

Research Trends and Results

Development of Tsunami Evacuation Safety Evaluation Method Aiming at Improvements for Safe Urban Districts

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1. Foreword

In the Great East Japan Earthquake, the importance of countermeasures against tsunami was highlighted due to the multitude of deaths that occurred. However, the tsunami evacuation safety evaluation method based on aspects of urban district improvements cannot be said to have sufficiently been deliberated.

NILIM has been dealing with the development of the tsunami evacuation safety evaluation method necessary for planning urban district improvement projects, and we shall herewith introduce the outline of the research and the perspective of R&D (research and development) for the future centering on the tsunami evacuation simulator being deliberated as its series.

2. Outline of the tsunami evacuation safety evaluation method

The tsunami evacuation safety evaluation method is formulated by deliberating the following three items.

- Development of tsunami evacuation simulator
- Development of method to identify places/factors disturbing evacuation
- Development of planning methods

Of these, the tsunami evacuation simulator is a program to pursue solutions as to whether each person in a region can reach a safety shelter by calculating their evacuation behavior, maximally utilizing existing research results (fire evacuation models, vehicle transport models, and tsunami retroaction models). We have been carrying out deliberations introducing new knowledge and technologies. (Figure 1)

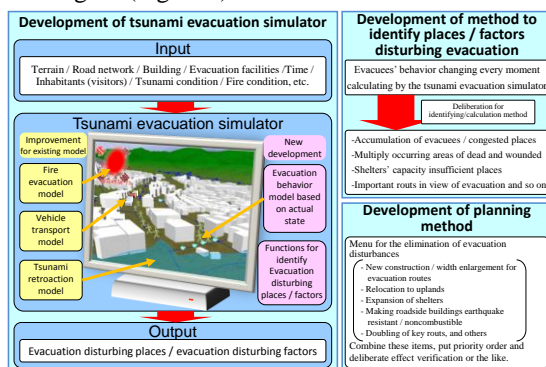


Figure 1: Research composition of development for tsunami evacuation safety evaluation method

3. Tsunami evacuation simulator

As a calculation model for evacuation behavior, in decision-making for evacuation commencement / destination selection / transferring route selection, evacuation is initiated at a point when an evacuation risk by tsunami and fire is in excess of a set level, so we established an evacuation behavior model making it a basic point to select destinations and transfer routes with minimal risks, and have prepared a program coordinated with tsunami retroacting calculation results and fire, building collapse and the like. (Figure 2, 3)

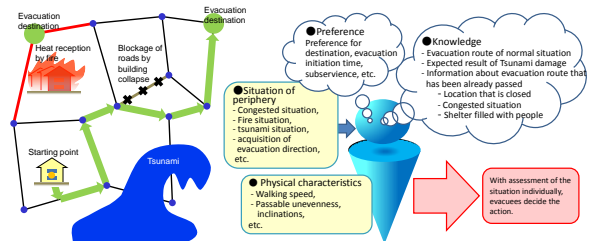


Figure 2: Conceptual chart for evacuation behavior model

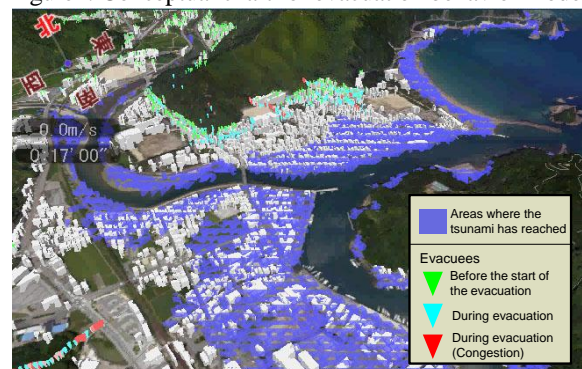


Figure 3: Calculation examples

4. Conclusion

We have carried out the development of an evacuation simulator with consideration to risks of tsunami, fire or the like. In the future, we will verify the effectiveness of the simulator in the design process of urban district improvement, as well as incorporating calculations for evacuation behavior using vehicles.

[Reference]

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