A REVIEW OF THE SCOPE FOR HIGH PERFORMANCE CONPOSITE PLASTICS MATERIALS WITHIN THE RAILWAY INDUSTRY

Potential applications for high performance fibre reinforced plastics (FRP) as lightweight structural materials are reviewed. Present use of FRP as structural materials is small in the railway industry, and is almost exclusively in the form of glass-reinforced plastics (GRP). Applications for composites based on carbon fibres (CFRP) and aramid fibres (ARP) are negligible, mainly as a result of the high material costs.

The economics of FRP are compared with aluminium in a simplified manner, which takes account of cost benefits arising from reduced fuel consumption as a result of lower mass. It is suggested that the high fibre costs will preclude the use of CFRP in the immediate future as a lightweight structural material *per se*, and the advantages of GRP are at best marginal. However, there is some evidence that ARP could be economically viable in a more intensively operated freight system such as "Speedlink". It is recommended that this possibility be investigated further.

A number of potential applications for ARP and AFRP have identified where their advantages could justify the high fibre costs. It is proposed that these areas, which include wheelsets, drive shafts and leaf springs, should be studied in detail.

Finally, it is recommended that the potential of carbon and aramid fibres in lower cost hybrid composites (i.e. in combination with GRP) should be investigated.

BR Research Report Ref: TN-PDV-1
Report Author(s): J Batchelor
Date of Publication: December 1977

AEAT Abstract Date:
23/05/2002