



final report

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IFFA 2016 Technology Exhibition, Study Program and Global IP scanning

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Executive Summary

This project supported an Innovation Delegation to the IFFA meat processing technology international trade exhibition (Frankfurt, May 2016) and associated activities.

The IFFA trade exhibition, held every 3 years, is widely regarded as the leading global technology showcase in meat processing. In 2013, 60,000 trade visitors from around 142 countries attended IFFA to view products and services offered by 960 exhibitors, who will show new products, technologies and solutions for all stages of the meat-processing chain on 110,000 square metres of exhibition space. A number of new technologies have previously been successfully evaluated and later adopted by Australian processors as a result of past processor attendance at IFFA.

A key objective of the 2016 delegation is focus global innovators on the needs of Australian red meat processors and to identify research and development opportunities to service Australian processors.

9 Partners / 15 Participants and supporters



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1 Project Objectives

The program has the following components:

- Attendance at the IFFA event to examine the range of exhibits covering slaughtering, breakdown, dressing, trimming, processing, weighing, filling / packaging, conveying, cooling, storing, transporting and selling, as well as value adding for meat and meat products.
- Visits to EU processing works and innovation centres to further examine international meat processing technology developments to inform technology and process automation strategy for Australian red meat processing.
- 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.

Each participant will report on their observations at the exhibition to the benefit of the Australian industry, and at a level of detail appropriate to the level of support toward attendance.

This project will answer 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?

2 Description of technologies applicable to the Australian red meat industry

Upon completing the IFFA exhibition attendance, the processor will include in the report:

- The various technologies (description, what is commercially available or being developed);
- How the technology works (if available), alternatively-
- Summary of overseas approach, investigations or concepts around a possible solution (if not commercially available),
- Summary of capabilities available or involved in investigating the task/issue,
- Summary of benefits, opportunities and outcomes;
- Data if available on the operation of a similar technology or solution;
- Other ideas and concepts that could relate and/or apply to Australian conditions.
- Summary of a possible R&D project based on the above (could be an industry project, PIP,

review, education, extension or adaptation or adoption related activity.

3 Technology opportunity investigated in further depth

Participants will:

- 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.

4 Participant Submissions

IFFA 2016 Meat Processing Exhibition Frankfurt Germany



960 exhibitors / from 50 countries / on 110,000 sq.m / in 7 halls



4.1 Submission: AMPC/MLA Red Meat Study Tour to IFFA and Denmark – May 2016

The aim of the AMPC & MLA sponsored trip was to send a delegation of Australian Red Meat Industry Processors to the IFFA Trade Show in Frankfurt and other associated site visits to –

- Evaluate the position of the Australian Red Meat Industry against that of Europe.
- Identify new technologies that might advance the Australian industry.
- Investigate means or processes that could improve yield or efficiencies across the industry.

The tour group consisted mainly of Innovation Managers, Chief Engineers and Operations Managers from the following companies – ALC, Gathercoles, JBS, John Dee - Warwick, Nippon, Northern Co-Op Casino, Teys & VV Walsh. There were also representatives from AMPC and MLA and periods of the trip when the group was joined intermittently by a few independent industry contractors. These comprised personnel from Scott Automation, Wileys and MeatEng.

The trip itinerary comprised site visits to operational plants, R & D facilities, IFFA Trade Show, Robotic Suppliers and Environmental facilities.

Monday 9th May

EDEKA Südwest Fleisch - Karlsruhe-Rheinstetten



This trip was an 'open' event organized by CSB Smartfactory and entailed a 2-hour bus ride south of Frankfurt to Karlsruhe.

No photos were permitted within the building.

Some points of interest about this facility are:

- 1,300 employees
- 3,000 pig and 600 beef/day whole carcass delivered i.e. No slaughter facility.
- Main line is manufacture of small goods but also sell cuts directly to its own chain of supermarkets which is one of the biggest in Germany.
- Low degree of automated boning but use the highly automated CSB 'Smart System' for value add, labelling, packaging, crate, carton and pallet handling.
- Auto:
 - Crate sortation
 - Pallet handling
 - Pallet sortation
 - Empty pallet stacking
 - Pallet storage
- Pallet storage done by automated racking system. Similar to Milmeq mFast system but for pallets.
 - 32 meters high.
 - 4 x trucks, each with a load and unload conveyor.

- 3500 pallet spaces random storage logged by the computer so location is known for retrieval.
- Everything except pure beef products spend 24 hours in the chiller. Beef spends 10 days.
- Works on always having 5% spare space.
- Chilled not frozen



Example of Pallet Storage Setup

Massive capital investment for both pallet storage and crate storage and movement but very good utilization of space taking advantage of the height while using the small footprint of real estate.

Conveyors had SEW Eurodrives with ASi controlling Moeller VSD's that were mounted locally on the side of each conveyor.

Rite Hite loadout doors. Very clever in how 4 sections of the door concertina'd onto themselves to reduce lifting height requirements. Each section stacked in front of the previous horizontally not vertically.

IFFA - Tue. 10th & 11th May

STOMMPY (9.1 F69)

Plastic barriers can be used for the guarding of walkways and equipment using bollards and rails. Especially effective against forklift impact. See website - www.stommpy.it/en/

- Can take high impact and if permanently damaged it is a simple exercise to unbolt and replace the damaged section.

- Low impact with little or no damage results in the Stomppy section springing back into position.
- Keeps solid infrastructure intact and humans safe.

HAARSLEV (9.1 D50)

- Do a system that melts fat directly to tallow, i.e. not a full rendering system and as it is dealing with fat and no blood the only smell generated is similar to that of cooking a roast.

FPE - Eagle (9.1 A88)



Example of MDX Capability

- MDX Technology (Material Discrimination X-Ray) identifies foreign bodies in the product and raises alarm.

Moda/McLaren (11.0 A13)

- New thermoformer. Unique design that incorporates ultrasonic sealing of the film down the side and inline printing.
- Thermoformer has no waste from film.
- 250mm & 350mm product types.
- 20 cuts per minute.
- Can bolt second machine in parallel to share services. Increase throughput to 40 cuts/minute.
- Moda/McLaren have coupled up with Edwards Pumps to create new style of vac pump for vacuum machines.
- Can be retrofitted to 8600's.
- Piggybacks booster on top of dry pump.
- 60,000 hour maintenance free.
- 35% more efficient than standard pump types.
- Can be mounted in a cabinet on the floor adjacent to the machine as noise emissions are low.

LINCO

- Distributors for Espera Labelers
- Auto labelling system.
- Open source Comms to tell which product is coming or pre-applied bar code stuck on by operator.



- Label on all surfaces of the carton.
- Multiple labels per carton
- Manual vertical movement but can label across the lid seal if we can find a common spot for all box types.
- All auto machines use glue backed labels so can stick to the plastic bag before lid goes in.

E+V (9.1 F34)

Axel Hinze principle and consultant.

Meat detection on waste bones imagery.

- Takes an average over a customized period of time and raises an alarm if the level rises above a configurable threshold.
- Could indicate that there has been a change of operator and the new operator is not performing as well as the previous or even operator fatigue, i.e. yield may be slipping towards the end of the day.



Meat/Waste Detection System

E + V also uses imagery for Auto Grading purposes. This system is used in many European pork and beef plants and is growing in popularity.



Auto Grading System

BMC (9.1 F34)

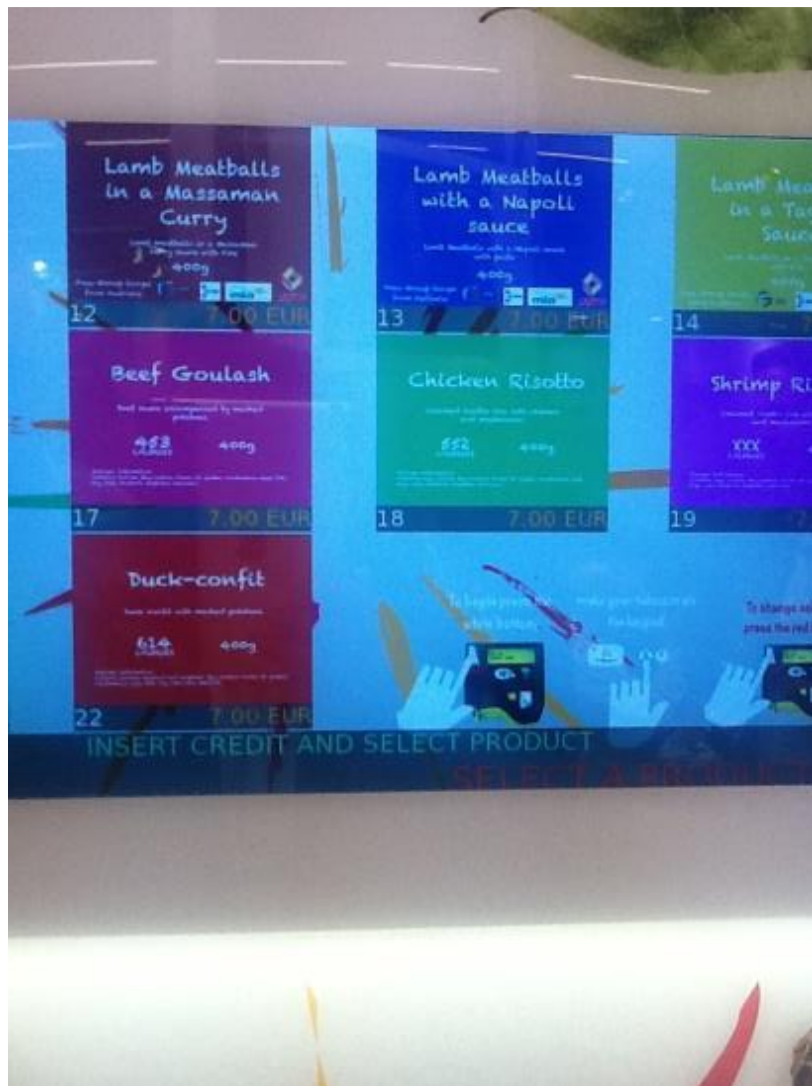
E + V shared their stand with BMC who is working with “Flavour Station”. This is an innovative fast food dispensing machine that contains a microwave oven and fresh, ready meals. The purchaser chooses the meal, pays by credit card and then waits between 2 and 2½ minutes while the meal is heated and dispensed.



The Flavour Station



Sponsorship Acknowledgement



Menu Selection



Preparation Screen

ITEC - (9.0 E34)

Anteroom equipment.

Various types of smart hand and boot wash systems.

- Dispenses soap, disinfectant and drying before permitting access to the floor.
- 5 year guarantee on the brushes (single shift).



All in One Unit

Single Unit

Disinfectant Dispenser

Knife and gear wash systems.

Large range of equipment capable of washing all pieces of equipment from boots to cutting boards. Quality was excellent and water efficiency has been at the forefront of the designs. There are two types of knife and gear cleaners, the Continuous Horizontal Cleaner and the Rotary Cleaner.

- The rotary will clean around 25 kits in 15 minutes for end of day wash and
- 8 minute partial wash at lunch breaks.



Horizontal Knife Wash

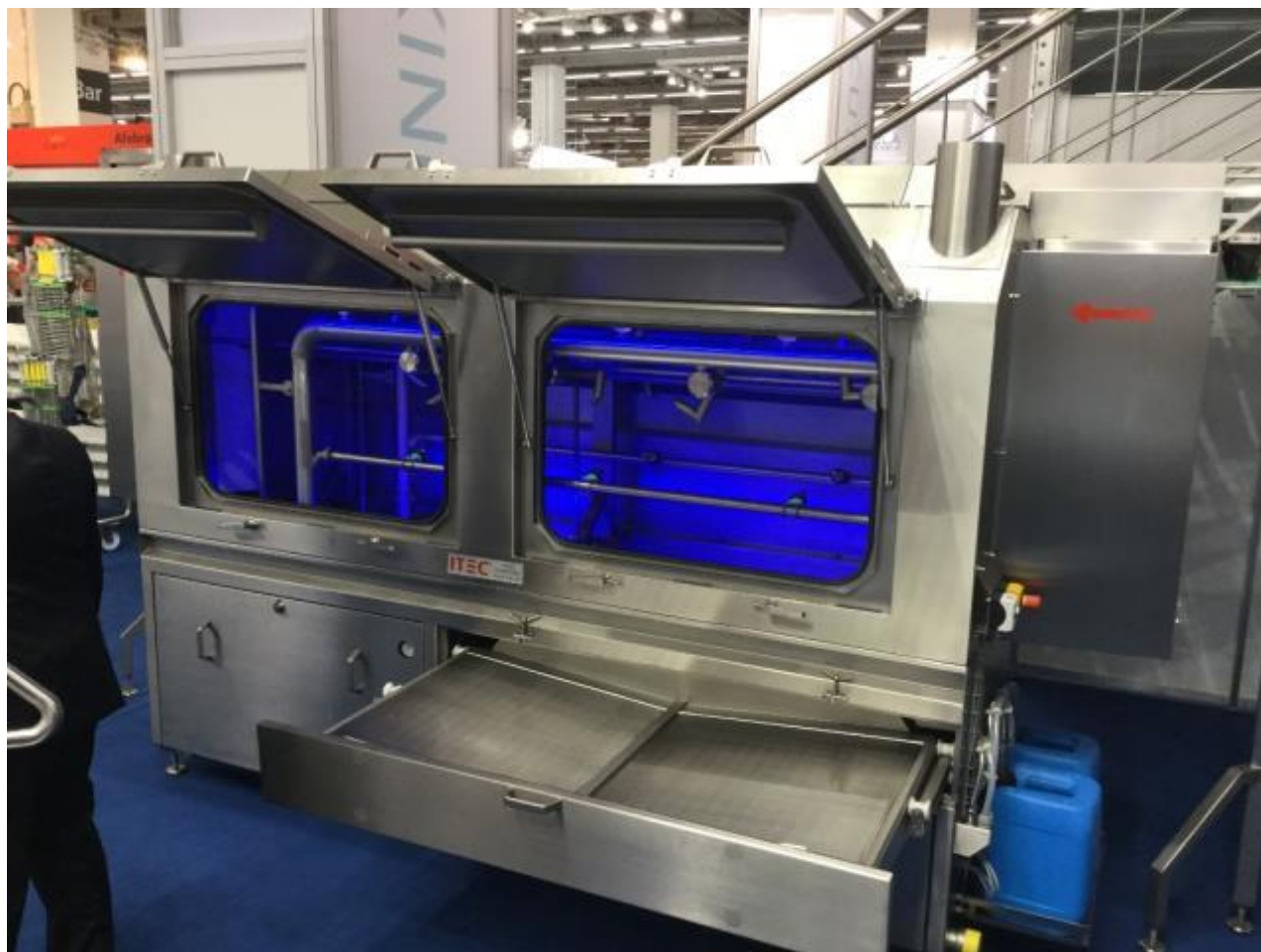


Rotary Type Cleaner

Continuous Horizontal Cleaner

- Use 1.4litres per kit.
- Takes 90 seconds to complete wash.
- Uses 55 deg. water applied via 'dishwasher' type whirlybirds.
- 82 deg. high pressure rinse on exit.

- Can fit an external air knife for drying on exit. Not included.



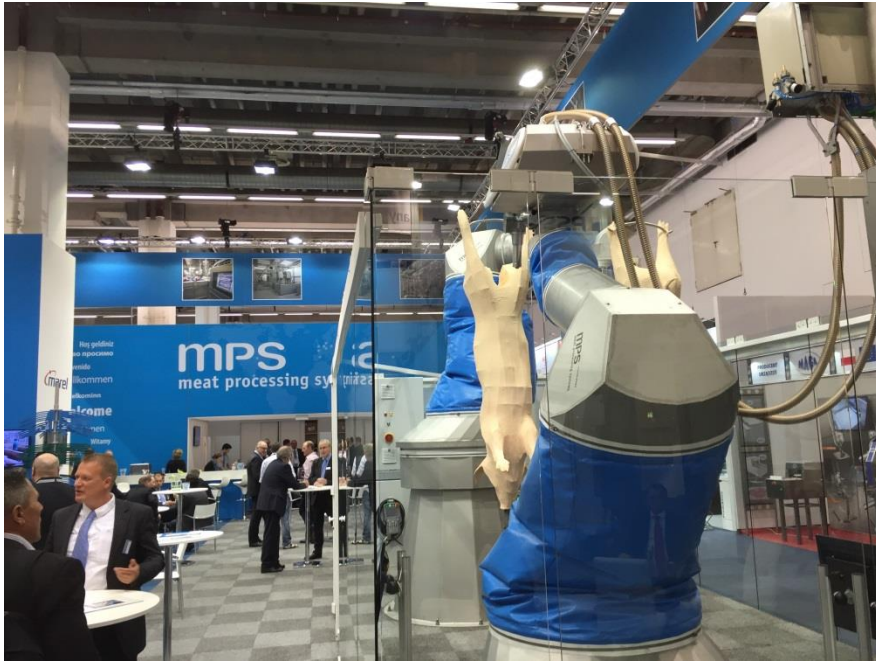
Continuous Horizontal Cleaner

MPS (9.0 B81)

This company had the most automation at the trade show but most of it was based around the pork industry.

- [Click to see 'MPS Robots' video.](#)

MPS are an engineering company that manufacture everything from cutting boards to full slaughter lines for Sheep, Beef and Pork. Their main market is Europe but have only limited representation in Australia.



EBERHARDT (9.1 B10)

Food Press System - Matt (Columbit)

Mix our trim to form whatever CL we want. Pack it into a mold in whatever shape we want.

Applies 400kgs of pressure to form a shape of our choosing into one solid mass.



Eberhardt Press System

- The product can then be smoked, cooked or left raw.
- Even raw it can then be cut into slices as thin as 1mm or steaks of 50mm.
- Molds made from sprung stainless which springs back into shape upon pressure release.
- [Click to see 'Bali Bacon Messe' Video](#)



Examples of Products That Have Been Pressed



Examples of Products That Have Been Pressed

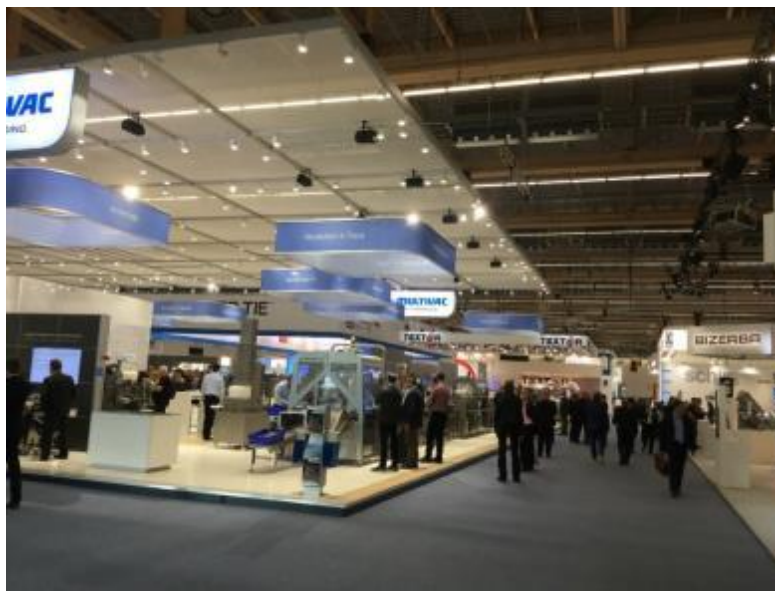
FOODPRO - (9.0 B16)

Stringing machine.

- One in Melbourne
- Rate of 55/minute
- Machine quality looked good and worth following up for the Boning Room Project.

BANNS

- Dynamic weighing.
- Multivac are the Australian agents.
- Sales rep. from Multivac will be in contact once back in Australia.



Example of IFFA Exhibition Stand and Showroom

Evening networking with Austrade

On Wednesday night we were hosted for a presentation and dinner by AusTrade who are based in Frankfurt in the rooms of a legal firm King & Wood Mallesons. Dr. Michael Henderson was the primary host and the evening provided the opportunity to hear what AusTrade does (and could do for us) in the European theatre and to network with other industry affiliated people.

If companies do not already utilize the services of AusTrade then it is recommended that Marketing Departments make contact with the AusTrade Frankfurt office for discussions. These people have the contacts and local knowledge that can –

- Potentially open new markets for our product in Europe.
- Assist to navigate stormy waters for any existing issues that companies may have with current customers or potential customers.

New Zealand currently outsells Australian lamb to the tune of 10:1 in Europe and the staff at AusTrade have made it one of their goals to narrowing this gap so the desire is there to help us increase market share if we want to go down that track. The quota system is the biggest inhibiting factor but the staff at AusTrade are working to obtain a bigger share of the pie for Australian Lamb Exporters.

Also present at the dinner was Carsten Meier, Investment Director for the State of Victoria, European Office. Carsten's job is similar to that of AusTrade but focused in particular on Victorian based businesses. Once again, could be a good contact for further development in the European market place for Victorian based companies.

King & Wood Mallesons are a legal firm that deal with large corporate legal issues in Europe and would be a good contact if any issues going forward in the European theatre or any other areas listed below. Their headquarters is in Brussels but they also have offices in –

- Asia Pacific
- North America
- Middle East

Thursday 12th May

Netherlands to visit two plants, Van Rooi Meats & ProMessa. Once again, this was an 'open' event where we were part of a larger group organized by CSB.

Van Rooi Meats - Helmond, Netherlands

It is a massive pork production plant utilizing the CSB Smartfactory System with the full slaughter floor, boning room and further processing facility.

ProMessa - Deventer, Netherlands

Small plant with no slaughter facility. They are a boning and small goods facility only utilizing the CSB Smartfactory setup. They had a very smart overhead robotic storage system that stacks crates full of product onto a levelled floor keeping similar product types stacked and grouped together for easy dispatch. Doesn't capitalize on real estate due to the overhead requirement though.

The CSB Smartfactory is something that could be of interest to industry. It is reasonably flexible after installation and extras can be added on as modules for a cost but you need the initial setup in place for this to happen.

Friday 13th

ABB Robots

Our party was hosted by ABB at their worldwide headquarters in Friedberg, Germany where we were given several presentations by members of the company. These included:

“Automation at a Global Level” – Presented by Alan Spreckley

- [See attached PDF presentation.](#)

Industry 4.0

- 4th Ind. Rev. - the Internet age
- Food and beverage industries are a long way behind other industries and stands to gain the most from Industry 4.0 in the next 5 years.
- One operating robot generates the same heat as four humans in a room. This scenario is ideal for the likes of the Boning Room i.e. as machines replace humans the chilling system won't have to work as hard to maintain 8°C.

“The Language of the Branch” – Presented by Ralf Nassmacher

- [Click here to see PDF Presentation](#)

Dual Arm Assembly With YuMi – Christian

The YuMi Robot is one the world's first collaborative robots i.e. can safely interact with humans. It has impact detection whereby the program knows that there should be zero resistance in any of the robot's travel path except for the source and destination of its travel. If an obstacle i.e. a human moves into the path and the robot detects resistance it will shut down immediately and stay inactive until a reset operation is performed.



YuMi Robot

Dot points of the machine are -

- YuMi designed around a human but has 7 axis.
- Target market is electronics, not meat industry yet but further development will make this a possibility.
- IP30 only. i.e. cannot get wet.
- Controller built into the body of the machine so very compact and easy to move around.
- Consists of two independent robots that are programmed to interact with each other which gives the appearance of the two arms working as a single unit.
- 38kg total weight.
- Standard type controller IRC5.
- Camera in hand for integrated vision if required.
- 500gm payload.
- Can move up to 1500mm/sec.
- Collision detection.
- 240V plug in.



YuMi is Designed to Interact With Humans

Hygiene Design - Roy Fraser (Global Product Manager)

- ABB maintain that their Picker is the only truly IP67 wash down robot at the moment.



ABB FlexiPicker

- Testing facility in Stockholm. Open invite to visit.

Current R&D Work

- ABB are experimenting with making the arms and the base of the robot from composite material. This, if successful, will almost halve the weight of each component without compromising strength, therefore, increasing the speed of the robots.
- ABB expect the costs to be around 20 - 30% more than the standard bagged robot available today.

Tuesday 17th May

ATTEC

Early start with a visit to the ATTEC manufacturing plant in Mommarkvej, east of Sønderborg.

- Primal cutting system will do 400cph.
- Laser measuring of the carcass for determining cut marks.
- Requires one operator for each of the machines.



Fine blade for the primal which resulted in an accurate cut with no sawdust



Course blades for the chine and flap but this creates sawdust

- Pneumatic and electrical feeds required.
- The prototype on display has just been sold in NZ.
- Open for inspection around November 2016.

This machine is short of the Scott Leap Technology but is aimed at the mid-priced option for plants.

Danish Crown Holsted, Denmark

One of Europe's newest beef plants opening in spring 2014 and houses the Danish Crown Beef Head Office. 60% of all beef in Denmark is minced.



Danish Crown Holsted

Dot Points for the Holsted Plant -

- 380 employees
- 4,500 head/week (1/2 of Denmark's weekly cattle slaughter)
- 110 head/hour
- 10,000 quarters boned out/day.
- 300 tons of beef is minced/week = 60% of all Danish mince consumed each week.
- 3 X lines, 2 operating 1 pack
- Smart 4-way ATTEC trim system at each station. The trimmer decides what CL each piece of trim is and deposits the cut into the appropriate hole. The bin below holds the trim until the supervisor calls for that particular CL and then all bins of the same CL are simultaneously dropped onto the belt below. The supervisor then inspects the product for accurate CL and corrects as necessary for the final target grade. Also a good way to measure staff performance.
- There is a dedicated training area on the floor where operators can hone their skills before joining the main production team.

Drying room

Holsted have incorporated a dedicated drying room to age their beef in. Cuts start at 15kgs but 40 days later the weight has decreased to only 9kgs. Normal cure time is 70 days but

demand is so high that time is reduced to 40 days and the restaurants cure it for the remaining time if they don't use it beforehand.

- Salt is added to assist the drying process.
- Room at 2°C with controlled humidity.
- Only 4% of carcasses qualify due to the correct marbling requirements.
- Green and grey coloured product have been there the longest.
- Very highly sought after in Copenhagen restaurants.
- Although the product is extremely high value Danish Crown can't cope with the demand.
- Mould is trimmed before leaving site.

'Smart' Boning Room Packing System

Utilizes a 4-way ATTEC packing system where operators have plastic tubs below their packing table.



4-Way Packing System

Each tub is on a separate weigh head but weights are displayed on a common screen in front of the boner. When required weight has been reached the boner pushes the crate on to the conveyor in front for dispatch, reaches up and grabs another empty tub to replace it and starts again.



4-Way Packing System

The system appeared to work very well with a high degree of accuracy and speed.

Danish Crown Horsens - Østbirkvej 2, 8700 Horsens



Danish Crown Horsens

Plant Quality Inspector, was our guide for the visit.

Danish Crown Horsens is the largest pork production plant in Europe processing 20,000 pigs/day on two lines over two shifts/day. The floor has a reasonable amount of automation but still relies heavily on human labour.

Dot points for the plant -

- 1,600 Employees. 2 shifts/5 days a week
- Average 100,000 pigs/week with max. throughput around 110,000/week
- Slaughter, Cutting & Boning
- Established 2005
- Kill all season but slightly lower in summer
- Farmers are reducing numbers though. Not enough money in the market place. Chinese paying twice the price per kilo for whole carcasses.
- Main competitor is Germany due to lower wages and a stronger union in Denmark.
- Heavy use of plastic crates but also a degree of cartons are used for packaging.
- 40,000 + cartons a day going out.
- 2,000 farmers own this cooperative.
- They use an automated gear washing system similar to the ITEC System (IFFA Exhibit above) where stainless steel pouches are hung on numbered racks that duplicate the employees company number so each operator knows where to hang his/her gear. The rack is then washed as one unit in a purpose built machine.
- 100 Government health inspectors on site at all times.
- 500m long building that has an enclosed observation deck that runs most of the length of the building and is open to the public with free admission.

- Sightseeing: 8 full time employees just to show visitors around. According to Per the 8 employees are always kept busy with visitors.



Adjustable Work Platforms



High Rise

Multi-Lane



Horsens Bioenergi & Daka Refoods

Denmark is the world leader for reusable energy and environmental consideration. 46% of all electricity comes from wind turbine power where they capitalize on their very windy shoreline to locate the majority of the turbines. Every bridge that we crossed had turbines installed adjacent,



Typical Danish Wind Farm

sometimes in farms of over 100 units.

Another form of reusable energy that is heavily utilized throughout Denmark is turning waste food and other proteins into bio-gas and bio-diesel. We visited three of these plants over two days, 2 x bio-gas and 1 x bio-diesel with the interest for our industry being that many Danish processing plants send their by-products to these facilities rather than for rendering.

The first of these facilities was Horsens Bioenergi which opened in 2014.



Horsens Bioenergi

Waste product is mixed with an organic slurry in two main digesters which 'eats' the food and produces methane gas as a by-product. The process is similar in concept to the CAL's (Covered Anaerobic Lagoon's) which are used by many red meat processors in Australia but more compact. The methane is then pumped directly into the Danish National Gas Grid for general use. All kinds of organic waste can be utilized for this process with the by-product

being an organic sludge. This sludge is then sent back to the farms for spreading over the fields as fertilizer and all sludge is traceable in the advent of something going wrong.

Dot points for this plant –

- 2400 cubic meters of waste are processed every hour. The result generated from this hour creates enough gas to supply two Danish households for an entire year.



Raw Waste Bin

- All the gas comes from waste i.e. restaurant food scraps, cattle and pig farms. 75% of this waste comes from the meat industry i.e. Danish Crown.
- The product is pumped into the natural gas mainline for Denmark so they can never oversupply.
- Result of process is 65% methane and 35% carbon dioxide.
- The slurry is taken back to the farmers but it has to be traceable.
- Waste can consist of chickens, fish etc.
 - Last year 65,000 tons of salmon died in two weeks due to temperature increase of water in Norway. Klaus bought the lot, trucked the fish to his plant at Horsens and processed it all for gas.
- The truck unload bays are operated in a slight vacuum so as to remove the smell. The fetid air is then scrubbed and pumped back to atmosphere. This is done to eliminate smell and keep the neighbours' on side.
- 900 tons of biogas manufactured on this site alone every day.
- Slurry is heated to 70°C to kill bacteria.
- 8% of energy made goes back into running the plant but through efficiency gains they are aiming for 6%.

- Each digester is 8,000m³, 24m high and 22m diameter. These are the tall white tanks in the aerial photo above.

Daka Refood

Daka ecoMotion who brand themselves as a 'Refood' company, share the Horsens Bioenergi facility. They are an independent company that supplies food scrap waste to be processed into biogas. They own a fleet of trucks that are dispatched daily to all points around Denmark to pick up bins full of food scraps from restaurants, hospitals and fast food outlets. They leave behind freshly cleaned and sanitized wheelly bins as replacements. The full bins are then taken to one of 43 sites in the Daka ecoMotion Group around the country (with Horsens Bioenergi being one) where they are emptied into a sorting bin. Paper, glass and plastics are filtered out automatically and then the remainder is mixed in with other waste and follows the same path as that above for general organic waste.

Dot Points for Daka -

- Cleans and disinfects the bins and swaps a clean bin for a full bin at each pickup.
- Waste receivable bin was 3m deep and 20m long.
- Plastics, glass and metal is removed automatically.
- Can't use household waste yet as it is not traceable but can use restaurant, hospital and fast food waste.
- Each truck takes 37 tons, accurate to one kg.

Wednesday 18th May

NGF - Nature Energy

A similar setup to Horsens Bioenergi, NGF are another privately owned company specializing in the collection and processing of organic waste products for the manufacture of biogas.

This company was one of the original co-op biogas plant and started with a group of 80 farmers who decided that it would be advantageous to unite and build a biogas plant to get rid of their farm waste i.e. feces, used bedding straw and animals that die on farm etc. They received Danish Government funding and then joined with Xergi, an established biogas production company, to build the plant. Xergi still own 10% of the plant. [Click to read the attached Xergi brochure.](#)

NGF have established their own fleet of trucks that make daily visits to the local farms to collect waste and, like Horsens, unload in a slight vacuum for odour control.



NRG Truck Unloading In Controlled Atmosphere Environment

Dot points for NGF -

- Source of biomass - Hay from farms, industrial waste, urine from cows and pigs.
- Food waste is supplied by pipeline.
- Air throughout the facility is replaced at a rate of 50,000m³ per hour to contain odour.
- Each primary reactor is 7,500m³ in size.
- There are 3 x primary reactors and 1 x secondary reactor.
- They also pump back into the main Danish gas grid so gas production takes place 365 days a year.
- Produce 60,000,000m³ of gas per year.
- This company has four of these plants but plans are to double this total within 4 years.



Sample of Farm Waste Being Processed at NGF

- Food waste is pumped over from the receivable building 200 meters away. This food is waste from supermarkets etc. that has passed its use by date. It is unpacked, mixed with a sludge and pumped over to the processing plant.
- 8% net return, therefore, about 6 -7 years payback. Expected lifespan is around 30 years.
- Took about one year to build the plant.

Daka ecoMotion Biodiesel Plant - Hedensted

Another by-product of general and organic waste is biodiesel. We were taken to a second Daka ecoMotion Plant in Hedensted where waste is once again collected and, through a different process is refined to diesel fuel. This fuel can be used in anything where normal diesel is used i.e. cars, trucks, ships etc. but engines have to be modified if the percentage of biodiesel exceeds 40%. Fully modified engines can run 100% on biodiesel.

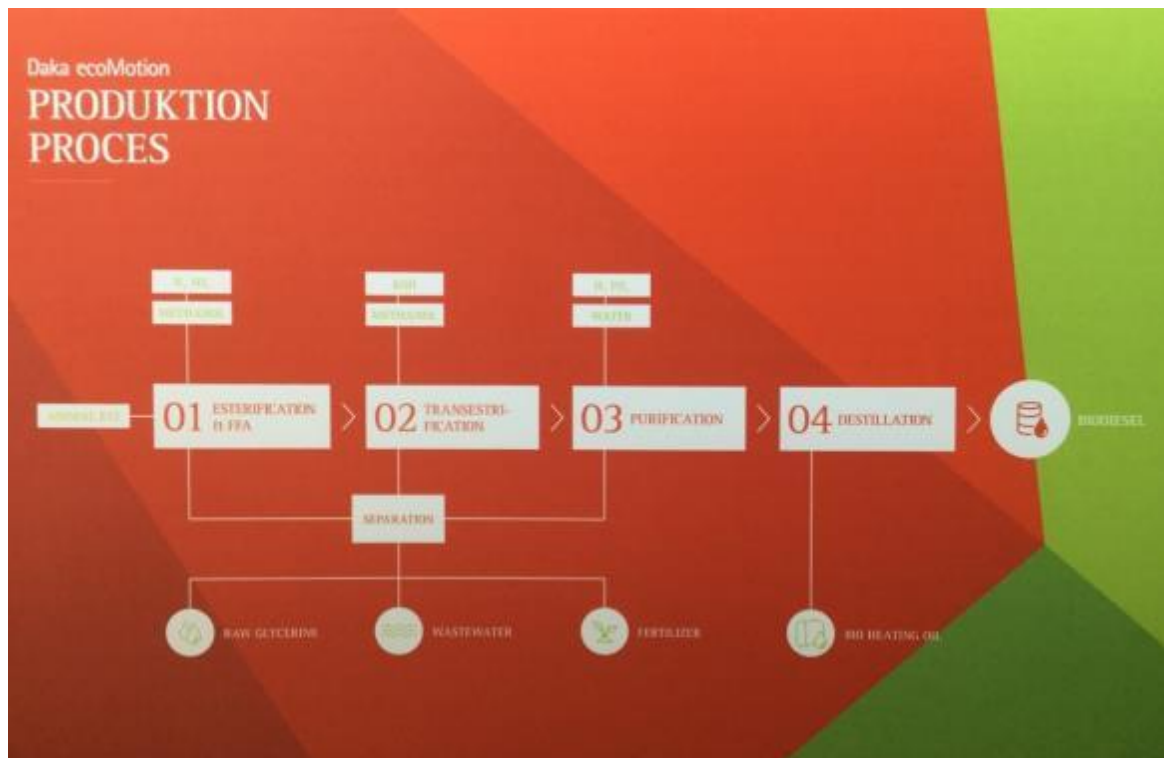
The process is quite similar to making soap but around 10% methanol is added in the mixture. Most of the raw materials come from Denmark but are topped up by product from Norway, Finland and other parts of Europe. Once again, red meat processors contribute a

significant amount of by-product to this process as animal fat is one of the main ingredients in bio-diesel. The plant took one year to build at a cost of DKR180M (\$AUD35.2M).



Daka Hedensted Biodiesel Plant (Foreground)

- Market - 50% to Danish market the rest goes across UK and the rest of Europe.
- The plant processes around 500,000 tons per year in raw material and is the largest recycling company in Denmark.



The Biodiesel Process

- The parent company of Daka is called Saria who split the company into Secanim, Sarval, EcoMotion & Refood in 2012. Saria own 51% and slaughter houses own the other 49%.
- France allows 30% of diesel to be bio, rest of Europe is 7% only, however, the biodiesel is capable of running a vehicle at 100%.
- 'Fame' (Fatty acid methyl esters) is the name of the finished product.
- Cold flow properties - Biodiesel freezes at below +10°C. Melts again at +11°C due to the combinations of free fatty acids.
- Due to the cold, Daka can only supply the market from March to October and then it goes to storage or shipped to Southern Europe where it is mixed with standard diesel.
- The plant is audited for 5 days every year to confirm self-compliance and sustainability.
- Rapeseed oil is the other major raw material used in the manufacture of biodiesel.



Three Stages of Distillation – Middle is Finished Product

The finished product, although looking clear and with a standard diesel viscosity, smelt like a rubbish tip.

Thursday 19th May

DMRI



**DANISH MEAT
RESEARCH INSTITUTE**



Today we spent the whole day at the Danish Meat Research Institute (DMRI) outside Copenhagen.

This is an international research and innovation centre focused on food from animal origins. They develop processes, tools and machinery designed to improve quality, hygiene and productivity and have worked closely with both MLA and AMPC in the past to assist in the development of many of the Australian funded projects.

The facility was extensive and we were provided with a full agenda for the visit including the following presentations; bullet points from each below.

Danish Agricultural & Food Council -

- 30,000 farms take up 62% of total Danish land mass. Lost 10% in the last 4 years to village expansion, roads etc.
- In 1903 there were 260,000 farms across Denmark; in 2014 that number had dropped to 30,000 farms.
- 67% of all food clusters are exported.
- This provides 25% of the total GDP of Denmark.
- Environmental legislation began in the late 80's which changed farming in Denmark. Doing more with less.
- Each Danish farmer receives DKR2,000/hectare in subsidies from the government.
- Government backs industry dollar for dollar in water efficient food production program.
- [Click here to see PDF Presentation](#)

Biogas - The Danish Model

- A lot of the biogas plants are owned by cooperatives.

- Improved process gets more carbon back to the soil as part of the sludge.
- Biogas picks up the slack from windmills as it can be stored in tanks.
- Energy crops are crops that are grown specifically so they can be used for biogas plants.
- Farm scale biogas suppliers will provide subsidized plants as small as one farm operation so the farm can be self-sufficient.
- LUC - Land Use Change
- [Click here to see PDF Presentation](#)

MAMSF - Meat technology Automation Measurement systems Slaughterhouse technologies
Food safety - Lars Hinrichsen, Director. Introduction for the company.

- Funded by levies for every animal born in Denmark. Around 1 Euro on average per animal.
- Aim is to improve all facets of the industry within Denmark.
- Farmers have input into where the money is spent.
- Mostly based around pork but does include other species.
- Founded in 1954 by the Danish Pig Producers.
- Entirely private organization. Excess money goes back into the company for further development.
- Danish AMPC/MLA equivalent but is not Government funded in any way.
- Decisions on how the money is spent is based on their Innovations Model. Step by step Transparent model on how decisions are made.
- Suggestion of research made after dialog with the factories, call a seminar for consultation, financial decision made by Board,
- All IP is owned by DRMI. Quite adamant about that aspect. One of the most active patent companies in Denmark.

Grading Systems -

- Series of development using various methods.
- For pig the current is AutoFom 2000 Ultrasonic Scanning using 16 sensors where the pig is dragged across the sensors. 4,000,000 pigs a day get graded this way across the world.
- Beef done by BCC-2 vision based system. E+V system uses same principle. It had more success across UK and Ireland.
- Grading and payment in Denmark based on correlating the colour and the fat score done by the vision sensing.
- DMRI are looking at CT scanning as well.
- Worked with E+V to develop a vision chicken grading system.

- DMRI have developed a tracking system from lairage to chiller. This is being used at Danish Crown Holsted and Horsens.

Detection of Contaminants -

- Metal Detectors -
- Electromagnetic detectors
- X-ray detectors- mixture of thickness and density. Dual energy helps overcome false positives.
- Multi spectral X-ray - new technology being worked on by DMRI
- CT - most efficient method of detection.
- Dyna CQ is latest machine used for detecting foreign images using vision. Very accurate but Contaminants must be on the surface of the product. This was the machine in display at IFFA. High speed capacity.
- Future - a combination of technologies should be used to detect contaminants. Each method has its strengths and weaknesses so by combining two or more methods it offers the highest chance of detection.
- Most recalls come from soft plastics i.e. Glove particles etc. the Dyna CQ is good for detecting this provided the contaminant is on the surface. Idea being that at least some of the packages will reveal a contaminant and the batch can be inspected before dispatch.
- Metal, clear plastics and glass could be detected but not as reliable as soft plastics.

Site tour

High Speed Innovation -

- Robotic tenderloin removal on pigs.
- Working with new types of materials and combinations thereof.
- Also work to the innovation model.
- DMRI are not scared to terminate projects if the goal posts move too much, therefore, focus is in the first stage to ensure they get it right.
 - Look for ideas that create value.
 - Close cooperation with the end user.
 - Close cooperation with the commercial partners. They aim for partners that can take a successful project global.
 - Value creation as guideline.
- Challenges
 - Implementation

- Development supporter, expert user, super user - Principal of success.

DMRI Current Projects -

- Robotic Rib removed for pork. Uses vision sensing to locate the rib. Not up to operator speeds as yet. Yield comparison is as good as humans but less splinters.
- Numerous Packaging projects.
- Intestines - finishing and quality control to combat the Chinese market.
- Automated knife removal from pig sticking.
- 24/7 - strategy on how to get better utilisation of work day.

Automation -

Robotics - Why?

- Flexibility
- Vulnerability
- Investment - more for the larger companies.
- Development cost.
- Time to market. Focusing on the end effector only. Robot base is off the shelf.

Robotics - How?

- Working with partners to develop the solution. Bannz/IFR is the company they worked with to produce the machine that was in display at IFFA.
- One robot - multiple tasks. More efficiency gains with removal of more operators but running at a slower operating speed.
- Co-worker robots. Removes the safety issue. YuMi, UR and the Kuka IVA which has a 15kg payload.

Packaging & Quality -

- Experimentation to find a way to keep colour (bloom) without compromising eating quality.
- 6-day old Aged beef 30% O₂, 30% CO₂, 40% Nitrogen had the best result for bloom without compromising eating quality.
- There was no 3 gas solution found for mince. Fast discoloration still occurred under all combinations. Mince was fresh, not aged.
- Result - useful alternative to O₂ but straight O₂ is still the best for eating quality.
- DMRI working with AMPC trial to document how 3 gas solution affects shelf life.
Working with Teys.

DRMI as a Case Study -

- Automation to be competitive.
- Used vision sensing to determine fat depth for cutting the fat plate off uniformly. Blades change depth according to vision feedback.
- Future focus will be around yield (high value) rather than reduced labour. More payback for the company.

DMRI will be focusing on the following 6 Concepts

- Factory Design
- Yield Improvement
- Productivity improvements
- Quality Improvements
- Processing Improvements
- Sales and Service

Hygiene and Shelf Life -

- Final rinse washer reduces contamination by around 2 logs. Use 15 litres of water per carcass.
- New light weight hand piece for the Sanivac. Very light printed on a 3D printer. Makes more money for the DMRI than any other invention.

Bung Handler being considered for trials. Preliminary review only to start with.

DRMI WEBSITE

- safemeat.dk
- dmripredict.dk/models
- Shelf life predictor on the website as well. Doesn't cover Australian beef though.

4.2 Submission: AMPC/MLA Red Meat Study Tour to IFFA and Denmark – May 2016

The trip to Europe this year was timed perfectly, as it allowed time to speak to known innovators and quality suppliers who we will need to engage with over the coming period to transform the business into the brand driven value added integrated supply chain that we all aspire to be.

One of the best points to note about the show, was that behind the \$2m Vemag and Marel stands, there were a lot of clever smaller businesses who are true innovators and have a wealth of

knowledge that we must tap into, as it will not be enough to spend the next period bringing the plant and our process back to industry standard, but we must integrate these small but intelligent innovations to stay competitive and sustainable.

Clearly there is a lot of information in this report on possible improvements, but from here we must start the process of feasibility and ensure we focus on the low hanging fruit first for the quick wins with fast returns to help with the investment on the larger projects that will transform the business to achieve our long term goals.

It's also important we begin the materials handling process mapping project to allow us to see what needs to be done to reduce bulk headcount post the boning room, and guide us in the right direction as to the right solution for future processing needs.

Plant and Process Innovation Opportunities

1) Knocking Box design

Objective: Modifying current knocking box
Supplier: Carne stunning wand / Meateng design of bleed tables and slaughter chain mods
Agent: Carne based in NZ / Meateng based in Australia
Findings: Meateng provided a system, investigate the Carne technology and see if its transferable to Australia
Next Steps: Need to follow up with Meateng to see if we can merge their bleed tables and bleed chain modifications with the Carne technology

2) Halal Slaughtering options

Objective: To find a cost effective solution for Stunning
Supplier: Carne (New Zealand)
Findings: This supplier has a high level of research that has gone into the science behind slaughtering.
Next Steps: Process map the current state, and work with Carne to design new process & assess feasibility including what would be required to make this change.

3) Carcass Grading improvements

Objective: To find ways of improving our carcass grading results and reduce dark cutting meat
Supplier: Carne (New Zealand)
Findings: Carne offers a range of services for smart stimulation methods. Not currently tailoring stimulation setup for the different cattle, cows need different stimulation to bulls, or steers. Smart Stim assesses the carcass and sets the stimulation up for the best result. Partner in the US on live animal analysis for identifying dark meat before its killed.
Next Steps: Project to trial and assess feasibility.
Editors Note: Refer to scientific reporting (MLA/MSA). See also StimTech (Brisbane QLD)

4) Suction conveying for Fat and Conveying to Render plant

Objective: Find a solution to replace water as a method of transporting waste to the rendering plant, Find a solution to convey fat from the boning table to a central compacting and packing location.

Supplier: Taifun / Oerlikon leybold vacuum

Agent: Avac Australia / John Morris Scientific

Findings: After researching at the show we realized that this technology may not work for the boning room due to the lack of CIP systems (clean in place), we only found 1 supplier at the show on small both. This technology would and does work well in red meat abattoirs so further investigation is required with Avco in Australia. In terms of inedible products such as waste products going to the render plant this technology is perfect to replace the expensive use of water.

Next Steps: Talk to supplier

5) Manual Handling aids for quartering Bodies

Objective: To find a solution for removing the need for heavy manual handling of Bodies when breaking from Halves to Quarters in order to reduce injuries.

Supplier: Several

Agent: n/a

Findings: At the MPS we saw a hydraulic arm that allows the operator to move the Forequarter to the second chain without the need to manual lifting/moving. The only issue this may bring is the speed of the hydraulic arms. Whilst at a factory tour there was another method seen that did not slow down the process.

Next Steps: Review all available options for a short term and longer term solution



6) Boning Room Ergonomics and automation

Objective: To gain an understanding of how we can improve the efficiency of our boning room by finding suppliers that can recommend designs that are innovative and can tailor a solution to the multi type cattle.

Supplier: Meat Packing Systems (MPS)

Agent: Will be an integrated part of Marel Aus

Findings: We watched a few videos and looked at brochures, and MPS claim to be able to design and build a complete system. Speaking to them did however trigger thought

patterns and open our eyes to what can be achieved with ergonomics, conveying, primal track and trace etc.

video [MPS Cattle Cutting 40.mp4](#)

Next Steps: From this visit and several factory tours we have a fair idea on process ergonomics, equipment required and semi automation including manual handling aides. We now need to thoroughly process map our operation and assess the physical restraints, and work with design partners to propose changes to allow ergonomic, efficient flexible process design to implement.

7) Materials handling post boning room - inc vision and sort systems

Findings: Although the Marel system would more than likely be a good solution, the biggest issue I see with any Marel system is that it is designed and built to operate using their Innova software system. From what I have seen and also what other people make reference to, it's a great system.

Next Steps: Create a plan to improve.

8) Blast Freezing/Crust Freezing post boning room

Objective: To find a solution for crust freezing and tempering of primals for improved presentation and yield

Supplier: Reiser / CTI (formerly Carnitech)

Agent: Vemag / Marel

Findings: CTI – belt is 1.1mtrs wide, single belt, crust freezes 1mm in @ -8c, 4mm in @ -1c

Reiser – Modular design to allow scalability. Each module is 3mtrs + infeed and outfeed. Will need to supply input weights and sizes to determine how many modules are required.

Next Steps: Consider where in the process this would sit to achieve what we need in a new design process.

9) Primal packing and vacuuming

Objective: To find a solution for finishing (bagging, Vac Packing, shrink and cool) primals including looking at options for automating the primal bagging process.

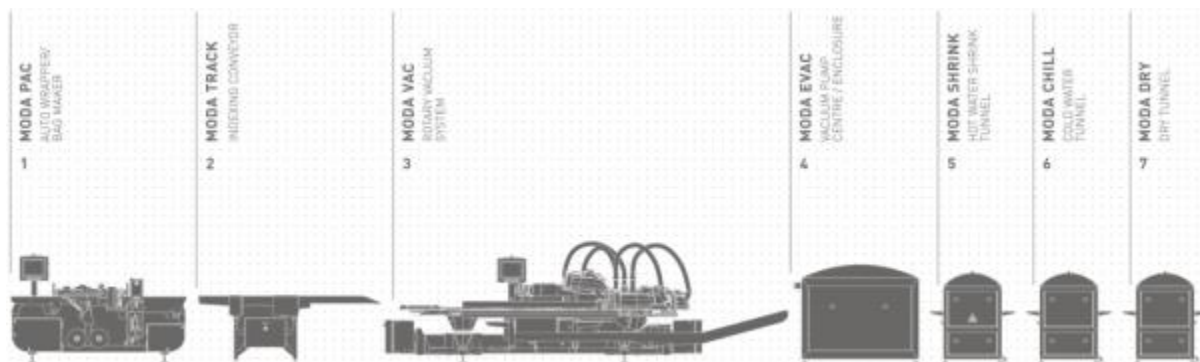
Supplier: Moda

Agent: Moda (NZ)

Findings: There were several Vac packing machines viewed during our visit, but only one system worth reporting on. The Moda system was a standout for many reasons. This modular system allowed for primals of various sizes to be bagged via a conveyor into a flow wrapper, where the AI stamp, Packed on date, a 2D barcode etc could be printed on the bag during the loading process. The bag is sealed via a Ultrasonic sealing technology instead of using heat sealing to allow for a neat seam instead of the normal overlap seal of the conventional flow wrapper. Following the Flow wrapper there is an indexing conveyor leading into the Maclaren Rotary vac sealer. If we have the materials handling system upstream to identify the primals, this would be linked to the 2d barcode printer to trace and identify each primal, and then on the indexing conveyor we can then have a multi head labeling system that is linked to our planning system, that will then apply the branded shrink

label according to the packing plan for the day, for that cattle type. It then moves into the Vac, which runs at 45 packs per minute (probably loading speed of more like 35ppm) then out into an innovative flue-less shrink tunnel, dip tank, then dryer, then it can be conveyed off to an auto sorting and packing system as it has already been identified with a 2d barcode. This system utilizes 70% less energy than a conventional system as it uses a new and innovative Dry Vacuum pump and booster that has zero service requirements annually. Due to the technology the Vac pump can be in the room next to the vac sealer creating higher productivity and product quality. The only maintenance required is an exchange pump program every 6 years where you exchange your old pump for a refurbished pump that will last another 6 years. Their system runs on a common Allen Bradley PLC controller, with full access to the program as well as Ethernet connectivity for remote support if required. They offer as part of the system, and online monitoring portal running on Windows Visual studio, that allow for live performance reporting alarms. Moda have these systems installed in Aust, and AFCO Fielding NZ. They will also have the system from the show in full operational mode in their factory in NZ by end June and have invited us to come and do some testing of the system to review speeds etc. The build of this machine was far superior to anything else we saw at the show, very robust and sleek design that allows for easy access and ergonomics.

Next Steps: Organize for visit to NZ factory to review and trial the machine in operation. Review potential layouts on this system as part of the new design post boning room following process mapping activities



10) Portion Control machinery

Objective: To gain an understanding of the latest technology in slicing and portion controlling equipment, that has the flexibility to produce accurate, high yield set weight and random weight products, as well as thin sliced capability.

Supplier: Treif

Agent: CBS Foodtech (Sydney)

Findings: Treif have 2 platforms, first being the Divider, which is a very accurate thin sliced portion cutter with capability to shingle, weigh and portion to pack automatically. This is really a dedicated thin sliced machine. This machine does 0.5mm + and does 660 slices per hour. The limitations/downfall with this machine is that each primal has 15mm waste at the end of the primal in the gripper, the meat MUST be at -2 to -5c, and primals are not auto loaded. At the end of each cycle you must open a guard and place the primal, which can be very inefficient if you have short primals. The second option was the Hybrid, which conveys the primals into the machine and have a new roller gripper at the outfeed to hold the primal firm whilst slicing. This machine can only go down to min 3mm slices, with a chamber max width of 240mm. This machine can handle a wider range of temperatures and works best

with crust frozen primals. It can also do bone in with a blade change. Very flexible and efficiency machine that would be ideal multi purpose machine

Next Steps: CBS to send table of throughputs for the products.

11) Value Optimisation machinery - MDM/FTM, Tripes, Bone Processing, Blood processing

Objective: To find the best solution to harvest MDM/FTM/ etc from crushing, rib,neck,backbone, and utilizing the res meat sinew that currently goes to waste

Supplier: Lima bone separation machine, and de-sinew machine

Agent: Austral West , Kenmore QLD

Findings: for Bones the cost of equipment and ease of use and better space utilization was much better compared to the Marel press system. could yield up to 25% from our selected bones, quick calculations even if this was straight MDM would yield around 10kgs per head of MDM from each carcass, which even at \$2.00 per kg from the product would yield around \$9k revenue per day.

Next Steps: Visit plant that is using one to assess machine and yields etc for bones, and speak to Lima about running a trial on the de-sinew machine. Need to assess how this product will be chilled as it can come out of the machine at 12-20 degrees C.



12) Retail Packaging machinery

Objective: To find the latest technology for retail packaging of meat products that reduces processing costs, increase efficiency through fast line speeds and tool changeovers, and has the flexibility to produce multiple platforms such as Skin, Thermoform and MAP

Supplier: Multivac

Agent: Multivac

Findings: Multivac had no new technology for Retail Packing equipment. The only new offer they had (which is not new) was a primal vision sorting and identification system that would then feed multiple Thermoformers for primals and claim to reduce packaging usage using a roll stock film instead of pre-made bags with people loading them. The issue with this would be the gauge of film needed for a thermoformer to draw a cavity big enough for say a rump would need to be 300-400um + which makes it an expensive film. You also end up with thin spots in your film in the corners of the cavity which would effect shelf life.

Next Steps: No further action required

Supplier: Mondini

Agent: Select Equip

Findings: Mondini presented their new Platformer Technology which is a module that can be added to their Trave tray sealing line after the traditional tray de-nester and before the loading station, that uses a roll of film and makes the tray on line, with zero waste (no rewind). This then feeds the highspeed tray sealer (over 160 packs per minute for 9x7 mince tray) again with zero waste on the top film. This is great technology as it is very cost efficient on packaging and would be the lowest cost tray on the market, with the flexibility to change between MAP, Skin on Pre-formed tray or Skin on Thermoformed Tray with high speed capability. This now really leaves Multivac behind in terms of flexibility, speed and efficiency. Multivac had no other new technology at the show regarding tray packing equipment.

Next Steps: Work with the Australian agent “Select Equip and Multivac Australia” to get pricing for equipment. Select to do analysis on potential packaging savings with new technology

13) Bulk Bin packaging

Objective: To see what options there are for packing Bulk bins in either vacuum/gas flush in order to improve shelf life for Export Bulk orders

Supplier: CVP systems

Agent: Krehalon (Vic)

Findings: Using a 10um bulk bag they are packing bulk products in the USA using this system and achieving up to 15 days life.

Next Steps: Discuss in more detail and organize trials with Agent in Australia.

14) Palletising Automation

Objective: To find a carton handling and palletizing solution, to remove the need for heavy lifting that is causing long term injuries. This solution also needs to make significant Labour savings in this heavily populated area of the factory

Supplier: Tavail

Agent: Select Equip (Vic)

Findings: Tavail is one of many automation and robotics suppliers that can take a carton, and palletise using many robotics options. Tavail also offer pick and place robotics to load primals or retail packs into cartons if required. With their system, you can stack 4 pallets with one robot. So rough calculations put us at 4 robots to pack the higher volume cuts/brands and then have a manual packing line where smaller % carcass cuts are handled manually offline. The system automatically de-nests a stack of pallets to feed the robots, and the pallets are automatically outfeed from the system and shrink wraps then goes to the pallet pickup location for a forklift to take away. A 4 Robot system can handle 1080 cartons per hour (2x3 pattern).

Next Steps: Assess feasibility during factory re-design once the process mapping is complete as part of the materials handling project. Investigate ROI.

Other

1. SMART systems pro's and cons

Objective: Review CSB SMART factories as part of the MLA/AMPC delegation to gain and understanding of a fully integrated supply chain business, and what the latest technology is in terms of automation and robotics.

Supplier: CSB Germany

Findings: **Factory visit #1**

Business: Edeka Germany

Supply to: Edeka Germany, Netto Germany

Edeka produce approx. 250sku's of Value added Pork, Beef & Chicken into 1200 supermarkets across Germany. They have 2 Abattoirs and this new 50,000m2 processing and distribution facility in close proximity near Heidelberg. They produce 400t/day of Value Added products, bone 6000 pigs and 1000 beef quarters per day. They have 1200 employees and 40 engineers to run a very sophisticated end to end automated plant.

The CSB system tracks product from their kill floor through their boning rooms, then product is transported in crates to a large Storage and Retrieval (SAR) type system which then delivers product on demand to the Value Added processing area.

Once the product was Value Added, the Finished Goods were then transported in crates to another SAR system ready for picking to order.

They would produce to forecast, then pick to order onto trolleys straight onto trucks. They had 100 company drivers and 60 company trucks doing daily deliveries 7 to each store 7 days a week. In summary, this business had its own livestock, kill, bone, retail pack, distribution and supermarkets. Very impressive fully integrated supply chain.

Findings: **Factory visit #2**

Business: Van Rooi Meats (Holland)

Supply to: 95% Export

Van Rooi Meats was another very large new factory using the CSB system to book in their pigs, kill, bone, chill, then pack retail and bulk for export.

The site was huge at 62,000m2 with 1100 employees. They were killing 650pigs per hour over a double shift 7 days. Of this they converted 160,000 packs per day into retail value added and the rest was boxed and frozen for export. They had robotics breaking the pigs down then CSB system would route the meat to either retail or vac rooms based on their MRP calculated plan. The product was then robot packed and robot palletized and sent into a 10,000 pallet SAR warehouse ready for picking and loadout.

Findings: **Factory visit #3**

Business: Promessa (Holland)

Supply to: 1200 small supermarkets

This is quite a small Value Adding business that has 150 employees and delivers to 1200 Supermarkets daily, producing 250t/week with small orders more frequently than we are used to, often with mixed product in each crate which is the main reason they have automated this pick and pack system. They also act as a 3PL for other manufacturers. They

load in Shelf Ready products, book them into their system, label them and pick and pack into the mixed crates including products made on site.

The automated flow of goods starts at a central I point, directly at production exit. Controlled by the software, the single-item containers with attached barcodes are transferred to the logistical system and moved to one of the two warehouses. Small-quantity units are stored in a conventional single-position high-bay storage, which has a capacity of 7,000 storing positions. All fast moving goods, which are sold quickly in large quantities, are forwarded to the fast-mover warehouse. This area gantry robot warehouse uses a storage technology that is relatively new to the food industry. What is special about this type of storage is that containers are not placed in shelves, but stacked directly on the hygienic storage floor. One of the reasons for the high performance of the area gantry is that up to 7 containers, as necessary, can be moved simultaneously during stock entry and removal. In order to assure adherence to the FIFO principle (First in - First out), the warehouse is constantly reorganized by re-stacking the plastic containers. This process is fully automatic and controlled by the CSB-System.

Their process defies all Lean principles with product being retail packed going into crates, then into the CSB crate system, then retrieved and unloaded from crates to be Price Weight Labelled, then back into crates and then pick n pack into mixed crates to order. The reason they did this was due to the short lead times, so they produced to forecast, then priced to order to avoid producing product with a price and risking having the wrong qty pre-priced when the orders come in.

2. Red Meat industry Robotics update

Objective: As part of the AMPC/MLA delegation we visited the ABB Global Innovation/Research centre in Friedberg to listen to ABB head of food robotics innovation.

Supplier: ABB Robotics

Findings: The speakers discussed global trends including emerging nations and how as developed nations we need to be innovating to the next level as consumerism grows and the mass numbers of middle class in the emerging nations evolves. There is a detailed presentation in the link below, but in summary the speakers message was that given the levels of automation in industries like automotive, pharmaceutical etc, the Food & Beverage industry has very little automation due to the difficult nature of processing food. They particularly spoke of the difficulty in wash-down areas. They explained the development cycle of new robotics being 3+ years, and claimed they are now going to put a lot of focus and investment into R&D in the F&B industry and would like to partner with people to develop this in the meat industry presentation

[IFFA 2016\MLA Rev B May 2016.pptx](#)

3. Europe/UK factory and retailer visits reports

Objective: Review TMS systems and Tray Track materials handling systems

Supplier: Marel

Findings: Visited 2 sites in Ireland, one a beef processor called Foyle Meats who were using TMS, and the other was a JBS Poultry site called Moy Park. Foyle Foods were a small Beef processor doing 1250 cattle a week. They were boning 400kg bodies at approx. 40 bodies/hour. They said they were mainly supplying UK/Europe market but have recently

been granted access to the US, but see this as risk with E.coli testing as they don't have any cookers in UK if they have rejections. Although a small operation, they had a well laid out boning room, the most interesting part I found was the trimming tables they had for leaning out or adding fat to trim on the fly to hit the right CL's which was on a big screen in the boning room so that if the TMS was packaging a certain order CL trim, the trim "grading team" were adjusting their trimming to achieve the right CL in the bins/boxes. They claim to never slash primals to get CL right in trim. In their kill floor they had an interesting setup with raise/lower platforms at each station. Although these were good for ergonomics it would be slowing them down. They also had their Stimulation on the Hide Pulling station after the hide was removed. In their boning room they also had some interesting methods including injecting air into primals to make seaming out primals easier when boning. There are several links to videos and photos from this factory.

This site has also invested a lot of time in training their staff on Lean Manufacturing. They have complete the process of measuring everything and creating visual management tools that are on screens around the factory that measure everything from OOE, Water consumption etc. They are now starting the process of implementing a continuous improvement process that focuses on using the data to focus on top 5 issues and so the cycle goes on.

Videos and photos [IFFA 2016\Foyle Meats](#)

EU/UK Retail Review & Insights

Global retail trends to gain insights that inspire innovative thought in product and process to stay ahead of the curve in global markets and deliver new solutions to our customers that either drive sales or increase margins.

In this document there are product photos from Marks & Spencer France & UK, Tesco, Waitrose, Morrisons, ASDA Sainsbury, Aldi Germany & UK, Lidl Germany and UK, Iceland, Metro, Carrefour, Match, Rewe, and Harrods.

Unlike Australia where there has been a duopoly with Coles and Woolworths for many years, the UK has at least 10 significant players in the UK supermarkets for some time. Where there is a comparison to Australia is that Aldi, and to some extent Lidl, have been rapidly gaining market share on the other big players, with their market share growing from 3.9% to 5.1% in 2015. The other major players are Tesco, Asda, Sainsbury's and Morrisons, with Marks and Spencers trailing in market share to the big 4 but leading in quality, range, sustainability and innovation. The big 4 just mentioned ended 2015 with around 70% of total market share.

Summary:

- Skin on tray appears to be the primary packaging type in UK retailers. Line speed and a more rigid tray for labeling would be the main factors in this choice over Thermoform Skin as we do.
- Reason everyone is in skin is life and eating quality. Waitrose has seen a 3% margin improvement on several lines through reduced shrinkage moving from MAP to skin.

- Single piece packs appear to be the norm. Would be interesting to trial this to see if there is an uplift in sales
- Presentation and Quality better in UK than Europe.
- Growing Slow Cooked ranges in all retailers
- Formed steak seasoned were in most supermarkets
- Mince packaging was nearly all from Roll Stock (Plug Assisted Thermoform MAP)
- Aldi UK heavy focus on premium and large Dry Aged offer
- Other retailers also have some kind of Dry Aged premium steak offer.
- Product Safety and British Beef focus more than ever before.

Aldi Germany: First noticeable difference is Merchandising. Where Aldi Aus has fresh meat Aldi Germany has all of their Smallgoods, and the Fresh Meat was in Chest fridges. The cabinet was a mess and there was not a great range of Fresh meat. Single Steak packs appear to be a common theme through Europe and the UK, even as you can see in Aldi one steak per tray with 2 trays in the one sleeve. Aldi Germany was also one of very few who were using Thermoformed Skin packaging, as you will see through this report most are using skin on a pre-formed tray.

Aldi UK: Aldi in the UK had a very large meat case with a wide range of products, and there were clear PSOS material marketing British Beef, assuming this is due to the Horse meat scandal from imported beef with Tesco a few years ago. Further to this each pack has British Beef in the name, and Origin, Slaughter and Minced declaration on the front of the label. All retailers also focus of the fat percentage on their labeling instead of a Star rating or similar system. There were a standard set with most retailers at 5%, 10%, 15% and 20%, but Aldi had a 5%, 12%,20% and 23% fat offer. Pack weights were also interesting with 250g, 500g and 750g for the 23% fat. I would assume this is to keep the price per pack down. Presentation across all MAP products were not great. The mince was not uniform and there was a lot of tray and film distortion. 3 tiers of Brands, Ashfield Farm being Highland Park equivalent, but they did not have steaks in the budget range. Next Teir up was Specially Selected, all of which was Dry Aged. I'm not sure why but the Aberdeen Angus was in a gold tray and Aged for 30 when the rest of the range was 28days. Every retailer had a slow cooked range. Some bigger than others.

Lidl Germany: Lidl Gemany had a very basic offer. The store itself looked poorly maintained and dirty, unlike the other retailers. This marinated steak in MAP looked very slimy and did not present well at all.

Lidl UK: Lidl in the UK was a much better store – the cleanliness, POS material and product quality was a long way better than in Germany. Like Germany though, their Red Meat was in the Chest fridges which is a bit of a waste of floor space as you can only fit a small amount of stock on show,

and as a result a lot of time these units are out of stock. Price in Lidl was incredibly cheap, but still not as cheap as Aldi. As you can see the 500g mince (80cl) was £1.69 or £3.38/kg . Aldi in comparison was £3.18/kg. I think this looks great, especially the story of the producers on the back of pack, the silver embossing where it says Dry Aged, and the reference to where it comes from for the consumer. The risk is that consumers feel that it is over packaged, and the labour for sleeving this box (it wasn't a sleeve) would be very high. Take note of the outside cut film on this tray which is the same as we see when using skin on tray with the Multivac.

Asda UK: Asda appears to have made an improvement in their quality and presentation compare to the last time I was in the UK. Their mince quality still leaves room for improvement. Their mince packaging is also one on only a few that don't use Thermoformed trays for their mince.

Carrefour France: Like most of France and Germany not much focus on fresh meat. There were a few burgers and flow wrapped Sous Vide steaks on offer.

Match France: Again a few flow wrapped steaks, and a few overwrapped cuts and a bit of basic value added.

Rewe Germany: Rewe was an express supermarket chain which there are several chain like this in Germany. I like this idea for a BBQ item. More Sous Vide.

Metro Germany: Metro had Aust primals, and a few retail lines. Metro also had some Vac Packed Salt Room Dry Aged beef from Kettle Beef (German) .

Iceland UK: Iceland is similar to Lidl and had a small range, one of which was a formed steak with coating of seasoning which they call "Grill Steaks". In the Freezer section they had bulk bags of Beef mince. Not sure if there would be a big enough market in Australia as you would need to buy an IQF line to do this and the running costs would be high.

Morrisons UK: Morrisons still have butchers counters in most stores, and pack some overwrap product. Woolworths strategy is similar - for any stores with \$30k/week or higher in sales they will keep a butchery in addition to their centrally packed lines. I'm not sure it's the best move as the meat behind the glass looks terrible. Morrisons were the only Supermarket to use specific cuts as a marketing tool as you can see from some of the Burgers and meatballs. Not sure if this works so well but would be interesting to do some insights work on it to understand shopper perception. Another example of the Grill Steaks. Biggest range of Sous Vide outside M&S.

Sainsbury's UK: Sainsbury's range was not great in the stores that I got around to compared to previous visits.

Waitrose UK: Waitrose is supplied beef solely by Dovecote Park which we visited. They appear to tailor their ranging by area, as not all products that we saw being manufacturing could be found on display.

They produce a few offers that are very different than other retailers. Especially on mince they produce a gas flushed Flow wrapped mince, and a small thermoform pack of mince with longer life. The Thermoform mince is not performing. It would be interesting to see what the cost comparison is

for this product compared to MAP trays. This was quite a good idea with the sleeve having a cavity for a sauce sachet.

Marks & Spencer France: Probably the best offer in France – small ranging but good quality and presentation as you would expect from M&S. I assume this is targeting British Expats living in Paris.

Marks & Spencer UK: As usual the range and quality was outstanding. They had a new range for their summer called BBQ Grill, with some sous vide skin packed products. And some marinated with basting or finishing sauces such as this one below. These 2 products were quite interesting. They had been smoked, sous vide and then I assumed skin packed in a high risk environment, however they had over 10 days shelf life on them in store which indicates this may not be the case. I don't believe they were sous vide in skin as they didn't have any purge in the pack. They could have been twice cooked, either way they looked and tasted amazing – very innovative products from M&S. Dry Aged OP Rib and a Chateaubriand.

4.3 Submission: AMPC/MLA Red Meat Study Tour to IFFA and Denmark – May 2016

IFFA provides the opportunity to explore areas of the meat industry that have potential to be applicable for the Australian red meat industry and our businesses. While there are a number of opportunities that were chosen to investigate in depth there were a range of offers that maybe of interest to Australian processors including the following:

- a) Using RFID technologies to trace carcase characteristics without use of manual paper based systems . Technology companies such as CSB Systems and SFKBlanc have offers in this space, although using radio frequency technology provided by Alies we will assess the possibility of meeting some Ausmeat regulations without paper. Using learnings from discussions during IFFA we should be able to develop a software package with suitable outputs with our current service provider Cedar Creek.
- b) The cleaning of tubs and cutting boards take many hours each day in any meat processing facility. Companies such as Elpress, Reima and Mohn are companies that make machines suitable for the European crate size and should be able to adapt this to common tub sizes used in Australia. With some adaption there is the opportunity to ensure such systems also enable boards to be washed prior to final sterilisation.
- c) Blast freezers are in many meat plants in Australia and Cesnac from Spain have developed a loading system for crates into a stillage type setup that with some consideration could be adapted to handle cartons. Many manual handling injuries in our industry stem from this activity of loading stillages for effective freezing. The basic principles of the applications are the same.
- d) Foodcap Meat handling system is a reusable meat handling system used for the storage and transfer of chilled red meat from boning room to packaging halls. This has been adopted by a New Zealand supermarket chain and given the centralised processing centres used by our two major retailers this may be worthy of acquired knowledge. The use of Co2 in this handling system provides retailers looking to further process with product shelf life. This could save costs associated with bagging, unbagging and materials required for some shelf life extension of red meat.
- e) ABB are developing robotics of the size and movement range to assist with light weight activities within our industry. 'Yumi' is the model robot currently build to IP35 rating,

however with some improvement in strength and an improved IP rating to handle our workplace environment this could really be an opportunity to integrate robotics to many tasks in the workplace. The lack of safety boundaries and easy teaching of the robots this has good opportunities for use in packaging activities in a boning room.

4.3.1 Technology opportunity investigated in further depth

4.3.1.1 Task/technology/opportunity #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 carcasses 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 carcass 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 want to identify the technology capable of providing the required information to make application to Ausmeat for the removal of the requirement to put carcass tickets on lambs destined for the boning room.

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 carcass slaughtered plus the labour costs associated with placing and removing the ticket on/from the lamb.

Findings:

During day one of the tour we visited a plant EDEKA Sudwest Fleisch with CSB who are a technology company providing end to end solutions to the red meat industry. They are using RFID technologies for traceability in a limited way and after extended discussions working through our requirements concluded that it should be possible with our existing service provider Cedar Creek. Using an interface into a separate system such as CSB would achieve the same end, although first course of action will be to reinitiate discussions with Cedar Creek in light of CSB experience. Using RF technology we should be able to avoid finding a scanner possible to access to screen the days database that was one of the issues when previously investigated.

It is anticipated that a successful solution should be achieved to be able to put a case together to presentation to Ausmeat on the need to require carcass tickets for fat depth verification and traceability.

4.3.1.2 Task/technology/opportunity #2

We are looking to invest in a new lamb processing line. While we have some appreciation of the available processing aids and service providers servicing our market the future investment will provide the opportunity to explore applicability of equipment used in overseas facilities. Slaughter floor equipment was the main focus with vacuum systems for cost effective

movement of skins also of interest. Any new knowledge obtained will provide a reference in the Australian environment for service providers.

Findings:

During IFFA I met with Approved Design Limited from the United Kingdom who have had some experience with vacuuming sheep pelts. The movement of pelts should be possible although a movement distance of less than 100 metres with minimal directional changes is preferred to ensure no blockages. A minimal amount of water is required to keep the pelts moving through the tube. One of our learnings sought was an appropriate cleaning system for the pipework, although they could only suggest a mechanicalised sewerage cleaner. We will need to investigate this part of the process further although the company will provide a quotation with details for our application.

While there was no significantly different slaughtering process equipment on offer there was a system from Cesmac out of Spain used for loading and unloading European pallets. The idea maybe able to be taken as a method of doing the same with stillages for frozen product heading for blast freezing. Thought provoking as manual labour and injuries from this process are a significant cost to the industry each year.

As part of our upgrade we are required to extend our stimulation system to handle an increased throughput rate. Carne Technologies out of New Zealand presented an alternative system than the Stimline system offered by Realcold Milmech to ensure that the carcasses receive a consistent voltage. *Need to explain detail further**

4.3.1.3 Key Messages

The European and Australian markets are of different scales with Europe having 502 million people on its doorstep compared to our population of 25 million. Even considering the majority of our red meat is exported the volume of meat processed in our country at single facilities does not justify much of the technology scale used in Europe.

We can learn from their system implementations to consider the best technology companies and processes to use when our Australian industry seeks to solve problems that are more likely common to the red meat industry globally. This assists in our research and development decision making to ensure we need not always start from the beginning, but rather learn from others learnings and adapt technologies to be suitable for our industry and livestock.

The benefit of IFFA and the plant tours for the MLA/AMPC study tour delegation is that you are provided the time and opportunity to focus the available technologies and bring the scale back to relevance to determine what may be beneficial to the industry and your business. The creation of this time enables informed decisions to be made depending upon the application and throughput rates required.

4.4 Submission: AMPC/MLA Red Meat Study Tour to IFFA and Denmark – May 2016

Summary

The combination of tour members from within Meat industry and associated business provided a suitable cross section of professionals that collaborated well during the tour, exchanging ideals, finding and knowledge.

This was a key element of the tour as it allowed the exchange of innovative ideas that ultimately is what's required if the Australian Meat Industry is to continue to be competitive in a global market.

IFFA trade show is the ideal forum where businesses that contribute to the meat industry advancements can show their wares and up and coming developments. The stalls and displays were well set up showing that last and greatest assets of each business to its audience. The purpose of each company was to engage with its customers and develop new or further business relationships and sales.

Identified in the table below are the key points noted during my walking around IFFA.

The visit to a range of Danish processing plants was of large benefit, as it allowed for the study group members to benchmark Australian facilities against the Denmark plants. Seeing different processors and machinery in working businesses provided an opportunity to evaluate if there were equipment, machinery or plant that would or could provide improvement within our industry in Australia.

The two Denmark meat plants (1 x beef and 1 x pork) were part of a Co-op and were well designed and encompassed a range of new and available technology.

The Biogas and Bio fuel facilities are well supported by the Danish government allowing them to get established. Without the government backing it would have been very difficult for these recycling plants to be built. The conversion of waste product into a usable fuel source is becoming a more common direction companies in the Australian Meat industry are taking.

| COMPANY | ITEM | VALUE TO THE MEAT INDUSTRY |
|---------|---|--|
| FOODCAP | System for storage of meat in bins with CO2 providing greater chilled shelf life and inventory management | <ul style="list-style-type: none"> - Provides additional shelf life of Chilled meat-allowing users to optimise cuts and trims for secondary processing. Ideal for value added facilities - Provides a trace and track inventory system to manage product dates and volumes that is fully automated. - Removes the cost of storing product in cartons and all the associated waste related with deboxing and decartoning product as raw product is stored in reusable and washable bins. - Provides a user-friendly method of storing up to 150 kg in transportable bins by both manual movement and machine. |
| MONDENI | Latest Tray seal and thermo form - flexible packaging line | <ul style="list-style-type: none"> - Offers a number of vacuum packaging tray systems from rigged trays to thermo-form systems to low cost tray seal options. - These types of flexible systems allow |

| | | |
|---|--|--|
| | | <p>processor to have greater packaging flexibly and can provide alternative packing cost to customers.</p> <ul style="list-style-type: none"> - Flexible packaging lines were also for quick change over times – increasing productivity and efficiencies. |
| (Still under investigation) | Automatic placement of bag liner in a box | <ul style="list-style-type: none"> - Resolves EU handling issue between carton handler and box handler |
| TREIF | Slicer to slice Beef Short loins into T bones | <ul style="list-style-type: none"> - Automatic T-bone cutting to reduce wastage and provide greater safety and efficiencies. <p>Note: machine was a proto type and still under construction. In approx. 2 months the machine would be operational.</p> |
| CSB AUTOMATION | Small robotic arms for pick, place and pack product. | <ul style="list-style-type: none"> - Cost effective alternative on high production lines in dry areas. Approximately \$30-40,000 each. - Excellent safety system - can work along side them |
| CSB AUTOMATION | Intelligent interface – linking different programmes and machineries together to identify line efficiencies and capacity constraints | <ul style="list-style-type: none"> - Allows different machinery supplied by different companies along a production line to interface with each other. Therefore allowing the operator to identify the optimum efficiency on the production line through data control and capture. - A number of processing plants have added machinery into their production lines over time without fully utilising all inline machinery for optimum use. |
| FREUND | Saw cutter for loins – pork. Simple system - using a counter weight system | <ul style="list-style-type: none"> - Discussions were held with FREUND regarding developing one for beef. - If developed it could provide greater yield recovery on beef short loins? |
| MULTIVAC – used in new machine released at IFFA | New packing material using 30% paper / 70% plastic as a composite. | <ul style="list-style-type: none"> - Provides an eco-friendly type of packing with the same durability's of 100% plastic. - Possibility for setting new trends in packaging. |
| HIPERBARIC | Water high pressure for extending shelf life - hiperbaric | <ul style="list-style-type: none"> - Sterilizations of meat under pressure to extend the product shelf life. - Ideally used instead of cooking product – e.g. Sous Vide. Significantly reduces the sterilization process compared to cooking from hours to minutes. Provides greater efficiency |
| CSB Automation | CSB camera for grading pigs and working out the most efficient method for cutting loins - fat payment | <ul style="list-style-type: none"> - Maximization of carcass primal for greatest return. This is achieved by programming key determined measurements that communicate between the grading of pig to the automatic cutting. - Proven technology on pig processing but if developed could be used on other species. |
| ATTEC | Automatic knife sterilisers | <ul style="list-style-type: none"> - Technology has been around for the past 3-5 years but now systems are more affordable and provides labour saving as well as meeting hygiene standards - Water and power saving through effective cleaning systems |

| | | |
|-----------------------------|--|---|
| MAGURIT | Robotic knife sharpener | New robotic system is very efficient and accurate with an automatic sharpen analysis machine as part of the process. Labour saving |
| (Still under investigation) | Shoe cover system - using a form of heat seal | Simple system that uses a single sheet of plastic that is heat-sealed around the foot wears being efficient and cost effective. |
| ATTEC | UV sterilisers for knives | Significant utility saving from having to use hot water as the sterilization method for knives. |
| LAPACK | New rotary vacuum packer | Conrad suggested to get a new rotary vacuum packer into JBS for trial by the end of the year |
| F DICK Knives | RFID in knives - linked to person | Provides traceability of knife to individual and if used in conjunction with auto knife sharpening system then you are able to provide direct feedback to operator of knife use and sharpening effectiveness. |
| FOSS EAGLE | Chemical lean (CL) management system | Trim management system provides the optimum return for trimmings based around chemical leanness. |
| MAREL | Marel - full boning room solution with the use of Smart line equipment | Smart line – measures yield and operator output. Allows the operator to have a screen that tells him the best cutting per primal to maximise returns. |
| - KENTMASTER - EFA | Hydraulic hand tools | Pork trotter nail removal and table beef blade bone puller |

4.4.1 Denmark Study Tour

4.4.1.1 ATTEC Factory Tour

Overview - Tour was conducted through the ATTEC factor in Sonderburg. ATTEC are a large supplier of boning room equipment for mainly pork and beef industry with 150 staff.

They produce equipment ranging from boning room, slicing and cutting systems to conveyor and automatic inventory systems.

During the tour ATTAC presented three prototype lamb primal cutting machines

- Primal cutter
- Loin cutter and rack splitter
- Forequarter cutter

These machines are to be trialled at a New Zealand lamb facility. Invitation was offered to view these machines in operation.

4.4.1.2 Danish Crown - Guided Tour of Holsted Beef Plant

Overview – the beef plant processes 1000 cattle per day and is part of a farmers co-op. the plant was built in 2013 processes a combination of large vealer and dairy cow / young bulls for grinding meat. Due to time constraints the tour was focused around the boning room and value added area. We were not able to see the slaughter processing.

Key observation points

- There was a lot of Attec boning room equipment – Q line
- Trim management system that split trim into 4 chutes for different chemical leans
- Weigh management system
- Trim meat master - chemical lean measurement system flowing through a fully automated pack, weigh and label system
- Primal on main belt were table boned
- Number of the belt had Auto washers on them to reduce the bacteria loading
- The plant operated a centralised sharpen system for all knives used on plant
- The facility had a large dry aging room, currently aging for 45 days then the customer ages further - room at 2c with air movement
- They are producing dry age mince beef
- A number of the finished packs had GR codes for traceability
- The plant was well configured, with three levels
- Staff were provided with daily sharpened and cleaned knives

4.4.1.3 Danish Crown - Guided Tour of Horsens Pork Plant

Overview – The facility was very impressive and the largest of its type in Denmark processing 20,000 to 25,000 pigs per day over two shifts. The pork plant is part of the farmer's co-op and the guided tour provided an opportunity to see the main processing areas.

Key observation points

- Plant facility was well layed out
- Highly mechanised – auto saws, bungers and splitters etc.
- Used a bin system to move primal product to key processing and pack off areas
- Bins / totes have RFID for track and tracing – primal (forequarter and loin cuts)
- Primal cutting room had a large digital display for line efficiencies
- Carcasses were split and fed into auto primal saw cutters, splitting each side into 3 main primal
- Forequarters were transferred into RFID bins
- Loins were conveyed into auto saws removing chime and belly
- Leg primal were grouped/stored and transferred on hangers
- Packing stations were ergonomically designed for greater efficiency with adjustable stand heights and tilting pack stations
- A number of mechanical aids were used throughout the process e.g. pneumatic rib boner using a wire hook to life the bones from the loin, pneumatic blade puller
- Bafflers in the ceiling space to reduce the sound
- All workers were supplied with sharpened knives in a holster system
- All knives were put through an auto wash system
- Yards used mechanical pushes in the race to feed pigs to the stun boxes
- Facility had a public viewing gallery
- Within the administration area a historic display showed the history of pork industry

4.4.1.4 *Horsens Biogas and Daka Refoods Plant*

Overview – Biogas facility used the waste material from the Danish Crown pork facility where it simply added vegetation to the effluent liquid and applied heat to activate the acceleration process for producing methane gas. The facility/ structure was based around formulated models, which were low cost and efficient to operate.

Daka Refood Plant operated on the same site; its business model was based on collecting waste food material from supermarkets, restaurants and households across Denmark. Waste material was put through a mechanical emulsifier where solids and liquids were separated.

Key observation points

- Methane facility produced 3000 litres of gas, with the main consumer of the gas being the processing plant. Excess gas is transferred into the national grid for domestic use.
- Waste material is mainly from industrial cattle and pig plant

4.4.1.5 *Daka Bio Fuel Plant*

Overview – Danish government has provided significant funds to set up the Bio Fuel Plant. Rendering tallow is processed through the bio fuel plant turning raw material into bio diesel

Key observation points

- Plant was completed and started production in 2008
- Facility construction was 180 million DKR
- Capacity is 50,000 tonne per year with opportunity to expand to 100 tonne
- Daka has 5 facilities- 4 in Denmark and 1 in Sweden
- Bio fuel is sold on the local fuel market

4.4.1.6 *Danish Crown Research Institute*

Overview – DMRI hosted the study tour. A tour of the facility covered the following discussion items

- Objective carcase measurement
- Progress on online CT
- Robotic co worker robots
- Overview of packing and quality shelf life trials
- High speed innovation systems

Whilst topics were of general interest to the tour group there were limited mechanical advancements in technology that have not previously been seen or developed in Australia.

4.4.1.7 *Conclusions/Recommendations*

From my observations / findings the following topic headings are the key areas that I recommend as a focus for driving further innovation and efficiencies within the Australian Meat Industry. Across Australia we need to further invest in these areas, to allow our industry to remain competitive in a forever challenging, world wide marketplace

- **Automation** – throughout the tour and presented at IFFA, where successful automation has been implemented significant benefits and outcomes have been achieved with improvements in efficiencies, throughput and costs reductions.
- **Efficiency Systems** – where companies have been able to link processing systems together with software innovations to identify efficiency opportunities, they have and will be able to optimise throughput.
- **Robotics** – the introduction of robotics throughout the meat industry including; yards, slaughter, processing, added value, storage and dispatch has and will continue to provide major benefits to the processor.
Those benefits are; consistency, control, reliability, lower costs and flexibility that are needed with our challenging labour market across Australia.
- **Value Added** – continuous investment in this area is required to keep pace with world food and product trends. This applies not only to product development but also to the variety of food types offered; fresh, flavoured, pre cooked and ready meals. Strongly associated with value added products are advancements in packaging types, allowing the customer to differentiate what is being offered against our competitors.
- **Shelf Life** – a food safety focus through all touch points of meat processes continues to be a major target area within development and controls. From UV sterilisation to robotics and greater mechanisation across manufacturing processes will reduced risk levels for contamination, providing improved shelf life.

4.5 Submission: AMPC/MLA Red Meat Study Tour to IFFA and Denmark – May 2016

Participated as representatives of the Australian meat industry in the IFFA Technology Exhibition, Study Program and Global Scanning study tour in May 2016.

The study tour included:

- Attendance at IFFA
- CSB Smart Factory Tours
 - EDEKA Südwest Fleisch GmbH site visit in Karlsruhe-Rheinstetten, Germany
 - Pork processor
 - Van Rooi Meats site visit Helmond, Netherlands
 - Pork processor - Slaughter to retail pack distribution
 - Promessa site visit in Deventer, Netherlands
 - Pork and Beef Value Adder – primal processing to retail distribution
- ABB Robot Application Centre site visit in Friedberg, Germany
 - ABB robotics activities in the meat industry
 - Collaborative robots

- ABB product development for food and beverage
 - hygienic design robots and food grade lubricants
- Attec
 - Processing Equipment designer and manufacturer
- Danish Crown (Beef and Pork Processing)
 - Large scale (volumes) pork processing
- Biogas Plant
 - Unique biogas generation facilities
- DMRI
 - Research and Development Facility
- PackForum (Sealed Air)
 - Innovation Centre
 - Packaging
 - Equipment

Background

Pre Study Program Briefing

Sunday 8/5/16

Preliminary walk through of the exhibition Messe Frankfurt making note of exhibitors to return to for subsequent thorough inspection and follow up investigations and discussions. These are noted below:

Hall 8

- Webber
- Vemag
- GEA
- Casing suppliers for tipper tie
- REX Slicing machinery

Hall 9

- Pork Processing equipment suppliers
 - Renner
 - Banns
 - MPS
 - JWE

Hall 9.1

- Eagle Inspection (check weighing solutions)
- DMRI
 - Contaminate inspection system – surface only contaminates
 - Consultancy opportunity
- Cantek Red Meat
- FOSS
- Cool It doors

Hall 11

- ULMA

Hall 11.1

- Multivac
- Sealed air – inspection of Mondini tray line
- Trief

Monday 9/5/16

[CSB System “Smart Factory Tour”](#)

CSB System, producer of meat & food specific ERP software solution based on Industry 4.0 methodology.

Refer Appendix B for further detail on CSB Systems and Smart MEAT Factory.

Site visit to EDEKA Südwest Fleisch GmbH in Karlsruhe-Rheinstetten.

www.suedwestfleisch.de

Tuesday 10/5/16

Hall 4

- Casings
- Pig runner machine

Hall 4.1

- Ingredients and packaging
- Casings
- Soaker pads
- Labels
- Retail accessories and presentation displays/counters
- Flexopack vacuum pack machine
 - Modernised 8600 machine
 - several less parts
 - stainless steel construction
 - Edwards pumps have an 8 year service interval
- APRA casings

Hall 9.1

- Pattyn carton erecting machines. Liner inserter follow up
 - Have a business partner in Aust. KHS Pacific.
- Elpress - G&F Polypropylene-random (PP-R) Pipework (green material) can't be chlorine based chemical. Estimated savings from satellite to stand alone is 10 to 30% saving in chemical. Water saving?? Project for enviro committee
- Follow up with Dyson for hand wash and dryer combo
- Wall cladding - follow up with email for quote and supply opportunities
- Entrematic rapid doors - email for further detail as per contact
- STOMMPY bollard system - see brochure
- Cantek- processing equipment including rotary box
- DSI Pet food plate freezers
 - Work with Erlinord
 - Milmeq for plate supply and install

Wednesday 11/5/16

Hall 8

- Banns pork splitter 2 x robots. A lot larger footprint than the Jarvis option



- Holac slicer.

Hall 9

- Laparmentiere Bangma machinery.
 - Bible splitter and intestine splitter.
 - Consider replacement of spaghetti cooker with kettle
- Jarvis for pork processing automation.
- [Sterilair](#) – UVC sterilising product
 - opportunity for carcass decontamination
 - commercial units for disinfection for conveyor belts.
 - Plus, air disinfection (bazooka) see brochures.
 - 12,000 hour life expectancy.
- Kentmaster – blade stop
- [Couedic Madore Equipment](#) - French company for pork processing equipment
- MPS
- Also on the MPS stand was [Aqua](#) - details for potential improvements for waste water system

Hall 11

- OCS contaminate detection and check weights will provide specification to Australian distributor
- Ilapak Deltarotavac (8600 variation vacuum packaging machine)



- Espera multi-head label printer and applicator ability to hold 6 rolls simultaneously
- Witt leak detection system for vacuum packs, map trays etc
 - Australian distributor

Hall 11.1

- [Trief](#) portion cutting machine.
 - Claim greater yields than a slicer.
 - System pre weighs and scans to ensure cuts are within spec.
- [Banss](#) dynamic rail scales.
 - Multivac
 - Check Banss website.
 - Not yet trade approved
- [Brizerba](#) slicer - Multivac

Networking Event with Austrade

King & Wood Mallesons, Central Frankfurt

- Presentations on investments in Australian Agribusiness and food.
- Topics – quota, product (beef, pork, lamb, goat) market access, food hygiene



CSB Smart Factory Tour (12th May)

Thursday 12/5/16

CSB System “Smart Factory Tour”

Van Rooi Meats site visit Helmond, Netherlands

www.vanrooimeat.nl

CSB System “Smart Factory Tour”

Promessa site visit in Deventer, Netherlands

www.pro-messa.nl

ABB Robot Applications Centre (13th May)

Friday 13/5/16

ABB Robot Applications Centre, Regional Application Centre for Collaborative Robots

Friedberg, Germany

Presentation Notes

- 450 employees onsite
- Due to population growth the food required between 2010 to 2050 equates to the same food needed for the past 8,000 years.
 - These are figures from UNICEF and WWF
- Significant difference in work force availability between older economies (America, etc.) compared to emerging technologies.
- Current figures from UK - 10 to 15 recalls per week equating to an annual average in excess of \$1M per week.
- Companies are current working on there to be no human "touching" food until the consumer opens the packaging
- Industry 4.0 - Alan gave brief description of industrial revolution:
 - Industry 1.0 was based on the introduction of mechanical production equipment driven by water and steam power.
 - Industry 2.0 was based on mass production achieved by division of labor and the use of electrical energy.
 - Industry 3.0 was based on the use of electronics and IT to further automate production.
 - Industry 4.0 was based on the use of cyber-physical systems.
- Food and beverage is lagging far behind other industries.
 - Still utilising paper, little islands of data, not coordinated, incomplete systems

YuMi collaborative dual arm robots

- Target market is electronics assembly
- IP 30
- Working range approx. 0.5m
- Payload 500 grams
- 7 degrees of freedom in each arm
- Integrated wiring and hoses
- Controller integrated within robot
- Portable 38kg
- Speed 1500 mm/s
- Collision detection
- Accuracy of plus/minus 0.02mm



Tour of the facility

- Training centre
- Refurbishment facility
- Technical and new development area R&D
- Project development and FAT facility



Attec, Horsens Biogas & DAKA Refoods (17th May)

Tuesday 17/5/16

Site visit to ATTEC Manufacturing Facility, Sønderborg

- 150 to 190 employees
 - Attec engage more workers when increase orders
 - assume a labour hire type arrangement
 - Attec is based in small town, maybe a concern for technical labour availability
- Started 1986
- Sales and service team based all over the world
- Equipment for pork, beef and lamb.
- Majority pork equipment
- Machine based not robots
- Predominately Attec equipment starts at exit chiller, also software Integrate with other equipment and suppliers such as vacuum packaging machines (sealed air)
- Systems for both creates and cartons
- Attec have orders up to 2019
- All trim in trays and through meat master - very little waste on floor
- Provided examples of processing rate increases up to 320kg per worker per day
- Attec create customised software system
 - many levels from received in at each station/ worker to full tractability
- Attec have 70 to 80 processing lines all over Europe
- Working on a beef loin deboning, assume this is not near commercial reality
- Currently trialling sirloin trimming machine
- Pork easier due to product being consistent
- Utilise carcass scanning with ultrasound, this enable data to be
 - Provided to the farmer for genetic purposes
 - also defining product detail for most suitability specification for orders

Attec facility tour

- Sales Dept., Software code room, Design room, workshops, store facility and trial room
- Have an internal developed system for project budget monitoring
- Machines have no functionality for carcass scanning and variability - set and forget
- With the trial there was issues with incorrect cutting of product due to product not "falling" correctly from the cutting and staged area

Gold Room – Dry Aging Room



- Dry aging beef, mostly organic
- 70 day dry age, program available but is not utilised due to demand for product
- 40 day program is used mostly due to demand for the product
- €50 Euro per steak or equivalent to \$77.00 Australian
- Start with a 15kg loin in the dry aging room and finish with a 9 kg loin. (40% loss)
- The dry age room operates at 2°C, with salt also being applied to reduce mould etc.
- Only 4% of production is suitable for dry aging due to marble scores etc.
- The dry aged product is trimmed onsite so customers receives finished product and doesn't require any trimming etc.
- Dry age room has full traceability of product back to carcass as consumers are interested in where the product has been sourced from etc.

Site visit to Danish Crown Pork Plant, Horsens



- 20,000 pigs per day which is Denmark's largest processing facility
 - 110,000 pigs per week maximum with no overtime
 - 1,600 employees
 - 2 shifts, working 8 hours each shift
 - Constructed in 2005 the facility is circa 83000m² and circa 500m long. Consisting of 3 processing levels throughout
 - The union in Denmark is strong throughout the processing sector. This impacts wages when compared to Germany and makes processing in Germany more viable option for many businesses. Danish Crown in Denmark are paying an average of €30 per hour where as in Germany the average is €18 per hour
 - Germany is major competition lower salary and not as unionised as Denmark
 - Denmark's price paid to producers is very stable, compared to Germany which the price fluctuates.
 - Danish Crown is a co-operative owned by some 2,000 pork farmers/producers
 - There are approx. 100 government inspectors onsite
 - 100 maintenance staff (mechanical and electrical) to maintain the facility and keep it operational. Major works are carried out on the weekend
 - Employee turnover - 100 new employees start each year during the summer to assist with increased demand for their products.
 - No spray chilling, "shock chill" system is used to bring pigs down to temperature the desired time frame with correct pH etc.
 - Visitors can come for free and take a tour of the facility. The company employs 8 full time people to take tours
 - Currently producing 300 containers a week to china (50% of production) and approx.40,000 – 45,000 cartons per day + crates
 - Running Multivac 3 x Thermoforming machines
 - Flow wrap for ribs, middles, full loin, (6 machines)
-
- Blue poly liners in crates are sealed to reduce the risk of cross contamination using CVP system



- Trim pack off station - 11 stations approximately



- 26 – Carton Pack Off Stations



- Auto/Robotic palletising utilised in a central location
- Central Carton Labelling with auto label applicator.
- Cartons/products have a unique identifier so the system can automatically generate the label and apply.



Boning Room

- 4 x Boning lines
- 22 work stations along table/belt
- 9-18 on line depending on spec. Skin on/off bone in boneless etc.



Chillers

- Auto loading and sorting in chillers
- 16-20 hours in chiller prior to boning

Slaughter Floor

- 3 x lines 436 hour, 2 shifts
- 120 employees (includes holidays etc.)
- Auto branding
- Hock cutter FQ, 4 machines save 6 labour units

Lairage

- Pigs are kept in farm lots of 15 per pen
- Yards employee, pigs don't see green as well as other colours
- The lairage has been designed so the pigs are moving up hill all the way to the knocking box
- The design has also taken into consideration lighting having the pigs move from poor light to good light to encourage movement.



Site visit to Horsens Biogas Plant, Horsens

- 1400m³ per hour methane production, equates to energy for two houses per

hour per year

- Receive waste material from industrial and commercial (not domestic)
- Cattle and pig farm waste (manure)
- Plus, industry waste such as abattoir
- Methane added to natural gas infrastructure
- Biogas 65% methane 35% carbon monoxide
- Water scrubbing system but notes they have had lots of problems with reliability of scrubbing systems
- COD load?? Product is captured as weight load as supplied, they do not appear to monitor COD
- No house hold waste allowed but allow waste from large restaurants.
- Trucks (tankers) approx. 37 tonne
- Appeared to be no air monitoring throughout the facility, inclusive of the scrubber stack
- Sludge/solids given back to farmers for fertiliser
- Waste from beef producers and pig producers (25%)
- Industrial waste equates for 75%
- The methane gas is placed directly into Denmark's gas network
- All waste materials are weighed on receipt at the plant.
- All waste has to be traceable.
- The facility also uses fish waste from Norway. Approximately 65,000 tons of salmon die as part of the natural migration process. The salmon are treated with a natural acid in Norway to start decomposition of the fish prior to reaching processing plant These salmon are collected and transported back to the facility and processed with in the reactors to generate gas.
- Biomass / slurry from farms must be consistent to achieve good gas results/ consistent results
- 900 tonnes of biomass per day
- All industrial waste heated is to 70°C for one hour to kill bacteria prior to going into the reactor. Stops transfer of bacteria between farms etc.
- 8-9% of the energy produced is used within the process onsite. Aiming to reduce it to 6%
- 3 reactors, 8000 cubic metres each, 24m high x 22 m wide
- 30 tonnes in 30 tonnes out in each reactor
- 2 x pre storage/blending tanks holds there for about 3 hours
- 2 tanks for biomass storage
- About 50minutes holding capacity for gas if there's a breakdown.
- 1 of 7 plants owned by the company



Site visit to DAKA Refoods plant, Horsens

- Collect material from all over Denmark
- 40 facilities across Europe
- 80% of collections are in wheelie bins
- Have a fleet of trucks picking up waste and dropping off empty wheelie bins.
- Due to Denmark legislation requirements DAKA have an exchange program with suppliers of food waste all bins have to be sanitised before going back into service



NGF Nature Energy, DAKA ECOMOTION (18th May)

- NGF Energy 51% ownership of plant
- Annual volume 400,000 tons
- 75% comes from local agricultural
- 7 minutes to load & unload trucks from farm with maze etc.
- All floors are heated throughout the factory
- Maze is used a bio material is grown for the site 50,000 tons per year from cattle
- Crane system operates automatically to feed the maze into the process and keep turning material
- Farmers own part of the plant, co-operative type system
- Pick up biomass for free, and return material as a fertiliser after it has been through the process.
- If 100 tonnes delivered from farm 100 tonnes must go back to back to farm to be used as fertiliser
- Pig & cattle waste is also processed from barns etc. and also take waste from abattoirs (Danish Crown)
- 3 tanks for holding liquid waste/ sludge for farms for fertiliser
- Material is placed through heat exchanger before going back to farm to minimise the risk of bacteria transfer between farms.
- 4 primary reactors
- 1 secondary reactor
- No heating in the digesters it's governed by material going in
- Volume for each reactor is 7500m³
- Clean the gas to remove CO₂ through water filters.
- Remove sulphur to spread back onto fields
- Gas production 60,000,000m³ per year
- Supply back to main grid
- Gas must be as good as natural gas to into the grid otherwise it's flared
- Retention time 1 month
- Have 4 plants in America, 60 plants across Europe
- 40-50,000 tonnes of food waste per year used. Transferred to the plant by pipe.
- Sterilised for 70°C for an hour at the beginning of process
- 6-7 year pay back without subsidies but received 30% subsidies from government
- Started as 80-90 farmers wanting to build a bio gas plant. But couldn't get funding. But got off the ground a short time later with business partners.
- Company must set a guarantee about the quality of gas that is produce.
- Returns about 7-8% on investment, \$130, 000,000 Danish Crown to build
- 30 year life span on factory, 12 month build time
- Retention Cycle
 - 6hrs feeding in
 - 12hrs sitting
 - 6 hrs feeling in

DAKA ECOMOTION

DAKA

- Segregate waste stream such as potassium and target users such as potato farmers
- Mostly supplied from material sourced through DAKA (70-80%) but some waste material is imported from other countries such as Norway & Germany.
- Government have subsidies until 2020 but stated future is not certain post this
- The construction of the facility commenced in 2006 and was completed in 2008.
- Biodiesel pricing is very stable
- Market 50% in Denmark but also into Italy, U.K, France and Holland.
- Have a plant in Australia built in 2008
- Can handle feed stock with high FFA were some other processes can't.
- DAKA supply 99% of own fat material and is category 1 & 2 with the category 3 material is sold off into the petfood market.
- The factory utilises 5-7% of the bio diesel energy produced during the process.
- DAKA is owned by the farmers & slaughter houses and operates as a co-operative 49% shares, 51% owned by Saria owned by Rethmann group in Germany.
- 5 plants (4 in Denmark & 1 in Sweden)
- 500,000 ton of raw material received per year
- \$160,000,000 US turnover per year
- Rendering plant adjacent to the bio diesel plant.
- DAKA is the largest recycling company in Denmark with zero waste.
- Cars in Europe must be able to use 7% bio diesel or they can't be marketed.
- Are audited by 5 departments /external countries etc. to ensure they meet standards.





DMRI (19th May)

Wednesday 19/5/16

Visit to Danish Meat Research Institute – DMRI

Refer Appendix DMRI Presentations

Environment - Danish Agriculture and Food Council

- The Danish Agriculture and Food Council is comparable to MLA/AMPC
- Both dairy and pork processing companies (cooperatives – farmer owned) have diminished due to amalgamation. This also includes grain but grain is typically not a cooperative
- More with less, legislation for farmers to utilise manure instead of chemical based fertilisers
- Farmers are heavily subsidised by EU for agriculture. \$2,000 Danish Kroner per hectare
- Water efficiency project for food product collaboration between food companies and government – funded by both



Danish Biogas Association

- Livestock manure + organic residues = improved fertiliser
- Biogas is excellent as a supplement to wind power generation
- 2018 15 – 20% of manure will be handled in biogas plants
- 2020 aim is 50%
- Transporting biogas plant feed materials are typically within 20km of abattoirs
- Farm scale biogas suppliers for farmers, currently sold in Denmark only.
 - Commented currently only cost viable with subsidies
- Currently 30% construction costs of biogas plants is from government subsidies
- Goal set by government 2023 50% of household wastes to be reused
- Biogas potential
 - Manure
 - Straw – barley and wheat production
 - Waste from household

Meat Technology Automation Measurement Systems Slaughterhouse technologies Food Safety -

- DMRI – 120 employees onsite, facility is only 12 months old
- DMRI founded in 1954, offer services from R&D through to consultancy

- Funded on a production levy based on all livestock born in Denmark poultry beef, dairy, etc. – controlled by public. Farmer based investment i.e. farmers contribute but also decide how this money is invested
- DMRI is a not for profit 100% private company but profit can be made be reinvested at the farmers discretion
- There is no co-funding from government
- Levies are calculated based on animal type and ultimate use i.e. piglet, sow, beef, etc. – approx. e.g. \$1 Euro for beef

Objective Carcass Measurement Systems for Grading

- First beef scanning 1997 – vision system, still operational in Holsted plant with a software upgrade 3 years ago
- Danish processor have a cost penalty to farmer for non-compliance with specification i.e. fat coverage

Quality and Foreign Object Measurement, Department of Measuring Systems -

- Metal detectors – definition of issues of contaminate detection
- Hyper-spectral
 - X-ray – images are generated from the variation in local attenuation. thickness or density
 - Internal product – high sensitivity but loss of sensitivity with areas such as edge definition
 - Dual energy – improved detection (or improved lower rate of false detection)
- Consider location within processing line of x-ray versus metal detector
 - Missing part
 - Damaged product
 - Check weighed per piece (not verified system for weights and measures but effective)
- CT
 - Ambiguity solved by multiple projections
- Plastic detection
 - Surface detection only
 - Detection limit 0.5mm x 0.5mm



Detection Statistics

- Detection limit is defined as 1% with a 95% accuracy

Conclusion

There is no one solution for all detection requirements

High Speed Innovation, The projects

- Hands tools, machines through to robotic applications
- Tenderloin (pork) removal project – 2-3 robots to enable throughput
- Working with new types of materials such as ceramics
- Trying to get applications faster to commercial outcome (shorter projects)
- Check photo for DMRI innovation model – consider this design as per stage gate for NCMC prelim investigation model
 - Innovation “Our focus Areas”
 - Ideas that create value
 - Close corporation with the end user
 - Close corporation with the commercial partner
 - Value creation as a guideline
- DMRI typically own all IP but are willing to negotiate with commercial partners in some circumstances
- Challenges – implementation
 - DMRI have developed an implementation model for new technology (check the presentation for further detail)

Projects

- Robotic de-ribbing (rib removal) tool (video as per demo at IFFA)
 - Vision guided
 - One rib at a time – capacity, through put??
 - Yield, comparable to manual but less bone splinters than manual
 - pay paid 0.8 year
- Intestine finishing machine – incl. quality control (no video)
- Knife removal for pork
- Packaging projects
- Project 24/7 utilising plant capacity better

Automation, Robotics and Co-worker Robotics

- It's all about innovation
- Robotics will not be cost effective with the strategy for implementing 1 robot to replace 1 operator – the design needs to be incorporating numerous tasks and current methods of processing must be considered to ensure opportunities are fully investigated –

- Robotics – How
 - One robot – one task
 - do the same but with robots
 - One robot – many tasks
 - CNC for the slaughter house
 - Co-worker robot (Kuka) uses software as safety device – nothing hardware??
 - The helper

Packaging and Quality

- Retail packaging of beef – metrics use to define score matrix
 - Packaging system
 - Cooked colour
 - Eating quality
- AMPC currently doing a trial for 3 gas packaging with Teys at Beenliegh
 - 3 gas O², CO² + N²
 - Traditional MAP
 - Vacuum packaged
 - Wrapped trays
- Report due November

Automation and technology implementation in the meat industry

- Trends
 - Less operators – more automation
 - More precise machines
 - Co-worker robots
 - Complex technology
 - Value creation
- Online CT
- DYNA CQ – as per display at IFFA
- Consultancy
 - 6 advice concepts
 - Factory design
 - directly or with project managers
 - review and comment on tender proposals from suppliers
 - Yield improvements
 - Productivity improvements
 - Quality improvements
 - Processing improvements
 - Sales & service

Hygiene and Shelf Life

- DMRI have done studies for hygiene and shelf life for beef, lamb and pork
- EU baseline survey pigs

- Bung dropped,. DMRI state significantly higher contamination than the robotic system
- Interventions
 - steam vac
 - decontamination based on MLA (CSIRO) designed system with hot water 82deg
- Pig farms are categorised by level 1, 2 & 3 results from testing done based on the E.coli on each farm. Cost penalty 8% of carcass if category 3 and 2% penalty for level 2. Solution to remove E.coli is to change feed to grain and fibre not pellet
- Check website safemeat-dk
- There is also a MLA model for shelf life - check MLA website

Pack Forum (20th May)

Site Visit to Sealed Air PackForum

- PackForum is a customer demonstration centre based in Paris
- Facility is approximately 6 years' old
- Display for packaged products
- Opportunity to inspect equipment:
 - Vacuum packaging
 - Tray machines
 - Cleaning equipment
- Operator less floor cleaners
- Follow up for specification for VS2X vacuum packaging machine for Value Adding Area



4.6 Submission: AMPC/MLA Red Meat Study Tour to IFFA and Denmark – May 2016

IFFA is the most important innovation platform for the sector and the leading international trade fair to focus on the subject of meat. Leading manufacturers from Germany and abroad present innovative technologies, trends and future-oriented solutions for all stages of the meat-processing chain: from slaughtering and dismembering, via processing, to packaging and sales.

IFFA is the leading international trade fair for processing, packaging and sales in the meat industry. It has been the international platform for the meat-processing industry.

1. IFFA Trade Show 9th – 11th May 2016

The range of exhibits at IFFA covers slaughtering, processing, weighing, filling / packaging, conveying, cooling, storing, transporting and selling, as well as spices and additives for meat and sausage products. IFFA has the most comprehensive overview of machinery and equipment for all stages of the process chain – from slaughtering to processing and packaging of any tradeshow in the world and was run from the 7th to the 12th of May, 2016.

With two and a half days, the schedule was full and focused on packaging and efficiency innovation that could be adopted

The more relevant new developments found were alternated packaging for retail ready items. This included Multivac tray forming, skin packaging

Marel had an interesting stand with focus on process efficiency including trim management systems, alternatively to Marel, Eagle

The automated system to fully de-bone pork legs was an impressive piece of automation developed by the Japanese company Mycom/Mayekawa, and is currently in operation at a Vion plant in Europe. Although it is a system developed for pork, we discussed potential opportunities to apply the technology to beef and sheep. Although MLA's strategy so far relies on the collaboration with RTL in NZ to develop automated boning technologies, the communication channels are open and future joint developments are a possibility.

2. CSB Smart Factory Tour 9th May 2016 – Edeka supermarket chain

The Edeka Group is the largest German supermarket corporation, currently holding a market share of 26%. Founded in 1898, it consists today of several cooperatives of independent supermarkets all operating under the umbrella organisation Edeka Zentrale AG & Co KG, with headquarters in Hamburg.

The processing facility located 2-3hrs from IFFA was a boning facility along with a sausage making facility supply to supermarket within a 350km radius. Employs around 1100 people with an output of around 200 tonnes per day to which all is consumed on the domestic market.

The CSB system integrates all departments from receiving raw materials through to dispatch

3. Network meeting with Austrade 11th May 2016

Held in Frankfurt the meeting was very good which explained the role that Australia play in the supply chain for the EU. Predominantly high quality Australian beef is the main import of the EU from the meat processing sector.

The Hilton Quota is the informal name of the Tariff Quota regulated by the Commission.

It consists of a quota of 58,100 tonnes of high-quality fresh, chilled and frozen beef. The suppliers are Argentina, Brazil, Uruguay, Paraguay, USA, Canada, Australia and New Zealand.

4. CSB Smart Factory Tour 12th May 2016 – Van Rooi Meats



“Van Rooi Meat shares the view, the meat industry is constantly changing. Among consumers more motivated by social organizations adapt their feeding behaviour. Durable and friendly are largely determined by the choices of today. That is the premise of the vision "from farm to fork".

Decisively a family business with a no-nonsense mentality, we have a strong vision for the long term. We like to run ahead of the market, speak the language of the farmer and listen to the needs of the consumer. For a more friendly existence therefore we are constantly talking to our suppliers, the local cattle and pig farmers. Of course we also have an eye for people and the environment. Our commitment to increase the use of sustainable products from itself in various sustainable procurement programs. Rooi is ready for the themes of tomorrow. Entire process under one roof

With the expansion of the modern production facility in Helmond they can now undertake all steps in the processing of pork from farm to fork under one roof through”

Van Rooi Meats process up to 12000 pigs per day, the facility is another of the CSB smart factory processors, which incorporates total traceability from farm to supermarket.

5. Pro Messa factory tour 12th May 2016



Pro Messa part of Coop Manufacturing group, is the central butchers of several supermarket chains. In operations for over 30 years, nearly 150 employees, supply more than 1,000 supermarkets with a full range of meat products. Pro Messa distinguish themselves by combining a traditional butcher's shop with qualified and experienced butchers and a highly automated logistics system. This allows them to deliver a wide range of perishables and customer specific range with a maximum of logistical performance.

The site was highly automated when it came to stock handling storage and dispatch although many of the other process were very hands on to the point it was quite obvious there were large inefficiencies.

Being a small process / packaging facility the 150 employees looked to very happy working in the facility with a high staff moral present.

6. ABB Robot Application Centre – Regional Application Centre for Collaborative Robots 13th May 2016

ABB is a leading supplier of industrial robots, modular manufacturing systems and service. A strong solutions focus helps manufacturers improve productivity, product quality and worker safety. ABB has installed more than 250,000 robots worldwide.

The site visit showcased the R&D that ABB is putting into their product for the manufacturing sector, traditionally robots have been utilised in what you could considered not harsh environment, the food manufacturing sector has high levels of chemical and water wash down variations in temperature and stringent hygiene requirements.

Therefore up until recent years robots were mostly seen in the palletising areas of the meat industry. With better IP ratings and hygienic styles of robots being develop this has allowed more complex robotic applications to come the forefront of the meat industry.

7. Danish Crown Beef Processing Plant – Holsted Denmark 17th May 2016



Danish Crown Beef plant employs 380.

The site processes 4500 animals per week, which is about half the weekly cattle slaughtered in Denmark. The hourly throughput is approximately 110 animals.

More than 300 tonnes of beef is minced per week. More than 600,000 trays of mince are dispatched to local supermarkets, the volumes produced is approximately 60% of all the minced beef consumed in Denmark per week.

The site operates a dry aging room utilising prime cuts only as most animals processed are dairy style cattle.

The cuts have salt added to each end of the piece which reduces mould growth. The primal enters the aging room at around 15kgs they then can spend up to 70 days, during this time weight is reduced down to around 9kgs or a 40% loss the primal is also then further trimmed adding to more loss adding to cost to produce.



8. Horsens Biogas Facility – Holsted Denmark 17th May 2016

Site commissioned in late 2012 biomass feedstock generally consists of slurry from cattle and pig farms which is trucked to the site on a daily basis

Retention time for the plant is between 28 and 30 days each of the three reactor tanks has a capacity of 8000m³.

The reactor vessels are maintained at a consistent temperature of 40 degrees C the plant produces 1140m³ of biogas per hour, the gas is cleaned through a wet scrubber and condensate plant, cleaned gas is fed into the main gas line for use in industry and domestic heating.

The average house in Denmark use 2500m³ of natural gas per year. Therefore the plant has the ability to supply approximately 4000 households annually.

Attached to the facility is an industrial food waste centre which is also used as a feed stock to the biogas plant.

For each load of biomass that comes from farms the equivalent amount of digested biomass is returned to the farms as fertiliser

The biogas industry in Denmark is regulated as to which feed stocks can be utilised as all incoming material needs to be traceable, in the unlikely event of the outbreak of disease.



Attached to the side of the facility is an industrial food waste collection business **Daka ReFood**

Daka ReFood

Established in 2012 and collect and recycle organic waste to ensure that no resources are wasted. The company traditionally utilised animal by-products from slaughterhouses and farmers, but in recent times all types of food waste and used cooking oil has become an integral part of the business.

They provide a service solution for customers who, among others, are in the food industry such as schools, restaurants and similar

The waste is collected and used in the production of biogas. Used cooking oil is also recycled as biodiesel, which is a green substitute for fossil fuels.



9. DAKA Ecomotion Biodiesel Plant - 18th May 2016



The processing plant was supplied by Bio Diesel International (BDI), an Austrian company with a great deal of experience when it comes to establishing biodiesel production plants based on animal fats..

The use of by-products for the production of biodiesel presents a number of challenges as opposed to the use of pure plant oils.

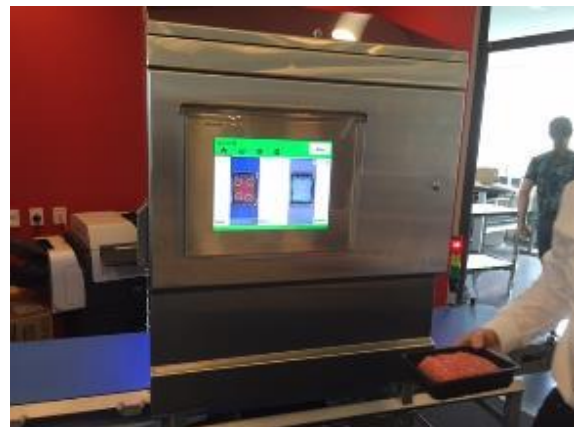
The conversion process involves two stages: the first comprises an acid pre-estering using sulphuric acid as a catalyst and the second the re-estering of the fatty acids under alkaline conditions with the addition of an alkaline catalyst, typically potassium or sodium hydroxide.

The production method also takes the needs of nature into account since the raw materials are almost fully utilised and no waste generated. By-products from the production of biodiesel, such as glycerine, are used either by the company or by other industries, who add it to their production.

10. Danish Meat Research Industry visit (DMRI) 19th May 2016

Site visit to look at the advancements in the following research fields

- Objective carcass measuring
- Online CT scanning of cuts
- Packaging, Quality & Shelf life
- Foreign object measuring technologies
 - ✓ Looked at identification technologies being developed mainly for further process the technology looks at colour differentials and does not capture any item embedded in the product – best utilised in mince production and meat patties.



4.7 Submission: AMPC/MLA Red Meat Study Tour to IFFA and Denmark – May 2016

IFFA, held every three years brings all players from the international meat processing sector together. It is the most important innovation platform and the only trade fair to focus exclusively on Meat Processing.

IFFA is the International trade fair for the meat industry globally. Here visitors received a comprehensive overview of machinery and equipment for all process stages - the exhibition program included slaughtering, cutting, processing, packing and cooling and auxiliary materials for meat and sausage products including various ingredients from around the globe.

Most Australian meat manufacturing companies were represented amongst the visitors, while most Australian (Distributors / Agents) was representing their overseas suppliers on the Stands. It made it very easy to be visiting and learning.

Value Added meat processing and particular End of line technology, was strongly displayed by all suppliers globally.

Integrated software systems are getting smarter all the time, and CSB and INNOVA seem to be the frontiers in this space. Fully integrated system, combining livestock, slaughter, boning, and value adding, with supply chain inventory, costumer orders and all the yield tracking and financial calculations you would ever need.

TOUR Days:

- Sunday = IFFA exhibition
- Monday = EDEKA CBS automation & IFFA exhibition
- Tuesday = IFFA exhibition
- Wednesday = IFFA exhibition
- Thursday = IFFA exhibition & Travel to DK
- Friday = Danish Crown -Blands
- Tuesday = ATTEC visit, followed by HOLSTED BEEF Plant –Danish Crown.
- Wednesday = DELIKA Foods A/S (TAFS only)
- Thursday = Danish Meat Research Institute. (MLA)
- Friday = Danish Meat Research Institute. (TAFS only)

SAFETY:

Food Safety and Work Health & Safety was a strong selling point for many of the exhibitors, when demonstrating their equipment. There is a noticeable push for products to be manufactured safely

and hygienically, in order not to endanger the health of consumers which includes the hygienic design of plant and machinery.

Machinery guarding standards varies wildly across the global landscape, and as Australian Standards are amongst the toughest in the world, overseas suppliers are constantly being challenged by our requirements.

Monitoring, Inspection and Traceability was a critical discussion topic throughout the show and was present throughout all of the Exhibition Halls in all sectors.

FLEXIBILITY:

Value Added meat processing and End of line technology for the meat industry is a fickle and ever changing landscape, as much is dictated by the major supermarkets latest trends.

The ability to innovate and remain flexible is vital if they are to survive a continuously evolving global market which covers changing consumer trends, variety of products, differing product packing materials and packaging sizes.

Most machines and processes displayed or demonstrated during the IFFA show, was well designed for full flexibility, hence allowing for current and future needs of potential buyers.

AUTOMATION:

Automation of tasks, and elimination of Manning, is always a Hot Topic item throughout the Fair, with many players investing substantial amounts of money to showcase their latest technologies which included Robotics, Automated product retrieval systems, various packaging machine solutions (Thermoform, Flow Wrappers) a good example of this was showcased by ILAPAK, MODA, ULMA which focused on integrated total product packing solutions including flow wrappers, rotary vacuum machines and shrink tunnels with small footprints and no labour required.

The MLA arranged tour, allowed for half day visit to EDEKA. The EDEKA Group is the largest German supermarket corporation, currently holding a market share of 26%. Founded in 1898 there are approximately 1200 stores with the EDEKA branding.

On a new site in Rheinstetten, EDEKA has built one of Europe's most modern and innovative meat processing plants. Its outstanding features - and success factors - are the high level of automation and the tremendous efficiency that comes with an integrated system.

Information technology plays a central enabling role: combined with cutting-edge production systems, such as the CSB System and machines, it ensures optimal process flows and enables a production volume of up to 650 tons of high-quality meat and sausages per day. The CSB-System controls the entire value-added chain in the new factory, covering goods receiving, cutting, production planning and control, packaging and weigh labelling, stock put away and removal processes, picking, trolley loading and shipping. With this maximum level of automation, EDEKA

ensures daily freshness with consistent quality, while at the same time the flexible process organisation allows for route optimised handling of customer orders.

EDEKA business model and Integrated CSB software system, would be a suitable consideration for new plant in Wagga.

NEW Technology;

- Vision system for foreign material in Case Ready Beef Mince;
- DMRI has now developed World first.
- Detects on surfaces
 - Plastic gloves
 - Plastic liner entrapment
 - Cardboard
 - Sizes down to 1.5mm

Danish Meat Research Institute has developed a Low Density material detector.

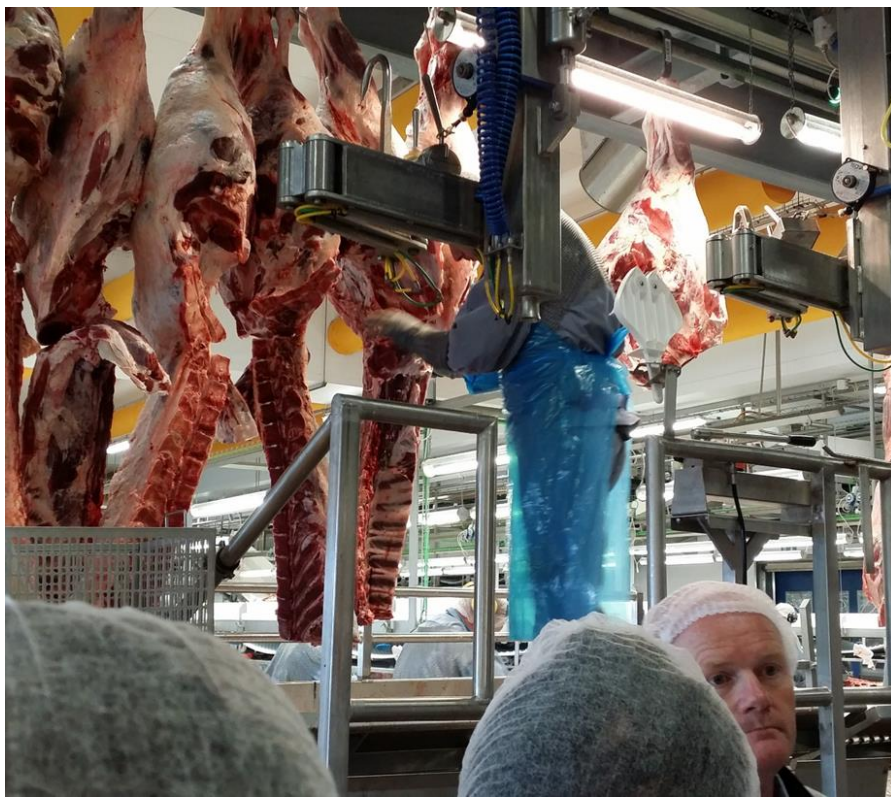
Low density materials like plastic and paper are used extensively in the food production. However, they cannot be found by the conventional technologies for foreign body detection, i.e. x-ray and metal detectors that target high-density materials and metals. Even small fragments of plastic or paper can cause considerable inconvenience and can result in a significant recall cost for the supplier.

DynaCQ analyses image data captured on-the-fly and detects even minuscule unwanted objects on the product surface (down to 1.5x1.5 mm).

With the DynaCQ quality inspection, you can prevent contaminated products from reaching the consumer, and you can quickly take corrective actions to reduce product waste. Stored images can be used for documentation and root cause analysis.



MLA visit to Danish Crown Beef Plant in Holsted;



Many suppliers, directly involved in Value adding cooked production (Smallgoods)

Focus was on the below listed areas;

1. Best Practice for Enhanced Eating Quality of Beef Primals.
 - a. US market is used to infused meats.
 - b. Australian marketplace are used to Poultry being infused, but not beef.
 - c. IFFA equipment suppliers like to sell equipment, so their advice is to infuse using 1.2mm diameter needles, with 2 x 1mm side ports for minimal product damage.
 - d. Ingredients suppliers offered many tenderising solutions, including some offers of no E numbers.
 - e. Ingredient suppliers offered solutions including Kiwi Extract and Ficin.
 - f. discussion with DMRI suggested combination of LTLT and infusion, might be best.

2. Recently launched Hot-Box Beef portion cutting, eating quality and packing formats.
 - a. Automatic portion controlling cutting devices reviewed;
 - i. MAREL I-Cut 55

- ii. MAREL I-Cut 130
 - iii. MARELEC Portio
 - iv. ITEC PraziCut
- b. Product packing options reviewed;
 - i. HFFS MAP options
 - ii. Thermoforming MAP options
 - iii. Vacuum-bags
- 3. Sauce making devices (from powder) and automatic dispensing units, to feed a thermos-former.
- 4. Post pack pasteurisation methods and techniques for Ready to Eat products;
 - a. Post pack pasteurisation is possible if a secondary cook-chamber is used.(time/temp)
 - b. Aqua-mat VEMAG is suitable for water submersion of prepacked products. (time/temp)
- 5. Listeria inhibiting ingredients was on offered, but nothing that will eliminate risk completely was found.
- 6. Current suite of pallet jacks and electric pallet jacks offered by Australian supplier are inadequate for a Ready To Eat factory. Range of suppliers including ULMA Stainless Steel Pallet-jack range. The Electric pallet lifters has an IP67 rating, which allows for full washing contact, with compromising electrical circuits.
- 7. Contact with some of the global technical network, Technical Meat College with several of the current key people in TULIP, Danish Crown. This network is amazingly effective when you want to get things done right and fast. This network gave access to TULIP and Danish Crowns plants during the tour, for intimate 1:1's with top operators, to discuss items listed above.

Some observations on technology:

Rotary Knocking Box for HALAL Slaughter

There were probably no less than half a dozen manufacturers of these units including COGEMAT Italy, BANNS Austria, CANTEK Turkey & JWE BAUMANN Germany to name a few and all of these companies build total Slaughtering Systems.

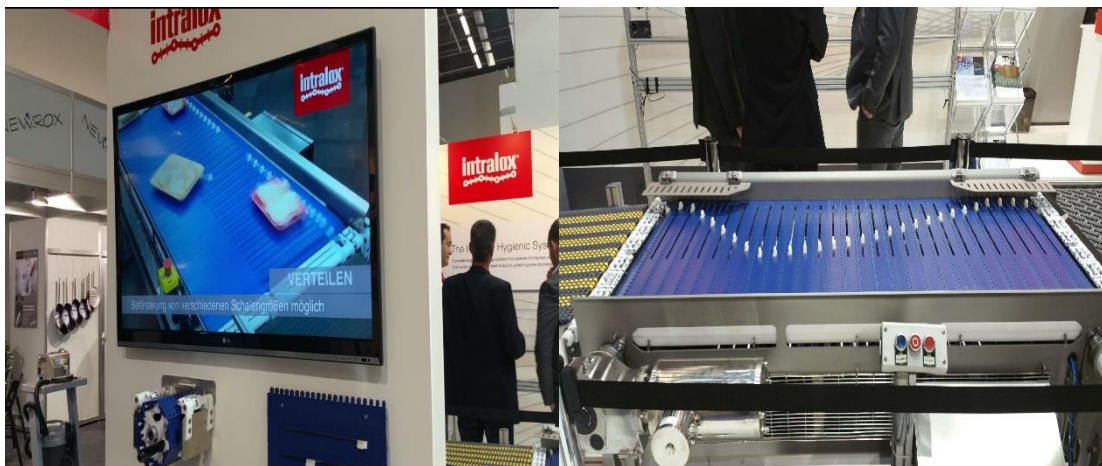


Lima Deboners / Desinewers



This FTM recovery device is one unit and does not require a pre-breaker or desinewer and as you can see does not take up a lot of floor space compared to current plant machinery (Pre-breaker, Press & Sepamatic) The unit in the photo has the production capacity of 10mt of bones per hr using the same types of bones we are currently using and is a third of the cost in setting up a whole system.

Intralox



A lot of new technology as far as product transfer conveyors I saw the above as something that stood out above the other concepts that were pretty standard. This type of technology may be suited, as an example, going from one mince line into two without having to separate both lines from exit of the mince line.

MODA



2

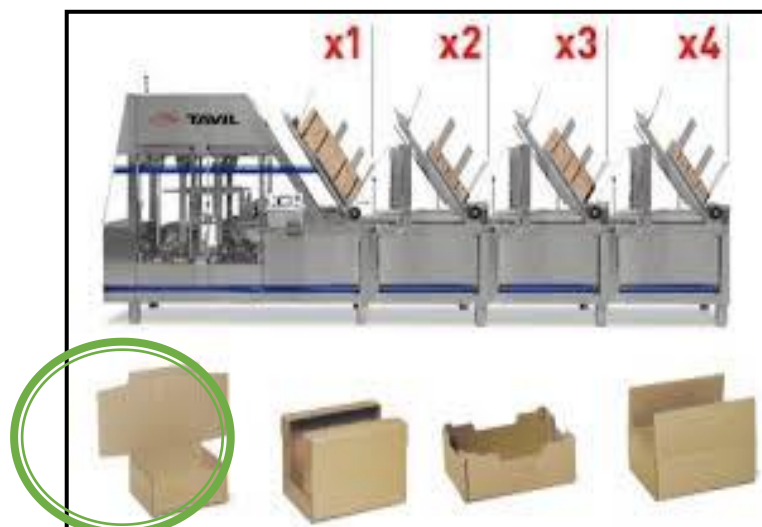


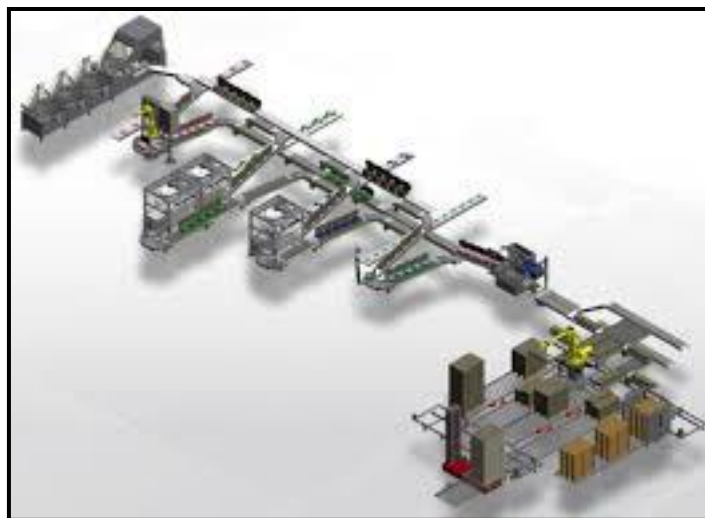
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1. MODA PAC – Automated Flow Wrapper with each unit operating at 20-30 ppm, is stating would reduce packaging material costs by 20-30 % compared to manual bagging. This unit does not have the fin seal running through the middle of the product and is situated on the side of the packaging once bag is formed and is hidden quite well.
2. MODA VAC (McLaren) – this technology and Flexopak have also partnered with McLaren as they also had a machine on their stand that was branded with Flexopak. These machines are fully stainless steel, have less moving parts, cheaper to run and have a throughput capacity of 45 cuts per minute.
3. MODA SHRINK (RED) – Electrically heated, hot water shrink tunnel that uses 70% less energy than our current units.
4. MODA CHILL (BLUE)– States to extend shelf life as a result of rapid chilling with an operating temperature of 1 – 2oc.
5. MODA DRY (WHITE) – Standard blower to dry product.

TAVIL





Tavil is a Spanish company that specialises in the construction of machinery and automatic lines for packaging, palletising & handling. As stated previously there was a big representation at the Fair in robotics, mostly for carton packing (value added products, Smallgoods) and palletising.

4.8 Submission: AMPC/MLA Red Meat Study Tour to IFFA and Denmark – May 2016

4.8.1 Technologies

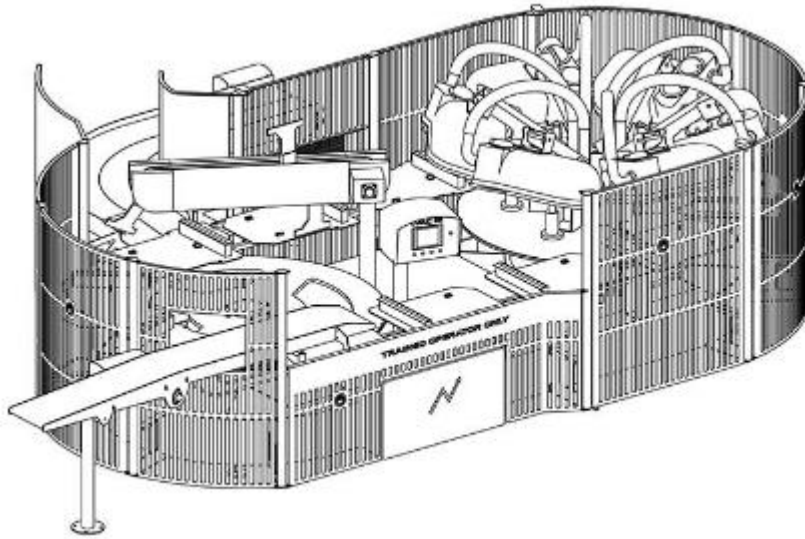
4.8.1.1 Moda: *iSeries*

Likely a top 10 in terms of innovation at IFFA, Moda in conjunction with McLaren Stainless, has developed a film flow wrapper which was presented for the first time for public viewing at IFFA 2016. Although the system is still in R&D, indicators are that it could impact the industry positively in terms of overhead savings and reliability.

The system incorporated:

- A bag forming machine with associated
- synchronized infeed conveyor to
- a high speed “octopus” type vacuum packaging machine,
- which ejected through a series of shrink and drying machines.

The system would allow for reduction in staff, as “bagging” personnel would be reduced to a bare minimum. At the same time, the system would reduce maintenance costs up to 50% due to improved functionality and at least 300 less moving parts than competing suppliers.



It is envisaged that staff numbers saved could be as high as 8 or 9 which would certainly impact the bottom line of any boning room.

4.8.1.2 *Lamb backstrap membrane removal*

There were several membrane removal and derinding machines on show, but two stands out in terms of simplicity, innovation and service. Grasselli had a very innovative safety system incorporated to the use of their membrane removal machine, and Weber had a very clean line and simple machine design philosophy.

- **Grasselli:**
Grasselli offered a safety system associated with the membrane removing machine, which comprised of a harness which contained the operating controls and power pack, which was used in conjunction with a wireless connection to the machine itself.

Features



- Wireless system allows the operator to move freely away from the machine without the risk, that the machine functions can be activated by third parties.
- The operator has the possibility to move between different machines, equipped with the WLO system, without having to perform additional calibrations.
- The operator has no physical connection anymore with the machine due to the wireless system. This eliminates the danger of accidental damages.
- Radio transmission with anti-tamper safety codes.
- Very user-friendly without calibrations before starting.
- Immediate status indication.
- The transmitter has an internal rechargeable battery, that will function +/- 12 hours.
- Multiple types of battery chargers.
- Real time monitoring of the complete safety harness, worn by the operator.
- Stop time in case of cutting the protective glove: typical <math>< 500\text{ms}</math>.
- The working area of the operator is limited to a very close distance to the machine.

Not only did the machine stop functioning once the operator left the direct vicinity of the membrane remover, but the gloves worn by the operator would cause the machine to immediately stop and partially reverse in the event that it got caught in the blade.

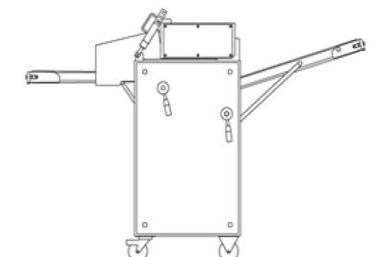
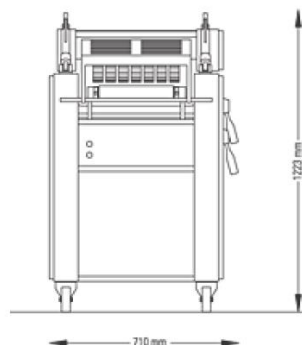


Although there were other similar technologies at IFFA, this system was by far the best developed and practical.

- **Weber**

The Weber stand offered a large variety of derinders and membrane removers, and had very clean line and simply designed machines. Very few moving parts and overall a functional design.

The models on offer were well ranged, and they offered small machines for lesser throughput applications.



This current machine was a derinder used to remove membrane and gristle from Lamb backstraps. The initial thought was that the process could be maintained using a membrane removal machine, as this would increase yields compared to the derinder. It was however quickly established that the membrane removing machine would create too much risk to the operator, as it was an open blade setup.

Comparison made, the Weber derinder was a top choice for the application, as the machine not only ticked all the boxes in terms of simplicity of design, but also the ability to be operated as an open derinder, which would create further benefits with other product groups. It was also later established upon return to Australia, that the use of a derinder rather than a membrane remover was the preferred method to process backstraps.

4.8.2 General Slaughtering Equipment

There were a few exhibits at IFFA dedicated to actual slaughtering, and even though they were not as many as the general processing exhibitors, the stands were well set out and consisted of high quality equipment.

The biggest standout feature of the exhibits was that high quality slaughtering equipment was being produced in Europe, and that pricing of equipment compared to that available in Australia, was not only much cheaper, but was also of high quality. Countries such as Turkey and Poland especially impressed with quality of equipment, and were dramatically cheaper than the Australian producers of heavy slaughtering equipment.

4.8.3 Conclusions/Recommendations

The key conclusions were:

- Although IFFA provides an insight of the suppliers and equipment available in the meat processing industry worldwide, it does not provide a market place for new innovations only. The volume of exhibitors was not an indication of innovation in the industry, and there were only a handful of exhibitors whom reflected true innovation. There was a lot of repetition, as can be expected from an exhibition of this nature, and ultimately a three day visit to IFFA was adequate.
- In terms of processing lamb and beef, Australia itself would be one of the best locations in the world to execute industry tours, as this is core to the industry in this country. Most of the plants available for tours in Europe were pork process related.
- The Moda iSeries Vacuum packaging process shows true savings for the industry, and could be employed with great success upon refinement.

4.8.4 Bibliography

- www.weberslicer.com/Weber_ASB_560_Derinder.html
- www.grasselli.com/products/wlo-wireless-safety-system/

4.9 Submission: AMPC/MLA Red Meat Study Tour to IFFA and Denmark – May 2016

Cross section of red meat in London retail



Ready meals balanced for intake



Select your meat, vegetables, and carbs, from conveniently presented portions.



Fresh and cost effective meals.



Health conscious segment.

5 Appendix

5.1 ABB Robotics

5.1.1 Presentation PowerPoints and video

Link



Processing engineers reviewing guardless 'collaborative' robotics.

5.2 Attec Technology

5.2.1 Presentation PowerPoints and video

[Link](#)

5.3 DMRI

5.3.1 Presentation PowerPoints and video

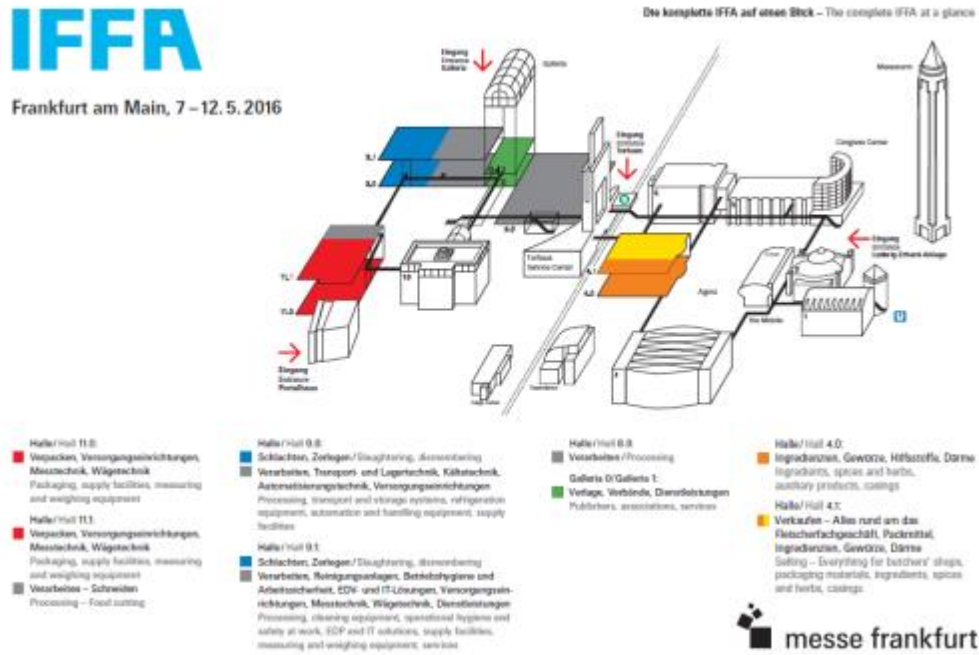
[Link](#)

5.4 Danish Environmental Systems

5.4.1 Presentation PowerPoints and video

[Link](#)

5.5 Itinerary





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| A | A. Lorenzo Barroso S.A. E-Argentina (Barcelona) ABIMAQ - Associação Brasileira de Indústria de Máquinas e Equipamentos BR-Sao Paulo/SP Alcoo-Food-Machines GmbH & Co. KG D-Bad Iburg ALKOR USA-Lodi Armor Inox F-Mauron AUTOTHERM Ludwig Brömmendorf GmbH & Co. KG D-Wasserloer | B | BAADER Nordischer Maschinenbau Rud. Baader GmbH & Co. KG D-Lübeck BANSO Schlaech- und Fördertechnik GmbH D-Biedenlopf Bayha & Strackebien GmbH D-Arnberg BE Maschinenmesser GmbH & Co. KG D-Spreinhagen BEGARAT Vertrieb und Service GmbH D-Bruchsal Barief Nahrungsmittelmaschinen GmbH & Co. KG D-Naumburg-Dietzside Bertsch-Laska Produktions- und Handels-GmbH A-Wien | B | BETTCHEER GmbH CH-Dierikon Boker BV NE-Boldward B.S. SRL I-Parma PR CEA S.p.A. I-Vicomaggio (AR) Colussi Ermes S.r.l. I-Casena della Delizia (PN) COOTEK SRL I-Covezano (Trento) Cozzoli, LLC USA-Chicago, IL C.R.M. s.r.l. I-Verderio (Lecco) CT International AS, DK-Hørshals | D | Danfotach USA-Chicago, IL DASSAUD FILS SAS F-Courpigne Friedt. Dick GmbH & Co. KG D-Deisau DIMAO XXI, S.L. E-Hondarribia DAM Foodprocessing B.V. NL-Elburg (GLD) DMS Maschinensysteme Lebensmittelmaschinen GmbH & Co. KG D-Saarbrücken DORIT-DFT Fleischermaschinen GmbH D-Erlangen Drake Loader USA-Waynesboro, VA | E | EDT Edelstahl Design Technik GmbH D-Craibheim SFA - Schmid & Wezel GmbH D-Mautbronn ELLER SRL I-Laguarda (BZ) Einsorte S.A.S. F-Frasates FAM nv B-Könich Fava Giorgio Ateli s.r.l. I-Parma Facemann GmbH und Co. KG D-Wismaden FOOD TECH Michael Jäger GmbH D-Rawfeld Fleischermaschinen GmbH D-Neudorferndorf Freund Maschinentechnik GmbH & Co. KG D-Paderborn Heinrich Frey Maschinenbau GmbH D-Hurtbrötlingen Industrial Furnace, S.L. E-Benitussar, Valencia Funk GmbH - Kälte mit System D-Kahl G. GEA D-Duesseldorf GERMOS GmbH & Co. KG D-Remshalden | F | FAM nv B-Könich Fava Giorgio Ateli s.r.l. I-Parma Facemann GmbH und Co. KG D-Wismaden FOOD TECH Michael Jäger GmbH D-Rawfeld Fleischermaschinen GmbH D-Neudorferndorf Freund Maschinentechnik GmbH & Co. KG D-Paderborn Heinrich Frey Maschinenbau GmbH D-Hurtbrötlingen Industrial Furnace, S.L. E-Benitussar, Valencia Funk GmbH - Kälte mit System D-Kahl G. GEA D-Duesseldorf GERMOS GmbH & Co. KG D-Remshalden | G | GEA D-Duesseldorf GERMOS GmbH & Co. KG D-Remshalden | H | Albert Handtmann Maschinenfabrik GmbH & Co. KG D-Biberach an der Riß Herpe GmbH D-Wagenfeld Industrie Ltda BR-Chapeco, SC Höcker GmbH D-Wilhelmsdorf Hoogwer AG CH-Fasel Hoja Maschinenbau- Metallbau GmbH D-Schwenenstadt holac Maschinenbau GmbH H96 D-Natthaim IFOOMA International Food Machines GmbH D-Sülz am Neckar Inject Star Pökelsmaschinen Ges.m.b.H. A-Hagenbrunn INOTEC GmbH D-Neudlingen | I | Glass GmbH & Co. KG D-Paderborn GMST Steflax & Co. OOD BG-Karlovo Grasselli S.p.A. I-Albinea (RE) Günther Edelstahltechnik Gest GmbH D-Dieburg Günther Maschinenbau GmbH D-Dieburg GW Steffens GmbH D-Remscheid | J | JEROS A/S DK-Ringe JUMO GmbH & Co. KG D-Fulda KARBEL SCHNELL GmbH & Co. KG D-Wienbach KERRES GmbH D-Buchang Kitzler Anlagen- und Maschinenbau EOOD BG-Kalvianovo Kitzinger Maschinenbau GmbH D-Friesenheim KMA Umwelttechnik GmbH B44 D-Kügelwener Josef Koch AG Technik für die Nahrungsmittelproduktion CH-Malters Paul Kolbe GmbH Foodtec D-Ehningen Korneta Oy FIN-Kauhajoki Korimat Metallwarenfabrik GmbH D-Haiger Maschinenfabrik LASKA Gesellschaft m.b.H. A-Traun Lumbeck & Wolter GmbH & Co. KG D-Walsperthal LUTZ GmbH & Co. KG D-Södingen Lyco Manufacturing, Inc. USA-Columbus | M | MADO GmbH C36, C44 D-Dornhan Maggit Gefärschneider GmbH D-Remscheid MANOXA Equipamentos Camicos S.L. E-Grandolas Maja-Maschinenfabrik Hermann Schill GmbH & Co. KG D-Kati Mandl BV NL-Bosmeer Marlen International Inc. USA-Riverside Maurer-Atmos Middleby GmbH D-Reichenau Mauring s.r.o. CZ-Valec MBS Industrie de Máquinas e Equipamentos Ltda. Medoc, S.A. E-Lognono Monozzi Luigi & C. S.p.A. I-Albinea (RE) MHS Schneidetechnik GmbH D-Abstatt MIDDLEBY Processing & Packaging Technology Brands USA-Chicago Minissa Washing Technologies E-Comella del Terri (Giropa) MINERVA OMEGA GROUP S.R.L. I-Bologna Modersmark Hoppe GmbH D-Oversch MORAVAL AB S-Mora MP EQUIPMENT, LLC E68 USA-Gainesville, GA MTJ Formtechnologie GmbH D-Rachelfeld | N | NESS-Smoke GmbH & Co. KG D-Bremshalden Nimo-KG AB S-Ägerid NOCK Maschinenbau GmbH D-Friesenheim Oltner Food Consulting GmbH D-Edewecht OMET FOODTECH SRL I-Poggibonni (SI) Plesmetal Tecnología Industrial, Ltd. BR-Olagam Poly-clip System GmbH & Co. KG D-Hattersheim a. M. PRIMMIGUE Europe s.a.r.l. F-Soucy Provonor Technologies Inc. NL-Badhoevedorp Pulpis, S.J. E-Sant Jaume de Llierca (Girona) PVS Systemtechnik GmbH D-Wissers/Luhe | R | TALLERES RAMON, S.L. (Barcelona) Resafak USA-Loji C. E. Reich GmbH D-Remshalden RECH Thermoprozessetechnik GmbH D-Schöningen Robert Reiser & Co. USA-Canton, MA REX Technologie GmbH & Co. KG A-Talguog RIZCO GmbH D-Schorndorf RIZCO S.p.A. I-Itzhas Rosar Construcciones Metalicas S.A. E-Cassa de la Selva Robla GmbH BR-Chapeco Josef Schwen GmbH D-Heilbronn Maschinenfabrik Seydelmann KG D-Stuttgart SJA Software Logistik Artand GmbH D-Daikenbrück Sorigo Anlagenbau GmbH A-Klagenfurt STERILFLOW S.A.S. F-Clichy STERITECH SA F-Savenna Stark & Hermann GmbH Maschinenfabrik D-Gütersloh | S | Schneider Maschinenbau GmbH & Co. KG D-Wierther (Wiest) Schriber Technologie GmbH & Co. KG D-Borgholzhausen Josef Schwen GmbH D-Heilbronn Maschinenfabrik Seydelmann KG D-Stuttgart SJA Software Logistik Artand GmbH D-Daikenbrück Sorigo Anlagenbau GmbH A-Klagenfurt STERILFLOW S.A.S. F-Clichy STERITECH SA F-Savenna Stark & Hermann GmbH Maschinenfabrik D-Gütersloh | T | Talabell S.A. TALSA E-Xirivella (Valencia) TECOMAS: TECNOLOGIA DE MÁQUINAS ESPECIALES LDA. BR-Oquirinos-SP Thielenmann Trading GmbH D-Schönen Thoma-Middleby Ltd. GB-Norwich TRAVAGLINI S.p.A. I-Ciniseallo Balsamo Usson Centro de Usinagem Industrial Ltda BR-Chapeco VAKONA GmbH D-Lünen I-Tribiano (MI) VEMAC I-Castellhuervo Rangone (MO) VEMAG ANLAGENBAU GmbH D-Wietzen (Jäger) VEMAG Maschinenbau GmbH D-Norden VERINOX Srl I-Hajvia Vattaro (TN) von den Steinen GmbH & Co. KG D-Remscheid VOS Schott GmbH D-Buzbach Weber Maschinenbau GmbH D-Breisbach Kutler- und Getriebebau Wetter GmbH D-Biedenlopf Winkelplatz GmbH D-Bell | Z | ZEGRA Elmashchin GmbH D-Ismnngagen |
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* Dieser vermietete Stand wurde nicht belegt.
This rented stand has not been occupied.

Nachtrag Supplement

9.1



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| A | AAZ FREZING a division of AAT GmbH Lüdenscheid | 681 | BORRIN SRL D-Bochum | 682 | ITT Bornemann GmbH D-Bochum | 683 | Boisemann Geräte und Anlagenbau GmbH & Co. D-Bochum | 684 | adtec GmbH D-Bochum | 685 | Advanced Cooling & Freezing Systems D-Bochum | 686 | Brügel Systems AG D-Bochum | 687 | AgriMaster Santini & C. S.r.l. Carnate (TN), (It) | 688 | Alcatia A/S DK-Vejle | 689 | Amarel GmbH & Co. KG D-Kreisnachheim | 690 | Ammerl Bebach D-Altmeppen | 691 | Amik D-Bochum | 692 | Microvess Applied Microvess Technology Inc. USA Cedar Rapids | 693 | Anamat Europe B.V. NL-Amsterdam | 694 | Andreas Applikations SL E-Llorenç del Vulk | 695 | Argalith Bodenwerk H. Ester GmbH D-Bad Essen | 696 | Autoreth Bels B.V. NL-Amsterdam | 697 | ASTOR Schneidwerkzeuge GmbH D-Buchholz | 698 | ATT Sp. z o.o. PL-Kraków | 699 | AZZAR AG CH-Basel | 700 | B-Hygiene BVBA B-Lokeren | 701 | BAERT - NORMANDE BAERT D-Bochum | 702 | BASF Coatings GmbH D-Bochum | 703 | Beck Gerate und Additive GmbH D-Schmalbach | 704 | Bernard Beck KG D-Bochum | 705 | Bismarck Bismarck D-Bochum | 706 | Bismarck Bismarck D-Bochum | 707 | Bismarck Bismarck D-Bochum | 708 | Bismarck Bismarck D-Bochum | 709 | Bismarck Bismarck D-Bochum | 710 | Bismarck Bismarck D-Bochum | 711 | Bismarck Bismarck D-Bochum | 712 | Bismarck Bismarck D-Bochum | 713 | Bismarck Bismarck D-Bochum | 714 | Bismarck Bismarck D-Bochum | 715 | Bismarck Bismarck D-Bochum | 716 | Bismarck Bismarck D-Bochum | 717 | Bismarck Bismarck D-Bochum | 718 | Bismarck Bismarck D-Bochum | 719 | Bismarck Bismarck D-Bochum | 720 | Bismarck Bismarck D-Bochum | 721 | Bismarck Bismarck D-Bochum | 722 | Bismarck Bismarck D-Bochum | 723 | Bismarck Bismarck D-Bochum | 724 | Bismarck Bismarck D-Bochum | 725 | Bismarck Bismarck D-Bochum | 726 | Bismarck Bismarck D-Bochum | 727 | Bismarck Bismarck D-Bochum | 728 | Bismarck Bismarck D-Bochum | 729 | Bismarck Bismarck D-Bochum | 730 | Bismarck Bismarck D-Bochum | 731 | Bismarck Bismarck D-Bochum | 732 | Bismarck Bismarck D-Bochum | 733 | Bismarck Bismarck D-Bochum | 734 | Bismarck Bismarck D-Bochum | 735 | Bismarck Bismarck D-Bochum | 736 | Bismarck Bismarck D-Bochum | 737 | Bismarck Bismarck D-Bochum | 738 | Bismarck Bismarck D-Bochum | 739 | Bismarck Bismarck D-Bochum | 740 | Bismarck Bismarck D-Bochum | 741 | Bismarck Bismarck D-Bochum | 742 | Bismarck Bismarck D-Bochum | 743 | Bismarck Bismarck D-Bochum | 744 | Bismarck Bismarck D-Bochum | 745 | Bismarck Bismarck D-Bochum | 746 | Bismarck Bismarck D-Bochum | 747 | Bismarck Bismarck D-Bochum | 748 | Bismarck Bismarck D-Bochum | 749 | Bismarck Bismarck D-Bochum | 750 | Bismarck Bismarck D-Bochum | 751 | Bismarck Bismarck D-Bochum | 752 | Bismarck Bismarck D-Bochum | 753 | Bismarck Bismarck D-Bochum | 754 | Bismarck Bismarck D-Bochum | 755 | Bismarck Bismarck D-Bochum | 756 | Bismarck Bismarck D-Bochum | 757 | Bismarck Bismarck D-Bochum | 758 | Bismarck Bismarck D-Bochum | 759 | Bismarck Bismarck D-Bochum | 760 | Bismarck Bismarck D-Bochum | 761 | Bismarck Bismarck D-Bochum | 762 | Bismarck Bismarck D-Bochum | 763 | Bismarck Bismarck D-Bochum | 764 | Bismarck Bismarck D-Bochum | 765 | Bismarck Bismarck D-Bochum | 766 | Bismarck Bismarck D-Bochum | 767 | Bismarck Bismarck D-Bochum | 768 | Bismarck Bismarck D-Bochum | 769 | Bismarck Bismarck D-Bochum | 770 | Bismarck Bismarck D-Bochum | 771 | Bismarck Bismarck D-Bochum | 772 | Bismarck Bismarck D-Bochum | 773 | Bismarck Bismarck D-Bochum | 774 | Bismarck Bismarck D-Bochum | 775 | Bismarck Bismarck D-Bochum | 776 | Bismarck Bismarck D-Bochum | 777 | Bismarck Bismarck D-Bochum | 778 | Bismarck Bismarck D-Bochum | 779 | Bismarck Bismarck D-Bochum | 780 | Bismarck Bismarck D-Bochum | 781 | Bismarck Bismarck D-Bochum | 782 | Bismarck Bismarck D-Bochum | 783 | Bismarck Bismarck D-Bochum | 784 | Bismarck Bismarck D-Bochum | 785 | Bismarck Bismarck D-Bochum | 786 | Bismarck Bismarck D-Bochum | 787 | Bismarck Bismarck D-Bochum | 788 | Bismarck Bismarck D-Bochum | 789 | Bismarck Bismarck D-Bochum | 790 | Bismarck Bismarck D-Bochum | 791 | Bismarck Bismarck D-Bochum | 792 | Bismarck Bismarck D-Bochum | 793 | Bismarck Bismarck D-Bochum | 794 | Bismarck Bismarck D-Bochum | 795 | Bismarck Bismarck D-Bochum | 796 | Bismarck Bismarck D-Bochum | 797 | Bismarck Bismarck D-Bochum | 798 | Bismarck Bismarck D-Bochum | 799 | Bismarck Bismarck D-Bochum | 800 | Bismarck Bismarck D-Bochum |
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Halle Hall 11.0

Standort Location

IFFA Jobbörse
Halle 11.0
Foyer Nord FOY01
Messe Frankfurt
Foodtechnology
Halle 11.0
Foyer Nord FOY03

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| <p>A ATM Machinery B.V. NL-Haasklobbergen A40</p> <p>B Gabr. Becker GmbH D-Wuppertal B22 Beta-Pak Otomatik Paketieme ve Ambalajlama Makineleri San. ve A.S. TR-Istanbul B19 BG-Pack s.r.l. I-Treviso (BG) D27 Bilwinco A/S DK-Skanderborg B18 BIS Vakuumtechnik GmbH D-Hennef (Siegl) B18 Helmut Boss Verpackungsmaschinen KG D-Bad Homburg B52 BS Verpackung, Gustav Müller & Co. KG D-Bad Homburg B71 Buhmann Systeme GmbH D-Wiesler im Allgau D-Osnabrück A31 Dr.-Ing. K. Busch GmbH D-Maulburg A37</p> <p>C Cabinplant A/S DK-Haarby C05 Carroz A/S DK-Aalborg D19 CA.VE.CO. SRL I-Palazzolo S/Oglio A10 CPS Case Packing Systems NL-Strangpoy CT Clottechnik Deutschland GmbH D-Meißen D28</p> | <p>CVP Systems, Inc. USA-Downers Grove B26</p> <p>D Dansensor A/S DK-Ringsted A71 Detectamet Detectable Products GB-Pocklington, York A54</p> <p>E Eilersen Electric Digital Systems A/S DK-Kokkedal D25 Eisele Pneumatics GmbH & Co. KG D-Waiblingen D63 ELS - European Labelling System GmbH & Co. KG D-Werther (Westf.) A57 Espera-Werke GmbH D-Duisburg B10</p> <p>F Gruppo Fabbri Vignola S.p.A. I-Vignola (MO) C45 Falkenstein Projektmanagement GmbH D-Aulendorf D53 Forpak USA-Burnsville USA-Burnsville D40 FRIMAD E-Lorca D28 Frontmatec A/S DK-Skive D28</p> <p>G Gas N2itrogen S.L. E-Serriena (Barcelona) C45 Giroflex SL E-Vitamaia D15</p> | <p>H Heder Schneid & Stanztechnik D-Rheinfelden Henkelman B.V. NL-'s-Hertogenbosch Havel Vacuum BV NL-Zaandam HHL Service GmbH D-Biebergemünd D25</p> <p>I Igis GmbH D-Köln B21 Ilapak Verpackungsmaschinen GmbH D-Haan International Clip srl I-Vermezzo (MI) C51 Interroll Fördertechnik GmbH D-Wermelskirchen C45 Intervac Vakuumtechnik GmbH D-Bissendorf A51 Ishida Europe Limited GB-Birmingham D53</p> <p>J Jaw Feng Machinery Co., Ltd. TW-Shui Shang Hsiang, Chia Yi County J'pack S.r.l. I-Val Brembilla - Loc. Brembilla D45</p> | <p>K KÖLLMORGEN Europe GmbH D-Ratingen D61 KOMET Maschinenfabrik GmbH D-Plochingen C19 Konatos Oy FIN-Kauhajoki D18 Kühne Anlagenbau GmbH D-Sankt Augustin C22</p> <p>L Maschinenfabrik Leonhardt GmbH D-Dreieich C37 LUBECA Verschleißmaschinen GmbH D-Braunschweig B21</p> <p>M MBP S.R.L. I-Castiglione delle Stiviere (MN) D62 McLaren Stainless Ltd. NZ-Hastings C30 Meßner GmbH & Co. KG D-Kallert B11 MESUTRONIC Gerätebau GmbH D-Kirchberg i. Wald MFI GmbH D-Berningen Minipack-Torro Spa I-Dalmine (Bergamo) Modas Systems NZ Ltd NZ-Auckland MULTIPOND Wipac Technik GmbH D-Waldkraiburg D75</p> | <p>N Northpack Sp. z o.o. PL-Malkowo D21</p> <p>O OCS Checkweighers GmbH D-Kaiserslautern D11 Ornelon Leybold Vacuum GmbH D-Köln C71 Orved S.p.A. con Socio Unico Osnova, S.L. E-Besalu D81</p> <p>P Packaging Progressions, Inc. USA-Collegeville PFM S.p.A. I-Torrelvignola (VI) B19 Packaging Machinery I-Torrelvignola (VI) PFM Verpackungsmaschinen GmbH D-Hollenstedt Promark Vac Co., Ltd. TW-Chia-Yi Shien Pulstar Industry S.r.l. I-Splambero (Modena) D60 Pulsotronic Anlagentechnik GmbH D-Niederdorf B30 D30</p> <p>R RECORD SPA I-Garbagate M.ro (LC) C28 Reepack S.r.l. Soc. Unip. I-Serrate (BG) Repack BV NL-Emmen B40</p> | <p>Rialpack Industries, SL E-Manresa B37</p> <p>S SCANDIVAC thermofomers factory LV-Marupe B51 Schur Star Systems GmbH D-Friedberg C41 SEALPAC GmbH D-Oldenburg (Oeb) D81 Siegens Technik B.V. NL-'s-Hertogenbosch A70</p> <p>T SOehne Industrial Solutions GmbH D-Backnang A17 Supervac Maschinenbau GmbH A-Wien B19 TECNOSISTEM Snc di Veschetti W & C. I-Coccolingo (BS) B19 Tecnovac SRL I-Grassano (BG) C25 TOLOMATIC Inc. USA-Hemel A19</p> <p>U Ulma Packaging S Coop E-Gulpuzkoa A68 ULMA Safe Handling Equipment S. Coop. E-Onati D22</p> <p>V VAMA Maschinenbau GmbH D-Wildpoldsried B37</p> | <p>A80 VARIOVAC PS SystemPack GmbH D-Zarrentin am Schaalsee C81 VC999 Verpackungssysteme GmbH D-Engen B71 VELEC Systems F-Toufflers D51 VERIPACK Packaging Division of F.M.C. Spa I-Cisliago (Varese) A25 W Hermann Waldner GmbH & Co. KG D-Wangen im Allgau A81 Fabbrri Walstar GmbH D-Köln C45 Wipotec Wiege- und Positioniersysteme GmbH D-Kaiserslautern B51 WITT Gasetechnik GmbH & Co. KG D-Witten A14 WITTENSTEIN AG D-Igersheim A18 WITTENSTEIN alpha GmbH D-Igersheim A18 WITTENSTEIN cyber motor GmbH D-Igersheim A18 WITTENSTEIN motion control GmbH D-Igersheim A18</p> |
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* Dieser vermietete Stand wurde nicht belegt.
This rented stand has not been occupied.

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| <p>A</p> <p>agmadata GmbH D-Garrel A30</p> <p>Astech Food Machinery S.L.L. E-Ravos del Terri A25</p> <p>Avusso GmbH D-Hersbruck D31</p> <p>Avure Technologies Inc. USA-Erlanger, KY C70</p> <p>B</p> <p>Bandall International NL-Woerden A80</p> <p>BESSERVACUUM I-Dignano (UD) C73</p> <p>Biancalci, Soc. Coop. I-Campogalliano MQ D77</p> <p>Bizetba A10, A11, A20</p> <p>BLU PACK D-Balingen D81</p> <p>DI MAURO SCOLARO I-Vignate D81</p> <p>C</p> <p>Carne Technologies NZ-Cambridge A41</p> <p>Chirino S.p.A. I-Biella A35</p> <p>Coligroup S.p.A. (COLIMATIC) I-Chiari (BS) B35</p> <p>CSB- Automation AG CH-Kestenholz B81, D70</p> <p>CSB- System AG B81, D70, D80</p> <p>D-Gellenkirchen D80</p> | <p>D</p> <p>de Man Automation + Service GmbH & Co. KG D-Borgholzhausen A76</p> <p>div Mediergruppe D-Frankfurt am Main D31</p> <p>DIGI Deutschland GmbH D-Hennef (Sieg) C70</p> <p>D.V.F. Vacuum Technology S.p.A. I-San Pietro in Casale (BO) D17</p> <p>F</p> <p>Famuc Deutschland GmbH D-Neuhausen auf den Fildern D80</p> <p>FoodCap Limited NZ-Auckland A41</p> <p>Foodware-Factory GmbH D-Kleinriederfeld D61</p> <p>Forsis GmbH D-Ravensburg A66</p> <p>FUJI PACKAGING GmbH D-Hamburg A70</p> <p>G</p> <p>GPS Reischer GmbH & Co. KG D-Bad Gronenbach A65</p> <p>Gehr. Graef GmbH & Co. KG D-Arnberg C71</p> <p>H</p> <p>HAJEK Maschinenbau GmbH A-Hard A65</p> | <p>I</p> <p>isotek GmbH D-Eschach D80</p> <p>IIS UG D-Meinerzhagen A76</p> <p>ILPRA Spa I-Vigevano (PV) B61</p> <p>ITALIANPACK S.R.L. I-Como D17</p> <p>K</p> <p>Kortlever (Technisch Buro Kortlever B.V.) NL-Meerkerk D73</p> <p>L</p> <p>Leich und Mehl GmbH D-Kernen im Remstal D31</p> <p>Linde AG Linde Gases Division D-Pullach D80</p> <p>LM Realisations SAS F-Saint-Symphorien d'Ozon D71</p> <p>LMD GmbH & Co. KG aA D-Lennestadt D80</p> <p>M</p> <p>Matrix Product Development, Inc. USA-Sun Prairie C77</p> <p>MAXAARTS B.V. NL-Enschede A80</p> <p>METTLER TOLEDO Produktinspektion D-Giesen D90</p> <p>G. Mondini S.p.A. I-Cologno-Brescia B60</p> | <p>MULTIVAC B11, C11</p> <p>Sepp Hagenmüller SE & Co. KG D-Wolferschwenden D39</p> <p>N</p> <p>Neumeyer AG CH-Lengnau C51</p> <p>O</p> <p>Omni Europe B.V. NL-Oudenzaal D21</p> <p>P</p> <p>PFM Verpackungsmaschinen GmbH D-Hollenstedt D80</p> <p>Precision Plus Vacuum Parts D-Kirchheim b. München A54</p> <p>Promarkvac Corporation USA-Ontario, CA D19</p> <p>R</p> <p>Reepak S.r.l. Soc. Unip. I-Seniate (BG) C40</p> <p>Robotik-Pack-Line D-Hannover D90</p> <p>S</p> <p>Dipl.-Ing. Schindler & Wagner GmbH & Co. KG D-Plüderhausen A31</p> <p>SES-Sträßburg-Etikettier-Service GmbH D-Buchholz D80</p> <p>Sirman Spa I-Pieve di Curtarolo (Padova) C85</p> | <p>Slayer Blades S.R.L. I-Digione Con Santo Stefano (VA) A34</p> <p>SMC Pneumatik GmbH D-Egelsbach D80</p> <p>SPG Packaging Systems GmbH D-Hilden A80</p> <p>T</p> <p>TAVIL - INDEBE, S.A.U. E-Sant Joan de les Fonts (Girona) D60</p> <p>toi - Gesellschaft für technische Informatik mbH D-Heuchelheim D80</p> <p>Textor Maschinenbau GmbH D-Wolferschwenden D80</p> <p>TIPPER TIE TECHNPACK GmbH D-Glinde b. Hamburg C31, C41</p> <p>TREIF Maschinenbau GmbH D-Oberföhr D80</p> <p>Hans Turck GmbH & Co. KG D-Mülheim an der Ruhr D80</p> <p>TVI Entwicklung & Produktion GmbH D-Irschenberg B65</p> <p>V</p> <p>VDMA Nahrungsmittelmaschinen u. Verpackungsmaschinen D-Frankfurt am Main B41</p> <p>Frans Vermeë GmbH D-Remagen C70</p> | <p>W</p> <p>Wächter Packautomatik GmbH & Co. KG D-Bad Wünnenberg-Haaren D80</p> <p>Watanabe A80</p> <p>Foodmach Co., Ltd. I-Nagoya-shi, Aichi-ken A80</p> <p>WEBOMATIC Maschinenfabrik GmbH D-Bochum B40</p> <p>WEIG Packaging GmbH & Co. KG D-Mayen D80</p> <p>Winweb Informationstechnologie GmbH D-Aldenhoven C30</p> <p>WTI International GmbH D-Hofheim B65</p> <p>Y</p> <p>Youngsun Pack Germany GmbH D-Krefeld C75</p> |
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Mon 9th May – 7am-1pm Edeka tour with CSB ‘SmartFactory tour’, return to IFFA exhibition
CSB - System

EDEKA Südwest Fleisch GmbH has approved registration of group for the visit in
Kalsruhe-Rheinstetten on 9th of May 2016.

Please be on time, because we have a tight schedule and cannot wait for delayed participants.

EDEKA Südwest Fleisch (D) - www.suedwestfleisch.de

Rheinstetten near Karlsruhe, in the heart of southwest Germany, is the home to EDEKA Südwest Fleisch GmbH

- Attendees:
 1. Andrew Triance / Wingham Beef NH-Foods Ltd / innovation manager
 2. Greg Williams /Northern Cooperative Meat Company / group engineering manager
 3. Justin Gathercole / Gathercole Lamb Tatura / plant manager
 4. Murray Miller / Australian Lamb Company Colac / Innovation manager
 5. Tony Kairouz / Cedar Meats Ltd/ plant manager
 6. Chris Ruberg / Meat & Livestock Australia / Innovation manager
 7. Darryl Heidke / Meat & Livestock Australia / Innovation manager
 8. Michael Overbye / Teys Australia / General Manager Operations Cooked Business
 9. Geoff Davis / Northern Cooperative Meat Company / Innovation manager
 10. Pat Gleeson / Oakey Beef NH-Foods Ltd / plant manager
 11. Paul Oosthuizen / VV Walsh / plant engineer
 12. Peter Cody / VV Walsh Ltd / Plant manager
 13. John Hart / JD Warwick Ltd / Group engineer
 14. John McGuren / AMPC / innovation manager
 15. Rick Vella / Bindaree Beef / general manager retail innovation
 16. Sage Murray / Teys Australia Beef / customer support manager

Note: evening with Multivac IFFA.

Tue 10th May - IFFA exhibition

Eagle/Mettler-Toledo x-ray inspection

Date/Time: 10 May 2016, 7:00PM

Attendees:

1. Andrew Triance / Wingham Beef NH-Foods Ltd / innovation manager
2. Greg Williams /Northern Cooperative Meat Company / group engineering manager
3. Justin Gathercole / Gathercole Lamb Tatura / plant manager
4. Murray Miller / Australian Lamb Company Colac / Innovation manager
5. Tony Kairouz / Cedar Meats Ltd/ plant manager
6. Chris Ruberg / Meat & Livestock Australia / Innovation manager
7. Darryl Heidke / Meat & Livestock Australia / Innovation manager
8. Michael Overbye / Teys Australia / General Manager Operations Cooked Business
9. Geoff Davis / Northern Cooperative Meat Company / Innovation manager
10. Pat Gleeson / Oakey Beef NH-Foods Ltd / plant manager
11. Paul Oosthuizen / VV Walsh / plant engineer
12. Peter Cody / VV Walsh Ltd / Plant manager
13. John Hart / JD Warwick Ltd / Group engineer
14. John McGuren / AMPC / innovation manager
15. Rick Vella / Bindaree Beef / general manager retail innovation
16. Sage Murray / Teys Australia Beef / customer support manager

Wed 11th May - IFFA exhibition

Evening networking event with Austrade. Please advise if you have any clients you would like to invite.

Dr Michael Henderson | Investment Research Manager, Western Europe

Australian Trade Commission (Austrade)

King & Wood Mallesons are a multinational law firm with a strong interest in agribusiness.

New 3rd partner to support event - **Food-Processing Initiative** (www.foodprocessing.de – the page is in German but scroll to the bottom and you'll find the “English” button). The Food Processing Initiative is an association with 120 members from across the German agribusiness sector, and a number of these members will also be attending IFFA. The mission of the Initiative is to facilitate innovation through branding and cooperation in the whole food value chain, with an aim to make companies stronger and more competitive and boosting cooperation. Once we informed them of your incoming delegation, they wanted to be a part of the event.



Agenda:

6-6:30pm – registration and welcome drinks

6:30 - Welcome speech (Austrade-KWM)

6:35 – Presentation by KWM

6:50 - Presentation by MLA (Josh or Christian)

7:00 - potential case study

7:10 – delegates introduce themselves

7:25 - end of presentation – networking

8:30-9:00 end of event

Thu 12th May – 6am – 10pm Site visits with CSB “SmartFactory” Tour to Van Rooi Meats (Helmond NL: 12k pigs/day) and Promessa (Deventer NL: boning & distribution), return to Frankfurt

Please be on time, because we have a tight schedule and cannot wait for delayed participants.
During the event you can reach Catrin

[Van Rooi Meat \(NL\) - www.vanrooimeat.nl](http://www.vanrooimeat.nl)

Since its foundation in December 1984, Van Rooi Meat has been characterized by its no-nonsense mentality and hands-on approach. The enterprise speaks the language of the farmers and of the customers, seizes the signals of the market and realizes them in its products and production processes

[ProMessa \(NL\) - www.pro-messa.nl](http://www.pro-messa.nl)

ProMessa BV, part of Coop Productiebedrijven BV, is the central butchery of several supermarket chains. With more than 30 years' experience and nearly 150 employees, the enterprise produces a full range of meat products. The recipe for success is the combination of a traditional butchery with skilled and experienced staff, and a highly automated logistics system. This ensures daily fresh deliveries of a wide or even customer-specific product range using the maximum logistical capacities.

Returning to Hotel Steigenberger Bad Homburg at around 10:00pm.

Attendees:

1. Andrew Triance / Wingham Beef NH-Foods Ltd / innovation manager
2. Greg Williams /Northern Cooperative Meat Company / group engineering manager
3. Justin Gathercole / Gathercole Lamb Tatura / plant manager
4. Murray Miller / Australian Lamb Company Colac / Innovation manager
5. Tony Kairouz / Cedar Meats Ltd/ plant manager
6. Chris Ruberg / Meat & Livestock Australia / Innovation manager
7. Darryl Heidke / Meat & Livestock Australia / Innovation manager
8. Geoff Davis / Northern Cooperative Meat Company / Innovation manager
9. Rick Vella / Bindaree Beef / general manager retail innovation
10. John Hart / JD Warwick Ltd / Group engineer
11. John McGuren / AMPC / innovation manager
12. Sage Murray / Teys Australia Beef / customer support manager

Fri 13th May - ABB Robot Application Centre, Regional Application Centre for Collaborative Robots Friedberg (30kms north of Frankfurt), taxis from Bad Homburg hotel (20 mins)

ABB Automation GmbH
Unternehmensbereich Robotics

Start at 9:00 am and finish around 1:00 pm.

Following the draft of the agenda as you already could see in the email from Alan:

| | | |
|---------------|---|------------|
| 09:00 – 09:15 | Welcome in Friedberg | Ralf, Alan |
| 09:15 – 09:45 | ABB, ABB Robotics, activities in Meat industry (global) | Alan |
| 09:45 – 10:15 | ABB Robotics Germany, activities in meat industry Germany | Ralf |
| 10:15 – 10:45 | Regional Application Center Collaborative Robotics | Thomas |

10:45 – 11:00 *coffee break*
11:00 – 12:00 *location tour, Lead Through YuMi* *Thomas*
12:00 – 12:45 *lunch break*
12:45 – 13:30 *ABB product development for Food & Beverage* *Roy*
(hygienic design robots and food grade lubricants)
13:30 – 13:45 *summary & end* *Ralf, Alan*

Hosted by:

| | |
|---|---|
| Alan Spreckley Global Industry Segment Manager (Food & Beverage) - Robotics ABB Limited | Marc Himmelmann Local Business Line Manager Packaging & Logistics ABB Automation GmbH Unternehmensbereich Robotics |
|---|---|

Attendees:

1. Andrew Triance / Wingham Beef NH-Foods Ltd / innovation manager
2. Greg Williams /Northern Cooperative Meat Company / group engineering manager
3. Justin Gathercole / Gathercole Lamb Tatura / plant manager
4. Murray Miller / Australian Lamb Company Colac / Innovation manager
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8. Geoff Davis / Northern Cooperative Meat Company / Innovation manager
9. Rick Vella / Bindaree Beef / general manager retail innovation
10. John Hart / JD Warwick Ltd / Group engineer
11. Stuart Shaw / Scott Automation / red meat business manager
12. Michael Overbye / Teys Australia / General Manager Operations Cooked Business
13. Sage Murray / Teys Australia Beef / customer support manager

Meet YuMI:

<http://new.abb.com/products/robotics/yumi>



Guardless robotics.

Fri 13th afternoon, train Friedberg to Frankfurt airport (40 mins), air transfer to Copenhagen –

1. Andrew Triance / Wingham Beef NH-Foods Ltd / innovation manager
2. Greg Williams /Northern Cooperative Meat Company / group engineering manager
3. Justin Gathercole / Gathercole Lamb Tatura / plant manager
4. Murray Miller / Australian Lamb Company Colac / Innovation manager
5. Tony Kairouz / Cedar Meats Ltd/ plant manager
6. Chris Ruberg / Meat & Livestock Australia / Innovation manager
7. Darryl Heidke / Meat & Livestock Australia / Innovation manager
8. Michael Overbye / Teys Australia / General Manager Operations Cooked Business
9. Geoff Davis / Northern Cooperative Meat Company / Innovation manager
10. Stuart Shaw / Scott Robotics Automation / Business development manager

Sat 14th - Sun 15th May - report writing

Mon 16th May - national public holiday - report writing

Tuesday 17th of May 2016

8:00am – 9:00am Intro and showcase of Attec equipment

9:00 – 10:30am transfer Sonderburg to Holsted

10:30 - 12:00pm Guided tour of Holsted beef plant

Danish Crown plant in Holsted, Energivej 5

12:00 – 13:00pm transfer Holsted to Horsens

13:00 – 15:00pm Guided tour of Horsens pork plant

Danish Crown plant in Horsens, Østbirkvej 2

15:00 – 15:30 transfer to Horsens Biogas

15:30 – 17:00pm Guided tour of Horsens Biogas and Daka Refoods plants

Horsens Biogas Plant is welcoming the delegation right after you leave Danish Crown Horsens. It should take 10 minutes to drive there.

Horsens BioEnergi
Ålkærgårdvej 13, 8700 Horsens
<http://horsensbioenergi.dk>

Here you will also see Daka Refoods brand new processing plant for food waste that is located on the biogas plant. Contact person Birger

Participant List:

1. Andrew Triance / Wingham Beef NH-Foods Ltd / innovation manager
2. Greg Williams /Northern Cooperative Meat Company / group engineering manager
3. Justin Gathercole / Gathercole Lamb Tatura / plant manager
4. Murray Miller / Australian Lamb Company Colac / Innovation manager
5. Paul Wightman / JBS Australia / Brooklyn innovation & projects manager
6. Tony Kairouz / Cedar Meats Ltd/ plant manager
7. Chris Ruberg / Meat & Livestock Australia / Innovation manager
8. Darryl Heidke / Meat & Livestock Australia / Innovation manager
9. Michael Overbye / Teys Australia / General Manager Operations Cooked Business
10. Geoff Davis / Northern Cooperative Meat Company / Innovation manager
11. Stuart Shaw / Scott Automation & Robotics / Red Meat Business Manager
12. Arthur Seiler / Wiley / Project engineer
13. Beau Taylor /Wiley / Project engineer

Bio-gas site visit hosted by:

Bruno Sander Nielsen
Sekretariatsleder / Head of Secretariat
Brancheforeningen for Biogas / Danish Biogas Association

Wednesday 18th of May 2016

9:00 – 10:00am transfer Ribe to Holsted

10:00 – 11:30am Guided tour of Holsted Biogas plant

Holsted Biogas plant less than 3 minutes drive from the Danish Crown Holsted processing plant.

At the biogas plant in Holsted your contact person will be:

Business developer Morten Gyllenborg from Nature Energy – the third largest natural gas company in Denmark and now owner of four of the biggest Danish Biogas Plants – three of them have started up within the last 18 months

He will be accompanied by a representative of the turn key supplier and part owner of the plant Xergi Mr. Michael Kjølner Hansen

The address of the plant is:
NGF Nature Energy Holsted
Grindstedvej 4
6670 Holsted

Participant List:

1. Andrew Triance / Wingham Beef NH-Foods Ltd / innovation manager
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11. Arthur Seiler / Wiley / Project engineer
12. Beau Taylor /Wiley / Project engineer

11:30 – 12:15pm transfer from Holsted to Hedensted

12:15 – 13:45pm Guided tour of Daka Ecomotion biodiesel plant

Hedensted to see the biodiesel plant using animal bi-products

Daka Ecomotion
Dakavej 6 | DK-8723 Løsning
Plant Manager
ecoMotion Denmark A/S

efm@daka.dk

<http://www.dakaecomotion.dk/dk/dkbd/sonderseiten/hjem/>

13:45 – 16:00pm transfer from Hedensted to Copenhagen.

Returning to Copenhagen by bus after midday (app. 2.5 hours)

Dinner with **(or Thursday night TBC)**

Damien Miller

Australian Ambassador to Denmark, Norway and Iceland



Thu 19th May – Visit to Danish Meat Research Institute,

08:30 – 09:00hrs transfer to Teknologisk Institut, Gregersensvej 9, 2630 Taastrup

Agenda:

- Objective carcase measurement
- Progress on on-line CT
- Robotics co-worker robots - automation
- Packaging and quality - shelf-life
- Hygiene
- New measuring technologies for quality and foreign objects
- High speed innovation with Niels-Henrik Grothe

Danish Agricultural & Food Council and the Danish Biogas Association TBC

Hosted by:

| | |
|---|--|
| Niels Toftelund Madsen Sektionsleder Målesystemer DMRI | Bruno Sander Nielsen Sekretariatsleder / Head of Secretariat Brancheforeningen for Biogas / Danish Biogas Association |
|---|--|

| | | |
|---------------|--|---------------------------|
| 08:00 – 09:00 | Environment | Bruno Sander Nielsen |
| 09:00 – 09:15 | Welcome to DMRI | Lars Hinrichsen, Director |
| 09:15 – 09:30 | Objective carcass measurement | Niels T. Madsen |
| 09:30 – 10:00 | Quality and foreign object measurement | Lars Bager Christensen |
| 10:00 – 10:30 | High speed innovation | Henrik Grothe |
| 10:30 – 11:00 | Automation – robotics and co-worker rob | Henrik Grothe |
| 11:00 – 11:30 | Tour around DMRI including CT facilities | Niels T. Madsen |

| | | |
|---------------|------------------------|-------------------|
| 11:30 – 12:00 | Lunch | |
| 12:00 – 12:30 | Packaging and quality | Mari Ann Tørngren |
| 12:30 – 13:00 | Hygiene and shelf life | Hardy Christensen |
| 13:00 – 15:00 | DMRI as a case study | Benny Sandersen |

Implications of DMRI presentations to Australia

Areas of future collaboration

Participant List:

1. Andrew Triance / Wingham Beef NH-Foods Ltd / innovation manager
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10. Stuart Shaw / Scott Automation & Robotics / Red Meat Business Manager

Fri 20th May morning - tour ends in Copenhagen
