

NAFEMS UK Regional Conference 2018 - Abstract Submission

Submission Date	2018-02-02 16:34:55
Name	Mr. Sean Horgan
Job Title	Managing Director
Company	80/20 Engineering Ltd
Please identify the event for which your submitting?	NAFEMS UK Conference 2018
Will you be the presenting author?	Yes
Presentation Title	USING TEMPLATE DRIVEN CFD TECHNOLOGY FOR ADVANCED AUTOMOTIVE AND MARINE APPLICATIONS”
Relevant Themes / Keywords	CFD, Democratization, Application Templates, Best Practices within the CAE Process, Verification and Validation, System Simulation
Abstract (plain text)	

"USING TEMPLATE DRIVEN CFD TECHNOLOGY FOR ADVANCED AUTOMOTIVE AND MARINE APPLICATIONS"

Sean Horgan, Managing Director – 80/20 Engineering Ltd Michael Clapp, Technical Director – 80/20 Engineering Ltd.

SUMMARY

The use of template technology for assisting simulation set-up within the development process is not a new idea. However, the successful application of template technology for advanced CFD analysis is less widespread. This presentation will focus on showing how US based automotive OEM's are working towards at least a ten-fold speed up of the entire simulation cycle time through the use of advanced template technology.

The bottleneck identified by their CAE group within this very large organization was not the simulation run times as considerable investment had been made in cluster computing with hundreds of CPU cores available. For large scale models, the time spent preparing production 3D CAD geometry so that it is in a form useful for CFD analysis was still very significant.

Various examples from one of the largest US automotive OEM's will be shown where use of "Binary Adaptive Tree Meshing" combined with advanced template technology can take a typical 6 weeks simulation cycle time with their traditional CFD process to less than 3 days.

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The presentation will describe in detail the steps of how the user undertakes a run such a Front-End Air Flow simulation:

Model Setup Time i.e. Dirty CAD to Run submission: 2 hours

- > CAD Cleanup: ZERO
- > Meshing: 1.5 to 2 hours
- > Model Setup: 15 minutes
- Model Size: 30 – 50 million cells
- Model Run Time: 20 hours*
- Number of Processors: 8
- * Subsequent Simulations: Starting from solution takes 4 hours

The presentation will also discuss how the definition of the Condenser, Radiator and Fan Module are automatically created and have produced results with accuracies between 2-5% against experimental wind tunnel measurements.

The same advanced template driven CFD process can be applied to other aspects of vehicle development such as the Lubrication system.

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Pressure: Difference between prediction and experiment

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Other Automotive applications where similar time savings are being achieved:

- || Under-hood Underbody Thermal
- || Water Fording
- || Induction System
- || Brake Cooling
- || External Flow
- || Plenum Water Management
- || Surge Tank
- || Fuel Tank
- || Wind Shield De-Icing
- || Heat Exchanger

The concluding remarks will show how this democratisation of CFD through the use of template driven CFD technology is not just restricted to use within the automotive industry. The presentation will close taking a brief look at certain Marine applications such as Propeller Performance.

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80/20 Engineering is a specialist Fluid Flow Simulation and Thermal Analysis Consultancy Company. We have a long track record of helping companies implement CFD software within 'Fluid Machinery' design environments and we believe CFD simulation will play an ever-increasing role within this challenging product development application area.

Please enter any additional comments or messages here

abstract id

Dear NAFEMS
I'll send actual copy of the abstract to Jo Davenport as this doesn't have any facility to include images.
Sean Horgan

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