

Comparative analysis of driver's motion using different headrest positions during the rear-end collision

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Abstract

The biggest problem regarding the safety of occupants during the rear-end collision is the occurrence of "Whiplash" phenomenon, which means that the human head moves backwards in relation to the thorax movement which is in the sitting position. In this case, only the headrest opposes the head movement. An important role in the attenuation of this phenomenon is played by the correct position of the headrest relative to the head position. If the headrest is adjusted correctly, to limit the angle and movement of the head and neck during a rear-end collision, it should reduce the injury risk caused by "Whiplash", a phenomenon that can cause easy to dangerous injuries. This paper presents a comparative analysis during the rear-end collision between a driver with the headrest adjusted in optimal and wrong position. The analysis is based on the front quarter driver side of body car, using an anthropomorphic dummy. The quarter of car was positioned on a sledge that was located on the test stand. The data acquired during the tests were processed in order to evaluate the most common injury criteria, called HIC (Head Injury Criteria).

Keywords: occupants safety, rear-end collisions, headrests, injuries, head injuries

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