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INVESTIGATION ON PRESTRESSED MONOBLOCK CONCRETE SLEEPER (PCS) SUBJECTED TO DYNAMIC LOADING OF THREE CAR SET

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By

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DECLARATION OF CANDIDATE

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This topic has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Under Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Rail transport has been one of the most important and popular transport modes in Malaysia especially in urban areas. Movement of train on a railway track can cause high vibration to railway sleeper due to many types of loading imposed on it especially dynamic loads. These loads will affect the behaviour of railway sleeper. The present railway sleeper should be able to absorb the stresses and vibration transmitted by the passing trains in serviceability limit state. Experimental laboratory method of Repeated Load Test by referring Australian Standard (AS 1085.14-2012) were conducted to determine the behaviour of prestressed monoblock concrete sleepers (PCS) under dynamic loading of three car set train and to compare the experimental data with the on-site data and also with data that was already available and relevant with PCS in Malaysia. Five hundred cycles of dynamic loading with frequency of 0.25Hz were applied on PCS. Data of deflections and strains were measured using SIRIUS Mini and strain gauge. The data then were analysed using DEWE software and Microsoft Excel. Data from in-situ testing at KTMB Pinang Tunggal, Seberang Perai Utara, Penang railway were collected and used to compare with experimental data. Behaviours of PCS were analysed in relationship of forces-cycle curve, load-strain curve, stress-strain curve, acceleration-time curve, load-deflection curve and deflection-time curve. The study has found that the PCS can sustain the dynamic load under its serviceability limit state.

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