

# The effect of bumper on the pedestrian leg injury

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## ABSTRACT

Every year several thousands of unprotected pedestrians are killed or suffer serious injuries in car accidents. In nonfatal passenger vehicle-pedestrian accidents, pedestrian leg injuries are the most commonly injury body parts. Therein, the main causes for leg injuries are the front bumper of passenger vehicle. Therefore, studying effect of bumper on pedestrian leg injury plays an important role in pedestrian safety. The first objective of this study is to evaluate effect of bumper shape on the pedestrian leg injury. Using different FE vehicle models have the different bumper shape to impact with FE legform models. Analyzing received results during impact process between legform and bumper to assess effect of different impact positions on each bumper for pedestrian leg injury. After, choosing all advantages of each bumper shape that make pedestrian leg injury reduces so that support designs new bumper. Material bumper has great effect to hardness of bumper structure. Therefore, material bumper plays an important role in reducing pedestrian leg injury. Thus, the second objective of this study is to evaluate effect of bumper material on pedestrian leg injury. To research effect of bumper material, we use above bumper structures to change material. Analyzing received results in impact position to choose suitable material for each bumper structures. The last objective of this study is to design pedestrian friendly bumper. Using all analyzing results relate effect of bumper shape and bumper material to design pedestrian friendly bumper. This bumper has to satisfy EEVC/WG17 safety requirements about pedestrian leg injury.

Keywords : Pedestrian, Leg Injuries, Bumper, Legform Impactor

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