**EMERGING TECHNIQUES IN FLOOD RESISTING STRUCTURE**

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**ABSTRACT**

This paper aspect the Flood Resisting Structure which are habitable during the various types of flood. Flood is major problem which causing damage to structure, loss of property &also posing risk to the health & life of their occupants. The various type of measures of Flood proofing and the emerging technology to protect the structure from Flood. The techniques involved which may be a column and sleeve system, column and ring system, digital simulation etc., and this methods to be used for resisting the structure. In this also give us the information about the retrofitting, amphibious house etc.

**KEYWORDS:** *Flood, techniques, structure*

**INTRODUCTION:**

A flood is a natural event that can have far reaching effects on people and the environment. Put simply, a flood is too much water in the ‘wrong’ place. A flood is an overflow of water that submerges land which is usually dry.  Flooding may occur as an overflow of water from water bodies, such as a [river](http://en.wikipedia.org/wiki/River) or [lake](http://en.wikipedia.org/wiki/Lake), in which the water overtops or breaks [levees](http://en.wikipedia.org/wiki/Levee), resulting in some of that water escaping its usual boundaries or it may occur due to an accumulation of rainwater on saturated ground in an areal flood. Floods can also occur in rivers when the flow rate exceeds the capacity of the [river channel](http://en.wikipedia.org/wiki/River_channel), particularly at bends or meanders in the waterway. Floods often cause damage to homes and businesses if they are in the natural flood plains of rivers.

Floodplain areas can be subjected to hydrostatic (standing water) and hydrodynamic (flowing water) pressures during floods. These pressures can result in displaced foundation walls, collapsed structures,floating fuel tanks, scouring, and other damage.Flood resistance thus requires that structural and nonstructuralcomponents be durable, resistant to flood forces (including buoyancy), and resistant todeterioration caused by inundation with floodwater.

**CAUSES OF FLOODING:**

Flooding generally occurs due to following events:

* Rainfall fills rivers, streams and ditches beyond their flow capacity.Floodwater overflows river banks and flood defences on to floodplains.
* Overloaded sewers can sometimes backflow into property.
* Rain can be so heavy that run-off flows overland down hills and slopes.
* Rain soaks into the ground causing ground water levels to rise and flood.

Flooding caused by a series of storms which crossed the country over as even-week period. Areas soon became waterlogged, resulting in rivers and streams rising very quickly as more rainfall.

**EFFECT OF FLOODING :**

* Buildings washed away due to the impact of the water under high stream velocity. Such buildings are usually destroyed or dislocated beyond feasible reconstruction
* Floatation of buildings caused by rising water. This occurs when light–weight houses are not securely anchored or braced.
* Damage caused by inundation of buildings: A building may remain intact and stable on its foundation, while its material is gradually and severely damaged.
* Damage caused by debris: massive floating objects like trees and materials from other collapsed house may have impact significant enough to cause damage to the standing buildings.

**EMERGING TECHNIQUES :**

Following are the some techniques to protect structure from flood & for making the structure Flood Resistance.

**1. Elevation**

Elevating a building to prevent floodwaters from reaching living areas is an effective retrofitting method. The goal of the elevation process is to raise the lowest floor to or above the flood protection elevation. This can be done by elevating the entire building, including the floor, or by leaving the building in its existing position and constructing a new, elevated floor within the building. The method used depends largely on construction type, foundation type, and flooding conditions.



Elevated structure

**2.** **Wet Flood Proofing**

Wet flood proofing a building is done by modifying the uninhabited portions so that floodwaters will enter but not cause significant damage to either the building or its contents. The purpose of allowing water into portions of the building is to ensure that the interior and exterior hydrostatic pressures will be equal. Wet flood proofing is often used when all other retrofitting methods are either too costly or are not feasible, but it is practical in only a limited number of situations.



Building With a Wet Flood-Proofed Subgrade Basement

**3. Dry Flood Proofing**

This method making the building watertight requires sealing the walls with waterproof coatings, impermeable membranes, or supplemental layers of masonry or concrete. Also, doors, windows, and other openings must be equipped with permanent or removable shields, and backflow valves must be installed in sewer lines and drains. The flood characteristics that affect the success of dry flood proofing are flood depth, flood duration, flow velocity, and the potential for wave action and flood-borne debris.



Dry Flood-Proofed House

**4. Integral automatic airbrick**

This novel airbrick is a permanent construction designed to replace standard air bricks. It is designed to automatically to close and open when floodwaters rise and fall, without external power. The product is relatively new on the market and has been applied by individual homeowners and a Housing Association.



**5. Novel resilient floor arrangement**

Ground supported floors with concrete slabs are usually reasonably resilient to floodwater but floodwaters can often ingress through gaps at joints or where seals are not effective. To improve resilience, concrete floors may be coated with an impermeable membrane and finished with ceramic or concrete based floor tiles, wood laminate or even carpets if the adhesives and bonding used in the applications are properly fitted. Resilient floor coverings on suspended floors could be effective but the seal between the covering and the floor must have a water tight interface, where no seepage or leakage is acceptable.

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floor arrangement

**6. A column-and-sleeve system**

 A column-and-sleeve system enables a house to rise during flood conditions, while leaving it in a normal grounded state at all other times. The system consists of a solid column that fits inside a slightly larger, hollow sleeve section. The fit needs to be snug, such that minimal lateral movement occurs as one section slides past the other. In addition, either rollers or viscous material must be present between the column and the sleeve in order to reduce friction. The column is fixed in position, embedded in a footing deep underground. The sleeve slides up and down the column when sufficient vertical force is applied. The column may be inside or outside the house, but must be tall enough so that the house does not lift above the column, and thus become detached, during a flood. A house using this system would have a column-and-sleeve unit at each corner, at least.

**7. A gas-filled basement**

A gas-filled basement is a means to increase the structure’s buoyancy. Due to its sheer weight, a house cannot float until the water level is well above its base. Therefore, the house itself must be watertight below that critical height. Water tighting methods are both costly and difficult to perfect. Wall stability poses another problem as external water pressure builds with increasing height. For these two reasons, minimizing the critical floating height is beneficial. Using lightweight materials alone might not be adequate. The gas-filled basement works like a submarine, pumping a lighter-than water substance into an empty chamber. That substance might be air, helium or another plentiful gas.

 **8. Amphibious** **house**

The lightweight, timber-framed structure sits on a floating concrete base that is built within a fixed wet dock foundation. In the event of a flood, the concrete base rises up as the dock fills with water, ensuring the house floats safely above the waves. The base effectively acts as a free-floating pontoon, and should have a lifetime of around 100 years before needing renewal or replacement. Climate proofing urban areas is a growing area of focus for architects and planners. Amphibious architecture looks set to join rain gardens, green roofs and permeable paving in the array of techniques available.



***9.* Column-and-ring**

The column-and-ring units provide horizontal stability while preventing lateral translation of the entire Flood-Proof House. The four columns are located at each corner of the house, within half a meter of the Casco’s outer wall face. The rings are not completely snug with the column a nominal gap of 2cm exists. This gap serves two purposes it allows intermittent friction-free vertical movement and permits a margin of error during construction. The gap is kept sufficiently small so that, if an irregular live load distribution causes an imbalance in the floating house, the tilt is limited to a few centimeters. The exact column and ring dimensions were determined independently.



Column & ring system

**10. Mobile, Modular Architecture Facilitated by the Gantry Crane**

The modular housing units are produced within existing shipbuilding facilities because they specialize in large force/water-tight construction. Units would deliver directly from factory to site via boat. In flood, gantry crane may move the structure from one place to another



**CONCLUSION**

We conclude that from the entire flood resisting structure techniques the emerging technology for elevation may prove economical and most effective techniques.

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