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alloys - 'Whiskers'

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'Whiskers' may solve super-
sonic problem'

The Guardian

Friday June 14 1968.

New Booster for Skylark

'Whiskers' may solve supersonic problem

By ANTHONY TUCKER, our Science Correspondent

Fibre reinforced aluminium alloys of great potential importance to the aircraft industry are being made experimentally at the Explosives Research and Development Establishment (ERDE) of the Ministry of Technology at Waltham Abbey, Essex.

Design limitations of both airframes and engines are predominantly those of materials strength, and Concorde has been criticised because—unlike its proposed US rivals—it makes little use of titanium, a metal that is both stronger and capable of retaining strength at higher temperatures than aluminium. But titanium is also almost twice the weight of aluminium and although the US designs aim at much higher cruising speeds, they are already running into weight problems.

Encouraging results

If the ERDE research is successful, titanium is likely to be obsolete as a structural material before it can be brought into widespread use. Already small billets and plates of whisker reinforced aluminium have been made with strengths and tempera-

ture performance comparable to that of titanium. But, and this is the important point, they are only slightly more than half the weight.

There is a long road from laboratory experiment to commercial application, but ERDE has extensive experience in fibre reinforced work and the aluminium project has grown out of a highly successful investigation of asbestos reinforced plastics. The initial aluminium results are so encouraging that a pilot plant is to be built for the continuous production of silicon carbide whiskers.

The reduced cost of whiskers (whose crystalline perfection is the source of strength in composite materials of this kind) is crucial to commercial success, but the laboratory believes that neither costs nor problems of whisker alignment within the final material will prove to be major obstacles. Once the whisker plant is working—and since this involves the use of hydrogen at 1,500 degrees Centigrade it is best placed in an explosives skilled context—the establishment intends to investi-

gate the possibility of producing continuously rolled reinforced aluminium sheet. Such a material would be invaluable to aircraft of the generation after Concorde and in other forms could lead to higher permissible temperatures and higher performance in jet engines.

Open days

In many ways this work parallels that carried out by the Royal Aircraft Establishment at Farnborough and Rolls-Royce, which led to carbon reinforced plastics and to unprecedented commercial success in the United States. But there is no technical overlap. The common factor is that both represent work of industrial value being carried out at Government establishments, a point which explains why although materials research is a relatively small part of ERDE work, it has an important place in the establishment's first open days this week.

The main areas of research naturally lie in high explosives and propellants, for which the establishment is uniquely equipped with automatic remote

handling sites. The growing importance of propellants and the cost of these special application sites are together sufficient to scotch the vague recent rumours that this, the oldest of Britain's explosive research establishments, is about to close down. If, under the present review of Government establishments being undertaken by the Ministry some telescoping of explosive and propellant research is contemplated, it seems more likely that other establishments will be brought to this large site.

Open days do not reveal classified work and much at ERDE is classified. But one important item on show is a new and large booster for the British Scientific Sounding Rocket "Skylark." Although its specification is still secret its size suggests that it will enable "Skylark" to lift a payload of 150 kilogrammes to height of 350 kilometres. For stabilised astronomical experiments this would be a valuable improvement in performance and could give the rocket new potential in export markets. This is an area of research that is expanding rapidly and the "Skylark" stabilising equipment is still ahead of that of the rest of the world.

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