

# Brief Resume of Surendra Kumar

## Surendra Kumar, PhD

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## SUMMARY

Surendra Kumar received Ph.D. degree in mechanical engineering from Indian Institute of Technology, Kharagpur. He has over 23 years of job experience which include research experience (at CSIR-National Metallurgical Laboratory, Jamshedpur; CSIR Centre for Mathematical Modelling and Computer Simulation, Bangalore and CSIR-Central Mechanical Engineering Research Institute, Durgapur) and teaching experience (at National Institute of Foundry and Technology, Ranchi).

His fields of research interest include *Stress Analysis of Structures, Finite Element Method, Composite Materials, Modeling of Metal Working Processes and Software Development.*

## EDUCATION

<b>Ph.D.</b>	Mechanical Engineering	Indian Institute of Technology, Kharagpur	1999
<b>M.Tech.</b>	Mechanical Engineering (CAD/CAM)	National Institute of Technology, Jamshedpur	1994
<b>B.Sc. (Engg.)</b>	Mechanical Engineering	National Institute of Technology, Jamshedpur	1992

## EXPERIENCE

<b>2013 to present</b>	Senior Scientist	Principal	Central Mechanical Engineering Research Institute, Durgapur
<b>2010-2013</b>	Principal Scientist		Central Mechanical Engineering Research Institute, Durgapur
<b>2006-2010</b>	Principal Scientist		CSIR Centre for Mathematical Modelling and Computer Simulation (C-MMACS), Bangalore
<b>2004-2006</b>	Assistant Professor		National Institute of Foundry and Forge Technology, Ranchi
<b>1997-2004</b>	Junior Scientist		National Metallurgical Laboratory, Jamshedpur

## RESEARCH PROJECTS

<i>Period</i>	<i>Title</i>	<i>Sponsor</i>	<i>Role</i>
<b>2020-Continuing</b>	<i>Multiscale Modelling of Structural Response of CNT (Carbon Nanotube) Reinforced Laminated Composites</i>	AR&DB, New Delhi	Principal Investigator
<b>May 2019-Sep 2019</b>	<i>Finite Element Analysis of Brake Disc for LHB Coach of Indian Railways</i>	Mackeil & Co. Pvt. Ltd., Kolkata	Principal Investigator
<b>Nov 2017-Feb 2018</b>	<i>Stress Analysis and Fatigue Life Estimation of Railway Wheel under Combined Mechanical and Thermal Loads Using Finite Element Method</i>	Durgapur Steel Plant, Durgapur	Principal Investigator
<b>2017-2019</b>	<i>Design and development of mob control vehicle (Work package-II)</i>	CSIR MLP project	Member
<b>2016-2019</b>	<i>Development of Design Methodology for Lightweight High Pressure Hydrogen Storage Composite Cylinder for Vehicular Applications</i>	Ministry of New and Renewable Energy, New Delhi	Principal Investigator
<b>2013-2016</b>	<i>Numerical Model for Realistic Simulation of Support-Strata Interaction</i>	CSIR Network Project (Nodal Lab: CSIR-CIMFR, Dhanbad)	Participating Scientist
<b>2012-2013</b>	<i>Design of Light Weight Composite Cylinders for Storage of Compressed Natural Gas for Mobile Applications</i>	GAIL (India) Limited, New Delhi	Principal Leader
<b>2006-2010</b>	<i>Finite Element Modeling of Thermomechanical Behaviour and Microstructural Evolution in Steel during Hot Deformation Processes</i>	SERC, DST, New Delhi	Principal Investigator
<b>2003-2005</b>	<i>Studies on Damage Mechanics of Composite Structures</i>	VSSC, Thiruvananthapuram (ISRO)	Principal Investigator
<b>2001-2004</b>	<i>Maximizing blast furnace productivity with Indian iron ores</i>	Ministry of Steel, India	Member
<b>2000-2003</b>	<i>Development of aluminium alloy matrix composite plates for defence applications</i>	DRDO, New Delhi	Member
<b>1999-2000</b>	<i>Development of Clad Metal Laminates Using Roll-Bonding Techniques and Numerical Simulation of the Related Processes</i>	In-house research project at NML, Jamshedpur	Principal Investigator
<b>1999-2001</b>	<i>Development of rapidly solidified Mg-base alloys</i>	VSSC, Thiruvananthapuram	Member
<b>1998-2000</b>	<i>Texture development in AISI 316 SS during cold rolling and annealing</i>	DST, New Delhi	Member
<b>1998-2000</b>	<i>Evaluation and recommendation of corrosion-resistant, mechanical properties and chemistry of corrosion-resistant steel bars</i>	S.S. Narmada Nigam, Gandhinagar	Member

## THESES SUPERVISED (M.Tech.)

Year	Title of the Thesis	Name and Affiliation of the Student
2013-2014	<i>Fatigue Analysis of Composite Reinforced CNG Storage Pressure Vessel- An FEM based Approach</i>	Anand Kumar Agrawal (PGRPE, AcSIR)
2013-2014	<i>Analytical and Finite Element Study of Mechanical And Vibrational Characteristics of Carbon Nanotube Reinforced Composites</i>	Shweta Paunikar (PGRPE, AcSIR)
2005-2006	<i>Finite Element Simulation of Hot-Strip Rolling Processes</i>	Jayant G. Deshmukh (NIFFT, Ranchi)
2005-2006	<i>Finite Element Modeling of Thermomechanical Behavior in Steel during Hot Deformation Processes</i>	B. Polaiah (NIFFT, Ranchi)
2002-2003	<i>Deformation Characteristics of Particle-Reinforced Aluminium Matrix Composites during Forging</i>	T. S. Arvinthan (NIFFT, Ranchi)
2002-2003	<i>Studies on Deformation Processing of SiC Particulate-Reinforced Aluminium Alloy Composites</i>	Sujit Kumar (NIT Jamshedpur)
2001-2002	<i>Three-dimensional Finite Element Analysis of Composite Beams and Plates</i>	Sunil Kumar Jha (NIT Jamshedpur)

## COURSES TAUGHT

2012-2015	Computer Lab I, Computer Lab II, Finite Element Method and Mechanics of Composite Materials for PG students at AcSIR, CSIR, New Delhi.
2004-2006	Advanced Metal Working Technology for PG students; and Engineering Graphics, Machine Drawing, Transport Phenomena, Computer Graphics and CAD, Modern Forging Processes, etc. for UG students at NIFFT, Ranchi.

## PUBLICATIONS

### *In Journal*

- 1) S. Kansabanik, B. Swarnakar, K.J. Uke and **S. Kumar**, "*In-situ single plane balancing in vertical circulating water pump-motor system*", International Journal of Mechanical and Production Engineering Research and Development, Special Issue, Jun 2018, pp. 452-458.
- 2) S. Paunikar and **S. Kumar**, "*Effect of CNT waviness on the effective mechanical properties of long and short CNT reinforced composites*", Computational Materials Science, Vol. 95, 2014, pp. 21–28.
- 3) A.K. Agrawal and **S. Kumar**, "*Fatigue Life Prediction of a Hoop-Wrapped Composite CNG Cylinder Containing Surface Flaw*", International Journal of Emerging Technology and Advanced Engineering, Vol. 4, No. 3, 2014, pp. 790-796.
- 4) **S. Kumar**, "*Use of Unsymmetric Finite element Method in Impact Analysis of Composite Laminates*", Finite Element in Analysis and Design, Vol. 47, No. 4, 2011, pp. 373–377.
- 5) **S. Kumar**, "*Analysis of Impact Response and Damage in Laminated Composite Cylindrical Shells Undergoing Large Deformations*", Structural Engineering and Mechanics, Vol. 35,

No. 3, 2010, pp. 349-364.

- 6) **S. Kumar**, "Three-Dimensional Non-Linear Finite Element Analysis of Impact Response and Damage in Laminated Composite Shells", Journal of Aerospace Sciences and Technologies, VOL.62, No.2, 2010, pp. 109-121.
- 7) **S. Kumar**, "Object-Oriented Finite Element Analysis of Metal Working Processes", Journal of Software Engineering and Applications, Vol. 3, No. 6, 2010, pp. 572-579.
- 8) **S. Kumar**, "Object-Oriented Finite Element Programming for Engineering Analysis in C++", Journal of Software, Vol. 5, No. 7, 2010, pp. 689-696.
- 9) **S. Kumar** and G. Prathap, "Mesh distortion, locking and the use of metric trial functions for displacement type finite elements", Structural Engineering and Mechanics, Vol. 29, No. 3, 2008, pp. 289-300.
- 10) **S. Kumar**, "Analysis of Impact Response and Damage in Laminated Composite Shell Involving Large Deformation and Material Degradation", Journal of Mechanics of Materials and Structures, Vol. 3, No. 9, 2008, pp. 1741-1756.
- 11) **S. Kumar**, B.N. Rao and B. Pradhan, "Effect of impactor parameters and laminate characteristics on impact response and damage in curved composite laminates", Journal of Reinforced Plastics and Composites, Vol. 26, No. 13, 2007, pp. 1273-1290.
- 12) **S. Kumar**, "Some Studies on Hot Extrusion of Rapidly Solidified Mg-Alloys", Journal of Materials Engineering and Performance, ASM International, Vol. 15, No. 1, 2006, pp. 41-46.
- 13) **S. Kumar**, "Heat Transfer Analysis and Estimation of Refractory Wear in an Iron Blast Furnace Hearth Using Finite Element Method", ISIJ International, Vol. 45, No. 8, 2005, pp. 1122-1128.
- 14) S.G. Chowdhury, S. Das, B.R. Kumar, **S. Kumar** and G. Gottstein, "Textural development in AISI 316 stainless steel during cold rolling and annealing", Materials Science Forum, Vols 408-412, 2002, pp. 1371-1376.
- 15) B. Pradhan and **S. Kumar**, "Finite element analysis of low-velocity impact damage in composite laminates", Journal of Reinforced Plastics and Composites, Vol. 19, No. 04, 2000, pp. 322-339.

#### **Book Published**

**S. Kumar**, *Finite Element Method: Theory, Software and Practice*, Studium Press (India) Pvt. Ltd, New Delhi, First Edition, 2012.

#### **PATENTS/COPYRIGHTS**

<i>Title</i>	<i>Country</i>	<i>Date</i>	<i>Author</i>
<b>PATENT</b>			
1) <i>Sandwich Structure with Ballistic Protection for Mob Control Vehicle</i>	India	Filed on : 18th Feb, 2020	Pranab Samanta, Tapas Kuila, <b>Surendra Kumar</b> , Naresh Chandra Murmu and Harish Hirani
<b>COPYRIGHTS</b>			
1) <i>Light Weight Composite Cylinder of 70 Litre Water Capacity and 350</i>	India	Registration No.: L-83126/2019,	<b>Surendra Kumar</b> , Nasir Hussain and

<i>Bar Working Pressure for Storage of Hydrogen Gas for Vehicular Applications</i>		Date of Registration: 8th June 2019	Kamalkishor J. Uke
<i>2) Light Weight Hoop-Wrapped Composite Cylinder of 70 Litre Water Capacity for Storage of Compressed Natural Gas for Mobile Applications</i>	India	Registration No. : L-59249/2014, Date of Registration : 27th May 2014	<b>Surendra Kumar,</b> Pradipta Basu-Mandal, Somenath Mukherjee, P.K. Pal, M.V.Ravi Someswarudu, Parivesh Chugh
<i>3) Light Weight Fully-Wrapped Composite Cylinder of 70 Litre Water Capacity for Storage of Compressed Natural Gas for Mobile Applications</i>	India	Registration No.: L-59234/2014, Date of Registration : 27th May 2014	<b>Surendra Kumar,</b> Pradipta Basu-Mandal, Somenath Mukherjee, P.K. Pal, M.V.Ravi Someswarudu, Parivesh Chugh

#### AWARDS/RECOGNITIONS/AFFILIATIONS

- National Merit Scholarship (during I.Sc. and B.Sc. (Engg.))
- GATE Scholarship (during M. Tech.)
- Best Paper Publication (In Journal) Award - 2005 by Indian Institute of Metals (IIM), Ranchi Chapter
- Life member of Institution of Engineers, India
- Life member of Indian Institute of Metals (IIM)
- Life member of Materials Research Society of India (MRSI)