Wyssen Reference Project

Avalanche mitigation for the Trans-Canada Highway #1 at Three Valley Gap

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wyssen switzerland avalanche control

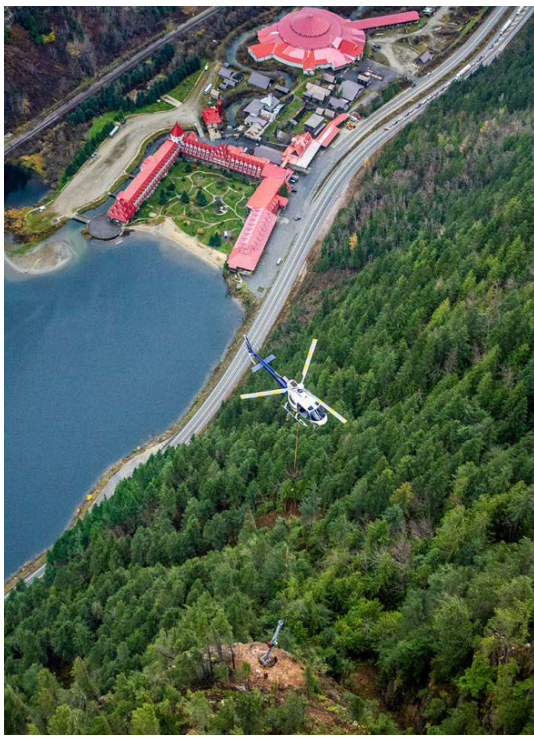
Avalanche mitigation for the Trans-Canada Highway #1 at Three Valley Gap

Project:	Avalanche Protection at Trans-Canada Highway #1
Place:	Three Valley Gap near Revelstoke, BC
Country:	Canada
Year:	Installation 2016, 2017 and 2018
Customer:	Ministry of Transportation and Infrastructure (MoTI)
Protected Object:	Road
Installed Systems:	11x Wyssen Avalanche Tower, 12 shots each

Initial Situation

The Trans-Canada Highway #1 is the main highway from East to West in Canada. With more than 7000 km (4350 miles) it is one of the longest traffic routes in the world. Between Banff and Salmon Arm the highway passes through the Rocky Mountains and the Columbia Mountains where many avalanche paths directly affect the highway, e.g. Kicking Horse Pass, Three Valley Gap and Rogers Pass.

In the past, avalanche mitigation in Three Valley Gap was performed by helicopter control or with preventive closures. Challenging terrain and weather conditions made helicopter control a risky task and avalanche control operations were limited to periods with flying conditions, e.g. daylight.



Our solution

In 2016 Wyssen Avalanche Control was awarded the installation of 9 Remote Avalanche Control Systems (RACS) in the Three Valley Gap avalanche starting zones. The terrain is characterized by gully features on a steep and forested rock face which rises nearly vertically from the highway. The exposure of the highway to avalanches and rockfall in Three Valley Gap is significant.

Working in the terrain at the planned tower locations was very challenging due to rockfall, proximity to the highway and the requirement for rope access at most locations. The allowed highway closure times were short to keep the traffic flowing since the fastest detour for traffic takes six hours. After extensive preparation, Wyssen successfully installed four avalanche towers in a four-week period. Five more avalanche towers were installed in summer 2017 followed by two more towers in 2018.

Operational experience

Closure times

In the first year the overall closure time of the highway (including removal of avalanche debris) was reduced by 50%. This was achieved with only four installed avalanche towers out of the planned nine. The time needed for avalanche control was reduced for each mission. The installed Wyssen towers allow conducting avalanche control at any time, e.g., day and night, and in a very fast and efficient manner.

Worker safety

The installed RACS allow the separation of the risks involved in handling explosives from operational risks during avalanche control missions.
All deployment boxes are loaded with explosives in the fall when operational pressure on workers is minimal. During an avalanche control mission, the safety team can focus on the tasks at hand and does not have to manipulate explosives.

Worker resources

Usually when avalanche control is needed in Three Valley Gap other areas along the highway also have increased avalanche hazard. The time efficient operation of the RACS allows to free up worker resources for other areas where personnel is needed.

Photo credits: © Ryan Buehler

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