

Research Trend and Results

Deprivation/Recovery of coastal cities' disaster-prevention facilities functions by the Great East Japan Earthquake tsunami and the construction of disaster-prevention cities' lodgment functions and creation of disaster-prevention cities

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1. Foreword

In the Great East Japan Earthquake, due to massive tsunami said to occur once in several hundred years or a thousand years, many of disaster preparedness facilities such as local government offices and hospitals, fire stations, shelters or the like became dysfunctional caused by flood and interference occurred in independently dealing with disasters as cities. In the "Research on disaster structuring support technology for coastal cities." being tackled by the Urban Planning Department (fiscal 2012 – 2014), research has been proceeded with disaster preparedness facilities against massive tsunami and the method for ensuring functions by disaster-prevention urban city structuring.

2. Location of disaster preparedness facilities and urban planning

According to an assumption of the biggest class of tsunami flood being carried out in each region currently, many of disaster preparedness facilities have been included in the flood zone, and its relocation to highlands has been deliberated. Meanwhile, many of such facilities are located adjacent to central urban districts, contributing to the convenience for inhabitants in normal times.

In order for fast and sloppy relocations of disaster preparedness facilities not to invite cities' declination in parallel with decrease in population, increase in earthquake/inundation resistances for these facilities and relocation to safer districts and identification of alternative facilities to replace existing functions, preferential functional recovery after disaster, enhancement in resilience for lifelines, ensuring delivery networks or the like, shall integrally be carried out in harmony with the future images of cities.

3. Survey results in afflicted cities

Last fiscal year, targeting devastated cities by tsunami in the Great East Japan Earthquake, we investigated damages of disaster preparedness facilities and resulting interferences on ensuring functions, the situation of functional recoveries by compiling literatures and hearing or the like. Due to tsunami damages surpassing presumption, although the measures prescribed in existing regional disaster-prevention plans varied in many cities, as a result, the facilities' spatial allocations of urban disaster preparedness facilities (including substitute facilities) and spatial allocations in urban/regional levels and locational relations with each facility and arterial roads or the like have been found affected to not only facilities' damaged conditions but also to its functions in its emergency response and recovery / restoration periods. If aligned phenomena seen in urban/regional levels with reference to ensuring disaster-prevention functions, it leads to the following charts.

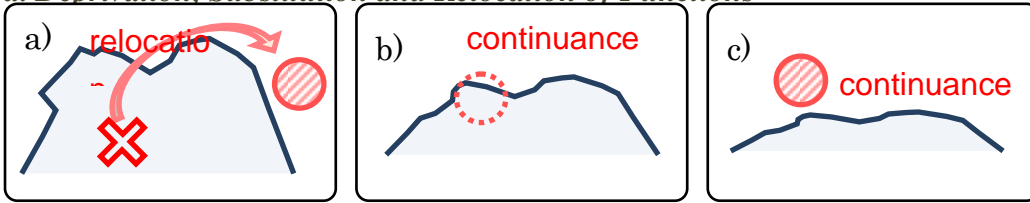
4. Preparation for Nankai trough giant earthquake

Currently, deliberating a scenario for ensuring disaster preparedness facilities' functions in Tokushima and Wakayama Prefectures where indicated presumption of tsunami flooding by Nankai trough giant earthquake and we are discussing methods to boost its effects.

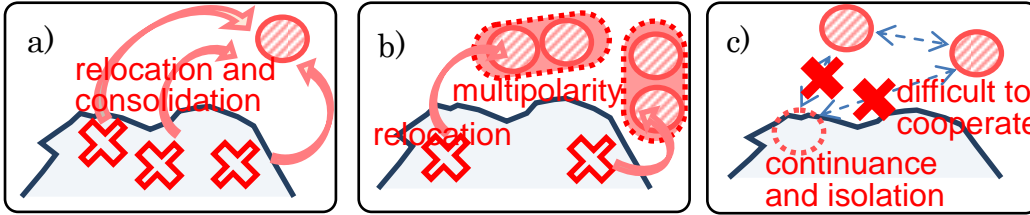
[Reference] Urban Disaster Mitigation Division Home Page: Current Study

<http://www.nilim.go.jp/lab/jdg/index2.htm>

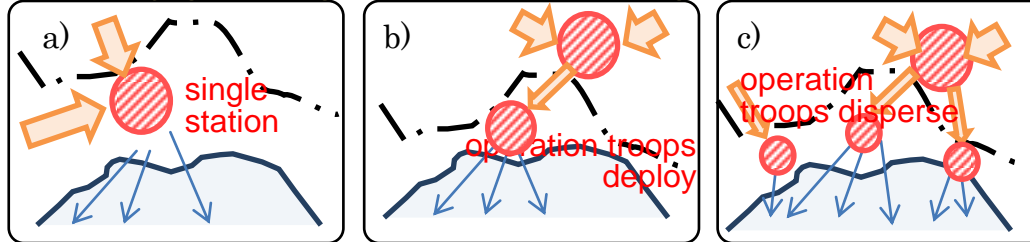
a. Deprivation, Substitution and Relocation of Functions



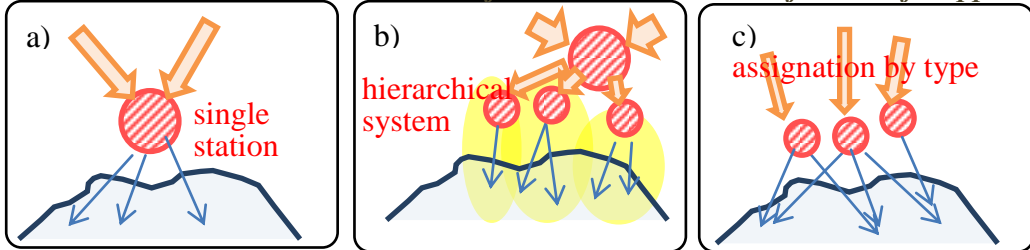
b. Consolidation and Dispersal of Headquarter Functions



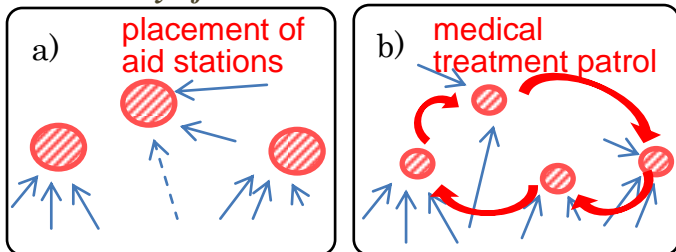
c. Hierarchy of Stations for External Disaster Relief Teams



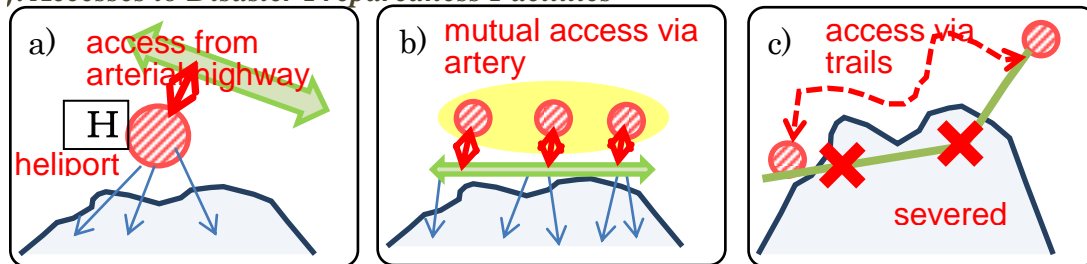
d. Centralization and Decentralization of Distribution Stations for Relief Supplies



e. Hierarchy of Shelter Functions



f. Accesses to Disaster Preparedness Facilities



g. Different Use of Public Facilities according to Locations

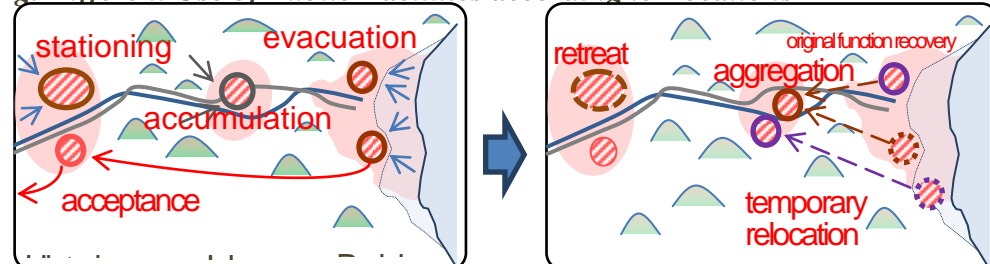


Figure Phenomena at cities' and regional levels observed in reference to ensuring disaster preparedness functions in tsunami disaster preventive cities