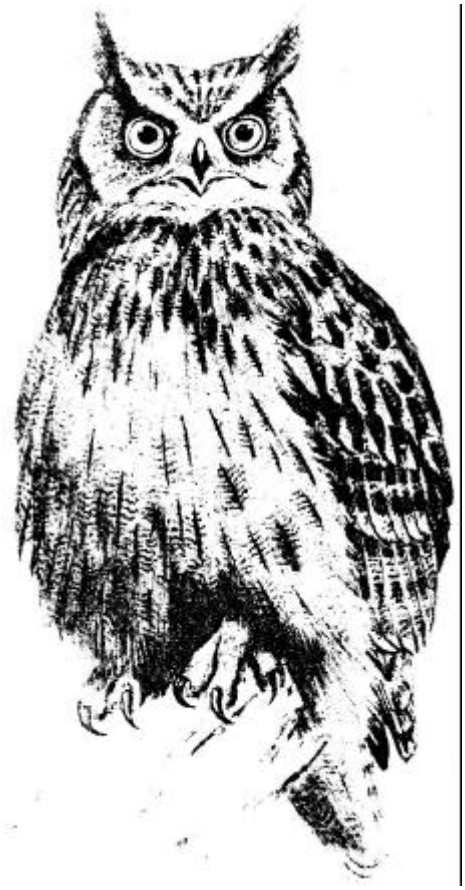
ALAM

Newsletter

Summer 2001



The Association of
Lecturers in Agricultural Machinery

The Association of Lecturers in Agricultural Machinery

Engineering Sector
Reaseheath College
Reaseheath
NANTWICH
Cheshire
CW5 6DF

July 2001

Dear Colleagues

I apologise for the delay in the production of the newsletter but major changes in the way that we work and are funded will cause our lives to remain hectic for quite a while I'm sure. The vast changes that are also taking place in the qualifications that we deliver will also contribute to a rash of headaches as well.

I issue a general plea that, in order for ALAM to continue to survive as an organisation that represents you, ordinary members become involved in suggesting short courses and be prepared to assist the committee in the delivery of such events for the benefit of all. This is the only way that such events take place, with the end reward being satisfied members. If any member has suggestions for such courses could they please contact a committee member with as much detail as possible.

Hope that you all have a well-deserved rest over the holiday period and return with renewed energies for the new term starting in September.

Phillip Hurrell
Honorary Secretary

The Association of Lecturers in Agricultural Machinery

NOMINATIONS FOR COMMITTEE

If you wish to nominate any Officers for Committee, please complete the form below and return to;

Phillip Hurrell
Engineering Sector
Reaseheath College
Reaseheath
NANTWICH
Cheshire
CW5 6DF

Present Officers

Chairman	Chris Creasy	Otley
Chair Elect	Ryan Roberts	Duchy
Secretary	Phillip Hurrell	Reaseheath
Treasurer	David Heminsley	JCB
Past Chairman	Tony Houghton	Myerscough
Committee members	Tim Richardson	
	Jonty Rostron	Newton Rigg
	Len Foreman	Rycotewood
NVQ (co-opted)	John Gough	Rodbaston
Inst. Ag. Eng. Conference 2002	Clive Perrins	Writtle

	Nominee	Proposer	Seconder
Chair Elect			
Secretary			
Treasurer			
Committee member 1			
Committee member 2			
Committee member 3			

Chairman's report

The last year of the Millennium has been an interesting one for ALAM, and became decidedly unconventional towards the end. It started for me as Chair of this association fairly conventionally with the annual technical conference at Reaseheath, efficiently organised by Phil Hurrell, amid the usual "networking" and technical updating for which ALAM conferences are renowned. The maize maze managed to get some members confused and lost, but later that evening, most of the assembled were totally perplexed by the Anderton boat-lift (or rather its age/ how it worked EXACTLY).

During the year there was another opportunity to spend a day at Lucas looking at Diesel Fuel injection systems, followed in December by a four day course at Claas looking at their balers, combines and tractor. Thanks to the organisers, Jonty Rostron and Tim Ball for those.

The major event of the year (or even Millennium?) was the study tour to Denmark, organised with meticulous attention to detail and executed with equal precision by Gwynfor Williams. It is almost true that he got everything "spot on", apart from two minor points;

1) the boat sailed to Holland instead of Denmark,
2) the Buch tractor factory had closed several years before our visit (but never mind, as we eventually managed to visit most of the tractors they made!!)!

In keeping with the Welsh flavour of the expedition, our driver was again the tireless John (the bus) Jones, who managed to get us to all our destinations in plenty of time, kept the usual string of facts and (poor) jokes flowing whilst driving, and upset several of the factory guides who got on the bus by putting on his "jam-jar bottom" glasses!

Seriously, it was a magnificent trip, and I am sure that all who went with us to Denmark are very grateful to Gwynfor for his efforts. We visited an interesting " near neighbour" of ours, and got to see how they live [well], work [hard] and play, although judging by the way the only pub in Soro ran out of beer on our second night, I am not so sure they play as hard as us. Or perhaps they didn't know about ALAM tours? In amongst all the "education", we still managed to hold an EGM, although it had to take place on the coach, covering matters that could not wait till the summer

The Cruise to get to Denmark and back was another education in many ways, not least of which was the impossibly calm seas on both trips. We made such good time on the way out that the boat stopped in the middle of the North Sea, let down a speedboat and practised rescue drills; I thought for a moment that Gwynfor had arranged warterski lessons for us all. The trip to the engine room was as anyone who has been on an ALAM visit would expect; kids in a sweet shop (or is it bulls in a china shop?), with the bemused engineers trying to

a) hear,
b) understand the questions,
c) keep the boat running and
d) stop Jonty from seeing if he could actually change the rings whilst the engine was still running.

The "mini" conference took place in the summer at Otley, thanks to this year's chairman, Chris Creasey, who organised a splendid couple of days, with plenty of "hands on" in their centre of excellence, followed by trips to Textron and Felixtowe Docks to look at the logistics of the container port. It was here that I handed over to Chris, and I wish him well for the coming year. Finally I must thank all the members of the committee who travel the country to organise the sort of varied and stimulating year that you see above. They do a wonderful job; please support them, or better still become one!

Tony Houghton

THE ASSOCIATION OF LECTURERS IN AGRICULTURAL MACHINERY

Income and Expenditure - Year Ending 31st March 2001

			1999/2000			2000/2001	
			Income	Expenditure		Income	Expenditure
Subscriptions			1302.00			1142.00	
Committee Expenses				724.25			397.21
Newsletter				81.8			86.10
Courses	Spring	Pneumatics	540.00	22.21	Otley	435.00	72.00
	Summer	Lucas	430.00	0.00	Claas	100.00	0.00
	Winter	Claas	500.00	528.75	one-day	0.00	0.00
Conference		Reaseheath	2810.00	2387.43	Denmark	500.00	4882.17
		Denmark	5000.00	6197.84		0.00	0.00
Interest			48.25			95.65	
Miscellaneous			130.00	361.53		185.00	672.50
Surplus/Deficit				456.44		3652.33	
TOTAL			**10760.25**	**10760.25**		**6109.98**	**6109.98**

Statement of Affairs as of 31st March 2001

Bank Account as on 1 April 2000		9082.18	Bank Account as on 31 March 2001		1373.15	29/03/01
Building Society as on 1 April 2000		2696.46	Building Society as on 31 March 2001		2766.16	
Plus uncleared incoming cheques	01/04/00	700.00	Plus uncleared incoming cheques	29/03/01		
Less uncashed outgoing cheques	01/04/00	4687.00	Less uncashed outgoing cheques	29/03/01		
Less Deficit		-3652.33				
		4139.31			**4139.31**	

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 2001

Signed
Treasurer _____ Signed _____ Signed _____

ALAM Members 2000-2001

Listed according to where Newsletters are mailed to.

Askham Bryan College
Sandy Ellis 01/ 086
Paul Talling 01/ 012

Barony College
Ian Taylor 01/ 030

Bicton College
Julian Jordan 01/ 021

Bishop Burton College
Martin Baxter 01/ 097
Rick Sunderland 01/ 098
Charles Szabo 01/ 117

Brackenhurst College
Vic Hird 01/ 071
Martin Towsey 01/ 022

Brinsbury College
David Harris 01/ 040

Cannington College
Stuart Christie 01/ 004
Alan Davey 01/ 100
Frank Facey 01/ 041
Steve Hasell 01/ 099

Claas UK Ltd
David Sparks 01/ 005

Coleg Meiron Dwyfor
Terence Broad 01/ 042

Coleg Powys
Neal Dodd 01/ 026

De Montfort University
Clive Bound 01/ 011
Graham Hartley 01/ 104
Stephen Watson 01/ 064

Duchy College
Duncan Elliott 01/ 035
Anthony Kessell 01/ 068
Ryan Roberts 01/ 115

East Devon College
John Palmer 01/ 014
Tony Roberts 01/ 018

Easton College
Gerald Anderson 01/ 081

Evesham College
Alan Fagg 01/ 061

Hadlow College of Agriculture
James Sanders 01/ 002

Hartpury College
Patrick McLeod 01/ 091
David Scotchmer 01/ 039

Hayter Ltd
Robin Blackford 01/ 106

Hereford College of Technology
Ian Coleman 01/ 008

Home
Michele Brown 01/ 113
John Bumby 01/ HON
Denis Cartmel 01/ 051
Peter Cockrell 01/ 087
Keith Coldwell 01/ 066
Peter Coleman 01/ 034
Miles Couchman 01/ 003
Oliver Dunthorne 01/ 116
Paul Durant 01/ 084
Peter Homer 01/ 059
Richard Newman 01/ 107
Mike O'Dowd 01/ HON
Robert Patmore 01/ 053
Brian Poulson 01/ 082
Robert Rattray 01/ 043
Jon Sarsfield 01/ 108
Alastair Taylor 01/ 013
Emlyn Thomas 01/ 058
Mark Tyson 01/ 088
Arthur Walker 01/ HON
John Welwood 01/ 029
Ian Whitehead 01/ 112
David Wilson 01/ 017
Peter Woodliffe 01/ 055

JCB Training Centre
David Heminsley 01/ 122

Kingston Maurward College
Colin England 01/ 102
David Henley 01/ 054
Tim Northmore 01/ 010

Lackham College
John Dixon 01/ 057
Richard Heath 01/ 015
Michael Sidlow 01/ 090

Llysfasi College
Peter Eland 01/ 069

Myerscough College
Kevin Davenport 01/ 049
Jon Hesketh 01/ 121
Tony Houghton 01/ 083
Gwynfor Williams 01/ 050

Newton Rigg College
John Jones 01/ 052
David Ross 01/ 067
Jonty Rostron 01/ 079

Oaklands College
Chris Bishop 01/ 094
Nicholas Cartwright 01/ 037

Otley College
Richard Clarke 01/ 078
Stewart Cousins 01/ 009
Chris Creasy 01/ 044
Derek Felgate 01/ 118
Paul Harrison 01/ 103
Chris Keeble 01/ 062
Michael Percival 01/ 077
Andrew Soar 01/ 048
Mark Stallabrass 01/ 036
Tom Turney 01/ HON
Richard Waterson 01/ 076

Otter Services
Thomas Fackrell 01/ 114

Reaseheath College
Tim Ball 01/ 110
Mark Embrey 01/ 046
Andrew Frank 01/ 016
Phillip Hurrell 01/ 065
Melvin Johnson 01/ 024
Alexander Johnston 01/ 025
Dave Kynaston 01/ 023
Rob Lee 01/ 085
Brian Nicholls 01/ 092
Simon Parker 01/ 047

Rodbaston College
John Gough 01/ 089

Royal Agricultural College
Harry Catling 01/ 056

Rycotewood College
Lionel Foreman 01/ 074
Evelyn Pearce 01/ 028
David Stephenson 01/ 038

South Kent College of Tech
Bob Creasey 01/ 095

Sparsholt College
Bruce Badger 01/ 075
Nick Bevan 01/ 007
Nigel Fox 01/ 111
Julian Greenman 01/ 093
Richard Gregory 01/ 073
William Helen 01/ 019
Nigel Macpherson 01/ 070
Roger Tiller 01/ 080

Walford College
Graham Higginson 01/ 120
Chris Morgan 01/ 119

Warwickshire College
David Howells 01/ 001
Tym Morgan 01/ 096
Peter Walley 01/ 072

Welsh College of Horticulture
Trevor Edwards 01/ 020
Colin Hughes 01/ 063

Writtle College
Brian Cairns 01/ 109
Steve Hackett 01/ 032
Paul Hill 01/ 027
Iain Kirk 01/ 105
Richard Langley 01/ 033
David Lankester 01/ 101
Les Milne 01/ 006
Clive Perrins 01/ 045
Steve Warr 01/ 031

As on 29/5/2001. Subscriptions for 2001/2002 are due on April 1st.
Thanks to all those who now use standing orders – it's so quick and easy!

TIM RICHARDSON

20/3/49 – 26/5/01

It is with great sadness that I write this obituary of a very old friend of mine and a longstanding friend of ALAM's.

Tim joined or rather first came in to contact with ALAM as I did in 1979 when our erstwhile machinery lecturer, the late Graham Hobbs invited us to present / describe the designing and running of the truck mounted slurry tankers and forage harvesting outfits.

It was the Myerscough conference and after the presentation we were invited to go on the other visits/sessions. We suddenly met all these witty, intelligent, obscure personalities that liked agricultural machinery and had a great time during which we were encouraged to join the profession!!

I succumbed first later that year, Tim followed me in 1983 to Rycotewood College where we trained. Tim took up his teaching post at Oaklands College in 1986 where he stayed until he was diagnosed with non Hodgkins lymphoma in 1996. During that time he worked with three stalwarts of ALAM, Chris Bishop, Nick and Roger Thomas. He often went abroad to Africa in particular, where he helped with aid work providing clean water supplies etc, indeed he took a years unpaid leave to enable him to do more.

This was typical of Tim, encouraging and helping others with their ideas but often not getting the glory (if any) himself.

Tim attended many of the conferences over the years and was elected to the committee in 1999. He attended the last meeting with me at the Poachers Pocket just a couple of months ago when he was obviously suffering considerably. He bore his illness with great fortitude, always having a positive attitude right up until the last three weeks or so when he accepted the inevitable with tremendous strength and bravery.

Tim died in the St Johns Hospice Lancaster just before midnight on the 26th of May and was buried with his mother at St Michael and Mary's Church, Garstang on the 31st of May. The family requested that there be no flowers but donations to the St Johns Hospice and the Macmillan Nurses Fund. ALAM made a donation of £25 to the fund which in total raised over £1500.

Tim's father and nephew are carrying on the family dairy farm on which Tim was born and lived for all his life.

Jonty Rostron

June 2001

Minutes of THE 40TH ANNUAL GENERAL MEETING held at Otley College

1. Apologies

John Jones, Reaseheath staff, Chris Keeble, Mike Percival, Gwynfor Williams, John Gough, Dick Waterson, Dave Heminsley, Duchy staff.

2. Minutes of the 39th AGM held on Tuesday 18 July 1999

Proposed by Chris Creasy, seconded by Tim Richardson, duly signed as a true record of the meeting by Chairman.

3. Matters from the minutes of the last AGM

There were no matters arising.

4. Chairman's report

Tony Houghton gave his report, copy in the newsletter.

5. Treasurers report

Dave Heminsley was unable to attend the meeting, but Phil Hurrell presented a copy of the accounts to date. The accounts currently look very healthy as not all the bills for Denmark have been cleared, so the account will drop shortly. Dave will supply Phil with an updated and audited account for the Autumn newsletter.

The report was proposed by Stewart Cousins and seconded by Jonty Rostron.

6. Induction of new Chairman

Tony Houghton induced the new Chairman, Chris Creasy

7. Presentations

Chris presented Tony with the gift of an owl painting, with a statuette to be presented at the next committee meeting as we are having difficulty with a supplier at the present moment. Tony was thanked by all for his efforts during the past year.

8. Election of Committee

Chairman Elect
Ryan Roberts was proposed by Jonty Rostron and seconded by Tony Houghton. Due to his absence, Phil was asked to get in touch with Ryan to see if he was prepared to stand.
Secretary
With no nominations Phil was asked if he would stand and duly agreed.
Treasurer
With no nominations Dave was asked if he would stand and duly agreed.
Committee members
No nominations were received for committee member. With no nominations Jonty Rostron suggested that he would be willing to take the post for a short period until a nomination was

found. The committee accepted this. Jonty was proposed by Phil Hurrell and seconded by Tim Richardson.

9. Election of Auditors

On Dave Heminsley's behalf Phil Hurrell proposed to continue to use the services of business lecturer at Rodbaston College as Auditor. Seconded by Stewart Cousins and duly carried.

10. Nominations

There were no nominations for Honorary membership. However the assembled members suggested that the committee look at the possibility of Honorary membership for Ian Whitehead, as a result of the contributions he has made to the association. The committee will consider such a proposal and report at the next AGM.

11. 2000 Conference

Gwynfor was praised for the excellent European Conference that took place at Easter.
Chris Creasy was thanked for the two-day conference that the delegates had just attended.

12. 2001 Conference

Phil outlined the plans to go to Writtle College in the year 2001. He has spoken at length with the Engineering Department. Suggested visits to include Ford New Holland, Packman Diesels, Dengie crop driers, flood defences and several large farm enterprises.
Further details to be provided in the Autumn newsletter.

13. Southern Ireland colleges

It was proposed that this item be withdrawn from the agenda as we have unfortunately only acquired one member from such colleges. Proposed by Phil Hurrell and seconded by Jonty Rostron

14. Constitution amendments

The proposed changes to the constitution as outlined by Phil were discussed.
Following further discussion on the detail the proposed changes were accepted with the secretary to send out an amended constitution to all members with the newsletter.
Proposal made by Jonty Rostron and seconded by Stewart Cousins.

15. One day seminars 2000 / 2001

Claas – it is possible that Claas will provide us with another four-day event at Saxham, with a likely date being the October half term. All the delegates agreed that we should pursue the offer if it materialises.

16. GNVQ / NVQ update

NVQ – John Gough was unavailable to present a report. John has also expressed his wish to stand down in the role of our representative at BAGMA E&T meetings, as his workload at Rodbaston does not allow him the time to attend. Phil was asked to write a letter of thanks to John for his efforts on our behalf.

GNVQ - no changes due on GNVQ until Advanced level changes in September 2000.The GNVQ will become a very basic generic qualification, made up of six mandatory units and about 18 optional units (not fully sorted out yet). Reaseheath College will be actively involved with EdExcel in the design of units for both the GNVQ and Certificates and Diplomas.

17. Update on links with The Institution of Agricultural Engineers Education and Training Committee

No report was forthcoming from Dave Stevenson.

18. Any other business

Phil to investigate the probability of sending out the newsletter in an electronic format

Phil asked for all report writers to produce reports in either hand written form that can be typed up by him or on a computer disc.

Tony Houghton proposed a vote of thanks to Chris Creasy for the Conference that he had laid on at Otley.

With no other business the meeting was closed.

Signed as a true record _____

Chairman

Phillip Hurrell
Honorary Secretary

Association of Lecturers Agricultural Machinery
European Study Tour
Denmark 2000

Visit to Aalborg Tekniske Skole, Jordbrugsskolen.

Danish Agricultural Education
Alternative Energy Systems

Visit Co-ordinator : Kaj Holm

Talk by Kaj Holm

Danish Agricultural Education

Kaj Holm outlined the Danish education system . The Danish state education system started in 1976. Education is free and nine years of schooling starting at the age of seven is compulsory. About half of all Danish students who graduate from secondary school continue on to higher education. Slightly more than half of these graduates enrol in vocational programmes.
Aalborg Technical School has 3000 students with 600 teachers. The farm school is situated two kilometres away from the main school. The farm students alternate between farm training and studies in farm school. The farm students are mainly boys but girls tend to concentrate on courses involving horses, pigs and dairying. Student hours per week are 34 with 22 taught hours and 11 hours of self-learning periods.

Danish Agriculture

This is carried out on lowland fertile farms but there are rolling hills, beech woods and heather covered moors. The highest elevation is 173 metres but there are no mountains.

There are many part-time farmers with a typical farm size of 30ha, 100ha farm size is required to be self-sufficient.
Dairy production and grain farms are popular, sugar beet is grown, and potatoes are grown with a 3-5 year gap between crops. There are legal limits on the amount of slurry that can be applied to the land. Slurry is not spread in the winter. Zero grazing is a common practice.

Biogas

Owing to the oil crisis in the early seventies, interest in biogas production from animal manure as an alternative to fossil fuels. Experimental farm scale plants were set up in Denmark but due to technical and economic problems they were closed down. The first centralised biogas plant was established in 1984 with combined heat and power production facilities. The heat was supplied to a nearby village and electricity was sold to the electricity grid. There are now 20 centralised biogas plants in operation in Denmark not only supplying energy but helping to solve a number of environmental problems in agriculture, waste recycling and greenhouse gas reduction.
The centralised biogas plant concept is used in Denmark to treat animal manure, mainly slurry. The slurry is transported from farms to the biogas plant in vehicles owned by the biogas plant. This animal manure is approximately 75% of the biomass treated in Danish plants. About 25% of the biomass is waste from the food processing industry. Some plants treat sewage sludge as a supplement to animal manure and 4 plants are capable of treating source separated household waste. Generally the food processing industries and municipalities transport their waste to the biogas plant.
The manure and organic waste are mixed and digested in anaerobic digestion tanks for 12-25 days. During this time weeds and pathogens are killed off to a satisfactory level. The biogas is produced from this digestion process and it is then utilised in combined heat and power production plants. Heat is

distributed in district heating systems and the electricity is sold to the power grid.
The biomass or digested manure leaves the digestion tanks. It is returned to slurry storage tanks by vehicles. The slurry storage tanks usually belong to the biogas plant but they may be placed near farms or near fields where the digested manure will be used to fertilise the fields.
Slurry separation equipment as a post-treatment facility is not used very much because the biogas plants have not managed to generate a market for digested compost products. Separation technologies and distribution systems may be offered by centralised biogas plants in the future if restrictions on manure application and demands on nutrient utilisation increase.
A visit to a Vegger biogas production plant, which mainly utilises pig slurry, illustrated the process from digestion of the slurry to the combined heat and power production facility.

Heat Pump

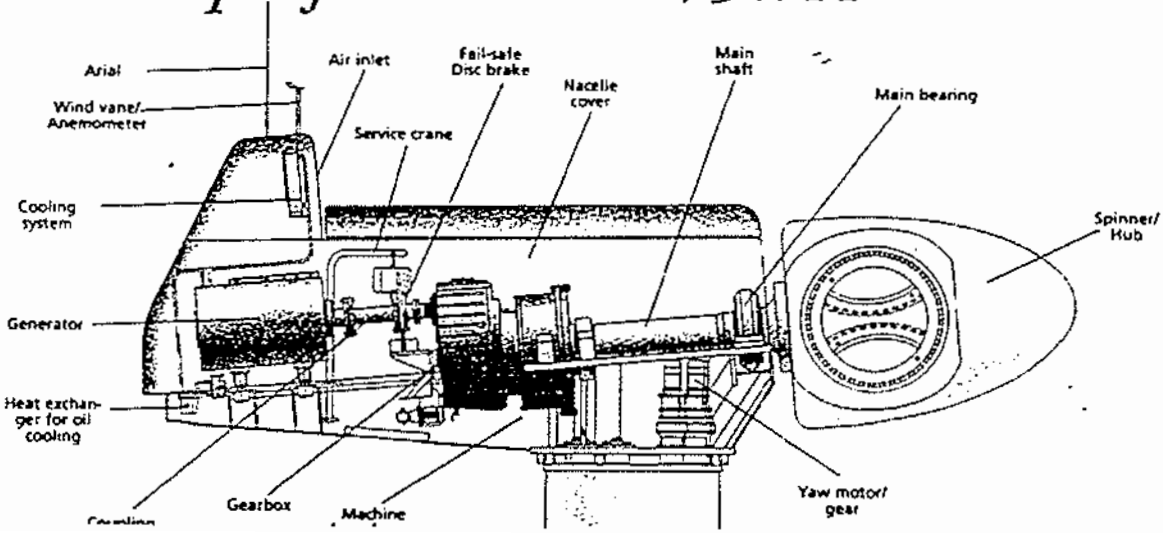
In the upper 3 metres of the Earth, that is shallow ground, a nearly constant temperature between 10-16 degreeC is maintained. This ground temperature is warmer than the air above it in the winter and cooler than the air above it in the summer. This resource is utilised by geothermal heat pumps to heat and cool buildings. These pumps consist of three parts : the ground heat exchanger, the heat pump unit and the air delivery system.
The heat exchanger consists of a system of pipes, called a loop, which is buried in the shallow ground near to the building. A fluid normally water or a mixture of water and antifreeze circulates through the pipes to absorb or relinquish heat within the ground.
The heat pump removes heat from the heat exchanger and pumps heated fluid into the indoor air delivery system in the winter.
The process is reversed in the summer and the heat pump moves heat from the indoor air into the heat exchanger. The heat

removed from the indoor air during the summer can also be used to heat water thus providing a free source of hot water.
Less energy is used by geothermal heat pumps than conventional heating systems since they draw heat from the ground. They are also more efficient at cooling buildings thus saving energy and reducing air pollution.
A visit to a dairy farm , utilising this system, and the factory producing heat pumps amply illustrated the application of this process.

Wind Generator

Denmark has many wind turbines particularly in breezy coastal areas. The wind turbine uses the wind`s energy to generate electricity. They are mounted on a tower to take advantage of the faster and less turbulent wind conditions. The propeller blade design catches the wind energy. Two or three blades are mounted on a shaft to form a rotor.
When wind blows against a blade, a pocket of low-pressure air forms on the downward side of the blade. The low-pressure air pocket then pulls the blade towards it, causing the rotor to turn. That is, "lift". The force of the lift is very much stronger than the wind force against the front side of the blade. That is "drag". The combination of lift and drag causes the rotor to spin like a propeller and the rotating shaft operates a generator to generate electricity.
A visit to Kaj Holm`s Micon NM 750/44 wind generator was very interesting and informative.

Technical specifications: NM 750/44



The wind turbine has a nominal output of 750kW and it operates in a nominal wind speed of 16m/s that is, cut-in wind speed of 4m/s and a cut-out wind speed of 25m/s. The rotor has 3 blades, the rotor diameter is 44metres and the rotor swept area is 1520square metres. The wind generator is computer controlled.

Willow biomass visit

An evening visit to Denmark`s largest willow biomass growing/ harvesting/ processing farm. Mr Aaye gave us a very interesting and informative tour of his willow biomass facility.
The willow is planted by machine in the spring and is ready to harvest in 3-4years. The crop is cut and chopped by the harvesting machine or a cutting machine can be used for whole crop harvesting where the willow is to be used for willow baskets and fencing products. The chopped willow is mixed 50%:50% with rye. This mixture is fed into the boiler by auger to give a very useful bioenergy resource.
Arthur Walker

TEXTRON

TURF CARE AND SPECIALTY PRODUCTS

Introduction

On the way to the Ransomes Factory, we were reminded that the current facility only occupies a very small part of the old factory site that produced a great deal of ploughs and other cultivation equipment. The large furnaces have long gone, to be replaced by an industrial estate.

In the reception foyer we were reminded of bygone years with a vast array of photographs, awards and medals on display. We were told that the factory now only produces turf care equipment under the banner of the parent company TEXTRON. This includes the brand names Ransomes, Jacobsen and EZ Go.

Modern manufacturing techniques have now been employed to produce these product lines.

Our first stop was the training school where a number of machines were assembled for our close inspection. After a great deal of hopping on and off seats we proceeded to the manufacturing facility where the party was split into two groups.

Over the last three years the factory has been significantly reorganised employing lean manufacturing techniques such as cellular manufacture and Kanban supply systems. The management is structured to operate with eleven areas that are well-defined cells.

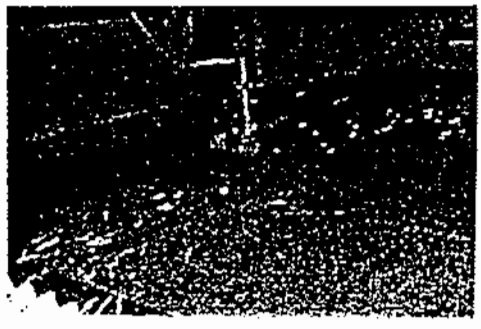
Press Shop

The Press Shop is very logically organised to provide the best flow of materials. At the far end there are two Pullmax punch presses and a Bystronic laser cutter that feed work into queues to be bent. There are four bending machines that are fully programmable. The computer programmes control back-stops which locate the material in the correct position for bending. After bending, work is stored on a number of racks that feed into the spot weld and TIG (Tungsten Inert Gas) welding area. Most of the parts produced in this area are finished panels and tanks.

Information flow is vitally important to the operation of a cell. To achieve this there are two trolley parks that receive empty trollies from the assembly lines with a signal that parts need replacing. In turn, removing material from the racks to fill the trollies results in the racks themselves becoming empty which then sends a signal to the punch presses, laser and benders that those parts need making again. Material flows from the laser cutter and punch presses towards the trolley park and information flows in the opposite direction. This is a classic example of the cellular manufacture called Kanban that operates throughout the factory.

Laser Cutter

The Laser Cutter was purchased in late 1995 to add to the capacity of the Press Shop and cost in the region of £350,000. It is used for cutting thicker material with the punch presses used for cutting thinner sheet material.



Paint Shop

Within the Paint Shop there are two massive lines where all the painting is done. The automatic line is the original line purchased in late 1995 at a similar cost to the laser cutter. The recent addition of the second line purchased in late 1998 at a cost of around £150,000.

This plant was sited in this area of the factory particularly as it is closed to all of the manufacturing areas but, more importantly, the cleanest most modern building they currently have.

The main larger plant uses modern Iron Phosphate technology in a five stage cleaning process followed by an electrostatic powder coating facility. The powder coat booths are enclosed in a Clean Room that receives an air supply from outside and therefore does not get contaminated by the dusty factory atmosphere.

In the main line there are two booths which move on to the conveyor line according to which colour is required, either black or green. These contain all the equipment necessary to spray powder, collect and recycle all the waste.

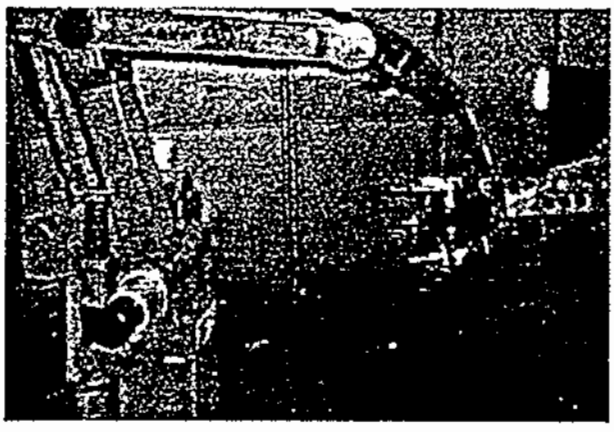
The cylinder construction building also has a similar line but scaled down, just to cope with painting the cylinders red.

The latest line is for powder coating or wet spraying the larger parts such as chassis and large welded assemblies and can also spray any colour.

The powder coat process works by earthing the workpiece and firing powder through a plastic nozzle which imparts a positive static charge (a simple analogy would be to comb your hair with a cheap nylon comb). The powder then sticks to the work piece in a very uniform manner. The work piece then passes through an oven where it is heated to 218°C which melts and fuses the powder to leave a smooth coloured finish. This ensures that all parts are evenly coated in all the nooks and crannies.

Weld Shop

The weld shop has it's own number of self contained small weld cells. The cells or bays are racked out with all of the piece parts, jigs, fixtures and tools necessary to complete an assembly. It also has a robot welder for certain components.



The robot is a five-axis unit which is used for the production of critical parts such as bottom blocks, wheel hubs and cutting frames. The principle of the operation is very simple – the operator loads and unloads the fixture on one side of the screen while the robot welds on the other side. Teaching the robot is very simple, there is a control box with a joy-stick which can control the arm, which the robot then learns and copies again and again for each type of component.

The piece parts are stored in two bins of equal size. Each bin contains a Kanban card that carries all the relevant information required to make the part. As the welder empties the bin it is removed from the rack and taken to the collection point and the second bin is pulled forward. The first bin is sent away for replenishment and arrives back on the rack before the second bin is emptied. This Kanban system is applied to all the piece parts that are manufactured for all the main line products.

Machine Shop

The Machine Shop is currently organised into specific processes and utilises cell technology to cut down transport times and costs in the factory by the flow of the piece parts produced on high technology machine tools.

The LB15 Bar Lathes were purchased between 1985 and 1987 at a cost of £70,000 each. They represented the best available technology and now, ten years on, are much slower than a replacement machine. The bar is loaded into the back of the machine and the piece parts produced with tooling that is controlled by a computer programme held in the controller. The controllers themselves have a graphics feature on them which is designed to ease on-line programming. They do not programme on-line but actually produce all the programmes in one office where they are maintained and managed. The next logical step, in the future, will be to link these machines directly to a central computer.

Behind the lathes are two MAZAK Maching Centres. These two machines are part of an £800,000 investment made in August 1996 to support the on-going commitment to manufacturing. The machines are 60% faster than manual machines and 25% faster than the LB15 Lathes. These machines have twin turning heads. This allows work to be held at one end, turned to shape and transferred to the second chuck. The part is then separated from the bar and finished. In addition, a further turret that holds powered tooling allows milling and drilling work to be carried out. This facility allows parts to be completed in one operation. Parts that used to take nine minutes and five different machines now being completed in one operation in three minutes.

The drilling cells contain machines (Heckler and Koch) for all components that need drilling. Within the next area of production are two further maching centres that were purchased in 1987 at a cost of £500,000 each. The machines themselves have the capability of simple milling work, but this is only occasionally utilised. The advantage of this machine is that they have two beds, therefore the Operator can be loading one side whilst the machine is working the other side. Again, all of the tooling and drawing information is located within this section.

Machining Centres

Since then they have produced vast numbers of grass machinery parts, especially cutting unit assemblies. They are also used to produce lift arms and axles. Many of these assemblies are first welded, so the Weld Booth was moved next to the machine and the whole activity put under the control of one Team Leader. This machine cell now has a response time to the assembly line of two to three days for large assemblies. The machines themselves are unique in that they have two computers – the first controls the actual machining of the part and the second is a monitoring system that continually checks that everything is working correctly. This capability allows these machines to run unmanned. Typically they could run twenty-two hours a day; sixteen hours when Operators are present and the remainder when everyone has gone home.

Mazak Machining Centres

A further two MAZAK maching centres were added in 1995 at a cost of £150,000 each to increase the capacity of the machine shop, particularly to cope with the production of cutting unit parts to match completed unit throughput.

The bar rack stores the total supply of random bar. This stock represents about two week's production. It is checked every week and a fax sent to the steel stockist who then delivers exactly the right amount of steel to refill it. This is just one of a number of examples of " Just In Time" deliveries

the have been set up with the supplier. Similar principles are set up for the supply of sheet metal, fasteners, hydraulic pumps, hydraulic hoses and hydraulic fittings.

Assembly

There are ten recognised Assembly Lines; five that produce the main tractor units, a cutting unit line, pedestrian lines and other areas that produce a variety of assemblies. The main lines are generally broken down into ten assembly stations. A station can consist of between fifteen components on a cutting unit station taking ten minutes to complete to up to two hundred components on the Commander station taking four hours to complete. Operators generally know a number of stations, which usually includes the previous and next station to their own. This ensures that they have a good idea of the impact of their assembly method on the other Assemblers.

All machines are built up in a similar manner, typically starting with axles on to which a chassis is bolted. The hydraulic valves are then fitted together with lift arms. These units are then linked up with the hydraulic pipes before the engine assembly is put into position. Finally, the operator seat and instrumentation is added and all connections completed. Quite a number of the smaller assemblies are manufactured for the parts department to maintain stock levels.

Test

Every machine that is produced off the main assembly line is tested in the Test Area. Essentially they are all tractor units and therefore require having the tanks filled with fuel and oil, radiators with water and engines with engine oil. Once this has been done, the machines are run to ensure that the various systems are operating correctly – for example, engine speeds and hydraulic pressures.

Quality Assurance

This group of people actually audits the finished machines and to ensure that quality is being maintained. There is lots of evidence that this is having a beneficial effect on the quality of machines going out of the door e.g. Highways used to have anything up to twenty-five faults per finished machine. This has now been reduced down to one or two. It must be borne in mind that a fault can be as little as a loose nut or bolt, however, in quality terms this is just as important to the customer.

Once machines reach a level of audit typical of the Highway, they move away from the full audit to random audit and the section Team Leader is responsible for ensuring quality is maintained. As each fault is identified on a machine, the relevant Assembler or manufacturing section is advised of the error so that it can be eliminated once and for all.

Iseki / Ransomes Tractors

They provide a range of 15 compact diesel tractors from the smaller 15hp 2-cylinder diesel with hydrostatic transmission and the larger 45hp 4 cylinder 4 wheel drive diesel machines and out front rider rotaries all available with an extensive range of attachments and accessories. Both Iseki and Ransomes tractors come in kit form, constructed here and then sent to the customer.

Spares Department

The technology does not stop in the warehouse! They deal with thousands of parts and accessories each week and therefore need a fast response time for sending out parts. They have 15 huge computerised retrieval units called industrievers that finds parts automatically to be sent to dealers or customers, turning over in excess of £11 million a year.

Our visit concluded at the training school where our host was thanked for a very informative tour of the manufacturing and warehousing facility at Textron, Ipswich.

Breakfast in GI-Vraa Northern Denmark

I see you are having a Light breakfast today Phill

10w000