted to test the Bung Evacuation System prior to the Bung Cutter Process and Evisceration. A series of tests and trials were completed over a number of weeks with the following variables:

- Initial prototype tool design
- Modified tool design to include larger diameter throat
- Use of Freund (Bung Cutter) vacuum system
- Use of GMP installed Vac San vacuum systems
- Various hose lengths and diameters
- Tool setup prior to final puller
- Tool setup prior to Bung Cutter and after final puller
- Tool setup in the Bleed Conveyor area
- Water flushing off/on and at various flow

The above combinations were used to find a good balance between:

- Sufficient vacuum to remove pellets
- To avoid vacuum lock between tool and colon
- To avoid colon collapse and prevent colon blockage
- To ensure sufficient flow in pipe system to continuously operate
- Ensure sufficient pellets are removed (colon empty)
- Ideal carcass position/orientation to remove pellets

Generally the equipment was setup at the start or end of production breaks and scheduled process line stoppages. This procedure was followed to avoid production delays and because some equipment used for the trials is used for other process operations, such as the vacuum system.

Generally approximately thirty carcasses were processed prior to equipment having to be relocated for production.

The evacuation hose between the tool and the vacuum system was constantly monitored for faecal material. Upon completion of each test run the bungs were inspected in the evisceration trays.

On most occasions it was apparent that suction system was not effective.

The following images show the trials in progress at GMP at various stages.



small tool diameter prior to final puller



small tool diameter prior to final puller



med tool diameter after final puller



med tool diameter after final puller with water flushing on



med tool diameter after final puller



Bung evacuation tool connected



shortened large diameter tool on bleed rail



shortened large diameter tool on bleed rail

Reference to Videos:

PPSH0443 MAR BungEvacuationToolTrials.mpg

5 Success in Achieving Objectives

5.1 Objectives for Bung Evacuation Tool Trials

MAR has completed the following objectives as initially agreed within the project scope

- Purchase of materials, build and setup of Bung Evacuation Tool for trials
- Test the manually operated tool on a processing line utilising equipment installed on-site for the current bung cutter trials
- Document and video the trials

With the assistance from GMP the following additional test and trials were completed adding to the original project scope:

- Modifications to the Bung Evacuation Tool (x 4)
- Installation of tool to Vac San Vacuum system (three locations on the processing floor)
- Additional installation and reinstallation of services such as water flushing

6 Impact on industry

6.1 Impact of Trials – now and in five years time

Trials completed under this project proved inconclusive, however based upon the potential benefits to be gained further modifications to the tool and further trials are being completed with the assistance of Gundagai Meat Processors outside the scope of this project to further evaluate the concept.

MAR and GMP remain confident that an evacuation system can be developed to successfully evacuate faecal material from the bung colon.

The learning gained from this project has provided a valuable step to foresee this development and the industry will see benefits should a tool be developed hopefully within the coming 3-6 months.

7 Conclusions and recommendations

7.1 Conclusions

The intention of the trials to test the feasibility of a bung evacuation tool fitted to a standard Freund Vac System used for the Bung Cutting tool.

Trials completed under this project proved inconclusive with results on most carcasses indicating that the evacuation process did not empty the colon to satisfactory levels.

However based upon the potential benefits to be gained further modifications to the tool and further trials are being completed with the assistance of Gundagai Meat Processors outside the scope of this project to further evaluate the concept.

Key issues that require addressing:

- Avoid vacuum lock between tool and colon
- Avoid colon collapse and prevent colon blockage
- To ensure sufficient flow in vac pipe system that provide continuous operation
- Determine ideal carcass position/orientation on processing line to remove pellets

- Ergonomics in tool design to provide maximum comfort, efficiency, safety, and ease of use

MAR and GMP remain confident that an evacuation system can be developed to successfully evacuate faecal material from the bung colon.

7.2 Recommendations

Should a successful tool design be realised the following options for the next stage in development of this process are:

Option 1: Development of new combined bung cutting and bung evacuation tool specifically designed for the lamb/sheep industry.

Option 2: Development of a production ready bung evacuation tool for manual process operations.

Option 3: Development to automate both operations “Bung Cutting” and “Bung evacuation” with the use of the bung cutter tool and a developed bung evacuation tool.

MAR will seek interest from MLA and industry process partners to develop a fully functional robotic bung evacuation system should a successful tool design be realised with the intention to have a fully functional automated system developed and installed by MAR within 12-24 months.