

THE INTERACTION OF PANTOGRAPHS AND OVERHEAD EQUIPMENT - PRACTICAL APPLICATIONS OF A NEW THEORETICAL METHOD

This report describes a new approach to the understanding of the complex interaction of moving pantograph and overhead line. The objectives of this work have been to establish a prediction for capability for current collection performance assessment at the new project design stage, and to guide development of existing electrified routes where performance improvements are sought. BR's approach has broken new ground by combining new theoretical methods with careful validation experiments, and also by verification of the mathematical modelling at the subsystems stage.

The new theoretical approach is now complete enough to aid the design and development process, and has already indicated several interesting practical applications. These include uprating the speed potential of given overhead line equipment by improvements to pantograph design; greater use of multiple pantograph operation; and a simplified overhead system for secondary routes. Some of these developments have been demonstrated in service, while others are still at a formative stage.

This paper outlines the theoretical methods now used and illustrates some of the practical applications, explaining various problems that have been overcome, and developments that are planned. It also describes how some quite diverse activities have become inter-related to contribute to an overall increase in the understanding of a very complex problem. Above all, it shows that an improved theoretical method enables the pantograph and overhead to be considered more readily as one overall system.