

Multiphysics Software Applications in Reverse Engineering

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Abstract

During the past decade reverse engineering has become a common and acceptable practice utilized by many aftermarket suppliers, and even original equipment manufacturers (OEM). This presentation focuses on the applications of multiphysics software such as COMSOL and Simpleware® in reinventing the design details and manufacturing processes of an existing part in the absence of the original design data. It showcases the real-life practice of reverse engineering in various industries. Attendees will learn the applicability and limitations of these software applications in reverse engineering through case studies and demonstration. COMSOL and Simpleware provide advanced software technologies applicable to many key elements of reverse engineering such as 3D image creation and simulation, rapid prototype, and finite element models. They offer a modern technology to reinvent a part that better meets the fit, form and function requirements that are essential to reverse engineering. The speaker will demonstrate the applications of these advanced software technologies in reverse engineering medical devices, bio implant designs, mechanical parts and components. The speaker will define the critical elements of reverse engineering, introduce the modeling and analyses required to reproduce an OEM part by reverse engineering. He will show the effectiveness of applying multiphysics software technologies in reverse engineering analysis and practices. He will discuss the feasibility of these software technologies in the medical, materials, mechanical design and other multiphysics fields from reverse engineering perspective. The presentation will compare the merits and shortcomings of these software technologies in reverse engineering applications from a user's perspective. The speaker will share his knowledge and experience, and exchange ideas and thoughts with other users in industries such as automotive, aerospace, and medical device, and educators from academia. He will elaborate on acceptable tolerance of variations in reverse engineering with emphasis on industrial standards in real-life practice; and the applicability of multiphysics software technologies to achieve these requirements. The speaker will discuss the applicability of Simpleware, COMSOL and other modern software technologies in material identification and manufacturing process verification that are crucial in reverse engineering practice. During his presentation the speaker will also stimulate discussions, if feasible, with the attendees either they are corporate senior executives, engineering managers, engineers, technicians, government inspectors, sales managers, salespersons, lawyers or legal counselors on the applications of modern multiphysics software to reverse engineering from their perspectives.

