

CASE STUDY — ACCIDENT RECONSTRUCTION / MECHANICAL FAILURE

Commercial Vehicle Loss of Control and Maintenance Practices

Matter type	Wrongful death and personal injury arising from a multi-vehicle highway collision
Retained by	Plaintiffs' counsel
Issue	Whether the loss of control resulted from driver input, roadway conditions, or a mechanical failure that reasonable maintenance would have detected
Role	Testifying expert — reconstruction and mechanical inspection

Background

A loaded commercial tractor-trailer departed its lane on a descending grade and struck two passenger vehicles. The carrier attributed the loss of control to driver error compounded by wet pavement. Plaintiffs contended a braking system deficiency contributed, and that the carrier's inspection and maintenance program should have identified it.

Scope of work

- Download and analysis of the engine control module and event data recorder, including speed, throttle, brake application and fault history in the seconds preceding the event.
- Three-dimensional laser scanning of the roadway and of all involved vehicles, with reconstruction of the pre-impact travel path from scene evidence and vehicle damage.
- Momentum and energy analysis to establish impact speeds independent of the recorded data, providing a cross-check on the electronic record.
- Component-level inspection of the foundation brakes, slack adjusters, pushrod stroke and friction material, with measurements against the applicable out-of-service criteria.
- Review of driver logs, inspection reports, repair orders and the carrier's preventive maintenance intervals against the governing federal regulations and the manufacturer's service literature.

Findings

Multiple wheel ends exhibited pushrod stroke beyond the adjustment limit, with friction material worn below the manufacturer's replacement threshold and wear patterns indicating the condition had developed over a period substantially longer than the interval since the last documented inspection. Braking capacity calculated from the as-found condition was materially below the vehicle's design capability. The reconstruction placed the vehicle's approach speed above the advisory speed for the grade and curvature, and demonstrated that with the braking capacity actually available the vehicle could not have been slowed within the distance available — whereas a properly maintained system would have produced a materially different outcome. The documentary review showed inspection entries that were inconsistent with the physical condition of the components.

Deliverables and use in the case

- Early case assessment memorandum identifying the evidence at risk and the preservation demands needed before the vehicles were released.
- Reconstruction report with scaled diagrams, time-distance analysis and animation-quality visualization suitable for mediation and trial.
- Separate maintenance-practices analysis addressing the applicable regulatory inspection requirements.
- Deposition and trial testimony, including cross-examination on the electronic data interpretation.

WORKING WITH FORWARD THINKING

How We Support Counsel

Early case assessment	A candid technical read before you commit to a theory. If the engineering does not support the claim or defense, we say so early, while that information is still useful and inexpensive.
Evidence preservation	Failure evidence is fragile and often destroyed inadvertently. We advise on preservation demands, joint inspection protocols and destructive testing agreements at the outset.
Defensible methodology	Analysis is conducted to recognized consensus standards and documented so that each step, assumption and calculation can be traced and reproduced — the standard a Daubert or Frye challenge is measured against.
Clear communication	Reports, demonstratives and testimony are written to be understood by judges and juries without an engineering background, while remaining technically precise under cross-examination.
Rebuttal work	We are frequently retained solely to evaluate an opposing expert's methodology, assumptions and calculations, and to identify where the conclusions outrun the underlying evidence.
Conflict checking	Prompt conflict clearance and a written engagement scope before substantive work begins.

Practice areas

Structural and mechanical failure analysis · Product liability and design defect · Fire and explosion origin and cause · Accident reconstruction · Materials and metallurgical failure · Construction defect · Industrial and workplace incidents · Equipment and machinery failure

Discuss a matter

Initial consultations to determine whether a matter is within our expertise are without charge. Contact us with the case posture, the technical question at issue and your key deadlines.

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