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Failure analysis of fiber reinforced plastics (FRPs) light pole

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In this study, failure analysis of light pole made of fiber reinforced plastics (FRPs) was investigated. The anisotropic properties of FRPs are advantageous in road accidents where these poles save valuable lives undergoing fragile failure. Chemical structure of FRPs light pole was studied using FT-IR. Samples of light pole were tested using dynamic mechanical analysis (DMA) and thermogravetric analysis (TGA) to study the viscoelastic and thermal stability properties respectively. Materials selection for wind load conditions was studied using Cambridge Engineering Selector (CES) program. FT-IR analysis refers to the presence of glass fiber, polyester (PE), natural fiber, coupling agent (N (beta-aminoethyl) gamma aminopropyltrimethoxy-silane). It is found that glass transition temperature (T_g) of PE composite is 76.2 oC as the peak of loss modulus using DMA. Weight percent of glass fiber represent 40% of the total FRPs according to TGA. CES software results showed that the glass fiber - PE composites are valid for light pole manufacture based on material index and wind load with safety factor 4. Delamination of FRPs was detected. This can be attributed to weak interfacial force among glass fiber and polyester in the presence of natural fiber. Hydrolytic breakdown of fiber matrix interface was formed due to presence of moisture (high humidity). This is led to loss in performance efficiency of light pole made of FRPs.

Biography

M Bassyouni has completed his PhD from Cairo University (Experimental work was carried out at TU-Clausthal-Germany) and Postdoctoral studies from TU-Clausthal, Germany. He is the Head of Chemical and Materials Engineering Department, King Abdulaziz University, Rabigh-Saudi Arabia. He has published more than 45 papers in reputed journals and conferences. He has co-authored two books. He has been serving as an Editorial Board Member of International Institute of Chemical, Biological and Environmental Engineering.

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