

Fulmer UPDATE

Fulmer Newsletter No. 56, July 1986

CBI GUIDELINES ON INNOVATION

The Confederation of British Industry, anxious to encourage more innovation in Britain's manufacturing industry, has produced a set of guidelines. These will be of particular value to small and medium sized companies, many of which we serve. The major point is that cash must be generated from the business. If innovation is funded from borrowing this accentuates the risk.

The key to generating more cash is shown in the diagram reproduced from the CBI leaflet 'Innovation—The Ground Rules'. To provide the minimum 10% needed for innovation, materials and employment costs for current output should not exceed 80% of sales. If you are not in the position of having this cash surplus, the first move must be to increase production efficiency and reduce materials and energy costs. There are many Government schemes available to help you do this: The Manufacturing Advisory Service, The Design Advisory Service and The Energy Efficiency Office all provide help coupled with part funding. Fulmer is very skilled at helping its clients to make use of

these schemes and we shall be delighted to advise you if you are not already in receipt of help.

Once the cash is available the leaflet goes on to give advice on how best to spend it. The questions to examine are:

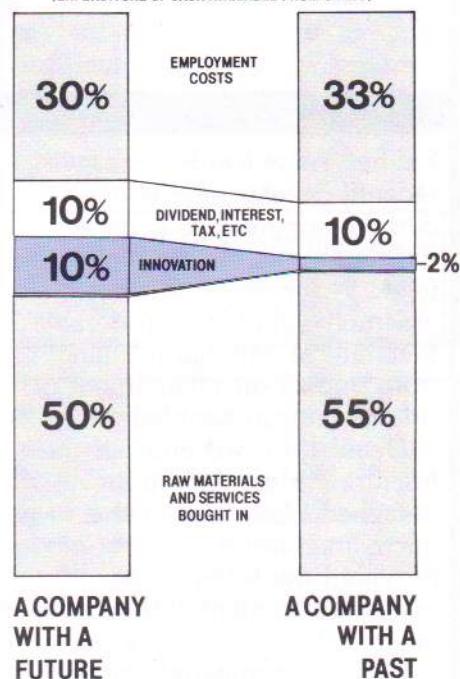
- ★ What new market opportunities could be opened by improved products?
- ★ Could existing products generate additional income from new markets?
- ★ Can new products be developed for existing markets?

Fulmer is, again, skilled at helping its clients in all three areas. We have operating experience across most of British industry and have assisted companies to develop products ranging from new automobile bearing materials to soft permanent contact lenses, together with new processes for making and shaping materials.

We would welcome an opportunity to discuss with you how Fulmer, together if necessary with Government help, can assist you in securing your future. Contact Dr W. E. Duckworth, Managing Director, Fulmer Research Institute.

ARE YOU SQUEEZING YOUR FUTURE?

(EXPENDITURE OF CASH AVAILABLE FROM SALES)



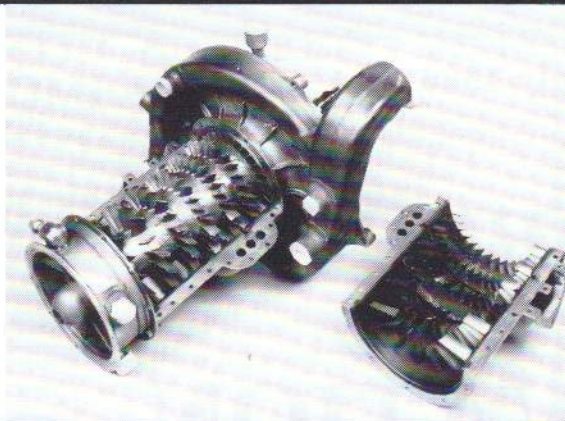
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SPECIAL FEATURE:

ENSURING SAFETY AND ECONOMY IN THE TRANSPORT INDUSTRIES

HELICOPTER COMPONENT FAILURE



Fulmer Technical Services recently investigated a compressor module from a helicopter gas turbine which had failed in service. The rotor assembly suffered considerable mechanical damage resulting from impact on detachment of one of the turbine blades.

Detailed examination of the fracture surface left by the detached blade and of the microstructure of adjacent blades provided the information necessary to identify the cause of failure.

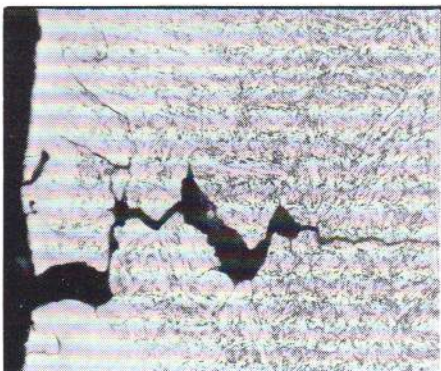
The blade material was a precipitation hardened stainless

steel, but an unusual and undesirable feature of its structure was a continuous grain boundary network of fine carbides. The presence of these carbides, uniformly distributed throughout the blade section, indicated that they were due to incorrect blade heat treatment, not to overheating during service. The grain boundary carbides had induced local compositional variations making the material susceptible to intergranular attack in the aggressive sulphur and chlorine containing operating environment.

The surface intergranular fissures, of which many were present on the blades examined, provided ideal initiation sites for fatigue cracks. On the failed blade a fatigue crack had propagated through the blade section to final overload failure.

These findings enabled the owners of the disabled helicopter to secure compensation from the compressor module manufacturer.

For details on Failure Diagnosis services please contact David Bagley at Fulmer Technical Services.



Intergranular corrosion attack and separation which provided the initiation site for a fatigue crack that led to final failure.

FIRE SAFETY IN LAND TRANSPORT

In both aviation and marine transport, fire safety is subject to statutory control. For land transport the situation is different; there is no statutory pressure to ensure the fire safety of vehicles and their component parts, unless they are exported to a country with more rigorous requirements than the U.K.

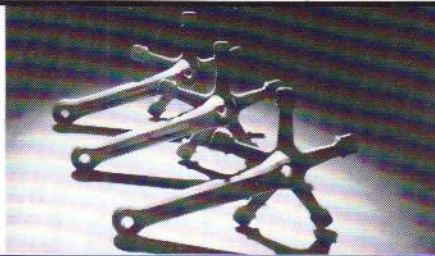
Some routine testing is always done, and, more encouraging, enlightened manufacturers are investigating the fire safety implications of innovations using laboratory simulation tests. However, there is little systematic effort to ensure that road vehicles will perform to a defined minimum standard in a fire.

To help improve this position, Yarsley Technical Centre is launching a project to investigate the potential fire hazards of all vehicle components. Yarsley bring to the project 20 years of experience as one of the principal fire testing and evaluation services in the U.K. Yarsley will evaluate the safety of vehicle materials and components in terms of flammability and emission of smoke and toxic combustion products. The aims are to highlight the most hazardous components and materials and to identify low risk alternatives.

Yarsley is actively seeking sponsors for this project. For further details please contact Ed Soja at Yarsley Technical Centre.

MIDAS

THE SEMI-SOLID SHAPING PROCESS FOR HIGH QUALITY AND VOLUME PRODUCTION



MIDAS is a novel process developed at Fulmer for production of high quality, pore-free components, particularly suitable for application in the transport industries.

In the MIDAS process an alloy produced as a specially treated continuously cast bar is cut into billets which are heated to a temperature at which they handle like a soft solid. Automatic handling of these billets is possible, to transfer them to a pressure diecasting machine. During diecasting the shearing action of the plunger converts the solid into a viscous liquid which flows into the die cavity. The major advantages of MIDAS over conventional liquid diecasting are the avoidance of air and gas entrapment and

reduction in casting shrinkage. These provide pore-free and heat-treatable castings with greater cast-to-size accuracy, and cycle times are the same as in pressure diecasting.

The first commercial exploitation of MIDAS will be in the production of aluminium alloy bicycle cranks. The process is not restricted to aluminium alloys—copper, zinc and magnesium alloys can be treated in a similar way and there is potential to apply MIDAS to the semi-solid casting of high temperature alloys.

For further details contact Greville Brook, Fulmer Research Laboratories, or see MIDAS on our stand 5206 at Foundry International.

ENVIRONMENTALLY SAFE ANTI-FOULING PAINTS FOR SHIPS

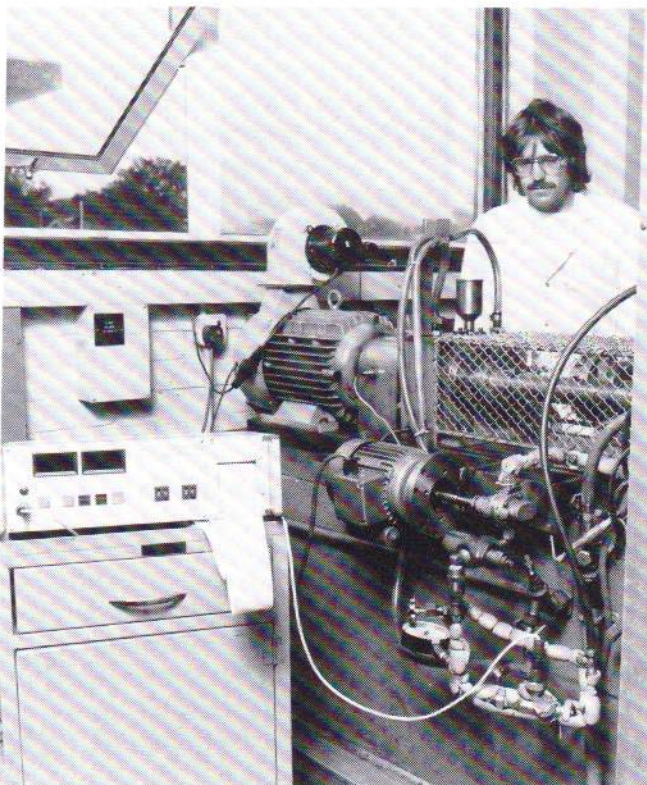
Anti-fouling paint systems are essential in marine technology. They are designed to inhibit the build up of marine organisms—such as barnacles, mussels, tubeworms, weed and algae—below the waterline on a vessel's hull, which increase resistance to movement of the hull, accentuate corrosion attack and raise noise levels.

The majority of anti-fouling paints incorporate toxic materials based on copper or organo-tin compounds. These act by poisoning the marine organisms, but they are not selective and may destroy inoffensive marine life.

Yarsley Technical Centre is preparing a programme aimed at finding alternative polymers and additives which will provide effective anti-fouling paint systems but which will be environmentally safe.

For further details please contact Geoff Newton at Yarsley Technical Centre.

ON-LINE WEAR DEBRIS MONITOR



Wear debris and abrasive contaminant in fuels and lubricants are causes of concern in the transport industries, reducing the life of machinery and, in extreme cases, leading to catastrophic failure.

Fulmer has developed a range of equipment which incorporates thin film intrusive sensors to provide continuous on-line monitoring of fluid condition, with rapid response to a change in system status. A number of major companies in the automotive, fuels and lubricants industries are evaluating Fulmer Wear Debris Monitors.

RHP Bearings Limited have incorporated a Fulmer device in their Bearing Failure Test Rig for angular contact bearings. B.P. Research Centre, at Sunbury-on-Thames, have been investigating the ability of a Fulmer device to detect wear debris and solid contaminants introduced into lubricating and engine oils.

These evaluation trials have shown that Fulmer Wear Debris Monitors signal correctly and provide advance warning of the build-up of significant concentrations of wear particles in the size range indicative of abnormal wear damage, and, also, readily detect the introduction of abrasive contaminants.

For further information, contact Ian Hunt, Fulmer Components Limited.

FULMER SETS THREE NEW RECORDS IN 1985

In 1985 Fulmer achieved record sales, record exports and record royalty and licence income. Worldwide sales of Fulmer's research, development, testing and consultancy services exceeded £4.9m and direct exports were 52% higher at just below £1m. Services for

British manufacturing industry provided 70% of Fulmer's income, which is the highest proportion among the U.K. contract research organisations.

These and the technological achievements made on behalf of our clients are described in our review

of 1985. Together with a new and expanding range of publicity material, our review provides details of the wide variety of contract services offered by the Fulmer group of companies. Literature is freely available on request. Contact Martin Moore at Fulmer Research Laboratories.

YARSLEY QUALITY ASSURED FIRMS: REGISTERED COMPANIES

YQAF has assessed the following companies and awarded them Certificates of Supplier Quality Management Systems:

Borden (UK) Limited, Industrial Products Division, Southampton.

Certificate No: 86/001; Assessment Standard: BS 5750: Part 1. Date Assessed: December 1985

Product Area Assessed: Research and development, manufacture and supply of formalin, synthetic resins, adhesives, putties, sealants and soil grouting for the woodworking, packaging, foundry and engineering trades.

Protim Services Limited, Birmingham, Bradford, Cambridge, Darlington, Exeter, Gateshead, Grangemouth, Hayes, Manchester, Newport, Southampton, and Welling.

Certificate Nos: 86/002 to 86/014; Assessment Standard: BS 5750: Part 2.

Date Assessed: January 1986

Product Area Assessed: The in-situ treatment, eradication and repair of insect and fungal attack to timber, the treatment of rising damp, the application of underground water proofing and the carrying out of associated building works.

Tyfoam Group Limited, Swansea.

Certificate No: 86/015; Assessment Standard: BS 5750: Part 2. Date Assessed: January 1986

Product Area Assessed: Installation of cavity wall stabilisation and insulation systems.

Durapipe - Glynwed Tubes and Fittings Limited, Cannock.

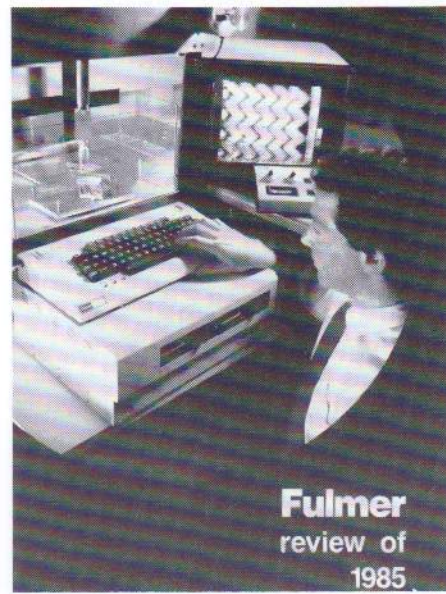
Certificate No: 86/016; Assessment Standard: BS 5750: Part 1. Date Assessed: May 1986

Product Area Assessed: Design and manufacture of plastic pipes and fittings.

Borden (UK) Limited, Bury

Certificate No: 86/017; Assessment Standard: BS 5750: Part 2. Date Assessed: May 1986

Product Area Assessed: Manufacture, approval and dispatch of hot melt systems, natural glues, adhesives and hardeners.



FULMER ON SHOW

Fulmer and Yarsley staff will be manning our stands at the following exhibitions during the latter part of this year:

Foundry 86 International, NEC, Birmingham—1st to 5th September.

Electronics in Engineering Design, NEC, Birmingham, 23rd to 26th September.

PEMEC 86, NEC, Birmingham, 23rd to 26th September.

Adhesives, Sealants and Encapsulants 86, Kensington Exhibition Centre, London, 4th to 6th November.

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