

CHAPTER 1

INTRODUCTION

SECTION 100.0 FLOOD-PROOFING AND BUILDING CODES

Sec. 100.1 GENERAL: Many thousands of structures and potential building sites are located in the flood plains of our Nation and are susceptible to flooding. Flood control projects have partially protected some of these structures and building sites through reduction of the flood threat. However, the residual threat to partially protected sites and the total threat to unprotected sites remain as major problems. Evidence of this is given every year by the millions of words and hundreds of headlines that dramatically describe floods and their resulting damage and loss of life. When floods strike developed areas, whole cities may be disrupted and their productive capacities impaired. Strategic transportation lines are cut. Public service facilities are sapped, homes and crops are destroyed, and soils are eroded. Yet, in spite of this, flood vulnerable lands are the setting for continued urban growth in the United States.

Studies of flood plain use show that some encroachment is undertaken in ignorance of the hazard, that some occurs in anticipation of increased Federal protection, and that some takes place because by shifting the cost of the hazard to society it becomes profitable for private owners to do so. Even if full information on the flood hazard were available to all owners or users of flood plain property, there would still be conscious decisions for some reason or another to build in areas that are subject to flooding. In order to escape this dismal cycle of losses, partial protection, further induced development, and more unnecessary losses, old attitudes must be transformed into positive actions.

Primary among these actions is the revision of development policies and the enactment of a regulatory program to encourage and/or restrict the direction of growth or change necessary to achieve flood plain management objectives. Information programs are essential to this revision. They foster the development of more appropriate policies and involve the gathering and dissemination of data on past floods, on estimates of future floods, and information on alternate ways of dealing with flood losses in areas where intensive development has taken place or is anticipated. The latter has led to an expanded approach to flood damage reduction and prevention, recognizing the need to control or regulate the use of lands adjacent to watercourses and the need to provide guidance in the design of flood plain structures through the planned management and development of the flood hazard areas.

Regulation of the use of flood plain lands is a responsibility of State and local governments and can be accomplished by a variety of means, such as establishment of designated floodways and encroachment lines, zoning ordinances, subdivision regulations, and building codes. These land use controls, most often known as "Flood Plain Regulations", do not attempt to reduce or eliminate flooding but instead are intended to guide and regulate flood plain development to lessen the adverse affects of floods. Flood plain regulations are now being adopted by communities and used as the legal tools to control the extent and type of development permitted on flood plains.

Flood proofing standards applied through building codes and regulations to flood plain structures can permit economic development in the lower risk areas by holding flood damages and other adverse affects within acceptable limits. Flood-proofing requires adjustments both to structures and to building contents and involves keeping water out as well as reducing the effects of water entry. Such adjustments can be applied by the individual or as part of collective action either when buildings are under construction or during remodeling or expansion of existing structures. They may be permanent or temporary.

Flood proofing, like other methods of adjusting to floods has its limitations, however. For example, in addition to reducing loss potentials, a main purpose of flood proofing habitable structures is to provide for early return to normalcy after floods have receded rather than for continuity of occupance. Through a false sense of security,

occupants may choose to remain during a flood and risk being stranded or losing their lives. Only very substantial and self-contained structures should be occupied during a flood. Also, unless correctly used, flood proofing can tend to increase uneconomical use of flood plains. Applied to structurally unsound buildings it (e.g., with closures and seals) can result in more damage than would occur without flood proofing. Generally it is applied to individual structures, so unless flood proofing is also applied to means of access, it is only partially effective in an area context. Accordingly, access ways should be passable at least in floods up to the magnitude used in setting flood proofing elevations.

Building codes and regulations presently in use throughout the nation, whether prepared by nationally recognized groups or by State and local governments, are directed primarily to the fire hazard. They do not contain special requirements, limitations, or design and construction restrictions for facilities located in flood hazard areas and susceptible to flood damage. This omission has been verified by a careful review of several national buildings codes, state and city building codes, and publications directed to flood-proofing; by numerous discussions with designers, planners, and construction contractors, and, through study of existing conditions and general building practices in known flood hazard areas. It has also brought to light the scarcity of information on flood-proofing standards. Designers of flood plain structures have either ignored the flood hazard altogether or attempted to use a "common sense" approach. The latter has, in many cases, resulted in designs that have neither prevented nor even reduced flood damages.

The lack of detailed flood hazard information and general misconceptions of the flood hazard problem have been recognized at all levels of government. Positive action at the Federal level to correct these deficiencies was initiated in 1960 and reinforced at the Presidential level in August, 1966 by issuance of Executive Order 11296. With growing impetus, detailed flood hazard information is being furnished to State and local governments to aid them in flood plain planning and development programs. Study is now being directed to the subject of flood plain regulations, but the building code implications of flood-proofing, which also warrant consideration as a means of flood damage reduction or prevention, have not been accorded similar treatment. Consequently, the Corps of Engineers has undertaken the preparation of these regulations to provide the minimum design and construction standards that would, if properly utilized, assist in safeguarding users and property in flood hazard areas.

These recommended regulations are intended for direct use or for incorporation into existing building codes which properly enforced should effectively reduce flood damages to buildings and structures located in the flood plain. Compliance should be a mandatory requirement for approval of plans or issuance of permits for construction of all new buildings and structures, and for existing buildings that will be subjected to major alterations, additions, or reconstruction in the defined flood hazard areas.

These recommended regulations neither contain nor are referenced to other regulations pertinent to flood plain management that may be provided by separate statute or involve political decisions relative to land use, zoning, subdivision regulations, occupancy restrictions, creation of flood zones, flood warning, or floodway encroachment. The intent here is to establish the special design and construction provisions that should be required for buildings, structures, and support facilities that are or may be subjected to flooding, relying upon zoning regulations to establish the areas of application. Other aspects of flood plain regulations, such as Flood Plain Zoning and Subdivision Regulations, are treated in "Regulation of Flood Hazard Areas to Reduce Flood Losses", Water Resources Council, 1971-1972, Washington, D.C.

This publication deals with the treatment of hydrostatic and hydrodynamic forces and waterproofing associated with riverine flooding only. To the extent that coastline structures are subject to these semi-static conditions, these provisions will be applicable to coastal or tidal flooding situations; however, no consideration is given to the special problems of wave impact, corrosion and erosion associated with coastal flooding. Similarly the problems of impact from floating debris and velocity introduce dynamic considerations which are not treated in detail and mud slide and high density fluid problems that are prevalent in West Coast communities are omitted entirely.

The design and construction criteria contained herein for riverine flooding conditions should be of substantial benefit to many communities. Future development of more comprehensive coverage including the treatment of special dynamic problems should be implemented where warranted by others more directly involved with the particular flood damage situations.

