

Traditional technique : Kawakura (skeleton)

Category : Groins Sicle : 17th century

River : Kurobegawa (Kurobe River)

Site : Kurobe City (Toyama Pref.)



Kawakura skeleton works placed in front of the village for protection from the flood of 1942



Flood fighting during the flood of 1959 (skeletons and bamboo gabions)



Skeletons assembled during a recent flood-fighting drill

Source: Taming the Wild River: A 60-year History of MOC Projects for the Kurobegawa (Kurobe River) (in Japanese), March 1998, Kurobe River Work Office, Ministry of Construction

Description:

The kawakura method is usually used in rapid rivers. In the Kurobegawa (Kurobe River), the method has been used since the feudal years. Skeleton works of this type may be placed so as to directly protect the lower part of the riverbank or may be placed so as to reduce the energy of the water. In the former configuration, the head of the skeleton is oriented toward the riverbank, the ridge beam is sunk in the water so it is directed slightly upstream from the direction perpendicular to the direction of flow, and the skeleton is immediately weighted down with gabions or stone bags. Since these skeletons are often used in torrential rivers, it is difficult to sink them exactly at the intended locations without allowing the skeletons to be washed away. The assembled skeletons, therefore, need to be moored until they are properly tied down (e.g., with wires).

In the Kurobegawa (Kurobe River), bamboo gabions were often used for flood fighting because flexibility of bamboos makes it easy to pack stones. It was common practice, therefore, to plant bamboos imported from the Noto region near the river.