

AN EXPERIMENTAL INVESTIGATION INTO THE EFFECT OF TRAIN SHAPE ON THE UNSTEADY FLOWS GENERATED IN TUNNELS

The flows produced by three types of train running in a single and double track tunnel are described. The trains contrast markedly in shape and roughness. One train is a modern streamlined passenger train (High Speed Train, HST), one is a conventional passenger train of intermediate roughness and the other is an extremely rough and angular hopper wagon train for transporting coal. It is shown that, for a particular speed, distinct differences exist between the transient pressure and velocity histories.

Although the HST produces the smallest pressure during entry and generates the lowest levels of turbulence when passing a stationary point within each tunnel at a given speed, the largest pressure change generated within a 3s period appears to be largely independent of train shape.

To some extent the aerodynamic differences between each train are masked by differences in cross-sectional area. It is shown that the differences between the pressures generated at entry would be much larger if all the trains possessed the same cross-sectional area.