QUARRY ACADEMY

Improving Processes. Instilling Expertise.

Quarry Academy 2013

San Antonio, Texas

Program Agenda

Course Descriptions

Presenter Biographies

SANDVIK

DYNO Dyno Nobel

Quarry Academy 2013

Registration Day Agenda

Monday - November 11, 2013

Time	What	Who / Where
4:00 PM	Registration Opens	Omni La Mansion – San Antonio, TX Hotel Lobby Area
5:00 PM	Program Registration and Open Reception	Omni La Mansion – San Antonio, TX El Capistrano Room
7:30 PM	Program Registration and Reception Closes	

Quarry Academy 2013

Day One Agenda

Tuesday - November 12, 2013

Time	What		Who / Where
6:30 AM	Continental Breakfast and Registration		Omni La Mansion – San Antonio, TX El Cabildo Foyer
7:45 AM	Welcome / Introductions / Opening Remarks		Dan McAtee & EJ Burke / Dyno Kauko Jurri – J Heinemann / Sandvik Iberian A, B, & C – 5th Floor
8:30 AM	The Whole Picture	100	EJ Burke / Dyno & J Heinemann / Sandvik
8:45 AM	Lean Thinking Applied to the Quarry Process	101	J Caldwell / Southwest Research Institute Iberian A, B, & C – 5th Floor
9:30 AM	Break / Simulator Time		El Cabildo Foyer/Madero Prefunction
10:00 AM	Mine – Quarry Planning	102	B Fidler / Dyno Iberian A, B, & C – 5th Floor
10:30 AM	Current / Future State Questions Audience Feedback using Clicker Units		EJ Burke / Dyno & J Heinemann / Sandvik Iberian A, B, & C – 5th Floor
10:45 AM	The Chemical Crusher: Drilling & Blasting Value Creation in The Pit	103	L Mirabelli / Dyno & B Hissem / Sandvik Iberian A, B, & C – 5th Floor
11:45 AM	Current / Future State Questions Audience Feedback using Clicker Units		EJ Burke / Dyno & J Heinemann / Sandvik Iberian A, B, & C – 5th Floor
12:00 PM	Lunch / Simulator Time		Madero – 5th Floor
1:00 PM	Best in the Blast: Fragmentation Management	104	S Giltner / Dyno Iberian A, B, & C – 5th Floor
1:45 PM	Blasting Vibration Control: Take Control, Not Grief	105	S Brashear / Dyno Iberian A, B, & C – 5th Floor
2:30 PM	Break / Simulator Time		El Cabildo Foyer/Madero Prefunction
3:00 PM	A Reality Check: A Legal Perspective on Blasting Risk Management	106	M Bowling & J Friedman / Friedman Leak Iberian A, B, & C – 5th Floor
4:45 PM	Clickers - Summation - Evening Instructions		EJ Burke / Dyno & J Heinemann / Sandvik Iberian A, B, & C – 5th Floor
5:00 PM	Free Time		
6:00 PM	River Walk Boat Cruise on the San Antonio River		Boat assignments / assembly point TBA
7:00 PM	Barbeque Dinner in Hotel		Madero – 5th Floor
9:00 PM	End of Day 1 – Retire for Rest		

Quarry Academy 2013

Day Two Agenda

Wednesday – November 13, 2013

Time	What	Who / Where
6:30 AM	Continental Breakfast	El Cabildo Foyer
7:30 AM	Load & Haul – Practical Cost Improvement 200	D Nus / Volvo Iberian A, B, & C – 5th Floor
8:30 AM	Mobile Crushing and Screening 201	S Gamble / Sandvik Iberian A, B, & C – 5th Floor
9:20 AM	Break – Simulator Time	El Cabildo Foyer/Madero Prefunction
9:50 AM	Challenges and Opportunities 202 Q & A Discussion with Audience	QA Staff – Attendees Iberian A, B, & C – 5th Floor
10:35 AM	Current / Future State Questions Audience Feedback using Clicker Units	EJ Burke / Dyno & J Heinemann / Sandvik Iberian A, B, & C – 5th Floor
10:45 AM	Orientation to Quarry Briefing	Martin Marietta Beckmann Personnel Iberian A, B, & C – 5th Floor
11:30 AM	Assemble / Load Buses / Pickup Box Lunch	Assemble on College Street on North Side of Hotel
11:45 AM	Buses Leave for Quarry	Depart from College Street on North Side of Hotel
12:15 PM	***Martin Marietta Beckmann Quarry Tour***	Buses arrive at Quarry - Military Gate
	View Primary Loading / In-Pit Mobile HSI Crusher	Martin Marietta Staff
	Plant Overview Observation Point	Martin Marietta Staff
	Electronic Initiation Systems Demonstration	Perry Zyduck / Dyno
	View Production Blast	Martin Marietta Staff
	Field Survey Control - Instruments/Tools/Methods	B Hissem / Sandvik & S Brashear / Dyno
4:00 PM	Load Buses – Drive to Hotel	Arrive College Street on North Side of Hotel
5:00 PM	Arrive at Hotel – Free Time	
6:00 PM	Reception	Veramendi – 4th Level
6:30 PM	Dinner	Iberian A, B, & C – 5th Floor
7:30 PM	Keynote Address: "From Deep Lead to Deep Safe… where few have gone before."	Corrie Pitzer Iberian A, B, & C – 5th Floor
8:45 PM	Informal Time with Speaker	Iberian A, B, & C – 5th Floor
9:00 PM	End of Day 2 – Retire for Rest	

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Day Three Agenda

Thursday – November 14, 2013

Time	What		Who / Where
6:30 AM	Continental Breakfast		El Cabildo Foyer
7:30 AM	Crushing – Principles of Mechanical Crushing	300	P Svedensten / Sandvik Iberian A, B, & C – 5th Floor
8:15 AM	Getting Control for Optimal Plant Performance: Advanced Crushing	301	A Scott / Sandvik Iberian A, B, & C – 5th Floor
9:00 AM	Break - Simulator Time		El Cabildo Foyer/Madero Prefunction
9:15 AM	"Making the Right Stuff": Screening and Sizing	302	A Scott / Sandvik Iberian A, B, & C – 5th Floor
9:45 AM	Break – Move to Classes		
10:00 AM	Putting the Plant Together ***Group A Must Attend this Workshop***	310	J Heckert & P Svedensten / Sandvik Iberian A, B, & C – 5th Floor
Group B Workshop Choices	Drilling and Blasting In Depth Crushing & Screening Do's & Don'ts Modern Blast Vibration Control Excavator Simulator Drill Simulator	311 312 313 314 315	A Lislerud/Sandvik & B Fidler/Dyno - Vermandi K Bohanon & A Scott / Sandvik – Espada S Brashear / Dyno – Concepcion W Turlington/Volvo–Madero Prefunction A Martin / Sandvik – El Cabildo Foyer
11:00 AM	Break		El Cabildo Foyer/Madero Prefunction
11:10 AM	Optimizing the "Crunch" Process	303	P Svedensten / Sandvik Iberian A, B, & C – 5th Floor
12:00 PM	Lunch / Simulator Time		Madero – 5th Floor
1:00 PM	Putting the Plant Together ***Group B Must Attend this Workshop***	310	J Heckert & P Svedensten / Sandvik Iberian A, B, & C – 5th Floor
Group A Workshop Choices	Drilling and Blasting In Depth Crushing & Screening Do's & Don'ts Modern Blast Vibration Control Excavator Simulator Drill Simulator	311 312 313 314 315	A Lislerud/Sandvik & B Fidler/Dyno - Vermandi K Bohanon & A Scott / Sandvik – Espada S Brashear / Dyno – Concepcion W Turlington/Volvo–Madero Prefunction A Martin / Sandvik – El Cabildo Foyer
2:00 PM	Wrap Up And Closing		EJ Burke / Dyno & J Heinemann / Sandvik Iberian A, B, & C – 5th Floor
2:30 PM	Safe Travels		

Keynote Address

From Deep Lead to Deep Safe… where few have gone before.

by Corrie Pitzer

In the management of safety, the path to success seemed clear: measure it, plan for it, budget for it, organize it, do it, check it, just like anything else in the business. It is a science and a process. But safety isn't improving anymore. We have hit plateaus in performance, and we increasingly experience very serious, unexpected mishaps, such as fatal or disastrous accidents. We are at the end of our capabilities and growth…

Breaking through this barrier will require a shift from *managing* safety to *leading* it. Managers set goals, leaders set visions; managers create commitment, leaders are inspirational; people obey managers, but they follow leaders. Safety leadership is the "next step".

And then there is deep leadership: the kind that is shown when adversity and dangers are looming, and people still follow the leader. The kind that makes a US Marine get up from a safe trench and run into the open, or that makes a sailor follow the explorer into the unknown and the unsafe, and they survive. In these circumstances, safety is not a checklist, or device or even a system. It is deeply entrenched in everything they do.

These leaders have passion, they have a sense of purpose, and they are pioneers.

Course Descriptions

Course Name: **100 The Whole Picture**
Instructors: **EJ Burke – Dyno Nobel Americas**
Jeff Heinemann – Sandvik Construction

Course Abstract / Deliverable: *This overview is designed to help attendees see our current working in the context of our historical experience as well as our current situation. We have all been living and working through a period of significant change as a result of our national economic and market environment. The degree and significance of the change we are experiencing suggests that we will look back from this point in time and refer to it as the "old normal", recognize that our present time was one of transition, and refer to what follows as the "new normal". With this perspective, we have a better chance of managing the change and transition that is upon us.*

Course Name: **101 Lean Thinking Applied to the Quarry Process**
Instructor: **Jim Caldwell – Southwest Research Institute / San Antonio, TX**

Course Abstract / Deliverable: *This course is designed to provide an overview into some of the tools and technologies that will help operators evolve their practice and standards. Seeing and understanding the "stone production value chain" to make less waste product and more value added materials from a "Lean – 6 Sigma" process perspective is the objective.*

Course Name: **102 Mine – Quarry Planning**
Instructor: **Baron Fidler – Dyno Nobel Americas**

Course Abstract / Deliverable: *This course is designed to help quarry operations and management understand and use practical mine/quarry planning to improve their operational results while improving their safety and financial outcomes. Practical applied production planning keeps one eye on current production activity and the other eye on middle / long term development requirements and objectives. Production has always been about designing, evaluating, creating, and managing an excavation sequence that is sustainable and profitable. Mines have always had to be rigorous and disciplined to bring a property online and make it go. Quarries, in the absence of market volumes that traditionally insured viability, can now benefit from a more disciplined planning effort that borrows from traditional mine planning programs as well as management methods borrowing from Lean-6 Sigma concepts.*

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Course Name: **103 The Chemical Crusher: Drilling & Blasting**
Instructors: **Larry Mirabelli – Dyno Nobel Americas**
Bill Hissem – Sandvik Construction

Course Abstract / Deliverable: *Drilling and Blasting as part of the crushed stone production process traditionally targets taking the rock in the bench apart and avoiding any of the undesirable consequences in the doing of it. Advanced technologies combined with improved design and disciplines now offer significant opportunity for drilling and blasting to improve productivity at the primary crusher and influence waste minimization at both pit and plant. This "chemical crushing" approach to drilling and blasting represents the largest process lever or fulcrum point for stone producers to lower total cost of production, avoid costly problems and facilitate productivity. This course will present the "chemical crushing" concept and provide the participants with an overview of drilling and blasting as well as their important relation to it. The key inter-related and mutually dependent design factors of drill and blast and how they contribute to the success of the rock production stream are addressed.*

Course Name: **104 Best in the Blast: Fragmentation Management**
Instructor: **Dr. Scott Giltner – Dyno Nobel Americas**

Course Abstract / Deliverable: *The rock crush, shape and size process begins with the "chemical crushing" that occurs during the blast. While most people recognize that they have some influence on the muckpile fragmentation, it is common to underestimate how much control of the fragmentation in the muckpile they actually can have and the real extent of the process benefits downstream from drill and blast. This course discusses the purpose of drilling and blasting in producing crushed stone along with the relative cost of drilling and blasting versus other quarry process activities. It describes the factors affecting fragmentation and the cost/production opportunities offered with optimized fragmentation.*

Course Name: **105 Blasting Vibration Control: Take Control, Not Grief**
Instructor: **Stuart Brashear – Dyno Nobel Americas**

Course Abstract / Deliverable: *With the introduction of precision, programmable electronic detonators and signature waveform analysis, alternative timing sequences can be derived that provide reduced community perception of blasting events. This new technology has resulted in conflicts when regulatory standards based on the "8 millisecond rule" have restricted the use of modified delay timing. This presentation will outline the origins of the 8 millisecond concept and why current blasting technology has proven the limitations of this theory.*

Course Name: **106 A Reality Check: A Legal Perspective on Blasting Risk Management**
Instructors: **Mike Bowling – Friedman Leak**
Jeff Friedman – Friedman Leak

Course Abstract / Deliverable: *This course is meant to provide a "wake up call" to operators on public relations issues and challenges that are currently being faced by many operations. This session provides attendee's with a review of critical Do's and Don'ts related to blast management and the risks associated with programs that ignore what can be a very controllable process. To further emphasize the legal environment that is present today, Mr. Jeff Friedman and Mike Bowling, counsels with Friedman Leak, will assist in a mock trial to highlight just what you can expect when you have to sit in the witness seat at court as well as discuss how today's social media tools can impact your operation.*

Course Name: **200 Load & Haul – Practical Cost Improvement**
Instructor: **David Nus – Volvo Construction Equipment**

Course Abstract / Deliverable: *Load and haul operations are central to the success of any quarry; ensuring raw and finished materials are delivered to the right place, at the right time. As a large part of a quarries operating budget goes to these steps in the value chain, continuous improvement is needed to survive - if not succeed. This course will briefly introduce one Big Idea that will apply to any quarry, as well as several additional ideas, that can help mobile equipment production be as efficient as possible.*

Course Name: **201 Mobile Crushing and Screening**
Instructor: **Stu Gamble – Sandvik Construction**

Course Abstract / Deliverable: *In the emerging "new normal" market environment, the traditional working assumptions about the kind of equipment you buy, the way plants are set up and configured, and the economic model that was the foundation of it all are now in question. The low investment cost, the immediate and continuing flexibility of moveable components and the ability to augment existing fixed plant operations make mobile plant systems a serious alternative to traditional fixed plant scenarios. These features and applications will be presented and discussed to assist attendees in gaining a new insight on mobile crushing and screening alternatives.*

Course Name: **202 Challenges and Opportunities**
Instructors: **QA Subject Matter Experts – Moderated By EJ Burke and Jeff Heinemann**

Course Abstract / Deliverable: *This period will be given over to a free form round-table discussion where the entire group can table questions and comments for discussion and review by the collective group. The purpose of this session is to get a reality check and consider alternative viewpoints particularly from the attendee side of the equation.*

Course Name: **300 Crushing – Principles of Mechanical Crushing**
Instructor: **Dr. Per Svedensten – Sandvik Construction / Europe**

Course Abstract / Deliverable: *Understanding the key controls and levers of crushing equipment to reduce waste, lower energy consumptions, and optimize productivity of your crushers is one of the largest areas of cost reduction for quarry operators. This classroom lecture will provide attendees the basics on physics and mechanical principles of breaking rock in a crusher that can provide operators with the knowledge to select and or "tune" equipment to lower total operating costs by increasing productivity and lowering maintenance costs.*

Course Name: **301 Getting Control for Optimal Plant Performance: Advanced Crushing**
Instructor: **Alex Scott – Sandvik Construction / Europe**

Course Abstract / Deliverable: *Recognizing that many crushers are underutilized or even mis-sized, this course will provide an overview and solution for common set up and maintenance issues that generally result in significant production bottlenecks. This session will provide practical controls, troubleshooting tips and adjustments to optimize the crusher set up.*

Course Name: **302 "Making The Right Stuff": Screening and Sizing**
Instructor: **Alex Scott – Sandvik Construction / Europe**

Course Abstract / Deliverable: *Correct selection, installation, and maintenance are critical to product quality and the running of a safe, efficient, and thrifty plant. Recognizing that many screening and sizing plants are seldom fully optimized, this course will provide an overview of screen types, design, and function with solutions for common set up and maintenance issues that generally result in significant production bottlenecks or sources of waste. There will be a focus on practical controls, troubleshooting tips and adjustments to optimize the screening plant setup with a take-home audit list to use back in the plant.*

Course Name: **303 Optimizing the "Crunch" Process**
Instructor: **Dr. Per Svedensten – Sandvik Construction / Europe**

Course Abstract / Deliverable: *Building on the principles of crusher design and operation, concepts and procedures for setting up and managing the crusher for optimum performance is critical for waste and energy reduction. This classroom lecture will build on the concepts introduced in the 104 course section and include a field case study for reference to demonstrate the dynamic relationship of total process production variables with regard to optimizing the plant crushing result. The objective of total process management requires that total product quality and end result profitability be kept in view at all times. The case study will serve to demonstrate this principle.*

Workshop Name: **310 Putting the Plant Together**
Instructors: **Jerry Heckert – Sandvik Construction**
Dr. Per Svedensten – Sandvik Construction / Europe

Workshop Content / Deliverable: *Utilizing Sandvik Mining and Construction's state of the art PlantDesigner® software, operations managers can create a virtual dynamic model of a crushing and screening plant. Once a working model is created and validated, the model can be used to check for mass flow, spot bottlenecks, see problems, run what if's, and optimize plant designs. This workshop will work through real world plant setups to demonstrate the modeling and analysis method.*

Workshop Name: **311 Drilling and Blasting In Depth**
Instructors: **Arne Lislerud – Sandvik Construction / Europe**
Baron Fidler – Dyno Nobel Americas

Course Abstract / Deliverable: *The design and evolution of various drilling and blasting technologies has over time evolved and continues to be refined to cope with the variety of needs and field conditions which operators encounter in the field. Additionally, the unique and diverse nature of geology and the role it plays in design and field execution creates as many exceptions to the rules as rules. This workshop is intended to take problems and issues that attendees face and address their challenges and needs with an interactive approach to application and possible alternative to address problems and objectives in the drill and blast phase of operations.*

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Workshop Name: **312 Crushing and Screening Do's and Don'ts**
Instructors: **Alex Scott – Sandvik Construction / Europe**
Kevin Bohanon – Sandvik Construction

Workshop Content / Deliverable: *The Sandvik staff will work through "Best Practices" examples to improve performance, minimize waste and save money in setting up crushers, screens and connecting equipment. Questions and issues individual attendees have with their own equipment and plants will be welcome for discussion and treatment.*

Workshop Name: **313 Modern Blast Vibration Control**
Instructor: **Stuart Brashear – Dyno Nobel Americas**

Workshop Content / Deliverable: *This workshop introduces the attendees to the basics of modern vibration control utilizing linear super positioning. Using real field data, blast designs will be processed and reviewed to show the potential benefits of signature waveform analysis and the pitfalls that can happen when using precision electronic detonators without any type of timing analysis.*

Workshop Name: **314 Excavator Simulator – Breaks/Lunch/Free Time**
Instructor: **Wade Turlington – Volvo Construction Equipment / North America**

Workshop Content / Deliverable: Simulators can add tremendous value as part of comprehensive competency development for machine operators. *A state-of-the-art Excavator Simulator will be used to illustrate operation technique development and response to actual field conditions.*

Workshop Name: **315 Drill Simulator – Breaks/Lunch/Free Time**
Instructor: **Avery Martin – Sandvik Construction**

Workshop Content / Deliverable: *Demonstration using state-of-the-art drill simulator for instruction of operation techniques and response to actual field conditions.*

Faculty and Speaker Biographies

Corrie Pitzer – Keynote Speaker – corrie.pitzer@safemap.com

Corrie completed the degrees, BA and BA Honors in Industrial Psychology, BA Honors and Masters in Business Management (Cum Laude) and a postgraduate Diploma in Education.

He worked in industry for the last 25 years, 5 years as the Group Human Resources Manager at Impala Platinum and 5 years as the Group Risk Manager of a large mining corporation (Billiton) in South Africa.

He founded SAFEmap International in 1992 and moved to Australia where he became one of the leading safety consultants on safety culture change. Since 2002, he consulted more internationally and moved to Canada. Corrie worked with major global companies including Goldcorp, Kinross Gold, Edison Southern California, Intergen, Peabody Energy, Rio Tinto, and many more.

He holds two positions: the CEO of the company he founded, SAFEmap International and he also serves as the President of ProconSAFE, the safety company of Procon Mining.

Kevin Michael Bohanon – kevin.bohanon@sandivk.com

Kevin Bohanon is Sales Manager for the Stationary Crushing and Screening Division for Sandvik Construction USA.

In 1982 he started his career in mining and construction with Spaulding Equipment, in Southern California and Arizona where he was involved in reverse engineering of Symons crushers, and represented various equipment manufactures. In 1998 he worked for Svedala, and then Metso after the acquisition. In 2002 he was part owner of Sonoran Process Equipment Company, in the Phoenix and Tucson Arizona representing Sandvik and several other manufactures. In December of 2007 he took a position with Sandvik Mining and Construction in the Northwest. With more than 30 years of experience in crushing, screening and wet processing, he is actively involved in many projects for Sandvik dealers. For the last two years, his main focus has been providing application and technical assistance to a wide variety of customers located throughout the United States.

In his spare time, Kevin along with his wife, Melissa enjoys golf, boating, camping and traveling to new destinations.

J. Michael Bowling – mbowling@friedmanleak.com

Mike Bowling's legal practice covers several areas with a focus on litigation. He currently represents two of the largest providers of explosives products and services in the State of Alabama. In addition to defending these companies against claims related to the sale, use and distribution of explosives throughout the Southeast, he counsels them on a wide array of business issues and litigation preventative measures.

Mr. Bowling also provides similar services to many surface coal mining and quarrying operations throughout the State of Alabama.

Mr. Bowling is admitted to practice in all state and federal courts in Alabama. He is also a member of numerous local, state and national organizations, including the Alabama Defense Lawyers Association, the Defense Research Institute, and is an attorney member of the International Society of Explosives Engineers.

Mr. Bowling is a graduate of the University of Alabama, where he received a Bachelor of Science in Accounting. In 1996, he graduated from the University of Alabama School of Law. Mr. Bowling holds an AV rating by Martindale-Hubbell which is the highest rating for an attorney bestowed by that organization.

Stuart Brashear – stuart.brashear@am.dynonobel.com

Stuart Brashear is a Project Manager for DynoConsult®, a division of Dyno Nobel. He earned his BA from Western MD College and has more than 26 years of industry knowledge and experience.

Stuart is very active in the mining and quarry industry with memberships in the International Society of Explosive Engineers (ISEE); Society of Mining Engineers (SME); North Carolina Aggregates Association; Mining Association of South Carolina; American Society of Civil Engineers (ASCE); and many more.

Stuart started with Martin Marietta's Blasting Research group and then worked as a Regional Manager for VibraTech. He then went on to work as a Dyno Nobel technical services representative in both regional and corporate organizations developing technical training modules to increase blasting service crew skills, leading customer BOT programs and projects, and implementing value-in-use and value-added solutions.

His current responsibilities include developing, managing and implementing projects focused on delivering value-creating process solutions to the quarrying, mining and construction industries. He also provides consultative service support to the Dyno Nobel's Marketing and Sales and Service divisions. Stuart's areas of specialty include vibration control; blast liability risk analysis; blast optimization; greensite / expansion / renewal permit assistance; litigation assessment and consulting; and coordinating inventory auditing for Sarbanes-Oxley compliance.

In his personal time Stuart would like to golf and keep up with NASCAR, but in reality, he says he spends most of his time chauffeuring horses around the southeast for his daughter.

Edward J. Burke, III – ej.burke@am.dynonobel.com

E.J. has more than 43 years of diverse experience including 35 years in senior management with the DuPont Company, Explosives Technologies International (ETI), a successor company to DuPont's Explosives Division, and Dyno Nobel Inc.

E.J.'s experience includes general management, sales, marketing, and business positions in the United States, Canada, Latin and South America, and Australia as well as extensive experience in Human Resources and Finance.

E.J. is Dyno Nobel's General Manager / Stone and lives in Dallas, Texas. He has a B.A. from the University of South Carolina in Columbia.

James M. Caldwell – james.caldwell@swri.org

Jim Caldwell is a Principal Analyst in the Process Improvement Engineering Section at Southwest Research Institute. Mr. Caldwell has over 29 years of experience in manufacturing, engineering, and quality in the business process arena. He has been educating business professionals and consulting utilizing lean principles in a variety of manufacturing environments as a business process improvement professional for the past 18 years. His areas of expertise include strategic planning, benchmarking, scorecard development, development and implementation of Key Performance Indicators (KPI's), project management, and process improvement utilizing modeling and metrics development.

As a Principal Analyst, he works with a variety of companies in implementing lean manufacturing methodologies including value stream mapping, 5S, setup reduction, cellular flow, Kanban/pull systems, and kaizen events. He also teaches numerous Lean Manufacturing workshops at the University of Texas San Antonio. Mr. Caldwell has earned his Lean Six Sigma black belt certificate and utilizes the DMAIC process in executing his project work.

Mr. Caldwell is a graduate of Duke University's Fuqua School of Business, where he earned his MBA in 1998. In 1982, he received his B.S. in Production Management from the State University of New York and an A.A.S. in Management Engineering Technology, Nassau College in 1979. Currently, he serves as an Executive Board Member on the San Antonio Manufacturers Association Board of Directors.

Baron Fidler – baron.fidler@am.dynonobel.com

Baron Fidler is Manager for the Applications Technology Team of North American - responsibilities include supporting product and application customer support including DigiShot electronic initiation and Titan bulk emulsion as part of "chemical crushing" value added solutions.

He obtained his MS (Technology Management) from South Dakota School of Mines & Technology. Baron's previous Dyno Nobel assignments include: Bulk Emulsion Product Manager, Technical Training and Support for Blasting Service, Dyno Consult, Field Technical Services in the Southeast and Michigan, Stone Solutions Team creating Value-In-Use and Value-Added solutions. Baron was a member of the Mine Automation Project (utilizing electronic detonators in underground mine development with the use of gassed emulsion loaded through the DynoMiner system). As a member of the Corporate Core Technical Team, Baron worked on training modules to improve the skills of shot service crews. Baron was a member of the Technical Services Team that worked with Dyno Nobel Joint Venture Distributor Partners. He introduced and coordinated the first Blast Optimization Team (BOT) at Lafarge's Alpena Cement Plant in Michigan. Baron has worked as a Blaster and Site Manager in Milan, Michigan and in Wyoming's Powder River Basin as an Emulsion Plant Operator, Pump Truck Operator, and Blaster. Additionally, Baron worked as a Contract Engineer to Jacobs Ranch Mine where he developed a laptop based program for Electronic Blast Reports.

In his spare time, Baron enjoys hiking, upland bird hunting, trap/skeet shooting, trail building on the Draper Trail Crew, trout fishing, and watching Nebraska "Husker" football.

Jeff Friedman – jfriedman@friedmanleak.com

Mr. Friedman's diverse legal practice is primarily litigation driven. As a defense attorney in various civil matters, Mr. Friedman has represented a wide array of corporate and professional interests. Mr. Friedman at one time defended the Governor of Alabama in a civil lawsuit and, in another case, defended a regional airline in the worst air disaster in the history of Alabama. He has litigated a number of cases including personal injury, professional liability, employment, product liability and fraud cases.

Mr. Friedman is a frequent speaker at client seminars and professional organizations. He has spoken and authored articles for the International Society of Explosives Engineers. Mr. Friedman has also lectured for the Alabama Bar Institute and Cumberland School of Law continuing legal education programs. In addition to professional organizations, Mr. Friedman and the lawyers of Friedman Leak, put on frequent seminars for our clients as part of our ongoing attorney-client relationships.

Another area of Mr. Friedman's practice includes a commitment to advise and counsel longstanding firm clients in various legal negotiations, mediations, and arbitrations.

Mr. Friedman is admitted to practice in all state and federal courts as well as the United States Eleventh Circuit Appeals and the United States Supreme Court. Mr. Friedman has litigated in over thirty counties in the State of Alabama and has been admitted, on a pro hac vice basis, to litigate in the States of Georgia and Oklahoma. Mr. Friedman holds an AV rating by Martindale-Hubbell which is the highest rating for an attorney bestowed by that organization.

Stu Gamble – stu.gamble@sandvik.com

Stu has been in the Mobiles business for the past 21 years beginning in the recycling industry in size reduction with mobile products. In the early 90's, he was one of the leaders in showing the successful use of blending used recycled asphalt shingles back into new asphalt through mobile units – a process which has been adopted by many large asphalt producers today. He has an extensive 20 year background in expanding the use of mobile units into all types of new products and uses.

After owning a welding and fabrication shop for 10 years, he was asked to look at a new career path in the uses of Mobile units by a small recycling manufacturer. He started in 1990 as a regional representative and quickly moved into a management position, running the daily operations. Over the years, his career path has led him to become VP of Mobile Crushing and Screening for Sandvik USA in 2007. He graduated from LVT in Lebanon, PA, with a Machine Tool Technology degree and has taught classes in Welding and Fabrication. Today he continues to run daily operations for the Sandvik Mobiles group in the USA.

Scott Giltner – scott.giltner@am.dynonobel.com

Scott G. Giltner is currently a Senior Project Engineer for DynoConsult®, a division of Dyno Nobel. Scott earned his PhD in 1993 from the University of the Witwatersrand in Johannesburg, South Africa; his Master of Science degree and Bachelor of Science degree in Mining Engineering from the University of Missouri-Rolla (Missouri School of Mines). In 2006, Scott also became certified as a Project Management Professional from the Project Management Institute.

Scott is a member of the International Society of Explosive Engineers (ISEE), Society of Mining Engineers (SME) and Project Management Institute (PMI). Scott has 26 years of industry experience, starting as a graduate teaching assistant at the University of Missouri-Rolla School of Mines. He has worked as a research engineer for the Chamber of Mines of South Africa Research Organization and as a Program Engineer at the University of Missouri-Rolla School of Mines on US Navy and DOE research contracts.

Scott was self-employed as a consultant and then joined Dyno Nobel as a technical sales representative as well as technical services representative in both the regional and corporate organizations, developing technical training modules to increase blasting service crew skills, leading customer BOT programs and projects, and implementing value-in-use and value-added solutions. Scott has worked in several countries including South Africa, Zimbabwe, Russia, and Canada.

His specialty area is blast optimization and instrumentation used for blast monitoring and quantifying blasting results. Scott's current responsibilities include developing, managing and implementing projects focused on delivering value-creating process solutions to the quarrying, mining and construction industries. Scott also provides consultative service support to the Dyno Nobel's Marketing and Sales & Service divisions.

Outside of work, Scott enjoys spending time with his family, historical research, and bicycling.

Jerry Heckert – jerry.Heckert@sandvik.com

Jerry Heckert is the Senior Applications Engineer for Sandvik Construction in North America.

In 1969 he took a position as a draftsman with Allis Chalmers Corp. in Appleton, Wisconsin. He worked his way up through the ranks to a position as lead designer of vibrating equipment. From there he was asked to work with AC process technology department and start a local group to breakdown the process equipment in our market to a more technical level. This became what is today the application eng department which was responsible for the development of the Plant designer flow program.

Currently he is responsible for assisting Sandvik's customers and clients in the mining, quarrying, and construction sectors of the industry with process and optimization solutions using the full range of process equipment available today.

Jeff Heinemann – jeff.heinemann@sandvik.com

Jeff Heinemann is Vice President, Construction for Sandvik Mining and Construction USA East Area with a BS in Mining Engineering from South Dakota School of Mines and Technology he has served 26 years in the industry. Jeff also has been an active member and participant in the SME, NSSGA, ISEE and several other local aggregate associations throughout the US.

Jeff started his career with Ingersoll-Rand Company in Milwaukee, WI as a Sales Engineer. He advanced through the organization in various roles including Distribution Manager, Regional Manager, Industry Manager, and Country Manager in Australia covering Australia, New Zealand, and the Pacific Islands. Later he served as General Manager for Perimeter Bobcat in Atlanta, Georgia where he left in 2007 to become VP, Construction at Sandvik Mining and Construction.

In his current role he is responsible for the overall customer satisfaction as well as the growth and profitability of Sandvik Construction.

Jeff resides in Smyrna, Georgia with his wife, Laura, and Son Alex. He has traveled the world extensively and enjoys the outdoors – fishing, hiking, biking, camping and mineral collecting. He is still looking for the illusive 'Mother Lode'.

William Hissem – bill.hissem@sandvik.com

Mr. William Hissem is the Senior Mining Engineer for Sandvik Construction in North America.

After taking a Bachelor of Science degree in Mining Engineering at Colorado School of Mines in 1979, he worked for ASARCO, Amax Metals, and Eisenman Chemical at mine operations in the western US. His work included a full spectrum of engineering staff and field production assignments in both open pit and underground operations.

He then joined Tamrock in 1983 where his work initially focused on hydraulic top-hammer drilling and its practical applications in the US market.

Since that time, Mr. Hissem has developed and implemented proprietary time-study and cost analysis software specific to drilling applications in the course of serving clients throughout North America, South America, and Western Europe.

Currently he is responsible for assisting Sandvik's customers and clients in the mining, quarrying, and construction sectors of the industry with process and optimization solutions using the full range of rock excavation and process equipment available today.

He is an active member in SME, ISEE, and is currently on the M&S Board of Directors for NSSGA. He resides in Neenah, WI – married – 2 children – 2 grandchildren – all joy.

Kauko Juuri – kauko.juuri@sandvik.com

Kauko Juuri is Sandvik's President of Global Markets for the Construction Division. Kauko has a BSc. Mechanical Engineer with a strong international business background and more than 30 years of experience within the global construction industry. He started his career in Sandvik within the breaker business (Rammer) in the year 1986. Kauko created the base for success in today's Sandvik Product Area Breaking (up to 2005), was member of the Sandvik Construction Segment Management Team as Vice President Demolition and Recycling (2005-2009), Managing Director for Extec and Fintec after the acquisition of the two companies by Sandvik (2007-2009) and Regional Customer Segment Manager for Construction in Europe (2009-2010). In 2010 Kauko worked as Director of Marketing and Sales for Ramtec, in Finland and rejoined Sandvik as President of Global Markets in November 2012.

Quarry Academy 2013

Arne Lislerud – arne.lislerud@sandvik.com

Dr. Arne Lislerud is the Surface Applications Manager for Sandvik Mining and Construction Drills.

After taking a Master of Science degree in Civil Engineering in 1980 and a PhD in Surface Blasting Operations in 1990 at the University of Trondheim, he joined Tamrock in Finland as a research engineer. He has 28 years of experience in the industry and is a member of the International Society of Explosive Engineers, International Society of Rock Mechanics and Norwegian Society of Rock Mechanics.

Currently Arne is responsible for Quarry Academy, Presplit Seminar, SimQuarry and QuarryGame within SMC.

Away from work, Arne enjoys being outdoors and in his younger years was a mountain climber. Now he enjoys hiking and skiing with his wife and Ruffe, a Newfoundlander. He also enjoys being a hobby photographer and reading epic novels and history books in front of the fireplace.

Dan McAtee – dan.mcatee@am.dynonobel.com

Mr. Daniel McAtee is President of Dyno Nobel United States & Canada of Incitec Pivot Ltd. He joined the Company as DNA Chief Operating Officer in April 2012 and was appointed President of Dyno Nobel USA & Canada in June 2012.

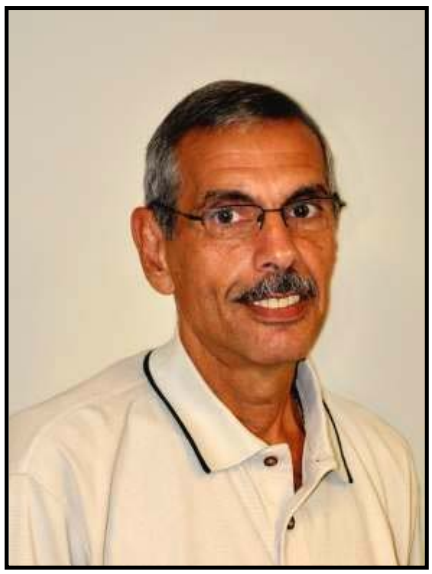
Dan holds a bachelor of Chemical Engineering from the University of Colorado and completed MBA courses at The Ohio State University.

Dan started his career as a research scientist working on advanced materials and engine coating systems for civilian and military use. Dan holds several US patents.

He further has over 20 years' experience in operations, engineering, product, commercial and general management across a variety of international commodity businesses including more than 15 years with General Electric, as well as three years as CEO of a Canadian public steel company. He is a Certified Master Black Belt in Six Sigma methodologies and has traveled, worked and lived in several foreign countries.

Dan was proud to sit on the board of the Vancouver YMCA and is married with 2 amazing daughters.

Larry Mirabelli – larry.mirabelli@am.dynonobel.com



Larry Mirabelli is Product Manager - Bulk & Delivery Systems / Sr Project Manager for Dyno Nobel Inc. and an industry leader in explosive application and blasting optimization. Since 2002, he has been focused on using drill and blast to deliver value-creating process solutions to the quarrying, mining and construction industries.

Larry has more than 40 years' work experience in the explosive industry with positions in: research & development engineering; manufacturing; technical services; licensed blasting; blast vibration/air blast monitoring and control; and marketing. His years of hands-on explosive application and blasting experience includes: quarrying (surface & underground); metal/nonmetal mining (surface & underground); coal mining (surface & underground); construction, tunneling; and geophysical prospecting throughout North America. He has been called on to work on blasting assignments in Canada, Dominican Republic, Japan, Mexico and the Latin America.

With a Bachelor of Science in Chemical Engineering from Newark College of Engineering, Larry's academic training complements his industry experience. Larry is a member of the International Society of Explosive Engineers (ISEE), serves on the ISEE Technical Program Committee and is a co-author of the ISEE Blaster's Handbook 18th Edition. He is also a member of the Project Management Institute (PMI) and an MSHA Part 48 Training Instructor for Underground and Surface.

David Nus – david.nus@volvo.com

David Nus is global Director for the mining, quarry and aggregates industries for Volvo Construction Equipment.

He started his career as a marketing/sales engineering intern at VME Americas, working with large Michigan loaders and Euclid rigid trucks, while earning a Bachelor of Science degree in Aerospace Engineering from Purdue University.

In 1993 David joined VME full time and stayed in the Euclid-Hitachi joint venture through the 1990's. He held several positions as Product Manager and Area Sales Manager for Euclid quarry/mining trucks, managing business and dealer development throughout Asia/Oceania from 1995-2000.

In 2000, David joined Hitachi CM Europe in the Netherlands, managing all sales and marketing of large/mining excavators and rigid trucks throughout the Europe, Africa, Middle East, and CIS markets. This included key accounts and dealer development.

In 2004 he returned to North America and Volvo CE, holding several positions in the excavator team, including 3 years pioneering business development in the demolition, waste and recycling industries.

In 2009 David returned to his roots in aggregates and mining to lead Volvo CE's worldwide efforts to increase satisfied customers in these industries.

Alex Scott – alex.scott@sandvik.com

Another Scot, born in Campbeltown, Argyll… the home of great whisky!

Alex has more than 41 years' experience in crushing and screening.

He joined Allis Chalmers (GB) Ltd in 1966 and has worked in application engineering, capital sales, service and product management.

Since 2001, Alex has worked internationally, travelling to such far flung corners as Africa, Australia, South and North America and China.

His main function is as an educator. He's known in the industry as a mechanical and process troubleshooter

Alex is married, has two married daughters, and 1 grandchild – great joy!

Per Svedensten – per.svedensten@sandvik.com

Per Svedensten is Manager for the Crushing and Screening Process Expertise Team.

He obtained his Ph.D. (Mech. Eng.) from Chalmers University of Technology (Gothenburg, Sweden) in 2007. The title of his Ph.D. thesis is Crushing Plant Performance. In the thesis, methods for optimizing the crushing plant performance are described. Both technical and economic models are utilized to make the optimization.

One of his key responsibilities is to develop Sandvik's crushing plant simulation software PlantDesigner. Some of the research findings from his thesis work are now implemented in an internal version of PlantDesigner. He is also continuing his research with the aim to develop more advanced methods for technical-economic optimisation of crushing plants.

The Crushing and Screening Process Expertise Team is also responsible for the Test Centre for rock materials, Education and Training, and Process Development. The team aims to mix advanced technical studies with practical field work and experiments. In his spare time, Per enjoys road bike cycling and home improvement projects.

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