



Embankment - Bungo Kiyokawa Miemachi

Product used: Barchip M 30mm

The Project

Customer:	Japan Railway Kyushu
Contractor:	Sanki Construction Company
Total Area:	2,000m ²

Introduction

Japan's four major islands, Honshu, Hokkaido, Kyushu and Shikoku are covered by an extensive and reliable network of railways.

About 70 percent of Japan's railway network is owned and operated by Japan Railways (JR), while the remaining 30 percent belongs to several dozen private railway companies, especially in and around metropolitan areas.

Kyushu is Japan's third largest island, located southwest of the main island Honshu. The embankment in Oita Prefecture in Kyushu, is located over one of Japan Railways main lines.

The embankment became unstable due to long term weathering of the soil and finally in October 2004 because of heavy rains a landslide occurred which led to the closure of the main line.

A solution was required to rehabilitate this embankment quickly and competently.

The works were made more difficult because of the sites isolation and height of over 50 metres. Both scaling and shotcrete operations had to be carried out from the top of the embankment.

Surface Preparation

Proper preparation of the embankment was essential to ensure that the substrate for the shotcrete bond was good.

This involved the use of a small mechanical excavator to remove rocks and loose earth to leave a relatively clean and competent spray face.



View of the embankment and the railway line approach



Scaling operations



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Shotcrete

Because of the sites isolation and difficult access shotcrete was batched using a mobile batching plant at the top of the embankment.

Once the surface had been prepared it was sprayed with Barchip reinforced shotcrete dosed at 9.0kg/m³



Mobile batch plant



Shotcreting the embankment face



The completed upper face of the embankment

No other reinforcement was used to stabilise the embankment and the railway line was quickly reopened minimising delays to the network.



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