

## Familiarity with Flood and Engineering Solutions to Control It

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**Abstract :** Undoubtedly, flood is known as a natural disaster, and in practice, flood is considered the most terrible natural disaster in the world both in terms of loss of life and financial losses. From 1988 to 1997, about 390,000 people were killed by natural disasters in the world, 58% of which were related to floods, 26% due to earthquakes, and 16% due to storms and other disasters. The total damages in these 10 years were about 700 billion dollars, which were 33, 29, 28% related to floods, storms and earthquakes, respectively. In this regard, the worrisome point has been the increasing trend of flood deaths and damages in the world in recent decades. The increase in population and assets in flood plains, changes in hydro systems and the destructive effects of human activities have been the main reasons for this increase. During rain and snow, some of the water is absorbed by the soil and plants. A percentage evaporates and the rest flows and is called runoff. Floods occur when the soil and plants cannot absorb the rainfall, and as a result, the natural river channel does not have the capacity to pass the generated runoff. On average, almost 30% of precipitation is converted into runoff, which increases with snow melting. Floods that occur differently create an area called flood plain around the river. River floods are often caused by heavy rains, which in some cases are accompanied by snow melt. A flood that flows in a river without warning or with little warning is called a flash flood. The casualties of these rapid floods that occur in small watersheds are generally more than the casualties of large river floods. Coastal areas are also subject to flooding caused by waves caused by strong storms on the surface of the oceans or waves caused by underground earthquakes. Floods not only cause damage to property and endanger the lives of humans and animals, but also leave other effects. Runoff caused by heavy rains causes soil erosion in the upstream and sedimentation problems in the downstream. The habitats of fish and other animals are often destroyed by floods. The high speed of the current increases the damage. Long-term floods stop traffic and prevent drainage and economic use of land. The supports of bridges, river banks, sewage outlets and other structures are damaged, and there is a disruption in shipping and hydropower generation. The economic losses of floods in the world are estimated at tens of billions of dollars annually.

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