



final report

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Development of Beef Hot Fat Trim Tool

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INTRODUCTION

This report details the work completed as part of Milestone 4, PRTEC.024 - "Development of Beef Hot Fat Trimming Tool". The purpose of this milestone is to fabricate and test two new fat trimmer tools for in-works trials in participating plants.

The two tools were assembled in the Food Science Australia workshop in Cannon Hill, Brisbane. Most of the components were made in-house using workshop tooling, mainly with the CNC milling machine. A number of items, such as the pulleys and rims, were contracted out. The lid and several brackets were made by a sheet metal fabricator. The hydraulic motors, bearings, springs, handles (c/w trigger valves), tungsten carbide tips (blade guides), and lead screw, etc., were purchased off the shelf. Note that the lead screw shaft required machining before fitment. A small number of extra spare parts were also manufactured.

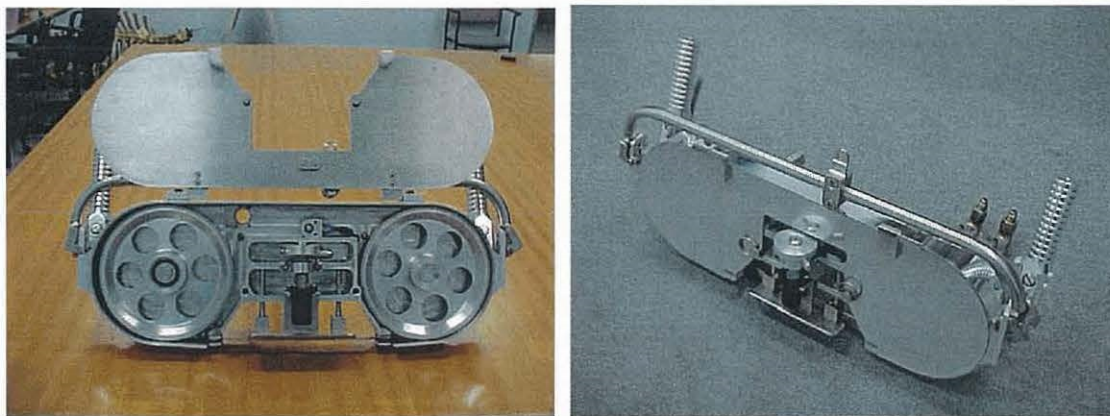


Figure 1a & b: First in-works prototype

INITIAL TEST RUNNING

The first tool completed was subjected to a running trial to gain an indication of blade life and general serviceability. The saw blade chosen for the tool has a similar tooth configuration to those used on the present working prototype; the only difference being the length, which is increased. A number of blades were purchased from the same company that supplies those for Rockdale Beef.

The tool was mounted on the bench and connected to a portable hydraulic power pack. The pressure was set to the recommended 1600 psi, with a flow rate of 15 litres/min, giving a rotational speed of around 1000 - 1200 rpm.

The life of the blade was found to be greatly extended, with no breakage encountered during the trial. First, the tool was run for 26 hours almost continuously. Then a timing device was added to the hydraulic circuit of the pump so that the tool could be cycled on and off, more closely replicating actual use. The timer switched the pump on for seven seconds and then off for three seconds. The unit was run for a further 14 hours in this mode. As it became apparent that a substantial blade life improvement had been made, the trial was stopped.

PRELIMINARY TRIAL AT ROCKDALE BEEF

The first tool was taken to Rockdale for an initial in-works trial (see Figure 2). It was installed at the same station as the previous Hot Fat Trimmer, which was temporarily decommissioned. The new trimmer initially ran with no apparent faults.



Figure 2: New Hot Fat Trimmer in place at Rockdale

After approximately 30 minutes operation, it was found that the blade was “riding up” the drive pulley and cutting into the plastic rubbing blocks and eventually the lid (see Figure 3). The adjustment device on the idler pulley mount was set to impart maximum downward force on the rotating blade. After the trial was restarted, the problem continued. It was observed that the operator sometimes pulled the tool downwards after obstructions such as bones were encountered, thus imparting an upward force on the blade. Also noticed was the tendency for the blade to “wander” on the pulleys, with the blunt edge often seen to lose contact with the underneath guides.

Note:
Original
drive pulley
has no
beveled

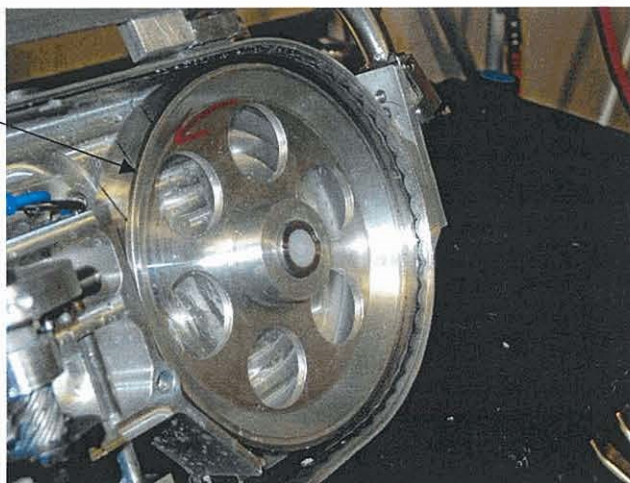


Figure 3: Blade "riding-up" on drive pulley

The decision was made to replace the drive pulley rim with a modified idler pulley rim. The alterations were performed at the FSA workshop at Cannon Hill, and a complete drive pulley with a pressed-on modified “idler” rim, was sent to Rockdale as a replacement.

The modifications involved reducing the angles of the split-level top edge (refer Milestone 3) and machining seven small (1 mm wide X 0.4 mm deep) circumferential grooves, equi-spaced across the face of the rim. When trials were recommenced, it appeared that the tendency for the blade to ride up was greatly reduced.

Closer examination during running revealed that the blade was continuing to not fully contact the underneath guide as was intended. It was decided to check the “squareness” of the blade (see Figure. 4). It was found, when placed on a surface plate, the blade face exhibited a non-perpendicular angle up from its base. In other words, the blade, when welded, had a smaller circumference around the cutting edge than the “blunt” edge. This would logically have the effect of causing the blade to migrate up the pulley face as it rotated.

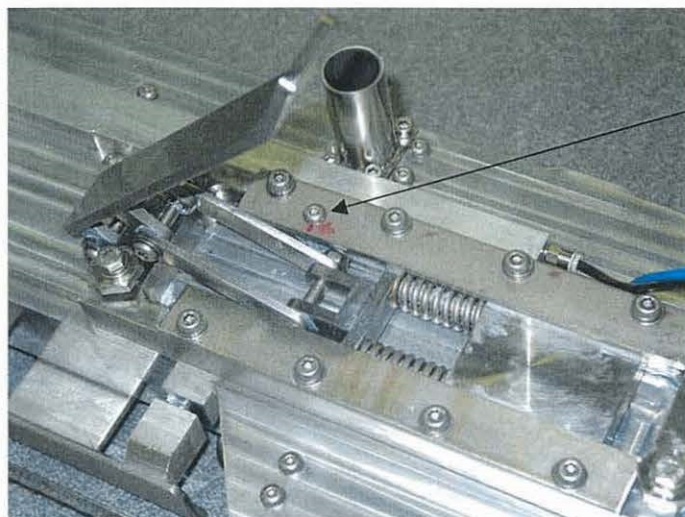


Figure 4: Measuring vertical angle of blade

The problem was discussed with the blade manufacturer, who made a commitment to supply all blades in the future with a relatively larger circumference at the cutting edge. A blade of this nature would have an inherent tendency to “ride-down” the pulley, where it can be supported by the rubbing blocks provided underneath.

A new set of blades was ordered and upon arrival the vertical angle of the edge was checked. The blades were found to be within the specified tolerances.

An issue arose with the blade tensioner/release mechanism, underneath the idler pulley (refer Milestone 3). When the release lever was pulled open, the tensioner spring force was great enough to cause the two retaining circlips to be dislodged from the guide shafts. A remedy for this was to remove the circlips altogether and insert a stopper screw in the guide plate, to perform the same task (see Figure 5.)



Retaining
Screw

Figure 5: Adjustment mechanism

SECOND PROTOTYPE

The modifications made to the first in-works prototype were incorporated into the second unit. These included the new drive pulley and rim, upgraded blades and the modified release mechanism. A short test run indicated that the tool is performing satisfactorily.

Commissioning of the second trimmer has been completed, and it will soon be handed over for in-plant trials.

CONCLUSION

Two Hot Fat Trimmer tools have been fabricated at Food Science Australia, Cannon Hill. The first tool has completed in-plant commissioning trials. Rockdale Beef, NSW, indicate that blade life has been increased from three per day to one every three days. The second tool is ready for commissioning and hand over.

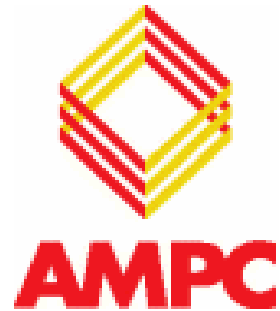
PROPOSED SHEDULE FOR HFT TOOL TRIALS

The table set out below is the proposed schedule for plant trials of the Hot Fat Trimming Tools. The timing allows for an in-plant trial time of 3 months with a two to four week break between each set of trials to allow for any maintenance, transport etc. It is proposed that the tools would return to the Food Science Australia, Cannon Hill workshop in between each set of trials where the tools can be inspected and serviced and forwarded on to the next plant.

The first tool is already in operation at Rockdale, where the initial testing was carried out, however for the purpose of simplifying co-ordination of the trials it is proposed that the official trial period for Rockdale start at the same time as Stanbroke ie 1st June.

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
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*



EXPRESSION OF INTEREST

Beef Hot Fat Trimming Tool

AMPC and MLA have allocated industry funds for 2004-2005 to Food Science Australia (FSA) to develop two prototype Beef hot fat trimming tools. The trimming tools will be based around the previous project work carried out by FSA and Rockdale Beef and funded through the Food into Asia Research Program.

The manufacture of the two prototype trimmers is expected to be completed by April 2005 and then will be ready for production trials in a works environment.

This document is an “Expression of Interest” to trial one of the Beef Hot Fat Trimming Tools in your beef processing plant for a set period of time (3 Months). The outcomes of these trials are to determine the tool’s effectiveness to the individual plants and to the Beef Industry in general.

The total length of the production trials is expected to be two years in order to give enough plants an opportunity to assess the tools. Depending upon the results of the trials, commercialization of the tools may occur after that time.

Each interested plant will need to agree to the conditions of use in order to participate in the trials.

The conditions are:

- Each participating plant agrees to trial the tool for a period of three calendar months and return the tool to FSA immediately after that time (unless for some reason an extension period has been granted to the plant by FSA). The plant is expected to provide suitable personnel to operate the tool and trim carcasses according to the individual plant needs.

- Each participating plant agrees to provide the necessary services for correct operation of the tool i.e. suitable clean air supply and hydraulic supply to the tool (hydraulic power pack may be required) as well as necessary valves, fittings and hoses, suitable work area (preferably after side wash and before chillers), supply of cutting blades for the tool, rise and fall platform (if required) and counterbalance for the tool.
- Each participating plant is responsible for installing and maintaining the tool during trials and for insuring the tool while at its premises. NOTE: Any damage occurring to the tool during trials is the plant's responsibility and damage shall be repaired at the plant's cost. The participating plant will receive from FSA instructions and general guidelines to ensure the tool is correctly installed. FSA will also provide details to each plant of where to purchase cutting blades or spare parts for the tool.
- Each participating plant acknowledges that the trials of the tool at its premises are carried out at its sole risk and that FSA gives no warranties concerning the performance of the tool. The plant further acknowledges that it has adequate workers' compensation and public liability insurance to cover all of the risks arising from the trials at its premises.
- It is each plant's responsibility to ensure that the tool is operated in a safe manner as described by FSA (Operation and safety manuals for its safe use, and/or video and/or verbal instructions will be provided by FSA)
- Each participating plant agrees to allow access for MLA/FSA staff to view (and video or photograph, if required) operation of the tool in the plant and to speak with the appropriate plant staff to determine progress of trials.
- The schedule for the selection of participating plants and the timing of the plant trials will be determined by AMPC/MLA/FSA at their discretion.

I _____ agree to trial the "Beef hot fat trimming tool" for a period of three calendar months and to the terms and conditions as listed in the "Expression of Interest" document.

Please return this document signed to:

ATTN: Andrew Finney
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