Traffic Crash Reconstruction 3

This one-week program was developed by our lead instructors and offers a curriculum that provides the reconstruction professional with advanced analytical and methodological concepts to better understand and explain real word crash reconstructions. In-depth instruction is focused on three key areas:

» Monte Carlo analysis
» Advanced concepts in energy
» Advanced concepts in momentum

Monte Carlo Analysis. A key issue in crash reconstruction is what range of input variables should be used when a problem is analyzed. For example, in a momentum problem, input values such as first contact angles, departure angles and after impact drag factors are required for the analysis. It is often necessary to use a range for these values. One way to range the input values is to select inputs that yield the highest and lowest first contact velocities. It is highly unlikely that the crash is represented correctly by either all high or all low inputs. The Monte Carlo technique allows the analyst to reach conclusions for the most statistically reliable solution. Highlights of this instruction module include:

» Use in a momentum analysis
» Application in an energy analysis
» Example of Monte Carlo technique in an Excel spreadsheet
» Instruction to develop your own Monte Carlo analysis with Excel

Advanced concepts in energy looks at specific cases where traditional approaches to energy determination have shortcomings. The use of $A$ and $B$ stiffness values to estimate the work done (energy) in the damage to a vehicle have been shown to be less accurate than desirable for narrow impacts of cars into trees, poles, etc. Methods to analyze narrow impacts are covered in this section of the course. The methodology of force balance can be useful in analyzing two vehicle impacts and is also covered in this section. Highlights of this instruction module include:

» Narrow object impacts
» Force balance in two-vehicle collisions

Advanced concepts in momentum – Momentum, as well as an energy analysis, is used to calculate delta-$v$. Delta-$v$, in some cases, can be obtained from event data recorders (air bag modules) in vehicles. Momentum-based delta-$v$ calculations can be used in conjunction with event data recorder information to reliably reconstruct vehicle crashes. Some event data recorders provide sufficient information to calculate the Principal Direction of Force (PDOF). This again can be used in conjunction with a momentum analysis to validate the analysis. Highlights of this instruction module include:

» Using Event Data Recorder data for delta-$v$ and PDOF
» Delta-$v$ and PDOF momentum-based calculations compared to Event Data Recorder calculations
» Damage-based delta-$v$ calculations compared to Event Data Recorder calculations

Who Should Attend?

Students who wish to register and attend this course must successfully complete Traffic Crash Reconstruction 1, have considerable experience in conduction of reconstructions and be familiar with Microsoft Excel. Successful completion of Traffic Crash Reconstruction 2 is recommended.