

Utilization of natural / local infrastructure in development of tsunami disaster prevention communities (Study period: FY2014 to FY2016)

KATO Fuminori, Head (Dr. Eng.) HARANO Takashi, Senior Researcher HAMAGUCHI Kohei, Researcher
River Department, Coast Division

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1. Introduction

Dunes or banking structures may prevent or reduce the run-up of tsunami and mitigate damage in land area. They are not the infrastructure facilities aiming at disaster reduction but considering them as such facilities may lead to more certain demonstration of the effect of disaster reduction. This study defined such planimetric features as "natural / local infrastructure" and examined points of attention in using dunes etc. considered to have effect on reducing the force of tsunami for development of tsunami disaster prevention area as well as procedure to consider maintenance / improvement of such infrastructure.¹⁾

2. Points of attention in using for development of tsunami disaster prevention area

It should be attended that the effect of natural / local infrastructure on reducing the force of tsunami is limited by some reasons, e.g., dunes may be eroded and lowered by overflow of tsunami, tree stems may be broken, or trees may be uprooted by attack of tsunami. In addition, since maintenance and improvement of natural / local infrastructure require mid- and long-term efforts, it is necessary to examine systems etc. that can be used continuously under related laws and regulations.

3. Procedure to consider maintenance / improvement of natural / local infrastructure

Figure 1 shows the procedure to consider maintenance / improvement of natural / local infrastructure effective to reduce the force of tsunami. First,

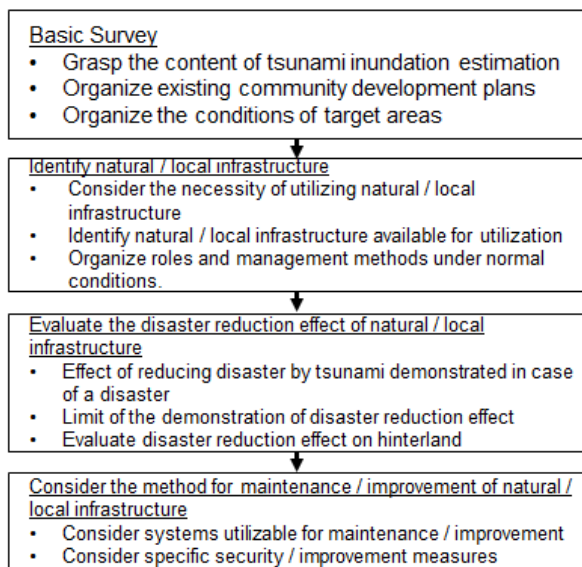


Figure 1: Procedure to consider maintenance / improvement of natural / local infrastructure effective to reduce the force of tsunami

necessity for using natural / local infrastructure is considered based on the tsunami inundation estimation map prepared through basic survey, and dunes etc. likely to have force reduction effect are identified as candidates for natural / local infrastructure. Next, in order to evaluate the disaster reduction effect of the identified natural / local infrastructure, tsunami inundation is simulated for multiple cases with different conditions including presence of a dune and plantation to compare inundation area, planar distribution of the maximum inundation depth, etc. in each case. In this step, topographic changes by tsunami are taken into consideration. Lastly, specific measures for maintenance and improvement are considered based on the systems available for maintenance, etc.

4. Holding of symposium

From a viewpoint of social implementation of natural / local infrastructure, we held an open symposium²⁾ for the persons in charge of the development of tsunami disaster prevention communities. The following opinions were developed in the comprehensive discussion including academic experts and persons in charge.

- Since dunes have various ecosystem services and constitute a resilient space, they should be maintained by considering them as a buffer zone.

- Since the disaster reduction effect of dunes can vary with sediment migration phenomena, prediction of sediment migration phenomena with high accuracy and sharing the usability and significance of the disaster reduction effect of dunes by communities will lead to enhancement of regional disaster-prevention capability.

- In using natural / local infrastructure, it is necessary to clearly explain local people so that they understand, including uncertainty of effect, and to improve environment and disaster prevention education so that local people can make a choice and consensus.

4. Conclusion

We intend to work for dissemination and technical support so that results of this study are utilized in development of tsunami disaster prevention communities.

☞ See the following for details.

1) Technical Note of NILIM, No. 986

<http://www.nilim.go.jp/lab/bcg/siryou/tnn/tnn0986.htm>

2) Outline of Symposium (NILIM HP)

http://www.nilim.go.jp/lab/fcg/labo/abstract_20170907symposium.pdf