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Passenger distribution versus a light rail vehicle running behavior

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Abstract: The paper deals with the influence of passenger distribution inside a multi section tram on its running behavior. Particular situations may contribute to an uneven distribution of passengers in the vehicle, such as a school trip packed in one car, occupying places mostly in air-conditioned section during summer time, some uncomfortable conditions repulsing people from one car to others or sitting place etc. Such behavior may change the carbodies inertia tensors substantially causing variable running behavior within the same track and speed conditions. The authors used a CAD software to calculate the inertia tensors of tram carbodies according to specified load scenarios and a multibody simulation tool to predict the vehicle dynamic response. Several arbitrary load scenarios were investigated to find the influence on vehicle dynamic behavior (derailment coefficients, ride index, ride comfort etc.). Additionally, scenarios including excitations from passengers jumping synchronously with several frequencies were also calculated and discussed

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