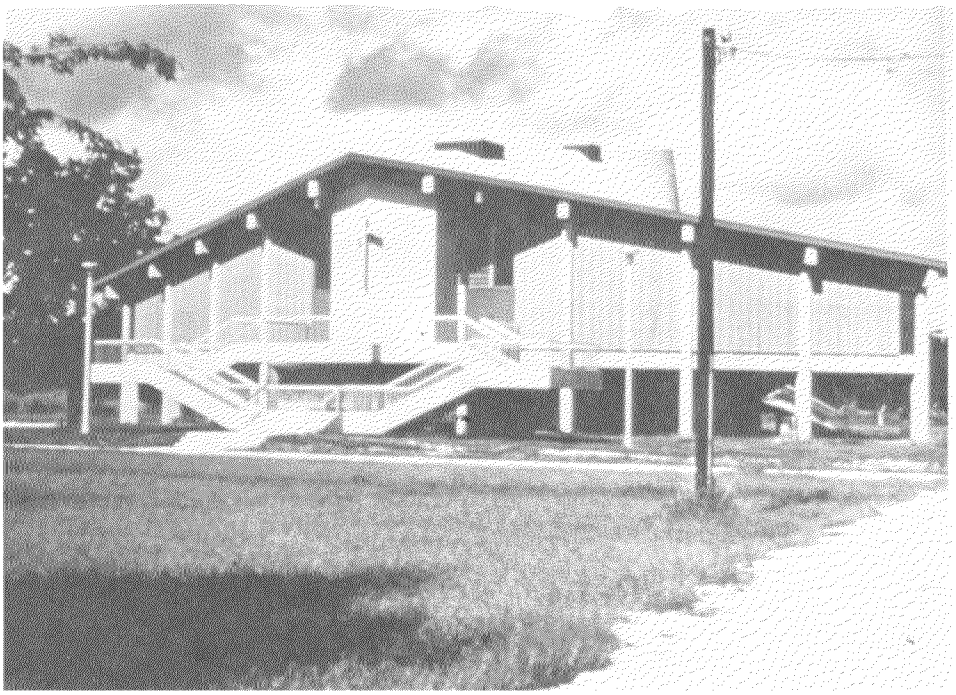
Building elevated on fill in Soldiers Grove, Wisconsin.

Photo by Jon Kusler.



Building elevated on pilings in a coastal area.

Photo by Jon Kusler.

residential buildings below the base flood elevation, if adequately floodproofed.

Prior to 1970, floodproofing was not widely applied because engineers and architects were not familiar with floodproofing techniques and little had been done to develop specific design standards. In 1970-1971, the Corps of Engineers published a document entitled Floodproofing Regulations,[25] which established the first detailed floodproofing guidelines. FEMA and others subsequently developed numerous floodproofing handbooks.[26]

Most floodproofing during the 1970s was "dry floodproofing." This type of floodproofing is designed to keep the flood waters out of the structures. To prevent inundation, floors and walls were reinforced and sealed. Basements were prohibited unless they also were reinforced and sealed; and doors, windows, and other openings were reinforced and fitted with emergency closures.

Despite widespread use of dry floodproofing, there has been little field documentation of its effectiveness. Preliminary evidence suggests that because of water pressure, it is impractical to dry floodproof most structures higher than 2 or 3 feet. Waterproofing has also proved difficult because of small leaks along doors and in foundations. These may be serious when flooding is of long duration. Sump pumps may be used to remove residual seepage, but this requires continuous use of electrical power which is often only provided on an emergency basis during floods and thus is undependable. The long-term effectiveness of dry floodproofing that requires temporary closures is also questionable without continuous monitoring, training, and practical exercises in their use. Temporary closures must be kept at hand.

To a lesser extent "wet floodproofing" was also used during the 1970s.[27] This method intentionally allows floodwaters to enter basements

This building combines five dry floodproofing techniques: reinforced concrete walls, an emergency flood door to prevent water entry, bricked-in window openings, elevated utility lines (near top of photo), and ladder for access through the roof.

Photo source: U.S. Army Corps of Engineers, St. Paul District.