

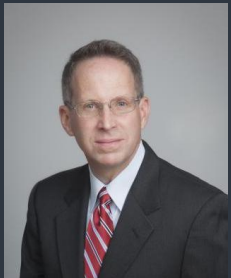
# Meet the Experts...

## The ARCCA Team...



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## CASE STUDY: Seatback Failure Third-Party Claim

### CASE DESCRIPTION:

ARCCA was asked to investigate a possible third-party claim stemming from a serious chain-reaction accident on an Interstate involving four vehicles:

- Vehicle 1 – Passenger vehicle
- Vehicle 2 – Crew-cab pick-up truck
- Vehicle 3 – 4-door pick-up truck
- Vehicle 4 – Tractor trailer (flatbed)

The driver of Vehicle 3 sustained fatal injuries as a result of the rear-end impact. We were working for Vehicle 4.

### STEPS TAKEN:

Vehicle 3 Driver's cause of death was an atlanto-occipital joint dislocation with brainstem injury.

Dr. Andrew Rentschler, a premier biomechanics/accident recon expert at ARCCA, reviewed all of the available documentary materials involved with this case, including police reports, autopsy reports, scene photographs, witness depositions, vehicle data/photos, and crash data reports, etc.

Dr. Rentschler also conducted an analysis to define the injuries sustained by the Vehicle 3 Driver to identify the mechanisms required to cause his injuries. He also assessed the driver's kinematic response (movement) within the vehicle as a result of the crash in order to determine the factors that contributed to or enhanced the injury mechanisms. He determined that the seat failure caused the injury.

Leading crashworthiness experts, Alan Cantor and Michael Markushewski of ARCCA, performed an investigation and seatback testing that included a surrogate fit analysis. A surrogate of similar anthropometry to the Vehicle 3 Driver was belted in the driver's seat of an exemplar 4-door pick-up. Available clearances and kinematics were investigated in the context of the occupant system and forensic evidence.

### FINAL FINDINGS:

The ARCCA team concluded that as a result of the rear-end impact to Vehicle 3, the driver moved rearward and loaded the seatback. The subsequent forces and accelerations caused the seatback to fail and collapse rearward, allowing the driver to slide up and ramp rearward along the seat back, contacting his head on the 2<sup>nd</sup> row seat bottom. This failure caused him to no longer be restrained in the seat, voiding the effectiveness of his seat belt.

The seatback within the subject Vehicle 3 failed to perform the intended function and the driver's resulting kinematics generated the loading and injury mechanisms responsible for his fatal head and cervical injuries. An alternate design was offered that would have prevented the seatback design failure and contact between the driver's head and the 2<sup>nd</sup> row seat bottom, thus preventing the driver's head and cervical injuries.

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