



The Pittsburgh Professional Engineer
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October 2006

PRESIDENT'S MESSAGE

I believe this year the Pittsburgh Chapter of PSPE has an exciting program for the year. The current Board of Direction and I are committed to presenting interesting meeting topics as well as increasing efforts to increase membership. Starting with our October meeting, Col. Stephen Hill, District Engineer of the U. S. Army Corps of Engineers, will talk about Hurricane Katrina and the lessons learned as well as what could have been done better. All members of the Southwest Region of PSPE are invited to participate in this joint activity.

Recently, all PSPE members were asked for input to develop a Strategic Plan for PSPE. The results of this survey will be published in the near future. There was a significant response to this survey, partially due to a one week extension for responses requested by the Pittsburgh Chapter. With declining engineering enrollment at the college level and other issues with professional engineering services, I believe that PSPE will emerge from this process with a new energy to forward the cause of professional engineers. I invite all members to become involved in the meetings and other activities to increase awareness of our legislators, our clients and the general public of the importance of professional engineering.

I look forward to personally meeting each of you at upcoming events

PSPE Pittsburgh Chapter President – Darryl Brogan, P.E.

P.E. Editorial

Congratulations! The PSPE Survey made last month was completed by a meaningful number of PSPE members. During the one week extension from Sep 4 until September 11, about 50 additional responses were received. A 10% response to this type of survey is considered average to good – your response was not quite double that at 17%. Somebody out there is thinking. The results are being analyzed and may be available by the next Newsletter. Former Chapter President Michel Sadaka, P.E., (currently PSPE Southwest Region Vice President) is deeply involved in the project.

The month of October will bring the first membership meeting of the year. “Katrina and New Orleans” will be the subject; the speaker will be Col. Steven Hill, District Engineer, U.S. Army Corps of Engineers, Pittsburgh District. The Washington and Beaver Counties Chapters will join us for the meeting. All Southwestern PA PSPE members are invited.

At the September Board of Direction meeting on September 14, it was agreed that the FE and PE Refresher Courses are offered as a service to the community and profession. They are not profit centers. If enrollment is too low to support the cost, the chapter will subsidize it. This fall, the Pittsburgh Chapter and Penn State Refresher Courses were both canceled for lack of demand. We expect the spring courses to go full tilt.

Acting Editor, Reyman R. Branting, P.E.

President's Message	1
Editorial	1
Katrina & New Orleans	2
Explaining Explosions	3
Apprenticeship Orientation	4
MathCounts Problem	4
Coming Attractions	5
Apprenticeship Visit – Biomedical Tower # 3 at Pitt	6
Meeting Reservation Form	7
Calendar	8

Katrina and New Orleans

Just over a year ago, New Orleans was hit with a double whammy – hurricane, then flooding. The nation, and the world, was stunned by the magnitude of the damage.

Many local, state and federal agencies, as well as private citizens, were involved in evacuation. The numbers involved area astounding. Every newscaster, newspaper and news magazine editor weighed in with graphic descriptions and lots and lots of free advice.

The US Army Corps of Engineers was one of the agencies called upon. Colonel Stephen L. Hill, Commander of the Corps Pittsburgh District, was among those called to the scene. He will tell a joint meeting of the Pittsburgh, Washington and Beaver Chapters of PSPE of his experiences and observations in Louisiana.

A 1982 graduate of West Point, Colonel Hill has served on assignments in Japan, Germany, Kuwait and Egypt as well as in the United States. He holds a Master's Degree in Civil Engineering from Purdue University and a Master's Degree in Strategic Planning and Policy from the Army War College.

I can personally attest to his composure and sense of humor under trying circumstances. You will enjoy his presentation.

EXPLAINING EXPLOSIONS

By Earl C. McCabe, P.E.

Through out the history of the world, explosions have occurred from time to time. Many were due to natural causes, such as volcano eruptions. Others occurred because man learned to make substances that could create explosions. The Chinese produced gunpowder to use in fireworks. Gunpowder was then used to propel an object or missile when it exploded, such as in guns and bombs. New materials have been developed, as well as new ways of using old ones, to create explosions to destroy property and/or people. In the recent wave of bombings, we desire to know what happened, and how it occurred.

One of the chemicals mentioned as being used in some bombs, particularly truck bombs as used in the Murrah Building in Oklahoma City, is ammonium nitrate. In that case the nitrate was mixed with fuel oil. Remember that gunpowder is a mixture of saltpeter, charcoal and sulfur and that saltpeter is potassium nitrate. So, I wondered, is ammonium nitrate explosive? Can it create much destructive power?

Many years ago, I came across a 61 page bulletin, a publication of the United States Atomic Energy Commission dated March 1966, titled "The Study of Missiles Resulting From Accidental Explosions, A Manual For Investigators, Safety and Fire Protection Bulletin #10". It discussed seven cases, as well as some fundamental principles of explosions and missiles, and procedures in analyzing them. The U.S. Government Printing Office, when called, said they have no knowledge of such a publication, which they had in 1966.

One of the cases discussed was titled, "The Product That Couldn't Explode". It was about the explosion in an ammonium nitrate plant back in the 1940's. People in the industry were greatly surprised when such a plant exploded. Evaporation of ammonium nitrate to dryness in steam-heated pans had been the long time practice. Air was introduced, for agitation purposes, through pipes or "lances". Oil was put into the high-pressure line of the air compressor. Although ceramic filters were in the line to remove the oil, it was found that a small amount of oil passed through and created an explosive mixture. The molten nitrate was at a temperature of about 307 F. The air-oil mixture ignited and set off the previously oil-contaminated molten nitrate in the lance, which then exploded. That burst the lance and set off the charge in the pan.

Tests run at the Bureau of Mines and other data from the literature indicated that chemically pure ammonium nitrate may be heated to decomposition point, above 400 F, and will decompose without exploding. Mixing a very small amount of carbonaceous material makes the mixture sensitive at high temperatures in the molten state. Also, it was known that zinc acts as a catalyst. The pipes were galvanized.

The Oklahoma City bombing was by a truck containing drums filled with ammonium nitrate and oil. Were the drums galvanized? One of the big unanswered questions of that occurrence is "Where was the crater where the truck stood?" In the afore-mentioned Bulletin #10, the investigation of craters is very important because they occur at the point of the explosion and give an index of the amount of explosive involved. What is absolutely essential in any investigation of an explosion is a map of the missiles generated, a missile being any size of fragment of any object, including a human body. If the explosion occurred within a vessel, the fragments should be found spread out in all directions and the pattern outline should be roughly a circle. No trace of the truck was found.

Investigating and explaining an explosion can be time consuming, but if we are to understand what happened, we should not "conclude" before we have data and analyze it.

Engineering Apprenticeship Orientation

On September 13, 2006 the Pittsburgh Section held the orientation meeting with 38 students from 26 local high schools for the annual Apprenticeship Program in conjunction with the Allegheny Intermediate Unit (AIU). The students were separated into five groups based on school location. After getting to know the other students in their group, each member introduced a fellow member to everyone in attendance. The PSPE volunteer members then led the students through an exercise that encouraged socialization and required analytical thinking. Each apprentice was randomly assigned two professions that ranged from Chess Master to Pole Vault to Lion Tamer. The students had to explain what quality they possessed that would make them successful at the chosen career.

The highlight this year was a thorough presentation by University of Pittsburgh's engineering guidance counselors, Lauren Byland and Lynn Rosen, along with three current students. The students are seniors in the Bio-Engineering field and each gave a fascinating account of their research experience associated with the UPMC hospitals in Oakland. One is working in the artificial heart lab while another is working with high-speed cameras to observe the beating of a heart. The third student is doing research on ways to improve EEG electrodes and she stressed the fact her group is applying for a patent. They also talked about college life and the co-op programs at the university. The apprentices greatly appreciated hearing about their experiences and what could be in store for them.

As always, the final event of the program was the bridge building contest. Each group was asked to build the strongest bridge between two tables using only gumdrops and spaghetti. The groups used various engineering principles but the winning group used their "noodle" to get the most out of the spaghetti.

The students truly enjoyed the experience and are looking forward to visiting several local engineering companies. If you think you would be interested in having some students visit your company, please contact Dave Briskey (412-275-2190, djbriskey@dickcorp.com) or Reyman Branting (bernardi11@comcast.net).

Below is a "Problem of the Week" from the MATHCOUNTS archives. MATHCOUNTS competition is for 6th, 7th and 8th graders. How do you rate?

Digital Camera

Simon's digital camera has a storage card with a capacity of 32 megabytes. A byte is a unit of storage space. Each picture Simon takes requires 2.6 MB of storage space. How many complete pictures can his storage card hold?

Simon currently has 10 different pictures on his storage card. He chooses 8 of the pictures at random. How many different combinations of 8 different pictures are possible?

Simon plans to use the 8 pictures he chose in a two-page display with each page containing 4 pictures organized in 2 rows of 2 pictures on each page. How many different ways can he arrange the 8 pictures?

Of the 10 pictures on Simon's storage card, his brother, Marcel, is in 7 of the pictures and his sister, Danika, is in 5 of the pictures. Marcel or Danika appears in each of the pictures. In how many of the 10 pictures do Marcel and Danika both appear?

<http://www.mathcounts.org>, All material © MATHCOUNTS Foundation

Coming Attractions

In November, another outstanding meeting is scheduled. The title is “Incident at Morales”, the subject concerns engineering ethics.

INCIDENT AT MORALES

Moderated by Michel J. Sadaka, P.E.

This interactive session is centered around a National Institute for Engineering Ethics (NIEE) 35 minute video entitled “Incident at Morales” which presents a fictional case study in engineering ethics associated with designing and building a chemical plant. You’ll come away with a greater awareness of the importance of candor and trust in the profession and the knowledge that you don’t have to go it alone when making important decisions. The principles of discussion apply to all branches of engineering. The video highlights many forces that influence our decision making process and the pressures we face on a daily basis. No advance preparation necessary. This is an interesting and educational session with great value to anyone engaged in any capacity with the practice of engineering.

Reserve the date: Saturday November 11, 2006, 10:00AM – 12:00 followed by a lunch / member meeting
Location to be determined

This Session is approved for 2 PDH credits by “The Practicing Institute of Engineering, Inc.” (New York State)

CHRISTMAS IS COMING!

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And so is the Pittsburgh Chapter Pre-Christmas Party. Mark your calendar now for December 2, the first Saturday in December, when the Engineers Society of Western Pennsylvania Building will be the site of a first class wingding (technical term meaning “Great Party”). The company, the camaraderie, the food, the music are always outstanding. This year we hope to make it better than ever. With your presence, we can.

Look for details in the November Newsletter. Chapter VP Tom Weber is in charge, so you know it can’t fail to be great.

Apprentices Visit Mascaro/Hunt and Pitt's Biomedical Science Tower 3

by Brian Fink, Bethel Park High School

On February 2, 2005, the Mascaro/Hunt Construction Company opened its doors to seven engineering apprentices from the Allegheny Intermediate Unit. These apprentices had the rare opportunity to see the construction of the University of Pittsburgh's Biomedical Science Tower 3 (BST3). Mr. Edward Elinski, Senior Project Manager, and Mr. Thomas Weber, Project Manager, graciously hosted these apprentices.

The day began with about an hour of discussion in the Mascaro/Hunt office, which is directly across the street from the BST3. Mr. Elinski and Mr. Weber, who attended Carnegie Mellon University and the University of Pittsburgh, respectively, gave the apprentices a brief overview of the BST3 project and what they do as engineers. They described some of their tasks and responsibilities, as well as some statistics of the BST3.

The project is broken into about 25 "sub-packages," for which private contractors are hired to complete. Some examples of "sub-packages" are structural, electrical, and mechanical. Construction of the BST3, which consists of 13 floors, 352,000 gross square feet, 6 elevators, and 2 aerial walkways and towers 238 feet above Fifth Avenue, began in May 2003. By June 2005 the basement through sixth floors will be complete, and floors 7, 9, and 10 will be finished by November 2005, so that the University of Pittsburgh will be able to utilize the BST3 for the Fall 2005 semester. This building, which will be the future of biomedical engineering, will cost approximately \$125 million, and about 13 engineers are currently working on this project.

After getting the facts about the BST3, the apprentices were issued hard hats and invited to take a tour of the construction site. Mr. Elinski led the group into the building on ground level and to the roof via the elevator. After peering over the edge of the roof at the scenic view of Oakland, the apprentices were shown the equipment that is housed on the upper floors of the BST3, such as electrical power systems and generators, HVAC, and plumbing.

With gravity on its side, the group worked its way down the building, touring many of the floors on the way. Floors closer to ground level were more complete than the higher floors. For example, on a higher floor, there might only be structural steel and the exterior walls, but on the lower floors, there was a maze of interior walls and corridors through which the group navigated. Even though the BST3 is not yet complete, it is still quite easy to get lost or disoriented within its walls. The last thing the apprentices were shown was the basement, which will house one of the largest electromagnets in the world.

After the tour, Mr. Weber treated the apprentices to lunch at a pizza parlor. He discussed some general information about engineering and gave advice on pursuing a career in this field. The apprentices are very fortunate to have visited Mascaro/Hunt and seen the BST3. It will be the home of future biomedical engineering discoveries, and to take part in this in any way is a great privilege.

***The Pennsylvania Society of Professional Engineers,
Pittsburgh, Washington and Beaver County Chapters***

Invite all current and prospective members of the Southwest Region to

“Katrina and New Orleans”

**A presentation by Colonel Stephen L. Hill
Commander, Pittsburgh District
US Army Corps of Engineers**

on Thursday, October 12, 2006 at the Crown Plaza, 1160 Thorn Road, Coraopolis, PA 15108

Please take time to join us to socialize with old friends and meet new and prospective members.

**Cocktails: 6:30 Social (Cash Bar)
Introductions
Dinner 7:00
Program**

Reservations and payment must be received by October 10, 2006.

**Reservations by FAX – 412/261-1606, by phone 412/391-0615,
by e-mail m.gaetano@eswp.org, by US Mail Pittsburgh Chap., PSPE, 337 Fourth Avenue, Pittsburgh, PA
15222**

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2006-2007 Chapter Officers

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2006-2007 Chapter Officers

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Hal Dietrick, P.E., 2006-2009	Michel Sadaka, P.E. 2005-2007
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2006-2007 CALENDAR

MEMBERSHIP EVENTS & MEETINGS

Date	Time	Description	Location
Sept 13, 2006	9:00 AM	Apprenticeship Program Orientation Meeting	AIU Bldg, Waterworks
Oct 12, 2006	6:30	Corps of Engineers - Katrina and New Orleans	Crowne Plaza
Nov 11, 2006	10:00	Ethics – Incident at Morales	TBD
Dec 2, 2006	6:30	Christmas Party	ESWP Building
Jan 11, 2007		Open	
Feb. 10, 2007	8:00 AM	Local Mathcounts Competition	University of Pittsburgh
Feb. 24, 2007	TBD	Engineer's Week Banquet	TBD*
Mar 8, 2007		American Bridge Engineers	
Apr 12, 2007		Open	
May 10, 2007		Open	

BOARD OF DIRECTION MEETINGS WILL BE HELD ON: , Oct. 12, 2006, Nov. 11, 2006, Jan. 11, 2007, Feb. 8, 2007, Mar. 8, 2007, Apr. 12, 2007, May 10, 2007 and June 14, 2007

All BOD meeting are to held @ 5:30PM @ the ESWP Building pending further notice.