

Promotion of Smart Sediment Management

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1. Introduction

In order to accelerate the trend of adopting comprehensive sediment management across the country, the National Institute for Land and Infrastructure Management (NILIM) has started the development of activities consisting of (i) development of typical activity as a flagship of comprehensive sediment management in Japan, (ii) generalization of the results of accumulation of individual cases and experiences in technical standards, etc., and (iii) application of generalized results to other cases. The contents of these activities are as follows.

2. Points and systems of activities

"Comprehensive sediment management" is based on the concept of managing sediment-related issues arising in various forms according to the areas of mountain / foot of mountain, alluvial fan, plain, and river mouth / coast in accordance with "flow of sediment," such as sediment transport system, without confining issues to each area.

Of these issues, with focus on maintenance / recovery of the functions of dams where sediment accumulated, we are studying in this fiscal year with the theme of "Smart discharge of sediment from the dam to downstream" by reasonable combination of all possible measures, including (i) sediment discharge with a flood, (ii) excavation of the upstream river channel of the dam to reduce incoming sediments, and (iii) moving sediments by mechanical power, such as a belt conveyor.

Comprehensive sediment management is a significant issue that the MLIT should solve with all its energy and take the initiative to address without merely providing "technical support." We are studying in close cooperation mainly with the Chubu Regional Development Bureau, which controls the Yahagi River and is addressing the urgent issue of sediment discharge from the dam.

3. Breakthrough in promotion

For appropriate sediment discharge / supply from a dam, main breakthroughs are the following two points.

One is development of technology for discharging the sediment already accumulated in the dam or technology for reducing the sediment that will accumulate in the dam in the future. We study the development of such technologies considering various conditions, such as

actual flow regime of the river, topography of the site, and operation of the dam.

The second is the grasp of behavior of sediment supplied downstream. Sediment discharge without particular purpose may result in excessive accumulation of sediment on river bed, which impairs the function of river channel to discharge flood to the downstream, and in affecting the areas of inhabitation / growth for fishes and other living things in the river. Therefore, we are studying how sediment accumulates on the river bottom according to the ways of sediment discharge and what measures are required to discharge sediment without excessive accumulation. And we found that this issue can be solved by controlling the amount of sediment to be discharged when flow rate is small.

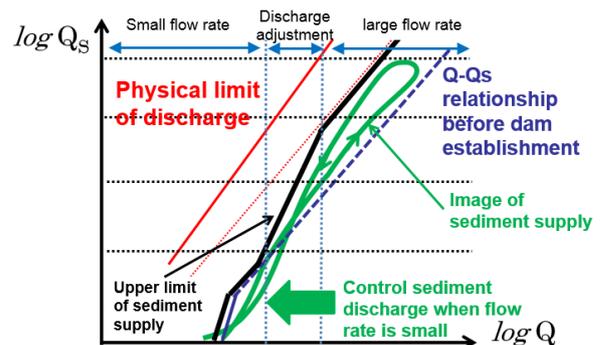


Figure. Relation between Water Flow (Q) and Sediment Discharge (Qs)

These two issues have often been discussed separately as the issue of "Dam area" and the issue of "Channel area," but it is important to address them comprehensively as a series of phenomena by introducing the relation of "water flow and sediment discharge" and grasping sediment behavior in respective areas.

4. Conclusion

We consider that dissemination of research findings is a significant role of the NILIM. In the process of developing study cases, we intend to share information and disseminate findings as appropriate.