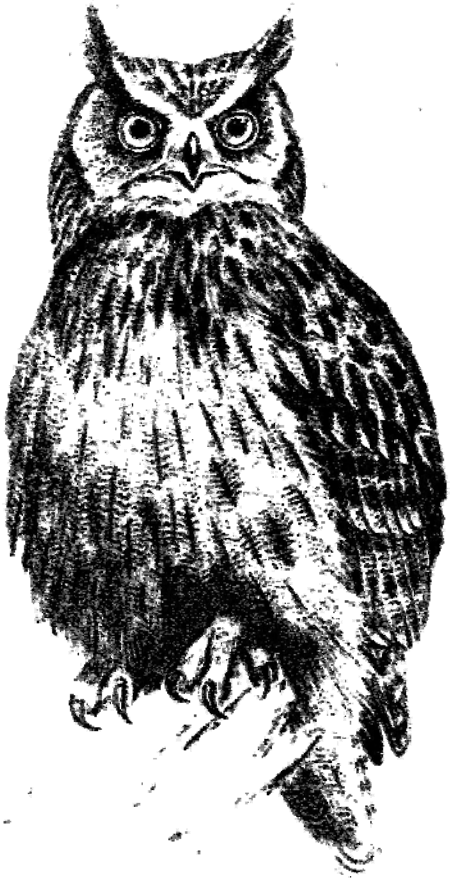
ALAM

Newsletter

Autumn 2008



The Association of
Lecturers in Agricultural Machinery

www.alam.org.uk

Contents

ALAM Newsletter Autumn 2008

Update Day - Legislation for Agricultural Vehicles on the Road

There are three reports and a cartoon for you - I'm sure you find it all interesting (and a little disconcerting) reading!

2008 Conference

David James organised our conference at Coleg Meirion Dwyfor, in North Wales. I think that those who were there will agree it was up to the usual high standards of ALAM conferences, with old and new friends, old and new technology, and staff development as only ALAM can do.

2009 Conference

Plans are underway for a conference in the Newton Rigg area, to be organised by Jonty Rostron.

We are planning for 13th to the 16th of July 2009.

The itinerary will include

- 1 or 2 "education" updates including the new diplomas
- A visit to VSEL, security permitting, to see some jolly big welding jobs and the spending of vast amounts of our taxes!
- Visit the "Laal Ratty" while we are over that way.
- Visit Sellafield, the usual nuclear plus work they are doing on CHP.
- Possibly British Gypsum mine but in any case the works using DSG from Drax power station
- A bio diesel project along with other smallish alternative energy projects, Hydro/biomass.

Put the dates in your diary, and keep looking out for more information in the next newsletter and on the ALAM website.

Update Day - Torro - 2008

We have the booking form for our day at Hayters.

Committee Members

Following the Annual General Meeting, the latest details are included in this newsletter.

Parts Offer

John Gough has a range of warranty return items sourced from JCB, which are available for colleges to use for teaching.

For full info about what is available, contact John by email at:

gough.j@btinternet.com - **note this is a new email address**

Phone - **01630 685 942 - evenings 7 to 10pm**, please.

ALAM Committee 2008-09

Updates are highlighted in **bold** text.

Position	Name	Work			Mobile	Home	
		Place	Tel	Email		Tel	Email
Chairman	**David James**	Coleg Meirion Dwyfor	01286 832507	d.james @meirion-dwyfor.ac.uk		01286 880534	
Secretary	Graham Higginson	Reaseheath College	01270 613230	grahamh @reaseheath.ac.uk	01948 667982	01948 667982	graham.higginson @ntlworld.com
Treasurer	David Heminsley	JCB Training	01889 594700	david.heminsley @jcb.com	07971 273725	01889 566882	
Conference Organiser 2009	**Jonty Rostron**	Appleby Heritage Centre	017683 53350		07919 458878	017683 52682	Jontyrostron @yahoo.co.uk
Conference Organiser 2010	**Gwynfor Williams**						
Committee	Nigel Macpherson	Sparsholt College	01962 797217	nmacpherson @sparsholt.ac.uk		01980 862102	
	John Gough	Walford College	01939 262100 ext 2158	j.gough @wnsc.ac.uk		01630 685942	gough.j @btinternet.com
	Neil Jewell	Reaseheath College	01270 613239	neilj @reaseheath.co.uk	07968 067298	01270 652554	neil.jewell @tiscali.co.uk
	Tony Houghton						

ALAM ONE-DAY TECHNICAL UPDATE

Developments in High End Domestic and Professional/Commercial Mowers

Hayter plc, Spellbrook, Bishops Stortford, Herts, CM23 4BU

Monday 27th October 2008

The event is being hosted by Robin Blackford of Hayter and the technical presentations will focus on the high end domestic ride on mowers/tractors along with the commercial/professional rotary and cylinder products.

Programme:

1030 - 1100 arrival/registration

1100 - 1230 technical presentation

1230 - 1300 lunch

1300 - 1600 technical presentation including a break for refreshments.

Cost:

The cost will be in £55 for members and £65 for non-members.

Booking:

To reserve a place, please advise me by email – grahamh@reaseheath.ac.uk or send official requisition/order for my attention at Reaseheath College, Nantwich, Cheshire, CW5 6DF.
My phone is 01 270 613 230

Registration Form:

Post to: Graham Higginson
Reaseheath College
Nantwich
Cheshire
CW5 6DF

Or email to: grahamh@reaseheath.ac.uk

Name	Email	
Address	Telephone	
	Mobile	
	Delete as applicable:	Invoice Payment enclosed Will pay at registration

ALAM ANNUAL CONFERENCE 2008

Wisdom for Welders

14th July 2008

Our first session at the 2008 ALAM summer conference was an update on gas safety from a Mr. Terry Broughton from Gas Safe, a company he established about nine years ago after working for BOC for nearly 20 years. Terry started his presentation in a businesslike manner firing questions at his audience and it quickly became apparent that this would be a lively session and we would need to remain attentive. He made us question our own knowledge about the subject and consider the existing procedures we currently use. His presentation included a number of vivid accident case studies comprising of a series of photographs of the events as they unfolded which he then asked us to analyse. The first involved a delivery driver in a 7 ton box truck with a number of Propane cylinders included in its load. He was in a town somewhere in South Wales and had turned right into a main street, travelled about 200 yards when he stopped on the side of the road as he realised that some of the cylinders had fallen out onto the road. Also one of the cylinders on the truck was leaking and the gas had ignited. He had the knowledge and presence of mind to take control of the situation and moved people away from the vehicle and stopped the traffic. The fire quickly developed and spectators were accumulating, one taking shelter behind a plastic keep left bollard at the road junction, the next shot showed this individual looking up into the sky distracted by a flying propane bottle which had exploded and taken off. The next shot showed that the spectating distance had increased somewhat! He then asked us to consider where our fire assembly points at college were in view of the fact that you need an exclusion zone of 200 metres for propane and 300 metres for acetylene cylinders coupled with the fact that motor vehicles usually contain large quantities of flammable fuel. Many of us will be returning to college in September with questions to ask about this point.

Accidents were examined in depth to establish their likely cause and to see what could be learned from each situation with the intention of preventing similar mistakes being repeated. Terry had already concluded that a major cause of accidents was complacency which gradually creeps in over time. This point should be borne in mind when updating training is considered as part of staff development; I found during this presentation that I had identified a number of basic facts and operating procedures which I need to correct for future teaching sessions so that we can all live to a ripe old age!

If an accident has taken place the subsequent investigation into the cause may involve the Health and Safety Executive. They are likely to ask for four things:

- a risk assessment.
- your standard operating procedure.
- the training record for the individual supervising the group.
- the last main inspection report of the equipment.
- Note (They will be expecting some written documents)

Equipment condition, quality and inspection evolved from this last point and the importance of date and identity marking each individual item for traceability was highlighted and we were reminded that there should be a 5 year replacement policy in operation. If individual items are not marked there is a danger that they can slip through without inspection if they are substituted for faulty units during the period of an inspection. It was stressed that modification of any equipment should be discouraged as if it is found to be a cause of a subsequent accident the person who carried out the modification would be held responsible. Gas leak testing the equipment each time it is used should become standard operating procedure if it is not already so. Teepol or an aerosol product called “snoop” should be used for this purpose. The equipment sealing joints are designed and intended to produce a gas tight seal by metal to metal contact only. Any PTFE tape you can see on regulator gauges is a special unsintered product specifically designed for this purpose. Most other PTFE contains lubricating additives making them potentially dangerous in this application. Remember oxygen + lubricant =

explosion and acetylene + copper = copper acetylide which is an unstable explosive substance. We were also reminded that as little as 2% acetylene in air produces an explosive mix.

Next came the transporting of gas bottles in vehicles. Recognising that we were from a service industry where oxy acetylene equipment was likely to be part of the service van equipment he reminded us of some of the requirements. The vehicle design should incorporate a gastight metal bulkhead behind the driver, proper ventilation at roof and floor level in the rear compartment, a fire extinguisher and an orange exterior sign showing that the vehicle is carrying dangerous goods as per European regulations. The cylinders should be transported upright and adequately secured and have no equipment fitted on them. We were then reminded of an accident which took place at Walsingham in the north east about 18 months ago where a mobile welder died when he opened his van door at 6.50am to go to work. The subsequent investigation into his death concluded that the interior light door switch ignited gas which had built up overnight from leaking equipment. The wreckage which remained following the blast bore no resemblance to a van.

We then moved on to the operation of the equipment and the exciting prospect of a flashback, quite aptly named really as it may be the last glimpse of life that you get in the event of not knowing how to deal with a real one. A flashback is caused by insufficient gas pressure / flow in relation to the nozzle size and it is initiated by a flame backfire.

This results in a sound like a machine gun coming from the handpiece accompanied by a high pitched squeal just prior to the flame shooting up the flexible pipes towards the cylinders. It is at this point that you appreciate the importance of technological development in the form of flashback arrestors which are now fitted to the outlet ports of the regulators. These devices stop the flame progressing any further and isolate the gas supply from the regulator. I have to admit that I was a somewhat nervous apprentice when it came to the gas welding training at Rycotewood College many years ago. As students we had heard of the exciting times which had been “enjoyed” by past students who had to coax the temperamental calcium carbide acetylene generator to produce sufficient gas for them to weld without blowing them up. Still we were told that we were now in a new safer era with dissolved acetylene delivered in cylinders, accompanied with the rider of instructions of what to do in the event of a flashback! As you can probably imagine there were quite a few pops and bangs during the learning process for a bunch of inexperienced young engineers but we were told that an early indication that a flashback had reached its intended destination would be an increase in temperature of the surface of the acetylene cylinder. I think I spent a good proportion of the gas welding sessions checking the temperature of the cylinder!

Other points of note included:

- The label on the cylinder neck should be completely legible and the colour on the shoulder should be clearly identifiable.
- Acetylene is only stable as a gas to a maximum pressure of 22 psi. it then becomes explosive. The porous material in which the acetone is contained is a mixture of lime silicate and charcoal. The acetone in the cylinder is able to absorb 25 times its volume of acetylene. The cylinder regulator rating should match the cylinder maximum pressure.
- If acetylene cylinders have been laid horizontal they should be stored upright for 12 hours before use. Propane cylinders should always be kept upright. All cylinders should be secured.
- Do not “snift” bottles:- crack off cylinder valve to blow out dirt, 1 bar gas pressure will blow your eye out of its socket. Instead remove plastic cap and clean out bull nose seating with clean paper towel.
- Use long side entry regulators for cylinders with side exit valve fittings. Attach a valve key to each cylinder so that it is always available in an emergency.
- Multi stage regulators are recommended as they maintain a stable output pressure despite a reduction in the cylinder contents during use.
- Flexible hoses should always be fully extended before use and if taped together this should be at considerable spacing to allow hot metal to escape.

- When purging the lines prior to lighting up do the oxygen then fuel gas then light acetylene with the nozzle pointing up as it is lighter than air. For propane nozzle down as it is heavier. Buy good quality equipment as your life may depend on it.

This was a very thought provoking session which gave us all good cause to pause and consider how we will approach our teaching and use of gas welding equipment in the future. I have included Terry's contact details below, they may well be a life saver in the future.

Terry Broughton,
Gas Safe Consultants,
Waterloo House,
2 Station Road,
Elworth,
Sandbach,
Cheshire,
CW11 3JG

Tel. no. 01270 758890

Fax no. 01270 758891

Email enquiries@gassafeconsultants.co.uk

J. Gough
Walford College

ALAM ONE-DAY TECHNICAL UPDATE

Tractor MOTs and Why We Need Them

Part of the “Legislation for Agricultural Vehicles on the Road” Day
Wednesday 13th March 2008

This session was presented by Adam Wyatt from BAGMA who has been doing a survey of the condition of the UK tractor fleet and trailed appliances commissioned by the DFT and HSE which some of you may have seen reported in the BAGMA newsletter.

The findings which he exposed during his presentation were worrying but probably not altogether surprising as many of the audience had an inkling that things out there generally were certainly not suffering from over maintenance.

Adam started by explaining that the first step in producing a meaningful survey was to devise a plan which would give a countrywide picture which encompassed all ages and sizes of tractor. Dealers from throughout the country were approached and invited to get involved by having some service staff trained up to become competent examiners. A 70 point checklist was devised and used as the standard by which each vehicle was to be assessed for its overall safe condition. The dealers invited customers to volunteer to present vehicles for inspection and the survey was undertaken between April and November in 2006 where 250 tractors from around the country were examined. Each inspection took between 1 to 1 1/2 hr to complete and about 85% of these inspections included a dynamic brake test using a decelerometer, a clever new electronic Tapley meter which produced a paper printout of the test results.

The results below represent tractors of 70 hp upwards.

Years	No. Tested	Failures	% Fail
<1990	54	50	93
91-5	45	36	80
96-0	67	37	55
2001-5	72	26	36
Total	**242**	**149**	**62**

Trailed appliances were also tested, when available, as it was suspected that some of the tractor brake problems which have been presented to dealers and manufacturers in the past had occurred due to inadequate or inoperative brakes on the towed equipment.

A total of 71 units were tested with 14% having worn hitch parts, 11% having faulty tyres or lights and 56% with brakes unfit for the highway. Hydraulic brake hoses were identified as the highest cause of failure.

When the test results were examined it became apparent that many of the machines had only minor faults which could easily be remedied. There were however insurance implications due to the requirement for the machine to be in a roadworthy condition if used on the highway.

The resulting conclusions that were drawn from the survey included recognition that maintenance could be improved and that thorough examination of equipment at regular intervals would encourage this to happen. This then posed the question, did the industry want a statutory scheme or a more informal industry developed system with a link to insurance or farm assurance as an incentive to comply?

In an effort to encourage improved levels of basic maintenance BAGMA have drawn up a machine Daily Checklist for operators. Vehicle and Trailed Appliance Health Check sheets have been in place for dealer service departments for some time.

Fork lift trucks and telescopic handlers should also be the focus of regular inspection and maintenance schedules .

A whole range of legislation is already in place which applies to mechanised equipment some of which is listed below:

- PUWER 98, Regulation 5, P.6.2 - Inspection by a competent person every 3 to 4 years and covers tractors, ATV's and machines. NPTC are producing an inspection qualification to formalise this.
- LOLER 98, Regulation 9, - Lift truck inspections every 3 years and a certificate of safe condition for insurance purposes.
- Health and Safety at Work Act 1974, Section 6 - covers second hand machinery which must be safe. Also the requirement for instruction books to be supplied.
- Construction and Use Regulations

Some time was given to discuss the issues surrounding tractor and trailer braking and the pros and cons of hydraulic and air brakes were considered. The lag in trailer brake application in an emergency situation was viewed as a potentially dangerous disadvantage and the consequences of engine failure with a hydraulically operated system would result in no brakes. Air brakes provide concurrent braking to both vehicle and trailer and without engine power will fail safe. It was suggested that this may be the direction future developments will go. Further information about this subject is being covered in another report so make sure that you are able to stop when you get to it!

As a reminder of what this is really all about we were also given the latest available accident statistics for 2005 for agricultural vehicles:

- 38 Fatal, with right-turns and wide loads being the main factors.
- 177 Serious,
- 845 Slight.

It is hoped that the industry is able to establish an agreed voluntary vehicle safety inspection scheme in the near future that will improve overall safety for us all and if so it will be partly due to the work that Adam and BAGMA have done in conducting this survey. This was an interesting and informative update.

John Gough
Walford College

ALAM ONE-DAY TECHNICAL UPDATE

Evaluation of the Mechanical Condition of Agricultural Vehicles

Part of the "Legislation for Agricultural Vehicles on the Road" Day
Wednesday 13th March 2008

This research study was carried out by BAGMA on behalf of the HSE & DfT, to establish a baseline assessment of the mechanical condition of agricultural vehicles currently in use on farms in the UK. Thorough inspections of 242 tractors and 71 trailed appliances were carried out by trained examiners, according to a standardised procedure and reporting format to satisfy the requirements of Regulation 6 of The Provision and Use of Work Equipment Regulations 1998 (PUWER 98). Only 35 tractors were found without any significant mechanical faults.

Roadworthiness of tractors, according to current highway legislation, was one of the factors that the analysis of results highlighted and it was found that 166 (68.6%) tractors and 40 (56.3%) of the trailed appliances inspected did not meet current road requirements.

The inspections were carried out between April 2006 and November 2006, targeting vehicles from a range of farms selected by dealers. Information was collected to enable analysis by region, age of tractor, horsepower and farm type.

Visibility items such as windscreens, wipers and rear view external mirrors (wing mirrors) were among the commonest faults and there were significant numbers of faults on specific safety items such as trailer hitches and PTO guards. A large number of faults were also identified, such as tyre pressures, that could be cheaply remedied and improve tyre wear, fuel efficiency and safety both on and off road.

The number of tractors and trailed appliances examined by dealers was disappointing, with some regions not being covered at all. With the funding available, dealers would not have been financially compromised between regular work and the research work. The extra forms may have altered the detailed results, but not the general overview of the report, as the numbers were sufficient to give a viable analysis.

Feedback from customers who had their vehicles examined was mixed. Some thought it was a good idea and long over due; others thought it was more regulation and pressure on farmers; others had an issue if subsequent vehicle inspection schemes were kept within the dealer trade. The most rewarding feedback was from farmers who wanted mechanical faults highlighting before a problem arose. With the cost of a vehicle breakdown increasing, as highlighted by Blackburn (2000), farmers are wanting to do more preventative maintenance rather than reactive repairs.

Agricultural vehicles need to be maintained more effectively. If a tractor is unsuitable to go on the road then it is also unsafe off-road and may also be mechanically unsafe. Implementing simple maintenance & condition checking procedures on the farm would reduce the number of faults and failures, although a statutory inspection scheme might be more effective.

The Farm Vehicle Health Check scheme should be adopted and used by Insurance companies when insuring farm tractors to promote the uptake of available guidance and improve vehicle maintenance. Farm assurance organisations should adopt the Farm Vehicle Health Check scheme to ensure tractors are up to the same standards as other farm processes.

This report identified some of the problems for inspection of trailed equipment, particularly due to the diverse range in use, and noted that further work is required to develop a procedure to test brake performance of trailers and trailed appliances.

The above text was abstracted from HSE Research Report No. RR554. The full report (including detailed results of the investigation) is available from the following web address:-

http://www.hse.gov.uk/research/rrhtm/RR554.htm

Adam Wyatt
BAGMA

ALAM ONE-DAY TECHNICAL UPDATE

BAGMA Brake-Safe Technology

Part of the "Legislation for Agricultural Vehicles on the Road" Day
Wednesday 13th March 2008

Agricultural Trailer Brake Performance Test Procedure (Hydraulic trailer brakes)

As part of our day at Warwickshire College, Adam Wyatt from BAGMA brought along BAGMA's specially-modified electronic decelerometer.

The meter can simply be placed on the floor of any tractor to measure braking forces, and can print an on-the-spot record of the results.

Warwickshire College provided a Ford 6410 4wd (mass 3000kg) and Massey Ferguson 200 twin axle trailer (mass 2500kg). The trailer had a load of 3000 kg.

Estimating Trailer Brake Performance

The deceleration of a free trailer is:

$$\textbf{Deceleration of trailer} = \frac{\textbf{Trailer Braking Force}}{\textbf{Trailer Mass}}$$

If the trailer brakes are used to decelerate the tractor too (i.e the tractor brakes are not applied) then the combined deceleration will be:

$$\textbf{Deceleration of trailer + unbraked tractor} = \frac{\textbf{Trailer Braking Force}}{\textbf{Trailer Mass + Tractor Mass}}$$

To conduct the trailer brake performance test the tractor should be driven at speed not exceeding 20 mph, and the trailer should be loaded to its gross plated weight.

The trailer brakes are applied using oil from a hydraulic spool valve, routed through a flow/pressure reducer to give a 100bar hydraulic pressure limit to the trailer brakes. Note that the flows and pressures in a spool valve are way above the specifications for trailer braking circuits!

For this particular combination, the results obtained were as follows:

Tractor weight 3000kg
Trailer weight 2500kg
Total gross train weight 8500kg
Measured trailer brake Force 0.0920g or 9.2%g

Using the formula above, the deceleration of the trailer brakes was calculated at **0.142g or 14.2%g**

The Road Vehicles (Construction and Use) Regulations 1986 (Regulation 18 paragraph 5) states "The brakes of every agricultural motor vehicle which is first used on or after 1st June 1986 and is not driven at more than 20 mph, and of every agricultural trailer manufactured on or after 1st December 1985 shall be capable of achieving a braking efficiency of not less than 25% when the weight of the vehicle is equal to the total maximum axle weights which the vehicle is designed to have."

The trailer tested only achieved 14.2%g brake performance, which falls short of the 25%g set out in the Construction and Use Regulations 1986, Regulation 18 (5). If this trailer was to be used on or off the highway it poses a serious safety and legal issue.

Further tests were carried out without the trailer attached, and the tractor brakes were able to meet the minimum standards of 65-70% efficiency for a solo tractor.

We can therefore see that when this combination is braking, it is the tractor brakes which are doing the majority of the braking, and therefore are working above the loadings they are designed for. As the majority of tractors have inboard oil-immersed brakes, then the risks of transmission overheating and damage, in addition to the obvious wear, is very high. With repair costs of an estimated £2000 to £6000 for this type of tractor brakes, it is obvious that a small amount of money spent on trailer brake maintenance could be a very wise investment, without even considering the safety and legal repercussions.

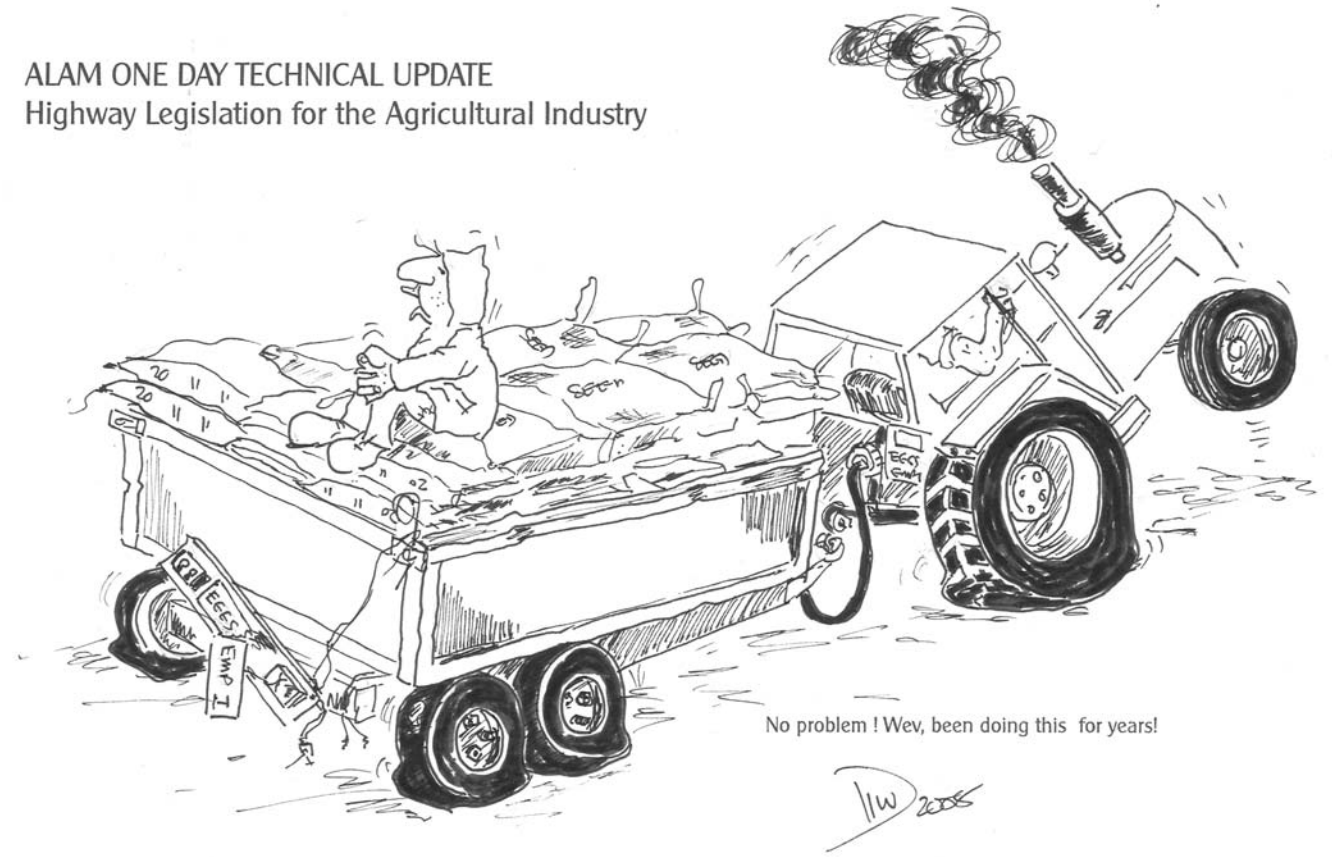
Incidentally the tractor should achieve full braking with no more than 600N of force on the pedal, so pressing very hard is not a legitimate way to “improve” your brakes!

HSE tests have found many farm trailers only 5% braking efficiency, and many fully-maintained trailers struggle to reach the 25% legal minimum. Even brand new trailers have been found below standard, so there is therefore clearly a need for trailer manufacturers to improve the quality of the braking systems fitted.

If a tractor is driven at 40kph instead of 32kph, then the braking energy increases by a factor of 1.6, and at 50kph it is 2.4 times higher than at 32kph, so the problem of poor trailer braking is hugely magnified at higher operating speeds. Although regulations restrict trailers with hydraulic braking systems to 32kph on the road, we all know how often this is ignored!

Adam Wyatt
BAGMA

David Heminsley
JCB Training

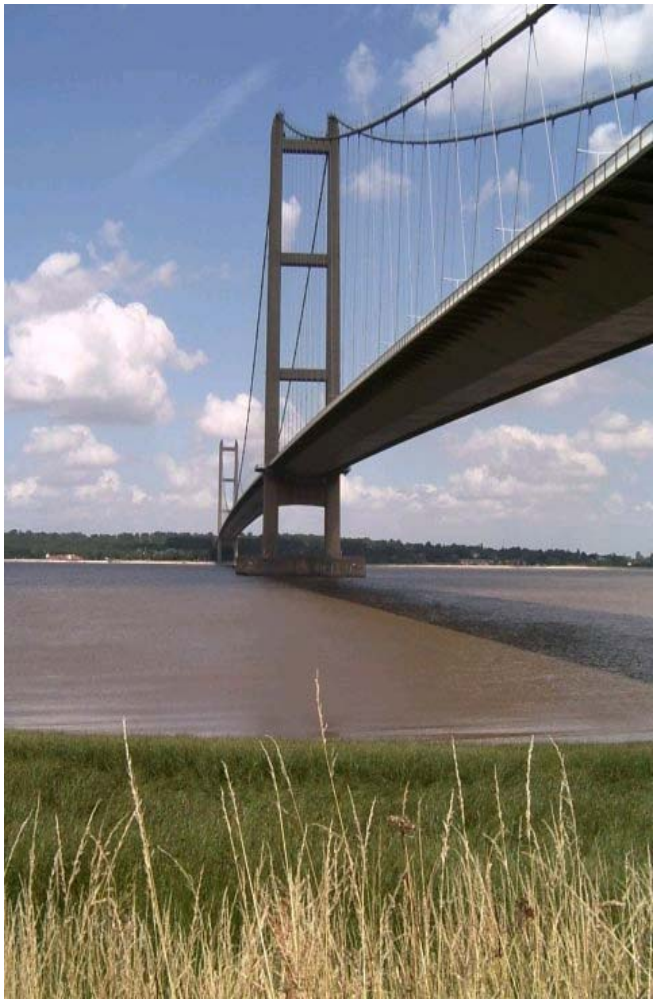


ALAM ANNUAL CONFERENCE 2007

The Humber Bridge

19th July 2007

On the 19th July 2007, a group of ALAM members visited the famous Humber Bridge as a day trip during our conference at Bishop Burton College. This proved to be an interesting and enjoyable day.



After arriving by mini bus, the group were given a guided tour around the different bridge stations.

Prior to this we had a briefing and video by the Bridge master Mr Peter Hill who provided us with relevant information. Many men and supplies were needed to produce this engineering masterpiece.

The first steps to producing the bridge were taken in 1973 when work first began. This however, may not have been possible without people campaigning during the last 100 years for a bridge or tunnel to cross the estuary. These people had good reason, for the estuary was a barrier for trade and development between the two banks. The final approval was given in 1959 along with the passing of the Humber Bridge act and the creation of the Humber Bridge board. Eight years later and no with deaths, work was completed. Thousands of workers and staff had to be employed over this period of time to help move the thousands of tonnes of concrete and steel needed. Now there are just ninety eight employees!

The bridge and approach roads cost 98 million pounds but this had risen to 151 million when the bridge opened to traffic in 1981. This was the result of the interest on the loan. Interestingly the cost was initially estimated at 28 million!

The north tower foundations are situated on hard chalk at a depth of 8 meters and are constructed on the bank. The south pier is located 500mts in the river and was constructed by forming circular caissons 24m in diameter with a cutting edge at the base to force its way through the kimmerage clay.

The bridge itself has four towers consisting of two tapered vertical reinforced concrete legs braced together with four reinforced concrete horizontal beams. The legs are hollow columns 155m high and vary from 6m x 6m at the base to 4.5m x 4.75 at the top. There is an electric lift in one leg of each tower for maintenance use. The bridge has two piers, the Hessle pier and the Barton pier which are reinforced concrete structures.

The bridge in held up by main cables. Each cable consists of 14, 948 parallel galvanised drawn steel wires of 5mm diameter. After construction, they were tightly compacted, coated with red lead paste and wrapped in soft galvanised iron wire to form a casing. The bridge is suspended from the main cables by spiral strand steel wire ropes called hanger ropes, 62mm in diameter. The road is a 2-lane carriageway with combined footways/cycle tracks and was constructed by welding together 124 prefabricated steel box sections 18.1m long and 4.5m deep formed from stiffened steel plate panels. The anchorages are huge concrete structures each containing two chambers within which the main cables splay out into separate strands and attach to steel crosshead slabs at the face of anchor blocks by the strand shoes and anchor bolts.

The Humber is the 4th largest bridge in the world with a life span of 120 years. There are many challenges for the bridge not least being the weather.

Wind and thermal movement are a stress to the welds. Corrosion is a major problem particularly for the cables suspending the bridge. In order to try and alleviate this problem they have installed de-humidifiers in the Anchorages and the steel deck. The road surface is bonded by tarmac to reduce noise pollution. The daily traffic predictions in 1970 where for 2400 vehicles, 20% of which are HGV`S. In 1981 the traffic was 8000 vehicles; in 2005 this figure had risen to 19500 vehicles.

The Humber Bridge is an engineering masterpiece which has fulfilled the needs of the local communities and beyond.

Paul Wray
ALAM Member

ALAM ANNUAL CONFERENCE 2008

National Slate Museum, Llanberis

19th July 2008

The buildings once housed the engineering workshops of the former Dinorwig quarry.

These workshops manufactured and maintained the machinery and tools of an operation which at it's peak employed almost 4000! The quarry closed in1969 and in1971 the Gilfach Ddu workshops taken over by the National Museums of Wales.

It was like walking into a time warp as if the carpenter and foundryman has just gone home and will return to work tomorrow.

Mr Peredur Hughes (a former employee) guided us through the complex with humour and depth of a man that was "once there".

The buildings have been modified to cater for visitors from all over the globe hence the visitor centre, café, slate splitting demonstration. Slate or "Llechi" slab in Welsh were extracted and processed in the quarry not at these workshops.

The Water Wheel

This is the largest on mainland Britain 50ft 5in diameter, 140 buckets, developing 80hp. Water comes from across the valley from the "Ceunant" waterfall in a cast iron pipe then up a vertical tower to a tank at the top of the wheel. On the rim is an internal ring gear which drives a pinion connected to 965 yards of line shafting!

The spokes therefore are of very light construction similar to a bicycle wheel. Built by De Winton of Caernarfon in 1870 it powered the saws, blast furnace, lathes, hammers, indeed the whole complex. In 1925 a Pelton type turbine of 120h.p by Gunther and Sons of Oldham was installed to work off a branch of the main pipeline.

Fortunately the Water Wheel was retained and restored under the Heritage Lottery Fund.

The Sawing Sheds

The three sawing sheds held all kinds of saws which gives a clue as to the great importance of timber. Thousands of railway sleepers and wagons were made, the rough nature of slate and the steep gradients meant these trucks needed constant replacement and maintenance. Much of the timber came from the Faenol estate and Canadian Yellow Pine as ballast from the St Lawrence River. The 13 mile railway to Port Dinorwig was certainly busy, slates down timber up.

Foundry-Brass and Iron and Pattern Store

The Pattern Store held over 2800 patterns mainly the work of five generations of the same family. The earliest go back to 1865 and are the patterns for moulding the window frames of the complex. The pattern maker would use a different tape for each metal which calculated the shrinkage of the metal.

The brass furnace produced bearings and small components, but due to recent Health and Safety matters a live demonstration was no longer possible.

Our guide, Peredur Hughes was presented with an Owl and thanked for giving us a most enjoyable and informative visit.

If in this area of Wales do visit but allow plenty of time, as there is so much to see.

For further information, see www.museumwales.ac.uk

Gwynfor Williams
ALAM Member

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 £10 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
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 January 2004