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Abstract

Frontal and side impacts are both important aspects in designing of a crashworthy high-speed train nose. Therefore a proper design should be considered both conditions and, compatibility should be made among the features that improve train nose crashworthiness under different accident situations at the same time. In order to achieve this goal according to aerodynamic rules there is not many options for changing the external shape of high-speed train nose therefore, a systematic study has been conducted to examine possible strategies to design crashworthy internal structure for the high-speed train nose that provide the best features under both frontal and side impact conditions. For this purpose, various multi-layer noses are studied and the best internal layer geometry is proposed. At the last step effects of foam usage in different spaces between internal and external layers of nose is shown.

Keywords

High-speed train nose, Frontal and side impact, Crashworthiness, Internal structure, Foam

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STUDY ON HIGH-SPEED TRAIN NOSE UNDER FRONTAL AND SIDE IMPACT

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Abstract: Frontal and side impacts are both important aspects in designing of a crashworthy high-speed train nose. Therefore a proper design should be considered both conditions and, compatibility should be made among the features that improve train nose crashworthiness under different accident situations at the same time. In order to achieve this goal according to aerodynamic rules there is not many options for changing the external shape of high-speed train nose therefore, a systematic study has been conducted to examine possible strategies to design crashworthy internal structure for the high-speed train nose that provide the best features under both frontal and side impact conditions. For this purpose, various multi-layer noses are studied and the best internal layer geometry is proposed. At the last step effects of foam usage in different spaces between internal and external layers of nose is shown.

Keywords: High-speed train nose, Frontal and side impact, Crashworthiness, Internal structure, Foam

1. Introduction

Rail vehicle crashworthiness analysis is a well-established branch within the passive safety area as a means of minimizing accident consequences on passengers and crew. This issue has a lot of interest in high-speed rail vehicle, with speeds in excess of 200 km/h. The potential for collisions at increased speeds has renewed concerns about passenger rail vehicle crashworthiness. Studies have been conducted to evaluate the effectiveness of alternative strategies for providing crashworthiness of the vehicle structures at increased collision speeds. This paper describes comparisons of proposed

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