CHAPTER I

INTRODUCTION

1-1. General. An important element in selecting storage magazines for construction is determining the type of magazine to be used and the siting requirements. AR 385-64 provides clear guidance in this regard. An earth-covered magazine is not designed to resist the damaging effects of its own exploding contents. It is accepted that the donor magazine will be demolished if an internal explosion occurs. Earth-covered magazines are utilized primarily to prevent propagation of an explosion within an adjacent (receiver) magazine. During the design phase, and prior to construction, site plans and non-standard magazine drawings must be submitted to the DDESB for review in accordance with AR 385-60 to assure that the proposed project meets explosives safety standards. only the drawing numbers of standard magazines need be submitted with the site plan since the construction of such magazines are preapproved by the DDESB.

1-2. Definitions.

a. Magazine: Any building or structure, except an operating building, used for the storage of ammunitions and explosives.

b. Standard Magazine: A preapproved magazine of the designation listed in AR 385-64. It is a magazine approved for the storage of 500,000 pounds net explosive weight (NEW) at the separation distances listed in AR 385-64.

c. Non-Standard Magazine: An earth-covered magazine that is not listed in AR 385-64 as being approved by the DDESB. These magazines are limited to a maximum 250,000 pounds NEW at the separation distances listed in AR 385-64.

d. Hybrid Magazine: A magazine that uses components and/or modifications from more than one magazine.

e. Intermagazine Distance: This is the minimum permissible distance between storage magazines. For earth-covered magazines, this distance is intended to provide reasonable protection against the propagation of an accidental explosion by airblast and by fragments.

f. Quantity-Distance: The quantity of explosive material and distance separation relationship that provide defined types of protection.

g. Donor Magazine: Is a magazine which produces the damaging output.

h. Receiver Magazine: Is the magazine away from the donor source which requires protection.

i. Barricaded: Magazines with intervening barrier, natural or artificial, of such type, size, and construction as to limit in a prescribed manner the effect of an explosion on a nearby magazine.

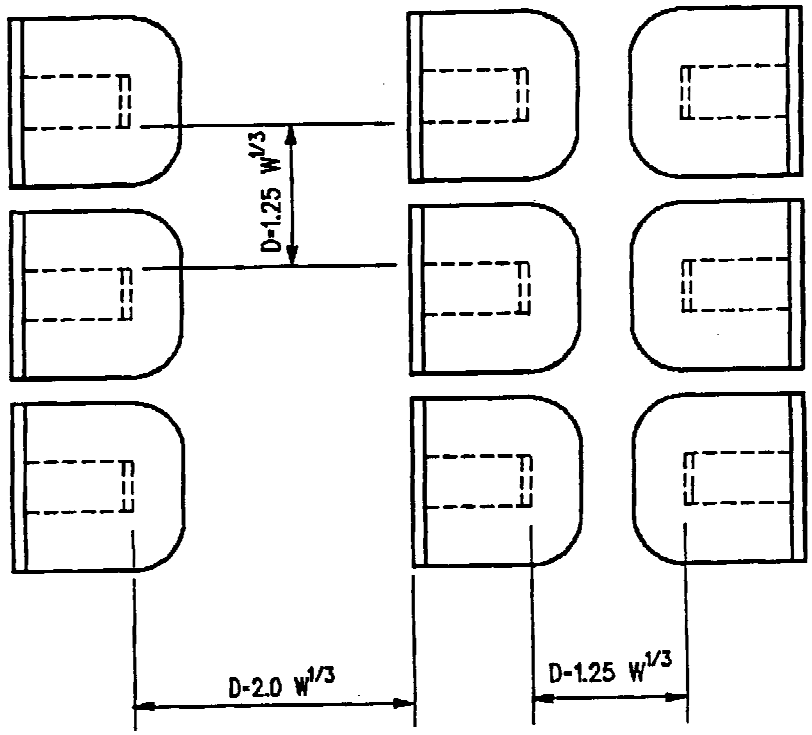
j. Unbarricaded: Magazines without an intervening barrier.

1-3. Separation Distances of Magazines. Separation distance from magazines, commonly referred to as quantity-distance (Q-D), governs many aspects of a project. Stated simply, the more explosive material concentrated at one place, the farther that place has to be from a potential target. AR 385-64 contains tables equating amounts of explosives to the distance that they must be separated from other magazines, other ammunition and explosives handling facilities, public roads, and inhabited buildings. Orientation effects on intermagazine distance can also be found in AR 385-64. The following table and Figure 1 show the Q-D requirements between standard magazines:

Orientation	Minimum Separation for Standard Magazines	Separation for W=500,000 pounds
Side-to-Side	1.25 $W^{1/3}$	100 feet
Rear-to-Front	2.00 $W^{1/3}$	160 feet
Side-to-Front	2.75 $W^{1/3}$	220 feet
Front-to-Front (barricaded)	6.00 $W^{1/3}$	480 feet
Front-to-Front (unbarricaded)	11.00 $W_{1/3}$	880 feet

W = largest net explosive weight (NEW)

1-4. Magazine Grouping Concepts. Magazine grouping concepts are provided in Figures 2 and 3. These concepts are typical layouts found on most Army installations. Magazines may be placed in one row or multiple rows. Siting is generally side-to-side and



HEADWALL

REAR WALL

EDGE OF EARTH COVER

EDGE OF ARCH

W = CHARGE WEIGHT

FIGURE 1. MINIMUM SEPARATION DISTANCES OF STANDARD MAGAZINES

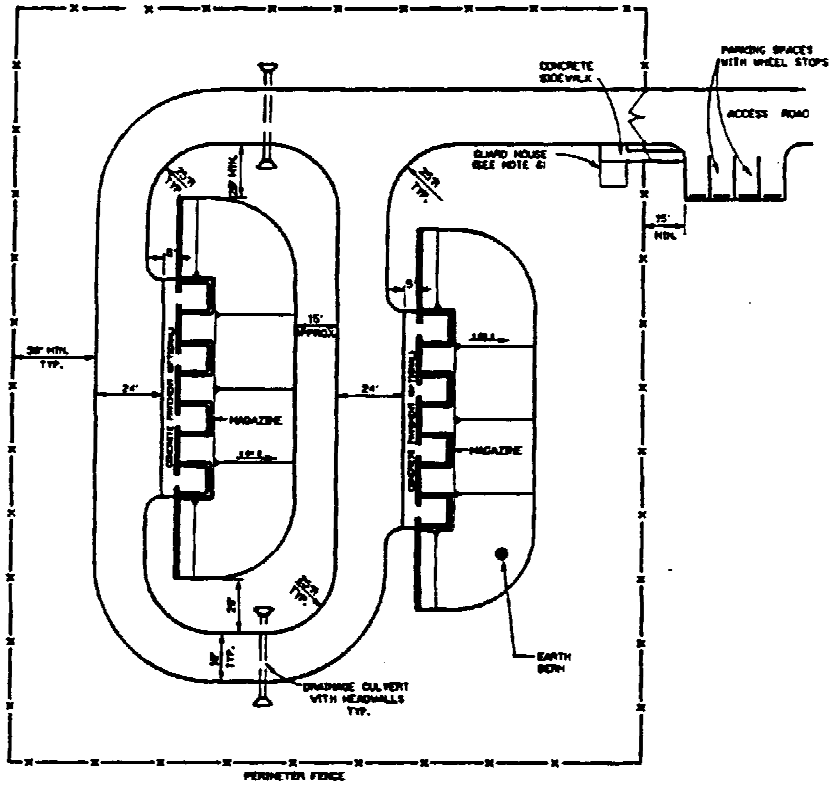


FIGURE 2 - SITING PLAN

REAR TO FRONT

MAGDLDGN

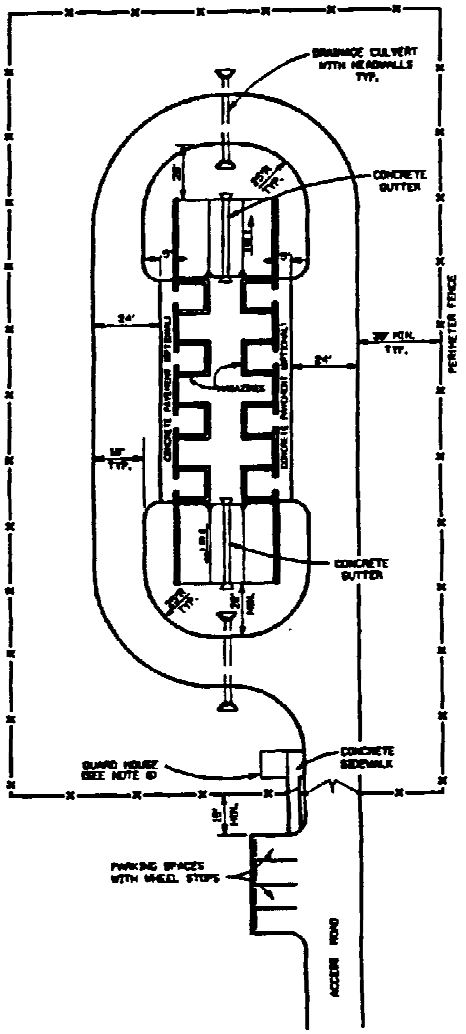


FIGURE 3 - SITING PLAN

BACK TO BACK

rear-to-front. Front-to-front orientation is seldom used because of the excessive intermagazine separation distance required.

1-5. Storage and Outloading Drawings. Storage and outloading drawings for ammunition are provided in U.S. Army Materiel Command drawings 19-48-75-5 published and distributed by the U.S. Army Ammunition Center and School (USADACS). These drawings will assist Army activities and contractors in the effective use of storage to ensure safe, economic and standardized procedures for storing and transporting ammunition commodities. Its Index lists the drawings that depict storage configurations (stacking patterns) of ammunition and components in various types of magazines.

1-6. Cost of Magazines. Construction cost estimates of magazines for programming purposes can be found in AR 415-17.

1-7. Waivers and Exemptions. Waivers, exemptions, and site general construction plan requests pertaining to Army owned facilities will be processed in accordance with AR 385-64. They are, however, discouraged since these waivers permit temporary deviation from the standards.

1-8. Technical Assistance. Users of this pamphlet are encouraged to communicate with the following organizations for technical assistance:

a. Planning Ammunition Facilities:

U.S. Army Defense Ammunition Center and School (USADACS)
ATTN: SMCAC-AV
Savanna, IL 61074-9639
Telephone: DSN 585-8921.

b. Facilities-Related Explosive Safety Matters:

U.S. Army Technical Center for Explosives Safety (USATECS)
ATTN: SMCAC-ES
Savanna, IL 61074-9639
Telephone: DSN 585-8919, commercial (815) 273-8919.

c. Magazine Designs and Criteria:

Headquarters, U.S. Army Corps of Engineers
ATTN: CEMP-ET
20 Massachusetts Avenue, NW
Washington, D.C. 20314-1000
Telephone: 202-761-1436

U.S. Army Engineer Division, Huntsville
ATTN: CEHND-ED-CS
4820 University Drive
Huntsville, AL 35816-1822
Telephone: 205-895-1650.

d. Protective Design Technical Assistance:

U.S. Army Engineer District, Omaha
ATTN: CEMRO-ED-SH
215 North 17th Street
Omaha, NE 68102-4978
Telephone: 402-221-3177

e. Distribution of Magazines (drawings and specifications):

U.S. Army Engineer Division, Huntsville
ATTN: CEHND-ED-ES (Service Section)
106 Wynn Drive
Huntsville, AL 35805-1957
Telephone: 205-955-4782