

# Prevention of the Recurrence of Disasters in Revetments of Small-and-medium-size Rivers

(Study period: Fiscal 2015 and 2016)

SUWA Yoshio, Head, FUKUSHIMA Masaki (Dr. Eng.), Senior Researcher, YAMAMOTO Yoko, Senior Researcher, SUZUKI Atsunori, Researcher, River Division, River Department

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## 1. Introduction

There is an increasing concern about damage to small-and-medium-size rivers since the 2016 typhoon No. 10 caused substantial damage to Omoto River, Iwate. When we focused on the small-and-medium-size rivers that once suffered damage and recovered from the disaster, we found that some of them suffered damage in an area near the disaster recovery area or two or more times during a short period. As one of the reasons for the occurrence of disaster at multiple times during a short period, failure to take into account the characteristics of river channels in disaster recovery is considered (e.g., having the shallow foundation embedment of the river revetment in disaster recovery of the area where the river bed was deeply scoured). Therefore, our Division conducted an on-site survey on some of such small-and-medium-size rivers in order to grasp the factors and situations of disasters and study countermeasures. This paper reports the results of this survey.

## 2. Selection of target rivers and areas

In selecting target rivers, we carefully examined the disaster recovery application documents, particularly those on river revetment, which are prepared to conduct disaster recovery projects and include damage pattern and recovery plan, with focus on the following.

- (i) A river that suffered a disaster about 5 times during the past decade.
- (ii) A river that suffered a disaster two times in the same area during the past decade.
- (iii) A small basin with area of about 100km<sup>2</sup> that suffered a disaster about 5 times during the past decade.

In addition to the above, we surveyed some rivers for which the relationship of bed material and riverbed gradient is different from the average river channel characteristics. For each target river, we surveyed the sites specified in the disaster recovery application documents where recovery was conducted.

## 3. Survey results (example of disaster in the inner side of the bend)

In one of the target rivers, there were a number of areas where the inner side of the bend, not the outer side of the bend, which constitutes the water colliding front. As a result of checking the site, the discharge capacity is not so large and disaster seemed to have occurred from the crown of revetment due to the rise

of water level in the event of a flood (Photo 1). Since the recovery work was conducted so as to connect with the existing dry masonry revetment of the upstream, if the dry masonry revetment suffers damage, the area may suffer damage again. In order to prevent the recurrence of disasters, when the revetment to be recovered is constructed so as to insert it to the stable area of the mountain side (base rock, etc.), it would be possible to prevent recurrence of damage to the revetment to be recovered even if the existing revetment suffers damage (Photo 2). Our Division intends to continue the survey on the situations of disasters in small-and-medium-size rivers and provide information to prevent recurrence of disasters.



Photo 1: Recovery from the damage in the inner side of the bend

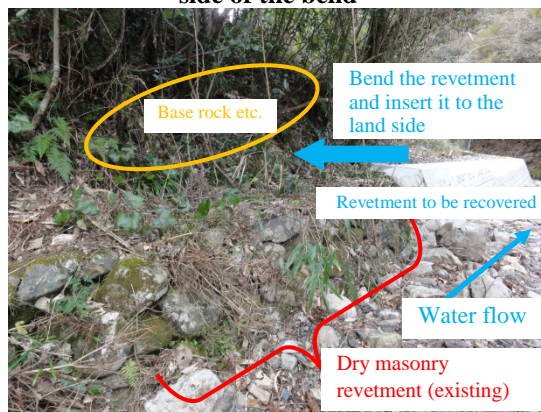


Photo 2: Proposal for recovery to prevent recurrence of disasters