



March 2024
First Quarter

Fire in the Hole Scroll

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The Upside of Old Age

(found online)

- You can sing along with elevator music.
- People don't call you past 8:00 pm anymore.
- You can eat dinner at 4:00 in the afternoon.
- No one expects you to run—anywhere.
- Your joints are more accurate meteorologists than the weather people.
- Life is too short to hold grudges. You can forgive and forget.

Black Hills Chapter
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Rapid City, SD 57702

bitwconference.org

Black Hills Chapter ISEE February Meeting Recap & Election Results

Black Hills Chapter of ISEE members and supporters enjoyed good food, networking, elections, interesting presentation, and door prizes at the February Membership Meeting in Rapid City, South Dakota. It was held at the SD Mines Center for Alumni Relations and Advancement Building on February 9th.

Attendees enjoyed a social hour prior to the meeting, which was a great time to network with students and people working in the industry. Thank you to **Stemlock Incorporated** for sponsoring the food and refreshments.



▲ Attendees at the meeting

Elections were held at the meeting for positions on the Board of Directors.

Thank you to everyone who participated and voted. We are very grateful to have hardworking and dedicated people on the BHC Board of Directors.



▲ The Black Hills Chapter ISEE Board

Left-Right: Alex Bolduc (Student Chapter ISEE President), Bill Clements, Brent Hunter, Tony Troughon, Randy Russell, Joan Clements, Dylan Haddix, Paul Sterk, Eric Weyer, Steve Fildes, Darcey Baker, and Jim McNulty

ELECTION RESULTS

President: **Darcey Baker** (Pete Lien & Sons)

Vice President: **Randy Russell** (Nelson Brothers)

Secretary: **Erik Carlson** (Buckley Powder)

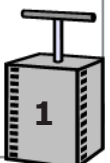
Treasurer: **Jim McNulty** (Crazy Horse Memorial)

Newly elected Directors with a two-year term:

- * **Bill Clements** (Century Blasting Service)
- * **Dylan Haddix** (Nelson Brothers)
- * **Tony Troughon** (Nelson Brothers)
- * **Eric Weyer** (Dyno Nobel)

Contact information for the current Black Hills Chapter Officers & Board of Directors can be found on page 9. Please contact them with any questions!

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Cont'd: Recap of the BH Chapter Meeting

After discussing the business items, **Darcey Baker** (Pete Lien & Sons) presented “Close-Proximity Gypsum Blasting for the Pete Lien & Sons Office Expansion”. It was an excellent presentation. Darcey has graciously shared it with us so you can read it below!

Thanks to everyone who attended the chapter meeting. See you at Best in the West!



◀ *Darcey Baker presents during the meeting. His full presentation is below.*



Close-Proximity Gypsum Blasting For the Pete Lien & Sons Office Expansion

By Darcey Baker; with Brett Hunter, Adam Heck, and Dylan Beaver. Presented at the Black Hills Chapter ISEE Meeting on February 9, 2024

Introduction

In August 2023, excavation for the new corporate office of Pete Lien & Sons was undertaken. Unfortunately, only one soil boring was done in the immediate vicinity of the excavation area. This boring indicated approximately four feet of Gypsum. As mechanical excavation commenced from east to west, one homogenous lens that ranged from six to 21-feet thick was encountered. Excavation continued across the top of the lens towards the west and to within 50-feet of the existing, occupied corporate office. Additionally, excavation continued to the south across the lens and to within 37-feet of a two-inch, poly gas line.

The options were discussed - - running a rock-knocker to chunk out the Gypsum or drilling and blasting. For the sake of time, the decision to drill and blast was the obvious choice. Then the decision became to contract the drilling and blasting or to cover the work in-house with internal resources and personnel. Due to scheduling conflicts and the lead-time required for the preferred contractor, the drilling and blasting was conducted internally by Pete Lien & Sons personnel.

Shot Design Parameters and Engineering

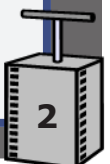
Using the Pipeline and Hazardous Materials Safety Administration guidelines of 5.0 IPS

maximum PPV for buried gas lines, and employing a self-imposed factor of safety of 1.5, resulting in a maximum PPV of 3.33 IPS at the gas line, reverse engineering was done. Using a confinement factor (K_R) of 200 and crunching the numbers using the formula $PPV = K_R \times D_S^{-1.6}$, the distance scaling factor (D_S) amounted to 12.93. Using the D_S of 12.93 and loading that into the Scaled Distance formula $\sqrt{W} = D/D_S = 40\text{-Ft.}/12.93 = 3.09 = \sqrt{W}$. From that, the Charge Weight (W) per delay was determined to be ~9.6 -Lbs. Provided the confinement factor $K_R = 200$ was suitable, then 9.6-Lbs. per delay should provide for a vibration level of 3.33 IPS or less at the gas line.

As an aside... The confinement factor K_R is a funny thing, and at times, a subjective one. For typical softer material, $K_R = 160$ is adequate and for confined or well laminated, tougher material (like the Minnekahta Limestone), a confinement factor of $K_R = 242$ is suitable. The Gypsum lens, in this case, appeared to be massive with few stringers of clay and was particularly competent with little or no indication of weathering or deterioration from surface moisture. Based on that, the confinement factor $K_R = 200$ was determined to be acceptable.

Double checking with another blaster that has a tremendous amount of experience, specifically with blasting Gypsum, we opted to strive for a powder factor that was 1.0-Lbs./BCY. The critical part of this was knowing that internally,

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Cont'd: Close-Proximity Gypsum Blasting

we do not have a tremendous amount of experience with blasting Gypsum. Blasting in the Minnekahta Limestone is something we do well, but blasting Gypsum - - especially this close to the office and a gas line - - is not something we have a tremendous amount of experience with. There is no shame in an Explosives Engineer admitting when they do not know something and seeking help. And for what it is worth, most Explosives Engineers that we know and work with, and that do have specific experience will willingly and freely help when asked. Such was the case in this instance. The shame is associated with an Explosives Engineer that does not have specific experience or has limited experience but forges ahead without verifying necessary and pertinent information. That is, unfortunately, how accidents occur, people can become injured, property can be damaged, and our industry can get a bad rap. Anyhow...

Shot #1 - - Details

The first blast was drilled with 3-½" diameter holes on a 5-ft. x 5-ft. pattern and hole depths ranged from 10-ft. to 21-ft, with an average depth of 18-ft. In all holes (over 10-ft. deep), two decks were used with up to 2.5-Ft. of ANFO column per deck. The charged decks were separated by inert decks (5/8" Clean Stone stemming material) that ranged from 4-ft. to 6-ft. depending on the powder column. The top decks were stemmed with the same stemming material from 4-ft. to 8-ft. depending on the powder column.

Electronic detonators were used for each deck of each hole. Within the hole, the deck delay amounted to 4ms with the top deck initiating first, followed by the bottom deck 4ms later. The delay between adjacent decks from subsequent holes was set at 20ms throughout the pattern. In this manner, we were able to ensure that only one deck charge was fired in any given 8ms period and the maximum charge weight per delay amounted to ~10.5-Lbs.



▲ August 2, 2023—Pete Lien & Sons, New Office Expansion in Rapid City, SD. Brett Hunter, Adam Heck, and Dylan Beaver loading Gypsum Shot #1. Note the existing office building approximately 65-feet due west of the nearest loaded blast hole.

The total explosive charge weight for this first shot amounted to 1,345-Lbs. and the total material blasted amounted to 1,050 BCY (2,415 tons). From that, the powder factor came out to be 1.28 Lbs./BCY which is equal to 1.79 tons per pound. The vibration at the office registered 1.82 IPS and the vibration at the gas line registered 1.20 IPS. For this shot, the nearest charged hole to the office was approximately 65-feet away, and the nearest charged hole to the gas line was approximately 65-feet away.

Shot #2 - - Details

The second blast was drilled with 3-½" diameter holes on a 5-ft. x 5-ft. pattern and hole depths ranged from 10-ft. to 22-ft, with an average depth of 18-ft. In all holes (over 10-ft. deep), two decks were used with up to 2.5-Ft. of ANFO column per deck. The charged decks were separated by inert decks (5/8" Clean Stone stemming material) that ranged from 4-ft. to 6-ft. depending on the powder column. The top decks were stemmed with the same stemming material from 4-ft. to 8-ft. depending on the powder column.

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Cont'd: Close-Proximity Gypsum Blasting

Electronic detonators were used for each deck of each hole. Within the hole, the deck delay amounted to 4ms with the top deck initiating first, followed by the bottom deck 4ms later. Due to the amount of coarse material in the muck generated by Shot #1, the delay between adjacent decks from subsequent holes was adjusted to 10ms throughout the pattern to provide for better rock-on-rock comminution. Again, using this timing, we were able to ensure that only one deck charge was fired in any given 8ms period and the maximum charge weight per delay amounted to ~10.5-Lbs.

The total explosive charge weight for this first shot amounted to 1,999-Lbs. and the total material blasted amounted to 1,516 BCY (3,488 tons). From that, the powder factor came out to be 1.32 Lbs./BCY which is equal to 1.74 tons per pound. The vibration at the office registered 2.56 IPS and the vibration at the gas line registered 1.90 IPS. For this shot, the nearest charged hole to the office was approximately 45-feet away, and the nearest charged hole to the gas line was approximately 65-feet away.

Shot #3 - - Details

The third blast was drilled with 3-½" diameter holes on a 6-ft. x 6-ft. pattern and hole depths ranged from 10-ft. to 21-ft, with an average depth of 18-ft. This pattern was adjusted to the 6 x 6 pattern because of the amount of excavation that had taken place to remove the blasted material generated in Shots #1 & #2. The additional relief created by the excavation reduced the confinement of the Gypsum lens - - hence a looser pattern. In all holes (over 10-ft. deep), two decks were used with up to 2.5-Ft. of ANFO column per deck. The charged decks were separated by inert decks (5/8" Clean Stone stemming material) that ranged from 4-ft. to 6-ft. depending on the powder column. The top decks were stemmed with the same stemming material from 4-ft. to 8-ft. depending on the powder column.

Electronic detonators were used for each deck of each hole. Within the hole, the deck delay

amounted to 4ms with the top deck initiating first, followed by the bottom deck 4ms later. With the fragmentation obtained in Shot #2, the delay between adjacent decks from subsequent holes was kept at 10ms to create a similar amount of fragmentation. Again, using this timing, we were able to ensure that only one deck charge was fired in any given 8ms period and the maximum charge weight per delay amounted to ~10.5-Lbs.

The total explosive charge weight for this first shot amounted to 1,321-Lbs. and the total material blasted amounted to 1,416 BCY (3,257 tons). From that, the powder factor came out to be 0.93 Lbs./BCY which is equal to 2.46 tons per pound. The vibration at the office registered 2.38 IPS and the vibration at the gas line registered 2.56 IPS. For this shot, the nearest charged hole to the office was approximately 40-feet away, and the nearest charged hole to the gas line was approximately 30-feet away.

Summary

This presentation had four imbedded videos, and they showed the evolution of the blasting from the first shot through the last. Three of the videos were all taken from the same location within the office and displayed a uniform

perspective of the shots relative to the building. The fourth and final video shown was from a slightly different vantage point and showed the perspective of the last blast pattern relative to the proximity of the office building. From the standpoint of improving and tweaking blast designs, the videos were helpful in making decisions about which blast design parameters needed to be adjusted. By the time we were ready to start working on the third shot, the parameters were dialed in for the material remaining and the conditions present in the excavation and the video of the third shot confirmed the effectiveness of making minor changes as the blasting process progressed.



Nearly 1,700 Gather at ISEE's 50th Annual Conference on Explosives & Blasting

By Dede Manross, ISEE

The International Society of Explosives Engineers held its 50th Annual Conference on Explosives and Blasting Technique January 24 -27, 2024, at the Savannah Convention Center, in Savannah, Georgia.

Nearly 1,700 blasters, manufacturers, government officials and suppliers from all over the world gathered for this conference to gain new insights, ideas, and form new business alliances.

This annual networking event is the premier international forum for the hands-on explosives user. The 2024 program showcased advances in explosives during 3 days of technical sessions, 2 days of blasters training, 4 days in the exhibit hall, fact-filled poster session, educational programs, and special events.

Starting on Wednesday afternoon the exhibit hall opened to close to 1,700 attendees with the welcome reception. The atmosphere was festive and included food, drinks, music, and 138 exhibitors. Other events held in the exhibit hall included the blasters reception, video roundup and BBQ, cooking with Alastair and

Steve, cocktail making, tequila tasting, bourbon tasting, ice cream networking, climbing wall and games.

On Thursday, the technical sessions opened after the annual awards during the opening session. The technical sessions were the premier event for attendees of the conference.

The latest research in explosives and blasting technique were presented Thursday through Saturday.

The Blasters Training included two-days of training designed specifically for the blaster in the field on Friday and Saturday with 279 in attendance. The seminar qualified for blasters re-training hours in several states.

Other special events and programs included a regulatory panel discussion with the Director of the ATF - Steve Dettelbach, student industry connection, Untold Stories: Industry Highlights and History, the annual clay shoot, fishing excursion, the emerging professionals social, goat yoga, and Historic Savannah Experience for spouses.

The conference ended with a All-Clear Cheers and Beers Bash and a spectacular fireworks display to celebrate ISEE's 50th Year.



SD Mines ISEE Chapter Enjoys National Conference

Text & Photo Submitted By Alexander Bolduc,
President of the SDSMT ISEE Student Chapter



Last month, the South Dakota School of Mines ISEE Chapter attended the National ISEE Conference in Savannah, Georgia. The group consisted of Freshman, Juniors, and Seniors. They got to meet industry professionals from across the country and learn all about the explosives industry. Some of their highlights from the conference consisted of the blaster's roundup video, technical sessions, and the industry connections event. They are thankful for everyone who has supported the chapter and are looking forward to the Best in the West Conference.

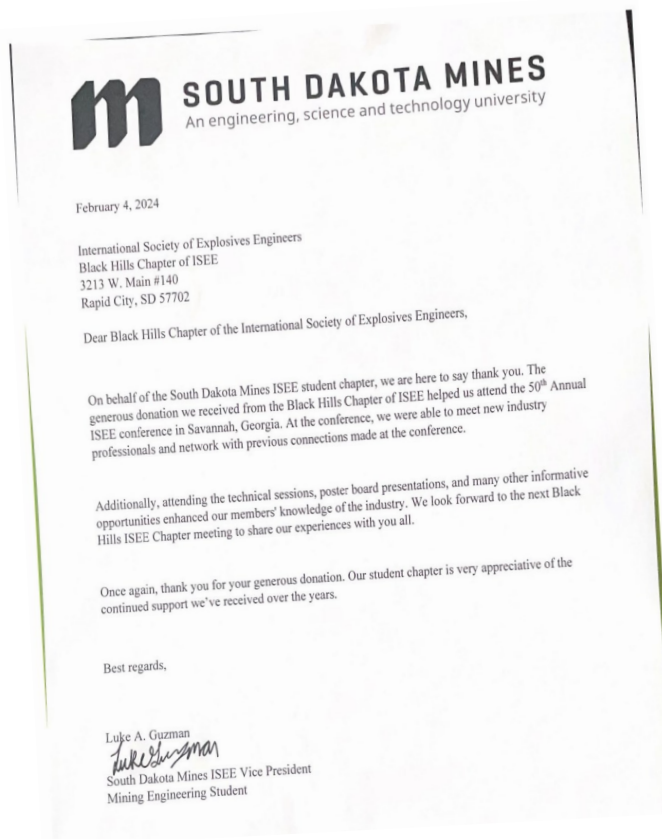


Black Hills Chapter ISEE Wins 3 Awards

The Black Hills Chapter of ISEE won three awards at the 50th National ISEE Conference in Savannah, GA. They include: Chapter Communications Award, Chapter Quality Operations Award, and Chapter Service Award for the 2023 Best in the West Drill & Blast Conference.



Thank You from the SD Mines ISEE Student Chapter



◀ The letter reads:

Dear Black Hills Chapter of the International Society of Explosives Engineers,

On behalf of the South Dakota Mines ISEE student chapter, we are here to say thank you. The generous donation we received from the Black Hills Chapter of ISEE helped us attend the 50th Annual ISEE conference in Savannah, Georgia. At the conference, we were able to meet new industry professionals and network with previous connections made at the conference.

Additionally, attending the technical sessions, poster board presentations, and many other informative opportunities enhanced our members' knowledge of the industry. We look forward to the next Black Hills ISEE Chapter meeting to share our experiences with you all.

Once again, thank you for your generous donation. Our student chapter is very appreciative of the continued support we've received over the years.

Best regards,
Luke A. Guzman
South Dakota Mines ISEE Vice President



Best in the West Conference Early Bird Registration Discount Ends March 31

You are invited to attend the Best in the West Drill and Blast Conference on April 17, 18 and 19 at the Spearfish Holiday Inn Convention Center in Spearfish, South Dakota. **Early bird registration discount ends March 31st.**

The conference is a great opportunity to interact with the industry, network, see tools and techniques, and talk with the best in the business. It is a great value for training, and tools to make your operations safer and more profitable: *the best bang for the buck!*

CONFERENCE REGISTRATION

Register online or download forms at www.bitwconference.org/register.html or download and print the forms at <https://bitwconference.org/links.html>.

PRE-CONFERENCE EVENTS

Additional optional activities before the conference include the Paul Muehl Memorial Trap Shoot, the Bob Martin Memorial Golf Scramble, and the Crazy Horse Mountain Tour.

An important note for Crazy Horse Tour participants: Highway 385 is usually used to get to Crazy Horse from Spearfish and for returning. Road construction on Highway 385 has begun and may impact your travels. It is recommended that you take an alternate route to and from the event, such as Interstate from Spearfish to Rapid City and Highway 16 from Rapid City to Crazy Horse.

BLASTER CREDIT HOURS

Blaster credit recertification hours accepted in multiple states. Typically 13.5 hours of qualified subjects.

REGULATORY PANEL

This is your chance to ask questions of your regulators and learn about industry happenings and changes. We will have representatives from MSHA South Dakota, MSHA Wyoming District 9, MSHA Training South Dakota, BATF & Explosives, Wyoming Department of Environ-

mental Quality—Land Quality Division, North Dakota Mining and Reclamation, and State of Colorado Division of Oil & Public Safety.

EXHIBIT HALL

Suppliers, manufacturers, engineers, and service representatives will be in attendance.

Back again this year—there is an Exhibitor Credit Sheet that you can complete to receive one hour towards your Wyoming Blaster License requirements. To do so, obtain signatures from four exhibitors after asking each one question pertaining to their exhibit. Please write down the question and response on the form that will be provided.

SCHOLARSHIPS

All proceeds from the BITW support explosives and mineral industry scholar-ships. This promotes and perpetuates the mining and explosives industry. Thanks to your generosity, we gave out \$15,000 in scholarships in 2023.

DONATIONS

To donate door prizes and/or scholarship auction items, please email bitwconference@gmail.com. It is greatly appreciated!

HOTEL RESERVATIONS

Spearfish Holiday Inn Hotel reservations can be made at www.spearfishconventioncenter.com/hotel using group code **BIW**. You can also call the hotel to make reservations at (605) 642-4683 and mention “explosives engineers”.





Post-Blast Safety Reminders

Reminders from the MSHA website, with a few additional thoughts.

Post-blast inspection is conducted to assess the effectiveness of the blast event, to inspect the area for undetonated explosives and to inspect the area to ensure safe ground for colleagues. It is critical to check for material that may need to be cleaned up, for unstable ground conditions and for damages to nearby equipment or structures. Many times the blaster completes a visual inspection, but the use of drones has become more common to evaluate each blast hole detonation and overall results of the blasting area.

- * ALWAYS disconnect the lead line or blast lines from the blasting machine immediately after a blast. No need to leave these connected.
- * NEVER re-enter the blasting area until all smoke, fumes, and dust have cleared. No need to inhale more dust.
- * ALWAYS check faces and muck piles for misfires. You may need to look from the top and the bottom of the working bench.
- * NEVER handle a misfire in any way unless you are an experienced blaster. Make a phone call to an experienced blaster to discuss the situation.
- * ALWAYS look for burning blasting materials. Clear the area immediately if you find any burning blasting materials. Best to maintain blockers just in case.
- * ALWAYS check highwalls for loose debris. Correct these problems before resuming work. Unstable ground needs to be marked off and promptly handled.
- * ALWAYS sound an audible all clear signal to indicate the blast site and all access roads are clear and safe.
- * ALWAYS wait at least one hour before going back on a blast when a misfire is detected. Slow down as you don't want an incident to turn into an accident.





In Memoriam: Greg Surwald

Obituary from the Gillette News Record at www.gillette newsrecord.com

Greg was a member of the Northern Plains Chapter of ISEE and served on the Board.

Gregory Joseph Surwald, 64, former resident of Wright, died November 27, 2023, from complications after a fall in his home.

A celebration of life took place in Fountain Hills, Arizona, on Jan. 27, 2024.

Greg was born May 1, 1959, to Delores and Harry Surwald in Lima, Ohio. He graduated from Shawnee High School in Lima, Ohio, and attended North Dakota State College of Science in Wahpeton, ND, studying diesel mechanics.

While in college he met Julianne Vogel. They later married and moved to Wright. Together the couple had two children, Julae and Joseph.

Greg worked for Black Thunder Mine from 1981 through 2006. He ran every piece of equipment the mine ever had, as well as set off many explosives working on the drill and blast

crew. He always said as a small boy he wanted to tear things down and run heavy machinery.

Greg enjoyed motorcycles, skiing, fishing, family vacations, demolition, bowling, and Mr. fix-it projects.

Greg married Lyn Hollibush in 2002 and gained three additional children to the family; Mandy, Mindy, and Josiah. The couple later moved to Newcastle, Wyoming, then South Dakota, and finally, Arizona.

Greg was an incredibly hard worker. He loved to entertain, cook enormous amounts of food (then dump them in the middle of the table), and have people over.

He enjoyed being busy and spoiling his grandchildren whenever he got the chance. He thoroughly enjoyed his time with his family and friends.

His light is gone too soon for those still here, but we know for certain that he is home and whole.

Black Hills Chapter Contacts

Here are the 2024-2025 Black Hills Chapter Officers and Board of Directors. If you have any questions, comments or concerns, please contact one of these members. Your suggestions are greatly appreciated.

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