

Usama Umer, Ph.D.

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Research Interest:

High speed machining/High performance machining, Machining of difficult to cut materials, Modeling of machining operations, Design Optimization of Mechanical Systems.

Education:

Ph.D. (Doctor of Philosophy)

June 2007

Mechanical Manufacturing and Automation, Beijing Institute of Technology, Beijing, China

Advisor: Prof. Dr. Wang Xibin, Co-advisor: Dr. Lijing Xie

Dissertation Title: **Experimental and Finite element analyses for High Speed Machining of AISI H-13 hardened steel using advanced tool materials**

The main aim of the research is to evaluate the cutting performance of ceramics and PCBN tooling during high speed machining of AISI H-13 hardened steel by high speed orthogonal turning and milling experiments and finite element modeling techniques. Experimental analyses consists of cutting forces, chip morphology, tool wear and surface roughness measurements using each tool material. Through Finite element simulations, cutting forces, chip morphology, temperature distributions on the workpiece and tool, stress, strain and strain rate contours have been found out for each tool material. The validity of the FE models have been checked using experimental cutting forces data and published results on temperature distributions.

M.S. (Master of Engineering Sciences)

July 2002

Mechanical Engineering (Manufacturing), NED University Karachi

Marks Obtained: CGPA 3.09

B.E. (Bachelor of Engineering)

August 1998

Mechanical Engineering, NED University of Engineering & Technology, Karachi, Pakistan

Marks Obtained: 81%

Academic Honors:

- O Awarded Best Student of the year award consecutively for three years by Beijing Institute of Technology during PhD studies.
- O Awarded scholarship by Higher Education Commission Pakistan in September 2003 to pursue PhD from Beijing Institute of Technology, China.
- O Secured 8th position (81% marks) in B.E in a batch of 230 students.

Publications in ISI indexed Journal

- 1) Usama Umer, Xie Lijing, Wang Xibin, Finite element analysis for chip formation in high speed turning operations by ALE method, Chinese Journal of Mechanical Engineering, Issue 4 Dec 2006, pp.480-482.
- 2) Usama Umer, Shahid Ikramullah Butt, Syed Jawid Askari, Syed Noman Danish, Lijing Xie, Comparative Analyses for Different Modeling Methods in High Speed Turning Operations for Hardened Steel, Strojniški vestnik - Journal of Mechanical Engineering 54(2008)12, 850-854.
- 3) Usama Umer, Lijing Xie, Xibin Wang, Finite element chip formation analysis for high speed milling operations, CSME Transactions, Vol 32 (3 & 4), 2008, 513-522.
- 4) . Usama Umer, Xie Lijing, Syed Jawid Askari, Experimental and FEM study of serrated chip formation in high speed turning processes, Journal of Advanced Materials Research, Vol. Jan 2011, pp. 1049-1054.
- 5) Usama Umer, High speed turning of H-13 tool steel using Ceramics and PCBN, Journal of Materials Engineering and Performance, DOI: 10.1007/s11665-011-0104-0, 2012.
- 6) J. A. Qudeiri, F. A. Khadra, A. Al-Ahmari, and U. Umar, "Effect of Material and Geometrical Parameters on the Springback of Metallic Sheets," Life Sci. J., vol. 10, no. 2, 2013.
- 7) U. Umer, J. A. Qudeiri, H. A. M. Hussein, A. A. Khan, and A. R. Al-ahmari, "Multi-objective optimization of oblique turning operations using finite element model and genetic algorithm," Int. J. Adv. Manuf. Technol., vol. 71 pp. 593–603, 2014.
- 8) Danish SN, Khan SU-D, Umer U, et al. (2014) PERFORMANCE EVALUATION OF TANDEM BLADED CENTRIFUGAL COMPRESSOR. Eng Appl Comput FLUID Mech 8:382–395.
- 9) Danish SN, Qureshi SR, EL-Leathy A, et al. (2014) Numerical investigation & comparison of a tandem-bladed turbocharger centrifugal compressor stage with conventional design. J Therm Sci 23:523–534. doi: 10.1007/s11630-014-0737-z
- 10) Umer U, Ashfaq M, Qudeiri J A., et al. (2015) Modeling machining of particle-reinforced aluminum-based metal matrix composites using cohesive zone elements. Int J Adv Manuf Technol 78:1171–1179. doi: 10.1007/s00170-014-6715-5
- 11) Qudeiri J A., Umer U, Khadra F A., et al. (2015) Layout design optimization of dynamic environment flexible manufacturing systems. Adv Mech Eng 7:1–9. doi: 10.1177/1687814015584252
- 12) Mohammed MK, Al-Ahmari A, Umer U (2015) Multiobjective optimization of Nd:YAG direct laser writing of microchannels for microfluidic applications. Int J Adv Manuf Technol. doi: 10.1007/s00170-015-7291-z
- 13) Ghandehariun A., Kishawy H A., Umer U, Hussein HM (2015) Analysis of tool-particle interactions during cutting process of metal matrix composites. Int J Adv Manuf Technol 1–10. doi: 10.1007/s00170-015-7346-1
- 14) Ghandehariun A., Kishawy H A., Umer U, Hussein HM (2015) On tool–workpiece interactions during machining metal matrix composites: investigation of the effect of cutting speed. Int J Adv Manuf Technol. doi: 10.1007/s00170-015-7869-5

International Conference Proceedings

1. Usama Umer, Xie Lijing, Wang Xibin, Finite element chip formation analysis for high speed turning operations, Proceeding of First BIT-TIT joint workshop in mechanical engineering, September 2005, pp.49-53
2. Wang Xibin, Lijing Xie, Long Zhenhai, Usama Umer, Research on high speed machining of difficult to cut material, Proceeding of The 2005 international symposium on advanced engineering, (Pukyong National University Korea), Dec 2005.
3. U. Umer, L.J. Xie, X.B. Wang, Modeling the effect of tool edge preparation by ALE method, Proceeding of 9th CIRP International workshop in modeling of machining operations (Bled, Slovenia), May 2006, pp.525-532
4. Usama Umer, Lijing Xie, Xibin Wang, Implementation of ALE method in high speed turning operations for hardened steel, Proceeding of 8th International conference on progress of machining technology (Matsue, Japan), Nov 2006, pp.349-352.
5. Usama Umer, Lijing Xie, Xibin Wang, Modeling of serrated chip formation in high speed turning operations for hardened steel, Proceeding of 8th International conference on progress of machining technology (Matsue, Japan), Nov 2006, pp.321-324.
6. Usama Umer, Xie Lijing, Wang Xibin, High efficiency machining of H-13 tool steel, 7th International conference on Manufacturing and automation Singapore, May 2007.
7. Usama Umer, Xie Lijing, Wang Xibin, Modeling of high efficiency milling operations.. 7th International conference on Manufacturing and automation Singapore, May 2007.
8. U. Umer, L.J. Xie, X.B. Wang, Machinability analysis of H-13 tool steel using advanced tool materials, 6th International high speed machining conference, Spain, March 2007.
9. U. Umer, S.N. Danish, S.J. Askari, S.I. Butt, High speed turning of H-13 tool steel using ceramics and PCBN, Proceedings of 2nd Tehran International Congress on Manufacturing Engineering (TICME 2007), Dec 2007, pp.162.
10. Usama Umer, Xie Lijing, Syed Jawid Askari, Experimental and FEM study of serrated chip formation in high speed turning processes, Conference on Advances in Materials processing technology, Oct 2009, Kuala Lumpur, Malaysia.
11. Abdel-Magied RK, Hussein HMA, Abu Qudeiri J, Umer U (2014) Computer Aided Design of the Die-Set for Sheet Metal Punching and Blanking Dies. Appl. Mech. Mater. pp 78–82.
12. Hussein HMA, Qudeiri JA, Umer U, Abdel-Magied RK (2014) If-Then Rules for Selection the Die-Set for Sheet Metal Punching and Blanking Dies. Adv. Mater. Res. pp 208–213.

Experiences:

A. Professional:

- O Served as a Quality Officer at Refrigerators Manufacturing Co. Pak. Ltd (Philips/Whirlpool) , from Oct 98 to April 2002.
- O Served Instructor at Pakistan Navy Engg. College, Karachi, Pakistan, from Nov 2002 to Sep 2003.
- O Served as Officer In charge Mechanical Workshop at Pakistan Navy Engineering College, Karachi, Pakistan, for the period Nov 2002 to Sep 2003.
- O Served as Research Assistant at Beijing Institute of Technology during PhD from Sep 2003 to July 2007.
- O Served as Assistant Professor at National University of Sciences and Technology (Pakistan) from July 2007 to July 2012.
- O Serving as Assistant Professor at King Saud University (Riyadh, KSA) since September 2012.

B. Teaching:

Institution	Level	Year	Courses
National University of Sciences & Technology, PNEC, Karachi, Pakistan	Undergraduate	2002-onwards	<ul style="list-style-type: none">• Manufacturing Processes• Material Science• CAD/CAM• Tool Design• Finite Element Analysis
	Postgraduate	2007-onwards	<ul style="list-style-type: none">• Product development• Computer Integrated Mfg.• Modeling of Manufacturing operations

Scientific Work/Projects Completed:

- O Design HVAC system for State Bank building Multan as BE final year project.
- O Design and fabricated Eutectoid Deep freezer for commercial use during work at Philips/Whirlpool.
- O Involved in R & D and testing activities of domestic appliances at Philips/Whirlpool.
- O Redesign ARP 1018 Refrigerators for efficiency improvement.
- O Performed two dimensional tool wear analyses with Co advisor Dr. Lijing Xie during PhD studies.
- O Completed experimental and finite element analyses for High Speed Machining of hardened steel for PhD thesis

Conferences Attended:

1. First BIT-TIT Joint workshop on Mechanical Engineering, Beijing Institute of Technology, Beijing, China, Sep 20-22, 2005.
2. Doctoral Forum of China, Beijing Institute of Technology, Sep 22-25, 2005.
3. 9th CIRP International Workshop on Mechanical Engineering, Bled, Slovenia, May 11-12, 2006.
4. 8th International Conference on Progress of Machining Technology, Matsue, Japan, Nov 7-12, 2006.
5. 2nd Tehran International Congress on Manufacturing Engineering, Tehran, Iran, Dec 10-13, 2007.
6. Conference on Advances in Materials and Processing Technologies, Kuala Lumpur, Malaysia, Oct 26-29, 2009.

Courses Attended:

- O Course on Internal Quality System Auditing to ISO 9001:2000, SGS Pakistan (Pvt) Limited, Karachi, Pakistan, April 2003
- O Special Instructional Training Course, PNS Rahnuma, Karachi, Pakistan, June – July 2002.
- O Training of ANSYS at SIMCON International, Karachi, Sep 2007.
- O Training of LS Dyna, DFM and Blade Pro at PNEC, Karachi, Nov 2007.

Professional Affiliations:

- O Life Member Pakistan Engineering Council