

SCIENCE AND ENGINEERING RESEARCH COUNCIL
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COMPUTING DIVISION

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Notes on a visit to Redfearn National Glass Ltd
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The purpose of the meeting was to discuss a forthcoming co-operative grant award between Redfearn and the department of production engineering at Loughborough University of Technology (Dr Richard Weston). Present at the meeting were Dr Weston, his research assistant on a current project funded by SERC, and Dr Roger Kent, Head of the production department at Redfearn.

Redfearn is the third largest UK glass container manufacturer. They have 17% to 18% of the market and annual turnover of about 70,000,000. They have factories at Barnsley and York, Redfearn National Glass being formed from the merger of National Glass (York) and Redfearn Bros (Barnsley). Redfearn Bros were established in 1900 and National Glass in the eighteenth century.

Redfearn make the full product range of glass containers including green, amber, white flint glass. Their normal production range is about 350 different designs.

The major automation in the glass making process comes from the IS machine (individual section IS). The basic machine design was produced in 1937. A section of the machine forms a single container in a number of stages (pipelined). A number of sections operate in parallel.

At Redfearn the process starts with sand, limestone, and soda and goes through to the finished product packaged in crates or on pallets. The process is heavily mechanised. Redfearn is typical of the best practice in the industry two or three years ago. The York plant is probably the best in the UK. When National Glass and Redfearn Bros merged the Barnsley plant was probably the worst in the UK. They had no management to speak of but the merger was followed with a massive capital injection into the Barnsley plant. Barnsley turnover is about 40,000,000 and in a single year 9,000,000 was invested in that one plant. They concentrated on installing well tried and proven technology.

Two years ago the company diversified into PFE Production (Polythene Containers!), at a small factory in Leeds. They also owned a subsidiary company which markets another technology they have invented.

The production and process and control department (of which Dr Kent is the head) was set up to look at modern control techniques some two years ago. Dr Kent has formed close liaison with Bradford and Loughborough. He has set up courses on microprocessor control systems in conjunction with the Bradford department and these courses are given in the company and to first line supervisors. Redfearn have been instrumental in setting up programmes for training engineers through the Ceramics and Glass Training Board and this has had an influence on university courses. His group also has links with a Glass Technology Department at Sheffield.

Redfearn support one MSc and three PhD students at Loughborough.

The Data Processing side of Redfearn uses Honeywell Level 64 equipment located at York. Dr Kent has persuaded the York DP Manager of the need to consider distributed integrated systems in the sense of integrated process control, office automation and management information. Redfearn take a radical view of introducing some of these concepts. They have a dynamic young management and are keen to keep up with the state of the art.

The company have experienced a rapid turndown because of the recession. The glass container industry is very much value sensitive and operates at about a 10% profit margin. Over 40% of the work force have been made redundant over the last two years and the intention is to build back production at the present manning levels. It takes 72 people per line on a four shift system whereas the best European practice is 56 to 58. Redfearn think they can get down to 38 to 40 with the best practice in control systems. The Barnsley plant has seven container production lines.

The Production Engineering Department at Loughborough has historically been concerned with machine tool control techniques. They are looking at microprocessor control systems for electron beam welding, cutter grinders and lathes etc. They have close links with processing industries and quality control for example beer barrel washing/testing. They have some fifteen PhD students engaged on activity involving microprocessors (!).

There are two major research areas in the department on robotics and glass industry/networking. The Redfearn people lecture at Loughborough in some of their control courses.

They have some joint works with Redfearn on furnace control which also involves the Bradford Department (furnace modelling). They work closely with Rockway Glass also on the control of individual section forming machines.

To a research assistant, or ? has been looking at networking, Alan Bradley Controller Systems and has produced some basic software in Pascal which runs on Texas Instruments 990 micros using the Alan Bradley Data Highway Network.

Dr Kent's department use Hewlett Packard equipment and are in the process of setting up an engineering database. A large amount of effort goes into the design of the cast iron moulds used in the container making process. They are developing CAD tools based on the Hewlett Packard 9845

machine and currently they can compress four and a half days of draughtsmans effort into half a day. They currently only go to machine production of engineering joins but hope to move to NC Production in the future. The York and Barnsley factories are linked through a wide area network connection bringing production information on line. They are aiming for a fairly sophisticated management information system.

Discussion of grant application.

Most of the discussion the grant application centred on the scope of the project envisaged. The draft case for support was unclear on the scope of the project and it was suggested that this be rectified before submission.

The aim of the project seemed to be to look at the requirements of a local area network to connect sensing devices to some host processing system on one of the production lines in the factory. When the requirements have been assessed they will be matched against existing commercial network equipment and either equipment bought off the shelf or bought to special order. A prototype system operating on one of the Barnsley factories production lines will then be commissioned.

The Redfearn contribution to the project is manpower for the specification phase and installation of cabling and fences within the factory. SERC will be asked to provide manpower and capital equipment for the local area network nodes. On reading the co-operative awards scheme brochure it became clear that there might be a problem in that Redfearn would wish to retain ownership of the local area network equipment at the end of the project. Discussion with the secretary of the Co-operative Awards committee revealed that it might be possible for Redfearn to purchase equipment from the University at the end of the contract if they so desired. The submission will be made along these lines. The office can then resolve the details.

It was suggested that the application ought not to assume that committee members reading it will be familiar with both control systems, technology and local area networks technology. A fairly general introduction aimed at both communities should be included.

Milestones, timescales and workplans need some beefing up.

My overall impression was that Redfearn are a very competent go ahead company. The project is clearly suitable material for a Co-operative Award application.