A CASE STUDY ON FLOOD RISK MANAGEMENT

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Abstract:

Risk management has been considered as a well defined procedure for handling risks due to natural, environmental or man-made hazards, of which floods are representative. Risk management can be carried out on three different levels of actions. The first level is the operational level, which is related to operating an existing system. The second level is a project planning level, which is used when a new or a revision of an existing project is planed, and a project design level, which is embedded into the second level and describes the process of reaching an optimal solution for the project. As the value system of a nation changes, and as the natural boundary conditions are modified by human actions or global changes, an existing system will be found not meeting the demands of the present society. The decisions for change depend on the changes in options available for handling a flood situation, as well as on the changes in risk perception and attitudes towards risk. On the third level, the actual cost of a design are evaluated and compared with the benefits obtained from the planned project. In particular, on this level the residual risk is considered, i.e. the risk which remains even after a project is completed and fully operational.

KEYWORD: man-made hazards, operational level, project planning level, design level.

INTRODUCTION

Flood risk is one of the most devastating natural hazards that cause lack of lives, damage to houses, resources and environmental degradation in urban regions over 3000 flood failures to place in a span of two decades formed 1990-2010 and are chargeable for the mise of 200 people and making 3 billion humans homeless within the worlds. It is predicted that on common nearly 200 million people in more than 90 nations are exposed to catastrophic flood activities every year and its miles predicted to upward thrust in destiny because of climate change and the consistent demographic boom, in addition to of urbanization (UNESCO, 2008). A crucial difficulty for world natural hazards is the technology of efforts, techniques, rules and

packages of the world wide governments at diverse ranges to mitigate the flood occurrences. The endurance occurrences of flood activities except the measure under taken indicates the lack of ability of flood manipulate measures to properly manage floods. A sustainable flood threat control calls for flood risk evaluation to pick out forces and factors inflicting capability flood risk. The quantity of medical books, studies, reviews and research packages focused on floods and their prevention is countless. In the Web of Science Core Collection Database, we recognized a total of 28,348 publications written among 1900 and 2016 containing "flood(s)" within the title of which fifty five% were posted within the last 10 years. However, notwithstanding growing know-how and understanding at the challenge, the impact of flooding continues to intensify. This impact is measured by means of growing charges, with the aid of feelings of inability to put into effect powerful prevention measures and by way of the belief, whether or not or now not its miles justified, that the intensity and frequency of flooding is increasing each year.

2 LEVELS OF ACTIONS

2.1 OPERATIONAL LEVEL

World-huge flood failure accounts for approximately a third of all herbal screw ups, via range and monetary loosed. The dying toll in 2013 was 10,000 people. The monetary damage in 2013 due to flooding turned into 50 billion US bucks. Climate alternates will boom the probability of excessive occasions, while populace growth and financial improvement, especially in delta regions, will increases the capacity effects of flooding. Government authorities convey a big obligation. A stable operational flood management infrastructure will permit governments to reply correctly, fending off damage and saving lives. Densely populated regions are at a high chance for flash floods, buildings, highways, driveways, and parking masses boom runoff through lowering the quantity of rain absorbed through the ground. This runoff increases capability for a flash flood.

2.1.1 INFORMATION AT RIGHT TIME AND APPROACHES

Deltares has enormous quantity of understanding in the subject of operational flood management, linking disciplines including hydrology, hydraulics, dikes era, arithmetic, probabilistic and tender abilities in communications and social sciences. As a result, we are in position to create new ideas and equipment that concentrate on our client's wishes, supplying actual, correct, reliable and sensible facts that may be utilized in flood situations. Together with our customers we tailor our approaches to consist of and employ present tools and information streams, and to broaden new competencies.

Deltares additionally affords recommendation about emergency response measures, using forecasts and flood scenarios to make sound and effective selection about which measures to take. An important feature of our consultancy paintings is our sound knowledge of the wishes of both selection makers and responders, inclusive of the addressing of uncertainty within the statistics to hand.

2.1.2 FLOOD FORCASTING STRUCTURES

Providing expert consultancy services and engaging in research worldwide. The Delft-FEWS Software program has been applied in over 35 countries and in lots of instances (consisting of America, England & Wales and the Netherlands), it's far the legit countrywide flood forecasting device. Further to the improvement of flood forecasting structures for predicting river discharges and water tiers, Deltares has additionally evolved a tool, DAM Live, to evaluate the power and stability of flood defences, which has been carried out in the Netherlands and China. These gears permit decision-makers to make sound and effective selections. During a disaster state of affairs, critical and brief selections are required. At times like this, get right of entry to all the right applicable data and the high-quality tailor-made visualizations is vital. The Deltares interactive information research laboratory (ID-Lab) combines and displays all of the applicable information for a selected task at a particular second.

2.1.3 24/7 EMERGENCY RESPONSE CONSULTANCY SERVICE

In several countries, Deltares has additionally supplied specialist advice in the course of predominant flood events, such as the Thai floods of 2012. In the Netherlands, Deltares additionally gives a 24/7 emergency response consultancy service, with as much as a hundred and fifty specialists, for the Dutch authorities. Internationally, Deltares key professionals are listed for emergency missions.

2.2 PROJECT PLANNING LEVEL

2.2.1 DAMS

Many dams and their associated reservoirs are designed completely or partially to useful resource in flood protection and manipulate. Many huge dams have flood-manipulate reservations in which the level of a reservoir must be stored under a sure elevation before the onset of the wet/summer time soften season to permit a positive quantity of area wherein floodwaters can fill. Other useful makes use of dam created reservoirs consist of hydroelectric electricity technology, water conservation, and recreation. Reservoir and dam construction and layout is based upon requirements, typically set out with the aid of the government. In the US, dam and reservoir layout is regulated through the United States Army Corps of Engineers (USACE). Design of a dam and reservoir follows recommendations set by the USACE and covers topics along with design glide rates in attention to meteorological, topographic, stream flow, and soil records for the watershed above the structure.

The term dry dam refers to a dam that serves merely for flood manipulate with none conservation garage (e.g. Mount Morris Dam, Seven Oaks Dam).

2.2.2 DIVERSION CANALS

Floods may be controlled with the aid of redirecting excess water to motive-built canals or flood ways, which in turn divert the water to transient preserving ponds or different bodies of water where there is a lower chance or impact to flooding. Examples of flood control channels consist of the Red River Floodway that protects

the City of Winnipeg (Canada) and the Manggahan Floodway that protects the City of Manila (Philippines).

2.2.3 FLOODPLAINS AND GROUNDWATER REPLENISHMENT

Excess water may be used for groundwater replenishment by using diversion onto land that can absorb the water. This method can lessen the effect of later droughts with the aid of the use of the ground as a natural reservoir. It is being utilized in California, in which orchards and vineyards may be flooded without unfavourable crops, or in other locations desolate tract areas have been re-engineered to act as floodplains.

2.2.4 RIVER DEFENCES

In many countries, rivers are susceptible to floods and are regularly cautiously managed. Defences which include levees, bunds, reservoirs, and weirs are used to save you rivers from bursting their banks.

A weir, additionally called a low head dam, is most usually used to create millponds, however at the Humber River in Toronto, a weir turned into constructed close to Raymore Drive to prevent a recurrence of the flood damage due to Hurricane Hazel in October 1954.

2.2.5 COASTAL DEFENCES

Coastal flooding has been addressed with coastal defences, consisting of sea walls, seashore nourishment, and barrier islands.

Tide gates are used at the side of dykes and culverts. They can be placed on the mouth of streams or small rivers, where an estuary starts off evolved or in which tributary streams, or drainage ditches connect with sloughs. Tide gates close at some stage in incoming tides to save you tidal waters from moving upland, and open in the course of outgoing tides to permit waters to empty out thru the culvert and into the estuary aspect of the dike. The starting and closing of the gates is driven through a distinction in water level on either facet of the gate.

2.2.6 SELF-FINAL FLOOD BARRIER

The self-closing flood barrier (SCFB) is a flood defences system designed to protect human beings and assets from inland waterway floods resulting from heavy rainfall, gales or rapid melting snow.[citation needed] The SCFB may be constructed to protect residential houses and entire groups, as well as commercial or different strategic regions. The barrier gadget is constantly geared up to install in a flood scenario, it is able to be hooked up in any period and makes use of the rising flood water to install.

2.2.7 TEMPORARY PERIMETER OBSTACLES

When everlasting defences fail, an emergency measure which includes sandbags or inflatable impermeable sacks is used.

In 1988, a method of the use of water to govern flooding became discovered. This was done by using containing 2 parallel tubes within a third outer tube. When crammed, this structure shaped a non-rolling wall of water which can manage eighty percentage of its peak in outside water intensity, with dry floor at the back of it. Eight foot tall water stuffed

limitations had been used to surround Fort Calhoun Nuclear Generating Station during the 2011 Missouri River Flooding. Instead of trucking in sandbag fabric for a flood, stacking it, and then trucking it out to a hazmat disposal web page, flood control can be finished by means of using the onsite water. However, those aren't fool proof. A eight feet (2.4 m) high 2,000 toes (610 m) long water stuffed rubber flood berm that surrounded portions of the plant turned into punctured by a skid-steer loader and it collapsed flooding a portion of the ability.

2.3 DESIGNING LEVEL

2.3.1 CHECK DAMS

- These are small gravity dams, usually constructed with rocks and mortar or concrete, of valuable height and width.
- These types of structures are located in small or medium sized gullies to stabilize riverbeds slopes and prevent soil erosion.
- Check dams, project gullies from being eroded by rainfall and runoff impact.

2.3.2 RETAINIG WALLS

These are rock or concrete block structures built on steep slopes anywhere in the watershed, where the erosion of the base foundation threatens lands and homes.

2.3.3 BUNDING

Bunding is the general name used in Jamaica for flexible structures of variable thickness and length, composed of galvanized wire mesh, stone, and wild-cane and riverbed materials.

Bunding is used to prevent bank erosion and landslips and to protect agricultural lands from being flooded.

2.3.4 BUILDING REGULATION

- Approved document C, Site training and resistance to contaminants and moisture, shows that after building in flood susceptible areas, homes may be built to mitigate some of the outcomes of flooding.
- Elevated groundwater levels or glide of subsoil water across the web page may be alleviated by the provision of good enough sub-soil drainage.
- Sewer flooding due to backflow or surcharging of sewers or drains can be addressed through the use of non-return valves and anti-flooding devices.
- Intrusion of groundwater through flooring may be addressed through using waterproof production.
- Where there's a chance of the access of water into floor voids, provision to check out and clean out sub-floor voids may be considered.

3. FLOOD RISK MANAGEMENT ACT

The Flood and Water Management Act was introduced on 8 April 2010 to

implement Sir Michael Pitt's recommendations following the widespread flooding of 2007 when more than 55,000 homes and businesses were flooded.

The Act requires better management of flood risk, it creates safeguards against rises in surface water drainage charges and protects water supplies for consumers. It gives a new responsibility to the Environment Agency for developing a National Flood and Coastal Risk Management Strategy, and gives a new responsibility to local authorities, as Lead Local Flood Authorities (LLFA's), to co-ordinate flood risk management in their area.

4. POSSIBLE SOLUTIONS

The following solutions can protect buildings located in flood-prone areas and prepare people, buildings and installations for a possible flood:

- The buildings can be designed in such a way that they can withstand a flood and be used again after a thorough cleaning. This requires waterproof construction and well-considered materials, equipment and infrastructure.
- The buildings can be sealed by means of bulkheads and hatches.
- The buildings can be built on raised ground.
- The buildings can be designed to float.
- Communication and information must be regulated. Buildings must also be evacuatable.
- The utilities within buildings can be designed in such a manner that they are able to withstand a flood.
- Making buildings self-reliant allows them to be independent of the network infrastructure.
- Also at the district level there are options such as surface elevation, floating areas, buildings on stilts, temporary dams, autonomous or raised infrastructure, and emergency refuges.

5. CONCLUSIONS

From the previous discussion it is clear that the safety aspects must be considered by the pharmaceutical industry not in the interest of the employees or property but also in the terms of the neighbouring environment as well. The source of possible hazards, risk analysis, control procedures, preventive measures and contingency plan are the main five essentials for ensuring a complete work atmosphere in industry. Risk assessment is a powerful tool for evaluating strategies to reduce disease and for prioritizing future research needs. Because we cannot inspect our way to food safety food assessment should be an integral part of food safety policy. Scientists, risk managers and policy makers need to work together to develop a food safety system that is both responsive and proactive in addressing threats to our food supply. Evaluation of risk management options is the weighing of available options for managing a food safety issue in light of scientific information on risks and other factors, and may include reaching a decision on an appropriate level of consumer protection. In this current consultation, the experts were being asked to address a central issue in food safety. Risk management, he observed, involve both, he identification of the standards of acceptable risk appropriate to different types of food hazards,

and the establishment of procedures to ensure that the risks are kept within the limits set by those standards.

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