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Engineering Systems Inc.
Engineering Consulting and Forensic Investigation

Advanced Topics Explained in Accident Reconstruction

PREPARED FOR:

Washington Defense Trial Lawyers (WDTL)

PRESENTED

March 31, 2021

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PRESENTER PROFILE



Patrick Riedlinger is a Senior Consultant at ESi with 30 years of progressive, technical experience. Pat is a graduate of Oregon State University with a Bachelor of Science degree in Mechanical Engineering and has knowledge in consumer product design, design verification, manufacturing processes, and material science. He is a registered Mechanical Engineer in the states of Oregon, Washington, Idaho, Utah, and California, and he holds accreditation as an ACTAR traffic accident reconstructionist and a certified fire investigator.

Pat has successfully applied his extensive mechanical engineering background to the reconstruction of vehicular accidents that range in severity from minor property damage to multiple vehicle and fatality collisions. His reconstruction experience includes motor vehicle fire investigation and accidents involving cars, trucks, motorcycles, bicycles, and pedestrians. He is trained and experienced in the collection and application of Event Data Recorder (“black box”) information from heavy trucks and passenger vehicles as it relates to accident reconstruction.

A handwritten signature in black ink that reads "Pat Riedlinger". The signature is written in a cursive, flowing style.

Patrick D. Riedlinger, P.E., ACTAR, ASE, CFEI, CVFI
ESi Senior Consultant

PRESENTATION HIGHLIGHTS

Roadway Data Collection – Friction, Road marks, Rollovers

- Coefficient of Friction, the resisting force to motion between two surfaces at their interface.
- The higher the roadway friction, the better the slowing action to a motor vehicle, for the same distance.

Yaw Marks

- Differ from skid marks which are straight, these occur from losing traction while turning.
- Critical speed calculations determine the maximum speed a vehicle can travel around a curve and not lose traction.

Rollovers

- Rollover crashes fall into one of three categories: Side-to-Side, Barrel Rolls, and Flip-over.
- Side to Side rollovers can be caused by a collision, cornering too fast, or bad steering input
- Barrel Roll can occur from an outside influence or external force creating rotation such as wind or the vehicle entering a sharp grade.
- Flip-overs can be caused when the PDOF enters at the lower frame of the vehicle. It can be a very violent collision.

Bicycle Accidents

- There are three basic types of pedestrian/bicycle accidents; Forward projection, wrap & carry, and fender vaults.
- Searle is a pedestrian speed equation taught in police academies. It is best used for a forward projection.

Understanding Crush Damage

- The crush is an indication of 'equivalent barrier speed'.
- To calculate the delta-V and impact speed you use 'MER': Momentum, energy, and restitution.

Commercial Transport

- Rollovers result from either static rollover conditions or dynamic rollover conditions from shifting loads.
- Drivers must know how to correctly load their cargo and must inspect the cargo and load securing devices to maintain the payload's integrity and federal resolution requirements.



ENGINEERING SYSTEMS INC.

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