The composite material of fiberglass reinforcement using polyester resin or epoxy resin as matrix for train railway electric control panel box

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Abstract

Train railway electric control panel box is a metal box functioned as the protector of electric control panel which manage train detector signal from environmental disturbance and theft. Composite material has a good durability to weather changing, compressive strength, tensile strength and bending strength. To change from using metal material to composite material there has been done a research on the making of train railway electric control panel box using composite from reinforced fiberglass and polyester resin or epoxy resin as the matrix with small scale industry technology. The research are casting process, lay up, mixing between resins (varied on polyester and epoxy resin), fiberglass (varied MAT 200, WR 200 as much as 4 layers) and accelerator agent, curing temperature of 60°C, time 1 hour, vacuum 45 cm.Hg, pressure 3 bar, layer of fiber orientation (0°, 90°). Pressure is needed to manage and control fiber volume fraction, to decrease the possibility of void which is air or gas that are trap in the composite that could be the initial crack when it receive static weight. The best outcome from this research is the panel box product made from epoxy resin composite material with fiberglass mix of MAT200 and WR200 (experiment code E), The testing result: Bending strength 21.33 kg/mm², compressive strength 8.36 kg/mm² and tensile strength 6.69 kg/mm², in this condition WR200 helps to increase the mechanical strength test and MAT200 makes the production easier.

Keyword: Electric control panel box, composite, fiberglass, polyester resin, epoxy resin

Introduction

PT KAI’s metal made properties had been stolen a lot lately; the most stolen property is train railway control panel box. Train railway control panel box functioned as the cover of electric control panel that monitor train existence signal from environmental disturbance. To anticipate the stealing that been happening, we need to exchange the metal material property into composite based material, composite material has good resistance to weather change, tensile strength, pull strength, and good flexibility. From survey result, the demand on this train railway control panel box is high and we still have to import them. Due to the simplicity of making Composite material, this can be done by small scale industry and the material components are easy to get and the components prices are cheap (Suhardjo, 2009). We have done the research on The Composite Material of Fiberglass Reinforcement Using Polyester Resin or Epoxy Resin as Matrix for Train Railway Electric Control Panel Box. Manufacturing factors that have influences on the production result are polymer epoxy resin curing or