PRIMARY SOURCES FOR EDUCATORS AND STUDENTS

Civil Defense Technical Bulletin, 1958



May 1958

DIGEST OF TECHNICAL INFORMATION

FAMILY SHELTERS FOR PROTECTION AGAINST RADIOACTIVE FALLOUT

PURPOSE

FCDA assumes that bases of military retaliation, other important military installations, and concentrations of population and industry may be targets in the event of nuclear

This bulletin provides guidance to engineers, architects, contractors, and the general public in planning family shelters for protection against the effects of radioactive fallout beyond the blast range of nuclear explosions.

FALLOUT

Ceneral

Whenever a nuclear bomb is exploded near the ground, large amounts of earth and debris are drawn upwards by the ascending fireball. The resulting cloud may rise to a height of 80,000 feet or more. Radioactively contaminated particles which fall back to earth from this cloud are termed "fallout." Some of these radioactive particles are deposited close to the point of burst soon after the explosion, while others may be carried several hundred miles by the winds before they settle to earth.

Period of Shelter Occupancy

In any locality in the United States, fallout could require occupants to remain in shelter for two weeks or more. In many areas, radiation levels may permit leaving shelter, for intermittent periods or permanently, after 2 or 3 days. However, since the intensity of fallout at any specific place is impossible to predict prior to an attack, it is advisable to plan for a 2-week occupancy.

Radiation Hazard

There are several types of radiation associated with fallout. From the standpoint of shelter, however, the most significant hazard is from gamma radiation. Gamma rays, like X-rays, are highly penetrating, and to secure adequate

protection from them special standards for shelter are required.

STANDARDS FOR FALLOUT SHELTERS

Shelter Dimensions

The shelter should provide for each occupant at least 121/2 square feet of floor area and 80 cubic feet of volume. In general, ceiling heights should not be less than 61/2 feet. The width of the entranceway should be kept to an absolute minimum, usually not more than 2 feet.

Shielding

- (a) The shielding must have enough mass to reduce gamma radiation to a relatively harmless level. The less dense the material used, the greater the thickness required for a given degree of protection.
- (b) As a general rule, a high degree of protection against gamma radiation will be afforded by an earth cover of 3 feet or an equivalent mass of other material or combination of materials. Approximate thicknesses required for other materials to afford protection equivalent to 3 feet of earth are: concrete, 24 inches; iron and steel, 71/2 inches; and lead, 3 inches.
- (c) The arrangement of the entranceway is important since harmful amounts of radiation may be scattered around corners. Therefore, the designs of the entranceways, shown on the attached drawings, should not be altered. It may be noted from the drawings that the radiation must make at least two right-angled turns before entering the main chamber. These changes of direction effectively reduce the intensity of radiation.

(a) In a basement shelter a tolerable and safe environment may be obtained by providing the means for natural ventilation, such as a grilled entrance door. Under-

CIVIL DEFENSE ADMINISTRATION

460705°-58

Citation: Visual Studies Collection, Library of Virginia