



SAFETY REGULATION

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STATE OF NEW JERSEY
N.J. DEPARTMENT OF LABOR & INDUSTRY
BUREAU OF ENGINEERING & SAFETY
Trenton, N.J.

Division of
Labor

REGULATION SHELF

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FOREWORD

This Regulation is promulgated to establish reasonable minimum requirements for the storage of explosives in the interest of the life, health and safety of employees and the public, as well as protection of property.

In the writing of this Regulation, the Department was guided by the recommendations of the Institute of Makers of Explosives, the United States Bureau of Mines, the National Fire Protection Association and the Ordnance Corps Safety Manual, Department of the Army.

This Regulation is promulgated by the Commissioner of Labor and Industry of the State of New Jersey, under authority vested in him by law:

N.J.S.A. 21:1A-131. The Commissioner may make and promulgate rules and regulations necessary to further the purpose of this act. The rules and regulations may include requirements that are not mentioned specifically in this act but which are reasonably necessary for the safety of the workers and the public and the protection of property.

Prior to promulgation this Regulation was reviewed by the New Jersey State Industrial Safety Committee and written notice of the proposed promulgation was given all holders of explosives permits in accordance with the Explosives Act. A public hearing was held on this Regulation on June 25, 1965.

SECTION 1 – PURPOSE AND SCOPE

- 1.1 **Purpose** — This Regulation is promulgated to establish reasonable minimum requirements and standards for the storage of explosives in the interest of the life, health and safety of the employees and the public, as well as the protection of property.
- 1.2 **Scope** — This Regulation is applicable wherever explosives are stored.
- 1.3 **Exceptions** — In cases of practical difficulty or unnecessary hardship the Commissioner may grant exceptions from this Regulation provided that a request for such exemption has been made in writing. Exceptions can only be granted when it is clearly evident that a satisfactory and safe condition is attained, but cannot be granted in any case where conflict would be created with mandatory requirements of the law.

SECTION 2 – DEFINITIONS

2.1 General Definitions

- 2.1.1 **Approved** — approved by the Commissioner
- 2.1.2 **Commissioner** — The Commissioner of Labor and Industry or his authorized representative.
- 2.1.3 **Department** — Department of Labor and Industry

2.2 Special Definitions

- 2.2.1 **Artificial Barricade** — an artificial mound or properly revetted wall of earth of a minimum thickness of 3 feet at the top.
- 2.2.2 **Barricaded** — that a building containing explosives is effectively screened from a magazine, inhabited building, railway or highway, either by a natural barricade or by an artificial barricade of such height that a straight line from the top of any sidewall of a building containing explosives to the eave line of any magazine or inhabited building, or to a point 12 feet above the center of a railway or highway, will pass through such intervening natural or artificial barricade.
- 2.2.3 **Blasting Cap** — a shell closed at one end and containing a detonating charge which is ignited by flame or spark from safety fuse.
- 2.2.4 **Delay electric blasting cap** — an electric blasting cap with a delay timing element interposed between the igni-

tion element and the detonating charge.

- 2.2.5 Detonating Fuse — a fuse containing a core of high explosives of sufficient strength to detonate other high explosives lying alongside and to explode the entire charge.
- 2.2.6 Detonator — any device used for the purpose of initiating an explosives charge and shall include, but is not limited to, blasting caps, electric blasting caps or delay-electric blasting caps.
- 2.2.7 Electric blasting cap — a shell containing a charge of detonating compound designed to be ignited by an electric current passed through the two insulated leg wires that project through the seal of the shell.
- 2.2.8 Explosives — any chemical compound or mixture that is commonly used or intended for the purpose of producing an explosion, that contains any oxidizing and combustible materials or other ingredients, in such proportions, quantities or packing that an ignition by fire, by friction, by concussion or by detonation of any part of the compound or mixture may cause such a sudden generation of highly heated gases that the resultant gaseous pressures are capable of producing destructive effects on contiguous objects. The term "explosives" shall include, but is not limited to commercial explosives, propellants and nitro-carbo-nitrates. The term "explosives" except as specifically stated in this act, shall not include small arms ammunition, explosives in the form prescribed by the official United States Pharmacopoeia, or fireworks regulated under Revised Statutes sections 21:2-1 through 21:2-7.
- 2.2.9 Explosives manufacturing building — any building or other structure, except magazines, in which the manufacture of explosives is carried on.
- 2.2.10 Explosives manufacturing establishment — all lands, and buildings situated thereon, used in connection with the manufacture of explosives.
- 2.2.11 Fuse lighters and fuse igniters — special devices designed for the purpose of igniting safety fuse.
- 2.2.12 Highway — any public street, road, highway, alley or those parts of navigable streams which are used as highways of commerce.
- 2.2.13 Igniter Cord — an external burning medium by which fire is conveyed at a continuous and uniform rate for the purpose of igniting safety fuse.

- 2.2.14 Inhabited building — a building regularly occupied in whole or in part as a habitation for human beings, or any church, schoolhouse, railroad station, store or other structure where people are accustomed to assemble, except any building or structure occupied in connection with the manufacture, transportation, storage or use of explosives.
- 2.2.15 Magazine — any building or structure used for the storage of explosives, but shall not mean an explosives manufacturing building.
- 2.2.16 Natural barricade — natural features of the ground including, but not limited to, hills, or timber of sufficient density so that the surrounding exposures which may require protection cannot be seen from the magazine containing explosives when the trees are bare of leaves.
- 2.2.17 Nitro-carbo-nitrate — a mixture intended for blasting, consisting substantially of inorganic nitrates and carbonaceous combustibles in which none of the ingredients is a commercial explosive.
- 2.2.18 Propellants — solid chemicals or solid chemical mixtures, which function by rapid combustion of successive layers, and include, but are not limited to, smokeless powder for small arms, smokeless powder for cannon, smokeless powder or solid propellants for rockets, jet thrust units, or other devices.
- 2.2.19 Public conveyance — any transportation facility which is carrying passengers for hire.
- 2.2.20 Railway — includes any steam, electric or other railroad or railway which carries passengers for hire on the particular line or branch in the vicinity where explosives storage magazines or explosives manufacturing buildings are situated, but shall not include auxiliary tracks, spurs, sidings installed and primarily used for transporting freight.
- 2.2.21 Safety fuse — an internal burning medium through which fire is conveyed at a continuous and uniform rate for the purpose of firing explosives.
- 2.2.22 Squibs - electric — similar in appearance to a blasting cap which upon firing by an electric current provides an intense heat instead of a detonation.
- 2.2.23 Small arms ammunition — any cartridge or shell for use in a pistol, rifle or shotgun, and including ball, shot or blank cartridges or shells.

SECTION 3 — GENERAL REQUIREMENTS

- 3.1 Compliance — All storage of explosives shall comply with the requirements of this Regulation.
- 3.2 Excluded Explosives — Excluded explosives, as listed in Section 8.1 of Safety Regulation No. 20 shall not be stored except at an explosives manufacturing plant.
- 3.3 Exemptions — This Regulation shall not be construed as applying to the following when used for the purpose for which they are intended:
 - a. Small arms ammunition
 - b. Explosive power-packs in the form of explosive cartridges
 - c. Explosive — charged construction devices such as
 - (1) explosive rivets
 - (2) explosive bolts
 - (3) explosive charges for driving pins or studs
 - (4) cartridges for explosive — actuated power tools
 - d. Lighting devices which do not function by explosion
 - (1) fuse lighters and fuse igniters
 - (2) safety fuse
 - (3) igniter cord
 - (4) instantaneous fuse
 - e. Model rocket engines will not be subject to this Regulation but the requirements for these are expressed in Safety Regulation No. 24.
- 3.4 Restrictions
 - 3.4.1 No person unless authorized by the owner of the explosives shall have access to or enter magazines.
 - 3.4.2 Every person storing or in possession of explosives shall be required to have a permit for each magazine used for the storage of explosives.
 - 3.4.3 All explosives except those in the process of manufacture, or being transported, or used, shall be stored in a magazine complying with the requirements of this Regulation.
 - 3.4.4 Any magazine in which explosives are stored, shall not be used for the storage of other material, except that Ammonium Nitrate may be stored with explosives. When so stored, the combined quantity of all materials shall be classified as explosives.

- 3.4.5 All magazines shall be kept locked except during the time of placement and removal of stocks of explosives.
- 3.5 **Fires, Explosions, Theft or Property Damage** — Any accidental fire, explosion, property damage, or theft occurring in connection with the storage of explosives shall be reported at once to the Bureau of Engineering and Safety by telephone, and be supplemented by a detailed report.
- 3.6 **Quantity Stored in Magazine** — No quantity of explosives in excess of the limitations expressed on the permit to store shall be stored in any magazine.
- 3.7 **Overnight Storage** — No explosives shall be stored overnight in a Class 3 magazine.
- 3.8 **Permits**
- 3.8.1 Requirements concerning permits are set forth in Safety Regulation No. 20 Explosives Permits and Fees.
- 3.8.2 The original copy of the permit to store explosives shall be posted in the storage magazine at all times, and the duplicate kept on file at the place of business.
- 3.9 **Notification to Municipalities**
- 3.9.1 Upon receipt of a permit to store explosives in a Class 1, 2 or 4 magazine, the permittee shall notify the Chief of the Fire Department.
- 3.9.2 The notification shall include:
- a. the location of the magazines
 - b. the maximum quantity of explosives authorized to be stored in the magazines
 - c. the type of explosives stored
- 3.9.3 The permittee shall notify the Chief or Fire Department upon removal of the magazines or upon any change in the original permit.
- 3.10 **Smoking and Open Flames** — Smoking, matches, open flames and spark producing devices, except as provided in Section 3.18, shall not be permitted in, or within 100 feet of any magazine containing explosives.
- 3.11 **Magazine Repairs**
- 3.11.1 When magazines require inside repairs, all explosives shall be removed therefrom and the floors cleaned.
- 3.11.2 In making outside repairs if there is a possibility of causing sparks or fire, the explosives shall be removed.

- 3.11.3 When explosives are removed from the magazine while repairs are being accomplished, the explosives shall
- a. be placed in another magazine, or
 - b. be placed a safe distance from the magazine, and be properly guarded and protected until the repairs have been completed.
- 3.12 Destroying Explosives — Explosives which have deteriorated, or have been damaged so that they are unfit for use, shall be destroyed by burning in a safe place, by a qualified person, in accordance with safety provisions set forth by the United States Bureau of Mines and the Institute of Makers of Explosives. EXPLOSIVES SHALL NEVER BE BURIED OR COVERED OVER BY ANY MATERIALS AS A MEANS OF DISPOSAL.
- 3.13 Opening Containers of Explosives
- 3.13.1 No person shall open containers of explosives in or within 50 feet of any magazine.
 - 3.13.2 No tools, except wooden wedges, and non-metallic mallets, shall be used for opening containers of explosives, except that metallic slitters may be used for opening fibre board containers, provided such slitters cannot come in contact with metallic case fasteners, or the explosives.
- 3.14 Housekeeping
- 3.14.1 All magazines shall be kept free from grit, paper, rubbish and empty containers.
 - 3.14.2 All premises surrounding magazines must be kept free from rubbish, brush, dry grass, trees or other extraneous combustible material for at least 25 feet in all directions. Combustible materials shall not be stored within 50 feet of magazines.
 - 3.14.3 No material or tools except material-handling devices necessary to the handling of explosives in storage shall be kept or stored in any magazine containing explosives.
- 3.15 Existing Magazines — Magazines erected prior to the promulgation of this Regulation, which comply with the intent and purpose of this Regulation but are not in accordance with all detailed specifications, may continue in use, at the discretion of the Commissioner. The Commissioner shall have the authority to compel changes necessary to comply with this Regulation, or to reduce the capacity, in accordance with requirements governing construction or quantity — distance tables.

3.16 Plans of Site Locations and Magazines

- 3.16.1 No magazine shall be used for the storage of explosives before a permit is secured from the Commissioner in accordance with the provisions of Safety Regulation No. 20.
- 3.16.2 The Commissioner may require a map of the site location showing the nearest buildings, nearest railways, nearest highways, and also showing existing barricades, if any, and barricades that are intended to be used. Plans and specifications of the proposed magazines may also be required.

3.17 Signs

- 3.17.1 The premises on which a permanent magazine is located shall be conspicuously marked by signs containing the words "EXPLOSIVES — KEEP OFF" unless such signs tend to attract general public attention to said storage. In such cases, the signs may, upon approval of the Commissioner, be eliminated.
- 3.17.2 No signs shall be placed on surface magazines or barricades, or be so located that a bullet passing directly through the face of the sign will strike the magazine.
- 3.17.3 All Class 3 and Class 4 magazines shall be painted red and marked "EXPLOSIVES" with white paint in letters not less than 3 inches high.
- 3.17.4 "EXPLOSIVES" signs at the site of a permanent magazine shall have the printing in a color contrasting with the background, and in letters not less than 3 inches high.

3.18 Lighting of Magazines — No lights shall be permitted in a magazine except

- a. battery activated lights or battery activated lanterns or
- b. electric fixtures with the bulbs adequately guarded against mechanical damage and falling, with all wiring in grounded conduits and with the control switch on the outside of the magazine.

3.19 Discharge of Firearms — No person shall discharge firearms of any kind within 500 feet of a magazine or explosives manufacturing plant, or at or against any such building or magazine, or at or against any sign placard located in such area.

3.20 Storage Within Magazines

- 3.20.1 Detonators shall be stored in a separate magazine and

no other explosives except safety fuse may be stored in such a magazine.

3.20.2 Detonating fuse shall be stored in the same magazine with dynamite.

3.21 Records — The records to be kept by a person having a permit to store explosives shall comply with Section 7.4.4 of Safety Regulation No. 20.

SECTION 4 — QUANTITY AND DISTANCE REQUIREMENTS FOR STORAGE MAGAZINES

4.1 Quantity and Distance

4.1.1 Except as otherwise provided magazines in which any explosives are kept or stored shall be located at distances from buildings, railroads and highways in conformity with the following quantity and distance table, unless otherwise authorized by the Commissioner.

4.1.2 Quantity Distance Table — next page

4.1.3 When a magazine is not barricaded the distances shown in the table in Section 4.1.2 shall be doubled.

4.2 Maximum Quantity — No quantity in excess of 300,000 pounds of explosives, or in the case of blasting caps, no number in excess of 20,000,000 caps shall be stored in any magazine.

4.3 Separation of Magazines

4.3.1 When two or more magazines are located on the same property, each magazine must comply with the minimum distances specified from inhabited buildings, railways and highways, and in addition they shall be separated from each other by not less than the distances shown for "Separation of Magazines".

4.3.2 If any two or more magazines are separated from each other by less than specified "Separation of Magazines" distance, then such two or more magazines, as a group, must be considered as one magazine and the total quantity stored in such group must be treated as if stored in a single magazine, and must comply with the minimum distance specified from other magazines, inhabited buildings, railways and highways.

4.3.3 The quantity of explosives contained in cap magazines shall govern in regard to the spacing of said cap magazines from magazines containing other explosives, but

under no circumstances shall a magazine containing blasting caps be within a less distance than 100 feet unbaricaded or 50 feet barricaded, from any magazine other than magazines containing blasting caps.

4.1.2

AMERICAN TABLE OF DISTANCES

FOR STORAGE OF EXPLOSIVES

EXPLOSIVES DISTANCES IN FEET WHEN STORAGE IS BARRICADED

Pounds Over	Pounds Not Over	Inhabited Buildings	Passenger Railways	Public Highways	Separation of Magazines
2	5	70	30	30	6
5	10	90	35	35	8
10	20	110	45	45	10
20	30	125	50	50	11
30	40	140	55	55	12
40	50	150	60	60	14
50	75	170	70	70	15
75	100	190	75	75	16
100	125	200	80	80	18
125	150	215	85	85	19
150	200	235	95	95	21
200	250	255	105	105	23
250	300	270	110	110	24
300	400	295	120	120	27
400	500	320	130	130	29
500	600	340	135	135	31
600	700	355	145	145	32
700	800	375	150	150	33
800	900	390	155	155	35
900	1,000	400	160	160	36
1,000	1,200	425	170	165	39
1,200	1,400	450	180	170	41
1,400	1,600	470	190	175	43
1,600	1,800	490	195	180	44
1,800	2,000	505	205	185	45
2,000	2,500	545	220	190	49
2,500	3,000	580	235	195	52
3,000	4,000	635	255	210	58
4,000	5,000	685	275	225	61
5,000	6,000	730	295	235	65
6,000	7,000	770	310	245	68

EXPLOSIVES DISTANCES IN FEET WHEN STORAGE IS BARRICADED

Pounds Over	Pounds Not Over	Inhabited Buildings	Passenger Railways	Public Highways	Separation of Magazines
7,000	8,000	800	320	250	72
8,000	9,000	835	335	255	75
9,000	10,000	865	345	260	78
10,000	12,000	875	370	270	82
12,000	14,000	885	390	275	87
14,000	16,000	900	405	280	90
16,000	18,000	940	420	285	94
18,000	20,000	975	435	290	98
20,000	25,000	1,055	470	315	105
25,000	30,000	1,130	500	340	112
30,000	35,000	1,205	525	360	119
35,000	40,000	1,275	550	380	124
40,000	45,000	1,340	570	400	129
45,000	50,000	1,400	590	420	135
50,000	55,000	1,460	610	440	140
55,000	60,000	1,515	630	455	145
60,000	65,000	1,565	645	470	150
65,000	70,000	1,610	660	485	155
70,000	75,000	1,655	675	500	160
75,000	80,000	1,695	690	510	165
80,000	85,000	1,730	705	520	170
85,000	90,000	1,760	720	530	175
90,000	95,000	1,790	730	540	180
95,000	100,000	1,815	745	545	185
100,000	110,000	1,835	770	550	195
110,000	120,000	1,855	790	555	205
120,000	130,000	1,875	810	560	215
130,000	140,000	1,890	835	565	225
140,000	150,000	1,900	850	570	235
150,000	160,000	1,935	870	580	245
160,000	170,000	1,965	890	590	255
170,000	180,000	1,990	905	600	265
180,000	190,000	2,010	920	605	275
190,000	200,000	2,030	935	610	285
200,000	210,000	2,055	955	620	295
210,000	230,000	2,100	980	635	315
230,000	250,000	2,155	1,010	650	335
250,000	275,000	2,215	1,040	670	360
275,000	300,000	2,275	1,175	690	385

4.4 Blasting Caps — Quantity Equivalent to Weight

- 4.4.1 All blasting caps in strengths through No. 8 caps should be rated as one and one-half pounds of explosives per 1,000 caps.

4.5 Class 3 Magazines — Quantity

- 4.5.1 Explosives — no Class 3 magazine shall contain a quantity in excess of 200 pounds.
- 4.5.2 Blasting Caps — no Class 3 magazine shall contain a quantity in excess of 1,000 in number.

4.6 Class 4 Magazines — Location and Quantity of Explosives

4.6.1 Location

- a. Not more than two Class 4 magazines shall be kept in any one building. One magazine shall be used for the storage of explosives and the other for the storage of blasting caps, squibs or similar items.
- b. Each magazine shall be located on the floor nearest the ground level and within 10 feet from an outside entrance, and separated by a distance of not less than 10 feet.
- c. The location of a Class 4 magazine within a building shall not be changed without approval by the Commissioner.

4.6.2 Quantity

- a. Explosives — no Class 4 magazine shall contain a quantity in excess of 50 pounds, except, however, that 100 lbs. of smokeless powder may be stored when packed in the original containers.
- b. Blasting caps, Squibs, and Similar Items — no Class 4 magazine shall contain a quantity in excess of 500 in number.

SECTION 5 — CLASSIFICATION OF MAGAZINES — SURFACE

5.1 Classification of Magazines — Magazines in which explosives shall be kept or stored shall be one of the following classes:

- a. Class 1 — Permanent Storage — intended to apply to dealers and others who store explosives permanently.

- b. Class 2 — Temporary Storage — intended to apply to temporary construction work.
- c. Class 3 — Daily Supply Storage — for the purpose of this regulation to be known as portable daily supply magazines.
- d. Class 4 — Storage Within A Building — intended for storage of explosives within a building, other than an inhabited building.

SECTION 6 — CONSTRUCTION OF MAGAZINES — GENERAL

- 6.1 Construction — Magazines shall be constructed in conformity with the provisions of this Regulation, or may be of substantially equivalent construction satisfactory to the Commissioner.
- 6.2 Openings — Magazines shall have no openings except for entrances and ventilation.

SECTION 7 — CONSTRUCTION OF MAGAZINES — CLASS 1

- 7.1 Class 1 Magazines — Class 1 magazines except for underground storage may be a building, earthen dugout, tunnel, igloo or army type magazine and shall be bullet-resistant, fire-resistant, weather-proof, theft-resistant and well ventilated.
- 7.2 Building type Magazines
 - 7.2.1 Construction — all building type magazines shall be constructed of masonry, wood, metal or a combination of these materials.
 - 7.2.2 Walls — Masonry Construction. Brick, concrete, tile, cement block and cinder block walls shall be at least 8 inches thick. Hollow masonry units used in construction shall have all hollow spaces filled with well tamped coarse dry sand or weak concrete (a mixture of one part cement and eight parts of sand with enough water to dampen the mixture while tamping in place.)
 - 7.2.3 Walls — Fabricated Metal Construction — Metal wall construction shall consist of sectional sheets of steel or aluminum not less than 14 guage, securely fastened to a metal framework lined inside with brick, solid cement blocks, or hard wood not less than 4 inches in thickness, or shall have at least a six inch sand fill between interior and exterior walls.

- 7.2.4 Walls — Wood Frame Construction — The exterior of the outer wood walls shall be covered with iron or aluminum not less than No. 26 gauge in thickness. An inner wall of non-sparking material shall be constructed so as to provide a space at least 6 inches between the outer and inner walls, which space shall be filled with coarse dry sand, or a weak mixture of cement mortar.
- 7.2.5 Floors — Floors shall be made of wood and must be strong enough to bear the weight of the maximum quantity to be stored.
- 7.2.6 Foundations — Foundations may be constructed of brick, concrete, cement blocks, stone or wood posts, or a solid foundation. If piers or posts are used, the space under the building shall be enclosed with metal to prevent fire from getting under the magazine.
- 7.2.7 Roof — Except for fabricated metal magazines the outer roof shall be covered with not less than No. 26 gauge iron or aluminum fastened to 7/8 inch sheathing.
- 7.2.8 Bullet Resistant Ceilings — Roofs of magazines located where it is possible to fire a bullet directly through the roof into the magazine at such an angle that the bullet would strike the explosives therein, shall be constructed by one the following methods:
- A. A sand tray located at the line of eaves and covering the entire magazine ceiling area except that necessary for ventilation; line with a layer of building paper and fill with 4 inches of coarse dry sand.
 - B. A fabricated metal roof with steel plate constructed of 3/16 inch plate steel lined with 4 inches of hard wood; for each additional 1/16 inch of plate steel, the hardwood lining may be decreased 1 inch.
 - C. Other structural means of bullet resistance approved by the Commissioner.
- 7.2.9 Doors — all Class 1 magazines shall be equipped with a door constructed in the following manner:
- A. The door shall be constructed of 3/8 inch plate steel and lined with 2-5/8 inches hardwood applied in 3/8 inch layers. If the thickness of steel is less than 3/8 inch than the door shall be lined with 4 inches of hardwood.
 - B. Hinges and hasps are to be attached to the doors by welding, or rivets or bolts with nuts on inside of

door, and installed in such a manner that the fastening cannot be removed when the magazine door is closed and locked.

- 7.2.10 Locks — The door shall be equipped with two mortise locks; or with two padlocks fastened in separate hasps and staples; or with a combination of mortise lock and a padlock; or with a mortise lock that requires two keys to open; or a 3 point lock. Locks shall be five tumbler proof.
- 7.2.11 Lock Protection — All padlocks on the door shall be protected with 1/4 inch steel cups so constructed as to positively prevent lever action on the lock or hasp.
- 7.2.12 Ventilation —
 - a. A 2-inch air space shall be left around the ceiling and around the perimeter of the floor, except at the doorway.
 - b. Foundation ventilators shall not exceed 6 feet center to center and the openings shall not be less than 4" x 6".
 - c. Vents in the foundation, roof or gables, shall be screened, and where necessary offset, to prevent the entrance of sparks through foundation vents.
- 7.2.13 Exposed Metal —
 - a. All nails in the interior of magazines shall be blind nailed or countersunk.
 - b. No sparking metal construction shall be exposed below the top of walls inside the magazine.
- 7.3 Igloo or Army Type Magazines
 - 7.3.1 Construction — All igloo or Army type magazines shall be constructed of reinforced concrete, masonry, metal or a combination of these materials.
 - 7.3.2 Earth Mound Covering — All igloo or Army type magazines shall have an earth mound covering of not less than 24 inches on the top, sides and rear.

SECTION 8 — CONSTRUCTION OF MAGAZINES — CLASS 2

- 8.1 Class 2 magazines — Class 2 magazines may be the equivalent of the construction for Class 1 magazines or conform to the requirements of this Section.

8.2 Building and Box Type Magazines

- 8.2.1 Walls — Fabricated Metal Construction. Metal wall construction shall consist of sectional sheets of steel or aluminum not less than 14 guage securely welded or fastened to a metal framework lined with 3 inches of soft wood or 2 inches of hard wood.
- 8.2.2 Floors shall conform to Section 7.2.5 of this Regulation.
- 8.2.3 Roof shall conform to Section 7.2.7 of this Regulation.
- 8.2.4 Bullet Resistant Ceiling shall conform to Section 7.2.7 of this Regulation.
- 8.2.5 Doors shall conform to Section 7.2.9 of this Regulation.
- 8.2.6 Locks and Lock Protection shall conform to Sections 7.2.10 and 7.2.11 of this Regulation.
- 8.2.7 Ventilation — vents shall be provided in the sides or roof and be adequately screened, and where necessary offset, to prevent the entrance of sparks through the vents.
- 8.2.8 Exposed Metal — Covering of exposed metal shall comply with the provisions of Section 7.2.13 of this Regulation.

SECTION 9 — CONSTRUCTION OF MAGAZINES — CLASSES 3 and 4

- 9.1 Material — Class 3 and 4 magazines shall be of wood or metal, or a combination thereof.
- 9.2 Wood Magazines — Wood magazines of this class shall have sides, bottom and cover constructed of 2 inch hardwood or 3 inch softwood braced at the corners and covered on the outside with not less than No. 26 guage sheet metal.
- 9.3 Metal Magazines — Metal magazines of this class shall have the sides, bottom and cover constructed of steel plate not less than 16 guage and shall be lined with 7/8 inch plywood or the equivalent.
- 9.4 Exposed Metal — All nails and other sparking material exposed to interior of the magazine shall be well countersunk.
- 9.5 Covers — Covers for both wood and metal magazines shall be provided with substantial strap hinges.
- 9.6 Locks — Covers shall be equipped with a 5 tumbler jarproof lock or the equivalent.
- 9.7 Casters or Wheels — All Class 4 magazines shall be mounted on casters or wheels.
- 9.8 Signs — The word "EXPLOSIVES" in letters at least 3 inches in

height shall be painted on the magazine. The magazine shall be painted red and the lettering shall be white.

- 9.9 Ventilation — All magazines shall be provided with adequate ventilation.

SECTION 10 — MINES AND TUNNELS

10.1 Underground Storage — General

10.1.1 Tunnels

- a. No explosives shall be stored in any tunnel where persons are employed.
- b. All unused explosives shall be returned to the primary storage magazine immediately after the completion of loading operations.

10.1.2 Mines

- a. No explosives shall be stored underground until the mine has been developed to the point where at least two modes of egress have been provided.
- b. All daily supplies of explosives within the mine at any working place shall be kept in boxes with hinged lids.
- c. It is strictly forbidden to leave any explosives in or near any working place; if required for the following shift, the storage shall comply with 10.1.2b.
- d. In the event of the closing of any mine or a part thereof, the explosives stored in that particular area shall immediately be removed.

10.2 Underground Storage — Magazine Locations

- 10.2.1 Primary storage auxiliary or secondary and daily supply magazines shall be so located that the accidental detonation of their contents will not cut off the escape of the employees.
- 10.2.2 Primary storage magazines shall be at least 300 feet from any shaft, slope or active mine working and at least 25 feet from haulage ways or travelways, and trolley wires.
- 10.2.3 Magazines containing blasting caps shall not be located closer than 50 feet from any magazine containing other explosives.

- 10.2.4 There shall be two or more right angle turns between the primary or auxiliary storage magazines and the nearest escapeway or travelway.
- 10.3 Underground Storage — Quantity
- 10.3.1 Auxiliary or Secondary Magazines
- a. Not more than 5,000 pounds of explosives or more than 10,000 detonators shall be stored in auxiliary or secondary magazines.
- 10.3.2 Daily Supply Magazines
- a. Not more than a one day's supply of explosives or detonators shall be stored in daily supply magazines.
- 10.4 Underground Storage — Class 1 Magazine Construction
- 10.4.1 All primary and auxiliary or secondary magazines shall be constructed in solid rock.
- 10.4.2 The floors of all magazines shall be so constructed that water will drain away from the magazines.
- 10.4.3 All floors shall be wood lined or covered with wooden slats.
- 10.4.4 All primary and auxiliary or secondary magazines shall be conspicuously marked with the words MAGAZINE — EXPLOSIVES — DANGEROUS.
- 10.4.5 All primary and secondary magazines shall be equipped with a door and at least one lock.
- 10.4.6 Doors for primary and secondary magazines shall be a minimum of 26 gauge sheet metal or other material of equivalent fire resistive protection and lined with 2 inches of hardwood.
- 10.4.7 No lights shall be permitted in a primary or secondary magazine except
- a. battery activated lights or battery activated lanterns or
 - b. electric fixtures with the bulbs adequately guarded against mechanical damage and falling, with all wiring in grounded conduits and with the control switch on the outside of the magazine.
- 10.4.8 Where added ventilation is required, it is to be provided by a tube blower fan located in the ventilating current with the tube extended into the magazine.

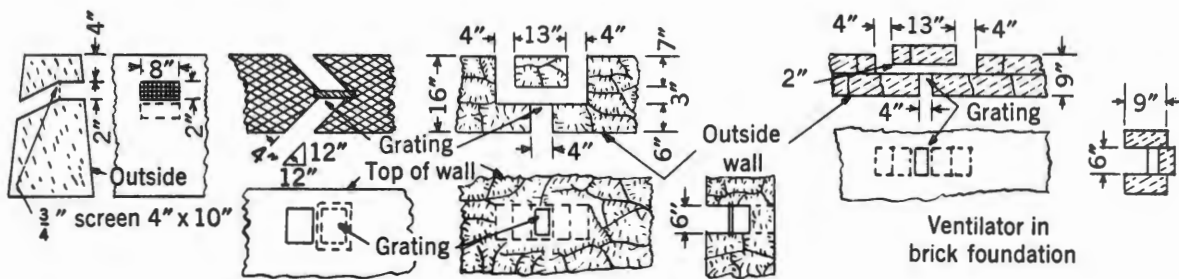
10.5 Underground Storage — Class 3 Magazine Construction

- 10.5.1 Daily supply magazines shall be constructed of hardwood having a thickness of 2 inches, be painted red, and the word "EXPLOSIVES" painted in white letters 3 inches in height.

APPENDIX

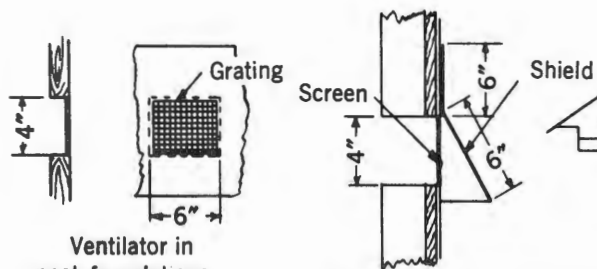
Drawings of explosives storage magazines have been reproduced from the Bureau of Mines Information Circular No. 7674, Bureau of Mines Miners Circular No. 54 and Pamphlet No. 1 "Standard Storage Magazines" published by the Institute of Makers of Explosives.

Details of construction of the magazines shown are general, and may be altered to suit the individual according to his needs, provided that the minimum requirements of this Regulation are met.

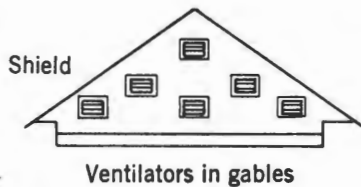


Ventilators in concrete foundations

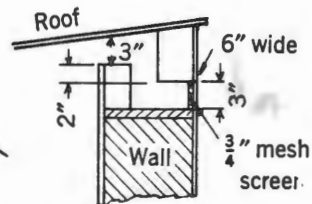
Ventilator in stone foundation



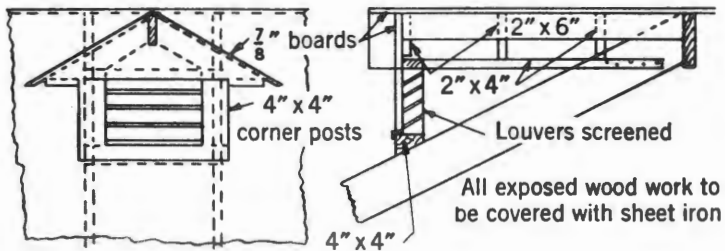
Ventilator in post foundations



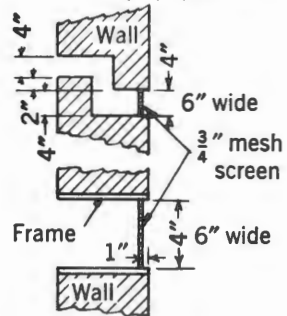
Ventilators in gables



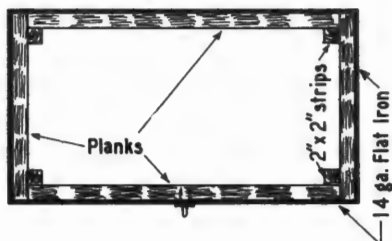
Vent near roof
(any type wall)



Dormer ventilator

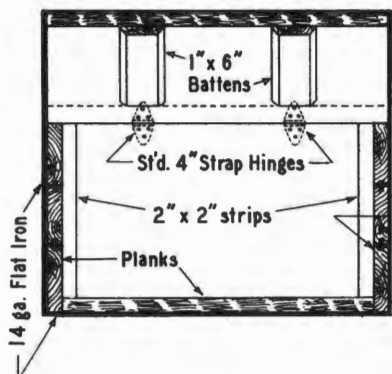


Wall vents
(any type wall)

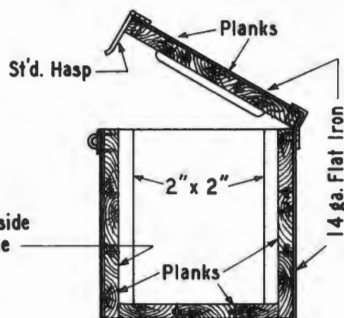


PLAN

All Planks to be 2" hardwood or 3" softwood.



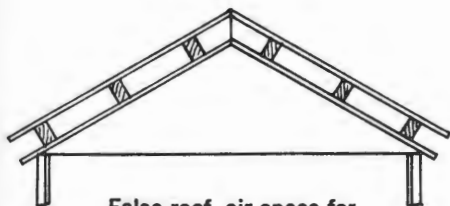
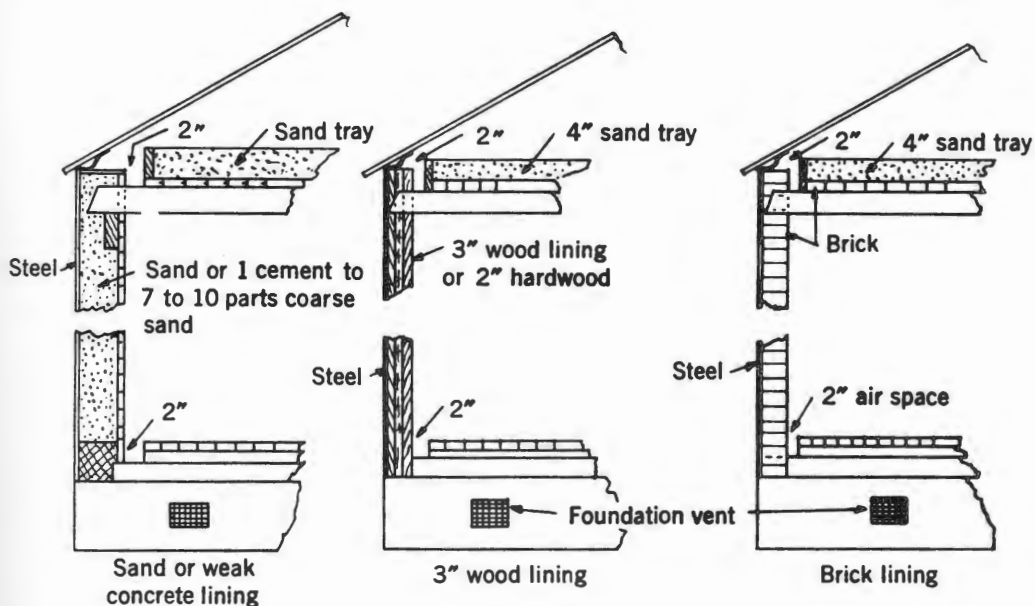
SECTIONAL FRONT ELEVATION



SECTIONAL SIDE ELEVATION

CLASS 3 PORTABLE (DAILY SUPPLY) MAGAZINE.

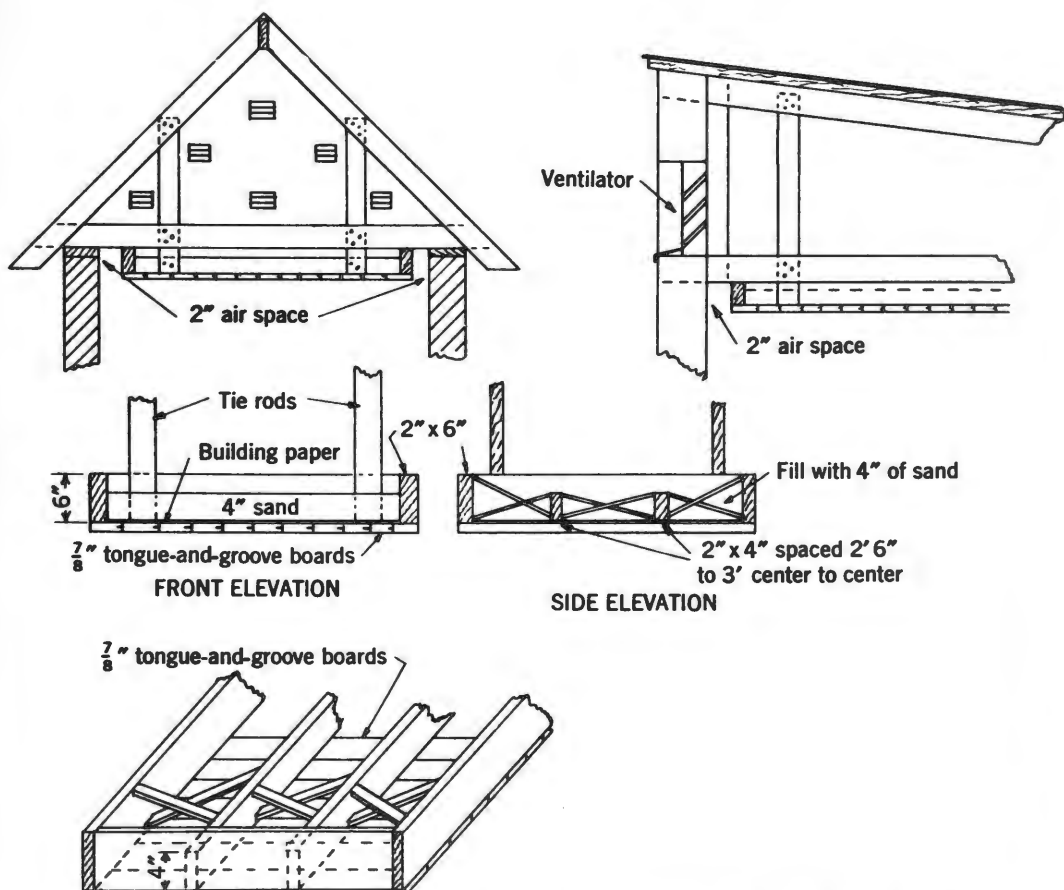
Construction: Box to be built of 2 inch hardwood or 3 inch softwood well braced at the corners; lumber to be smooth on the inside of the box; no metal to be exposed on inside; lid or door to be securely locked with at least one lock equivalent to a 5 - tumbler jar proof lock; box to be metal covered as indicated in drawing above; size of magazine to suit number and shape of packages to be stored; magazine to be painted red with word "EXPLOSIVES" in white letters not less than 3 inches high on top, sides, and ends of magazine.



False roof, air space for maintaining lower temperature

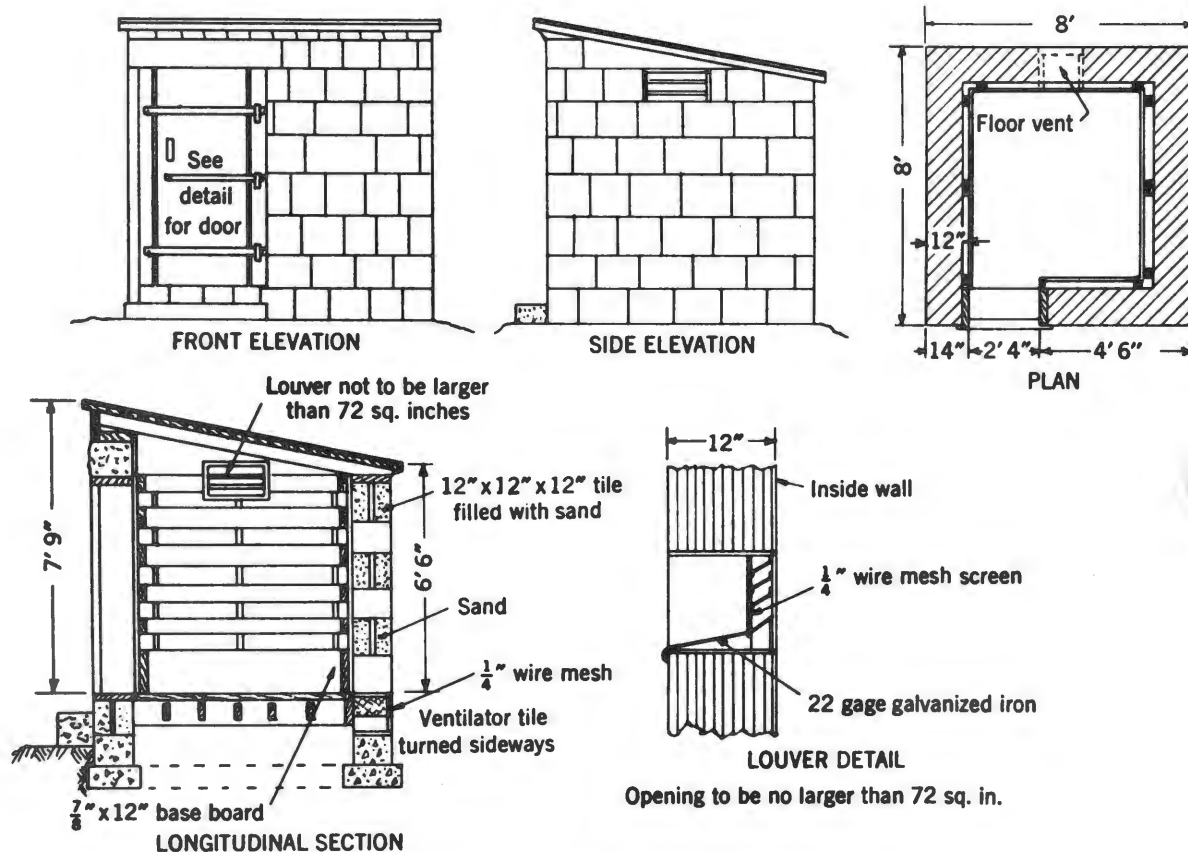
LININGS FOR CLASS 1 OR 2 STEEL MAGAZINES.

Specifications: Metal should not come in contact with stored explosives; floors to be blind-nailed and lining nails to be countersunk; and false roof or 7/8-inch ceiling to be used when necessary to maintain temperature in magazine.



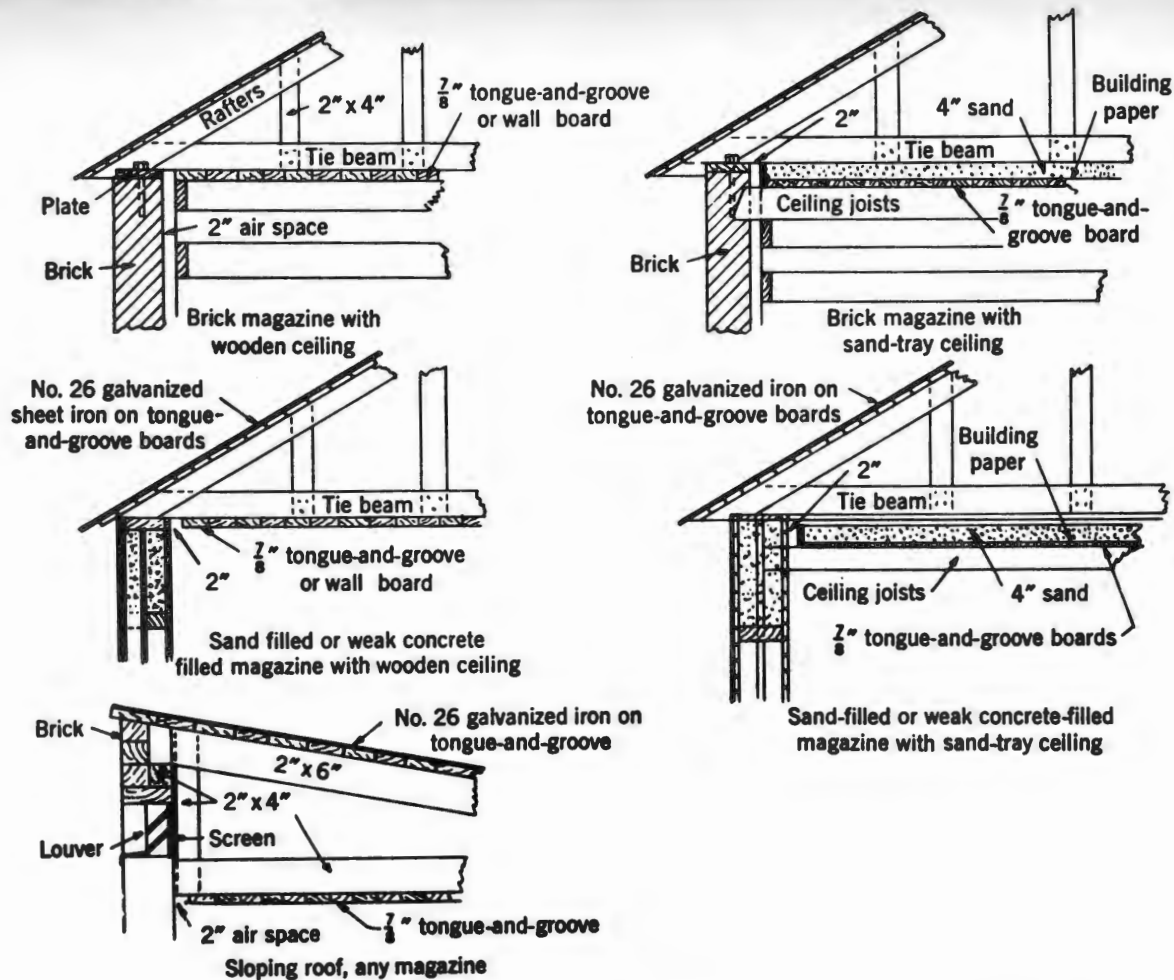
METHOD OF CONSTRUCTING A CLASS 1 OR 2 MAGAZINE SAND-TRAY CEILING.

Construction: Side and end of box to be built of 2- by 4-inch boards and installed as needed, depending on size of box; bottom of box to be $\frac{7}{8}$ -inch tongue-and-groove boards covered with building paper; box to be filled to the top of the 2 by 4's with dry, coarse sand; brace roof as needed to carry weight of sand tray; and tie rods may be of steel or wood, the number used depending on size of box.

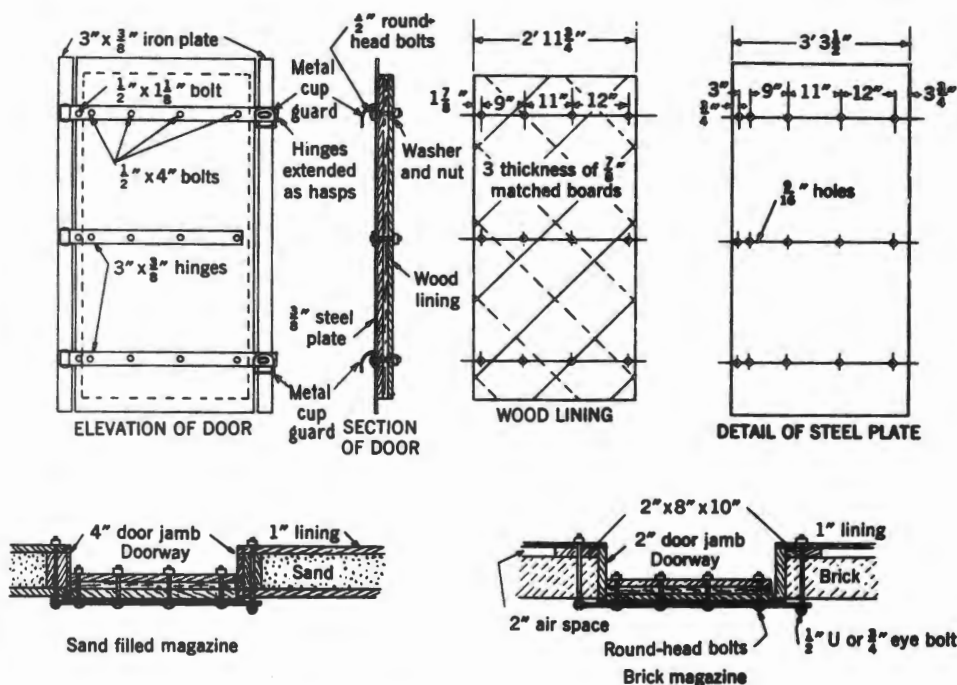


PLAN AND SECTIONS OF CLASS 1 OR 2 MAGAZINES - TYPE II.

Construction: 12- by 12- by 12-inch hollow tile with cells filled with screened sand, but may be constructed of other material such as soft brick, weak concrete or masonry, cement, or concrete blocks with cells filled with screened sand, cement mortar, or other bullet-resistant filler; walls to be not less than 6 inches thick; and louvers or ventilators to be not larger than 72 square inches. Size and type of vents will depend on kind of material used. Foundation will vary with thickness of wall (sketch is for 12-inch walls).



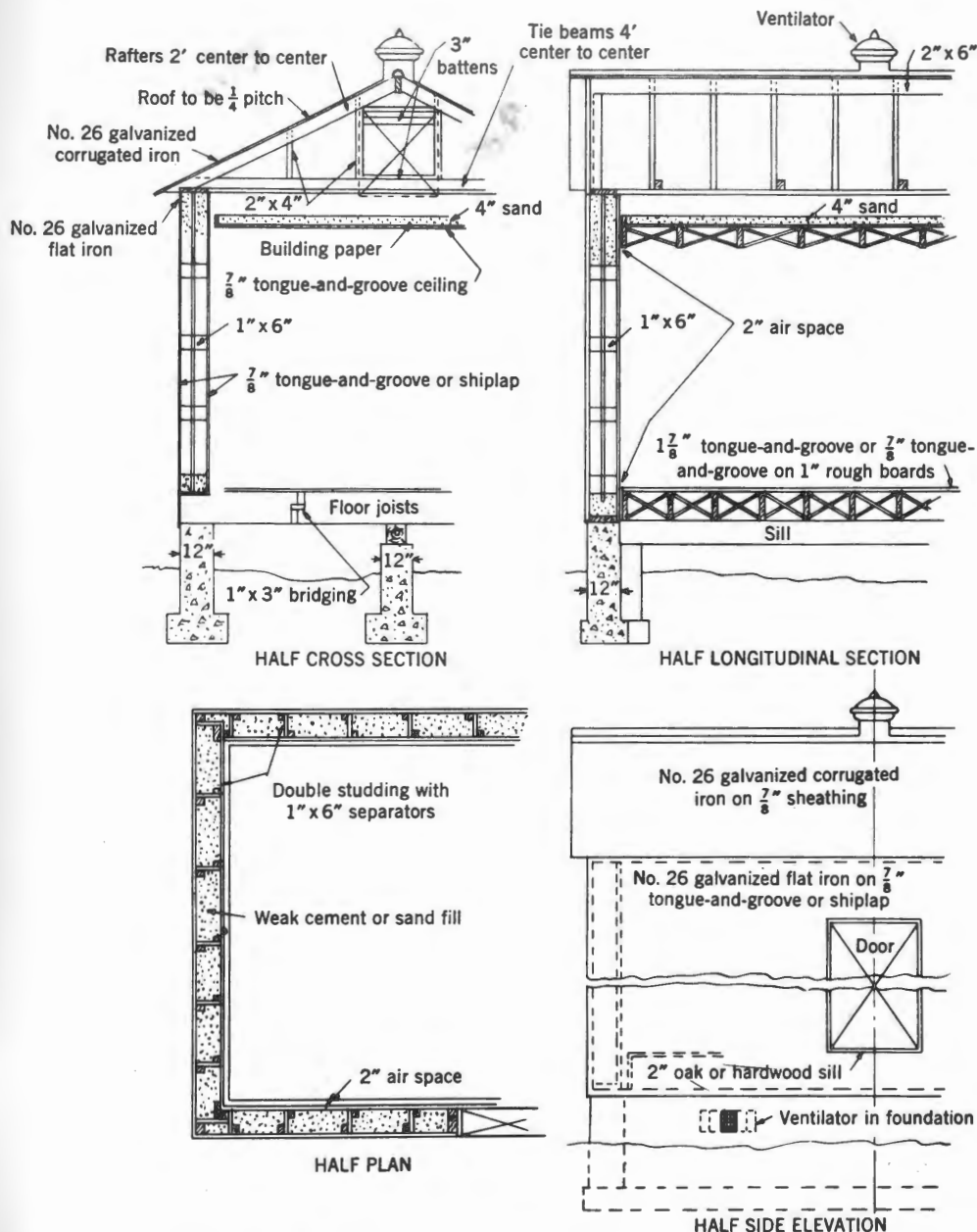
METHOD OF INSTALLING SAND-TRAYS AND CEILINGS IN CLASS 1 OR 2 MAGAZINES.



SECTIONAL VIEWS OF DOOR

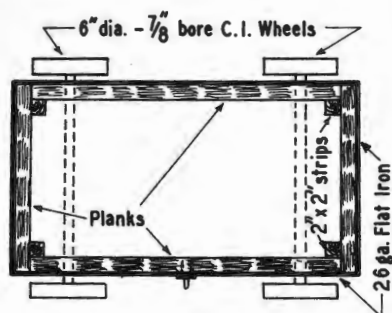
SKETCH OF EASILY CONSTRUCTED CLASS 1 AND 2 MAGAZINE DOORS.

Construction: Three thicknesses of $\frac{7}{8}$ inch tongue and groove boards are laid diagonally back of a $\frac{3}{8}$ inch steel plate; doors should be $\frac{3}{8}$ inch steel plate and lined with at least $2\frac{5}{8}$ inches of hardwood applied in $\frac{3}{8}$ inch layers. If the thickness of steel is less than $\frac{3}{8}$ inch the door shall be lined with 4 inches of hardwood; hinges and staples to be attached by welds, rivets, or bolts fitted with lock washers and nuts on the inside; door to be equipped with two padlocks fastened in separate staples; top and bottom hinge straps to be extended to cover iron plate for hasp and either U or I bolt for staple, or two hasps and staples substituted, hasp ends of bar hinge to be covered by a $\frac{1}{4}$ inch thick metal cup guard open at bottom to allow access with key, guard to be welded to bar hinge.



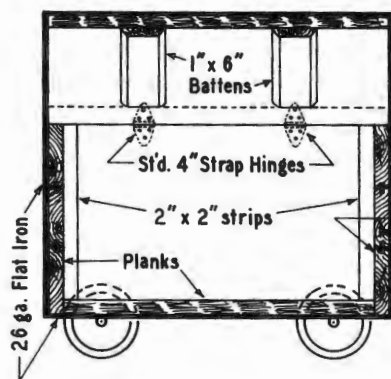
STANDARD SAND-FILLED OR WEAK CONCRETE-FILLED CLASS 1 OR 2 MAGAZINES - TYPE III.

Specifications: Outside and inside sheathing to be tongue-and-groove boards to prevent loss of sand; space between outside and inside sheathing to be filled with weak concrete mortar, approximately 1 part Portland cement and 7 to 10 parts sand or 6 to 12 inches of weak mortar over the sills and coarse, dry sand in the remaining space; bullet-proof sand roof as shown; floor and ceiling to stop 2 inches from walls to provide ventilation; and nails in walls and floors to be concealed.

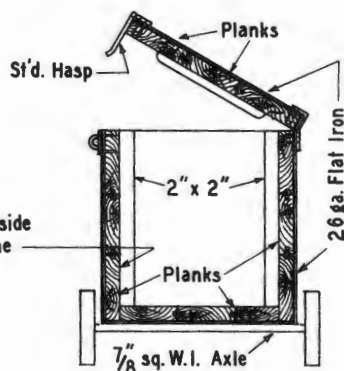


PLAN

All Planks to be 2" hardwood or 3" softwood.



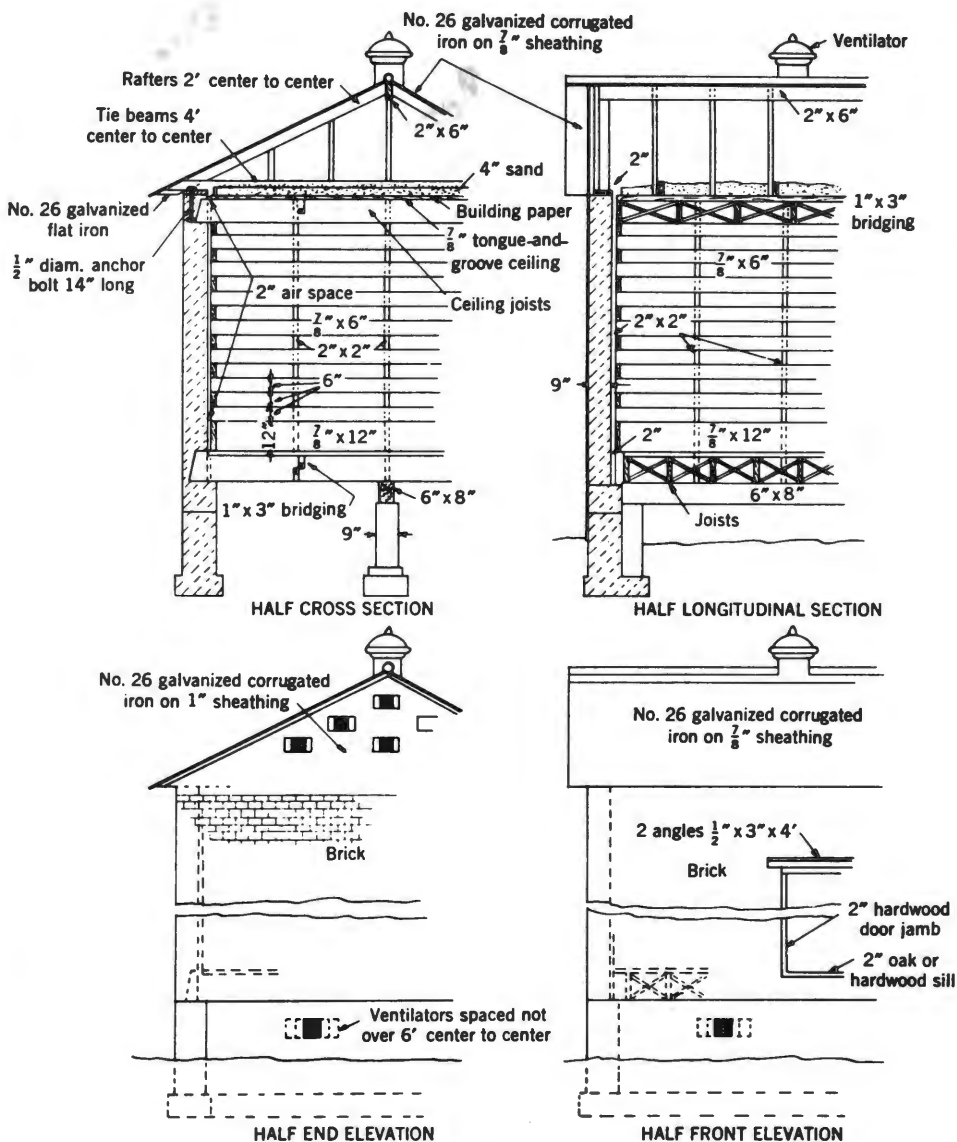
SECTIONAL FRONT ELEVATION



SECTIONAL SIDE ELEVATION

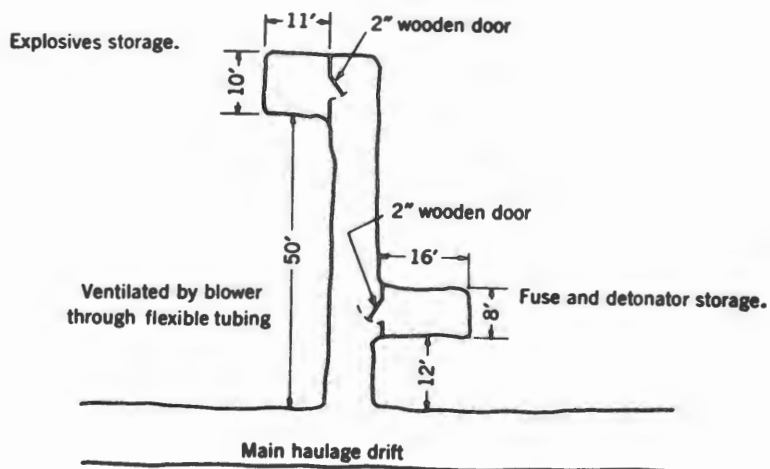
CLASS 4 PORTABLE MAGAZINE WITH WHEELS.

Construction: Box to be built of 2 inch hardwood or 3 inch softwood well braced at the corners; lumber to be smooth on the inside of the box; no metal to be exposed on inside; lid or door to be securely locked with at least one lock equivalent to a 5 - tumbler jar proof lock; box to be metal covered as indicated in drawing above; size of magazine to suit number and shape of packages to be stored; magazine to be painted red with word "EXPLOSIVES" in white letters not less than 3 inches high on top, sides, and ends of magazine.

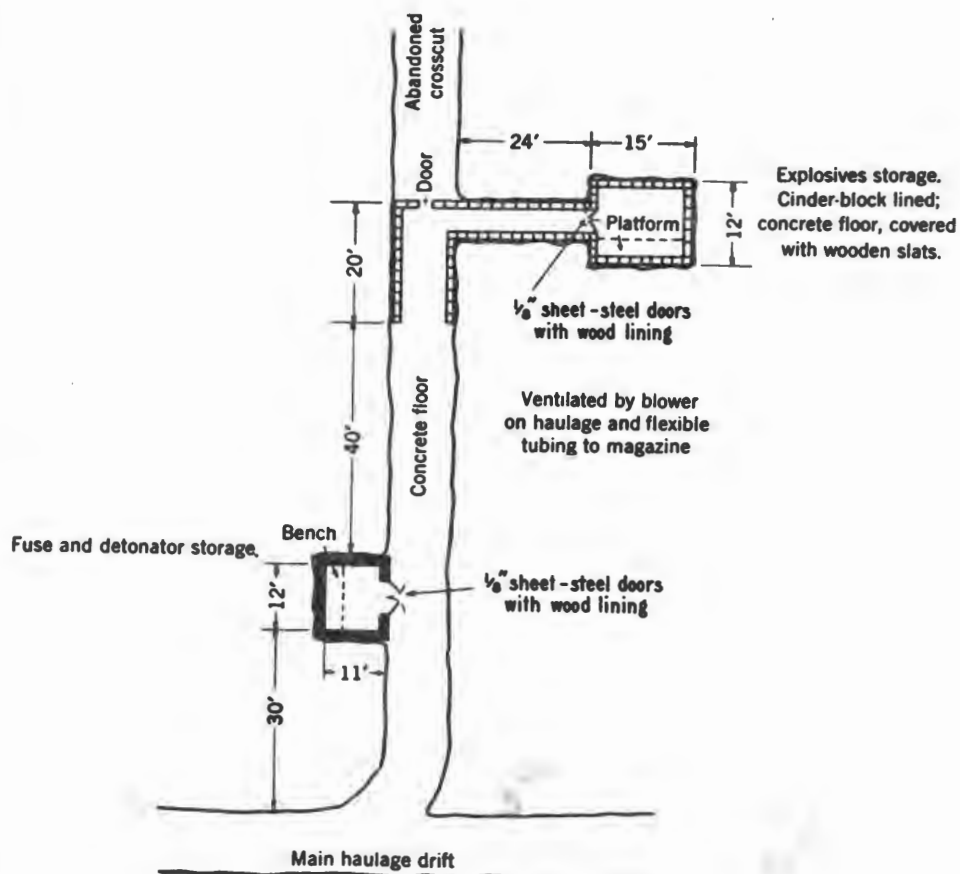


STANDARD BRICK CLASS 1 OR 2 MAGAZINES - TYPE IV.

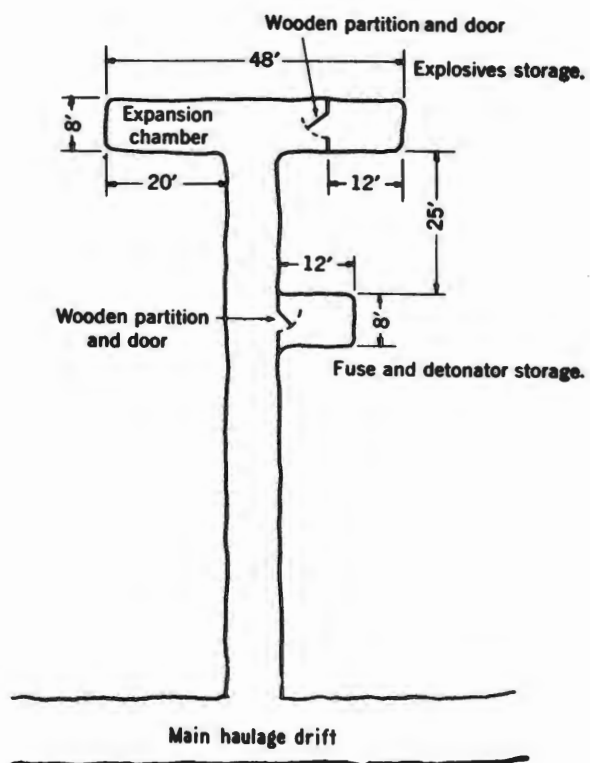
Specifications: Brick to be medium-soft and laid in cement mortar containing not over 25-percent lime; no metal to come in contact with explosives packages; floors to be blind-nailed and lining nails to be countersunk; floors and ceiling to stop at 2- by 2-inch lining supports, leaving 2-inch ventilation spaces around the walls; lattice lining, as shown, with 12-inch base boards and 6-inch wall boards spaced 6 inches apart; gable or hip roof; bullet-proof sand roof as shown; box formed by laying floor of tongue-and-groove boards on ceiling joists and building 1- by 4-inch rim line with one layer of building paper and filling with not less than 4 inches of coarse, dry sand. If bullet-proof roof is not necessary, a ceiling should be built of $\frac{7}{8}$ -inch tongue-and-groove boards or wall boards to stabilize temperature within the magazine.



EXPLOSIVES MAGAZINE - TYPE A .



EXPLOSIVES MAGAZINE - TYPE B.



EXPLOSIVES MAGAZINE - TYPE C.