

Tsunami Hazard Map at Imwon, Korea

Yong-Sik Cho / Tae-Hwan Kim / Seong-Ho Ahn

Hanyang University, Professor / Yongin University, Professor / Hanyang University, Graduate Student

Abstract

The East Sea surrounded by Korea, Japan and Russia is one of the most vulnerable places to tsunami attacks in the world. A number of tsunamis have been occurred during last decades in the region. In special, the middle areas of the eastern coast of the Korean Peninsula have been damaged due to the Central East Sea Tsunami occurred in 1983. Thus, tsunami hazard mitigation becomes an important issue at those coastal communities. The countermeasures against unexpected tsunami attacks are not sufficient because the government policy of Korea generally focused on not preventing but recovering. In this study, a hazard map based on the field survey and tsunami evacuation plan is developed to mitigate tsunami damage at Imwon port, which was severely damaged during the 1983 Central East Sea Tsunami.

Keywords: *Tsunami, Hazard map, Field survey, Evacuation*

^{1*} Department of Civil and Environmental Engineering, Hanyang University, 17 Haengdang-dong, Seongdong-gu, Seoul 133-791, Korea, ysc59@hanyang.ac.kr

^{2*} Department of Security Services, Yongin University, 470 Samga-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-714, Korea, taehwan@yongin.ac.kr

^{3*} Department of Civil and Environmental Engineering, Hanyang University, 17 Haengdang-dong, Seongdong-gu, Seoul 133-791, Korea, zczczcz@hanyang.ac.kr

1. Introduction

Tsunamis are long-period oceanic waves generated by underwater earthquakes, submarine or subaerial landslides or volcanic eruptions. They are among the most huge nature disasters which have become the biggest killer for communities in coastal areas in the last decade. It is important to prepare a plan for preventing damage of unexpected tsunami. The most representative plan for tsunami hazard mitigation is a hazard map. Hazard map describes the initial responsibilities and action to be taken to protect all human in the event of real natural disaster(Cho, 1995).

The Eastern Coast of Korea is very vulnerable to tsunami attacks because of the large amount of tsunami energy concentration caused by the topographic condition of the region(Lee et al., 1997). The historical tsunami events show that the Imwon port is the most susceptible area from tsunami attacks generated at the Western Coast of Japan. The Central East Sea Tsunami occurred on May 26, 1983 caused a damage at Imwon port(Casualty - death 3, injury 2, Structure damage - destruction 23, inundation 21). Thus, tsunami hazard mitigation becomes an important issue at those coastal communities.

In this study, a tsunami hazard map is developed for more effective and economic countermeasures against unexpected tsunami attacks based on the field survey and tsunami evacuation plan.

2. Field Survey

The Central East Sea Tsunami occurred on May 26, 1983 caused a huge damage at Imwon port. Fig. 1 shows the location of Imwon port, Korea. A series of tsunamis with height of 3-4m attacked at Imwon port on May 26, 1983. Three people were killed and two inhabitants were injured. When the tsunami attacked Imwon port, oil tank which diameter is 7m and capacity is 8 ton was shattered entirely and moved toward village(Kim et al., 2007). Approximately, 22 houses were destroyed and 7 houses were inundated. In special, several houses near the Imwon River were destroyed drastically because sea water ran over the bank located about 700m upstream from the Imwon port. A boat was jumped about 3.5m and bumped into the building's roof.

The survey team interviewed inhabitants to investigate run-up heights, inundation area and damages from tsunami attacks by using voice recorder. The 6 locations were selected and historical maximum run-up heights are estimated.

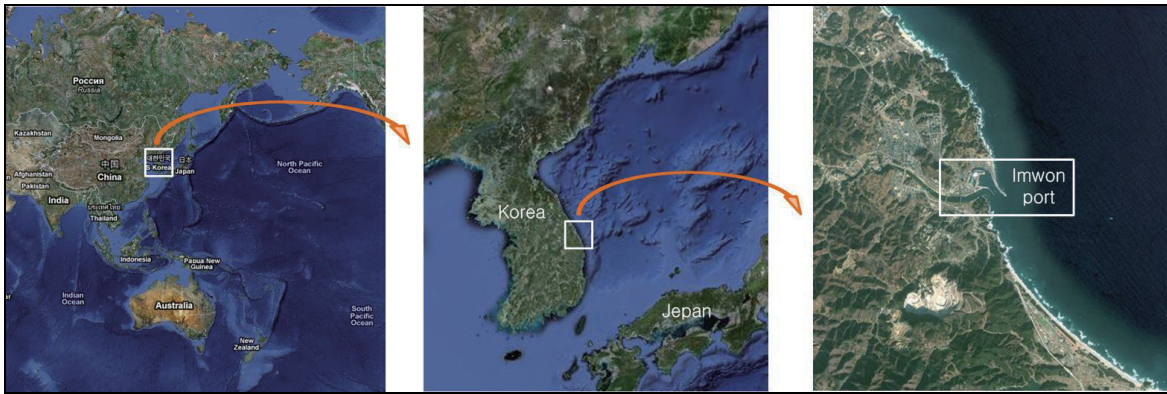


Fig. 1 Location of Imwon port, Korea

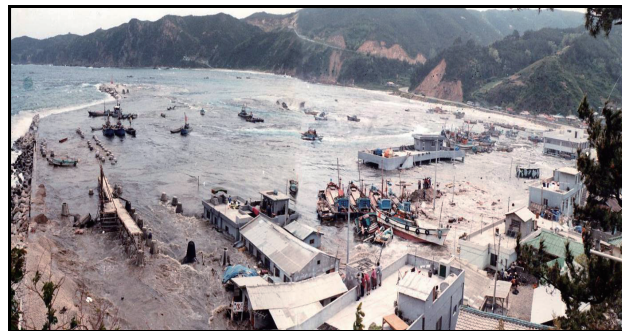


Fig. 2 Tsunami damage at Imwon port, Korea(1983 Central East Sea Tsunami)

Fig. 3 shows inundated areas at Imwon port during the tsunami. The field survey data can be used to verify the tsunami inundation model and also has an important role to set up the tsunami evacuation plan. Fig. 4 shows position and name of suitable buildings for temporary and designated shelters and evacuation routes at Imwon port.

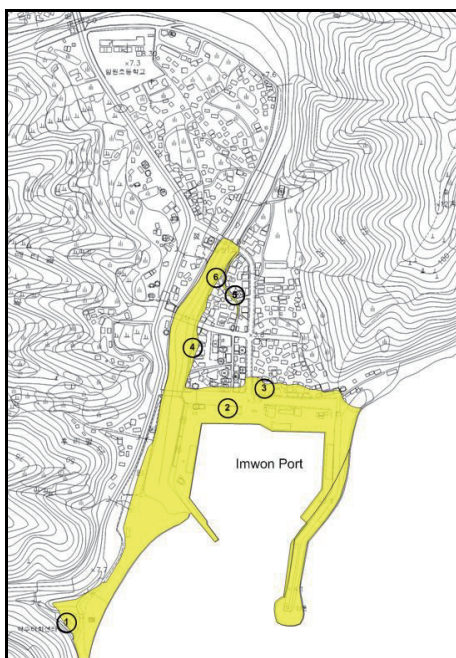


Fig. 3 An inundated areas at Imwon port during the Central East Sea Tsunami

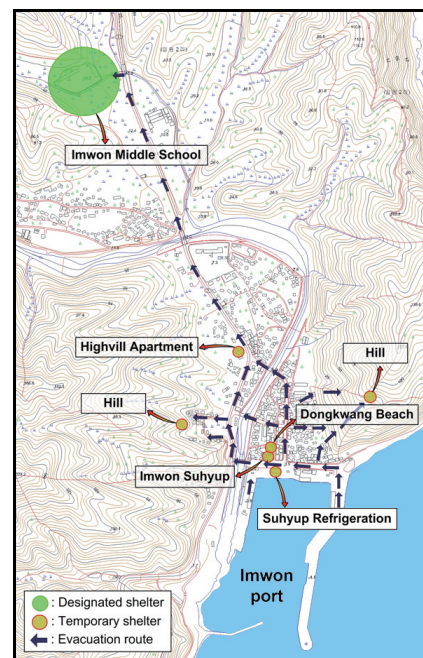


Fig. 4 Evacuation plan at Imwon port, Korea

3. Generation of Tsunami Hazard Map

A tsunami hazard map consists of the information which contains location of shelter, evacuation routes and the maximum inundated areas caused by a tsunami. In an addition to that, it contains satellite photograph of the target area, emergency contact lists, main construction nearby and other information of evacuation. Fig. 5 is the tsunami hazard map at Imwon port.

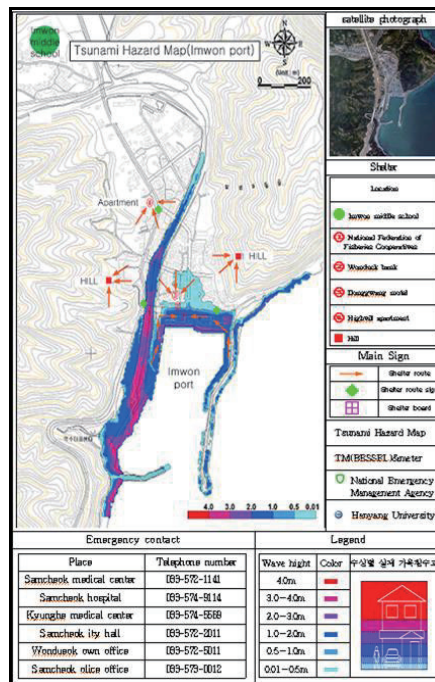


Fig. 5 Tsunami hazard map at Imwon port, Korea

4. Conclusion Remarks

A well-established hazard map may play an important role in prevention of the damage occurred by disasters such as tsunami high tide and storm surge. In this study, a tsunami hazard map at Imwon port where is the most susceptible area from tsunami attacks generated at the Western Coast of Japan is developed for more effective and economic countermeasures against unexpected tsunami attacks. It can contribute to real evacuation plan which is element of tsunami hazard mitigation plan as a reference material.

Acknowledgements

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