

THE EFFECTS OF TRAFFIC, TRACK CONDITIONS AND S&T ADJUSTMENTS ON THE STRAIN ENVIRONMENT OF POINT CLAMP LOCK COMPONENTS

Previous research assessed the effects of high speed traffic on the ultimate safety of point operating equipment, that is the risk of mechanical failures leading to facing points opening under traffic. This showed that whilst speed has an effect on the risk of fatigue failure, its influence was greatly over-shadowed by site related factors.

This report therefore investigates these factors and concludes that:

- Significant rail accelerations and clamp lock body strains are generated not only by wheel-rail impacts such as can occur at joints, but also by other mechanisms. As a consequence improving the geometry of the joint preceding the switch tip of a facing point may be of little benefit to the clamp lock. There are also major inter-site variations which cannot simply be attributed to differences in track quality, as normally assessed, or to vehicle parameters.
- A common feature of all the sites investigated was the occurrence of high rail accelerations and clamp lock body strains when a wheel was directly over the clamp lock.
- Heavy axle load freight at speeds up to 60mph is no more damaging to the clamp lock body than high speed (125mph) passenger traffic. Previous work indicates that running passenger traffic at 140mph would not significantly alter the situation.
- With the proviso that the mechanisms which give rise to clamp lock body strains are not fully understood, the test results generated by this programme indicate that the fatigue failure of a cast clamp lock body is unlikely.
- The magnitude of the strains in the lock arm are related to the track support conditions. Strains may sometimes be influenced by the tightness of the lock, but other factors have a greater effect.
- The test results indicate that lock arm strains in service can be sufficient to cause fatigue fractures within a relatively short time. However, this conclusion is based on estimates of the lock arm fatigue strength, and contrasts with service experience (no such failures have been reported).

It is recommended that the effects of light weld grinding and rail corrugation on accelerations should be investigated, and the fatigue strength of the lock arm should be determined experimentally.