



final report

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MSA Express 'Hot Grading' Cost benefit analysis

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1 Background

The Meat Standards Australia (MSA) program was implemented with the core goal to measure and control (systems and standards) against known Critical control points within an enterprise's Total quality management system based on consumers' quality research.

Traditionally the assessment of carcasses for quality attributes has been confined to collection of attributes post chilling, some 12 hours after slaughter.

Inherent issues related to traditional practices include:

- Lag time to make decisions based on quality
- Activities based on 'Night Shift' work times
- Speed of collection required.

In line with the industries desire to reduce cost allocated to this activity and ability to drive change in the processing sector. MSA investigated the possibility of varying collection points for carcass attributes in order to create a streamlined effect.

MSA Express 'Hot Grading' was developed for industry to ensure the grading process could be more suitable to larger processing facilities. 'Hot Grading' does not eliminate chiller assessment. Chiller assessment is still required for the collection of meat colour, MSA marbling, ultimate pH and loin temperature for an eating quality score to be applied to a carcass.

2 Introduction

In an aim to reduce costs, Nolan Meats have undertaken the task of incorporating the MSA grading model into their existing on-plant software system.

Thorsys were engaged in scoping the vendor to develop software and hardware to allow MSA carcass attributes to be collected from carcasses prior to chiller entry, merged with final chiller assessment data, and internal grades to apply an ultimate eating quality grade to the carcasses being processed. This report serves as a comparison of the costs to establish MSA grading within an enterprise compared to traditional Chiller assessment and MSA grading.

Readers are advised that this project was based on set outcomes from the participating enterprise. The implementation and outcomes from each enterprise may vary according to the required outcomes.

3 Objectives

The concept of 'Hot Grading' was an initiative by MSA and put forward to processing plants as a method of assisting with reducing the overall time resources and costs associated with chiller assessment and MSA Grading in processing plants grading beef carcasses.

The objectives of the project were

For MSA:

- Establish systems that offer opportunity to reduce costs to grade
- Alternative collection sites for quality attributes
- Value-add to chillier assessment.
- Reduce working hours
- Apply pre-grade prior to chilling
- One system for data management

For Nolan Meats:

- Reduction of labour
- Real time data collection
- Accuracy of data collection
- Allow for forward planning (operations, staff rostering)
- Scaling the level of training

Industry wide:

- Reduce tools and equipment required
- Schedule of work
- Time of work
- Process time
- Operator time
- Standard work procedures
- Quality outcomes
- Safety outcomes

3.1 Comparison of systems

The table below details a comparison between the systems currently available, pre and post project collection, and MSA traditional and opportunities from Hot grading.

Pre-assessment:

13 carcass attributes were collected throughout the production process. Up to 3 of these attributes were collected in the chiller for a second time, due to a deficiency in computer hardware.

Post-assessment:

- One system for managing data flow this negates the need to collect data twice
- Back up where an attribute is not allocated
- Instant validation of the process and grades
- Pre-grades allocated
- Pre-chiller marshalling possible

This assists in the amount of chiller labour required to re-draft carcasses into boning room groups prior to boning. Over time it is also envisaged that this pre-grade information will also assist in production and boning room management.

Table 1: Existing data collection systems and comparison to Nolan Meats

Required attribute to be collected	Conventional Collection*	Pre-pilot	Post-pilot	Conventional MSA	'Hot Grading'
DNA		Cold	NA	Cold	Hot (if applicable)
Breed		Cold	Hot	Cold	Hot
Hump Height		Cold	Hot	Cold	Hot
Sex	Hot	Hot	Hot	Cold	Hot
HGP		Cold	Lairage	Cold	Hot
HSCW	Hot	Hot	Hot	Cold	Hot
Hang Method		Cold	Lairage	Cold	Hot
Maturity		Cold	Hot	Cold	Hot
MSA Marbling		Cold	Cold	Cold	Cold
Rib Fat		Cold	Cold	Cold	Cold
P8 Fat	Hot	Hot	Hot	N/A	Hot
PH		Cold	Cold	Cold	Cold
Temp		Cold	Cold	Cold	Cold
Meat Colour	Cold	Cold	Cold	Cold	Cold
Fat Colour	Cold	Cold	Cold	Cold	Cold
EMA	Cold	Cold	Cold	Cold	Cold
Aus –Meat Marbling	Cold	Cold	Cold	Cold	Cold

Notes: Methods of collection identified i.e. Hot is represented by collection on the slaughter floor and cold by collection in the chillers or immediately post chilling, * Aus-Meat chiller assessment or Standards carcass definitions.

4 Conclusions

The key benefits resulting from the project are a reduction in labour and increased efficiencies from manipulation of the grading process.

Nolan Meats participated in the program principally with the anticipated reduction in the cost of carcass grading against the COP (cost of production) Additionally the system design would deliver improvement in data capture and accuracy in a real time environment.

The grading system was integrated with the existing slaughtering system which offered efficiencies in factory software management from a support and maintenance perspective. Further synergies were achieved by Nolan Meats with the implementation and integration of lairage / livestock system upgrades concurrently with the combined grading / slaughtering system. The fully integrated system now provides for a more flexible and dynamic data reporting capability at both financial and operational levels.

Key Benefit Area	Outcomes
Cost Savings	<ul style="list-style-type: none"> • 16 % cost reduction in year 1 • 22 % saving in the second year
Allocation of pre-grade	<ul style="list-style-type: none"> • Reduction in carcass drafting prior to boning
Labour skills	<ul style="list-style-type: none"> • Operative on the slaughter floor are not required to be Aus-Meat chiller assessors • Ability to train variable operatives • Reduction in required labour units
Labour working hrs	<ul style="list-style-type: none"> • Reduces total chiller assessment by 2 hours
OHS issues reduced	<ul style="list-style-type: none"> • Limited manual carcass movement
Multi Tasking	<ul style="list-style-type: none"> • Combining labour units for data collection
Data collection	<ul style="list-style-type: none"> • Collection of full data set • Increased feedback for genetic improvement • Real time data collection • Accuracy of data • Ease and flexibility of collection • Back up collection possible
Operations	<ul style="list-style-type: none"> • Reduction in the number of changeovers in the boning room • Reduction in marshalling time prior to boning

4.1 Summary – Stakeholder benefits Payoffs

Benefits are measured based on entry cost. This program will reduce costs to the enterprise to allocate a quality grade over 10 years by \$234,019.

The total cost to grade is indicated to represent 1.4% of the total cost to slaughter and bone an average carcass on site. As a comparison Chiller assessment costs represent 1% of slaughter and bone costs, with limited additional benefits.

The below table is a summary of costs for each assessment method.

Costs	Chiller Assessment		Cold Grade		Hot Grade	
	1	2	1	2	1	2
per kg (HSCW)	\$0.0076	\$0.0058	\$0.0128	\$0.0099	\$0.0106	\$0.0083
Per head	\$1.83	\$1.40	\$3.07	\$2.38	\$2.56	\$1.99

Note: It is assumed that the ongoing costs are equal to cost incurred in year 2. No depreciation has been assumed for any capital expenditure.

Economic

The program has realised a cost savings of 16% in year 1 and 22% in year 2. Anodotocally data accuracy as an issue was noted that Pre-program 2 to 3% was not uncommon. Currently the Post-program systems are recording less than 1%, avoiding the need for re-working product.

Social

Consultation showed that additional data collection provided rigour for processors to provide information back to producers regarding quality traits of the carcasses, and therefore the information for the production sector to make informed decisions regarding long term goals and management decisions. Opportunities from these changes include the social and well-being

changes in an effort to maintain staff education, training, and technical leading to longterm retention and productivity growth.

The changes also remove the distorting effects of hours as such more accurately enables the skills of those employed in the enterprise to be effectively mobilised.

Environmental

No significant benefits or costs are identified as a result of the program.

Further opportunities

Going forward and capitalising on this opportunity highlights several factors that should be investigated in order to further reduce cost.

These opportunities are identified as:

- Elimination of subjective chiller assessment measurement
 - Meat colour
 - Marbling (both Aus-Meat and MSA systems)
 - Migration of the Marbling systems
 - Fat colour
 - Ultimate pH
 - Rib Fat
 - EMA

All of the above will be further investigated as a result of the program and opportunities presented back to industry.

5 Appendix 1 – Cost of Implementation

The table below details an analysis of the first and second year costs to operate the system, also a comparison to basic chillier assessment.

Comparison of annual Operating, Capital and Labour costs over 2 years

Detail	Cost					
	Chiller Ass		Cold Grade		Hot Grade	
Operating Costs	Yr 1	Yr 2	Yr 1	Yr 2	Yr 1	Yr 2
MSA Processor License	\$0.00	\$0.00	\$5,500.00	\$5,500.00	\$5,500.00	\$5,500.00
Plant Survey (day rate)	\$0.00	\$0.00	\$495.00	\$0.00	\$495.00	\$0.00
MSA Processing Staff Training	\$0.00	\$0.00	\$2,400.00	\$1,200.00	\$2,400.00	\$1,200.00
MSA Coordinator Training	\$0.00	\$0.00	\$2,200.00	\$0.00	\$2,200.00	\$0.00
Ausmeat Chiller Ass Course	\$10,800.00	\$2,700.00	\$10,800.00	\$2,700.00	\$5,400.00	\$0.00
MSA AusMeat Standards Kit	\$1,600.00	\$0.00	\$3,200.00	\$0.00	\$1,600.00	\$0.00
MSA Company Grader Course	\$0.00	\$0.00	\$10,472.00	\$2,618.00	\$5,236.00	\$0.00
MSA Hot Grader Training	\$0.00	\$0.00	\$0.00	\$0.00	\$3,920.00	\$980.00
Total Operating Costs	\$12,400.00	\$2,700.00	\$35,067.00	\$12,018.00	\$26,751.00	\$7,680.00
Capital Costs						
pH Meter	\$918.00	\$0.00	\$3,672.00	\$0.00	\$1,836.00	\$0.00
Computer Hardware	\$5,000.00	\$0.00	\$5,000.00	\$0.00	\$5,000.00	\$0.00
Computer Software	\$5,000.00	\$0.00	\$5,000.00	\$0.00	\$5,000.00	\$0.00
DCU	\$6,260.10	\$0.00	\$6,260.10	\$0.00	\$4,173.40	\$0.00
Total Capital Costs	\$17,178.10	\$0.00	\$19,932.10	\$0.00	\$16,009.40	\$0.00
Annual Costs						
MSA plant audits (Ausmeat)	\$400.00	\$400.00	\$400.00	\$400.00	\$400.00	\$400.00
Ausmeat Chiller Ass Corr	\$3,600.00	\$3,600.00	\$3,600.00	\$3,600.00	\$3,600.00	\$3,600.00
Consumables	\$0.00	\$0.00	\$5,000.00	\$5,000.00	\$5,000.00	\$5,000.00
Extras	\$500.00	\$500.00	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00
Total Annual Costs	\$4,500.00	\$4,500.00	\$11,500.00	\$11,500.00	\$11,500.00	\$11,500.00
Annual Labour Costs						
Hot Grader	\$0.00	\$0.00	\$0.00	\$0.00	\$20,000.00	\$20,000.00
Cold Grader	\$40,000.00	\$40,000.00	\$80,000.00	\$80,000.00	\$40,000.00	\$40,000.00
Chiller Staff	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00
DNA Collection Staff	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
pH Audit Staff	\$0.00	\$0.00	\$5,200.00	\$5,200.00	\$5,200.00	\$5,200.00
Total Labour Costs	\$80,000.00	\$80,000.00	\$125,200.00	\$125,200.00	\$105,200.00	\$105,200.00

Year 1 Summary of Costs

Total Year 1 Costs	Chiller Ass	Cold Grade	Hot Grade
Operating Costs	\$12,400	\$35,067	\$26,751
Capital Costs	\$17,178	\$19,932	\$16,009
Annual Costs	\$4,500	\$11,500	\$11,500
Annual Labour	\$80,000	\$125,200	\$105,200
Total	\$114,078	\$191,699	\$159,460
Average cost per week	\$2,193.81	\$3,686.52	\$3,066.55
Head Graded per week	1100		
Average Carcase Weight	220		
Carcase weight per week	242000		
Costs	Chiller Ass	Cold Grade	Hot Grade
per kg (carcase weight) cost	\$0.01	\$0.01	\$0.01
per head cost	\$1.83	\$3.07	\$2.56
Labour Units	2.00	3.13	2.63

Year 2 Summary of Costs

Total Year 2 Costs	Chiller Ass	Cold Grade	Hot Grade
Operating Costs	\$2,700	\$12,018	\$7,680
Capital Costs	\$0.00	\$0.00	\$0.00
Annual Costs	\$4,500	\$11,500	\$11,500
Annual Labour	\$80,000	\$125,200	\$105,200
Total	\$87,200	\$148,718	\$124,380
Average cost per week	\$1,676.92	\$2,859.96	\$2,391.92
Head Graded per week	1200		
Average Carcase Weight	240		
Carcase weight per week	288000		
Costs	Chiller Ass	Cold Grade	Hot Grade
per kg (carcase weight) cost	\$0.01	\$0.01	\$0.01
per head cost	\$1.40	\$2.38	\$1.99
Labour Units	2.00	3.13	2.63