Systematic initiatives to link disaster case studies to the improvement of river technologies

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1.Maintaining technologies

Needless to say, river improvement and river course management play a role in maintaining and improving safety from flooding, but recent large-scale disasters have been sharp reminders of the importance of maintaining the technologies which support these activities [1)]. A Levee Research Committee and River Structure Technology Council established by the River Bureau last year have presented a framework for performing field surveys of disaster cases to accumulate technical knowledge and revise technical standards etc. Under this framework, the NILIM is conducting the following three research projects related to the above technological maintenance.

2. Analysis information concerning disaster cases are the touchstone of river technologies

A disaster case survey diverges from the conventional perspective by, based on a variety of actually measured values, connecting the processes resulting in damage one at a time to mechanically verify the appropriateness of its findings. Based on knowledge obtained from such meticulous analyses, reviews and improvements of design methods are made continually. In order to put the above ideas into practice, the NILIM conducts disaster case studies jointly with regional development bureaus, and taking the disaster study of the weir and its adjoining levees on the Angagawa River System [2)] as an example, the impact of the previous year's fluctuation of the river course downstream from the weir on the water level and on riverbed scouring near the disaster location was analyzed.

3. Discovering technological information in inspection and patrol records

Records of inspections and patrols of levees and past disasters and repairs are checked to abstract the types of deformation, members deformed, and degree of their deformation which are linked to decline of functions at the same time as all conditions for inspections and patrols done to accurately grasp such deformations (walking, driving or other traveling method, implementation frequency, state of vegetation, etc.) are clarified. To establish such an analysis method, records of inspections and patrols, etc. performed during the previous five years are used to analyze data. Even initial organization by superimposing locations where deformation is confirmed and locations repaired on a plane map of the river course provide clues drawing out information of use for inspections by, for example, permitting sections where deformation was concentrated and confirmed to be distinguished.

4. Need for mechanisms to continue disaster case studies

For the NILIM and regional development bureaus to continue to jointly survey disaster cases etc. in such detail, considerable labor is required and the number of surveys performed each year is probably naturally limited. Consequently, it is important to also provide a mechanism to strengthen motivation to continue studies. The NILIM is constructing a database as a means for river managers to share cases in which they have been involved with river managers throughout Japan, and to obtain hints for solutions to challenges they face. The River Bureau has established an implementation system to contact the NILIM after a disaster, to perform joint studies to obtain more detailed results, and to record the results in the database. The NILIM intends to take initiatives in order to apply information which has been accumulated in the database to improve technologies.

[Sources]
1) Report by Hurricane Katrina External Review Panel of the American Society of Civil Engineers (Japanese translation):
http://www.nilim.go.jp/lab/bbg/saigai-gaikoku/asce.pdf
2) Survey of Causes of Levee Disaster on the Agagawa River and Future Policies: Journal, River, February, 2013