Dr. Niranjan Kumar

Work Address

Assistant Professor
Department of Mining Machinery Engineering
IIT(ISM) DHANBAD
Dhanbad-826004, Jharkhand, India
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Residential Address

New Type IV Qtrs, Quarter No.- 83; Block No.- VI; Govindpur Road Side; ISM Campus, ISM Dhanbad-826004.

Permanent Residential Address

Lila Nagar (Kangoi), Mihijam,
Jharkhand,815354,
India.

Birth-date & place

12th December 1987, Rohtas, Bihar, India.

Citizenship

India

Education

Jan, 2016
Ph.D.

Indian School of Mines, Dhanbad, Jharkhand, India.

Title: *Performance investigation of Two-Motor Hydrostatic Summation Drive used in Off-Road vehicle*

Supervised by: *Prof. Kabir Dasgupta, Prof. & Dean (F&P), ISM Dhanbad.*

2011
Master in Mechanical Engineering
In
Dept. Of Mechanical Engg.
Specialization: Machine Design
(74.6%)

Jadavpur University, Jadavpur, West Bengal, India.

Title: *Fatigue Life Analysis of Multilayer Pressure Vessel:* Analytical approach to design the multilayered vessel

Supervised by: *Dr. D. K. Mandal, Reader,* Jadavpur University.

2009
Bachelor of Technology
In
Dept. Of Mechanical Engg.
(75.4%)

Dept. Of Mechanical Engineering,
Jalpaiguri Govt. Engg. College
Jalpaiguri, West Bengal, India.

2005
Higher Secondary (10+2)
(80.6%)

D. V. Boys, Chittaranjan, West Bengal, India.
Under CBSE

2003
Secondary (10th standard)
(82. 6%)

D. V. Boys, Chittaranjan, West Bengal, India.
Under CBSE

Countries Visited

- RWTH Univerdity, Germany (2018).

Work Experience

July 2011 to Dec. 2011

- Assistant Professor, Department of Mechanical Engineering,

Assistant Professor — MCKV Institute of Engineering, Liluah, Howrah, India.

Dec 2011 to Till Date
Assistant Professor
- Assistant Professor, Department of Mining Machinery Engineering, Indian School of Mines, Dhanbad-826004, Jharkhand, India.

Languages Known

English, Hindi, Bengali, Bhojpuri.

Scholarships/Awards

2014 **The Institution Prize:** For publishing paper titled 'Steady-state performance analysis of hydrostatic transmission system using two-motor summation drive' in the Journal of the Institute of Engineers (India): Series C, Vol. - 94, 2013.

2009 **UGC (GATE) Fellowship** to study Master of Mechanical Engineering in Dept. Of Mechanical Engg, Jadavpur University, Kolkata in 2009-2011.

2005 **Address of Honour** for standing 1st in AISSCE-2004-05 in the railway township of Chittaranjan.

2003 **Address of Honour** for standing 2nd in AISSE-2002-03 in the railway township of Chittaranjan.

2002 **Merit Certificate** in 2002 for qualifying Maths Olympiad organised by Delhi Association of Mathematics Teachers.

Professional Membership

Student Member, The Institution of Engineers, India. (SE-735110177).

Student Member, FOSET, India. (SM26-06-SLG).

Professional Membership

Research Experience

Jan. 2016 to till date **Research Area:** Hydrostatic Transmission system; Power steering system; Additives and its properties;

Jan. 2012 to Dec. 2015 **Ph.D. under Institute R&D Project funded by UGC:** Design and Development of Computer Controlled Energy Efficient Hydrostatic Transmission System for off-road vehicle using Two-motor Summation Drive.

Work Done:

1. Studied the selection criteria of the components and fabricated the Two-motor summation drive in collaboration with the representatives of M/s Bosch Rexroth (I) Pvt. Ltd.
2. Studied the mechatronics of the system.
3. Practiced IndraLogic for the PLC programme. The control of the physical system through PLC was made.
4. Determination of the loss-coefficients of the major components
5. Analysed the steady state and transient performance of the system
6. Automatic Switching over from single-motor mode to twin motor mode of operation

Work Remaining:

Acoustic and vibration analysis of the HST system.

July 2009 to April 2011 Title: Fatigue Life Analysis of Multilayer pressure Vessel.

Work Done:

1. Effect of autofrettage on a Monobloc pressure vessel,

2. Effect of shrink-fit
3. Combined effect of "Autofrettage" and "Shrink-fit".
4. Optimization of the degree of shrink-fit and autofrettage for optimum fatigue life

Work Remaining:

Experimental Analysis of the above.

Computer Skill

Autocad, Matlab, Lab-view; Abaqus, IndraLogic. Automation Studio; DSH Plus, MS Office, Adobe Photoshop.

Hobbies

Playing Cricket & carom, Listening to music.

Publications

(i) International Journals	: 19
(ii) National Journals	: 03
(iii) International Conferences	: 03
(iv) National Conference	: 04

PUBLICATIONS

INTERNATIONAL JOURNALS

1. Vardhan, A., Dasgupta, K., & Kumar, N., & Mishra, Santosh Kr (2017). Steady-state performance investigation of open-circuit hydrostatic drives used in the rotary head of drill machine. Proc IMechE Part E: J Process Mechanical Engineering, 0(0) 1–18 (Impact Factor: 1.448) [SCI Journal] {Thomson Reuters}.
2. Pandey, A. K., Dasgupta, K., Kumar, N., & Vardhan (2017). A. Leakage analysis of bent axis hydro- motors: An experimental study. Journal of Chinese Society of Mechanical Engineers, 38(1), 93-98 (Impact Factor: 0.274) [SCI Journal] {Thomson Reuters}.
3. Vardhan, A., Dasgupta, K., & Kumar, N. (2017). Comparison of the steady-state performance of hydrostatic drives used in the rotary head of the drill machine. Journal of the Brazilian Society of Mechanical Sciences and Engineering, 39(11), 4403-4419 (Impact Factor: 0.963) [SCI Journal] {Thomson Reuters}.
4. Hasan, M. E., Ghoshal, S. K., Dasgupta, K., & Kumar, N. (2016). Dynamic analysis and estimator design of a hydraulic drive system. *Journal of the Brazilian Society of Mechanical Sciences and Engineering*, Volume 39 4, pp 1097–1108. DOI: 10.1007/s40430-016-0594-7. (Impact Factor: 0.963) [SCI Journal] {Thomson Reuters}.
5. Kumar, N., Dasgupta, K., & Ghoshal, S. K. (2015). Dynamic analysis of a closed-circuit hydrostatic summation drive using bent axis motors. *Proceedings of the Institution of Mechanical Engineers, Part I: Journal of Systems and Control Engineering*, *229*(8), 761-777. (Impact Factor: 0.889) [SCI Journal] {Thomson Reuters}.
6. Kumar, N., & Dasgupta, K. (2015). Steady-state performance investigation of hydrostatic summation drive using bent-axis hydraulic motor. *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science*, *229*(17), 3234-3251. (Impact Factor: 0.730) [SCI Journal] {Thomson Reuters}.
7. Kumar, D., Das, J., & Kumar, N., (2015). Study on PID controller used in electro-hydraulic actuation system. International Journal of Applied Engineering Research, 10(69):108-112 [Scopus indexed].
8. Paswan, R., Das, J., Kumar, N., Kumar, A., Mishra, S. K., & Sujit, K. (2014). Performance Analysis of Directional Control Valve: An Overview. In *Applied Mechanics and Materials* (Vol. 592, pp. 1983-1987). Trans Tech Publications. (Impact Factor: 0.130) [Scopus indexed]
9. Paswan, R., Das, J., Kumar, N., Kumar, A., Mishra, S. K., & Sujit, K. (2014). Hydraulic circuit in damper: an overview. In *Applied Mechanics and Materials* (Vol. 592, pp. 2056-2060). Trans Tech Publications. (Impact Factor: 0.130) [Scopus indexed]
10. Das, J., Sujit, K., Mishra, S. K., Kumar, A., Kumar, N., & Paswan, R. (2014). Modern Advancement of Hydraulic Motor: A Review. In *Applied Mechanics and Materials* (Vol. 592, pp. 2179-2183). Trans Tech Publications. (Impact Factor: 0.130) [Scopus indexed]
11. Das, J., Sujit, K., Mishra, S. K., Kumar, A., Kumar, N., & Paswan, R. (2014). Study of Energy Saving System for Hydrostatic Drive-A Review. In *Applied Mechanics and Materials* (Vol. 592, pp. 2210-2214). Trans Tech Publications. (Impact Factor: 0.130) [Scopus indexed]
12. Paswan, R., Das, J., Kumar, N., Kumar, A., Mishra, S. K., & Sujit, K. (2014). Simulation Study on Different Energy Efficient Hydraulic System: An Overview. In *Applied Mechanics and Materials* (Vol. 592, pp. 2234-2238). Trans Tech Publications. (Impact Factor: 0.130) [Scopus indexed]
13. Das, J., Mishra, S. K., Kumar, A., Kumar, N., Sujit, K., & Paswan, R. (2014). Study of Energy Recycling in Electro-Hydraulic System. In *Applied Mechanics and Materials* (Vol. 592, pp. 2244-2248). Trans Tech Publications. (Impact Factor: 0.130) [Scopus indexed]
14. Das, J., Mishra, S. K., Kumar, A., Kumar, N., Sujit, K., & Paswan, R. (2014). Study on Hybridization of Hydraulic System Used in Heavy Machinery. In *Applied Mechanics and Materials* (Vol. 592, pp. 2249-2253). Trans Tech Publications. (Impact Factor: 0.130) [Scopus indexed]

15. Kumar, A., Kumar, N., Dasgupta, K., Das, J., & Kumar, R. (2014). Analysis of Steady State Performance of an Open Loop Drive of a Hydraulic Motor used in Hydrostatic Transmission System. *International Journal of Current Engineering and Technology, Special Issue-2 (Feb 2014)* (pp.- 407-412). [Google Scholar indexed]
16. Dasgupta, K., Ghoshal, S. K., & Kumar, N. (2013). Modelling and Simulation of a Hydrostatic Transmission System using Two Motor Summation Drive. *Journal of Modeling, Simulation, Identification, and Control*, *1*(3), 89-104. [Google Scholar indexed]
17. Kumar, N. (2012). Optimization of autofrettage-reautofrettage percent and shrink-fit combination for optimum fatigue life in multilayer pressure vessels. *Journal of Applied Mechanics Engineering*, *1*(3), 100-113. [Scopus indexed]
18. Kumar, N., Mandal, D. K., Mondal, S. C., & Acharyya, S. K. (2011). Optimization of Shell thickness in Multilayer Pressure Vessel and Study on Effect of Number of Shells on Maximum Hoop Stress. *Int. J. Eng. Sci. Technol*, *3*, 2693-2700. [Google Scholar indexed]
19. Kumar, N., Mondal, S. C., Mandal, D. K., & Acharyaa, S. K. (2011). Optimum autofrettage pressure and shrink-fit combination for minimum stress in multilayer pressure vessel. *Int. J. Eng. Sci. Technol*, *3*, 4020-4030. [Google Scholar indexed]

NATIONAL JOURNALS

1. Vardhan, A., Pandey, A. K., Dasgupta, K., & Kumar, N. (2016). Selection of hydraulic components for body hoist control of dumper. *Journal of mines metals and fuels, 64(5-6)*, 148-154. (Impact Factor: 0.122) [Scopus indexed]
2. Kumar, A., Kumar, A, Shreeharsha, R., & Kumar, N. (2016). Operational characteristics of a fixed displacement hydraulic pump. *Journal of mines metals and fuels, 64(5-6)*, 161-164. (Impact Factor: 0.122) [Scopus indexed]
3. Dasgupta, K., Kumar, N., & Kumar, R. (2013). Steady State Performance Analysis of Hydrostatic Transmission System using Two Motor Summation Drive. *Journal of The Institution of Engineers (India): Series C*, *94*(4), 357-363. **[Google Scholar indexed]**

INTERNATIONAL CONFERENCES

1. Bhola, M., Sreeharsha, R. & Kumar, N. (2018). Electrical Energy Regeneration of Hydraulic-Split Power Transmission System Using Fuel Efficient Controller. IFK 2018, RWTH University, Aachen, Germany, 19-21 March, 2018.
2. Kumar, N., Dasgupta, K., & Ahmad, F. Analysis of leakage flow characteristics in bent axis motors. In *Proceedings of the 1st international and 16th national conference on machines and mechanisms (iNaCoMM2013),* December 18th -20th, 2013, IIT Roorkee, India, (pp. 318-323).
3. Barnwal, M. K., Kumar, N., Kumar, A., & Das, J. Effect of Hydraulic Accumulator on the System Parameters of an Open Loop Transmission System. In *Proceedings of 5th International & 26th All India Manufacturing Technology (AIMTDR 2014*), December 12th –14th, 2014, IIT Guwahati, India, (pp. 304-1-5).

NATIONAL CONFERENCES

1. Chandraker, R., Kumar, N. & Gupta, Pankaj. Complex Model Analysis of Damped Rotor Using Finite Element Method. In *Proceedings of the 3rd National Conference on Mining Equipment: New Technologies, Challenges & Applications (MENTCA-2018)* February 9th -10th, 2018, IIT (ISM) Dhanbad, India (pp. 105-109).
2. Sriharsha, R., Kumar, N., Kumar, A., & Naik, D. B. Impact of used Hydraulic Fluids on Environment. In *Proceedings of the 33rd National Convention of Environmental Engineers on Status of Technological Advancement to MEET the Environmental Norms for Indian Mining and Allied Industries.* August 24-25, Directorate General of Mines Safety, Dhanbad, India.

3. Vardhan, A., Pandey, A. K., Dasgupta, K., & Kumar, N. Selection of hydraulic components for body hoist control of dumper. In *Proceedings of the 2nd National Conference on Mining Equipment: New Technologies, Challenges & Applications (MENTCA-2015)* October 9th -10th, 2015, ISM Dhanbad, India (pp. 123-130).
4. Pandey, A. K., Vardhan, A., Kumar, N. & Dasgupta, K. A Comparative study on Leakage Behaviour of Fixed and Variable Displacement Bent Axis Hydro-motors. In *Proceedings of the 2nd National Conference on Mining Equipment: New Technologies, Challenges & Applications (MENTCA-2015)* October 9th -10th, 2015, ISM Dhanbad, India (pp. 140-145).

Ph.D. Guidance

No of Students- 04 Full time + 03 Part time (ongoing)

Sl No	Name of Student, Adm No.	Type	Topic	Remarks
1.	**MOHIT KUMAR** **B.Tech** 2016 DR 0072 D.O.J.- 15.02.2016	Full time ISM JRF	Performance Analysis of Hydrostatic Transmission System using Different Types of Transmission Oil	**Sole guide**,
2.	**SREEHARSHA ROWDURU** **M.Tech** 2016 DR 000146 D.O.J.- 01.08.2016	Full time ISM JRF	Dynamic Control Analysis of Hydraulic Power Assisted Steering System used in Off-Road Vehicles	**Sole guide**,
3.	**RITURAJ** **M.Tech** 17DP000234 D.O.J.- 15.03.2017	Part time IIT (ISM) JRF	Development of Viscoelastic Multi-Layer Hybrid Polymer Composite for Rotor Applications	**Co-guide: Dr. P K Gupta**
4.	**ASHWINI KUMAR** **M.Tech** 17DP000236 D.O.J.- 03.04.2017	Part time IIT (ISM) JRF	Design and Analysis of Positive Displacement Machine Characterized by Tribological Systems	**Sole guide**,
5.	**RAM KRISHNA RATHORE** **M.Tech** 17DP000328 D.O.J.- 07.09.2017	Part time IIT (ISM) JRF	Numerical study of the effect of swirl pipe on pressure drop and erosion wear in multi-sized particulate slurry pipelines and bends	**Co-guide: Dr. P K Gupta**
6.	**ANUBHAV KUMAR** **M.Tech** 2017DR000615 D.O.J.- 28.12.2017	Full time IIT (ISM) JRF	Wear Failure Analysis of Hydraulic Components and Their Remedies	**Co-Guide: Dr. A. K. Das**
7.	**ABHINAV KUMAR** **M.Tech** 2017DR000608 D.O.J.- 28.012.2017	Full time IIT (ISM) JRF	Efficiency Improvement of Hydraulic Excavator Incorporating Load Sensing Technique to Variable Displacement Pump	**Co-Guide: Dr. S. K. Ghoshal**

M. Tech. Dissertation supervised

Sl. No.	Name of Student, Adm No.	Topic	Remarks
1.	**Mukesh Kumar** 2012MT0273	Performance Analysis and Modeling of Hydraulic Shovel	2012-14
2.	**Nirbhay Kumar Sinha** **2013MT0130**	Modeling, Simulation and Control of HST System	2013-15
3.	**Umesh Kumar** 14MT000141	Modeling and Performance analysis of Secondary Control Hydrostatic Transmission Using Multi-Point Wave Energy Converter	2014-16
4.	**Amit** 15MT000693	Stress-Strain Analysis of Different Shapes of Piston used in Constant Power Controlled Variable Displacement Axial Piston Pump	2015-17
5.	**Amit Kumar** 15MT000635	Modelling and Simulation of Hydrostatic Power Steering System using Orbitrol Valve	2015-17
6.	**Sujeet MadhavRao S. Patil** **15MT000063**	Hydraulic Oil Cooling of DM110 (SANDVIK) Mobile Bolter Machine	2015-17
7.			
8.			
9.			

Teaching Experiences (Subjects Taught)

Sl No.	Details

In MCKV Institute of Engineering, West Bengal	
1.	Engineering Thermodynamics, ME301
2.	Workshop Technology, ME
3.	Engineering Drawing, ME
In IIT(ISM) Dhanbad, Jharkhand	
1.	Engineering Mechanics (MMC 11103)
2.	Engineering Graphics (MMC11101)
3.	Kinematics of Machines (MMC13103)
4.	Kinematics of Machine Lab (MMC13203)
5.	Soft Computing Lab (MMC15206)
6.	Advanced Design of Machine Elements (MMH15103)
7.	Diagnostic Maintenance and Condition Monitoring (MMC51301, MME51101)
8.	Fluid Power & Control (MMC16104) Fluid Power System in Mines (MMC 51102)
9.	Fluid Power & Control Lab (MMC16204) Fluid Power System in Mines Lab (MMC 51202)
10.	Mineral Processing Engineering (MME52103)

Administrative Activities

Sl No.	Details
1.	M.Tech Course Coordinator
2.	In-Charge of MME Society (since 2018) and MME Alumni (Since 2017).
3.	TEQIP III Co-ordinator (Since 2017)
4.	Faculty In Charge for 3rd Year (2012-2017) and 4th Year (2017-18) B.Tech students.
5.	Time-Table Incharge of the Dept. (2012-2018).
6.	Lab-In-Charge of the Power Hydraulics and Pneumatics Lab of Deptt. of Mining Machinery Engg.
7.	Acted as Head of Department (Acting)/ Deptt. of Mining Machinery Engg.
8.	Member of Anti-Ragging squad.
9.	Member of Placement In Charge of the Department
10.	Organising committee member in various conferences

Other Academic Contributions

Sl No.	Details
1.	Acted as Member for "Five weeks Intensive Training Programme for Management Trainees (Excavation Cadre) of CIL" held at Deptt. of Mining Machinery Engg., ISM Dhanbad during 5th Aug. 2013 to 6th Sept. 2013.
2.	Acted as Member for "Five weeks Intensive Training Programme for Management Trainees (E & M Cadre) of CIL" held at Deptt. of Mining Machinery Engg., ISM Dhanbad during 9th Sep. 2013 to 11st Oct. 2013.
3.	Arranged two weeks Winter Training for B.Tech students at Sinidih Workshop, BCCL since 2012.
4.	Arranged Internship Program for B.Tech students.
5.	

6.	Arranged internship at Sandvik, KPIT etc.

Short Term Courses/ Conferences Organised (Ascending order)

Sl.No.	Title of the Courses/Conferences	Organising Institute	Duration	
			From	To
1.	Five Weeks Intensive Training Program for Executives of E & M Cadre of CIL	Member	09.09.2013	11.10.2013
2.	Five Weeks Intensive Training Program for Executives of Excavation Cadre of CIL	Member	05.08.2013	06.09.2013
3.	Lubrication and Lubricants	ISM-Industry-Institute Interaction Centre, Kolkata.	29th Aug 2016	01st Sep, 2016
4.	Measurement, control and Simulation through LabVIEW software	Deptt. of Mining Machinery Engg. ISM Dhanbad	22nd June 2015	26th June 2015
5.	Five Weeks Intensive Training Program for Executives of E & M Cadre of CIL	Deptt. of Mining Machinery Engg. ISM Dhanbad	9th May 2016	10th June 2016
6.	Five Weeks Intensive Training Program for Executives of Excavation Cadre of CIL	Deptt. of Mining Machinery Engg. ISM Dhanbad	4th July 2016	5 Aug 2016
7.	2nd National Conference on Mining Equipment: New Technologies, Challenges & Applications (MENTCA-2015)	Deptt. of Mining Machinery Engg. ISM Dhanbad	9th Oct 2016	10th Oct 2016
8.	Five weeks intensive training programme for executives of E&M Cadre of Coal India Limited	Deptt. of Mining Machinery Engg. IIT (ISM) Dhanbad	20th February 2017	24th March 2017
9.	Hydraulics in Underground Mining Equipment	Deptt. of Mining Machinery Engg. IIT (ISM) Dhanbad	12nd June, 2017	16th June, 2017
10.	Coal Washeries-Equipment & Practices	Deptt. of Mining Machinery Engg. IIT (ISM) Dhanbad	9th October, 2017	11th October, 2017

Extension and Field Outreach Activities

Sl. No.	Title of Project/ Research	Sponsoring Agency & Grant Received	Grant Utilised	Status
1.	Design of Energy Efficient Hydraulic System Incorporating Accumulator along with Pressure Intensifier	TEQIP II (Minor Research Project)	Rs. 2.73 Lakh	PI (9th Nov. 2015 to 30th June 2016)
2.	Vetting of Design of 5 Cum. Hydraulic Excavator	HEC, Ranchi	Rs. 64.9 Lakh	Co-PI (5 other Members)

Summer/ Winter School /Short Term Courses Attended

Sl.No.	Details	Organising Institute	Duration	
			From	To
1.	International Workshop on "Alternative Fuels in I.C. Engines".	TEQUIP- Organised by Dept. Of Mechanical Engg, Jalpaiguri Govt. Engg. College, West Bengal, India.	21st Feb. 2008	22nd Feb. 2008
2.	Workshop on MECHATRONICS	TEQUIP- Organised by Dept. Of Mechanical Engg, Jalpaiguri Govt. Engg.	16th April, 2008	21st April, 2008

		College, West Bengal, India.		
3.	Industrial Hydraulics	Bosch Rexroth Ltd. (India), Ahmedabad.	21st May. 2012	25th May. 2012
4.	Mining Training on Heavy Earth Moving Machinery	Central Coalfields Ltd., Piparwar, Ranchi.	04th June, 2012	29th June, 2012
5.	Mining Training on Machineries used in Underground Mines.	Putki Balihari Project, BCCL.	17th Dec. 2012	28th Dec. 2012
6.	Orientation Training Program at SECL	Gevera Project, SECL.	20th May 2013	15th June 2013
7.	Matlab and Simulink for Engineering Applications	ISM Dhanbad	24th June 2013	29th June, 2013
8.	How to Publish a Technical Paper with IEEE	Jadavpur University	8th Aug 2014	8th Aug 2014
9.	Measurement, Control and Simulation through LabVIEW Software	ISM Dhanabad.	25th Aug 2014	29th Aug 2014
10.	Fluid (Drive) and Alternative Drives, And Control in Aerospace	IIT Kharagpur (GIAN Programme at IIT Kharagupr)	5th Dec 2016	13th Dec 2016
11.	Mechatronics and Electro-hydraulics	Jadavpur University (Sponsored by TEQIP)	21 May 2018	25 May 2018

Award Received

Sl No.	Details
1.	**Hindi Pakhwara**: Got Third position and awarded by Head of Institution on 28.09.2016.
2.	**The Institution Prize:** For publishing paper titled 'Steady-state performance analysis of hydrostatic transmission system using two-motor summation drive' in the Journal of the Institute of Engineers (India): Series C, Vol. - 94, 2013.
3.	**UGC (GATE) Fellowship** to study Master of Mechanical Engineering in Dept. Of Mechanical Engg, Jadavpur University, Kolkata in 2009-2011.

High Value Instruments Procured

Sl No.	Name of Equipment	Purpose	Value (in Lakh Rupees) & P.O.
1.	Proportional Pressure Relief Valve and PLC modules	For research work.	Rs. 4.30 Lakh (P.O. No.- 329/MME/536009/13-14) dated 19th Dec. 2013
2.	Variable displacement hydro-motor with Amplifier card and accessories of existing hydraulic test set up	Required for practical classes of the B.Tech and M.Tech students.	Rs. 9.70 Lakh (P.O. No.- 216/15-16/MME/536003/14-15) dated 14th Oct, 2014
3.	Torque Sensor	To measure the torque generated by the hydraulic drives of the existing HST systems.	Rs. 10.05 Lakh (P.O. No.- 229/15-16/MME/536014/14-15) dated 8th Sept, 2015.

Professional Membership

(i) Student Member, The Institution of Engineers, India. (SE-735110177).

(ii) Student Member, FOSET, India. (SM26-06-SLG).

Name and Addresses of Referees

Name	Referee 1	Referee 2	Referee 3

Occupation or position	Prof. K. Dasgupta	Prof. R. Maiti	Prof. Sanjib Kr. Acharya
Address	Professor & Ex-Dean (Faculty & Planning), IIT(ISM) Dhanbad- 826004, Dhanbad.	Professor, I.I.T. Kharagpur, Kharagpur–721302, West Bengal.	Professor, Jadavpur University
Email	dasgupta_k2001@yahoo.co.in	rathindranathmaiti@gmail.com	skacharyya@mech.jdvu.ac.in
Phone no	+91-9431126118	+91-9434065298	+91-9433229345

Declaration

I certify that above statement are true, complete and correct to the best of my knowledge and belief.

Date: 05.05.2018

DR. NIRANJAN KUMAR