

Open Day 1968 and the Whiskers Demonstration

I was very interested to read Geoff Hooper's articles in the Winter 2018 edition of Touchpaper. Unfortunately I have no recollection of the Open Day because I did not join ERDE until 1969, but I do have a copy of the Mintech ERDE leaflet 'Composites – The Right Material for Your Job?' that was one of a number produced for the occasion on a variety of topics. As its title suggests, the leaflet was part of an initiative to make industry more aware of the expertise and facilities available within the Establishment, as indeed were the Open Day itself and the ERDE brochure 'Research and Development Activities and Facilities' produced at about the same time. The leaflets and the brochure included advice on how to consult ERDE.

The leaflet on composites covers the displays at the Open Day as well as outlining ERDE's research and development work on materials reinforced with fibres and on the growth of ceramic

whiskers. The composite materials of interest included thermoplastics such as polypropylene and Nylon 6 reinforced with asbestos fibres graded to remove rock and dust, thermosetting resins based on epoxy or phenol formaldehyde reinforced with asbestos and other fibres, and aluminium alloys reinforced with ceramic whiskers such as silicon carbide.

Asbestos, the cheapest fibre, was of interest because of its good balance of mechanical properties, particularly stiffness and tensile strength, and was the subject of a research project aimed at improving these properties by treating the surface of the fibres. Other fibres such as carbon, and whiskers made from silicon carbide or silicon nitride were also being studied, and were candidates for use in more demanding applications. In some applications, properties such as the performance at high temperature could also be important. Silicon carbide whiskers, the best experimental fibres, were the subject of an intensive research project to produce them cheaply on a large scale as demonstrated at the Open Day by Exhibit 24.

The leaflet on composites does not give details of Exhibit 24, but it must be the one remembered by Allen Clarke's daughter Ann. Very probably, the exhibit included equipment similar to the 'Bran Tubs' used for the synthesis of silicon nitride that are illustrated on page 13 of the ERDE brochure. The 'Bran Tubs' were furnaces of various types with removable lids, and were capable of operating at temperatures up to about 1600 °C. A 'Bran Tub' would have looked like a vat when displayed with the lid removed.

Another exhibit (13) showed two methods for aligning fibres for use in applications where composites were required with high strength in a particular direction. Two other exhibits (16 and 25) displayed equipment for separating fibres according to their length. In practice, the longest fibres were used in thermosetting resins and the shorter fibres were used in light alloys and thermoplastics.

The stand at the Open Day also displayed some items made from composite materials. These included airframe structures and components of rocket motors made with fibre-reinforced thermosetting resins, and components made from metals reinforced with silicon carbide whiskers. RR58, an aluminium alloy used in the Concorde airliner, was one of the metals that ERDE had selected for development, and items made from reinforced RR58 formed part of the display.

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