BASIC CONCEPTS OF STRUCTURE SHIELDING FROM FALLOUT

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A MASTER'S REPORT

submitted in partial fulfillment of the

requirements of the degree

MASTER OF SCIENCE

Department of Civil Engineering

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1974

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1974
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GENERAL NOMENCLATURE

B_c -- Barrier reduction factor for exterior walls.

C_g -- The total ground contribution to a detector.

C_o -- The overhead contribution to a detector.

G_a -- The geometry factor for skyshine radiation

G_d -- The geometry factor for direct radiation

G_s -- The geometry factor for scatter radiation

H -- Height of detector above the contaminated plane.

L -- Length of a rectangular structure.

L_c -- Length of an interior core area.

MT -- Megaton, explosive energy equivalent of one million tons of TNT

PF -- Protection factor

R_f -- Reduction factors sum of all contributions.

S_w -- Scatter fraction, fraction of wall emergent radiation that has been scattered in the wall.

W -- Width of a rectangular structure.

W_c -- Width of an interior core area.

X_e -- Mass thickness of an exterior wall.

X_o -- Total overhead mass thickness.

Z -- Distance from the detector to an overhead plane of contamination.

ω_L -- Lower solid angle fraction defined by a segment of wall in elevation below the detector plane.

ω_u -- Upper solid angle fraction, defined by a wall segment above the plane of the detector.

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CHAPTER I BACKGROUND

INTRODUCTION

President John F. Kennedy in addressing the United Nations General Assembly on September 25, 1961 stated, "Every man, woman, and child lives under a nuclear sword of Damocles, hanging by the slenderest of threads, capable of being cut at any moment by accident, miscalculation, or madness" (9)*. While we have learned that a nuclear war would be pure lunacy, it is still an ever present possibility. A nation can be provoked to the point of lunacy when it becomes exasperated to the point where only violence can relieve its frustrations. It is the business of governments to know where this point of uncontrollable lunacy is, and stay well back from it. Nuclear weapons are very efficient from the military point of view. Nuclear weapons are very reliable, predictable in performance, can be delivered to nearly any target anywhere in the world, and produce fire and blast effects on unimaginable scales with the added bonus of radioactive fallout. The problem of providing protection from thermal radiation and blast destruction will be expensive and difficult to solve for above ground structures. The area involved with thermal radiation and blast destruction is small in comparison to the area affected by fallout. Millions of people will need only fallout protection which can be obtained at a relatively low cost, thus it is the present practice to emphasize fallout radiation shielding.

Procedures and standards for evaluating a fallout shelter's protection have been developed (6). These procedures and standards can be used to evaluate the fallout shelter potential of existing structures or structures

*Numerals in parentheses refer to items listed in Bibliography.