final report

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Prepared by: Study Tour Participants
Various Organisations

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IFFA Trade Exhibition and Study Tour May 2014

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Abstract

Process automation is a strategic imperative for innovation in the Australian red meat processing industry. AMPC and MLA are now reviewing the strategy for future investment in technology and attempting to build further strategy in this area.

Key drivers for automation include:

- Labour reduction. Automation is critical to realise benefits through:
  - Reduced processing costs without dependence on unattainable high manning levels
  - Minimizing opportunity costs of redirecting labour from value adding
- Activities in low value tasks that are critical for continuous operations
- Yield improvement. Tight margins mean meat processing can only remain competitive via processing efficiencies that improve yield.
- OH&S. Removing tasks that cause strain and injuries will reduce accident claims and attract a wider pool of workers.
- High food safety standards are key to access markets and compete with other foods.

The current portfolio of MLA's automation projects is represented by a matrix which includes four major quadrants across two species (beef and smallstock) and two processing areas (slaughter and boning), with a core of enabling technologies at the center.

This syndicated PIP project will involve a study program commencing in Frankfurt, Germany, to examine technologies both under development and/or applied on plants to address processing efficeincy, yield and labour challenges.

The project includes:

- Attendance at the IFFA event to examine the range of exhibits covering slaughtering, dismembering, processing, weighing, filling / packaging, conveying, cooling, storing, transporting and selling, as well as spices and additives for meat and sausage products.
- Direct examination of a selected automation opportunity by Australian processors
- Visits to EU processing works, Universities and participation in a range of technology stakeholder meetings to further examine international developments in this area that will inform the development of a revised technology and process automation strategy for MLA and AMPC.
- Determination of what might be applicable and/or that could be further developed as projects integrated into the current technology strategy of MLA or AMPC, or that could apply to Australian processing companies, notwithstanding the recognition of commercial decision making for any specific uptake.

The processors participating in this syndicated PIP study program will:

- participate in all aspects of the project and meet all milestone requirements
- Not use the study tour for commercial purposes

Executive Summary

The technical representatives from nine Australian red meat processing organisations contributed to the success of this initiative, and their observations and insights are summarised below. Additional supplier material, video, and images have also been archived and are available on request. The technical collaboration and comradeship demonstrated by the Australian industry participants was positively commented on by many industry representatives in Europe as indicative of a high level of innovation capability.

The IFFA Trade Exhibition & Study Tour May 2014 itinerary was developed by MLA to:

- Provide an opporunity for processors to visit the IFFA tradefair and interact with the exhibitors in detail;
- Provide an opportunity for processors to visit meat processing facilities in Europe;
- Provide an opportunity for processor technologists and operations specialists to view and gain insights into: primary and further processing, value adding technologies, packaging innovation;
- Provide an opportunity for processor technologists and operations specialists to listen to market updates on Europe and associated markets such as Russia, and to gain insights to feedback to industry and into their own businesses
- Collaborate on the technical evaluation of new technology opportunities, consider how solutions may need to be modified for unique Australian market conditions, and thereby avoid the potential pitfalls in the adoption of new and often unproven solutions.
- Support technical collaboration between processors and innovation capability development in terms of new technology opportunities in primary processing, and exposure to trends and opportunities in packaging, further processing, and value adding.

The study tour was considered successful, as evidenced by

- The level of technical cooperation and collaboration between tour participants, discussing pro's and con's of the various solutions observed, and the adoption potential for Australian firms;
- The level of post tour activity evaluating new technologies and solutions observed;

Key Findings:

Australia processors recognise that on average Australia only contributes 1.1% of global R&D so many of the technological opportunities will come from overseas. Regular global technology scanning is therefore essential to investigate the global technology provision options, comprising services & technology, for primary meat processing (slaughter, dressing, boning, packing) of lamb and beef production.

However, general feedback from international automation consultants and local service providers indicates that Australia does currently have a lead in lamb and beef automation development due to the efforts of the MLA and AMPC programs.

Australian processors are aiming to realise processing efficiencies, labour efficiencies, to manage product cost. They are aiming to identify opportunities and markets to add value to their red meat product offerings thereby building demand and the competitiveness of Australian red meat.

Australian processors benefit from significant global recognition of the strength or quality, “Clean & Green” of Australian branded products. Consequently, an important secondary objective is to expose processing technologists and operations specialists to the options and opportunities to further add value to meat products, through further processing, value adding processes, and packaging presentation innovation.

The challenge is to identify and then to successfully adopt cost effective new work practices, technology, and hence to be innovative in the domestic and global market. In a sophisticated and competitive global market, team work and collaboration will be essential elements for success.

In addition, MLA wishes thank contributors for generously providing their time, expertise, and technical insights.

Contents

Project code: P.PIP.0370

Prepared by: Justin Gathercole

1 Tatura Abattoirs Pty Ltd

P.PIP.0370 - Technology and Automation Study Program and IFFA

Project objectives:

- Receive briefings on R&D and technological development approaches being taken in the EU
- learn about the approaches being taken by processors in the EU and by technology providers for the development of slaughter, boning, vision and sensing and cutting and technologies;
- examine new smallstock and beef technological advances and critique these in relation to opportunities for Australian processors;
- See how new technologies are being implemented by processors in the EU;
- Understand the capabilities available and emerging;
- Contribute to a consolidated program report and also a specific PIP project report relating to a key technology (to be identified in the application);
- investigate and report on a specific issue/area of choice in relation to Australian processing conditions and requirements.

Specific topics:

This project covered a range of objectives to be investigated during this study trip including the following:

1. Identify the technology capable of providing the required information to make application to Ausmeat for the removal of the requirement to put carcase tickets on lambs destined for the boning room.
2. Seek a point of sale scanner able to integrate with existing Wedderburn equipment on our plant to perform a quality assurance check currently performed by the naked eye which presents the opportunity for error.
3. Understand equipment needs and limitations for cutting lamb and beef bone-in chops.

Introduction:

Approaches to date re each of these objectives are as follows:

1. Currently as an Ausmeat accredited lamb processing plant there is a requirement that several times a day our quality assurance team need to randomly select carcases that have been subject to grading and verify the assessment. For each lamb to be identified a ticket is required to be printed and placed on the carcase to enable the sample selection to be checked by the quality team.

At our facility we have put RFID chips on our gambrels which we believe provides an opportunity to use a scanner to bring up this grading information to a scanner for the quality assurance personnel to perform their routine sampling. We are one of only two plants in Australia that are using RFID's throughout their production process and we are seeking to unlock the benefits we can gain through our previous investment.

2. At the commencement of each of our production runs per customer in our retail ready area we generate a test label which is compared by the naked eye against a standard label for the product line and customer run. The Product Description, Price per kg, Weight and Barcode details are checked during this manual review.

   We would like to have the ability to upload a masterfile from our labelling system to a point of sale scanner that would display the relevant information as it will be in the supermarket. Several weeks ago we had an incident where one of the numbers on the barcode was incorrect, not identified by the operator and a product recall was almost initiated.

   This would also avert the risk where products are produced on different labellers where the product masterfile is not the most current.

3. Facilities temper their products down to a frozen state and either use bandsaws or slicing machines to chop the cuts into required sizings. We are looking to cut lamb and beef chops without moving the product from a fresh to frozen state preferably without using a bandsaw for occupational health and safety reasons.

Summary of findings / Conclusion:

Our findings and investigations in relation to our objectives were as follows:

1. Prior to heading overseas we made preliminary investigations with our software supplier, Cedar Creek, in relation to the alternatives they considered possible to meet our objective. Their likely solution involved entering each chiller, scanning an RFID and marking the once scanned, taking the manual measurements and recording these on paper prior to taking the scanner downstairs to batch release the carcases scanned with these results being compared to the data recorded manually on paperwork.

   We did not favour this approach primarily due to the fact that the auditing personnel would only know the accuracy of grading post leaving the chiller areas. This process had the potential to add time in the event of differences requiring re-verification and given the checking process is done several times a day we wanted to make this process streamlined.

We sought a scanner that would enable us to upload the processing database from a grading station by batch or radio frequency, enter the chiller system and test check as required with immediate results on the screen of the scanner for review.

Unfortunately there were only a limited number of scanner suppliers at the fair and we have been unable to find an acceptable outcome at this stage. Once we find a scanner that can hold the processing information for review on RFID scanning then we can work with our software provider to achieve a position for approval by Ausmeat.

2. Prior to heading overseas we made investigation with our labeller supplier, Wedderburn, regarding the ability to meet our objectives. They were only able to offer a scanner that would not integrate to their system in that each change to the product masterfile would need to be manually input to the scanner.

   We would need to ensure that each change to their software systems was also replicated manually on the new scanner. We believed that there should be a method of integration between their software and the scanner.

   During our investigations we found systems of vision technology being developed which takes a photo of each product and compares against a masterfile. This masterfile will include data such as label information, label positioning, product shape and presence of foreign particles in seal. One system currently available through a company called Luceo out of France costs in excess of $200,000, however talking to other companies there are lower cost alternatives that will shortly be available for the Australian market through existing weigh labelling companies although they are still expected to cost in excess of $100,000.

3. Despite their being a number of slicer machines (eg.Holac and Trief) that are capable of slicing boneless meats the capability of these same machines are limited for bone in cuts of red meat. While it was generally agreed between the providers that to slice fresh product there would need to be a crust around the external surface of between – 1 and - 4 celcius machine suppliers were not prepared to warrant their machines could cut all bone in cuts.

   Bone in beef cuts were an issue and while lamb loin chops were possible, lamb forequarter chops were considered an issue given some of the bone is not exposed to the external surface (eg. round bone). Subsequent discussions with Frued who produce circular blades verified the information being provided by cutting system suppliers.

Cutting systems using bandsaw blades are available through suppliers such as Marel, who market AEW saws, and the level of investment required will depend on the volume and raw material product sizing.

Benefit to the industry:

1. Should we be able to find an acceptable solution to all parties industry participants who introduce RFID technologies to their lamb plant will be able to save in excess of 2 cents per carcase slaughtered plus the labour costs associated with placing and removing the ticket on/from the lamb.

2. Provide an option of a streamlined audit scanning tool between the production weighing systems used in processing facilities and retail point of sale systems used in the Australian market.

3. Eliminate the use of bandsaw type systems to cut bone in steaks. Bandsaws are one of the most dangerous pieces of equipment in a facilities boning room with injuries sustained being a significant cost in workcover premiums charged.

Recommendations and Follow Up:

As follows:

1. Make contact with major scanner suppliers to determine their scanner capabilities prior to engaging software provider to link to our existing Cedar Creek Foodchain slaughter system.

2. Meet with Digi, amongst other companies, who are an international company with weight label experience and they believe such a solution should be possible at a reasonable cost. Digi are the supplier of systems to the Wedderburn group and there are many of these systems in the Australian market.

3. Provide model and serial numbers of existing bandsaws to equipment suppliers to determine if available guide systems can be retrofitted to existing machinery. Alternatively new bandsaw type systems for chops will need to be purchased if doing significant quantities of bone in product into chops.

Project code: P.PIP.0370

Prepared by: Graham Traffone and Dennis McClenaghan

2 JBS Australia Pty Ltd

2013 IFFA STUDY TOUR as seen by Graham Treffone,

JBS Australia Pty Limited.

Day 1. *Arrived in Frankfurt and proceeded to Intercity Airport Motel, Frankfurt.*
Activities.

1. *Meet & greet fellow members of the tour as they arrived at motel.*
2. *Trip into Frankfurt for orientation purposes.*
3. *Pre-IFFA group meeting, responsibilities and expectations.*

Day 2, 3, 4, 6 &7*, attend the IFFA trade expo.*
IFFA 2013 presented to the attendees 6 massive exhibition halls, jammed packed with meat processing equipment that included.

1. *Slaughtering lines. Mainly pork & chicken.*
2. *Large slaughtering equipment. Knocking boxes, scalding tanks, de-hairing & singeing equipment. Hide pullers, robotic brisket & pig splitting saws.*
3. *Dressing equipment such as meat saws, hock & horn cutters, brisket & splitting saws, horn cutters, de-fatting knives, air scissors, bone trimmers, rodding tools.*

I was surprised by the number of different companies manufacturing and marketing abattoir cutting and sawing tools other than Jarvis, Bettcher, Kentmaster & Ibex.

4. *Knives, cleavers, mesh & PVC PPE, rubber & safety footwear.*
5. *Sharpening equipment for tools & knives.*
6. *Washing & sanitation equipment for general & personal use & boot washers.*

There appears to be huge emphasis in Europe on assurance that every person entering the process area sanitise with a surgical spirit on their hands.

7. *Automatic crate & tub cleaning equipment.*
8. *Brooms, tubs, shovels & scrubbing brushes, detergents & CIP equipment.*
9. *Ride on & manual floor sweepers & scrubbers.*
10. *Trim line sorters.*

Marel had their trim line system on display. I'm still not convinced that this equipment does what we want it to. Bob Vermeulen is visiting Australia soon and I expect to have further discussions with him to sort out my doubts.

11. *Intralox belting & transfers.*
12. *Multi head weighing systems.*
13. *Traceability processing lines.*
14. *Chemical lean analysers for fresh raw, fresh or frozen cartons.*

The NextGen Foss MM and Eagle FA were on display including fresh meat analysis with full wash down and sanitation capability on both. Marel also have their version called "Sensor X" which was on display in Boxmeer.

15. *In line & pipeline metal detection.*
16. *UV sterilisation. This should be tested as an alternative to 82C water.*
17. *Hyperbaric sterilisation chambers.*
18. *Robotic picking & packing solutions (mainly for geometric shapes)*
19. *Robotic carton or crate picking & palletising systems.*

20. *Sortation systems (like the Ibex).*
21. *Robotic & semi auto processing equipment.*
22. *Meat recovery systems. Sepamatic have added cooling to the process.*
23. *Tripe & casing recovery & processing equipment.*
Olari Conti have added standalone water temperature mixing valves to their tripe processing equipment as added control for the process.
24. *Casings & synthetic skins.*
25. *Ingredients, gums, fillers, rubs & marinades.*
26. *Pickling, injecting & smokers & dehydrators.*
27. *Locker room fittings.*
28. *Brooms, buckets, shovels & scrubbing brushes.*
29. *Spiral, vertical plate & mould freezing systems.*
30. *Refrigeration compressing equipment.*
31. *Membrane skinners & de-rinders.*
32. *Rotary & VS95 vacuum equipment, multivac & tray packers.*
33. *Shrink tunnels, chiller tunnels & air tunnel blasts.*
34. *Robotic baggers & over wrappers.*
35. *Portion cutters, cubers & chop cutter (incl. T-Bones).*
36. *Bandsaws of all sizes, styles & brands.*
37. *Printers, labellers & inserters.*
38. *Manual lift assist equipment, pallet lifters & tilters. These would be handy for quarter beef.*
39. *Steam irons.*
40. *Effluent polishing screens & treatments.*
41. *Meat stringing machines & netting equipment.*
These would be very handy to reduce labour and improve efficiency.
42. *Hoses & spray guns.*
43. *Waste product vacuum transfer systems.*
MBA have these systems that they claim can move waste material 400 meters.
44. *Paunch dewatering presses.*
45. *Pre-breakers & grinders, render cookers.*

Most of all IFFA was about pork, smallgoods, sausages and anything further processed.
Every hall was littered with processing equipment or ingredients for the pork industry.
Finding equipment outside the ordinary for the beef & lamb processor was hard.
There were copious amounts of,

1. *Massagers, mincers, blenders & fillers.*
2. *Formers, formax for patties, sausage, meat balls, kievs & kebabs.*
3. *Lifters & bucket elevators.*

Day 5.
Travelled to Hamm, Germany to a company named Westfleisch who process pork & bull beef to view the E+V beef carcases grading system in action.
The E+V system takes several carcase characteristics such as weigh, fat distribution & conformation to determine lean meat yield for payment purposes.

Day 7. Tranfer to Paris.

Day 8.
Visit PackForum, sealed air's R&D centre in Paris for introductions & pre-day activity meeting.

1. *Travelled to "Auchan" Supermarket to witness the various types of retail ready packed products available on the supermarket shelves for meat, poultry, seafood and smallgoods.*
2. *Visit second supermarket "Carrforrs"to compare the differences in packaging and presentation between the 2.*
3. *Return to PackForum for an overview of the global meat business and a inspection of the developmental equipment currently in the R&D centre.*

Day 9.
Free day in Paris

Day10.
Travel to Dusseldorf, Germany and then across the border to Cuijk, Netherlands.

Day 11.
Travel to Marel R&D centre, Boxmeer (NL) then onto,

1. *Vanlommel, Belgium a veal only processing facility to view a Marel "trim line"system in operation.*
2. *Goedegebuur, Rotterdam (NL) a Holstein/fresian hindquarter only boning room to view a Marel "stream line" system in operation.*

Day 12.

1. *Visit "Pukon" poultry to view 2 Marel chicken pattie & chicken kiev forming, coating and crumbing lines in operation including baking and pre-pack cooling systems using reclaimed chicken meat.*
2. *Return to Marel, Boxmeer for full tour of R&D workshop and test centre.*

Day 13.

1. *Return to Marel Boxmeer, to witness the Marel DMM 10, low pressure meat separation equipment in operation, processing veal bones and the Marel pattie former line in action using the reclaimed veal product from the DMM 10.*
2. *Travelled to Apeldoorp (NL) to witness a 2 man vertical plate freezing operation in action.*

From my point of view visit provided the single most system with the WOW factor of the entire trip.
We have been looking at plate freezing for nearly 15 years now and have never been able to tick all the boxes on how we could handle fresh product into vertical plates and onto pallets without adding lots of labour costs.
This plant was doing 120 metric tonne of product with only 4 units of labour per day.
CO2 was the refrigerant running at -40C and achieving a frozen block core temperature of -18C in 90minutes per plate freezer

Day 14.
Travel to Dusseldorf, then from Dusseldorf to Frankfurt on the ICE train.

Day 15.
Free day in Frankfurt.

Day 16.
Start journey back to Australia.

Special thanks to Chris Ruberg for organising the trip to IFFA and the after tour to France, Belgium and the Netherlands and keeping the group together without incident. A job well done.

Project code: P.PIP.0370

Prepared by: John Hart

3 John Dee Warwick Pty Limited

Date submitted: July 2013

Executive summary

John Dee Warwick participated in the IFFA Study Tour in May 2013. From a John Dee perspective, the purpose of undertaking the study tour in Europe was to compare technologies and see if other systems may impact on the direction of decisions made in relation to materials handling priorities.

This study tour was undertaken under a project syndication involving representatives from several Australian Red Meat companies (see Photo 1). The study program commenced in Frankfurt, Germany to examine technologies both under development and/or applied on plants to address processing efficiency, yield and labour challenges.

Photo 1: IFFA syndicated 2013 study tour participants.

The study program included:

- Attendance at the IFFA event to examine the range of exhibits covering slaughtering, dismembering, processing, weighing, filling / packaging, conveying, cooling, storing, transporting and selling, as well as spices and additives for meat and sausage products.
- Direct examination of selected automation technologies.
- Visits to EU processing works, Universities and participation in a range of technology stakeholder meetings to further examine international developments in this area that will inform the development of John Dee's research and develoment priorities.
- Develop networks and direct contact with suppliers and service providers to assist with implementation of pilots and evaluation of technologies and services.

Primary focus areas for John Dee were beef boning, materials handling, load out logistics. The general focus areas for John Dee included:

- Lifting system (dock & container load out and various processing operations)
- Automated guided vehicle (container load out)
- Knife sharpening (semi and fully automated options)
- Optimal slaughter and boning floor technologies (NAWI)
- Manual assist including intelligent assist devices
- Naked block freezing
- Beef boning
- Cleaning and hygiene products
- Vision or Sensing technologies
- Grading and objective measurement technologies
- Cold storage, chilling & freezing technologies
- Sorting or Packing technologies
- Traceability and identification technologies
- Alternative cutting technologies
- Contamination detection and sterilisation
- Chemical Lean (CL) trim management systems (Marel)
- Sortation and auto-stacking technologies
- Inventory management
- Vision or Sensing technologies (cut identification through image analysis of cartons)
- Plant information and decision support systems

John Dee is currently engaged with several international companies as a direct result of the study tour program with interest in a range of beef slaughtering and boning processing technologies. Opportunity exists for companies to participate in collaborative efforts in areas of mutual benefit and John Dee would be interested to undertake syndicated R&D for specific industry beneficial initiatives.

Background

Process optimisation and innovation are critical in the Australian red meat processing industry. Key drivers for adoption of new techniologies and ideas include:

- Labour reduction. Automation is critical to realise benefits through:
    - Reduced processing costs without dependence on unattainable high manning levels
    - Minimising opportunity costs of redirecting labour from value adding
- Activities to low value tasks that are critical for continuous operations

- Yield improvement. Tight margins mean meat processing can only remain competitive via processing efficiencies that improve yield.
- OH&S. Removing tasks that cause strain and injuries will reduce accident claims and attract a wider pool of workers.
- High food safety standards are key to access markets and compete with other foods.

John Dee's John Hart participated in the syndicated study tour program involving several Australian Red Meat companies in May 2013. The study program commenced in Frankfurt, Germany to examine technologies both under development and/or applied on plants to address processing efficeincy, yield and labour challenges. At the conclusion of the IFFA program, there were various plant and supplier visits undertaken in Paris and Netherlands (See Figure 1).

Figure 1: Study tour 2013 program map

The study tour allowed focus on the following key questions:

- What new technologies are under development that directly relate to current gaps in the Australian approach specifically John Dee's material handling priorities ?
- What technologies or approaches might apply to further R&D and priorities for John Dee?
- What is the focus and strategy of technology providers and processors in the EU and other countries? How can this inform the Australian R&D priorities ?
- What learnings can be gained from comparing these approaches to the approaches in

Australia, what are the gaps and what information do we need to upgrade the current information on these activities for processors in Australia?

Study Tour Objectives

The overall purpose of undertaking European tour is to compare technologies and see if other systems may affect direction of decisions made in relation to materials handling project.

The study program specific objectives were :

- learn about the approaches being taken by processors in the EU and by technology providers for the development of slaughter, boning, vision and sensing and cutting and technologies;
- examine new beef technological advances and critique these in relation to opportunities for Australian processors;
- See how new technologies are being implemented by processors in the EU;
- Understand the capabilities available and emerging;
- Identify priorities that can contribute to priority (consolidated) focus areas;
- investigate and report on a specific issue/area of choice in relation to Australian processing conditions and requirements.

Study Tour Program

3.1 Pre-Study Program Briefing

- A briefing was initially undertaken to consolidate the key questions and company-specific issues.
- During this briefing, an agenda, program terms of reference, the itinerary, key discussion questions and standardised presentations was finalised.
- Agreement on the reporting (format template to be provided) and products from this project was developed.
- As part of the application processes, John Dee provided key focus areas that will be investigated as part of the study tour program.

3.2 Visit to IFFA

- Briefings were given by overseas colleagues to inform participants of the current considerations, approaches, interventions and practical applications underway in relation to technology development.
- Participants attended the IFFA program with focuses on their company specific priority areas.
- 960 companies on show from 47 countries, 60,266 trade visitors from 142 countries, 110,000 square metres display
- John Dee approached their contacts and arranged critical contacts
- Key focus areas :
    - Energy & resource sustainability

- Spiralling price of resources
- Clean labelling recipes
- Convenience
- Snacking
- Food Safety & accreditation

3.3 Visits to processor, suppliers equipment fabricators

- Meetings with technology suppliers and industry representatives to gain further knowledge to complement site visits. Some of these will be scheduled during the time at the IFFA program.
- Summary presentations on Australia's activities were provided.
- Noteworthy suppliers included :
  - EU: MPS, Banss, SFK-LeBlanc-Narvic, Attec
  - Aust: Scott Technologies, MAR, BMC/KK
- Refer to Appendix A, B, C for full study program

3.4 Study Program de-briefing (held in country)

This de-briefing included the following activities:

- Consolidation of the information collected on the various technologies;
- Confirm what each processor will focuss on reporting;
- Consolidation and reporting on the research questions or issues documented as part of the study program (and fulfilled through the respective stakeholder meetings)
- A summary of the solutions observed, the applications and how these may relate to Australian circumstance;
- Collation of the information required to provide a consolidated report on all learnings to be disseminated to industry and that will inform current/future research projects and activities in industry, as well as the MLA or AMPC strategy for investment in the future;
- Identification of key issues, gaps and opportunities.

3.5 Submission of the Participant-specific reports

Each participant investigated a company-specific issue and prepared a report includes:

- The nominated task including background information (e.g. benefits, opportunities, current challenges or issues with practices, benefits to wider industry broadly);
- Summary of any related approaches used to date in Australia;
- Description of the possible solution, opportunity or approach to be examined.

3.6 Followup after the completion of the program

Upon completing the study tour, the processor reported on:

- The various technologies and R&D priorities identified;
- Networks established and ongoing contact with options of trialing and evalaution technologies and services;
- Where appropriate evaluate options of syndication with other companies where mutual benefits is identified by collaborating.

Study Tour Priorities (John Dee)

The highlights of the study tour program for John Dee (See general field notes – refer to Appendix B) were :

4.1 Production Control Systems (visit of CSB):

- Attend seminar in Stuttgart showing CSB's production control systems.
- CSB's systems control a wide range of management systems covering enterprise-wide system integrating aspects of businesses from procurement and production through to sales, inventory, requirements planning, traceability system, quality management according to HACCP, IFS, BRC, ISO, Food Safety Programs, logistics and financial accounting.
- Traceability and cost control is reached though connection of systems with the final terminals as scales, scanner, transponder, labeling machines, batching systems, picking systems, sorter, storage and retrieval machines, etc.

4.2 Picking and Packing (Visit of a meat plant and logistics center of the supermarket EDEKA).

- Picking capacity of 130,000 order lines with 100,000 crates and boxes per day, ca. 630 tons per day. Cutting capacity: ca. 800 pig halves and 35 fattening bulls per hour. Cold store capacity: 4,000 half pigs, 600 beef quarters and 1,000 beef roasts. Transport performance: 3,000 meters of conveyor belt, ca. 7,000 crates per hour. Automatic crate storage: ca. 50,000 storage locations
- This plant demonstrated the extent Europe has progressed in automation with materials handling in relation to Super Marked supply.
- Traceability requirements of the EU have shaped production techniques to reflect regulation requirements. This is a high capital cost exercise.
- When asked questions on maintenance manning, the reply was 50 for normal duties and 100 when maintenance demand requires more resources.

4.3 Materials Handling (Visits to IFFA stands - Attec, MPS, MFI, JLS, Nieros, Tavil)

- E+V Technology (GmbH & Co.KG) – for grading & carcase confirmation.
- Cut sortation. Has the potential to sort raw cuts prior to packaging. This could be an answer to reducing labor at the packing line.
- Lifting (hydraulic) Torras hydraulic lifting systems in 2 models (see Figure 2):
  i) Torras (Barcelona Spain) Meat Loading Model (BMI) – refer to Figure 4 :
    - Constructed totally in stainless steel and according to effective norm.
    - Oleodynamic operation
    - Lifting capacity: 300Kg. max.
    - Maximum Length: 3.170mm; Minimum Length: 2.720mm; Max. /Min. altitude: 2.700/950 mm.
    - Rotation: 360º (Exclusive)
    - Exclusive Fixation by its base of 400 x 400.
    - Installed electrical Power: 1.5KW. 240/400V. Three-phase. 50/60 Hz.

- Electric panel in a IP67 plastic box
- Electrical Manoeuvre to 24 V.
- Production: 4 cycles / min.
- Total Weight: 300Kg.
- Total Volume: 2,0m³
- Estimated AUD $6,500

ii) Torras Hydraulic loading arm for refrigeration (Trucks model; BCI)

- Specially designed for refrigerator trucks
- Made in stainless steel with CE mark.
- Lifting capacity: 180Kg.
- Length: 2200mm.
- Power: 800 W. 24 V. DC.
- Height max. / min.: 2150 / 500mm.
- Weight: 80Kg.
- Estimated AUD $5,500

Figure 2: Torras lifting systems

4.4 Knife Sharpening (E50 Knecht)

- Fully automatic hand knife sharpening machine sharpens knives of diverse shapes and sizes.

- The 4-axis operated gripping arm extracts a knife out of the magazine – the exact individual knife shape is detected – the knife is sharpened, deburred and polished – the gripping arm returns the knife to the magazine.
- The E 50 fully automatically sharpens knives of diverse shapes and sizes.
- 48 hand knives are placed randomly into the knife magazine.
- They are processed as follows: The 4-axis operated gripping arm extracts a knife out of the magazine – the exact individual knife shape is detected – the knife is sharpened, deburred and polished – the gripping arm returns the knife to the magazine.
- The output is up to 400 knives per 8-hour shift.
- Knife gripping arm - The central organ of this machine is its 4-axis operated knife gripping arm. It grabs the knife handle, moves the knife through the different processing positions and guides it, according to its exact shape, through the sharpening stages.
- Before the sharpening program can begin, each individual knife is scanned at the measuring station. The detected knife shape is then converted into CNC data. The gripping arm steers the knife, according to this data, through the complete sharpening process.

Figure 3: Fully automatic hand knife sharpening machine (Knecht) including gripping arm.

- Benefits of Knecht knife sharpening system :
  - Individual measurement and calculation of the optimal sharpening process of every single hand knife
  - Original knife shape is retained through every resharpening process
  - Sharpening of up to 400 hand knives per 8-hour shift (depending on the knife shape and size), at one man-hour
  - Knife magazine providing a capacity of 48 hand knives, can be loaded with knives outside the machine during the operating process
- Overall opportunity for E50 Knecht knife sharpening :
  - Primarily all sharpening in Australia is hollow ground. The limitation of the E50 Knecht system is that it does not have this function.
  - While opportunity exists for John Dee (ie employ 2 full time labour units) it is unlikely that the system can be adopted in Australia
    - John Dee is considering semi- and fully automated knife sharpening options.

4.5 Chine Boning

- Danish Crown, vision sensing & robotic for loin cutting for pork, tunnel scanning, removal of chine bone (spine cutter robotic)
- Currently using bandsaw to take chine off
- A second technology available is Attec rib remover

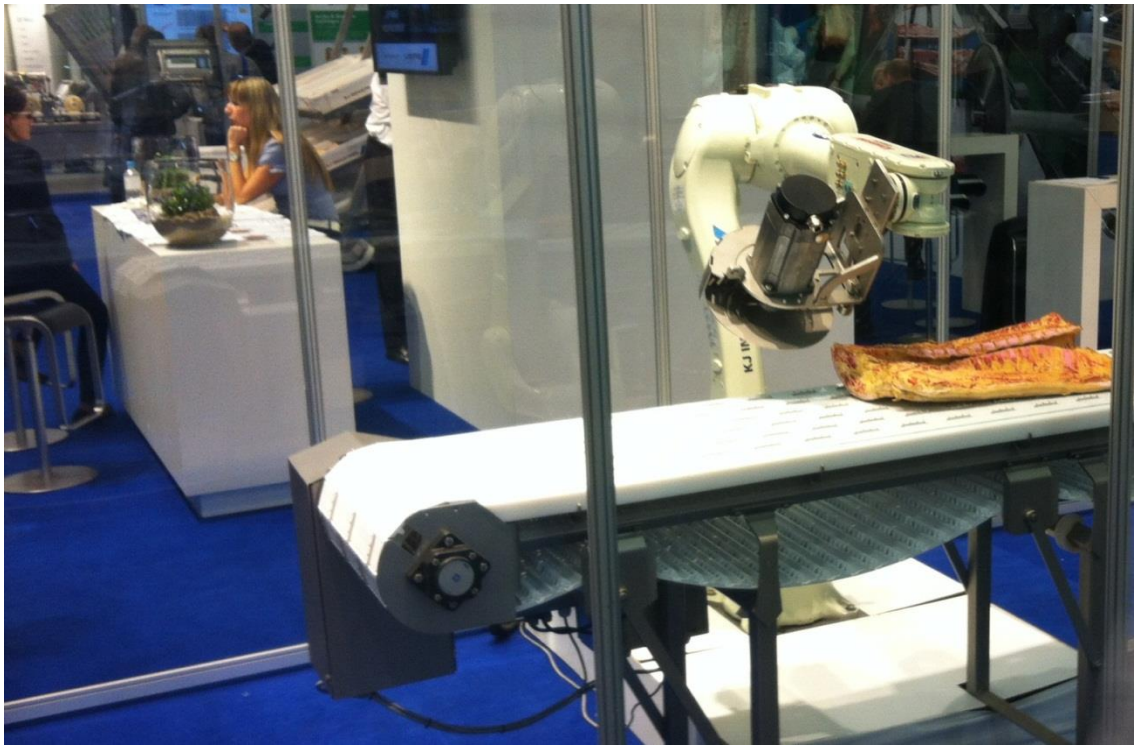


Figure 4: MPS pork rib vertabrae remover

4.6 Pork processing transferable to beef processing (Visit Vion Plant – Pork processing)

- Pork processing plant was recently bought out by executive buyout and had modernised boning room with pork cutting lines using Frund saws to improve efficiency.
- This plant did not have much to offer in the materials handling area, although the observation of value adding indicated they were modernising.

4.7 Optimal sortation & palletising (Visit boning and distribution centre)

- This plant was boning 850 quarters/day using system to ensure traceability. 3 lines produces 50 quarters/hr. Boning lines were to produce 20 quarters /hr/Line. 13 cuts FQ, 14 cuts/HQ.
- Traceability a main focus to boning facility. Each carcass could be tracked to the packing area where labels were placed on meat portions identifying the animal origin.
- This plant also produced lines of hamburger, mince etc for supermarket ready portions.
- All items were placed in standard RFI tagged European tubs where they were tracked and automatically loaded on to pallets and stored in an automated chiller facility.
- On demand pallets were retrieved on demand and conveyed to an automated individual bin storage facility.
- Again on demand items were retrieved and transferred to picking stations where orders were assembled.

- Once orders were complete, plastic tote bins were transferred once again to pallets for orders dispatched to a large marshalling area where product was loaded to refrigerated transport vehicles on route to supermarkets.
- This facility could transfer 3000 trays/day and store 50,000 and 1800 pallets with no labour.

4.8 Horse meat processing transferable to Beef processing (Visit NabaCarni)

- This plant portioned horse meat shipped in from Poland.
- The main propose of the visit was to observe Bizerba packaging and labelling equipment.

4.9 Optimal Slaughter floor processing (Visit beef processing plant)

- This abattoir produced 157 cattle/hour.
- Equipment included a twin knock box system and blood collection facility. After legging and preparation steps carcasses were presented to twin downward hide pullers and then on to a rotary evisceration system. After inspection carcasses were split with two inline automatic saws, which appeared to be accurately dividing sides. Notes there was a manual splitting saw that was used for their higher quality carcasses.
- Boning room was constructed for traceability, and also noted was the attempt to assist boners with ergonomic layout. Various options for value adding to trimmings were available such as cold forming of product for Carpaccio and mincing lines.
- Noted on this site was a bio gas plant producing 350m3/hr of methane gas running a 1meg generator. Hot water was generated from generator exhaust and sludge dried from the same gasses. Comment made was that in spite of every effort made to recover energy, the plant did not have a cash positive outcome. Maintenance costs from high wearing plant were absorbed benefits.

4.10 Veal processing (Visit J.Vanlommel Veal processing, Belgium)

- Visit a specialist boning and packing plant using Marel streamline boning system.
- This boning only facility had introduced Marel equipment to address traceability requirements 12 months previous. Daily boning of 120kg veal carcasses and 250kg Belgian Blue carcasses. The line processed 26 bodies/hr with 8 boners (490Kg/man/day)

4.11 Processing (Visit Goedegebuur, Rotterdam)

- Boning only processing line to view 26 station Marel boning line.
- Plant processed 10,000 hind quarters/week to achieve 140~150kg/man/hour. Saw 16 boners for butt cuts and 8 boners on loins.
- Marel system was installed to trial productivity gains. Management indicated they were considering adding a Marel boning line to the loin boning section.

4.12 Optimal processing

- A processing plant at Plukton that was producing snitches 2.5 tonne/Hr and cordon bleu at 1.2 tonne/Hr on two lines over two shifts.

4.13 Processing Technologies (Visit Marel Centre Boxmeer)

- On demonstration was the portioning machines …400 (1000kg/Hr)showing the dry processing technology that can produce patties, nuggets, and many other shaped pieces in a cold forming process (incoming product -2degC)
- Products demonstrations were patties (65~70 CL) and skinless sausage. These products were cooked for taste testing.
- Equipment in demo centre included spiral cooker, spiral freezer, and Marinade unit.

4.14 Technology Demonstration (Visit Marel Centre Boxmeer)

- Viewed operation of Marel DMM10 with Sepremat ic de-Sinuer. The demonstration showed principal of low pressure pressing of bones to achieve a 20% meat recovery of meat
- First press is through 6mm holes in pressing chamber and then product is pressed through 3mm holes in de-sinewing operation.
- Showed products with DMM – meat Patties with 10% and meat Ball with 20%
- Meat recovery estimated at 4kg body using vertebra and neck bones
- DMM10 750kg/Hr, DMM 2.5 t/Hr, DMM70 5 t/HR
- If second press used to clean bones a further 20% meat recovery can be achieved at a lower quality. Suggested prices at 1.5 euro for high quality and .75 euro for low quality.

4.15 Trim Line Management (TMS) - (Visit Marel Centre Boxmeer)

- Marel have developed a quality check trim line.
- The principle is that an operator roughly sorts batches of product to pass through the “sensor x” x-ray. Product is then checked for contaminates and CL measurement. The batches then pass on to a grading conveyor where they are sorted into CL boxes or bins where the CL graded product is accumulated into required kg lots.
- Marel’s trim management system is designed to analyse beef and pork trim for fat/lean ratio, and give processors the ability to manage their trim and hit target fat percentage

Figure 5: Marel CL Trim Management System

Marel's trim management system is designed to analyse beef and pork trim for fat/lean ratio, and give processors the ability to manage their trim and hit target fat percentage.

Features

- Effective analysis of fat/lean (CL) ratio in meat
- Detection of contaminants
- Continuous real-time data collection
- Creation of batches with target fat percentage
- Total Trim Management solution

Marel's new Trim Management System is designed to analyse beef trim for fat/lean ratio (Chemical Lean) and give you the ability to manage your trim and reach batch target fat percentage.

Trim Management :

- Knowing the accurate fat percentage of incoming product is valuable, but controlling what actually comes out of the process will give you even more added value.
- Using Marel's grading and batching technology, the system makes different batches of precise fat/lean ratio (CL), based on incoming products and on your requirements (for example 50/50, 75/25 and 80/20).

Fat analysis :

- The core of the Trim Management System is the SensorX, which uses x-ray technology to scan the product.
- This enable the SensorX to detect presence of hazardous contaminants and decide the precise chemical lean ratio of the meat.
- Product with hazardous contaminant such as bone, metal or glass is removed from the process, through specified reject gates.

Technical specifications

- Max individual product dimensions: 250 x 200 x 50 mm
- Throughput: Up to 6 tons/hour depending on final batch size.
- Measurement accuracy 25 kg crate:
- For a 25 Kg/55 lbs to 100 Kg/220 lbs batch the accuracy will be +/- 2% from the target CL, in 95% of the cases.
- In other words: if CL target is 85% - then 95% of the batches are between CL83 & CL87.
- Measurement accuracy batching into large dolavs / combos:

- For a 100 Kg/220 lbs to 1000 Kg/2200 lbs batch the accuracy will be +/- 1% from the target CL level, in 95% of the cases.
- In other words: if the CL target is 85%,- 95% of the batches are between CL84 and CL86.
- Contaminant detection (smallest dimensions)
  - Bones: 5.0 mm
  - Metal: 5.0 mm
  - Stone: 5.0 mm
  - Glass: 5.0 mm
  - Other options
- The Trim Management system can be integrated with Marel's StreamLine deboning & trimming system.

Benefits

- Less lean giveaway
- Fewer complaints, claims and rework
- Superior in contaminant detection
- Labour savings
- Improved process flow

4.16 Autobagger (Sealed Air)

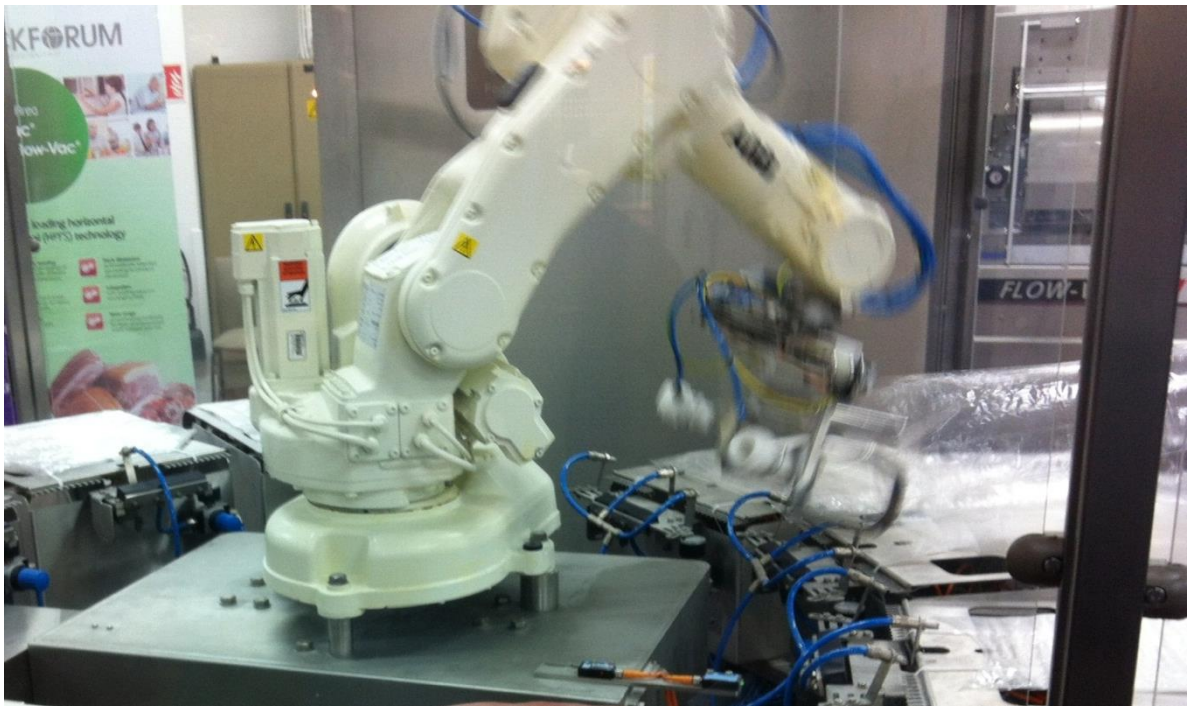


Figure 6: Sealed Air autobagger

4.17 Knife Sharpening (Knecht)

The E50 (Knecht) :

- Fully automatic hand knife sharpening machine sharpens knives of diverse shapes and sizes.
- The 4-axis operated gripping arm extracts a knife out of the magazine – the exact individual knife shape is detected – the knife is sharpened, deburred and polished – the gripping arm returns the knife to the magazine.
- The E 50 fully automatically sharpens knives of diverse shapes and sizes.
- 48 hand knives are placed randomly into the knife magazine.
- They are processed as follows: The 4-axis operated gripping arm extracts a knife out of the magazine – the exact individual knife shape is detected – the knife is sharpened, deburred and polished – the gripping arm returns the knife to the magazine.
- The output is up to 400 knives per 8-hour shift.
- Knife gripping arm - The central organ of this machine is its 4-axis operated knife gripping arm. It grabs the knife handle, moves the knife through the different processing positions and guides it, according to its exact shape, through the sharpening stages.
- Before the sharpening program can begin, each individual knife is scanned at the measuring station. The detected knife shape is then converted into CNC data. The gripping arm steers the knife, according to this data, through the complete sharpening process.
- Benefits of Knecht knife sharpening system :
  - Individual measurement and calculation of the optimal sharpening process of every single hand knife
  - Original knife shape is retained through every resharpening process
  - Sharpening of up to 400 hand knives per 8-hour shift (depending on the knife shape and size), at one man-hour
  - Knife magazine providing a capacity of 48 hand knives, can be loaded with knives outside the machine during the operating process

Figure 7: Fully automated Knecht sharpening system.

4.18 Sortation and Auto-stacking

Figure 8: Sortation and auto-stacking

4.19 MPS pork rib remover

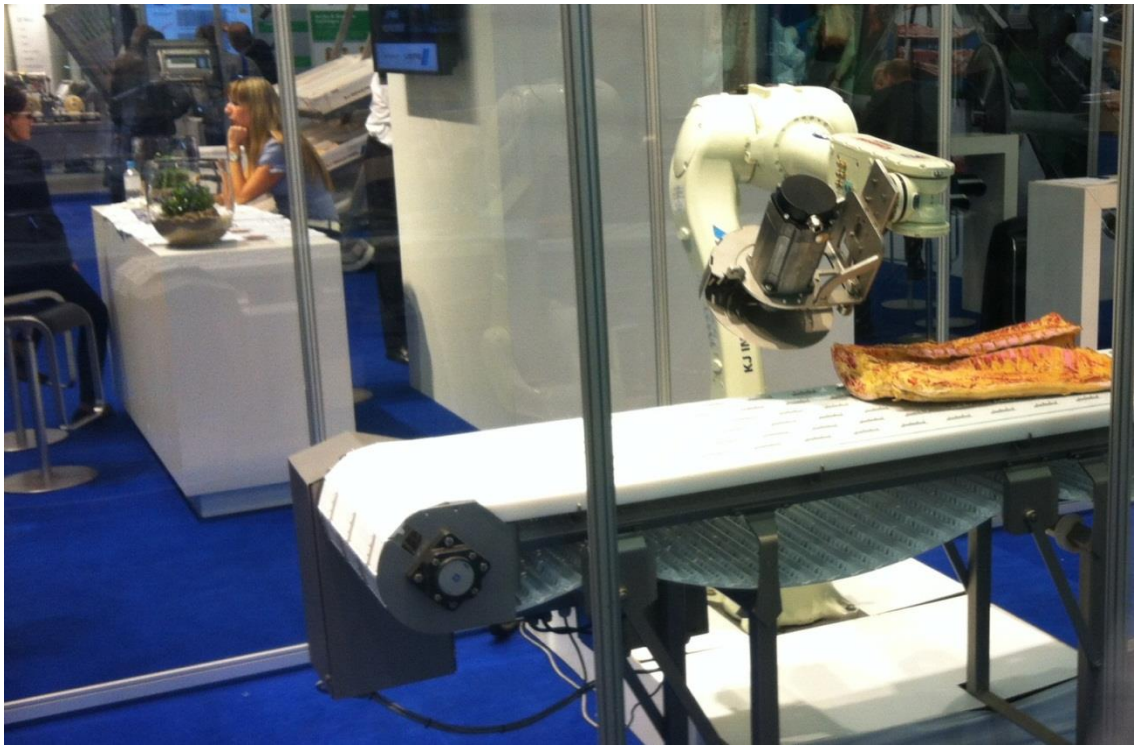


Figure 9: MPS Pork rib remover.

4.20 X-Ray finds Bone, Metal, Glass, Stones, PVC - (Visit Marel Centre Boxmeer)

- Examples of grading achieved 50/50,70/30,80/20,54/64,68/32
- Marel have measured and advise they find a consistent 4% red meat give away of red meat.
- Marel also showed if the Trim Line system was placed after Streamline boning system a person would be saved as trim is already batched. Traceability is also enabled by this system as individual animal identification is achieved on the Streamline process.
- Also discussed was the Incoming Meat Inspection System (IMI) was developed for the purchased to inspect and grade incoming trimmings
- Note. Graham-JBS advised aperture may be too low at 100mm to handle chuck which they pass through the trimming line at times.

4.21 NAWI automated system of plate freezer filling and packing (Visit Grolleman Cold Store)

- NAWI automated system of plate freezer filling and packing of 120 tonnes /Day
- The facility is a freeze, pack and ship service. Companies send fresh product to this cold store to be processed.
- System consisted of a large room 60mX20mX12m high. Bulk bins were transported to facility, and hoisted up to a loading platform where weighed batches were loaded into

loading chambers. As the charging bin was filled, the whole load was lifted over the plate freezer and discharged into freezing chambers.

- The DSI plate freezers (a Danish company) running on CO2 liquid recirculation (-40degc) could freeze product in 90 minutes.
- Chambers hold 70kg and a unit can hols 1000~1200 kg in total.
- Frozen blocks were robotically loaded on to pallets placing a sheet of plastic between layers. Bocks could also be individually wrapped by a interchangeable section in the line where a flow wrap machine is added.
- Plant mostly runs in Co2 (40,000kg) and a smaller amount of Ammonia (1200kg).
- Overall the opportunity exists for NAWI Naked block freezing :
  - Opportunity to remove labour out of boning process (350T/day naked block beef trim using 4 staff)
  - Issue is exporting
  - Stamped dye establishment number on each block
  - Offals (pork livers) in naked block freezing as well
  - Frozen blocks sleeved with plastic and robotic staking of individual blocks

Figure 10: Naked block freezing

Figure 11: Naked block freezing

4.22 Products & packaging

- Shaping technologies

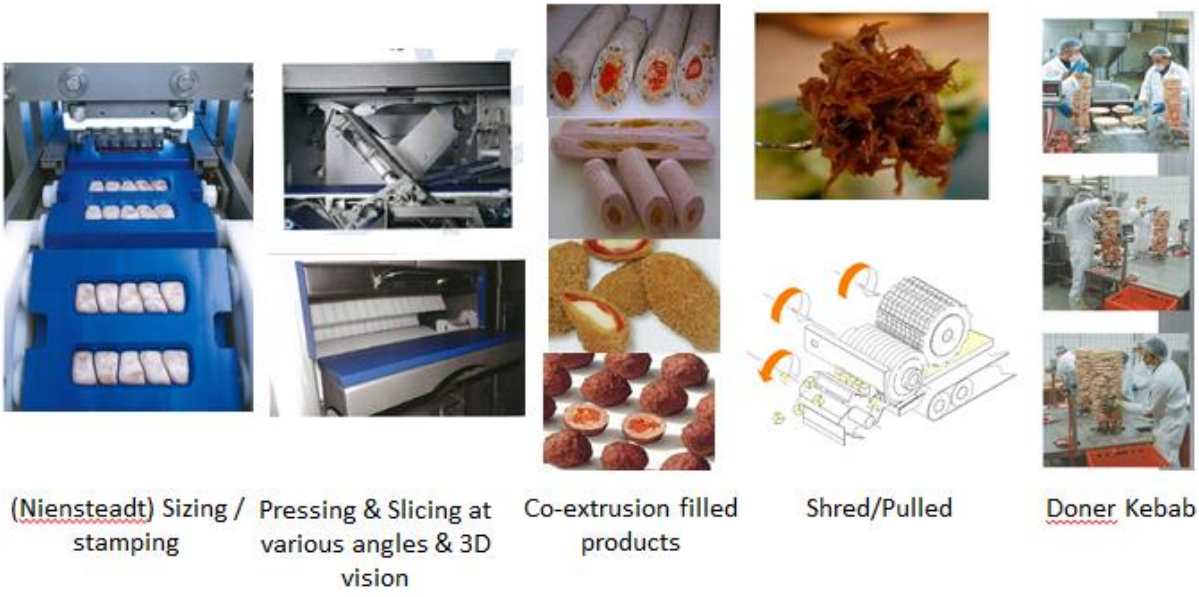


Figure 12: Various shaping technologies

Figure 13: Case ready products

Figure 14: French Innovation at Cryovac using Darfresh film

Figure 15: Beef Mechanically Deboned Meat (MDM)

4.23 General – Technologies & Services

- Optimal slaughter & boning floor technologies (Nawi)
- Loadout (opportunities IBEX and container) specifically optimal picking systems
- Vision or Sensing technologies (cut identification through image analysis of cartons) (CSV). Visioning and cut identification system (CSV) - Cut identification through imaging of cartoned products, piece count, cut identification, 98% developed.
- Foot operated aitch bone knuckle pullers
- Optimal beef hide puller systems – current standard equipment limited to 80 per hour. New systems available now to deliver the targeted chain speed of 120 per hour from a single unit.
- Optimal waste handling, fat collection
- Spinal chilling and freezing for offal chilling (chill before vacuum packing)
- Hand blowers & hygiene s/s covers for hand blowers for night cleaning
- Automated pork splitting saw possibly transferable to beef
- Leak detection system for Cryovac, leak check primal cuts

- Chinese machinery manufacturers (eg Honyo Manufacturer) producing cost effective meat manufacturing equipment

Implications and Conclusions

In summary, of specific interest in new and alternative means of beef processing to John Dee has been :

- Lifting system (dock & container loadout and various processing operations)
- Automated guided vehicle (container loadout)
- Knife sharpening (semi and fully automated options)
- Optimal slaughter and boning floor technologies (NAWI)
- Naked block freezing
- Visioning (grading & cut identification)
- Beef slaughter & dressing
- Manual assist including intelligent assist devices
- Grading and objective measurement technologies
- Cold storage, chilling & freezing technologies
- Inventory management
- Sorting or Packing technologies
- Traceability technologies
- Clean in place technolgies
- Materials transfer technologies (offals, cartons)
- Alternative Cutting technologies
- Contamination detection and sterilisation
- Plant hygiene technologies
- OH&S technologies
- Further processing and value adding, new products and packaging
- Plant information and decision support systems

John Dee has several contacts since returning from the IFFA study tour. The IFFA study tour provided a valuable source of current commercial and state of art beef processing technologies. The additional benefits of this collaborative approach have been the contacts and networks of the group involved and sharing of ideas.

John Dee has appreciated the opportunity to participate in this collaborative initiative and share ideas amongst other beef and lamb processors and service providers in Australia. The main benefits to John Dee has been new and alternative means of beef processing including slaughter and boning options and general meat industry services and systems.

John Dee would appreciate the opportunity for ongoing contact and where appropriate collaboration on specific initiatives. John Dee proposes for the IFFA tour group to regroup again shortly and distil ideas and opportunities to collaborate on specific projects.

Overall John Dee has been attentive to new technology developments and general meat industry services. A primary consideration for all new ideas is John Dee's sensitivity to large capital investments funded with tight margins and high level of perceived market risk where competitive advantages often quickly lost through market dynamics, competition and pay back.

John Dee's primary focus on the study tour program has been on materials handling. The tour has provided input into priorities that will be the core focus of the John Dee collaborative program (John Dee CISP). It is proposed that companies with similar priorities will collaborate on similar projects in the future.

Appendix A – Travel Program Overview

Study Tour Location	**Activity**
Travel Australia to Europe and return **Return air travel arrangements made by participants.**	Travel arrangements
IFFA Frankfurt **Trade fair Entry Pass arranged by participants, via web or at Frankfurt Messe.**	4th – 9th May: Meetings with technology providers
PackForum SealedAir/Cryovac Paris	10th – 12th May: The group will arrive for coffee and a tour of the facilities. Two experts will be on hand to discuss trends and issues affecting the US market and the European/Russian market. We will then have some packaging equipment system demonstrations, followed by lunch and a hypermarket tour.
Marel/Townsend DemoCentre and reference sites Boxmeer Netherlands	13th – 15th May: (site specific) • Demonstrate the innovations shown at the IFFA in our DemoCenter, Boxmeer, The Netherlands. The focus rests on portioning, heat treatment and sausage production. • Reference visit to a further processor of red meat, The Netherlands. • Reference visit to Goedegebuur, Rotterdam, The Netherlands (beef) or Van Lommel, Olen, Belgium (veal), whom both operate a StreamLine • Reference visit to Compaxo, Zevenaar, The Netherlands, whom operate a DeboFlex (pork shoulder deboning line) including Meat Harvesting process on neck-bones with DMM10 • Demonstrate a Trim Management System in our test-center in Oss, The Netherlands • Reference visit to Schwede, Germany, who operate a Pig head Deboning line
Train travel	16th – 17th May • Participants to make arrangements for

	transfer Dusseldorf back to Frankfurt (train) and return travel. MLA only booking accommodation on earlier specific request.

Appendix B – Travel Field Notes (John Hart)

IFFA Tour 2013
Sun 28th April – Leave for Europe
Mon 29th April – Arrive Frankfurt
Tue 30th April –Stay Rüdesheim Allen pickup to CSB
Wed 1st May – CSB Tour Attend seminar in Stuttgart showing CSB's production control systems. CSB's systems control a wide range of management systems covering enterprise-wide system integrating aspects of business from procurement and production through to sales, inventory, requirements planning, traceability system, quality management according to HACCP, IFS, BRC, ISO, Food Safety Programs, logistics and financial accounting. Traceability and cost control is reached though connection of systems with the final terminals as scales, scanner, transponder, labeling machines, batching systems, picking systems, sorter, storage and retrieval machines, etc.
Thu 2th May – CSB Tour Visit of a meat plant and logistics center of the supermarket EDEKA. Company Profile Picking: ca. 130,000 order lines with 100,000 crates and boxes per day, ca. 630 tons per day. Cutting capacity: ca. 800 pig halves and 35 fattening bulls per hour Cold store capacity: 4,000 half pigs, 600 beef quarters and 1,000 roast beef Transport performance: 3,000 meters of conveyor belt, ca. 7,000 crates per hour. Automatic crate storage: ca. 50,000 storage locations Observations and Conclusions This plant demonstrated the extent Europe has progressed in automation with materials handling in relation to Super Marked supply. Traceability requirements of the EU have shaped production techniques to reflect regulation requirements. This is a high capital cost exercise. When asked questions on maintenance manning, the reply was 50 for normal duties and 100 when maintenance demand requires more resources.
Fri 3th May – Travel to Frankfurt and met up with MLA tour members.
Sat 4th May - IFFA Materials Handling – Attec, MPS, MFI, JLS, Nieros, Tavil E+V Technology GmbH & Co.KG – Cut sorting. Has the potential to sort raw cuts prior to packaging. This could be an answer to reducing labor at the packing line.

Sun 5th May - IFFA

Mon 6th May - IFFA

Tue 7th May - Visit Vion Plant – Pork processing

Opportunity presented itself to visit a pork processing plant. This plant was recently bought out by executive buyout and had modernised boning room with pork cutting lines using Frund saws to improve efficiency. This plant did not have much to offer in the materials handling area, although the observation of value adding indicated they were modernising.

Wed 8th May - Stopover in Insbruge

Thu 9th May – Italy

Visit boning and distribution centre.

This plant was boning 850 quarters/day using system to ensure traceability. 3 lines produces 50 quarters/hr. Boning lines were to produce 20 quarters /hr/Line. 13 cuts FQ, 14 cuts/HQ.

Traceability a main focus to boning facility. Each carcass could be tracked to the packing area where labels were placed on meat portions identifying the animal origin.

This plant also produced lines of hamburger, mince etc for supermarket ready portions.

All items were placed in standard RFI tagged European tubs where they were tracked and automatically loaded on to pallets and stored in an automated chiller facility. On demand pallets were retrieved on demand and conveyed to an automated individual bin storage facility. Again on demand items were retrieved and transferred to picking stations where orders were assembled.

Once orders were complete, plastic tote bins were transferred once again to pallets for orders an dispatched to a large marshalling area where product was loaded to refrigerated transport vehicles on route to supermarkets. This facility could transfer 3000 trays/day and store 50,000 and 1800 pallets with no labour.

NabaCarni

This plant portioned horse meat shipped in from Poland. The main propose of the visit was to observe Bizerba packaging and labelling equipment.

Fri 10th May – Visit beef processing plant.

This abattoir produced 157 cattle/hour. Its equipment included a twin knock box system and blood collection facility. After legging and preparation steps carcasses were presented to twin downward hide pullers and then on to a rotary evisceration system. After inspection carcasses were split with two inline automatic saws, which appeared to be accurately dividing sides. Notes there was a manual splitting saw that was used for their higher quality carcasses.

Boning room was constructed for traceability, and also noted was the attempt to assist boners with ergonomic layout. Various options for value adding to trimmings were available such as cold forming of product for Carpaccio and mincing lines.

Noted on this site was a bio gas plant producing 350m3/hr of methane gas running a 1meg

generator. Hot water was generated from generator exhaust and sludge dried from the same gasses. Comment made was that in spite of every effort made to recover energy, the plant did not have a cash positive outcome. Maintenance costs from high wearing plant was absorbed benefits.

Sat 11th May – Leave Italy. Train trip to Bologna. Overnight stay.

Sun 12th May – flight from Bologna to Dusseldorf and Boxmeer, Netherland.

Mon 13th May Morning. J.Vanlommel Veal processing -Belgium

Visit a specialist boning and packing plant using Marel streamline boning system. This boning only facility had introduced Marel equipment to address traceability requirements 12 months previous. Daily boning of 120kg veal carcasses and 250kg Belgian Blue carcasses. The line processed 26 bodies/hr with 8 boners (490Kg/man/day)

Afternoon

Goedegebuur - Rotterdam

Boning only processing line to view 26 station Marel boning line. Plant processed 10,000 hind quarters/week to achieve 140~150kg/man/hour. Saw 16 boners for butt cuts and 8 boners on loins. Marel system was installed to trial productivity gains. Management indicated they were considering adding a Marel boning line to the loin boning section.

Tue 14th May

MORNING

Morning visit was to a processing plant PLUKTON, that was producing snitches 2.5 tonne/Hr and cordon bleu at 1.2 tonne/Hr on two lines over two shifts.

AFTERNOON

Visit Marel Centre Boxmeer

On demonstration was the portioning machines …400 (1000kg/Hr)showing the dry processing technology that can produce patties, nuggets, and many other shaped pieces in a cold forming process (incoming product -2degC)

Products demoes were patties (65~70 CL)and skinless sausage. These products were cooked for taste testing.

Equipment in demo centre included spiral cooker, spiral freezer, and Marinade unit.

Wed 15th May.

Visit Marel Centre Boxmeer

Viewed operation of Marel DMM10 with Sepremat de-Sinuer. The demonstration showed principal of low pressure pressing of bones to achieve a 20% meat recovery of meat

First press is through 6mm holes in pressing chamber and then product is pressed through 3mm holes in de-sinewing operation.

Showed products with DMM – meat Patties with 10% and meat Ball with 20%

Meat recovery estimated at 4kg body using vertebra and neck bones

DMM10 750kg/Hr, DMM 2.5 t/Hr, DMM70 5 t/HR

If second press used to clean bones a further 20% meat recovery can be achieved at a lower quality. Suggested prices at 1.5 euro for high quality and .75 euro for low quality.

TRIM LINE MANAGEMENT (TMS)

Marel have developed a quality check trim line. The principal is an operator roughly sorts batches of product to pass through the “sensor x” x-ray. Product is then checked for contaminates and CL measurement. The batches then pass on to a grading conveyor where they are sorted into CL boxes or bins where the CL graded product is accumulated into required kg lots.

X-ray finds Bone, Metal, Glass, Stones, PVC

Examples of grading achieved 50/50,70/30,80/20,54/64,68/32

Marel have measured and advise they find a consistent 4% red meat give away of red meat.

Marel also showed if the Trim Line system was placed after Streamline boning system a person would be saved as trim is already batched. Traceability is also enabled by this system as individual animal identification is achieved on the Streamline process.

Also discussed was the Incoming Meat Inspection System (IMI) was developed for the purchased to inspect and grade incoming trimmings

Note. JBS (Graham Treffone) advised aperture may be too low at 100mm to handle chuck which they pass through the trimming line at times.

AFTERNOON

Visit Grolleman Cold Store to view the NOWI automated system of plate freezer filling and packing of 120 tonnes /Day

The facility is a freeze, pack and ship service. Companies send fresh product to this cold store to be processed.

System consisted of a large room 60mX20mX12m high. Bulk bins were transported to facility, and hoisted up to a loading platform where weighed batches were loaded into loading chambers. As the charging bin was filled, the whole load was lifted over the plate freezer and discharged into freezing chambers.

The DSI plate freezers (a Danish company) running on CO2 liquid recirculation (-40degC) could freeze product in 90 minutes.

Chambers hold 70kg and a unit can hols 1000~1200 kg in total. Frozen blocks were robotically loaded on to pallets placing a sheet of plastic between layers. Bocks could also be individually wrapped by a interchangeable section in the line where a flow wrap machine is added. Plant mostly runs in Co2 (40,000kg) and a smaller amount of Ammonia (1200kg).
Thurs 16th April. Return

Appendix C – Travel Plan

Activity	Date	Travel	Accom	Activity	Meetings	Visits
Depart Sydney	Thu 2nd May	Business air				
Arrival Frankfurt	Fri 3rd May	Business air	Intercity Hotel Frankfurt Airport	Pre-Study Program briefing meeting 5pm at hotel (1.5hours)		
IFFA Frankfurt	Sat 4th May	Orientation and attend IFFA	Intercity Hotel Frankfurt Airport	IFFA Tradeshow orientation		
	Sun 5th May	Attend IFFA	Intercity Hotel Frankfurt Airport	Good quiet day to arrange appointments		
	Mon 6th May	Attend IFFA	Intercity Hotel Frankfurt Airport			
	Tue 7th May	Attend IFFA	Intercity Hotel Frankfurt Airport		Dinner hosted by Eagle 6:30pm Refer to details below.	12 participants Plant visit Westfleisch Hamm, E+V beef grading Pickup from hotel 7am

Activity	Date	Travel	Accom	Activity	Meetings	Visits
						return to Messe 3pm
	Wed 8th May	Attend IFFA	Intercity Hotel Frankfurt Airport		Dinner hosted by Attec Australia Refer to details below.	
	Thu 9th May	Attend IFFA and transfer to Paris (flight depart Frankfurt 15:15pm arrival Paris 16:35pm)	Kyriad Parc des Exposition Villepinte			
	Fri 10th May	PackForum	Kyriad Parc des Exposition Villepinte		Dinner hosted by SealedAir Refer below for details.	
	Sat 11th May	Free Day	Kyriad Parc des Exposition Villepinte			
	Sun 12th	Transfer, flight depart	Hotel Van			

Activity	Date	Travel	Accom	Activity	Meetings	Visits
	May	Paris 15:40pm arrival Dusseldorf 16:50pm, and transfer bus to Cuijk 70 mins	der Valk Cuijk			
	Mon 13th May	Marel reference sites by bus	Hotel Van der Valk Cuijk	A reference visit to Lommel, Olen, Belgium (veal) and to Goedegebuur, Rotterdam, The Netherlands (beef), whom both operate a StreamLine. In the evening, we might Dinner in Rotterdam.		
	Tue 14th May	Marel Democentre by bus	Hotel Van der Valk Cuijk	Reference visit to Plukon, Ommel, The Netherlands whom operate two further processing lines and afterwards demonstrations of the innovations shown at the IFFA in our DemoCenter, Boxmeer, The Netherlands.		
	Wed 15th May	Marel reference	Hotel Van der Valk Cuijk	Demonstration of trim management system in our test-center in Oss, The Netherlands and reference visit to Compaxo, Zevenaar The Netherlands, whom operate a		

Activity	Date	Travel	Accom	Activity	Meetings	Visits
				DeboFlex (pork shoulder deboning line) including Meat Harvesting process on neck-bones with DMM10.		
	Thu 16th May	Transfer Dusseldorf to Frankfurt by train,	Intercity Hotel Frankfurt Airport	Transfer from Cuijk to Dusseldorf and onwards to Frankfurt. Many people making their own arrangements at this point.		
	Fri 17th May		Intercity Hotel Frankfurt Airport	Free day for post IFFA engagements		
	Sat 18th May	Return Australia				

Appendix D – John Dee's Study Tour presentation

IFFA Study Tour

- IFFA Frankfurt
- Beef & pork processing plants
- Products & Packaging

John Hart
May 2013

European Style Wealth from Forschung

- Presentation innovation
- Art out of Machinery
- The Art of Machinery

IFFA 2013 Processor Study Tour

- Frankfurt Germany, every 3 years
- 960 companies on show from 47 countries
- 80,266 trade visitors from 142 countries
- 110,000 square metres display
- Key focus areas:
  - Energy & resource sustainability
  - Splashguards of research
  - Clean labeling recipes
  - Convenience
  - Smoking
  - Food safety & contraction

IFFA

Technology Providers

- EU: MPS, Banss, SFK-LeBlanc-Narvic, Attec
- Aust: Scott Technologies, MAR, BMC/KK

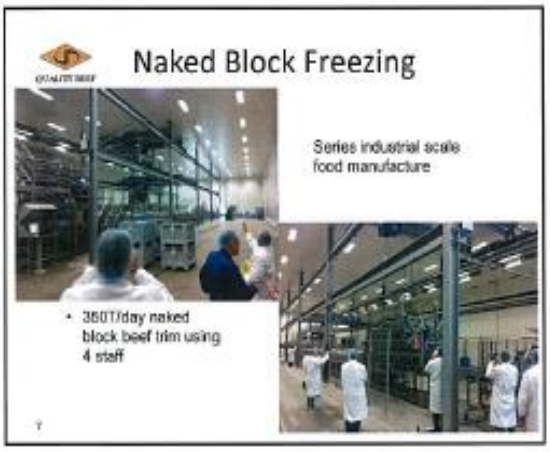
IFFA Study Tour Itinerary

1. IFFA tradeshow **technology scanning** (8 huge halls)
2. **Site visits** to German and Dutch processors (pork & beef)
3. Visit to PackForum (SealedAir)
   - **Packaging innovation**
4. Visit to Democentre (Marel)
   - **Processing efficiency**
   - **Further processing & value adding**
5. Visit to **hypermarkets**,
6. Talk to **consumers**

Let's shop for ideas !!

John Dee – possible interest

- Naked block freezing
- Lifting systems
- CL trim management systems
- Autobagging
- Knife sharpening
- Slaughter & boning, sortation and storage
- Technologies
- Products, offal & packaging
- Beef MDM
- Case ready


Naked Block Freezing
Series industrial scale food manufacture
• 360T/day naked block beef trim using 4 staff


CL trim management (Marel)

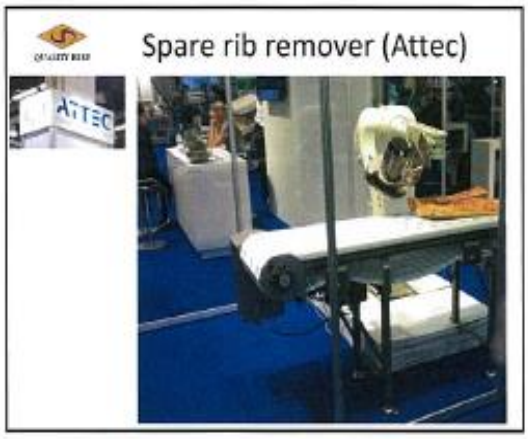

Naked block


Auto-bagger (Sealed Air)

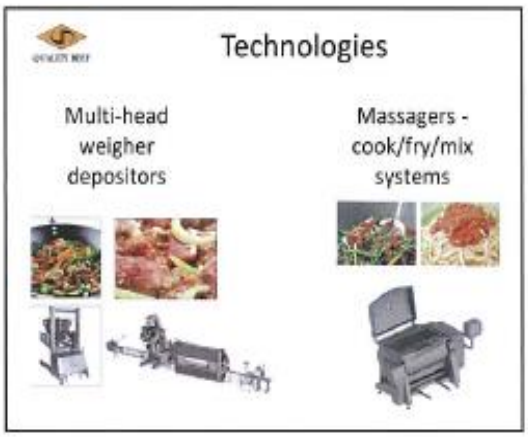

Lifting Systems
TORRAS


Knife sharpening
KNECHT.
E 50
Fully automatic hand knife sharpening machine


Slaughter & boning
NAM


Spare rib remover (Attec)
ATTEC


Storage
GROLLEMAN COLDSTORE


Technologies
Multi-head weigher depositors
Massagers - cook/fry/mix systems


Sortation & auto-stacking


Technologies
Shaping


Technologies
Deboners & Seperators / Fat Analysers
Mechanically Seperated / Deboned Meat
Structured Meat
Low pressure deboned meat
*** Poultry MDM have used Near Infrared (NIR) lateral transmission & x-ray Assays
→ opportunity for Red Meat MDM with FOSS**


Products – case ready


Technologies
Sterilisation / Pasteurisation
Cold Plasma Technology
Ultra Violet Radiation (UVC)
Microwave & Radio Frequency (thawing, forming, heating)
Infra red Pasteurizer
High Pressure Processing (HPP)

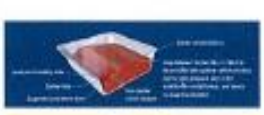

Products – case ready

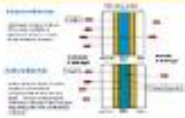

Attec


"Fresh" Complete Meals
French innovation at Cryovac using Darfresh film

Offal

Packaging





Packaging

Beef MDM

Packaging

Slicing


Value added (Marel pilot plant)


Paris
Supermarkets
SANDWICH


Value added


Paris
Supermarkets
Salade


Dusseldorf
Supermarkets

Project code: P.PIP.0370

Prepared by: Dean Goode and Shane Clancy

4 Kilcoy Pastoral Company

Date submitted: July 2013

Executive summary

Kilcoy Pastoral Company participated in the IFFA Study Tour in May 2013. This study tour was undertaken under a project syndication involving representatives from several Australian Red Meat companies. The study program commenced in Frankfurt, Germany to examine technologies both under development and/or applied on plants to address processing efficeincy, yield and labour challenges. The study program included:

- Attendance at the IFFA event to examine the range of exhibits covering slaughtering, dismembering, processing, weighing, filling / packaging, conveying, cooling, storing, transporting and selling, as well as spices and additives for meat and sausage products.
- Direct examination of selected automation technologies.
- Visits to EU processing works, Universities and participation in a range of technology stakeholder meetings to further examine international developments in this area that will inform the development of KPC's research and develoment priorities.
- Develop networks and direct contact with suppliers and service providers to assist with implementation of pilots and evaluation of technologies and services.

The general focus areas for Kilcoy Pastoral Compay (KPC) included:

- Cold store facilities – Accessories & options
- Stunning technologies
- Beef slaughter & dressing
- Beef boning
- Knife sharpening
- Manual assist including intelligent assist devices
- Vision or Sensing technologies
- Grading and objective measurement technologies
- Cold storage, chilling & freezing technologies
- Inventory management
- Sorting or Packing technologies
- Traceability technologies
- Clean in place technolgies
- Materials transfer technologies (offals, cartons)
- Alternative Cutting technologies
- Contamination detection and sterilisation
- Plant hygiene technologies
- OH&S technologies
- Further processing and value adding, new products and packaging
- Plant information and decision support systems

KPC is currently engaged with several international companies as a direct result of the study tour program with interest in a range of beef slaughtering and boning processing technologies :

- Chemical Lean (CL) trim management systems (Marel)
- Automated knife sharpening (Knecht)
- Sortation and auto-stacking technologies
- Vision or Sensing technologies (cut identification through image analysis of cartons)

- ERP upgrade systems

Further information is being requested in areas of interest and in some cases trials are being planned to evaluate some of the beef slaughtering and boning technologies seen in the study tour.

Background

Process optimisation and innovation are critical in the Australian red meat processing industry. Key drivers for adoption of new techniologies and ideas include:

- Labour reduction. Automation is critical to realise benefits through:
    - Reduced processing costs without dependence on unattainable high manning levels
    - Minimising opportunity costs of redirecting labour from value adding
- Activities to low value tasks that are critical for continuous operations
- Yield improvement. Tight margins mean meat processing can only remain competitive via processing efficiencies that improve yield.
- OH&S. Removing tasks that cause strain and injuries will reduce accident claims and attract a wider pool of workers.
- High food safety standards are key to access markets and compete with other foods.

Kilcoy Pastoral Company's Dean Goode and Shane Clancy participated in the syndicated Study Tour program involving several Australian Red Meat companies in May 2013. The study program commenced in Frankfurt, Germany to examine technologies both under development and/or applied on plants to address processing efficeincy, yield and labour challenges. At the conclusion of the IFFA program, there were various plant and supplier visits undertaken in Paris and Netherlands (See Figure 1).

Figure 1: Study tour 2013 program map

The study tour allowed focus on the following key questions:

- Assessment of new technology options that might apply to the existing MLA or AMPC strategy in relation to:
  - Preliminary or fundamental R&D. This phase includes all the preliminary research work done typically in labs, provider's facilities and outside processing plants.
  - Assisted Adoption. Once a prototype has shown enough promise, it will be tested under normal operational conditions, and if those tests are successful the system may be permanently integrated in the host site operations (e.g. options for PIP type projects).
- What new technologies are under development that directly relate to current gaps in the Australian approach?
- What technologies or approaches might apply to further R&D in Australia?
- What is the focus and strategy of technology providers and processors in the EU and other countries? How can this inform the Australian direction?
- What learnings can be gained from comparing these approaches to the approaches in Australia, what are the gaps and what information do we need to upgrade the current information on these activities for processors in Australia?

Objectives

The overall purpose of undertaking European tour is to compare technologies and see if other systems may affect direction of decisions made in relation to materials handling project.

The study program specific objectives were :

- learn about the approaches being taken by processors in the EU and by technology providers for the development of slaughter, boning, vision and sensing and cutting and technologies;
- examine new smallstock and beef technological advances and critique these in relation to opportunities for Australian processors;
- See how new technologies are being implemented by processors in the EU;
- Understand the capabilities available and emerging;
- Contribute to a consolidated program report and also a specific PIP project report relating to a key technology (to be identified in the application);
- investigate and report on a specific issue/area of choice in relation to Australian processing conditions and requirements.

Study Tour Program

3.1 Pre-Study Program Briefing

- A briefing was initially undertaken to consolidate the key questions and company-specific issues.
- During this briefing, an agenda, program terms of reference, the itinerary, key discussion questions and standardised presentations was finalised.
- Agreement on the reporting (format template to be provided) and products from this project was developed.
- As part of the application processes, KPC provided key focus areas that will be investigated as part of the study tour program.

3.2 Visit to IFFA

- Briefings were given by overseas colleagues to inform participants of the current considerations, approaches, interventions and practical applications underway in relation to technology development.
- Participants attended the IFFA program with focuses on their company specific priority areas.
- 960 companies on show from 47 countries, 60,266 trade visitors from 142 countries, 110,000 square metres display.
- Key focus areas:
    - Energy & resource sustainability
    - Spiralling price of resources
    - Clean labelling recipes
    - Convenience
    - Snacking
    - Food Safety & accreditation

3.3 Visits to processor and provider organisations and meetings with stakeholders

- Meetings were held with technology suppliers and industry representatives to gain further knowledge to complement site visits. Some of these will be scheduled during the time at the IFFA program.
- Summary presentations on Australia's activities were provided.
- Refer to Appendix A, B & C for full Study Program meeting agenda (KPC specific visit in Appendix B).

3.4 Study Program de-briefing (held in country)

This de-briefing included the following activities:

- Consolidation of the information collected on the various technologies;
- Confirm what each processor will focuss on reporting;
- Consolidation and reporting on the research questions or issues documented as part of the study program (and fulfilled through the respective stakeholder meetings)
- A summary of the solutions observed, the applications and how these may relate to Australian circumstance;
- Collation of the information required to provide a consolidated report on all learnings to be disseminated to industry and that will inform current/future research projects and activities in industry, as well as the MLA or AMPC strategy for investment in the future;
- Identification of key issues, gaps and opportunities.

3.5 Submission of the Participant-specific reports

Each participant investigated a company-specific issue and prepared a report includes:

- The nominated task including background information (e.g. benefits, opportunities, current challenges or issues with practices, benefits to wider industry broadly);
- Summary of any related approaches used to date in Australia;
- Description of the possible solution, opportunity or approach to be examined.

3.6 Followup after the completion of the program

Upon completing the study tour, the processor reported on:

- The various technologies and R&D priorities identified;
- Netowrks established and ongoing contact with options of trialing and evalaution technologies and services;
- Where appropriate evaluate options of syndication with other companies where mutual benefits is identified by collaborating.

Opportunities Identified for Beef Processing

The general focus areas for Kilcoy Pastoral Compay (KPC) included:

- Cold store facilities – Accessories & options
- Stunning technologies
- Beef slaughter & dressing
- Beef boning
- Knife sharpening
- Manual assist including intelligent assist devices
- Vision or Sensing technologies

- Grading and objective measurement technologies
- Cold storage, chilling & freezing technologies
- Inventory management
- Sorting or Packing technologies
- Traceability technologies
- Clean in place technolgies
- Materials transfer technologies (offals, cartons)
- Alternative Cutting technologies
- Contamination detection and sterilisation
- Plant hygiene technologies
- OH&S technologies
- Further processing and value adding, new products and packaging
- Plant information and decision support systems

4.1 Naked block freezing (Nawi)

- Series industrial scale food manufacture (see Figure 2)
- 350T/day naked block beef trim using 4 staff

Figure 2: Naked block freezing

4.2 Lifting (hydraulic) Systems

Figure 3: Torras lifting systems

4.3 CL Trim Management System (Marel)

Marel's trim management system is designed to analyse beef and pork trim for fat/lean ratio, and give processors the ability to manage their trim and hit target fat percentage

Figure 4: Torras CL Trim Management System

4.4 Autobagger (Sealed Air)

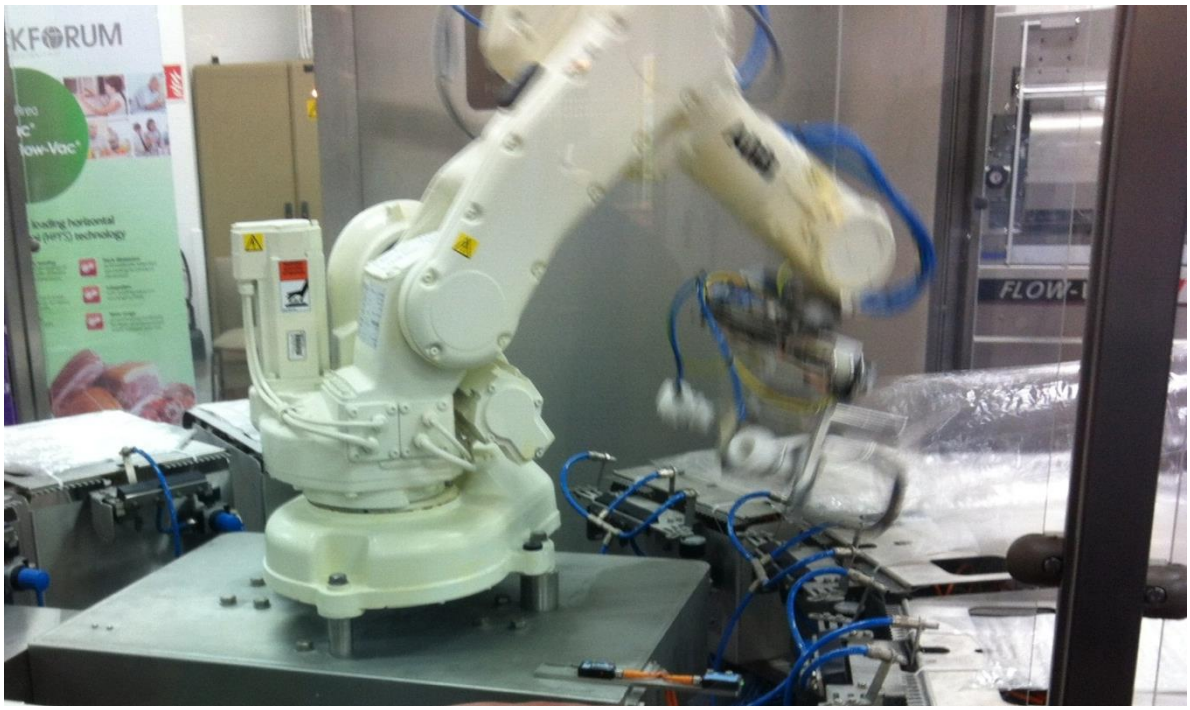


Figure 5: Sealed Air autobagger

4.5 Knife Sharpening (Knecht)

The E50 (Knecht) :

- Fully automatic hand knife sharpening machine sharpens knives of diverse shapes and sizes.
- The 4-axis operated gripping arm extracts a knife out of the magazine – the exact individual knife shape is detected – the knife is sharpened, deburred and polished – the gripping arm returns the knife to the magazine.
- The E 50 fully automatically sharpens knives of diverse shapes and sizes.
- 48 hand knives are placed randomly into the knife magazine.
- They are processed as follows: The 4-axis operated gripping arm extracts a knife out of the magazine – the exact individual knife shape is detected – the knife is sharpened, deburred and polished – the gripping arm returns the knife to the magazine.
- The output is up to 400 knives per 8-hour shift.
- Knife gripping arm - The central organ of this machine is its 4-axis operated knife gripping arm. It grabs the knife handle, moves the knife through the different processing positions and guides it, according to its exact shape, through the sharpening stages.
- Before the sharpening program can begin, each individual knife is scanned at the measuring station. The detected knife shape is then converted into CNC data. The gripping arm steers the knife, according to this data, through the complete sharpening process.
- Benefits of Knecht knife sharpening system :
  - Individual measurement and calculation of the optimal sharpening process of every single hand knife
  - Original knife shape is retained through every resharpening process
  - Sharpening of up to 400 hand knives per 8-hour shift (depending on the knife shape and size), at one man-hour
  - Knife magazine providing a capacity of 48 hand knives, can be loaded with knives outside the machine during the operating process

Figure 6: Fully automated Knecht sharpening system

4.6 Sortation and Auto-stacking

Figure 7: Sortation and auto-stacking

4.7 MPS Pork rib remover

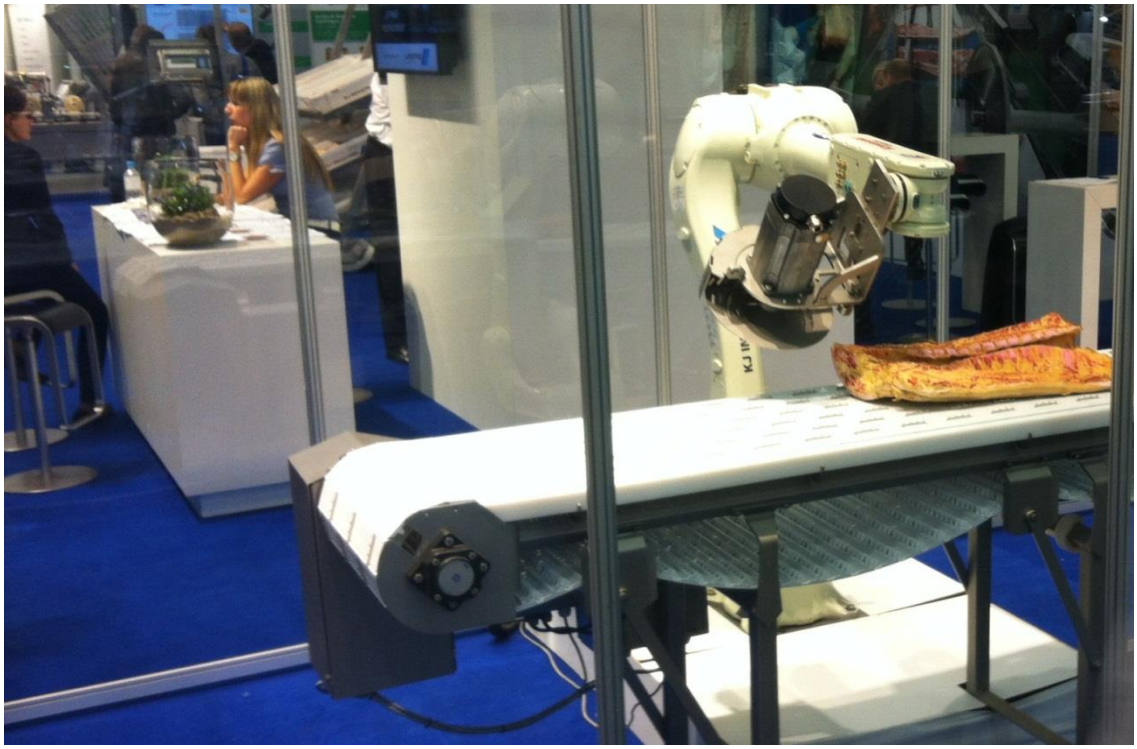


Figure 8: MPS Pork rib remover

4.8 Shaping technologies

Figure 9: Various shaping technologies.

4.9 Products & Packaging

Figure 10: Case ready products.

Figure 11: French Innovation at Cryovac using Darfresh film.

Figure 12: Beef Mechanically Deboned Meat (MDM).

4.10 General – Technologies & Services

- Optimal beef hide puller systems
- Optimal slaughter & boning floor technologies (Nawi)
- Marel streamline (yield management traceability) system
- Bioproduct (Denmark Haarslev)
- Rendering - Optimal waste handling, fat collection
- Mouse trap sharpening system (table boning)
- Retractable hose inserted wall mounting
- E+V technology (Vision and grading system)
- Spinal chilling and freezing for offal chilling (chill before vacuum packing)
- Hand blowers & hygiene s/s covers for hand blowers for night cleaning
- Ergonomic grip knives (eg Frost Mora)
- Tripe cleaners
- Automated pork splitting saw possibly transferable to beef
- Foot operated aitch bone knuckle pullers
- Loadout (opportunities IBEX and container) specifically optimal picking systems
- Leak detection system for Cryovac, leak check primal cuts
- Chinese machinery manufacturers (eg Honyo Manufacturer) producing cost effective meat manufacturing equipment
- Tripe cooker processing – half price to standard tripe cooking systems (eg Larphomere)
- ERP upgrade
- Vision or Sensing technologies (cut identification through image analysis of cartons)
- Cold store facilities – Accessories & options

Specific opportunities for KPC

The following general beef processing (i.e. slaughter and boning) opportunities have been identified :

5.1 Naked block freezing (Nawi)

- 350T/day naked block beef trim using 4 staff

Figure 13: Naked block freezing

Figure 14: Naked block freezing.

- Summary / status (Nawi Naked block freezing)
  - Opportunity to remove labour out of boning process
  - Issue is exporting
  - Stamped dye establishment number on each block
  - Offals (pork livers) in naked block freezing as well
  - Frozen blocks sleeved with plastic and robotic staking of individual blocks

5.2 Trim CL Management System (Marel)

Marel's trim management system is designed to analyse beef and pork trim for fat/lean ratio, and give processors the ability to manage their trim and hit target fat percentage

Figure 15: Marel CL Trim Management System.

- Summary / status (Marel CL Trim Management System)
  - KPC interested to evaluate Marel's CL management a pilot trial in September
  - Proposal under pip under development, KPC would consider a syndication project if other companies also interested to trial & pilot the technology

5.3 Knife sharpening (Knecht)

The E50 (Knecht) :

- Fully automatic hand knife sharpening machine sharpens knives of diverse shapes and sizes.
- The 4-axis operated gripping arm extracts a knife out of the magazine – the exact individual knife shape is detected – the knife is sharpened, deburred and polished – the gripping arm returns the knife to the magazine.
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- They are processed as follows: The 4-axis operated gripping arm extracts a knife out of the magazine – the exact individual knife shape is detected – the knife is sharpened, deburred and polished – the gripping arm returns the knife to the magazine.
- The output is up to 400 knives per 8-hour shift.
- Knife gripping arm - The central organ of this machine is its 4-axis operated knife gripping arm. It grabs the knife handle, moves the knife through the different processing positions and guides it, according to its exact shape, through the sharpening stages.
- Before the sharpening program can begin, each individual knife is scanned at the measuring station. The detected knife shape is then converted into CNC data. The gripping arm steers the knife, according to this data, through the complete sharpening process.

Figure 16: Fully automatic hand knife sharpening machine (Knecht) including gripping arm.

- Benefits of Knecht knife sharpening system :
  - Individual measurement and calculation of the optimal sharpening process of every single hand knife
  - Original knife shape is retained through every resharpening process
  - Sharpening of up to 400 hand knives per 8-hour shift (depending on the knife shape and size), at one man-hour
  - Knife magazine providing a capacity of 48 hand knives, can be loaded with knives outside the machine during the operating process

- Summary / status (E50 Knecht)
  - Primarily all sharpening in Australia is hollow ground. The limitation of the E50 Knecht system is that it does not have this function.
  - While opportunity exists for KPC (ie employ 2 full time labour units) it is unlikely that the system can be adopted in Australia
  - KPC is considering semi- and fully automated knife sharpening options.

5.4 Lifting Systems

Figure 17: Torras lifting systems.

5.5 Visioning and cut identification system (CSV)

- Vision sensing of primal cuts (CSV)
- Cut identification through imaging of cartoned products, piece count, cut identification, 98% developed.

5.6 Chine bone removal

- Danish Crown, vision sensing & robotic for loin cutting for pork, tunnel scanning, removal of chine bone (spine cutter robotic)
- Currently using bandsaw to take chine off
- A second technology available is MPS rib remover

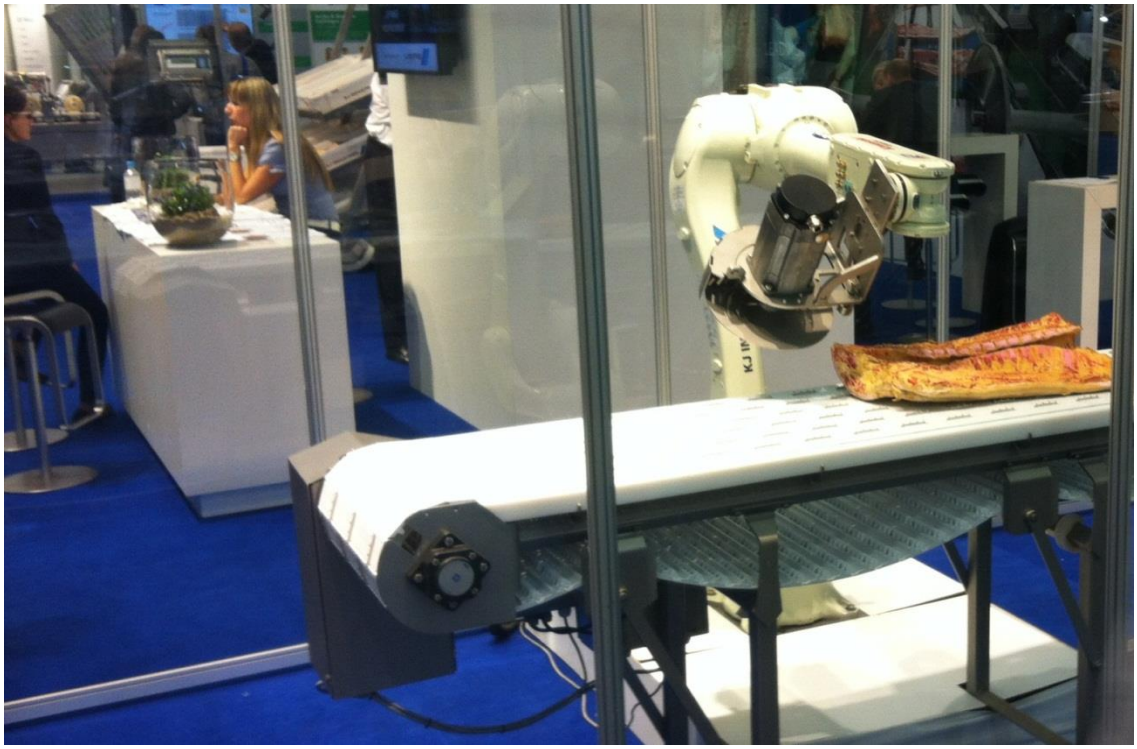


Figure 18: MPS Pork rib remover.

5.7 Cold Storage Options

- Post chilled (open top) carton inspection station for quality improvement.
- Carton QA and rework room.
- Fully automated carton storage and retrieval system, storing cartons in pigeon holes allowing just in time order fulfillment.
- Improved automaton and information systems for operators and supervisors via warehouse management system to control and track every carton's exact location within the new cold store. Automated carton labelers, linked to the warehouse management system.
- Telescopic conveyors into containers for carton loading or robotic loading
- CCTV recording and additional bar code scanning at critical control points such as QA room, inspection station, labeling and container loading for improved carton tracking and proof of order fulfillment at final dispatch point.
- Improved reporting systems.

i) **Mini-Load**

The mini-load option consists of mini-load cranes for frozen storage and for chilled storage. Each crane travels down its own independent aisle, rising up to pick and place cartons into or out of its location.

Cartons are stored in matched pairs two (2) deep. Cartons are then picked and brought to the front of the system where they are placed onto the conveyor system.

The key driver behind the number of cranes is the rate at which cartons are received and dispatched.

Mini-load systems are a proven technology throughout the world in storage of frozen and chilled cartons.

ii) **Multi-Shuttle**

The multi-shuttle option consists of shuttles which run up and down aisles placing product.

There is one shuttle per level.

Each shuttle travels the length of the isle to pick and place cartons into or out of its location.

Cartons are stored in matched codes, two (2) deep. Cartons are then brought back to the front of the system where they are picked and placed onto the conveyor system.

Some differences between a multi-shuttle system when compared to the mini-load system are:

- Reduce downtime if one shuttle is required to be offline for maintenance it doesn't affect the other shuttles in that aisle;
- Every group of shuttles is separated by an access platform so breakdowns can be attended to easily.
- Sequencing of cartons is easier as sequencing is dependent upon the number of aisles and the options within each aisle.
- Power consumption is generally 35% less than mini-load systems.

5.8 General – Technologies & Services

- Optimal beef hide puller systems – current standard equipment limited to 80 per hour. New systems available now to deliver the targeted chain speed of 120 per hour from a single unit.
- Optimal slaughter & boning floor technologies (Nawi)
- Marel streamline (yield management traceability) system
- Bioproduct (Denmark Haarslev)
    - Rendering plants

    - Company coming out to KPC on rendering
- Rendering
    - Optimal waste handling, fat collection
    - Innovative using renewable biogas covered anaerobic gas into boiller
    - R&D opportunities - Pip rendering opt processing (Keith engineering SA) 12mths to go.
- Mouse trap sharpening system (table boning)
- Retractable hose inserted wall mounting
- E+V technology (Vision and grading system)
- Spinal chilling and freezing for offal chilling (chill before vacuum packing)
    - Reason for chilling first is enhanced shelf-life & product presentation
    - Remove heat and vacuum product is considered better
    - Now hanging offal on racks using 3 labour units
- Hand blowers & hygiene s/s covers for hand blowers for night cleaning
- Ergonomic grip knives (eg Frost Mora)
- Tripe cleaners
- Automated pork splitting saw possibly transferable to beef
- Foot operated aitch bone knuckle pullers
- Loadout (opportunities IBEX and container) specifically optimal picking systems
- Leak detection system for Cryovac, leak check primal cuts
- Chinese machinery manufacturers (eg Honyo Manufacturer) producing cost effective meat manufacturing equipment
- Tripe cooker processing – half price to standard tripe cooking systems (eg Larphomere)
- ERP upgrade

Implications and Conclusions

In summary, of specific interest in new and alternative means of beef processing to KPC has been :

- Cold store facilities – Accessories & options
- CL trim management system
- Knife sharpening (semi and fully automated options)
- Optimal slaughter and boning floor technologies (Nuwi)
- Boning room technologies (hybrid of current process product offering including Marel etc)
- Naked block freezing
- Visioning (grading & cut identification)

KPC has several contacts since returning from the IFFA study tour. The IFFA study tour provided a valuable source of current commercial and state of art beef processing technologies. The additional benefits of this collaborative approach have been the contacts and networks of the group involved and sharing of ideas.

KPC has appreciated the opportunity to participate in this collaborative initiative and share ideas amongst other beef and lamb processors and service providers in Australia. The main benefits

to KPC has been new and alternative means of beef processing including slaughter and boning options and general meat industry services and systems.

KPC would appreciate the opportunity for ongoing contact and where appropriate collaboration on specific initiatives. KPC proposes for the IFFA tour group to regroup again shortly and distil ideas and opportunities to collaborate on specific projects.

Overall KPC has been attentive to new technology developments and general meat industry services. A primary consideration for all new ideas is KPC's sensitivity to large capital investments funded with tight margins and high level of perceived market risk where competitive advantages often quickly lost through market dynamics, competition and pay back.

As a result of the IFFA study tour, KPC is current investigating opportunities and at least 5 service providers have been engaged and pilot and evaluation processes are currently under development. Specifically KPC are talking to Marel, Haarvev, etc) on a range of topics that they are currently investigating.

Appendix A – Travel Plan

Program Overview

Study Tour Location	**Activity**
Travel Australia to Europe and return **Return air travel arrangements made by participants.**	Travel arrangements
IFFA Frankfurt **Trade fair Entry Pass arranged by participants, via web or at Frankfurt Messe.**	4th – 9th May: Meetings with technology providers
PackForum SealedAir/Cryovac Paris	10th – 12th May: The group will arrive for coffee and a tour of the facilities. Two experts will be on hand to discuss trends and issues affecting the US market and the European/Russian market. We will then have some packaging equipment system demonstrations, followed by lunch and a hypermarket tour.
Marel/Townsend DemoCentre and reference sites Boxmeer Netherlands	13th – 15th May: (site specific) • Demonstrate the innovations shown at the IFFA in our DemoCenter, Boxmeer, The Netherlands. The focus rests on portioning, heat treatment and sausage production. • Reference visit to a further processor of red meat, The Netherlands. • Reference visit to Goedegebuur, Rotterdam, The Netherlands (beef) or Van Lommel, Olen, Belgium (veal), whom both operate a StreamLine • Reference visit to Compaxo, Zevenaar, The Netherlands, whom operate a DeboFlex (pork shoulder deboning line) including Meat Harvesting process on neck-bones with DMM10 • Demonstrate a Trim Management System in our test-center in Oss, The Netherlands • Reference visit to Schwede, Germany, who operate a Pig head Deboning line

Train travel	16th – 17th May • Participants to make arrangements for transfer Dusseldorf back to Frankfurt (train) and return travel. MLA only booking accommodation on earlier specific request.

Appendix B – Travel Field Notes (Focused Visits)

Friday 10 May 2013

Plant Visits:

Suttero Ernst Sutter AG – Zurich and

Bischofszell Nahrungsmittel AG

New cold storage options includes:

- Post chilled (open top) carton inspection station for quality improvement.
- Carton QA and rework room.
- Fully automated carton storage and retrieval system, storing cartons in pigeon holes allowing just in time order fulfillment.
- Improved automaton and information systems for operators and supervisors via warehouse management system to control and track every carton's exact location within the new cold store. Automated carton labelers, linked to the warehouse management system.
- Telescopic conveyors into containers for carton loading or robotic loading
- CCTV recording and additional bar code scanning at critical control points such as QA room, inspection station, labeling and container loading for improved carton tracking and proof of order fulfillment at final dispatch point.
- Improved reporting systems.

i) Mini-Load

The mini-load option consists of mini-load cranes for frozen storage and for chilled storage. Each crane travels down its own independent aisle, rising up to pick and place cartons into or out of its location. Cartons are stored in matched pairs two (2) deep. Cartons are then picked and brought to the front of the system where they are placed onto the conveyor system.

The key driver behind the number of cranes is the rate at which cartons are received and dispatched. Mini-load systems are a proven technology throughout the world in storage of frozen and chilled cartons.

ii) Multi-Shuttle

The multi-shuttle option consists of shuttles which run up and down aisles placing product. There is one shuttle per level. Each shuttle travels the length of the isle to pick and place cartons into or out of its location.

Cartons are stored in matched codes, two (2) deep. Cartons are then brought back to the front of the system where they are picked and placed onto the conveyor system.

Some differences between a multi-shuttle system when compared to the mini-load system are:

- Reduce downtime if one shuttle is required to be offline for maintenance it doesn't affect the other shuttles in that aisle;
- Every group of shuttles is separated by an access platform so breakdowns can be attended to easily.
- Sequencing of cartons is easier as sequencing is dependent upon the number of aisles and the options within each aisle.
- Power consumption is generally 35% less than mini-load systems.

Appendix C – Travel Plan

Activity	Date	Travel	Accom	Activity	Meetings	Visits
Depart Sydney	Thu 2nd May	Business air				
Arrival Frankfurt	Fri 3rd May	Business air	Intercity Hotel Frankfurt Airport	Pre-Study Program briefing meeting 5pm at hotel (1.5hours)		
IFFA Frankfurt	Sat 4th May	Orientation and attend IFFA	Intercity Hotel Frankfurt Airport	IFFA Tradeshow orientation		
	Sun 5th May	Attend IFFA	Intercity Hotel Frankfurt Airport	Good quiet day to arrange appointments		
	Mon 6th May	Attend IFFA	Intercity Hotel Frankfurt Airport			
	Tue 7th May	Attend IFFA	Intercity Hotel Frankfurt Airport		Dinner hosted by Eagle 6:30pm Refer to details below.	12 participants Plant visit Westfleisch Hamm, E+V beef grading Pickup from hotel 7am return to Messe 3pm
	Wed 8th May	Attend IFFA	Intercity Hotel Frankfurt Airport		Dinner hosted by Attec Australia	

Activity	Date	Travel	Accom	Activity	Meetings	Visits
					Refer to details below.	
	Thu 9th May	Attend IFFA and transfer to Paris (flight depart Frankfurt 15:15pm arrival Paris 16:35pm)	Kyriad Parc des Exposition Villepinte			
	Fri 10th May	PackForum	Kyriad Parc des Exposition Villepinte		Dinner hosted by SealedAir Refer below for details.	
		Plant Visits:	Suttero Ernst Sutter AG – Zurich and Bischofszell Nahrungsmittel AG		Hosted plant visits (specific to KPC)	
	Sat 11th May	Free Day	Kyriad Parc des Exposition Villepinte			

Activity	Date	Travel	Accom	Activity	Meetings	Visits
	Sun 12th May	Transfer, flight depart Paris 15:40pm arrival Dusseldorf 16:50pm, and transfer bus to Cuijk 70 mins	Hotel Van der Valk Cuijk			
	Mon 13th May	Marel reference sites by bus	Hotel Van der Valk Cuijk	A reference visit to Lommel, Olen, Belgium (veal) and to Goedegebuur, Rotterdam, The Netherlands (beef), whom both operate a StreamLine. In the evening, we might Dinner in Rotterdam.		
	Tue 14th May	Marel Democentre by bus	Hotel Van der Valk Cuijk	Reference visit to Plukon, Ommel, The Netherlands whom operate two further processing lines and afterwards demonstrations of the innovations shown at the IFFA in our DemoCenter, Boxmeer, The Netherlands.		
	Wed 15th May	Marel reference	Hotel Van der Valk	Demonstration of trim management system in our test-center in Oss, The Netherlands		

Activity	Date	Travel	Accom	Activity	Meetings	Visits
			Cuijk	and reference visit to Compaxo, Zevenaar The Netherlands, whom operate a DeboFlex (pork shoulder deboning line) including Meat Harvesting process on neck-bones with DMM10.		
	Thu 16th May	Transfer Dusseldorf to Frankfurt by train,	Intercity Hotel Frankfurt Airport	Transfer from Cuijk to Dusseldorf and onwards to Frankfurt. Many people making their own arrangements at this point.		
	Fri 17th May		Intercity Hotel Frankfurt Airport	Free day for post IFFA engagements		
	Sat 18th May	Return Australia				

Appendix D – KPC's Study Tour priorities


KILCOY
Naked Block Freezing
Series industrial scale food manufacture
• 350T/day naked block beef trim using 4 staff


KILCOY
CL trim management (Marel)

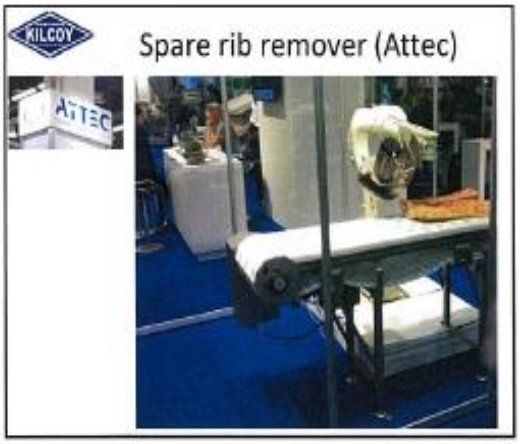

KILCOY
Naked block


KILCOY
Auto-bagger (Sealed Air)


KILCOY
Lifting Systems
TORRAS


KILCOY
Knife sharpening
KNECHT
E 50
fully automatic hand knife sharpening machine


KILCOY
Slaughter & boning
NAW


KILCOY
Spare rib remover (Attec)
ATTEC


KILCOY
Storage
GROLLEMAN COLDSTORE


KILCOY
Technologies
Multi-head weigher depositors
Massagers - cook/fry/mix systems


KILCOY
Sortation & auto-stacking


KILCOY
Technologies
Shaping


Technologies
Deboners & Seperators / Fat Analysers
Mechanically Seperated / Deboned Meat
Structured Meat
Low pressure Skinned Meat


Products – case ready


Technologies
Sterilisation / Pasteurisation
Cold Plasma Technology
Ultra Violet Radiation (UVC)
Microwave & Radio Frequency (Cheving, forming, heating)
Infra red Pasteurizer
High Pressure Processing (HPP)


Products – case ready


Attec


"Fresh" Complete Meals
French Innovation at Cryovac using Darfresh film


KILCOY
Offal


KILCOY
Packaging


KILCOY
Packaging


KILCOY
Beef MDM


KILCOY
Packaging
Sealed Air
PACKFORUM


KILCOY
Slicing


KILCOY
Value added (Marel pilot plant)


KILCOY
Paris
Supermarkets
SANDWICH


KILCOY
Value added


KILCOY
Paris
Supermarkets
Salade


KILCOY
Dusseldorf
Supermarkets

Project code: P.PIP.0370

Prepared by: Hideki Kanai & Pat Gleeson

5 Nippon Australia

Date submitted: July 2013

IFFA trade show and the affair of equipment introduction example visit in Europe

Purpose：

Visit IFFA trade show(exhibition contractor of about 1,000 companies) that opened once in three years, recognition of an equipment contractor's new technology and the example of real business, a trend, etc. to be recognized through a show, and it uses for future business deployment.

Visited place：

Visited Place	Location	Purpose	Date
1. Grelleman Coldstore	Appledoon The Netherland	Vertical Plate freezer	1/5
2. Tonnies	Wiedenbruck Germaney	Meat processing Plant	2/5
3. EDECA	Kerlsruhe Germaney	Meat Processing Plant	3/5
4. IFFA	Frankfurt Germaney	EXPO	4,5/5
5. GWE	Loppem Belgium	Wastewater Engineering companey	6/5
6. McCain	Reims France	Biogas recovery/recycle plant	7/5
7. Sterro	Zurich Switzaland	Meat processing plant (Streamline/VA)	7/5

Overall comment：

One of my interest of the visit that to identify cattle process automation. Unfortunately, I couldn’t find great technology evolution in this area. It thought that there was a background referred to as not maintaining receipt balance about the further evolution for european contractor. I realized that it should make it evolve original with Australia.

I have identified potential several independent applicationIns which may valuable for our company.

I would like to examine the following application as the latest subject.

- Possible boning/Triming line application for special specification (Marel Flow line)
- Material handling solution

・Vertical plate freezer aplication that can possibly use for nacked frozen bloc.(DSI (Australian agent(Milmec))

・Competitive vacume machine has developed by NZ supplier (Similar to Oldriver 8600seriese)（NZ McLaren Stainless）

・Shrink film supplyer from China（Unternational Plastic Engineering）

Please refer further comment as follows;

IFFA EXPO

Meat processing facilities

For slaughter floor section, MPS(STORK),NAWI, BANNS are introducing automation process using robot, etc. specially for pork process. For beef process, there are not much evolution compare to several years ago. Spoken to several salesman and according to them there are no much benefit for them to develop beef process automation in Europe due to big variation of size, targeting quantity & small market for them.

Similar to boning line with SFK, ATTEC,

MYCOM was introduced progress type “automatic deboning system for pork shoulder” from “pork ham”. I felt whether this product matches demand or not.

Beside of these, Marel “Stream line” may suitable to introduce our application for further boning/slicing process(for handling special specification). This is like combination between Oakey boning line & phase boning line. This may one of suitable application for further special specification handling that cannot handle at main process line.

Material handling

Very generic introduction related to material handling (MPS, MAWI, Singer & Sohn, MFI, etc.). It seems that the technology of material handling using “Crates” are prudent in EUROPE. Everyone has similar applications. Each component has what I have seen in EDEKA a previous day that the each component can be seen in Australia as well. Important part in mass balance of “Sorting, Picking, Storage & Load out”. To improve our productivity, I need to consider all of those application & find out best practice of equipment. (see EDEKA visit report below)

In Europe, it is assumed that recovery, washing, and storage of a crate have been a subject because that I found the many exhibitor promote & introduce “Crate washing & Auto storage facilities”.

Also, I notice material handling supplier from Turkey as exhibitor. I assume mid east demand are getting bigger recently. ???

Refrigeration

I couldn’t find any significant progressed equipment. (Compressor (Mycom & Russian), Spiral freezer, Tunnel freezer & plate freezer.

I had interested in contact plate freezer supplier (DSI from Denmark). Introduction example shows later in Grelleman Coldstore visit report. There are opportunities to make a success of "naked frozen block project". (Example of video, you can find in www.dsi-as.com)

Packaging machine

As usual, MULTIVAC occupied overwhelming exhibition occupied area, and was the Gulliver existence.

Thermaform/Darfresh/MAP packing applications are the most for majority of exhibitor.

Speed, higher capacity, easy handling, cleaning ability, spider robot technology are the most their PR.

Beside of this, there is one of NZ company(McLaren Stainless) doing a promotion for rotary vacuum packing machine which very similar to Oldriver 8600 type. They were trying to target for Australasia area customer. I need to investigate further if it's suitable for our operation.

(www.mclarenstainless.com)

Through the exhibition, I saw many Asian visitor (I assume it's Chinese). Many of them are seeing around "Further Processing Facilities" area.

Packaging material

Majorities are "Casing" exhibitor.

Less vacuum packaging supplier.

Identified one of Chinese shrink vacuum film supplier is aggressive with reasonable size of booth.

Company name is "International Plastic Engineering Co. Ltd". (www.hq-plastic.com)

Many Chinese suppliers are located in corner an exhibition site for display with finding target customer from same country(Chinese). But they are not. They are looking for outside of Chinese market. It is good signage for less competitive market such as Australia.

Grelleman Coldstore visit

Coldstorage business & Outsorcing re-packing operation business.

They are handling about 80% of fresh meat and 20% of seafood & ice.

One of vertical plate freezer supplier (DSI) introduce for this visit.

Facilities to do re-packing for suitable for further distribution chain.

Automated Vertical Plate Freezing System has installed & commissioned in 2010.

Outline of operation flow as below;

Raw material (1 ton bin from supplier) feed to conveyor to trimming station

→ Trimming (Trim rawmaterial to applopliate size for plate fleezer width)

→ Batch weighing at hopper計量(about 15kg batch)

→ Feeding raw material to Plate section (1 batch about 15kg x 60plate section /freezer lot)

→ Freezing(According to them, take about 1 hour to freezedown to minus 7 degree from 2 degree)

(According to DSI design point of view, it takes about 2 hours)

→ After freeze, push frozen block from bottum and pull/pick the block from top using automated crane system

→ Transfer the blocks to conveyor and send each block to rebot palletizing with auto layer sheet feeding system via metal detector

→ Transfer to auto pallet wrapping system for palletizing completion

Total 16 freezer lots(30windous x 2 low/lots x 16lots=96windows) capable to manage 60 ton of freezing production with12hr shift with 3 operators.

All automation has been engineered,supplied & installed by NAWI(The Netherland)

This application to meet customer requirement (Meat Supplierwho did not have freezing facilities/ Less packaging cost & Meat buyerdo non't required waste from packaging material to reduce handling cost) Cold storage is in the middle of distribution chain may suitable for their satisfaction.

DSI has been developping these application for fish industry. Recently identified meat industry requirement then start introduce to meat industry.

We need to review why nacked frozen block project has failed in Australia previously. Based on this review,if any opportunities exist, I would like to find out the opportunities for utilise this application.

Outside	Plate freezer
	
Freezing	Transfer using crane
	
Transfer	Robot palletizing

Tonnies head office plant

Meat production plant (Pork 28,000HD/day,Beef 1,200HD/day) (No slaughtering operation.)

Majolity of livestock will supply from north west of Germany.

Mr. Ogura from Nippon Meat UKmade this visit appointment.

Unfortunately, we are not allowed to take any photo in inside.

About 5,500 worker working 6days 10hours per day.

It seems like they are very proud of less workers turn over with community frendly companey.

One of example is well facilitated ammenity facilities at outside of workplace. (eg: Restaurant, Bucher shop, Kidergarden, Own Profrsional women socor team and ground is located next to plant, Fitness club, etc.)

From office & ammenities block to plant using over 100m colidour.

Beef boning operation:

Carcass intakefrom outside: QTR receival (Barcode reading, Rundam foreign material check using UV camera)

Carcass marshalling room: Segregate F&H

Feeding to Boning room: Fore operation period then after completion of fore, then feed Hind QTR.

Pre-breaking: On-line breaking

Boning/Slicing: Phase table conveyor boning(Typical US style) (3 lines)(Due to QTR operation, handling items in the room at one time are very minimum)

Packaging: Using Thermaform machine & Bag type. They were using Robot for bagging then after this using dual infeed conveyor to feed product to Oldriver 8600 (only one operator per machine))

Packing: Using typical European crate. Very minimum cardboard box.

Carton Sorting: Manual sorting (Due to less production items in one time)

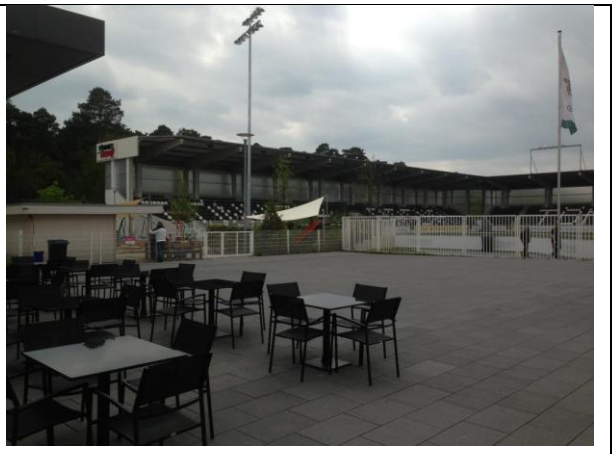
Chilled/Freeze/Store: Using auto pallet transfer material handling storage.

Pork processing plant: Very similar to typical US & Denish line system. (Using AATEC boning system)

Impression from this plant is typical volume plant , not highly introduce latest technology.

Office/Plant/Parking(5stories)

Entrance

	
Bucher shop	Restaurant/Kinder/Soccer field

EDEKA meat processing plant

Meat processing plant & small goods palnt

(Pork:260ton/day, Beef100ton/day, Small goods& VA products 260ton/day)total 620ton/day

Majolity of livestock will supply from south of Germany.

One of major supermarket chain companey. Supply fresh meat product to over 1200supermarkets.

About 50,000m2 floor space.

CSB(German software companey) made an appointment for this visit.

(CBS can introduce all plant integration system include “Production planning, Operation control/management, Accountant, Stock control, Ordering, Delivering))

No Slaughtering & Rendering

100% of products goes to EDEKAsupermarkets

This new plant start operating since 2010. Full production formation start since this year. Currently about 80% of total plant capacity handling volume.

Unfortunately, plant tour for production area is only from mezanine viewing colidor.

Pork /beef production line: Only we could see “Pork arcass breaking line(AATEC) ,only on section of boning table & Empty crate returning conveyor”.

Boning lines are phase conveyor table boning. According to their explanation, there are 6 boning conveyors(4 for pork, 2 for beef)

Small goods process area are extreamly limited space to view from viewing colidour. (Very general operation with high technology machine?????? That their explanation. And could not see any further.)

Material handling area that we could see very closely.

They have installed with multi material handling application for fit for purpose to reduce manpower requirement.

- Order picking system:
  Transfer the pallets from Production room
  →Using auto de-palletizer to breaking to each crate
  →Multi shuttle crane system picks each crate and transfer it to first-in/first-out gravity rack systemfor tempraly storage
  →Pick the items from first out side(Other sisde to infeed) according to auto instruction by "Order picking System"
  →Crate that the items has been assembled transferred auto palletizing stations. / Or transfer to loadout area for waiting load out.
  →Assembled pallet for destination to be transferred to auto pallet storage using stacker crane or load out.

- Pallet handling:
  De-palletize
  →According to order, crate will transfer to palletizing area then assemble to a pallet.
  →Assembled pallet to transfer to auto pallet storage.
  →Loading by pallet unit due to loading out schedule.

This plant model is from production to supermarket distribution case. It was very useful to see material handling installation case fou our future consideration.

EDEKA

GWE & McCane bio gas plant from wastewater

The check of the visit and the example of real business was performed as part of the biogas reproduction reuse project under plan at Oakie with GWE currently which is considering it as the candidate of the plant engineering company.

GWE establishes a headquarters in Belgium, they has a worldwide base in Germany, the Netherlands, Hong Kong, Manila, and Bangkok, and is offering engineering service about waste water treatment facilities.

About Australia, a partner with CST Water is constructed and the company is introducing the technology which is GWE to Australia.

I visited McCain which is a French potato company then check the example of their installation..

The recovered of biogas was about 700Nm3/day constantly from 8,000ppm COD wastewater.

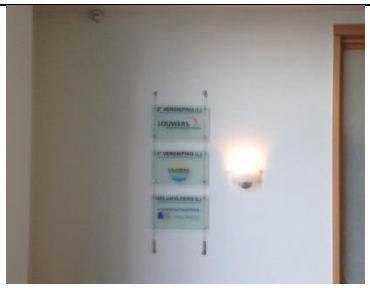
Utilised collected biogas for gas bouler that pallalel to natural gas burner.

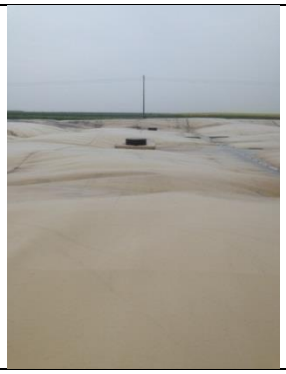
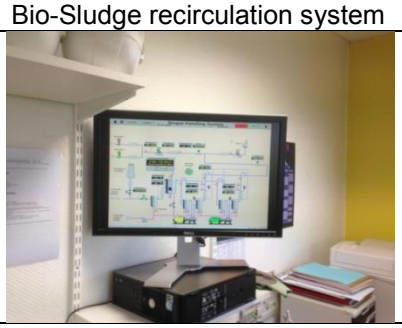
This is poteto plant application, which higher TSS and lower O&G compare to meat industry application.

After discharge the treated water COD level was down to 300ppm. Final treatment to be made by conventional airlated biological wastewater treatment to meet council requirement. (Below 90ppm)

The plant start operating since 2003. According to them(McCain maintenance staff), the system are not required significant maintenance.

They used to use conventional covered pond. Due to unsatisfied installation, low gas generation & high maintenance requirement, they have changed to current style system which called “High rated anaerobic lagoon” with flat top cover.

		
GWE(Belgium)	Office entrance	Office
		
McCane（France）	Anaerobic covered pond	Cover

		
Gas collection	Maintenance hatch	Water outlet
		
Bio-Sludge recirculation system	Gas collection system building (R)	Gas collection system
		
SCADA for gas delivery	Multi gas burner (Natural gas & Bio gas)	

DSI V16

Vertical Plate Freezer

with automatic unloading

PLATE FREEZING

... worldwide!

iVAC i8

The iVAC i8 rotary chamber machine offers an affordable high speed vacuum-packaging solution for quality food manufacturers of any size.

McLaren Stainless
INNOVATIVE | SUPERIOR | CONNECTED
Conrad Graham
Phone: +64 6 873 9100 | Fax: +64 6 873 9109 | Mobile: +64 27 704 501
109 Manchester Street | PO Box 643 | Hastings 4156 | New Zealand
Email: conrad@mclarenstainless.com | www.mclarenstainless.com

Available in clockwise or counter-clockwise orientation, the product enters the iVAC via an optional auto synchronising infeed conveyor, placing the product centrally on the transport pallet.

The product then enters one of six vacuum chambers where it is clamped, evacuated and sealed, with the remaining bag end cut and ejected to a scrap collector.

It continues along to the soft discharge system where it is gently pushed off the platen and to the optional outfeed conveyor.

A simplistic, robust design ensures ease of operation, cleaning and maintenance, along with safety, hygiene and reliability.

FEATURES

- Symmetrical design allows for reduced moving parts and increased reliability
- Left and right hand in-line options
- Twin impulse seal system for added product security
  - Air-cooled sealbars
- Central lubrication system
- Synchronised infeed options
- Customised outfeed options
- Speeds of up to 35 bpm/minute with 1 operator
- Touch screen/PLC control
- Stainless steel guarding
- Fully integrates to downstream ISEPES of equipment

McLaren Stainless
INNOVATIVE | SUPERIOR | CONNECTED
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FIRST IN ASIA FIRST IN
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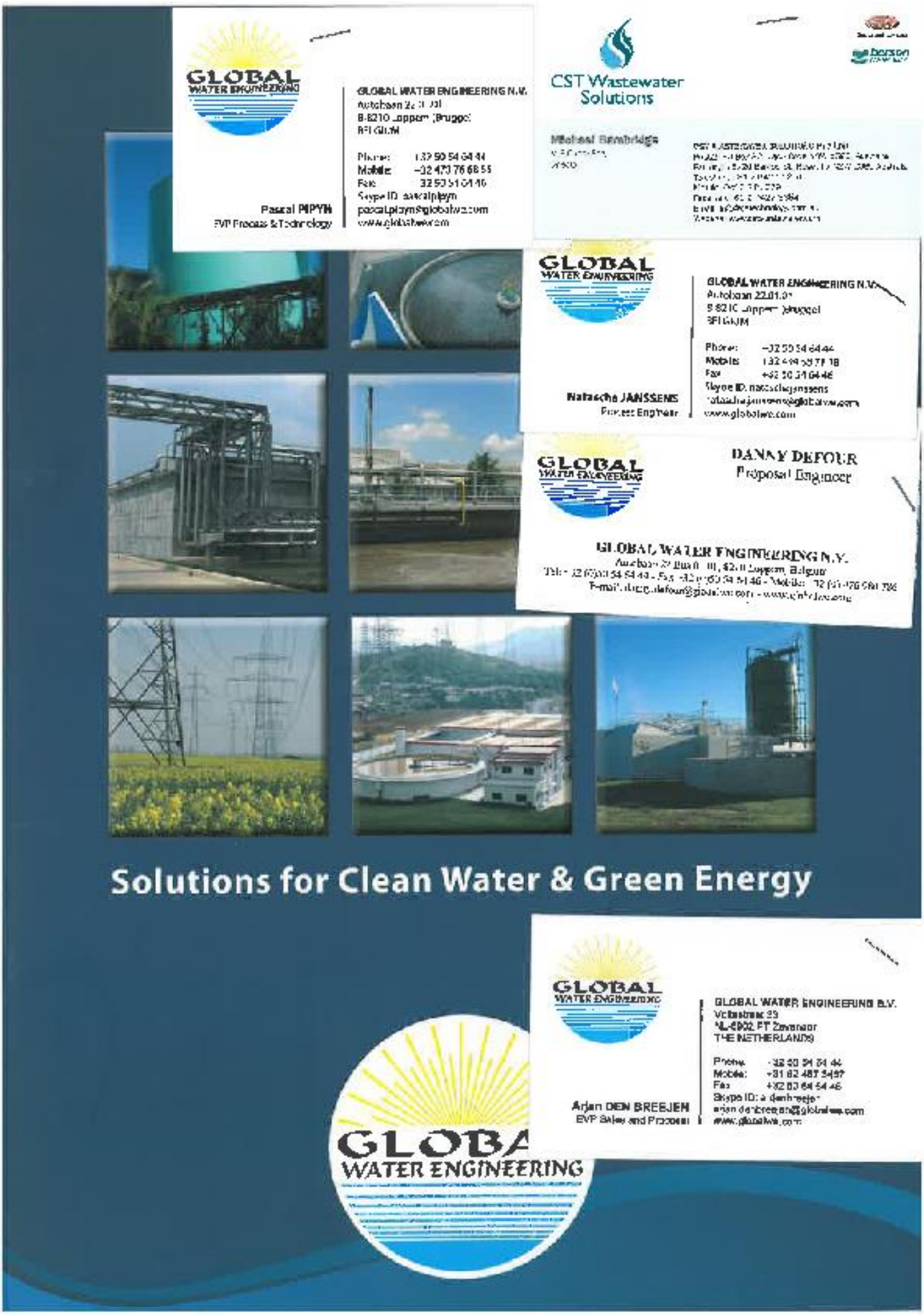
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EVP Sales and Processes
GLOBAL WATER ENGINEERING B.V.
Solutions for Clean Water & Green Energy
GLOBAL
WATER ENGINEERING

Project code: P.PIP.0370

Prepared by: Stuart Hincksman

6 Prime Valley Pastoral Company

P.PIP.0370 - Technology and Automation Study Program and IFFA

Project objectives:

- Receive briefings on R&D and technological development approaches being taken in the EU
- learn about the approaches being taken by processors in the EU and by technology providers for the development of slaughter, boning, vision and sensing and cutting and technologies;
- examine new smallstock and beef technological advances and critique these in relation to opportunities for Australian processors;
- See how new technologies are being implemented by processors in the EU;
- Understand the capabilities available and emerging;
- Contribute to a consolidated program report and also a specific PIP project report relating to a key technology (to be identified in the application);
- investigate and report on a specific issue/area of choice in relation to Australian processing conditions and requirements.

Specific topic:

Systems for in-line measurement of CL of boneless beef/sheep meat in bulk form, with the intention of managing CL prior to packing into combos or cartons.

The task is to measure CL of incoming product and maintain CL set points by controlling lean/fat ratios of the product t be packed.

Current system of packing trim in Australia relies on packers making a visual lean assesment of trim prior to packing, which requires an experienced operator. The packed carton can then be measured for CL, in-line, and graded accordingly. This system does have limitations in that CL results can be outside allowable limits, resulting in re-work. Band of CL across a load can be as high as 5CL and beyond in some circumstances. Packing on visual lean can limit auto-packing solutions.

The opportunity is to remove the need for packing on visual lean, resulting in tighter bands of CL of packed product, more accurate product going to end-user which brings advantage to their production, and ability to utilise automated packing options.

I will seek technologies for in-line fat analysis, control systems to manage measured CL streams of trim and automated packing solutions.

Benefits to industry will be better utilisation of raw material, maximising value of trim by accurate CL control, ability to better target lean points with less variance in

finished product. (This point will itself benefit end-user greatly). Allow automation of the trim packing process, both sortation and packing.

Solution to be investigated is in-line CL measurment, control of differing CL streams and automated packing at rates appropriate to Australian industry (Estimate aroung the 10 ton/hr rate).

Introduction:

In Australia I am not aware of any functioning trim blending lines operating to pack carton product. The industry measures CL of packed carton and grades accordingly.

Summary of findings:

Systems that are suitable to fulfil project objectives:

Marel Trim Management System: Complete system, sorting trim into cartons or combos, throughput up to 6 ton/hr.

Eagle FA - Cabinplant Trim Blending System: Complete system, sorting trim for carton packing or combos, throughput up to 20 ton/hr (more if just combo packing)

Foss MeatMaster II: In-line CL measurement and sortation capability.

Benefit to the industry:

Improved utilisation of valuable raw material

Improved final product which would be appealing to Export and local markets

Automate production (Labour savings)

Enable production with fewer “experienced” operators

Production efficiencies through targeting orders

Conclusions:

These systems have been implemented in Europe and USA already, technology is mature even though the systems are new. The change to production methods in Australian industry is major, would require a boning room upgrade in most cases to implement, therefore planning needs to begin now for implementation in coming years.

Recommendations:

Specific plant needs to establish which system best suites, i.e. Marel system is suited to more CL targets lower throughput, Eagle FA system is suited to less CL targets but greater throughput.

I would like to see a temporary “trial” line established in Australia for industry to have the opportunity to pack product on for a few days and assess the process and results. Given this system represents a major change to the way the Australian industry has packed trim product, thorough analysis of system functionality via a trial line would be a great step to build industry confidence.

Attachments & supplier material:

Marel: Trim Management System.pdf

Eagle FA: DS_FA 720_A4 & 2658-121031 (Example of system layout)

Foss: Meatmaster II solution_brochure

Project code: P.PIP.0370

Prepared by: Duncan Downie & Allan Platten

7 Teys Australia

Date submitted: July 2013

MLA Study Tour 2013

General Comments

The tangible benefits identified below have the potential to allow the participants of the tour to improve their businesses as well as the Australian Industry. He intangible aspects of the tour will also provide long lasting benefits for each of the participants. For example the opportunity to witness first hand the daily operations of a European Meat Plant and to understand that they have the same labour issues which affect the Australian Industry. We visited plants who's employees originated from Eastern Block Russian Countries to Brazil and Asia. The livestock breeding and husbandry practices are dramatically different to those practised in Australia. Cattle are raised in sheltered conditions for their entire lives. Each animal presents at the Abattoir with it's own pass port which identifies the animals life time movements, medical history and its ancestors.

IFFA Exhibition Centre provided a glimpse of the enormity of the European industry and the magnitude of their Small Goods industry. Some of the larger exhibitors invested in excess of $2m on their demonstration stand for the week of the IFFA show. During the plant tours which followed the show we had the opportunity to see how many of the products and equipment demonstrated at IFFA were used in their plants. The SuperMarket visits also provided insight into the variety of meat products on sale throughout Europe, particularly in the Small Goods Industry with hundreds of varieties of Sausages on the market.

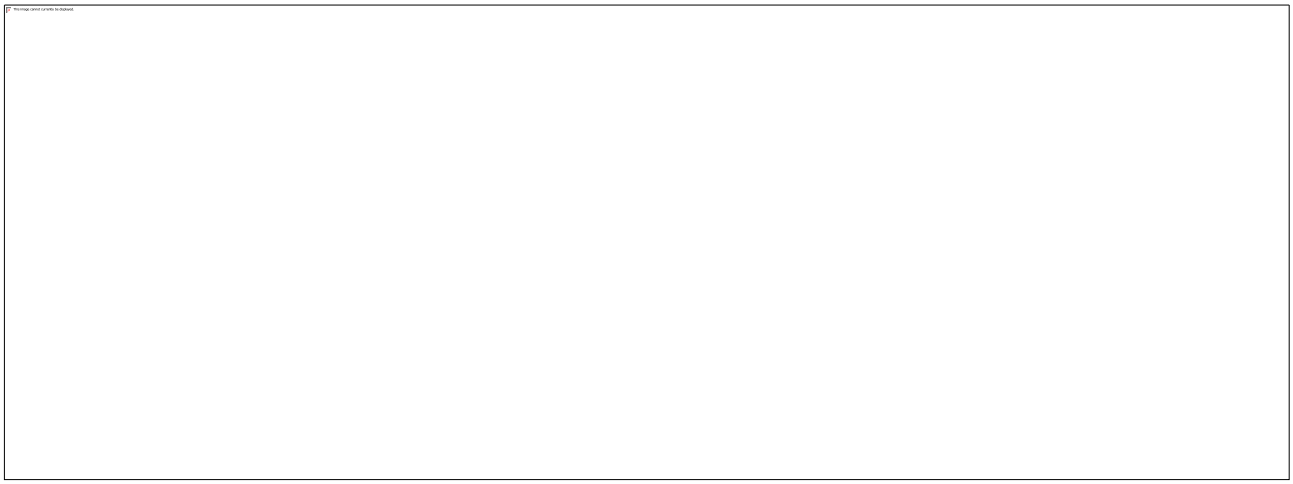
The trips to the demonstration centres at Marel in the Netherlands and the COV centre in Paris were also enlightening. The insight into their operations has provided a better understanding of their industry and the potential benefits to the Australian Industry. They both emphassed the fact that they have the ability to work with individual companies to design an build tailor made equipment to suite the individuals requirements.

MLA and AMPC are to be congratulated for the planning and structure of the tour. The time at IFFA and the planned plant tours were well balanced and informative. The opportunity to spend time with senior managers from other companies was also very beneficial, the contacts

made throughout Australia will be invaluable future assets to each of the participants on the tour.

Points of Interest on Tour

Ultra Violet Sterilisation



Benefits

Log Reduction

The belt is continuously sanitised throughout production achieving results of up to 95% reduction in bacteria loadings.

Water Saving

The sterilisation process is achieved without the need to periodically sanitise the belt with traditional hot water methods resulting in significant water saving benefits.

Continuous sterilisation

The benefits of this system is the fact that the belt is sanitised through out the entire process as opposed to the unreliability of intermittent water sterilisation.

Available Within Australia

Numerous suppliers available.

Maintenance

Low maintenance costs.
Cleaner friendly.

Other Applications

Air disinfection.
Water purification.
Product contact surfaces.

Odour reduction benefits.

COV Product Label Applicator

Benefits

Flexibility for customer and Country requirements.
Labor saving benefits.
Waste reductions achieved through the Just In Time production of labels as they are required. Removes the necessity to produce large quantities of labels to cover possible maximum production requirements.
Removes the risk of incorrect information being applied to product through date changes, shift changes, incorrect slaughter dates and operator errors.
The labeller has the ability to apply labels directly onto the product surface as well as the external surfaces of product packaging. e.g. stickers

Automotive Processing Systems

Automation in Pork processing has come a long way over the last ten years. Robotic automation has achieved significant labour reductions within the Small stock Industry.

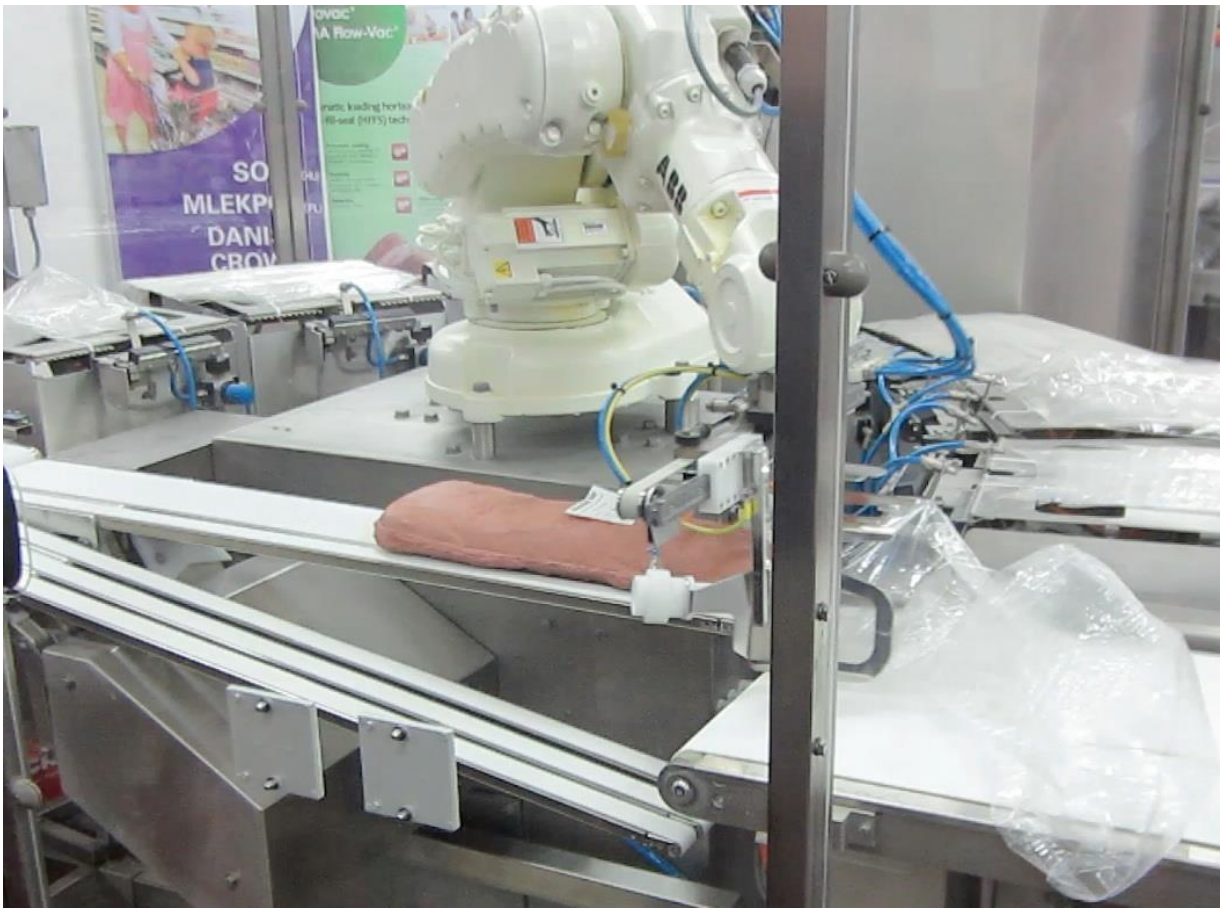
BANSS German Meat Technology have developed a system which has the ability to process up to 5,000 pigs per day. They have successfully introduced processes which can automatically de-hair and singe pork carcasses. The system also automatically bungs, separates the pelvic cavity, trims fore feet, opens the front of the carcass including the brisket area, severs the head and splits the

carcass. The labour reductions achieved through this system are significant.

Bone line

The Japanese company MYCOM have developed an automatic line system with the ability to remove bones from Pork legs at a rate of up to 500 per hour. They also have a line to remove the bones from forequarters.

Bag filler from COV



COV have developed a robotic bag filler which has the ability to scan primal cuts and select the correct bag size to pack it into. The robot also places the primal into the bag. The benefits of this system include labour savings and reduced packaging costs.

Knife sharpener

Knecht have developed an automatic knife sharpening system which has the ability to sharpen up to 400 knives per eight hour shift. The machine selects each knife and scans the blade to establish its shape prior to grinding. Each knife is then de-burred and polished then placed back into its original position.

Naked block palletiser

NAWI have developed a robotic loading system for their naked block plate freezing process. The robot selects each piece and places it in the correct position on the pallet to form a perfect symmetrically shaped stack. The robot also neatly places a layer sheet between each of the layers as it constructs the pallet. The robot has the ability to pack up to 120 ton in a twenty hour shift and delivers other benefits through labour savings, product presentation and reduced lost time injuries.

Marel Trim Line

Marel have developed a trim packing system which is designed to ensure that trims are directed to the correct Chemical Lean pack. Current packing systems err on the conservative side by packing higher CL's against specifications to ensure that minimum customer requirements are met. The current system disadvantages the packer through loss of potential profits by giving away excess red meat. The Marel system has the ability to control the CL of each individual carton by analysing the CL of each batch of meat placed in every carton.

Benefits

Customer satisfaction.
Preferred supplier reputation
Reduced fat claims
Increased profits
Improved yield

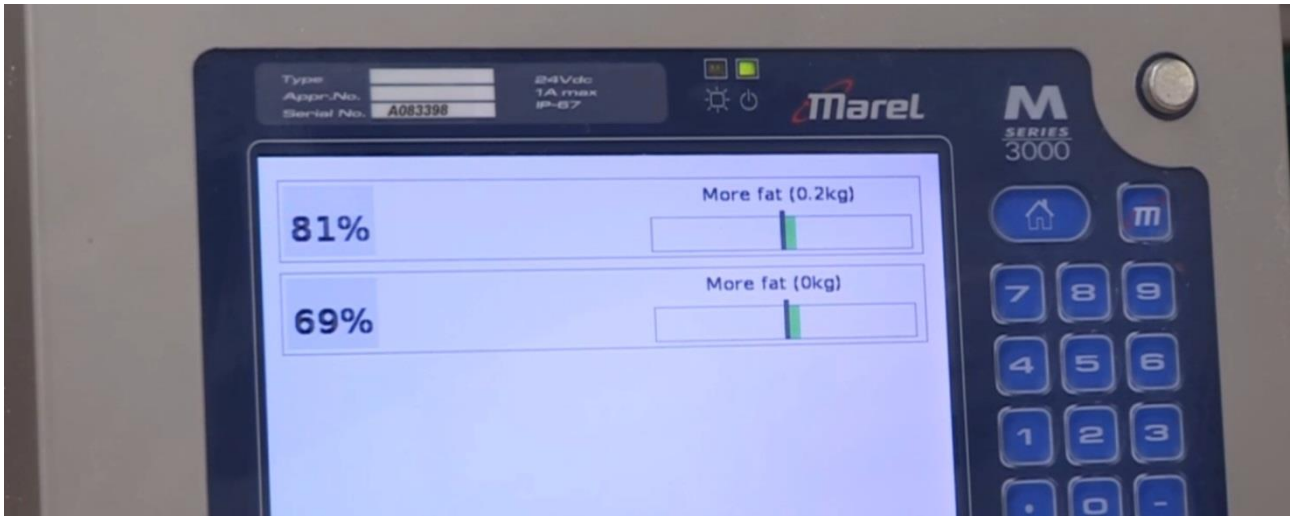
Marel Traceability boning system.

Marel have also designed a boning system which has the ability to control the traceability of every piece of meat back to the carcass it came from. The system includes a net work of PLC controlled conveyors which deliver primal cuts to selected operators. The cuts are automatically weighed prior to slicing to to specification, then weighed after slicing to measure the yield. This information is also used to measure the performance of individual operators

Benefits

Increased yield
Full traceability
Reduced claims
Increased profits
Customer confidence
Reduced supervision

Eagle On Line Chemical analysis



The Eagle company have modified their inline carton chemical lean analysing machine to measure the CL of unpacked meat as it passes along a conveyor.

The machine is designed to average a predetermined Chemical Lean into batch lots, e.g. 85 CL for 500 Kg's of meat.

Benefits

Customer satisfaction.
Preferred supplier
Reduced fat claims
Increased profits
Improved yield
Ideal for bulk bins

Entrances and Personal Equipment


Photo 50


Photo 51

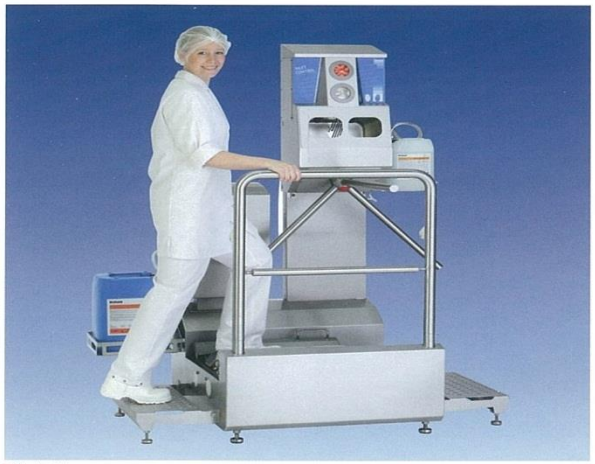


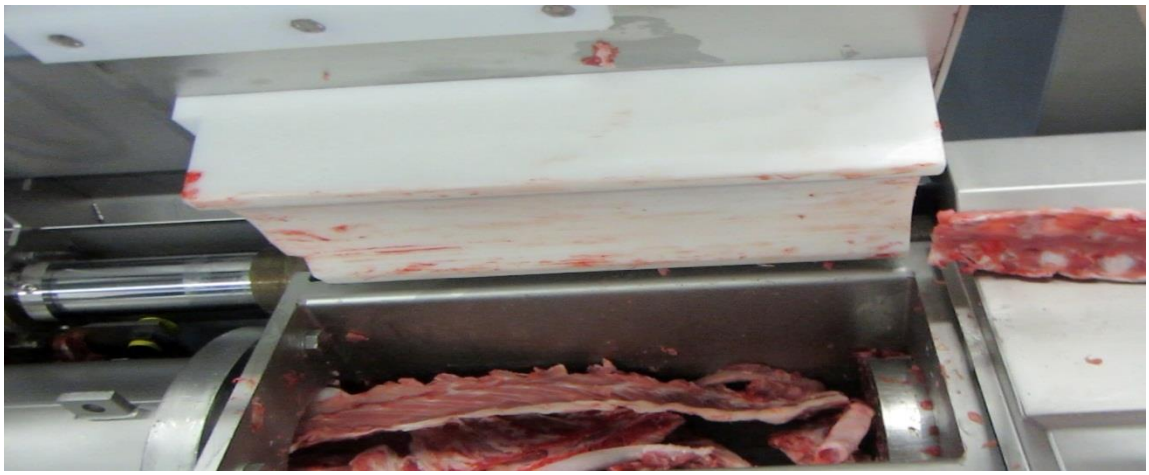
Photo 52


Photo 53

One of the highlights of the tour was the development of departmental entrances to guarantee personal hygiene and equipment hygiene. The entrances are set up to ensure that operators must pass through a system of boot washes, hand washers and sanatizers prior to being allowed access to their place of work.

During our time at the IFFA show we observed many samples of entrance equipment from numerous suppliers. This equipment is readily available on the market today and it is expected that the Australian Industry will soon follow suite.

Finely Textured Meat



Marel demonstration centre put on a display of the their Townsend Protocon Machine. The machine is used to force untrimmed meat from bones to improve carcass recovery. The end product is called finely textured meat and it is used in further processed foods. Bones are placed into a camber and the meat is forced off the bone under pressure supplied from a hydraulic ram. The pressure setting is imperative as too much pressure will force excess calcium out of the bones which has the potential to lower the value of the product. Machines have been developed to process beef as well as small stock. The European Industry has mastered the art of marketing this product to maximise its benefits, this is the challenge for the Australian Industry.

Reported By
Duncan Downie & Allan Platten
Teys Australia

Project code: P.PIP.0370

Prepared by: Murray Miller

8 Thomas Foods International

P.PIP.0370 - Technology and Automation Study Program and IFFA

Task: To source solutions that will lead to the reduction or eradication of E coli and other adulterants in pre-packaged export products bound for the USA.

Issue: Recently, the USDA has tightened the requirements that suppliers need to adhere to in order to export their products into the USA. Up until the change only E. coli 0157:H7 was being tested for at the Port Of Entry (POE) into the US but as from June 4th 2013, a further six adulterants, commonly known throughout the industry as "The Big Six", were added to the list of bacteria to be tested for. A positive test result could ultimately lead to the loss of a producers' US licence, which is a genuine concern for the Australian red meat industry. Thomas Foods International (TFI) is only one of many red meat producers around Australia who are directly affected by this change in US law so defining a process or engineering a solution would have a profound effect on red meat producers who export their products to the USA.

Technology/Process: To date, there is nowhere in Australia that is successfully treating trim or other products, pre-packaging, that will reduce or eradicate the incidents of adulterants. The aim, while at IFFA, was to determine if there is any technology currently being used in Europe that may assist with developing a process, suitable to the Australian industry, that would reduce or eradecate the instances of E. coli and other adulterants in export meat.

Challenges: There are several challenges facing successful treatment of trim products bound for the USA. These include, but are not limited to:

- Determining the type of the remedy i.e.
  - Chemical
  - UV Sterilization
  - Heating
  - Chilling
- The type and quantity of application i.e.
  - Spraying
  - Dunking
  - Temperature
  - Exposure time
- Product integrity after treatment i.e.
  - Colour
  - Taste
  - Shelf life
- Chemical residue.
- Meeting Australian and foreign market QA requirements.

Opportunity: If an effective solution to the above problem was already being used in Europe then it may lead to an expediant, low cost transition to meeting the new USDA requirements. As a large number of Australian producers export their products to the USA a successful outcome of this project would ensure the high regard that Australia currently enjoys as a red meat provider is maintained. It could also potentially lead to more Australian red meat producers seeking markets in the USA.

Introduction:

In 2009 tests were undertaken by the CSIRO at CRF Colac to dose whole carcasses with a Twin Oxide solution in order to reduce bacteria count, however, the results of these tests were not conclusive and fell short of the predicted positive outcome. To the writers' knowledge there have been no further testing undertaken, using any form of sterilization on red meat in Australia that would lead to a reduced bacteria count in export products.

The aim of the visit to IFFA in Germany was to source solutions that may be readily available in the European pig or red meat industry that would lead to a reduced bacteria count in product.

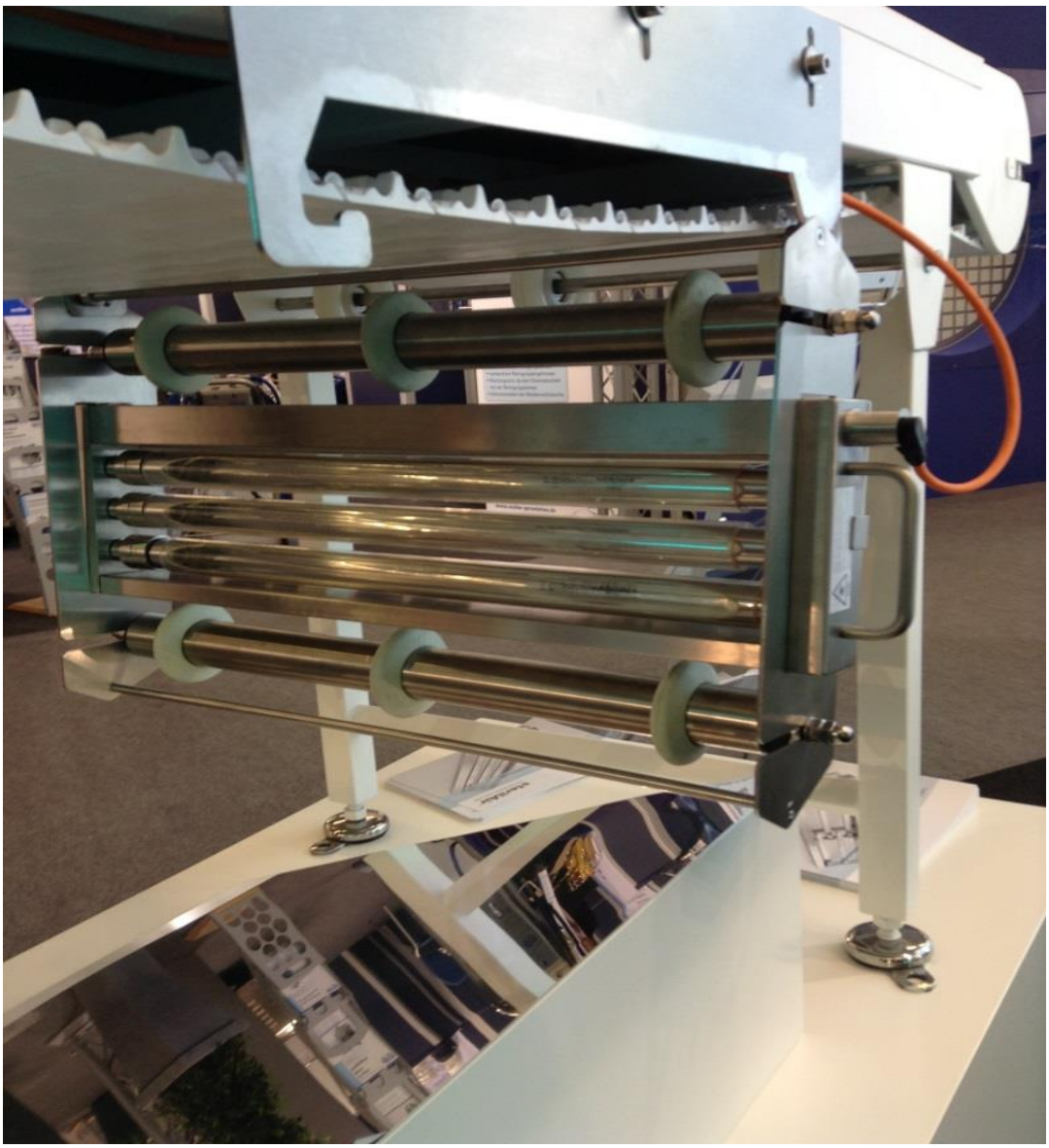
Summary of findings:

The study tour to IFFA and to suppliers in France and The Netherlands provided only one real possibility in sourcing a solution to reduced bacteria count in trim product. The only displays on offer in the food safety arena were centred on using UV Light Sterilization to treat belting used for trim transportation in an effort to reduce the transference of bacteria from one piece of infected trim to a clean piece.

I was unsuccessful in sourcing any suppliers who used temperature or chemicals as an intervention in eradicating or reducing bacteria levels on product.

UV Sterilization

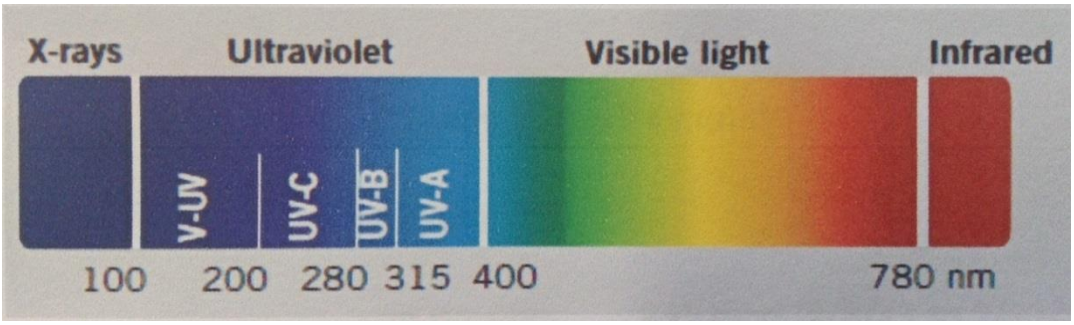
Manufacturers and suppliers of UV equipment seemed to concentrate on the irradiation of supply belts, air quality and the water treatment aspect of UV sterilization rather than direct application to product as a means of killing bacteria.



Example of typical UV Sterilization Lamps used to irradiate supply conveyor

Air treatment takes place in the form of lamps being fitted to various kinds of air supply systems in an attempt to eradicate airborne bacteria before they make their way to production areas. UV treatment of water has been used by companies around the world producing drink products for many years and is recognised as an effective way of filtering the water prior to mixing and filling of drink containers.

When a UV lamp is operating it appears to emit a soft blue colour that is visible to the naked eye but the actual short wave UV-C light is emitted beyond the visible light spectrum and resides in the electromagnetic spectrum.

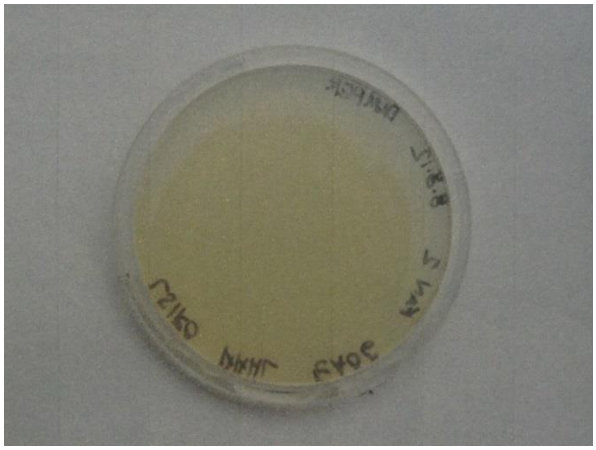


UV Spectrum Scale

Bacteria cannot survive prolonged exposure in this light band as indicated by the photos below of agar test plates taken from an air handling unit before and after treatment with UV Sterilization.

Agar Plate five days after sampling from an air handling unit.

Agar Plate sample taken from the same location three days after UV lamps were installed. Photo was taken five days after sampling.



The photos above indicate that there is a profound effect on air that is treated by UV Sterilization, however, none of the exhibitors at IFFA could produce examples or results of work applying UV directly to the carcass, primals or trim product in the pig or red meat industries.

Using air treatment as a guide, indicators are that UV Sterilization can treat infected trim to a high standard provided there is enough contact time and complete exposure to the light. The ultra violet light needs to make direct contact with the entire surface of the trim for a specific amount of time to be effective. This contact time would have to be determined through experimentation with the conveyor speed that is delivering the product to the UV chamber. The fact that there can be no overlapping pieces of meat poses a problem in that extra labour would be required to spread each piece of trim as flat as possible and spaced with a gap from every other piece so as to enable the UV light to irradiate as much of the surface as possible. The extra labour may be justified to effectively treat trim on smaller plants, however, in larger boning rooms where the throughput of product is much greater, it would make it economically unattractive to staff the lines with the resources necessary to do the job effectively.

Another downside of using UV as a form of sterilization of product lies with the uneven shape of the trim. Most pieces, irrespective of how carefully they are laid on the conveying surface, will creating ‘valleys and peaks’, hence, shadow. As UV Sterilization is only effective where the light actually makes contact with the surface, this would, therefore, prove largely impossible to dose each piece of trim 100% successfully.

UV light is harmful to the naked eye and can cause skin issues with prolonged exposure. That means that the lamps would have to be installed within a safe enclosure that could not leak UV light. It would also require a substantial increase in real estate on a boning floor to accommodate the enclosure and the extra staff.

Conclusion

After talking to suppliers at IFFA it became apparent that no ‘ready made’ solution is available to treat trim or other products prior to packaging with any form of intervention. Two suppliers indicated that they are working towards providing a resolution for this issue using UV, however, there is no actual data available as to the success of this method when applied directly to red meat. Results from water treatment and air testing, however, indicate that there is enough evidence to suggest that future exploration in this field may be worthwhile.

I could not locate any suppliers who were using heat, cold or chemical applications to eradicate adulterants on trim or whole carcasses. Hence, it appears as though there is no universally available solution to the problem at hand. Although this not a positive outcome from the IFFA visit it does open the door for research possibilities in Australia.

Project code: P.PIP.0370

Prepared by: Christian Ruberg

9 Meat & Livestock Australia

P.PIP.0370 - Technology and Automation Study Program and IFFA

Executive Summary:

- **What was Wow** – Viewing a fully automated naked block beef trim packing plant (250T/day capacity) by Nawi Germany.
- **What was interesting** – Noting that none of the major European automation suppliers had an automation strategy for lamb and beef processing. Scott Technology NZ, and MAR Australia are now considered world's leading developers & suppliers. Attec Denmark was the most active lamb primary processing machinery developer.
- **What was expected** – A wide selection of value adding, further processing, and packaging equipment options, with a strong pork processing focus.

The study tour was considered successful by processors, as evidenced by

- The level of technical cooperation and collaboration between tour participants, discussing pro's and con's of the various solutions observed, and adoption potential for Australian firms;
- The level of post tour activity evaluating new technologies and solutions observed;

Project objectives:

- Receive briefings on R&D and technological development approaches being taken in the EU
- Learn about the approaches being taken by processors in the EU and by technology providers for the development of slaughter, boning, vision and sensing, and cutting and technologies;
- Examine new smallstock and beef technological advances and critique these in relation to opportunities for Australian processors;
- See how new technologies are being implemented by processors in the EU;

- Understand the capabilities available and emerging;
- Contribute to a consolidated program report and also a specific PIP project report relating to a key technology (to be identified in the application);
- Investigate and report on a specific issue/area of choice in relation to Australian processing conditions and requirements.

In addition, MLA wishes to:

- Support technical collaboration between processors and innovation capability development in terms of new technology opportunities in primary processing, and exposure to trends and opportunities in packaging, further processing, and value adding.

Study Tour objectives:

Investigate the global technology provision options, comprising services & technology, for primary meat processing (slaughter, dressing, boning, packing) of lamb and beef production.

Australia processors recognise that on average Australia only contributes 1.1% of global R&D so many of the technological opportunities will come from overseas. Regular global technology scanning is therefore essential.

However, general feedback from international automation consultants and local service providers indicates that Australia does currently have a lead in lamb and beef automation development due to the efforts of the MLA and AMPC programs.

Australian processors will be aiming to realise processing efficiencies, labour efficiencies, to manage product cost. They will also be aiming to identify opportunities and markets to add value to their meat products.

Australian processors benefit from significant global recognition of the strength or quality, “Clean & Green” of Australian branded products. Consequently, an important secondary objective is to expose processing technologists and operations specialists to the options and opportunities to further add value to meat products, through further processing, value adding processes, and packaging presentation innovation.

The challenge is to identify and then to successfully adopt cost effective new work practices, technology, and hence to be innovative in the domestic and global market. In a sophisticated and competitive global market, team work and collaboration will be essential elements for success.

Introduction:

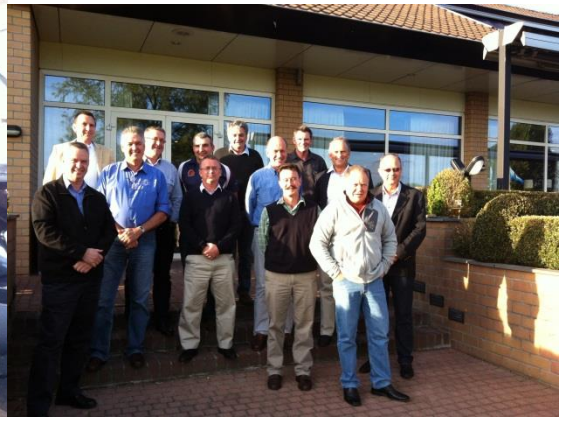
The IFFA Study Tour itinerary was developed by MLA to:

- Provide an opporunity for processors to visit the IFFA tradefair and interact with the exhibitors in detail;
- Provide an opportunity for processors to visit meat processing facilities in Europe;
- Provide an opportunity for processor technologists and operations specialists to view and gain insights in further processing, value adding technologies, packaging innovation;

- Provide an opportunity for processor technologists and operations specialists to listen to market updates on Europe and associated markets such as Russia, and to gain insights to feedback to industry and into their own businesses.

Summary of Itinerary

1. Arrive and orientate Frankfurt - Friday
2. Visit IFFA Trade fair - Saturday & Sunday
3. Detailed IFFA exhibitor discussions and presentation from MLA Brussels on Europe & Russia market update - Monday
4. Processing plant visit Westfleisch Hamm (pork & beef) hosted by E+V objective carcase measurement, dinner presentation with Eagle CT Scanning - Tuesday
5. Detailed IFFA exhibitor discussions, dinner presentation with Attec lamb processing and processing efficiency technologies - Wednesday
6. Detailed IFFA exhibitor discussions, transfer to Paris - Thursday
7. Visit to Cryovac Packforum innovation centre, packaging market update, visit to Carrefour and Auchan hypermarkets, practical demonstration of latest packaging systems, dinner presentation with SealedAir - Friday
8. Free day - Saturday
9. Transfer to Cuijk Holland - Sunday
10. Visit to Marel reference sites Vanlommel Belgium and Goedegebuur Rotterdam - Monday
11. Visit to Marel reference site Pukon chicken processing, and later visit to Marel Boxmeer Holland meat processing innovation Democentre, dinner presentation with Marel industry centre meat and Stork Townsend further processing - Tuesday
12. Visit to Marel Boxmeer Holland meat processing innovation Democentre meat recovery and further processing. Later visit to Apeldoon Holland Grolleman coldstore and their fully automated naked block beef trim processing plant – Wednesday
13. Transfer to Frankfurt, further independent plant visits and return.

Summary of notes:

Frankfurt Messe IFFA General notes:

- Koln Messe mainly for meat traders, Anuga Meat 5-9th Oct 2013, Anuga FoodTec 24-27 Mar 2015
- Many Australian processors critical of AusMeat (too restrictive, let customers determine specification), additional product programs adds cost and complexity, and cost competitiveness getting critical, whole area of grading in Australia needs review for cost/benefit/updating;
- Germany currently has no minimum wage (but currently being debated), no wonder they are competitive, EU5/hr but rises with experience and value, labour from Poland, Rumania, eastern bloc (Australian rate EU16/hr unheard of), but food costs 50%, and low cost housing;
- Germany has order and discipline, autobahn often unlimited speed, no cages around footbridges, culture pushes the boundaries and trusts their engineers, not risk averse;
- Refer to “Power of Meat” from AMI (American Meat Institute);
- Marel used old stainless steel machine components to make artworks, demonstrates an eye for culture and sophistication, hence innovation;
- This trip allowed processors to meet with technology providers, next trip could allow processors to interact with marketers and value adding;

- EU very impressed with Australian collaboration between companies;
- Collaboration, team work, breakdown information barriers, innovation, leads to commercial success;
- Robot beef primal breakdown with manual/automated deboning workstations a potential industry solution;
- Harry Schultz has led a pork industry contingent;

Exhibitor Stands:

- CabinPlant, agency FPE, multibatcher, CL management,
- Freund, a range of manual cutting tools
    - Hosted by Robert Freund who generously provided drinks for Australian processors.
- CL Management: not cost effective if price curve linear (?), closer deliver to customer requirement valuable (?), not an issue if each carton is measured accurately (?), every plant to think through cost benefits,
- Eagle, owned by Mettler Switzerland, agency FPE, CL measurement, James Nabors sales engineer from South Carolina, long experience, Kyle Thomas "strategic business unit manager" from Mettler to integrate Eagle, nice chat about US (Clinton will be remembered for GFC, Bush Jnr for energy independence and seam gas)
- Attec, a range of lamb processing equipment (boning, primal cutting)
    - Refer to company profile and technology offerings documentation attached;
    - MLA presentation hosted by Andreas Jenson, Koorosh Khodabandehloo, and Will Cowley, KK generously made drinks available for Australian processors.

- Interfood, Australia supplier of equipment, Paul Spokes director;
- Multivac, Michael Lang, system development (Forshung & Entwicklung = R&D), beef primal pick and place not on their radar screen too small a market, not seen as a standard offering, too much customisation

- Cryovac, (not at IFFA, rely on PackForum democentre) key business is film and extrusion, but rely on Multivac / Ulma as machine builders, hosted by Gareth Reynolds Cryovac Aust (EU experienced), generously hosted Australian processors in Paris innovation centre;
- MLA Michael Crowley and Nigel Gosse, summary of Europe and Russia to processors, and dinner (circulate notes)
- Banss, all pork slaughter, nice but very expensive brisket saw dual tool with auto wash, no plans to move into beef or lamb, missed out plant visits this time, Harry Schultz (former SFK) works with Banss and pork
    - Refer to company profile and technology offerings documentation attached;
- MPS (Spin-off of Marel), same size as Banss, with cold store logistics, John Hart visited ?, no EU demand for beef automation, lamb only in Aust/NZ, check on rotary beef evisceration stand,
- German Nawi, pork slaughter lines, naked block, linking with SFK and LeBlanc Canada/US,
- SFK LeBlanc, beef slaughter line too slow to warrant automation, not a market for them at this stage, thinks US may move into automation with labour law changes, EU has tray handling but no carton product anymore
- Marel, (history, Townsend US buys Stork Oss, Marel buys all, sells slaughter to MPS), competes with American Meat
- DMRI working on automated visual inspection of bones and trim, lean meat and fat monitoring
- EMF systems Hanover Bremen Germany gives the impression of a large supplier, slaughter systems beef, sheep, pigs, poultry, Russia and Middle East. However, closer questioning suggests no automation strategy in beef and lamb, robot sanivac on demonstration has no sensing, merely POC with no installations so far.
- KJ Industries (refer to attached company profile and technology offerings, - now division of MPS)
    - In-line pork primal splitting/trimming

http://kjindustries.com/Corporate-info/Automatic-chine-bone-saw-type-AM11.aspx

- MLA EU Market Overview (presentation to processors from Michael Crowley & Nigel Gosse)

Westfleisch Site Visit Hamm

- Hosted by E+V Dr Lutz Kreuchwig
- Hosted by Herr Bayer (not available), and Thomas (Manager Inspection)
- Westfleisch is a Co-op with 5 plants
- Hamm: 5000 pigs, 750 beef, 80k beef/ann
- 75M pigs, 400k beef & veal
- 80kT convenience products, 150kT sausage

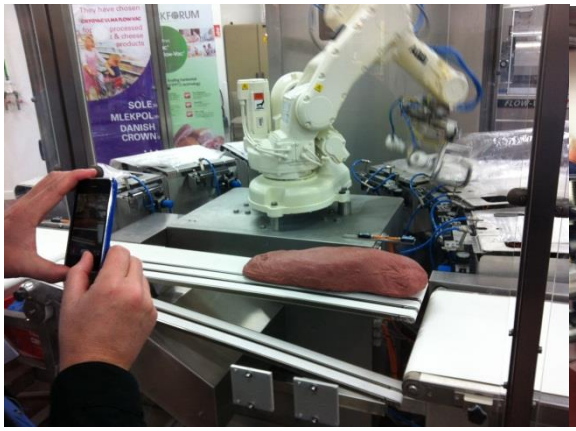
- 55% export, Russia, China, Middle East
- Live animal grading at feedlots 12mth cycle
- Australia still relies on dentition, no automated pH probes
- Uses E+V beef vision inspection for grading and payment to producers

- Cryovac/SealedAir/Packforum briefing (refer to attached presentations from Gareth Reynolds)

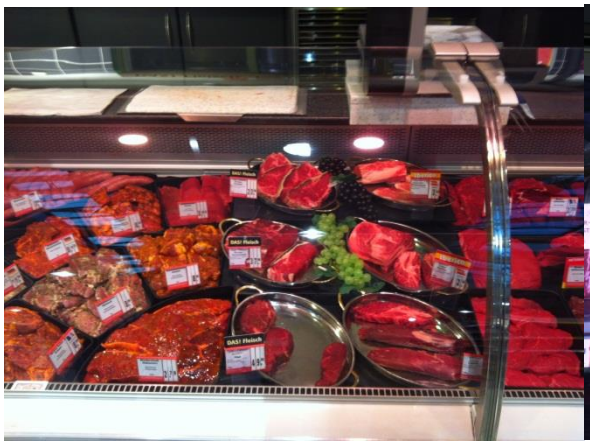
  - Big money and investment in R&D, Australia just to monitor trends
  - Fresh Red Meat / Packaging Trends / New SealedAir
  - Russia market growth 10%/ann, but can be tricky trading environment
  - Russian pork automation going up
  - Miritor Russian distributor
  - Cryovac have detailed store audit (consumer, retailer) 2006 & 2012, large database, can be made available, product / film / package spec / species, consumer has 11 key packing requirements (freshness #1, bright red meat, leakproof, aged <but only 10-14 days>, ease of opening, extended shelf life, disposal, etc)
  - Cryovac very strategic, they understand consumer preferences in packaging, Cryovac understands supply chain and consumer to assist processors, and set equipment and product strategy
  - 10Billion product packages annually (81% retail ready, 19% backstore), 4B beef, 5B pork, 0.3B lamb
  - EU 71% Modified Atmosphere Packaging MAP, 14% vacuum, 15% non barrier overwrap
  - Case ready fixed weight bone in
  - DarFresh new trend in high performance film
    - Add value to customers
    - Farm to consumer value chain
    - Hygiene and packaging
    - Collaborative solution development (PackForum)

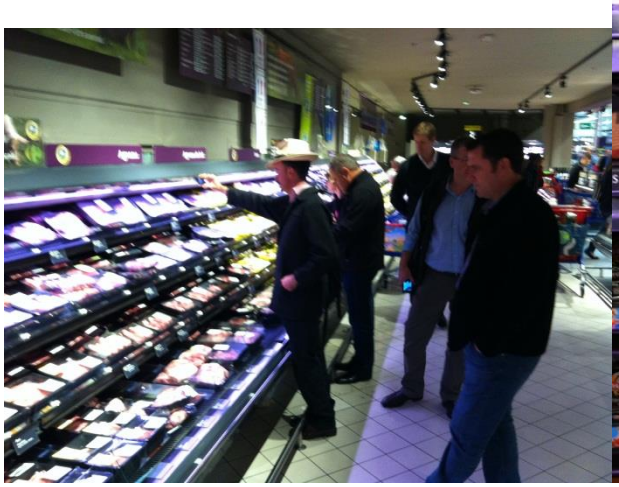
- SealedAir works with US cattlemen, tenderness, flavour, food waste, shift from PVC overwrap to vacuum sealed
- Innovation focus into Operational Efficiency
- Machines, Mondini, eliminate scrap web, 100packs/min, vision system to confirm deviation and QA
- Vision inspection trends
    - Kill floor welfare monitoring
    - Packing vision monitoring
    - Measure, tolerance, compliance
- PakFormance: production, compliance, pre-emptive machine maintenance
- Food Safety waste, shelf life, active barrier films
- Product differentiation with packaging, 11 points of difference, vertical product display, freshness O2 scavenge, sulphur compounds
- Customer experience, easy opening grip and tear, storage, step saving with marinates and separated flavours, cooking, quick preparation
- Market insight team / Strategic innovations team
- Lactic acid sterilisation wash on beef allowed in EU
- No solutions to leaking bag defect
- My observation, different line layout for inside and outside bag labelling

Packaging Automation




Visit to French retail outlets




Vanlommel (Belgium)

- Hosted by Johan Heylen QA
- Veal to retail, 3k/wk, 30T/day deboning

- Marel yield management, 1.2% improvement with system (Australians claim they would be out of business with such low yield)
- Productivity claimed up from 155 to 170kg/man.hr
- 18 mths difficult to implement, but now rhythm steady and staff pleased, short term higher staff turnover
- 150T/wk not possible before system
- Interpretation and actioning data difficult
- IT capability is important to support system
- System switched over on weekend, but better to phase in with training

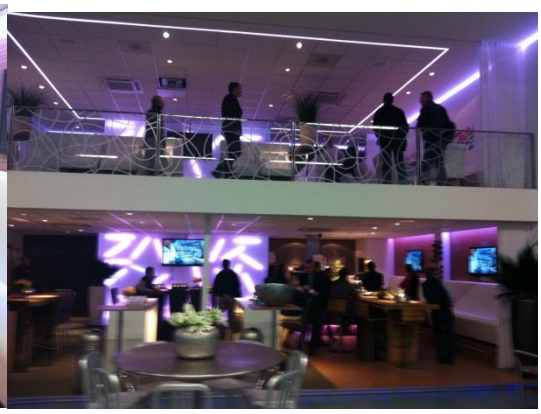
Geodegebuur Rotterdam Netherlands (Michiel Goedegebuur son of owner, and "business controller")

- Introduced by Harry Verdonk (Marel Sales Director Industry Centre Meat based in Oss)
- Incredible 1950s style beef carcase breakdown using a meat axe (processors mesmerised)
- Only process 2000 hindquarters/day (10k/wk), 75kg each, purchased from as far as Austria, partner with other processors to buy whole carcase
- www.geodegebuur.ne
- 32 boners, 16 slicers, weigher introduces product to Marel line, 4 packers into tray wrappers
- Motivated polish workers, 1 Dutch supervisor
- Workers weigh and count bones for yield measurement
- Using a Marel Flowsystem

Pukon Chicken Processor

- 300/min crumbed line
- 90/min filled fold over paddie lines (chicken pulp, cheese, ham)
- Highly automated, few people, but ingredient management

Marel Democentre Boxmeer

- Meat recovery hosted by Lindsay / Gus
    - Soft separating (pressure causes meat shear from bone and flow)
    - Linear


Lamb Mince
MEAL FOR ONE
Shepherds Pie
Hot & Spicy meat balls

- DMM meat (10mm filter plate), soft separation 3mm filter plate
- 15 x DMM machines in NZ
- Meat balls can have 20% DMM
- Meat paddies 10% DMM (quite tasty, bit chewy)
- DMM capacities 750kg/hr (lamb), 2500kg/hr (beef), 5000kg/hr (hi volume beef)
- No hollow bones due to marrow and lower value with lower CL
- Competitive rotary meat separation suffers from high calcium, higher marrow, higher bone fragments, but has higher yield, no beef due to hard bones on machine longevity
- DMM, 1 pass 25% recovery ("A" class products), 2nd pass another 20% (for "B" class products)
- Poor CL control is a problem for grinders
- Market anomalies can allow lower value product to exceed higher value product
- TMS trim management system
- IMI incoming meat inspection
- Fat knowing, then fat controlling

Grolleman Coldstore (Apeldoorn, Netherlands)

(Refer to video, company profile and technology offerings document)






- Introduced by Alfred Klunder Nawi Sales Director
- Peter (very knowledgeable engineer, knows whole system intimately)
- Naked Block (normally 20 people)
- 17-18kg fixed weight blocks
- 2-3 people
- 100-150T/day
- 1.5hrs from 5 degrees to -18 degrees
- Fixed block weight
- Save packaging
- Visual inspection prior to placement in mould (gravity feed, other plant uses pump)

- Good hygiene
- Plates are aluminium (with anodising or coating for food contact ?)
- Comparison; 1000hd/day plant produces 35T/day beef trim
- Rind = beef in german
- EU1.50 per kg CO2 0.05 pure
- Another Nawi naked block site pumps trim product (DSI?), which may influence product temperature. A CL batcher featuring pumping may also suffer this issue.
- CSB logistics management

Marel Democentre Boxmeer Netherlands

- Hosted by Henri Janssen Manager Industry Centre Meat
- FPE agents for Townsend & Stork Further Processing
- Marel Andrew Voke agent for Marel FlowLine
- Jacques Roosenbrand ex chef and manager DemoCentre

Navi Briefing:

- Navi (two young directors) advise firm to merge with SFK-Leblanc (largest beef automation in USA, slaughter supplier in US & Canada, cutting & boning)
- Australian competition, 2-3 new boning rooms with Milmeq

Other Notes:

- Processor insight or observation:
    - Investment in Processing Efficiency and cost control is a much easier decision
    - But to investment to increase product value through differentiation is complex due to market dynamics (Porters 5 forces: negotiating power of buyers and suppliers, competition from incumbents, threat of new entrants or substitution)
- MSA links consumer purchase experience and premium to producer actions, supply chain must coordinate activities in order to achieve brand and premium.
- Gerbermuehle Restaurant Frankfurt (Sachsenhausen Nord) very good but manage pricing (wonderfully arrogant haughty waiter with a smile)
- Uber Ruessell Bad Homburg Braeuhause, recommendation, just outside Frankfurt by train
- Jazz: Team of Rivals, Delores Kerns, Grudwin
- Bonn: supermarket Net, beef from Argentina (eye rib fillet very similar to Australian) EU9/kg, lamb from Ireland EU29/kg
- Munich: Rewe, no lamb too expensive

Lamb Supply Chain Summary:

- Processors benefited from observing trends overseas, very professional and looking out for opportunities, challenging commercial and technical environment
- EU has high pork automation, lamb very expensive, supplied from NZ and Ireland,
- Tray vaccum sealed product, extend shelf life, allow consumer aging,
- MLA working on market access, supply chain access,
- None of the EU automation suppliers (Banss, MPS, SFK LeBlanc) will enter lamb automation, ATTEC introducing a number of semi-automated solutions, Scott (not at IFFA) will continue to move into the high volume production,
- A number of value adding providers and innovations (refer to Michael Lee summary), but Australian processors baulk at cost and complexity, opportunities for value added new products to capture imagination of EU consumer,
- EU competitive, processors really need to understand market, fat control, flavour, professional presentation,
- MLA work with processors important, supply chain collaboration
- Processors will increasing rely on objective carcase measurement to control output specifications
- Meat recovery, automation

Benefit to the industry:

Conclusions:

Successful innovation is not just an idea gleaned from an IFFA Study Tour.

1. The idea needs to be explained to a colleague to clarify thinking;
2. The idea or developing innovation needs a senior champion and mentor;
3. Form a team to assist with moving forward;
4. Remember crazy ideas always get rejected before they become the obvious way forward. Trust your intuition, at least for a while;
5. Persistence, try another way to explain the vision;
6. Evaluate and test the idea rigorously. It is fine to kill it if it fails the reality check, the cost benefit study, and really will never work, which yes contradicts 4 above, 90% of ideas should quietly die;

Attachments & supplier material:

Technology Providers have supplied additional information, brochures, report, white papers, which will be available on-line at the MLA/AMPC website.

Meat Processing Suppliers:

MPS:

Banss:

Nawi/SFK/LeBlanc:

KJ Industries:

EMF:

Renner:

Processing Efficiency:

Marel

Further Processing:

Naked Block:

Nawi

Packaging:

Cryovac SealedAir

Multivac

Materials Handling:

Attec

Dia Werke

Marel

Supporting Notes:

Some suggested questions that might help guide participants thinking around how to approach information gathering at IFFA and assist in writing the report (includes slight variants of those in the report template). Responses to be discussed at the pre-study program briefing:

1. Describe the task, issue, practice, technology, process or opportunity that you seek to investigate in relation to technology and/or automation whilst at IFFA (NB provide detail of specific tasks, process steps and technology gaps that you seek solutions for).
2. Explain the business drivers and industry need that new/enhanced solutions in your chosen area would address (e.g. detail the challenges occurring now and their impacts on individual businesses and industry more broadly).
3. Describe the opportunity that implementing new/enhanced solutions for your chosen area offers at both the business and industry wide level (e.g. detail the

likely specific benefits that would flow from improvements gained from new or enhanced technologies to be investigated).

4. Detail the specific information you seek to gain through the study tour (e.g. describe possible/concept and/or known solutions for which information is sought, equipment design, engineering, performance data, throughput etc.) and how this will be applied in assessing the suitability/attractiveness of potential solutions.
5. Describe the solutions identified at IFFA/on the study tour and how they could (or have been demonstrated to) improve the task, issue, practice, technology, process or opportunity that you sought to investigate whilst at IFFA (NB provide detail of anticipated/demonstrated improvements to specific tasks, process steps and technology gaps filled by the identified solutions).
6. Describe how identified solutions could (or have been demonstrated to) successfully resolve/mitigate the challenges occurring now and address impacts of current practice/approaches on individual businesses and industry more broadly.
7. Describe the strengths and weaknesses of identified solutions (e.g. cost, practicability, flexibility with regard to meeting product/customer/market requirements, suitability to Australian processing and supply chain models etc.).
8. From your investigation of solutions in your area of interest provide an assessment of the ability of available technologies to cost effectively address the current challenges faced and deliver commercially attractive investment opportunities.
9. Describe any technology gaps that in your opinion remain to be addressed through further investment in research and development.
10. Describe the likelihood of the successful adoption within Australian processing business of identified solutions to the area investigated.