Final report

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REVIEW OF SMARTSHAPE AUTOBAGGER

Executive Summary

This report provides a commercial evaluation of an enhancement to current SmartShape machine developed by Meat & Livestock Australia. Smartshape is a shaping technology that improves portion cutting and presentation of sub primals. The project specifically compares the new prototype SmartShape Autobagger & Ring Attachment System of the current SmartShape Gen Two System applied to beef cube rolls.

Background

The Fix All Services Gen two model (displayed in Figure) has been in operation for over two years with several completed partnership projects (P.PIP.0284) facilitating the successful adoption of SmartShape technology platform. The currently system operates at 1-2.5 cycles per minute, processing approximately 224 cube rolls ranging from 4.5 to 5.2kgs each (and up to 150mm in diameter as displayed in Figure 2), derived from YG-YP cattle, 320+kg hot standard carcass weight with a combination of grass and grain fed cattle are used to supply the current program of supplying a large domestic steakhouse chain.

Figure 2: Target / desired Shaped Cube Roll

Current customer demand and other market development opportunities now require increased production capacity and the processing partner wishes to explore contingency planning to produce in multiple sites. This project enabled provision for the review of the recent MLA funded (A.MPT.0055) design modifications of the SmartShape autobagger system (Figure 3).
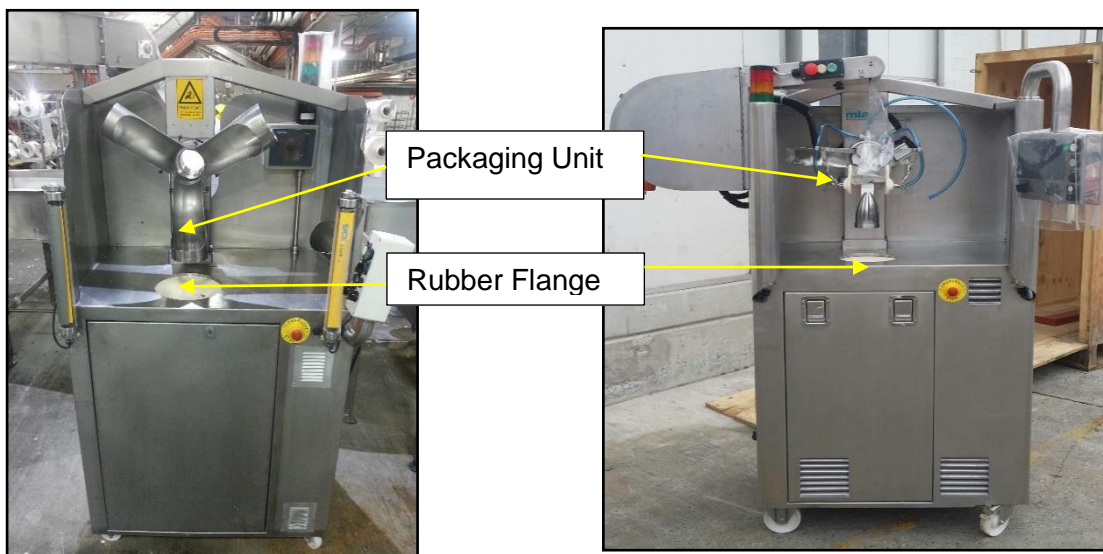

Packaging Unit

Rubber Flange

Figure 1: Current SmartShape Gen
2 system

Figure 3: Newest SmartShaper with
Autobagger and ring attachment

Value Proposition

Much like the current Gen two system, the latest prototype SmartShape autobagger stretches, shapes and packages meat cuts into uniform circumference bag sizes. However, the major upgrade between these two systems is the autobagger loading mechanism (Figure). Automatic loading and bagging intended to remove the operator and increase processing rate from 59 primals per hour (current Gen two system) to 118 primals per hour conservatively with the new autobagger system. If achievable this would represents an additional benefit of $0.29 per primal or $0.58/head (Table **1**). This comes as result of the operator now having the capability to place the meat into the rubber flange simultaneously while the system is automatically setting up the next bag.

Table 1: Processing costs & statistics

Processing Costs and Statistics		
	Smartshape Gen two (Current System)	Smartshape with Autobagger (New System)
Throughput (primals per hour)	59	118
Labour requirement*	0.60	0.30
Cost of labour per primal	$ 0.57	$ 0.29
Rubber Flange costs	$ 0.23	$ 0.23
SmartShape packaging	$ 0.25	$ 0.25
Percentage of cube rolls processed	9%	9%
Costs per primal	$ 1.05	$ 0.76
Benefit per primal for new system		$ 0.29

Key Findings

Given throughput pressure on the existing system, the intention in trialling the new system was to confirm that it would increase production capacity and reduce the cost of labour while maintaining similar quality and shelf life attributes of the existing product.

Trials conducted at the factories however were not successful and highlighted a range of operational challenges that need to be overcome to realise any commercial benefit to consider investment. Trials were run a number of times but the following issues prevented the autobagger system from functioning onsite:

- The infeed design (funnel/bag holder) was not robust enough to operate in a meat processing environment. The processor had to build a more robust attachment.
- Errors in the PLC meant operators could not control the autobagger
- Electronic faults relating to the Varial Speed Drive (VSD) prevented commercial trials from testing production capability.

If the challenges discussed could be overcome and the SmartShape autobagger could operate as intended, the opportunity to generate new profit value (NPV) for the processor is well in excess of $13 million per annum per system installed was able to be extrapolated as a future value proposition (Table 2).

When compared to the current SmartShape Gen Two system, a commercially operational SmartShape autobagger system would substantially increase the net benefit per head by $0.63 from $35.07 to $35.70 over non-SmartShaped product. This improvement would be a direct result of the increased throughput, decreased operating costs per primal processed and the reduction in labour (Table 2).

A commercially operational SmartShape autobagger system offers a $0.57 reduction in operating costs from $2.10 to $1.53 per head. This decrease is a result of the reduction in the labour costs per primal processed discussed in table 1. In contrast however, capital costs increase from $77,000 for the current SmartShape Gen Two system to $125,520 for the new SmartShape autobagger system. Consequently, an increase in the capital costs per head from $0.29 to $0.47 would be experienced. If the volume processed could be doubled however, the associated capital costs would reduce from $0.47 to $0.23 per head (refer to Table 2).

Table 2: Value benefit of the current Gen Two SmartShape system compared to the newly customised SmartShape autobagger system

SUMMARY PERFORMANCE MEASURES			
	Current System	**New System - Current Volume**	**New System - Doubled Volume**
hd / annum	26,930	26,930	53,861
Cube Rolls / annum	53,861	53,861	107,722
% of kill processed	100%	100%	100%
	From	From	From
Capital cost (pmt option, upfront)	$77,000	$125,520	$125,520
Gross return ($/hd)	$37.46	$37.46	$37.46
Operating Costs ($/hd)	$2.10	$1.53	$1.53
Capital costs ($/hd)	$0.29	$0.47	$0.23
Net Benefit ($/hd)	$35.07	$35.47	$35.70
Annual Net Benefit for the plant	$ 944,556	$ 955,094	$ 1,922,740
Annual Net Benefit for the ex cap	$ 952,256	$ 967,646	$ 1,935,292
Pay back (years)	0.08	0.13	0.06
Net Present Value of investment	$6,616,283	$6,679,032	$13,475,372

If the range of commercial challenges identified could be overcome, value well beyond the initial investment could be created for the processor. Recommendations have been made on the basis this investigation found the following:

- The major upgrade that can be seen between these two systems is the autobagger loading mechanism.
- The smartshape autobagger would provide the processor with a range of benefits including:
    - The throughput rate could be almost doubled to 118 primals per hour.
    - A range of alternative market access opportunities exist. If these new markets could be developed and sales volume could be increased, the processor could expect to increase their annual net benefit to $13million.
    - The reduction of labour per primal processed could be halved to $0.30

- o Increase in the value of higher quality cow cube rolls for example, could help offset increasing cattle prices.
- There were no perceivable differences in either the sensory or shelf life of the finished beef cube roll product.
- There were provisional findings at the time of the trial that showed high product inconsistency in terms of length and width of the loin muscle. Whilst they were able to be "smartshaped" to approximately 20% reduced width on both machine models, the client needs to grade raw meat to ensure consistency.

Incremental improvements to current SmartShape Gen Two system

To increase uptake across industry and further enhance the value of the current SmartShape system, there are a number of additional incremental improvements that could be made including:

- Increased throughput rate, resulting in decreased cost per primal processed
- An additional increase could be achieved if an automatic bag loader could be fitted.
- Reduced operating costs in the following areas:
    - o Producing a smart shape bag which would double as the vacuum packaging bag, would reduce both the associated labour and packaging costs
- Increase the operating life of the rubber flanges. By doubling the useful life of these the cost per primal could be halved.

Recommendations

Based on value well beyond initial investment, the Smartshape autobagger system business case is extremely robust. The opportunity to generate new profit value for the processor is well in excess of $13 million per annum per system installed.

On the basis that the commercial challenges discussed can be overcome, and that sales demand warrants investment in increased capacity the following recommendations have been proposed for consideration:

- The processors' sales team to identify the most effective product mix (size, volume and value) that could be sold globally.
- Identify which primal specifications (small, medium, large) have the largest volume
- Identify which plant can most easily produce consistent runs of that product size and invest in the installation of a SmartShape autobagger system at that plant.
    - o It is important to note that the SmartShape autobagger system only allows for one bag size to be utilised at any one time.
    - o From discussions the investment should be at the plant that could effectively manage the increase in total volume of grass fed cube rolls between 4.5 and 5.2kgs but to be confirmed by sales.
- Transfer of the existing manual bagger to the plant that is able to supply the remaining sales mix that has a wider range of weight specifications. The manual system is able to accommodate this variation.