Uncertainty Quantification and Validation –
A Promising Approach to Improve Credibility of Crash Simulations?

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With increasing hardware availability the computation of bigger models, i.e. models with finer meshes, becomes affordable. Nonetheless, it should be discussed whether mesh refinement is the right and only way to achieve the goal of creating higher credibility of crash simulations.

To give a first look on this issue the concepts of Validation, Verification and Uncertainty Quantification are reviewed from a general point of view. In the following, these principles are applied to two simplified examples from crashworthiness. These are namely a square tube and a crash box. For both examples experimental results are available to evaluate simulation credibility. Thus, even an Uncertainty Quantification in the comparison between simulation and experiment can be realized. As a further aspect of simulations presented, a very detailed representation of geometry based on photogrammetric measurements is evaluated with respect to its influence on results.

For the evaluated examples it is shown that a fine mesh is only half way to still improve results – detailed knowledge about the test specimen characteristics is another one.