Best Practices for Production Loading

By Tina Grady Barbaccia, Contributing Editor

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- Make sure the operator has been well-trained.
- Use uniform removal when working the muckpile.
- Take buckets from left to right and work toward the face.
- Approach the muckpile on level with the bottom of the pile.
Production Loading at the Quarry Face

The difference in movement when observing an excellent loader operator versus an average one is similar to watching someone perform ballet versus a hip hop type of dance. They are very different and distinct motions. “One dancer has constant starting and stopping, and the other is very smooth,” says Eric Yeomans, product manager, General Purpose Equipment (GPE), Volvo Construction Equipment. “Ballet is very fluid. It’s similar to looking at a very good loader operator. When I see jerky, un-interrupted reaction, that’s when you can instantly spot someone who is struggling or hasn’t had enough time on the machine for a good comfort level operating it.” 

“It’s pretty dramatic when you see someone that is good,” he continues. “It’s very easy to spot.”

In addition to smooth operation, the expert operator is taking in other elements to monitor. “There is no extra stress put on the machine and no overuse of fuel and power,” Yeomans explains. “Most customers are tracking overuse of fuel and power.”

The operator needs to be extremely aware of wheel spin and how much throttle and horsepower is being applied,” says Chris Connolly, product manager, GPE products, Volvo Construction Equipment and a seasoned trainer. “Keeping a smooth underfoot is also absolutely critical.”

Communication between the operator and driver must be constant to prevent incidents as short as possible. “Productivity goes down if you’re transporting rock farther than you have to,” Connolly adds. Minimizing the distance traveled to and from the face can also help prevent equipment downtime. Following a blast, it’s not uncommon to find sharp pieces of materials in the loading area. “This is tough on tires and on gas,” he says. “You need to make sure the trucks keep moving with the most efficient route. If a truck is sitting idle, waiting, or an operator is not doing his best to get the bucket loaded properly, this all factors into poor productivity and fuel usage – and time is money.”

Failing to keep the correct bench height, as well as maintaining safe space for excavators to swing and safe distance from the high wall, are also mistakes that are important to note. “To prevent issues and keep the work safe, we directly address this with repetitive discussion and demonstration,” explains Erin Waldron, aggregates supervisor for Cemex USA’s Brooksville Quarry.

The operator needs to be aware of a machine’s operating power. “This means being aware of wheel spin – i.e. revolutions per minute and how much throttle and horsepower are being applied. Applying too much power can cause the equipment’s wheels to slip. This could result in the need to re-grade the underfoot and production floor and create unnecessary downtime. Awareness should also consider safety aspects, such as an area that needs to be graded again.”

Good communication between the driver and loader operator is essential for safety and maximum productivity. “The distance between the machine loading and the haul truck driver should be kept as short as possible. The farther away the truck is from the loader, the more distance it has to travel. This costs time and fuel, which affects productivity. As a pile size becomes smaller, the loader operator and haul truck driver will need to adjust positions. Coordinate timing to keep trucks from sitting idle to achieve maximum cycle times and productivity.”

Letting the underfoot and loadout areas fall into disrepair can have a major effect on productivity. Maintaining proper grade will prevent water retention, which could lead to ruts, and keep the equipment from being operated at maximum efficiency. Loader operators should be mindful of simulations, such as rocks protruding from the ledge or sharp, jagged ones in the production area. Colliding with a protruding rock presents safety issues and could stop a machine. Sharp rocks not cleaned up from the production area could puncture a truck or loader tire, affecting productivity and tire repair expenses.

Provide thorough training with a seasoned production loader operator or trainer to develop the necessary skills. Use of simulators can be effective and help develop skills to operate the equipment with deliberate, fluid motions, and to do so comfortably. Trainers should also observe trainees to examine their alertness with trucks, whether they are communicating with the haul truck drivers, and whether they have a situational awareness for issues that could affect safety and productivity.

Taking time to review the muckpile’s physical characteristics and determine if any safety issues need to be addressed. Look at the height of the pile and take note if it is taller than the production loader. If so, there is a threat of material rolling and hitting the machine or getting in the way. If concerns exist, they should be immediately addressed. The high points of the pile should be removed to guard against a material avalanche. Be aware of flaws and anomalies such as a soft vein of rock that could have contributed to the higher pile.

Eric Yeomans is a product manager at Volvo Construction Equipment. He has 40 years of construction industry experience and has also worked in Sweden, Australia, and currently in North America. His background includes experience in technical service, customer support, and product management.

Chris Connolly is a product manager for Volvo Construction Equipment with nearly 25 years of experience in the construction industry. Prior to his current position, Connolly served as a Volvo Road Institute instructor and managed equipment operator training for North America.
**Voices of Experience**

**Chris Connolly**

Using equipment at the quarry face may be the most challenging place (and is certainly in the top three) for a machine operator to work in an aggregates operation, says Chris Connolly, product manager for GPE products, Volvo Construction Equipment. Overall smooth operation is important, but so are all the details that come with it.

“First and foremost, you need to monitor how much power you are applying to the machine,” he says. “Be aware of its power and be extremely confident in operating it. Make movements deliberate and smooth.”

Choppy, erratic actions are not only inefficient, but can result in secondary issues. For example, applying too much power can cause the equipment’s tires to slip. This, in turn, causes wear and tear on very expensive (upwards of $20,000 for Volvo’s largest wheel loader) tires. “And, as soon as the tires start slipping, you won’t be able to get the maximum amount of material in the bucket,” Connolly explains, adding the underfoot will also be affected and should be graded out.

Maintaining the grade and keeping the underfoot condition in good shape is essential because it helps to protect proper drainage. “You need to keep the grade so water is not held in the loadout area,” Connolly says. “This is very important. If you’re not taking care of it and have big ruts, it is just slowing the operator down, because he can’t operate at maximum efficiency.”

A loader operator also needs to ensure he won’t create any problems at the crusher. “As loading blasted rock into the truck going to the crusher, be aware of the largest rock the crusher can handle,” Connolly advises. “If you pick up a larger rock, put it to the side and let the excavator operator with a rock breaker take care of it.”

**Eric Yeomans**

Before approaching a muckpile, a loader operator needs to be aware of its characteristics, including what it looks like, how tall it is, and its density to determine the right bucket for the machine being used.

“You don’t want a machine going into a muckpile that towers over the machine,” Yeomans says. “There is concern of material rolling, hitting the machine, and getting in the way. If the pile exceeds its height, send in a different type of machine, such as an excavator, to move material around to make it more suitable for the loader — to take off the high points that are at risk of rolling or avalanching.”

Blasting techniques also play a role in whether the muckpile will tower over the top of the machine. “Sometimes, there are soft veins of rock, and they get more blasted out than originally planned,” Yeomans says. “Generally, in a blasting plan, the height of the face is measured, and the amount of explosives is gauged accordingly, but there can be anomalies, fissures and cracks, and other things that can cause a higher muckpile.”

When a loader operator begins to work on the muckpile, consistency is imperative. “The machine operator should systematically take buckets [of material] from left to right, working back toward the face,” Yeomans says. “There needs to be uniform removal of the material — not just one spot at a time.”

It is also extremely important to use the correct bucket attachment. The bucket size is determined by the model and size of the machine, as well as weight and density of the material, Yeomans says.

“You try to match your bucket to the material and size of truck being loaded,” he says. “You want to load it to the maximum payload potential.”

**Erin Waldron**

At Cemex’s Brooksville Quarry in Brooksville, Fla., the training is the same for all excavator operators. It is conducted with a series of steps to ensure proper and efficient training for an excavator operator.

“Excavator operators in training are observed by a qualified operator as part of the training process,” says Erin Waldron, aggregates supervisor for Brooksville Quarry. “They are required to read and understand the operation manual. Trainees are then observed completing a series of increasingly demanding tasks.”

The training covers not only operating the excavator itself, but also the proper way to approach a muckpile, deal with mud seams and the toe, and procedures dealing with loading at the quarry face.

“We train operators to approach muckpiles at the same level at the bottom of the piles,” he explains. “They start pulling materials, and as it is moved out, it creates a natural ramp for the excavators. The process is repeated until they reach a proper access height to create a bench.”

The operators pull material from the highest points and fill in low areas to create level benches from which to load. The bench height is determined by the stick length of the excavator, which will be used when loading haul trucks. “The operators then load the trucks on the floor from the bench,” Waldron says.

Dealing with mud seams, however, is not as cut and dry. It requires knowledge about the aggregate itself. “It is deposit specific,” Waldron points out. “We use excavators to load from the muckpile so that we can be very selective along the face and move aside or strip out what we can’t use.”

Dealing with the toe is determined by the drilling pattern and shot design. “Proper time and effort to ensure your blasting is done properly will minimize the problems with hard toe,” he says.