final report

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Hot Fat Trim – In-Plant Support & Evaluation

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EXECUTIVE SUMMARY

Tool #1 is currently being trialed at the AMH-Beef City plant, however no trial data has been included in this report as the plant only commenced trials at the time of this report. A one page update of the trial results from this plant will be provided after completion of the trials on 31/07/2006.

Tool #2 was not installed or trialed at the Cassino plant due to the decision of that plant not to proceed with trials.

The tools have performed well with only some relatively minor repairs/modifications required, mostly during the initial trials at Rockdale. The modifications carried out to improve blade tracking have also resulted in greatly improved blade life, with indications that up to 1500 carcasses per blade is achievable.

From observations of the trials and discussions with management, engineering and operations personnel, five potential areas of tool improvement have been identified (refer Section 4 – tool improvements). Of those five, four improvements could be feasibly incorporated into the current tool design at a reasonable cost and should be considered prior to any further tool manufacture.

The tools have only been trialed in four of the eight plants that agreed to participate (AMH is still trialing tool #1). There was a fairly wide variety of reasons given from the plants that did not trial the tool, such as;

- Too busy
- Lack of suitable staff to install/operate tool
- Lack of suitable animals for trialing
- Unable to allocate suitable space for trials
- Unable to secure necessary equipment to run tool

Although there is no reason to doubt that the reasons given for not trialing are genuine, it appears likely that, in the majority of cases, better planning/resource management at the plant level may have circumvented some of the problems encountered.

Future projects of this type would also benefit if provision was made to supply as much of the equipment/services (such as hydraulic power packs, valving, etc) as possible along with the tools/equipment being trialed. Further benefits would come from the provision of a research staff member (project champion) to be available (up to 2 or 3 weeks for a 12 week trial period) to each plant to assist in installation, troubleshooting, training and data collection.

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INTRODUCTION

As part of the hot fat trim project (PRTEC.024 Development of Beef Hot Fat Trim Tool) two tools were developed and sent for production trials of 3 month duration each to a total of 10 participating plants (8 plants within the 2005/2006 financial year). The aim of this project was to provide the ongoing support necessary during trialing of the tools at each plant during the 05/06 financial year. The ongoing support includes the distribution, repair and maintenance of the tools as well as consultation with collaborating plants on initial setup and troubleshooting.

This is the final report for this project, detailing the progress of the plant trials and the trial results for the 2005/2006 period, including an evaluation of the overall performance of the tools as well as the effectiveness of the trial process and procedures.

Figure 1: Tool #1 being trialed at Beef City

AMH (BEEF CITY) AND CASSINO PLANT TRIALS

Tool #1 (108173-1) was sent to AMH-Beef City Abattoir for trials on 13/04/2006. The tool was installed and trials commenced on 20/06/2006. The tool was installed on the slaughter floor prior to the side wash and final inspection, as this was the only area on the floor available at the time.

The location where the tool was installed had a rise and fall platform available for the operator. Unfortunately the safety rail in front of the platform was set at a height that interfered with the hydraulic hoses of the tool and made it difficult for the operator to correctly position the tool for trimming. It was recommended that the rail should be lowered or completely removed (and used in conjunction with a safety harness if necessary) to give the operator easier access to the carcase.

It was also pointed out that the connection of the counterbalance to the overhead rail (chain wrapped around the round rail) was not ideal and may also cause difficulties for the operator to maintain correct positioning of the tool (Figure 2). It was recommended that a simple roller trolley be fitted to the rail that would allow the tool to move back and forth easily, similar to the installation at Oakey Abattoir (Figure 3).

Figure 2: View of the counterbalance connection at Beef City

Figure 3: View of the counterbalance connection at Oakey

The animals being processed on the day of the initial trials were 200 day, grain fed animals. Although there was some reasonable fat cover on some of the carcasses, many did not warrant a lot of trim. From discussions with operations personnel, these animals were lighter in fat coverage than what is usually processed.

The operator appeared to gain an understanding of the tool operation reasonably quickly, and was using the tool with some degree of confidence, however the previously mentioned issues of the counterbalance connection and interference with the hydraulic hoses combined to make operation of the tool more difficult than it should have been. It was also observed that the use of the rise and fall platform may have been counter productive in this instance as it seemed to be awkward for the operator to locate the controls for the platform and control it smoothly. It was suggested that it may be easier for the operator to set the platform at a convenient height and increase the pull on the counterbalance so that the operator could pull the tool down to the lowest position and then guide the tool up as the counterbalance pulls it to the highest position (this is the method Rockdale utilizes). The above method would eliminate the need for raising and lowering the platform constantly, aside from the initial height setting to suit the individual operator and the type/size of animal being processed.

Tool #2 was serviced, ready for shipment to Plant #8 (Cassino), however notification was received from that plant prior to shipment (11/04/2006) that they did not wish to proceed with trials. The reasons given for not proceeding with trials were;

- They were very busy and it would have been difficult to find time to run the trials.
- They had some issues with providing suitable floor space for the trials.
- They had viewed the video footage of the tool in use and felt that there may not be very many advantages for their plant.
- They had concerns about the tool causing damage to the carcass (although they recognize that this may only be an operator training issue).

TOOL PERFORMANCE

The overall performance of the tools in terms of functionality, reliability and maintenance has been good. Tool #1 required some repairs and modifications during trials at Rockdale. The repairs consisted of replacing the blade tensioning springs that had fallen off the tool due to dislodgement of the retaining circlips. The tool was then modified by incorporating a retaining screw to prevent the springs from being displaced again.

The tools also required some modification to the tyre profile as reported in PRTEC.024 Milestone 4 Report and also PRTEC.038 Milestone 1 Report. As a result of inconsistent blade tracking during the initial trials at Rockdale (prior to the tyre profile modifications) the front cover and plastic wear blocks were damaged and required replacement. Both tools also required 38mm diameter holes to be drilled into the case to enable cleaning and inspection of the rear faces of the pulleys to meet AQIS/Quality Control requirements.

The table below summarizes the repairs and modifications carried out to the two tools.

	Date	Plant	Problem	Repair	Modification
Tool #1	11/05/05	Rockdale	Blade not tracking properly- damaged cover & wear blocks.	Replaced front cover & plastic wear blocks.	Fit modified pulley tyres to stop blade rising.
	23/05/05	Rockdale	Blade tensioning springs displaced.	Replaced springs.	Added screw stop to prevent springs being displaced.
	26/08/05	Rockdale	Difficult to clean/ inspect behind pulleys.		Added 38mm dia. cleaning/ inspection holes to case.
	20/09/05	Work carried out at FSA	Excessive wear on pulley tyres.		Re-designed tyre profile- fitted new tyres to pulleys.
Tool #2	23/05/05	Work carried out at FSA			Carried out screw stop mod. to prevent spring displacement same as tool #1.
	20/09/05	Work carried out at FSA			Carried out tyre profile mod. same as tool #1.
	15/11/05	Work carried out at FSA	Difficult to clean/ inspect behind pulleys.		Added 38mm dia. cleaning/ inspection holes to case same as tool #1.

Blade Life

During the initial trials of the tool at Rockdale, the pulleys were modified to prevent the cutting blade from rising and cutting through the wear blocks and the front cover. After completing this modification the plant reported that the tool was capable of an economy of approximately 800 carcasses per blade. The previous prototype, currently in use at Rockdale, used 3 blades per day, or approximately 90 carcasses per blade. After the tool

was returned to FSA, it was observed that the pulleys had excessive wear on the anti ride-up feature of the tyre, therefore the tyre profile was modified again to improve tracking and further preserve the blade life. Neither of the tools had significant trials again until tool #1 was trialed at Oakey Abattoir. The trials at this plant confirmed that the modifications had provided a further increase in blade life of up to approximately 1500 carcasses per blade. As well as the blade life improvement, the pulley tyre was still in very good condition, with very little measurable wear. Figure 4 shows the changes made to the tyre profile.

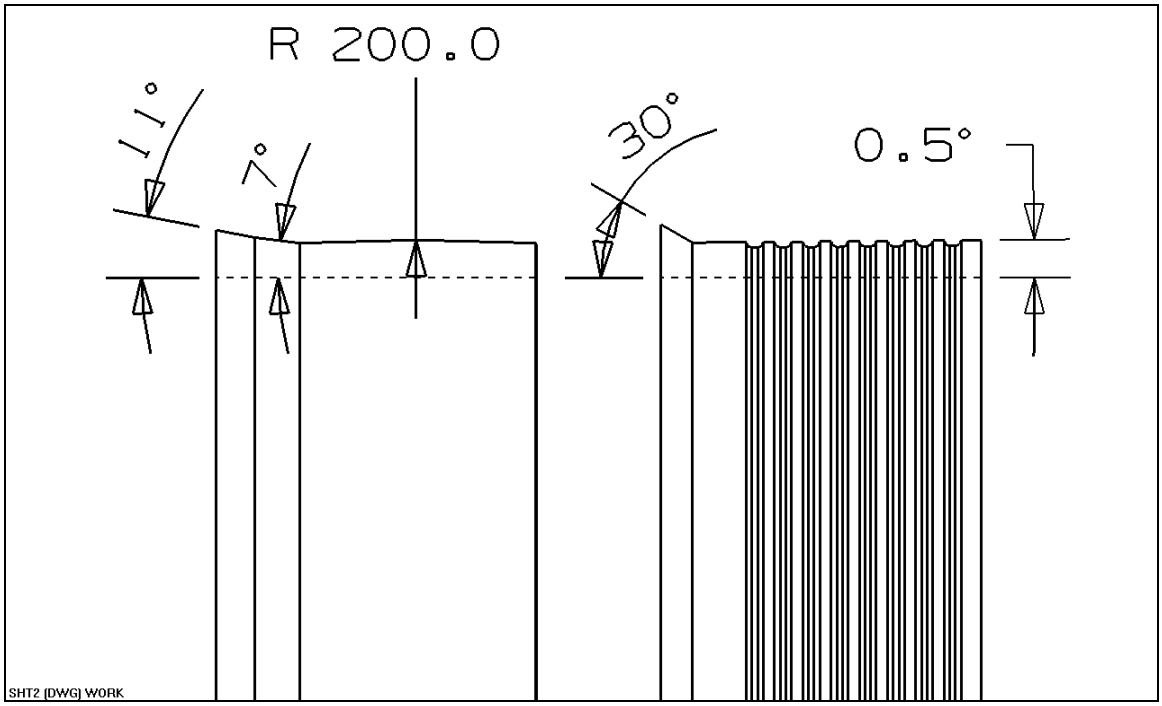

Figure 4: Comparison of old (left) and new (right) tyre profiles

Tool Improvements

During the course of the plant trials, there were a number of comments received from the plants in relation to possible improvements for the tools. After consideration, the bulk of the comments and concerns can be condensed into five main areas. Those areas are listed below along with possible means and feasibility of achieving the improvement.

1. **Quick release latches for the front cover.**
   Some operators (during early trials at Rockdale) complained that the current screw type latches are too awkward to un-screw when the operators' hands (and the tool) are covered in fat. This makes it difficult to open the cover quickly when a blade change is necessary. Some off-the-shelf quick release type latches are available that may be suitable for retro-fitting to the tool. Alternatively suitable latches could be designed and manufactured at modest cost.

   Before considering this improvement however, the need should be re-assessed, given that the blade life has improved markedly since the early trials and hence the need to open the cover should now be considerably less frequent.

2. **Quick release pulleys for easy cleaning/inspection.**
   The current design of the tool features two 38mm diameter holes located in the case under each of the pulleys. The purpose of these holes is to allow cleaning/inspection of the rear faces of the pulleys for quality control and hygiene. A quick release mechanism for the pulleys would allow rapid pulley removal and much easier access to the areas that need cleaning and inspection. This modification is certainly feasible and desirable and would require design/manufacture time in the order of two working weeks.

3. **Hot water purge**
   In plants such as Rockdale, where the fat trimming is carried out in a chilled area, some of the fats from trimming become partly solidified inside the case of the tool, requiring periodic flushing with a hot water hose to remove any build up.

   A series of small nozzles could be mounted inside the case and connected to a hot water line via a small finger operated button incorporated in one of the handles or alternatively a foot or knee activated button on the work platform. This would allow the operator to periodically (between carcasses, if necessary) flush any solidified fats/oils from inside the case very quickly and easily without the need of parking the tool and opening the cover to flush with a hose.

4. **Reversing switch for blade direction**
   A common problem at all the plants where the tool has been trialed, is that either the leading or trailing beef side (depending on whether the product flow is right to left or left to right) tends to deflect away from the tool when trimming. This is caused by friction between the rotating blade and the carcass surface where the blade makes contact. The direction of rotation of the blade determines which direction the carcass will deflect, so one side will always trim easily as the side is pulled in to the area requiring trimming and the other side will always tend to be more difficult to trim as it is pushed away from the tool.

For the operator, this deflection of the carcass side away from the area needing to be trimmed, creates a problem as the side must be continually 'chased' in an effort to trim the required area, therefore the results on the 'chased' side are often inferior to the other side.

If a reversing switch were to be incorporated in the tool (perhaps a thumb switch located conveniently on the tool), the operator could select the appropriate direction of rotation, depending on which side was being trimmed, and avoid the need to chase every second side. This would make operation of the tool easier and should also provide overall benefits in efficiency and carcass finish. Some re-design of the blade guides would be needed to achieve this improvement as well as a suitable switch and associated valving, but overall the modification should not be cost prohibitive.

5. **Size reduction/improved maneuverability**

   Another aspect of the tool that is often commented on is the size/weight and maneuverability of the tool. Most of the plants have asked if it is possible to reduce the size of the tool so as to make the tool more maneuverable.

   Some reduction in the overall size and weight of the tool would be achievable with re-design and use of light weight or composite materials where possible, however, due to the constraints of pulley diameters it is unlikely that any size reduction would be large enough to make a noticeable difference to the maneuverability of the tool.

SUMMARY OF 2005/2006 PLANT TRIALS

This summary of plant trials includes plants one (Rockdale) through to and including plant eight (Cassino). Trials scheduled for plants nine and ten fall outside the reporting period of this project and must be included within a new project. The schedule used for the trials is shown below.

Trial Period	Tool 1	Tool 2
01/06/ 2005 to 31/08/2005	Rockdale Beef P/L	Stanbroke Beef P/L
15/09/2005 to 14/12/2005	E G Green and Sons P/L	John Dee, Warwick
09/01/2006 to 12/04/2006	Oakey Abattoir P/L	Aust. Country Choice (ACC)
01/05/2006 to 31/07/2006	AMH-Beef City*	Northern Co-operative Meat
01/09/2006 to 30/11/2006	Kilcoy Pastoral Co.	Cargill Beef Aust.

* *Tentative Agreement*

As indicated in the schedule, each plant had the opportunity to trial the tool for a three month period. In general each plant received an information pack well in advance of their trial period to allow sufficient time to prepare for the trials (Plants 1 and 2 did not receive the pack as it was still being compiled at the time of their trials, instead they were given some written information as well as verbal advice). The information pack mailed to plants contained the following;

- Plant requirements and trial schedule
- AQIS letter referring to the tool (supplied to plants #4 onward)
- Safe operating procedure (SOP) wall chart
- HFT operator manual
- Contact details for replacement cutting blades
- Acknowledgement of induction form (to be signed & returned to FSA)
- Video of HFT in use at Rockdale

All plants that installed and trialed the tool received on-site assistance from FSA staff for the initial trials. This assistance was in the form of a one-day visit to the plants to assist with installation, operator training and general troubleshooting.

Out of a possible eight plants, a total of four plants installed and trialed the tool. As reported in PRTEC.024 Milestone 4 and PRTEC.038 Milestone 1, the first trials of the new tool were carried out at the Rockdale plant.

Rockdale

The Rockdale trials were successful based on feedback from the plant, however, only a limited amount of data was received from the plant about numbers of carcasses trialed, types of animals, fat cover, etc. At the completion of the trials, Rockdale reported that the tool was a definite improvement over the previous prototype, particularly in terms of blade life and maneuverability of the tool. The plant has recently expressed an interest in acquiring one of the new prototypes to replace the original prototype they are currently using.

John Dee

The tool was only trialed at this plant for a short time, due to delays at the plant with installing the tool and connecting services (the plant was in the process of completing a new kill floor at the time of trials, which put a strain on resources). There were also some problems at that plant with providing suitable staff to run the tool. Adding to these problems, no records were kept of the few trials that were carried out, however an estimate at the time suggests that around 100 carcasses may have been trimmed. Although the trials were quite limited, the feedback from this plant about the trials and the tool performance was generally positive and that there would probably be worthwhile benefits for the plant. They would also like the opportunity to trial the tool again with greater attention paid to issues such as data collection.

Oakey Abattoir

The trials carried out at Oakey were well organized and implemented. The plant trialed the tool for two and a half weeks, processing about 4500 carcasses and were able to determine within that time that the tool would not be of great benefit to their plant. The plant reported that although the tool performed well on the loin area of carcasses and produced a superior finish to standard ring knives, the ring knives produced just as good a finish on other areas of the carcass and was quicker and easier to use compared to the FSA tool. However, as noted in the PRTEC.038 Milestone 3 Report, the operational procedures at this plant precluded the possibility of trimming the carcass to the final fat depth specification prior to the boning room and therefore did not benefit from many of the advantages of the tool as a final fat trim still had to be carried out in the boning room.

AMH-Beef City

As noted earlier in this report, AMH started trials of the tool on 20/06/2006 and at the time of writing this report there is no data available from the trials. An update of the trial results from this plant will be provided after completion of the trials on 31/07/2006.

A summary of the trial information at all plants is shown in the table below.

Plant	Installed	Trialed	Trial Data	Results
1. Rockdale	Yes	Yes	Limited	Rockdale trialed the tool extensively and were very positive about the tool performance, however very little data was received from them in regard to numbers processed etc.
2. Stanbroke	Yes	No	-	Stanbroke did not trial -did not have suitable animals for trial at the time.
3. Harvey Beef	No	No	-	Harvey Beef did not trial -plant was in receivership at the time of trials and was unable allocate funds for necessary trial equipment (hydraulic power pack).
4. John Dee	Yes	Yes	Very limited	John Dee only trialed the tool for a short time and did not keep any records of numbers processed or results. An estimate is that 100 carcasses may have been processed. They were generally positive about the tool & would like to trial it again with more attention paid to recording results.
5. Oakey	Yes	Yes	Good	Oakey trialed the tool on approx. 4500 carcasses and kept some records of results. They do not believe the tool has many advantages for their plant.
6. ACC	No	No	-	ACC did not trial -unable to find suitable space on floor.
7. AMH-Beef City	Yes	Yes	Not available	AMH received the tool on 13/04/06 but did not start trials until 20/06/06. Trial data not available at the time of this report.
8. Cassino	No	No	-	Cassino plant pulled out of trials before receiving the tool.

