

# (1) Development of design technique for disaster prevention facilities against recently more frequent and intense water hazards

## Research Summary

Research period: FY 2016 - FY 2021  
Program leader: Director of Cold-Region Hydraulic and Aquatic Environment Engineering Research Group

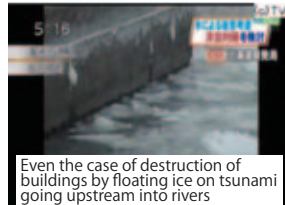
### Research background



Levee breach by overflow beyond the designed level



Levee breach by piping



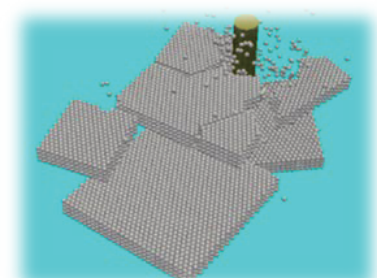
Shocking destruction by tsunami with wreckage



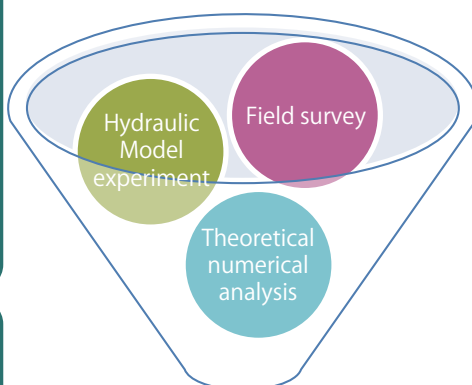
More frequent occurrence of storm surge/high waves due to climate change



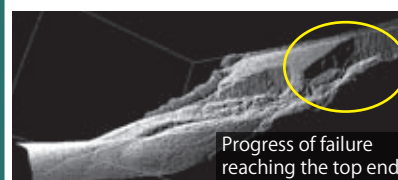
Technical evaluation using full-scale experiment



Development of numerical calculation method for collision/fracture of tsunami debris such as sea ice floes



Development of technology for non-structural measures to mitigate damages for the new stage of water-related disasters and massive earthquakes/tsunami



Progress of failure verified by the permeation model experiment



Understanding the effect on structures by experiment of tsunami running up a river

In recent years, intensive and heavy rainfalls in local areas cause frequent floods that is beyond the capacity of facilities. Levees are destroyed by overflow and seepage, and river structures are damaged by high-speed flow. In addition, due to the 2011 Great East Japan Earthquake, working on tsunami disasters has become an urgent issue.

Furthermore, the technology capable of responding to hydrographic changes such as massive waves caused by the low-pressure is required, because frequent low-pressure system developing into a powerful level equal to typhoon due to climate change is expected to approach the coastal area facilities.

However, the research has not been fully conducted to establish technologies to make higher resilience against devastating destruction. For this reason, in this research, we develop

technology for structural measures to mitigate damages against the new stage of water-related disasters and massive earthquake/tsunami caused by climate change in consideration of the external force of disaster at the level of reaching maximum and causing shocking destruction. In order to achieve these goals we will work on the following research topics.

- (1) Development of technology for evaluation/strengthening river levees against overflow and erosion
- (2) Development of technology for evaluation/investigation of safety of river levees against water permeation.
- (3) Development of technology for evaluation of impact of tsunami on structures and design method
- (4) Development of technologies appropriate for hydrographic changes due to climate change