ALAM Newsletter

Winter 2017

What's Been Happening

There's various reports from one-day events and recent conferences – we have some catching up to do, as one way or another the newsletter has slipped to the bottom of the pile lately; apologies for this.

We are always open to ideas and suggestions from members for future one-day updates, and names of useful contacts would be most welcome. Please contact the ALAM secretary, Graham Higginson.

2018 Conference

Plans are being pulled together, and we are looking into holding the event this year at Harper Adams, Shropshire. Keep the week beginning April 2018 free in your diary!

One-Day Events

We have plans for a day of Manitou updating – see page 2 of this newsletter for this and other future plans.

Membership

You will find a list in this newsletter of all the paid-up members for the current 2017-18 year, as at the end of September 2017.

At the last AGM, it was decided that after many years we would increase our subscription to £20 a year, with an introductory rate of £10 for a new member's first year.

Alongside this, we will be getting in touch with everyone to check we have correct details.

Contents

ALAM Committee 2017-18

Chairman	Nigel Macpherson	**Committee**	John Gough
Secretary	Graham Higginson		Roger Madge
Treasurer	David Heminsley		Oliver Dunthorne
Chair Elect	Mike Seaman		Charles Czabo
Conference Organiser 2018		**I Agr E rep**	Lance Butters
	Graham Higginson		

FUTURE ALAM EVENTS

ALAM One-Day Event - Manitou

Thursday 15th February 2018

Hartpury College.

Price £60 members, £70 guests.

Organiser - Ian Coleman, Hartpury College.

To reserve your place for this event please send an email to ian.coleman@hartpury.ac.uk

ALAM Annual Conference 2018

Week beginning April 2018

Proposed host Harper Adams

Price around £220 members, to be finalised

Caterpillar engines, Harry West, JCB Transmissions, Turf Mech, and JCB Power Products are on the agenda.

To reserve your place for this event please send an email to ghigginson@harper-adams.ac.uk

ALAM Summer Event - Claydon

24th to 26th July 2018

This event will be based in the Eastern Counties and the subjects which will be covered are Crop Establishment using seedbed preparation and direct strip seeding techniques and the reasons behind this methodology and the processes, techniques and equipment involved in establishing a range of vegetable crops for UK conditions. We anticipate that the cost for this event will be around £160.00 We hope that you will note this training event in your diary and book your opportunity to attend with your Continuous Professional Development co-ordinator at your College.

If you wish to reserve your place for this event please send an email to gough.j@btinternet.com

OBITUARY

A tribute to David Ross - a ploughman and his plough.

It was with great sadness that staff and students at Newton Rigg College, Cumbria learned of the sudden death of a valued colleague and mechanisation lecturer, David Ross, on the morning of 17th July 2016.

Dave began work on the college farm in 1975 as tractor driver, transferred to the engineering department in 1979 as a lecturer and remained there until his untimely death.

A remembrance service was held at Newton Rigg on the 25th April where an overhauled Ransomes plough was sited in remembrance of his valuable contribution to the education of agricultural students over a 36 year period.

The Ransomes TS90-12-3 plough was commissioned by Dave in 1980, possibly the last year Ransomes ploughs were available. His reasons for this choice was that he had “grown up” with the Ransomes range, was loyal to British manufacturers and this particular plough was suitable for the varying soil types to be encountered on the college estate. It was also a difficult plough to set up but incorporated many features and adjustments not available on other machines.

Dave was a hands-on man and strove to train students to a level of competence demanded by industry. He would team up the plough with a small Datatronic 2WD MF tractor. “Adequate” he would say “for this size of plough”. Once the basics of ploughing was mastered by students he would set a practical project in the field to compare different plough settings, tractor gear selections and engine speeds to obtain maximum efficiency from the Datatronic information for wheelslip percentage, fuel economy and ploughing quality.

The plough is as off the production line condition and can be viewed on the Newton Rigg campus at the end of the engineering workshops. A fitting memorial to a conscientious ploughman.

Henry Schultz

OBITUARY

Gerald Anderson, Lecturer and Agricultural Engineer

1949 – 2016

Sadly, Gerald Anderson passed away in February 2016, after suffering ill health for a number of months

The sudden demise of Gerald affected not only his wife, family, friends and colleagues, it was a major blow to the world of education, and in particular the Agricultural Engineering sector. Gerald had devoted the last thirty or more years of his life to the training and education of young people entering the world of agricultural engineering; latterly focusing on dealership apprentices in Norfolk and surrounding counties.

Gerald's first footsteps into the world of agriculture were as a student on the National Certificate of Agriculture course at Hampden Hall Agricultural College; Hampden Hall, at the time was affiliated to Aylesbury College and in later years ran into financial difficulties and closed down. After completing his NCA, Gerald went on to work on the College Farm until the opportunity of working on a pig farm came along. Following this job, Gerald moved on to work for an agricultural contractor and spent many hours silaging and hedge cutting. The long hours eventually took their toll and the inevitable back problems started and forced Gerald to give up tractor driving. What could he do? This era of his life coincided with the demise of the traditional apprenticeship scheme and the introduction of the Youth Training Scheme; Gerald had kept in contact with his former College Lecturers and they suggested he apply for a job instructing YTS trainees at Hampden Hall Agricultural College. He started in 1984 and the rest, as they say, is history.

Gerald had always had a thirst for knowledge, especially agricultural engineering; persevering over a number of years he achieved the City and Guilds Licentiateship Award in Agricultural engineering. Working in education he needed his Certificate of Education; the City and Guilds Award provided the necessary qualification for enrolling on the "Cert-Ed". In April 1989 he started work as a lecturer in machinery at Easton College, working his way up to lead the team, however, in 2004 a heart condition led to a bi-pass operation. On his return to work the organisation had undergone a restructuring process and Gerald became responsible for the agricultural engineering apprentices; this was the job he gave his all to. Having maintained a good relationship with the trade he was at home with this sector. Frustrated with the direction syllabus content had gone he felt the modern apprentice lost out on the knowledge the former apprentices gained. Never-the-less he gave much more than required and was well respected by both student apprentices and the trade.

Always having student learning as the main priority in his professional life, Gerald became a member of the Association of Lecturers in Agricultural Machinery (ALAM), this gave access to specialist training courses, enhancing personal knowledge, which could be transferred onto his students. In 1993 Easton College hosted the National Forum for Agricultural Engineering Education (NFAEE), an organisation made up of Colleges that deliver agricultural machinery and engineering courses having the specific role for strategic management of curriculum delivery. Gerald master minded the event and from this earned a place on the executive committee and progressed to be the secretary. Due to educational policies, agricultural machinery and engineering departments were amalgamated or closed down in Colleges. This meant that the NFAEE became defunct and Gerald took a leading role in negotiating amalgamation with ALAM, successfully achieved by 2014.

Throughout his teaching career, Gerald actively participated in developing the National Proficiency Test Standards, and in particular the application of agricultural chemicals leading the setting up of the Eastern Region Instructor Group, which liaised between manufacturer and end user.

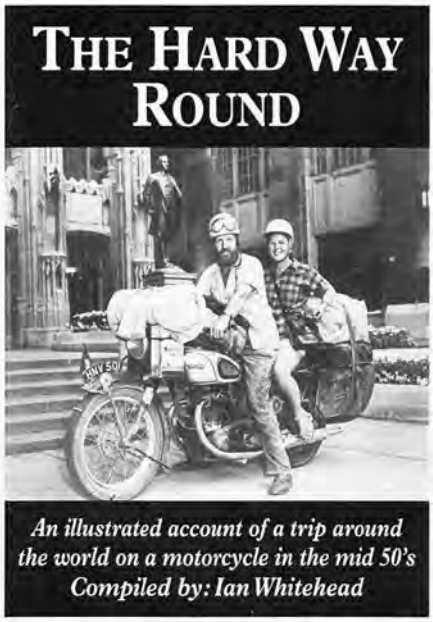
During the final years Gerald had become very concerned with the way financial policies were taking precedence over student learning, leading to the underfunding of curriculum delivery and shortage of qualified agricultural engineering staff in Colleges.

Throughout his career, Gerald has been supported by his wife Sue, whom he met as a student at Hampden Hall College, when she was undertaking the Ordinary National Diploma for Farm Secretaries. Sue always helped out with the administration for the events organised by Gerald, a team to the end.

Lance Butters

ALAM BOOK NEWS

The Hard Way Round



ALAM member Ian Whitehead has produced this book from the diary of Ernest Bell, and his round-the world trip on a Norton Dominator.

This epic trip was undertaken in 1954, when every border crossing needed a Visa, there were no mobile phones (and few landlines), different currencies in every country, and no roll-on roll-off ferries.

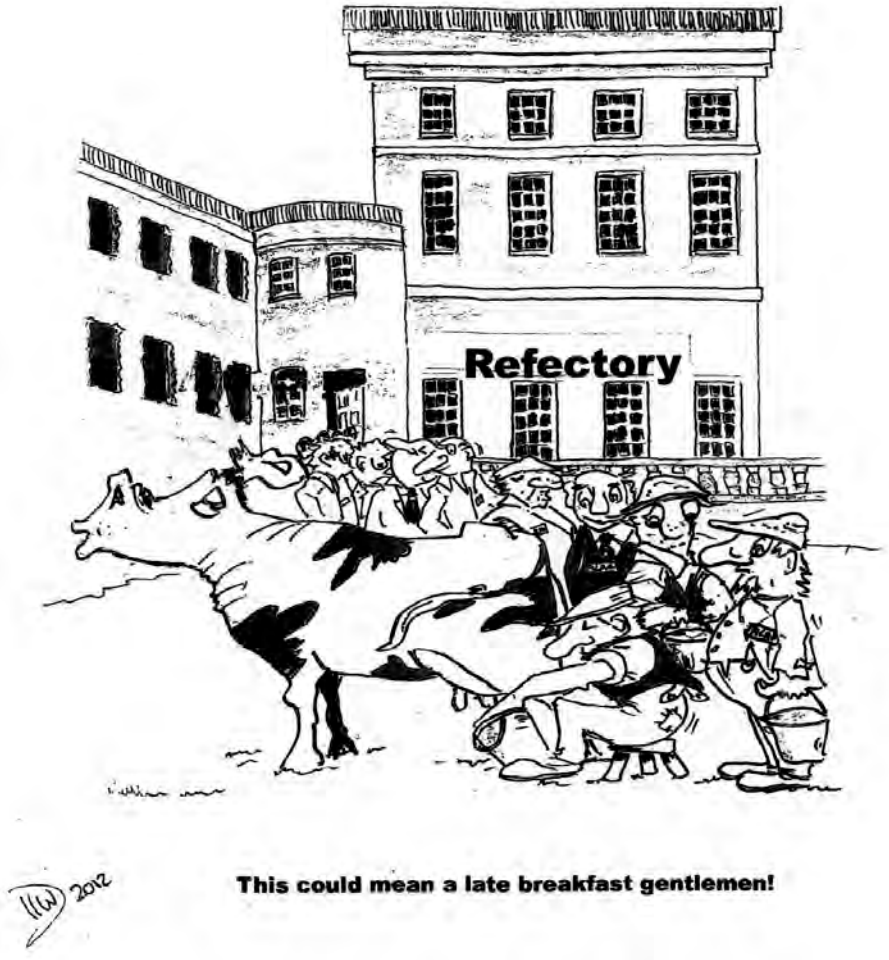
The text is transcribed direct from Ernest's own notes, which makes the read more compelling.


5 >> Upsetting the natives Took 3 hours to get through Iranian customs

Copies are available for £7 from:
Ian Whitehead
Springfields
Court Mill Lane
Wadeford
Chard
Somerset
TA20 3AX

Alternatively, ask your local book shop for ISBN 978-1-904-686-23-1

ALAM ANNUAL CONFERENCE 2012



ALAM ONE DAY EVENT

Fullwood Robotic Milking Technology

30th November 2015

This event was held at Hartpury College on 30th November 2015 and the day was attended by a select group who were fortunate enough to hear from Mr John Baines, Technical Director of Fullwood. The day started with a brief overview of the company history. In 1785 the Fullwood family started out as pharmacists producing and using herbal remedies, in the 1800s the Bland family, who were cheese makers, combined forces using products from the Annatto plant to give colouring to their cheese. In the 1880's the company found premises in Ellesmere and has been based there from then on. In more recent times Packo, a Belgian company specialising in stainless steel equipment for the pharmaceutical and food industries, merged with Fullwood and in 2015 Veerda, a Dutch company have just taken ownership of the whole group.

Fullwood has a long history and depth of expertise in milking machinery and supplies its equipment throughout the world for milking mainly cows, sheep, goats and buffalo. You may be surprised to learn that buffalo produce 15% of the world's milk production. Fullwood has designed and produced milking equipment for other animals, including camels which can produce up to 15 / 20kg / day at maximum production.

Mechanised milking started with the vacuum pipeline running through the cow shed, the cows in stalls and the milking unit, a bucket and cluster, carried into position and set down and connected to the vacuum line before the cluster was fitted. Tandem stalls in a parlour were the next development with different entry / exit designs for the animals, which included the Chute system. Next followed the herringbone layout which can be dated to the late 1950s, followed by the parallel index layout where the cow stands at 90°to the pit with its rear facing inwards. The floor on which the animals stand is sloped down away from the pit at an angle of 7°. The animal's natural reaction to this is to reverse up pushing its rear against the back rail and conveniently present its udder for access to the dairyman. Rotary parlours were first produced in the 1960s but have become more commonplace in recent times as herd numbers have increased and now we are in the age of the Robot milking machine.

The process of milking an animal is dependent upon our ability to keep it in an un-stressed condition and our understanding of the triggers, timing and sequence of processes within the body of the animal which allow the milk to be drawn. The preparation of the udder and teats before milking by washing are usually the first stage, followed by "stripping out "each quarter, drawing a small quantity of milk into a small container to check for mastitis.(stripping out is still a requirement in all milk contracts) This process is registered by the animal's brain which in turn induces the pituitary gland to release a hormone called Oxytocin into the bloodstream, which is carried to the udder to start the let-down of the milk. There is a time lag of between 45 seconds and 90 seconds / couple of minutes depending on the individual cow before the milk is available to be drawn. If the cow is stressed adrenaline is produced which completely blocks the oxytocin so the milk is not let down.

The health and condition of the animal throughout its lactation is a key factor for the dairy farmer, together with a proper understanding of the feed-requirement compensations, which are needed to maintain both milk yield and animal condition. The cow loses body weight and increases milk yield in the early stage of the lactation. This needs to be countered by increasing the feed dry matter intake per day with a maximum feed quantity occurring about 8 weeks after maximum milk yield has been reached. If this is achieved with quality feed then condition is maintained.

The Merlin Robot milking system has now been established in the industry and is in its second generation. The main difference to the previous system is that the new machine uses electric motors and toothed belts to manoeuvre the cluster arm into position rather than pneumatic cylinders.

For trouble-free operation, the system is dependent upon the cow having an udder with vertical teats with sufficient ground clearance for the cluster to hang squarely below. Indeed a story was related at this stage giving the Queens view on the issues when preparations were being made for a robot to be installed for the Royal Jersey herd at Windsor. Having assessed each cow for suitability it was concluded that 3 animals had udders which did not give sufficient ground clearance. This information was duly relayed to Her Majesty, together with the reason, whereupon she replied "it is not that their udders are too close to the ground, it is that their legs are too short!"

The robot uses lasers to detect the teat positions for washing and cluster attachment. This process is improved if the cattle have their tails shaved as the udder is then cleaner and teat position is more easily established. Once the cluster is fitted, the milk from each quarter is electronically monitored for mastitis as it begins to be drawn. The system measures electrical conductivity which has the capability to detect blood, reduced levels of lactose and increase in the levels of sodium and chlorides, all of which may be mastitis indicators. Any imbalances from preset norms will flag up the early stages of mastitis up to 36 hours before any clinical signs become apparent, which means that treatment can be administered earlier, resulting in earlier recovery and reduced risk to the animal. Cows are individually identified by the machine from an ear or neck transponder and this enables the machine to

record their data which includes teat positions, milk quantity and the number of visits to the machine over each 24-hour period. The Fullwood “Crystal System” dairy and herd management package fully integrates all aspects of herd welfare, performance and costs in one system enabling data input and access to be conveniently accomplished by the range of people involved.

In short the Merlin system will:

- Milk cows cleanly and consistently,
- Decide if cows are due to be milked,
- Automatically reject contaminated milk,
- Foremilk and post spray teats,
- Automate herd management,
- Telephone if there is a problem.

However it will not:

- Maintain itself,
- Cure Mastitis,
- Clean grossly soiled teats,
- Call the vet,
- Order more feed,
- Become angry!!!!!!

Throughout the presentation we were given facts, statistics and information which helped to give us good overall picture of the dairy industry and milk production worldwide so that we were able to appreciate the factors which are influencing dairy farming in the UK. I do not think that I will be able to do justice to the subject but will attempt to lay out what I managed to note down on the day.

- There are 122 million dairy farmers worldwide.
- The average herd size is 3 cows.
- The average yield/cow/year is 2100kg.
- 6% of the total world milk production is traded internationally.
- New Zealand is setting the world milk price agenda as it exports 50% of its production. (New Zealand has a warmer climate with rain and is on a latitude 15°nearer the equator than the UK).
- The UK national herd has dropped from 2.2m cows in 2000 to 1.8m in 2013 Ireland has 1.1m, Netherlands 1.6m, Germany 4.0m, France 3.7m (2013 figures)
- The UK had 17,500 producers in 2003 which had dropped to 10,700 in 2014.
- A cow produces on average about 7500 kg/lactation or 25 kg/day in the UK.

The 2013 table of world producers by quantity in millions of tonnes:

1, USA 91	6, Russia 30
2, India 60	7, France 23
3, China	8, New Zealand 19
4, Brazil 34	9, Turkey 17
5, Germany 31	10. United Kingdom 14

During the day discussion took place about the layout, limitations and throughput of the different manned systems to achieve the optimum efficiency. It was clear that this is a far from straightforward subject which has exercised many very experienced dairy specialists over many years. It seems that the parallel index fast exit layout offers the greatest potential for efficient throughput and that the rotary system needs operators who have a full appreciation of the animal physiology. It seems that following installation of one rotary system the operators were a little too keen to wash, prepare and fit the units, not giving the animal time to let down the milk. Washing the udder was done by the first worker while the second was fitting the units immediately he was able to. The solution to this over enthusiasm was to place a cut down 45 gallon plastic drum 1 minute platform travel time away from wash position and make the second worker stand in it, only fitting the units when the animal arrived at that point. Simple solutions to complex problems!

This was an extremely interesting and informative day delivered by a very knowledgeable and internationally experienced industry specialist. Our sincere thanks to Mr John Baines and Fullwood.

John Gough

Acknowledgements: My thanks to R.H. and D.G. for agricultural and linguistic content accuracy!

ANNUAL CONFERENCE 2014

Draper Tools

Visit by ALAM members to Draper Tools at Southampton the 21st of July 2014

The visit was a pleasant surprise to many of us as we had a preconceived idea that Draper meant cheap and cheerful, how wrong we were!

We were greeted in there reception area by Keith Hunt, the Southern Area Sales Representative, Pete McCarthy the National Accounts Manager and Nigel Whatley – General Manager.

We were swiftly taken into there new showroom, a vast area displaying over 90% of all the products they market. Nigel then took over the MC duties and we learnt how proud he was of this Emporium which has only been recently finished. I doubt that anyone amongst us failed to be impressed with what was on offer. Nigel reeled off impressive facts and figures and talked through a small selection of product of product features.

I'll list but a few!

- The company was founded by Bert Draper in 1919 in Kingston upon Thames and moved to Southampton by his son Norman Draper in 1963 into what was the old Supermarine aircraft factory (Spitfires for the nostalgic amongst you). At this time the products were of a limited range but in the late seventies early eighties they moved beyond the DIY market.
- They now market three ranges of product, 1- DIY, 2 – Draper Trade, 3 Draper – Expert. Each being aimed at a different segment of the total market. They are offering a lifetime guarantee on all products subject of course to the product being used in the correct manner and for the correct purpose. i.e. A tradesman using a DIY product for his business on a daily basis is not going to get a lifetime guarantee on the product. They are very proud of the fact that they meet all the known standards such as DIN and BSI and in most cases exceed them. In the case of the Expert range by a minimum of 20%.
- They maintain a Quality assurance department both in Southampton and Shanghai, the dominate source of most of their product manufacturer. They have no design office and produce no drawings!

We were taken around the Q A department and they are very proud of the array of test equipment and we had demonstration of a test to destruction of a ring spanner in a torque mode which easily beat the +20% limit of the accepted international standard. Some lucky visitor now has a spanner with a 20 degree set in the shank. This example was then put through a Go/No-Go gauge to see if the A/F Dimension of the tool had suffered suffice to say it was acceptable to the lucky ALAM member.

They had equipment to test for all manner of tools and equipment even down to being able to test for lead content of plating and painting. We were given an example of a hand torch which

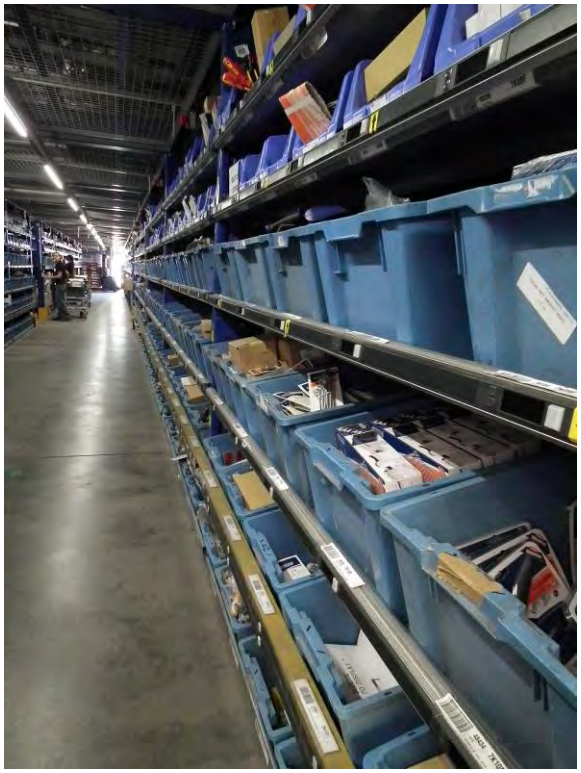
during the moulding process has a release agent with a lead content which exceeds the permissible level and we were assured the item would have been rejected on that basis.

We were then given a tour of the various warehouses on the three sites. Two are opposite one another with the public road separating them but the third is some 2 miles away and is a hundred acre site where all future expansion will take place.

It was pointed out that the company is very much a family affair being wholly owned and without any debts, Cash rich was the term used to describe their situation and with £40 million in stock at any one time this amounts to a sizeable nest egg as all the warehouses are owned as is the land they sit on.

They add some 1200 to 1600 new lines every year of which some 600 will be totally new products not marketed previously by them. Fortunately they produce all there own literature and have a full printing set up which includes their own photographic department so they do their own artwork and publicity.

In fact they do nearly everything themselves except the design and manufacturer of the product!



We were given the grand tour of their warehouses and packing facilities and here they are equally impressive with state of the art in racking, pallet handling and container handling. Which is just as well, as they receive 7,000 containers a year. They receive the products unpackaged as they do not wish to ship packaging material the 10,000 nautical miles from Shanghai to Southampton and even pallets are excluded as they take up 5% of the container space. When the containers are received the staff move to repacking the products where applicable. Many are blister packed and held in box quantities. The staff driven by the all encompassing computer system then fill the warehouses using a unique system of a double sided rack where the IN is higher than the OUT so the picking for the customer is in the opposite aisle to the receiving isle therefore the products will always be picked in strict rotation by date. Having put all the stock away the computer then turns its mind to shipments and out come the picking lists and the same staff then pick as instructed by the computer being directed to the products by scanning their list and the bays light up to indicate the location of the item to be picked and further action by the computer confirms the correct items has been picked. Not satisfied with that the items are packed and as the weight of everything is known a running check is automatically carried out and discrepancies picked up (Apparently they do admit to many, 0.0001%) as they are automatically boxed, strapped and weighed prior to a fleet of carriers arriving for onward transmission to the customer.

The customer is not just located in the UK but from here 70 countries are served.

Whilst all the practical side of the business is very impressive they have been very shrewd in their marketing. Having accepted that they were seen as “Cheap and Cheerful” they continued to market tools for the DIY market but also marketed tools for the Tradesman and the Expert and charged accordingly. They have also targeted those organisations that require complete kits such as the MOD, The RAC and many more, and even more astute they market other manufacturer’s products that slip nicely into their product portfolio and give the customer a choice. Products such as Elora Spanners and Knipex pliers. They also supply outlets that demand their own brand name to appear on the tool and/or the packaging so tools you see in Wicks may well be Draper. If all this is not enough they carry a £25 million third party liability cover, just in case!

Oliver Dunthorne

ANNUAL CONFERENCE 2016

Tractair

Alan Wattam, Senior Design Engineer joined as at York to tell us about Tractair's products.

Our session started with discussion about Tractair's retro-fit trailer air brake kits, but the main focus of this session was explaining all about their Central Tyre Inflation Systems (CITS).

It is well known that working with the correct tyre pressures has many advantages:

- Reduced wheel slip in the field gives lower fuel consumption - up to 15%
- Reduced soil compaction gives better drainage, and therefore yield improvements of 6%
- Reduce tyre damage and reduce wear by up to 20%
- Increased grip and stability on the road
- Better self cleaning of tyre tread in the field
- Improved operator comfort on both field and road
- Longer working season, especially in wet areas

In the field low pressures are needed to spread the weight of a machine and to maximise grip. Conversely on the road higher pressures are needed to give stability, fuel efficiency and minimum tyre wear.

A Tractair CTIS system allows the farmer to change pressures from inside the cab at the touch of a button, while in motion and at any speed. Systems can be Integrated into main tractor display using ISOBUS

Most systems use external air connections to the wheel, independent of the existing tyre valve. The CITS is easily detachable when required, for wheel changing.

Kits are available which route the air through the axle, but these obviously involve more cost and have limits as too what types of axles can be equipped this way. It is also possible to fit CITS to dual wheels

Cost of a CITS system is in the £2500-5500 range, and Tractair are gaining 2 or 3 customers per week, with more sales of trailer kits than tractor kits.

The Trailair website www.airbrakesystems.co.uk has much information and videos for those who want more details.

David Heminsley

ANNUAL CONFERENCE 2013

Visit to Feltwell Growers

Where does one start with a person like Rob Parker, manager for salad crop production for the G J Shropshire group From the outset facts about the business were effortlessly reeled out and I knew that the session would be difficult to chronicle. A graduate of Harper he'd worked for the company for ten years and his enthusiasm for what he was doing was palpable. As I could not hear what was being said at times and often distracted by my own interest by some mechanism or other I am acutely aware that many details will have been missed and therefore can only hope that some of the facts recorded will help you to recall others relevant to your particular interest.

Business details

1.7 million Lettuces produced weekly for Tesco and Asda

The company has 70% of the lettuce market in the UK. 6000 ha are farmed by the group with 4000 owned by G J Shropshire. The group farms5 000 ha in Spain enabling the company to supply its main customers for extended periods

Company operates on several farms across the U.K.

The annual turnover is £350 million

0.2% of profit generated is top sliced by a mandatory EU Fund. A proportion of the levy returns in the form of grants for the purchase of machinery and capital projects

The margin of profit on each lettuce produced is 0. 3 pence, cost of production is 19.7 pence / lettuce, sale price 20pence.

GS Fresh is the marketing brand of the company.

Machinery

The company hires 100 CNH tractors.

Trailers are tested for brake efficiency on a rolling road every 12 weeks

Rob claimed that oil rather than air was the preferred option for activating trailer brakes; this was because oil flow could be controlled with greater precision. The air brakes are much more sudden and there is a tendency for brakes to lock on

The company were not using JCB Fastrac or similar machines because of their speed capability and the dangers they foresaw of operators towing four wheeled trailers at speeds in excess of their designed stability.

Attached to the workshop was a store full with new metal to support the extensive fabrication work carried out on site, likewise a hydraulic hose store.

The planting machine which we saw being loaded on to its transporter was of French origin 'REGERO' but modified substantially by workshop staff on site. The planter is capable of planting 5000 plants / row/ hour and can plant 3million plants per day with 12 operators. A planting machine of this type costs £ 0.5 million

A single spraying machine covers all the spraying needs on the farm visited in 7 working days. The sprayer had logged 8000 hrs since it was purchased.

Some machines are guided by GPS

Irrigation

1400 acres can be irrigated in 6 days.

Lettuce were watered immediately after planting using the ' Watering can' a six wheeled tanker built on site capable of carrying 10 000 l Stress, due to lack of water at this stage of the plan's life would manifest itself a week before harvesting in the form of 'bolting'. What was of interest from an engineering standpoint was the front and rear steering axles of the 'watering can' It seemed that activation of the steering system was not in the usual form using the relative movement of the drawbar to the towed vehicle but was achieved either by manually activating the steering hydraulic control gear or alternatively using lateral forces on the front and rear axles to activate a control valve. Those I spoke to were not sure how the steering was activated but perhaps some of you could enlighten the rest of us

Irrigating in dry weather condition is critical and significant quantity of water has to be applied within six hours of planting.

Lettuces are irrigated three times per week during the growing season. the amount is determined by probes left in the field indicate soil moisture but Rob has to walk the 200 ha three times a week to check that the crop is receiving the appropriate amount of water. The company is investigating the use of a drone to monitor soil water levels and disease problems. Cranfield University is assisting the company by producing maps of soil conductivity on the farm.

Staffing

Workshop visited had 10 full time fabricators /mechanics who were responsible for repairing and constructing machines with a further 10 mechanics at other bases in the U.K.

A peer review system was used by managers with managers from other sections of the business visiting each other regularly. This was seen as very beneficial as it brought a fresh pair of eyes to the unit.

Manual workers were mostly from Bulgaria and Poland, a number of which were graduates in disciplines such as accounting and engineering but had failed to find appropriate work in their respective countries. The driver of the harvester R2 was of Polish origin and had worked for the company for ten years. Staff working on the harvester worked for 3.5 to 4 hrs and were given half an hour for break. The day and night shift varied from 8 to 10 hours depending on product demand. Staff working on the harvesters are paid £ 7.50/ hr.

Willow Farm

A partnership formed in 2008 between Crystal Heart and GJ Shropshire farms

The large growing area appeared similar to conventional glass but was in fact a relatively thin and flexible plastic This Dutch invented polymer gave a more uniform growth pattern than conventional glass and prevented plants from becoming leggy and twisted. This was achieved by the polymer allowing part of the UV spectrum conducive to strong plant growth to come through. Incidentally one could get sunburnt within its environment.

3 People managed the fully automated site.

During the peak salad season the unit produces 4million plants/week

The two varieties of lettuce grown are Iceberg and Little gem and the company are looking to increase production of the latter so enabling increase plant numbers / ha The seeding machine had the capability of sowing 3/4 million lettuce plants per day

The equipment operated for four days per week, the remaining time being used for maintenance and cleaning.

All planting trays were sterilized upon their return from the field.

The entire sowing and compost feeder were made by FLIER of Holland

Plants were stored and grown on pallets with each pallet holding 1400 plants.

A coating of sand and bonding agent was place over the sown modules in order to reduce evaporation losses and consolidate the moss based compost underneath It also assisted the handling of plants when planting in the field.

The two halves of the covered plant shed was kept at different temperature, one side was kept cool, whilst the other was at a temperature conducive to plant growth.

Lettuce plants required on distant farms travelled over night in order to minimise stress generated by hot weather conditions.

Solar panels on site fed the National Grid during the summer and maintained the covered area at 5 degrees C during the winter. This helped to reduce heating cost during the winter months.

90% of the water requirement for the unit was harvested on site.

Once the main salad season was over in August the houses cease production and are sterilized Sowing recommences in November.

Pallets are labelled so that the crop is fully traceable from sowing to harvesting and even to the area of land where the crop was grown.

Out in the field

Two harvesters working side by side was seen. One shift using a single harvester is capable of harvesting 60,000 lettuces per day. It is essential for lettuce to be cooled in a vacuum cooler within two hours of harvest otherwise a red hue developed on the cut portion.

What will have left a lasting impression was the amount of waste in the form of perfectly formed lettuce left in the field. This was because customers specify in some detail the size of lettuce required. As much as 30%of the crop grown is either too large or too small and hence is ploughed back. Another totally unrelated but interesting fact was that knifes used by the operators for cutting lettuce were counted and stored at the end of each shift I wonder why?

I must have left a whole load of interesting details out so I plea for you pardon. Rob was thanked by Gwynfor who was most impressed by the guide's gesticulations, invariably the sign of a good orator we were informed. Be that as it may Rob was an excellent guide who gave us a cracking visit which will be long remembered.

Emlyn Thomas

ANNUAL CONFERENCE 2013

Feltwell Growers Farm Workshop

ALAM was met by Rob Parker, a Harper Adams Graduate, who is now the Production Manager for lettuce.

In the large yard, there was a large workshop, flanked by a well-equipped fabrication workshop, and a container fitted out with everything necessary to make hydraulic hoses. Most of the mechanics are qualified to make hoses, in order to ensure that any downtime is minimised.

Before entering the workshop, Rob told us there were 10 full time staff in this workshop, complimented by 3 other satellite workshops – 2 maintenance workshops and a dedicated fabrication workshop – with a total of 20 mechanics, all with vans.

The main workshop does all kinds of routine maintenance on all the farms' machinery, and also builds bespoke machinery for specialist operations on the farm – the lettuce planter we were to see later in the day was made here. Modifications to equipment such as the irrigation kit were also common.

In the workshop on the day of our visit there was a large trailer being maintained, some large steel gates being fabricated (complete with a panel incorporating the company logo), a New Holland tractor being repaired, and a Claas combine being prepared for harvesting 1000 hectares of wheat, which it was expected to clear in 10 days work.

The New Holland tractor was one of the fleet of 100 NH machines the farm runs, and was having a major repair done to it's transmission. Due to the size of the fleet, New Holland allow Feltwells to do their own warranty repairs, and their mechanics are trained at the NH training centre.

Next to the main workshop, there was a rolling road test bed, where all vehicles are tested on a 12 week cycle – this includes the tractor fleet, other trucks, and all the farms' trailers (with trailers on the farm ranging from 4 tonnes to 20 tonnes).

There was an emphasis on routine and preventative maintenance, with systems in place to plan and record machine history. As part of a company-wide policy, managers from different areas hold monthly reviews of each other's systems and work, with the often-repeated mantra that proper maintenance and repairs saves wear, prevents damage as well as improving safety. Tractor drivers do not do any such work – the mechanic team is always only a phone call away.

It was interesting to note that in spite of all the staff, workshop and tractor facilities, the farm does not plant or harvest it's maize crop, preferring to use a specialist contractor, leaving the farm free to concentrate on it's own specialisms.

It was interesting that the range of staff, skills, tasks and machinery in this workshop would rival a main dealer, and allowed the mechanics to be involved in fabrication projects probably beyond the scope of a regular dealer, so it was an interesting reminder that there is much more to the industry than working for the local dealer.

David Heminsley

ALAM ONE DAY EVENT

Fundamentals of Air Conditioning Systems

On Friday morning 26th October a group of ALAM members met at Riseholme College just north of Lincoln for a one day Fundamentals of Air Conditioning course presented by Mr Graham Higginson from Pro Auto.

Firstly the legal aspects of dealing with air conditioning equipment.

- DEFRA requires that those involved in the safe handling and recovery of refrigerant gases are trained and hold a formal qualification. Further training and qualification is required for anyone working on motor vehicle air conditioning systems.
- It appears that those working with landbased equipment air conditioning systems currently only need the refrigerant handling part of the qualification but in the event of an incident the phrase " adequate training " applied to health and safety legislation should give pause for thought!
- All refrigerant to be disposed of should be treated as controlled waste which is covered by the Environmental Protection Act. 1990
- If more than 3kg of refrigerant is recovered then records are required to be kept. The average capacity for a car system is 550gm; a coach system by comparison is likely to contain 14kg.
- Since 1991, it has been illegal to release refrigerant into the atmosphere.
- Refrigerant gas R12 is a CFC (chlorinated fluorocarbon). Since October 2000 it has been illegal to sell the gas, and since Oct 2001 illegal to service, - you should convert to take R134A refrigerant.
- Refrigerant gas R134A is a HFC (hydrofluorocarbon)
- Refrigerant gas HFO1234YF (awaiting introduction) Now in use. Jan 2013

Health and Safety

- Refrigerant gases are heavier than air, always work in a well ventilated area. Do not use a pit.
- If refrigerant is allowed to come into contact with a naked flame it produces toxic gases (fluorine, phosgene) Tiny concentrations have a pungent smell.
- When handling refrigerant and when working on a vehicle air con system wear protective goggles / wrap around face shield and only thick fluoromastomer gloves.
- If refrigerant should get into the eyes rinse the affected areas immediately with clean water and seek medical attention at once. If the refrigerant comes into contact with the skin it can produce severe frostbite.
- Do not handle cylinders of refrigerant with wet hands, they may freeze on contact.
- Store refrigerant cylinders in cool conditions above freezing and below 50°C
- Do not steam clean air con components on a vehicle, it can cause overheating and damage.

Air Conditioning Theory

All air conditioning systems use the scientific fact that energy is absorbed when a substance changes state from a liquid to a gas. If we take water as an example, it makes two changes of state within a temperature range of 110° being ice at -5°C, then changes state to a liquid at 0°C and then to a vapour at 100°C. This process takes place at normal atmospheric pressure, 14.7psi / 1 bar, which we usually quote or measure at sea level.. We get different temperature results for the changes of state for water if we increase or decrease the pressure acting on the water. This is used to advantage in a pressurised cooling system on an engine where the water remains a liquid at 120°C if the system has a one bar pressure cap fitted.

R134A refrigerant changes from a liquid to a vapour at -26.2°C at atmospheric pressure.

Main components which make up an air conditioning system are:-

- Compressor, low pressure refrigerant gas enters the compressor and is pressurised where it then exits as high pressure / high temperature refrigerant vapour.
- High pressure condenser, Its function is to act as a heat exchanger. The refrigerant enters the condenser as high pressure / temperature vapour and is cooled and condensed into a liquid as it passes through the condenser tubes.
- Filter Receiver Drier. This component acts as a particle filter, liquid refrigerant storage container and a moisture absorber.
- There are two types of air conditioning circuit in use on vehicles; these are the Fixed Orifice Tube (FOT) and the Expansion Valve (TVX) system
- Thermal Expansion Valve. This pressure and temperature sensitive valve controls the flow of liquid refrigerant going to the evaporator in order to maximise the cooling potential of the refrigerant.
- Fixed Orifice Tube. This is a less sophisticated control valve which is effectively a fixed jet to control the flow of refrigerant into the low pressure side of the circuit. The jet size is determined by the temperature range of the country by the manufacturer. In this system the filter receiver drier is positioned in the low pressure circuit between the evaporator and compressor – this ensures that only vapour/gas can make its may to the compressor!
- Evaporator coil. The refrigerant enters the evaporator as a low pressure low temperature liquid which draws the heat from the warm air blown through the evaporator fins, cooling the air before directing it back into the vehicle cabin. During its passage through the evaporator the refrigerant changes state from a liquid to a vapour. The vapour is then drawn back into the compressor where it goes through the cycle again.
- Lubrication. The compressor is protected by a small quantity of oil which is added to the refrigerant and carried around the circuit providing both a sealing and lubrication role.

Servicing

The vehicle air conditioning circuit should be equipped with 2 service access points, one in the low pressure side identified by the larger diameter pipework with the smaller service fitting, onto which the blue flexible hose is attached. The high pressure side has the small diameter metal pipes, the large service fitting onto which is attached the red flexible hose. Unfortunately it cannot be assumed that all systems are laid out with this standard service point arrangement; recent Renault vehicles come equipped with one large service point which is confusingly fitted to the low pressure side of the circuit, so a suitable adaptor is needed to correctly attach the blue service hose to the low pressure circuit. Other vehicle manufacturers have their own special connectors just to make things even more challenging!

Refrigerant Recovery

The refrigerant can be removed from the system using a mobile air conditioning service unit or the individual air conditioning service components appropriately assembled and connected to the vehicle system. If the refrigerant is recovered from the low pressure side of the circuit the lubricating oil is not removed; if recovery takes place from the high pressure side both oil and refrigerant are withdrawn. The recovered refrigerant is captured in a recovery cylinder after being filtered to remove any moisture and oil particles. Following this process the vehicle system is connected to a vacuum pump which must be allowed to evacuate the system for at least 30 minutes at a negative pressure of at least -1.006 bar (29.71 in. Hg). The moisture in the system is removed by creating this vacuum as in this negative pressure the water boils at a much lower temperature (4.4°C at -1.006 bar) and is drawn out as steam. Moisture is the number one enemy of the air conditioning system so running the vacuum pump for up to 4 hours will ensure that all the moisture is removed. If a vacuum of -1.006bar cannot be achieved or maintained this is likely to indicate a leak somewhere in the circuit which must be identified and repaired before the system is recharged.

Suitable dyes can be introduced into the circuit before it is ~~still~~ charged with refrigerant in order to locate and pinpoint a leak by using ultra violet light and UV glasses. Ultrasonic leak testers and sensitive electrical sniffer tools which are sensitive to the refrigerant gas are another means of detecting leaks. Only Oxygen free Nitrogen gas at 10 bar should be used to pressure test the circuit.

Recharging the system.

The first step is to look up the manufacturers specification for the weight of refrigerant for that particular system. Place the refrigerant cylinder on the weigh scale, attach the coloured service hose(s), manifold gauges and outlet hose to the cylinder valve and note the start weight. It should be noted that the refrigerant can be re-introduced into the low pressure system circuit as a vapour which is drawn from the top of the refrigerant cylinder. If the cylinder is inverted and then placed on the weigh scale the refrigerant will exit the cylinder at the bottom as a liquid and must enter the circuit on the high pressure side. During transfer monitor the weigh scale readings until the correct quantity / weight of refrigerant has been transferred from the recharging cylinder to the circuit and then close of the transfer pipe and cylinder valves before carefully disconnecting from the vehicle system. In cold conditions an electrically operated heat blanket can be wrapped around the refrigerant cylinder to aid the transfer process by increasing the temperature and hence the evaporation / pressure inside.

Recharging is usually carried out following the evacuation of the circuit so the vacuum will assist the recharging process by helping to suck in the refrigerant.

Checking System Operation

Correct operation of the cabin air con cooling capacity can be determined by setting the controls to deliver cold air through the face level vents and inserting a thermometer into the air stream. Leave the system to run for 3 to 5 minutes and the temperature should have dropped down to about 5 to 8°C.

Technical Titbits.

There are 3 types of compressors in use:

Swash Plate type - 30% efficient

Scroll Type - 90%

Vane Type - used by Citroen

The electro magnetic clutches used to engage drive have a working clearance of ½ mm which is adjusted with shims.

System Lubrication

If individual circuit components are replaced then reference should made to what quantity of oil should be added to the system. New compressors should come ready filled with oil and capped. Carefully fit without loss of oil.

Approximate lubricant quantities:

Condenser	30ml
Receiver Drier	15ml
Expansion Valve/Orifice Tube	Nil
Evaporator	50ml
Hose/Pipe	10ml
Accumulator	Equivalent to that drained +28ml
Compressor	Refer to manufacturers spec

There are a range of different “PAG” oils of different specification and properties for the various air conditioning systems and refrigerants. Hybrid and electric vehicles need special non conducting lubricants.

John Gough

REFRIGERANT CIRCUIT

Principle

The refrigerant circuit is split into a high-pressure side and a low-pressure side. The evaporation of the refrigerant is controlled on the low- pressure side while its condensation is controlled on the high-pressure side.

Diagram of expansion valve system

1 *Condenser fan*
2 *Condenser*
3 *Receiver drier*
4 *Expansion valve*
5 *Blower motor*
6 *Evaporator*
7 *Compressor*

N.B

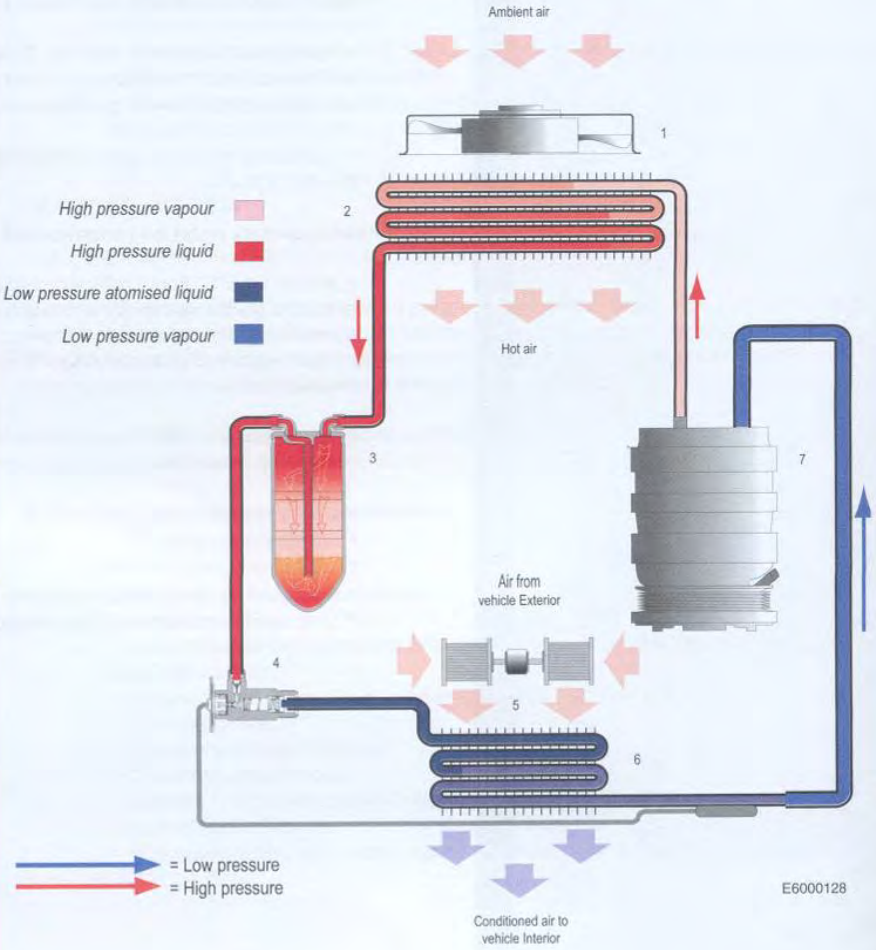
Electrical devices maybe used to control the compressor operation.

EXPANSION VALVE (TXV) SYSTEM

Operation

1 The refrigerant vapour is drawn in and compressed by the compressor (7). In the process it is heated to a temperature of between 25°C and 75°C.

2 The hot vapour is then pumped to the condenser (2) which consists of a series of pipes surrounded by numerous cooling fins through which the refrigerant passes. The refrigerant vapour is cooled by the air stream, with the assistance of the condenser fan (1) on certain models, so that it condenses from a vapour into a liquid. This task is shared by the engine radiator cooling fan on all models without a condenser fan.



3 The liquid refrigerant flows into the receiver drier. The receiver drier filters, dehydrates and stores the refrigerant until required by the evaporator.

4 The condensed liquid refrigerant is then allowed into the evaporator (6) in precisely metered quantities via the pressure and temperature controlled expansion valve (4). The suction effect of the compressor creates a lower pressure in the evaporator. The result is an abrupt drop in refrigerant pressure as the refrigerant passes through the expansion valve, causing the liquid to absorb heat and evaporate. During this process heat is extracted from the air passing across the evaporator coil. The now cooled incoming air is blown into the vehicle interior via the HVAC assembly.

REFRIGERANT CIRCUIT

FIXED ORIFICE TUBE (OT)

Operation

Principle
The circuit with the fixed orifice does not differ fundamentally from the circuit with the expansion valve; the evaporation is still controlled on the low-pressure side and the condensation on the high-pressure side. However, there are two significant differences:

1) A Fixed Orifice Tube with a constant cross-section is used instead of a controlling expansion valve.

2) A Suction Accumulator drier is used for refrigerant vapour on the low pressure side instead of a receiver drier for liquid refrigerant on the high pressure side.

1 The refrigerant vapour from the evaporator is drawn in and compressed by the compressor (7). In the process it is heated to a temperature of between 25°C and 75°C.

2 The compressed hot vapour is then pumped to the condenser (2) which consists of a series of pipes surrounded by numerous cooling fins through which the refrigerant passes. The refrigerant vapour is cooled by the air stream, with the assistance of the condenser fan (1) on certain models, so that it condenses in to a liquid. This task is shared by the engine radiator cooling fan on all models without a condenser fan.

3 The condensed liquid refrigerant is then passed through a fixed orifice tube (3) with a constant cross section. After the fixed orifice tube the pressure and thus the temperature drop rapidly, the refrigerant absorbs heat and partially evaporates.

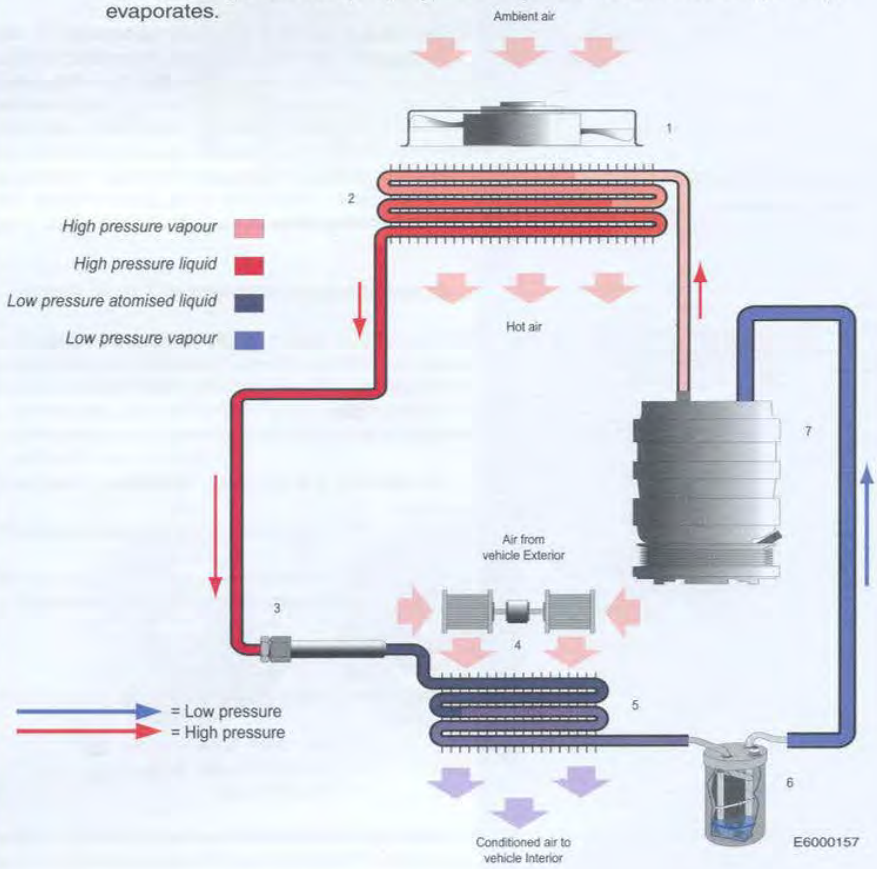


Diagram of a fixed orifice tube system

1 *Condenser fan*
2 *Condenser*
3 *Orifice tube*
4 *Blower motor*
5 *Evaporator*
6 *Suction accumulator*
7 *Compressor*

The fixed orifice tube is mounted in front of the inlet of the evaporator in which complete evaporation takes place.

N.B
Electrical devices maybe used to control the compressor operation.

4 The fixed orifice tube (3) is mounted in front of the inlet of the evaporator (5) in which evaporation takes place. This cools the evaporator and the air flowing across it.

The cooled air is blown into the interior of the vehicle through the air distribution system by the heater / air conditioning blower (4). The refrigerant gas is then passed through the suction accumulator drier (6) before being drawn in again by the compressor (7).

ALAM ONE DAY EVENT

Finns Formulate Ingenious Ideas and Solutions.

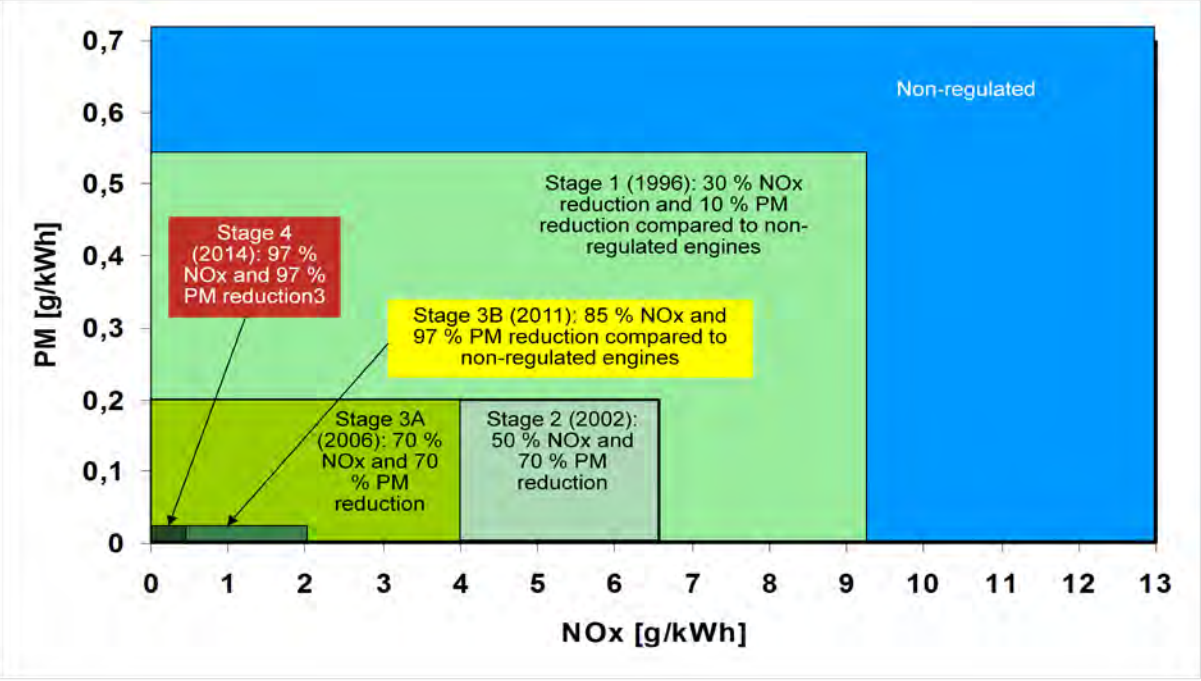
You may wish to categorise this report as the one which nearly got away as it dates back to a one day seminar which took place at Walford College on 28th October 2010 and was presented by Mr Gareth Jones of Valtra, and Ice Bear Tractor Pulling Team.

During the day Gareth covered a number of subject areas relating to the systems and technology found on the Valtra tractors and reports have already appeared in earlier issues of the Newsletter covering these aspects.

So why now for this one, you may ask? Well, for anyone who knows me well you will probably have noted that I have a chronological filing system; and I never throw anything away. This system has its drawbacks and every now and again I have to run a “Back up” where I sort through the pile and refresh….my memory of what is therein, so the Valtra Day notes fleetingly see the light of day and having now made a number of appearances it only seems right to write the report. I am sure you will understand that time dulls the recall and hence the report may not be as extensive as those of more recent events.

Valtra engines are produced in the Suolahti plant in central Finland, the engines are known by the name SISU which when translated from Finnish means grit, guts and determination. To set the scene, In October 2010 we were at Tier 3 stage of regulation for exhaust emissions. Engine manufacturers were wrestling with the issue of how to achieve increasingly stringent / difficult emission reductions which had been laid out by the legislators for some years to come. A number of manufacturers had recognised that a serious rethink was required and that a new generation of engines may be required together with the accompanying investment to successfully develop that new range.

To put the problem into perspective here is a chart of what was required:



Also to make the task more interesting in January 2011 red diesel was to incorporate at least 5% Bio Diesel, with the accompanying necessity to change the seal materials used in the fuel system to prevent degradation.

An Interesting set of factors and circumstances to ponder upon!

From the introduction of the Tier 3 regulations in 2005 Valtra had been using engines with Selective Catalytic Reduction (S.C.R.) and Bosch common rail fuel injection incorporating the combination of a 4 valve cross flow cylinder head with central injectors. The injectors are operated from a 70 volt electrical supply and the rail runs at 1600 to 2000 Bar pressure.

The fuel is fed through a 30 micron primary filter and 5 micron secondary filter at 1.5 bar pressure to the high pressure pump which comes in and out of stroke according to demand requirements. Injection timing is controlled by the camshaft position sensor and fuel delivery at the injector is in three phases, pre – a small amount to start combustion, main – to produce the power, and post – to extend the potential power delivery.

Exhaust Gas Recirculation (EGR) has been adopted and used by many engine manufacturers for some time as a means to achieve the reduction in NOx in exhaust emissions. NOx is produced in light load situations with light throttle opening. This system reduces the quantity of oxygen present in the cylinder at the completion of the induction cycle by diverting a small quantity of exhaust gas back through the inlet manifold to re enter the cylinder. This has the effect of cooling the burn which takes place following ignition, due to the reduced oxygen available with the result that less / no NOx is formed. One of the drawbacks to this system is that the exhaust gas recirculation valve unit suffers from reliability issues due to its working environment.

They have long dark winters in Finland which I suspect the Valtra Sisu design engineers used to very good effect to overcome and solve the inevitable inefficiencies of the previous design of exhaust gas recirculation systems used by many manufactures. They have developed, and patented, a simple but clever method of achieving the same result while engineering out the unreliability. During the exhaust stroke the inlet valve is also opened about 2mm for a short time which at high turbo pressures provides a scavenging effect but at low turbo pressure it allows a small amount of exhaust gas to enter the inlet tract. So by altering the inlet cam profile to provide this secondary opening during each cylinder cycle they are able to achieve the advantage of further scavenging at high load and simplified E.G.R. when it is required together with improved reliability.

The S.C.R. system is electronically controlled and uses Add Blue, a urea / water based liquid, as an exhaust emission after treatment. The liquid is sprayed into the exhaust before the catalytic converter and reacts with the NOx gas in the converter before being released as nitrogen and water together with carbon dioxide into the atmosphere. The system operates when the engine load is above 60% and the catalyst temperature is above 260°C. The Bosch system injects the add blue at 5 bar pressure and there is a temperature sensor fitted at the bottom of the exhaust stack next to the injector. Engine coolant is used to keep the injector cool, while also being used to heat the add blue in the tank in cold conditions as it has a freezing point of -11°C. If the system is allowed to run dry or becomes faulty the engine is derated to 1500rpm which is equivalent to limp home mode. Add Blue consumption will be equivalent to between 5 – 8% of fuel usage depending upon engine load.

A further snippet of information gleaned on the day was that Scania fuel injection pressures were 2400Bar and they were experimenting with 5000Bar. This was a fascinating and factual session which benefited all who attended, our thanks to Gareth Jones and Valtra.

John Gough.

(Some years later!)

ANNUAL CONFERENCE 2015

Maliebaan Station Utrecht

Museums are of essence places where one reacts to artefacts in accordance to one's own experience, recollections and interest, hence this brief report is skewed towards things which captured my interest.

My fist impression was how well the place was hidden from public view and but for John's advanced driving skills negotiating obstacles within the narrow streets we would have had to walk a long way to get there. However once inside the forecourt, Maliebaan station is an impressive brick building with its majestic archways, regal waiting and rest rooms This bold statement in the 1830 must have been a convincing way to lure people into thinking that this was the only effective way of moving people and goods.

Standing in the main exhibition hall by one of the British built engines made one realise the enormity of it's size and how frightening it must have been for the driver when such a large mass of metal went into some kind of harmonics at speed. By some strange coincidence the previous day our visit the Japanese Maglev train had reached a record speed of 374 miles /hr which just goes to demonstrate how technology has changed from the 20th September1839 when John Middlemis from the UK drove the first steam train from Amsterdam to Haarlem. What intrigued me about the journey was that John was shrouded by a white sheet in the cab for fear that someone would see how he controlled this monster bristling with advanced technology. Several of the steam engines used in the Netherlands in those early days were British built by three principal loco builders and again how things have changed as all of our main line train builders in this country are now owned by foreign companies. I shall refrain from going one my soap box about British manufacturing as I seem to be doing it in every report that I write for ALAM.

Some other items which provided memorable experiences and one in particular which moved me to tears were the wagons used to conveyed prisoners to the death camps in Germany and Poland. Despite being only weathered wooden planks and four wheels one could still sense the fear and utter despair of those who were crammed like animals felt on what was their last journey; a very sobering experience.

Another experience completely new to me was driving a train inside a simulator, David James was the second man, Gwynfor the driver and I just tagged on to enjoy the view from the drivers cab. Everything went swimmingly as we climbed the rack and pinion railway enjoying the wonderful mountain scenery but 'O!' how things changed as the train started to descend and to top it all some f-ing bandit had blown the wooden bridge crossing the ravine, The fall was rapid and I started to climb the back of my seat for fear of being crushed at the bottom. On coming out of the thing Gwynfor wanted to spew, David looked dazed and I temporarily lost my balance, I never imagined that a simulator could replicate real life so vividly.

There were many other items of interest such as the locos and interlocks in the signal box etc but as stated at the beginning, museums are personal spaces and I am sure that you all have memorable recollections of a very worthwhile visit.

Emlyn Thomas

ANNUAL CONFERENCE 2015

Krone

The visit to Krone Factory in Spelle, North Germany started with a presentation of the Company's history.

In 1906 – Master Smith Bernard Krone Founded a blacksmiths shop in the small village of Spelle, North Germany. The company from then on grew and in 1930, the 2nd Generation took over the business. 1962 seen the 3rd Generation and in 2007 saw the 4th Generation of the Krone family take over the running of the business and in 2010 Dr Bernard Krone hands company leadership over to his son Bernard Krone.

During this time the business grew family owned company and is still to this day. The business today has 3 main divisions. Biggest John Deere Dealership in North Germany, Commercial Trailers manufacturer, the 2nd biggest company in Europe and Agricultural Machines (Grassland).

Krone Group has a large workforce and below is the comparison of how the company has expanded within a few years within the commercial trailer and Agricultural Machinery manufacturing.

	2007 / 2008	2013 / 2014
Commercial Trailer	971	1074
Agricultural Machinery	914	1431

19% of the workforce are employed in research and development. The company has 80 apprentices and training last between 2 ½ to 3 ½ years. The agricultural machinery division 30% of turnover comes from the German market. 70% comes from the rest of Europe. The top export country is USA / Canada, then France with the UK being 4th on the list.

In 2009 Krone UK was established and in 2008/2009 it had a turnover of £1m and in 2013/2014 this had increased to £21m. Krone UK employs 26 staff of which 60% are in aftersales. There are now approximately 100 dealers in the UK and the parts warehouse stocks over 8500 different lines, with 120,000 parts worth over £1.6m.

A timeline of krone machinery started off in 1925 with Pasture drinkers. In 1948 krone produced Linkage drawbar ploughs of which 10000 units were sold. In 1977 saw the first Round baler and in 1989 tedders and rakes were produced but in 1993 saw the company focus more down the grassland route and is still that today.

The Factory at Spelle today is a total size of 45 hectares (130 acres) of which 21 hectares is under roof and is split into different areas. The first area we visited was pre-production this is where machining of components, cleaning up castings took place. Amazing only 10% of components are produced in house and everything else is tendered out to other companies all over Germany. On site they only stock enough parts for 2 to 3 days of production. Within Pre-production it runs 4 shifts 24hrs a day.

We then walked into the manufacturing of Mower beds. Roughly 30,000 units are produced each year which is approximately 80 per day. Each bed is air pressure tested for leaks and once built, is put on a test bed for 9 minutes.

The production line or lines were amazing. The first building housed the production lines for Mowers and Rakes each having their own line. These were being built in batches of the same machine then the line would be changed onto a different model. Round Balers, Combi-round balers, Forage wagons each had

their own lines but each machine could be a different model. The baler production line gave employees 24 minutes at each station to attach parts and they aimed to roll off 18 completed balers per day

In the building there was the production line of the Maize headers for the Self-propelled foragers and next to it was the production line for the Big Square bales (Big Pack)

A short walk across the yard dodging the forklifts and the stock of parts waiting to be moved to the various production lines. We entered a newly finish building that houses the production line for the Big X 600, 700, 800 and 1100 forage harvester and there newly developed baby Krone big X 480 and 580 forage harvester and Big M Self-propelled mowers. Again they batch build so they either build the 4 models of the Larger Big X or the 2 smaller Models or the Big M. On the day of the visit we saw the smaller Big X's being built with 11 on the production line spending 2 ½ hours at each station and 4 completed foragers rolling off the production line each day. The 480 and 580 foragers use the MTU (Mercedes) engine and the larger Big X use the MAN engines.

We had a quick tour around the Part Warehouse for their worldwide distribution which covers at total area of 1.2 hectares. Another new building recently completed is Krone's technical building that has a workforce of 500 employees. Unfortunately we were not allowed in this building as this also their research and development building.

The next building we went into was their industrial size paint baths which happens to join onto their fabrication and pre-production line. First the metal which is thicker the 3.6mm gets hung onto an overhead trolley in a specific position not to touch other pieces on metal but hangs in a position so the paint with drip off and not gather in a corner etc. It is first sent through the industrial shot blaster to clean the metal. Any metal less than 3.6 is manually rubbed down and then hung onto the trolley once it comes out of the shot blaster. It then moves on to paint.

The new paint facility was fitted in 2007 and is one of the most advanced dip painting systems in Europe. It expanded Krone's painting capacity by 60%. The system is all computer controlled, starting from the point where the parts are put onto the trolley to where they are removed, with a handful of employees looking after the system. The metal gets lowered and soaked in solutions to clean and degrease it before being lowered into baths filled with paint to give it a strong, durable coating. There would be 8 or so tanks for cleaning the metal and then another 2 or 3 that contained paint. Each of the paint or cleaning tanks holds 90,000 litres of liquid and the whole process takes around 9 hours from start to finish.

Overall the tour around the Krone Spelle factory was very interesting seeing how the company has developed over the years from what they started off with to where they are now. Also how they have developed the site to accommodate the various pieces of modern day equipment they manufacturer and being able to manufacturer so many machines at once.

Thank you to all at Krone who willingly gave up their time to show members of ALAM around their factory.

Paul Clarke
Newton Rigg College

ANNUAL CONFERENCE 2015

The Power of Green

Krone, Spelle. 9th April 2015

Having had a very worthwhile informative tour of the factory, the afternoon was initially to inform us of the "Green" machinery available. Now at this stage I need to apologise as documenting what is available became difficult as my biro began to melt.

There is a huge range available from small mowers to "Big M" and anything imaginable that you could do to hay and forage grass is produced here.

The quality of the manufacturing and the process of keeping the manufactured end product in a good condition with the painting processes, seemed a high priority, not only in Krone, but for all German manufacturers that we saw.

The best I can do with the range is to give you the website address. http://www.krone-uk.com/english/products/round-balers/ Then choose the Ultima video and it thoroughly explains how it works. The continuous baling without the need to stop when tying is very good. I cannot get over the speed it travels, well worth a look.

Reversing the feed belt to stop the crop entering and creating a pre chamber is the main feature to allow continuous non-stop baling.

The square baler video is of the same calibre. The cam less pick up reel is truly ingenious as it relies solely on geometry to retract the tines.

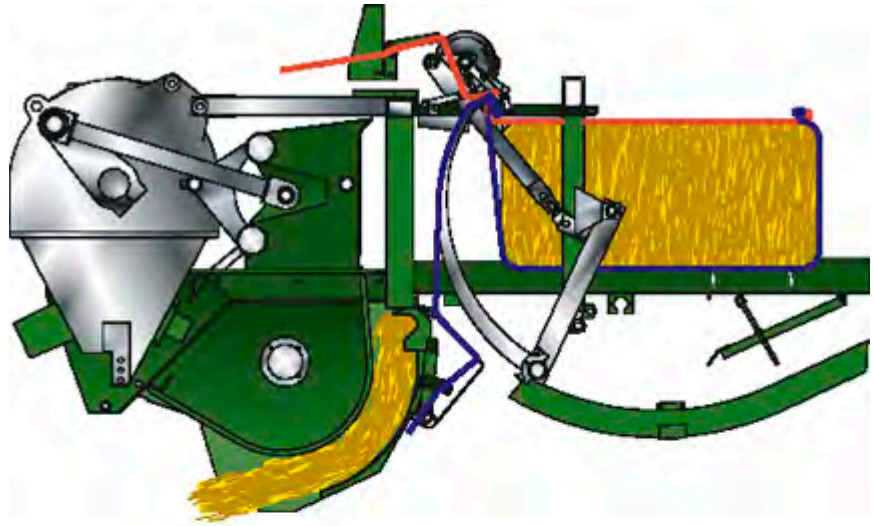
This is one of the only two bearings in the pick up reel. It boasts speed and quietness.

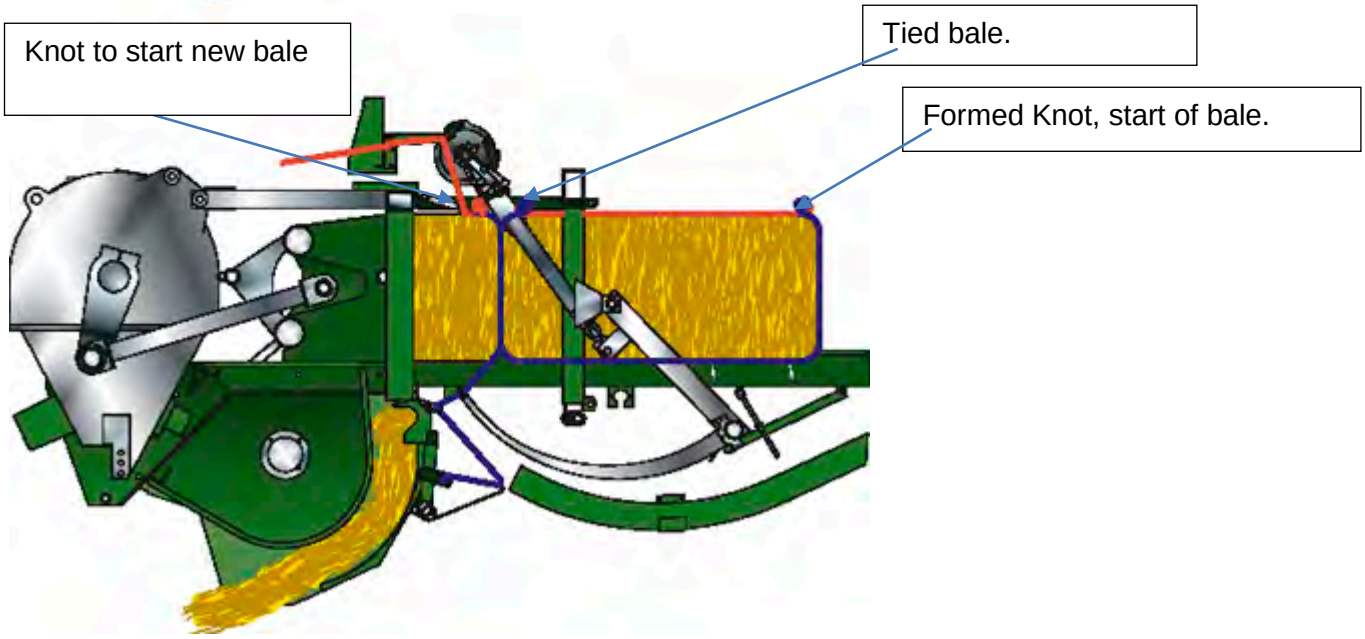
The shaft is off centre and with the shape of the stripper bar achieves smooth, fast operation.

Up to 30 % increase in speed and production in the square baler.

The 8 Knotter ties twice. Once to finish the formed bale, and secondly to start the next.

Because of the increased density of the baling, twine is unable to slide between the formed bale and the forming bale. Therefore when tying off the bale, the knotter completes the bale and then ties off the top spool tail to the Needle spool tail and then is pulled down by the needle. As the bale is formed, the twine extends from the top and bottom spools, until it trips and process is repeated. Does that make sense???





By the way, 2 high density bales per minute is the work rate.

The load wagons are very impressive. It was noted that in Germany, Should the tractor /trailer combination be overloaded, the driver, the person that loaded it and the employer would face prosecution. So having a drawbar and sensing pins to show how much load you have lifted/carrying is advantageous.

Since we mentioned lifting, the easy flow pick up reel is fitted to ZX range as well. The six tine rotor, with tines 55mm apart in this case boast a 50% increase in performance to the conventional cam ring type, there are no moving parts to content with. Clever.

Then the 880mm diameter rotor with Hardox tines arranged in a scrolls sends the crop, if desired through two banks of knives and aim for a cut length of 37mm.

Now knives need to be sharpened. They are easily removed without the need of tools or, for a price there is the easy sharp option. The video clip shows the both banks of knives being sharpened. If you have 2 minutes 39seconds of spare time have a look, as that how long it takes to swing out the knife frame from the belly of the machine, set up the automated sharpener and away you go, not advisable in a "dry" environment perhaps.

I noted earlier that "anything imaginable" is what Krone aim to achieve to forage crops. Imagine a rotor in a Self-propelled forage harvester with inclined blades to the shear bar to give a scissor type cut, nothing new I hear you say.

Krone have put 48blades to suit the biogas industry and it is said that there is a potential of increasing capacity by 25% which in turn can give a 16% saving in fuel, See the following couple of slides, it compares the 40 blades against the super biogas cylinder with 48 blades.

To rotate this monster drum, you need some power. The range available of self-propelled machines starts at the "smallest" Big X at 480 (h)p to the Big X 1100. In case you haven't noticed, the number corresponds to the size of engine in the machines.

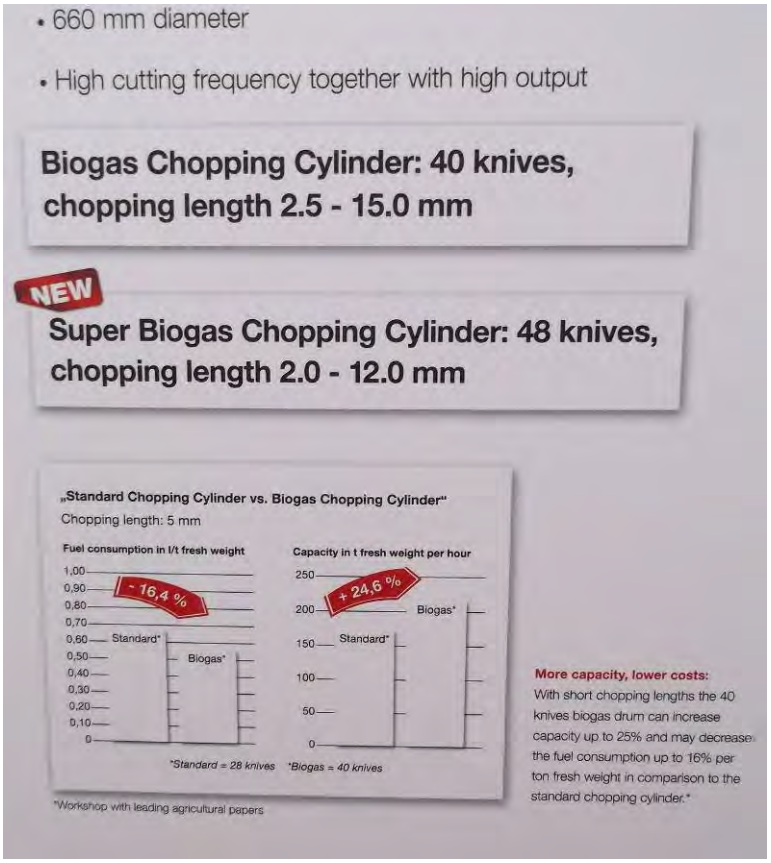
The grunt from the engine rotates hydraulic pumps that then can provide, I quote:-

" Infinitely variable drive power: The wheel motors, the six pre-compression rollers and the header" "The system offers infinitely variable adjustment of the cutting lengths and corn head speeds."

As the drive and steering axle does not depend on shafts, Big X also boasts manoeuvrability with the increased steering angles they can then achieve

So there you have it, an insight to some of the machines we saw being manufactured and explained to us.

David James,
Grwp Menai Llandrillo, Glynllifon
(Some images Krone website, others own camera.)



THE ASSOCIATION OF LECTURERS IN AGRICULTURAL MACHINERY

Accounts - Year ending 31st March 2017

Income and Expenditure

	2015-16				2016-17			
			Income	Expenditure			Income	Expenditure
Subscriptions			938.00				763.00	
Committee Expenses				299.00				219.25
Newsletter				0.00				0.00
Conference	2014	Hartpury	250.00	0.00	2015	Germany	0.00	0.00
	2015	Germany	1,140.00	2,159.33	2015	AGM - NFPC	262.50	0.00
	2015	AGM - NFPC	1,060.00	3,002.39	2016	York	3,350.00	3,645.74
Courses	Oct14	Bomford	0.00	0.00	Feb16	Morgan	425.00	0.00
	Feb15	NIAB	100.00	240.00	0	0	0.00	0.00
	Nov15	Fullwood	0.00	0.00	0	0	0.00	0.00
	Feb16	Morgan	150.00	240.00	0	0	0.00	0.00
Interest			0.00				0.00	
Miscellaneous			745.00	285.28			385.00	285.00
NFAEE fund			0.00	0.00			0.00	0.00
Surplus/Deficit	Deficit		1,843.00		Surplus			1,035.51
TOTAL			**6,226.00**	**6,226.00**			**5,185.50**	**5,185.50**

Statement of Affairs

Bank Account as on 1 April 2016	12,666.00	Bank Account as on 31 March 2017	13,701.51
Plus uncleared incoming cheques	0.00	Plus uncleared incoming cheques	0.00
Less uncashed outgoing cheques	0.00	Less uncashed outgoing cheques	0.00
Plus Surplus	1,035.51		
	13,701.51		**13,701.51**
Of which NFAAE stands at	3,811.78	Of which NFAAE stands at	3,811.78

In my opinion the above is a true and fair view of the financial state of the Association of Lecturers in Agricultural Machinery for the year ending 31st March 2017	
Signed Treasurer	Signed Auditor

ALAM ACCOUNTS

Annual accounts 2016-17

ALAM MEMBERSHIP 2017-18

This is the list of all those whose membership has been renewed as of September 2017.

We still have a couple of unresolved issues with unidentifiable standing orders so please ask your colleagues to check their bank statements– if any have standing orders taking money from their bank but are not on this membership list, please get in touch with the treasurer.

Name	Member No.	Mail to
Bruce Badger	17/053	Sparsholt College
Tim Ball	17/070	Home Address
Nick Bevan	17/060	Home Address
Robin Blackford	17/011	Home address
Denis Bloomfield	17/066	Otley College
Chris Brown	17/039	Home address
Lance Butters	17/078	Home Address
Denis Cartmel	17/045	Home address
Stuart Christie	17/032	Cannington College
Paul Clarke	17/047	Home Address
Richard Clarke	17/069	Otley College
Ian Coleman	17/013	Home address
Peter Coleman	17/059	Home address
Chris Creasy	17/064	Home address
Kevin Davenport	17/067	Home Address
Alan Davey	17/040	Cannington College
Wynn Davies	17/034	Home address
Neal Dodd	17/037	Home Address
Oliver Dunthorne	17/077	Home address
Sandy Ellis	17/055	Askham Bryan College
Colin England	17/026	Home Address
James Foster	17/063	Royal Ag University
Nigel Fox	17/042	Sparsholt College
Richard Gargett	17/076	Home Address
Philip Goddard	17/071	Walford College
John Gough	17/007	Home Address
Julian Greenman	17/036	Home Address
Keith Harrison	17/020	Brinsbury College
Paul Harrison	17/020	Otley College
Simon Harrison	17/020	Home Address
Steve Hasell	17/038	Cannington College
Richard Heath	17/031	Home address
William Helen	17/017	Home address
David Heminsley	17/008	Home address
David Henley	17/074	Home Address
Trevor Hicks	17/050	Hartpury College
Graham Higginson	17/012	Harper Adams
Vic Hird	17/073	Home Address
Tony Houghton	17/025	Home address

Name	Member No.	Mail to
Phillip Hurrell	17/051	South Cheshire College
Tim Hutchinson	17/049	Warwickshire College
David James	17/029	Home Address
John Jones	17/046	Home address
Chris Keeble	17/006	Home address
Brian Kessell	17/028	Duchy College
Nigel Macpherson	17/010	Home address
Patrick McLeod	17/019	Hartpury College
Chris Morgan	17/018	Home Address
Tym Morgan	17/056	Warwickshire College
Richard Newman	17/041	Home address
Brian Nicholls	17/014	Home Address
Tim Northmore	17/035	Kingston Maurward College
Mike O'Dowd	17/002	Home address
Robert Patmore	17/065	Home address
Brian Poulson	17/015	Home address
Freddie Pullan	17/075	Home Address
Robert Rattray	17/068	Home address
Paul Reynolds	17/072	Home Address
Jonty Rostron	17/009	Home address
Jon Sarsfield	17/044	Home address
Michael Sidlow	17/058	Lackham College
Graeme Smith	17/023	Reaseheath College
Roger Soper	17/061	Home address
David Sparkes	17/021	Home address
Charles Szabo	17/027	Home Address
Emlyn Thomas	17/052	Home address
Tom Turney	17/001	Home address
Mark Tyson	17/043	Home address
Arthur Walker	17/003	Home address
Peter Walley	17/057	Home address
Stephen Watson	17/062	Riseholme College
Mike Wellham	17/054	Home Address
John Welwood	17/030	Home address
Ian Whitehead	17/004	Home address
Gwynfor Williams	17/005	Home address
David Wilson	17/033	Home address
Peter Woodliffe	17/048	Home address

Honorary members are:
Robin Blackford, John Gough, David Heminsley, Graham Higginson, Chris Keeble, Nigel Macpherson, Mike O'Dowd, Jonty Rostron, Tom Turney, Arthur Walker, Ian Whitehead, Gwynfor Williams, Ian Coleman.

ASSOCIATION OF LECTURERS IN AGRICULTURAL MACHINERY

Membership Application Form

Title	Initials	Forename		Surname	
Home Address			College Name		
			Address		
Postcode			Postcode		
Phone			Email		
My connection with education in agricultural/horticultural engineering is:					
Signed			Date		
Proposer (Member of ALAM) If you don't know any members, just return the form and we'll arrange contact with one in your area.					

HOW TO PAY- The current rate is £20 per annum, payable on April 1st each year.

By cheque: Cheques should be crossed and made payable to "The Association of Lecturers in Agricultural Machinery", and sent with this form to the treasurer.

By standing order: It will help us provide an efficient service to members if you pay subscriptions by Standing Order, by completing the following, and returning the whole form to the treasurer.

Bank Name	Name of Account
Branch	Account No.
Address	Sort Code
	Payment Reference
	Please write your Initial and Surname as a Payment Reference in the space above, to ensure ALAM can clearly identify your payments.
Postcode	

Please pay to Lloyds Bank, 12 Lendal, York, YO1 2AF, (Sort Code 30-99-99) in favour of The Association of Lecturers in Agricultural Machinery (Account Number 1373714), the sum of £10 immediately, and then annually on the first of April each year, until cancellation by me of this standing order, debiting the account specified above.

This order cancels and replaces all previous orders in favour of The Association of Lecturers in Agricultural Machinery.

Signed	Date

Standing Orders are for a fixed amount, which can only be altered by you. It is not a Direct Debit, which allows the payee to vary the amount drawn.

Return completed forms to David Heminsley, ALAM Treasurer,
The Old Byre, Lower Street, Doveridge, Ashbourne, DE6 5NS.

For use by the treasurer							
Details recorded		Payment received		Bank Order processed		Member number	

Form revised June 2009