Editorial

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Biographical notes: Uday S. Dixit obtained his PhD in Mechanical Engineering from the IIT Kanpur. He is working as a faculty member in the Department of Mechanical Engineering, Indian Institute of Technology Guwahati since 1998. He is actively engaged in carrying out research in the modelling of manufacturing processes using finite element methods as well as soft computing techniques for the last 24 years. He has published a number of research papers and five books related to manufacturing and finite element method. He has also edited three books related to manufacturing. He has guest-edited several special issues of journals and is currently an Associate Editor of the *Journal of Institution of Engineers (India) Series C*. He has guided several doctoral and Master's students. He also has more than four years experience in the manufacturing industry. He was the Organising Secretary of prestigious AIMTDR conference held at the IIT Guwahati in December 2014.

Manas Das is an Assistant Professor in the Department of Mechanical Engineering, Indian Institute of Technology Guwahati, India since 2012. He received his Master's and PhD degrees from the Mechanical Engineering Department, IIT Kanpur. His research areas include advanced finishing and nano-finishing processes, magnetorheological finishing (MRF) process, advanced/non-traditional machining processes, and micromachining processes. He has published more than 20 papers in reputed journal and conferences. He has also written two book chapters in the area of surface finishing. Presently, he is supervising five PhD students in the broad area of manufacturing.

International Journal of Machining and Machinability of Materials (*IJMMM*) was started in the year 2006, with a view to disseminate knowledge in the area of traditional as well as non-traditional machining. The first paper in this journal was by Victor P. Astakhov who presented a brief history of traditional metal cutting (in which a wedge shaped tool removes the material in the form of chip). Astakhov (2006) points out that despite the research history of 150 years, the predictive models of machining are poor. He concludes that "the studies on metal cutting and machinability of engineering material are very important to meet the challenging requirements of today's competitive market place". A decade after the launch of *IJMMM*, Astakhov's observations are still valid. In the last decade, a lot of development has taken place in the area of non-traditional machining and many non-traditional machining processes have become so popular in industries that the tag non-traditional associated with those processes is irrelevant. However, the importance of traditional machining processes like turning, milling and grinding still continues. The

attempt is being made to enhance the performance of the traditional machining processes to achieve the goal of sustainability.

All India Manufacturing, Technology, Design and Research (AIMTDR) Conferences are held biennially since 1967. The 5th International and 26th All India Manufacturing Technology, Design and Research (AIMTDR) Conference was held at Indian Institute of Technology, Guwahati, India during 12–14 December 2014 and got huge participation from India. The contributed papers covered different fields of manufacturing. Enhanced version of nine papers has been selected for the special issue entitled 'Enhancing the performance of traditional machining'. Out of these papers, six are related to turning, one to milling and two to grinding.

The paper by Thakur et al. investigates dry turning of Nimonic C-263 superalloy using TiN/TiCN/Al_2O_3/ZrCN coated tool. Experiments showed significantly lesser tool wear in comparison to uncoated tools. Chinchanikar and Choudhury conducted experiments on turning of hard AISI 4340 steel (55 HRC) using PVD-applied nanolaminate TiSiN-TiAlN coated carbide tools in dry as well as near-dry environment. It is observed that under certain operating conditions, both dry and near-dry environment provide almost same wear rate. Bartarya and Choudhury studied the white layer formation in hard turning of EN31 steel using cubic boron nitride tool. Authors conclude that it is possible to control white layer formation by choosing an appropriate cutting speed depending on the wear-state of the cutting tool. Das et al. studied the finish hard turning of AISI 52100 steel using cubic boron nitride tool. All these papers highlight the trend of minimising/eliminating cutting fluid and enhancing the performance of turning by optimising the process parameters. Gajrani et al. developed coated and uncoated micro-textured tools and studied their performance in turning. Texturing improves tribological properties and it is possible to get rid of the cutting fluids.

Kalidasan et al. have studied the performance of double tool parallel turning when the tools are mounted on the opposite sides of the job. The preliminary study shows that it is possible to achieve higher production rate with double tool turning. Dikshit et al. have developed a semi-mechanistic model for ball end milling to accurately predict the cutting forces. This model is useful for improving the precision of the milled surface. Vashista and Paul have carried out a statistical analysis to study the role of process parameters on the convective heat transfer coefficient of fluid and heat partitioning ratios in high efficiency deep grinding. An accurate analysis of heat transfer is important for the overall performance of grinding. Sinha et al. have obtained optimum parameters in surface grinding with minimum quantity lubrication.

In nutshell, the focus of the researchers is on carrying out environmental-friendly machining. This requires minimising or eliminating the cutting fluids and optimising the process parameters for enhanced productivity. The research papers also indicate the need for carrying out a scientific study of metal cutting, so that dependency on costly trial and error experiments is minimised. We expect that these papers will be useful for professional working in industry as well as academia.

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References

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