A THEORETICAL MANUAL OF RAILWAY VEHICLE DYNAMICS - PART A: GENERAL INTRODUCTION

As advances have been made in various areas of the study of vehicle dynamics, practical tools have been developed which are now regularly used in the specification and assessment of vehicle designs. The requirement for a railway vehicle to be stable at high speed and for it to negotiate sharp curves without excessive wear on wheels and rails are conflicting. In many cases a compromise can be obtained for the particular situation and the ability to understand and predict vehicle behaviour is an essential part of this process.

Many reports have been published which deal with particular subjects such as derailment, curving, wear, or response to irregularities, but most of them assume a considerable amount of previous knowledge and it is difficult for a newcomer to the field of vehicle dynamics to obtain an introduction to the subject.

This report is intended to provide definitions of the basic concepts involved in vehicle dynamics and to present some of the equations governing various types of behaviour. Brief discussions are included of some particular areas (eg stability, curving, transient response) and the analysis methods used to investigate them. More detailed information on any particular subject may be obtained from the referenced reports.

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