BIOMECHANICAL ANALYSIS OF THE DUMMY RESPONSES IN CASE OF CHILD PEDESTRIAN/CYCLIST COLLISION WITH PASSENGER CAR

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Abstract: The safety of pedestrians and cyclists in traffic is justified especially in terms of prevention. This paper deals with the biomechanical analysis of load exerted on the child pedestrian and cyclist. In the case of cyclists, the impact configurations were chosen with respect to the statistical outputs (sudden enter the road or the case of non-giving way; the car front vs. the left side of the cyclists). Two tests were performed in the same configuration and nominal collision speed, the first one with a bicycle helmet and the second one without the helmet. The initial position of pedestrian was chosen with respect to the dummy degrees of freedom. Using the accelerometers in the head, chest, pelvis and knee of the dummy acceleration fields were detected, which are the child pedestrian and cyclist exposed during the primary and secondary collision. In addition, prediction diagnostics method implementation was discussed such as one possible solution of vulnerable road users harm reduction. In conclusion, the results are interpreted by values of biomechanical load and severity of potential injuries including kinematic and dynamic comparison.

Key words: *Child cyclist, child pedestrian, passenger car, dynamic test, collision configuration, biomechanical load, accidents and losses minimization, prediction diagnostics*

1. Introduction

Pedestrians and cyclists are exposed to strongly incompatible impact within a collision with vehicle. The passive safety of cyclists colliding with a vehicle still remains, unlike the passive safety of pedestrians at the edge of interest. According

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