



# final report

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Prepared by: Stuart Shaw  
Machinery Automation &  
Robotics Pty Ltd  
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## Bung Cutter – Stage 1

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## 1 Project Background

The Technology European tour that took place in November 2006 with MLA and several Australian Processors served, among other things, to illustrate how current technology can deliver clever solutions to automate manual tasks. An example of that is bung cutting, which is the process of evacuating faecal material from the colon and to free the bung from its natural attachments.

Under that tour, representatives of the Australian plants participating in this project had the opportunity to witness a robotic bung cutting tool for pigs running under normal operational conditions at high speeds at a pig processing plant in Germany. This system had been developed by BANSS, adapting a manual tool used for de-bunging pigs to a robot, and using 3D laser profiling technology.



*Hand tool, part of the pig de-bunging system*

The natural question that followed was whether that approach could be used to automate the same de-bunging task in sheep processing. In particular, the very first question to answer is whether the manual tool for pigs (that had been integrated with the robot) would give satisfactory results when used with sheep, as the current practices used for sheep is much simpler but requires more physical effort and interaction from the operator thus not being suitable to automate the task.

The purpose of this project was to assess the suitability of the pig tool to process sheep, by testing it in two different Australian operations. The participating plants “Gundagai Meat Processors and Wammco Katanning” will test the equipment under normal operational conditions and will provide feedback on what satisfaction level the equipment achieved and performed under test and trial to be conducted with the assistance of Machinery Automation & Robotics.

If results from the trials prove positive the next progression of the development would be the integration of the bung cutter equipment to a robot as a step to produce a fully automated system.

## 2 Project Summary

The purpose of the MLA funded project was to assess the suitability of the pig de-bunging tool manufactured by Freund Germany to be used for sheep processing,

The trials were to be completed in two different Australian processing plants.

The participating plants that agreed to take part in the project both by offering a trial site location and funding where:

- Gundagai Meat Processors
- Wammco Katanning

Machinery Automation and Robotics agreed to participate in the trials by means of additional funding, overseeing the project and arranging the following components to be completed:

- Purchasing of equipment
- Installation of Bung Cutter Equipment – site 1
- Installation of Bung Cutter Equipment – site 2
- Bung Cutter Equipment Trails
- Presentation Video, Documentation

Funding for the project was split between Gudagai, Wammco, Machinery Automation & robotic, AMPC and MLA.

- Wammco Intl               \$8,370
- Gundagai Meat Processors   \$8,370
- AMPC                     \$16,740
- MAR                      \$16,740
- MLA                      \$50,220

It should be noted that to date MAR have contributed more funding and resources to this project than other parties involved based upon the work completed, investment in the hardware for the trials and contribution funds to the project..

### 3 Project Progression

Initially trials where conducted at Wammco in November 2007 after some delays in getting the bung cutter equipment delivered from Europe.

The equipment was setup by MAR at our Silverwater workshop to ensure correct operation of the equipment prior to shipment to Wammco in WA. Trials where then completed by Harry Schulz, operating as an industry expert for MAR at Wammco. A full report on these trials was issued in Feb 2008 and can be found in “Section 4: Bung Cutter Stage 1 Trials – Wammco” of this report. The basic conclusions of the initial trials were as follows:

- It was very obvious from the trials conducted that the bunging operation performed with the Freund Bung Dropper unit does have potential for future manual and/or automated operations in the Australian lamb/sheep industry.
- The bung cutter operation worked well and provided excellent freeing capabilities with no pulling required, however the evacuation operation of pellets from the colon was insufficient and did not empty the bung.
- Discussions with Harry Schulz (MAR), Tony Bessell and Nigel Aitkin (Wammco) at the completion of the trials concluded that suggested future alterations to the equipment should be perused to incorporate a successful suction application in the tool.

Upon completion of the trials, further evaluations and discussions were held between MAR, Freund, MPS, BANSS and Gundagai Meat to review the findings of the trials.

Discussion with Gundagai noted that they had also trialled some similar equipment with comparable results in relation to bung evacuation and removal of pellets, however the trials conducted at Wammco provided much more favourable results in relation to the bung cutting operation. Gundagai provided images and information relating to these trials to MAR for our review.

It was clear from the results of trials conducted at Wammco that we had the following two actions for consideration:

Action 1: Relocate the bung cutter equipment from Wammco to Gundagai in NSW and continue with trials to meet the objectives initially set out in the project

OR

Action 2: Evaluate further what possible solutions are available to improve the bung colon evacuation requirements seen at Wammco and Gundagai.

To do this would require additional time and resources to be applied to the project by MAR and would delay the project further, however it was determined to be the better course of action as a suitable result here would benefit the industry as a whole and provide an automation opportunity that has better overall payback capabilities.

To find a solution to the evacuation process of the de-bunging tool not emptying the colon to a satisfactory level MAR initially reviewed the tools operations with Freund and users of the tool in the pig industry in Europe.

The conclusion of this investigation resulted in the following:

- Freund informed us that the current tool design may not be suitable for the removal of pellets from sheep and lamb bungs.
- Freund agreed to investigate what modifications if any could be done to the tool to suit the requirements.
- The operation of the bung cutter's actual cutting and separation action maybe compromised with any modifications to the evacuation system are achieved, EXPLAIN THIS.



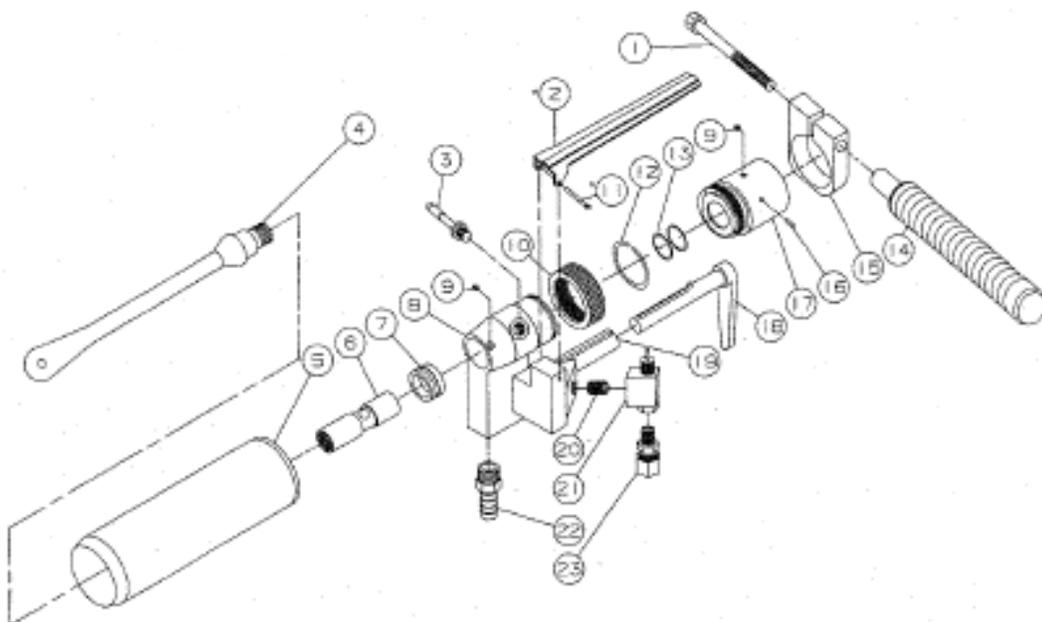
Indication of bung contents/pellets



Bung Cutter tool used in trials

MAR continued with our investigations and after some months of communications with the tool manufacturer with no successful outcome the following was concluded;

- No modifications to the current tool design would allow for pellet removal from the colon due to the size of the pellets and size restrictions within the tool components.
- The design and size of components within tool would not allow a clear unrestricted path of adequate size and minimal obstructions for vacuum evacuation of pellets.
- Even if the tool was able to be modified to allow removal of pellets, the actual operation of the bung cutting would be compromised. It should be noted that the tool relies upon a vacuum lock on the colon to pull the colon tight and position for cutting.
- Only a new design would allow the tool to perform successfully both operations, bung cutting and pellets evacuation. Although those design changes would have to be analysed in detail to take into account all the implications, a proposed alternative design would be one where the pilot pin (item 4 in the diagram below), is pierced (at the base, the tip or a point in between) with a hole big enough to evacuate sheep pellets, and an adequate conduct is provided, probably along the central axis of the tool, in order to facilitate that evacuation.



Freund EDF51 Bung Cutter Tool

ITEM	PART NO.	PART NAME	QTY	ITEM	PART NO.	PART NAME	QTY
1	1065543	Hex Head Screw	1	16	1010466	Dowel Pin	1
2	1018101	Lever	1	17	1061290	Adapter (includes 2)	1
3	1054081	Shaft Locking Screw	1			Item 9 and (11 item 18)	
4	1010242	Pilot Pin, without water	1	18	3018033	Trigger, without water	1
	1010458	Pilot Pin, with water			3018045	Trigger, with water	
5	3023018	Blade, 1 1/4 inch I.D.	1	19	1008091	Valve Sleeve	1
	3023019	Blade, 1 1/4 inch I.D.		20	1065865	Hex Pipe Plug	1
	3023020	Blade, 2 inch I.D.			1061061	Close Nipple	1
	3023023	Blade, 2 1/4 inch I.D.		21	1022073	Control Valve	1
6	1020156	Cutter Shaft	1	22	1060287	Barbed Fitting	1
7	1021277	Bearing	1	23	1060264	Connector	1
8	3016163	Shaft Housing	1		3016162	Housing and Valve	
		(includes items 7-10,				without water (includes	
		13 and 19)				items 3, 7-10, 12, 13,	
9	1038016	Grease Fitting	3		3016165	Housing and Valve	
10	1011191	Housing Coupling	1			with water (includes	
11	1045003	Rivet	1			2, 3, 7-13 and 19-23)	
12	1013173	Retaining Ring	1		3022095	Water Valve Package	
13	1035165	O-ring	2			(includes items 2, 11,	
14	1019099	Handle	1			20, 21 and 23)	
15	1042139	Handle Bracket	1		047 004 002	Grease Gun	

During our investigations and when a clear indication of modifications required was not apparent MAR had asked Wammco to send back the hand tool to our Sydney workshop for further analysis. The objective here was to review the tool design internally to confirm the findings of Freund and or perform any modifications deemed suitable for further trial of the tool.

The following images show the tool piece and various disassembled conditions after return of the tool from Wammco to MAR.



internal view of pistol piece



disassembled tool



Internal view of pilot pin



side view of pilot pin showing vac holes

The images above and the disassembled tool drawing show clearly that the tool has insufficient vacuum ability to extract full pellets from the colon in its current configuration.

Each of vacuum holes on the pilot pin are accurately positioned and sized to create a vacuum to hold the colon in position and to perform the cutting operation with minimal fluid evacuation from the bung as required and designed for application on pigs.

After consideration and discussions with MLA a decision was made to complete this report and offer to all parties for their consideration and feedback with respect to the outcome of these trials.

## **4 Current status of project**

The purpose of this report is to obtain feedback from participating parties involved in the project to establish a clear direction for the future of this project and any further trials and testing to obtain a suitable bung cutting and evacuation tool for the Australian lamb and sheep industry.

MAR can offer the following directions for this development work and are happy to discuss further with all involved to find the most suitable solution.

### **Options to continue existing project:**

- Option 1: Relocate the bung cutter equipment from Wammco to Gundagai in NSW and continue with trials to meet the objectives initially set out in the project
- Option 2: MAR will consider any design options and modifications possibly put forward by other parties to suit the current tool design and employ these modifications for further trials at either Wammco or Gundagai should the modification fall within a reasonable budget.
- Option 3: Termination of project upon agreement of finances

### **Options for next stage development:**

- Option 1: Development of new combined bung cutting and bung evacuation tool specifically designed for lamb/sheep industry. This option would require the use of additional resources.
- Option 2: Use current bung cutter tool for Manual Bung Cutting operation only
- Option 3: New project scope to automate both operations “Bung Cutting” and “Bung evacuation” with the use of the existing tool for cutting operations and the development of a suitable vacuum evacuation tool for integration onto an automated system.
- Option 4: Should a solution be found to modify the existing tool and further successful trials are completed, the tool can then be used for manual operations and the next stage would then be to integrate the existing tool for automation of the “Bung Cutting” and “Bung evacuation” processes.

MAR appreciate the patience of all involved parties and apologise for the delays in reaching the current conclusion.

As an organisation applying significant resources to the development of new technologies in the red meat industry MAR is dedicated to finding the correct solution to this and other difficult applications.

We trust that a suitable direction can be agreed upon for all parties and look forward to your feedback.

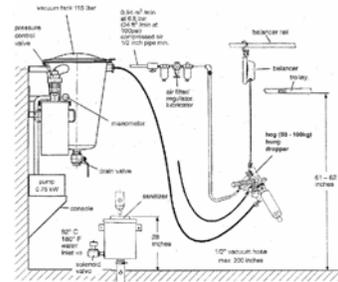
## 5 Bung Cutter Stage 1 Trials - Wammco

The first of the Bung Cutter Trails took place at Wammco Katanning WA.

### Site 1 Trials Conducted at Wammco - Katanning (Nov 2007)

Harry Schulz represented MAR for the purpose of the trails with the following main objectives set out for the initial setup and trial of the equipment:

1. Installation & Setup Bung Cutter Equipment
  - a. Position and secure vacuum system in suitable location.
  - b. Position and secure Sanitiser in suitable location
  - c. Mount overhead counter balance and fix bung cutter tool if required
  - d. Connect Power, Air and Water.
  - e. Check Pump Operations
  - f. Check and fill if necessary Oil levels
    - i. Compressed Air Lubrication
    - ii. Vacuum system oil (SAE 10 high detergent oil)
  - g. Fit bung cutter tool (eg 44mm)
2. Note current manual operations
3. Check operation of Bung Cutter (referring to operating instructions EDF51)
4. Perform test and trials of Bung Cutter Operations
5. Catalogue all tests with written notes, videos and photos noting number of carcasses time dates, operator and equipment settings.
6. Note operational performance
7. Note Equipment functionality (Vacuum, Filters, Tool Size, Noise etc)
8. Review Bung Cutter operations
9. Perform Limited number Bung Cutter operations and compare against manual operations currently used at plant
10. Run limited production using bung cutter
11. If bung cutter operation not sufficient review possible improvements required (Vac settings, tool size, procedure and repeat test.)
12. Note operational cycle time per carcass plus sterilisation procedures etc.
13. Catalogue feedback from production staff, Inspectors, operators etc.
14. Review requirements for permanent manual operations (location of equipment etc)
15. Review requirements for possible automated bung cutter operations via robot noting the following;
  - a. Location on-line
  - b. Floor space available
  - c. Carcass orientation
  - d. Heights and positions of carcass, bung area, rails, walls, etc...
  - e. Heights and positions of adjacent equipment and operations
  - f. Speed of operations (line speed, bung operation speed, sterilisation)
  - g. Catalogue, photos, floor plan drawings, and notes.
16. Discuss outcome with Plant Engineers, Maintenance, Operators, Production etc...



**The current manual operation notes:**

- Use a hook to pull the bung up slightly to put tension on the tissue around the rectum.
- Making a circular cut around the rectum, ensure that all pelvic attachments are freed.
- Allow the bung to drop down into the anal cavity.

**5.1 Installation & Setup:**

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All equipment was set in place at the current manual bunging operation position, after reversion of the carcass (i.e. hanging by the back legs.) and prior to evisceration.

**5.2 Day 1 Trials:**

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- Twelve trials were carried out during normal production.
- Any stoppages did not relate to operator speed using the new equipment, but to check the results.
- The chain speed during all trials remained at a constant 7.8 seconds per carcass.
- Animals being processed were a good mixture of Breed, Sex & Age.
- Prior to bunging, the tail was removed to comply with customer specification.
- With the tail off, the circular blade became caught on the bone where the tail was docked, making it slightly difficult.
- After the first two trials the tails were left on, and the procedure was much easier.
- Removal of tails was relocated to after bunging.
- Some difficulty was experienced in the early trials with using the new equipment resulting in not completely severing all pelvic attachments therefore making it difficult to pull the bung down to commence evisceration.
- The pressure asserted to pull the bung resulted in some urine spillage.
- This problem was totally rectified when operator competence and ability was achieved.
- The early "Empty Colon" results were not achieved by the suction system in the tool, but must have been empty prior to slaughter with animals being off feed for some time.
- The Vacuum tank emptied to prove this.
- The suction unit had no effect on any full colons.
- Operator 1 Steven Shoo, Assistant Slaughter Floor Manager Wammco
- Operator 2 Ces Ell, Slaughter Floor Manager Wammco



**Results of Trials Conducted – DAY 1:**

Trial 1. 5 Carcasses Operator 1

Carcass 1. Not sufficiently freed, difficult to pull. Colon was empty  
Carcass 2. Not sufficiently freed, difficult to pull. Colon was empty  
Carcass 3. Sufficiently freed, easy to pull. Colon was not empty  
Carcass 4. Not sufficiently freed, difficult to pull. Colon was empty. Urine Spillage.  
Carcass 5. Sufficiently freed, easy to pull. Colon was not empty.

Trial 2. 5 Carcasses Operator 1

Carcass 1. Not sufficiently freed, difficult to pull. Colon was empty. Urine Spillage.  
Carcass 2. Sufficiently freed, easy to pull. Colon was not empty.  
Carcass 3. Not sufficiently freed, difficult to pull. Colon was empty.  
Carcass 4. Not sufficiently freed, difficult to pull. Colon was empty. Urine Spillage.  
Carcass 5. Not sufficiently freed, difficult to pull. Colon was empty. Urine Spillage.

Trial 3. 5 Carcasses Operator 1

Carcass 1. Not sufficiently freed, difficult to pull. Colon was empty. Urine Spillage.  
Carcass 2. Not sufficiently freed, difficult to pull. Colon was empty.  
Carcass 3. Not sufficiently freed, difficult to pull. Colon was empty.  
Carcass 4. Not sufficiently freed, difficult to pull. Colon was not empty.  
Carcass 5. Not sufficiently freed, difficult to pull. Colon was empty. Urine Spillage.

Trial 4. 5 Carcasses Operator 1

Carcass 1. Not sufficiently freed, difficult to pull. Colon not was empty.  
Carcass 2. Not sufficiently freed, difficult to pull. Colon was empty.  
Carcass 3. Not sufficiently freed, difficult to pull. Colon was not empty.  
Carcass 4. Sufficiently freed, easy to pull. Colon was empty.  
Carcass 5. Not sufficiently freed, difficult to pull. Colon was empty.

Trial 5. 5 Carcasses Operator 1

Carcass 1. Sufficiently freed, easy to pull. Colon was not empty.  
Carcass 2. Not sufficiently freed, difficult to pull. Colon was not empty.  
Carcass 3. Not sufficiently freed, difficult to pull. Colon was not empty.  
Carcass 4. Not sufficiently freed, difficult to pull. Colon was not empty.  
Carcass 5. Not sufficiently freed, difficult to pull. Colon was not empty.

Trial 6. 6 Carcasses Operator 2

Carcass 1. Well freed, very easy to pull. Colon was not empty.  
Carcass 2. Not sufficiently freed, difficult to pull. Colon was not empty.  
Carcass 3. Well freed, very easy to pull. Colon was not empty.  
Carcass 4. Well freed, very easy to pull. Colon was not empty.  
Carcass 5. Well freed, very easy to pull. Colon was not empty.  
Carcass 6. Well freed, very easy to pull. Colon was not empty.

Trial 7. 6 Carcasses Operator 2

- Carcass 1. Well freed, very easy to pull. Colon was not empty.
- Carcass 2. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 3. Well freed, very easy to pull. Colon was not empty.
- Carcass 4. Well freed, very easy to pull. Colon was not empty.
- Carcass 5. Well freed, very easy to pull. Colon was not empty.
- Carcass 6. Excellent freeing, no pulling required. Colon was empty.

Trial 8. 6 Carcasses Operator 2

- Carcass 1. Not sufficiently freed, difficult to pull. Colon was not empty. Urine Spillage.
- Carcass 2. Well freed, very easy to pull. Colon was not empty.
- Carcass 3. Well freed, very easy to pull. Colon was empty.
- Carcass 4. Well freed, very easy to pull. Colon was not empty.
- Carcass 5. Well freed, very easy to pull. Colon was not empty.
- Carcass 6. Excellent freeing, no pulling required. Colon was empty.

Trial 9. 10 Carcasses Operator 2

- Carcass 1. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 2. Well freed, very easy to pull. Colon was not empty.
- Carcass 3. Well freed, very easy to pull. Colon was not empty.
- Carcass 4. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 5. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 6. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 7. Well freed, very easy to pull. Colon was not empty.
- Carcass 8. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 9. Well freed, very easy to pull. Colon was not empty.
- Carcass 10. Excellent freeing, no pulling required. Colon was empty.

Trial 10. 10 Carcasses Operator 2

- Carcass 1. Sufficiently freed, easy to pull. Colon was not empty.
- Carcass 2. Well freed, very easy to pull. Colon was not empty.
- Carcass 3. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 4. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 5. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 6. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 7. Well freed, very easy to pull. Colon was not empty.
- Carcass 8. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 9. Well freed, very easy to pull. Colon was not empty.
- Carcass 10. Well freed, very easy to pull. Colon was empty.

Trial 11. 10 Carcasses Operator 2

- Carcass 1. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 2. Well freed, very easy to pull. Colon was not empty.
- Carcass 3. Well freed, very easy to pull. Colon was not empty.
- Carcass 4. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 5. Well freed, very easy to pull. Colon was not empty.
- Carcass 6. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 7. Well freed, very easy to pull. Colon was not empty.
- Carcass 8. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 9. Well freed, very easy to pull. Colon was not empty.
- Carcass 10. Well freed, very easy to pull. Colon was not empty.

Trial 12. 10 Carcasses Operator 2

- Carcass 1. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 2. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 3. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 4. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 5. Well freed, very easy to pull. Colon was not empty.
- Carcass 6. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 7. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 8. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 9. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 10. Excellent freeing, no pulling required. Colon was not empty.

**Summary of Trials Conducted - DAY 1:**

- Operator competency was very good after the initial trials.
- It appears that Operator 2 adapted to the new equipment quicker and better than Operator 1.
- As a result of the circular blade severing all attachments to the extent that the bung did not have to be pulled from the annul canal was an excellent result.
- With the extent of total separation of the bung, care needs to be taken to not allow the bung to hang external to the cavity, as this then may result in cross contamination.
- As the results indicate, the suction component of the equipment was ineffective.

**Investigative Work after Completion of DAY 1 Trials:**

- Together with WAMMCO Maintenance staff MAR dismantled the hand piece to investigate the evacuation holes in the tool.
  - These are situated under the circular blade, close to the trigger on the grasp handle, and seemed to be too small to accommodate Ovine "Pellets"
  - Freund in Germany where contacted to discuss the day's trials and results.
  - Freund suggested that the holes be drilled to make them more suitable for the application.

### 5.3 Day 2 Trials:

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- Discussion where held regarding Day 1 Trials and information from Freund.
  - Once again the hand piece was dismantled and studied.
  - As a result, a collective conclusion was observed that enlarging the holes would not be effective to achieve the desired results due to the location of the holes.
  - We agreed that when the Pilot Pin is inserted into the rectum, it actually compounds the "Pellets" tightly within the colon with its pushing motion.
  - It was discussed that if the suction could be relocated to the end of the Pilot Pin, this may possibly achieve the desired results.
  - As a result of this, a decision was made to continue with more trials to ensure that operator competency is as good as it can be, and gather further video and photo footage.

#### Results of Trials Conducted – DAY 2:

##### Trial 13. 10 Carcasses Operator 2

- Carcass 1. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 2. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 3. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 4. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 5. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 6. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 7. Well freed, very easy to pull. Colon was not empty.
- Carcass 8. Well freed, very easy to pull. Colon was not empty.
- Carcass 9. Well freed, very easy to pull. Colon was not empty.
- Carcass 10. Excellent freeing, no pulling required. Colon was not empty.

##### Trial 14. 10 Carcasses Operator 2

- Carcass 1. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 2. Well freed, very easy to pull. Colon was not empty.
- Carcass 3. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 4. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 5. Well freed, very easy to pull. Colon was not empty.
- Carcass 6. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 7. Well freed, very easy to pull. Colon was not empty.
- Carcass 8. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 9. Well freed, very easy to pull. Colon was not empty.
- Carcass 10. Excellent freeing, no pulling required. Colon was not empty.

##### Trial 15. 20 Carcasses Operator 2

- Carcass 1. Well freed, very easy to pull. Colon was not empty.
- Carcass 2. Well freed, very easy to pull. Colon was not empty.
- Carcass 3. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 4. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 5. Well freed, very easy to pull. Colon was empty.
- Carcass 6. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 7. Well freed, very easy to pull. Colon was not empty.
- Carcass 8. Excellent freeing, no pulling required. Colon was not empty.
- Carcass 9. Well freed, very easy to pull. Colon was not empty.
- Carcass 10. Well freed, very easy to pull. Colon was empty.
- Carcass 11. Well freed, very easy to pull. Colon was empty.

Carcass 12. Excellent freeing, no pulling required. Colon was not empty.  
Carcass 13. Well freed, very easy to pull. Colon was not empty.  
Carcass 14. Well freed, very easy to pull. Colon was not empty.  
Carcass 15. Well freed, very easy to pull. Colon was not empty.  
Carcass 16. Well freed, very easy to pull. Colon was empty.  
Carcass 17. Excellent freeing, no pulling required. Colon was not empty.  
Carcass 18. Excellent freeing, no pulling required. Colon was not empty.  
Carcass 19. Well freed, very easy to pull. Colon was not empty.  
Carcass 20. Excellent freeing, no pulling required. Colon was empty.

Trial 16. 10 Carcasses Operator 2

Carcass 1. Excellent freeing, no pulling required. Colon was empty.  
Carcass 2. Excellent freeing, no pulling required. Colon was empty.  
Carcass 3. Excellent freeing, no pulling required. Colon was not empty.  
Carcass 4. Excellent freeing, no pulling required. Colon was not empty.  
Carcass 5. Well freed, very easy to pull. Colon was not empty.  
Carcass 6. Excellent freeing, no pulling required. Colon was empty.  
Carcass 7. Well freed, very easy to pull. Colon was not empty.  
Carcass 8. Excellent freeing, no pulling required. Colon was not empty.  
Carcass 9. Well freed, very easy to pull. Colon was not empty.  
Carcass 10. Excellent freeing, no pulling required. Colon was empty.  
Carcass 11. Excellent freeing, no pulling required. Colon was not empty.  
Carcass 12. Excellent freeing, no pulling required. Colon was not empty.  
Carcass 13. Well freed, very easy to pull. Colon was not empty.  
Carcass 14. Well freed, very easy to pull. Colon was not empty.  
Carcass 15. Well freed, very easy to pull. Colon was empty.  
Carcass 16. Well freed, very easy to pull. Colon was empty.  
Carcass 17. Excellent freeing, no pulling required. Colon was not empty.  
Carcass 18. Excellent freeing, no pulling required. Colon was not empty.  
Carcass 19. Well freed, very easy to pull. Colon was not empty.  
Carcass 20. Excellent freeing, no pulling required. Colon was not empty.

**Summary of Trials Conducted - DAY 2:**

- It was very obvious that the bunging operation performed with the Bung Dropper does have potential.
- Operator competency was very good, and does not require a high skill level.
- When the bung was well cleared, there were no further incidents of urine spillage.
- I had a meeting with Tony Bessell and Nigel Aitkin from Wammco at the completion of today's trials to discuss the results and suggested future alterations to incorporate a successful suction application.
- Both Tony and Nigel were very supportive, and looked forward to further trials in the future, obviously recognising the potential to enhance the bunging operation.
- Wammco advised that they were having an AQIS review/audit tomorrow, and would like to demonstrate the equipment to Dr. James Kobes and Dr. Roger Turner.
- MAR agreed to demonstrate the equipment in the presence of AQIS next day.

**5.4 Summary of AQIS Demonstration Conducted - DAY 3:**

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- Prior to the proposed demonstration for the AQIS, a short meeting with Dr. Roger Turner, Dr. James Kobes and the Relieving Plant Veterinary Officer Dr. Mark Rosendale, and Senior Meat Inspector Patrick Cassidy, was held to explain what we are trying to achieve and what we have achieved so far.
- A short demonstration took place early afternoon, with Ces Kell operating the tool.
- The results were consistent with yesterdays, achieving very good freeing/cutting with no visual contamination.
- All AQIS representatives were satisfied with the demonstration, and commented that they will be interested with future trials incorporating the suction/removal of pellets and also then conduct a Microbiological Assessment to compare against the present manual operation.



## **6 Bung Cutter Stage 1 Trials at Gundagai**

To date no trials have been completed with the Freund bung cutting equipment by MAR at Gundagai.

Discussion with Gundagai noted that they had also trialled some similar equipment with comparable results in relation to bung evacuation and removal of pellets, however the trials conducted at Wammco provided much more favourable results in relation to the bung cutting operation. Gundagai provided images and information relating to these trials to MAR for our review.

MAR and MLA have been on-site at Gundagai late 2007 after the completion of the trials at Wammco where we witnessed trials with similar equipment. Also present was a representative from Banss Germany.

MAR are more than happy to complete further trials at Gundagai should this be agreed upon as being the best course of action, however it should be noted that we “MAR” do not see any advantage in completing further trials with the same equipment in its current configuration.