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Implementation of rendering cost model

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Abstract

A spreadsheet-based model for assessing the processing costs of rendering was developed in a previous MLA project. The model was implemented at five rendering plants to determine if it would assist in tracking and controlling costs. The plants estimated that their average processing costs were from $68 to $162 per tonne of rendered product. The lower costs in the range were reported by plants with continuous wet rendering systems. The costs at the low end of the range also included very low estimates of depreciation and interest.

The plants did not change their cost structures during the course of the project. However, the model will show the affect of changes in cost structures by reporting costs per tonne of rendered product. One plant was able to recognise and correct a loss of yield from the section of model's report that compares calculated with actual production.

The model could be used more widely by the abattoir-based rendering sector. It provides more information than some of the in-house cost tracking systems observed during the project. Those who do not track costs could use the model but should also be encouraged to develop their own cost tracking systems designed to suit their particular needs.

Executive summary

A previous MLA project, PRCOPIC.035 assessed processing costs of rendering to be $130 to $265 per tonne of rendered product. As part of PRCOPIC.035 a model was developed to provide a uniform method of entering data and calculating costs of rendering in terms of $ per tonne of rendered product or $ per kg carcase weight. The model applies best to renderers who obtain most of their raw material from livestock processed on the same site as the rendering plant. Information from PRCOPIC.035 was released to the industry and as a result there were several enquiries from the industry, including interest from the Australian Renderers Association, seeking access to model for calculating costs of rendering. The current project was initiated to provide assistance to the industry to implement the model and to assess the functionality and use of the model in wider distribution.

The model was introduced at six rendering plants that were on-site at abattoirs. Three of the abattoirs used the model on four or more occasions to evaluate rendering costs on a weekly or monthly basis. Two of the other rendering plants used the model twice to evaluate costs. The five plants that used the model estimated their average processing costs to be from $68 to $162 per tonne of product.

Some of the data that should be entered into the model is difficult to obtain, particularly when costs are shared between the rendering plant and abattoir. This inhibited the use of the model at some plants. Once the model has been used, the costs are known and do not change unless there are significant changes in plant and labour utilisation. This also reduced the interest in using the model on a week-by week basis.

The model shows the value of product generated per tonne of raw material and the costs of processing. It therefore gives a good guide to the value of raw material at plants that either buy in raw material or assign costs to raw materials that are generated on-site.

The rendering plants that implemented the model did not use it to fine tune costs. The model calculates expected production of rendered product and compares expected production and costs per tonne with actual production and cost per tonne. This complicates the use of the model and the reports generated by the model, but one of the rendering plants found this function beneficial because it pointed to a loss of yield of tallow.

By reporting processing costs on the basis of $ per tonne of product, the model provides a basis for assessing the affects of cost cutting and cost control efforts. It also provides a basis for assessing the value of raw materials. It should help the abattoir-based rendering industry to focus more on the profitability of rendering as opposed to the revenue generated by rendering. The model also shows the profit contributed by rendering to the value of livestock.

The model is designed for use by abattoir-based renderers. It is not tailored to suit independent renderers. Many abattoir renderers use cost-tracking systems. These systems may not provide as much information as the cost of rendering model but they are designed to meet the requirements of the rendering plant management and for this reason they will not be replaced by the model. The data from in-house cost-tracking systems can be transferred into the model to generate costs per tonne of rendered material and to evaluate the value of raw material. It may be useful for renderers to use the model to make these calculations and to quantify the affect of changing costs structures.

Renderers that do not have cost-tracking systems could use the model as a ready system to assess costs.

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1 Background

In 2006, the price of rendered products was similar to what it had been 15 years earlier. In the meantime costs had increased. For example the CPI had increase by 45% (Spooncer and McGlashan, 2007). In the circumstances where renderers cannot increase prices to cover increased costs, renderers have to cut costs to maintain profitability. To assist the industry in cost control, MLA initiated a project to assess rendering costs and identify opportunities to reduce cost. As part of this project a model was developed to provide a uniform method of generating KPIs and comparing costs between rendering plants. The model was discussed in MLA's Fifth Quarter and the joint Food Science Australia, MLA and AMPC publication Meat Technology Update. As a result of the publicity industry expressed interest in using the model. In addition, members of the Australian Renderers Association had expressed interest in benchmarking costs. The model was a potential method of comparing costs from different plants by calculating KPIs and presenting costs in a uniform format. In response, the model was presented in a paper delivered at the 2007 ARA Symposium.

In view of the apparent interest in the model, the current project was initiated to assist rendering plants to implement the model. In its original state, the model had been provided to rendering plants but it had not been utilised because people found it too time consuming to work through the model. With some coaching and technical support it was expected that rendering plants could successfully use the model to track costs. The supported implementation of the model would also identify any errors or specific difficulties and identify possible improvements. If the model could be refined and its implementation simplified, it could be suitable for widespread introduction in the abattoir sector of the rendering industry This could result in improved knowledge of rendering costs and opportunities to evaluate the affect of cost control or cost-cutting measures. The exercise of the assisted introduction of the model at several rendering plants could also assess whether the model has any value in the benchmarking studies proposed by the ARA.

2 Project Objectives

The objectives of the project were:

- Introduce the cost of rendering model at three rendering plants and encourage the plants to submit costs weekly.
- Assess the costs reported by the plants and identify any improvements in cost structures
- Report on the benefits of the cost of rendering model

3 Methodology

Six rendering plants associated with abattoirs were offered training in the use of the model and on-going technical support. The model relates costs and production volumes to carcass production at the associated abattoir. The model can take account of raw material brought in from outside sources but is limited in the amount of data about outside material it can handle. Nevertheless, four of the selected rendering plants brought in material from outside sources.

Three of the plants were selected because they had shown previous interest in the model. Another three plants were selected because they provided a range of rendering circumstances. The six plants are designated A-F. Table 1 identifies the characteristics of each plant.

Table 1: Summary of rendering plants selected to implement the cost of rendering model

Plant designation	**Type of rendering**	**Material rendered**	**Outside material**
A	Continuous wet rendering	Beef from on-site slaughter floor and boning room	None
B	Continuous dry rendering	Beef from on-site slaughter floor and boning room	Small amount of outside material
C	Continuous wet rendering	Mixed species	Outside material from a variety of sources
D	Continuous dry rendering	Beef from on-site slaughter floor and boning room	None
E	Continuous dry rendering	Mixed species	Outside material from a variety of sources
F	Continuous dry rendering	Material from on-site slaughter floor and boning room.	Small amount of outside material

The model was explained to the rendering managers at the six sites in a face-to-face coaching session that took 3 to 5 hours. The MLA report on the cost of rendering project PRCOPIC.035 and written instructions on how to use the model were given to the rendering managers.

The rendering managers were encouraged to enter data into the model on a weekly basis and send the updated spreadsheets to Kurrajong Meat Technology. When updated spreadsheets were received they were reviewed and comments were provided to the rendering manager. Kurrajong Meat Technology provided on-going support to the rendering managers to help the managers obtain accurate data and update the model as required.

The initial plan was to assist the six plants to use the model over a three-month period with weekly updates being submitted by the plants. The plants were unable to submit weekly updates and the project was allowed to run for four months to give plants more opportunity to test the model.

4 Results and Discussion

4.1 Initial implementation

At the initial implementation of the model it became apparent that there were some errors in the model or that improvements could be made. These errors were reported to ProAnd Associates who modified the model. The errors related to the entry of the value of raw material brought in from outside sources and the calculation of expected yields of tallow and meat meal from some species. The modified model was re-issued to those plants that were affected by the initial errors. There is another apparent error in assigning annual environmental costs to the cost per tonne of product. This apparent error has not been resolved with ProAnd Associates.

4.2 Return of updated models

During the course of the project, one plants submitted seven updates of the model; one plant submitted six updates; one plant submitted four updates; two plants submitted two updates and one plant submitted no updates. The initial use of the model requires the entry of about 34 items of data, some which were difficult to obtain. After the initial use, updates required about 6 items of data, most of which related to kill numbers, production volumes of rendered product and values of rendered product. The other data could be updated on an annual or other long-term basis or when the plant knows that the data has changed. For example, employment costs can be entered on an annual and would only be re-entered if there was a known change in employment costs.

It appears that some of the plants baulked at the initial use of the model because they were not confident about the accuracy of the data they were entering. The managers were encouraged to make estimates and were given advice on what estimates might apply. While these plants submitted some updates they did not persist with the model because they were not happy about the quality of the data.

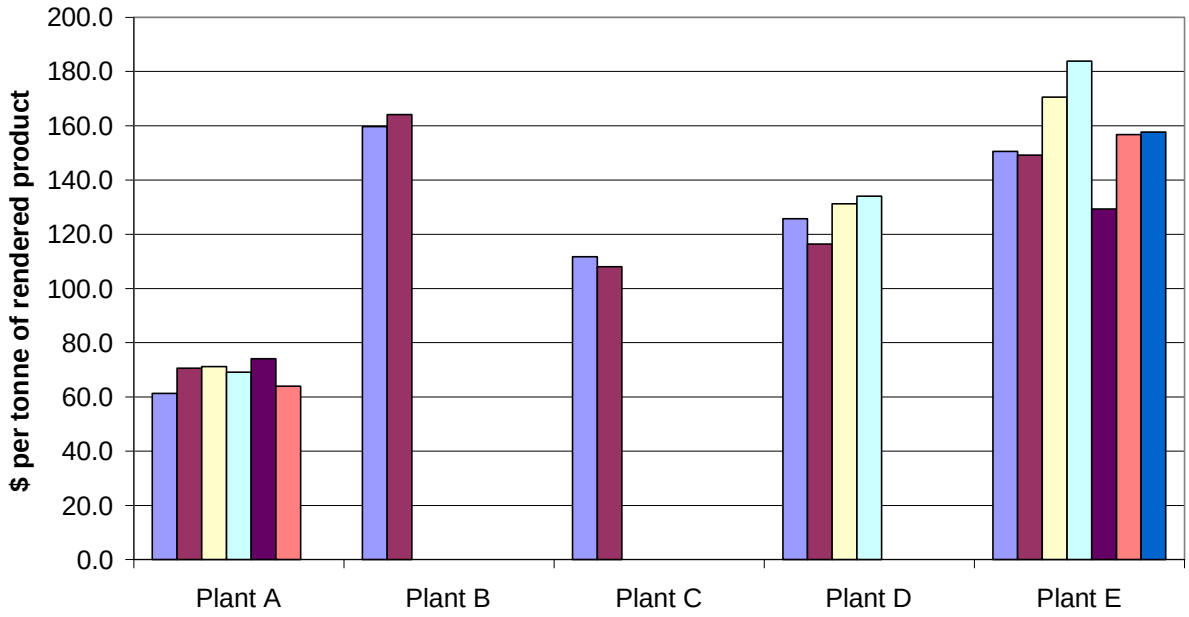
The plants that submitted more than a couple of updates already had cost-tracking systems in place. None of them had cost-tracking systems that used the same data required by the model. But the managers at these plants had ready access to much of the data required for the model. It was easier for them to do the initial set up of the model and they had more confidence in the reports generated by the model.

In addition, the plants that were familiar with tracking costs had a better appreciation of the possible benefits of using the model. Plants that did not assign costs to production of rendered product had less confidence of the value of using the model.

4.3 Submitted costs

The total cost of rendering submitted by the plants are shown in Figure 1

Figure 1: Total cost of rendering



The objective of the project was to assess whether the cost of rendering model is useful to rendering plants and whether it can be used to help control costs. The project was not indented to compare costs between plants or to look for reasons for high or low costs. This assessment is discussed in the report of project PRCOPIC.035. However, Plants A and C clearly had lower costs than other plants. These plants were continuous low temperature plants and had lower energy costs. Plant A, which had the lowest processing cost per tonne, also had the highest yielding raw material.

The average costs of the different components of costs at the five rendering plants are shown in Table 2. Table 2 also shows the average costs of rendering determined in project PRCOPIC.035.
The complete costs submitted during the project are shown in Appendix 1.

Table 2: Average cost components estimated at five plants

Cost component	Average cost per tonne of rendered product ($)					
	Plant A	**Plant B**	**Plant C**	**Plant D**	**Plant E**	**Project PRCOPIC.035**
Staff	21.1	22.9	24.8	17.7	31.4	32.1
R&M	26.0	29.1	24.4	25.9	46.6	48.2
Interest & depreciation	5.2	55.4	32.0	31.0	15.1	52.0
Energy	14.1	54.0	26.3	39.7	51.1	68.00
Environmental	2.0	0.5	2.4	12.6	12.7	
Total	68.4	161.9	109.9	126.8	156.8	200.3

The cost elements that make up the total costs in the model are staff, repairs and maintenance, interest and depreciation, energy and effluent. Staff costs at the 5 plants showed least variation with average costs at the 5 plants from about $18 to $31 per tonne.

Repair and maintenance costs were very similar at four plants at about $24 to $29 per tonne. Plant E had an average R&M cost of $46 per tonne because some of the abattoir R&M costs were assigned to the rendering plant.

There was considerable difference in interest and depreciation costs. The average cost at each plant was $5 to $55 per tonne of product depending on how new the equipment was.

Energy costs were in two bands. The average cost at the continuous dry rendering plants was $40 to $54 per tonne. At the continuous wet rendering plants it was $14 to $26 per tonne.

Environmental costs were difficult to assess. In the submitted model updates, environmental costs were assessed at an average of $0.5 to $12 per tonne of rendered product. Some of the differences between plants are due to the way the costs are apportioned between the abattoir and rendering operations.

The three plants that submitted more than two updates of the model showed some variations in the processing costs. These variations were caused by changes in utilisation. Once the plants established a cost structure, variations in costs per tonne of product in an accounting period arose because of differences in the amount of material processed and amount of product produced during the period.

During the course of the project, the plants did not use the model to assess the affect of changing cost structures. The time-frame of the project was probably too short to make changes to cost structures that would be reflected in noticeable changes to the cost of rendering per tonne of product. As an example of how changes in cost structures could be quantified using the model, a co-generation plant fuelled by biogas from an anaerobic pond was being installed at

one of the co-operating sites. If the site continues to use the model to assess costs, the model should show a change in costs per tonne of product when the new energy source is available.

The model allows for the input of data about the costs of raw material. The model calculates the cost of raw material per tonne of rendered product. Some of the plants entered data on the cost of raw material. The basis of these costings was variable and in all cases only applied to a portion of the raw material. The contribution of the value of raw material has not been included in the costs discussed above. However, from the reports submitted, the typical cost of raw material was about $200 to $250 per tonne of finished product.

4.4 Industry comment on the model

The rendering managers to whom the cost of rendering model was introduced all expressed interest in the model and thought that the model was useful. However, the model clearly is not useful enough to encourage people to use it on a regular basis. Three plants already had reasonably comprehensive cost-tracking systems although these systems did not necessarily relate costs to the quantity of production as does the model. These plants made more use of the model than the plants that did not have routine costing systems although they already know what their costs were. For those who did not have a good handle on costs, the model did not provide any incentive to examine costs or to consider cost reductions or controls.

The model calculates actual costs per tonne of product based on the amount of meat meal, tallow and blood meal produced. It also provides “calculated” costs based on expected yields of meat meal, tallow and blood meal. The manager at one plant found the estimates of expected production useful and used the actual versus calculated production to identify a loss of yield and then tracked down the cause of loss of yield. However, the calculated yields and costs based on yield predictions are probably not necessary. This function of the model adds to the complexity of entering data into the model since expected yields have to be entered. It also makes the report form difficult to read because twice the amount of data that is required is reported. There are other tools for estimating production of rendered product. These tools could be used separately from the cost model and the cost model could be simplified by omitting the yield estimations.

One of the reasons for implementing the model was to determine whether it would be useful in helping members of the Australian Renderers Association to share costs among the members. Although the model provides a uniform way of entering and calculating costs it is still difficult to compare costs between processor because of the difference in raw material types. The extreme example is that the yield of rendered product from a renderer that handles predominantly material from grain-fed cattle could be twice as much as a mixed species renderer. This difference in yield could make the costs per tonne of product at the high-yielding plant less than half the costs at the low-yielding plant. For this reason, comparing costs between plants on per tonne of product basis is not very illuminating.

The ARA is still interested in benchmarking but has turned its attention to sharing information about water use, overall energy use and carbon emissions rather than benchmarking costs.

5 Success in Achieving Objectives

There was limited success in achieving the objectives of the project. The initial objective was to implement the model at three plants and have the plants update the model on a weekly basis over a three month period. The model was introduced at six plants but none of the plants were able to update the model on a weekly basis. Some plants found it too difficult to find accurate

data to enter into the model while others found that the model did not provide clear reports that suited their needs.

The second objective of the project was to use the model to demonstrate cost reductions. There were changes in the cost of production at the different plants but these changes were caused by differences in plant and labour utilisation i.e. variations in production volumes, during the assessment periods rather than by any controlled cost reductions. There is no doubt that if there were changes to cost structures, the model would demonstrate cost reductions by quantifying the cost of production per tonne. But for routine week to week or month to month use of the model, changes in costs per tonne are heavily influenced by the volume of production.

6 Impact on Meat and Livestock Industry – now & in five years time

The plants that have used the model do not have the incentive to continue using it and the project has no current impact on the industry. Abattoir rendering plants are aware of some or all of their rendering costs but do not appear to need accurate assessments of the profitability of rendering operations. The current high prices of rendered product, particularly tallow, have removed some of the urgency to examine costs.

In five years the value of rendered products may change and create more incentive for renderers to examine costs and profitability. In these circumstances there could be more interest in using the model at plants that have not developed their own cost tracking systems.

7 Conclusions and Recommendations

The cost of rendering model was a useful tool for assessing rendering costs in the project PRCOPIC.036.

The model has been used subsequently by five rendering plant. The model provided the participating plants with a breakdown of their costs expressed as costs per tonne of product. While the plants found this information interesting, it was not of sufficient value to encourage the plants to use the model beyond this project. Some plants already had methods of assessing costs and others were more focussed on the revenue generated by the rendering plant rather than costs and profit margin. The model calculates theoretical production and shows costs based on theoretical production in addition to actual production. This makes the model over-complicated and the amount of data entry required for the initial use of the model is daunting.

Renderers who want to track costs should develop systems that are tailored to their own circumstance. One of the participants had a cost-tracking system that was at least as useful as the model. Others had weaker system but the plants had ownership of these systems and were not motivated to use the model instead.

The model has received publicity through Fifth Quarter, a Meat Technology Update and a presentation at the ARA symposium. There is no need to continue to promote the model to the industry. The model should be made available to establishments that want to initiate costs tracking exercises. However, plants that do not have the resources to develop their own systems will probably find the model too demanding to use on a regular basis.

In this project a list of data to be entered into the model was prepared. This list could be provided to people who want to use the model. It will be a helpful supplement to the instructions for using the model.

8 Bibliography

Anon (2006). The costs of rendering PRCOPIC. 035. Meat and Livestock Australia, Sydney, NSW

Anon (2007) Tracking Rendering Costs. Meat Technology Update 3/07 Food Science Australia, Cannon Hill, Qld.

Spooncer W.F. and McGlashan S., (2007) Benchmarking rendering costs. Proceedings of Ninth International Symposium. Australian Renderers Association Inc., Baulkham Hills, NSW

9 Appendices

Table 3: Compilation of all costs submitted by co-operating establishments

Plant	Cost component $ per tonne of product					
	Staff	**R&M**	**Interest and depreciation**	**Energy**	**Environmental**	**Total**
A	17.9	23.5	4.7	14.5	0.7	61.3
	21.3	28.1	5.6	14.8	0.7	70.6
	20.6	24.7	4.9	13.0	0.8	64.0
	22.3	26.7	5.3	14.1	0.7	69.1
	23.9	28.6	5.7	15.1	0.8	74.1
	20.6	24.7	4.9	13.0	0.8	64.0
Average	21.1	26.0	5.2	14.1	0.8	67.2
B	22.6	28.7	54.6	53.3	0.5	159.7
	23.2	29.5	56.1	54.8	0.5	164.1
Average	22.9	29.1	55.4	54.0	0.5	161.9
C	25.3	25.0	32.7	26.4	2.4	111.7
	24.2	23.9	31.4	26.2	2.3	108.0
Average	24.8	24.4	32.0	26.3	2.4	109.9
D	17.3	25.8	30.4	39.6	12.6	125.7
	15.5	24.5	28.4	36.0	12.0	116.4
	18.7	26.3	32.2	41.3	12.8	131.3
	19.2	27.0	32.8	42.0	13.0	134.0
Average	17.7	25.9	31.0	39.7	12.6	126.8
E	29.9	41.5	14.5	52.0	12.8	150.5
	29.9	41.5	14.5	50.6	12.8	149.2
	34.1	52.0	16.4	54.2	13.7	170.5

	37.0	56.4	17.8	58.8	13.9	183.8
	25.9	39.5	12.5	41.1	10.4	129.3
	31.4	47.8	15.1	49.8	12.6	156.7
	31.6	47.4	15.2	50.9	12.6	157.7
Average	31.4	46.6	15.1	51.1	12.7	156.8