



# **Best Practice Guideline Community Concerns – Blasting at Quarries**

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### **A How- To Guide for the Aggregate Industry**

#### **Introduction**

You may never see completely eye-to-eye with your neighbours when it comes to blasting for rock. Those who are not in the industry understandably fear the vibrations, noise and sudden shock that can come with blasting. But an educated, concerned and proactive approach can help you work through and minimise community concerns about the necessity and effects of blasting within your operation.

#### **Educate Yourself and Your Employees**

##### ***Why people complain about blasting...***

Blasting is safe when conducted according to regulations and established, accepted procedures. But human beings are extraordinarily sensitive to vibration. And, it is hard for people to understand that a blast that can be felt is not necessary of sufficient force to damage surrounding structures. Because many misconceptions and inadequate information about the process, the public often identifies blasting as the cause of cracks that appear in their homes. Blast vibration complaints from neighbours are frequently due to house vibration, not ground vibration. If the house doesn't shake, no one complains. For that reason, you may find you won't get complaints from people who are outside when the blast occurred. So the real culprit in blasting complaints isn't vibration, it's structural response. And air vibration – or air blast – can shake homes just as much as ground vibration.

It is the high amplitude, long duration, low frequency vibrations that generate complaints. These types of vibrations are caused by geology – the way the ground wants to vibrate. If the geology is consistent throughout the area you share with neighbours, it will vibrate the same way, sending higher amplitude and longer-duration vibrations to greater distances. If the geology is inconsistent, with changes, the amplitude will die more quickly, and you will notice you do not garner many complaints.

Complaints also can stem from the fact that the unexpected suddenness of the blast makes the vibrations and noise seem greater than they are. In reality, structural vibration from blasting, rarely exceed-or even equal- those caused by thunder, traffic, slamming door, heavy footsteps, etc.

##### ***Who is most likely to complain...?***

Arm yourself effectively. Get to know your neighbours. But, importantly, also identify the likely opposing organisations, citizens' groups and special interest groups. Find out where they are "coming from" – and what the real issues are, because those that are openly argued may not be the ones actually espoused.

#### **Educate the exposed Community**

##### ***Make community education a priority...***

A proactive approach to the concerns of our community establishes you as a good neighbour from the start- and a little bit of education goes a long way. Lay the groundwork early with your neighbours. Meet and develop a rapport with community leaders, regulators, citizens' groups, homeowners' associations and individuals. Establish yourself as a good neighbour: support local organisations and causes; attend community events and activities. Join your local Chamber of Commerce; it's often a good way to meet key people in your community.

Educate the community about the necessity and safety of proper blasting techniques. By explaining limits, seismographing and structural response, you may help to reduce a lot of anxiety. If possible, hire a third-party seismologist and structural engineer to communicate with neighbours and reduce any perception of bias in relating this information.

##### ***Establish a community liaison committee...***

It is a good idea to establish a dedicated committee, the members of which will be responsible for proactively educating the community and dealing with neighbour complaints. Assign one or two people from this committee to be the community contacts for questions. And make sure your neighbours know who the contacts are that they can call with their questions and concerns. This will speed up the process and, as a result, allay concerns more quickly,

### **Ways to "Get the Word Out"....**

Hold an open house. By inviting neighbours to come and see who you are and what you do, you may help change many unflattering opinions and perceptions. Allow your neighbours to meet the blasters – whether part of the crew, or an independent firm – so they may answer questions. Explain efficient blasting and why minimum vibration, where the maximum of blast energy is spent in breaking rock, is in everyone's best interest. Offer a pre-blast inspection – especially if yours is a new operation. This also can be seen as a good-neighbour effort, even if you have an existing operation, and have never offered this service before. Visit schools and offer a presentation.

### **Be aware of the most frequently asked questions...**

Do your homework, and have your answers, solutions and alternatives prepared. If you can't answer a question, admit it, and offer to provide follow-up information as soon as possible – and then follow through! Here are some commonly asked questions – and suggested answers:

- *Why do you have to blast the rock? Why can't you just dig it out?* Blasting is the last alternative. It opens a whole new world of expenses for the aggregate operation, including permits, drilling, explosives and safety measures. Producers will run test and consider all their options carefully, and will turn to blasting only when other, methods of extraction are determined to be impractical or impossible.
- *Will I hear or feel the blasting?* If blasting takes place near your home, it's possible you may hear some noise and feel some minimal vibration. Be aware that people are more sensitive to blasting vibrations than are their homes. But when you feel the blast, its suddenness, and added feeling of vibration from your floors, wall and windows, it will contribute towards making the blast seem worst than it really is.
- *If I can feel the blast, how do I know it's safe?* The Department of Mineral Resources imposed strict limits on the level of vibration and noise that can be produced by blasting. The vibration levels from blasting are normally lower, and no more dangerous than those caused by slamming doors, heavy footsteps and active children running and jumping inside the structure, or such things as traffic and thunder occurring outside. In fact, research has shown that vibration readings taken within a home will usually be at higher levels from normal indoor activities than from local blasting operations.
- *Who regulates blasting?* The aggregate industry is vigorously regulated by the Department of Mineral Resources.
- *What qualifies a person to become a licensed blaster?* The Department of Mineral Resources requires blasters to be licensed. Contact Aspasa for details of service providers in relation to the law of Rock-breaking and Making Safe of a Quarry Law.
- *Will you be storing explosive materials onsite?* Blasting at aggregates sites is increasingly conducted by contract blasting companies. Most facilities that use contract-blasting services do not store explosive materials on-site
- *Is there anything a blaster can do to control vibration and noise?* From the perspective of being a good neighbour, operations understand that keeping vibrations and noise to a minimum will reduce neighbourhood concerns. From a cost perspective, it is in the aggregates producer's best interest to keep vibration effects to a minimum. It takes a large amount of energy to break rock. Energy from a blast, which does not contribute to rock breakage, is dissipated in the form of vibration. Vibration is wasted energy. Given the high cost of explosives, it is to the producer's advantage to conserve as much energy as possible in the breaking of rock, and keep vibrations to a minimum.

Vibration and noise levels are influenced by many factors that do fall under the control of the blaster, including; size and depth of the holes, the type of explosives, and the type of detonator. Factors outside the blaster's control include weather, slope of the land and the geologic makeup of the land.

- *Does anyone really know what levels of ground vibration and air blast are safe for my property?* Actually, yes. Much research has been conducted by the Department of Mineral Resources on the effects of blasting on structures. Institutions, corporations and individuals continue to contribute to

this research. Blasters follow legal and recommended vibration and air blast limitations, minimising or eliminating the risk to structures located in the neighbourhood. Seismologist can measure and evaluate ground vibrations, and are often employed as consultants to help the blaster produce desired blast results, with minimum vibration and noise.

- *How are the levels of vibration and air blast measured?* Blasting seismographs have been specially designed to measure manmade vibrations, including ground motion and air blast. The results are stored electronically and/or printed.
- *Can use of a seismograph help improve blast results?* The data produced by the seismograph can be used to evaluate the performance of the blast – primarily to ensure the measured vibration and air blast levels fall within safe and legal limits, but also for use in the design of future blasts so that effects can be further minimised
- *How do I know the seismograph is accurate?* The blaster/user wants the readings of the seismograph to be as accurate as you do to help with future design blasts, and so the validity and accuracy of its recordings will not be questioned. Seismographs are thoroughly calibrated, tested and also verified by the manufacturer before they are approved for use in the field. The procedure is repeated annually. There also is a simple test the operator can perform on-site, which will verify the seismograph is in proper working order.
- *If it's not caused by blasting, then what has caused the cracks in my walls and ceilings?* There are 40 different major causes of cracks in walls and ceilings. They include:
  1. building a house on a fill;
  2. failure to make the footings wide enough
  3. not enough cement used in the concrete;
  4. failure to protect beams and sills from rotting through dampness;
  5. drainage water from roof not carried away from the foundation and/or
  6. too few nails used.
- *Is there anything I can do to reduce the effects of blasting on my home and family?* The degree to which property owners are affected by blasting is in large part dependent on their understanding of blasting, and the safety procedures as well as their ability to anticipate the blast itself. It is recommended that you learn what you can about blasting from recognised resources; ask us questions – we'll be glad to answer any you may have; inquire about blasting schedule, and learn what warning signals we use.

### **Best Management Practices (BMPs) - Before, During and After the Blasts:**

#### ***Provide a buffer...***

Build berms, and top them with landscaping such as thick vegetation and fast –growing trees, to act as air blast and noise buffers. Landscaping will help you maintain an attractive facility, which will create a more favourable impression among your neighbours and the community, as well. No one wants to look at an eyesore

#### ***Schedule blasts with neighbours in mind...***

When possible, schedule your blast at low “population” times for the neighbourhood (i.e.; lunchtime or recess time if your facility is located near a school, as people do not feel blasts so strongly when they are outside). Let your neighbours know when you have a blast scheduled – by written notice – and invite feedback after the blast. Create signage to post in the area when you have a blast scheduled to remind neighbours.

#### ***Perform seismograph testing and document it...***

Perform seismograph testing to ensure that all blasting is conducted within the vibration limits set by national, provincial, and local laws and below the threshold for causing damage to structures. Also, perform testing whenever there is community concern about blasting, there is a significant change in the blasting design, or if there is a high density of residential or commercial structure adjacent to the quarry. Establish minimum requirements for the use of seismographic testing equipment. Conduct testing more frequently if plant management determines it necessary, or if required by law. Document all blast and seismographic records, and use them to improve your blast design, as well as for your protection, should questions arise.

***Have a written blasting policy...***

Have a written policy in place for neighbours to view upon request also to alleviate some fears by showing an ordered, organised and regulated method with which your operation handles its blasting program.

***Respond quickly to complaints...***

Whether you receive your complaint directly from a resident or through a local government office, respond promptly. Listen and be concerned. Make sure your neighbours know you understand and empathise; repeat their concerns to let them know you heard and understood. Meet them on an emotional level with your response. Be open and honest, emphasising positives in your language, not negatives. Say things such as, “we are a safe company because....” and repeat the phrase with your reasons. Follow up after your initial response. Continue to follow up if the neighbours feel their concerns have not been resolved.