

ROLLS-ROYCE VIEW ON CURRENT APPLICATIONS AND FUTURE DEVELOPMENTS IN FINITE ELEMENT ANALYSIS

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ABSTRACT

Due to the combination of innovative software, novel computer hardware and a broad range of possible engineering applications there has never been a more interesting time to be involved in Finite Element Analysis (FEA). In this talk I intend to start with a brief historical perspective and look at how FEA in Rolls-Royce has developed to its current state. Developments have largely been paced by a tension between the complexity of engineering problems and the availability of computer hardware.

I will then outline the current state of FEA within Rolls-Royce and look at how it integrates into the overall design/analysis/test landscape. I will then take a look at the business requirements which are driving improvements in simulation: the need to run more extensive simulations, faster and with more physics. I will then look in detail at a number of areas where significant improvements are, or will be, needed in FEA to meet future demands. Developments will be needed in basic FEA processes, while the need to run many more, significantly larger analyses will prompt additional "Big Data" type innovations. The need to extend FEA out of its traditional design support role, into manufacturing, test and service support will also drive specific improvements. The requirement to represent more complex physics in simulations will also drive innovation, as will the need for better ways of interpreting simulation results. Lastly, what benefit does the availability of plentiful, cheap IT bring to simulation and does that bring its own problems? These developments will not be made by a single group but will need concerted, long-term effort from a broad consortium, involving industry and academia as well as software suppliers and hardware manufacturers.

Finally I want to explore the often overlooked area of human factors in simulation. How do analysts spend their working day, and what are the barriers which prevent more effective working? Looking forward, how will the role of the analyst develop in the future? Where are the areas of best practice, where is the debate taking place and what skills will be required?