Rakesh Sagar

Visa Status	:	US Green Card (US Resident**)**
Contact	:	549 Wills Point Way, Belton, TX 76513 940-536-7617 (Mobile#) rsagar2005@yahoo.co.in
Education	:	Ph. D. (Mechanical Engineering), I.I.T. Delhi, 1980
	:	M. Tech. (Production & Industrial Engineering), I.I.T. Delhi, 1974
	:	B. Tech.(Mechanical Engineering), I.I.T. Delhi, 1968
Experience	:	41years of teaching& research at IIT Delhi, in various positions, retired as Prof 30.6.2010, the following courses have been taught as guest faculty during Aug 2010 – June2011; Tool Design, Metal Cutting, Applied Plasticity and Casting Technology
Courses Taught	:	Under Graduate Level
	:	Graphic Science & Engineering Drawing, Theory of Machines, Manufacturing Processes /Practices Metal Working Analysis & Technology (Elasticity and Plasticity), Metal Forming and Machining Engineering Materials Technical Management Descriptive Geometry Production Engineering Primary Fabrication Processes Process Engineering and Tool Design

	:	Post Graduate Level
	:	Metal Forming Analysis Foundry Technology Metal Forming Technology & Robotics
Training Courses for Industry		TPM, TQM, BPR, 5S Advanced Manufacturing Processes Gemba Kaizen **(Maruti Suzuki, Mahindra and Mahindra)**
Assignments Abroad	:	Post Doctoral Research in Robotics at the School of Engineering Systems and Design, South Bank University, London. 3/1987 to 10/1987. Visiting Professor, AIT, Bangkok. 1/1998 to 4/1998.and 1/2005 to 4/2005 Associate Professor, Air Academy, Tajoura, Libya, 1/1996 to 4/1998. Lecturer, Engineering Section, Air Academy Misurata, Libya, 11/1980 to 9/1982 CSIR-NSF Exchange program for faculty to USA funded by Govt. of USA, 5/1992 to 6/1992. Addisababa University, Ethopia, Dec-May 2010(Video Conference-distant learning program, plus contact program for one week)
Lectures Delivered Outside India	:	1. Computer Integrated Manufacturing 2. Assembly with Robot (At international Post Graduate Course on Industrial Robots and Robotics, sponsored by

UNESCO, Oct. 29 to Nov. 9, 1990, Budapest, Hungry).

Supervision of Research Projects : Completed Ph.D.

1. Computer integrated Manufacturing of Precision Engineering components.
2. Studies of Composites with Reinforcements.
3. Studies and Development of Al-Sic particulate composites for automotive applications
4. Development of Alternative Abrasive Cut-Off Wheel
5. Study of wear and friction in metal matrix composites (Al-SiC) automotive parts(Joint guidance).
6. Composites for high performance structures and cutting materials (joint guidance).

Masters' Thesis 43

B. Tech. Projects 28

DETAILS OF RESEARCH AND OTHER PUBLICATIONS

(a) JOURNALS

1. R. Sagar & B. L. Juneja : "Mechanics of Bar Forging" Journal of Institution of Engineers, India 1976, 56 pt. ME4, pp. 163-167.

2. R. Sagar & B. L. Juneja : "An upper bound solution for flat tool forging taking into account bulging, Int. Jour. of Machine Tool

Des. & Res. England, 1979, 19, pp. 253-258.

3. R. Sagar & B. L. Juneja : "An upper bound solution for closed die forging of hexagonal shapes" Int. Jour. of Machine Tool Des. & Res. England, 1980, 20, pp. 67-72.

4. R. Sagar & B. L. Juneja : " Open die forging of four sided irregular disc', International Journal of Machine Tool & Manufacture, England. 1991, 31, pp. 315-382.R.

5. R. Lakshmipathy & R. Sagar : "Effect of die surface topography on die- work interfacial friction in open die forging' International Journal of Machine Tools and Manufacture, England, 1992, 32, pp. 685-693.

6. V. K. Gupta & R. Sagar : " A PC based system for integrating CMM & CAD for automated inspection and reverse engineering" Int. Jour. of Advanced Manufacturing Technology, Springer Verlag Ltd., London (1993) 8: 305-310.

7. V. K. Gupta & R. Sagar : "Total quality control using PC's in an engineering company", International Journal of Production Research, (U.K.), 1993. Vol. 31, No.1, pp. 161-172.

8. Nitin Seth, S. G. Deshmukh & R. Sagar : Some Studies for Quality Improvement in a Medium Scale Company, Industrial Engg. Journal, 1995 Vol. XXIV No. 10 pp. 15-23

9. K. C. Ramesh & R. Sagar : "Fabrication of Poppet Valves, Using Metal Matrix Composites", It. Jour, of Advanced Manufacturing Technology, 1999, Vol. 15 No. 2 pp. 114-118. No.2.

10. R. Purohit & R. Sagar : "Fabrication of a Cam Using Metal

	Matrix Composites" Int. J. Adv. Manuf. Technol., Vol. 17, 2001, pp. 644-648.
11. R. Purohit & R.Sagar	'Fabrication and Testing of Al-SiC Composite valve seat inserts'The International J. of Adv. Manuf. Technology, (2006) pp922-28
12. P. Sahu and R. Sagar	'Development of abrasive cut-off wheel having side grooves' The In. J. of Adv. Manu. Technology, Publisher- Springer-verlag, London Ltd, ISSN:0268-3768(Paper) 433-3015(Online) .
13. M. Soni, R. Sagar and A. K. Ghosh	'Finite Element Analysis to Use Mild Steel for a Tape Slit Die and Extrude Biodegradable Material' J. of The Institution of Engineers(India) Vol87 Sept. 2006 pp 46-50
14. D.Gosain, G. Gupta, Rajesh Purohit, and R.Sagar	'Metal Rubber'. Int Journal of Nanomanufacturing, Inderscience Enterprises Ltd, UK(2008)Vol 2N6
15. Rajesh Purohit and Rakesh Sagar	'Fabrication and impact wear testing of Al-SiCp composite valve seat inserts for Automobiles' Int. J. of vehicle systems modeling and testing, Indersience publishers Ltd(2009) Vol4,Nos1/2, pp102-116.
16. Rajesh Purohit and R. Sagar	'Fabrication and testing of AlSiCp composite poppet valve guides' Intl. J. of Adv. Manuf. Technology, Springer-verlag, London (2010)vol 51, pp 685-698

(b) INTERNATIONAL CONFERENCES/ SYMPOSIA

1. R. Sagar – 'Collapsibility of Cores and Moulds (Carbon dioxide – Sodium Silicate Process) Proceedings of the International Symposium on Innovations in Metal Casting Technology – Impact on Productivity, Institute of Indian Foundrymen, Calcutta, 1975, pp. 192-195.

2. R. Sagar & B. L. Juneja – 'An Upper Bound Solution for Bar Forging' presented at the 19th ISTM Conference, Kharagpur, India, 1974.
3. R. Sagar & B. L. Juneja – 'An Upper Bound Solution for Elliptical Disc Forging' Proceedings of the 20th ISTAM Conference, 1975, pp. 212-218.
4. R. K. Gupta & R. Sagar – 'Measurement of Coefficient of Friction in Wire Drawing' ASME International Symposium on Metal Working Lubrication. San Francisco, USA. August 1980.
5. R. Sagar – 'Friction in Cold Die Forging' presented at the Seminar on Surface Technology Applied to Dies and Moulds organized by the Asian Productivity Organization, Hong Kong, 2-6 Dec. 1985.
6. Anil Kumar & R. Sagar – 'Effect of friction and strain rates in the forging of aluminum strips "ICMF Conference organized by the American Society of Metals (India Chapter) Bombay, Feb. 19-22, 1987, pp. 43-48.
7. K. V. Ramakrishnan & R. Sagar – 'Relevance of Numerically Controlled Machine Tools in India' Second International Conference on Robotics and Factories of the Future, San Deigo, USA, July 1987, pp. 184-192.
8. R. Sagar & B. L. Juneja 'Mechanics of Forging of any Irregular Four- Sided Plate' 20th Midwestern Mechanics Conference, Purdue University, August 31- September 2, 1987.
9. A. Mandal, P. Jain & R. Sagar – 'Isostatic Pressing of Metal Powders' Twentieth Midwestern Mechanics Conference, Purdue University, August 31- September 2, 1987.
10. R. Lakshipathy & R. Sagar – 'Effect of surface pattern on die-work material interface in compression of metal billets' Twentieth Midwestern Mechanics Conference, Purdue University, August 31- September 2, 1987.
11. M. Mehdi, T. P. Sattar & R. Sagar – 'Pin assembly by robot' Third Int. Conf. CAD/CAM, Robotics and Factories of the Future, Southfield Michigan, USA, 14-17 August 1988, Vol. III, p. 64-69.
12. M. Mehdian & R. Sagar – ' A prototype flexible manufacturing system' Third International Conf. On CAD/CAM Robotics and Factories of the Future, Southfield Michigan, USA, 14-17 August 1988 Vol. I, pp. 309-315.
13. M. Mehdian & R. Sagar – 'A part transfer method for automated track guided Automated Guided Vehicle System' Fourth International Conference on CAD, CAM, Robotics and Factories of the future, December 19 to 22, 1989, IIT Delhi, Vol. II, pp. 753-760.
14. V.K. Gupta & R. Sagar – 'Computer Integrated Manufacture in Engineering Industry' Fourth Int. Conf. On CAD, CAM, Robotics and the Factories of the Future, December 19 to 22, 1989, IIT Delhi, Vol. II, pp. 159-172.
15. V.K. Gupta & R. Sagar – 'An Integrated approach to tool management system in manufacturing of precision engineering components' DACIM 91, P.S.G. College of Technology, Coimbatore, India, pp. 405-411.

16. V. K. Gupta & R. Sagar – 'Computer aided quality assurance systems' Fifth Int. Conf. On CAD/CAM, Robotics and the Factories of the Future, Omni International Hotel, Norfolk, Virginia, USA. December 2-5 1990 pp. 421-435.
17. V.K. Gupta & R. Sagar –'Flexible manufacturing system in manufacture of precision engineering components- key issues in implementation' Fifth Int. Conf. On CAD/CAM, Robotics and the Factories of the Future, Omni International Hotel, Norfolk, Virginia, USA. December 2-5, 1990, pp. 9-18.
18. V. K. Gupta & R. Sagar –'Integrated CMM and CAD system in manufacture of precision engineering components' Sixth Int. Conf. On CAD/CAM Robotics and Factories of the Future, South Bank University London. August 19-22, 1991, pp. 690-699.
19. V.K. Gupta & R. Sagar –'Computer aided design and software prototyping in manufacture of precision engineering components' Sixth International Conference on CAD/CAM Robotics and Factories of the Future, South Bank University, London, August 19-22, 1991 pp. 679-689.
20. R. Sagar, P.K. Madan, A. Jain, M. Kumar and R. Sachdeva –'Compaction of SIC – reinforced aluminum powders' Powder Metallurgy World Congress, June 21-26, 1992. San Francisco, California, USA.
21. P.K. Madan and R. Sagar ' The electric discharge machining of 6061A1/A1203' 9th Int. CAD/CAM, Robotics and Factories of the Future Conference held at the Radisson Hotel, Newark, New Jersey, USA, August 17-20, 1993.
22. P.K. Madan and R. Sagar 'The Electric Discharge Machining of Metal Matrix Composites' 9th Int. Conference held at the Radisson Hotel, Newark, New Jersey, USA, August 17-20, 1993.
23. V.K. Gupta and R. Sagar " Integrated Information Technology Approach' International Conference on CAD/CAM, Robotics and Autonomous Factories, held at IIT Delhi from 16-19 December 1993, Vol. 2, pp. 256-265.
24. M. Suliman, R. Sagar and B.L. Juneja " Gear Manufacture by Rolling using Single Rack Forming Tool" International Conference on CAD/CAM, Robotics and Autonomous Factories, Vol. 3, pp. 369-384.
25. P.K. Madan and R. Sagar " The Electrical Discharge Machining of 6061 Al/SIC Composites" Sixteenth AIMTDR Conference to be held at CMTI Bangalore, 8-10 December 1994.
26. P.K. Madan and R. Sagar "Processing, Microstructure of 6061 A1/ SIC Composites" Sixteenth AIMTDR Conference.
27. P.K. Madan, R. N. Mittal, B.L. Juneja and R. Sagar "Machining of Metal Matrix Composites " Ninth ISME Conference, Roorkee, 10-11 Nov. 1994.
28. R. Sagar and K.C. Ramesh, "Automotive Parts Fabrication Using Metal Matrix Composites". The 4th Asia Pacific Conference on Materials Processing Singapore, 19-21, May 1999.
29. R. Sagar, R. Purohit, R. Kumar, C. R. Meena and A. K. Shukla " Agile manufacturing, design and analysis of guides for poppet valves", 8th ISPE

International Conference on Concurrent Engineering Res. and applications, Anaheim, California, USA 28 July – 1 August 2001.

30. Purohit, R., Hemath Kumar G., Sagar, R., “Fabrication and wear testing of aluminum based metal matrix composite automotive parts”, National Seminar on Emerging Trends in Manufacturing, Proceedings of XVI National Convention of Production Engineers, January 19-20, 2002, IT BHU, Varanasi, pp. 495 500.
31. Purohit, R., Sahu, P., and Sagar, R., “Design and fabrication of various types of ball mills for the synthesis of aluminum based metal matrix composite powders”, International Conference on Powder Metallurgy for Automotive components and 28th annual Technical Meeting of PMAI on Powder Mutallurgy and Particulate Materials, 22-24th January, 2002, India. Habitat Centre, New Delhi.
32. Purohit, R., and Sagar, R., “ Modeling and simulation of press forming of aluminum 5 weight % SiC_p composites”, International Conference on Powder Metallurgy for Automotive Components and 28th annual Technical Meeting of PMAI on Powder Metallurgy and Particulate Materials, January 22-24, 2002, India Habitat Centre, New Delhi. Published in Powder Metallurgy in Automotive applications-II, pp. 159-168.
33. Sagar, R., Das, A. K., and Purohit, R., “Microstructure and fractographic study of Al-SiC_p composites”, Conference on Progress in composite Materials, October 18-19, 2002, Mumbai.
34. Purohit, R., Das, A. K., and Sagar, R., “ Hot Rolling of Al- SiC_p composites”, Conference on Progress in Composite Materials, October 18-19, 2002, Mumbai.
35. Soni, M., Sagar, R., and Ghosh, K., “ F.E. Analysis to use Mild Steel for A Tape Slit Die & Extrude Biodegradable Material Added in PP. International Conference CAD, CAM Robotic and Autonomous Factories, IIT Delhi. 11-13 Aug’03.
36. Purohit, R., Das, A. K., and Sagar, R., Cold Rolling of Al-SiC_p Composites. International Conference CAD, CAM Robotic and Autonomous Factories, IIT Delhi. 11-13 Aug’03.
37. R.Sagar, P. Edukondalu and G. Hemath Kumar’ Surface Finish and Roundness in very small and deep hole drilling’ ISEC-SMT 2005 Congress, ASM,
    Radison River Front Hotel, St Paul, Minneosota, USA, 1-3 Aug 2005.

38. R Purohit and R. Sagar’Automotive applications of Aluminum Matrix Composites’ IMPACT 2005, Le Meridian Hotel, New Delhi, India 1-2 Dec 2005.

39. G. Hemath Kumar and R .Sagar ‘Microstructure Charecterization and Mechanical Properties of Al-SiC Composites’ Int Conf. On advances in Mechanical Engineering, 14-16 Dec 2006. Chennai(Madras) India

40. P. Sahu , R .Sagar , G. Hemath. Kumar and Purohit Rajesh 'A newer approach for reduction of cutting zone temperature during the abrasive cut offwheel operation' , APIEMS, 17-19 Dec. 2006, Bangkok, Thailand.

41.. R.Sagar and P.Sahu 'Development of an abrasive wheel ' MCMAT 2007, ASME conf at Univ of Texas, Austin , USA 3-7 June 2007

.

42. .R.Sagar and P. Sahu 'Al-SiC metal matrix composite' AEROMAT 2007 ASM Conf at Convention center, Inner Harbour, Baltimore, USA.25-28 June07

43. P. Sahu,R. Sagar, G. Aggarwal, and R. Purohit,'Performance evaluation of glass reinforced-Silicon Carbide abrasive parting off wheels' Proceedings of Int and INCCOM-6 Conference, Future Trends in Composite Materials and Processing, IIT Kanpur,Dec. 12-14,2007

44. Gurjot Dhaliwal and R.Sagar 'AlSiC reinforced with glass fiber and bonded with epoxy' AEROMAT2008, June 23-26, 2008, Convention Center, Austin Texas, USA

45. R.Sagar, Mumtaz Ahmed and I.P.Singh; 'AlSiC composite for Cutting and Structural applications', AEROMAT2009, June 7-11, 2009, Dayton,Ohio, USA Session chair for two sessions on EMP, Tuesday 9th June 2009, AEROMAT 2009. organized by American Society of Materials

46. R.Sagar. S. Nenavath, P. M. Pandey and S. Jha ' Drilling of small transverse holes in wire(SMA) ', SMST organized by ASM, Asilomer, Monterey, CA, USA May 16-20, 2010,

NEWSPAPERS

1. R. Sagar 'Factories of the Future' National Herald, 23.07.1989.

2. R. Sagar 'Technology and Production' National Herald, 26.4.1990.

3. R. Sagar 'Robotic Revolution" Sunday Herald, 05.01.1992.

4. R. Sagar 'Insect Robot Awaits a Walk' The Hindu, 17.2.1993.

(c) ENCYCLOPAEDIA

1. R. Sagar, Rajesh Purohit 'Powder Metallurgy' Ind. Engg. Encyclopaedia.

(d) INVITED ARTICLES

1. R. Sagar 'EDM of Nano Litre plates and Metal Matrix Composites'

Modern Machine Tools, April 2004, pp 36-42

2. R Purohit and R. Sagar ' Metal Matrix Composites- New Materials for Auto Parts' Search, vol8, No1 pp 327-338

3. R. Sagar ' Electrochemical Machining, Furrowing in Tiny Spaces' Search, vol 9 No1, pp354-370

4. R. Sagar and P. Sahu 'Abrasive Machining –Making of a wheel' Modern Machine Tools, In three parts- Feb, Mar, April 2007. pp 54-60, pp42-47, pp44-53 respectively

5. R. Sagar ' Fabricating Metal Rubber' Modern Machine Tools, June 2007, pp44-48

ADMINISTRATIVE RESPONSIBILITIES

- Co-ordinator Practical Training & Placement, July 1984 to July 1992.
- In-charge Production Engineering Laboratory, 1977-78, 1997 to August 2003.
- In-charge Machine Tool Lab, 1997 to July 2001.
- In-charge Metrology Laboratory, 1991 to 1995.
- Course Advisor, 1983-87., 2005 to 08
- Program Co-ordinator, M. Tech. (Production Engineering) July 1992 to December 1995.
- Head Central Workshop, 1/9/2000 to 1/9/2004
- Chairman Production and Industrial Engineering Group 1st Sept. 2003 Dec 2004.
- President Mech. Engg. Society, IITDelhi, Sept2006 to 08

ORGANISATION OF CONFERENCES, WORKSHOPS ETC.

- General Secretary, the 4th International Conference on CAD/CAM, Robotics and Factories of the Future held at IIT, Delhi, December 19-22, 1989.
- Co-ordinator, workshop on Manufacturing Automation held at IIT Delhi, December 17-18, 1989.
- Co-ordinator, Indo-US workshop for Co-operative Research and Technology Transfer in Manufacturing Systems. Topics –CAD, CAM and Robotics, held at IIT Delhi, December 19-21, 1991.
- Co-ordinator, CEP Course on Robotics and Low Cost Automation held at IIT Delhi, April 20-25, 1992.
- General Secretary, International Conference on CAD/CAM, Robotics and Autonomous Factories held at IIT Delhi, December 16-19, 1993.
- Convener, International Conference on CAD, CAM, Robotics and Autonomous Factories held at IIT, Delhi August 11-13, 2003.

DEVELOPMENT WORK

- Strength Testing Machine for Sand.
- Linear Variable Differential Transducer for Measuring and Controlling Displacement.
- Electrical Mechanical Comparator.
- 50 Ton Hydraulic Press.
- Milling Dynamometer for the measurement of cutting forces.
- Pin Type Transducer for measuring interface friction.
- Shell Moulding Machine.
- Ring compression test for measuring the friction factor “m” in the forging process.
- Dynamometer for determination of friction in Wire Drawing.
- Composite Cylinder for isostatic compaction of metal powders (capacity 700 Mpa).
- Flexible Manufacturing System containing a Robot, Machining Centre, Automated Guided Vehicle, Buffer Stores and Retrieval System (UK).
- Briquetting Apparatus.
- Roller die set for tube drawing.
- Draw bench with rotating die.
- Roller die set for gear forming.
- Cryogenic testing and treatment chamber.
- Ball Mill.
- Attrition Mill.
- Dies and other low cost equipment for football making

* Pin on Disc Wear Testing Machine
* Pin on Drum Wear Testing Machine
* Valve guide wear Testing Machine

Jointly with:

Mr. S. C. Sethi	(1)
Prof. B. L. Juneja	(2-6, 13-15)
Mr. P. L. Mehta	(7)
Mr. Anil Kumar	(8)
Mr. R. K. Gupta	(9)
Mr. A. Mandal	(10)
Mr. M. Mehdian	(11)
Mr. S. K. Bidani	(12)
Mr G.Hemath Kumar	(20-22)

BOOKS AND TEACHING AIDS

1. CAD/CAM, Robotics and Factories of the Future three volumes of the proceedings, Edited jointly with Prof. B.L. Juneja and Prof. K.K. Pujara (1989) Tata Mc-Graw Hill, New Delhi.

2. CAD/CAM, Robotics and Autonomous Factories Four volumes of the proceedings, Edited jointly with Prof. B.L. Juneja and Prof. K.K. Pujara (1993) Tata Mc-Graw Hill, New Delhi
3. CAD/CAM, Robotics and Autonomous Factories Four volumes of the proceedings, Edited jointly with Prof. S.G. Deshmukh and Prof. Arun Kanda (2003).
4. Robotics
   A Course package prepared for the Continuing Education Program for engineers working in Industries.
5. Video Film on Sand Casting.
6. Slide packages in the areas of machining, welding, foundry and boilers jointly with Prof. B. L. Juneja.
7. Correspondence courses of Japanese Management Association/FAAI edited

AWARDS, PRIZES AND FELLOWSHIP ETC.

1. Fellow Member of ISPE. USA
2. Institute Scholarship 1964-68.
3. First Prize in General Knowledge 1964.
4. Chairman – Northern Region of the Indian Institution of Production Engineers.
5. Member Editorial Board- Int. J. of Nanomanufacturing, UK

CONSULTANCY

1. Development of metal powder Bushes, SHIV SHAKTI ENGINEERS, Ballabgarh, India.
2. Analysis of Failure of Copper Tubes, BLUE STAR, New Delhi.
3. Evaluation of Shot Peening Effects on Spring Steels, AKAL SPRING, Ludhiana, India.
4. Advance 'Tooling Systems', Indian Railways Workshops.
5. Forging of Flange, Indian Customs.
6. Permanent Magnet in unmagnetized condition, Indian Customs.
7. Fabrication of composite Glass and Testing for its conductivity, Gold Plus.3
8. Powder Metallurgy, Nusint, Yamuna Nagar.
9. Forged steel balls, UP Power House, Aligarh.
10. Forged steel balls, Rajsthan Power House, Suratgarh.

11. Evaluation of Fogging Machine Hindustan Latex

12. Energy and Waste Reduction in Commercial Buildings, Yardi Systems, Santa Barbara, CA, USA

13. Stainless Steel and Mild Steel Foundry, Joginder Kohli, Ghaziabad

14. Evaluation of Super Sucker Units, MCD, Delhi

15. Evaluation of Air Conditioning Equipment, Prodigy Projects Pvt. Ltd, Delhi

16. Evaluation of Chillers installed at Ghazipur Slaughter House, Aerocomfort Delhi

17. Evaluation of Air Cooled Air Conditioning System of Railway Hospital, Aerocomfort, Delhi

18. Evaluation of Stainless Steel Tubes, Jindal Steels, Hissar, Haryana

NB: All the appointments at IIT Delhi were permanent, other assignments were visiting and the job continued at IIT Delhi (July 1969-June 2010).