



final report

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Prepared by: Stuart Shaw

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MLA / DMRI EU plant tour July 2008

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Executive summary

The tour included a total of 13 site visits and/or meetings arranged and organised by DMRI, Each site visit focussed on the following:

- automation systems used in EU plants particularly seeking Pork automated systems where technology maybe transferred to Beef
- obtain knowledge, and understanding of different and common operational practices used in Australia and the EU to assist with this feasibility study to improve efficiency in beef deboning

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1 Visit/Meet No. 1**Location:** DMRI – Roskilde (near Copenhagen, development office)**Date:** 7th July 2008**Time:** 9am 12pm**Attend:** S Shaw, D Doral, J Hughes**Host:** Niels T Madsen, Ove Vasvari, Claus S Jensen**Subject:** Introduction and review of study so far**Notes:**

- Explanation given to attendance of S Shaw with reference to current MLA and MAR collaboration.
- David Doral explained that Scott Automation will be the preferred automation supplier for any development projects that are a direct outcome from this project.
- DMRI engineers do not spend much time here, use of other training and development centre used, location near by Roskilde or on site
- Discussed initial draft feasibility study in detail “P.PSH.0358”
- Outcome of today’s discussions highlighted that the main focus over the next weeks visits would be to establish what development projects have the higher values
- The current Tentative conclusion as discussed and as shown in the report before any plant visits conducted:

Technology	#	Labour		Yield	Y I
Tenderloin	1	2		+	Yes
Middle processing – machine	2	2		+	No
Scribing / Brisket cut	3	1		~	No
Banjo Remove	4	2	~	Yes	Evt. semiautomatic
Banjo processing – machine	5	2		=	No
Middle separation – robot	6	1		=	Yes
Hindquarter processing – robot or machine	7	(1)		=	No

2 Visit/Meet No. 2

Location: Danish Crown – Ringsted (20min from Copenhagen)

Date: 7th July 2008

Time: 1pm 4pm

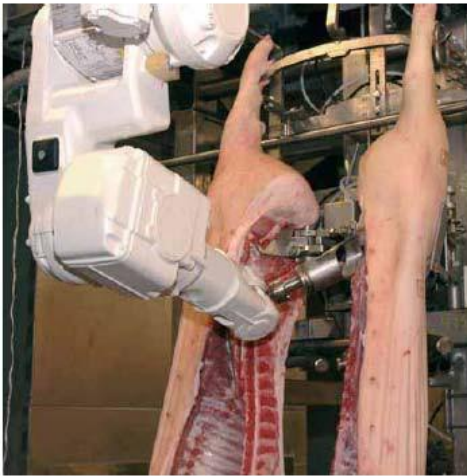
Attend: S Shaw, D Doral, J Hughes

Host: Niels T Madsen, Ove Vasvari, Claus S Jensen

Subject: View plant and technology installed

Notes:

- 4 lines 360 400/hr each
- Leg De boning machine
 - First prototype machine
 - 2 wks from start of production tests
 - Manufacture in Holland by Townsend
 - Pneumatic Control with pressure sensors and pressure controls
 - Mechanical alignment via pressure detection and LVDT
 - PLC Control
 - DMRI develop, Townsend build to Process specification.
 - Design specification by Townsend
- Middle Machine
 - Similar to of system seen to date
- KJ buffering system and conveyors as seen at IFFA
- DMRI XMAS tree hanging system/machine, conveyor presents product (Legs, Middles) for operator to then easily hook cut. developed for OH&S reasons and increased speed by DMRI.
- Tenderloin removal robot
 - Initial prototype development
 - 2400ABB Robot, huge base for overhanging inverted mount.
 - Fore Leg and Rear handling system for 2 sides of carcass.
 - Removes tenderloin from each side
 - Position robot/tool at top of tenderloin fixed location based on stabilisation and clamping locations. (works)
- Carcass handing suspected to be engineered to create positioning of carcass as accurately as possible as the system locates the start of cut purely as a mechanical position (no carcass scanning and sensing is used)
 - Cup in downward action push and oscillate before push down, smooth and very quick, actually works better when quick operation done. (slow speed was also demonstrated and this tears the tenderloin out more



- Splitting machine, mechanical, split to neck. (old design)



- Feather Boning
 - Pre split operation
 - dual cut down back one circular knife
 - 2 blades to follow
 - Note that middle machine preparation is not a reason for this system
 - actually the operation appears to be defunct as the new Middle Machines do this operation better.



- Rear split, belly open, throat cut open



- Manual Evisceration Process.
- Pluck removal semi automated manual control device (DMRI based Evisceration MC on this)



- Old probe and grading machine (huge complex up to 9 probes, used to be 20)

3 Visit/Meet No. 3 Location:

Danish Crown – Fårevang **Date:**

8th July 2008

Time: 9am – 1pm

Attend: S Shaw, D Doral, J Hughes, A Arnold, Niels T Madsen, Ove Vasvari, Claus S Jensen

Host: Jørn Madsen, Plant Manager, Torban Prod Manager

Subject: View Small Beef Boning Plant

Notes:

- 5,000/ Beef qtr per week
- 90% local production (Small eg tenderloin export to Spain, Italia, etc)
- Bone Only, Various quality



- Except for main primals and tenderloins, All meat is boned for mince product



- 1995 Beef plant change from old Pork facility
- Boners paid / carcass
- Pistola (longs)
- Boners do complete process
- Simple conveyor loading of positioned mince into form packs using conveyors
- 13 tonne minced meat/day

- Small operation not high quality though fairly efficient based upon product, market and plant layout

4 Visit/Meet No. 4 Location:

Danish Crown – Horsens **Date:**

8th July 2008

Time: 2pm – 5pm

Attend: S Shaw, D Doral, J Hughes, A

Arnold Niels T Madsen, Ove Vasvari,

Claus S Jensen **Host:** Joern Kjoer DC

Subject: Largest and Most advanced Automated Pork Plant

Notes:

- 3 Slaughter Line, to 2 line for trimming
- Biggest DC Plant 75K/wk, cap 90K, 5 day/wk approx 15K/day on the 3 lines,
- 250 300million Euro estimated cost for plant
- 4 Million/year
- 1 every 4 seconds
- Plant is 3 yrs old
- 250 300 jobs have been automated/robotised
- Public tours available at small cost
- Initial tour of factory via viewing windows, This is like a museum style toured walk
- Plant tour on the floor with guide.
- •No photos where allowed throughout plant



- KILL FLOOR – SLAUGHTER

- Pig Pens and stunning, all pigs in groups of 9 15, shuffled and automated into CO₂ chambers, very quiet with no squealing etc. (system DMRI developed, now used widely in industry)
- Sticking and blood collection completed through a semi automated vac and blood collection system attached to the sticking tool
- Ultrasound grading system after sticking, has 16 probes on a curved SS conveyor bed. DMRI now have a new system still ultra sound that will be installed later this year. More accuracy and better probes. Ultra sound is picking density for Fat content counts,
- Automated Head Cut, uses laser to detect ear positions for head cut operation.
Similar to SFK systems for splitting etc made by NAWVI (Dutch company ?).
- Feather Bone Separation prior to splitting, 2 off blades for performing the feather bone split follow a circular knife that creates the opening cut tail bone to spine (note relation ship to middle machine, however new developments of the middle machine does not or no longer requires this
- feather bone split
- There is mixed feelings other the requirements for the Feather Bone within the local Pig industry
- Tail cut off saw in chiller area, works like a sock ring cutter using a circular blade that mechanical position on back/rump to slice off tail as they pass on Auto chiller rails.
- All rails and chillers are automated for carcass handling,
- No Auto hock cutting (fore leg) fitted online. This is done standard, manual operation. A system will be installed by DMRI this year to do this work.
- SFK Automated Brisket cut and belly open is done via a Shear like tool which enters the carcass through throat opening and then upward slices through brisket and belly via sharp C cut knife at base of brisket insertion tool.
- SFK Automated Evisceration, work with two oscillating knives that follow up inside the brisket on both sided to then separate and drop into trays below.
- SFK Auto splitter, works from inside of carcass.
- SFK make a Vac San system developed by DMRI that is higher temp, maintains temp and is lighter than equivalent USA models.
- DMRI do a pluck separation automated, Pluck from hanging conveyor, Heart, lungs, Liver etc. Not installed here but will be later this year.

- BONING

- 200 standard cuts in the boning operation
- Hanging Xmas tress used for stacking shoulders and middles, use of semiautomated loading system that position hooks for operator to

drop product onto hooks from extending conveyors that present product

- 4 boning lines, manual operations typical layouts, table boning, adjustable mesh floors.
- 6 Townsend Shoulder machines

- Leg/Shoulder de bone system not as developed as system seen previously 2 days at DC plant near Copenhagen.
 - System is used more to prepare the shoulder for deboning by hand and does not actually separate leg bones and joints.
 - (robot knife, Circular Blades, Chain Conveyor to hold and position shoulder. Townsend Build
- 2 KJ circular Blade splitting systems include
 - Dual for 3 way Cut
 - E+V vision systems
 - De hook / de gambrel systems used to lay carcasses on conveyors and position for cutting.
 - As they de gambrel hocks are cut.
- 2 large KJ Buffer systems after 3 way cut systems, includes the conveyor flipping system and SS pole style rotators on infeed conveyors.
- 6 Attec Middle machines, (note that the feather bone cut done prior to splitting does help position the middle in machine (OLD DESIGN))
- OTHER
 - - 20°C blast chilling for 20mins
 - Trim pack off area is not automated to any great degree, many tote conveyors and tote handling but labour intensive and OH&S unfriendly packing and repacking of totes
 - KJ Sortation system, at least 4 crane systems
 - All KJ bone and pack conveyor systema, huge quantity of conveyors throughout plant
 - MCC's are all in production room eg boning room on a raised floor but still within the room. Similar build style to MAR however all Panels are Stainless Steel and at huge cost. Roof did appear to be accessible however not used.
 - Many SCADA screens located throughout plant (view and control of production lines etc)

5 Visit/Meet No. 5

Location: SKARE - Vejen

Date: 9th July 2008

Time: 8am - 12pm

Attend: S Shaw, D Doral, J Hughes, A Arnold, Ove Vasvari, Claus S Jensen

Host: Birger Rittmeyer Prj Manager, Gregers Boeberg Hansen Production Manager

Subject: Beef DeBoning Plant

Notes:

- Boning only no slaughter
- 1400 Pistolas / day
- Quality, Consistency Focus on Niche Markets, Restaurants etc.
- Very unique, Cleanest and best quality plant, Plants, waterfalls, expenses lights etc..

Pleasant surroundings.

- Pre Break, Boning and Slicing through to portioning are all separate areas of the room(s)
- 4 plants 1 = Bone Only, 1 = further processing and 2 Slaughter
- Further processing is target and promoting the SKARE brand
- Bulk product eg (Brazil will not work for SKARE, quality is required.
- Carcass either from 2 SKARE kill floors or selected local and German, Dutch slaughter plants
- See pics.



- PH reading on inspection station, If PH fail, meat is still used however processed different for mince etc.
- Cameras used at inspection, If operator who defined value of meat and processing requirements based on current market quota.

- If fault or bad quality a photo will be taken as evidence and reference to give back o supplier of carcass.

- Pre-Break of Pistolas is done very manually at high quality with skilled butchers using eg hatchet knives to separate rather than bandsaws. These chop knives produce better cut with no sawdust.



- All meat looks good quality good marbling and white fat.
- Use of Xmas tree hook hangers from rails to store and transfer pre broken pieces to boners.
- All boned and cut meat is transferred using plastic totes
- Boners get approx 25 EURO/hr
- Boners do same job every day. “best quality and speed”
- Cappacio raw meat slices is taken from the topside cut.
- Glass walls and skylights through factory to produce good light and atmosphere.
- Owner has office with windows in middle of plant between load in chillers and boning room. He sees most of production.
- Every tote is bar coded and quality check for traceability
- Casino Italian knife sharpening system used
- Cryovac, Multi Vac, Preformed, Modified atmosphere and a few other packaging types used for presentation and shelf life of product.
- Bag to carton packing station is a standard setup
- Skinners are used to remove fat and create lean meats on topsides etc for specific markets
- Further processing includes, mince, hamburger, marinated rumps and other portions • Large number of KJ conveyors
- Multivacs, and Cryovac’s used

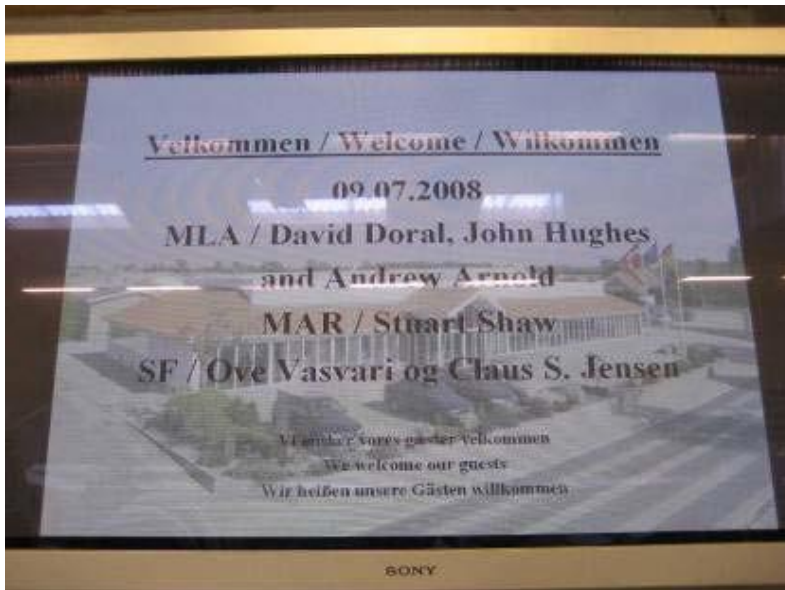
- Stork Mincing equipments
- FROZEN BLOCKS of meat used.
 - Common practice from trim collection (no cartons)
 - Norway based fish industry system
 - Like MLA project.
 - DMRI will try to get us info and maybe a site visit
 - Not done on site, (local packers / cold store)



- Scanvec Portion Cutter (Marel)
 - Cut to set portion size eg 800g rump
 - Cut off Cubes sent either to flatteners if big enough or put in trim bin for further cubing or mincing.
- Overall very impressive company, Best I have ever seen from a quality point of view and working environment
- Probably not suited to any of the boning project being discussed and considered.
- They did offer to DMRI that they should be considered for trials however they did admit that this would be difficult
- All in our party was impressed by what we seen today, very different from other plants.
- Scare have 2 physiotherapist on site to reduce OH&S problems
- 10 years ago decision to change focus of business to reach goals being achieved today.
- From a presentation point of view all companies we visited where impressive, however SKARE where without doubt the best:
 - Quality of supplied Carcass

- Quality of process

- Quality of Equipment
- Every boned piece of meat or cut piece of meat is presented perfectly with great care
- Presentation throughout company (Fountains, Plants, Windows, Sktlights)



6 Visit/Meet No. 6

Location: ATTEC /

Tandslet **Date:** 9th July
2008

Time: 1pm-5pm

Attend: S Shaw, D Doral, J Hughes, A Arnold, Ove Vasvari, Claus S

Jensen **Host:** Soren Peter Frandsen (Area Sales Manager "ex 50%

owner with Andreas) **Subject:** Meat/Food Technology Equipment

Notes:

- 150 employees, 60 in Germany @ ITTEC
- ATTEC own 20% of ITTEC
- Conveying equipment to date is the largest component of the ATTEC business
- 600 series Middle machine as seen in workshop has been 6 years in development DMRI and ATTEC
- ATTEC paid for 50% of first machine as their development input to the project (hardware)



- ITTEC are agents for ATTEC as ATTEC are agent for ITTEC,
- ITTEC main product lines are wash stations etc.



- Good clean workshop with MC Shop, Fab Shop, Glass Blasting, Assembly areas (x2).
Well set out and organised for an engineering shop of this size.

- ATTEC take on 2 apprentices / trainees per year from school.
- ATTEC sub all their laser Cutting
- Many brackets and pusher plates etc “common parts” have ATTEC logo laser cut into them.
- A Number of standard components for brackets and conveyor components are bulk purchased from India (Stainless Work)
- 90% of all stainless is blasted (matt finish)

- ATTEC Primal cut System
 - Only 16 off have been supplied (in various versions of design)
 - Does not use laser alignment, Mechanical done when carcass is laid down with datum on the gambrel/hocks
 - 2 primal cut systems on workshop floor
 - Opinion of DMRI that this system operates better than KJ system
 - DMRI did help in the development
 - Adjustable saw blade positions rather than conveyor positioning.
- Interroll Drum motors used wherever possible for conveyors, complete SS units. (no gear box)
- 10 Middle machine on factory floor in various stage of production (9 off 500 series)
- 1 middle machine is 600 series owned at this stage by DMRI.
 - Currently nearing end of development
 - Move to DC within 3 weeks (DC Ringsted)
 - Additional tooling etc more boning operations.
 - 600 series additions will be available for retrofit on 500 series machines
 - Each pig line will remove 8 persons per shift (4 from left – 1 MC) and (4 from right – 1 MC)
 - 16 people for 2 machines running 2 shifts
 - 3 million DK, eg AUD \$600K per machine
 - See photos, equipment is well made many unique components, standard components almost being only pneumatics and electrics etc.



- All equipment produced by ATTEC is very well made and well presented.
- Soren will join us in our next 2 site visits in Germany DC and VION
- Soren was very willing to offer any information we asked for.
- It appears that although successful ATTEC would not have a lot of work on in their factory if not for the machines developed by DMRI (Middle and Primal Cuts)
- Note also that ATTEC had a prototype machine in stock for moulding plastic film onto the top of TOTES, in development, (could not view properly on a pallet rack)

7 Visit/Meet No. 7

Location: Danish Crown, Husum, Germany

Date: 10th July 2008

Time: 9am – 12pm

Attend: S Shaw, D Doral, J Hughes, A Arnold, Ove Vasvari, Claus S Jensen, &(Soren Peter Frandsen from ATTEC)

Host: Uwe Follscher (QA Manager), Flemming Christense (Sales Manager)

Subject: Beef Deboning (Beef Slaughter, Lamb Slaughter)

Notes:

- 100K Cattle/year 5 days/week – Slaughter and bone
- 65K Lamb/year 3 days/week – Slaughter only of lamb
- 140/hr Lamb line speed (lamb 17 22kg avg)
- 60/hr Beef Line Speed
- 2005 extended deboning rooms



- Originally built in 1964 (owned by DK for 11 years previously VIION 1997)
- Single Shift operation (+8hrs)
- Slaughter Beef and lamb on different lines but using the same operators.
- Beef and Sheep lines do not operate at same time
- Slaughter capacity does not fill boning capacity.
- Carcasses for beef boning also brought in from other slaughter facilities
- Largest processor of lamb in north Germany
- 80% of lamb in district processed at plant. (this district is famous for lambs)
- 1200 Cattle capacity in chillers (6+ chill rooms)
- Some Larger Bulls avg 620kg
- German cattle (x2) size of Denmark supplied small bulls

- Fore Qtr (x2) per hook/gambrel after pre break
- 160 employees at plant
- A significant amount of pre break or pre bone work up work is done in Chillers etc prior to actual Boning room



- Scriber type saw used on fore qtr ore bone
- Pistolas and Fore Qtr's bone at separate times, Trim is packed separate and not mixed for market
- No boning is done with Sheep
- Split of lamb carcass for BSE reasons (did not see and unsure why and if this is required)
- Lambs not being processed on day of visit until after 5pm
- Multivacs and Cryovacs used
- Totes used throughout plant
- ATTEC conveyor system around plant
- Product shipped in Totes, Carton and bulk Trim Pallecons



- Pallecons are trim packed to CL level and use of CO2 to get temperature
- (Spade into Pallecon) (290kg packs Steel Euro Pallet size in large PVC bag)



- SFK Grader system at end of Slaughter, %Meat, %Bone, %Fat



- Upward Hide puller is used (Note JH will send DC videos of TEYS downward puller for reference)
- Slaughter speed = 1/min
- Continuous Chain (moving line)
- 90° Cross under intralox style conveyor used to remove Punch under a moving evisceration platform/conveyor for operator



- 250 capacity in pens
- Pens are gal railing with green panels separating each lane and compartment. Noticeably less and/or little panic noise from cattle



- 4M cattle in Germany, compared to (27M in Aus +120M in Argentina)
- A number of the smaller Beef plants show very similar round rail system as shown below that present very greasy and dirty.



- Site images Boning room totes



8 Visit/Meet No. 8

Location: VION/Bad Bramstedt Germany

Date: 10th July 2008

Time: 1pm – 3pm

Attend: S Shaw, D Doral, J Hughes, A Arnold, Ove Vasvari, Claus S Jensen,
&(Soren Peter Frandsen from ATTEC)

Host: Lothar Welsch Prod/Sales Manager, Stephen Hausch

Subject: Beef De Boning

Notes:

- Originally organised by ATTEC however this was cancelled as the person we where to meet could not attend,
- We then had David call Marten Klusters (Vion) to see if he could assist. Marten made a few phone calls etc and the visit was arranged.
- Founded 1968 for pig production (10K)
- 1993 change to cattle
- Largest beef plant in Germany
- 2 line boning, one fore and one hind qtr
- 75 cattle/hr with 32 workers in slaughter
- 12hrs/day worked 10 ½ AWT 4am – 4pm
- 200 Pistolas / hr with 26 men
- 1600 2000 Pistolas per day
- De Bone 1,000 tonne wk
- Export to Russia and Baltic's
- 73/hr 32 workers on Slaughter
- Some Carcass on sold as sets
- 500 800 head per day.
- Romanian and Polish used for cheaper labour. Polish better paid but not as much as Germans.
- Good paid Bonner or Slaughter man = 3,500 EURO / month (Boners paid per Kilo)
- Vion did have an old automated split saw, but this was to unreliable, soft side etc.
- Blood Collection via vac after sticking (part of sticking)
- Manual Splitting
- Fore Leg hocks cut but not all the way through, finished by knife, also cut at elbow not dew claws
- Cross under Intralox Evisceration conveyor like previous DC plant
- Render is processed on site (first on this trip)
- Vac and Spinal cord removal with a hose wash afterwards on Spinal Cord

- Auto chain in Blast Chillers. Blast Chillers quick chill for 1 ½ hrs prior to slow chill. This removes moisture
- Trim in totes is frozen to form a frozen block and the, palletised as such • Table Qtr Boning Pistolas and Fore Qtr's
- 36 Boners and Slicers seen whilst on site at Boning tables
- Pre Breaking done, Pistolas, Bango and ribs prior to tables, Scribe saw operation and knives
- Skinners used as in all beef plants seen
- Knife sharpening system used as per all sites seen
- ITEC and ATTEC conveyors throughout
- 12 hrs 5days / wk
- MultiVac and Cryovac used
- Bag Carton pack off is similar to standard systems
- No photos or Videos allowed on site
- Not our best visit, suspected due to the circumstances of arrangements.
- This site did not offer any automation, procedures or processes that would influence the study

9 Visit/Meet No. 9

Location: SFK System, Kolding, Denmark

Date: 11th July 2008

Time: 9am – 12pm

Attend: S Shaw, D Doral, J Hughes, A Arnold, Ove Vasvari, Claus S

Jensen **Host:** Jan E Hansen (exec vice president) Thomas Bork (prj

manager) **Subject:** Meat/Food Technology Equipment (mainly slaughter)

Notes:

- 18 years selling in Australia
- 80% of business is pork related
- Installations in Australia QAF, Kingaroy etc
- Working on new Primo Plant in WA
- De Dagger supposed to now work better
- Harry Schulz did work for SFK until takeover by LD and equity company (pension fund)
- Beef Slaughter Lines in Ireland, Scotland, Norway, Denmark
- 360 employees worldwide
 - 2 x Denmark
 - Olbery ○ 1 x
 - Denmark Kolding ○
 - 1 x USA (120)
 - 1 x China (45)
- Growing organically within company new positions
- Turnover stated to be the biggest in industry comparing against BANSS, ATTEC etc
- Lines in Japan some are focussing on automation, They run at avg speeds of 100/day but Jan mentioned with an investment as if 1,000 per day
- MYCOB and MAEKWA Japan company copy some SFK equipment. However SFK respect over others as they keep working on developments until correct or near too
- 10 years ago all automation by SFK was hydraulic, now they are focussing on servo systems
- SFK work with short term goals for product development and market placement.
- SKF work with DMRI who can offer the long term goals in development and admit that SFK need DMRI to exist and feed development
- USA SFK water cutting project believed to be very successful.

- Used for portion cutting of pork
- AUT water Cutting (one at Cargill USA)
- Only boneless to date
- ??? BLANK USA company
- 3 system working in operation

- No shelf life or quality problems (Stated by Jan)
 - SFK originally dropped water cutting 10 years ago after failure (eg Shelf life)
 - Possible use for French Cuts • SFK technology and SFK system are different companies
 - SFK technology developed the Beef Grading system seen at VION
- SFK do not consider use of Robots as they say they are more expensive and take up to much floor space.
- Jan comments on French plants
 - Grain fed, Halal almost 100%,
 - similar process to Scandinavian (Denmark)
 - Similar Speed 80 120/hr
- Jan stressed that Development must be industry driven
 - New Primal cut system being put into USA plants are using variable band saws to control pitch, speed and angles etc. (no other details given)
- No tour of factory offered, may have been due to time available.

10 Visit/Meet No. 10

Location: Carnitech, Marel, Stoeving
Denmark

Date: 11th July
2008

Time: 2pm
5pm

Attend: S Shaw, D Doral, J Hughes, A Arnold, Ove Vasvari, Claus S
Jensen

Host: Svend Nielson – Division Manager
(Carnitech) John Steffessen Int'l Business
Manager (Scanvaegt) **Subject:** Meat/Food

Technology Equipment

Notes

:

- Plant tour given and information sheets
- Scanvaegt Weighers & labellers, Cryovac Bagging system, Auto Neck fillet packing, Pace Boning conveyors, etc . see info
- Use of mesh style cable and pneumatic trays systems as per everyone in Europe today.
- Belt system and conveyors lift up for cleaning and washing, can be done whilst running, however JH made comments that this is now band in Aus after accidents and people trapping hands in sprockets??
- Quality workmanship especially conveyors, simple design , very sturdy, mainly laser cut profiles used, little fab required
- Tote / Carton elevator about 2 M high off ground with one take up position and 2 drop zones operates at 1,200/hr
- 300 people on site (2nd biggest site, 1st in Iceland)
- 4,500 people global Marel and Stork complete
- Seen 2 off ATTEC saws in workshop, (still unpacked)
- Proman Boning System not built at this site
- Carnitech concentrate more on Logistics equipment, (Eg new boning conveyors etc)
- Will now concentrate on MEAT more that fish, shell or IQF
 - Now = 50% Meat, 30% fish & Shell, 20% other eg IQF Freezer work
 - Original speciality was salmon and shell fish
 - Current salmon work done on this site will be moving soon
 - 100 people work only on the Salmon lines, factory 25km from here

- 10-15 people in Brisbane Office QLD, Jonathan Rankin
- AEW Delford and Scanvech merger did not see a reduction in R&D, and noted that x2 products are now being developed rather than 2 off the same product with different variation.
- Marel Conveyor system is the only USD certified supplier/design

- Frozen BLOCK project

- Svend was originally involved in Frozen Block Project with Jim Vick
 - Svend/Carnitech spent considerable time on project before it stopped
 - Carnitech now believe they can do this project better, no actual reason why was given
 - They will send info to MLA (revisit old project documents etc (4 yrs old)
 - JH seems to drive this project
- FAT / CL measurement
 - Vision / Optical based CL Fat content system
 - Proven many times over
 - 30mm thickness max required to allow for correct averages
 - Generally used for Minced Meat, Salami etc.
- IQF freezer work done in Singapore
- All developments in house, not contracted eg DMRI or uni
- New Streamline System
 - Tracks drop cuts from boning chain IN/OUT/IN/OUT boning and or slicing stations, similar concept to Proman
- Other Chain and side boning systems with tracking and drop and weighs conveyors from Chain drop points

11 Visit/Meet No. 11

Location: NORTURA – Egersund Norway (ex Guidle?)

Date: 14th July 2008

Time: 10am – 2pm

Attend: S Shaw, D Doral, J Hughes, Ove Vasvari, Claus S Jensen

Host: Ove Drange Plant Manager not @ Site Holidays, (other production staff showed us in and around)

Subject: View Beef Slaughter & Boning Plant

Notes:

- 120 190 Beef per day (*190 only if boning supplied beef from other plants*)
- 2nd biggest site in Norway
- Only running about 50/day this week due to Holidays (one Boning line working only)
- 2 Bone (Pre Cut Lines) (main bone remove)
- All grass fed animals, 90% Domestic
- Approx 22 Boners (see video to confirm)
- 50 people on floor complete
- Proman Boning System (see Videos)
 - Pre Bone operator pump Compressed Air into Qtrs before boning
 - Qtr Boning (hind and fore qtr same workup line) (2off only 1 being used today)
 - Qtrs Pre Worked/Broken/Sawed/Scribed on angled panel workstation
 - Series of assista device working from rails, Panels and Pneumatic lifters and pushers all assisting operators
 - Comments
 - To much meat being left on bones (OPERATOR ERROR)
 - Last operation, separation causes major stress and swinging.





- Good condition and design of rails (Clean also)
- Marel cut & slice stations (?? Is this called and or part of the Proman system?)
 - Sequence operation dependent
 - Trap door operator push button
 - Cuts to menu
 - Take meat from rails piece by piece
- Auto Packing system Marel Paddles divert from conveyor to TOTES and or Pallecons
 - CO2 used in pallecons to cool, shovel inn



- Quartering completed in Chiller
- Cryovac single system
- All trim mixed to fat content for mincing
- Auto Trim Fat mixer, done using Xray Sampling machine (old system)
- Forklifts in Boning Room
- Different type of Hyde Puller, takes from both top and bottom and pulls into middle
- Automatic Beef Splitting Saw
 - Different stabilisation methods
 - Does not cope with broken backs
 - Slow operations?
 - No Guarding
 - Pushes beef to an angle



12 Visit/Meet No. 12

Location: Danish Crown Ringsted (2nd Visit at plant)

Date: 15th July 2008

Time: 9am 12pm

Attend: S Shaw, D Doral, J Hughes

Host: Ove Vasvari, Claus S Jensen

Subject: Manual operations and cutting explanation of pork middles (like

Notes:

- On site for relatively short time 2 3 hrs
- See Video
- Meeting semi started to discuss findings
- See next meeting @ DMRI Roskilde



13 Visit/Meet No. 13

Location: DMRI – Roskilde & Danish Crown Ringsted

Date: 15th July 2008

Time: 12pm – 5pm

Attend: S Shaw, D Doral, J Hughes

Host: Ove Vasvari, Claus S Jensen

Subject: Review of tour and define new path & order of project importance

Notes:

- Why not use system design by NZ company
 - AMH did not approve
 - Maybe expand upon
- DMRI Splitter was about 99.5% efficient with no soft side
- Middle MC 100/6000 fail due to;
 - Splitter soft
 - side ○ Vet
 - inspection ○
 - Other.
- Pork = 56 115kg (pig size)
- Middle MC note, Spinal Cord channel must be visible to work properly as it used to grip and guide,
- DMRI also working on CT scanning that may be used meat applications such as Tenderloin removal.
- DMRI education groups to employees for training and awareness of automaton and understanding of technology. (operators in EU stuff machines and technology too)
- Beef Middle machine expected to be shorter than pork machine as we are doing less operations (4 knife and one saw operation required Estimate as per video of pork taken at DC today)
- 1st MC option Short version (Short Loin)
- Defined Name for Beef Middle Style Machine – Back Boner MC
- TEYS (Back Bonner MC) (eg similar to Pork Middle Machine)
 - 5-6 people per chain that covers L&R sides
 - Estimate saving of 4 person per chain
 - 8 person / shift
 - 16 per day
 - 16 people = 2MC's (Estimated eg 1.^M per Machine)
 - Possible 3 per chain, 4 will be dependent upon Yield. Either Yield or a Person will be saved dependent upon system used at each plant.
- BB MACHINE – Back Bone Machine

- New defined name for full machine (removes Strip loin and cubed roll meat, Spinal bones)
 - Focus on finding plants that would be interested in the machines
 - More input required from other plants and persons
- Strip Loin MC
 - Different smaller version of the BB MACHINE, smaller loin part no cubed roll section
- Tenderloin Removal Machine
 - 2 Persons (one per side)
 - No real Yield improvement
 - Estimated Cost = \$400K (estimated retail cost) + 40% development DMRI =
 - 4 person per day for a 2 shift operation
 - Aim for 240/hr speed
 - DMRI to offer schedule for adoption of Tenderloin testing robot
 - Mechanical setup complex to define start point
- Note some water is used for hydraulics in EU plants (common practice)
- Banjo removal
 - JH described a possible manual assist version to help cut and separate plus remove
 - Is Auto version feasible due to quality and meat to bone tear etc?
 - Simple part of job to pickup shank after cut and dropped (eg robot to pickup shank)
 - Only Good for Side chain boning as in Aus we hold via the Shank.



- Banjo Processing Machine

- As per ham Leg boning machine at Ringsted (DMRI 1st Development) this system would not remove enough meat from bone
- Too difficult, not enough to gain
- Fore Qtr Meat less valuable , not as big advantage to Automation
- Other projects Discussed
 - Skirt Removal (partial Evisceration process)
 - SFK Tool manual
 - DMRI Developed
 - Adapted version of saw used in the Auto Evisceration
 - Adapted version of tool to be used for beef



- Beef Splitting Saw
 - How soon can MAR move
 - Should we use DMRI / SFK Pig system adapted
- Feather Bone splitting saw NOT required if BB MACHINE is built, the cut on the BB MACHINE will be better and will not have the chilling problems associated
- Scribing the Brisket Cuts
 - Basically what MAR are doing.
 - What would be better is CT Scanning to get Brisket Bone cut depth
 - Wait and see
- Loin Removal and Load to BB Machine
 - Old Middle Separation, Cut out Middle
 - For loading and taking out the whole middle
 - Not required at present until Scriber and BB MACHINE are working properly
- Hindquarter processing – robot or machine

- Similar operation from Pro Man Machine
- Maybe be relevant to Mac Pro machine for Lamb
- Will be relevant as a future project.
- De Boning of But
- May relate to some H Bone work being completed
- May be No.1 Priority Ease of doing.
- Somewhere between 2 6 people per line
- Yield Increase
- Further conveyors and logistic conveyor handling



Visit/Meet ALL

Subject: General Notes from all site visits and Meets

Notes:

- Use of new Dyson hand Dryers, very effective, first hand dryer I have ever seen that works.



- Sterilisation procedure and equipment supplied by eg ITTEC is very impressive.



- All companies present well and have clean organised facilities
- Traffic control eg Kill floor to canteen is all indoors and through cleaning stations
- Windows an Skylights



- Always we where presented with Coffees and facilities setup for meeting