agricultural engineer

Spring 1995

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Agricultural Engineer

Journal and Proceedings

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Front cover: Case IH 2100 series combine

The Institution of Agricultural Engineers

NEWS ROUND-UP

Institution display stand

PROMOTE THE INSTITUTION!

A professionally produced display unit is now available to help you and your branch publicise the Institution. The display is easily transported, by car or carrier, in one case for any branch or specialist group to use at:-

Branch meetings,
Exhibitions,
Show stands,
Career conventions,
etc.

The attractive light green and grey panels are reversible and made of loop nylon. The photos are individually attached by 'Velcro' to produce a flexible and versatile exhibition. The text panels describe the professional status of the institution, the branches, the specialist groups and what the Institution can offer members.

The photographs represent the range of activities of the Institution. Feel free to create new ones or edit them to suit the needs of your branch or specialist group. If you produce new material to the same high standard and you feel that it would help others please leave copies with the exhibit.

The Institution needs more member. This display has been produced to help you in your recruitment efforts! Further details from the Secretariat. Tel: 01525 861096

XII CIGR WORLD CONGRESS AND AgEng CONFERENCE - AUG 94

A small number of the abstracts from the conference in Milano last August are now available. They comprise two books and cost £15.00 including postage in UK (overseas extra at cost). Please send your order with a cheque made out to **EurAgEng** to the Secretariat at Silsoe

SHOW SEEKS BRAINWAVES

One of the West's top agricultural invention competitions will be continuing an eleven-year tradition at this year's Royal Bath & West Show (31st May - 3rd June) with farmers able to win £100.00 of prize-money.

The "Farmers' Brainwave" competition is open to people actively engaged in agriculture or horticulture, who are not connected with a company manufacturing or marketing on a commercial basis. There are two classes for this year's event - pre-patent and patent, with the opportunity to win cash prizes, farmers in the past have received excellent coverage for their ideas in the farming press.

The judges come from the Dorset College of Agriculture, the local farming community and the Editor of Practical Farm Ideas Magazine. They will be looking for originality, simplicity of design and manufacture, contribution to safer working conditions on the farm, commercial viability, ease of operation and general appeal of the exhibit.

Last year's winner was Devon dairy farmer, Bernard Dymond, who runs a herd of 70 milkers at Awliscombe, near Honiton. He cleverly adapted his feeder scraper so that he did not have to move his ring-feeders every time he cleaned the feed area. Other commendable entries included a collapsible lamb adopter crate, a high tech tractor auto pickup hitch, a converted hand-fork and a tractor- mounted round bale unloader that can work in confined feed passages.

Entry forms are available from the Society's Offices, Showground, Shepton Mallet (Tel: 01749 822200). They have to be returned by 2nd May. Judging will be on the first day of the show and all exhibits will be at the Showground throughout the four days of the Show.

HAVE YOU GOT AN OLD DEGREE?

Many of you will know that the academic standard for registration as Chartered Engineers is a BEng Honours degree. Agricultural Engineering qualifications that are currently accredited by the Engineering Council for Chartered Engineer status are BEng Honours degrees from:

Harper Adams Agricultural College
Silsoe College
University of Newcastle-upon-Tyne

With effect from the end of 1995 the Engineering Council will be much more stringent and cease to accept some UK Engineering and Science qualifications that were previously acceptable. From then some applicants will have to take three supplementary papers from an Engineering Council list. In addition, many applicants will have to show evidence of further engineering experience.

ACT NOW - don't leave it until it is too late. If your degree is not a BEng Honours, you should consider registering your qualification with the Engineering Council. There is a small fee, which for 1995 is only £4.50, and it will save taking further exams.

Give our Membership Secretary, Shiela Hollowell, a ring without delay, and find out whether it would benefit you.

No action is required by anyone who is already registered at either Stage 1 or Stage 3 Chartered Engineer

EIMA

The 25th Anniversary edition of Esposiizione Internazionale delle Industrie di Macchine per l'Agricoltura (EIMA) brought good luck. For the first time, after a series of discouraging years, a reverse in trend was seen for the agricultural machinery markets with signs of recovery in Europe, USA and in other points around the globe from South America to the Near and Far East.

This recovery, it must be pointed out, cannot be translated in terms of a recuperation of the values of some years ago, but, shows an increase that replaces the trend of decreases in recent years for mechanisation sales in all countries. This 25th celebration therefore was enhanced and exhibitors, visitors and, above all, for UNACOMA that created and promotes EIMA were pleased with the event.

The role of EIMA as a meeting point for associations, experts and a wide range of authorities from many fields was confirmed at this anniversary edition that hosted meetings of AIGR, UNAGA and the European Management Committee of the Club of Bologna, in preparation for the plenary session to be held at XXVI EIMA

FARM WASTE HANDLING GRANTS TO END

Grants for installing or improving waste handling facilities were removed from the Farm and Conservation Grant Scheme on 30th November, 1994. The amending decision was announced in November's Budget Statement. Statutory Instrument s Farm and Conservation Grant (Amendment) Regulations 1994 (SI 1994 No. 3003) and the Farm and Conservation Grant (Variation) Scheme 1994 (SI 1994 No. 3002) amend the Farm and Conservation Grant Scheme Regulations 1991 and the Farm and Conservation Grant Scheme 1989 respectively.

The Agricultural Minister stated that over the last five years farmers have received some £150 million grant aid to help with the cost of improving their waste handling facilities. The time has now come for farmers to accept full responsibility for the costs involved. It was always the intention that these grants should only be available for a limited period.

He also went on to say that we will continue to provide farmers with advice on avoiding pollution, including help with the preparation of whole farm waste handling plans. Also, when we formally designate the Nitrate Vulnerable Zones, we will make assistance available to farmers in NVZs who have to improve their waste handling facilities because of the limits that we will be setting on their manure spreading.

Some £150 million has been paid out since 1989 represents nearly £290 million of investment in these types of facilities in a little over 5½ years. In England alone, more than 9,000 farmers have benefited.

Grants continue to be available at the rate of 30% in the Less Favoured Areas and 25% outside them, for the provision, replacement and improvement of hedges, traditional walls and banks and shelter belts, the enclosure of heather moorland and grazed woodland and the burning of heather and the control of bracken and at the rate of 25% in Less Favoured Areas and 20% outside for the repair or reinstatement of traditional farm buildings. Grants are also available under the Farm and Conservation Grant Scheme for works associated with the Countryside Access Scheme and the Habitat (Water Fringe) Scheme. In addition, fencing grants will be available in Wales when associated with the Habitat (Coastal Belt) Scheme once the scheme is launched.

Farmers in England and Wales will continue to receive help to minimise pollution through the free Codes of Good Agricultural Practice and through the availability of either free pollution advisory visits or assistance in the preparation of farm management plans by ADAS. Once the Nitrate Vulnerable Zones have been designated, waste handling grants will be re-introduced for farmers with land within the zones. 650,000 hectares of farm land in England and Wales have been proposed within vulnerable zones under the 1991 EC Nitrate Directive, (91/676/EEC). Following a public consultation the proposals are currently under further consideration by Government. It is expected that the designations will be made in 1995, followed by regulations to apply in the zones at some point before 1999. These regulations will cover the maximum amount of nitrogen that may be spread as a component of animal manures. There are also expected to be closed periods for manure spreading. To comply farmers in NVZs may be required to improve their waste storage and handling facilities.

WHERE THERE'S MUCK THERE'S BRASS

An old saying may turn out to be true, according to the organisers of Muck '95. Taking a closer look at the muck held in a farm slurry store could reap rewards as the manure and slurry produced by an average herd of 100 cows during the 180-day housing period has a potential value of nearly £2900.

This figure represents the value of nutrients, nitrogen, phosphate and potash contained in the manure and slurry if it's spread onto farm land. The details of this will be highlighted in a special feature at Muck '95 on Wednesday and Thursday 5th and 6th April, 1995 at the National Agricultural Centre in Warwickshire.

David Storrar from the RASE, co-organiser of the event, said "we have used 'Mr. Average' to produce some general figures designed to make producers stop and think about their muck and how they can make the most of it. We are aiming to show that manure and slurry have the potential to reduce fertiliser bills if they are integrated into the farm's overall fertiliser policy.

It must be every producer's intention to minimise the amount of waste but they then need to look at storing and disposing of it safely and efficiently. Using it effectively by applying to the land in a planned way could help to reduce disposal problems and reduce the pollution risks. Safe disposal has to be a priority. Producers who think about what they are applying to land and take advantage of its natural nutrients can save a penny or two."

Muck '95, the biennial National Farm Waste Management Demonstration, is organised by the Royal Agricultural Society of England and ADAS in association with What's new in Farming and is supported by the National Rivers Authority. For further details please contact Jayne Spence, Marketing Executive Technical Events at the RASE on 01203 696969

FELLOW IN FOOD PROCESS ENGINEERING

William Waldegrave, Minister of Agriculture, Fisheries and Food has appointed Professor G.L. Quarini of the Department of Mechanical Engineering in the University of Bristol as the first MAFF Fellow in Food Process Engineering.

Professor Quarini will lead a small team of academic experts that will serve as a centre of excellence on the technology of food processing, with particular emphasis on transferring a number of novel methods into food industry practice.

The Fellowship for £200,000 is for 3 years, with a possible extension for up to 5 years. Announcing the award at the Food From Britain Conference in London Mr Waldegrave said:

"A key element in our strategy for transferring new technology to the food industry is our new research Fellow in Food Process Engineering. We announced in March 1994 that we were setting up this Fellowship to establish an academic centre of excellence in this vital scientific area. I am delighted today to be able to announce that we have awarded the Fellowship to Professor G.L Quarini of the Department of Mechanical Engineering in the University of Bristol.

We received a number of very interesting proposals. Professor Quarini's proposal has been selected because it puts a particular emphasis on innovation and offers us a way of evaluating a number of technologies important to the future of the food industry, with the aim of bringing them into industrial practice as soon as possible. Prominent among these technologies are ultra-rapid surface heating and ultra-rapid cooking, and methods of rapid cooling of processed food. We know that these topics are seen as major priorities by food processing companies.

Furthermore, Professor Quarini will be working with a group that has wide-ranging contacts within the food industry: this will be a sound basis for faster transfer of technology into the industry. I am delighted that Professor Quarini is the first MAFF Fellow in FOOD Process Engineering. I congratulate him and his group on their success. This shows the Ministry's commitment to harnessing science to the future success of our food industry."

ROYAL SHOW RESTRUCTURED FOR 1995

The Royal Show has been extensively restructured for 1995 in one of the most far-reaching developments in the Show's 155-year history. Fundamental to the change is a series of specialist exhibitions. This is based on the proventechnical events formula.

By working in close consultation with exhibitors, the RASE has developed a series of theme, specialist areas, each supported by technical demonstrations, exhibits, trade stands and displays from key organisations.

The new structure will ensure that exhibitors and their audience are brought together. Marketing plans have been developed for each area to ensure that visitors can quickly and easily target their area of interest; innovative new features will be used to draw new customers; and new rest, information and refreshment areas have been developed to ensure visitors can use their time most efficiently. New areas for 1995 include:

* **Arable Area.** Relocated and developed in one of the busiest areas of the Showground and including demonstration areas covering the major production systems.
* **Equine Area.** A substantial development to the northern of the Showground of new facilities - including one of the biggest all-weather rings in the world, a new trade section and demonstrations.
* **Farming and the Countryside.** Demonstrating the integration of farming and conservation and including 'Home Farm', a complete working demonstration farm to show developments and initiatives.
* **People in the Countryside.** An area dedicated to issues such as housing and transport; social issues; employment and training; leisure and tourism.

In addition to these new areas, significant developments include:

* **Livestock Area.** Expanded and developed and now including all the technical messages formerly based at the NAC Technical Units; a new Livestock Health Centre; and new trade section.
* **Machinery Area.** Developed to link more closely with the adjacent arable and livestock areas to form the 'New Focus on Farming' area.
* **Food Area.** The highly successful British Food Pavilion will have new features and demonstrations while international food will be strongly represented in the nearby International Food Court and International Food Pavilion. A Cookery Theatre will include celebrities from the world of food.
* **Country Pursuits.** Redeveloped to include hunting feature; bigger and better off-road track; trade area; and Town and Country area including rural crafts and skills.
* **Retail and Gardening.** These popular areas have been redesigned and expanded.
* **International.** A new emphasis on bringing international visitors into contact with the relevant exhibitors and organisations

For further information please contact the RASE on 01203 696969. The next Royal Show will be held at National Agricultural Centre from 3rd to 6th July, 1995.

NEW FROM MAFF - ANNUAL REPORT OF THE WORKING PARTY ON PESTICIDE RESIDUES 1993

The range of pesticides that may be used in agriculture and food production, either in the UK or abroad, is very large and is monitored on behalf of the Working Party on Pesticide Residues. Their annual report for 1993 covers all surveillance data generated from samples collected in the 12-month period from January to December 1993 with the exception of UK.winter lettuce which continued into 1994. In addition, the report contains the result of three other surveys: of fruit and vegetables imported from Spain during 1992/93, of wine samples obtained between November 1992 and February 1994 and animal feedingstuff ingredients collected in 1992/93.

The report contains: Summary of results and subsequent action; Graphic summary of 1993 results; Dietary staples; Fruit and vegetables; Cereals and cereal products; Animal products; Fish and fish products and Miscellaneous surveillance.

This annual report would be of great interest to food scientists, nutritionists, dietitians, food manufacturers and producers.

Annual Report of the Working Party on Pesticide Residues 1993 is produced by the Ministry of Agriculture, Fisheries and Food and is available from Microinfo Ltd., P.O. Box 3, Omega Park, Alton, Hampshire GU34 2PG. Tel: 01420 86848. Fax: 01420 89889.

Please quote ISBN 0 11 242983 1 when ordering.

TRACTOR REGISTRATIONS

A.E.A. recently announced that agricultural tractors (over 40 hp) registered in 1994 was 18,130 , an increase of 1.3% on the previous year.

1994 proved to be a very satisfactory year with demand remaining firmer than first anticipated. While a good level of sales had been expected for the first half year, the second part of the year exceeded expectations as farming conditions remained favourable.

Given the evidence of the brisk level of enquiries received at the recent Royal Smithfield Show, plus the continuing confidence in many sectors, the trade anticipates an on-going high level of orders through the spring of 1995.

For further information contact
C.J. Evans, A.E.A., Samuelson House,
Paxton Road, Orton Centre, Peterborough.
PE2 5LT
Tel: 01733 371381 Fax: 01733 370664

UNITED KINGDOM TRACTOR REGISTRATIONS

Agricultural Tractor Registrations (>40 hp) : Monthly 1994

Year	Month	Units	Yearly % Change	Year TO date	Yearly % Change	Moving Total	Yearly % Change
1994	Jan	1149	26.1	1149	26.1	18137	35.6
	Feb	1207	6.0	2356	14.9	18205	35.3
	Mar	1809	7.7	4165	11.7	18335	31.6
	Apr	1706	12.2	5871	11.8	18520	30.5
	May	1833	25.3	7704	14.8	18890	31.3
	Jun	1138	-15.4	8842	9.7	18683	27.7
	Jul	936	-20.9	9778	5.8	18435	23.1
	Aug	3061	11.7	12839	7.1	18755	18.9
	Sep	1716	-10.4	14555	4.7	18556	13.1
	Oct	1489	-3.3	16044	3.9	18505	9.1
	Nov	1194	-29.5	17238	0.6	18006	1.0
	Dec	892	16.1	18130	1.3	18130	1.3

Source: AEA Economics Department

INTEGRATED ARABLE CROP PRODUCTION

A new alliance of five UK groups researching and promoting sustainable farming systems has been welcomed by the Earl Howe, Parliamentary Secretary at MAFF.

The alliance aims to avoiding duplication of work, ensure wider dissemination of results, and remove confusion in farmers' minds about the individual roles of the groups, and how they relate to each other. Each group will keep its own individual identity and objectives. The groups are:

* LIFE Less Intensive Farming and the Environment
* LINK: IFS Integrated Farming Systems
* FOFP Focus on Farming Practice
* LEAF Linking Environment and Farming
* FWAG Farming and Wildlife Advisory Group

Lord Howe said: "There are now a number of groups working in the field and it makes sense for them to work together. I am delighted they have agreed to come together to form this new alliance and I wish it every success.

Farming needs to find new ways to reduce its use of scarce resources, not only to save the farmer money, but also to encourage plant and animal life and protect the rural economy.

Central to this aim is research and the need to inform the farmer of the practical ways he can improve the environment, while being profitable and meeting the needs of the consumer".

The five groups will co-ordinate projects, exchange literature and research results, and seek to continually interchange information. The new grouping will be called The Integrated Arable Crop Production Alliance.

Integrated arable crop production is seen as a possible way forward. Research in Europe has shown that this more managed approach, integrating natural regulatory mechanisms and husbandry practices into farming activities, with the aim of replacing some purchased off-farm inputs, is feasible on a large scale and is a logical development for current agricultural practice. Many successful integrated farming pilot schemes have put research into practice in Europe.

The main objectives of an integrated system of production are to address environmental concerns, to ensure inputs are managed efficiently and effectively, and to maintain or increase quality of produce and profitability. If successful, this system will meet the most pressing concerns of industry, consumers and governments alike.

Details of the five groups involved are:

LIFE: Less Intensive Farming and the Environment

A research project funded by MAFF aiming to provide fundamental ecological information on, and economic appraisal of an integrated approach to arable crop production.

The project is based at the Institute of Arable Crops Research (IACR), Long Ashton and is part of a European Network of Integrated Farming Systems. Already in its fifth year of farm-scale comparisons with conventional production systems, it is providing data on farming practices that are economically viable and compatible with environment protection.

Based on the data generated, EU-funded Pilot Demonstration Farms have been set up in Cornwall and in the Cotswolds for technology transfer, and to explore the feasibility and constraints of such systems in commercial practice. The project started in 1989 and has already shown that profitability can be maintained whilst minimising "off-farm" inputs. It has a budget of £95,000pa.

LINK: IFS Integrated Farming Systems

This large research project on integrated crop production, commenced in 1992 on six sites in the main arable areas of the UK, and occupies approximately 55 ha at each site. ADAS, ICAR Rothamsted, The William Scott Abbott Trust, The Game Conservancy Trust, Southampton University and the Scottish Agricultural College, Edinburgh are collaborating to provide and run the sites, four which are being run on commercial farms, the other two being on ADAS Research Centres. The project is funded by MAFF, SOAFD, HGCA, Zeneca and the British Agrochemicals Association.

This initiative was set up to investigate whether integrated arable crop production is practical, economically viable and will deliver the environmental benefits that are needed. The project is seen as a development of integrated farming into different geographical and climatic locations in the UK, and covering a wide range of soil types. It concentrate on optimising inputs whilst maintaining profitability.

At each site integrated arable crop production is compared, over a five course rotation, with conventional production methods. Two of the five treatment years of this project have been completed. Initial results are encouraging, and the successful components will be built into future practice as the integrated system continues to evolve.

The project, which has a budget of £300,000 p.a., is part of the LINK programme "Technologies for Sustainable Farming Systems" (LINK: TSFS), in which government and industry jointly fund a wide range of research aimed at providing the technologies needed for sustainable farming.

FOFP: Focus on Farming Practice

Jointly funded by CWS Agriculture, Hydro Agri (UK) Ltd and Profarma Ltd, this project investigates the practical, economic and environmental effects of the integrated farming compared with conventional and organic practice at the same site.

These farm-scale trials which are being run at CWS' Stoughton Estate, Leicester are subject to continual monitoring and evaluation. Project Manager Alastair Leake already maintains regular contact with LINK, LIFE and LEAF, with full exchange of information being maintained. The project's ultimate objectives are to enhance both the farm's income and environment, whilst meeting the demands of the food industry and consumers.

LEAF: Link Environment and Farming

Funded by over 50 industry bodies and companies together with farmer members, and with a budget of £70,000 p.a., the objective of the project is to promote farm practices which combine care and concern for the environment with the responsible and economic use of modern methods. It looks to LIFE, LINK and FOFP for information which will continually update whole farm systems on its 20 demonstration farms run by volunteer farmers.

One of six similar initiatives in European countries, LEAF's philosophy is based on Integrated Crop Management (ICM) to which major supermarkets are becoming committed. To facilitate the uptake of ICM, LEAF has worked with FWAG and other interests to produce an Environmental Audit for farms, which has been widely welcomed throughout the agricultural and food industries and is increasingly being used by farmers.

FWAG: Farming and Wildlife Advisory Group

FWAG promotes wildlife and landscape conservation within the context of a profitable farm business, with a team of 58 advisers and a budget of £1.5m p.a.. Through its Environmentally Responsible Farming approach it works directly with farmers and others to encourage farming practices which minimise their impact on the environment. A UK-wide network of local FWAG groups, backed up by an advisory team, provides an effective means of taking sometimes complex messages to farmers in language they can understand. FWAG farm conservation advisers promote integrated farming through the whole-farm approach to conservation, which it pioneered. It works with a wide range of organisations, including LEAF and LIFE, to facilitate information transfer.

Every possible effort will be made to disseminate useful information to agricultural community through any and all available routes.

Continue on next page

Dr Clive Wall of LINK: TSFS will act as co-ordinator of the Alliance.

For further information contact:

Clive Wall	LINK: TSFS	0171 238 5562
Sue Ogilvy	LINK: IFS	01944 738646
Vic Jordan	LIFE	01275 392181
Alastair Leake	FOFP	01162 714278
Caroline Drummond		
	LEAF	01203 696969
Richard Knight	FWAG	01203 696699

EngEx '95
ENGINEERING SHOP WINDOW FOR NORTHERN IRELAND

Belfast will host an engineering trade show in September 1995, the first of it's kind designed to meet the needs of all the engineering disciplines.

Organised by Eurocom (UK) Ltd in association with the Institution of Water Officers and the Engineering Council for Northern Ireland, the aim of EngEx '95 is to provide a forum in which developments in engineering can be made accessible to professional working in the Province.

The decision to stage EngEx '95 resulted from local initiatives, particularly on the part of the Engineering Council for Northern Ireland, which has been in the forefront of moves to promote the interest of engineers across the broad spectrum of activities.

EngEx '95 will afford exhibitors an opportunity to bring their new products and services to the attention of highly professional forward-looking audience.

The engineering aspects of all the major service industries will be represented, including manufacturing, transportation, communications and government.

The organisers see EngEx '95 as an important and timely event, bringing together engineers from all sectors of the profession who are involved in providing, maintaining and developing services for the community.

For further information, please contact:
Lynn West, Eurocom (UK) Ltd,
Heriot House,
12 Summerhill Terrace,
Newcastle upon Tyne, NE4 6EB.
Tel: 0191 230 5150 Fax: 0191 230 2880

UNWANTED TEXT BOOKS

The Institution occasionally receives requests for unwanted text books in agricultural engineering both from individuals and libraries in the third world. If you have any you would like to donate, please send them to the Secretariat at Silsoe, and they will distribute them in a cost-effective manner.

If you have any queries, please contact Mike Hurst at Silsoe.

THE 1995 GREAT YORKSHIRE SHOW

One of Britain's premier agricultural events - The Great Yorkshire Show - takes place on Tuesday 11th, Wednesday 12th and Thursday 13th July 1995. The Show will take place at the permanent Showground on the edge of Harrogate which is currently undergoing a £10m re-development programme. The 1994 event attracted 121,752 people.

Visitors will be able to see more than 8,000 animals - cattle, sheep, pigs, horses, donkeys, goats, terriers, foxhounds, beagles, rabbits and angora goats, as well as poultry and pigeons. Also there are competitive classes for country skills - stick making, sheep shearing and horse shoeing.

In addition there is top class showjumping with many of Britain's leading riders, a spectacular Flower Show and more than 600 trade stands on the 250 acre showground. The 1995 Show will be the 138th.

SCIENCE AND TECHNOLOGY MEDIA FELLOWSHIPS 1995

Help put science where it belongs - on the front page! The 1995 COPUS Science and Technology Media Fellowship offer scientists and engineers the opportunity to find out how the media works and to improve their communication skills.

Designed to create a greater understanding and awareness of the media, scientist spend between four to eight weeks with a newspaper or magazine, or in radio or television. By experiencing the news making process and the restrictions journalists work under, fellows will develop a greater understanding of how and why stories make news. It is hoped the placement will help improve their skills in communicating science to students, the public and the media.

As part of the scheme, fellows will attend the British Association's Annual Festival of Science at the University of Newcastle on 11-15 September 1995.

Andrew Derrington, 1994 Media Fellow at the Financial Times recalls his experience: "The British Association Festival really taught me the meaning of pressure. There is nothing like having to write three stories on completely different topics about which you know absolutely nothing, within three or four hours. During the week I filed twelve stories, of which only one was spiked".

Administered by the British Association on behalf of CPUS, the scheme is open to professional scientists and engineers - in any discipline - working in an academic or research institution, civil service or other similar organisation. Fellows receive a grant of £200 per week to cover costs of expenses and accommodation. It is expected that they will continue to be paid by their permanent employer during their placement

YES! TWO HALVES DO MAKE A WAGON

Two halves of a 90 year-old Bridport farmer's sprung pony wagon given to an East Devon wheelwright, but then sawn in half for delivery by car, are about to be lovingly reassembled at Clyton, East Devon. Wheelwright Mike Rowland has made the most of the parts but he admits, "I could have cried when I saw the damage but it is repairable. Better two halves of a wagon than none at all"

Normally Mike and his family construct three-quarter ton brewer's drays, each finished in 16 coats of coach enamel - the sort seen harnessed to shire horses at English county shows and bearing the name of the big breweries.

However, he rates the six and a half foot long wagon, which is around four feet high and four feet wide, a labour of love which will take about six months of craftsmanship to complete to perfection in the only purpose built wheelwright's shop constructed in Britain this century.

"Bridport area farmers used such wagons to take a pig, sheep or poultry to their local market, and then their market buys back home, so how many journeys has this made?" Mike wonders. "My wagon was made in the 1900s by Oxenbury of Bridport whose name plate remains, and I believe the company still exists."

Potential buyers are already vying for the finished wagon, but Mike's first thought is to use it for promoting his own business. "Happily I can reassure potential customers that I can recreate such historic wagons exactly - given time," he says.

Further information from Mike Rowland, 1 Wheeler's Yard, Road Green, Colyton, East Devon. EX13 6DT (Tel: 01(+44)297 552562) or East Devon District Council, Marketing Officer Robert King (Tel: 01(+44)395 516551 Fax: 01(+44)395 577853

FARM AND CONSERVATION GRANT SCHEME:
IMPROVEMENT PLANS TO END

Improvement plans under the Farm and Conservation Grant Scheme are to end from 31st December 1994. Conservation grants under the non-plan side of the scheme will continue to be available after that date.

Improvement plan applications received at Regional Services Centres no later than 31st December will be accepted but applicants must ensure that they have fully completed their application forms.

Farmers are advised to seek the latest information from their local Regional Service Centre before committing themselves to an improvement plan application.

YOUNG ENGINEERS FOR BRITAIN 1995

Links between education and industry are to be greatly strengthened by combining the two leading national competitions for young engineers in schools and colleges. The Engineering Council's 'Young Engineers for Britain' regional and national finals and the Young Engineers clubs' regional and national awards, organised by the Standing Conference on schools' Science and Technology (SCSST), will be joint events from 1995.

'Young Engineers encourages engineering project work by students and young people undergoing training and each year attracts 1,000 entries from 11-19 year olds competing for the title of "Young Engineer for Britain".

The SCSST's Young Engineers club are now operating in 500 schools, with a nationwide membership of 10,000 students. Their regional and national awards are judged on a wide range of criteria including quality of project work, ingenuity, design excellence and marketability.

Denis Filer FEng, Director General of The Engineering Council, said: "our joint regional finals and the national final will enable schools and other supporting organisations to focus on entering for the one premier event in their region. For too long there has been confusion over the two activities and by combining we hope that 'Young Engineers for Britain' will be enhanced and strengthened."

Ann Parkin, Chief Executive of SCSST, said: "I believe we can all gain much by combining efforts. Our Young Engineers clubs bring an ethos of personal commitment and team-building, relying on enthusiastic volunteers who willingly give much of their time and energy. We also provide valuable proven experience of school-industry links through our nationwide network of SATROs (Science and Technology Regional Organisations)."

Both competitions receive significant national and regional support from industry and other organisations.

THE LLOYD'S REGISTER TROPHY AND REVIEW OF ENGINEERING

The Engineering Council have announced that the Lloyd's Register Trophy plus a £5000.00 prize will be awarded to registered engineers (CEng, IEng or EngTech) who can demonstrate their skill and versatility in giving priority to environmental problems. The closing date is 17th May 1995.

The Engineering Council have produced a document "Competence and Commitment" that takes into account the wide range of responses to an earlier document "Review of Engineering Formation".

Further information from: The Engineering Council, 10 Maltravers Street, London. WC2R 3ER Tel: 0171 240 7891

UPDATE ON THE 'UNIFICATION' PROJECT

Since the presentation of the 'Unification' proposal agreement has been reached to set up a Transition Project Group (TPG). This group comprising, Sir John Fairclough as Chairman, Alan Rudge - past President of the Institution of Electrical Engineers, Stuart Mustow - past President of the Institution of Civil Engineers, Ken Burrage - member of the Engineering Council, will take forward the implementation of the project once the Institutions and The Engineering Council have formally approved the proposal. It will report jointly to the Stage II Policy Group and The Engineering Council.

The TPG has met twice and is concerned at this stage with the preparation of transition plans. No executive decisions will be taken until formal approval of the proposal, which will take the form of signed Declarations of Intent by the Institutions and The Engineering Council. However, it is important to start to address two issues so as to have a smooth transition next year. These are the recruitment of a Director General and changes to the Royal Charter of The Engineering Council.

It is important to appoint a Director General, quickly, so that he or she can take a part in the implementation of the new arrangements. A small panel has been set up consisting of Sir John Fairclough as Chairman, Brian Kent - President of the Institution of Mechanical Engineers, Sir Geoffrey Allen - President of the Institute of Materials, Sir Frank Holroyd - member of The Engineering Council and Chairman of its Finance and General Purpose Committee and Major General Malcolm Hutchinson - member of The Engineering Council and past President of the Institution of Electronics and Electrical Incorporated Engineers to consider 102 applications. A short list will be drawn up and interviews arranged.

The Royal Charter must be changed to reflect the proposal. It is uncertain how long this will take as the approval of the Privy Council is required and the whole process could be lengthy. It is hoped that this activity will not prevent us making the transition next year. Because of this, preliminary work is being done to identify the changes necessary and to seek legal advice.

A number of Institutions have raised questions about the clause stating that Institutions accept a target 95% registration of the eligible membership within three years. From this it will be clearly necessary for the new body, early in its existence, to meet each Institution and agree the number of members who are eligible for registration. An agreed plan for registration will then be needed, consistent with the particular circumstances of the Institution. It is important to note that the 95% target will only apply to those members who are registerable with the New Body. It will be for the Institution to show good faith and commitment to this clause rather than it being interpreted with unhelpful rigidity.

NEW STUDY OPTIONS

Manchester Open Learning, one of the country's leading providers of such study have announced that they have produced two new study units that will be of interest: "Hydraulics and Pneumatics" and "Pumps, Fans and Compressors". These are part of the National Certificate in electro-mechanical engineering programme. MOL stand out from other open learning providers in their flexibility.

They can offer start dates at any time of the year, individual or complete programmes. All study programmes are managed centrally and the studies are supported by a telephone helpline and practical tutorials held in regional centres. Students can registered individually on the national student programme or as part of an employer's in-company group.

MOL offer a number of National Certificate and Higher National Certificate subjects, in electrical engineering or telecommunications related subject areas, all are BTEC registered.

For further information please contact: William Waddilove, Manchester Open Learning - Midland Office, The Holics, Prior Road, Wolston, Coventry. CV8 3FX Tel: 01203 545574

COUNTRYSIDE IS NOT A MUSEUM

"The countryside cannot be preserved as a museum," the Agricultural Minister, William Waldegrave recently said.

Speaking at an ADAS conference on strengthening the rural economy, he said "a Rural White Paper will look at how we can preserve countryside beauty and encourage sustainable development in rural areas. Policies for agriculture and rural development will look at issues such as the availability of affordable housing, village shop problems and the question of access to schools and doctors.

The White Paper will consider the interaction between the urban and rural populations. The population of rural areas is actually increasing as people move out to live, but not always work, in the country. Some crystal ball gazing is needed regarding telecommunications, the so-called information super highways, resulting in more people working from home or from rural tele-cottages. This might be a more positive development from the point of view of the village community."

"I am not one of those that believes that the countryside should be preserved as some kind of museum, its appearance is largely the result of farming and other human activity and we should not try and arrest its evolution. Conservation, bio-diversity and a clean and safe environment are vitally important, not just as abstract concepts but in terms of our immediate interests and our children's future. We have to find a way of reconciling our objectives in these areas with the need to preserve the economic vitality of our villages and our rural towns."

COMPANY AND PRODUCT INFORMATION

SAVING MONEY AND LIMITING POLLUTION

A simple tractor-mounted instrument could soon be used by farmers all over the world to monitor accurately the condition of their crops. This could ensure that each plant receives precisely the right amount of water, fertilizers or herbicides at all times. Not only would such an instrument save farmers time and money, but it would also protect the environment from unnecessary pollution caused by uniform overuse of agrochemicals.

No such instrument exists, but it could if the research currently being undertaken by a third year PhD student on the Postgraduate Training Partnership, set up jointly by SIRA Ltd and University College London, comes to fruition.

Sonia Rubie is studying the condition of crops, such as wheat, barley and sugar beet, from a few metres away using an instrument that looks at reflected sunlight from plants' leaves. She is now matching this information to chemical analyses of the plants' water, nutrient and pigment content. By comparing this chemical date with her remote optical observations, she expects soon to be able confidently to give early warning of plant stress, long before an experienced farmer would notice anything with the naked eye.

"Remote sensing of visible and infra-red solar radiation could save the farmer large sums of money, as the early warning deterioration would give a greater chance of revitalising the plants," she says.

"Pollution could also be minimised and agrochemical bills reduced," she adds. "At the moment a farmer irrigates, and applies herbicides and fertilizers, uniformly to the whole field, regardless of whether the whole field needs them or not, which is very wasteful and potentially damaging to the environment."

"Fertiliser uptake by a crop can vary from plant to plant across a field. Too much fertiliser costs the farmer money unnecessarily and leaches into the groundwater, too little and the full potential of the crop is not realised," she explains.

Farmers could deploy the remote-sensing instrument by mounting it on a tractor, a few metres above the ground. Sampling crop health would then be a matter of driving around the field. Sonia points out that although much work has been done on remote sensing, the correlation between stress and changes in spectral response has been poor.

However, her laboratory experiments are expected to establish clear links between variations in the quantity and quality of radiation reflected and transmitted by leaves and their degree of stress in terms of their nitrogen, potassium, phosphorous and water contents. If these sources of stress can be distinguished and identified early enough, they can be corrected chemically.

Initial field trials and laboratory work are highly promising. Further field trials are now being carried out to determine the significance of plant geometry, soil and atmospheric conditions. Another PhD student, Jacqueline McElhinney has also started work in the same area of research, which is expected to culminate in a usable instrument within the next few years.

Bill Simmonds of Sira Technology Centre, which manages the Postgraduate Training Partnership on behalf of SIRA and UCL, believes Sonia's project is a good example of what can be achieved in the newly-emerging field of intelligent imaging. "The next generation of intelligent-imaging instruments will be able to measure directly parameters that can now only be inferred, and draw conclusions from those measurements. This will have a profound effect on people's lives," he says.

He points out that industry can sponsor specific areas of research, such as remote sensing of crops, or they can join Sira Technology Centre's multi-client Intelligent Imaging Programme.

He also notes that facilities have now been set up at Sira for growing plants under controlled conditions of temperature, humidity and illumination, and for chemical analysis of plant material. These facilities will be attractive to researchers seeking to establish botanical 'ground truth' values in connection with satellite or remote-sensing observations.

Last autumn, Sira Technology Centre launched its Intelligent Imaging Programme, comprising Research Evaluation Programmes related to real application needs, as well as multi-client development projects. This Programme focuses on 'optical' non-contact sensing techniques as part of total systems, including data processing based on artificial intelligence technologies, and user interfacing elements such as virtual reality.

For further information please contact: Ronan Phelan, Sira Technology Centre, South Hill, Chislehurst, Kent. BR7 5EH
Tel: 0181-467 2636

INTERCHANGEABLE ELASTOMERIC COUPLINGS

Cross & Morse KE Series elastomeric flexible couplings have been introduced in eight basic sizes to fit nominal torque capacities ranging from 33 Nm (73 max) at 7700 rev/min up to 3300 Nm (7000 max) at 2200 rev/min. These couplings are fully interchangeable with established competitive designs and any coupling part can be individually purchased for replacement purposes.

Power transmission is via an elastomeric geared ring, which is held between and interlocks with two machined cast iron, geared flanges when the coupling is installed. Phosphated for corrosion resistance, the flange hubs are parallel bored, or bored from either end to fit a taper bush, to suit shaft requirements and can be supplied for installation with any bore combination. The geared ring is manufactured from Pebax R Polyether, which is resistant to oils and many chemicals and has a low moisture absorption rate. It cushions transient peak torques, effectively reducing transmission of vibration and shock loads.

Free movement of the coupling components is sufficient to fit modern shaft misalignments - 1° angular, 0.3 - 0.5 mm radial and from +0.2 mm to +1.7 mm axial depending on coupling size - while still providing full power transmission. Design power ratings range upwards from 0.35 kW at 100 rev/min for the smallest coupling to 762 kW for the largest version at its maximum permissible speed.

Standard KE couplings can be operated in environmental temperatures from -40 C to +85C. They are easy to assemble, the machined outer edges of the flanges enabling simple alignment using a straight edge.

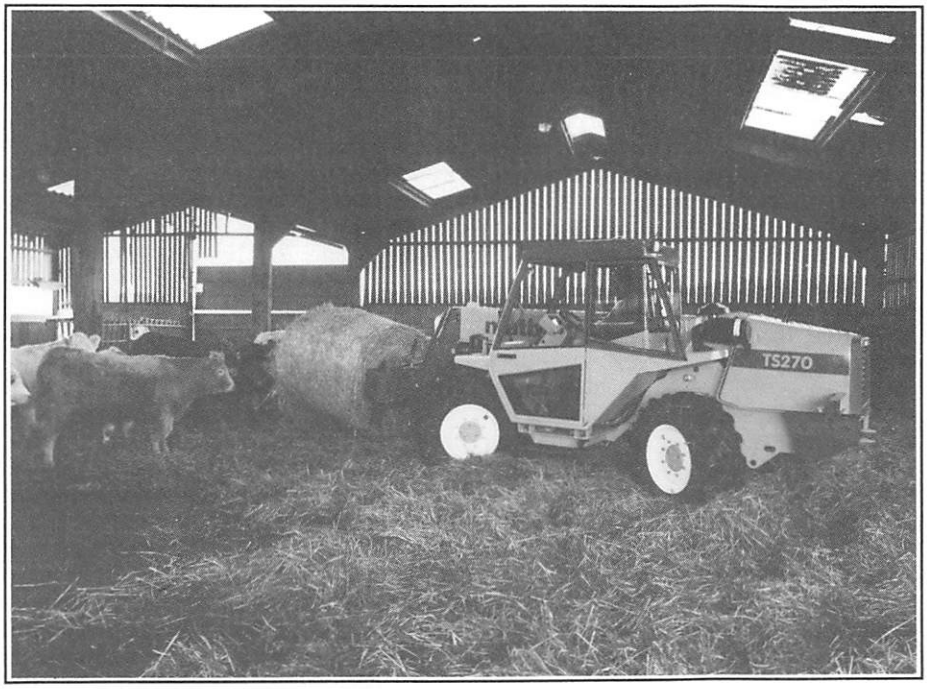
For detailed descriptive literature and prices, contact Cross & Morse, Shady Lane, Great Barr, Birmingham B44 9EU.
Tel: 0121 360 0155 Fax: 0121 325 1079.

HUSKY FIELD COMPUTING

Husky Computers has revised its Hunter 16 range to 3 models and reduced prices by approximately 30%. This move is designed to increase market take-up after spectacular sales growth. The 16 bit, MS-DOS handheld with power to provide complex processing and data storage is used in a wide range of agricultural and forestry applications including woodland surveys and seed and crop research.

Now available in 1.0 Mb, 2.0 Mb and 4.0 Mb configurations, the Husky Hunter 16 series offers a new level of price competitiveness. The Hunter 16 is used in a wide range of out-of-office applications including Service Management, Local Government, Sales and Marketing, Agriculture and Forestry, Utilities, Quality Control and the Military.

For further information contact Christine Smith, Husky Computers Ltd., Eden Road, Walsgrave Triangle Business Park, Coventry. CV2 2TB Tel: 01203 604040.



Matbro - TS270 Telescopic Handler

MANOEUVRABILITY

With a turning radius of only 2.99 m, the new Matbro TS270 has the tightest turning radius,for a machine of its kind. The TS270 joins Matbro's telescopic handler range to meet the changing demand for smaller, more compact machines. Despite its small dimensions, the machine can safely lift a 2.7 tonne load to a height of 5.5 m, and reach forward 3.1 m with a 1.5 tonne load. Stability is exceptional because of a low centre of gravity and an operating weight of 6.2 tonnes.

Powered by a Perkins 1000 series 4-cylinder high torque rise diesel engine, the TS270 can be specified as a naturally aspirated 75 hp unit or as a turbocharged 96 hp machine. A four-speed torque converter power shuttle transmission, limited slip differential and large 405/70R 20 radial tyres keep productivity levels high. With three steering modes, the TS270 is highly manoeuvrable. Its 2.3 m wheelbase and 45 degree steering axles help to achieve the tight turning radius by using four wheel steering. Combined with a width of 2.23 m and a low overall height of 2.25 m, the TS270 can place and retrieve the bulkiest of loads into and from the most restrictive of areas.

Operator comfort is afforded by a 940 mm wide cab. Access is via a two-piece door with a maximum glass area for clear vision. Visibility around the machine is also enhanced by the low boom pivot point and the sloping engine canopy - essential when reversing out of confined areas. Clear instrumentation, safe load indicator, fully adjustable suspension seat and a heating and ventilation system further enhance the operator's environment.

Hydraulic power is provided by an 81 litres/min gear pump with boom controls via the standard multi-lever controls or an optional 4-function single lever joystick control. A Z-linkage provides 166 degrees of carrier rotation for impressive dump and roll-back characteristics. Fitted with an ITA 2B carrier with Marbro's hydraulic Quick-Attach system, the TS270 can be used with a wide variety of implements, including manure and earth buckets, silage grapples and pallet forks currently fitted to other Matbro machines.

FULL POWERSHIFT TRANSMISSION

Matbro Ltd., has also redesigned its TR250 pivot steer handler with a specification that now includes a powershift transmission, high torque engine and heavy duty axles. Called the TR250 Powershift Plus, it has been developed for contractors and farmers who require a telescopic machine with greater performance.

The transmission, a Clark full powershift unit, offers four forward and three reverse speeds. Ratios are selected using a twist lever, which also provides direction control. Transmission control is from an electronic gear selection (EGS) unit that allows the operator to automatically to shuttle between gear ratios when direction changes are made.

Power comes from a Perkins 1000 series high torque diesel engine developing 106 hp at 2200 rpm. The use of a waste-gated turbocharger keeps engine performance high, with a maximum torque figure of 405 Nm achieved at 1400 rpm.

Maximum traction comes from Clark Hurth rigid drive axles fitted with limited slip differentials, planetary reduction gears in the hubs and oil immersed braking.

Hydraulic power comes from a heavy duty 100 litres/ minute variable displacement piston pump, driven by the engine's crankshaft. The system is load sensing from main control valves, with steering and power braking valves taking priority. By using a load sensing hydraulic system, heat build up is reduced during long road journeys.

For the operator, the cab receives improved insulation and sound proofing, a luxury seat and full heating and ventilation. Cable controls are standard, with an electro-hydraulic four function joystick available as an option.

For further information please contact: Brendan McGrath, Sales Director, Matbro Ltd., London Road, Tetbury, Gloucestershire. GL8 8JD Tel: 01666 502502

Matbro - Teleram TR250

ROTA CUT SYSTEM

New for the Claas Quadrant 1200 baler will be a Rota Cut system enabling crop length to be reduced before it is formed into a bale. The result is a denser, heavier bale for wrapping or stacking. The cutting mechanism is similar to that used on the Claas Rollant Rota Cut baler with 25 spring loaded knives taking material from the 2.1 m wide pickup. The feed rotor has double fingers arranged in a helix formation for smooth crop flow and even power distribution.

Other improvements to the Quadrant 1200 include a bale ejection system, mid line PTO support with PTO shaft bearing for increased reliability on uneven ground and in turns, and 40 kph axles and road braking system. The latter facilitate safe travel at high road speeds between sites.

The bale ejector system, now standard on all 1200 balers, enables operators to remove the last bale before moving to another contracting job, when changing from one material to another, or before storing the machine at the end of the season.

Changes have also been made to the Quadrant 1100, which now has a twine failure indicator as standard that keeps the operator informed of twine breakages and supply problems. The 1100 has a 16 ball twine compartment feeding the four heavy duty knotters and forms a bale 0.8 m wide by 0.5 m deep and up to 2.4 m in length. This machine is also equipped with a fan to keep knotters clear of chaff and dust and ensure positive working in all conditions.

For further information please contact Roger Marshall, Sales Promotion Manager, Claas UK Ltd, Saxham, Bury St Edmunds, Suffolk. IP28 6QZ Tel: 01284 763100 Fax: 01284 769839

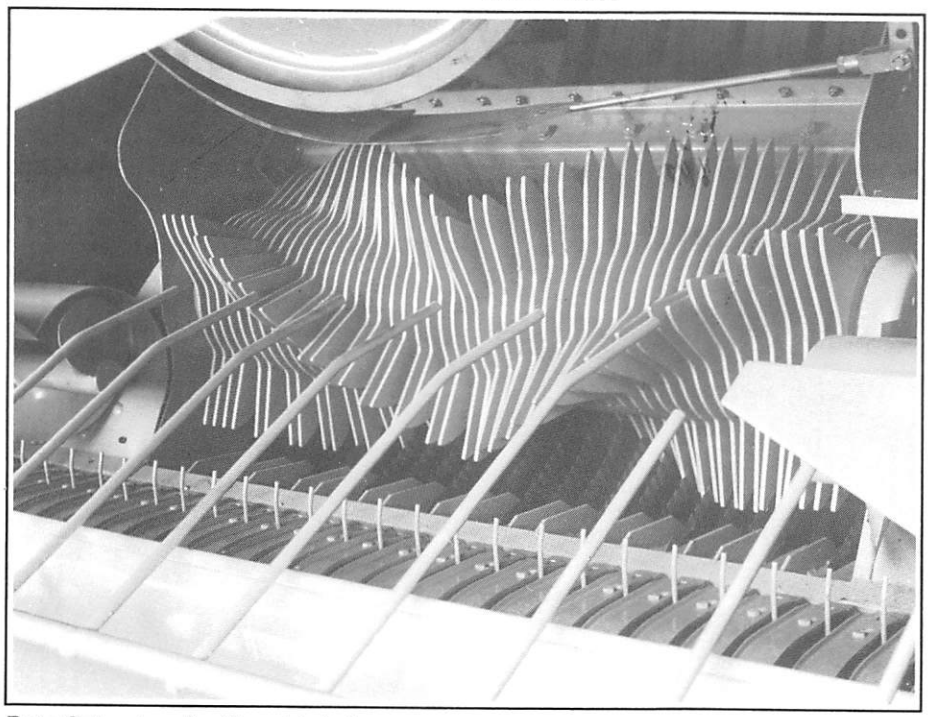
NEW SPRAY TIP

Spray Contractors have a new tool to help manage drift, simplify spraying and maximise their investment in crop protection chemicals. The patented new design of the Turbo TeeJet™ nozzle, combines longer wear life, a wider range of operating pressures, and clog-free passage that helps operators manage drift with outstanding pattern uniformity.

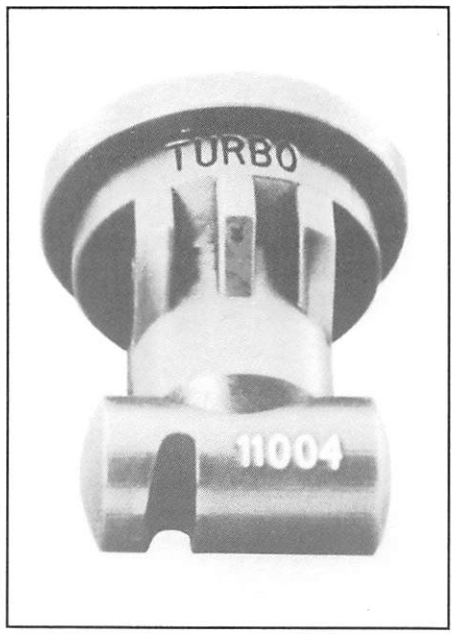
Droplets from the Turbo TeeJet are 50-60% larger than the standard flat spray nozzles operating at the same pressure. Across all pressure ranges, the Turbo TeeJet tip produces a very small percentage of fine particles that can drift off target. In fact, less than 1.5% of its spray droplets are smaller than 150 microns at 3 bar. Unlike most other nozzles, the Turbo TeeJet can be operated between 1 and 6 bar. "The tip is ideal for applications using automatic control systems because the wider pressure range allows them greater flexibility to vary application speed", says Bert Drenth. In addition, upper pressure ranges provide good foliar coverage while minimising drifts.

Even over the wider range of pressures, the Turbo TeeJet tip maintains a uniform pattern. A turbulence chamber inside the Turbo TeeJet distributes spray more evenly across the boom than the traditional nozzle. The new tip also minimises clogging and has a longer wear life. Because it was designed with liquid flow in mind, the orifice is less subject to wear. Turbo TeeJet nozzles range in sizes from 0.39 to 1.97 litres per minute and are colour-coded for easy identification of flow rates. They fit in all TeeJet nozzle bodies.

For further information please contact: Spraying Systems Limited, 4 Bourne Mill Industrial Estate, Guildford Road, Farnham, Surrey. GU9 9PS Tel: 01252 727201 Fax: 01252 712211



Rota Cut system for Claas big balers



Turbo TeeJet™

CO-OPERATION AGREEMENT ON PRECISION FARMING

Yield mapping pioneer Massey Ferguson and Optimix Computer Systems Ltd. have signed an agreement to cooperate on precision farming technology. The collaboration will ensure that the UK remains the world leader in the application of yield mapping on farms and variable rate inputs such as seeding and fertilising.

The agreement envisages collaboration projects between Optimix and Massey Ferguson covering development of data collection systems for tractors, and systems for using yield map data to control tractor and implement operations.

Optimix, based at Thetford, Norfolk, are leading suppliers of crop management software in the UK and are developing specialist programs for precision farming that will integrate with their management systems.

Stareton, Warwickshire-based Massey Ferguson introduced yield mapping in 1991. Mr Peter Hart, MF's product marketing manager, combines, said "Yield mapping is increasingly being seen as in the vanguard of developments that will be needed for sustainable farming systems in the future, and this agreement provides a solid basis for realising its full potential in the UK".

Mr Bruce Eglington, Managing Director of Optimix, said: "Precision farming promises considerable benefits to farmers, from both economic and environmental viewpoints. To maximise these benefits, compatibility between systems is essential and this agreement is a very important step to help ensure this for UK farmers".

For further in formation, please contact Bruce Eglington, Optimix Computer Systems (Tel: 01362 820836) or John Briscoe, Massey Ferguson (01203 531221).

ULTIMATE IN AXIAL-FLOW

Case IH has unveiled the new 2100 Series combine harvesters. The 2166 and 2188 are the latest additions to the Axial-Flow single rotor concept. Since this system was incorporated in the 1400 Series 17 years ago, improvements have provided better grain cleaning, operating controls and cutting platform. Case have come up with innovations for the new models that will provide higher levels of performance, enhance reliability and the ultimate in operator working environment and comfort.

Through extensive research using computers, a range of improvements enhance the new 2100 Series models. Still powered by the Case 8.3 litre, 6 cylinder turbo diesel engine, horsepower on the larger model, the 2188, has been uprated to 280 hp. Other improvements are; closed centre PFC hydraulics for specific functions; smoother unloader engagement; cab adjustments of the concave; pre-preparation of the cab for communications equipment; new windscreen wipers; optional rock trap; and optional radial tyres.

Improvements for service and maintenance include the addition of side access to the straw chopper fixed knife cassette, a right hand access deck to ease cleaning the screen, hand holds and step plates for easier cleaning of the radiator and three detachable (magnetised) 'wanderlights' to enhance visibility for carrying out service tasks. The battery is relocated at ground level and, alongside, a tool box has been provided. Routine, daily checks can be carried out quickly and in total safety.

The most visual part of the 2100 Series is the new operator station. The cab sits on state-of-the-art 'focalised cab mounts' for a smoother ride. Four isomounts, precisely angled, intersect just above the operator's head, providing 'virtual cab suspension', minimising vibrations. The sound level has been reduced to further enhance operator comfort. Visibility has increased with a glazed area of 5.11 m² providing a panoramic and view over the cutting platform irrespective of width. The integrated control console has been designed to suit the operator's seating position, by being mounted to the seat, thus removing the stresses and strains associated with poor control operation. A multi-function, finger-tip control lever provides operation over all functions. Two four-way rocker switches instantly activate the header lift/lower (or field tracker where fitted) and reel lift/lower, fore/aft. On-the-go unloading is controlled, without the operator moving his hand from this lever, via a rocker switch and push button discharge. The multi-function lever also contains the safety cut-off for the feeder.

Accompanying control features include:

* a superb ventilation system with no less than 13 adjustable vents and an infinitely variable fan speed,
* six powerful halogen work lights with additional lights for roadwork,
* a larger, multi-directional folding ladder,
* a wide-opening doorway for easier access to the 1676 mm wide compartment,
* a steering pedestal with upper and lower pivots to suit the operator's reach and preference,
* a deep cushioned air-suspension seat which is 10% wider, for armchair comfort throughout the working day, and
* electronically sophisticated display systems for monitoring, control and warnings.

The improved passenger seat (with storage space beneath) does not obstruct the operator and provides the ideal arrangement for training new operators.

For further information please contact: J.I. Case Europe Limited, Marketing Division, P.O. Box 121, Wheatley Hall Road, Doncaster, South Yorkshire. DN2 4PN
Tel: 01302 733393 Fax: 01302 738581

Case IH - 2100 series Axial-Flow combine harvester

FINANCIAL PREFERENCES

A recent independent survey showed the only financial services that interest farmers are those that offer competitive interest rates and levy no hidden charges. Massey Ferguson Finance, Britain's largest captive farm finance provider commissioned Silsoe College, Cranfield University to conduct a comprehensive investigation into attitudes to their own and competitive financial and insurance services.

The results, published in a 103-page report, outline the way customers perceive both MFF's field performance and the performance of major competitors such as market leaders Highland Finance, FAF, UFB Humberclyde and NFU Finance as well as the High Street banks.

Conclusions indicate that Massey Ferguson Finance leads the market in new tractor funding, represents a 'good deal' in the words of questionnaire respondents and is well-positioned in the farmer's mind compared to other finance companies.

Many farmers are suspicious of what they call 'hidden charges' implicit in deals from other financiers. These emerge as the biggest negative factor in using a finance company or bank and survey respondents approve the fact that all Massey Ferguson Fiance's agreements are free of arrangement fees.

The survey also revealed farmers want better insurance services than those on the market at the moment and require what researchers describe as 'a more farmer specific company'. Figures reveal 65% of them would be prepared to switch insurers if a better deal was forthcoming.

The research team's only negative conclusion was that MFF was still as yet unknown by up to 35% of farmers borrowing money indicating the value, clarity and flexibility of the firm's product packages were not yet matched by customer awareness.

Massey Ferguson Finance is a joint venture with De Lage Landen - financial offshoot of Rabobank - one of the world's three Triple A-rated banks. MFF was established in 1990, is now capitalised at £ 8.9 million and based at Stareton near Coventry. In spite of its close affiliation with a specific branded product, MFF is unique amongst manufactured-based finance providers in offering terms on other farming equipment: new and used tractors and equipment, cars and 4WD vehicles, dairy and grain installations, buildings and fixed equipment. The firm also provides a vital Keyman insurance service which safeguards families and business partners by covering the outstanding term of financial agreements should the signatory die.

For information contact: Mr. Henry Corp, Massey Ferguson Finance Ltd, Stareton, Kenilworth, Warwickshire. CV8 2LH.
Tel: 01203 305363 Fax: 01203 304480

Claydon - Yieldometer

WINDOWS BASED COSHH

EO Associates have developed a Windows version of their highly acclaimed software package COSHH Organiser. This has all the key features of its DOS parent and fully utilises the many advantages of Windows based architecture to provide a data management system that is completely user friendly.

Simplified report generating procedures allow speedy access to and print out of all data logged in the system.

Screen layouts have been greatly enhanced and the substance data sheet follows the recommended CHIP 16 point format that can be printed in hard copy as required. A very comprehensive 'Help' screen library is now included with easily accessible indexing. This offers the user a step-by-step guide through the regulations.

It should be possible for anyone with very limited knowledge of the Codes of Practice successfully to complete a full COSHH assessment to meet the requirements.

The COSHH Regulations are changing with more information to be recorded and greater demands to monitor your procedures. COSHH Organiser for Windows will keep you in control.

EO Associates, the quality software specialists for Health and Safety data management have a full suite of programs.

Further information from:
EO Associates Ltd.,
18 Shepperton Close, Castlethorpe, Milton Keynes. MK19 7HR
Tel: 01908 510034 Fax: 01908 510901

'GRIPPA' CONNECTIONS

A revolutionary new adaptor is set to banish the traditional problems associated with connecting metal service pipes to MDPE (or polyethylene) pipes with varying outside diameters - in just one universal fitting.

The new 'Grippa', which takes part of its inspiration from Talbot's popular 'Pushfit' range, means that one single adaptor can now be used to connect to lead, copper or galvanised iron. It is designed as a 'one stop' easy-to-use fitting that will not only save installers time, but also ensures that the right adaptor is always available on site.

There are 3 adaptors in the range, capable of jointing pipes with outside diameters from 15 mm to 34 mm. Grippa copes with all pipes and covers almost all service to ¾". For example the ½" Grippa adaptor covers both common pipe specifications such as lead ½" 5, 7, 9 lb plus other weights between and Galvanised Iron ½" and copper 22 mm.

Extensive tests for extreme installation and usage have been conducted and passed to standards. Real life performance tests showed that hand tightening proved performance up to the burst pressure of MDPE pipe at 46-48 bar while tightening with Stillson wrenches revealed minimal damage to the nibs on the nut, with no need to worry about over-tightening. Grippa can also cope with everyday conditions on varieties of types and sizes of pipe including mud, clay and out of round hard copper that can be connected without the need for flaring.

For further information please contact; Miss Kate Sellars, F.W. Talbot & Co Ltd., Winnall Valley Road, Winchester, Hants. SO23 0LL
Tel: 01962 843311 Fax: 01962 841344

STREAMLINED YIELDOMETER - COMBINES PRINTER

The Claydon Yieldometer, marketed exclusively as an option for Claas combines, now comes as a single compact unit with the printer as an integral part of the electronic control box.

The unit has been redesigned to appear as part of the combine's control console putting it in easy view of the operator. It features a larger illuminated Liquid Crystal Display Screen that now constantly shows Time, Forward Speed and Cutting Width Adjustment. The fascia panel and function control switches have been designed to complement the existing controls of the combine.

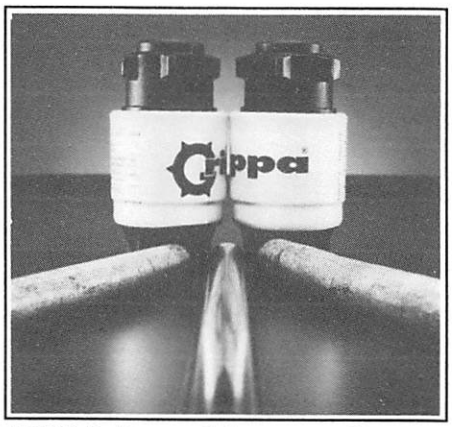
Setting the unit is as easy as before. Built in is the ability to display Spot Data, with tonnes per hour and yield updated every four seconds, Field Data and Batch Totals. Any selected area of the field can be recorded on the printer. Those parts of the field or 'Batches' are accumulated in the Yieldometer's memory to provide a printout of the total field results.

Invented and perfected by Suffolk farmer Jeff Claydon, the Yieldometer provides a wealth of field, part field and farm information that can help improve farm input management efficiency

Being extremely accurate and reliable Claas found the Yieldometer the ideal unit to record performance data during early trials of the new Mega combine range which showed the new APS (Accelerated Pre-Separation) system to increase output by 15-25%. Subsequently Claashave used it in all demonstration machines and close on 50% of the UK customers have opted to have a Yieldometer fitted.

The Yieldometer's value as both operational and managment tool was recognised by the RASE with the award of a 1995 Silver Medal, along with the Claas APS system.

For further information please contact Jeff Claydon, Gaines Hall, Wickhambrook, Newmarket, Suffolk CB8 8YA Tel: 01440 820327.



F W Talbot's new Grippa connection

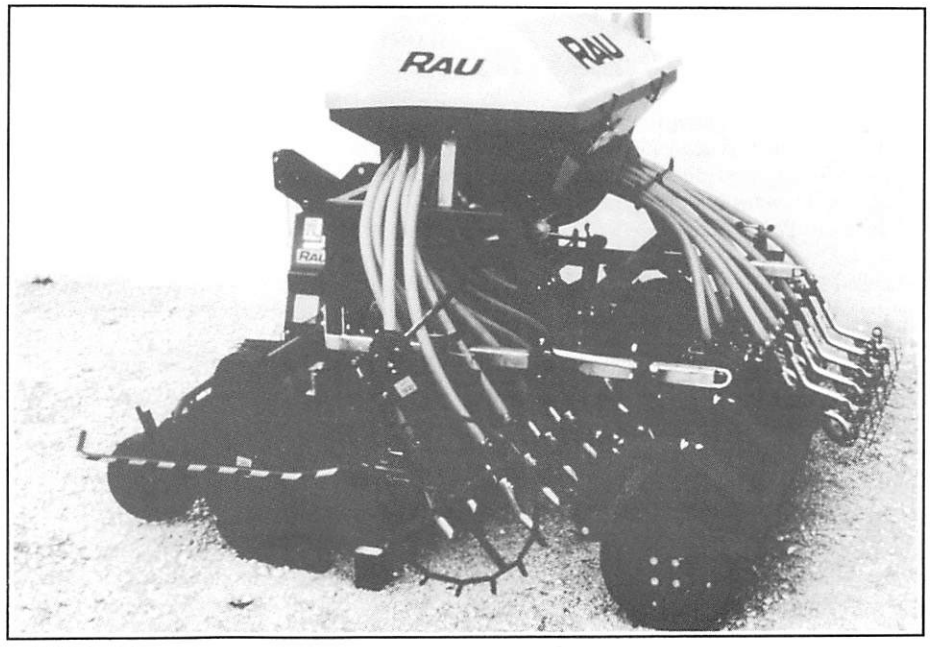
INTEGRATED FARMING SYSTEMS

The new RAU Kombisem is designed to combine with Rototillers, power harrows or tined cultivators, using the versatility of the ACCORD Distribution system.

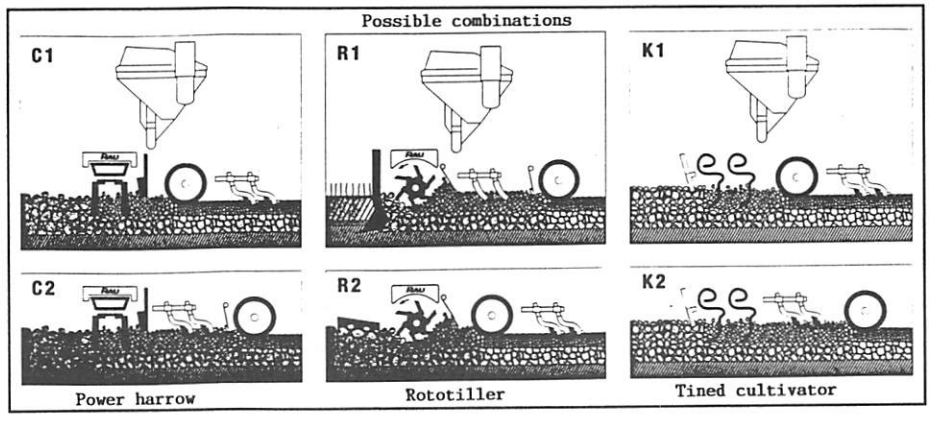
The Kombisem offers the possibility of sowing either in front or behind the packer roller. When combined with the RAU Rototiller fitted with soil loosening legs, seed can be injected into the soil flow thus eliminating the need for coulters.

This makes it the ideal combination for mulch drilling and in this format (R1) it is completely compatible with the requirements of integrated plant production considered to have many benefits on soil structure to the extent that in certain German states they offer investment aids to farmers purchasing such machinery.

For further information please contact: G.E. Randles, Ferrag Limited, P.O. Box 90, Haydock Lane, Haydock Ind. Estate, St. Helens, Merseyside. WA11 9UU Tel: 01942 272777 Fax: 01942 271287



RAU Kombisem

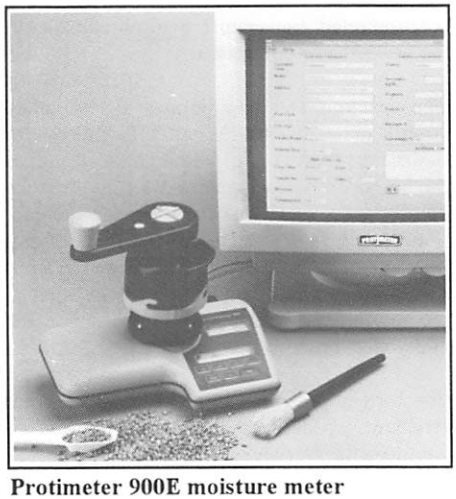


SAMPLE DATABASE

A market leader in grain moisture meters has developed a new system to store grain sample information. The new data base which runs on Microsoft Windows is compatible with Protimeter 900E moisture meter. The programme draws customer information from its data base and then logs the information from the 900E such as moisture content, temperature, sample number, time, data and crop type.

Additional data such as protein hagburg, and nitrogen content can be entered manually along with bushel weight and screening percentage. Labels printed off with all relevant information can be attached to the sample bag. Files may be selected by any of the sample criteria previously entered.

For further information please contact: Olive Bloor, Protimeter plc, Meter House, Fieldhouse Lane, Marlow, Bucks. SL7 1LX Tel: 01628 472722 Fax: 01628 474312



Protimeter 900E moisture meter

REVERSIBLE POINT AND WING

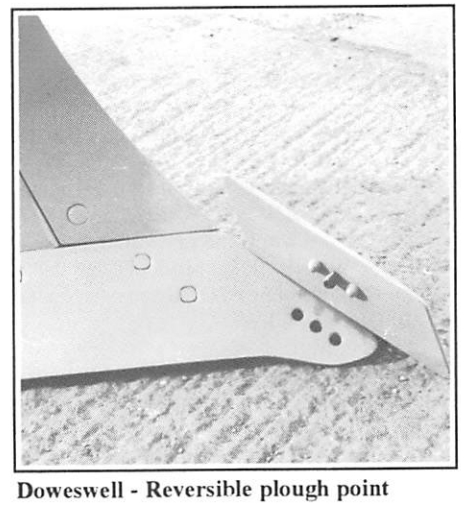
A new design of reversible point and wing has been introduced by Dowdeswell for use with its DD plough body. The point is suitable also for Dowdeswell's UCN and SCN bodies currently fitted with a small reversible point.

The point features a patented method of attachment to the plough wing using a single bolt instead of the previous two-bolt fixing. To provide extra strength and prevent it rotating in work, the new point incorporates two spigots that locate in two former bolt holes in the wing.

The principal advantages of the new single hole reversible point over its predecessor include:

* the single hole fixing provides additional usable steel to give a longer lasting component;
* material thickness has been increased to 15 mm, providing 20% more steel, also increasing working life;
* the use of just one set of fastenings reduces costs and the time taken to change parts; and
* both the nut and bolt head of the single fixing are better shielded by the point and wing to reduce premature wear.

For further information please contact:
Michael Alsop,
Dowdeswell Engineering Co. Ltd.,
Blue Lias Works,
Stockton, Rugby, Warwickshire.
CV23 8LD
Tel: 01926 812335



Doweswell - Reversible plough point

UPRATED SUBSOILER LEGS

Stronger, thicker and deeper-working subsoiler legs have been introduced by Dowdeswell as an option for its Bed Former implement, which is used for potato seedbed preparation mounted directly to a tractor or behind a Dowdeswell Poweravator rotary cultivator or Power Harrow.

Attached to the Bed Former's frame, each of the two subsoiler legs works directly in front of a ridging body to alleviate soil compaction caused by the tractor's wheels. The result helps ensure optimum potato root growth and tuber development within the prepared beds.

Improvements over the company's previous design include thicker (25 mm) and longer (200 mm) legs for greater strength and deeper compaction treatment, a reversible and replaceable wear shin, shearbolt protection and uprated mounting brackets.

As before, customers can choose from 200 mm winged chisel points or a 50 mm diameter bullet point to suit soil type and degree of compaction. Adjustable up and down through 2550 mm of travel in 50 mm increments, the subsoiler point can be set to work above, below or level with the base of the following bed-forming body to suit requirements.

For further information please contact Michael Alsop, - address and telephone on page 13.

CHANCELLOR PRESENTS WORLDAWARE AWARD

Hunting Technical Services, the Hunting PLC subsidiary that advises developing countries on Natural resources, agricultural and rural development issues, has received the 1995 Worldaware RTZ Award for long term commitment to sustainable development. The award was presented to the company's managing director, David Potten, by Chancellor of the Exchequer, Kenneth Clarke.

Hunting has been helping across the world for more than 40 years and, in the words of the Worldaware judges, "has been committed to sustainable development and to the protection of the environment well before these concepts became fashionable. This entry is considered one of the best ever seen for the award."

The company's ability and commitment is seen in a run of significant contracts. These include major projects in Asia, Africa, the Middle East and Eastern Europe. Their expertise in advancing technology, such as geographical information systems, is proving particularly beneficial, as is the company's policy of maintaining a large permanent field staff of experienced field workers.

For further information please contact:
Nick Johnstone/Marie Richardson,
Campaign PR
Tel: 0171 222 8866

PIONEERING WASTE PROCESSOR

A pioneering company in Corby with a unique process for recycling organic waste has won an Environmental Innovation award from Northampton County Council.

Organic Waste Processing claims its Ad/BIO process will convert almost any organic slurry into dry inert products that are harmless to the environment if dumped but, in many cases, are also saleable as quality animal feed supplements, soil conditioners or slow release fertilisers.

Using the Ad/BIO process, Organic Waste Processing can accept even problematic high B.O.D. sludges. It will treat wastes from bakeries, food manufacturing (fruit, vegetable and meats), supermarkets, breweries and wineries, and agricultural waste such as pig slurry, dairy whey, poultry and meat offal. Even contaminated raw matter, whether of plant or animal origin, can be converted into safe protein-based materials.

Organic Waste Processing Managing Director, Philip Moore confirms the company has now established biological conversion values for the stabilisation of most organic wastes.

Information from Philip Moore, Organic Waste Processing Limited, Unit C, Baird Road, Willowbrook Industry North, Corby, Northants. NN17 5AZ Tel: 01536 408081

NEW 240 DIN TRACTOR

A new 240 DIN hp Massey Ferguson tractor - the first fruits for UK farmers of the company's partnership with its new parent AGCO Corporation - will make its debut here this spring. Designed from the ground up to provide sheer lugging power of big equipment for fast coverage of large acreages, the MF9240 is based on AGCO's high power White tractor range, which it manufactures at a plant in Independence, Missouri.

British industry makes a significant contribution to the tractor, with Cummins of Darlington supplying the turbocharged and aftercooled 8.3 litre 6-cylinder engine and David Brown Transaxles of Penistone, South Yorkshire, making the rear axle. Its performance is based on engine power characteristics already made familiar by other tractors in MF's range. The result is that the rated output of 240 DIN/176.5 kW is delivered at 2,200 rev/min, maximum power peaks at 255 DIN/188 kW as engine speed falls to 2,000 rev/min and maximum torque of 941 Nm/694 lb ft is produced at 1,800 rev/min. Maximum PTO power is estimated at 210 DIN/155.6 kW.

The drive-line is completed with a full powershift transmission giving 18 forward and 9 reverse gears. It is operated by moving a single lever forwards or backwards and can permit the tractor to be driven entirely without using the clutch pedal. As a safety feature, however, the clutch pedal has to be depressed before the engine will start. It also provides "inching" accuracy for attaching implements. The powershift speed and direction changes are made via the transmission's electronic control system.

Drivers can choose to "pulse" shift up or down the range one gear at a time in forward or reverse with a brief movement of the console lever. He can also choose sequential changing by holding the lever in the upshift or downshift positions and the transmission will continue to shift automatically to the end of the gear range or until the lever is released.

Other features of the transmission available include speed matching which ensures that when the tractor is travelling in the transport speeds, it is in the most efficient gear for the engine speed being used. In addition, forward and reverse start-off gears can be preset and the transmission will automatically bypass the lower gears to engage the gear selected for starting from standstill.

The on-the-move, under-load changes are smoothed by the electronic control system that automatically adjusts the rate of engagement of the transmission clutches according to the tractor's engine speed and boost pressure of the turbocharger.

An eye-level readout on the driver's right shows the gear engaged and the preset gear selected for the opposite direction travel. It also displays diagnostic codes pinpointing any system malfunction.

This single powershift lever is mounted for right hand operation in a console attached to the driver's seat. When the seat is swivelled to either side, the console turns with it so the control is always at the driver's finger tips. The same console also incorporates the hand throttle and switches for differential lock and 4-wheel drive engagement/disengagement. The driver's hand can move easily from the seat-mounted powershift control console to the other major controls.

The spacious cab incorporates a new solar-control glass that blocks out 17% more ultra violet rays than normal tinted glass. It makes the MF9240 the only tractor offering the extra comfort of a solar glass cab. Inside the cab, good visibility is offered by the sloping bonnet, glass-to-glass joints between the front and side windows and routing the exhaust to the non-door side of the cab. A passenger seat and air-conditioning are standard.

For further information please contact John Briscoe, Massey Ferguson, Stareton, Kenilworth, Warwickshire. CV8 2LJ
Tel: 01203 531000.

THE CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 1994

On the 10th January the long-awaited Construction (Design and Management) Regulations 1994 were laid before Parliament with them being scheduled to come into force on 31st March 1995. The Regulations were developed in response to the European Commission Directive 92/57/EEC, commonly known as the Temporary or Mobile Construction Sites Directive, which was adopted on 24th June 1992.

The Regulations have been the subject of intense controversy since they were first proposed. This is illustrated by the fact that they were to have come into force on 1st January 1994 and then again on 1st October 1994. On both occasions, however, they were postponed after criticism from sectors of the construction industry.

REGULATION REQUIREMENTS

The primary purpose of the Regulations is to establish a safety management network at all stages in the development of a construction project. Starting from the initial design stage to completion - by imposing safety responsibilities on everyone involved in a construction project, including clients, contractors and designers. In addition, the Regulations establish two new positions in respect of safety on a construction site, the Planning Supervisor and the Principal Contractor.

The Client's Duties

The Regulations are revolutionary among construction and safety rules in that they impose certain duties in relation to safety on the person contracting the work, the client. These duties include the obligation to appoint a competent Planning Supervisor and a competent Principal Contractor, and to ensure that both have allocated adequate resources for ensuring safety on site.

In addition, the Client has the obligation to ensure, so far as reasonably practicable, that construction work does not begin on site until satisfactory Health and Safety Plan has been prepared and developed by the Planning Supervisor, together with the Principal Contractor. The Health and Safety Plan will serve as the foundation of health and safety management for the site. This will provide a source of information for contractors tendering for the job on the safety risks associated with the project (in terms of the design, the site, the programme, etc.), and as a reference for contractors working on the site in respect of the safety management systems and welfare arrangements developed by the Principal Contractor. This is one of the most important of the Client's duties insomuch as it is possible for a civil action to be brought for a breach of this statutory duty.

The Client must also provide information to the Planning Supervisor on the condition of the site for use in the Health and Safety Plan, and for inclusion in the Health and Safety File. The Health and Safety File is a collection of information about the design and the structure comprised in the project. This may prove useful for persons planning work on the completed project in the future, including maintenance and/or redecorating. The Client must ensure that this File is available for inspection by anyone who may need it.

The Planning Supervisor's Duties

The Planning Supervisor is essentially responsible for co-ordinating health and safety for the Project during its design stage. In doing so, the Planning Supervisor is expected to supervise the design production and review the work product.

Specifically, the Planning Supervisor has the responsibility for sending notice of the Project, including the appointment of the Planning Supervisor and the Principal Contractor, to the Health and Safety Executive. The final version of the Regulations requires that the Planning Supervisor send out notice of its own appointment as soon as possible after the appointment, and other information at that early stage, as soon as reasonably practicable thereafter.

In its supervisory capacity, the Planning Supervisor has the responsibility to review the designs for the Project to ensure that they eliminate safety risks and that they provide information on the risks remaining in the design, so far as reasonably practicable.

The Planning Supervisor is also responsible for ensuring co-operation among the Designers for the project, to ensure that they work together effectively and that the designs that they produce do not interact in a way that creates hazards.

One of the most important duties on the Planning Supervisor is to prepare in the first instance the Health and Safety Plan and to prepare and update the Health and Safety File.

The Designer's Duties

Every Designer who prepares a design for use in construction must ensure that the design:

* eliminates foreseeable risks to the health and safety of persons involved in the construction, cleaning or maintaining of the project;

* combats risks, at source, to limit access to the risks, whenever reasonably practicable;

* gives priority to measures that protect all workers;

* provides information on the materials, project or structure, to the extent reasonable practicable, to assist contractors when planning the construction methods.

More generally, each Designer is expected to co-operate with the Planning Supervisor and other Designers, so that each of them can comply with their duties under the Regulations.

Lastly, it is important to note that the final draft of the Regulations has added a new obligation on the Employer of Designers to forewarn the Client of its obligations under the Regulations. The intent of this provision is to ensure that Clients are made aware of duties under the Regulations.

The Principal Contractor's Duties

The Principal Contractor is responsible for ensuring safety on site during construction. As part of its duties, it must ensure, so far as reasonable practicable that contractors (which includes sub-contractors) comply with the health and safety rules and procedures developed for that site.

As part of this duty, the Principal Contractor must take reasonable steps to ensure co-operation and co-ordination among the contractors, so that each can comply with their statutory duties. Similarly, the Principal Contractor is expected to provide information to every contractor on the health and safety risks present on site. The contractor must then deliver this to its employees.

In order to ensure that these systems and information are used effectively by the contractors the Principal Contractor is empowered to "reasonably direct" the actions of other contractors on matters involving health and safety.

The Principal Contractor has the important responsibility to take reasonable steps to see that only authorised personnel have access to the construction site. Failure to do this could lead to a civil suit (besides a possible conviction for a statutory breach).

In addition, the Principal Contractor is responsible for providing the Planning supervisor with all information that it has or "could be ascertained by making reasonable enquiries" which it believes should be included in the Health and Safety Plan. While the Regulations do not describe the information that this would include, it is reasonable to assume that it would include information on design hazards that arise during construction.

Lastly, the Principal Contractor is required to display a copy of the notice sent to the Health and Safety Executive by the Planning Supervisor in an accessible location.

The Contractor's Duties

In addition to the Contractor's traditional safety responsibilities, there are some specific new obligations on Contractors. These include co-operating with the Principal Contractor in respect of health and safety rules on the site, complying with the reasonable directions of the Principal Contractor and complying with the Health and Safety Plan.

In addition, Contractors are expected to notify the Principal Contractor of any information (such as design information) which they believe should be included in the Health and Safety Plan. This is a corollary obligation to that imposed on the Principal Contractor, and as such would include any information that the Contractor has or "could ascertain by making reasonable enquiries" of his employees.

TRANSITIONAL PROVISIONS

The Regulations are scheduled to come into force on 31st March 1995. Therefore, any construction project commenced after that date will be subject to the full force of the Regulations (assuming that the limited exception the application rules do not apply).

When construction work commences before 31st March 1995, it is not necessary for the Client to appoint a Planning Supervisor or a Principal Contractor until 1st January 1996. If at 31st March 1995, construction work has not started but the date for appointing a Planning Supervisor or the date for appointing a Principal Contractor has passed, then they must be appointed "as soon as is practicable " after the effective date of the Regulations.

It is not necessary for the Client to ensure that an acceptable Health and Safety Plan has been prepared before the construction work begins where that work has started by 1st August 1995. Similarly, it is not necessary for the Client to supply information on the site conditions to the Planning Supervisor for inclusion in the Health and Safety Plan for projects where construction work starts before 31st March 1995.

Until 1st August, the Planning Supervisor and the Designer's duties are not applicable to any design that was prepared before 31st March 1995

This information has been obtained from Review February 1995, Newsflash published by Masons International, Solicitors. The information contained therein is only intend to be a synopsis. Before acting on it, detailed professional advice should be taken

For further information please contact the Principal Author: Christopher Dering
Tel: 0171 490 4000.

TREE WORK IS IN HIGH RISK INJURY CATEGORY HSE WARNS

The Health and Safety Executive (HSE) issued an urgent warning to tree felling operators and tree surgeons that their work is in the "high risk of injury" category. The warning came from John Oliver, HSE's South East Area Director, speaking at an event at the National Trust's Scotney Castle in Lamberhurst.

He said that the HSE is concerned at the number of serious accidents in the forestry and allied industry sector. In the past 3 years 21 persons have died. The main risks are from falling trees, operators falling and severe injuries from machines such as chainsaws. Other industries are showing an improvement in accident rates but forestry type work remains resistant to an improvement in its overall health and safety performance."

Organised jointly by HSE, the National Trust and Lamberhurst Equipment Ltd, the safety day combined 20 live work demonstrations including felling trees, tree surgery, the use of chainsaws and logging for firewood.

Mr Oliver said that the actual number of persons earning a living in tree work was unknown, but that some of these people have to work alone in woodland and in all weathers.

He spoke about the work of tree surgeons. There are too many cowboys in the South East pretending to be tree surgeons. Nearly all of these take no precautions at all. They are a risk not only to themselves but also to others helping them and to their customers. The HSE recommends that only qualified tree surgeons are engaged as contractors.

He added, that the HSE is concerned about the welfare of people who earn their living in forests or woodland. Our surveys reveal that some operators are going nearly deaf because of high noise level from machines and others have the condition known as vibration white finger caused by over vibrating components of machinery. Inspections often reveal the use of dangerous machines such as circular saws with safety guards missing.

Tractors are often used with the safety cab or frame missing and the driver is at high risk if the tractor should overturn. During this winter I have instructed agricultural inspectors working in Kent, Surrey and Sussex to crackdown on 'cowboys' and on employers who fail to meet basic health and safety requirements for their employees.'

Mr Mark Daniels, Health and Safety Officer with the National Trust, said: "the National Trust is keen to work with the HSE in promoting high safety standards in forestry and arboricultural work. The Tree Work Safety Day will help by raising standards among the local contractors who may undertake work on trust properties, and by reminding our own staff of safety practices."

INSTITUTION OF AGRICULTURAL ENGINEERS

Conference
AGM & Annual Dinner

PRODUCTION AND PROCESSING OF CROPS FOR INDUSTRY

Tuesday 16th May, 1995
Silsoe College, Silsoe, Bedford

Currently there is much interest in producing new crops for industrial use and in finding non-food uses for existing crops. This interest has been stimulated by the food surpluses in the developed world which have led to set-aside, and to increasing consumer demand for "green" products and processes. The conference will provide a platform for experts in the production and processing of crops for fuels or industrial feedstocks to illustrate the latest technology developed for these areas, and will encourage discussion on the way forward.

After the conference, the Institution will hold its AGM, Annual Dinner and Awards ceremony.

For details, contact: Yvonne Miles, Institution of Agricultural Engineers, West End Road, Silsoe, Bedford. MK45 4DU
Tel: 01525 861096 Fax: 01525 861660

Membership matters....

THE NEWSLETTER OF THE INSTITUTION OF AGRICULTURAL ENGINEERS

THE PCD FOCUS AND THE ROLE OF SPECIALIST GROUPS.

In the last issue of the Journal, an announcement was made about the PCD focus. Following a suggestion from one of our younger members, the Executive Committee has decided that the letters PCD should, in future, stand for **Personal Career Development**. Every committee within the Institution is now examining ways in which all of our activities can be of even greater help to existing members of the Institution in their work and in assisting the development of their personal careers.

This is the second of a series of articles which is intended to keep members informed about progress with the PCD concept. The President's January letter made reference to the Continuing Professional Development initiative which is expected to be in full swing by the end of 1995. CPD will be the subject of a later article. This article is concerned with the role of Specialist Groups.

Specialist Groups are one of the fastest growing activities within the Institution. The work of the Groups is clearly vital both to CPD and PCD. Why is this so?

The Institution Membership Survey in Volume 49/1 of the Journal showed that members rated technical interest and support very highly amongst Institution activities. The particular areas of technical interest mentioned by members broadly matched our current Specialist Groups. We cannot rest there. We must continue to develop the whole area of our Specialist Group activities so that they remain in tune with members' requirements. These must be as dynamic as the industries we serve.

It is not surprising that Specialist Groups are already highly rated by members. They are providing an important means by which members can keep in touch with the latest developments in their specialist field. They are an ideal means for making contact with other specialists. In personal terms they help members to do their job more effectively and above all to maintain employability.

Specialist groups clearly have a key role in assisting members to obtain valuable CPD knowledge and experience. They have the potential to become one of the major means by which members can build up impressive CPD records.

If you have ideas on the improvement of specialist group activity, NOW is the time to get in touch with a member of your Group or to contact the Group Secretary directly. Details of Specialist Group Chairman, Secretaries and Treasurers are given below. If your specialist interest is not currently represented then contact the Specialist Group Coordinator Peter Redman, on 0525 860077. Finally, if you are not currently a member of a specialist group review this situation TODAY. You may be missing out on a vital means of improving your career prospects! Let the Secretariat know which groups (up to four) you wish to be registered with.

SPECIALIST GROUP	CHAIRMAN	SECRETARY/TREASURER
Amenity & Ecological Engineering	Brian Hurtley.....01844 214500	John Gowing.....0191 222 6000
Crop Drying & Storage	Peter Webb.....01380 813787	David Bartlett.....01525 860077
Precision in Farming	Simon Blackmore.....01525 863000	Andrew Scarlett.....01525 860000
Forestry Engineering	Roger Hay.....0131 447 2430	Geoff Freedman.....0131 334 0303
Machinery Management	Andrew Landers.....01952 815245	David Pullen.....01525 863000
Overseas Development	Derek Sutton.....01525 860000	
Soil and Water Management	Ainsley Ede.....01223 76002	Tim Chamen.....01525 860000
Vehicles	Richard Stayner.....01584 876846	Andrew Scarlett.....01525 860000
Young Engineers	Allan Kaminski	

News of members

Lackson Kaluba says that it is more than a year since he returned to Lusaka. He has taken up his old job at the Natural Resources Development College where he is running intensive in-service training courses. These range from 2 to 4 weeks. The participants are mainly from the Ministry of Agriculture field and extensive service. The major topics for include adjustment of both tractor and animal drawn implements, proper attachment and usage, and safety of PTO driven machines.

On his return, Lackson was invited by Larenstain International Agricultural College, in the Netherlands, to present a paper on policy issues relating to sustainable rural and agricultural development with reference to agricultural mechanisation. His paper was presented in Arusha, Tanzania and the countries involved included Tanzania, Kenya, Uganda and Zambia.

The paper considered policies that promoted low input agriculture with support services as opposed to those policies which focus on high external input agriculture. A contrast was made between animal draft power and tractor based technology.

Karl-Ludwig Weiner says that he no longer works in science or agricultural engineering as he has moved to ABB where he is involved with overall management of turbogroups. ABB are designing, planning and erecting turbo machinery all over the world. Currently they are installing a 66 MW turbine for a compressor drive in Holland, a 103 MWturbine and generator close to the Arctic circle in Finland and a third is a 300 MW compressor drive in Bombay.

Karl is based in Nurnberg and is responsible for the just-in-time completion of contracts for. He says that although there is no science, and little computing in his new job he can still use many of the skills that he learnt at Silsoe.

R.J. Sims after retired from his overseas career in agricultural education, is setting out to establish a wildlife reserve near Crewkerne, Somerset. He is buying a 10 ha valley which is wooded in the wet bottom, partly replanted with mixed broadleaves and partly rough grassland with a lot of bracken and gorse to clear. He says that his plan is to plant native broadleaves over much of the area, but leaving extensive rides and glades to vary the wildlife habitats. His intention is to do most of the work himself with whatever help he can get from volunteers.

He has been given the indefinite use of a tractor but he is in desperate need of flail forage harvester and he is hoping that a member will have one to spare that he would be allowed to look after for a couple of years. The valley contains two ponds, one of which could be 0.25 ha, which need desilting and he would be grateful for some advice on how to do this. If anyone can help with a forage harvester or advice on the ponds please contact John on 01460 55587.

Giles Wardle who is British, was born and brought up in Portugal on the family farm that has 550 ha, of which 480 ha are sown to wheat, barley and sunflower. In addition the farm has 3000 olive trees of which half are watered by trickle irrigation. They also have a flock of 700 sheep.

Giles was educated in Britain and obtained a BSc. from Newcastle University. After a year soil surveying in Spain he went to Silsoe and did an MSc. in Irrigation Engineering. He then worked for Watermation for several years as an export sales engineer.

After getting married last year he decided to return to Portugal and has set up a practice as a consultant engineer in soil and water. At present Giles is undertaking the design, specification and tender documents for an irrigation system for a golf course being constructed in Mallorca. He is involved with the family farm. They intend to upgrade and extend the present irrigation system by the installation of a new 45 ha centre pivot thus enabling them to double.

Giles says that the farm has 2 holiday cottages for which Institution Members could be offered special rates. Besides a wide variety of agriculture in the region there are many bird species and several historic castles. The farm is next to a 27 km long reservoir, which has coarse fishing along the availability of dingy sailing and windsurfing. The cottages are fully equipped and there is a swimming pool.

Enquiries should be sent or faxed to: Herbade Da Contenda, 7370 Campo Maior, Portugal. Tel/Fax: 010 351 68 685193.

Hugh Back and his wife have returned to the tea industry in Western Uganda after an absence of 8 year. Having seen three changes in government during his period of work in Uganda in the eighties, he says that the current relative stability has led to some remarkable improvements in conditions in the country.

Hugh is working for CDC as a development engineer with the Rwenzori Highlands Tea Company Ltd. RHTC has recently taken over the running of six tea estates and factories with a total area of over 300 ha under tea and 4000 ha of land in other uses. The estates are spread throughout the country; the northerly being Bugambe near Hoima, with Ankole in the south-west and Salama in the east and the others spread between them. The lack of tele-communications and the distance and road conditions, especially in the heavy rains, makes logistics extremely difficult.

Only three of the six factories were working earlier in the year, but at the time of writing the number has increased to four and five were expected to be in operation by Christmas 1994. Problems include the lack of parts for 30 year old machinery, the lead times to procure new equipment and the rehabilitation of one badly looted factory that has not worked for over 12 years.

John Gregory after working for MAFF/ADAS, took early retirement in June and has started his own Soil and Water Engineering Consultancy rather than face, as he put it, another massive reorganisation in ADAS. His main areas of interest and expertise are in land drainage;agricultural water supplies; irrigation; farm waste disposal; preparation of farm waste management plans; restoration of land after mineral extraction, pipeline installation, etc.; and pond and lake design.

T. Ijir who has taken a Phd at Southampton University is to return to Nigeria to resume his career as a lecturer in the Department of Agricultural Engineering.

C.T. Nyongo in Bamenda, N.W. Province, Cameroon has set up the Centre for Appropriate Technology (CAT), being a non-governmental, non-profit making, non-political organisation created to act as a focal point of existing technologies. In writing, a request is made for members to provide any information or ideas that could help the growth of this organisation.

CAT aims to develop and raise the level of technology in the province, along with the standard of living of the rural people with special emphasis on the women. Over 90% of farm work is carried out by women, which coupled with running their families, means they are the worst hit by drudgery.

The intended activities of CAT are:

* to collect, develop, and diffuse indigenous technology in the North West Province, particularly in the agricultural domain,
* to identify the needs of the people for technological improvement,
* to collect development technology from elsewhere, adapt, and introduce them to suit the socio-economic and cultural environment of the province.
* carry out surveys of existing technologies and identify the needs of the people.
* establish contacts with NCOs for information exchange,
* test new equipment,
* promote technological development and transfer through women's organisations,
* carry out joint ventures with institutions,
* encourage the use of environmentally friendly technology and alternative and renewable energy sources,
* assist local craftsmen with the acquisition, repair and maintenance of equipment, and
* carry out contracts for others in the field of technological transfer.

If any member can help please contact C.T. Nyongo at CAT, P.O. Box 558, Bamenda, N.W. Province, Cameroon. Tel: 36 25 10 Fax: 237 36 21 71

INSTITUTION MEMBERSHIP CHANGES

Admissions - A warm welcome to the following new members:

Member: R. Vijayakumar (Essex)

Associate: J Heard (Devon), S. Mansaray (London) and C.J. Richter (S Africa)

Student: I.J. Day (Essex), S.R.B. Done (Beds), A. Finney (N. Ireland), C.S. Graver (Berks), B. Kotschoubey (London), B. McGee (Shrops), M. Rubbis (Italy) and A.J. Taylor (W. Yorks)

Re-admission: R.F. Flach (Cambs)

Transfers - Congratulations on achieving a further phase of their professional development

to **Member:** P.K. Afful (Lancs), C.R. Blessley (London), J.A. Burley (Oxon) and D.J. Roe (Herts)

to **Student:** L.C. Ashmore (Ireland) and S.R. Briggs (Scotland)

Deaths - with great sadness we report the death of:
R.J. Morgan (Cornwall) and K.C. Stacey (Cambridge)

European Engineer (Eur Ing) - Congratulations on this achievement.
G.F.D. Wakeham (Shrops)

Movements - members who have changed their addresses except where they remain in the same English county or, elsewhere, in the same country. We hope the move has proved beneficial.

Member No	Name	From	To
5258	P.W. Ashendon	Surrey	Beds
5888	C.L. Cook	London	Essex
6278	M.P. Duggan	W. Sussex	Essex
66101	M.D. Fallon	Beds	Notts
5515	G.N Foster	Lancs	Cambodi
2772	W. Hancox	Scotland	Cambs
5539	D.K. Hemstock	Derbys	Notts
6129	J.C.A. Henry	Devon	Somerset
3973	L.E. Hughes	Warwicks	Hereford
3559	S.L. Kittle	Links	Norfolk
3258	A. Murison	Singapore	W. Midlands
6039	L. Mwale	Shrops	Zambia ***
5760	N.C. Portch	Wilts	Oxford
4226	W.J.H. Ramsay	Cambs	Canada
5387	S.J. Scoones	E. Sussex	Lancs
5352	A.R. Scott	Warwicks	Glouc s
4963	J.A.C. Steel	Sussex	Tyne & Wear
5742	N.S. Taylor	London	Berks
6172	C.J.N. Tootill	Dorset	Hampshire
5633	J.W. Turnbull	Oxon	Surrey
4668	H.N. Turral	Surrey	London
6348	M.V. Westwood	Surrey	Oxon

*** L. Mwale was shown as "gone away" in the previous Newsletter; he has now contacted the Secretariat.

NEVILLE GASCOIGNE FIAgrE

Neville Gascoigne, Fellow of the Institution, member for 50 years and pioneer of modern milking technology, died on 30th January 1995 at the age of 82. He was physically less active in his later years, but his mind remained as sharp as ever, as evidenced by the preparation of a book on the Company - 'Gascoignes the Company' - and his lively correspondence with the Institution Secretariat. His long association with the industry came initially through his civil engineer father, who was importing steel silos from the United States and saw something emerging milking technology while over there.

In 1922 Gascoigne senior began developing improved machines in this country. Neville Gascoigne joined him as a fitter after a period with the National Institute for Research in Dairying, Shinfield, and became Sales Director in 1936, when Gascoignes became a public company. He retired as head of the company in 1971, and continued to accept consultancy assignments for some time afterwards.We have lost one of the real pioneers of agricultural engineering development in our time. We offer our sympathy and sincere best wishes to his

BRANCH DIARY

South East Midlands Branch

7.30 pm, Monday 24th April, 1995
Turbochargers for Diesel Engines, B. Walsham, Holset Engineering Co. at Silsoe College.

7.30 pm, Friday 16th June, 1995
Social evening to be arranged.

June/July 1995 details to be arranged
Technical visit to a Shanks & McEwan site. For further information contact D.B. Tinker, Silsoe Research Institute. Tel: 01525 860000

Southern Branch

7.30 pm, 5th April, 1995
The operation of the UK's largest combine hire fleet and direct selling operations, Philip Steam, Agricultural Plant Hire, Peterborough at Rycotewood College

7.00 pm, 17th May, 1995
Setting up an American Style golf club. Martin Jones, Head Greenkeeper, Oxfordshire Golf Club at The Clubhouse, Oxfordshire Golf Club, Thame, Oxon. Information from: Hon. Secretary, O. Statham, Potato Marketing Board Tel: 01865 714455.

West Midlands Branch

7.00 pm, Monday 10th April
Visit to Horticultural Research International
Dr. Chris Woods, Wellesbourne, Warwick.

11.00 am, Sunday 11th June
Tour & Bar-B-Q at Warwickshire College, Moreton Hall, Moreton Morrell, Warwick. Information from: Neil Sparey, Oak Barn, Clifton-on-Teme, Worcs. WR6 6EN. Tel: 01886 812378

Yorkshire Branch

Wednesday 22nd March
AGM followed by "Automatic Milking up to Date", Mr T. Mottram, Institute of Animal Health, Compton, at Buckles Inn, Askam Richard, York

Wednesday 26th April
Visit to N.D. Marston, Shipley. Details from Secretary

Tuesday 9th May
"Four Wheel Drive & Traction Control - The Rover Experience", Mr. K Parsons, Land Rover. Joint meeting with ImechE at Leeds University Dept, Mechanical Engineering

THE JCB FASTRAC - HAS IT MET THE CHALLENGE?

The Herts and Essex Branch of the Institution joined forces with the "Herts Machinery Club" (ably led by Roger Thomas) for a meeting at which Paul Hemingway gave the talk. He began by reminding his audience that it was almost exactly 3 years since his initial talk and explanation of the Fastrac, at the same venue.

Before describing the further developments that have taken place with the Fastrac he gave a round-up of the JCB business and commented that 20% of JCB was now committed to agriculture. Apparently, JCB has now captured 10% of the tractor market within their horsepower bracket. They export around 60% of their products with Germany being a major trading partner. The old "MB Trac" was very popular in Germany, and Paul sees the Fastrac selling well there as a direct replacement for the MB Trac.

Fastrac also has a place in Forestry with Australia being a current customer, amongst others, within this area and the Military have just placed there first order, which is particularly pleasing. During question time he was asked about numbers sold when he responded by telling the audience that 1000th machine was made last summer and that the company was hoping to double this figure by the summer of this year.

Some developments and improvements that have taken place were described during the talk and at a lively question time and are:

* Three years ago, "Michelin" was the only company that were able to produce tyres for the Fastrac, but now there are others, including "Goodyear"

* Changes that have occurred in order to make the machine more of a "field tractor", e.g. the 135 now has an engine torque increase of 4%, while the 155 has an increase of 14%.

* The introduction, in July 1995, of a larger machine, the 185, which has a Cummins engine.

* The building of a prototype machine that has an extended chassis and 6 wheels for a UK electricity company.

* The availability of a transmission "splitter".

* The fitting out of the Fastrac as a full "goods vehicle" with tachometer, etc.

* Future improvements to the slightly limited turning circle.

The appreciative audience found the event well worthwhile, which was evident by the fact that there was many questions and that the meeting finished very late.

R.W. Langley

WREKIN BRANCH

WORKING ON AIR

"Dear Father Christmas,Please could I have a Range Rover Classic in my stocking this year? Your special envoy, **David Clare**, has told us all about it and it's just what I need".The December meeting of the branch no doubt tempted many of the audience to write such a note and despatch it in the customary manner. I haven't got mine yet but I suppose even FC can't jump the queue - I expect it will come along soon. Meanwhile I'll just fill in the lottery ticket.....

David Clare, an ex-Silsoe graduate, is Projects Engineer in the 4 x 4 Dynamics Development Section at Land-Rover. His brief was to expose the intricacies of the air suspension and he did it with aplomb.

Air suspension on road vehicles is not new by any means - if you travel the M6 near Birmingham at all you will have had ample opportunity to study the air-bag end of HCV systems, but to classify these with the Rang Rover's system would be doing the latter a gross injustice indeed. Their's is a much more intelligent set-up.

Admirers of the Rang Rover will be well versed in the system's benefits over the previous steel sprung medium - improved pitch suppression; no head-lamp self-levelling required; improved ride quality (with better progression on the bump); maintenance of body clearance underload.

These, plus five ride-heights available, make this system quite remarkable. Those alternative ride heights make a huge difference. The middle three can be selected manually or the system can be left in 'auto' in which case it starts at the mid-setting, lowers itself to setting two above 50 mph, and to setting one after switch off - let m'lady disembark without showing too much ankle!

Setting four is selected manually for negotiating the rough stuff. The fifth and highest setting is chosen by the on-board computer when it senses that the vehicle has grounded - very clever, and the subject of a patent application so few details revealed.

The whole caboozle works at 10 bar pressure, an electric pump driving filtered and dried air to a series of solenoid-operated diaphragm and poppet valves. Sensors twixt body and axle tell the brain what is happening 'down under'. The brain has a self-diagnostic capability lest things go a bit awry.

In true tutor style David brought along visual aids for us to finger, fondle and investigate, including an example of the marque to demonstrate the system in action. Unfortunately he was wiser than we would have liked - no chance to put it to the test (more like 'putting it to the sword' if we'd been allowed behind the wheel!).

A super evening, one that comes highly recommended. Regrettably, I've just found a sooty letter on the heart, it's unopened and it's addressed to Father Christmas in my hand-writing. Dream on, sucker.

HOW DO THEY DO THAT .....?

'That' in this case reads 'controlling the environment of crop stores'. 'They' are Cornerstone Systems Ltd. of Stone in Staffordshire. No Desmond Lynam did not present this expose but someone equally, nay, better suited - he designed the system. He is Gareth Hughes, Cornerstone's Sales Director.

This was a delightfully informal evening in which Gareth got the audience involved by firing questions (what do we need to monitor?) and providing the hard-ware to do the monitoring. No aspect was left unmentioned, the audience saw to that, but Gareth was up to the task. In the end everyone present knew that they had had a detailed insight into the latest monitoring equipment.

The culmination of all this activity was a demonstration of how Cornerstone's computer programme collates the signals and responds to ensure that, whatever is being stored, it leaves the store in a condition near-identical to when it went in.Another great evening's entertainment, the only mugs were the ones that Gareth handed out and those that didn't turn out to hear him.

Wrekin branch reports from Dennis Cartmel

SOUTHERN AND SOUTH EASTERN BRANCH JOINT MEETING

ERA TECHNOLOGY LTD

Members from the two branches met at ERA Technology Ltd, Leatherhead just before lunch. After being given an excellent lunch we were given a brief introductory talk followed by visits to various workshops and laboratories.

The firm is an independent organisation, set up in 1920 as the Electrical Research Association then funded 50% by members and 50% by government. Today it is independentantly funded with 96% of its income from contracted research and development and only 4% from its 320 members.

ERA Technology Ltd main functions are carrying out research for single or multi-clients, design and development, test and assurance, consultancy and quality control.

Some of its projects are diagnostics of printed circuit boards; metallurgical stresses on turbine blades; analysing the life of power plants; avionics work at Farnborough, including lightning strikes, heat tests, explosion risks, etc.

This proved to be an excellent and very interesting meeting. Eoin Martyn

HEALTH AND SAFETY COMMISSION CONSULTATION DOCUMENT

PROPOSALS FOR REFORM OF HEALTH AND SAFETY POSTER AND NOTICE REQUIRMENTS

INTRODUCTION

1. This document is the first step in the Commission's programme of work to simplify health and safety legislation, following the Review of Regulation. The first part of recommendation 20 of the report stated:

"the Commission proposes to issue a consultation document with proposals for streamlining the requirments on the display of health and safety information"

2. During its Review of Regulation, the Health and Safety Commission identified 78 statutory requirments on employers to display posters and notices. This document puts forward proposals for the removal without replacement of 51 requirements, listed at Annex 1, which predate the Health and Safety at Work, etc. Act 1974 and whose purpose has clearly been overtaken by more modern legislation.

3. There are a number of pre-1974 requirments for the display of health of safety information which relate to significant risks. Examples include requirements to post notices of safe working loads on cranes and to mark tanks of highly flammable liquids.

A full list is at Annex 2. Proposals for the revocation of these requirments where they are no longer needed, with replacement where necessary, will be brought forward over the next few years as part of the Commission's programme to complete the reform of health and safety legislation envisaged in the Health and Safety at Work Act. An indication of the timescales for the necessary reviews is in Annex 2.

4. The main requirement for display of health and safety information introduced since 1974 is the poster approved by the Health and Safety Executive (HSE) under the Health and Safety Information for Employees Regulations 1989 (HSIE Regulations). This replaced earlier requirments for one of four notices to be posted, and was itself a major simplification of the existing provisions.

A proposed amendment to the Regulations is included at Annex 3. This would enable HSE to approve posters specific to particular classes of employer. The present poster, together with the leaflet which can be offered as an alternative is at Annex 4.

Proposals for Repeal and Revocation

5. Of the 51 statutory requirments listed at Annex 1, 36 relate to the posting of copies of regulations or of abstracts. A further 9 are for posting notices of exemptions from regulations. In the view of the Commission these requirements do not fulfil any necessary health and safety function. Indeed, because there are so many of them and because they focus attention on outdated legislation, they may distract attention from employers' duties under modern legislation to provide information to their employees and others.

6. The key elements on provision of information in the present framework are:

- Section 2 (2) (c) of the Health and Safety at Work Act which requires employers to provide necessary information to employees;

- Regulation 8 of the Management of Health and Safety at Work Regulations 1992, which requires employers to provide employees with comprehensible and relevant information on risks to their health and safety and preventative and protective measures. The information can be provided in whatever way is most suitable;

- The HSIE Regulations which require employers to display an approved poster, or provide each employee with an approved leaflet. As shown at Annex 4, the poster and leaflet provide a summary of the main duties of employers and employees,

- Six of the requirements listed at Annex 1 require the posting of notices other than regulations, abstracts or exemptions. Details, with the reasons that the Commission considers these to be no longer necessary are set out in the Annex.

Proposal to Amend the Health & Safety Information for Employees Regulations 1989 (HSIE Regulations)

8. The requirement for employers to display a poster or hand out an equivalent leaflet under the HSIE Regulations serves a number of purposes. The poster:

* alerts employees to the existence of health and safety law and the duties which employers have under that law;

* gives details of the local enforcing authority and the Employment Medical Advisory Service;

* enables employers to discharge the most basic parts of their general duty to provide information to employees on health and safety;

* informs employees of their own responsibilities for health and safety.

The poster and leaflet provide a convenient means of conveying information about health and safety and the Commission is not proposing that this obligation should be removed.

9. The current poster and leaflet do not fully cover the most recent legislation, including the Management of Health & Safety at Work Regulations: they will become progressively out of date as other new law is introduced and pre-1974 requirements are replaced. For the present, no change is proposed to the content of this poster as the alterations required are not great and the costs of change would be significant. It is estimated that net costs of approximately £6m would result if the poster and leaflet were revised.

While there might be some benefits from drawing attention afresh to health and safety responsibilities, the impact is likely to be very limited. The Commission will keep the poster and leaflet under review.

10. The Government's Deregulation Task Force and the Commission's own Sector Task Groups, set up to help with the Review of Regulations, have not questioned the requirement to display a poster or issue a leaflet but have suggested that the introduction of sector-specific or industry-specific information might make the poster and leaflet more user-friendly.

This suggestion needs to be examined carefully. Specific posters, which would be alternatives to the current approved poster, would give employers greater choice as to what was displayed at their places of work but might lead to greater confusion about what should be displayed. The advantages of sector specific posters may apply to industries with clear boundaries, e.g offshore, construction, agriculture. The Commission is inviting views.

11. At present, the regulations allow the Executive to approve only one poster and leaflet at a time. The proposed amendment (Annex 3) would enable posters and leaflets to be prepared for different classes of employer, if consultation shows that these would be useful.

12. **Comments are invited on the following points:**

- would posters which include a section targeted towards sector or industry risks be useful for some sectors of the economy as an alternative to the existing 'Health & Safety Law' poster?;

- if so, which sectors or industries should be covered and what form should these posters take/ Should they, for example, seek to cover all the main risks or should they simply draw attention to the relevant legislation?

13. Views are also invited on a longer-term issue. Would it be helpful if the poster and leaflet were designed in a way that enabled employers to record the significant findings of their risk assessment?

This might be a means of meeting the requirement, in Regulation 8 of the Management of Health and Safety at Work Regulations, to provide employees with comprehensible and relevant information on the risks identified by the assessment.

TECHNICAL ARTICLE

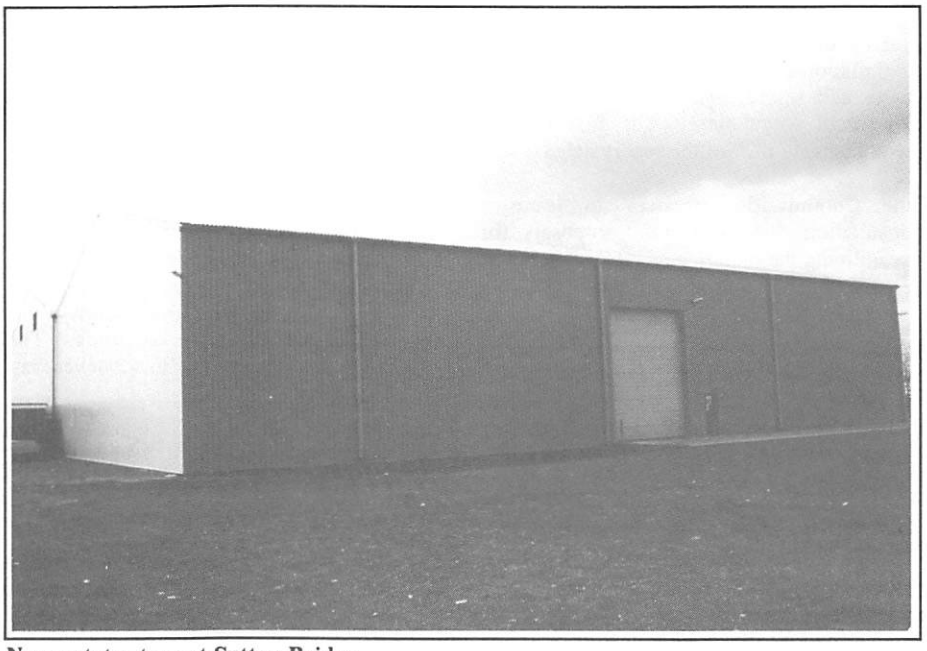
NEW STORAGE DESIGNS AT THE POTATO MARKETING BOARD'S EXPERIMENTAL STATION, SUTTON BRIDGE, LINCOLNSHIRE

In 1991 the Potato Marketing Board extended its commercial storage facilities at its Experimental Station, Sutton Bridge, near Spalding, Lincs. The site at Sutton Bridge is not only home to the Board's Experimental Unit which is the largest dedicated research facility concerned with potato storage in the world, it is also home to the Board's Potato Pre-Packing Station.

The latter complex which is run as a wholly commercial enterprise now packs in excess of 70,000 tonnes per annum for a number of the major multiples in this country. A proportion of this throughput is held in long term storage on the site and a decision was taken to extend this capability by the addition of 5,400 tonnes of new storage in two separate but adjoining buildings to which was also linked a new handling structure.

Each of the three buildings, which are of identical construction, has a span of 25 metres and an overall length of 42 metres in seven 6 metre bays. The buildings were erected side by side, the centre unit sharing common walls with each outer building. All three buildings have a galvanised steel portal frame erected on a ring beam foundation with an eaves height of 8 metres.

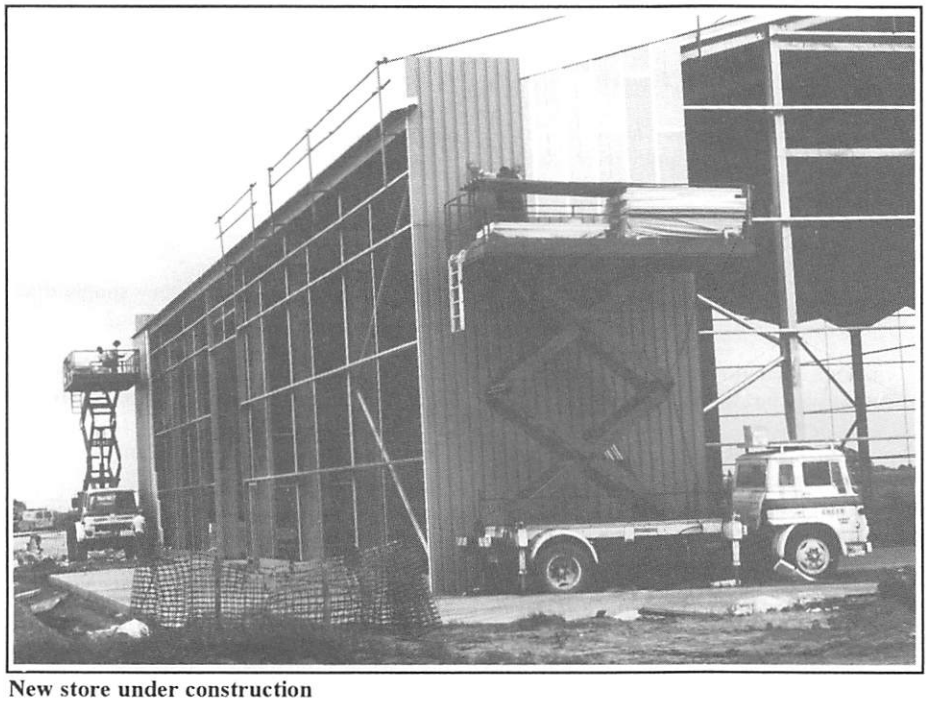
Very careful consideration was given to the choice of insulation, the contract finally being placed with Linpac Insulation Products who supplied 90mm thick Polyfoam Agriboard, an extruded expanded polystyrene whose characteristics particularly suited the high water vapour transmission levels expected.



New potato store at Sutton Bridge

The insulation was placed above the roof purlins and on the outside of the sheeting rails on the vertical surfaces so that the insulation by encompassing all the structural steel work eliminated cold bridging. Because there was to be no product contact with the inside face of the insulation it was left unprotected on all elevations.

The buildings were clad with a mineral fibre cement sheet to the roof and a plastisol treated profile galvanised steel sheet on the vertical elevations. Although the extruded expanded polystyrene insulation board was tongue and grooved on all four faces and the upper surfaces of all joints were taped as they were laid, the risk of water vapour migration through the insulation was recognised and steps were taken to deal with the risk of water condensing on the under surface of the cladding and working its way back into the potato stores to produce very damaging drip lines. Enkamat was used on all the roof sheet end laps to create a breathing roof and this strategy has proved to be highly successful. The overall U value for each of the buildings is calculated at 0.28 W/m²/deg. C



New store under construction

The total site capacity of 5,400 tonnes was divided into two 2,700 tonne units each of which are loaded and unloaded by accessing from the handling building at the mid-point along the length of each store.

Boxes are stacked 7 high either side of this central transverse service corridor which is subsequently back filled with cross stacked boxes. The two main blocks of boxes either side of the service corridor in both stores are each 13 wide by 14 long and the environmental control services plant is located on the four gable ends.

Although the construction details of the two stores were identical, a decision was taken to install two different types of cooling systems in each store and subsequently an observational trial was carried out to compare the performance of a conventional direct expansion (DX) refrigeration layout with the performance of a wet cooling system which

was developed by HoweCool and is the product of a re-evaluation of the factors influenced weight loss in potato storage with the aim of reducing the potential dehydrating effect of cooling systems.

CONVENTIONAL DIRECT EXPANSION SYSTEM

In this store, two floor mounted coolers are positioned along each of the internal gable faces. Recirculated chilled air is discharged into the head space by a series of "chimney" ducts and thrown across the densely stacked block of boxes

The system is designed so that a significant proportion of the air falls into a gap left next to the cross stacked boxes in the service corridor in the middle of the store and thence is recirculated to the coolers via the pallet apertures in the base of each box.

Evaporator coils in each cooler are serviced by compressors and associated condenser units situated outside the main fabric of the store. Alternatively, when prevailing conditions are suitable, by use of motorised louvres, the cooler unit fans can be used to introduce ambient air to the store at an equivalent rate of 0.025m3/s/t (50 cfm/tonne)

Control of the store is carried out by a configurable computer installation measuring temperatures via six probes located in the top boxes in each half of the store. Additional probes monitor temperatures in the ducts and in the bottom boxes.

Chilled air is normally only blown in the store when the crop temperature rises above the desired set point and the store is managed to run at a minimum temperature differential, between crop and delivered air, of 2°C.

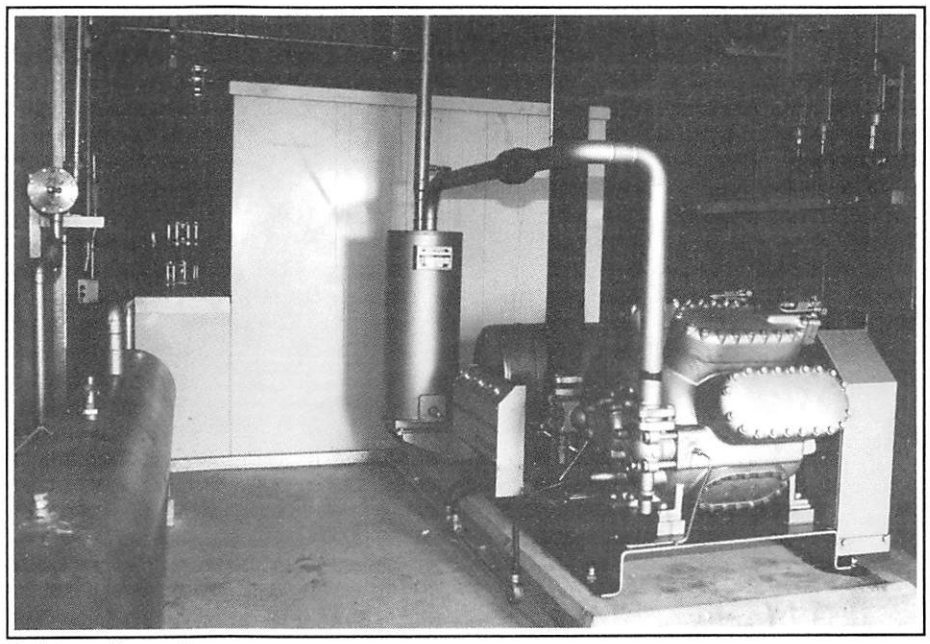
WET COOLING SYSTEM

At each gable end in this alternative store, air is blown into a plenum chamber against which the main block of boxes are stacked. The pressurised air is forced through the pallet apertures in the base of each box.

Air eventually discharges from this conduit into a gap left by the cross stacked boxes positioned in the access corridor in the middle of this store and returns to the cooler unit on top of the plenum chamber via the head space above the boxes.

Mounted on top of the plenum is the cooler unit which consists of a membrane over which chilled water is streamed. Air is blown through this membrane (and consequently cooled) and then into the plenum by three high level fans. Recirculated water is pumped to the in-store cooling units after being chilled in Baudelot-style coolers, situated in plant rooms outside end of the store.

Cooling of the water is achieved in each unit by flooding it over a network of fine coils which contain refrigerant from a single DX system. There is a compressor located in the east plant room for the latter task.



Refrigeration unit

There is no ambient ventilation capability in this store. The air within the building is constantly recirculated through the store at approximately 0.01m^3/s/t (20 cfm/tonne) and the differential between returned air and air blown to the potatoes during the holding period is normally less than 1°C. Crop temperature is monitored by computer but the system has its own independent electronic unit to control the cooling differential and water temperatures.

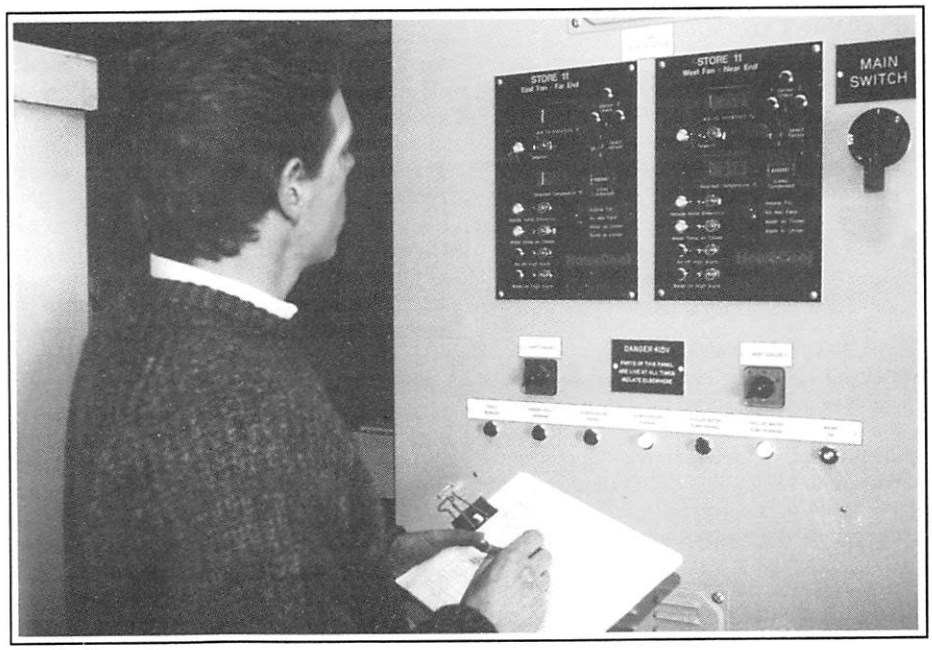
The concept of cooling with low air volumes continuously is in marked contrast to the relatively short periods of high volume cooling carried out by the DX system in the adjacent store.

All cooling systems will remove moisture from the air. This drying effect can be minimised if a low air side temperature differential (TD) can be maintained. Wet cooling is a way of minimising operating TD's.

The theoretical advantages of a wet cooling system are lower evaporative weight losses and smaller in-store temperature variations. These benefits occur because of a reduced TD and the necessary adoption of continuous ventilation.

To remove a given quantity of heat requires a mass of air with a temperature differential to the product being cooled. The smaller the TD the greater the mass of air needed.

If the TD is reduced in the interests of low water losses then either the air flow must be



Control panel

commensurably increased or the plant must operate for longer. Rather than enlarge the size of the fan it was judged for a variety of reasons to be more attractive to run a smaller airflow for a longer period of time.

POTENTIAL ADVANTAGES:

Low air side temperature differential across cooling plant, (minimum TD 0.5°C) when compared with finned tube evaporator of conventional refrigeration plant (TD 2.5°C), maintains high RH.

At near to crops equilibrium RH (96 - 98%) respiration heat is removed by conduction rather than evaporation thus minimising weight loss.

A low air side TD demands a considerable mass of air to remove the totality of the heat load. This is economically provided by continuous (24 hour) circulation of smaller volumes of air (0.01m^3/s/tonne).

If a continuous positive ventilation and distribution system is employed there will be a minimal temperature/gradient and/or variation throughout the store.

OTHER ADVANTAGES ARE:

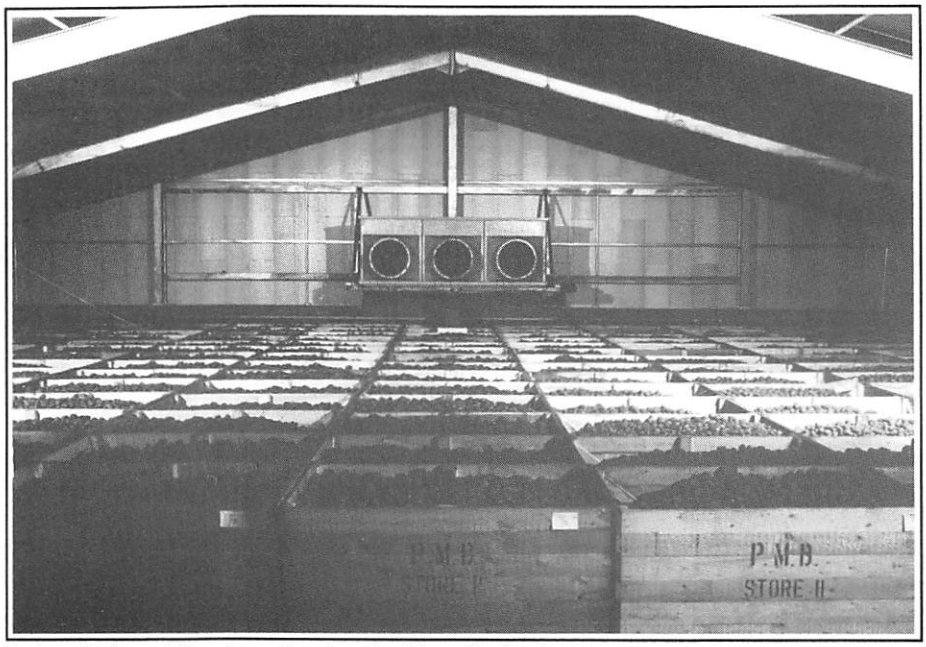
* Very suitable for low temperature storage.
* Cannot freeze the crop.
* Eliminates risk of condensation in the crop.
* Precision temperature control.
* Good turn down ratio.
* No defrosting.
* Potential for off peak operation.
* Washing of store atmosphere.

DISADVANTAGES:

* Increased capital cost, 15% - 25%, requires more sophisticated air distribution system.
* Increased complexity and maintenance charges.
* Poor drying capability.
* Slower pull down rate

These potential advantages were assessed by the Board. In 1991/2 in a limited trial whilst there was an advantage for the wet cooling system when compared with the conventionally refrigerated store, the reduction in weight loss achieved, down from 4.1% to 3.4%, was not sufficient to cover the enhanced capital costs of the system.

The results recorded in a second larger trial in 1992/3 are shown in Table 1:



Internal view of the store showing the HoweCool unit

Table 1 - **Weight Losses in Stored Potatoes from Two Growing Sources**

Source	DX Plant %	Wet Cooled %
Boxes A	5.66	5.32
Boxes B	4.86	4.33

The recorded reduction in weight loss was again not as great as had been expected. If the weight loss differences in the sample boxes are extrapolated as being representative of the full 2,700 tonnes in store, the weight loss advantage for the wet cooled stores when compared with the conventionally refrigerated building ranged over the two years between 9.18 and 18.9 tonnes. If a notional value of £150 per tonne is ascribed to the potatoes the financial advantage lies between £1,377 and £2,835. In the two years of the trials, detailed assessments were also made of the quality of crop in both stores but there were no significant differences in terms of disease, skin finish and packability between both systems.

The additional capital cost of the wet cooled system was some £17,500 representing a 25% increase over the conventional DX plant. Given this difference the amortised extra costs of the wet cooling systems were calculated as £3,060 per annum and clearly the value of the saving in weight loss did not cover this figure.

CONCLUSIONS

Two full storage seasons have demonstrated that whilst the wet cooling system does reduce weight loss, the advantage has not been sufficient to justify the increased investment and complexity with the attendant maintenance problems associated with this plant.

Furthermore the reduced volume air flow inherent in the system has proved insufficient during the temperature pull down phase, resulting in prolonged temperature gradients which was only satisfactorily addressed by adding supplementary fans for use during the immediate post loading period.

Other difficulties associated with the system are connected with the air distribution arrangements whereby cool air is introduced into the pallet conduits via a Strawson wall configuration. Air leakage from small gaps around the boxes allows a significant proportion of the delivered airflow to short circuit back to the cooler coils resulting in temperature differentials of approaching 2° deg.C over the 14 box length of potential air run. The simpler overhead space distribution system utilised by the conventional DX systems generally works better to produce lower temperature gradients across the store.

Both systems suffer from the common service gangway approach which whilst a very economic layout from the construction viewpoint has resulted in each store being too large from a management standpoint with additional control problems as a result of the environmental plant on each gable end "fighting each other". Better performance would undoubtedly be achieved if a division wall were to be placed across the middle of each 2,700 tonne store to make four discrete units instead of the present two.

The Author is Oliver Statham farm buildings advisor with the Potato Marketing Board and designer of these stores.

The following manufactures and suppliers were involved in the construction of the store:-

* LinPac Insulation
* B & D Refrigeration
* Eternit UK Ltd
* D.A. Green, Spalding
* H & K Timbers

NATURAL ROOF LIGHTING TO BUILDINGS

For the past 40 years clear profiled roof sheeting has been easily incorporated into the roof design in order to allow daylight to be readily available. Profiles to match the opaque areas roofed in corrugated asbestos cement or profiled steel, have been generally available in either p.v.c. (polyvinyl chloride) or G.R.P. (glass reinforced polyester).

But why do we bother? The clear sheets are generally more expensive than the opaque sheets, certainly more fragile and requiring care when handling, fixing and for roof repairs. They require more fixings and potentially more maintenance. Should the building need insulating, although the rooflights can be offered as a twin skin, the rooflight area will always provide a lower insulation level than the insulated opaque areas. So why not forget the rooflights, insulate and put on the electric lights!

The answer, I would suggest, is that the prime benefit from rooflights is that people (and one assumes livestock) are provided with a "feel good factor". Natural lighting affects the body clock. Our bodies relate to night and day, dusk and dawn and the shortening of the shadows at midday. We need to experience this cycle to "feel good". If stock are contented then there will be less stress, resulting in healthier stock and better yields.

Angle of Glazing to the Horizontal	0° - 9°	10° - 59°	60° - 90°
Clear (Rural)	0.7	0.8	0.9
Industrial (Urban)	0.5	0.6	0.7
Dirty (Heavy Industry)	0.4	0.5	0.6

Table 1 - **Location Factors**

However, the level of natural lighting needs to be correct for the building purpose. If there is too much light, this leads to:-

Glare,
Solar Gain, and
Heat Loss.

Too little light leads to:-

Feel depressed factor,
accidents, and
low yields.

So how do we calculate what level of lighting we need in the roof and relate this to the function of the building?

Step 1 - Determine the Daylight factor

Illumination requirements depend on the work to be done or the nature of the use. Lighting requirements will vary according to the operational zones within the building. Consider the primary zones and design roof lighting to match. Areas where higher lighting levels are required can be supplemented by artificial lighting. Do not over design the rooflighting, since this will lead to glare and heat loss.

Daylighting Factors for Factories, Stock Buildings and Process Units should be between 5% and 7%. For storage the daylight factor should be reduced to 2% or 3%.

Table 2 - **Required daylight factor (percentage)**

Natural translucent Filon
Single skin glazing: 85% light transmission
Double skin glazing: 72% light transmission

Location factor	Glazing	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%
0.4	Single	1.5	4.4	7.4	10.3	13.2	16.2	19.1	22.1	25.0	27.9	30.9	33.8
	Double	1.7	5.2	8.7	12.2	15.6	19.1	22.6	26.0	29.5	33.0	36.5	40.0
0.5	Single	1.2	3.5	5.9	8.2	10.6	12.9	15.3	17.7	20.0	22.4	24.7	27.1
	Double	1.4	4.2	6.9	9.7	12.5	15.3	18.1	20.8	23.6	26.4	29.2	31.9
0.6	Single	1.0	2.9	4.9	6.9	8.8	10.8	12.8	14.7	16.7	18.6	20.6	22.5
	Double	1.2	3.5	5.8	8.1	10.4	12.7	15.1	17.4	19.7	22.0	24.3	26.6
0.7	Single	0.8	2.5	4.2	5.9	7.6	9.2	10.9	12.6	14.3	16.0	17.7	19.3
	Double	1.0	3.0	5.0	7.0	8.9	10.9	12.9	14.9	16.9	18.9	20.8	22.8
0.8	Single	0.7	2.2	3.7	5.2	6.6	8.1	9.6	11.0	12.5	14.0	15.4	16.9
	Double	0.9	2.6	4.3	6.1	7.8	10.0	11.3	13.0	14.8	16.5	18.2	20.0
0.9	Single	0.7	2.0	3.3	4.6	5.9	7.2	8.5	9.8	11.1	12.4	13.7	15.0
	Double	0.8	2.3	3.9	5.4	6.9	8.5	10.0	11.6	13.1	14.7	16.2	17.8
Area of rooflights (percentage of floor area)													

Step 2 - Determine the Location Factor.

The amount of light able to get into a building will depend on the location. Rural and urban environments and industrial locations will affect general lighting levels and air deposits onto the rooflights. The roof pitch will also have an effect, the steeper the roof the more light gets in per unit of floor area.

Having determined the requirements from step 1 and 2, we use Table 2 to determine the percentage of roof area that should be given over to roof-lighting.

Thus, taking a typical example of a stock building in the country, with a typical roof pitch of 15°

Daylight Factor	7%
Location Factor	0.8

Single skin rooflights would need to be 9.6%, say 10.0%, of the roof area.

Having determined the general level of lighting needs for a specific building, is there anything further to consider?

When you put lighting up in an office what do you do? Most times you will buy a fluorescent strip tube and mount this above a diffuser. Both the strip tube and the diffuser are providing you with light scatter.

Why do you want this?

It provides an even level of lighting over a large working area, reduces the shadows, reduces bright light intensity and generally makes the work environment more pleasant.

If we do this in an office, do we want it in the stock building?

We have already shown that we generally need about 10% of the roof to be in rooflights to give the right level of lighting at floor level.

If clear glass were used, the sky was blue and the sun was shining, we end up with the 10% of glass providing shafts of light to illuminate 10% of the floor area, leaving 90% of the floor in deep shadow. The part illuminated is also very bright (by contrast) and generally unpleasant.

It is called the "Key Hole Effect".

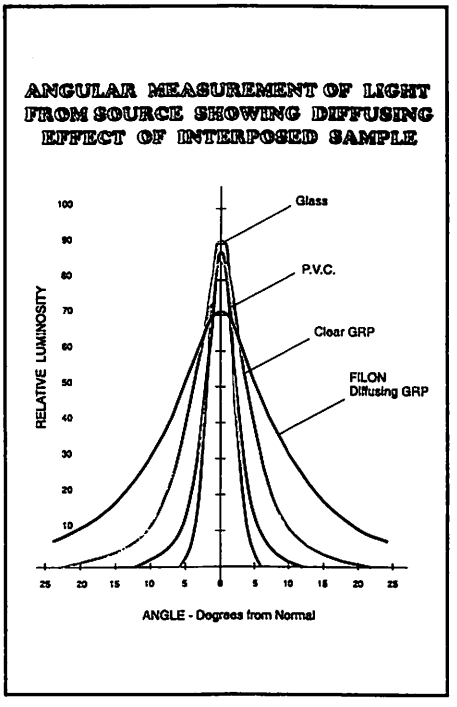
So, ideally, we need to provide a light scatter with our 10% of rooflights. A corrugated rooflight will provide some scatter just because it is corrugated and, therefore, offering variable angles of incidence to the sun's rays. P.V.C sheets are considered clear but when corrugated will provide some scatter. G.R.P. translucent sheets being a composite of clearglass fibres and clear resin will provide additional diffusion as the sun's rays pass through the matrix of glass and resin.

The differing angles of diffusion are as follows for each material described above:

Clear glass	5°
Corrugated P.V.C	12°
Corrugated unfilled G.R.P	20°

For a large industrial building, where the floor to ceiling height is generally large, a 20° or even 12° scatter may be sufficient to provide even light levels at floor level. However, many modern industrial premises, and certainly agricultural buildings, are generally low to medium height buildings. In such cases even a 20° scatter may not be sufficient to give general even light at ground level.

Filon G.R.P. sheet is unique in the UK market as it is the only sheet manufactured with a diffusing agent, incorporated into the G.R.P. This diffusing agent does not inhibit light transmission but does provide a scatter of 30° that is generally sufficient with 10° roof lighting to give all round even light at ground level for even the lowest building. This diffusing agent, or filler, is a standard ingredient in the Filon sheet and unless specifically required, the company does not normally recommend the use of "unfilled sheet.



Note the graph does not imply that Filon sheet only allows 70% of transmitted light and glass 92%. The transmitted light of these materials is:-

P.V.C., G.R.P.) and) Filon G.R.P.)	Approx. 85%
Glass	Approx. 95%

The analogy that is easiest to relate to is that low diffusing sheets provide a 'clear light bulb' effect; Filon sheets provide a 'Pearl light bulb' effect.

Having calculated the lighting levels you then have a choice of how to achieve your requirements - what are the options?

Open Areas:

Generally applied to the vertical areas, particularly where high levels of ventilation are required and frequently used with plastic netting or space boarding. However, it can be applied to the roof. An Open Ridge and/or spaced roofing will provide a reasonable amount of natural lighting but will generally need to be supplemented by additional daylight from other sources.

Glass:

Rarely used these days on the roof due to the problems of matching flat glass to profiled roof sheets on the opaque areas. Glass is generally restricted to vertical glazing. Life expectation is almost unlimited but generally fails by the surrounding flashings.

P.V.C.:

Generally available in the more common profiles used in agriculture and even if not available from stock can be produced by heat moulding from a flat sheet.

Sheets provide a 'clear light bulb' effect and generally marginally cheaper than alternate materials. Being a thermoplastic it is vulnerable to changing temperatures. In winter it becomes very brittle and in the summer can soften and sag. Great care is needed when being installed to provide oversize fixing holes to minimise failure caused by thermal movement. Life expectation will depend on the severity of the weather and location.

Polycarbonate:

A tough material, also thermoplastic; that can be heat formed from flat sheet to the required profile shape. It is, however, considerably more expensive than alternate materials and generally does not find favour with the agricultural market. A relatively new material to the market but product life can be expected to be reasonable.

G.R.P:

Generally available in all the fibre-cement and metal profiled sheet range. It is a thermoset material and is for all intents and purposes unaffected by the temperature range of the UK climate. It is very user friendly on installation and is now the preferred material by most industrial and agricultural roofing contractors since fixing failures after installation are rare.

Generally more diffusing than alternatives with Filon sheet offering the true 'pearl bulb' effect.

Marginally more expensive than P.V.C in the common profile sheets when new, but when related to product life G.R.P. is generally more cost effective. G.R.P. can be expected to be structurally sound for 25 to 30 years but light transmitting qualities will reduce with age with only moderate levels of light transmission after 20 years. This effect can be minimised by regular cleaning and maintaining the external surface with a clear resin lacquer.

The Electric Light:

Does not need cleaning, does not suffer from U.V. degradation, unaffected by the rotation of the earth on its axis or its annual cycle around the sun.

Sounds like the perfect solution! I hope you agree with me that it is not.

The author is Chris Pearce - Managing Director of Filon Products Limited. This is the text of a paper given by the author at the recent Winter Conference of the Rural Design and Building Association.

Wormwood Scrubs Pony Centre for the Handicapped using Filon G.R.P. sheets in a Chequer Board pattern resulting in no shadow at ground level. Material supplied in conjunction with the Anneka Rice Challenge.

ELECTRONIC AIR SUSPENSION

***Editorial note:** The following was sent to me recently and unfortunately I have been unable to trace the source. However, I have published it because it may be of interest and use to members.*

SYSTEM OPERATION

Numbers refer to pneumatic circuit diagram.

Air is drawn through the inlet filter (1) to the compressor (2), where it is compressed to 10 ±0.5 bar.

Compressed air passes to the air dryer (3) where moisture is removed as it flows through the dryer dessicant. The dessicant in the lower portion of the dryer becomes wet. Dried air passes through the valve block, through a non-return valve NTRV1 to the reservoir (4).

The 3 non- return valves (6) ensure correct air flow. They also prevent loss of spring pressure if total loss of reservoir pressure occurs.

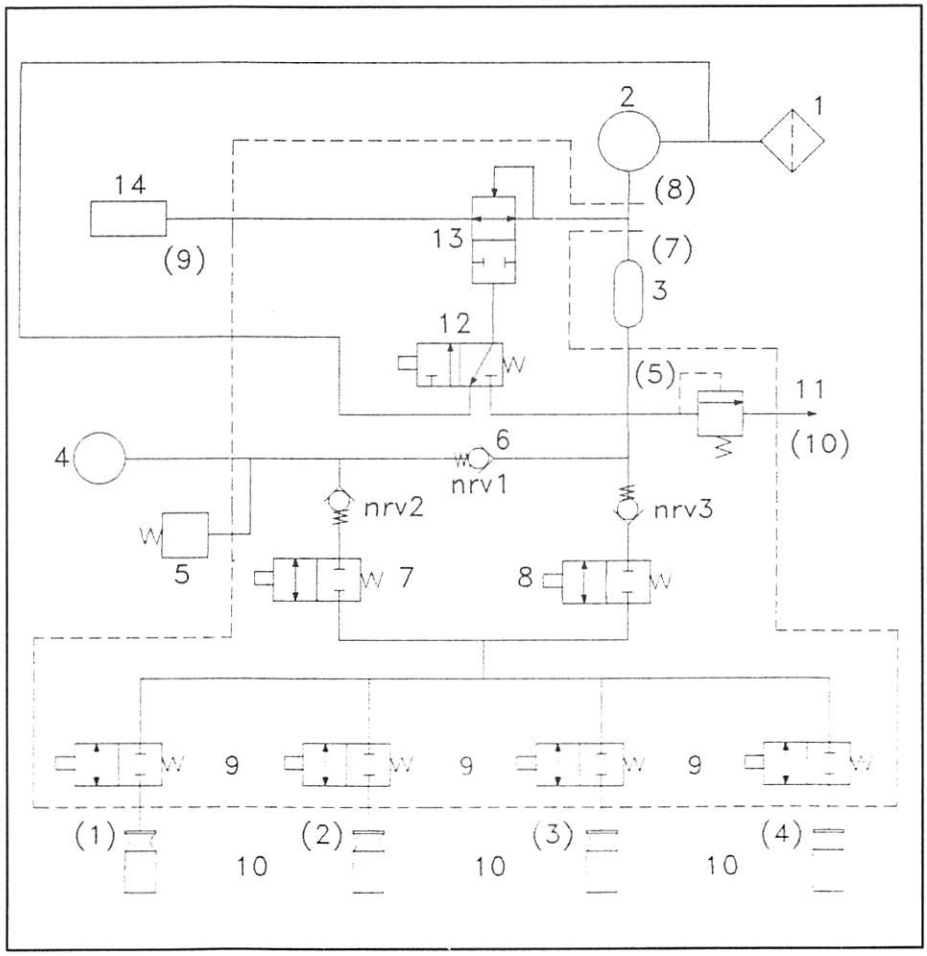
The pressure switch (5) maintains system pressure between set limits by switching on and off the compressor via an ECU controlled relay.

For air to be admitted to a spring or springs, the inlet valve (7) must be energised plus the relevant air spring solenoid valve or valves (9). For air to be exhausted from a spring or springs (10), the exhausted valve (8) must be energised plus the relevant air spring solenoid valve or valves.

The solenoid diaphragm valve (12) ensures that all air exhausted to atmosphere passes through the dryer. Exhausted air passes vertically downwards through the dryer. This action purges moisture from the dessicant and regenerates the air dryer.

Air is finally exhausted through the system air operated diaphragm valve (13) and to atmosphere through the silencer (14) mounted below the valve block.

Circuit diagram



TECHNICAL ARTICLE

DESIGN

When did you last talk to your warranty engineer? To some engineers this may seem a strange question but to others of advanced years maybe not so odd.

In the distant past the warranty engineer would have been housed in the dark and remote cave, the walls stacked with the detritus of bad design and manufacture. The denizen of this festering hole would have only come second to the man from the degreasing tank in competition for the most grumpy member of the company's staff. He would have been selected for this very characteristic and instructed to minimise warranty cost by saying "no" whenever possible.

Times, however, have changed. The use of trichloroethylene is restricted and the findings of Marks and Spencer have redefined the role of the customer. Retail chains have discovered that being nice to customers is good for sales. Accepting that products go wrong and replacing them without making the customer feel a cheat has also been adopted as company policy further encouraging customers to shop with them again and again.

These findings have filtered back to the manufacturer of engineering products. The engineer in-charge of warranty may now be young, female and pleasant. They will be charged with maximising customer satisfaction with expense being no-object. They will, however, still have the responsibility for minimising the cost of warranty claims.

To some this may seem a contradiction of job aims, because how can you minimise cost when releasing the control of payment to conmen and fiddlers called customers? This is achieved by making sure that the product meets the customers' demands and so remove the need for claims on the supplier. If there is nothing wrong with the product then there will be no warranty claims.

This is, however, not easy to achieve. It requires the involvement of everyone in the supply of the product. Sales staff are involved in ensuring the customer is only sold what will do the job. Manufacturing must make the product they are asked to make and design must ensure that designs are fully validated and that they can be made right first time.

The person who knows where and when it goes wrong is that nice man or woman in the warranty department. They see all the failures of design (60-80% of the cause of claims some say), the inability of production to follow drawings (is design demanding more than production can deliver), the purchase of substandard components by the Buying Department (did design fail to specify clearly what they wanted), or Sales and Service getting it wrong again (did design fail to test the product under typical conditions).

So it may be worth seeking out your warranty engineer and having a chat. She or he may be of more value to you than you think. Might it not be an idea to close the circle and invite warranty personnel into the design process? Make them a partner not an enemy. You do all work for the same company after all.

Many companies are looking to install design process control systems such as QFD, FMES and DFM. These will formalise what good designers always do but how often is the real expert on the company's problems invited to join the party. The warranty engineer is no longer the party pooper of yesteryear whose only real value was to keep the angry customer at bay.

She or he has become the friendly face of the company who sorts out the mistakes of others. She or he retains the loyalty of the customers and ensures they re-purchase in the future. She or he will be the expert on the problems in the field, the areas of weakness in design and manufacture and know which suppliers products are unsuitable for the purpose they have been chosen. She or he should sit in on design meetings and so close the circle. If you wish to become world-class then this is one person who will know where action is required.

When did you last talk to your warranty engineer?

Author: Geoff Wakeham, Senior Lecturer in Engineering at Harper Adams Agricultural College.

INTERNATIONAL CONFERENCES

XXVI International Congress on Work Science

The Agricultural University of Norway, Dept. Agricultural Engineering will host the XXVI International Congress on Work Science that will be held at Lillehammer, Norway on 29-31 May 1995.

Further information: Arne Hilmerson, Agricultural University of Norway, Dept. Agricultural Engineering, P O Box 5065, N-1432 Aas, Norway. Tel: +47 64 94 87 63.

19th CIGR Conference of Section IV

The University of Hohenheim, Stuttgart, hosts on 25-28 September 1995 the 19th Conference.

Scope: Energy Production and Management

Further information: Peter Epinatjeff, University of Hohenheim, Institute of Agricultural Engineering, D-70593 Stuttgart, Germany. Tel: +49 7114 592508.

Workshop on Control Applications in Post-Harvest and Processing Technology

This workshop organised by BIRA, will be held in Ostend, on 1 and 2 June 1995. Scope is to give the state of the art and application of control methods in storage and processes of agricultural and horticultural products. Furthermore, future developments will be discussed on intelligent control and on the use of artificial intelligence in combination with on-line observations of plants or processed products.

Further information: BIRA, Desguinlei 214, B-2018 Antwerp, Tel: +32 3 216 09 96

Seventh International Symposium on Agricultural and Food Processing Wastes

This Symposium will be held in the Hyatt Regency Chicago, Chicago, Illinois on June 18-20, 1995. The purpose of the conference is to advance and disseminate information and technology on managing wastes from agricultural production and food processing facilities Info: available from ASAE.

VIIIth International Congress on Polymers in Concrete

Development and dissemination of knowledge and technology in the field of polymers in concrete. The VIIIth congress will take place in the Thermae Palace Hotel in Ostend (Belgium) on 3-5 July 1995 and will be followed by a symposium on 6 July 1995.

On July 6 the RILEM TC-113 Symposium on Properties and Test Methods for Concrete-Polymer Composites will be held.

Secretariat: VIIIth International Congress ICPIC, Attn Mrs C Mortelmans, c/o TI-K VIV, Desguinlaan 214, B-2018 Antwerp 1, Belgium. Tel: +32 3 216 09 96.

16th International Congress on Irrigation and Drainage Sustainability of Irrigated Agriculture.

The International Commission on Irrigation and Drainage, ICID, organises its 16th International Congress in Cairo, Egypt on 15-22 September 1996. This three-yearly congress is on the theme "Sustainability of irrigated agriculture".

Information from: ICID-CIID, International Commission on Irrigation and Drainage, 48 Nyaya Marg, Chanakyapuri, New Delhi 110 021, India. Tel: +91 11 301 68 37.

WOODCHIPS FOR COMBUSTION IN DENMARK

INTRODUCTION

Woodchips from forest resources are widely used in Denmark to fuel boilers for district heating systems (see Figure 1). These systems pipe hot water along the street to each individual property in much the same way as our gas and water mains in the UK. The district heating company and the customers, who usually own the company as a cooperative, do not pay tax on woodchips as it is a renewable fuel. Many woodchip plants have been newly built and former oil and coal plants have been converted.

	Boiler capacity MW	Woodchip consumption t/year
Average (of 30 plants)	3.8	4,717
Plants visited Hinnerup Kjellerup	 3.2 9.2	 4,900 13,500
Total (of 30 plants)	115	141,500

Figure 1 - **Woodchip district heating plants in Denmark**

Oil or coal, which are fossil fuels, attract both an energy tax and a CO_2 (greenhouse gas) tax which nearly trebles their price. These taxes are in support of the Danish policy of minimising energy imports, reducing total energy levels, and reducing CO_2 emissions by 20% from their 1988 levels. For the Danes to meet their targets, it is essential that they concentrate on renewable fuels and also natural gas.

This paper describes the use and supply of woodchips for fuel in Denmark. This follows a study visit during 11th - 15th July, 1994 to technical institutes, commercial operators, and several heating plants.

WOODCHIPS AS A FUEL

Woodchips can be used most efficiently by direct combustion in a boiler for heating, either for single premises or for district schemes. This is because the required output is hot water at only 80° C, with the water returning to the plant at 40° C. Wet woodchips (42% moisture content) can be burned directly to heat this water with a heating efficiency of 100% or greater calculated on net heating value of the dry wood as explained in the Appendix.

Electricity is also produced from wet woodchips in Denmark, by the large combined heat and power (CHP) plant at Maabjerg (67 MW heat plus 28 MW electricity) but in this case natural gas is used as an additional fuel to raise the temperature to 520° C for a steam turbine. Straw is burned with the woodchips, as well as municipal waste (56%). For smaller CHP plant (e.g. 6 MW heat), natural gas is used in a combustion engine (Otto or Diesel) and is the most economic fuel. However, there is a possibility that gasification of woodchips may also produce a gas fuel that is competitive in price. Danish research is actively pursuing this, pilot plants have been studied, and a full-scale demonstration plant is being built.

THE WOODCHIP RESOURCE

Commercial forest areas are continuing to build up in Denmark. There are also substantial areas of old pine forest that were originally planted as pioneer species for land reclamation, Figure 2. Currently, forest thinnings represent the largest potential woodchip resource, a total of 1.4 million m^3 loose volume per year. The resource from old pine clearance is estimated at a total of 600,000 m^3, based on what is extractable annually. The forest residue resource is smaller again because of the small volume per hectare and because of the relatively small areas of clearfell, although these will increase as forests mature.

The total woodchip resource potentially available in the forest areas is therefore estimated to be over 2 million m^3 per year. The total quantity currently burned as woodchips in the heating plants listed in Figure 1 is 525,000 m^3, which is one quarter of the theoretical resource; these woodchips come predominantly from thinnings.
The wood pellet resource is additional to these figures and comes from compressed sawdust, shavings, and other waste from sawmills and industrial sources such as furniture factories. Numerous heating plants are fired on wood pellets, and some other plant supplement their woodchip fuel with wood pellets, particularly if the wood is very wet.

Figure 2 - **Woodchip resources in Denmark**

Type	Area, ha	Chip volume (loose), m^3/ha	Yield (loose), m^3 /year
Forest thinnings	8,000 per year	150 - 200	1,400,000
Old pine plantations	30,000 total	400	600,000
Forest residues	2,500 per year	40	100,000
Pellets	*industrial/sawmill waste*		*110,000 t*

HARVESTING IN THE FOREST

First thinnings are made when the trees are 8 m high, and the second at 10 m. A skid road is cut the previous year to provide access; it is aligned with the direct slope and is made with ample turning room. To produce woodchips, the thinning work is carried out in January to March when the sap is low. The trees are felled by harvester, or chainsaw, collected and left on the skid road in the forest over the summer to dry; the moisture content reduces from 50 - 55% to about 40%. Also, nutrients in the twigs and needles return to the soil.

The Silvatec chipper is used to harvest woodchips in the autumn, possibly starting in late August to stockpile for the heating season. The machine is articulated and works forward into the butt ends of the trees lying on the skid road. A good driver can drive forward at a speed to match the chipping rate. There are three designs of chipping mechanism, disc, drum, and screw, with each suited to specific parameters of stem size and chip size.

The stream of chips is blown into the mounted 12 m^3 hopper on the machine, Figure 3 provides information on the equipment used. A single chipper can now achieve a work rate of 250 m^3/day and an annual production of 70,000 m^3, which is three times the rate of production in the early 80's.

TRANSPORT SYSTEMS

The system of chipping and transport is closely coordinated. The supply of chips from the chipper is delivered to a road transport container, dumped at the roadside, or a forest storage area. In either case, the chipper will not be used to forward the chips in its hopper

Equipment	Volume (loose), m^3	Work rate
Sivatec chipper	12	25 - 30 m^3/h
Tractor and trailer	12	
Forwarder	12	
Transport container	40	two per 3 - 4 h
Lorry and trailer	80	

Figure 3 - **Chipper and transport capacities**

unless the distance is very short. Normally the hopper, which has a high-lift tipping mechanism, will be emptied into a tractor and trailer or a specially adapted forwarder.

The transport container at the roadside has a capacity of 40 m^3 that takes 3 - 4 forwarder loads to fill. Two containers are transported by lorry, one of them on the lorry container, making a capacity of 80 - 90 m^3 per lorry delivery. The chipper work rate can fill two containers, or one delivery load, every 3 - 4 hours. On the road, the containers are netted to prevent woodchips flying off the top and causing a traffic hazard. Typically the haulage distance is within 10 km from a heating plant, but may be up to 30 km.

STORAGE REQUIREMENTS

Storage in the forest is inevitable because of seasonal variations in demand, occasions when the weather makes chipping impossible, and diverse management needs for forest labour and machinery. Generally, supply contracts specify a minimum requirement of forest storage to guarantee supplies. The storage simply consists of a carefully sited pile of woodchips; it must be near the forest road, and the ground must have clear runoff for rainwater; contamination by debris and splashing from passing vehicles should be avoided. Over periods of two weeks or more, the store needs a tarpaulin cover or roof to keep off rain.

Storage at the heating plant usually corresponds to at least 5 days supply, sometimes up to 14 days, as indicated in the Appendix. Normally, this is all indoors in a silo. The woodchips are dumped by lorry in a reception area within the plant from where they are loaded by crane and grab bucket into the silo. The reception area must be adequate to take at least one full delivery and will sometimes have capacity for four deliveries.

Outdoor storage is used if the heating company wish to negotiate a discount on bulk supplies or, if the plant is so large, as at Maabjerg, that it is impossible for supply contractors to keep up with the rate of consumption. An outdoor dump area may also be needed if there is disagreement on the quality (e.g. moisture content) of the woodchips. For very small plants, for example heating a single institution, outdoor storage is also essential to cope with the whole of a lorry delivery.

Outdoor storage requires hard standing, and the stack height must be restricted to a maximum of 7 - 8 m to avoid self-ignition. A stack decomposes continuously, especially in the case of a large uncovered stack; also, when the woodchips are frozen, it may be impossible to unload. Precautions are needed against the health hazard of fungus spores, including proper ventilation design.

SUPPLY CONTRACTS

Typically, contracts between the heating company and the woodchip contractor are negotiated for periods of three years. In addition, the heating company may negotiate short-term supplies with smaller contractors, as well as buying some of its woodchips cheaply on the spot market. The price generally closely follows the price of timber pulp because forest managers can switch between pulp and woodchip production easily, and normally do so. Woodchips therefore aid flexibility and profitability of forest management.

Woodchips are generally paid by net heating value, i.e. the delivery is weighed and the net heating value is calculated after measuring moisture content at the plant. The average price of woodchips in 1993 was 33 DKK/GJ (net), Figure 4. (Note: DKK10 equals £ 1.00 approx.). The data in the Figure are derived from a one year survey of Danish heating plants, and show the overall average of what the individual plants had paid on average over the year. One plant had therefore paid an average of 41 DKK/GJ (net) and another had paid an average of 28 DKK/GJ (net). The great degree of latitude on moisture content for woodchip combustion in heating plant, while still operating at close to 100% net thermal efficiency, is what makes this payment system economic.

Occasionally, woodchips are also paid for by loose volume. The loads do not need to be weighed, but load volume, the type of wood and estimated ratio of solid volume to loose volume, all need to be agreed. Moisture content still needs to be measured to determine price. The Maabjerg plant has such a large requirement for woodchips that it buys by volume, at the rate of 90 DKK/m^3 at 45% mc. One of the two large Danish contractors actually transports 500 km by road from Germany to meet his contract quotas.

Woodchip particle size also needs to be agreed in the contract, to ensure that the stoking system does not jam (bark slivers create problems) and that the material burns fully (large chips may not burn out). On delivery, the need for coordination and mutual understanding between the forest, transport and plant operators is paramount, to avoid holdups.

SUMMARY OF FINDINGS

1. Woodchips are widely used in Denmark to replace coal and oil firing of district heating plants. This has been achieved by tax incentives on fuel pricing in support of the Danish energy and carbon emissions policy. The total supply of woodchips to district heating plants is 525,000 m^3 loose volume per year.

Figure 4 - **Woodchip supply data for district heating plants**

	Mean of plants in survey	Minimum	Maximum
Moisture content (average over one year's deliveries)	42%	32%	48%
Range of moisture content (in two years' deliveries to one plant)		18%	68%
Upper limit on moisture content at time of combustion (to maintain acceptable plant performance)	50%	40%	56%
Upper limit on moisture content at time of combustion (to continue stable burning)	56%	45%	63%
Chip size distribution	Subject to Danish standards and Dependant on plant specification		
Price (excl. VAT, in 1993)	33 DKK/GJ (net)	28 DKK/GJ (net)	41 DKK/GJ (net)

2. Woodchips at a typical moisture content of 42% burn very efficiently in such plants, which are now usually fitted with flue gas condensers to increase the plant's thermal efficiency to around 100% based on net heating value of the dry wood.

3. Woodchips are purchased by the heating company, which is often a cooperative with the consumers, at a price based on the net heating value. Delivery amounts are normally measured by weight, but can be measured by volume; in either case, moisture content must also be measured to convert to heating value.

4. The vast bulk of woodchips in Denmark are supplied by contractors from forestry thinnings. The trees are felled in January-March and left in the forest to dry until autumn when they are chipped using a mobile Sivatec chipper that has a work rate of 25-30 m^3/h.

5. The chips are forwarded to a forest storage area or a container at the roadside. Two containers make a lorry load for delivery to the heating plant, typically a distance of 10 km.

6. Woodchips are stored in a silo inside the plant that is loaded and unloaded by overhead crane; the storage volume is 5-12 days' fuel. Outdoor storage is used at some plants for very large quantities.

APPENDIX

Typical operating information on two types of plant is given here, **two district heating plants** and one **combined heat and power (CHP) plant**, Figures A2 and A4. All three plants were visited during the study tour. The information gives a general indication of the woodchip supply requirements for the different types and scales of plant, and of storage capacities.

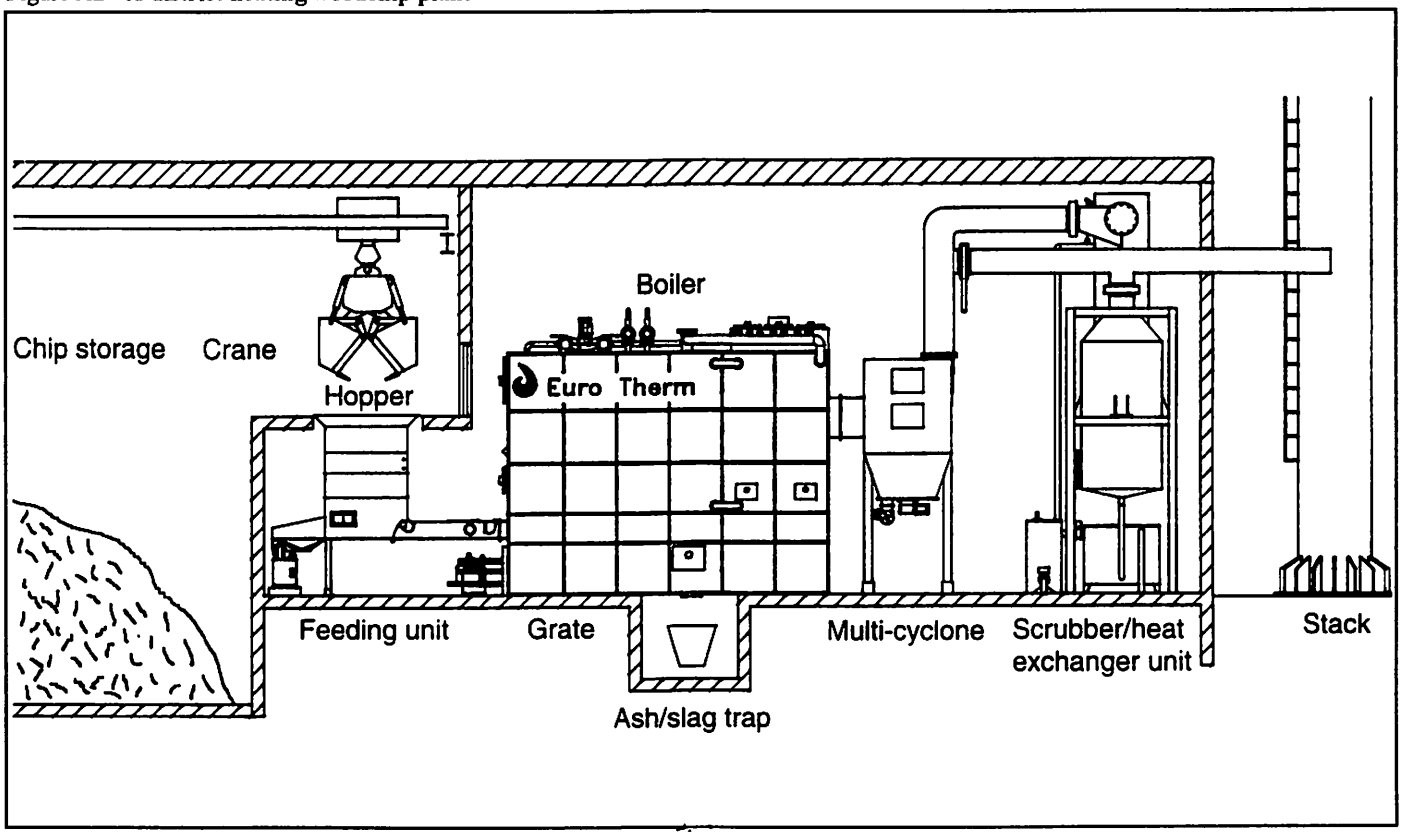
Plant	Hinnerup	Kjellerup
Heating rate MW	3.2	9.2
Heating consumers, number	2100	1280
Distribution pipes (mains), km	80	25
Woodchip consumption, t/year	4,900	13,500
Heat efficiency, per cent	85	108
Parallel plant	Straw	None
Peak woodchip consumption, t/day	40	56
Peak transport requirement (at 80 m^3 each), deliveries/day	2	10
Delivery storage, m^3	80	300
Silo storage, m^3	600	2,400
Silo storage (e.g. full load), days	5	12

Figure A1 - **Typical district heating plant operation data**

The **Hinnerup district heating plant** was of average size but it ran in parallel with a separate straw-fired plant that supplied heating for the same district as well as a natural gas boiler for peak loads. It also had priority; as a result it generally ran at a steady load. It did not have a flue gas condensing unit fitted so its efficiency of 85% had not been boosted to the highest level achievable.

The **Kjellerup district heating plant** was one of the largest and also ran with a natural gas boiler for peak loads. Its efficiency with a flue gas condensing unit installed was much higher at 108% (based on the ***net*** calorific value of the wood). The explanation for this high

Figure A2 - **A district heating woodchip plant**



		Rating	Share
Output	Heat	67 MW	61%
	Heating water storage 5,000 m^3		
	Heating consumers, numbers	20,000	
	Electricity	28 MW	27%
	Electricity consumers,	40,000	
	equivalent number		
	Overall thermal efficiency		88%
Fuels used	Municipal waste	135,000 t	56%
	Straw	30-50,000 t	27%
	Natural gas 7,500,000 m^3	11%	
	Woodchips	17,000 t	6%
Fuel storage	Woodchips	30,000 m^3	50% approx (of annual woodchip consumption)

Figure A3 - **Maabjerg CHP plant operation data**

efficiency is that, in the process of condensing moisture out of the flue gases, more heat in total can be transferred to the district heating water than the heating value of the dry wood alone. The load on this plant was more variable than the Hinnerup plant.

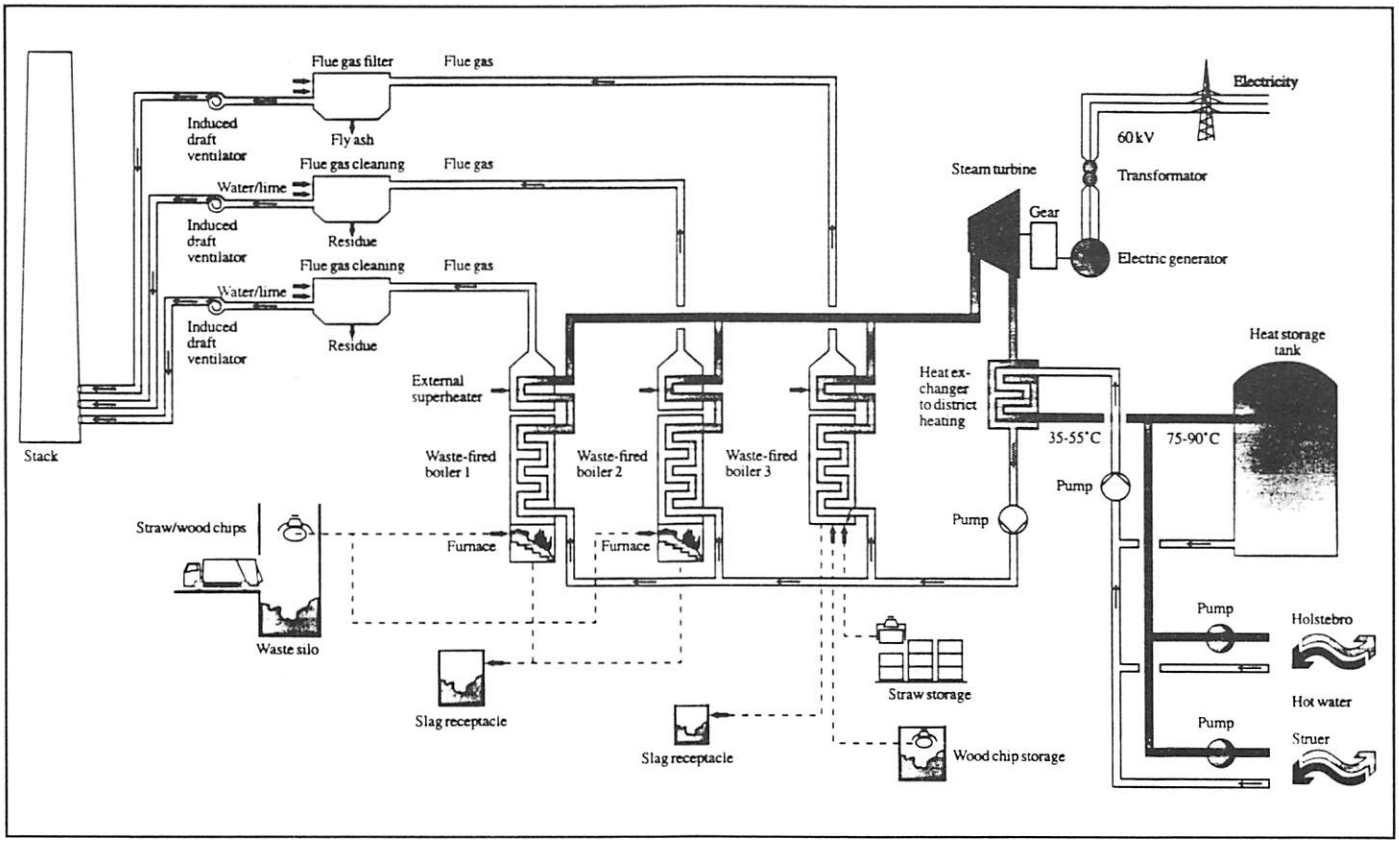
The peak transport requirements to the Hinnerup plant were two lorry deliveries (80 m^3) a day, because of the steady load and the relatively small silo store (5 days). The delivery storage area was only the capacity of one lorry load that could be cleared easily in time for the lorry to return with a second load, if necessary. The peak transport requirement to the Kjellerup plant was relatively larger at 10 lorry deliveries a day, which typically occurred at Christmas when the heating load was high and the plant manager wished to have his store full (12 days) and give his staff a holiday. The capacity of the delivery area at this plant was four lorry loads.

The **Maabjerg combined heat and power (CHP) plant** had a heating capacity alone which was ten times that of the largest district heating plant, and it also supplied 28 MW of electricity. The overall thermal efficiency of this plant (heat and electricity combined) was 88%. This plant contained three separate boilers of which one was designed to burn woodchips and straw together; the other two burned municipal waste. Natural gas was used in the steam superheaters. The woodchip share of fuel to the plant was only 6% but even this was 17,000 t; *cf* the total woodchip supply to all the 30 district heating plants combined was only 8 times this amount. All the woodchips were stored outdoors in a 30,000 m^3 holding area, where part of the woodchip bulk might remain for 2 - 3 months.

This paper was presented by the author Alistair Hunter at the Annual Symposium of the Forestry Engineering Specialist Group of the Institution of Agricultural Engineers, 'The Harvesting and Use of Wood Residues (Including Coppice)', held at Newton Rigg, Cumbria, on 1st September 1995.

It reports the findings of a study visit to investigate the use of wood as a biomass fuel that is well established in Denmark. In the UK, ongoing work is aiming to establish the best practice for energy generation from wood fuel, with existing Danish practice as a valuable pointer.

Figure A4 - **The CHP multi-fuel plant operation at Maabjerg**



AN OVERVIEW OF HAND-HELD EQUIPMENT

Today in our discussion on manually-carried sprayers, we remember the impact of Edward Bals on the way spraying equipment has evolved over the last 40 years. Edward dedicated his life to the development of more efficient ways of applying pesticide sprays, and introduced us to the field use of spinning discs to atomise sprays. Edward had spent his early working days in China, where he saw how small-scale farmers battled to survive and, then post World War II, he was again in Asia selling the newly developed pesticides.

It was in Sri Lanka that he was appalled at the drudgery of carting gallons of water up steep hillsides to apply a pesticide for control of blister blight to tea. Two hundred tons of water was required to treat 400 acres at 100 gallons per acre. Edward succeeded in applying lower volumes and by mistake the amount of pesticide was reduced proportionately and found equally effective.

He also soon discovered that most of the water-based spray rolled off the waxy leaves or was washed off when it rained. He reasoned that it would be better to use an oil that would stick to water-repelling leaves and insects, and it would not evaporate like water in the hot tropical environment. This experience convinced Edward that spraying could be more efficient, less pesticide would be needed and manual drudgery could be reduced.

In London in the early 1950's, he set up Micron Sprayers Limited, and initially developed motorised sprayers with rotary cages. However, commercial success eluded Edward as then there were no formulations available for application in oil.

The development of 'ultra-low volume' spraying against locusts did provide one success in that a rotary atomiser, the original Micronair, was taken up by Britten-Norman Limited and fitted to aircraft, such as the Auster J5G (Rapley, 1960, Courshee, 1961), Piper PA 18 and de Havilland Dragon (Besnault, 1962). Micronair A1000 atomisers on a Tiger Moth were also used to investigate aerial sprays on Kent orchards (Hunnan and Dash, 1959; Rose, 1959). Few realise today the originator of this type of equipment.

I first met Edward in 1960 on a visit to Birmingham, to find a manufacturer willing to produce 'tailbooms' to fit knapsack sprayers in Africa. On a blustery wet day he demonstrated his "Tomato Sprayer" on the roof of the Birfield Building. Despite protesting that the disc diameter (about 45cm) was too large to go between cotton rows and a two-stroke engine was too expensive for the small-scale farmer, I agreed to evaluate his machine. A smaller disc to go on a tailboom was suggested, but it was not until 1967 that I was able to see the "Turbair X" and "Tot", developed by Edward. I felt that the "Turbair X" might not survive rough handling in Africa, but I again agreed to do trials, this time with success.

Using 2.5 litres per hectare of an oil-based formulation, we obtained yields of cotton in Malawi that were comparable with the knapsack sprayer applying 200 litres pf. water per hectare (Matthews, 1973). By this time Edward had re-established Micron Sprayers at Bromyard and the Micron "ULVA" had entered the market. In contrast to the flat double disc on the "Turbair X", Edward widened the gap between the two discs on the "ULVA" and shaped the disc to achieve better distribution of the liquid to the edge. It was only later that it was realised that the second disc was not necessary and had increased power consumption by the fan action it produced.

Over the years the "ULVA" has proved highly successful spraying cotton, especially in Tanzania, Mozambique and the Francophone countries in Africa.

Edward's main interest, however, was to improve the droplet spectrum and prove that using less pesticide could be just as effective. Before we used laser drop sizing technology, he had invested in high-speed photographic equipment to investigate the force of surface tension on droplets from a capillary tube and sharp point, and the effects of flow-rate on droplet formation on discs rotating at different speeds (Bals, 1969, 1970). In the same paper he compared the coverage with a fan nozzle operated at 40 psi. It was these studies that had led him to the need for a series of "zero" issuing points around the periphery of the disc.

At the Brighton Conference in 1969, Edward set out his views on Ultra-Low Volume spraying. In stressing how inefficient spraying with ordinary hydraulic pressure nozzle, producing droplets which can vary from 20 to 400 µm in diameter, he argued that as the largest droplets have 20^3 ie 8000 more units of pesticide than the smallest, it was, and I quote "absolutely essential to have as near as possible even sized droplets".

He also emphasised the need to harness natural forces to distribute the droplets in a crop, pointing out how the force of four jet engines on a VC10 aircraft is rapidly dissipated against a prevailing 5mph wind. In this paper he advocated his arbitrary choice of 70 µm diameter droplets for insecticides and fungicides and a larger 350 µm droplet, settling with its own terminal velocity, for herbicide spraying.

It was back in 1969 that he also suggested the concept of "Ultra-Low Dosage", this is only now being given more consideration. With greater environmental concern, the need to apply minimal dosages of pesticides is being investigated as Governments adopt policies of pesticide reduction of implementation of Integrated Pest Management.

While success had come with the "ULVA" sprayer in the semi-arid tropics, followed by the "Micro-Ulva" and copies by manufacturers in several countries, the adoption of reduced volume spraying in Europe was negligible, despite research at the Weed Research Organisation (WRO) using a stack of discs in each atomiser (Taylor, Merritt and Drinkwater, 1976).

Edward Bals was not happy with this approach. Unaided by modern computer-aided design, he thought about the three-dimensional shapes and how they might be moulded in plastic and assembled. From this the larger spinning cup-shaped disc, later called the "Micromax" was developed. This had large grooves to feed the teeth individually, thus allowing an increase in flow-rate to at least 1.5 litres per minute and retaining ligament formation (Heijne, 1978).

While intended for use on tractor-mounted sprayers, one use of the large disc is now on a vehicle or ATV to treat roadsides and other areas. Rather more important is the way the disc design, with grooves feeding the teeth, has been the basis of the latest small disc fitted to the new hand-held applicator, the "ULVA+".

Interest in herbicide application was initiated by Ciba-Giegy who asked Edward to design a simple sprayer to fit a pesticide container. Using the ULVA disc, with a new speed governed motor, the "Handy" was introduced with atrazine to treat maize crops with 250 µm diameter droplets. In contrast to Edward's height the "Handy" was tiny and the user's ankles were easily sprayed. This led to the longer "Herbi" sprayer, and at a meeting at WRO, the concept of "Controlled Droplet Application" (CDA) was born and quickly used by Edward (Bals, 1975a,b).

The "Herbi" and subsequently other lightweight spinning disc CDA sprayers are now used in many situations by local authorities, foresters and others in different parts of the world to apply herbicides, especially where drift must be minimised. As 'spray drift' is a very emotive issue, the scope for greater use of more uniform droplet spectra is enormous.

However, as with other revolutionary developments, there is a reluctance by the majority to change from existing technology. One aspect of the difficulty in promoting new spray equipment to reduce the volume of application is related to the supply of suitable formulations. When applying droplets smaller

than 100 µm diameter, for more efficient insecticide and fungicide application, less volatile oil-based formulations are ideal in hot, dry climates or where leaf surfaces are particularly hydrophobic, but are expensive unless used at less than 2 l/ha.

Formulating some pesticides in such a small volume is very difficult as illustrated by the difficulties encountered with the development of the "Electrodyn" sprayer. There is now also the environmental concern about using organic solvents which are in emulsifiable concentrates as well as ULA sprays. This has prompted a major shift to particulate formulations diluted in water.

With the latest disc design, application of very-low volumes (10-20 l/ha) of water-based insecticide and fungicide formulations has proved to be as effective as ULV application in many trials. While costs are always dominant there is still scope for further development of formulation to meet specific requirement for better retention, uptake and biological efficacy.

Packaging of the formulation is another key issue considered by Edward many years ago. Then no-one wanted to know about supplying a pesticide in a bottle that screwed directly on to the sprayer. This approached was pioneered with the Turbair range and later the "Bozzle" was used on the "Electrodyn" sprayer (Coffee, 1981) and "No-mix" sprayer.

However, the need to provide the pesticide in a container to attach directly to the sprayer is now promoted by the health and safety regulations to achieve chemical transfer without contaminating the operator.

Release of pesticide close to the operator of hand-held equipment inevitably increases the risk of contamination during spraying. This needs to be minimised although the pesticide has now been diluted. Conventional knapsack sprayers are too often used with the operator holding the nozzle in front of the operator so that the spray is seen directed to the targets.

This leads to excessive contamination of the user, especially when walking through treated foliage. The "ULVA" concept using natural air movement always advocated holding the atomiser downwind to allow the spray to be taken away from the operator. Similar instruction is clearly needed with knapsack sprayers to reduce operator contamination.

Safety considerations have initiated more interest in quality specifications for manually-operated equipment. However, efforts to have more durable sprayers, with a more consistent output remain ignored in most countries because of the quest for a cheap product. This is despite all the evidence of poisoning following contamination both during mixing highly toxic pesticides and hours of walking through the spray.

Fortunately in the United Kingdom recent legislation has prompted the publication of BSI standard for knapsack lever-operated and compression sprayers, although as yet no sprayer has the kitemark.

This action and concern in southeast Asia, expressed by the Health authorities and the Asian Development Bank, initiated moves to have an international standard. FAO is also about to publish a Bulletin that includes Specifications based on the BSI Standard, WHO specification and a suggested standard for Spinning disc sprayers.

Having specifications is only one aspect. In the UK it is fortunate that training and certification of operators is now mandatory, and this provides a more informed attitude to pesticide application.

An inherent fault with the manually operated pressure sprayers has been the variation in output with different walking speeds and changes in pressure at the nozzle. The latter could be overcome by fitting a pressure control valve, but this was seldom done as it increased costs and, being adjustable, was rarely set correctly.

The recent arrival of a preset control valve (Matthews and Thornhill, 1993) has already had an impact on large estates in southeast Asia to ensure herbicides are applied at a constant 1 bar pressure. Greater use of the valve on lever-operated knapsack and compression sprayers would greatly improve the accuracy of most applications and can be used on tractor equipment.

Hand-held spinning disc sprayers have now provided, in the UK, an important alternative to the conventional lever-operated knapsack and compression sprayers. Each type will continue to have an important role for different spray treatments. No doubt there will continue to be changes in design as new material, pesticides and manufacturing techniques evolve. For example direct injection of pesticide into water from a knapsack sprayer (Craig et al., 1993) is now possible but awaits commercial development.

For the present, we will miss the far-sighted vision of Edward Bals as inventor and original thinker.

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Edward Bals Memorial Lecture

by G A Matthews
IPARC
Department of Biology
Imperial College of Science, Technology and Medicine
Silwood Park, Ascot
Berkshire, SL5 7PY

COMPUTER, VIDEO & BOOK REVIEWS

NEW BOOK EXAMINES ADVANCE AND OPPORTUNITIES IN BIOTECHNOLOGY

BASEL - Switzerland - A new book from Technomic presents a detailed survery of technical advances and market opportunities in biotechnology. Now published, **Opportunities for Innovation: Biotechnology** provides a 270-page overview of biotechnology in health care, agriculture, forestry, pollution control, plastics, chemicals, and other areas. Edited by Robert M Busche, D.Sc., Ch.E., the book includes research on:

* New products, even at the bench scale, based on a scientific discovery that if translatable to commercial scale would be assured of market acceptance.

* New or improved processes for producing existing products having commercially relevant objectives for scale up to viable business providing a competitive cost advantage over the incumbent processes.

* Products or services mandated by legislation to alleviate the adverse effects of pollution in its various forms.

* Products based on coal or renewable natural resources, although at current competitive cost are disadvantaged compared with products from petroleum, have a strategic importance to the US. in the event of disruptions of international trade.

Chapters in the book include:

Health Care,
Crop Agriculture and Forestry,
Innovative Opportunities in Animal Biotechnology,
Chemicals from Renewable Natural Resources:
A Techno-economic Guide to Research and Commercialisation of this Area of Biotechnology,
Biodegradable Plastics,
Near Term Application of Biotechnology to Fuel Ethanol Production from Lignocellulosic Biomass,
The production of Biogas from Biomass and Wastes, Biological Conversion of Fossil Resources,
Mineral Bioprocessing: Opportunities in Extractive Metaaurgy and Environmental Control.

Technomic Publishin AG has just published this National Institute of Standards and Technology research report to make its timely contents more widely available.

Opportunities for Innovation: Biotechnology. Available from Technomic Publishing AG, Missionstrasse 44, CH-4055 BASEL, Switzerland. Tel: 061/381 52 26. Fax: 061/381 52 59.
ISBN: 1-56676-253-7

HELP FROM BRUSSELS

The first book to be published in English analysing the various EC Grants and Assistance programmes is published by Public Affairs Consultant Europe Ltd.

It describes the objective and application procedures for some 175 programmes including the Structual Funds, R&D funding and other assistance to industry, Educational, Training, Social and Environmental Programme, Agriculture and Fisheries and Overseas Aid, and give contact addresses for each programme.

It also explains the institution and policies of the Community and the criteria under which grant applications are assessed.

The author, **Charles Bidwell,** a solicitor who has specialised in EC work for many years, told us that the book is aimed at businessmen, Local Authorities, research institutions, students, voluntary organisations and all special interest groups who could be eligible for EC funding, the take up for which is very low in the UK.

Sir Leon Britain who wrote the foreword describes it as a "useful tool for all those who need and use such grants".

For information please contact: Yvonne Hook Tel: 01865 770099 Fax: 01865 770011

EARLY YEARS ON THE TRACTOR SEAT

As the title suggests this is an autobiography covering the period from 1938, when the author left school, until his marriage in 1948. During this time he progressed from working in a garage, to farms and threshing rigs. He became a contractor and spends much of the book relating encounters with various tractors.

In essence the book is a series of incidents, often humourous, interfaced with mechanical problems encountered and solved often in very novel ways.

What this book offers the reader is an insight into farm machinery contracting in war time conditions. Hardly a crafted history more a series of good yarns set in a period. Its main attraction, however, will be for anyone with the flair for "taking things to pieces" just to see if they work. Perhaps even more for solving the endless "little problems" that seem to beset all machines of that or any other period.

It is a light work intended to entertain and inform just a little, which I feel it does well. The machine fanatic I am sure would happily put this on his Christmas or birthday list.

Author Arthur Battelle, Published by Farming Press at £ 4.95 (paperback)
ISBN 0 85236 276 5

TRACTORS AT WORK (A Pictorial Review 1904 - 1994)

This, as the title suggests is a pictorial review chronicling the changing scene of working tractors over the last ninety years. Indeed there are some 167 separate photographs selected by the author to illustrate change but also to emphasise the variety of practical uses the tractor has been put to during this century.

The book is very well presented in hard back and even the earliest photos from 1904 are very well reproduced. It has only a limited index but this is in keeping with the rest of the work. It is intended as a book that you "flick" through rather like a magazine of interest rather than following a precise story. The book is of course more or less in chronological order allowing the reader to follow a "potted" history. The author has, however, broken with this order whenever it seems to suit his needs. This rather adds to the charm of the piece, and it will appeal to those with an interest in farm machinery history.

Indeed many of the photographs will give great pleasure as they are rare and depict tractors long lost in the annals. If you are an old tractor buff buy it, if you like rural working photographs it will appeal.

Author Stuart Gibbered, Published by Farming Press ISBN 0 85236 284 6

Last two reviews written by Dr M.J. Hann, Lecturer in Agricultural Engineering, Cranfield University, Silsoe College, Silsoe, Bedford. MK45 4DT

AGRICULTURAL MACHINERY COMPANIES SHOW SIGNS OF IMPROVEMENTS

The latest report analysing the financial character of UK agricultural machinery companies, reveals a marked improvement in the industry. It has been difficult to regain ground lost during the recession, but it now appears that UK agricultural companies are managing to improve their position.

The report, the Plimsoll Portfolio Analysis: Agri-Machinery, 1st Edition 1995, covers some 1600 companies and although it shows that over a third of all companies are experiencing financial problems it reveals that the industry is now growing. During the year reviewed, on average, sales increased by 15%.

This was variable; the smallest , those with a turnover less than £3m recorded an 11% increase in sales while the largest, with a turnover in excess of £19m recorded sales growth of 19%. These sales growth figures are not the only good news for the industry, pre-tax profit figures also showed improvement.

Further information from Mark Haynes, Plimsoll Publishing Ltd Tel: 01642 230977

THE CROP PROTECTION DIRECTORY 1995-96

The Crop Protection Directory brings together the names and addresses of the many organisations and individuals involved in this field in the UK. This directory outlines what they do with it being designed and compiled for the business by people in the business.

The Directory is an essential business tool for everyone who needs to contact other parts of the U.K's crop protection industry. Its scope and its easy-to-use format saves valuable time and money. It is a quick guide to areas of business that may be outside ones expertise. It is essential for newcomers whether they are in research, marketing, sales, biotechnology, training, safe handling, consultancy. It can save months, if not years, of finding out who matters and how specialist sectors work.

It is essential for anyone from outside wanting to do business in Britain and for organisations looking for exporting companies and consultants with international experience.

The directory has been compiled by Elaine Warrell, who has worked in the international crop protection industry for many years; associate editor and researcher, Anne Kirkwood who, was until recently, head of information for Shell International Chemical Company's Crop Protection Division; and associate editor and marketing manager, Dr Ray Ah-Sun who has many years' international experience gained with Shell.

The specialist sections have been reviewed by experts in the field to ensure that the right organisations, companies and individuals have been included and that the introductions are technically correct. Companies, organisations and individuals listed and described have also checked entries. The Crop Protection Directory not only gives names, addresses, telephone and fax numbers for organisations, companies and individuals, it also outlines their activities. So you have good chance of contacting the right people first time.

Each of the 16 sections deals with a specific part of the business, starting with an authoritative 'state of the art' introduction, setting out how the sector operates in the UK and commenting on topical issues. It also has a special section on organisations and individuals involved in environmental issues.

The need to cut costs and increase profits has led organisations into consultancy services and others to companies and individuals to supplement or replace in-house services. Each section of the Directory lists consultants specialising in the subject. Comprehensive listings and descriptions of who does what are divided into 16 easy-to-use sections

Copies are obtainable at a cost of £ 110.00 each post free from Elaine Warrell Associates, 105 lee Road, London, SE3 9DZ
Tel: 01 (+44) 81 852 6158
Fax: 01 (+44) 81 297 0789

GUIDE TO TOP 500 EUROPEAN ENGINEERING FIRMS

Details of the leading European engineering consultancies have been published in the 1995 edition of Consultant Engineers 500. The only all Europe independent guide to the engineering profession.

The fifth 288-page guide lists highly recommended and recommended consultancies in 27 different sectors of engineering in 67 UK counties and 22 European countries. The consultancies recommended in the guide range from practices to the professional engineering divisions of contractors, manufacturers, utilities and government. They employ over 170,000 staff and have a turnover of some £10 billion - over a third of the total European market for engineering consultancy services. The guide also explains the role of major professional organisations, including the European Federation of Consulting Associations (EFCA).

The guide's editor, chartered engineer Simon Fullalove says, "The past two years have seen upheavals in the consultancy sector. The recession and the privatisation of public sector services have led to a shopping spree for financial strong consultancies. Some well-known names have got bigger and others have simply disappeared. However, there is an increasing mood of optimism that could now bring some stability to this sector.

Furthermore, European expertise is still highly sought after internationally - EFCA members alone earned some £3 billion abroad in 1994.

For further information contact: Rachel Radford, Anchorage Press, 9 King Street, Twickenham. TW1 3SD
Tel: 01(+44)81-892 9905

THE GRIFFITHS LANDSCAPE & GARDENS PRICE BOOK 2nd EDITION

A brand new edition of the Griffiths Landscape & Gardens Price Book was published in January 1995. It is edited by Tweeds, Chartered Quantity Surveyors, and was written to answer the increasing need in the landscape industry for greater accountability of the spending of private and public money. This was fulfilled by the adoption of analytical pricing techniques that appeared in the first edition for the first time in any book on landscaping. The book contains over 5,000 measured items, each broken down into labour, plant, materials, profit and overheads producing over 20,000 individual pieces of cost data.

Extensive market research was carried out by the editor and the publishers to gauge reaction to the first edition. All purchasers were sent a questionnaire and from the high number of responses received, most of the constructive comments have been incorporated in the second edition. In particular the maintenance of planted and seeded areas was well received and this section has been enlarged and further improved.

The second edition is also available on disc as part of an estimating software package called Estimate_it for Landscape, produced by Snape Computers, one of the country's leading construction software specialists. This has also been updated to keep in line with improvements in the book.

The book is available at a cost of £ 48.00 (postage free) from Barton Publishers, Baden House, 7 St Peter's Place, Brighton, E. Sussex. BN1 6TB
Tel: 01273 680041. Fax: 01273 606588.
ISBN: 0900417323
ISSN: 1351-2382

MACHINERY ON VIDEO

Stirling, Scotland based writer and photographer David Shearer has produced a video showing some machinery, both in action and on static display, at the 1994 Association of Professional Foresters, European Forest Machinery Exhibition, held at the Thoresby Estate in Nottinghamshire last September.

The one hour video is divided into four sections - Harvesters and Processors, Forwarders, Winch Systems and Miscellaneous Equipment.

Filmed over three days of the show the video was made using professional camera equipment similar to that used by the BBC. for much of their location work, with editing and titling and commentary being carried out at David's Mechanisation Publications business in Stirling.

David said "The idea of producing a video was prompted by the interest created by my photographs taken at the past five APF machinery demos.

The video brings the images to life, and allows people who could not make it to the show to enjoy the sights and sounds. It also provides those who were there with the chance of a second look."

Copies of the video are available, priced at £19.95 including postage and packing from Mechanisation Publications, FREEPOST TY425, Stirling, FK7 8BR.

For further information contact David Shearer Tel and Fax: 01786 814952

DIARY OF EVENTS

21st - 22nd March, 1995
Emergency Planning and Incidental Management of the Water Environment Details from Conference Manager, The IWEM, 15 John Street, London. WC1N 2EB. Tel: 0171 831 3110 Fax: 0171 405 4967

22nd March 1995
The Fifth Silsoe College Postharvest Convention - "Postharvest Quality Assessment" - at Silsoe College, Silsoe, Bedford MK45 4DT, in association with the Association of Applied Biologists and the Institution of Agricultural Engineers. For further information contact: Mrs Pam Cook, Postharvest Technology Department, Silsoe College, Silsoe, Bedford. MK45 4DT Tel: 01525 863276 Fax: 01525 863277

22nd March 1995 - 7.30 pm
Codes of Good Agricultural Practice for the Protection of Soil and Water, IAgrE, Soil and Water Management Group, Silsoe College. For further information contact: Tim Chamen, Silsoe Research Institute, Wrest Park, Silsoe, Bedford. MK45 4HS Tel: 01525 860000

28th March - 1st April, 1995
16th International Agricultural and Agricultural Machinery Exhibition Agro+Mashexpo: Budapest, Hungary. Details from Clare Taylor, London Chamber of Commerce and Industry, Europe House, World Trade Centre, London. E1 9AA Tel: 0171-488 3399

4th-8th April, 1995
R.D.B.A. Spring Tour 1995 Brittany, France. For information contact; Sir Pat Astley-Cooper, Rural Design and Building Association, Stoneleigh, Kenilworth, Warwickshire. CV8 2LG Tel: 01203 696525

5th-6th April, 1995
Muck '95 - Theme "Make the Most of It" National Agricultural Centre, Stoneleigh Park. Organised by Royal Agricultural Society of England and ADAS in association with What's New in Farming and supported by NRA. For information contact: RASE, National Agricultural Centre, Stoneleigh Park, Warwickshire. CV8 2LZ Tel: 01203 696969

6th April 1995
Risk Assessment in Forestry Practice, IAgrE, Forestry Engineering Group Spring 1995 Symposium, Newton Rigg, Cumbria. For further information contact: Geoff Freedman, Secretary, Forestry Engineering Specialist Group, 231 Corstorphine Road, Edinburgh. EH12 7AT

6th - 7th April, 1995
Agribusiness & The Food Industry in Central Europe at Marriott Hotel, Warsaw. Information from Emma Hilditch, Conference Manager, Agra Europe (London) Ltd., Rue du Noyer 262, 1040 Brussels, Belgium. Tel: +322 736 6313/6344. Fax: +322 734 4681

2nd - 3rd May, 1995
Emergency Planning and Incidental Management of the Water Environment. Details from Mrs L. Gittins, Conference Manager, The Institution of Water and Environmental Management, 15 John Street, London. WC1N 2EB. Tel: 0171 831 3110 Fax: 0171 405 4967

16th May, 1995
Production and Processing of Crops for Industry. Institution of Agricultural Engineers Conference, AGM and Annual Dinner, at Silsoe College. Contact Yvonne Miles, 01525 861096.

17th - 18th May 1995
Potato Technology '95, PMB's Research Station, Sutton Bridge, near Spalding, Lincolnshire. Exhibitors prospectus and information from: The Demonstration Organiser, Potato Marketing Board, Broad Field House, 4 Between Towns Road, Cowley, Oxford. OX4 3NA

14th-15th June, 1995
Cereal '95 - Theme "Efficiency through effective management" Shuttleworth, Old Warden Park. Organised by RASE, ADAS, Home Grown Cereals Authority and East of England Agricultural Society, in association with Farmers Weekly and sponsored by Lloyds Bank. For further information contact: RASE, National Agricultural Centre, Stoneleigh Park, Warwickshire. CV8 2LZ Tel: 01203 696969

4th-11th June, 1995
International Workshop on Soil Conservation Extension: Concepts, Strategies, Implementation and Adoption, Chiangmai, Thailand. Organised by Soil and Water Conservation Society of Thailand, Department of Land Development and The International Board for Soil Research and Management. Details from Mr. Sompong Theerawong, Department of Land Development, Paholyothin Road, Bangkok 10900, Thailand. Tel: 66-2-5611954

20th - 21st June, 1995
ILAM '95 Leisure Show to be held at the Harrogate International Centre, Hall Q. Further information contact: 01491 874222 ext 256

20th - 23rd June, 1995
AGRO Vietnam 95, Ho Chi Minh City, Vietnam. Information from: Clare Taylor, LCCI Exhibitions, Europe House, London. E1 9AA . Tel:01(+44)71-488 3399. Fax: 01(+44)71-702 0066

3rd - 6th July, 1995
Royal Show, National Agricultural Centre, Stoneleigh, Warwickshire Tel: 01203 696969

5th - 7th September 1995
The Sports, Amenities & Landscaping Trades Exhibition, Royal Windsor Racecourse, organised by the Institute of Groundsmanship. For information contact Andy Centre, Tel: 01932 564455

11th - 14th September, 1995
RSS95: Remote Sensing in Action, Conference and Exhibition at University of Southampton. Further information from Prof. Paul Curran, Dept of Geography or Dr. Colette Robertson, Department of Oceanography, University of Southampton, Southampton. SO17 1BJ Tel: 01(+44)703 592259/2389/3642. Fax: 01(+44)703 593059/3295

19th - 23rd September, 1995
Agro-Tech '95 International Supplements and Machinery Fair in Antalya. Details from Hüsamettin Ünsal, FS Fuarcilik AS, CC. 120 80303 Mecidiyeköy - Instanbul, Turkey. Fax: (90) 212 288 92 46

20th - 23rd September, 1995
Agricultural & Biological Engineering: New Horizons - New Challenges. International conference at Newcastle University. Details from: Marion Turner Tel: 0191 222 6891.

21st - 22nd September, 1995
Engineering for Sustainable Development - expectations and responses on manufacturing and transport, Queen Elizabeth II Centre, London. Further information from Christa Langan, Royal Academy of Engineering, 29 Great Peter Street, Westminster, London. SW1P 3LW Tel: 01(+44)71-222 2688 Fax: 01(+44)71-233 0054

7th - 9th November, 1995
IWEX '95 9th International Water & Effluent Treatment Exhibition and TRENCHLESS TECHNOLOGY '95, NEC, Birmingham. For information contact Paul Tweedale or Howard Phillips, Turret Group plc. Tel: (+44) 01 923 228577 Fax: (+44) 01 923 221346

Short Courses at Silsoe College

9th April - 5th May, 1995
Agriculture & Food Development through Enterprise - Joint programme with School of Management

October 1995
Postharvest Technology of Grains, 10 week continuing professional development programme

27th November - 1st December, 1995
"Postharvest Technology and Commodity Marketing" - Conference in Accra, Ghana with Exhibition of Agriculture, Irrigation, Forestry and Food Processing Equipment.

January 1996
Postharvest Technology of Fruit, Vegetables and Root Crops, 10 week continuing professional development programme.

Further information from Mrs Gill Burrows, Cranfield University, Silsoe Bedford. MK45 4DT.
Tel: 01(+44)525 863349. Fax: 01(+44)525 863344

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