

# REMODELING OF SABO DAM BY INSTALLING SLITS

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## 1. Introduction

Uesugi-tani river, a tributary of the Asahi river, of which rank is 1<sup>st</sup> in terms of the river law, runs in Maniwa city in the northern part of Okayama Prefecture.

The river is characterized by beautiful topographic settings formed by falls and rich in fauna and flora so that attracts a lot of tourists and holidaymakers during high-time. The river is affectionately known as Uesugi valley.

On the centrally to the scenic settings however, the river is characterized by high risk of flash flood with high sediment concentration rate due to bank erosion and associated mobile materials accumulated on the bed.

To cope with possible disasters, three sabo dams had been built in order to stabilize the valley bed.

In view of recent trend in the needs for actions aiming at recycling-oriented society and better global environments, among various means to reduce sediment discharge, an existing sabo dam was remodeled by attaching slits. The slits allow smaller particles to pass during peace time so that a sabo dam can keep the sediment storage capacity maximized to cope with flash flood.

A sabo dam equipped with slits can therefore allows fauna such as fish and amphibia run upstream and check debris in case of flood. Consequently natural environments are well preserved.

## 2. Study on aquatic fauna and fishway design

In order to make an appropriate design of the slits and the fishway to be attached to the existing sabo dam, a study on the aquatic fauna around the dam was conducted.

The results of the study revealed that, as illustrated in Table 1, a variety of Fish and salamanders were living in the valley.



Figure 1 Location of the project

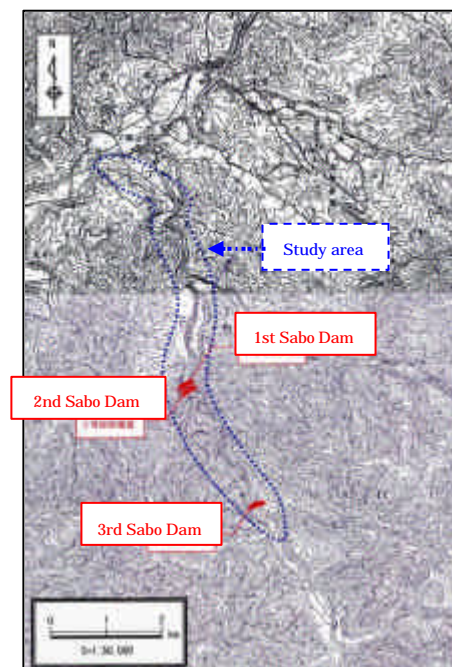


Figure 2 Location of existing structures in Uesugitani River

**Table - 1** Fish identifies in Uesugitani river

Order	Family	Species
Eel	Eel	Eel
Carp	Carp	Kawamutu
		Takahaya
		Ugui
	Dozyou	Shima Dozyou
Catfish	Alaza	Akaza
Salmon	Salmon	Amago
Kasago	Kajika	Kajika
Suzuki	Haze	Kawayoshinobori



Photo 1 Environmental Study

### **3. Remodeling of existing Third Sabo Dam by installing slits**

The Uesugidani river third sabo dam of which height and length are 8.7 meters and 51.3 meters respectively had been built in 1978 and reservoir had been filled with sediment. In order to examine whether the sabo dam can well fit the slit type dam, a piece of core sample was extracted by boring work. The core sample showed that the concrete of the dam was sound enough as the foundation of slits. The center part of the dam was therefore removed by wire-saw and hydraulic sharing machine.

The type of slit was determined, taking into account the flow mode of bed materials and their particle size, as B type. The dam was, at the same time, strengthened by placing extra concrete on the upstream face and extending the crest 3 meters wide.

The followings are the sequence of the work:

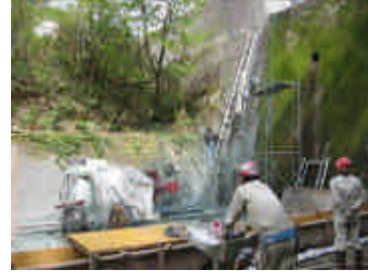
- 1) remove sediment in the reservoir in order to make sufficient space for concrete cutting work,
- 2) make temporally stock yard,
- 3) cut dam body using wire-saw and removed the center part concrete using hydraulic sharing machine,
- 4) install the B-type slit in the dam body,
- 5) place extra concrete on the upstream slope



3rd Sabo Dam



Sedimentation in the 3<sup>rd</sup> dam reservoir



Concrete cutting by means of chain saw



Crest of the dam



B-type Steel pipe Slits



Completion of the work

Photo 2 Construction Process

#### 4. Conclusions

Remodeling work of three sabo dams was planned. Slits were attached to the uppermost dam last year and to the second upper dam two this year, and a fish ladder will be attached to the lower dam next year.

As a result, reservoirs will be kept always vacant during peace time so that fauna can move freely in the valley. Debrisflow can be efficiently checked and natural environments will be well preserved.

The following follow-up activities are necessary for verification of the project;

- 1) study on the move of fauna,
- 2) study on the move of fish
- 3) survey on the changes in sedimentation in the reservoirs,
- 4) study on the effects and efficiency of the fish ladder,
- 5) environmental assessment on the impacts of the work

Further study on the effects of the slit-type dam and fish ladder is needed by collecting cases. The results of the study are useful to construct many more environment-conscious structures.