

CHAPTER 1

INTRODUCTION

1-1. Background. Military facilities for the Army and Air Force have included construction of buildings and other structures partially below ground surface. In more recent years, missile launching and support structures, fallout and blast-protection shelters, and command-control centers have been constructed below ground surface. Many of these structures were constructed using cut-and-cover procedures and required backfilling within confined areas using various types of soil.

a. Numerous deficiencies in backfilling operations occurred in some of the earlier missile-launch construction programs and caused conditions that jeopardized the proper functioning of those structures. Measures to correct deficiencies were both time consuming and costly. It was recognized that critical areas must be delineated and the causes of the deficiencies be determined and corrected.

b. Measures were taken to alleviate the overall back-filling problems. These measures were progressive modification of design and configuration of structures, more detailed instructions to the construction personnel, and close control during construction to ensure that proper construction practices were being followed.

(1) Some of the problem areas were eliminated by modification of design and configuration of structures to allow easier placement of backfill and to permit access of compaction equipment so that required densities could be achieved.

(2) Construction personnel were issued more detailed field directives covering some of the particularly difficult phases of backfill placement.

(3) Inspector training programs were conducted to point out critical areas and emphasize proper backfill procedures and the need for continuous surveillance and close control.

c. The advent of energy efficient structures, partially embedded below ground level, had increased the use of backfill. In addition, the ever increasing need for fuel conservation requires maximum use of all excavated or onsite materials for backfill to reduce fuel needed for hauling in better materials from offsite. Thus, innovative planning and design and good construction control using rapid check tests are imperative for all backfill operations.

1-2. Purpose and scope. This manual is for the guidance of designers, specification writers, and especially field personnel engaged in designing, planning, and conducting earthwork operations around major deep-seated or subsurface structures.

a. The greatest deficiencies in earthwork operations around deep-seated or subsurface structures occur because of improper backfilling procedures and inadequate construction control during this phase of the work. Therefore, primary emphasis in this manual is on backfilling procedures. Design and planning considerations, evaluation and selection of materials, and other phases of earthwork construction are discussed where pertinent to successful backfill operations.

b. Although the information in this manual is primarily applicable to backfilling around large and important deep-seated or buried structures, it is also applicable in varying degrees to backfilling operations around all structures, including conduits.