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Eastern Pennsylvania Chapter International Society of Explosives Engineers www.easternpaisee.com

Volume 28 Number 3

Summer 2021

The Eastern PA ISEE welcomes requests for topics, and invites readers' letters and other contributions that relate to drilling, blasting, seismology and explosives engineering.

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Clay Shoot & BBQ

Thursday, October 28, 2021 11:30am - 5:30pm Lehigh Valley Sporting Clays 2750 Limestone St., Coplay, PA

Prizes Awarded!

Gun Raffle!

Sign up individually or register your team of 4 today!

The event is FREE for Members or \$35 for Non-Members

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Letter from The President

Dear Members,

I hope your summer is off to a good start!



As a Chapter we are preparing for the 5th Annual Clay Shoot & BBQ set for Thursday, October 28, 2021. Last year we had a record number of attendees and I hope we can continue to grow

this event! You can register as a team of 4 or we will place you on a team. We are again looking for station sponsors for the event. Registration and sponsorship forms can be found on pages 4 & 5.

Unfortunately, the Pennsylvania Drilling and Blasting Conference will not take place this year, but the planning committee is already focusing its efforts to plan a great return in 2023. If anyone needs credit hours this year, I encourage you to visit www.isee.org and check out the ISEE Webinar Series information on page 20.

I am excited to see that the ISEE Annual Conference on Explosives and Blasting Technique will resume in January as an in-person conference.

Best regards,

Scott





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Eastern Pennsylvania Chapter Clay Shoot & BBQ

On Thursday, October 28th the Eastern Pennsylvania Chapter will host it's fifth annual Clay Shoot and BBQ. Join us at 11:30am for a BBQ lunch followed by a mandatory 12:30pm safety class and 1pm start at the Lehigh Valley Sporting Clays course in Coplay, PA.

The event is FREE for members. Non-members will be charged \$35 for a Chapter Membership. Registration includes a BBQ lunch, 8 station course with 50 rounds, and friendly competition. Ear protection is provided. You are encouraged to bring eye protection or purchase glasses for \$10.00. Prizes will be awarded for the

Become a Station Sponsor Today!



top three shooters as well as Lewis class shooter placements. We will also be raffling off a shotgun.

If you are interested in registering, please complete the attached form on page 4. We also have station sponsorship opportunities available.



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Eastern Pennsylvania Chapter Clay Shoot & BBQ



Send to:

Thursday, October 28, 2021 FREE for Members \$35 for Non-Members 11:30am - 5:30pm Lehigh Valley Sporting Clays 2750 Limestone St., Coplay, PA

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Deadline to register is Thursday, October 21, 2021

Your registration includes a BBQ lunch, 8 station course with 50 rounds and a golf cart per team of 4. Ear protection is provided. You are encouraged to bring eye protection or purchase glasses for \$10.00. You can bring your own gun and ammo (7.5-9 lead shot only). Prizes will be awarded!

The event is FREE for Members. Non-Members will be charged \$35 for a Chapter Membership. Non-members - please complete the membership form on page 21 and this registration form to sign-up.

> Eastern PA Chapter I.S.E.E. Ethan Huff c/o Vibra-Tech Engineers, Inc. 109 East First Street, Hazleton, PA 18201 ethanh@vibratechinc.com

Eastern Pennsylvania Chapter Clay Shoot & BBQ



Sponsorship Commitment Form

Clay Shoot Station Sponsor for \$250

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ISEE Announces New Executive Director

The ISEE Board of Directors announced the appointment of Steven B. Shivak, M.S., CAE, as the new executive director. Steve started the position April 26, 2021, becoming ISEE's third executive director.

Mr. Shivak previously served as the Director of Membership and Interim Vice President of Conferences and Meetings for the National Asphalt Pavement Association (NAPA) – a trade association representing the interests of the asphalt pavement industry with federal officials, departments, and agencies. He was directly responsible for membership, meetings, education and conferences and expositions.

Mr. Shivak has more than 30 years of experience in non-profits including: SAE International, NACE International, The American Productivity & Quality Center, Pittsburgh Technology Council, and the SMC Business Councils. He has a master's degree in marketing, a bachelor's in public relations and is completing his Business Analytics Certificate from the Wharton School of Business. He also



holds a Certified Association Executive certification through the American Society of Association Executives and sits on their Membership Section Advisory Council. His family lives in Pittsburgh, but he will operate out of the Cleveland office as restrictions ease.





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The Museum Corner: Detcord Part 2

Written by C.W. "Mickey" Bradley

William Bickford had lived in Truckingmill in the heart of the Cornish mining industry and that he had invented safety fuse in 1831 (patented on September 6, 1831). (Photo #1) Note: this photograph shows a very unusual black powder safety fuse. This E.B. "Beaver Brand" was specifically produced for "Damp Work."

William Bickford died shortly before his company actually started up, but his sons and grandsons developed a profitable commercial business producing "Safety Fuse." The Bickford Fuse was introduced in America through Richard Bacon II, who was the superintendent of the copper mines of the Phoenix Mining Company of Old Newgate Prison, Granby, Connecticut. (Historical note of interest: In 1773 Old Newgate Prison was the site of the first American construction blasting; blasting prison cells out of solid rock in a former underground copper mine.) Bacon set up his first plant in 1836 at the Old Newgate Prison under the firm name of Bacon, Bickford & Company. When the copper mines closed down, the plant was moved to East Weatogue, near Simsbury, Connecticut. After two fires, Bacon became discouraged with the business and Joseph Toy took over as manager and the



company name was changed to Toy, Bickford, & Company. When Toy died in 1887, Ralph Hart Ensign, Toy's son-in-law, became manager, and the firm became Ensign, Bickford, and Company. In 1907, the company was incorporated as the Ensign-Bickford Company, and has remained as such. I had mentioned in Part I of this article, that Ensign-Bickford introduced "Cordeau" in 1913, and set up their Cordeau-Bickford plant in Simsbury, Connecticut in 1915.

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By 1937 Ensign-Bickford had replaced the Cordeau-Bickford (lead tube with TNT) with "Primacord-Bickford," normally known as just "Primacord." It is composed of PETN (pentaerythritol tetranitrate) contained within a waterproof sheath overlaid by reinforcing coverings. It has a very high velocity, detonating at about 21,000 feet

per second (nearly four miles per second). Primacord has good tensile strength, yet is light in weight and flexible, making it easy to handle and connect. It absorbs water slowly and will detonate when the core is soaked with water, provided it is detonated from a dry end. In spite of its high velocity and violence of detonation, "Primacord" is very insensitive and according to the 1952 DuPont Blaster's Handbook, it cannot be exploded by friction, ordinary shock, or by firing a .30 caliber Springfield steel-Jacketed bullet through a spool of it. Another advantage is that the melting point of the PETN core is 284° F, so "Primacord" can be stored for extended periods, even in the hottest climates, without suffering deterioration. You will note that



the cord comes in a wide variety of colors and various spiral bands used by the manufacturers to identify their different products. Note that the "Scuf-Flex" cord by Ensign-Bickford had a raspberry-red color with a wide black checkered spiral band. The outside diameter of "Scuf-Flex" is 0.205 inches, and contained 55 grains of PETN per linear foot. Each manufacturer has product information sheets on its products.

Although "Primacord" is the Registered trademark originally owned by the Ensign-Bickford Company, they sold the trademark to Dyno Nobel in 2003, which currently manufactures it in their Graham, Kentucky factory. In



the explosives industry, the term "Primacord" is often used to refer to any detcord. I have an extremely rare (one of a kind) piece of detcord in my museum that has only sentimental value. It simply reads: "Dyno Nobel, Mickey Bradley" along the entire length of the cord.

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In the late 1940's-early 1950's time frame, the DuPont Company developed "Primacord" MS (millisecond) Connectors for short interval delay firing of a blast. Originally they consisted of copper tubes (later aluminum) about 2 ¾ inches long, containing a delay element and having a piece of "Primacord" approximately 12 inches long crimped to each end of the element. Originally, the average delay period was approximately 17 MS and later 25 millisecond delays were produced. These connectors were packed 50 to a cardboard tube and 500 to a case. They were used by simply cutting a "Primacord" trunk line and tying the connector to the two cut ends with a square knot or by taping the joints. In later years, these MS Connectors were replaced by simple plastic body MS Connectors.





An unusual find

that I acquired in the mid 1980's is a "SAF-T-DET" advertised as a revolutionary, ultra-safe detonator, perfect for EOD kits. A product advertisement states that it is the safest initiation system ever offered just for Detcord: even if accidentally actuated, all effects are confined to the capsule itself. Underlined is: The DOT has declared it a nonregulated blasting cap, exempt from all red tape. This product was designed to initiate detonating cord in the range of 4 to 100 grains per foot. According to an April 1983 price list, these products were

produced by Detonics Manufacturing Corporation and sold, on average, for a dollar apiece.

I have seen cords with core loads ranging from as little as 2.4 grains to 400 grains of PETN per linear foot. The smallest of these cords was DuPont Explosives' "Detaline," and measures only about 0.10

inches in diameter. The spool that I was able to acquire was made by ETI, Explosives Technologies International. This very small cord was originally designed to set



off millisecond delay blasting caps that held a Remington .22 shell (Company owned by DuPont) to initiate the delay powder train. The snap of this very small cord functioned like a firing pin against the base of the shell. Later, utilizing Detaline, other blasting caps were designed to fit snugly into Pentolite cast primers.





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The largest cord that I ever used was a 400 grain per foot (80 grams per meter) cord made by Austin Powder Company. It had a red plastic covering and measured 0.450 of an inch, about the diameter of my thumb. The largest cord that Austin makes today is a 200 grain cord (40 grams per meter). Years ago, I saw a triple braid of 400 grain cord, for a total of 1200 grains of PETN per linear foot, designed to fight wildfires by clearing back combustible vegetation. I believe that the product was called "Firebreak."

I had mentioned that Detcord was versatile, and I am sure that you have used it in IV bags, plastic soda bottles,

or in pre-cast forms as a breaching charge. One company that I worked with for years in Tulsa had a most peculiar use - that of expanding and sealing metal tubes in heat exchangers for power plants. The company, Yuba Heat Transfer LLC, which closed in 2018, had utilized Detcord inserted in a rubber tube and when detonated, expanded the metal, making the perfect seal. It was repetitious and the "blasters" performed the same operation all day long. The belt buckle was presented to me just prior to my retirement.



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Obituary: Ronald Eugene Frye

Ronald Eugene Frye, 71, of Elizabethtown, passed away on Sunday, May 16, 2021 at Hospice and Community Care in Mount Joy, Pennsylvania. Born March 19, 1950 in Washington, PA, he was the son of the late William R. and Florence (Martin) Frye. He was married 37 years to Cynthia J. (Weagly) Frye.

Ron was a 1968 graduate of Fort Cherry High School. He attended Geneva College and W & J College and served in the US Air Force during the Vietnam Era.

"Fire in the Hole!" Ron started his blasting career at Midway Coal, Aloe Coal and Balsinger Explosives (Senex). In 1988 he became an explosives engineer with Hall Explosives, Inc. He was with Hall Explosives for 28 years, holding the Mine Manager position and then Vice President. In 2006, Ron was hired as the Site Manager for Central Pennsylvania Operations with Dyno Nobel. Ron retired in



2011, but in 2012 he served as the Safety and Compliance Manager for Maurer & Scott for several years.

Ron was a co-author and presenter on several technical papers about improving blasting technologies, safety and promoting future electronics at International Technical Conferences. Committed to improving the blasters skills at Hall Explosives, Ron developed and implemented the Jr. Blasters training program for Blaster's advancement and cross training. Additionally, he was a member of United Mine Workers of America #2377, International Society of Explosive Engineers (ISEE), Eastern PA Chapter ISEE, Pennsylvania Aggregate & Cement Association Associate Committee Member

Associate Committee Member (PACA) and the National Stone Association. He was also the recipient of the 2001 Hall Explosives Presidents Award and PACA's Hall of Fame Ambassador of the Industry award.

Contributions in Ron's memory may be made to Coral World Ocean and Reef Initiative "CWORI", in St. Thomas, US Virgin Islands to continue their efforts with research, rehabilitation and care of the local wildlife and coral reefs.

Checks can be mailed to: CWORI 6450 Coki Point St. Thomas, VI 00802

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Another application of Detcord is in space operations for separation of rocket stages. I could not get a great

deal of info on this area, but I was given the largest diameter blasting cap that I had ever seen and was told that it was used in aerospace operation for stage separations. The number 6 fuse cap is approximately 1 ³/₄ of an inch long and the No. 8 strength cap is approximately 1 ⁷/₈ long. They are about ¹/₄ (0.25) of an inch in diameter. Electric blasting caps and Nonel caps vary, of course; the blasting cap size and length being based on their specific application and length of delay. The blasting cap for space rocket stage separations and a copy of the original blue print (complete with a misspelling) were donated by an Engineering and Manufacturing Corporation out of Fullerton, California. Although the length of the blasting cap is only 1.775 inches long, its diameter is 0.529 of an inch, the largest that I have ever seen.



Continued on page 15



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Detcords are not only used on earth and in space, but also deep within the earth. There are variations to earth's temperature, but as a rule of thumb, for each 100 feet of descent, the temperature increases 1° F. Some of the

gold mines in Africa are four miles deep, and the airconditioning units required to keep the miners safe are



larger than Baker Hall, where I taught at Eastern Oklahoma State College. I am currently working on a Museum Corner article on explosives used in deep oil wells, but have been invited to a special class in November, so will add just a tidbit here for now. PETN Detcords have a melting point of 284° F. In deep wells the PETN Detcord would initiate the shaped charges attached to them before the perforating gun got down to the desired depth. RDX cord, however, is rated for up to 350° F for one hour. HMX cord is rated up to 400° F, HNS for up to 550° F, and PYX up to 600° F. You may run across some of these other cords in our line of work. I promise more information after my class in November.

I would like to end on a note of safety: always use the proper tools to cut Detcord - never wire strippers, crimping tools, side cutters, or any implements that have two blades coming together. Always use a sharp knife or a single blade guillotine type cutter.





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Chapter Treasurer Position Available

The Chapter Treasurer is a volunteer position responsible for collecting Chapter dues, sponsorship and advertising payments as well as paying invoices and reporting on the Chapter's financial status at quarterly Chapter meetings.

If you are interested in nominating yourself or someone else, please contact Scott Mueller at smueller@bluestonedrilling.com to be added to the list of nominations.



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Chapters Host Joint Zoom Meeting

On Thursday, April 8, 2021 at 6 pm the Eastern PA Chapter, Mid Atlantic Chapter and Penn State Student ISEE and SME Chapters came together to host a joint virtual meeting. In attendance were 17 participants including Chapter members, students, faculty, and our guest speaker.

The meeting included chapter updates and announcements followed by a guest presentation by

Nolan Eckroade, North American Services Lead of Orica. He presented, "No Wires, No Worries – Introducing Truly Wireless Electronic Blasting."

Nolan's presentation looked at a wireless electronic blasting system for mining. Wireless initiation through rock, air and water is achieved using low frequency magnetic induction waves to send a firing command to groups of in-hole primers. This not only removes the limitations imposed by a wired connection to each primer in a blast, but also enables users to alter the paradigm of conventional mining techniques to advance operational productivity and reduce personnel exposure to high-risk activities. Nolan discussed how wireless electronic blasting is transforming both surface and underground applications across the globe.

Nolan has worked within the mining and explosives industry for 10 years starting as a proud alumnus of Virginia Tech's Mining & Minerals Engineering program. Nolan joined Orica after graduating and has held roles within operations, technical services, wireless initiation systems, and most recently regional marketing of Orica's explosive delivery services.

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ISEE Blasters Training Webinar Series Now Available On-Demand!

Blasters Training Webinar Series - Part 1

Approximately 4 hours - Cost \$100

- 1-1 Fundamentals of Blast Design by Joe Nawrocki, Senior Technical Manager, Dyno Nobel *Presentation sponsored by Tradestar*
- 1-2 Importance of Communication Between Drillers and Blasters by Seth Burns, ISG Manager, Nelson Brothers Presentation sponsored by Montabert
- 1-3 Explosive Products: Properties and Application by Alastair Torrance, Principal, Kilmorie Consulting Pty Ltd *Presentation sponsored by O-Pitblast*
- 1-4 Preventing Flyrock Through Good Blast Design and Delay Timing by Richard O'Meara, US Technical Services Director, Orica Presentation sponsored by Lubrizol

Blasters Training Webinar Series - Part 2

Approximately 4 hours - Cost \$100

- 2-1 Close In Construction Blasting by Mike Koehler, President, B.E. Consultants, Inc.
- 2-2 Blaster's Math by Bill Necker, Manager of Technical Services, Maurer & Scott Presentation sponsored by GeoSonics/Vibra-Tech
- 2-3 Legal Advantages of Good Blast Reports/Recordkeeping by Kelly Ratliff and Ralph Burnham, Attorneys, Reminger Co., LPA *Presentation sponsored by JM Miller, Inc.*
- 2-4 Vibration Level One+ by Jeff Taylor, President, Sauls Seismic, LLC

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Several states have approved to accept this training including: Alabama, Colorado, Delaware, Hawaii, Indiana, Kansas, Kentucky, Maryland, Missouri, Montana, New York, Ohio, Pennsylvania, Tennessee, Virginia, Washington, West Virginia and Wyoming. Check ISEE's website for an up-to-date list of states.

Blasters Training Webinar Series - Part 3

Approximately 4 hours - Cost \$100

- 3-1 Geology Level One+ by Kurt Oakes, Senior Manager - Drill & Blast, Peabody Energy *Presentation sponsored by Dyno Nobel*
- 3-2 Flyrock by Jay Elkin, Wampum Hardware Presentation sponsored by Tread Corporation
- 3-3 Bulk Explosives Equipment and Use by Mark Curry, Technical Services Manager, Orica *Presentation sponsored by O-Pitblast*
- 3-4 Blasting Safety Level One+ by Maggie Hettinger, Senior Technical Engineer, BME USA

Blasters Training Webinar Series - Part 4

Approximately 4 hours - Cost \$100

- 4-1 Public Relations by Josh Hoffman, Director of Technical Services, IME
- 4-2 Preventing Block Movement/Misfires Through Good Blast Design and Delay Timing by Frank Lucca, President, Terra Dinamica LLC
- 4-3 Loading Bulk Blasting Agents and Quality Control on the Bench by Evan Hagenlock, Product Manager, Bulk, Austin Powder Company Presentation sponsored by Austin Powder Company
- 4-4 Transportation of Explosives by Matt Spina, State Trooper, CT State Police



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