

SEAMLESS CAE FOR FASTER DESIGN OPTIMISATION

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ABSTRACT

Many companies use simulation tools such as CFD and FEA to assess designs before they are built. However, there is often a serious disconnect between the CAD production model and obtaining simulation results. Often the production model has to be significantly simplified for simulation which results in the inefficient and time consuming process of having two models – one that the designer produces for manufacture and one for the analyst. In addition, predicted temperature, pressure and material property changes from one simulation tool cannot always be used automatically as a starting point for subsequent analysis in another simulation tool. This all serves to slow down the product development process and creates duplication of model and analysis set up data at each stage. The “analyst” is usually involved late in the design concept to manufacture process so any predicted design or performance issues has to go back to the designer for suggested modifications and the process starts all over again.

This presentation will show how existing CAD data for complex parts and assemblies can be used directly in CAE, whether this is for CFD, FEA or Plastics Injection Moulding simulation without the need for a different or newly created “analyst” model each time. It will also show interoperability between simulation tools such as how thermal and pressure predictions from CFD can be used in FEA and how material property changes and internal stresses due to the moulding process can be automatically accounted for in FEA. Further interoperability with additional software products for composites design, photorealistic results visualisation and fast design modification will also be presented.

The earlier a design issue that affects product performance is found the faster the product development process becomes. Today, in many companies there is typically one seat of simulation or one expert analyst for every 15 designers. The analyst can become quickly overloaded and a bottleneck in the development process. The presentation discusses the availability and user friendliness of accurate simulation tools that can now be also used by designers and engineers for a faster prediction of design performance and comparison of different designs much earlier in the product development

process. This encourages true design optimisation rather than the common approach of overdesigning to try to ensure that a design will work. Data from the design concept phase can be used by the engineer to assess the effects of introducing engineering detail and in turn this data can be used by the analyst for higher end analysis.

The net result is a more efficient, streamlined and seamless product development process where simulation can be performed at an earlier stage by more people. This helps to drive innovation, business growth and the development of products that are fully optimised and not just designed for function.

The analysis types shown in the presentation will include CFD, FEA, Composites and Plastics Injection Moulding.