

ABSTRAC

HEAT RESISTANCE OF PHENOLIC MATRIX COMPOSITE WITH FLY ASH COAL AS AMPLIFIER

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Fly ash is the waste produced at coal combustion process, the amount is large enough to require management that does not cause environmental problems. Braking systems on trains require a brake canvas material that can be made using composites, waste fly ash as reinforcement composite. Operating temperature of the brake canvas that is up to 350°C, so the research for heat resistance of brake canvas is required. The purpose of this research was to determine the heat resistance of phenolic matrix composite with fly ash coal as amplifier.

Composites that are used is particle type of composite with ratio of phenolic resin of 50%, 60%, 70%, 80% as a matrix, BaSO₄ 10% as a filler, fly ash 40%, 30%, 20%, 10% as an amplifier. Research method conducted by mixing the composition (mixing) phenolic, BaSO₄ and fly ash for 10 minutes to obtain a homogeneous mixture, then heat up the composite totemperature of 250°C and pressed with pressure of 5 tons for 20 minutes. Once the suppression process is complete, continued with the curing process. In the curing process, composite specimen is heated using the furnace for 4 hours at temperature of 150°C. In this research the specimen was formed into powder. Thermogravimetric testing can be done.

Composite of 40% fly ash/Phenolic has the highest heat resistance and composite of 10% fly ash/Phenolic has low heat resistance. The early reduction between temperature of 100-150°C is the reduction of water vapor, the next phase in the temperature range 150-350°C is the weight reduction of the phenolic resin in the sample because the resin decomposition point range between 240-280°C. Last phase is the temperature of 350-1000°C where there is a reduction in phenolic resin that has not decomposed due to temperatures above 300°C phenol resin will burn back without going through the melting process. BaSO₄ ingredients do not experience weight loss because BaSO₄ has a decomposition point of 1580°C. Fly ash as a composite reinforcement has not undergone weight reduction because the liquid temperature is generally at 900-1600°C. The conclusion of this research is increasingly fly ash in the composite the higher the temperature of the heat resistance of the composite fly ash/phenolic.

Keywords: Composites, Fly ash/Phenolic, brake canvas, heat resistance.