You're going to be moderating the multi-material joining session of the Crash Simulation Summit. Could you outline for the audience why you think multi-material joint simulation is an important topic to discuss for improving lightweight material manufacture.

Automotive manufacturers are being driven to using more and more lightweight materials in our vehicles. Our design philosophy has always been “use the correct material in the right spot” which could lead to different materials that need to be joined together. When that is the case then conventional joining methods do not work. For example, connecting aluminum to steel or composite to metal cannot be done with traditional joining technology. The strength and energy absorption capability of a part relies heavily on the strength of the joint. Being able to simulate these joints is critical in helping design a crash structure using new lightweight materials.

What do you see as the most important hurdles to overcome in implementing CAE and FAE technologies for safety testing of lightweight materials? What optimizations need to be implemented?

The biggest hurdle to overcome is time. It could take as long as 2 years to characterize and understand these new materials under dynamic (crash) loading. There is a lot of testing that needs completed from coupon to component to assembly before we have confidence in our prediction method. Of course designers and suppliers want to implement these materials faster than CAE experts can create an accurate material model. Some materials are very difficult to model due to the importance of predicting fracture. Once this base performance is understood then topology and joint optimization could be used to help create a robust crash structure.

What are some of the potential applications and implications of improved material models and more accurate safety simulations to the manufacture of lightweight vehicles?

Eventually it can lead to reduced testing of prototype vehicles. Early on with these new materials more physical testing will be needed to build confidence in our CAE methods. Once that confidence and accuracy has been demonstrated then CAE can replace early prototype testing in the development process.

Which presentation/panel discussion are you especially excited about during the Crash Simulation Summit 2016?

I wish I had time to attend all the sessions. I am interested to hear what other industry experts have to say about their struggles and successes in modeling these new materials and joining methods.

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