

SINGAPORE

A Dynamic Experience

The photograph below typifies the dynamism of Singapore today, but it remains a fascinating island in which the new continues to co-exist with the old.



Singapore River

Having successfully developed as one of the world's leading trading, financial, and communications centres, Singapore is now turning its attention to the development of a thriving manufacturing industry. The power house in the development of the Singapore manufacturing industry is the Economic Development Board, EDB. Speaking at the official opening of Fulmer's newest subsidiary company, Fulmer Research and Development (Singapore) Pte. Ltd., Dr. Vincent Yip of the EDB described ways in which investment in R and D is being encouraged in order to stimulate the development of high value added products. Various subsidies are available, and as a local company Fulmer Research and Development (Singapore) Pte. Ltd. qualifies for grants under many of the schemes.

The second speaker at the official opening was Fulmer Research Institute's Managing Director, Dr. W.E. Duckworth, who is the joint Chairman

of the new company with Fulmer's local partner Mr. F.W. Kam. In his talk Dr. Duckworth gave numerous examples of how Fulmer has worked with companies throughout the world to develop new products, particularly where an innovative science-based approach was required.

Following this, staff of the new company described the services available. Dave Foreman, the General Manager, was previously Manager of the Polymer Engineering Division of Fulmer's Yarsley Technical Centre. He is a very experienced polymer engineer with specific expertise in polymer product design and development, and injection mould design. The Laboratory Manager, Dennis Baxter, who was a member of the Fulmer Technical Services team, is a metallurgist with particular experience in non-ferrous alloys for the aerospace industry.

The comprehensive range of mechanical testing equipment available to the Fulmer laboratories includes an Instron tensile testing machine, a Vickers hardness tester, metallographic facilities, and the basic requirements for metallurgical failure analysis. Computer facilities have also been installed for computer-aided mould design analysis.

As well as assisting with the R and D requirements of local companies, Fulmer Research and Development (Singapore) Pte. Ltd. can also advise foreign companies who are considering possible investment in manufacturing facilities in Singapore. Through the EDB, the Singapore Government has been very successful in attracting high technology companies from North America and Europe to set up manufacturing operations. Fulmer Research and Development (Singapore) Pte. Ltd. will be pleased to offer on-the-spot advice to companies who are considering such an investment.

For further information:

Mr. M. A. P. Dewey at
Fulmer Research Institute Ltd.

Mr. D. C. Foreman at
Fulmer Research & Development
(Singapore) Pte. Ltd.

FULMER AND COMPOSITES

As long ago as 1948, the Yarsley Research division of Fulmer began studying the properties and potentials of GRP composites and also the chemistry of the resin matrix. In those early days, the selection of resin and glass was very much a case of trial and error, since, for obvious reasons, there was no long-term factual data available, and consequently there were the successful and the not-so-successful applications.

Today, the composites "industry" is a specialist industry in every sense of the word, embracing a wide range of materials and reinforcements requiring specialised know-how in order to avoid failures in the monetary and functional senses. The textbook is no substitute for practical experience in any profession, and this fact of life is particularly pertinent in the GRP sector where hand lay-up of composite structures is still undertaken on a large scale.

The Fulmer — Yarsley expertise in GRP is unique in that it covers every facet associated with such structures including —

- resin chemistry;
- selection of reinforcement;
- the design of new concepts;
- advice on the serviceability of existing structures;
- the testing of structures to Standards or to realistic service conditions;
- the role of expert witness in cases involving litigation.

All this experience is brought together in the collective sense in the Fulmer Composites Committee, formed several years ago and made up of chemists, technologists, physicists, etc. all of whom have been practically involved with GRP or FRP for many years. Much of the work carried out — both governmental and industrial — is of a strictly confidential nature, but some interesting projects of an unclassified nature can be mentioned, such as for example the GRP roof for Bradford market where the Yarsley Technical Centre was closely involved from the initial design stage. A similar project is currently under way in Keighley. The revolutionary design concept for the roof of the Covent Garden market involved us in a long-term programme to prove its structural viability under adverse weather conditions, which involved the simulation of rain, snow, and the associated problems of snow in terms of weight on the large unsupported GRP panels.

One area where we are regularly involved in our role as expert witness is in the failure of GRP public swimming baths and pools where it often requires very detailed and careful analysis to determine the exact cause of the failure and to apportion blame in a court of Law. Osmotic pressure has been the cause of a number of failures where delamination of the gel coat has occurred.

The yacht and boat industry has also called upon our services to advise on new and sometimes radical design configurations based upon GRP. The importance of sound and sensible advice in GRP technology cannot be over stressed, particularly in the case of projects involving public money; a local authority for example who has a swimming pool built which is below specification is unlikely to view GRP in future with anything but caution and distain if and when an expensive failure occurs. The greatest stress must be placed on the need to consult at the design stage, in terms of material and structural optimisation. In so many case histories it is evident that a good deal of money could have been saved — and indeed the good name of GRP upheld — if we had been consulted at the drawing board stage.

Further information: The Secretary
 Fulmer Composites Committee
 Fulmer Research Institute



ASBESTOS IN THE HOME AND ENVIRONMENT

This is the subject of a two-day conference to be held in Lambeth 16-17th December, at which senior local government officials, trade unionists and other interested groups will be discussing the problems of health and safety at work and the replacement of asbestos in the home and the environment.

Yarsley Technical Centre is very active in 'on site' monitoring of airborne asbestos, and will be demonstrating its mobile unit in the exhibition being staged in conjunction with the conference.

It was a television documentary on the health hazards of asbestos called "Alice — a fight for life" which focussed on Lambeth's position with regard to asbestos removal and replacement by non-toxic substitutes that prompted the Council to organise this conference on a National level.

With effect from January 1983, the control limit for asbestos in air will be as follows —

Crocidolite (blue asbestos)	0.2 fibres/ml
Chrysotile (white asbestos)	1.0 fibres/ml
Amosite (brown asbestos)	0.5 fibres/ml

The television programme had a profound effect on the number of enquiries received by Yarsley Technical Centre for 'on site' monitoring, particularly from companies engaged in stripping asbestos, but also from Trade Union organisations and Safety Officers associated with ageing factories and office blocks.

Yarsley Technical Centre is an Associate Member of the Asbestos Removal Contractors Association, and is experienced in carrying out surveys to identify the type of asbestos installed and advise on its removal.

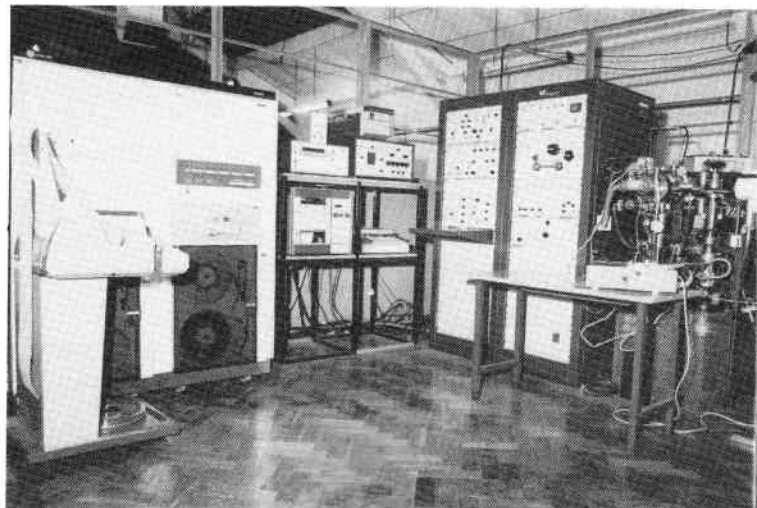
Further information: Mr. R. Bent
 Yarsley Technical Centre

APPOINTMENT FOR MR. BERRY

Mr. D.B.S. Berry of Yarsley Technical Centre has recently been appointed Chairman of the TECHNICAL ADVISORY GROUP OF THE ASSOCIATION OF BUILDING COMPONENT MANUFACTURERS in the U.K. Mr. Berry, a member of the Fulmer Composites Committee, specialises in the evaluation and testing of non-metallic materials including GRP.

GAS CHROMATOGRAPHY COUPLED MASS SPECTROMETER

Yarsley Research Laboratories has recently installed a Varian CH5 Mass Spectrometer coupled to a Pye 104 Gas Chromatograph. The recording, storage, and then interpretation of the spectra is simplified by attachment to a Varian SS-100 MS Data Processor.



The unit will enable the separation and identification of complex organic chemical mixtures whether they be gaseous, liquid, or solid. The acquisition will prove invaluable to both organic and analytical chemistry sections.

Further information: Dr. J. Jappy
Yarsley Research Laboratories

JOINT SCHEME FOR THE MANUFACTURE OF THE CEMENT & CONCRETE ASSOCIATION HOT BOX

Yarsley Technical Centre and Wexham Developments Ltd. are collaborating in the construction of the guarded Hot Box as developed by the Cement & Concrete Association.

This is used in determining the thermal transmittance (U-value) and conductance (C-value) of masonry and other materials on test specimens measuring up to 2.1 metres square.

All vertically mounted building components and structures can be tested, including those of conventional concrete and brick construction, reinforced composite panels, glazing systems, or roller shutters. The boxes may also be used horizontally to measure floors and ceiling constructions.

The design is based on ASTM C236, and is expected to meet the design criteria of BS.874 which is currently under revision. Special attention has been given in the design to the ease of operation to obtain optimum accuracy of measurement. This includes providing automatic temperature control of the guard space to provide temperature equality between inside and outside of the metering box to within 0.01K. Inside the metering box uniform air circulation is obtained using variable speed fans (with the heat contribution of the fans taken into account), so that different surface coefficients may be obtained.

The prototype apparatus has been in use at the Cement & Concrete Association for years. It has proved to be easy to operate and produces results on standard reference materials which agree very well with expected values.

Two boxes are currently being built and one of these is for use at Yarsley Technical Centre to provide facilities for an independent service.

Further information: Mr. R.N. Trubshaw
Yarsley Technical Centre

Reference was made in Fulmer Newsletter No. 47 to the SAFETY IN TOYS report in the course of preparation by Yarsley Research Laboratories. This will be published in December at a cost of £55 per copy. A discount, however, is being offered to recipients of the Fulmer Newsletter, and the report will be available at the reduced price of £45 in respect of any orders received to the end of December 1982.

The text discusses the current requirements in terms of safety with respect to materials and design within the W. European sector, giving abstracts from current or proposed legislative documents by way of examples.

Considerable emphasis is placed on the role of plastics in the toy industry since these materials have provided the toy maker with far greater scope in terms of design and production methods. Nevertheless, it is true to say that plastics, generally speaking are still an unknown quantity to the majority of people, and whilst the major manufacturers are producing toys to a very high safety standard, some imported goods are very much at the other end of the spectrum. This can put the shopkeeper, in his materials' ignorance, in an onerous position vis-a-vis negligence in cases of child injury.

SAFETY IN TOYS is an emotive subject, and one that is thwart with complexities when trying to apportion blame or responsibility; how much responsibility for example should be loaded directly on the parental shoulders? how much on the shopkeeper? how much on the manufacturer?

Many of the Regulations refer to minimum ages of children in relation to certain types of toys; again, how can one generalise in the difference between, say, a 4 year old and a 5 year old in terms of "safe and not-safe"? Finally, with the advent of so many sophisticated electronic toys and the associated hazards of electrics, who would be brave enough to clearly define what is a child or minor today? It all depends on whether you are talking about a) riding half-fare on the bus, b) drinking in pubs, c) watching adult films, d) voting for government, e) riding a motor cycle, f) the right to leave school, g) the right to marry, etc. etc. etc.

In our report we have endeavoured to draw a "line through the points" and give a common sense appraisal of the subject along with the requirements of official regulations, codes of practice and the like.

Further information: Mr. J.A. Shelton
Yarsley Research Laboratories

JAPANESE VTR STUDY REPORTS

The DJK Management Service Group in Tokyo has prepared three in-depth study reports on selected Japanese VTR equipment. According to DJK, some 13 million units will be produced in Japan this year. The current trend is now biased towards the portable types with built-in camera.

The top 7 companies produce around 90% of the total systems with the remainder shared between 10-15 companies. About 20% of this production is of the portable type, although in the case of Hitachi the figure is around 40%. At the present time a number of Japanese companies are standardising VTR models with an 8mm camera using a 1/4 inch tape. This standardisation is expected to aid the growth prospects for VTR in the domestic section which, in Japan, accounts for only 0.4% at the present time; some 90% of Japanese production being exported. The domestic market requires models with built-in camera function, and this trend necessitates the use of light-weight and energy saving electronic circuitry, miniature motors and chassis, and the use of plastics components wherever possible.

These reports give detailed descriptions of individual components within each system, and a useful feature of the reports are the comments made by DJK on likely alternative materials for the manufacture of component parts. The reports are sub-divided into "Plastics Materials Edition" and "Electronic Materials Edition", and cost between \$700 and \$1,950. Fulmer, through its association with DJK in Tokyo, is undertaking the sale of these reports within Europe.

Further information: Mr. W. Flavell
Yarsley Research Laboratories

YTEC COMPUTERISES ITS IFWIM

The Instrumented Falling Weight Impact Machine (IFWIM) developed and manufactured by Yarsley Technical Centre has, in the six months since its launch, been very enthusiastically received by many different sectors of the plastics industry. This response has justified the commissioning of a computer programme which greatly reduces the time and effort needed to interpret and quantify the considerable amounts of data on impact properties which are produced from each test. The software runs on a Commodore PET 4032 and enables the print-out of the following data:

Energy at yield
Energy at break
Total energy absorbed
Load at yield
Load at break
Deflection at yield
Deflection at break
Total deflection
Stiffness
Type of failure

The programme makes the statistical analysis of a series of test results a simple exercise which can be adapted to individual needs.

All this information can provide insights which are difficult to obtain by conventional techniques into the performance of existing or novel materials or the products made from them. Either standard test specimens or complete products can be tested, and therefore this method has relevance to all stages of development, approval testing and quality control.

Yarsley are able to carry out confidential and independent testing for interested companies or can supply all relevant apparatus.

Further information: Mr. R.N. Trubshaw
Yarsley Technical Centre

EVALUATING THERMAL PROPERTIES OF BUILDING MATERIALS

The Department of Thermal Conductivity and Electrical Testing at Yarsley Technical Centre is now providing a further service to manufacturers of building insulation products.

Computer determination of various thermal properties, such as thermal transmittance (U-value) and predictions of interstitial condensation can be carried out in accordance with guidelines such as CIBS Guide A3 and A10, and BS 5250:1975.

Manufacturers can use this data to determine if their structures comply with the new Building Regulations issued in April 1982, which call for the minimum U-value of walls to be 0.6 W/mK, or to assist generally in the assessment of proposed designs.

However, this service not only enables companies to have calculations carried out, but additionally enables Yarsley expertise in testing and evaluating building insulation products to be of assistance in establishing the most effective approaches to design and manufacture.

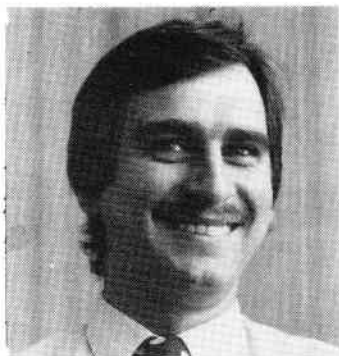
Further information: Mr. P. Bell
Yarsley Technical Centre

PROJECT PLANNING AND CONTROL FOR RESEARCH MANAGERS

Further seminars on this subject will be held in the Spring and Autumn of 1983.

Further details from: Mr. D.G.S. Davies
Fulmer Research Laboratories

New Faces

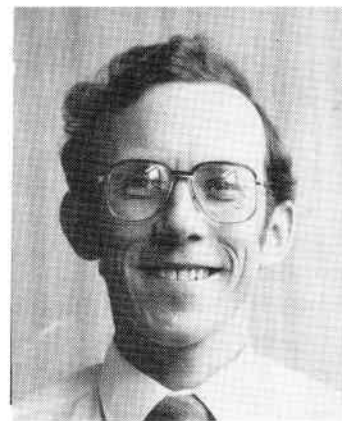


PAUL BELL

Previously at the University of Salford as a Research Assistant in the Department of Applied Acoustics, Paul has recently joined Yarsley Technical Centre to work in the Thermal Conductivity section. For the last four years he has been researching into the effects of moisture on building insulation structures.

JOHN HODGES

John Hodges has joined the Test Development section at Yarsley Technical Centre. He comes from Babcock-Woodall-Duckham, where he spent over 30 years in the Analytical Chemistry laboratories. His expertise ranges from the analysis of constructional materials to chemical plant corrosion and pollution problems, and also on-site investigation and pilot plant development work.



MIKE CHRISTIE

Mike, who is in the Mechanical & Physical Testing Division at Yarsley Technical Centre, has over 10 years experience in the mechanical properties of thermo-plastics. He has an Honours Degree in Mechanical/Production Engineering and was previously at the Cranfield College of Technology

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