A PROJECT REPORT SUBMITTED TO THE SCHOOL OF ENGINEERING IN PARTIAL FULFILMENT OF REQUIREMENTS FOR THE AWARD OF ADVANCED DIPLOMA IN CIVIL ENGINEERING

DYNAMIC ANALYSIS OF PRESTRESSED CONCRETE SLEEPERS (PCS)

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ABSTRACT.

The nature of dynamic loading causes variations of pressure distribution between sleepers and ballast, hence it contributes to a wide range of bending moment.

A train with a certain wheel load which runs at a certain speed imposes an external forces on the track. The means to withstand against this force is provided by the strength og track structure. The track structure forms a wheel running way, provide maintenance capacity and restoring the deformation and deterioration of the track.

At higher speed, higher frequency sleeper stress component developed on quasi-static responce due to dynamic force. This can lead to fairly high tensile stresses in sleepers and problems of concrete ties cracking. Thus analyses of dynamic load to prestressed concrete sleepers will be investigated under the positive bending moment test.

This report is to analyse by aid of ANSYS on the structural behavior of the prestressed Concrete Sleepers when it subjected to dynamic load at the rail seat.

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1.0 INTRODUCTION.

1.1 General.

The railway system in Malaysia has performed its role as a driving force for economic growth and modernization of the nation. The Malaysian railways started operating in 1881 with short lines connecting the interior to parts on the west coast. And by 1923 the through line from the Thailand border to Singapore was connected sucessfully. Nowdays the system totaled more than 1685 route kilometer of meter gauge track carries approximately seven million passenger and four million tonnes of freight per annum.

On going modernisation programmes include the replacement of absolute rolling stock, relaying of new track, installation of new signalling and telecomunication facilities and monorail system. As the decline in timber resources as meant that timber increased in price as its value for use by other industries has been appreciated, concrete sleeper will be needed.(See Figure 1.0 Malaysian Railway Map).

Sleepers in railway track perform two important function:-

i) hold the track to gauge.

ii) transmit and distribute the oncoming loads to the ballast underneath.