



Valley Engineer Newsletter

October, 2015

UPCOMING PROGRAMS

- October 22, 2015, Eastern Exterior Wall Systems tour
- November 12 or 17 2015, Bethlehem Steel Hoover Mason Trestle Guided tours (tentative)/Alternate: Cetronia Ambulance Corp., Allentown
- December 10, 2015, Holiday Party, Morgan's Restaurant, North Cedar Crest Boulevard, Allentown
- February 6, 2016 (Snow date February 7), MATHCOUNTS®, Northeast Middle School, Bethlehem
- February 26, 2016, Lehigh Valley Engineering Council Banquet, Holiday Inn, Breinigsville



**PENNSYLVANIA SOCIETY
OF
PROFESSIONAL ENGINEERS**

**LEHIGH VALLEY CHAPTER
(ORGANIZED 1935)**

President's Message

Alfred Gruenke, PE

The Pennsylvania Society of Professional Engineers held its annual State Conference on September 24 – 26 in Cranberry Township, north of Pittsburgh.

The main purpose of the Conference was the installation of officers for the coming year, a Board of Directors meeting, and an opportunity to participate in eleven out of 42 PDH sessions.

Eric W. Tappert gave two presentations: "Ethics Case Study: Johnstown's Flood" and "Powering the Telephone I and II."

Peter Staffeld also gave two presentations: "EXELent Engineering Worksheets Advanced Tips & Tricks" and "Economic Metrics for Engineering Projects."

The Lehigh Valley Chapter is well represented in the State leadership. Eric Tappert is Immediate Past President, Peter Staffeld is Treasurer, Michael Basta is Vice President Northeast Region, and Angelika Forndran is State Director representing the Lehigh Valley Chapter.

Eric Tappert presented the Dedication Service Award to Francis Sprague, Jr.

NSPE President Tim presented the Recognition of NSPE Fellows to Susan Sprague.

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Peter Staffeld (Treasurer), Ed Gourley (NW Region VP), Tim Orminston (President), Susan Beck (SE Region VP), Joe Boward (SW Region VP), Jim DiLouie (Central Region VP), John Nawn (President-elect), Dave McCullough (Representative to NSPE House of Delegates), Steve Novotny (secretary), Eric Tappert (Immediate Past President) Missing: Michael Basta (NE Region VP)

It was with pride that I accepted two awards for our Chapter. The first was the Chapter Special Projects Award, for our "Who Wants to be an Engineer" presentations to Allentown Middle School students, and the Chapter Communications Award, recognizing this newsletter and our outstanding web site. We do what we do because it's the right thing to do, but it's nice to have our Chapter efforts recognized.



Tim Austin, President of the National Society of Professional Engineers attended, giving the conference a nationwide perspective. One of the recurring themes in the various meetings and

get-togethers was the national trend to eliminate professional licenses. In Indiana recently the bill to eliminate licensing was only narrowly defeated. Tim emphasized the need to be constantly vigilant to ensure that the ethical and technical standards espoused by the NSPE are not compromised by the various state legislatures.

Thursday evening's activities included a dance band with Joe Boward playing a mean sax, and, of course, the Trivia Contest!

Questions ran from the easy; how many time zones in China? The answer is one To more difficult; Where are you if the sun rises from the Pacific, and sets in the Atlantic? The answer is Panama. We didn't get that one right. Everyone contributed.



The Lehigh Valley team consisted of your humble correspondent, Walter Poplawski from Luzerne County, Peter Staffeld, Eric Tappert, Joan Gruenke, and Team Captain Angelika Forndran

I would now like to apologize to my team mates and the Chapter. I insisted that one can fold a piece of paper nine times, when the answer is seven! However, I fall back to a political response, "I miss-remembered!" I redeemed myself somewhat by knowing that apples belong to the rose family, but everyone who attended Dr. Burkhardt's Biology class at Allentown High School knows that!

Continued on page 3

The prize for knowing the most off-the-wall tid-bit of information, the most insignificant fact, belongs to Eric Tappert. The question was, "What is the state sport of Maryland?" The answer being jousting. Eric was the only person in the whole ensample that had the correct answer. Now, how the heck did Eric come in possession of that fact? And why would he even remember it? I always thought I was pretty good at useless information, but compared to Eric, I'm only a minor leaguer, second division!

We were in a three-way tie for first place, but some mathematical gymnastics involving Chaos Theory, transcendental numbers, and high tides on the Jersey shore resulted in us being the winner! We didn't understand it, but accepted it. Our Chapter will receive \$500.00 for MATHCOUNTS. Well worth the effort.



Team Captain Angelika Fordran with the First Place Award.

Movie Magic in the Lehigh Valley

Around twenty members and guests of the Lehigh Valley Chapter, Pennsylvania Society of Professional Engineers gathered on a warm autumn evening to view a bit of movie magic in the village of East Texas, compliments of Trey Bianco, President of Smooth-On.

Smooth-On manufactures and distributes casting materials including silicone rubber and urethane rubber, casting resin, plastic, epoxy resin, life casting, and more. If you've ever been to the movies, admired a piece of sculpture, marveled at detailed architectural ornamentation or used a telephone, then you've encountered the handiwork of Smooth-On rubbers, plastics, foams and other products that turn their ideas into three-dimensional reality.

Liquid Rubbers and Liquid Plastics were used to create special effects in such blockbuster movies as the original Jurassic Park, Anaconda, Free Willy, Star Wars, Star Trek (TV series and movies), Die Hard, all Harry Potter movies, James Bond films, Matrix Series, King Kong and many others too numerous to mention. The components consists of organic petroleum and silicone based liquids, and have no vapor by-products. Sales are to large scale industrial customers and to individuals in small, lunch-box sized containers. The company is emphatic that all components be an easy 1:1 ratio. All labeling is in six languages since 50% of sales are international. When asked about Safety Data Sheets, Trey responded with "Of course!"

The products are also adaptable to fabricate light-weight prototypes of various parts used in industry. Besides the movies, Smooth-On also has Ford Motors, the Defense Department, and others on its customer list.

The tour started in the retail shop, which displays various Smooth-On creations used in movies and other venues. Zombies, with many variations on the theme presently popular in the movies and television, were prominently displayed. Naturally, Halloween was a popular theme.



Some of my favorite characters from the Star Wars series

They explained to the group that the company started in 1895 manufacturing a paste to fill cracks in cast iron. The paste had a virtual monopoly for years until it was supplanted by other products. The key to its success was a "secret ingredient"; orange juice! Then, early in

the last century, Smooth-On also made rubber molds for tires.

Since 1997 Smooth-On had been headquartered in Easton, but its 55,000 ft² facilities proved to be inadequate to meet demand. The company decided last year to move its headquarters and production to the old Dorney Printing campus at 5600 Lower Macungie Road, increasing its size to 365,000 ft². Production started on May of this year. The company has 200 employees and over 300,000 customers. Smooth-On is represented at 88 trade shows a year, and has the ability in-house to print the large posters and other paraphernalia for these shows.

Smooth-On holds regular training seminars for its customers so as to increase the functionality of its products. These are "hands-on" sessions, guiding the attendees through all stages of the process, from mold fabrication to castings and coloring. The seminar room is able to accommodate fifty persons.

They guided the group through its production facilities, with obvious pride. There are forty 7,000 gallon stainless steel tanks to hold the various components and eight miles of stainless steel piping. Two miles of piping was bought on E-Bay! They said that stainless steel was chosen so that no corrosion issues would ever arise. Each tank has load cells to measure the content, a pumping station with variable frequency drives, and air operated valves. Limit switches on the valves "tell" central control its position. The 150 hp mixing tanks are also sitting on load cells, enabling the process to be fully automated. There are three propane boilers to supply heat for the mixers. A laboratory verifies the mix. Each device has an IPP address and is connected to a Central Processing Unit. There is a 50,000 gallon emergency overflow tank.

They obviously is considerate of the worker's comfort and work-ambiance. Most of the interior lighting is LED (including "fluorescent" tubes) with some halogen fixtures. Piped-in music and air conditioning throughout add to the pleasing work conditions.

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SCHOLARSHIP SPONSORS

A great way to be involved in the LVPSPE Chapter is to contribute to the **LVPSPE SCHOLARSHIP FUND**. Please Contact the Valley Engineer Editor to sponsor scholarships for the remainder of the calendar year.

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Or, you may contribute via the LVPSPE website <http://www.lvpspe.org/Donations>.

Scholarship application is at <http://www.lvpspe.org/Scholarships>. Any questions regarding scholarships can be directed to

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Board of Direction Meetings

The monthly Board of Direction meetings are 6:00 PM on the second (2nd) Monday of each month. Open to all members; they are held at the office of Barry Isett & Associates, 85 South Route 100, Allentown, PA.

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We thank Trey for allowing us to view some of the reality that makes the magic.

A Trip Through the Heart of Pennsylvania

Alfred Gruenke, PE

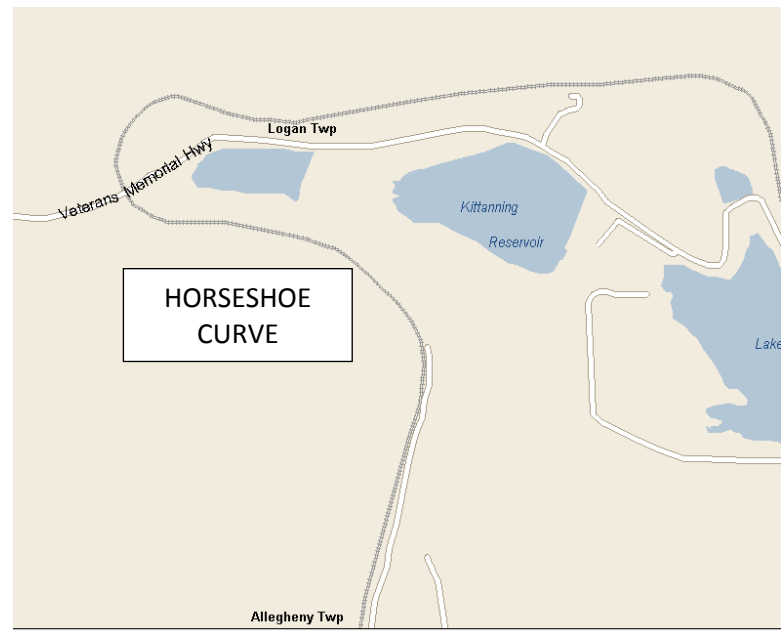
In June of this year Jennifer Summers of the PSPE asked me to give a presentation to Pennsylvania PEs at a PDH Boot Camp in Pittsburgh. I had given the presentation, entitled "Engineering for OSHA and MSHA Compliance in a Regulatory Environment" a number of times previously and was tired of it, but Jenn convinced me that there are 13,000 PEs in Pennsylvania and probably quite a few of them had never attended this particular presentation! I was prepared for fifty people, and almost a hundred people attended. Jenn saved the day by making extra copies of my presentation.

Normally, my wife Joanie and I drive to Pittsburgh via I-78, I-81, then the Turnpike to Exit 28, less than a mile from the hotel. I return the same way. This time I decided to return on Route 22! There were two reasons: one, I always wanted to, and second, I wanted to see Horseshoe Curve, in Altoona.

Horseshoe curve was something I've heard about since high school, but it was never explained to me just what it was. It supposedly followed an old Indian trail, which is certainly reasonable. For some reason I always thought Horseshoe Curve was part of the turnpike, but a quick check on the Internet set me straight.

Horseshoe Curve is a railroad track located about five miles west of Altoona, Pennsylvania. It replaced the Allegheny Portage Railroad, an inclined plane system that moved canal boats over the Allegheny Mountain Range on railroad flatcars. A series of stationary steam engines pulled the boats on rail carriages up one side and down the other in five stages on each side. There were two

sets of tracks for each section, one going up and one going down, to balance the load. The system allowing continuous barge traffic between the Ohio and the Susquehanna rivers. It cut the travel time from Philadelphia to Pittsburgh from a 23 day wagon ride to a four day canal ride. The portage took up almost one day, with six hours being a typical transit time. Considered a technological marvel in its day, it played a critical role in opening the interior of the United States beyond the Appalachian Mountains to settlement and commerce.



Construction of the railroad began in 1831 and took three years to complete. The project was financed by the State of Pennsylvania as a means to compete with the Erie Canal in New York and the Chesapeake and Ohio Canal and Baltimore and Ohio Railroad in Maryland.

Construction of Horseshoe Curve started in 1851 and completed in 1854. It was the engineering achievement of J. Edgar Thomson, Chief Engineer of the Pennsylvania Railroad. The primary construction crew consisted of 450 Irish laborers using mostly hand tools and black powder explosives. It opened on February 15, 1854. It immediately rendered the Allegheny Portage Railroad obsolete.

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Horseshoe Curve is 2,375 feet from beginning to end. Elevation rises from 1,594 feet above sea level to 1,716 feet above sea level, for a total of 122 feet. The average grade is 91 feet per mile, a 1.8% incline. Originally there were two sets of tracks; a third line was added in 1898, and a fourth in 1900. It has been in almost continuous duty since it opened. It has been owned by the Pennsylvania Railroad until the PRR merged with the New York Central in 1968.



Aerial view of Horseshoe Curve. Trains headed counterclockwise around the curve are ascending. The visitor center and observation park are at the apex of the curve. The reservoir supplies water for Altoona. Printed with permission of the Railroader Museum, Altoona, PA

There is a small gift shop at the base of the hill. The transport system up to the tracks can best be described as Allegheny Portage Railroad Light, consisting of a single track with two cars, one going up and one going down. A cable connects the two cars. An electric motor and gearing at the top supplies the power. In the middle of the hill there is a short bypass so the two cars can pass each other. I have seen this system before, in Heidelberg, Germany, going from the city up to the castle. It's an efficient system, since one car acts as a counterweight to the other.

The main impetus for building the railroad line was to transport coal and other goods from nearby coal mines and Western Pennsylvania to markets in the east. It remained a major link for rail traffic between the East Coast and the Midwest ever since. During World War II a contingent of soldiers was assigned to guard it.



The importance of Horseshoe Curve was also recognized by Nazi Germany. Eight would-be saboteurs were brought by a submarine and landed in Long Island in 1942 with the express purpose of destroy the Curve plus a number of other key industrial sites. They were quickly apprehended, and six were executed.

Horseshoe Curve is not just for nostalgia buffs. It may be a historical site, but is still in use to this day and well worth a visit.

Penn Central owned the line until 1976, when Conrail was formed. In 1998 it reverted back to a private company, Norfolk Southern, who owns the line to this day.

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My other reason for going on Route 22, William Penn Highway, was that I always wanted to do it. I exited the Turnpike near Mile Marker 57, and headed west. The distance to Altoona is about 75 miles.

Route 22 in western PA is not the same as it is in the Lehigh Valley. It winds through a lot of little towns, shopping centers, and small businesses. It reminded me of McArthur Road in Whitehall, including a lot of traffic lights. This continued for about twenty agonizing miles, before becoming a leisurely country road with few distractions or points of interest. The only break from this pattern was a marker on the crest of the Alleghany Ridge ten miles west of Altoona, 2,167 feet above sea level. It's all "downhill" from there, as the saying goes.

Horseshoe Curve is about six miles north of Route 22, via Route 754 to Altoona, then five miles west.

Altoona, and the area around it, is railroad country. There are railroad cars of all descriptions as attractions at various businesses in the area. It's also the home of the Railroader Museum. Unfortunately, we did not have an opportunity to see that.

Route 22 continues for another sixty miles to Lewistown, at which point Route 22 and Route 322 combine for the final 60 miles to I-81 in Harrisburg.

There are two types of fools in Japan. The first is someone who never climbed Mt. Fuji, the second type of fool is someone who has climbed it twice. I put driving across Pennsylvania on Route 22 in the same category.

I recently picked a new primary care doctor. After two visits and exhaustive Lab tests, she said I was doing fairly well for my age. (I am past sixty-five).

A little concerned about that comment, I couldn't resist asking her "Do you think I'll live to be 80?"

She asked "Do you smoke tobacco, or drink beer, wine or hard liquor?" "Oh no," I replied. "I'm not doing drugs, either!"

Then she asked "Do you eat rib-eye steaks and barbecued ribs?" I said "Not much...my former doctor said that all red meat is very unhealthy!"

"Do you spend a lot of time in the sun, like playing golf, boating, sailing, hiking, or bicycling?" "No, I don't," I said.

She asked "Do you gamble, drive fast cars, or have a lot of sex?" "No," I said...

She looked at me and said "Then why do you even care?"

If you can read this with ease
you are twisted! And have an
awesome talent! This is both
backwards and upside down!
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Success is going from failure to failure without losing your enthusiasm.
- Abraham Lincoln

You can't use up creativity. The more you use, the more you have.
- Maya Angelou

Anyone can find the dirt in someone. Be someone that finds the gold
- Proverbs 11:27

The difference between involvement and commitment is like ham and eggs. The chicken is involved; the pig is committed.
- Martina Navratilova

Be what you are, and be it well.
- St. Francis De Sales