



# UPDATE

Summer 1989  
Building Industry Issue

The Newsletter of  
Fulmer Limited

## FIRE-RATED CURTAIN WALLS FOR BROADGATE

**The Scheldebouw curtain walling system which clads the £75-million Broadgate Phase 11 development in the City of London has been assessed for one-hour fire performance by Fulmer Yarsley.**

This is unusual because curtain walls are not normally fire rated. But the spectacular building which straddles railway lines at Liverpool Street Station is far from usual in many ways.

In this case, two great structural steel arches stand 1.5 metres clear of cladding at the building's front and rear. As these are important architectural features it was decided to incorporate one-hour fire performance in the walling behind rather than protect them and reduce aesthetic appeal.

The assessment was carried out on behalf of De Schelde, the Dutch curtain wall contractor.

It covered the fire resistance of both the panelling and the glazing, plus the effects of thermal expansion by the panels, firestopping where steelwork penetrates cladding, and radiation reduction by glazing.



Following a programme of intensive desk studies in summer 1988, Fulmer Yarsley's Fire Testing Department reported that the curtain walls would, if tested, retain integrity as defined in BS 476: Part 20: 1987 for at least an hour. The only design changes needed were modified sliding pin fixings on main and spandrel panels to compensate for thermally-induced stresses. Furnace tests carried out on twin

sheets of 8mm thick Pyroswiss glass showed that the selected double-glazing met British Standards and would at least halve any heat radiated through window apertures for one hour.

When completed in May 1990, Broadgate Phase 11 will stand ten storeys high and provide 55,000m<sup>2</sup> of accommodation.



## MANUFACTURERS WARY OF NEW VALVE TESTS



A new more stringent BSI fire test for valves used by the petroleum and petrochemical industries is being treated with great caution by British manufacturers, reports Sean Mimmagh who runs Fulmer Yarsley's valve and pipe testing laboratory.

"It appears that each company is waiting for a competitor to put an existing valve range through the new fire type-tests before deciding whether to submit its own products or redesign them first", says Sean.

Although Fulmer Yarsley has been equipped for the new specification for many months, manufacturers are still more interested in testing to the 1974 standard BS 5146:Part 2. The test laid down in BS 6755:Part 2:1987 is

aimed at soft-seated ball, plug and butterfly valves. It is being phased in over three years up to August 1990 when it will take over totally from the 15 year old standard.

Another problem is that only two or three independent labs in the UK can perform the new test which -- like the American API 6FA standard -- subjects valves to higher temperatures and pressures than previously required but accepts a higher leakage rate.

"The fact that BSI is now publishing a regular valve register proves that users and specifiers are keen to learn which products have been independently fire tested", says Sean.

## DESIGN SERVICES FOR THE CONSTRUCTION INDUSTRY

Fulmer Yarsley has recently installed a Computervision personal designer CAD (Computer Aided Design) system, so further enhancing its advanced design capabilities.

In the area of plastics injection moulding, the CAD system will enable rapid design of products with the facility to link to the proven Moldflow package. This uses computer models to optimise the proposed design for injection moulding.

Product design is optimised and the client is able to see a detailed picture of the product before a mould or drawing has been produced. Complex shapes can be visualised in 3D, and can be rotated and viewed from any angle.

In addition to the Computervision CAD software, Fulmer Yarsley has also acquired the COSMOS suite of finite element programmes to enable design analysis to be carried out. This is to support development programmes in the novel uses of new materials.

Identical work stations have been installed at Fulmer Yarsley's sister company, Fulmer Research at Stoke Poges. Designers can cross-check layouts and calculations, providing a commitment to quality in design. Dr Eric Duckworth, Managing Director of the Fulmer Group, says "the purchase of this CAD system last year underlines our commitment to support our clients within the Building Industry right the way through the development path from initial concept to final design".

## FULMER INTRODUCES NEW TOXICITY TESTING SERVICE FOR TOYS

The toxicity testing service provided by Fulmer Yarsley's Analytical Section has been updated to comply with new European regulations on the levels of toxic heavy metals in toys.

Users of this service will be trading standards officers and consumer watch bodies, as well as manufacturers, importers and retailers whose products must meet the new stringent standards.

Sample analysis is quick, accurate and economic, using a combination of plasma emission spectroscopy (PES) and ion chromatography for the detection of heavy metals. PES cuts sampling time by 30 per cent as it simultaneously analyses for seven listed metals.

Testing at the Redhill laboratory costs £120 per sample with reductions on bulk orders.





## FIRE TEST SURPRISES ARCHITECTS

Panels of Pyrok Five Star, a cement-bonded particle board, are now challenging blockwork walls after a successful series of tests at Fulmer Yarsley's NAMAS-approved Fire Test Laboratory.

The aim was to prove that Pyrok Class 'O' boards are suitable for a major commercial development where non-load bearing partitions six-metre high are specified and fire compartmentation is essential.

Partition panels were constructed to various designs by Pyrok Building Products of Highbridge, Somerset. These were tested for fire resistance to BS476:Part 22:1987 in a three-metre square furnace at Fulmer Yarsley's Redhill laboratory.



"Fire-resistance grading is measured by the time a panel continues to satisfy certain criteria", reports Niall Rowan, head of fire testing. "We monitor for structural failure, passage of flame or hot gases, and excessive temperature rise on the unexposed face of a panel as measured by thermocouples."

Four-hour resistance was achieved by a panel made of 18mm Pyrok on either side of a lightweight steel frame, with an extra layer of 12mm Pyrok sandwiched on both faces. The panel had 18mm board fillets and was filled with mineral wool.

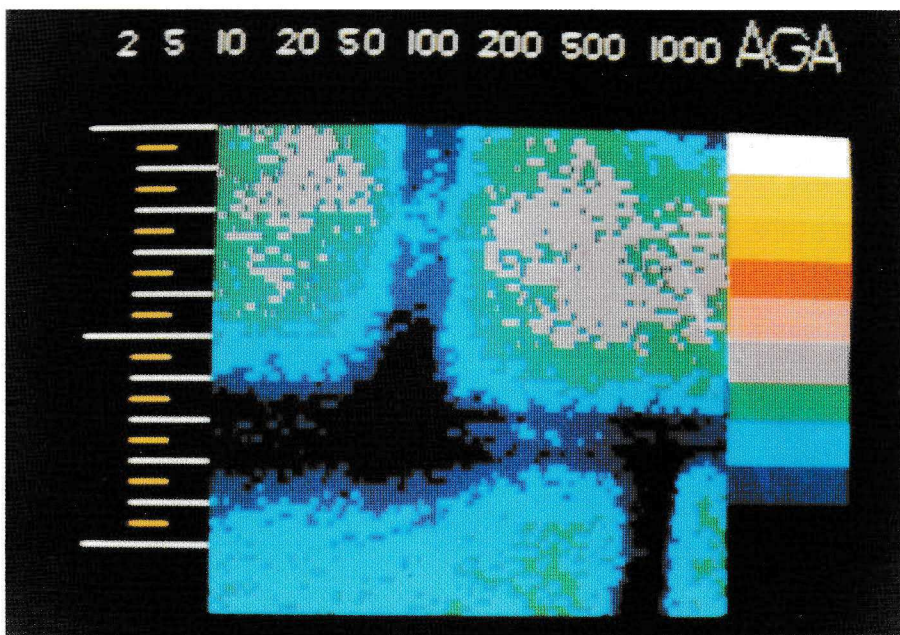
"When we turned the furnace off after four-and-a-half hours the panel was still meeting requirements with no signs of impending failure", says Niall.

A two-hour fire grading was reached earlier in the test series using 16mm Pyrok on either side of a steel frame filled with mineral wool.

"This result so surprised architects, contractors and fire consultants that we re-ran the two-hour test with their representatives as witnesses", he says.

## CUTTING HEAT LOSS IN BUILDINGS

Tests show that traditional mortar joints increase heat loss through low-conductivity blockwork by a staggering 26 per cent. But this figure can be cut to only eight per cent by using insulating mortar.



Thermogram of 125 mm thick block wall built from autoclaved aerated concrete with 10 mm mortar joints

Tests carried out at Fulmer Yarsley's thermal laboratories in Redhill, prove that mortar joints must always be considered when calculating the thermal properties of a building. Although recommended in the 1980 CIBSE guide, this is widely ignored because the significance of thermal bridging -- especially in blockwork walls -- is not fully appreciated.

The insulating properties of jointing materials will be a prime factor in meeting the new draft building regulations on thermal performance. These set a U-value (thermal transmittance) for walls of  $0.45\text{W/m}^2\text{K}$  which together with other measures should reduce domestic heating bills by 20 per cent.

To achieve this with two-leaf brick and blockwork structures with clear cavities means relying heavily on low energy autoclaved aerated concrete (AAC) blocks. But, as standard 1:1:6 (cement: lime:sand) mortar is such a poor insulator in comparison to AAC, either the jointing medium must be changed or blocks

made considerably larger to reduce mortar area -- or both.

Says Derek Berry, head of Fulmer Yarsley's Building Division: "Whichever route is chosen, traditional design and building practices must be reconsidered if the recommended U-value is to be met. Otherwise Swedish-style chalets with very little wet construction will become the norm."

AC blockwork panels were tested to British Standard methods using three types of joint: 10mm of standard 1:1:6 mortar; 10mm of Tilcon Limelite insulating mortar which contains crushed perlite instead of sand; and glued with a 1mm layer of polyurethane aerosol foam.

Results showed the standard mortar panel had a U-value of  $1.043\text{W/m}^2\text{K}$ , compared with  $0.916\text{W/m}^2\text{K}$  for the Tilcon Limelite jointed panel and  $0.862\text{W/m}^2\text{K}$  for the glued panel.

## SHELL ACQUIRES ALL OF YARSLEY FLUOROchemicals

Shell has bought the outstanding 50 percent of Yarsley Fluorochemicals that it does not already own in an effort to become a major player in the fluorine chemicals market.

Yarsley Fluorochemicals was formed last year as a 50:50 joint venture between Fulmer Yarsley and Synthetic Chemicals (SCL), a subsidiary of Shell Chemicals UK.

Yarsley Fluorochemicals makes about 600 fluorine chemicals in kilo quantities in the

UK. But with demand for the products growing the group is building a £1m pilot plant for the production of 100 kilo quantities at SCL's Four Ashes site in the UK. The more successful products may be taken to the multi ton scale.



# ROLLING LOAD TESTS PROVE VALUE OF SOFT WHEELS

**"Heavy rolling loads, such as loaded trolleys and American-style mail mobiles guided by underfloor wire, greatly accelerate the wear on platform floors", says Derek Berry, head of Fulmer Yarsley's Building Division.**



*This linear rolling rig has been constructed to carry out investigations into platform floors at Yarsley's Redhill laboratory. Here the rig tests a sample floor of four 600 mm by 600 mm panels plus two half panels*

Berry's comments are based on the findings of a research project carried out in the company's Redhill laboratories.

It showed hard nylon wheels are far more liable to cause damage than more flexible polyurethane ones with cast-iron hubs. Also that main access routes and doorway or lift thresholds need careful attention -- especially if cut floor panels are used.

The tests were carried out on Fulmer Yarsley's linear rolling rig. It takes a sample floor of four 600mm-square panels plus two half panels, all supported on their pedestals.

A pair of pneumatically-loaded wheels in tandem runs to-and-fro along the surface at 27m/min (1mph) to simulate trolley movement. The panels are regularly examined and any bow or indentation is measured.

Ten medium grade platform flooring systems -- under PSA MOB 08-801 classification -- were tested using a 3kN load on each of two hard nylon wheels measuring 150mm by 38mm.

The test showed up variations in quality in one run. One panel failed in less than 100 passes but a similar panel of the same brand survived 4000. Panels from different manufacturers also showed different performances. Some survived over 60,000 passes, although they were badly deteriorated.

Four brands were also tested at 1.5kN and 4.5kN to show clearly the effects of wheel loads on floor life. All full panels survived over 100,000 passes at 1.5kN and some were still usable after 170,000.

With 4.5kN load one half panel had to be changed at 12 passes. Another make of full panel delaminated at 100 passes, and no system survived 14,000.

To clarify the importance of 'footprint' load, polyurethane tyred wheels with cast-iron hubs were used to retest five types of panel at 3kN. These panels lasted three to seven times longer under the soft tyred wheel than the hard nylon type.

These results suggest it is more economical to fit softer or wider wheels to spread the load than to replace damaged floor panels, or pay more for an upgraded floor system.

Medium-grade flooring systems should withstand heavy office equipment. They are used for offices, data preparation rooms, educational accommodation, and public areas.

"The fact that their ability to withstand dynamic loads varies so greatly suggests that a separate specification must be included in any Eurostandard to cover these conditions" says Derek Berry.

## FIRESAFE EXHIBITION AT OLYMPIA A GREAT SUCCESS

Fire performance testing, smoke and toxicity, and consultancy services in readiness for 1992 were highlighted by Fulmer Yarsley on its stand at Firesafe 89, the passive fire defence exhibition.

Held at Olympia in June, this new event proved to be a good venue for promoting the company's Fire Test Laboratory in view of its £1/4 million investment programme in furnaces and calorimeters for testing to harmonised European standards.

Barry Holland, Marketing Manager, reported that in spite of one or two setbacks such as the rail strike, the throughput of visitors was considerably in excess of what was expected. To attract visitors, Fulmer raffled a 14 inch colour television which proved to be a great success. The quality of visitors to the stand was not in the least impaired by this strategy.

Fulmer Yarsley is a NAMAS-approved laboratory with nearly 20 years' specialist experience in the fire field.

It is particularly skilled in testing building materials and components, furnishings and aircraft interiors, valves and pipes for the petrochemical industry, and marine equipment for Lloyd's, DNV or DTI approval.

Much work on smoke density determination and toxic combustion product analysis involves the safety of passenger vehicles. It also carries out on-site inspections of fire resistant structures and investigates the causes of fires and explosions for insurance purposes.





# BRIGGS AMASCO CERTIFIED



*Briggs Amasco provided most of the building envelope of the New Daily Telegraph printing and publishing works on the Isle of Dogs, London. A combined total of 23000 square metres of roofing and cladding was originally carried out with further extension work continuing*

Registration to BS 5750:Part 1/EN 29001/ISO 9001, carried out by Yarsley Quality Assured Firms Ltd has been announced for all Briggs Amasco regional offices and branches. This company is Britain's largest roofing and cladding contractor and part of the Tarmac Group.

Registration involved the assessment of office and site activities at 30 locations throughout UK and Eire. It provides recognition of the well established reputation

that the company has for quality. One of the company's many strengths is it's ability to handle a wide range of contracts of different size and complexity ranging from domestic premises to large commercial and industrial projects. Its head office at Dorking, Surrey, provides centralised purchasing, technical and marketing services as well as personnel and training functions for all branches.

Briggs Amasco's quality management ef-

forts are led by Dr Barry Jackson who is a Fellow of the Institute of Quality Assurance.

"Briggs Amasco quality standards have always been high and registration will provide public recognition of this", he says. "The quality system will ensure that standards and client needs will continue to be met and market leadership maintained."

## STRENGTHENING OUR GREATEST ASSET

Two new research staff are adding strength to our teams at Stoke Poges. They are Jan Kowal, 29, and Calvin Prentice, 24.

JAN KOWAL is a physicist who will be splashing around in water developing measurement techniques for ultrasonic non-destructive testing. He holds a BSc in physics from Imperial College and an

MSc in biophysics and bioengineering from Birkbeck.

He joins us from Bestobell Mobrey where he was working on ultrasonics for industrial flow and level measurement. Prior to that he developed high performance cathode ray tubes for GEC.

CALVIN PRENTICE joins as a research investigator in the Chemistry and Com-

posites Division where he will work on ceramic fibre composites.

He was previously with Technicoat Limited where his research covered the chemical vapour infiltration of carbon-carbon deposits and production of chemical vapour deposition equipment. He holds a BA in natural sciences from Gonville and Caius, Cambridge.



**Fulmer****Group**

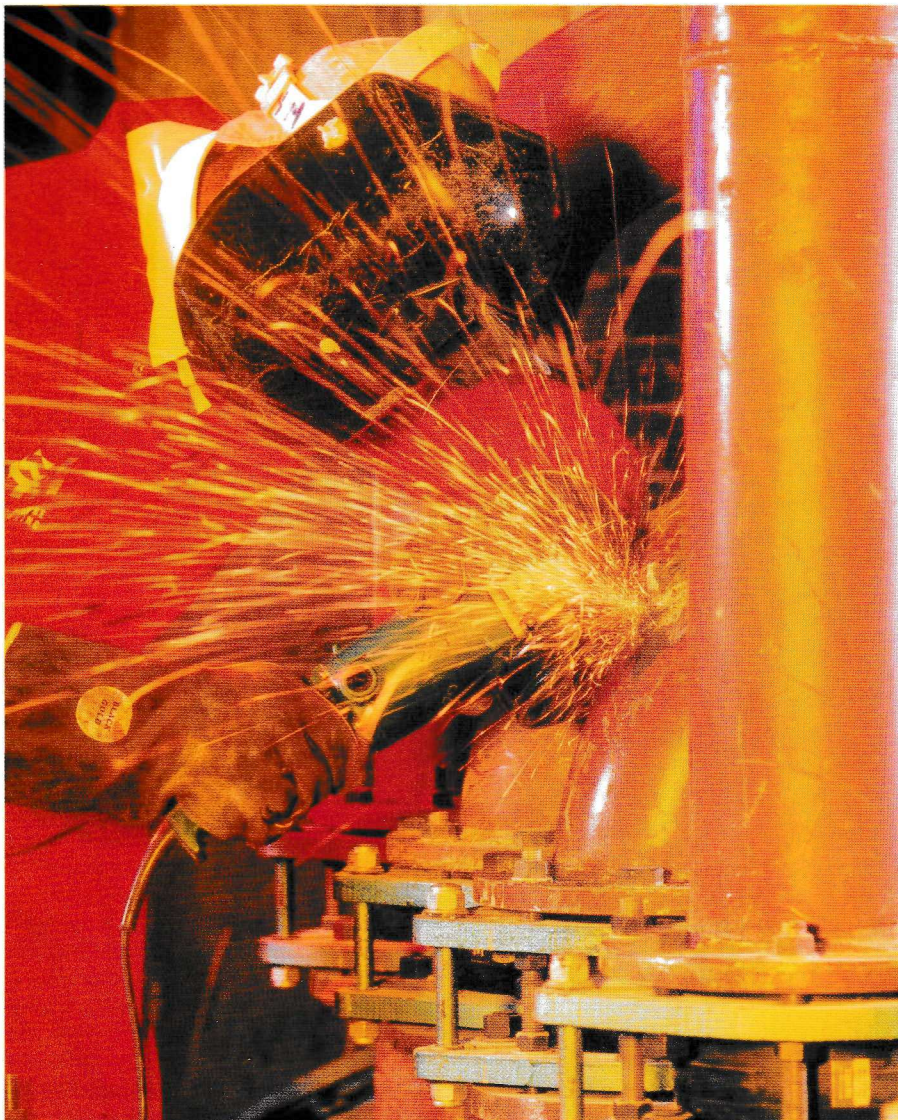
# UPDATE

## CROWN HOUSE ENGINEERING - A FIRST FOR SCOTLAND

The Quality Assurance Management System of Crown House Engineering Scottish Region has just been successfully assessed against the British Standard 5750 Part 1/ISO 9001 by Yarsley Quality Assured Firms Limited.

This is the first region of Crown House Engineering to achieve the qualification and one of the first multi-disciplinary companies within the building services industry to pass this third party assessment. The certificate of compliance includes the region's Glasgow, Edinburgh and Aberdeen offices.

Scottish regional director Archie Stark said, "Our efforts do not end with the certificate hanging on the wall. In addition to complying with our Quality Management System we are committed to continue to improve and develop established systems and for all our operating regions throughout the UK to be registered with an assessment capability."



### **Fulmer Limited - United Kingdom and International Offices**

#### **Fulmer Research Limited**

Stoke Poges, Slough SL2 4QD  
Tel. Slough (0753) 662181 Telex 849374  
Fax 0753 663178

#### **Fulmer Systems Limited**

Stoke Poges, Slough SL2 4QD  
Tel. Slough (0753) 662181 Telex 849374  
Fax 0753 663178

#### **Fulmer CVD Limited**

227 Berwick Ave., Slough SL1 4QT  
Tel. Slough (0753) 71356, Telex 849374

#### **Fulmer Yarsley Limited**

Trowers Way, Redhill, Surrey RH1 2JN  
Tel. Redhill (0737) 765070, Telex 8951511  
Fax 0737 761229

#### **Yarsley Quality Assured Firms Limited**

Trowers Way, Redhill, Surrey RH1 2JN  
Tel. Redhill (0737) 768445, Telex 8951511  
Fax 0737 761229

#### **Fulmer Singapore**

520 Balestier Road, Singapore 1232  
Tel. 01 065 2501082

#### **Fulmer Dyson**

PO Box 910, Englewood Cliffs, New Jersey  
07632, U.S.A.  
Tel. 01 01 201 5687023