



Surendra Singh
Associate Professor

Metallurgical and Materials Engineering
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Research Interests:

Thermo mechanical treatment of Al alloys, Corrosion of Weldments, Surface Engineering, Erosion Corrosion and its prevention, Thermal spray coatings, Materials Development, Heat Treatment, Materials Selection and Characterisation, Erosion Corrosion, High-temperature materials and processes.

Name & Designation : Dr. Surendra Singh, Assoc. Professor

Date of Birth : 6th August 1947

Nationality : Indian

Marital Status : Married

Email : surenfmt@iitr.ernet.in

Teaching Experience : About 36 years

Research Papers : More than 43 Published in Refereed Journals & National & International Conferences

No. of Ph.D. Thesis Guided : 02

No. of Ph.D. Thesis Guiding : 02

No. of M.E. Thesis : **18**

No. of M. Phil Thesis : **01**

BIOGRAPHICAL NOTE:

Passed BE (Metallurgy) in 1971 and M.E. (Physical metallurgy) in 1973 from University of Roorkee, India, joined Metallurgical Engineering Department at University of Roorkee as Lecturer in 1973 and completed PhD (part time) from University of Roorkee in 1986. Received University gold medal for Standing Ist in M.E. (1973) and Khosla Medal on Research paper (1986). Presently, serving as Associate Professor. Authored more than 43 research papers in refereed journals and national and international conferences.

LIST OF SHORT TERM/CONTINUING EDUCATION / SPECIALIST COURSES CONDUCTED

1. Specialist course on “Advances in Heat Treatment Technology”, coordinated by Dr D B Goel and **Dr S. Singh** during Feb. 6-14, 1989, under the joint venture of Department of Metallurgical Engineering, University of Roorkee and the Institution of Engineers, India, Roorkee Local centre Roorkee.
2. QIP short term course on “Metallurgical Failures” by Dr D B Goel and **Dr S. Singh** under QIP centre, UOR, Roorkee during June 22 to July 06, 1993.
3. QIP short term summer course on “Metallurgical Failures and their Remedial Measures” by Dr D B Goel and **Dr S. Singh** under QIP centre, UOR, Roorkee during June 27 to July 11, 1995.
4. QIP short term course on “Non Destructive Testing and its Application in Industry”, coordinated by Dr S Prakash and **Dr S. Singh** under QIP centre , IIT Roorkee during June 02 to June 06, 2008.

DETAILS OF THESIS SUPERVISED

Degree	Title of Thesis	Year	Name of student	Name of Co-Supervisor
M.E.	Thermomechanical treatment of 2218 Al-Alloy	1980	N.C. Upadhyay	Dr D. B. Goel
M.Phil.	Electron microscopy study of Thermomechanically aged 2218 Al-Alloy	1986	Mukesh Kumar	Dr D. B. Goel Dr K Chandra
M.E.	Thermomechanical ageing 2014 Al-Alloy	1991	A K Sarna	Dr D. B. Goel
M.E.	Effect of Thermal Treatments on Mechanical Properties of 13/4 steel weldment	2000	Vikram singh	Dr G.C. Kaushal
M.Tech.	Studies on dimensional changes and distortion in material during post forging finishing operation.	2001	Milind V Meshram	Dr S. Prakash
M.Tech.	Design of Press tools	2002	Pankaj Vashistha	Dr S. Prakash
M.Sc. Physics	Effect of Thermomechanical ageing treatment on Corrosion behavior of 2014 Al-Alloy	2002	Saurabh Saxena	Dr S. Prakash Dr G.D. Verma
M.Tech.	Failure analysis of Boiler components in the Anpara Thermal Power Station with Case Studies	2003	Summit Chaurassia	Dr S. Prakash
M.Tech.	To study the wear behavior of Thermomechanically aged 2014 Al-Alloy	2003	Shyam Kr. Pandey	Dr S. Prakash
M.Tech.	Effect of Thermomechanical processing on the precipitation behavior a cobalt based superalloy	2003	Shivakant	Dr S. Prakash

M.Tech.	Friction and wear behavior of grey cast iron	2005	Pandya Shailesh Kumar N.	Dr S. K. Nath Dr G.C. Kaushal
M.Tech.	Ageing behavior of Copper bearing HSLA-100 (GPT) steel	2005	Amit Virmani	Dr D. B. Goel
M.Tech.	To study the Thermo-mechanical behavior of A291 Magnesium alloy	2005	Deppak Kumar	Dr S. Ray
M.Tech.	Effect of Heat Treatment on Structure and Erosion of Nitronic Steel	2005	Sreenu Banothu	Dr D. B. Goel
M.Tech.	Erosion behavior of Nitronic Steel	2006	Nilesh Kumbhare	Dr D. B. Goel
M.Tech.	Ageing behavior of copper bearing HSLA 100 (GPT) steel	2006	Ratnakar Malik	Dr D. B. Goel
M.Tech.	Evaluation of Mechanical properties of dissimilar welded specimen (TIG,EBW, Friction welding)	2007	Kamal Sehgal	Dr S. Prakash
M.Tech.	Hot corrosion & aqueous corrosion studies on friction welded dissimilar metals	2008	Sunil Soni	Dr S. Prakash
M.Tech.	Study of hot and aqueous corrosion of EBW dissimilar welds	2008	Kishore Reddy V.	Dr S. Prakash

Degree	Title of Thesis	Year	Name of student	Name of Co-Supervisor
PhD.	Role of Inhibitors on Hot Corrosion behavior of Superalloys in Na₂SO₄ Environment	2003	Gitanjaly	Dr S. Prakash
PhD.	High temperature corrosion studies on welded dissimilar metals	2007	N. Arivazhagan	Dr S. Prakash
PhD.	Study of detonation gun coated alloys for resistance to erosion and corrosion	In Progress	Pawan Kumar Sapra	Dr S. Prakash
PhD.	High temperature Erosion-Corrosion of Coatings on superalloys	In progress	Gurbhinder Singh	Dr S. Prakash

LIST OF SPONSORED/CONSULTANCEY PROJECTS

S. No.	Title	Amount (Rs.) In Lacs
1.	Development of stainless steel bellows for Indfos Industry Ghaziabad	1.50
2.	Formulation of Heat Treatment of Threading Dies for Sharp Tools Pvt. Ltd. Paonta Sahib (H.P.)	0.30
3.	Investigation in Cracking of Continuously cast product during Rolling of Arti steels Ludhiana (Pb.)	0.30
4.	Hot Corrosion in Boilers due to formation of Low temperature vanadates sponsored by AICTE	2.97
5.	Investigation into Residual Life of Runner Assembly in UttarKashi Powerhouse (Uttarkashi Power Corporation)	0.25
6.	Investigation into the Failure of Tractor Components (Escorts Research Centre)	0.25
7.	Characterisation of High Speed Steel components Starwire India ltd. Ballabgarh (Hr.)	0.25
8.	Effect of Cryo rolling on the Precipitation Kinetics of Selected ultra fine Grained Al-alloys sponsored by DST	38.0

LIST OF PAPERS PUBLISHED:

(A) International Referred Journals

1. Sapra, P.K., **Singh, S.**, Prakash, S. and Arivazhagan, N. (2009) 'Performance of Al₂O₃-3%TiO₂ detonation gun coated ferritic steels in coal fired boiler', Int. J. Surface Science and Engineering, Vol. 3, No. 1/2, pp.145-156.
2. Harpreet Singh , Gitanjaly, Surendra Singh, S. Prakash, (2009) "High temperature corrosion behaviour of some Fe-, Co- and Ni-base superalloys in the presence of Y₂O₃ as inhibitor" Applied Surface Science xxx xxx–xxx
3. Sapra, P.K., **Singh, S.** and Prakash, S. (2008) 'Evaluation of detonation gun sprayed alumina titania coatings', Int. J. Surface Science and Engineering, Vol. 2, No. 5, pp.400–408.
4. Pawan Kumar Sapra, **Surendra Singh**, Satya Prakash, "Detonation spray gun coatings against high temperature erosion in actual Boiler Environment", International Journal of Materials and Product Technology (IJMPT) (In Press)
5. Arivazhagan N, **Surendra Singh**, Satya Prakash, G.M.Reddy (2008) "An Assessment of Hardness, Impact Strength and Hot Corrosion Behaviour of Friction Welded Dissimilar Weldments between AISI 4140 and AISI 304" International Journal of Advanced Manufacturing Technology, Vol 39 (7-8), pp 679-689
6. **Arivazhagan N, Surendra Singh, Satya Prakash**, "Hot Corrosion Studies on Dissimilar Friction Welded Low Alloy Steel and Austenitic Stainless Steel under Chlorine-Containing Salt Deposits under Cyclic Conditions" Corrosion Engineering Science and Technology, (Accepted for Publication).
7. **Arivazhagan N, Surendra Singh, Satya Prakash**, "Hot corrosion studies on friction welded low alloy steel and stainless steel exposed in air and molten salt" Journal of Materials Engineering and Performance, (Accepted for Publication).

8. N. Arivazhgan, **Surendra Singh**, Satya Prakash, G.M. Reddy 'High Temperature oxidation in Air and Molten Salt ($\text{Na}_2\text{SO}_4+50\% \text{NaCl}$) Corrosion of Friction Welded Low Alloy Steel and Stainless Steel Welds in Temperature range of 500-600°C', , Materials Transaction, 'A' (Accepted for Publication).
9. N. Arivazhgan, **S. Singh**, S. Prakash and G.M. Reddy, (2006), 'High temperature corrosion studies on friction-welded dissimilar metals', published in Materials Science and Engineering B, Vol. 132, p. 222-227.
10. **S. Singh** and D.B. Goel 'Influence of Thermomechanical ageing on fatigue behaviour of 2014 Al-alloy', Bulletin of Materials Science, Indian Academy of Science Bangalore, Vol. 28, No. 2, April 2005, p. 91-96.
11. Gitanjali, S. prakash and **S. Singh** 'Effect of MgO and CaO on hot corrosion of Fe base superalloys superfer 800 H in $\text{Na}_2\text{SO}_4-60\% \text{V}_2\text{O}_5$ environment', British Corrosion Journal 2002, Vol. 37, No. 1, p. 56-62
12. **S. Singh** and D.B. Goel 'Thermomechanical Ageing (TMA) of 2014 Aluminium Alloy for Aerospace Applications', Bulletin of Materials Science, Indian Academy of Science, Bangalore, Vol. 14, No. 1, Feb., 1991, p. 35-41.
13. **S. Singh** and D.B. Goel 'Influence of Thermomechanical Ageing on Tensile Properties of 2014 Al-Alloy', Journal of Materials Science, Chapman and Hall Ltd., London, Vol.25 (1990), p. 3894-3900.
14. **S. Singh** and D.B. Goel, Strengthening of Alloy AlCuSiMn(2014) by Thermomechanical Treatment, ALUMINIUM, Vol. 65, Jan. 1989, p. 64.
15. Mukesh Kumar, **S. Singh** and D.B. Goel, 'Electron Microscopic Studies of Thermomechanically aged 2218 Al-Alloys', Bulletin of Materials Science, Indian Academy of Science, Bangalore , Vol. 10, No. 3, May 1988, p. 217-222

(B) International and National Conferences:

16. Pawan Kumar Sapra, **Surendra Singh**, Satya Prakash, N Arivazhagan "Performance of Fe-based Superalloy Supefer-800 in the Real Service Environment of the Boiler, International Symposium "Fundamental Corrosion Research in Progress" NACE Northern Area Eastern Conference "Minimizing Infrastructure Corrosion" October 26-28, **2008** Toronto, Ontario, Canada.
17. Pawan Kumar Sapra, **Surendra Singh**, Satya Prakash, N Arivazhagan, High temperature erosion behavior of detonation gun-sprayed alumina-titania coatings under simulated coal-fired boiler atmospheres, 2nd International conference on Advanced Tribology iCAT **2008**,(Singapore) ISBN 978-981-08-2067-1, Paper No. iCAT295, p. 554
18. Arivazhagan Natarajan, **Surendra Singh**, Satya Prakash, G. M. Reddy , "Hot corrosion studies on Friction Welded dissimilar metals of AISI 4140 and AISI 304 under air and molten salt mixture of Na₂SO₄ + 50% NaCl " Paper No. 4C162:, **2008** Joint Symposium on Molten Salts, Kobe Japan.
19. Arivazhgan N., **Surendra Singh**, Satya prakash and Reddy G.M. 'High Temperature Corrosion Studies on Dissimilar Friction Welded and Electron Beam Welded AISI 304 and AISI 4140 in the Molten salt Environment of Na₂SO₄ + V₂O₅ (60%)', in 33rd International Symposium for Testing & Failure Analysis (Materials Science & Technology 2007) held during Nov. 4-8, **2007** at Michigan (USA).
20. **S. Singh** and D.B. Goel, 'Influence of Thermomechanical Ageing on Mechanical Properties of 2014 Al-Alloy', presented in the "ALUCAST 2007" National conference on Technology Trends in Aluminium Cast Components and Processes held at MNIT Jaipur during December 10-12, 2007, pp 83-86.
21. Arivazhgan N., **Surendra Singh**, Satya prakash and Reddy G.M., 'An Effect of Burn-off length on Mechanical Properties and Hot Corrosion Behaviour under Na₂SO₄ + NaCl (50%) of Friction Welded AISI 4140

- and AISI 304 Dissimilar Metals”, 3rd Joint Conference, Finland, Aug. 22-23, **2007**.
22. Arivazhgan N., **Surendra Singh**, Satya prakash and Reddy G.M., ‘High Temperature Corrosion Studies on and Electron Beam and friction welded AISI 304 and AISI 4140 in the molten salt Environment of K₂SO₄ + NaCl (60%)’, ICMAT 2007 Singapore, July 1-6, **2007**.
 23. **Arivazhagan N, Surendra Singh, SatyaPrakash and Reddy G.M**, “Hot Corrosion Studies of Dissimilar Friction Welded Low Alloy Steel and Austenitic Stainless Steel below Chlorine-Containing Salt Deposits” Accepted for Oral Presentation ICMAT **2007** Singapore.
 24. N. Arivazhgan, R. Jayaganthan, **S. Singh** and S. Prakash, ‘A study on the high temperature corrosion behaviour of nano-crystalline Ni-base alloys’, 3rd International Conference on Materials for Advance Technologies, Symposium-W: ICMAT 2005, held at Singapore during July 03-08, **2005**, Organised by Materials Research Society, Singapore.
 25. N. Arivazhgan, **S. Singh**, S. Prakash and G.M. Reddy ‘High Temperature Corrosion Studies on friction welded dissimilar metals’, 3rd International Conference on Materials for Advance Technologies Symposium-W: ICMAT 2005, held at Singapore during July 03-08, **2005**, p. 222 Organised by Materials Research Society Singapore.
 26. N. Arivazhgan, **S. Singh** and S. Prakash, ‘Corrosion behaviour of friction welded dissimilar metals’, published in the proceedings of 18th National Convention of Metallurgical and Materials Engineers, held at MNIT Jaipur, during Oct 11-12, **2004**.
 27. S. Prakash, **S. Singh** and N. Arivazhagan, ‘Weldability and Corrosion effect of dissimilar metal combinations’, published in the proceedings of XIII National Conference of Indian Society of Mechanical Engineers ISME-2003, held at IIT Roorkee during Dec. 30-31, **2003**, PE-067.
 28. Gitanjaly, Surendra Singh and S. Prakash (2003), ‘Effect of superficially applied oxides on the hot corrosion behavior of Fe- and Ni-Base Superalloys in Na₂SO₄-60%V₂O₅’, Presented in International

Conference, “2nd Surface Engineering Congress and Exposition,” held at Indianapolis (USA) on 15-18th September, 2003.

29. Gitanjaly, **S. Singh** and S. Prakash, ‘Effect of Superficially applied CeO₂ and Y₂O₃ on the hot corrosion behaviour of Fe and Ni base superalloys in Na₂SO₄ – 60% V₂O₅’, presented at International congress on Emerging Corrosion Control Strategies for the new millennium, held at Indian habitat center, New Delhi during Feb. 20-22, **2002** (Published in the CD ROM).
30. Gitanjaly, **Surendra Singh** and Satya Prakash, ‘Hot corrosion-an Overview’, Proc. of National Seminar on Advances in Materials & Processing, held at IIT, Roorkee during Nov. 9-10, **2001**, p. 254.
31. S. Prakash, **Surendra Singh**, Buta Singh Sidhu and Amitesh madhesia, ‘Tube Failures in Coal Fired Boilers’, Proc. of National Seminar on Advances in Materials & Processing, held at IIT, Roorkee during Nov. 9-10, **2001**, p. 245.
32. Gitanjaly, **Surendra Singh**, S. Prakash, ‘Effect of Additives on the hot corrosion behaviour of superalloy superfer-800 H’, published in proc. of National Seminar on Advances in Materials & Processing, held at IIT, Roorkee during Nov. 9-10, **2001**, p. 236.
33. Vikram Singh, **Surendra Singh** and G.C. Kaushal, ‘Effect of Thermal Treatments on mechanical properties of 13/4 steel Weldments’, published in proc.of National Seminar on Advances in materials and processing, held at IIT Roorkee during Nov. 9-10, **2001**,p.118.
34. **S. Singh** and D.B. Goel ‘Industry-Institute interaction through Continuing education’, , published in proc. of National conference on Continuing Education, held at University of Roorkee, Roorkee during Oct. 4-5, **1991**, p.216.
35. **S. Singh** and D.B. Goel, ‘Optimization model of Thermomechanical Ageing (TMA) Treatment Cycles for 2014 Al-Alloy’, presented in the international conference on Modelling and Simulation held at Shekou (China) during Nov.7-9, **1989**.

36. **S. Singh** and D.B. Goel, (1989) Fracture Toughness of Thermomechanical Aged 2014 Aluminium Alloy, Proceedings of International Symposium on 'Advanced Materials', Islamabad (Pakistan), p.255.
37. Q.M. Amir, D.B. Goel, **S.Singh** and M.S.Kalra 'Peripheral Grain Coarsening in 2014 Al-Alloy', , presented in the National conference on Alloy Design and Development, held during March 10-11, **1989** at University of Roorkee, Roorkee.
38. D.B. Goel, **S.Singh** and K.Chandra, 'STEP and metallurgical industries', published in proc. of National Seminar on interaction between Institutions and Industries through STEP held at University of Roorkee, Roorkee during Feb. 20-22, **1988**, p. III-19.
39. Mukesh Kumar, **S. Singh** and D.B. Goel, 'Strengthening of 2014 Aluminium Alloy by Thermomechanical Ageing (TMA) Treatment', published in Proc. of 67th Annual Meeting of Institution of Engineers (India), U.P. state centre Lucknow on Feb. 7, **1988**, p.40.
40. G. Chauhan , **S. Singh** and A.S. Chawla 'Metallurgical Constraints on mechanical components of Hydroelectric Projects', , Published in Proc. of All Indian Seminar on Metallurgical problems in power projects, held at Institution of Engineers (India), U.P., State centre Lucknow, during Oct. 30-31, **1987**, p.383.
41. **S. Singh** and D.B. Goel 'Structural changes Thermomechanical Ageing of 2014 Al-Alloy', published in Proc. of XIth International Cong. On Electron Microscopy held at Kyoto, Japan, during Aug-Sept. **1986**, p. 1611.
42. **S. Singh** and D.B. Goel 'Fatigue and fracture toughness of thermomechanically aged 2014 Al-Alloy', published in proc of IInd international symposium on Electron microscopy and biophysics, held at Panjab university Chandigarh , during Jan-Feb. **1986**, p.265.
43. **S. Singh** and D.B. Goel, Thermomechanical Ageing of 2014 Al- Alloy', published in the proceedings of National conference on Aluminium metallurgy, held at I.I.Sc. Bangalore, during October **1979**, p.267.

BOOKS/ MONOGRAPHS/MANUALS

- ❖ Prepared a manual on Physical Metallurgy of Non-ferrous metals and alloys, sponsored by MHRD, Govt. of India, under continuing Education Department University of Roorkee.
- ❖ Edited Proceedings of National Seminar on “Advances in Materials and Processes” held during Nov 2001 at Department of Metallurgical and Materials Engineering, Indian Institute of Technology, Roorkee.