

## CURRICULUM VITAE



### **Dr Arka Sen (PhD)**

C/o Nripen Sen, Advocate

Congresspara, Ward no -16, House no- 395 P.S- Kotwali,

Post & District - Jalpaiguri,

West Bengal, Pin-735101

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#### **A. PROFILE SUMMARY :**

1. PhD in Mechanical Engineering (NIT Durgapur) with Expertise in Project Engineering & Management (Tata Power Company Limited) (Total Experience – 9 Years 10 months)
2. Technical Advisor : “**Machine Fault Diagnosis and Technological Solutions**” [**MFD Tech Solutions**], an Engineering Consultancy Firm providing technical support and expertise in vibration related problems for static and rotating equipment.

#### **B. EDUCATION :**

1. **Ph.D. in Mechanical Engineering** (Full time - June 2018) from National Institute of Technology, Durgapur, India (Thesis: Condition Monitoring of Rotating Equipment Considering the Various Causes and Effects of Vibration).
2. **M.Tech in Mechanical Engineering (Production Technology and Management)** (Fulltime - 2013) from Jalpaiguri Government Engineering College.  
(Thesis : Experimental Verification to predict optimum weld bead geometry for low carbon mild steel)
3. **B.Tech in Mechanical Engineering** (2007) from Sikkim Manipal Institute of Technology (SMIT, Majitar, Sikkim)

#### **C. EMPLOYMENT SUMMARY:**

*(Total Experience: 9 Years 10 Months which includes Industry experience: 3 Years 9 Months, Academics Experience: 3 Years 1 month and Research Experience 3 Years)*

##### **1. INDUSTRY:**

- ✦ Executive –Mechanical Construction in Tata Power Company Limited from December 2007 till September 2011 ; Job Profile - Project Management (Erection, Procurement and Commissioning)

##### **2. ACADEMICS:**

- ✦ Assistant Professor in Mechanical Engineering at Durgapur Institute of Advanced Technology and Management (DIATM), Rajbandh, Durgapur from August 2018 till Present.
- ✦ Assistant Professor in Mechanical Engineering at Dr B.C Roy Engineering College

(BCREC Durgapur), Durgapur from January 2015 till August 2015.

- ✦ Assistant Professor in Mechanical Engineering at Surendra Institute of Engineering and Management (SIEM), Siliguri from January July 2013 till December 2014.
- ✦ Lecturer in Mechanical Engineering Department from July 2007 till December 2007

3. RESEARCH:

- ✦ PhD Full time Research Fellow at NIT Durgapur from September 2015 till June 2018.

**D. TRAINING / COURSES/WORKSHOP/SEMINARS:**

Sl.No	From	To	Institute/Organization	Sponsored by	Name of the course
1	Feb 22 2007	May 16 2007	G-tek Solutions Jamshedpur (Unit of Reliance Education Trust)	Self	SAP – R3 (Material Management Module)
2	Nov 12 2008	Nov 21 2008	Tata Steel Adventure Foundation	Tata Power Company Limited	Outbound Development Training
3	Nov 2008	Dec 2008	CADD Centre	Tata Power Company Limited	Diploma in PPM using MSP
4	Dec 7 2009	Dec 9 2009	Power Management Institute (NTPC Limited)	Tata Power Company Limited	Fundamentals of Steam Generator Design
5	May 24 2010	May 28 2010	BHEL-EDN	Tata Power Company Limited	Max-DNA
6	Dec 2010	May 2011	NICMAR	Tata Power Company Limited	Essentials of Project Management
7	Feb 7 2015	Feb 7 2015	Dr B.C Roy Engineering College	Dr B.C Roy Engineering College	Advances in Welding Technology
8	Nov 30 2015	Dec 4 2015	S.V NIT, Surat	NIT Durgapur	Finite Element Methods for Engineering Applications
9	Jan 5 2016	Jan 6 2016	NIT Rourkela	NIT Durgapur	Concepts of Vibration and Fatigue
10	Jan 7 2016	Jan 9 2016	NIT Rourkela	NIT Durgapur	National Symposium on Rotor Dynamics
11	Sept 20 2016	Sept 24 2016	NIT Durgapur	NIT Durgapur	Machine Condition Monitoring
12	Feb 13 2017	Feb 15 2017	NIT Durgapur	NIT Durgapur	Design and Analysis of Industrial Experiments
13	Jan 15 2018	Jan 19 2018	NIT Durgapur	NIT Durgapur	Matlab and Simulink for Technical Computing

#### E. AWARDS AND RECOGNITIONS:

- ✦ Awarded “*Excellence Certificate*” for Erection & Commissioning of Ash Handling System for 525 MW Thermal Power Plant at Maithon on schedule.
- ✦ Awarded “*Excellence Certificate & Trophy in Safety*” for no fatalities and zero loss man days in erection & commissioning of Ash Handling System for 525 MW thermal power plant at Maithon.
- ✦ *Bronze Medalist (3<sup>rd</sup> Rank) in M. Tech* from West Bengal University of Technology.
- ✦ Awarded “*Best Paper Award*” for my research paper “COMPARATIVE SPECTRUM ANALYSIS FOR VIBRATION IN A ROTATING MACHINE WITH MULTIPLE VARYING CONDITIONS FOR UNBALANCE FAULT AND CHECK FOR FREQUENCY PEAK DOMINANCY” from Trans Stellar Publishing Group.

#### F. RESEARCH PAPER PUBLICATION SUMMARY:

Peer reviewed journal publications: 09 (Nine)

#### G. ACADEMIC FINAL YEAR STUDENT PROJECT SUPERVISION:

SL No.	Dissertation/Project Title	B.Tech//M.Tech	Supervision	Status
1	An Experimental analysis to optimize hot metal output of blast furnace by taguchi method	B.Tech	Main supervisor	Completed
2	An Experimental Analysis to predict the variation hardness values of 0.25% carbon mild steel under various heat treatment process	B.Tech	Main supervisor	Completed
3	Design of Unmanned Fire Fighting Machine	B.Tech	Main supervisor	Ongoing
4	Application of Renewable Source – Solar Energy in everyday use.	B.Tech	Main supervisor	Ongoing

#### H. AREA OF EXPERTISE :

##### (i) **Condition Monitoring / Machine Maintenance :**

- ✦ Vibration Signature Analysis and Monitoring of Rotating & Static Machines.
- ✦ Rotor Balancing & Fault Analysis.
- ✦ Failure Analysis – Bearing Fault Analysis.
- ✦ Machine Maintenance: Maintenance Planning, Scheduling and execution.

##### (ii) **Project Management:**

- ✦ Erection , Procurement & Commissioning – Thermal Power Plant
- ✦ Material Management using SAP -ARIBA
- ✦ Project - Planning, Execution & Management
- ✦ Financial Risk Assessment associated with Projects.

#### **I. OTHER ACADEMIC AND PROFESSIONAL ACTIVITIES**

- ✦ *Reviewer for Articles and Papers submitted in Journal of The Institution of Engineers (India):Series C*
- ✦ *Life Member – Von Karman Society for Advanced Study and Research in Mathematical Sciences.*
- ✦ *Valuable Contribution in NAAC & NBA Accreditation process for college.*

#### **J. SOFTWARE KNOWLEDGE/KEY SKILLS:**

##### 1. In Research and Academics:

- ✦ Spectra Quest- Vibraquest Condition Monitoring Software (Vibration Data Collection and Analysis)
- ✦ ANSYS Workbench – Used for Dynamic Analysis of rotating system.
- ✦ Matlab r2010 (FEA, FEM, FFT Analysis, Artificial Neural Network, Fuzzy Logic, ANFIS, GA, PSO, ACO)
- ✦ Origin 7.0 – Used for data plotting.
- ✦ Auto CADD, Catia V5 - Used for 3D modeling of rotating system.
- ✦ Bond Graph Modeling using Symbols Shakti software.
- ✦ Minitab - Used for statistical analysis of vibration data.
- ✦ CAD/CAM : CNC Programming.

##### 2. In Industry

- ✦ Primavera P6 - Was used extensively for project management purpose for planning and execution of the assigned construction task
- ✦ MS Projects – Project Planning and execution.
- ✦ SAP (MM Module) – Used in projects for material management system.
- ✦ SAP ARIBA – Generation of Purchase Requisition, Generation of Request for Quotation, E-bidding and contract finalization.

#### **L. INTERNATIONAL JOURNAL PUBLICATIONS DETAILS:**

1. An Experimental Study to predict optimum weld bead geometry through effect of control parameters for Gas Metal Arc Welding Process in Low Carbon Mild Steel - Published in *International Journal of Modern Engineering and Research*, Volume 3, Issue 4, July-August 2013.  
URL- [http://www.ijmer.com/papers/Vol3\\_Issue4/EU3425722576.pdf](http://www.ijmer.com/papers/Vol3_Issue4/EU3425722576.pdf)
2. Optimization of Surface Roughness Parameters Through Regression Model Analysis – Published in *International Journal of Engineering Research & Technology*, ISSN: 2278-0181, Volume 3, Issue 6, June 2014.  
URL- <http://www.ijert.org/view-pdf/10014/optimization-of-surface-roughness-parameters-through-regression-model-analysis>

3. Significancy Test for The Control Parameters Considered in Weld Bead Geometry Optimization for Gas Metal Arc Welding Process using Taguchi Method and Anova Technique, Published in *International Journal of Modern Engineering and Research*, Volume 4, Issue 12, December 2014.  
URL- [http://www.ijmer.com/papers/Vol4\\_Issue12/Version-2/D0412\\_02-2529.pdf](http://www.ijmer.com/papers/Vol4_Issue12/Version-2/D0412_02-2529.pdf)
4. Condition Monitoring of Rotating Equipment Considering the Cause and Effects of Vibration: A Brief Review - Published in *International Journal of Modern Engineering and Research*, Volume 7, Issue 1, January 2017.  
URL- [http://www.ijmer.com/papers/Vol7\\_issue1/Version-1/F7113649.pdf](http://www.ijmer.com/papers/Vol7_issue1/Version-1/F7113649.pdf)
5. Application of Artificial Neural Networking for Determining the Plane of Vibration of Rotating System – Published in *IOSR Journal of Mechanical and Civil Engineering* , Volume 14, Issue 1, Version 5, January – February 2017.  
URL- <http://www.iosrjournals.org/iosr-jmce/papers/vol14-issue1/Version-5/C1401052335.pdf>
6. Comparative Spectrum Analysis for Vibration in a Rotating Machine with Multiple Varying Conditions for Unbalance fault and check for Frequency Peak Dominance – Published in *published in International Journal of Mechanical and Production Engineering Research and Development*); ISSN (Online): 2249-8001; ISSN (Print):2249-6890; Impact Factor (JCC) (2016): 5.7294; Index Copernicus Value (ICV) - (2016): 60.6; NAAS Rating: 3.11; Volume - 7, Issue - 2; Edition: April 2017 .  
URL- <http://www.tjprc.org/publishpapers/2-67-1489584364-10.IJMPERDAPR201710.pdf>
7. Multi Attribute Decision Making in Selection of the Most Significant Condition Monitoring Methodology for Rotating Equipment - Published in *International Journal of Mechanical Engineering and Technology (IJMET)*Volume 8, Issue 3, March 2017, (ISSN Print: 0976-6340 and ISSN Online: 0976-6359).  
URL- <http://www.iaeme.com/citearticle.asp?Ed=7072&Jtype=IJMET&VType=8&Itype=3>
8. Polar and Orbit Plot Analysis for unbalance identification in a rotating system. Submitted for publication in in *IOSR Journal of Mechanical and Civil Engineering* – Published in *IOSR Journal of Mechanical and Civil Engineering*, e-ISSN: 2278-1684, p-ISSN: 2320-334X, Volume 14, Issue 3 Ver. V. (May - June 2017), PP 49-56  
URL- <http://www.iosrjournals.org/iosr-jmce/papers/vol14-issue3/Version-5/E1403054956.pdf>
9. Use of Bond Graph Technique for Rotor Dynamic System Modelling and Comparative Analysis of Vibration Frequency using Fast Fourier Transform. - Published in *International Journal of Mechanical and Production Engineering Research and Development (IJMPERD)* ISSN (P): 2249-6890; ISSN (E): 2249-8001 Vol. 8, Issue 2, Apr 2018, 1151-1160 © TJPRC Pvt. Ltd  
  
URL:<http://www.tjprc.org/publishpapers/2-67-1521867384-133.IJMPERDAPR2018133.pdf>

## **K. EMPLOYMENT DETAILS:**

### *1. INDUSTRY:*

*Job Title : Executive – Mechanical Construction*

*Company Name: Tata Power Company Limited.*

*Location: Mumbai, Haldia & Maithon*

*Date of Employment: December 2007 to September 2011*

### **Projects Handled:**

*(i) 2 x 525MW – Maithon Power Limited (a Joint Venture of Tata Power Company Limited and DVC) under Project Manager Mr Sanjay Bhattacharya*

*(ii) 2 x45MW and 1x30MW (HRSG) – Tata Power Company Limited at Haldia under Project Manager Mr Sunil. Kulkarni and Mr P.Thakur*

### **Responsibilities as Executive Mechanical Construction:**

- ✦ Developing & monitoring schedules for work packages using Primavera P6& MS Project for Boiler Pressure part erection and Ash Handling System at 2\*525MW thermal power plant at Maithon.
- ✦ Monitoring project progress and providing inputs to MIS for Ash Handling System
- ✦ Development of Overall/Yearly/Monthly/Weekly/Daily Project Schedule
- ✦ Preparation of Detailed Work Plan (activities) based on the project objectives and contractual specifications and develop a schedule
- ✦ Compilation of Resource Requirement – Manpower, Material and Equipment
- ✦ Monthly Construction Schedule/Look Ahead Schedule
- ✦ Preparation of Detailed Construction work plan and cycle time
- ✦ Material Allocation Schedule (Equipment/Man Power/Material)
- ✦ Conducting project & safety review meetings with the vendor / contractor.
- ✦ Reviewing drawings and issuing comments to the drawings for revision.
- ✦ Monitor overall project activities on an ongoing basis.
- ✦ Report project progress on a periodic basis (Daily Progress Report (DPR) to Project Manager / Monthly Progress Report (MPR) to Head Office.
- ✦ Erection (Equipment, piping & structure), commissioning & Operation of Boiler and Ash Handling system at 525MW power plant at Maithon.
- ✦ Reviewing, checking & clearance of bills which includes Design & Engineering, Material and Services for Ash Handling package worth Rs 112.8crs at 525 MW Maithon Thermal Power Plant.
- ✦ Contract closure for Ash handling system.
- ✦ Erection, commissioning & synchronization of 120MW WHRSG power plant at Haldia.

### **2. ACADEMICS:**

*Subjects of Interest: Vibration, Machine Design, Theory of Machines, Engineering Mechanics, Strength of Materials, Material Science, Operation research, Manufacturing and Production.*

- (I) *Job Title :Assistant Professor in Mechanical Engineering*  
*Institute Name: Durgapur Institute of Advanced Technology and Management (DIATM), Durgapur*  
*Location: Durgapur, West Bengal, India*  
*Date of Employment: August 2018 till Present*

Job responsibility and duties include:

- ✦ Conduct Lecture classes and experiments
- ✦ Conduct seminars and workshops on recent developments in Mechanical Engineering
- ✦ Contribute to research related activities.
- ✦ Prepare weekly and monthly progress report.
- ✦ Prepare lecture plan, assignments.

*Subjects Taught:* Metrology, Machine Design, Advance Manufacturing Process, Dynamics of Machines (DOM), CAD/CAM

*Practical:* Metrology, Advance Manufacturing Lab (CAD/CAM)

- (ii) *Job Title :* Assistant Professor in Mechanical Engineering  
*Institute Name:* Dr B.C Roy Engineering College (BCREC)  
*Location:* Durgapur  
*Date of Employment:* January 2015 – August 2015

Job responsibility and duties include:

- ✦ Impart quality education in the field of Mechanical Engineering.
- ✦ Guide for Final year students project on “Optimization of Blast furnace parameters”
- ✦ Organize and participate in seminars in colleges and outside based on Recent Trends in Mechanical Engineering
- ✦ Prepare weekly and monthly progress report of Syllabus.
- ✦ Conduct labs: Engineering Graphics and Drawing, Workshop, Engineering Materials
- ✦ Conduct Theory Classes: Engineering Graphics, Engineering Thermodynamics and Fluid Mechanics, Engineering Materials and Material Science.
- ✦ National Board of Accreditation (NBA) coordinator for Mechanical Engineering Department in Dr B.C Roy Engineering College situated at Durgapur.
- ✦ Take up Research oriented projects in Mechanical Engineering with final year and pre-final year students.

*Subjects Taught:* Machine Design, Principles of Management

*Practical:* Machine Drawing, Engineering Graphics

- (iii) *Job Title :* Assistant Professor in Mechanical Engineering  
*Institute Name:* Surendra Institute of Engineering and Management (SIEM)  
*Location:* Siliguri  
*Date of Employment:* July 2013 – December 2014

Job responsibility and duties include:

- ✦ Conduct Theory Classes
- ✦ Conduct Lab/ Experiments
- ✦ Arrange for Seminars
- ✦ Final Year Projects.

*Subjects Taught:* Engineering Mechanics, Engineering Materials, Strength of Materials,

*Practical:* Engineering Graphics, Machine Drawing, Workshop, Strength of Materials

- (iv) *Job Title:* Lecturer in Mechanical Engineering Department  
*Institute Name:* Sikkim Manipal Institute of Technology  
*Location:* Sikkim.  
*Date of Employment:* July 2007 – December 2007

Job responsibility and duties include:

- ✦ Conduct Classes
- ✦ Conduct Lab/ Experiments

*Subjects Taught:* Elements of Mechanical Engineering

*Practical:* Engineering Graphics, Workshop.

3. RESEARCH : [Research Oriented Responsibilities (Related to PhD Work)]

*Job Title:* PhD Full Time Research Scholar

*Institute Name:* National Institute of Technology (NIT) Durgapur

*Location:* Durgapur

*Period of Research:* September 2015 – June 2018

Job responsibility and duties include:

At NIT Durgapur:

- ✦ Conduct and participate in Seminars in Mechanical Engineering Department, NIT Durgapur.
- ✦ Conduct classes for Engineering students as per curriculum
- ✦ Contribute to the intellectual life of the University and to the advancement of education and scholarship.
- ✦ Exploring the literature, discussing with experts or colleagues, gathering and processing data, reflecting and organizing their thoughts, taking notes.
- ✦ Publication of Papers in International and National Journals and Conferences held worldwide.

Job responsibility and duties include:

At CSIR – CMERI Durgapur:

- ✦ Analyse Equipment criticality (this will help ensure that focus is applied to the appropriate equipment).
- ✦ Ensure Data integrity (don't fall prey to "garbage in equals garbage out"). Ensure Proper instrument installation and equipment setup.
- ✦ Ensure best Analytical setup (are the correct parameters being measured). Ensure hassle free Data Collection with proper Data Acquisition set up using the software.
- ✦ Ensure proper Route compliance (is the data being acquired routinely and at the correct intervals for defect identification).
- ✦ Data gathering, data processing, and the formulation of hypotheses to explain the data.
- ✦ Calculate the amount of work has resulted from Condition Monitoring efforts
- ✦ Identify the corrections made by in the equipment conditions by Condition Monitoring efforts.
- ✦ Calculate the time required to implement the work generated by Condition Monitoring efforts.
- ✦ Tracking "bad actors" (machines that routinely fail or routinely exhibit poor performance).
- ✦ Track failures by component type (bearing, coupling, alignment, etc.) and equipment type.
- ✦ Calculate Mean time between failures of types and populations of equipment. (This will help track the effectiveness of the combination of CM and repair efforts.)



- ✦ Perform Detailed analysis of collected vibration data – Time Domain, Frequency Domain, Time-Frequency Domain, Perform Spectrum Analysis –Amplitude Spectrum, Power Spectrum, Frequency Peak Determination
- ✦ Analytical Modeling using Bond Graph and simulation of the model for determining the faults and frequency peaks using SYMBOL SHAKTI software.
- ✦ Modelling and Simulation of Rotodynamic system using ANSYS workbench simulation.
- ✦ Statistical Analysis of Vibration Data.
- ✦ Perform Oil Debris Analysis, Ferrography, Thermography, Filter Debris Analysis in laboratory.

### **DECLARATION**

I hereby solemnly affirm that all the information furnished above is true to the best of my knowledge and willing to provide required documents when demanded.

**Date: 09.01.2019**

**Yours Sincerely**

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**(Arka Sen)**