

UPRR Hybrid Barrier Dunsmuir, California, USA

Product: Hybrid, Cable Net and Double Twist Mesh Rockfall Attenuator.

Introduction

Dunsmuir is a city in Siskiyou County, California, United States. The population was 1,650 at the 2010 census, down from 1,923 at the 2000 census. It is currently a hub of tourism in Northern California as visitors enjoy fishing, skiing, climbing, or sight-seeing. During steam engine days, it was notable for being the site of an important Central Pacific (and later Southern Pacific/ Union Pacific) railroad yard, where extra steam locomotives were added to assist trains on the grade to the north. The area is still extremely important for rail traffic moving along the West Coast.

Problem

When UPRR started a modernization of track at Dunsmuir they had to resolve continuing safety issues caused by rockfall

Solution

Maccaferri suggested and assisted in the design of a Hybrid Rockfall Barrier / Attenuator to catch and safely control falling rock to the bottom of the slope.

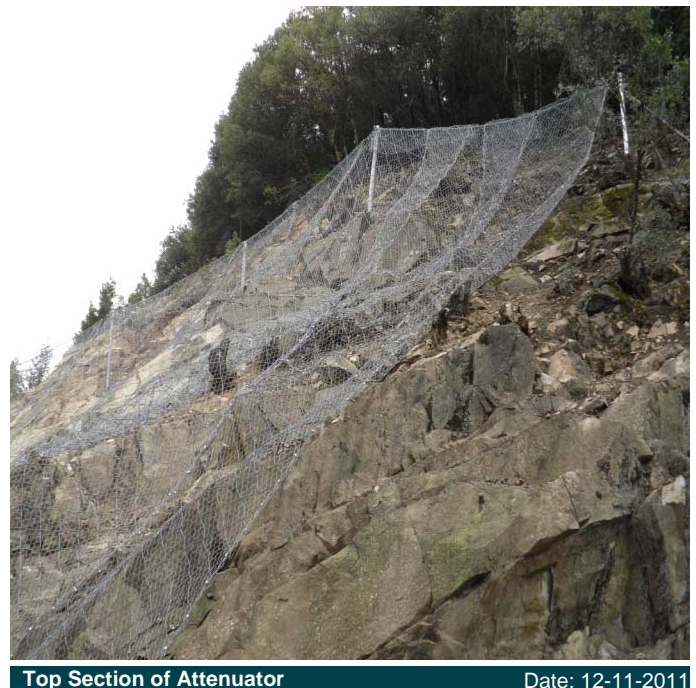
Best Features of Structure

A Rockfall Attenuator or Hybrid Rockfall Barrier combines features of a simple drapery and a Flexible Rockfall Barrier. The upslope portion of the drapery is lifted off of the slope with the post and rigging of a flexible barrier. The drapery mesh is then laid down the slope. In this case cable net is used to add weight to the system. Rock falling from above the drapery is caught by the lifted leading edge of the barrier and guided safely to the bottom of the slope by the mesh drapery system.



Hybrid Rockfall Barrier

Date: 12-11-2010



Top Section of Attenuator

Date: 12-11-2011

Client:

Union Pacific Rail Road

Main contractor:

Neil's Controlled Blasting, Loomis, California

Designer:

Holdrege and Kull, Nevada City, California

Products used:

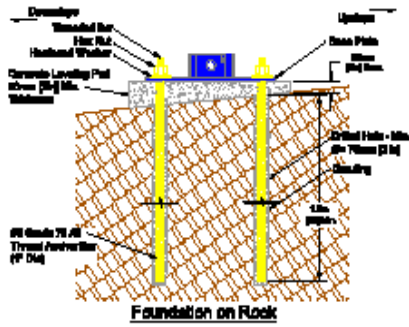
HEA Cable Net, Double Twist Net, Barrier Post System

Date of construction

September 2010

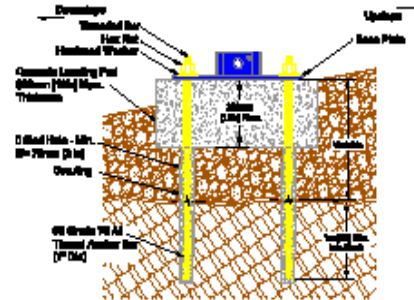
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FOUNDATION POSITIONS FOR THE DAME PLATE SECTION



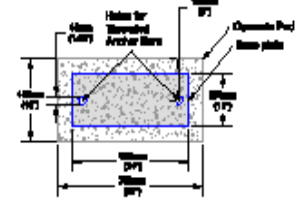
Foundation on Rock

FOUNDATION POSITIONS FOR THE DAME PLATE SECTION



Foundation on Soil over Rock

FOUNDATION POSITIONS FOR THE DAME PLATE PLAN



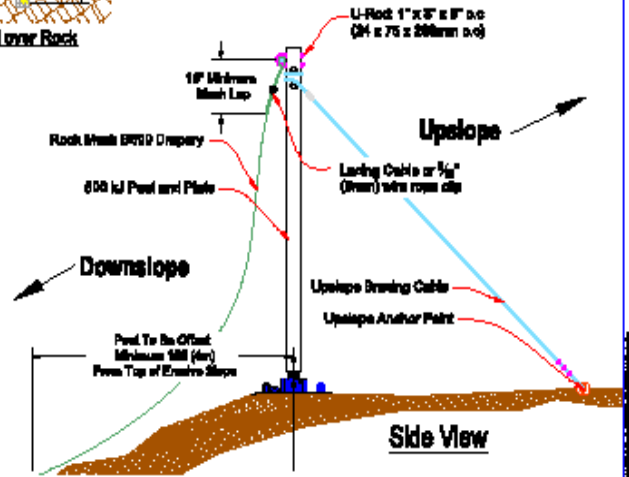
Anchor Length Recommendations:

- L = 1.5m (48") Min. In for Foundation on Rock
- L = 1m (30") Min. Embedment into Rock for Foundation on Soil over Rock
- L = 3.66m (120") Min. In Soil or Foundation on Soil

Note: Length of anchor shall be designed based on the hole conditions.

Leveling Pad Recommendations:

- Foundation on Rock - Leveling Pad to Gain Intimate Connection Between Rock Foundation and Base Plate, Using 4000psi (28MPa) Type II Cement Grout.
- Foundation on Soil over Rock / Foundation on Soil - Leveling Pad to be Formed Using 4000psi (28MPa) Type II Cement Grout.



Side View

<p>Maccaferri Inc. assumes no responsibility for the design and construction of projects, as designed by the contractor or a general contractor to support the proper use of its products.</p>	<p>Drawing Title: HEA Panel Plus DT Mesh Drapery Side View, and Foundation Details</p>	<p>Design: - Date: -</p>	<p>Project: UPRR - HYBRID BARRIER</p>	<p>MACCAFERRI Maccaferri, Inc. 13003 Governor Lane Blvd. Williamsport, MD 21795-3116 Tel: (301) 223-6910 Fax: (301) 223-6134</p>
	<p>Project No: UPRR0110-000</p>	<p>Client: NEIL'S CONTROLLED BLASTING</p>	<p>Drawn: BL Date: 01.10.2010</p>	
<p>Drawing No: 3</p>	<p>Units: Feet</p>	<p>Scale: NTS</p>	<p>Sheet: 1</p>	

Project Detail Date: 08-16-2010



Cable Mesh and Double Twist Mesh Date: 12-11-2011



End Post and Rigging Date: 12-11-2011

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