

# Joint Study on Sewer Damage and Its Impact Caused by Large Earthquake in Aomori City

Year of research	2007~2010	Promotion of earthquake disaster prevention
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**(Purpose)**

In recent years, large earthquakes have occurred frequently and damage to sewer facilities has become a serious issue.

The drainage earthquake measures emergency plan in Aomori city has developed on FY2006 and drainage earthquake measures emergency project based on this plan is being carried out (FY2007-FY2011).

This study is aimed at developing the base for an earthquake measure plan of the entire Aomori City area. The matters being investigated are as follows.

- The estimated amount of damage of drainage facilities that would be suffered as a result of a large earthquake.
- The prioritization for implementation of earthquake measures.

And Menus of disaster mitigation measures based regional characteristics were picked out as provisional measures.

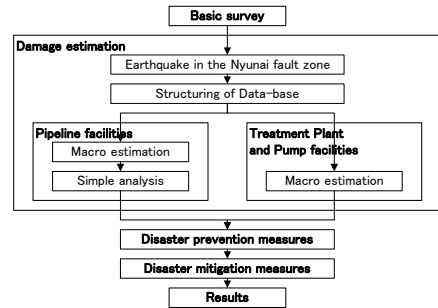


Fig.1. Joint study flow

**(Results)**

(1) The investigated of Prioritization for Pipeline facilities

1) Damage estimation

Damage estimations were evaluated comprehensively using two types of damage estimation methods target of seismic intensity of 6 – 7.

- Macro estimation method : for understanding the damage to the overlook and the population effected
- Simple analysis : for determining prioritization of the concrete implementation for earthquake countermeasures

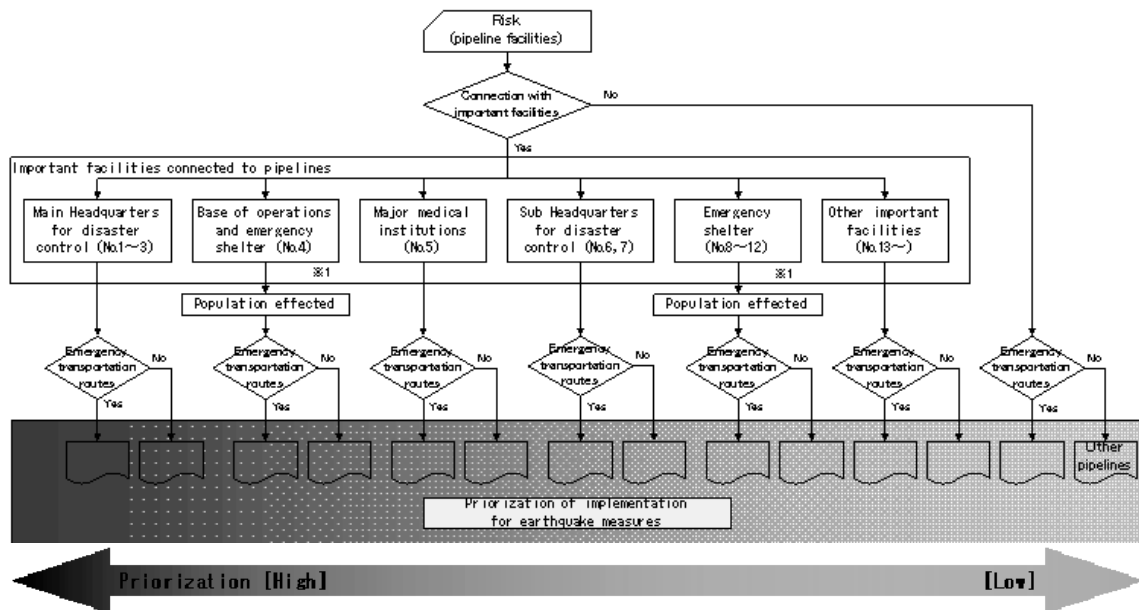


Fig.2. Prioritization for pipeline facilities

2) Protection measures (Implementation Prioritization)

The implementation prioritization of measures for the pipeline was determined in terms of "Emergency", "Importance", "Impact"

Scores based this implementation prioritization was assigned to each pipeline and the prioritization of each area was clarified considering the laying year.

(2) Earthquake measures and disaster mitigation measures for Treatment plants and Pumping stations

1) Damage estimation

Damages for Treatment plants and Pumping stations were typed and degree of macro damages was expected based the factors of earthquake, ground condition and situation of pre-seismic for 2 treatment plants, 15 pumping stations and a regulating pond.

2) Implementation Prioritization

Phased measures target for Aomori city based the earthquake guidelines.

Damage estimations were evaluated comprehensively using two types of damage estimation methods target of seismic intensity of 6 – 7.

The prioritization of measures for each facility was clarified by use of 3 points, "Emergency", "Importance", and "Impact".

3) Mitigation measures

The menus as the mitigation measures in Aomori city is as follows.

- Toilets measures in shelter with accommodations
- Ensuring flow capacity (Networking Pipes)
- Management by the inspection map for the important pipes
- How to use the database to emergency earthquake activity
- Emergency response of manhole pump facilities
- Temporary pond and Temporary chlorine mixing basin

**(Conclusion)**

Prioritization of unit areas and span was clarified for existing pipeline facilities, and the foundation for the master plan for the efficient earthquake countermeasures projects.

We picked out 6 menus for the mitigation measures based regional characteristics.

Even if earthquake countermeasures have not been finished. Those menus make temporary responses possible.

In the future, the earthquake countermeasures master plan will be formulated based on the results of this study. And earthquake countermeasures will be promoted effectively in Aomori city.

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Key words

Damage estimation, population effected, earthquake countermeasures plan