

## **Reviewer's Discussion**

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Re-Analysis of the RICSAC Car Crash Accelerometer Data

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This paper presents the results of a fresh look at the accelerometer data for the 12 RICSAC full-scale crash tests and includes transformation of the measured data into an inertial coordinate system. Observations and comparisons are then made of the transformed data with the physical laws and with the results of prior research. The authors properly conclude that the results of the RICSAC tests are useful and valid for their intended purpose of comparing experimental data with predictions from accident reconstruction models.

During the course of this review several subject areas were identified that should be considered in possible future research:

1. The effects of variation of the originally reported separation times and angles. RICSAC97<sup>1</sup> concurred with Bundorf<sup>2</sup> in the finding that some of the originally reported separation times and angles were erroneous.
2. Consideration of recommendations from RICSAC97<sup>1</sup> that a time-forward simulation model should be used in conjunction with the interpretation and analysis of full-scale test data. Momentum equations or classical mechanics when applied to motor vehicle accidents require, of course, consideration of the time duration (generally 50 to 150 msec), the relative movement of the vehicles (dependent on impact configuration) and the effects of external forces during the exchange of momentum. A time-forward simulation could assist in the determination of whether the cited system momentum changes and other observations are due to measurement anomalies or to the choice of equations used to interpret and evaluate the test results.
3. A detailed review of reporting and interpretation procedures for use in crash tests that include "side slap" collisions (e.g., RICSAC 10).
4. An analysis of angular momentum changes using the coordinates of the system center of gravity at impact as the reference point (e.g., RICSAC 12).

The paper provides an interesting analytical approach to a complicated problem and it provides results that can serve as a basis for additional future research.

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<sup>1</sup> McHenry, B.G., McHenry, R.R. "RICSAC97 – A Reevaluation of the reference Set of Full Scale Crash Tests", SAE Paper 970961

<sup>2</sup> Bundorf, R.T. "Analysis and Calculation of Delta-V from Crash Test data", SAE paper 960899