It is of enormous contentment to come to know that Department of Production Engineering of Haldia Institute of Technology is going to publish the 3rd version of annual newsletter to cover up all the achievements by the teaching and students fraternity in its small form, i.e. TECHNORAMA 2015-2016.

Owing to the mission and vision of the Department, the whole fraternity has inexorably dedicated and extended efforts towards the wholesome quality improvement of the stake holders. I guess that the nobility of academic achievements has already reached to its apex, but we have to be concerned in extenuating the lacunae more and more in the pursuit of excellence. To me this is not only a tangible brochure; rather, it includes the outcomes of intangible venture of every individual to continually move our Department forward.

I somberly believe and foresee that our Department will certainly unfurl its vivacity and dynamism towards achieving academic excellence.

I appreciate the persistent efforts put in by members of the departmental committee for bringing out this issue of Annual Newsletter.

Achievement of the faculty members

JOURNALS:


CONFERENCE PROCEEDINGS:

BOOK CHAPTERS:

PhD Submitted:
1 Mr. Balaram Dey has submitted his doctoral thesis in the month of February 2016 at Jadavpur University, Kolkata.
2 Mr. Bipradas Bairagi has submitted his doctoral thesis in the month of March 2016 at Jadavpur University, Kolkata.

PhD Guidance:

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of the faculty member</th>
<th>Title of the Thesis</th>
<th>University</th>
<th>Date of Registration/ Submission (Award)</th>
<th>Name of the Supervisor(s)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>S. Bhattacharya</td>
<td>Design Development and Characterisation of a Compliant Micro Oxygen Sensor</td>
<td>IIT Kharagpur</td>
<td>12/04/2015 (Guw)</td>
<td>Prof. B. Bepari</td>
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<td>2</td>
<td>S. Chattaraj</td>
<td>Design Development and Characterisation of a Compliant Micro Oxygen Sensor</td>
<td>IIT Kharagpur</td>
<td>15/08/15 (Guw)</td>
<td>Prof. B. Bepari</td>
</tr>
<tr>
<td>3</td>
<td>S. Dinda</td>
<td>Design Development and Characterisation of a Compliant Micro Oxygen Sensor</td>
<td>IIT Kharagpur</td>
<td>27/03/15 (Guw)</td>
<td>Prof. B. Bepari</td>
</tr>
</tbody>
</table>

B. SESSION CHAIR / ACTING AS RESOURCE PERSON / INVITED SPEAKER

Prof. Bikah Bepari was invited at 48th Foundation Day Celebration of CIPET on 17th June 2016 at CIPET, HALDIA as ‘Guest of Honour’ to deliver a Lecture on ‘Discrete Multi Objective Optimization - Application to Milling of Calmax Mould Steel’.

Prof. Bikah Bepari was invited at RCC Institute of Information Technology (RCCIIT), KOLKATA as ‘Speaker’ to deliver a Lecture on ‘AutoCAD used in different Engineering Discipline’ on 7th August, 2015 under TEQIP II.

Prof. Bikah Bepari was selected as member of National Advisory Board for the 28th International Conference on CAD/CAM, Robotics and Factories of the Future 2016 held at College of Engineering and Management, Kolaghat, WB; held from 06-01-2016 to 08-01-2016.

C. REVIEW WORK DONE FOR JOURNAL / BOOK

Prof. (Dr.) Bikah Bepari is reviewer of:
Journal of The Institution of Engineers (India): Series C of Springer India.
International Journal of Information Technology & Decision Making of World Scientific Publisher.
Few papers in line with the 28th International Conference on CAD/CAM, Robotics and Factories of the Future 2016 held at College of Engineering and Management, Kolaghat, WB. [Springer publisher]

Mr. Balaram Dey is reviewer of Journal of Management Science and Engineering Management of Taylor & Francis.


D. ACTING AS COMMITTEE MEMBERS / AFFILIATED SUPERVISORS / EXAMINERS / OTHER COLLABORATIVE ACTIVITIES WITH OTHER INSTITUTES / UNIVERSITIES / ORGANIZATIONS

Prof. (Dr.) Bikah Bepari has been:
Elected as Fellow, The Institution of Engineers on 14/12/2015 with fellowship number F-120508-7.
Selected as Convenor of the Production Engineering Sub-Divisional Committee for the sessions 2014-2015 and 2015-2016.
Nominated to act as Guest Faculty at School of Mechatronics & Robotics of IIEST, Shibpur for

FACULTY OUTREACH

A. TRAINING / WORKSHOP / FACULTY DEVELOPMENT PROGRAM ATTENDED / ORGANIZED


Prof. Bikash Bepari attended 28th International Conference on CAD/CAM, Robotics and Factories of the Future 2016 held at College of Engineering and Management, Kolaghat, WB; held from 06-01-2016
past two years.
Nominated supervisor in compliance with guid-
ing Ph.D. students in collaboration with Facultie-
S of IIEST and JU.
Selected as national advisory committee member
of 28th International Conference on CAD/CAM,
Robotics and Factories of the Future 2016 held at
College of Engineering and Management, Kol-
laghat, WB

ACHIEVEMENTS OF THE STUDENTS

<table>
<thead>
<tr>
<th>No of Students Qualified Competitive Examinations</th>
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<tr>
<td>Year of Graduation</td>
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<td>2016</td>
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PAPER PUBLISHED

B. Bepari, T. Kolay, K. Nayan and S. Mishra,

S. Bhattacharya, R. Chattaraj, M. Das, A. Patra, B. Bepari, and S. Bhaumik,


PRACTICATION AND AWARD OWN FROM TECH FEST

Mr. A. Raushan of 2nd year PE secured 2nd position in final round of Mechanical championship at IIT MADRAS in Chemclave 2016.

Mr. A. K. Tiwari, Mr. A. Singh, Ms. N. Mishra and Ms. D. Saha of 3rd yr. won the 1st prize in GOSPEL event (Paper presentation) of Prayukti 2016-Techno-management Extravaganza of Haldia Institute of Technology.

Mr. B.B. Singh, Mr. A. Nehal and Mr. A. Sharma of 3rd yr. won the 2nd prize in GOSPEL event (Paper presentation) of Prayukti 2016- Techno-management Extravaganza of Haldia Institute of Technology.

Ms. S. Banerjee of 3rd yr. won the First Prize in “R U Sherlock” (Crime Investigation) and got 2nd Prize in De-movier at Prayukti 2016 (Techno-management Extravaganza) of Haldia Institute of Technology.

Mr. B. B. Singh of 3rd yr. won the 1st prize in the event “SAUDAGAR” (Business Plan) at Prayukti 2016-Techno-management Extravaganza of Haldia Institute of Technology.

PAPER PRESENTATION

Mr. T. Kolay and Mr. K. Nayan presented a paper in 28th International Conference on CAD/CAM, Robotics and Factories of the Future 2016 (CARs & FoF 2016) 6th-8th January 2016 at College of Engineering and Management, Kolaghat, Purba Medinipur, WB-721171.

UNIVERSITY RESULT

GLIMPSE OF THE STUDENTS PROJECTS

PROJECT 1: Selection of compliant robotic gripper material

Tanumoy Kolay Kamal Nayan, Subham Mishra, Niranjan Kumar Sharma, Abhinav Bhagat and Sandipan Patra
Supervisor: Prof. Bikash Bepari

Abstract

Compliant mechanism is breed of elastic mechanism that gains its mobility from relative flexibility of its members. As a load is applied flexible links will deform and flexural joints will bend consequently. From the plethora of available compliant materials, choosing or selecting a particular compliant material subjected to a set of requirements seems to be a daunting task. Criteria for compliant material selection were Hardness, Density, Tensile Strength, Elongation at Break and cost. The competing materials were Ethylene Propylene Diene Monomer (EPDM), Ethylene Vinyl Acetate (EVA), Ethylene Propylene Monomer (EPM), Poly Di Methyl Siloxane (PDMS), Polyurethane (PU), Ethylene Propylene Terpolymer (EPT) and Polyvinylidene Fluoride (PVDF). Certain MCDM techniques were employed such as TOPSIS, COPRAS,
MOORA and ELECTRE-II to obtain the material which is best suitable to simultaneously attain the criteria mentioned earlier. PDMS was found as the best material from application point of view as revealed by all the methods.

**Keywords:** MCDM, Compliant Material Selection.

**PROJECT 2:**
Supplier selection in a supply chain using multi-criteria decision making methods
Ankita Mahato, Abhilasha Banerjee, Ranju Kumar, Vidhan Ch. Jha, Chandan Kumar, Vivek Shrivastav and Arjit Guochait

**Supervisor:** Prof. Balaram Dey

Abstract
A supply chain is a network of departments, which is involved in the manufacture of a product from the procurement of raw materials to the distribution of the final products to the customer. The term supply chain is already invoked effervescence among the managerial community. The purchasing function has gained importance in the supply chain management due to factors such as globalization, increased value addition in supply and accelerated technology change. Undoubtedly, a supplier plays a very major role in a supply chain. Supplier evaluation and selection has been a vital issue of strategic importance for a long time. Different multi-criteria decision making (MCDM) approaches have been proposed by the researchers in past, to solve the supplier evaluation and selection problem. In this paper, MCDM methodologies are presented namely SAW, MOORA and TOPSIS for solving the supplier evaluation and selection process. The study presents that with the change in processes and the requirements, how the approach of the manufacturing industry has shifted from striving for operational effectiveness to the strategic partnership in the dyadic relationship. These MCDM methods are applied to solve real-time supplier selection problems. The ranking performance of all the three methods are analyzed and compared to find out the most prevalent approach in the articles and thereby present the future scope of arriving at an optimal solution to the problem, based on the specifications, the strategies and the requirements of the buyers. Sensitivity analysis is also carried out for the three methodologies for in depth analysis. It is carried out by two ways by varying the individual weights of the criteria and by using normalized weights of the criteria. The results obtained using these three methods are observed to be almost similar to those derived by the past researchers. The project work concludes that all the three methodologies are highly robust in nature.

**Keywords:** MCDM, SAW, MOORA, TOPSIS, Sensitivity analysis.

**PROJECT 3:**
Multi-response optimization using desirability function analysis- A case study in AWJM of composite

**PROJECT 4:**
Optimization of Transportation cost in a rolling sheet manufacturing industry
Kunal Kumar Gupta, Manish Kumar, Prem Nath, Shubham Kumar, Shyam Raj, Suyash Kumar Singh

**Supervisor:** Mr. Soumik Dutta

Abstract
Transportation problem has an increasingly great impact on the management of transport. It is one of the subclasses of linear programming problem. It aims to transport various quantities of a single homogeneous commodity that are initially stored at various sources to different destination in such that transportation cost, transportation distance or time is minimum. There are two main responsible factors for the development of transportation models are number of shipping sources and number of destinations. It also deals with the minimum cost plan to transport a commodity from a number of sources to destinations using initial feasible solution max-min penalty approach. There are mainly three techniques which have been adopted in this paper such as northwest corner method, least cost and Vogel’s approximation to arrive at the optimal solution. Modified distribution method has been adopted to check the optimality of the feasible solution.

**Keywords:** MODI, Vogel’s approximation, NWCM

**PROJECT 5:**
Fuzzy Multi-Criteria Decision Making Models for Performance Evaluation of Alternatives for Diverse Conflicting Decision Making Environment
Aniket Kumar Deepak Kumar, Harsh Anand, Joydeep Kumar, Khushabu Lata, Khushbu Kumari
Supervisor: Bipradas Bairagi

Abstract
In modern era of globalization proper decision making is considered as the essential tool to attain the world wide competitive advantage and to ensure the existence and survival of any business organization. Decision making regarding the performance evaluation and selection of an appropriate alternative from feasible set for a particular product is one of the critical tasks for the decision makers. Decision makers need to identify the alternatives with specific criteria in order to find feasible design concepts and fulfill the customers’ end requirements. A systematic and efficient approach towards alternative selection is necessary in order to select best alternative for a given engineering application. This paper focuses on the application of three preference ranking based MCDM methods for solving three different type of problems such as airport selection, firm selection and best software selection. FTOPSIS, VIKOR and MOORA are the three well established MCDM methods. Using these three methods, a list of all possible choices from the best to worst suitable alternative is obtained by taking into account all different important selection criteria. The ranking performance of these methods is also compared for the individual problem.

Keywords: MCDM, FAHP, FTOPSIS, FMOORA, TFN, Fuzzy Number, Linguistic Variable, FST.

PROJECT 6:
CFD Modeling and Experimental Study of Continuous Flow Types in a Horizontal Circular Pipeline
Abhinav Keshri, Deep Saha, Pankaj Kumr Mahato, Prashant Raj, Ramesh Das, Sourav Roy, Tanmay Saha
 Supervisor: Abhishek Samanta and Uttam Ghosh

Abstract
Fluid flows are encountered in everyday life include meteorological phenomena (rain, wind, hurricane, flood, fires) environmental hazards (air pollution, transport of contaminations) heating, ventilation and air conditioning buildings, cars etc., combustion in automobile engines and other propulsion systems, interactions of various objects with surroundings air/water and so on and so forth. The measurement of velocity and turbulence in stratified and dispersed pipe flow has contributed to the better understanding of the topic. It can be concluded that CFD makes it possible to measure the velocity, pressure, temperature and species concentration of fluid flow throughout the solution domain, allowed the design to be optimized prior to the optimized phase. However, it may be pointed out that the measurements are conducted on model systems and that the systems are simplification of real life flow in horizontal pipelines. The results may be used in the development of models and computer simulation programs for liquid flow.

Keywords: Horizontal pipe flow, Laminar flow, Turbulent flow, Pipe friction, Viscosity.

PROJECT 7:
Parametric optimization of single pass end milling through weighted Grey Relational Analysis for high carbon-high chromium-D2 mould steel
Abhishek Kumar, Sourav Banerjee, Ankit Kachhap, Satyajit Das, Raghuvansh Thakur
Supervisor: Satyajit Chatterjee

Abstract
This paper encompasses parametric optimization for machining (finish cut) of high-carbon-high-chromium-D2 mould steel through GRA, which is still in its embryonic stage as revealed by the author during literature survey. To substantiate the same, a Box-Behnken DOE was carried out for the factors, namely spindle speed, feed and depth of cut during high speed single pass end milling of high-carbon-high-chromium-D2 for enhanced surface quality (lower Ra, Rz and Rmax) at higher production rate (Higher MRR). Grey relational analysis (GRA) has established itself as an adroit tool to convert multiple process parameter optimization problems to a single objective optimization problem in the past decade. GRA is generally adopted to find out the best process parameter (factor) combination entailing the different levels of factors and the goodness is ascertained through an index known as grey relational grade. This is achieved by weighted aggregation of the grey relational coefficients. It has been observed that higher level of spindle speed and lower levels of feed rate and depth of cut can achieve the good surface quality. In order to determine the weights for the responses, compromised aggregate weights were synthesized by conglomerating Principal component analysis, Entropy and Variance methods. It has been observed the ten point average roughness value, Rz is having equal or even more weightage than Ra and Rmax. Hence Rz value also to be considered while ascertaining the surface quality characteristics.

Keywords: D2 mould steel, End milling, Principal Component Analysis, Grey Relational Coefficient, Entropy, Variance, Grey Relational Grade.

PROJECT 8:
Ideal ship selection for oceangoing watchkeeping officers
Sayan Biswas, Vikram Kumar Burnwal, Akshay Hazra, Amit Satvaya, Asteek Singh, Mukul Anand and Rahul Kumar
Dr. Nilabha Sankar Mitra

Abstract:
Seafaring profession is a high risk job involving several dangers. One of the primary concern for modern day marine transportation is the concept of qualified seafarers. The watch keeping officers are subject to training liabilities for serving as an officer on board. Wrong ship choices of ocean going watch keeping officers might also have a negative impact on their professional continuity. Present work focuses on the concept of ideal ship selection for oceangoing watch keeping officers on merchant fleet and ranking ideal types of ships using suitable techniques. Selection of the most suitable sea carrier to
transport cargo from an origin port to a destination port among multiple alternatives is a complex decision making process. Thus a decision making approach for ship selection requires both company demands and ship characteristics and their interactions are also to be considered. The focus of the present work is to develop the basic understanding of ideal ship selection for ocean going watch keeping officers and aim of the work is to structure a practical decision support mechanism on ensuring multiple criteria analysis of shipping registry selection. PROMETHEE-II methodology is used here in order to model the shipping registry selection.

**Keywords**: ship selection, multicriteria decision analysis, PROMETHEE-II

**Seminar/SDP/STTP Organized**

The Department of Production Engineering of Haldia Institute of Technology has successfully organized a Three Days Faculty Development Program on “RECENT ADVANCES IN CAD CAM FOR PRODUCTION TECHNOLOGY” from 16th to 18th March 2016.

**NSS activities**

The following activities have been performed and accomplished under NSS scheme by production engineering students along with the students of the other departments.

- Coastal area cleaning
- Blood Donation Camp
- Teachers’ day and Plantation Programme
- Celebration of The birth day of Dr. Sarvepalli Radhakrishnan
- Poster preparation & Presentation for the awareness:
- Campus Cleaning
- Education Day:
- Thalassaemia detection camp:
- Creating educational awareness among community

**Address for Correspondance**:

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