DR. SHUBHASHIS SANYAL

Professor

Mechanical Engineering Department,

NIT Raipur, Raipur (C.G.) 492010

Area of Interest: Synthesis of Mechanisms, Machine Design, Stress Analysis.

Awards:

1. **GSFC and ISTE National Award for Best M.Tech. Thesis "Safe Spacing of Nozzles in Pressure Vessel"** submitted under the guidance of Prof. K. B. Mulchandani, M.I.E.D. University of Roorkee, Second Prize Holder, 1990.
2. Institute is awarded for **Dedicated Industry Linkage Activities** at **CIIILP - SHOW CASE CONFERENCE GOA** – 8-10 Oct. 2004.
3. **Outstanding Engineering Teacher Award,** felicitated by the Institution of Engineers (India) Chhattisgarh State Centre, 5th Sept. 2014.
4. **Certificate of Appreciation** as TEQIP Coordinator by NPIU, MHRD, GOI.
5. Certified **Applied DACUM Facilitator** and **Applied Strategic Planning Trainer,** Canada India Industry Institute Linkage Project

Portfolio's handled: Hostel Warden, Chief Warden, Chairman Purchase Committee, Prof. I/C Workshop, Head of the Dept. (Applied Mechanics), Registrar I/C, Member Secretary BOG, Finance and Senate, Member BOG, Head of the Dept. (Mechanical), Dean (R&C), Dean (FW), Industry Linkage Officer (CIIILP), Chairman Continuing Education Cell, Chairman BOS, Chairman DRC, TEQIP- II Coordinator, TEQIP - III Coordinator, Prof. I/C – Click Club, Prof. I/C – Raaga Club.

Membership of Professional Institutions:

1. Life Member, **Indian Society for Technical Education**.
2. Life Member, **Association for Machines & Mechanisms.**
3. Fellow Member**, Institution of Engineers.**
4. Life Member, **Tribology Society of India.**

Doctoral Thesis Supervised:

1. **Investigation on the performances of Rolling Element Bearings for Enhanced Life by Shri S. P. S. Matharu, Co-supervised by Dr. D.S.Bal.**
2. **Kinematic Synthesis and Analysis of Mechanisms** by Shri G. S. Bedi.
3. **Analytical and Experimental Investigation of Mitigation of Stress Concentration Factor in Isotropic and Orthotropic Plates with Different Discontinuities Subjected to Various Loading Conditions** by Shubhrata Nagpal, Co-supervised by Dr. N. K.Jain.
4. **Three Dimensional Analysis of Stress Concentration Factor in Isotropic, Orthotropic and Laminated Composite Plate with Central Circular Hole under Various Loading** by Moon Banerjee, supervised by Dr. N. K. Jain, Co-Supervised by Dr. S. Sanyal.
5. **A Novel Method for Identification of Structural Characteristics of Planar Kinematic Chains** by Shri Arvind kumar Shukla.

6. **Kineto-Elastodynamic Analysis of Polymeric Composite Planar Mechanism Under Hygrothermal Environment** by Shri Shailendra Kumar Singh.
7. **Investigation of Thermal Performance of Low Income Group Houses in Chhattisgarh** by Nisha Netam, Co- supervised by Dr. S. Bhowmick.
8. **Fracture and Fatigue Analysis of Cracked Piezoelectric Plates using XFEM by** Shri Gulab Pamnani, supervised by Dr. S. Bhattacharya, Co-supervised by Dr. S. Sanyal.
9. **An Investigation of Stress and Deformation Behaviour of Functionally Graded Beams -** by Shri Deepak Mahapatra Co- supervised by Dr. S. Bhowmick.
10. **A Parametric Investigation of Stresses and deformation in Functionally Graded Axisymmetric Structures** by Shri Lakshman Sondhi, Supervised by Dr. S. Bhowmick, Co-supervised by Dr. S. Sanyal.
11. **Development and Characterization of High Entropy Alloys** by Shri Vinay Kumar Soni Supervised by Dr. S. Sanyal, Co – supervised by Dr. Sudip K Sinha.

Research Articles:

A. International Journals:

1. **Pseudo Probabilistic Approach To Test Isomorphism Among Kinematic Chain**, by S.Sanyal, A.C.Rao, M.Choubey, Transactions of C.S.M.E., Vol. 21, No. 2, 1997.
2. **Pseudo Probabilistic Approach To Detect Distinct Inversions Of Kinematic Chain**, by S.Sanyal, A.C.Rao, & M. Choubey, Transactions of C.S.M.E., Vol. 21, No. 2, 1997.
3. **Development of a Multipurpose, Efficient and Inexpensive Bearing Test Rig** by S. P. S. Matharu, S. Sanyal and D. S. Bal, Journal of Engineering and Technology Research Vol. 2(3), pp. 044-049, March 2010.
4. **Representative Lubricant Film Thickness, a New Concept for Online Condition Monitoring ofRolling Element Bearings,** SPS Matharu, S Sanyal, DS Bal, International Journal of Applied Engineering Research 6 (16), 1981-1987, 4, 2011.
5. **Modified Joint Connectivity approach for Identification of Topological Characteristics of Planar Kinematic Chains,** G S Bedi and S Sanyal, Proceedings of the Institution of Mechanical Engineers Part C: Journal of Mechanical Engineering Science, Vol. 225, No.11, 2700-2717, November 2011.
6. **Interaction Effect of Auxiliary Holes for Mitigation of Stress Concentration in Isotropic Plate with Central Circular Hole Subjected to In-Plane Loading**, Shubhrata Nagpal, S. Sanyal and N.K. Jain, International Journal of Mechanics and Solids, Volume 6, Number 2, pp. 149-156, 2011.
7. **Structural Identification of Distinct Inversions of Planar Kinematic Chain,** Sanyal Shubhashis, IIUM Engineering Journal, Special Issue, Malaysia, Mechanical Engineering, pp 87 – 94, 2011.
8. **Design Optimization of Rectangular Isotropic/Orthotropic Plate with Opposite Semicircular Notches subjected to In-Plane Static Loading for Reduction of Stress Concentration Factor**, Ms. Shubhrata Nagpal, Dr. S. Sanyal and Dr. Nitin Jain, International Journal of Applied

Engineering Research, Volume 6, Number 18, pp.2239-2242, 2011.

9. **3D analysis of stress concentration factor and deflection in thin isotropic and orthotropic plates with central circular hole subjected to transverse loading,** Jain NK, Sanyal S, International Journal of Mechanical Engineering Research and Development, Vol.1, Number 2, 2011.
10. **Development of a Reliable, Inexpensive and Multipurpose Test Rig for Determination of Electrical Resistivity of Liquid Lubricants,** SPS Matharu, S Sanyal, DS Bal, International Journalof Pure and Applied Sciences and Technology 8 (2), 34, 2, 2012.
11. **Three dimensional parametric analyses on effect of fibre orientation for stress concentration factor in fibrous composite cantilever plate with central circular hole under transverse loading-** Moon Banerjee, Dr. N. K. Jain and Dr. S. Sanyal, IIUM Engineering Journal, Malaysia, Vol.13, No-2, pp 131 – 144, 2012.
12. **Mitigation Curves for determination of relief holes to mitigate stress concentration factor in thin plates loaded axially for different discontinuities**, Shubhrata Nagpal, S.Sanyal, Nitin Jain, International Journal of Engineering and Innovative Technology Volume 2, Issue 3, pp1-7, September 2012.
13. **Stress concentration and its mitigation techniques in flat plate with singularities - A Critical Review,** S Nagpal, N Jain, S Sanyal, Engineering Journal 16 (1), 1-16, 47, 2012.
14. **Stress concentration in isotropic and orthotropic composite plates with center circular hole subjected to transverse static loading,** M Banerjee, NK Jain, S Sanyal, Int J Mech Ind Eng 3 (1), 109-113, 21, 2013.
15. **Effect of Elastic Constants on Stress Concentration Factor and its Mitigation in Rectangular Plate with Central Circular Hole Under in Plane Loading,** S Nagpal, S Sanyal, NK Jain, International Journal of Engineering Research 3 (6), 2014.
16. **Structure based grading of Kinematic Chains,** S. Sanyal, G. S. Bedi, Applied Mechanics and Materials 575, 501-506, 2, 2014.
17. **Numerical simulation of crack propagation under fatigue loading in piezoelectric material using extended finite element method**, S. Bhattacharya, G. Pamnani, S. Sanyal, K. Sharma, International Journal of Computational Materials Science and Engineering Vol. 4, No. 4, 2015.
18. **Three Dimensional Parametric Analyses of Stress Concentration Factor and Its Mitigation in Isotropic and Orthotropic Plate with Central Circular Hole Under Axial In-Plane Loading,** S Nagpal, NK Jain, S Sanyal, Journal of The Institution of Engineers (India): Series C 97 (1), 85-92, 3,2016.
19. **Analysis of semi-permeable crack growth in piezoelectric materials using extended finite element method,** G Pamnani, S Bhattacharya, S Sanyal, International Journal of Applied Mechanics9 (07), 1750106, 7, 2017.
20. **An investigation of stresses and deformation states of clamped rotating functionally graded disk,** AK Thawait, L Sondhi, S Sanyal, S Bhowmick, Journal of Theoretical and Applied Mechanics55 (1), 189-198, 7, 2017.

21. **An Investigation of Stress and Deformation States of Rotating Thick Truncated Conical Shells of Functionally Graded Material,** A Thawait, L Sondhi, S Bhowmick, S Sanyal, Journal of Solid Mechanics 9 (4), 865-877, 2017.
22. **Elastic analysis of functionally graded variable thickness rotating disk by element based material grading,** AK Thawait, L Sondhi, S Sanyal, S Bhowmick, JOURNAL OF SOLID MECHANICS 9 (3), 650-662, 9, 2017.
23. **Thermal performance analysis to assess inhabitant comfort inside LIG houses in Chhattisgarh,** N Netam, S Sanyal, S Bhowmick, International. Journal of Theoretical Applied Mechanics 12 (3), 613-622, 3, 2017.
24. **Parametric Study of Interaction effect between closely - spaced nozzles in a thin cylindrical pressure vessel,** D. S. Kushan, Shubhashis Sanyal, Shubhankar Bhowmick, International journal of Pressure Vessel and Pipings, Elsevier Publication, https://doi.org/10.1016/j.ijpvp.2018.05.009, 31 May 2018.
25. **An Anisotropic Analysis of Human Femur Bone with Walking Posture: Experimental and Numerical Analysis,** Ritu Painkra, Shubhashis Sanyal, Arindam Bit, BioNanoScience, Springer, 8(4), 1054 – 1064, 3, 17th Sept.2018.
26. **Modified experimental procedure to determine the output variable in an optimum range – A case study: Pulley belt experiment** by Ankur Verma, Shubhashis Sanyal, International Journal of Mechanical Engineering Education, SAGE Journals, Oct. 4, 2018.
27. **Stress and deformation analysis of clamped functionally graded rotating disks with variable thickness,** AK Thawait, L Sondhi, S Sanyal, S Bhowmick, Mechanics and Mechanical Engineering23 (1), 202-211, 3, 2019.
28. **An approximate solution of functionally Graded Timoshenko beam using B-spline collocation method,** D Mahapatra, S Sanyal, S Bhowmick, Journal of Solid Mechanics 11 (2), 297-310, 46, 2019.
29. **Selection of High Entropy Alloy for Solid Solution Using Multi-Criteria Decision Making Tool,** V K Soni, S Sanyal, S K Sinha, Materials Science Forum 969, 466-471, 1, 2019.
30. **Effect of Attack Angle on Lift and Drag of a Bio-Inspired Corrugated Aerofoil,** A Biradar, A Chandraker, R Madan, S Sanyal, S Bhowmick, Innovative Product Design and Intelligent Manufacturing Systems, 261-268, 2, 2020.
31. **Gradient method for identification of isomorphism of planar kinematic chains,** A Shukla, S Sanyal, Australian Journal of Mechanical Engineering 18 (1), 45-62, 7, 2020.
32. **Numerical simulation of tri-layer interface cracks in piezoelectric materials using extended finite element method,** G Pamnani, S Bhattacharya, S Sanyal, Iranian Journal of Science and Technology, Transactions of Mechanical Engineering, 2020.
33. **A Mathematical Model Featuring Time Lag And Decrement Factor To Assess Indoor Thermal Conditions In Low-Income-Group House,** N Netam, S Sanyal, S Bhowmick, Journal of Thermal Engineering 6 (2), 114-127, 1, 2020.
34. **An Investigation of Stress and Deformation Behavior of Functionally Graded Timoshenko**

Beams subjected to Thermo-Mechanical Load, D Mahapatra, S Sanyal, S Bhowmick, Mechanicsof Advanced Composite Structures 7 (1), 157-176, 2020.

35. **Effect of Temperature on Stress Concentration Factor,** J Satish, S Sanyal, S Bhowmick, Recent Trends in Mechanical Engineering, 641-648, 2020.
36. **Phase evolution and mechanical properties of novel FeCoNiCuMox high entropy alloys,** V K Soni, S Sanyal, S K Sinha, Vacuum 174, 109173, 15, 2020.
37. **Property oriented design of non equiatomic high entropy alloy composition,** VK Soni, S Sanyal,SK Sinha, Advances in Materials and Processing Technologies, 1-18, 1, 2020
38. **Microstructure and mechanical properties of non equiatomic FeCoNiCuMo high entropy systems,** VK Soni, S Sanyal, SK Sinha, Advances in Materials and Processing Technologies, 1-14, 1, 2020.
39. **Influence of Tungsten on Microstructure Evolution and Mechanical Properties of Selected Novel FeCoCrMnWx High Entropy Alloys,** VK Soni, S Sanyal, SK Sinha, Intermetallics 132, 107161, 2, 2021.
40. **A Review on Phase Prediction in High Entropy Alloys,** VK Soni, S Sanyal, KR Rao, SK Sinha, Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science, 13 May 2021.
41. **Generation of Coupler Curves for Planar Kinematic Chains Using Link Joint Equations,** H S Yadav, S Sanyal, Machines, Mechanism and Robotics, 491-501, 2022.
42. **Effect of Structural Characteristics on Kinematics of Planar Kinematic Chains,** A Biradar, S Sanyal, Machines, Mechanism and Robotics, 257-267, 2022.
43. **Three Dimensional Photoelastic Investigation for Analyzing Stress Concentration Factor in Isotropic Square Simply Supported Plate with Hole Subjected to Transverse Loading,** Moon Banerjee, Nitin Kumar Jain, Shubhashis Sanyal, Current Applied Science and Technology Vol. 22 No. 5, September-October 2022.
44. **Design of Pneumatically Actuated Soft Robotic Gripper for Gripping Cylindrical Objects of Varying Diameters,** Monalisa Sharma and Shubhashis Sanyal , pp 547–558, Recent Advances in Machines and Mechanisms(LNME), 4 October 2022.
45. **Bilinear and bicubic interpolations for image presentation of mechanical stress and temperature distribution,** M.B. Pithani, S. Sanyal, A.K. Shukla, Power Eng. Eng Thermophysics 1 (1), 8-18.
46. **Modified Secant Method for Reduction in Number of Iterations,** Sunil Pal, Anuj Kumar Shukla, Shubhashis Sanyal, Mathematical Modelling of Engineering Problems, Vol. 10, No. 1, February, 2023, pp. 376-382

B. National Journals:

1. **Stress Mitigation in Infinite Thin Plate with Two Circular Holes Under Tensile Loading** by S.Sanyal, M.Swarnakar, S.Dehariya and M.Dewangan, CSVTU Research Journal, pp 67-69, Vol.2, No.1, Jan 2009.
2. **Joint Connectivity : A New Approach for Detection of Isomorphism and Inversions of Planar**

Kinematic Chains by G.S.Bedi and Sanyal S, Journal of Institution of Engineers (India), 2010, Vol. 90, pp. 23 – 26.

3. **Joint - Loop Representative Table for Detection of Isomorphism among Kinematic Chains,** G.S. Bedi and S.Sanyal, CSVTU Research Journal, Vol. 05, 2012, pp 82 -87.

C. International Conferences:

1. **Relief Holes for Stress Mitigation in Infinite Thin Plates with Single Circular Hole Loaded Axially** by Sanyal S and Ms. Priti Yadav, ASME International Mechanical Engineering Congress and Exposition, 5 – 11 November 2005, Orlando, Florida, USA.
2. **Multiple Relief Holes for Stress Mitigation in Infinite Thin Plates with Single Circular Hole under axial loading** by Sanyal S and Ms. Priti Yadav, 5 - 8 July 2006, 2nd IC-SCCE, From Scientific Computing to Computational Engineering" Athens, 5-8 July, 2006.
3. **Detection of Isomorphism amongst Planar Kinematic Chains using Link Joint Connectivity Table,** Sanyal Shubhashis, 25 - 27 Dec.2009, International Conference on Applied Mechanics and Machines, WASET09, Bangkok.
4. **Structural Identification of Distinct Inversions of Planar Kinematic Chains,** Sanyal Shubhashis, 17 - 19 May 2011, International Conference on Mechanical, Automotive and Aerospace Engineering, ICMAAE'11, Kuala Lumpur, Malaysia.
5. **Effect of fiber orientation on stress concentration factor in fixed rectangular fibrous composite plate with center circular hole subjected to transverse loading,** Dr. N. K. Jain, Moon Banerjee, Dr. S. Sanyal, Third Asian Conference on Mechanics of Functional Materials and Structures, ACMFMS 2012, 5-8 December at IIT Delhi.
6. **Three dimensional analysis for effect of fibre orientation on stress concentration factor in fibrous composite plates with central circular hole subjected to in-plane static …** NK Jain, M Banerjee, S Sanyal, 2013 7th International Conference on Intelligent Systems and Control (ISCO), 2,2013.
7. **Loop based algorithm for automatic sketching of planar kinematic chains,** GS Bedi, S Sanyal, iNaCoMM, 452-456, 8, 2013.
8. **Thermal Comfort Analysis : A Case Study of LIG Housing in Chhattisgarh**, Nisha Netam, S.Sanyal, S. Bhowmick, ICME 2015, 18 - 20 Dec. 2015, Dhaka, Bangladesh.
9. **An approximate solution to the stress and deformation states of functionally graded rotating disks,** Lakshman Sondhi, S.Sanyal, S. Bhowmick, ICME 2015, 18 - 20 Dec. 2015, Dhaka, Bangladesh.
10. **A PMV-PPD model based study of thermal comfort in Low-Income Group house in Chhattisgarh,** N Netam, S Sanyal, S Bhowmick, MATEC Web of Conferences 172, 06006, 3, 2018.
11. **Investigation of phase stability of novel equiatomic FeCoNiCuZn based-high entropy alloy prepared by mechanical alloying,** VK Soni, S Sanyal, SK Sinha, AIP Conference Proceedings 1953 (1), 030253, 1, 2018.
12. **Limit Elastic Yield Pressure of Internally and Externally Pressurized Functionally Graded**

Thick Cylinder, L Sondhi, R Kumar, S Sanyal, S Bhowmick, Materials Today: Proceedings 18, 5507-5514, 2019.

D. National Conferences:

1. **Computer Aided Design and Drafting of Flange Coupling Through Parametric processing**, by V.Verma, S.Sanyal, NACOMM 1993, I.I.T. Kharagpur.
2. **Photoelastic Analysis for Safe Spacing of Nozzles In A Pressure Vessel**, by S.Sanyal, K.B.Mulchandani, NACOMM 1993, I.I.T. Kharagpur.
3. **Computer Aided Synthesis of Slider Crank Mechanism with Four Accuracy Points**, by S.Khandekar, P.Sharma, S.Sanyal, NACOMM 1993, I.I.T. Kharagpur.
4. **Analysis of Walking Mechanism and Design of the Shoe Insole Through Mathematical Modelling**, by A.Chaturvedi, S.Sanyal, NACOMM 1995, C.M.E.R.I., Durgapur.
5. **Detection of Isomorphism Among Kinematic Chains Using Joint-Loop Probability Matrices**, by A.Ganguly, S.Sanyal, NACOMM 1997, I.I.T. Kanpur.
6. **Analysis of Stress Concentration for Rectangular Plate with Hole under Transverse Loading by Three Dimensional Finite Element Analyses,** Moon Banerjee, Dr. N. K**.** Jain and Dr. S. Sanyal, The Indian Society of Theoretical and Applied Mechanics ISTAM, 17-20 December 2012, Organized by IIT KGP at DIAT, Pune**.**

Book Chapter:

1. **A Systematic Survey of the Realm of Biomechanics: A Mechanical Engineer's Perspective,** D Mahapatra, S Bhowmick, S Sanyal, Design, Development, and Optimization of Bio-Mechatronic Engineering Products, IGI Global, Publisher of Timely Knowledge, pp 1-35, 2019.

Case Study Presentation:

1. **SUSTAINABLE MODEL OF REVENUE GENERATION** at Show-Case Conference, CIIILP, held at GOA on 2004.

Curriculum Development and Training Provided:

1. Two Competencies based Course Curriculum's using **DACUM** techniques **Chemical Process Operator** and **Commissioning and Maintenance of Transformer**.
2. Provided training for development of **Institute's Strategic Plan** to technical institutions.

Industry Institute Interaction:

1. Developed **Testing and Consultancy brochure** for promoting Institute's testing and consultancy.
2. Identified the **training needs** of the students and arranged summer training and industrial visits for the students.
3. **Interaction with Various State Govt. Dept's and Industries** for identification of the institute as consultancy provider.

Project: Computer Aided Design and Drafting Lab Development, funded under FIST-DST scheme.

Others: Developed Vision Document, **Vision 2030, NIT Raipur** with Dr. Amit Raj Singh.

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