

Maine Turnpike Authority Special Provisions that refer to MaineDOT 2002
Standard Specifications

Use Of Explosives

105.2.6 Use of Explosives

This Subsection is deleted in its entirety and replaced with the following:

The use of explosives is permitted, however, prior to any blasting, the Contractor must submit a detailed blasting plan to the Resident at least three (3) weeks prior to commencing drilling and blasting operations. The blasting plan shall contain the following information:

- a. Site plan with location of nearest structures and abutters. Plan shall also show the location of all private wells;
- b. Plan of each blast showing hole-spacing and delay pattern;
- c. Diameter and depth of each hole;
- d. Amount of explosive per hole;
- e. Total pounds of explosives per delay;
- f. Total amount of explosives per blast;
- g. Type of non-electric delays to be used;
- h. Amount of stemming in each hole;
- i. Type of explosive to be used;
- j. Soil and rock profile in blast zone;
- k. Scale distance to the nearest abutting structure;
- l. Type and location of seismograph to be used;
- m. Size of blasting mats and cover to be used; and,
- n. Safety precautions to be followed.

After submission of the blasting plan, but prior to the start of the blasting program, the blasting Contractor shall meet with the Resident, Maine Turnpike Authority officials, State Police (turnpike barracks), and affected utility representatives. The purpose of the meeting is to advise them of their blasting plan and schedule, accept feedback on the proposed plan, and coordinate the blasting effort.

Should field conditions warrant a change in the general blasting plan, the blasting Contractor shall provide a sketch and blasting plan details based on the actual field conditions prior to the blast for inclusion in the Project records.

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The following general requirements are to be adhered to:

- A. Blasting permits shall be obtained by the Contractor from all local, State and Federal agencies having jurisdictions. Blasting will not be authorized by the Resident without proper permits.

The Contractor shall comply with all applicable laws, rules, ordinances, and regulations of the Federal Government, the State of Maine, and the city or town governing the transportation, storage, handling, and the use of explosives. All labor, materials, equipment, and services necessary to make the blasting operations comply with such requirements shall be provided at no additional costs to the Authority.

The Contractor shall obtain and pay for all permits and licenses required to complete the work of this Section.

In case of conflict between regulations or between regulations and Specifications, the Contractor shall comply with the strictest applicable codes, regulations or Specifications.

- B. Obtain the services of a qualified vibration and blasting expert to monitor the blasting. All seismographic instruments shall be capable of producing a permanent record of the information required to determine the particle velocity at any time during all phases of the blasting operation. A copy of all recording shall be furnished to the Authority within two (2) working days after a blast. Seismographic recordings shall be taken at the critical locations and additional instruments shall be furnished, located and operated as deemed necessary by the Resident.

Persons responsible for blasting shall be Licensed Blasters in the State of Maine and shall have had acceptable experience in similar excavations in rock and controlled blasting techniques.

- C. Non-electric detonation systems shall be used. Electric blasting caps will not be permitted.
- D. The Contractor shall conduct all blasting activity in such a manner that the peak particle velocity of ground vibration, measured at the locations of the nearest structures to the blast, does not exceed the "safe limits" recommended by the U.S. Bureau of Mines in FIGURE B of BUMINES RI 8507, as follows:



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FIGURE B

BUMINES RI 8507

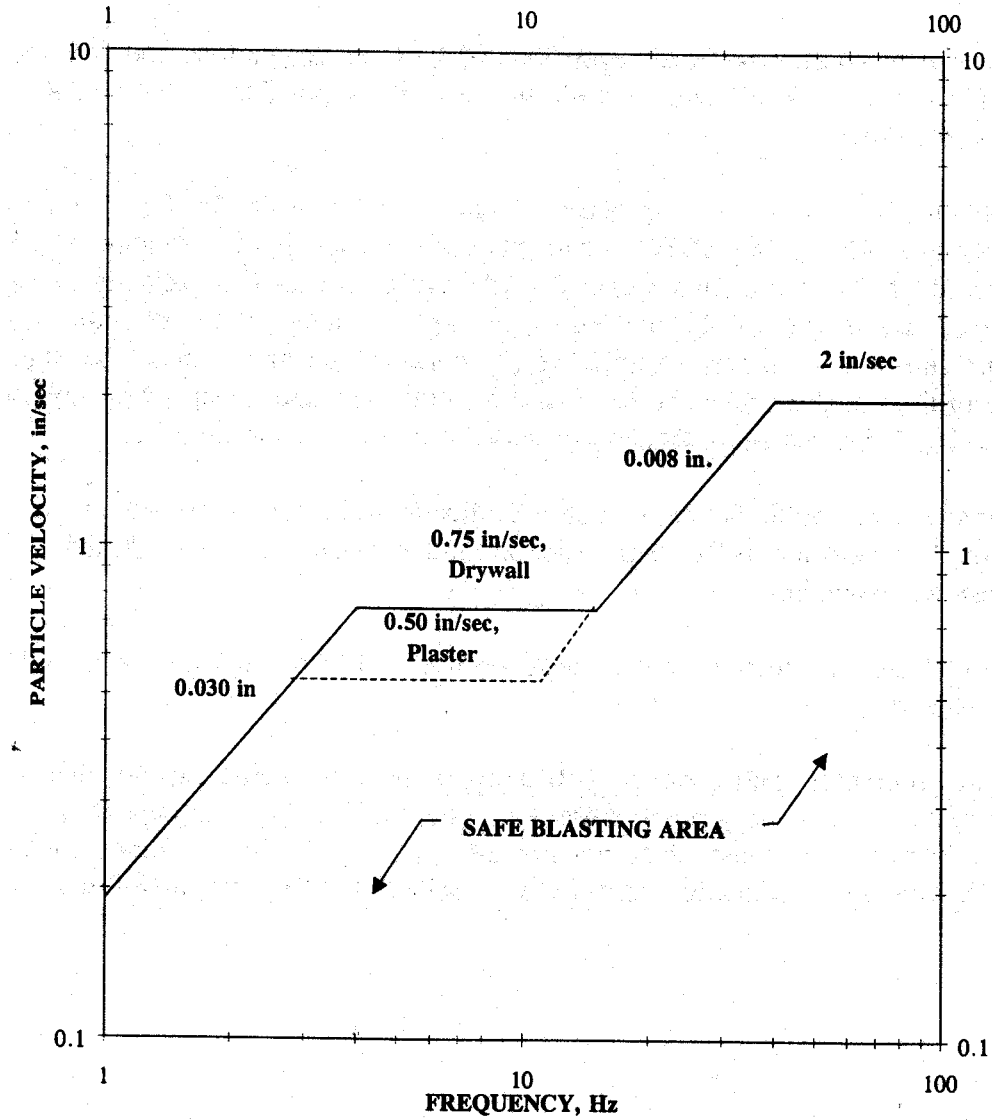


Figure B-1 - Safe levels of blasting vibration for houses using a combination of velocity and displacement

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ALTERNATIVE BLASTING LEVEL CRITERIA

E. The Contractor shall conduct all blasting activity in such a manner that the peak airblast overpressure measured at the locations of the nearest above ground occupied structures to the blast (considering wind direction) does not exceed 0.014 psi.

F. Scaled distance factors permitted for various distances from blast:

<u>Distance from blast site (ft)</u>	<u>Scaled distance factor to be used without seismic monitoring (ft)</u>
0 to 300	50
300 to 5000	55
5000 and beyond	65

G. The Contractor shall advise the Resident at least five (5) working days in advance of the dates on which he proposes to perform blasting operations, providing an approximate hour for the Resident's approval. The Authority will provide police at the turnpike site, who will stop traffic in both directions while the blast is detonated. The Contractor will be responsible for obtaining the necessary permits and police officials required to close local streets during periods of blasting.

H. Safety Precautions

1. Clearing Danger Area Before Blasting - no blasting shall be permitted until *all* personnel in the danger area have been removed to a place of safety. A loud, audible warning system, devised and implemented by the Contractor, shall be sounded before each blast. The Contractor shall familiarize all personnel on the Project, Authority, Police Officers, Residents, and the general public with the implemented system. The danger area shall be patrolled before each blast to make certain that it has been completely cleared, and guards shall be stationed to prevent entry until the area has been cleared by the blaster following the blast.
2. Explosives shall be stored, handled and employed in accordance with Federal, State and local regulations.
3. No explosives, caps, detonators or fuses shall be stored on-site during non-working-hours.



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4. Blasting mats may be used to cover the top and vertical face of all blasts in order to minimize the possibility of excessive throw of rock. The use of blasting mats is not required.
5. The Contractor is advised that the Authority's Maintenance Forces and State Police use two-way radios in the vicinity of the Project. These radios cannot be turned off during loading operations. Therefore, non-electric detonation systems shall be used. Electric blasting caps will *not* be permitted.
6. The Contractor shall be responsible for determining any other safety requirements unique to blasting operations at these particular sites so as not to endanger life, property, utility services, any existing or new construction, or any property adjacent to the site.
7. No requirements of, or omissions to, require any precautions under this Contract shall be deemed to limit or impair any responsibility or obligations assumed by the Contractor under or in connection with this Contract; and the Contractor shall at all times maintain adequate protection to safeguard the public and all persons engaged in the work, and shall take such precautions as will accomplish such end, without undue interference to the public. The Contractor shall be responsible for and pay for any damage to adjacent roadways or structures resulting from work executed under this Section.
8. The Contractor is required to secure all travelways, entrances and exits within 300 feet of the blast zone. No vehicles or pedestrians will be allowed within the 300-foot-zone until the blast is complete, all debris is cleaned from the roadways, and the site is deemed safe by the Resident.

I. General Blasting Procedures

1. The time during which explosives may be restricted to non-peak travel periods. The use of explosives is not permitted on Friday, weekends (Saturday and Sunday), holidays, on the eve of a holiday, or during non-daylight-hours unless approved in writing by the Resident. A blast may be allowed early on a Friday morning before 6:00 a.m. if it can be completed during daylight-hours. Specific allowable blasting times are outlined in the Special Provisions. In order to minimize traffic disruptions, the Contractor shall schedule blasting such that all disrupted traffic shall be cleared between any two successive blasts detonated anywhere on the Project. The Contractor will be allowed as many mainline traffic stoppages as can be cleared in the designated blasting window, provided the blast schedule can be safely coordinated. Each stoppage will be counted as one complete stoppage of mainline traffic. The Authority may withhold permission to blast if, in the opinion of the Authority, actual or anticipated traffic volumes will produce mainline or local road congestion that cannot be cleared in a reasonable amount of time. The Contractor's blasting operations shall be performed using extreme care to minimize the



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inconvenience and interruption to traffic and damage to the existing pavement, structures and surrounding areas.

2. The Contractor shall have sufficient equipment available on-site to clear the pavement of blast rock, if it is necessary. At a minimum, the Contractor shall have a vehicle to sweep the pavement and a half-ton pickup equipped with a plow. The blast will not be allowed to occur if this equipment is not present.
3. The Contractor shall coordinate all blasting with the Resident on-site who shall determine in advance when the charges may be set.
4. Blast hole diameter shall not be greater than three inches.
5. No free flowing, pourable or pumpable explosives shall be used unless approved by the Resident. All explosives shall be in cartridges or other semi-rigid containers.
6. Mainline traffic control during blasting periods shall be in accordance with the Plans and Specifications. All temporary signage shall be removed when the daily blasting period is over. Traffic control signs shall meet the requirements of Section 652 and will be paid for under Item 652.35, Construction Signs. The setup and removal of signs and the coordination with State Police and local Municipalities for mainline blasting will be included for payment under Subsection 652.361, Maintenance of Traffic Control Devices.
7. Local traffic control during blasting periods shall be in accordance with MUTCD and local requirements. All temporary signage shall be removed when the daily blasting period is over. Local traffic control signs shall meet MUTCD requirements and will be measured for payment as construction signs. Providing flaggers or local police officers on local roads, if required for mainline blasting, will be measured for payment. The payment for local police will be paid as a direct cost with no markup allowed by the Contractor. Coordination with the local officials for mainline blasting will not be paid for separately, but shall be incidental to the Rock Excavation item.
8. The Contractor shall report to the Resident, in writing, all blasting complaints received by the Contractor within 24-hours of receipt. Each blast complaint report shall include the name and address of the complainant, time received, date and time of blast complained about, and a description of the circumstances which led to the complaint. Upon receipt of a written complaint alleging damage from the blasting, the Contractor's vibration and blasting consultant and/or a representative of the blaster's insurance company shall investigate the claim and a written report shall be issued to the complainant, with a copy to the Resident, of the results of the investigation and the response of the Contractor. This written report shall be received by the complainant and Resident within 15 work days of receipt of the written complaint.
9. The maximum time for which traffic may be stopped at any single time shall be eight (8) minutes. This duration shall be measured as the time between the time that the last car passes the Resident, until the time the Resident determines that all travel



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lanes are cleared of blast debris. The Contractor shall reduce the size of the blast, change the design and method of the blast, use more mats, or otherwise alter the blasting so that the traffic is not stopped for more than eight minutes. If, due to the throw of rock onto the highway or other blasting related activities, traffic is stopped for more than eight minutes, the Contractor shall pay a penalty of \$500.00 per minute for every minute traffic is stopped in excess of the eight minute limit. The penalty shall be measured separately on the northbound and southbound roadway (or eastbound and westbound roadway). Total liquidated damage shall be deducted from the next pay estimate. Whenever the volume of traffic is excessive such that a eight minute interruption would cause objectionable congestion, in the opinion of the Resident, the hours during which blasting may occur may be further restricted.

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J. Pre-Blast Condition Survey

The Contractor shall provide a pre-blast survey as described below:

Prior to start of excavation (earth/rock) or blasting work, the Contractor shall conduct a pre-blast condition survey of all existing structures and conditions on the site, adjacent to the site, or in the vicinity of the site. This survey shall extend to such structures or conditions as may be affected by the Contractor's construction operations. As a minimum, condition surveys shall be performed on all structures within 500 feet of anticipated blasting areas. The Contractor is responsible for the following:

1. Coordinate activities, issue notices, obtain clearances and provide whatever photographic and secretarial assistance is necessary to accomplish the survey.
2. Give notice, in writing, to the owner of the property concerned and tenants of the property. Advise in notice, the dates on which surveys are to be made so that they may have representatives present during the examination. Provide copies of all notices to the Resident.
3. The survey shall consist of a description of the interior and exterior conditions of the various structures examined. Descriptions shall locate any existing cracks, damage or other defects existing, and shall include such information so as to make it possible to determine the effect, if any, of the construction operations on the defect. Where significant cracks or damage exist, or for defects too complicated to describe in words, photographs shall be taken and made part of the record.
4. The survey shall include a test of all private wells in the area. Water quality tests shall be obtained so that a baseline condition may be developed.

Contractor's record of the pre-blast condition survey shall consist of written documentation and photographs of the conditions identified, or a good quality videotape survey with appropriate audio description of conditions and defects. Prior to start of work, one copy of the Contractor's record of conditions survey shall be submitted to the Resident for review and retention.

Upon completion of all excavation (earth/rock) and blasting work, the Contractor shall make an examination similar to the pre-construction survey of any properties, structures, and conditions where complaints of damage have been received or damage claims have been filed. Notice shall be given to all interested parties so that they may be present during the final examination. Records of the final examination shall be distributed the same as the original preconstruction survey.

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K. Payment

No separate measurement or payment will be made for the work outlined in this Section including the detailed blasting program, pre-blast and post-blast surveys, blasting and permit acquisitions. All cost associated with this work shall be incidental to the Rock Excavation item(s).

L. Indemnity

Notwithstanding full compliance with these Specifications, approval of blasting plan, and successful limitation to maximum peak particle velocity noted above, the Contractor shall be solely responsible for any damage, direct or indirect, arising from blasting and shall hold the Authority and Resident harmless from any costs, liens, charges, claims or suits, including the costs of defense, arising from such damage, real or alleged. The Authority and Resident shall be additionally-named insured on any insurance policy covering blasting carried by the Contractor, and this requirement shall also be enforced on any subcontractor.

The Contractor shall provide a pre-blast and post-blast survey including photographs. An inspection of all facilities within and adjacent to the Contract limits shall be made to determine any changes that may occur due to the blasting operations.

The Resident's approval shall not relieve the Contractor of any responsibility for any hazards or damages related to this work. The use of explosives shall conform to all Federal and State laws and regulations. Explosives must not be stored within the turnpike right-of-way. Explosives shall be in the care of competent watchmen at all times, and placement and detonation shall be performed under the direction of a qualified blaster licensed in the State of Maine.