ChemEXplored
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THE 'BEHIND-THE-STAGE' PERSONNEL FROM THE ICCEAPM 2016

ICCEAPM 2016 sets new recognition for the Chapter

The International Conference on Chemical Engineering and Advanced Polymeric Materials (ICCEAPM 2016) aimed to bring together expertise on every sector of Chemical Engineering and Allied branches for a congregation where they can make each and every one aware of the recent advancements in their respective fields of study. The conference was attended over by approximately 75-80 delegates from across the country and beyond.

The contribution of the Chapter towards the effective execution of the Conference, right from scratch to the polishing end, was beyond compliments, as was evident from the closing ceremony speech by Dr. Gautam Sarkhel, Convener of the Conference and Head of Department, Department of Chemical Engineering and Technology, BIT Mesra, along with Prof. K. Raghu raj Pandiyan, the co-convener of the Conference. Papers were presented on each and every sector of advancement and modernization in Chemical Engineering as well as problems regarding the functioning of the Chemical industry were also discussed. Solutions of these problems were resorted to on a large scale from the enthusiastic audience of the Department students, who had brushed themselves up with the knowledge of the whereabouts of their scope in the near future.

The Conference was scheduled from 18th August, 2016 to 20th August 2016 mid-day. Presentations were held in two halves, each half comprising two parallel sessions. The sessions were categorized on the basis of the field of discussion, namely Rheology, Biochemical Technology, Modelling and Simulation, Environment and Safety, Mass Transfer, Polymer Composites, Surface Coatings, Food Technology, Synthesis & Characterization and Energy. Apart from these technical sessions, plenary lectures were also organized and were hosted by eminent dignitaries from Research Centers in India as well as abroad.

In the words of the spokesperson of the Chapter, the Conference gave the former ample exposure to the various glitches and barriers encountered while organizing an event on such a large scale, as well as gave them a deeper insight into the various veins of the branch, on the basis of which they can arrange their events and symposiums. In other words, the Conference has proved to be a turning point in the decision-making section of the Chapter regarding the nature of events undertaken by them.

IN THIS ISSUE

Induction Ceremony for the class of 2015

This event was aimed to get the 2015 batch well-acquainted with the activities of the Department as well as assist them in any problems, both curricular as well as non-curricular.

Page 2

Intern Talk

How we do, what we do, whom to contact, necessary criteria for applying and all these queries will be answered in this section.

Page 7

Induction session for class of 2015 undertaken successfully

It has been high time since the class of 2015 has been formally introduced to the Department of Chemical Engineering, BIT Mesra. The tradition of making the freshmen aware of the activities of the Department and the Chapter has once again been executed successfully by the Executive Body of the Chapter. The Induction Ceremony also provided an insight into the hierarchy and the various events associated with the Chapter.

The evening of 29th August proved to be quite informative and entertaining for the students of Chemical Engineering, Chemical Engineering- Plastics & Polymer and IMSc in Food Technology, as the day was presided over by two experienced professors from the Department, Dr A K Sen and Dr Raghuraj Pandiyan K. The opening speech was delivered by the General Secretary of the Chapter, Mr Subhodip Banerjee, which emphasized on the advantages of being one of the member of the Chapter and the various avenues of events where members can participate. Special emphasis had been provided on Shell Ideas 360, the international Innovation competition organized by the Royal Dutch Shell.

After briefing, Prof. Raghuraj had given a full overview of the status of chemical industry in India as well as the future prospects in this field. He had tried to eliminate the last element of confusion from the minds of the audience, regarding the scope of the branch in the country in an age where everyone is running behind the IT sector. He had also briefed the audience regarding the placement scenario of the branch and the modus operandi for enhancing the former in the near future.

Turning over to Prof. Sen, he give a vivid description of his experiences with the industry and described the demands of the former from an undergraduate chemical engineering student. He also resorted to methods for equipping students with the knowledge of recent developments in Chemical Engineering sector by providing a modus operandi for the present academic session. The methods adopted by him were highly appreciated by the audience seated at that time.

After the intervention of administrative viewpoint, it was time for a nasty informal talk with the new batch. Addressing of problems and their fruitful solutions were executed in the remaining time duration, along with the distribution of registration forms for formal absorption into the mainstream of the Chapter.

HIGHLIGHTS

- The induction was aimed to provide just a brief insight into the Chapter, but has ended up with a complete debriefing of the chemical industry.
- The impact of the induction session was felt after the former, during the turnover for registration to the Body.
- The event had marked the ardent presence of the Department of Chemical Engineering in the campus and its Executive wing- IIChE Students' Chapter, with its signature events.

Equipment of the day

By The Editorial Board

In every issue, we shall be discussing about one basic method/equipment which is being used extensively in the chemical industry, in order to keep you updated with the recent activities out there, in the open. Today's article is based on "Pneumatic Conveying systems".

A brief glimpse of pneumatic conveying systems

A pneumatic conveying system transfers powders, granules, and other dry bulk materials through an enclosed horizontal or vertical conveying line. The motive force for this transfer comes from a combination of pressure differential and the flow of air (or another gas) supplied by an air mover, such as a blower or fan. By controlling the pressure or vacuum and the airflow inside the conveying line, the system can successfully convey materials.

Advantages of Pneumatic Conveying:
Pneumatic conveying provides several advantages over the mechanical conveying. A pneumatic conveying system can be configured with bends to fit around existing equipment, giving it more flexibility than a mechanical conveyor with its typically straight conveying path. This also means the pneumatic conveying systems occupy less space than a comparable mechanical conveyor. The pneumatic conveying system is totally enclosed, unlike many mechanical conveyors, which enables the pneumatic system to contain dust. The pneumatic conveying system typically has fewer moving parts to maintain than a mechanical conveyor, as well.

Possible Disadvantages
Pneumatic conveying also has some disadvantages compared with mechanical conveying. One is the pneumatic conveying system's typically greater use of horsepower than a mechanical conveyor, resulting from the pneumatic system's need to change air pressure to produce conveying power. The pneumatic conveying system also uses a comparatively larger dust collection system than a mechanical conveyor because the pneumatic system has to separate the materials from the conveying air at the system's end. Some materials also have characteristics that make them difficult to convey in a pneumatic system. Examples are materials with a large particle size and high bulk density, such as gravel or rocks, and extremely sticky materials, such as titanium dioxide, which tend to build a coating on material-contact surfaces and can eventually block the conveying line.

Pneumatic Conveying System Types and Applications
Pneumatic conveying systems are classified by their operating principle into two basic types: dilute phase and dense phase. Either can run under pressure or vacuum.

Dilute Phase Conveying: In dilute phase conveying, particles are fully suspended in the conveying air and transported at low pressure and high velocity.

Dilute Phase Pressure Conveying:
Dilute phase pressure conveying is one of the most common conveying methods for powders or granules. It's most often used with non-abrasive, non-fragile materials that have a light bulk density (typically less than 62 lb. /ft3); common examples are flour, sugar, corn starch, plastic granules, sodium bicarbonate, hydrated lime, activated carbon, and zinc oxide.
In this method, a blower at the system's start supplies a high volume of low-pressure air to the system, and material is fed into the conveying line through a rotary airlock valve. The system relies on the air stream's velocity to pick up and entrain each particle, keeping the particles in suspension as they travel through the conveying line. The dilute phase pressure conveying system requires relatively little headroom and is simple to operate, economical, and ideal for conveying

FAST FACTS

82%

of the undergraduates have no idea of the scope of chemical engineering after completing their Bachelor's Degree.

75%

of the undergraduates lack basic knowledge of equipment used in the industry.

materials from a single source to multiple locations.

Dilute Phase Vacuum Conveying:
Dilute phase vacuum conveying is suitable for conveying materials that tend to pack or compress under pressure, such as wood shavings and certain other fibrous materials, and for toxic materials that must not leak into the workplace air. This system is typically used to convey materials over short distances at low capacities. Dilute phase vacuum conveying requires minimal headroom at the feed point and is ideal for conveying material from multiple sources to a single destination.

In dense phase conveying, particles aren't suspended in the conveying air and are transported at high pressure and low velocity.

Dense Phase Pressure Conveying
Dense phase pressure conveying is suitable for gently conveying fragile or abrasive materials with particles ¾ inch and smaller over long distances (typically more than 250 feet). Commonly handled materials include silica sand, feldspar, fly ash, glass cullet, alumina, glass batch mix, carbon black, sorbitol, dextrose, candies, resins, cocoa beans, hazelnuts, and puffed rice cereal. The system conveys materials at a relatively low speed to reduce materials degradation, air consumption, and abrasion on pipeline, bend, and diverter contact surfaces. This system can also stop or start with the conveying line full of material.

Material conveyed by this method is loaded into a pressure vessel (also called a blow pot or transporter), as shown in Figure 1b. When the vessel is full, its material inlet valve and vent valve are closed and compressed air is metered into the vessel. The compressed air extrudes the material from the pressure vessel into the conveying line and to the destination. Once the vessel and conveying line are empty, the compressed air is turned off and the vessel is reloaded. This cycle continues until all of the materials required for the process have been transferred.

To overcome resistance in the conveying line, supplementary air injectors (also called air boosters or air assists) can be located along the conveying line (Figure 1b). These injectors provide additional air to help maintain conveying velocity, transfer materials over long distance, and minimize line plugging. They can also be used to gently restart flow when materials are left in the line after the conveying cycle. An air injector should be sued with a high pressure manifold to prevent back feeding of material into the compressed air system.

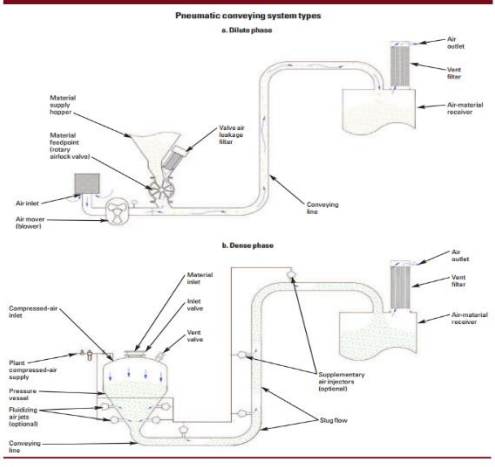
Dense Phase Vacuum Conveying
Dense phase vacuum conveying is ideal for gently conveying fragile or abrasive materials short distances (typically 200 feet or less). This system is typically used to transfer powder and granules at a low rate (25 tph or less) in applications such as truck or railcar unloading.

A less commonly used semi-dense phase conveying system is configured like other dense phase systems, but uses a pressure vessel with a fluidizing bottom so it can handle semi-abrasive powders and fluidizable powders that need aeration to discharge into the conveying line. This method isn't the ideal choice for fragile materials or materials containing large, variable, or both large and variable particle sizes. The largest particles handled by this method are approximately ¼ inch.

Following are the industries with suitable pneumatic conveying system options:

- Grain Handling – Lean phase/ Dense phase pressure pneumatic conveying system.
- Grain conveyor – Dense phase vacuum pneumatic conveying system
- Grain processing plant – All options are open
- Sugar Handling – Dense phase vacuum pneumatic conveyor
- Sugar Handling system - Dense phase vacuum pneumatic conveying system
- Sugar processing plant – Dense phase conveyor
- Malt Handling – Dense phase pressure Pneumatic conveying
- Malt Handling system – Dense phase pressure conveying system
- Malt processing plant – Dense phase vacuum conveying system
- Corn grain handling system - Lean phase pneumatic conveying system
- Corn processing - Lean phase pneumatic conveying
- Flour handling system –vacuum conveying system
- Flour Handling – Vacuum pneumatic conveying system
- Powder handling – Vacuum conveyor
- Powder handling system – lean phase pneumatic conveying system

Figure 1



Fact Corner

By Editor's Choice

In this section we shall be discussing the real essence behind the success of some of the students under the aegis of the Department of Chemical Engineering, at an undergraduate level. Today we shall be interviewing Mr. Sourav Agarwal and Mr. Manish Chandan, both of them being 4th year students and have bagged a pre-placement offer at TATA Steel. So the whole Department is eager to know the secret behind this success.

What was the source of inspiration for applying at TATA Steel?
TATA Steel is the country's largest steel producing company and it is considered as Indian multinational company. It is one among the core companies in India in where every engineer wants to pursue his/her career. The name of this organization is big enough in itself which motivated me towards applying for the same.

What are the common points that a corporate house expects from you?
Organization like TATA Steel have great ethical values, they expect discipline in the work from their employees. There is a simple logic which is applicable for every organization that if company is paying you for the work then they want you to be an asset for the company.

What are the common points that everyone should keep in mind regarding the placement issue?
We believe that, the earlier placement kind of things petrified you, more early you will be placed. A perfect resume is the basic thing for applying in any placement procedure. Always make two resume for your placement (one for core companies and the one is for the consultancy based companies) because there are a lot of thing like your industrial visit, winter or summer training which You cannot show in your resume while applying for the consultancy based companies. Start preparing your resume as soon as you enter in 5^{th} semester and make a habit of updating it regularly. Moreover, these are the days when you have enough time to build a good aptitude skills which only came from practice.

What factors give weight to the CV?
A good resume or CV is a way through which one can get the reflection your sincerity and dedication towards the work. The weight of your CV depend on the type of position for which you are going to apply. If your inclination is towards CAT and GRE then a good healthy resume will always have an edge. Your academics carrier, social activities, projects of importance are some of the parameter which can boost your resume. But a good core company will only test your technical knowledge along with the leadership quality which came from the convincing power of the individual.

How does association with any society or body affect the CV? In your case, what is the role of IIChE?
Association with any organization made you to interact with new people. The interaction with your senior or junior is a healthy thing to boost your confidence level. There are a lot of big buddies with whom you have to interact as soon as you enter in the corporate field, so being the part of a club in the college will surely enhance your personality and made your extrovert behaviour to shine. During the resume submission to the HR of the TATA Steel, we had kept the IIChE related thing in top, because they reflect our leadership qualities as well as our interests towards the chemical engineering. There's a lot of things that we had learnt from this club not only from the seniors of 2k10, 2k11 and 2k12 but also from some of the dedicated juniors of 2k14.

What are the obstacles that you have faced during the entire schedule?
Since we got selected in TATA Steel through mind over matter challenge which is a national level competition. So quite different types of challenges and difficulty came in front of us. We have to suggest an innovative idea regarding our challenges i.e. "maceral separation of coal". The first issue is how to find the innovative solution on that particular topic. We read all the research papers regarding this topic and soon we realize what innovative input we can add. Finally our idea got selected and we got two months internship opportunity in the R&D of TATA Steel to implement our idea. The next challenge in front of us is to apply our idea. We have to use many new machines which we had never seen earlier. We encountered with many new terminology which we do not know before. Every day in the R&D is a challenge for us. We had given so many presentation in front of researcher and scientist in the R&D and finally in front of president of the TATA steel. Presenting your

entire 2 months in the limited time interval was the biggest challenge for us .Like us, other team is also giving their best in order to secure top 3 position. Finally our hard work paid off and we made it.

What are the common questions that are asked from the technical sector?
Frankly speaking, company like TATA Steel test your technical skill just to check your sincerity and level of understanding towards the subject. During our internship period, we had not encountered the use of any of such knowledge. It depends on the company to company basis. Suppose if you are applying for RELIANCE, than your deep technical knowledge towards some subject like mass transfer, petroleum and refinery engineering will make your way. So we would suggest better to go through the company profile, the kind of work they do and previous year question which they had asked (it is easily available in various sites like INDIA BIX etc).

At last, what aid would you like to give to your juniors? What soft skills should they possess?
We think there is a perfect time for anything. 1^{st} and 2^{nd} year are the days when people use to enjoy their college life to the fullest and it is a perfect time to do so. But the last 2 years are the carrier building time, so utilize these 2 years' time wisely. We personally think that making your future secure is the biggest success that one can get in the college days, and it is completely in your hand. Cool type personality won't work always. Try to be serious towards your goal and whenever the situation demand.

Your seriousness towards the goal make you leader. Fear keeps people, Run towards your fear. Begin with small step. Don't let other to stand in your way. Walk your own path. Some may laugh, so what? Many will follow. Whatever is your dream, go for it. You will inspire others. And have faith in God Good luck!!

Events schedule in the near future

By Editor's Choice

Brain versus brawn: In this event, participants will be subjected to a virtual simulation of real-life pre-placement scenario, where the two aspects, namely aptitude skills and effective communication & analytical skills determine your journey ahead to the personal interview round. The main objective of this event is to make everyone aware of the scenario so as to prevent them from panicking during the actual session, thus distinguishing them from the crowd. The entire event comprises two rounds, being executed over a span of 2 continuous days. The first day witnesses the preliminary session where an aptitude test will be held. There will be a total of 15 questions, each carrying 3 marks. No negatives will be awarded. Questions in this round will mainly comprise qualitative and quantitative assessment. In case of a tie, 5 questions each carrying 2 marks for correct answer and -1 mark for wrong answer will be evaluated, hence candidates are required to use their own discretion while attempting for the tie-breaker section. The tie-breaker section will be a surprise section, revealed only on the paper.

15 candidates will be qualified for the next level, which will be a group discussion on any topic being asked under the sun. The candidates will be split into groups of 5, and their judgement will be done on the following parameters:

- Understanding of the topic
- Ability to influence the course of the Group Discussion
- Validity of the points spoken
- Manner of examining counter-questions
- Maintenance of decorum during the course of the event.

Virtual Reality: This event is basically a workshop to make those attending the event, aware of the various simulators used in the industry as well as the working principle behind them. The present industry is completely digitized, due to which knowledge of computing is also necessary in collaboration with the theoretical aspects behind solving major industrial issues.

- Fluent system under Workbench enables one to visualize several aspects of momentum and heat transfer in simple as well as complicated structures in all dimensions.
- Aspen is used for flow sheeting any process, which is required to be scaled up for other purposes.

Rasaayan-e-Karizma: This event covers all the core aspects of chemical engineering, ranging from the very basics to infinity. The present world is facing a severe shortage of basic amenities. Using waste products from various sources, engineers and researchers all over the world have started to recycle them to yield products more valuable and durable than their mother material. There is no prerequisite for taking part in this event. In this event, participants will be provided with certain industrial by-products, which may or may not be related to chemical engineering, and they have to make the best use of them to convert this rubble into something very useful for chemical industry. Point is to be noted that participants cannot use any external spare parts or boosters to alter the basic working of the rubble. Materials will be anything, and participants can utilize any facilities available within the premises of the campus for assembling their product. A working model is not necessary for delivering results, a simple presentation will be enough for this issue. Evaluations will be done as follows

- Nature of product.
- Design expenses incurred.
- Efficiency of the system.
- Innovation/plagiarism-free nature of the product.

TV Mania: It is truly said "All work and no play makes Jack a dull boy". Sometimes, apart from this quagmire of deep studies in engineering, a refreshment is must. So, to enlighten the spirits of participants, the event "TV Mania" has been introduced. The event is based on the assumption that the participants are well aware of the famous television series "Breaking Bad". If not, well, you can watch it and participate, for there is ample time allocated for the event as well as a plethora of clues. A set of 30 questions will be circulated among the general audience, which will contain general idea regarding the TV Series. A group of 7 will be competing for the next level, where they will be exposed to deeper zones of the series. The person who becomes the first one to accumulate 150 points will be the winner.

Mind boggler

By Editor's Choice

Are you a puzzle solver? Do you have the innate desire to discover something new? Well, here we give you an opportunity to prove your thirst. Presenting before you, a new version of Puzzles. Check out the first question.

1) You have 3 switches in a room. One of them is for a bulb in next room. You cannot see whether the bulb is on or off, until you enter the room. What is the minimum number of times you need to go in to the room to determine which switch corresponds to the bulb in next room?
2) The warden meets with 23 new prisoners when they arrive. He tells them, "You may meet today and plan a strategy. But after today, you will be in isolated cells and will have no communication with one another. "In the prison is a switch room, which contains two light switches labelled 1 and 2, each of which can be in either up or the down position. I am not telling you their present positions. The switches are not connected to anything. "After today, from time to time whenever I feel so inclined, I will select one prisoner at random and escort him to the switch room. This prisoner will select one of the two switches and reverse its position. He must flip one switch when he visits the switch room, and may only flip one of the switches. Then he'll be led back to his cell. "No one else will be allowed to alter the switches until I lead the next prisoner into the switch room. I'm going to choose prisoners at random. I may choose the same guy three times in a row, or I may jump around and come back. I will not touch the switches, if I wanted you dead you would already be dead. "Given enough time, everyone will eventually visit the switch room the same number of times as everyone else. At any time, anyone may declare to me, 'We have all visited the switch room.' "If it is true, then you will all be set free. If it is false, and somebody has not yet visited the switch room, you will all die horribly. You will be carefully monitored, and any attempt to break any of these rules will result in instant death to all of you" What is the strategy they come up with so that they can be free?
3) People are waiting in line to board a 100-seat airplane. Steve is the first person in the line. He gets on the plane but suddenly can't remember what his seat number is, so he picks a seat at random. After that, each person who gets on the plane sits in their assigned seat if it's available, otherwise they will choose an open seat at random to sit in. The flight is full and you are last in line. What is the probability that you get to sit in your assigned seat?

Send us your entries at iiche@bitmesra.ac.in to win exciting prizes! Deadlines upto three days from the launching of the newsletter.

Intern Talk

By now you all have realized how boring the summer vacations are, especially when you are sitting idle at home, wasting your time. Now, certain questions will be rising in minds regarding what to do during vacations, regarding where to do the summer/winter trainings/internships during the course of study, which category of training will be suitable for you and so on. Well, here we bring before you a first-person account of summer trainings undertaken by various students from the class of 2013 and 2014.

A summary of the students who had undergone summer training in various organizations have been listed below. For detailed description regarding the procedures for applying for aforesaid, the e-mail IDs and contacts have been provided.

1) **Summer fellowship at IIT-Guwahati**
Kislay Jha (contact: 8986718901, e-mail ID: kislayj45@gmail.com)
Madhur Sharma (contact: 9162639261, e-mail ID: madhursharma.2429@gmail.com)
Komal Gupta (contact: 8987460243, e-mail ID: komalgo801@gmail.com)
Astha Alankrita (contact: 9934105756, e-mail ID: asthaalankrita@gmail.com)

2) **ONGC:**
Akshata Trivedi (contact: 9955817130, e-mail ID: akshatat800@gmail.com)

3) **SAIL- R&D, Ranchi**
Ankeeta Shriya (contact: 9801161418, e-mail ID: ankeetashriya@gmail.com)
Anupam Ambuj (contact: 829402605, e-mail ID: be10597.14@bitmesra.ac.in)
Puja Singh (contact: 7549085418, e-mail ID: pujasingh8541.ps@gmail.com)
Shiksha Das (contact: 8809419323 , e-mail ID: shikshadas168@gmail.com)
Subhodip Banerjee (contact: 8521821633, e-mail ID: be10519.14@bitmesra.ac.in)

4) **Coal India Limited**
Abhishek Kumar (contact: 9709105694, e-mail ID: abhishekkumar2404@outlook.com)

5) **TATA Motors**
Tanmay Sinha (contact: 8521929352, e-mail ID: tanmaysinha1996@gmail.com)

We always welcome all sorts of recommendations for modification of contents displayed here in this session. To send your feedbacks regarding anything about the newsletter, feel free to drop a message at our Facebook page: http://m.me/IICHEBITMESRA

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To avail the latest versions in pen and paper, contact us here at:

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