DYNAMIC ANALYSIS OF A RAILWAY BOGIE

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1. INTRODUCTION

In the initial design phase, development of a new design of railway bogie equipped with two electric traction motor units and anti-vibration system must be checked for validity of the mechanical design. To this end, the static and dynamic behaviour of the bogies, including the car body connections from the driven electric train unit, have been simulated.

Numerical analysis was carried out with a complete ADAMS model of the electric train unit, which includes almost all features of bogies and contact modelling forces, in order to :

- calculate transient dynamic forces in the connections for mechanical resistance analysis and show possible coupling effects between rotational motions of transmission shafts and horizontal and vertical motions of bogies and car body.

- to investigate the influence of the primary stage anti-vibration system of the bogies and secondary soft car body anti-vibration system on their dynamic behaviour and estimate the dynamic residual forces exerted on the car body, for use in computational studies of vibrational comfort.

2. MODELLING OF THE CAR TRACTION UNIT

2.1. Dynamic model

The ADAMS model of the complete electric train traction unit was performed with a car body considered rigid. Two bogies and transmission shafts were modelled by rigid bodies connected to each other. All relevant parts, joints, linear and non-linear connections were accurately modelled by linear and non-linear springs or field forces .