

ANALYSIS OF THE STRESS STATE IN THE FRAME OF THE Y 25 CS BOGIE AT RUNNING IN CURVES

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Rezumat. Pentru compensarea forței centrifuge care acționează asupra vehiculelor feroviare în timpul circulației în curbe, la construcția liniilor de cale ferată se execută supralărgirea căii și supraînălțarea firului exterior. În prezenta lucrare analizăm influența vitezei de circulație în curbă cu raza de 500 m la un vagon Eacs echipat cu boghiuri Y25Cs, asupra tensiunilor din cadrele boghiurilor

Abstract. In order to compensate the centrifugal force that appears in railway vehicles during running in curves, overwidening of the track and superelevation of the external rail are executed. In this paper, we analyze the influence of the cruising speed on the stress state in the frames of the bogie, in a turn with a radius of 500 m of an Eacs car, equipped with Y25 Cs bogies.

Keywords: Y 25 Cs bogie, circulation in turn, stress, finite element analysis

1. Introduction

In order to diminish the effect of the centrifugal force that acts on the railway car in curves and to ease the entrance in a curve, the tracks are overelevated and overwidened. The lateral centrifugal acceleration of a vehicle when running in a curve is given by the equation [4]:

$$a = v^2 / R \quad (1)$$

where: v - the speed of the vehicle [m/s], R - radius of the curve [m].

In Figure 1 are depicted the accelerations that act on a vehicle which runs in a curve of radius “ R ” and superelevation “ h ” of the external rail. In such a case, the uncompensated value of the acceleration is given by the relationship [4]:

$$a_d = \frac{v^2}{R} - \frac{gh}{s} \quad (2)$$

The ideal case during running in a curve is the one when the uncompensated value of the acceleration is $a_d = 0$, and the resultant acceleration between $a = v^2 / R$ and gravity g is perpendicular to the track.

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