

application note



Metal Hardness Testing

Mont Blanc Express

The “Mont Blanc Express” safely climbs the slope of Europe’s tallest mountain on a 200‰ line. How does Equotip help to maintain the 100-year-old cog railway tracks?

To overcome steep gradients in Alpine landscapes, special lines called “cog railways” are common. A cog railway has a flat toothed rack between the two guide rails to drive the train.

The TrackNet Holding is the Swiss market leader in the production and maintenance of railroad track material. TrackNet inspects the 37 km narrow-gauge mountain railway “Mont Blanc Express” running from Martigny in the Swiss Rhone Valley to the French city of Chamonix at slopes of up to 200‰. To report structural changes in the toothed racks over the years, TrackNet uses Equotip to determine their hardness.

Application

TrackNet use the Equotip Piccolo 2 to study the hardness of toothed rack rail made from tempered steel. The task is to verify whether the hardness of the contact point between the cog rack and the train gear changes with time.

One particular inspection job on the “Mont Blanc Express” consisted of testing cog tracks of three different ages: brandnew, 2-year old and 100-year old ones. On the mountain, the racks can get greasy, rusty and rough. The test location was prepared simply by removing the grease and sandpapering. Seven impacts were done across a tooth of the rack to determine the average hardness converted to HB. It was found that the hardness of the brand new rack was approximately 220 HB, whereas the hardness of the 2-year and 100-year old rack ranged between 250-270 HB.

Customer Quote

“We sought a solution to reliably compare the hardness of up to 100-year old toothed racks of cog railways. It was not possible to use stationary Brinell testing machines on rail tracks that were installed outdoors.

The Equotip Piccolo 2 offers the portability and accessibility required to test racks running on a mountain side. We have found results that reassured us that the ‘rack strength’ does not usually deteriorate over time, but reaches a stable hardness level once the train has consolidated the material beneath its gear.”

Inspection engineer, TrackNet Management AG, Kerzers, Switzerland - Proceq customer since 2009.

Profile

Customer

TrackNet Management AG is an inspection service company within the TrackNet Holding group, the Swiss market leader in the production and maintenance of railroad track material with origins going back to 1954. TrackNet now plays an important part in the development of railroad transportation in Europe.

Employees

Over 100 employees located in Switzerland

Requirements

- Outdoor inspection of installed rail tracks
- Testing in restricted spots on the flat toothed rack
- Simple preparation of the surface for the test
- Hardness readings indicated in Brinell HB
- Data recording

Proceq Product

Equotip Piccolo 2 with DL Accessory Kit

Benefits to the Customer

- Portable and easy to operate
- Long slim DL test nozzle
- Test spot can be prepared easily with a cloth and sandpaper to remove dirt and enhance surface smoothness
- Display of hardness in all common hardness scales
- Data can be transferred to a PC via Piccolink to analyze the results once returned to the office

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