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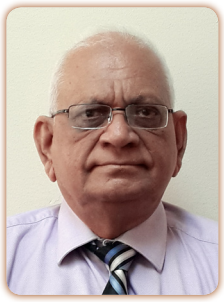

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Virtual tests for studies in impact engineering and prototype testing

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Virtual Testing and Virtual Labs are increasingly being used to test, analyze and design industrial structures and components using simulation and modelling. These components and assemblies are subjected to impact loads due to collisions, fabrication problems, accidents e.g. vehicles, flying objects, missiles, structures etc. To assess safety and damage caused due impact, standard tests such as Hammer drop tests and Charpy tests are conducted on models in the laboratories and prototype tests in the field. Impact loads being intensive, which might cause the fracture and damage of the prototype, these experimental approaches are very costly to carry out repetitively. As an alternative, virtual tests which are nondestructive dynamic tests, can estimate the impact response of structures economically and expeditiously as per standard procedures and can then be extended to prototype testing of components and assemblies of any shape and size after calibrating the virtual experiment. These virtual impact tests are developed using the finite element code, ABAQUS to model the objects and simulate the response of the components as per standard procedures. The simulated impact response of the structure can be refined and calibrated using the analytical and experimental results available for subsequent applications involving variations in sizes, shapes and configurations. The contact interaction analysis is very essential in modeling the impact incidents. In these studies, the general contact interaction algorithm is used to model the contact and the accuracy of the results has been verified using analytical and experimental results. Thus these virtual tests can be used to predict the response of assemblies of any arbitrary size, shape and material properties. They can be applied to assess the safety and damage of structures and even quality control and subsequently improve the impact resistance of the prototype iteratively. They can also be used for educational and training purposes.

Biography

Professor Kameswara Rao did PhD from Indian Institute of Technology, Kanpur. He was teaching in IIT Kanpur continuously since 1966 and joined Faculty of Engineering, Universiti Malaysia Sabah, Kota Kinabalu, Malaysia in 2004 and continuing. He held several academic and administrative positions during the last 50 years of service. He published more than 150 papers in Journals and Conferences and also authored 4 books, the last one in 2011 published by John Wiley and Sons. He is serving as a reviewer and editorial board member of technical journals. He was a consultant to several projects of national importance. Chong Chee Siang currently is doing her PhD in Universiti Malaysia Sabah, Malaysia. She has earned her Master of Engineering degree from Universiti Malaysia Sabah by completing thesis of "Dynamic response of beams due to impact load" in 2013. Kenneth TeoTze Kin received his BEng (Hons) degree from University of Leicester in 1997 and Master of Science from Universiti Malaysia Sabah in 2003. He has been a full-time lecturer in Universiti Malaysia Sabah since 2003. His current research interest includes modeling, simulation, control and optimization, intelligent transport system. He has published about 70 papers in journals and national or international conferences for presenting his research.

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