

# Pelt-O-Matic

Commercial pelting machines were developed in New Zealand in the 1980s for large throughput plants operating inverted dressing chains. The major Australian export sheep processors quickly adopted inverted dressing and the associated automated pelt removal equipment.

However, there remained in Australia a significant number of smaller domestic abattoirs that continued to use conventional dressing technology with little automation. This led Australian Meat Technology (AMT) to identify a market opportunity for a mechanical pelting machine that would suit smaller conventional chain abattoirs.

## **Background**

### **Labour**

Approximately 30% of the butchers on a conventional (head-down) sheep dressing chain are involved in pelting operations including clearing the hind legs and pelting down the back. This work is the most physically demanding task on a conventional or inverted sheep dressing chain. Mechanical sheep dressing equipment has been developed to reduce labour costs, reduce injuries and improve hygiene. Automation of pelt removal has become a key element in mechanised dressing programs.

### **OH&S**

Manually removing the pelt from sheep and lamb is the cause of a significant number of injuries. V&V Walsh Abattoir was under increasing pressure from WorkSafe Western Australia for them to devise a way to reduce the heavy manual labour required to remove a sheep pelt on their conventional sheep processing chain. Therefore there was strong support for the development of the *Pelt-O-Matic* from plant management.

### **Pelt quality**

The grain layer of a sheep skin can be easily damaged if the skin is pulled incorrectly during dressing. This damage is referred to as grain strain and is a major reason for the downgrading of skins and loss of revenue. The advent of mechanical pelting systems has resulted in an increase in the incidence of grain strain.

It was recognised that a mechanical pelting system that did not increase the incidence of grain strain was required. It was also recognised that a slow pull parallel to the carcase could minimise grain strain.

### **Hygiene**

Examination of sheep and lambs dressed using both conventional and mechanical pelting systems has shown that microbiological contamination is lower in the areas where there is an absence of hand contact. This has been a key driver of meat process automation including the *Pelt-O-Matic*.

## ***History of the technology***

### **Early developments**

A range of mechanical pelting systems was trialled in Australia and New Zealand in the 1970s but none operated satisfactorily on a commercial-speed chain. The first successful mechanical pelting system to operate on southern hemisphere chains was based on the inverted dressing system. This was a six-head rotary machine, released in 1982, that removed the pelt from the lower back and hind legs by driving a ring between the pelt and the carcass.

The rotary machine was too large and complex to suit most plants and was replaced by a two-stage system. This consisted of a shoulder puller followed by a final puller. These MIRINZ-developed machines achieved good market penetration but were designed for inverted dressing chains processing over 3,000 head per shift.

A puller had also been developed for the Ruakura research abattoir. This machine had four prongs that gripped and rolled the pelt and pulled downwards.

### **Pelt-O-Matic**

The *Pelt-O-Matic* concept originated at Australian Meat Technology Pty Ltd (AMT) which was formed in the early 1990s by the Meat Research Corporation (MRC), with the co-operation of the CSIRO, using a core of staff from CSIRO's Meat Research Laboratory at Cannon Hill.

AMT staff identified a market opportunity for a relatively simple and cost-effective pelt removal machine for conventional chains with a throughput of 2,000 to 3,000 head per shift. The development was also driven by a need to find a way to overcome the problem of grain strain caused by existing mechanical pelt pullers.

The concept of sock-skinning using a slow pull parallel to the carcass was successfully trialled with a prototype machine. Supported by funding from the MRC, a single-head machine was designed along the lines of the Ruakura puller but using only two prongs. Food Equipment Australia Pty Ltd (FEA) was commissioned to develop a mechanism for moving the individual pelting heads synchronously with the slaughter chain.

The first plant prototype, referred to as the linear model, was installed at V & V Walsh Abattoirs in Western Australia in 1998. Because V & V Walsh had a need to overcome injuries associated with the manual pelt pulling task, they made a significant financial and in-kind contribution to the project.

The prototype worked well – it replaced the heaviest manual jobs, gave excellent pelt quality and validated the overall concept. However, the initial design of the linear pelt puller (Mk 1) meant that at any time only half the pelting heads were being used. As the pelting heads were the most expensive part of the machine, the developers began to explore ways to get a better utilisation of the pelting heads.

Industry personnel liked the pelting action and suggested a rotary version to increase the number of heads being utilised at any time. The rotary version (Mk 2) of the *Pelt-O-Matic* (Figure 1) was very successful and has become the industry standard. The

design is flexible and scalable and can be supplied with 6, 8 or 10 heads depending on throughput.



**Figure 1: Rotary Pelt-O-Matic**

From its inception, the *Pelt-O-Matic* was designed to operate on a conventional chain. However in January 2002, a machine was installed on a conventional chain that was later converted to inverted dressing. It was found that the *Pelt-O-Matic* operated satisfactorily without modification. This opened up inverted dressing chains as a whole new market for the *Pelt-O-Matic*.

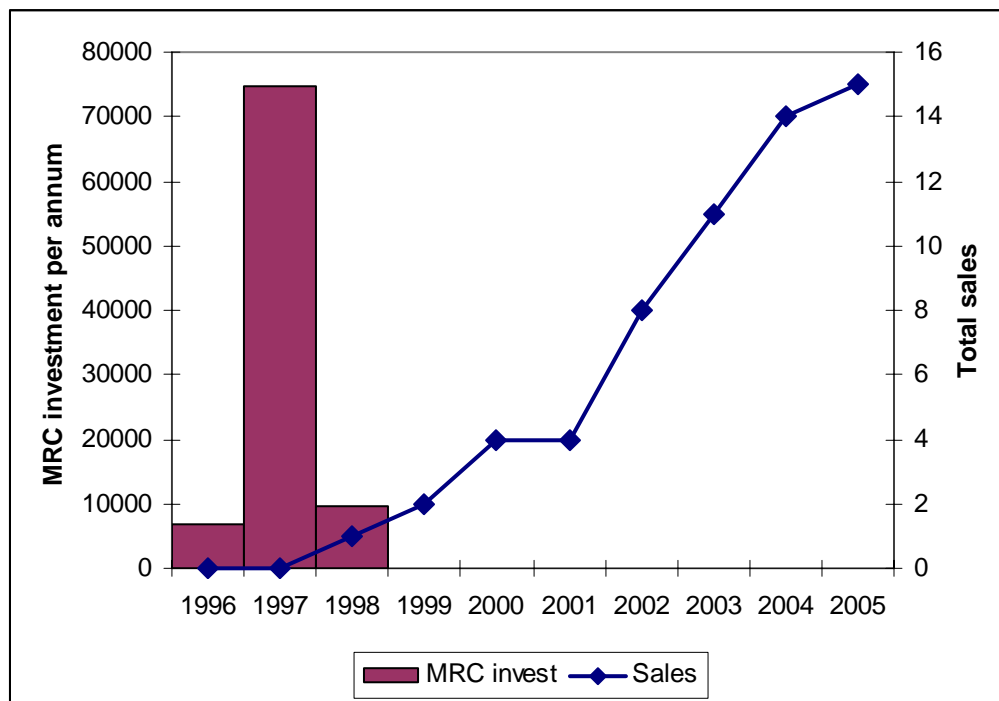
The installation of the first *Pelt-O-Matic* directly on an inverted dressing chain occurred in August 2005 as a replacement for a MIRINZ shoulder puller and final puller pair. This

installation has been successful, showing that it can replace the MIRINZ technology, while maintaining throughput and improving pelt quality.

### **Development cost and sales**

The total research and development cost for the first linear mode *Pelt-O-Matic* was \$336,100. This consisted of \$91,100 from the MRC, \$75,000 from AMT and the remainder from V & V Walsh and FEA. Commercialisation and development of the rotary model was funded internally by AMT/FEA and the eventual licensee SFK Australia Pty Ltd.

By September 2005, 11 *Pelt-O-Matics* had been sold into the Australian market and four to overseas clients. Based on the original AMT study that there were approximately 20 plants in Australia in this market sector, this represents a 50% market penetration. The MRC investment and sales numbers are depicted in Figure 2.



**Figure 2: Development cost and sales of the *Pelt-O-Matic***

The technology has proven to be scalable, with machines from one to 10 heads having been manufactured. It has also been shown to operate satisfactorily on an inverted dressing line and at a speed of 8 to 10 carcasses per minute. Therefore there is scope for additional sales to higher throughput plants both in Australia and internationally.

### **Benefits**

#### **Reduced labour**

One of the main reasons for installing machinery on the dressing chain is to save labour. The designers calculated that 2 – 3 butchers can be saved per installation.

However this may be difficult to achieve in some situations but there is certainly a de-skilling of tasks.

### **Reduced injury claims**

The labour saved by this machine performs heavy manual tasks and the workers are prone to injury. Installation of the unit has resulted in reduced injury claims and compensation payments. One plant has experienced saving of \$50,000 to \$80,000 per annum.

### **Improved pelt quality**

One of the key drivers for this technology was improved pelt quality through reduced grain strain. The slow pulling action of the *Pelt-O-Matic* has been shown to reduce grain strain when compared with other mechanised pelt pullers, especially the MIRINZ shoulder and final pullers. The consistent minimisation of grain strain could result in up to 20% increase in pelt market value.

Pelt damage under manual pelting can also be significant. After one *Pelt-O-Matic* installation, the percentage of downgraded pelts was reduced from 15% to 2%.

### **Improved carcass hygiene**

Evaluation of the microbiological quality of sheep carcasses dressed using the *Pelt-O-Matic* compared with manual processing showed improved hygiene in the neck/foreleg area. There was a significant reduction in the percentage of samples where coliforms or *E. coli* were detected.

The puller also reduces the chance of aerial contamination by wrapping the pelt so that contaminants are contained and there are no violent movements.

### **Key learnings**

The development cycle for the *Pelt-O-Matic* was quite short. After initial trials in late 1995 and a feasibility study in 1996, a commercial machine was designed and successfully trialled within 12 months from commencement of the project in June 1997 to completion in May 1998.

There are several reasons for the success of this project and the sales success of the technology.

- A need was recognised and the *Pelt-O-Matic* successfully filled this need.
- The development was enthusiastically supported by V & V Walsh who had a requirement to reduce injuries on their conventional chain.
- The design built on existing technology such as the MIRINZ puller at Ruakura.
- Sales are supported by thorough training of staff to ensure correct workup so the machine operates successfully.
- The equipment is scalable to suit a range of production rates by providing between 1 to 10 heads.
- The equipment adds value by reducing labour costs, reducing injuries and improving pelt quality by reducing grain strain.