Approach for maintenance management of Sabo facilities that passed many years after completion

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INTERPRAEVENT
2020 – Bergen, Norway

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INTRODUCTION

Japan is very prone to sediment-related disasters. In recent years, climate change has intensified natural phenomena; large-scale sediment-related disasters (such as that caused by heavy rain in July 2018) are becoming more common **(Fig. 1)**. Sabo works (efforts to improve erosion and sediment control) have been ongoing for centuries in Japan. Many Sabo facilities, such as masonry check dams, were constructed more than 50 years ago. To avoid sediment-related disasters, it is very important not only to construct new facilities but also to maintain and prolong the functions and performance of these existing Sabo facilities adequately.

Fig. 1. Example of masonry check dams in Hiroshima Prefecture damaged by heavy rain in July 2018.

To this end, the Erosion and Sediment Control Department of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) has ordered all Sabo offices of Japan to develop plans prolonging the lifespan of Sabo facilities. The Erosion and Sediment Control Department of the MLIT has delivered manuals to all Sabo offices. The manuals, entitled "Planning Manual for Maintaining and Prolonging the Lifespan of Sabo Facilities" and "Inspection Procedure Manual for Sabo Facilities" are aimed at helping facility managers investigate the soundness of existing facilities and plan lifespan-prolonging maintenance; all Sabo facilities are currently maintained and managed in line with these plans. To support these efforts, our organization has been studying methods for evaluating the soundness of Sabo facilities and measures for prolonging the lifespan of Sabo facilities based on its own research and analysis.

In March 2019, the manuals mentioned above were revised; the concept of "life cycle cost (LCC) reduction" was introduced. Also, initiatives to prevent damage to old masonry Sabo facilities caused by sediment-related disasters commenced. Here, we introduce to reduce the LCCs of Sabo facilities and to show example to repair/reinforce existing masonry Sabo structures.

INITIATIVES FOR APPROPRIATE FUTURE MAINTENANCE OF EXISTING SABO FACILITIES

1) Revisions of the Manuals

Reduction of life cycle costs (LCCs) is essential for future maintenance of Japanese Sabo facilities. Therefore, in March 2019, the Ministry ordered Sabo officers to revise their prolonging plan for lifespan of Sabo facilities, and to consider reducing LCC and levelling their annual budget for maintenance of existing Sabo facilities **(Fig. 2)**.

2) Repair and reinforcement of old masonry Sabo facilities.

Many old masonry Sabo facilities were damaged in recent disasters. In response, Ministry ordered the facility manager to consider the repair and reinforcement of old masonry Sabo facilities **(Fig.3)**.

In addition, a budget system was established in FY2019 to subsidize part of the maintenance costs necessary to achieve.

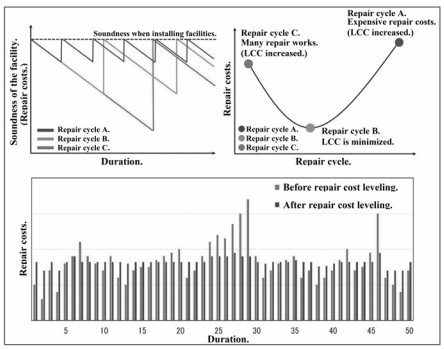

Fig. 2. Image of reducing LCCs and leveling annual budget for maintenance.

CONCLUSION

Today, the environment surrounding Japan's Sabo works has changed remarkably. To maintain and improve the safety of the region in the future, it is essential to take appropriate measures to extend the life of exiting Sabo facilities.

Many old Sabo facilities is still functioning as active disaster prevention facilities. We think that the essential points in the maintenance of existing Sabo facilities are as follows; to preserve the functions and performance required for disaster prevention facilities, to widely communicate the role of Sabo facilities, to examine utilization measures as regional vitalization resources, and to examine maintenance management in cooperation with the region.

Our organization will continue to maintain and manage existing Sabo facilities, including Sabo facilities built in the older ages, utilizing the knowledge and technology accumulated in previous efforts and new research results.

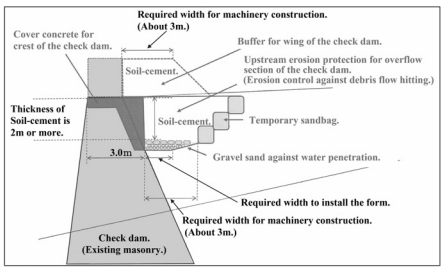

Fig. 3. Example of Repair and reinforcement of an old existing masonry check dam. (Example of minimum safety control planning.)

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