

TRACK FORCES FROM FREIGHT VEHICLES - CALCULATIONS FOR RIFTS

At the RIFTS (Railfreight Inter Functional Technical Subgroup) meeting on 17 October 1989 it was agreed to carry out a number of theoretical studies. These cover the calculation of dynamic vertical forces using the Vehicle Dynamics Unit computer program VAMPIRE and the derivation of track costs using the Track Research Unit mini-MARPAS program. This document describes the part of the work carried out by Vehicle Dynamics Unit, where a variety of different heavy axleload wagons were studied.

The conclusions are:

- The level of dynamic ride force generated by vehicles depends on the wavelength content of the track as well as on its roughness.
- The level of friction present in friction damped designs has a very significant effect on force levels.
- Experimental measurements generally confirm the theoretical calculations of forces.
- The two-axle vehicles studied are considerably worse in all situations than the bogie vehicles. Good suspensions are particularly beneficial for higher speeds and loads on good quality track.
- Forces often increase with speed, though not in a linear way.
- Dynamic forces do not always increase with axleload.
- The force levels generated are dependent on other parameters as well as bogie design. Care is therefore needed in comparing different types of vehicle.
- For the purposes of track damage calculations, a realistic range of track data is needed, together with an appropriately detailed vehicle model.