

Wyssen Reference Project  
**Remote Avalanche Control System**  
**for public road in Norway**



**Safety** through **innovation**

**WYSSSEN** *avalanche*  
switzerland+ *control*



## Remote Avalanche Control System (RACS) for public road in Norway

<b>Project:</b>	Securing County Road 53 Tyin - Årdal by avalanche towers
<b>Place:</b>	Tyin, Oppland County
<b>Country:</b>	Norway
<b>Year:</b>	2016
<b>Customer:</b>	Norwegian Public Road Administration (NPRA)
<b>Protected Object:</b>	Road
<b>Installed Systems:</b>	- 14 Wyssen Avalanche Towers 12 shots with wind generator - 1 Automatic Weather Station (on tower) - WAC.3®

### Initial Situation

The county road 53 Tyin – Årdal, is in Oppland county on the border to Sogn & Fjordane in Norway. It's an important road for the inner parts of the Sogn region and especially the local community Årdal. A large part of the road is located above tree line, which makes it very exposed to winter storms and avalanche hazard.

- ✓ Several avalanches hitting the open road every year
- ✓ Temporary closures only option to mitigate the risk
- ✓ High avalanche danger causing closures to last several days each winter
- ✓ High uncertainty and elevated risk when re-opening the road

### Avalanche Control in Norway

In Norway, avalanche protection has traditionally been carried out with permanent measures such as tunnels, dams, snow sheds or snow fences. These measures are very effective, but the investment and running costs are often very high and the environmental impact is considerable.



## Testing Wyssen Avalanche Tower at Road 53 Tyin - Årdal

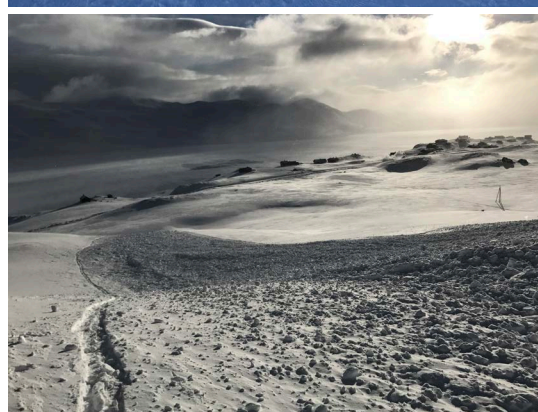
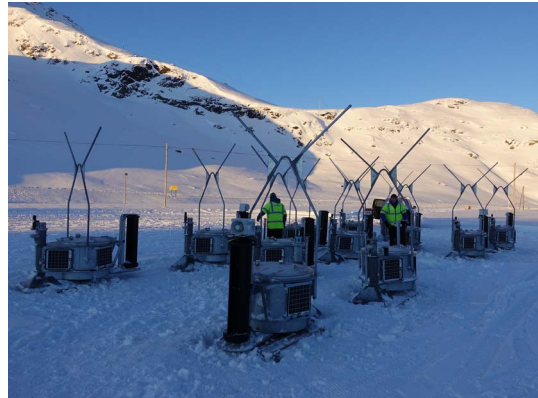
In 2010 the Norwegian Public Road Administration (NPRA) decided to test a Remote Avalanche Control System (RACS) at the county road 53 Tyin – Årdal in Oppland County. A Wyssen Avalanche Tower was installed in one of the many avalanche paths threatening the road to test out whether the system would perform in tough Norwegian winter conditions with strong winds, low temperatures and almost no daylight during the winter months. The two year test-project was very successful.

Based on this the NPRA and Oppland county decided to install RACS at all avalanche paths along the road to mitigate the avalanche hazard along the road. The project was announced January 2016 and several suppliers delivered offers.

### Our Solution

In April 2016 the NPRA awarded Wyssen with the contract of supplying, install and maintain 14 RACS for Road 53 Tyin - Årdal. The award criterias set by NPRA in the public tender was 70% price and 30% quality. The offer from Wyssen had the highest score on both criterieas. During the first planning phase of the project, NRPA had to take into account that they did not know which system what would be installed when they decided the positions to install the RACS. Due to the large area affected by the Wyssen Avalanche Tower, some RACS locations could be moved to cover one extra release area that was not in the original plans.

All towers were installed during the fall of 2016, and all systems were operational ahead of schedule before the 2016/2017 winter. During the first two operational seasons, close to 200 avalanches has been released by the system and the risk for all users of the road has been significantly reduced. NPRA considers the project to be a great success and is considering the low investment and the achieved result.



### Summary

- ✓ All 14 systems delivered, installed and operational ahead of schedule
- ✓ 95 % cheaper than the original plan of alternating the road and building a tunnel
- ✓ Almost 200 avalanches released during the first two winter seasons
- ✓ Automatic weather station on the tower provides crucial information for the avalanche control team
- ✓ 24/7 monitoring of all systems to ensure 100% operational systems all winter long
- ✓ Increased safety for all users of the road
- ✓ Significantly decreased closure times related to avalanches



## A Project of:

### Wyssen Norge AS

Fosshaugane Campus, Trolladalen 30  
6856 Sogndal  
Norway  
Tel.: +47 971 235 82  
norway@wyssen.com  
[www.wyssenavalanche.com](http://www.wyssenavalanche.com)

### Stian Langeland

Tel.: +47 971 235 82  
stian@wyssen.com



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