

SUMELA MONASTERY ROCKFALL PROTECTION PROJECT TRABZON, BLACK SEA , TURKEY

Dynamic Barriers

Problem

The Sumela Monastery is an ancient Greek Orthodox monastery founded around 386 AD within the Pontic Mountains, in the Macka district of Trabzon Province in Turkey. The monastery is located in a steep cliff at an altitude of about 1,200 meters and is known as a site of great historical and cultural significance, as well as a major tourist attraction nationally and internationally. Due to the almost 300 meter high steep slope and the exposed position of the monastery towards the slope it is very vulnerable to rockfall. That is why in 2015 due to several severe rockfall events the monastery was closed to the public for safety reasons.

Solution

Within the guidelines of a technical committee consisting of several professors from various, prestigious technical universities of the country, Maccaferri supported the design phase regarding the rockfall prevention systems for the Sumela Monastery. Due to the touristic aspect of the project, next to the technical safety also the aesthetic aspects of the design needed to be in line with the architectural structure of the monastery.

As a technical solution the lowest part of the monastery was scaled and trimmed in great detail by our team of professional climbers in order to prevent any rockfall without using any netting systems, so that the direct view would not be disturbed. The steep slope right above the monastery has been protected by 5 lines of 3000 kilojoule dynamic rockfall barriers and a 8500 kilojoule rockfall barrier right above the monastery.

Next to the dynamic rockfall barriers, the slope has been covered with Double-Twist Wire Mesh and High-Energy Absorbent (HEA) Panel in combination with surface anchors. One of the main challenges was the installation that had to be carried out in a very careful manner due to the fact that even small rockfall events during the installation could damage the monastery itself. Also, due to the position of the monastery, it was not possible to use any kind of heavy equipment, which is why all the transportation of the materials, the drilling of the anchors and installation of all protection systems needed to be carried out by the Professional climbers by hand.

Client: MINISTRY OF CULTURE AND TOURISM

Designer / Consultant: MACCAFERRI

Contractor: KARACAN GROUP

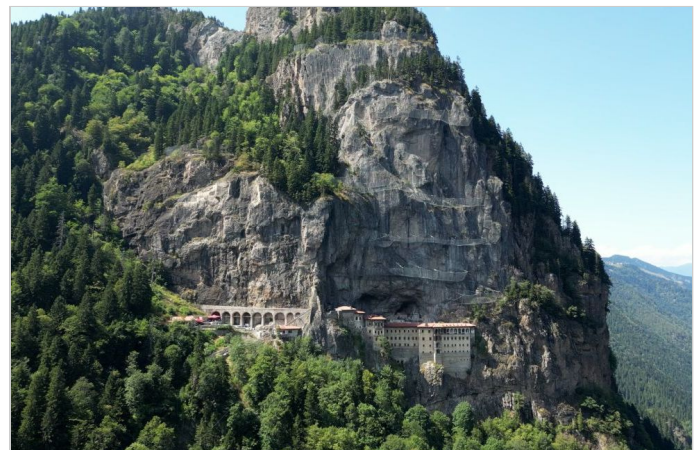
Products used (Qty.)

- Rockfall Barriers 3270 sqm

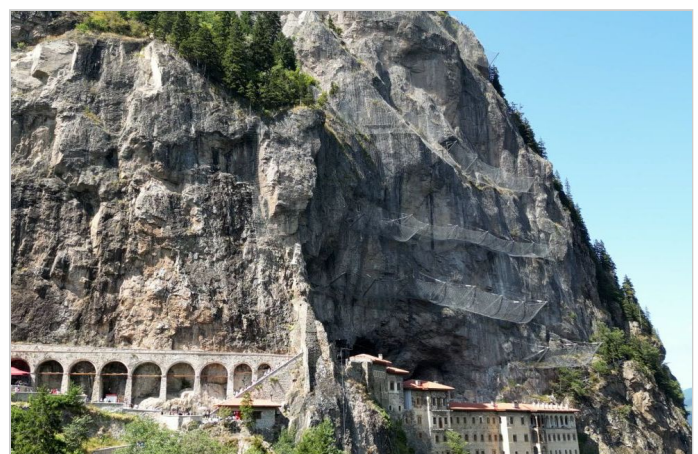
Date of construction: 03/2019 - 09/2021

[Google Maps](#)

[Google Earth](#)



Sumela Monastery Front View



Sumela Monastery Side View



Sumela Monastery Front View Initially



Sumela Monastery Inside View



Drilling Operations Sumela Monastery