

END IMPACT COLLISIONS BETWEEN RAKES OF CRASHWORTHY VEHICLES

Previous work has developed an approach to a 'crashworthy' vehicle, where impact energy is absorbed by controlled deformation of the end parts of the vehicle, but was based on considerations of similar vehicles.

The dynamic effects of the impact between trains composed of rakes of 'crashworthy' vehicles have been studied with the aid of a simple non-linear dynamic model. The characteristics of the vehicles modelled have been based on simple analysis of the impacts of single vehicles. For impacts involving many vehicles, the following conclusions can be drawn:

- The behaviour (maximum forces and deformations) at lower speeds up to 8m/s is similar for single vehicles and for rakes of similar vehicles.
- At lower speeds energy is absorbed at many interfaces throughout the train, so confirming that the basing of the energy absorption characteristics on single vehicle impacts gives reasonably accurate values for vehicle rakes.
- At the highest speed, the interface deformations tend to be more concentrated so that more deformation occurs at the impact interface than a single vehicle impact would predict.

It is concluded that for moderate impact speeds, the single vehicle model previously proposed is adequate to be used in the design of crashworthy vehicles operating in rakes.