Editorial

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Biographical notes: Pingfang Tsai has worked with Ford Motor Company for 19 years. Currently he is responsible for supporting the engine development and design in the areas of product robustness, reliability and statistical applications. Dr. Tsai is a company certified Six-Sigma Black Belt. Prior to joining Ford, he was a Senior Reliability Engineer with General Motor Corporation. He received his PhD degree in Industrial Engineering from West Virginia University. He has published and presented numerous technical papers.

Robert C. Creese is Professor of Industrial Engineering in the Industrial and Management Systems Engineering Department in the College of Engineering and Mineral Resources at West Virginia University. He previously taught at The Pennsylvania State University, Grove City College and at Aalborg University in Denmark and worked at the United States Steel Corporation as an Industrial Engineer for two years. His BS is from Penn State University (1963), his MS is from the University of California (1964) and his PhD is from the Metallurgy Department at Penn State (1972). He is a life member of AACE International, the American Foundry Society and ASEE. He is also a member of ISPA, AIST, SME, ASM, SCEA and AWS. He has authored/coauthored two books, *Introduction to Manufacturing Processes and Materials* and *Estimating and Costing for the Metal Manufacturing Industries*, and authored/coauthored over 100 articles.

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Chemistry and Mathematics from University of Calcutta, Calcutta, India. He is presently a Consultant with MISRA ASSOCIATES, Morgantown, WV, USA. His previous work includes Assistant Professor of Engineering, Wilkes University, Wilkes-Barre, PA, USA; Lecturer in Physics, Gauhati University, Gauhati, India; Scientist at BARC, Bombay, India. He is a life member of APS, Senior Member of AIIE and a member of IEEE, ASEE and INFORMS. He has authored over 30 articles, and has participated in many Conferences and Meetings of National and International Professional Societies.

The rapid change and market demands that drive the way products are developed and designed continue to keep the pressure on profits in automotive industry. If the mantra is 'product, product, product', lean product development and management is crucial to deliver the right, cool product to market at the right price, while maintaining profit margins and lowering development costs.

This special issue of *IJPD* focuses on disseminating the essential practices that may be applied in the automotive industry for Product Development (PD) from concept to design and engineering, to verification, to production and to sales. These PD practices, including customer attributes and cascade, supplier selection and collaboration, CAE/FEA optimisations, design validation and tests and warranty strategy, bring together the entire set of methodologies and tools that support product and process design in every stage of the product development to achieve product programme delivery with fast and more products to market, minimum costs and meeting customers' satisfactions and desires. After scrutinising reviews, six papers from academics and practitioners were selected for publication.

In the first paper, 'A hierarchical choice modelling approach for incorporating customer preferences in vehicle package design', by Deepak Kumar et al., the authors propose a hierarchical choice modelling approach that addresses the special needs of complex engineering systems. The approach incorporates the use of qualitative attributes and provides a framework for pooling data from multiple sources. Heterogeneity in the market and in customer preferences is explicitly considered in the choice model to accurately reflect choice behaviour. The design of the automotive vehicle occupant package is used to demonstrate the proposed approach and the impact of both packaging design decisions and customer demographics upon vehicle choice are investigated.

The second paper, 'Neural network application for supplier selection', by Davood Golmohammadi et al., develops an efficient decision-making model to select suppliers using multi-layer feed forward neural networks. A set of input functions for supplier selection criteria was defined to create input data for training the model. The proposed neural network model can use historical data of suppliers to evaluate their performance in the vendor supplier selection decision. The vendor can update the suppliers' database information over time for future decisions.

The third paper, 'Strategies for feedback on reliability and robustness from automobile warranty data', by Bharatendra K. Rai, presents strategies for automobile warranty data analysis that helps obtain meaningful feedback towards reliability and robustness improvements leading to warranty cost reduction. Role of hazard plots in giving clues about nature of noise factors that influence failure is presented. Strategies for stratification of warranty data in terms of customer reported concerns and/or parts reported to be the cause of failure to prioritise reliability and robustness improvement projects are discussed.

The fourth paper, 'Crash simulation evolution and its impact on R&D in the automotive applications', by Philipp Spethmann et al., analyses the impact of the virtual tool 'crash simulation' on automotive R&D over the last 35 years. The research carried out in this context identifies and investigates distinct phases respectively stages of the potential of crash simulations based on the Finite Element Analysis and the stages' impact on automotive R&D in-depth. In a study of German Original Equipment Manufacturers' (OEM) utilisation of crash simulations, the evolution of this tool is explored and its impact on productivity and problem-solving investigated.

The fifth paper, 'An alternative definition of reliability reinvigorated traditional metal fatigue strength performance assessments', by Warren Jocz et al., presents three fatigue strength reliability demonstration case studies; one each at the component, sub-system and system levels. These case studies utilise classical methods for fatigue strength assessments and also highlight the engineering information, cost and timing advantages associated with the applications of these fatigue performance techniques.

The sixth paper, 'Co-design – from an automaker perspective', by Dalicio Guiguer Filho et al., illustrates the main objective of a partnership to develop a product (co-design) that is to take advantage of suppliers engineering capability (know-how), bringing new technologies to the vehicle and reducing development costs. Successful collaborative product design depends on the ability to effectively manage and share engineering knowledge and experience throughout the entire development process. The authors explored how these issues are addressed in a Brazilian automaker subsidiary, through the study of its processes and tools and the comparison with the characteristics studied academically.

Each paper identifies an opportunity for applying the methodologies in product development and management. As Guest Editors we hope that readers will find these papers stimulating and useful for the research and applications during the product development and design in the automotive industry.

Dr. Tsai expresses his profound regards to Dr. Mohammed A. Dorgham, the Editor-in-Chief, for inviting him to lead this special issue with helps from Dr. Robert C. Creese and Dr. Sheo G. Misra, who provided him an opportunity of calling for reviewing, editing and organising the papers. The Guest Editors would like to thank all the authors for submitting and revising papers for this special issue. We also wish to extend our sincere thanks to those referees who acted as reviewers for the papers submitted to this issue. They were Wei Chen (Northwestern University), Vasiliy Krivtsov (Ford NA), Horst Lanzerath (Ford Europe), Dingjun Li (Ford China), Bharatendra Rai (University of Massachusetts – Dartmouth), Robert Schilling (Ford Europe) and Donald N. Zwiepi (Emeritus, Worcester Polytechnic Institute). The Guest Editors also would like to express their sincere appreciations to Liz Harris, the Journal Manager, for her advice, help and support to make this special issue possible for publication.