

Report on PunjRobotics

The idea of **PunjRobotics** was coined in Jan 2016 at IIT Ropar to provide an active interaction, resource sharing and networking platform for the academicians, researchers and students working in Robotics field in Punjab and the nearby regions around. In this regard, as a very first session, a two-day Robotics-Meet had already been conducted on January 16-17, 2016 at IIT Ropar.

On the similar note, the second session of the Punj-Robotics was planned as a **one-day workshop on May 23, 2016 at Thapar University**. The event was a step towards upliftment of the interdisciplinary field within the institute and around, and also for a brainstorming session on the design and establishment of a common platform for Robotics oriented work-exchanges and discussions. The workshop agenda was

1. Launch of PunjRobotics website
2. Policy making for common project registration and resource sharing
3. Discussion on general infrastructure requirements
4. Selected talks (15 min duration) on planned projects

It was the first industry-academia meet in the field of robotics where number of experts from IIT Ropar, NIT Jalandhar, CSIO Chandigarh, TBRL Mohali and TIET Patiala had shared their viewpoints.

An Intensive Short Course on Design and Troubleshooting of Pneumatic Conveying Systems for Fly Ash Handling in Thermal Power Plants

April 10-11, 2015, Patiala, Organized by Department of Mechanical Engineering, TIET

Resource persons: Dr.S.S.Mallick, Associate Professor, TIET, Prof. Peter Wypych, UoW Australia, Dr.Renhu Pan, Fujian Longking, China

Pneumatic conveying systems to transport fly ash in dry mode are extensively used in of coal fired thermal power plants in India in large capacities due to the high ash content of Indian coal and the increasing requirements of conveying fly ash in dry form. However, reliable design of such system is not a trivial task and requires considerable amount of knowledge on product characterization and complex solids-gas-pipe wall interactions. A wrongly designed or not properly optimized fly ash pneumatic conveying system can cause significant amount of losses in terms of reduced delivery, increased energy consumption, unnecessarily larger capital investments, wearing of hardware etc. This short course was aimed at bringing the latest updates from the experts on the recent developments on improved system design and hardware. Several cases studies and troubleshooting options was covered for the benefit of users, designers and suppliers. The content of this program is based largely on the techniques used and developed and the experience gained by the expert presenters. The major topics that was covered during the course included: Principles of pneumatic conveying of fly ash; Characterization and classification of different bulk solids and fly ash; Latest feeding equipment; Mathematical modelling of solids friction and pressure drops in straight pipes and bends; Reliable prediction of pipe blockage condition and estimation of minimum pick-up velocity; Conveying characteristics and scale-up; Latest developments in pneumatic conveying technology for reliable fly ash transport; Troubleshooting and optimizing fly ash handling systems; Laboratory demonstrations at the Pilot Plant for pneumatic conveying at TIET. The course was attended by 28 delegates from reputed industries such as NTPC, L&T, DCPL, Prasad Group of Industries, HPGCL etc.

An Intensive Short Course on Design, Simulation and Troubleshooting of Bulk Solids Handling Systems

February 15-16, 2018, New Delhi, Organized by Department of Mechanical Engineering, TIET

Resource persons: Dr.S.S.Mallick, Associate Professor, TIET, Prof. Peter Wypych, UoW Australia

Industries that rely on bulk materials handling, such as power, cement, mining and minerals, steel, chemical, petrochemical, food and grains, pharmaceutical etc. face challenges of increasing capacity while meeting new product/process and reliability requirements in a sustainable manner. This in-depth course provided up-to-date and comprehensive training for the design and operation of storage and conveying of bulk solids systems. It covered: Application of characterization of bulk solids; Flow properties of bulk solids - shear testing and stresses induced in bulk solids, design of hoppers and silos; Quality control, segregation, handling of bulk solids; Feeder interfacing, flow obstructions, promotion; Pneumatic conveying: flow modes, pressure drop, blockage prediction, scale-up, layout, components; Simulation/modelling of storage and transport processes using Discrete Element Method (DEM): design/ improvements - silo, feeder, wear, conveyor transfer; Modelling, application and troubleshooting, industry case studies and user problems. The course was attended by 15 delegates from reputed industries such as NTPC, DMN Westinghouse, Paul Wirth India, Aditya Birla Group, Prasad Group of Industries etc.

**Report on one week short term training program on structural analysis using ANSYS
“SAA-2013”**

TEQIP-II sponsored one week short term training program on structural analysis using ANSYS “SAA-2013” was organized MED, Thapar University, Patiala, 16th – 20th December, 2013 for faculty, research scholar and P.G. students from various departments who had interest in the fields of CAD and CAE. The course was organized to enable the participants have a actual practical experience on functionalities of ANSYS-14; like modeling, meshing, pre-processing and design optimization for static and dynamic analysis problems. The training was given by experts from authorized supplier of Ansys in India. In this event 22 P.G. students and 6 faculty members participated and got training on static and dynamic analysis using Ansys multi-physics software package.

1. Engine Dissection Training:

Experiential Learning Center (ELC), TIET launched experiential learning activities in January 2018 for undergraduate engineering students under the guidance of Prof. Sanjeev Bedi. The first planned event was an engine disassembly and assembly activity for second year undergraduate students of Mechanical, Mechatronics and Mechanical-Production Engineering. The smooth conduct of this activity required an assessment by faculty and the time required by an average second year B.E. student. For this purpose it was suggested to conduct a trial in which the new Honda Gx160 engines were disassembled and assembled by MED faculty and staff.

In this regard a one day workshop was organised for engine dissection training for faculty and staff of Mechanical Engineering Department (MED), TIET from expert from authorised Dealer of Honda Engines M/s Inder Electricals Ludhiana.

The time and venue for the event was 1:00 pm on 2nd Feb, 2018 (Friday) in CAM Lab in Central workshop. The entire event was video-graphed and the developed video were also used as a reference material by the students.

Following faculty and staff participated in the training session and later has helped in executing the engine dissection activity on 12th February 2018:

1. Dr. S K Sharma, Assistant Professor, MED
2. Dr. R K Duvedi, Assistant Professor, MED
3. Dr. Gautam Setia, Assistant Professor, MED
4. Dr. Amandeep Oberoi, Assistant Professor, MED
5. Mr. Sohan Lal, Lab Superintend, MED
6. Mr. Satwinder Singh, Lab technician, MED
7. Mr. Parminder Singh, Lab Superintend, MED
8. Mr. Manoj Kumar, Lab Superintend, CW
9. Mr. Harinder Singh, Technical Staff, CW
10. Mr. Mukhmeet Singh, Support Engineer, ELC

2. Engine repair and maintenance Training:

Experiential Learning Center (ELC) organised a one day **IC engine repair and maintenance** workshop for Honda Gx160 engine on 23rd Feb 2018 for the faculty and staff of Mechanical Engineering Department (MED) in the IC engines lab in H block. The training was provided for all the design, engineering and maintenance details of the engine by the authorised Dealer of Honda Engines M/s Inder Electricals Ludhiana himself. This one day session was in continuation of the workshop on dissection and assembly of Honda GX160 engines organised in MED TIET on 2nd Feb 2018.

Following faculty and staff participated in the training session and later has helped in executing the engine dissection activity conducted on 26th Feb 2018:

1. Dr. S K Sharma, Assistant Professor, MED
2. Dr. R K Duvedi, Assistant Professor, MED
3. Dr. Devender Kumar, Assistant Professor, MED
4. Dr. Vineet Srivastava, Assistant Professor, MED
5. Dr. Gautam Setia, Assistant Professor, MED
6. Dr. Amandeep Oberoi, Assistant Professor, MED
7. Dr. Rajinder Kumar, Assistant Professor, MED
8. Dr. Sachin Singh, Assistant Professor, MED
9. Dr. Satish Kumar, Assistant Professor, MED
10. Mr. Harmanpreet Singh, Lecturer, MED
11. Mr. Sohan Lal, Lab Superintend, MED
12. Mr. Satwinder Singh, Lab technician, MED
13. Mr. Parminder Singh, Lab Superintend, MED
14. Mr. Harcharan Singh
15. Mr. Sukhbir Singh, Lab Technician, MED
16. Mr. Mukhmeet Singh, Support Engineer, ELC
17. Mr. Manoj Kumar, Lab Superintend, Central Workshop
18. Mr. Harinder Singh, Technical Staff, Central Workshop

Thapar Institute of Engineering and Technology has initiated the concept of Experiential Learning in January 2018 for undergraduate engineering students to enable students learn, understand and actively engage in engineering design activities through direct use of industrial grade machines/equipment. These activities are being organised under the supervision of Dr. Sanjeev Bedi, Professor, University of Waterloo, Canada and Dr. Ajay Batish, Deputy Director, TIET and has taken a formal shape under the Experiential Learning Center (ELC). In May 2018, ELC has been further strengthened with the induction of Dr. S.K. Mohapatra (Sr. Professor, MED) as Coordinator, and Mr. A.S. Jawanda (Associate Professor, MED) and Dr. R. K. Duvedi (Assistant Professor, MED) as Associate Coordinators with a mandate to assist the various departments to plan and execute the experiential learning initiatives.

Mechanical Department at TIET has taken the lead in initiating a number of experiential activities and summer internship projects for all undergraduate engineering students of TIET. These initiatives has been supervised by an interdisciplinary team of motivated faculty volunteers from all engineering disciplines. The ELC activities initiated with the Engine Dissection activity which is conducted 4 times in the last semester (Jan-May) for 430 students on 12th Feb (for BE Mechanical, Production, and Mechatronics) , 26th Feb (BE Mechatronics, and Electrical), 23rd April (3rd Year Mechanical students of TPC). Some trial projects which can be taken up as future activities for MED students were also conducted during Jan-May 2018 and are listed below:

1. Design of a solar water heating system
2. Bicycle dissection and assembly
3. Design of a double column hydraulic lift of automobile servicing
4. Design competition for E-transportation system for TIET
5. Design of a two axis CNC table
6. Design of a modular semi-automatic drill machine
7. Design and manufacturing of wood stove for room heating
8. Design and manufacturing of a general purpose bearing puller
9. Design and fabrication of folding table for ELC activities
10. Design of plate heat exchanger

During summer vacation June-July 2018, we have executed trials for various activities to be undertaken as experiential activity in the coming semesters. These included:

1. Design of Brushless DC Motor and controller – Mechanical and Mechatronics Engineering Student
2. Assembly of a modular CNC machine structure, electrical and electronics components - Mechanical and Mechatronics Engineering Student
3. Bi-cycle dissection and assembly - Mechanical and Mechatronics Engineering Student
4. Power Supply design and fabrication (Electronics students)
5. Design and fabrication of Radio transmitter and receiver (Electronics students)

Major Internships Projects undertaken during summer vacations June-July 2018

1. Jeep project: 24 students are working for conversion of an IC engines based all-terrain sports utility vehicle to an electrical vehicle.
2. E-transportation system (entrepreneurial-transportation system) – Team AEDI and Team RISCIO with 10 students in each are working for developing the first stage prototype for e-transportation system.
3. Design of a bicycle sharing concept using a mobile app - GoGo Bikes: 4 of Mechanical and Mechatronics Engineering Student working on this project.

The ELC activities planned for under graduate students of Mechanical Engineering Department for the academic year 2018 are listed below along with the faculty responsible for execution of these activities:

List of ELC activities for MED			
		MED	MEDFaculty assigned
1st Sem			
1	8 Hours	Bike (Axle/Handle bar+Improved Rear Susp) +Bike design for Physically challenged person	Dr.Supreet Bhullar Dr. Vinod Kumar Singla Dr.Daljit Singh Dr.Kundan Lal Rana Dr. Ravinder S. Joshi Dr. Sachin Singh
2	8 Hours		
2nd Sem		201 C (ME)	
1	8 Hours	Engine/G.Box/Susp/ Brake	Mr. Sumit Sharma Dr.Devender Kumar Dr.Gagandeep Bhardwaj
2	8 Hours		
3rd Sem		301 C (ME)	
1	8 Hours	Pneumatic M/c Structure/ Design & build Chair testing facility	Dr.Anant Kumar Singh Dr.Ratnesh Kumar Dr.Munish Kumar
2	8 Hours		
4th Sem		401 C (ME)	
1	8 Hours	Dism/Assem of 3 -axis CNC M/c	Dr.Vivek Jain Dr.Jaswinder Singh Saini Dr. Ravinder Kumar Duvedi
2	8 Hours		
5th Sem		501 C (ME)	
1	8 Hours	M/c design Activities like: Hydraulic Lift, E-Bike, Solar collector & Tracker, Heat Exchanger	Mr. A. S. Jawanda Mr. Bikramjit Singh Dr. Vikrant Khullar Dr.Rohit Singla
2	8 Hours		
6th Sem		601 C (ME)	
1	8 Hours	Design analytics intensive activities like: Quarter Car problem, Trailer Problem	Dr.Tarun Kumar Bera Dr. Ashish Singla

2	8 Hours		Dr.Neeraj Kumar
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