Evaluation Method for Crashworthiness Using Integrated Value of the Deceleration of the Railway Vehicle Having a High Correlation with the Degree of Passenger Injury

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The standards for crashworthiness of railway vehicles have been defined in Europe and the U.S., while there is no standard for crash safety in Japan. Therefore, it is important to establish an evaluation method for crashworthiness of railway vehicles in Japan. The authors carried out finite element analyses under various conditions based on the statistical analysis of serious level-crossing accidents in the past of 30 years in Japan. We evaluated the mean decelerations (conform to European standard), the maximum decelerations (American standard) and integrated values of the deceleration, which are obtained from impact deceleration waveforms in the passenger area. We also performed finite element analyses of dummy's behavior and injury values using these deceleration waveforms as input. We examined the correlation between these evaluation results and dummy's injury values. As a result, we confirmed that the integrated values of the deceleration of the passenger area had the highest correlation with the dummy's injury values.