Fire Marshal In service 2011

Blasting & Explosives Regulations

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Objectives

The Student shall be able to identify:

1. Statutes governing explosives.
2. Licensing Types and Requirements.
3. Permits for Storage and Transportation.
4. Vehicle Requirements and Use.

Objectives cont.

The Student Shall also:

5. Know Recognition of Explosives.
6. Be Able to Identify Classification of Explosives.
7. Know How to Investigate a Complaint and Conduct an Investigation.

Explosives Statutes

Explosives in Connecticut are regulated by:

- Federal Government ATF, DOT, OSHA,MSHA
- State Statutes CGS 29-343 to 29-351

Explosives Statutes continued…

- CGS 29-349 provides for:
  - Licensing
  - Permits
  - Regulations
  - Penalties

Explosives Statutes continued…

29-349(a)

- Grants the Commissioner of Public Safety **EXCLUSIVE** jurisdiction in the preparation of regulations concerning the transportation, storage and use of explosives and blasting agents.

Explosives Statutes continued…

29-349 (b)

- Requires any person, firm or corporation must obtain a license from the Commissioner of Public Safety.

Explosives Statutes continued…

29-349 (c)

- Requirement of criminal history check.

Explosives Statutes continued…

29-349d

- Requirements for permits for the storage, manufacture or selling of explosives.

Explosives Statutes continued…

29-349 (e)

- Permits/Explosive Transport Truck licensing.

Explosives Statutes continued…

29-349 (f)

- Provisions for the revocation or suspension of either a license or a permit by the issuing authority.
- For any provision of law relating to explosives.
- Suspension or revocation of a a license shall automatically suspend or revoke the permit, suspension or revocation of a permit shall automatically suspend or revoke the license.

Explosives Classification

- Classified as High or low explosives
  - Performance
- Further classified as 1.1,1.2,1.3,1.4,1.5
  - Sensitivity to initiation

Explosive Definition

- Energetic material which undergoes rapid decomposition.
- Fuel and an oxidizer.

CATEGORIES OF HIGH EXPLOSIVES

- Extremely sensitive to heat, shock and friction.
- Used in detonators.

CATEGORIES OF HIGH EXPLOSIVES continued…

SECONDARY

- Relatively insensitive to heat, shock and friction. Used as a main charge.

Commercial High Explosives

- Dynamite
  - Packaging Convolute Paper Shell

  - Spiral Wound Paper Shell

Commercial High Explosives cont…

WATER GEL/SLURRIES

- Packaged in Plastic Film Cartridges (chubs)
- Can be insensitive at low temperatures

Commercial High Explosives cont…

- ANFO (Ammonium Nitrate /Fuel Oil)
  - 94% Ammonium Nitrate, 6% Fuel Oil

HOW EXPLOSIVES WORK

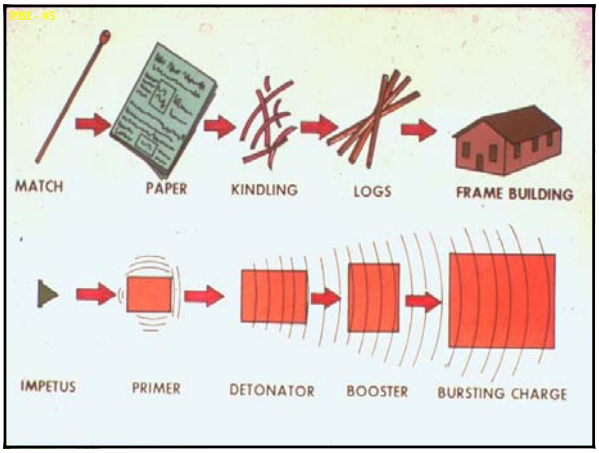
INITIATION OF EXPLOSIVES

- NON-ELECTRICAL INITITATION
  - *FUSE*
  - *NON-ELECTRIC DETONATOR*
  - *SHOCK TUBE (None)*
- ELECTRICAL INITIATION
  - *ELECTRIC DETONATOR*

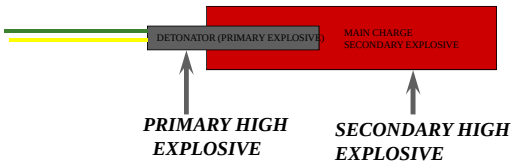
BASIC TERMS

- INITIATION

  The first step in an explosive process; initiation begins the reaction that leads to the explosion.



TWO STEP TRAIN

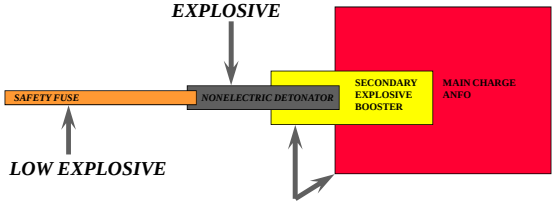


PRIMARY HIGH EXPLOSIVE

SECONDARY HIGH EXPLOSIVE

FOUR STEP TRAIN

PRIMARY HIGH EXPLOSIVE

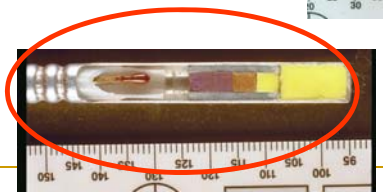


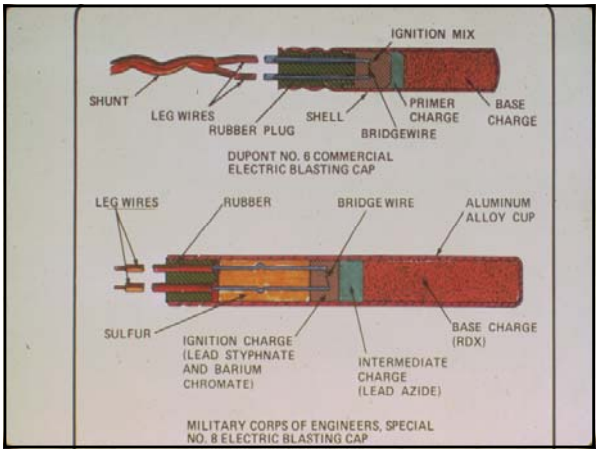
LOW EXPLOSIVE

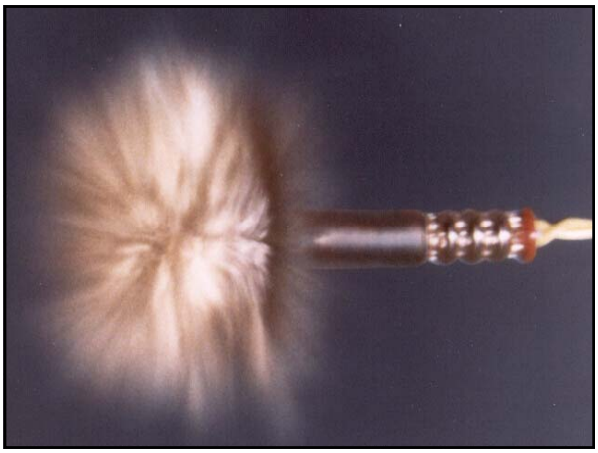
SECONDARY HIGH EXPLOSIVE

Detonators - Electric Match

- Detonator assembly components







Propellants

Black Powder History:

- Oldest Explosive Known.
- Used as both propellant and explosive.
- Individual may purchase up to 50lbs.

Black powder

- Composition
  - Potassium Nitrate, Sulfur, Charcoal
  - Granular

Propellants

Pyrodex

- History
  - Substitute for Black Powder
  - Equal on Volume Basis
  - Less Corrosive
- Use
  - Small arms
  - Equivalent sizes to Black Powder and in Pellet form.

Permits

- Storage-Issued by local FM after proper inspection of facility. Compliance 29-349-108 and 29-349-126 through 29-349-176.
- When permits are issued a copy must be forwarded to the SFM. 29-349-109.
- Whenever a permit is refused SFM must be notified 29-349-111.

Permits continued…

- Copy must be forwarded to the SFM.
- Whenever a permit is refused SFM must be notified.

Regulations

- Local fire marshal shall report any violations to the SFM immediately 29-349-112.
- Manufacturing operations must be approved by SFM.
  - Not applicable to hand loading of small arms ammunition for personal use.
  - Maximum 50 pound of smokeless powder and not more than 10,000 primers.

Storage Requirements

- All explosives shall be kept in magazines and:
  Must be located in compliance with American Table of Distances 29-349-341.
- No explosive storage in buildings used as school, theaters or place of public assembly.
- Type I magazine required for any amount over 50 pounds.
- Type II for less than 50 pounds or larger amounts on a temporary basis with approval of AHJ.

Storage Requirements continued…

- All class A (1.1, !.2), Class B (1.3) and Class C (1.4) special industrial explosive, newly developed or unclassified explosive shall be kept in magazines.

Exemptions:

1. Ammunition primer less than 750,000
2. Special industrial explosives devices less than 50 lbs.
3. Smokeless propellants less than 750 pounds
4. Explosives kept in manufacturing area for manufacturing purposes.

Magazines

Five types:

- Type I = permanent storage.
- Type II= Similar to type I except foundation.
- Type III= Also called a Day box.
  - Max. 200 pounds.
  - No overnight or unattended storage.
  - Used on vehicles for transportation and/or a storage box at job site.

Type IV magazine

- Located on floor with entrance at grade level, 50lb max storage.
- Located not more than 10 feet from said entrance.
- Separation of 10 feet between magazines.
- Provided with wheels for easy removal.
- Painted red and must bear words “explosives keep fire away”.
- Location must be approved by local fire marshal.

Type V magazines continued…

- May be used for “temporary” storage of blasting agents. 29-349-272©.
- Required to be kept in a fenced in area.
- Vehicle must be immobilized by use of steering wheel lock.
- Trailer units must have a king pin lock or other methods of being immobilized.


DYNO
Dyno Nobel

Magazine Operations

- Must be kept locked.
- Types I,II,III,IV must be lined with non-sparking materials.
- Detonators shall not be stored with other explosives.
- Running inventory must be maintained.

Magazine Operations continued…

- No smoking or open flames within 50 feet.
- No combustible storage within 50 feet.
- Ground around magazines must be kept clear of any combustibles 50 feet.

Magazine Operations continued…

- Must be inspected periodically by local or state fire marshal.
- All accidents or thefts involving explosives shall be reported verbally to the local fire marshal immediately and to the SFM in writing within 24 hours 29-349-152.


4
5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Indoor magazines

- 29-349-173 Allows for the storage of up to 50 pounds of explosives inside warehouses, wholesale and retail establishments.
- Allows for a second magazine for up to 5,000 detonators.


Censored


PREMIER

Ammunition, small arms primers, smokeless propellants

- No quantity storage limitations in warehouses, retail stores and other general occupancies.
- Residential storage smokeless propellants maximum 50 pounds wooden cabinet.

Ammunition, small arms primers, propellants

- Commercial storage 50 pounds display in 1 pound container. 20 to 100 pounds in wooden boxes (50 lbs per box)
  - Up to 750 pounds in wooden cabinets . (maximum 400 lbs per cabinet. Wall thickness of box or cabinet 1 inch nominal.
  - Above 750 lbs stored in magazine
- Small arms primers:
  - 75,000 stored in building
  - 750,000 requires magazine

Transportation

- Permits for vehicle issued by SFM.
- Local fire marshal issues permit to transport explosives into specific town or city.
- Vehicle could be pick-up truck, box truck or pump trucks.
- Amounts to be transported to the site must be determined by the blaster and must be “realistic”.
- 29-349-178 Does not place a limit on the amount a fire marshal may approve.

Transportation continued…

- Vehicles must be driven by person licensed by state fire marshal. 29-349-190.
- Vehicle must comply with state regulations including CFR-49, motor carrier safety regulations.
- Vehicle must be attended at all times. 29-349-192.

Transportation continued…

- No parking except under emergency conditions . 29-349-195.
- Shall not be taken into garage or repair shop while containing explosives. 29-349-191.
- Fire extinguishers 29-349-185:
  - *Regulations specify (2) 6 BC*
  - *New Motor Carrier Regulations require (2) 10 BC*


BRI-MAR

Issuance of Permits to Purchase, Transport and Use

- Normally issued by Local Fire Marshal of the town or city where the explosives will be used.
- On some occasions and under special circumstances the permit has been issued by the Office of State Fire Marshal.

Issuance of Permits to Purchase, Transport and Use continued…

Restrictions:

- Time duration- Maximum one year.
- Amount of explosives.
- Matting, Seismographs.
- Pre-blast surveys.

Issuance of Permits to Purchase, Transport and Use continued…

Fees:

- Set by Legislature-Statutory requirement 29-349(e)
- Presently $50.00
- Other

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC SAFETY
DIVISION OF FIRE, EMERGENCY AND BUILDING SERVICES
OFFICE OF THE STATE FIRE MARSHAL

APPLICATION TO PURCHASE, TRANSPORT, AND USE EXPLOSIVES *

MUNICIPALITY _____ DATE _____

In accordance with the applicable statutes and regulations of the State of Connecticut, I hereby make application to _____ purchase, _____ transport, and _____ use explosives.

1. (Full name and address of person actually discharging explosives.)
2. (Previous experience as a blaster including name of employer & dates.)
3. (Full name and address of employer.)
4. (Brief description of proposed blasting including location.)
5. (State license for use.)
6. (Method of transportation.) (Transport license number.)
7. (Transport vehicle number and expiration date.) * *
8. (Name and address of company supplying the explosives.)
9. (Amount and type of explosives to be purchased, transported, and used.)
10. (Call before you dig number.)
11. (Insurance information, if where applicable.))

I understand that any information given herein which I do not believe to be true, and which information is intended to mislead a public servant in the performance of his / her official duties, is a crime under C.G.S., Section 53a-157.

Signature of Applicant _____

PERMIT TO PURCHASE, TRANSPORT, AND USE EXPLOSIVES

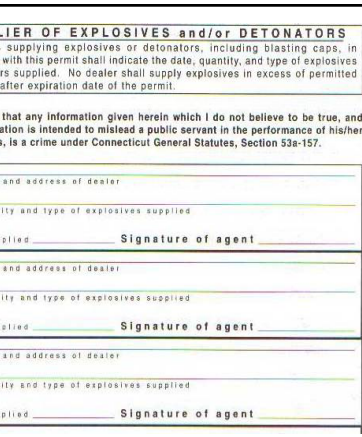
MUNICIPALITY _____ DATE _____

In accordance with the applicable statutes and regulations of the State of Connecticut, permission is herewith granted to _____ to _____ purchase, _____ transport, and _____ use explosives in accordance with the aforegoing application. This permit will expire on _____

Limited to any conditions? If so, state. _____

Signature of Fire Marshal _____

* NOTICE - Reverse side must be completed by supplier of the explosives. [White Copy: Permittee]



SUPPLIER OF EXPLOSIVES and/or DETONATORS

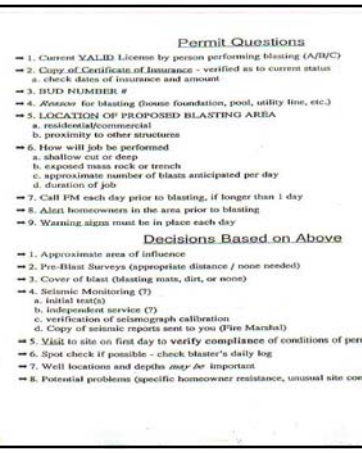
All dealers supplying explosives or detonators, including blasting caps, in accordance with this permit shall indicate the date, quantity, and type of explosives or detonators supplied. No dealer shall supply explosives in excess of permitted quantity or after expiration date of the permit.

I understand that any information given herein which I do not believe to be true, and which information is intended to mislead a public servant in the performance of his/her official duties, is a crime under Connecticut General Statutes, Section 53a-157.

1. _____
Name and address of dealer
_____
Quantity and type of explosives supplied
Date supplied _____ **Signature of agent** _____

2. _____
Name and address of dealer
_____
Quantity and type of explosives supplied
Date supplied _____ **Signature of agent** _____

3. _____
Name and address of dealer
_____
Quantity and type of explosives supplied
Date supplied _____ **Signature of agent** _____



Permit Questions

- 1. Current VALID License by person performing blasting (A/B/C)
- 2. Copy of Certificate of Insurance - verified as to current status
  - a. check dates of insurance and amount
- 3. BUD NUMBER #
- 4. *Witness* for blasting (house foundation, pool, utility line, etc.)
- 5. LOCATION OF PROPOSED BLASTING AREA
  - a. residential/commercial
  - b. proximity to other structures
- 6. How will job be performed
  - a. shallow cut or deep
  - b. exposed mass rock or trench
  - c. approximate number of blasts anticipated per day
  - d. duration of job
- 7. Call PM each day prior to blasting, if longer than 1 day
- 8. Alert homeowners in the area prior to blasting
- 9. Warning signs must be in place each day

Decisions Based on Above

- 1. Approximate area of influence
- 2. Pre-Blast Surveys (appropriate distance / none needed)
- 3. Cover of blast (blasting mats, dirt, or none)
- 4. Seismic Monitoring (?)
  - a. initial test(s)
  - b. independent service (?)
  - c. verification of seismograph calibration
  - d. Copy of seismic reports sent to you (Fire Marshal)
- 5. Visit to site on first day to verify compliance of conditions of permit
- 6. Spot check if possible - check blaster's daily log
- 7. Well locations and depths *may be* important
- 8. Potential problems (specific homeowner resistance, unusual site concern, etc.)

Blasting operations

- Use of mats
  - Fly rock
- Seismographs
- Third party monitoring
- Pre-blast surveys
- CBYD

Blasting operations continued…

- Record of shots fired 29-349-203
- User without magazine 29-349-204
- Handling of explosives 29-349-205
- Protection of persons and property 29-349-206
- On job containers 29-349-207
- Smoking, drugs, liquor prohibited 29-349-208

Blasting operations continued…

- Blasting precautions 29-349-209
  Mats, delays, initiation, confinement.
- Blasting on Sunday 29-349-210.
- Blasting areas of public utilities 29-349-212.

Blasting operations continued…

- Amount of explosives at site 29-349-215.
- Warning signs 29-349-213.
- Destruction of empty containers 29-349-216.
- Stemming 29-349-240.
- Misfire Investigation 29-349-242
  - No one at site of misfire.
  - One hour for fuse firing.
  - 30 minutes electric firing.
  - 12 hours if explosives are burning.

Blasting operations continued…

- Must notify utility companies of intended blasting not less than 24 hours prior to operations per 29-349-212.
  - *Call before you dig specifies a minimum of 2 full day or 48 hours*. 16-345-4 (a) (1)
- When blasting in congested areas additional precautions must be taken by the blaster including the use of mats, loading and initiation, delay firing, seismographs. 29-349-209

Blasting operations continued…

- Loaded holes to be guarded 29-349-245.
- Explosives must be attended at all times 29-349 (d) *Statutory requirement .*
- Warning horn 29-349-245.
- Accidents, Thefts, Fires 29-349-248.
  - Report to local Fire Marshal Immediately.
  - State Fire Marshal 24 hours written report.

Blasting operations continued…

29-349-206 (b):

- Provides for the requirement to use seismographs whenever there is a possibility of a serious complaint or damage as result of ground vibrations.
- SFM may order the monitoring to be conducted by independent third party.
- SFM may set maximum vibration limit.

Seismographs

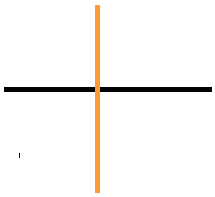
- Required by 29-349-206(b) and most insurance companies.
- Third party monitoring may be ordered.
- Normally placed between blast site and nearest structure.
- Must be checked after every blast and readings recorded.
- Must be factory calibrated once a year.

Seismograph Monitoring

- Readings are recorded in three distinct angles:
  - Horizontal

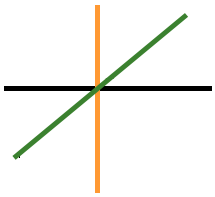
Seismograph Monitoring

- Readings are recorded in three distinct angles:
  - Horizontal
  - Vertical



Seismograph Monitoring

- Readings are recorded in three distinct angles:
  - Horizontal
  - Vertical
  - Transverse



Blasting operations

29-349-220

- Provides for blasting operations in accordance with nationally accepted practices.
- Maximum ground vibration levels set at 2.00 inches per second @ 40 Hertz.
- Air blast safe level Per USBM 129 db with a maximum at 133 db.
  - Complaints will be likely at 115 db

Investigating Complaints

- Excessive vibrations
- Excessive air blast
- Cracks
  - Plaster or sheetrock walls
  - Concrete walls
  - Asphalt
- Damaged water wells
- Flyrock

Excessive Vibrations

- Most common complaint:
  - Automatic perception of damage that results in awareness and inspection of the surroundings.
  - Exaggerated mental views based on Hollywood productions.

Excessive air blast

- Anything over 115 db will most likely result in a complaint.
- Often confused with ground vibrations.
- Rattling of windows = perception of damage.

Cracks

- Plaster
- Sheetrock
- Concrete

Damaged wells

- Most common effect from blasting is turbidity which will clear up with time.
- Fracturing around a blast hole is limited to 20-40 diameter holes.
- Blasting for an open-cut may have an adverse effect on the capacity of the well.
  - This is not a blasting effect but rather a project design effect.

Damaged wells continued…

- Contaminated wells.
- Department of Environmental Protection and Health Department issues and concerns.
- May be the result of blasting operations.
  - Perchlorate contamination
  - Manganese contamination
- Pre-blast testing

Flyrock

- One of the most dangerous conditions resulting from blasting operations.
- Obtain all records from blaster.
- Photograph/video the scene.
- Have blaster provide a written report as to the cause and precautions to be taken to prevent other incidents.
- Forward a copy of all reports to State Fire Marshal.

HAZARD ALERT

Control fly rock
Fly rock is a constant concern to blasters and the public. It can be controlled if you follow proper preparation procedures and practice safe blasting techniques. Four of the major causes of fly rock are:
Geology conditions.
Inaccurate drilling and loading.
Poor hole design.
Poor pattern timing.
Prevention alert:
Supervise all drilling and loading operations.
Use blasting mats.
Use proper blast design.
Ensure danger areas are of a suitable size and are sited properly.
Ensure danger areas are properly guarded.

Flyrock Causes

- Inadequate burden
- Improper stemming
- Hole misalignment
- Cap Scatter
- Improper matting
- Overloading
  - Design
  - Drill wander
  - Failure of blaster and driller to communicate

Flyrock prevention

- Laser profiling of wall face to insure burden.
- Use of adequate material and amount of stemming.
- Use of electronic equipment to determine borehole alignment.
- Mandatory use of matting, specify on permit including type to be used.
- Have blaster provide a written blast plan including drilling operations which can be used in the event of an accident to determine possible overloading conditions.

Summary

- Check the site.
- Check all required documentation.
- Stay within the statutory and regulatory guidelines.
- If in doubt call for assistance.
- QUESTIONS ????