What You Need to Know Before Blasting Begins

Why is blasting needed? Why can't you use heavy equipment to dig instead?

The decision to use commercial explosives for breaking rock requires careful consideration. Rock hardness and equipment ability are evaluated and blasting was determined to be the most effective option for the project. Blasting is an expensive option and requires permits, holes to be drilled, explosives to be purchased and blasting safeguards to be implemented to ensure safety. Blasting is conducted when other means cannot be completed. This is a costly solution and is not undertaken lightly.

Will I feel or hear the blasting?

Probably. If blasting is occurring near your home, you can expect to feel some vibration and hear some noise. However, the vibration levels are normally lower than those caused by a slamming door, thunder during a storm or children running and jumping around the house. While you may feel or hear the blast effects, they are not dangerous to your family or your home. In fact, research and experience has shown that vibration readings taken within a home will usually be at a higher level from normal indoor activities than from local blasting operations. These occurrences normally go unnoticed throughout the day.

Understandably, however, you still may be concerned about the blasting. If you fail to hear a warning signal, you may be startled by the vibration and noise. Because the human body feels very low levels of motion, you may feel vibrations in the floor if you are standing or sitting indoors as opposed to being involved in an outdoor activity. On occasion, the noise traveling through the air may rattle windows and doors.

People are more sensitive to blasting vibrations than their homes. Even though you may hear or feel a blast, its suddenness, coupled with your sensitivity to vibrating floors, walls and windows will make the blast seem worse than it really is.

If I can feel the blast, how can I be sure it is safe?

Federal, State and/or Local Governments often impose strict limits on the level of vibration and noise that can be produced by blasting. Most blasters prefer to “shoot” or blast so that the resulting vibrations are well below these limits. Blasters know that keeping ground vibrations and noise to a minimum will reduce neighborhood concerns.

From a cost perspective, it is also preferable to keep vibration effects to a minimum. It takes a large amount of energy to break rock. Energy in a blast that fails to contribute to rock breakage is dissipated in the form of vibrations. This represents wasted energy. Given the high cost of explosives, it is to the blaster’s advantage to utilize as much of the energy as possible in breaking the rock, thereby keeping vibrations at the lowest possible levels.

Does anyone really know what levels of ground vibration and air overpressure are safe for my home, my water well and the rest of my property?

Yes, considerable research has been done on the effects of blasting on structures. Numerous factors have been studied, including blast design variables and structure type. Historically, research agencies, such as the U.S. Bureau of Mines, produced the majority of this country's technical data on blasting. Today, institutions, corporations and individual investigators, both here and abroad, continue to contribute to blasting research.

Current legal and recommended vibration and air overpressure limits are based on this research. By adhering to these limits and following safe blasting procedures, the blaster minimizes or eliminates the risk to structures located in the surrounding area.

Specialists, such as seismologists, who measure and evaluate ground vibrations are often employed as independent consultants. Their experience and training, coupled with the blaster's knowledge, help to produce the desired results with minimum vibration and noise.

What qualifies a person to become a blaster? Is there anything a blaster can do to control vibration and noise?

Blasting is a specialized occupation that requires extensive training in the storage, transportation and field application of explosives and detonating devices. In many states, blasters are required to be licensed, a process that requires classroom instruction, written exams and an apprenticeship. It is during this training period that blasters learn how to design blasts that will maximize rock breakage, properly distribute the fragmented rock and minimize the resulting ground vibration and air overpressure effects. In addition, once licensed a blaster must continue training to renew that license.

Vibration and noise levels are influenced by a number of factors, many of which are under the control of the blaster. These include the size and depth of the holes and the type of explosives utilized. However, blasters must also contend with factors outside of their control. These include the weather, slope of the land and certain geologic conditions.

How are the levels of vibration and airblast measured?

Blasting seismographs are specialized instruments that are often used by explosives users, consultants and seismologists to measure and record data from each blast. These instruments, which have been specially designed to measure man-made vibrations, measure both ground and air motion. The results of these measurements are stored electronically and/or printed on-site.

How do I know that a Seismograph is accurate?

Before a seismograph is approved for use in the field, it is thoroughly tested and its accuracy verified by the manufacturer. Seismographs are carefully calibrated on specially designed shake tables. This procedure, which is generally repeated on an annual basis, is done using laboratory test equipment calibrated to national standards. The seismograph operator also has the option of performing a simple test, on-site, which will verify that the instrument is in proper working order. Manufacturers have also decided upon a set of standards for all instruments to measure blasting accurately and with the same methodology. This makes sure data is uniform and correct.

Can using a seismograph help to improve blast results?

Seismographs collect data that can be used to evaluate the performance of the blast. Of course, of primary interest to the blaster is that the measured ground vibration and air overpressure levels fall within safe and legal limits. In addition, these recordings often contain data that can be used by a blaster in the design of future blasts so their blast effects can be further minimized.

The seismograph recordings may also be forwarded to an independent consulting firm, comprised of geologists, seismologists, physicists and/or mining engineers. These independent consultants can verify the blaster's interpretation of the readings and make recommendations for further improvements.

What can I do to reduce the effects of blasting on my home and family?

In our experience, the degree to which property owners are affected by blasting is dependent upon their understanding of blasting and blasting safety procedures, as well as their ability to anticipate the blast itself. Therefore, we recommend that you consider the following:

- Learn what you can about blasting from factual and recognized sources.
- Inform yourself about the scope of the local blasting activities by questioning those involved with the project. Generally, they will be glad to answer any questions that you may have.
- Avoid being startled by the blasts by inquiring about the blasting schedule and by learning about what warning whistles or sirens will be used.

What else should I know?

In some instances, homeowners living near a new mine, construction site or quarry will be given an opportunity to have their homes inspected before blasting starts or approaches their property. The company doing the blasting is often required to offer this service or offers it as a courtesy.

In most cases, the inspections will be performed by an independent company. The inspection reports will consist of detailed descriptions of conditions observed by the inspector. This documentation may include written or sketched descriptions, photographs or videotape. If you are contacted by an inspector, we strongly recommend that you take advantage of this service. We suggest, however, that you ask for some form of identification before giving an inspector access to your home.

To ensure the safety of you and your family, please adhere to any instructions posted on signs around the project, mine or quarry.

We hope that we have answered most of your questions about blasting. We also hope that we have given you insight into the precautions taken to protect you, your family and your property. If you have additional questions, however, do not hesitate to contact supervisory personnel employed by the company involved. They will be happy to discuss them with you.

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