



Düsseldorf, August, 2009

New anaerobic Loctite Products in 2009

## A German masterpiece

Imagine a 82 m long, rock-eating submarine with four floors, as tall as a high rise building with 20 floors lying on its side. This monster is heavier than a dozen 747 jumbo jets and creeps forward through the earth behind a more than 9 m tall rotating cutting face. Sounds a little outlandish to you? Product of a hyperactive imagination? If you thought that, you were wrong. This is not Hollywood, this is the Discovery Channel.

If you are the kind of person that doesn't like science fiction, because you are interested in reality, Allmannsweier in Baden-Württemberg is the place for you. This is one of the more pleasant regions of Germany, famous for its good food and the friendly locals. It's also the home of Herrenknecht, the world's leading manufacturer of tunnel boring machines. And it's those machines which dwarf the imagination of your average Hollywood screen writer. It's not surprising that the company and its charismatic founder, Dr Martin Herrenknecht has attracted a lot of attention from the global media lately. "An insane piece of engineering" is how the American Discovery Channel describes the Herrenknecht machine that drilled a 5.4 and a 3.9 kilometer tunnel in Kuala Lumpur in 2006. The defining project of Herrenknecht's career and one of the greatest public works of any kind is the Gotthard Base Tunnel. The tunnel, which has been under construction since 2002, will run from the village of Erstfeld, in central Switzerland, to Bodio, in the southeast, a distance of more than 57 kilometers. When completed, in 2017, it will be the longest traffic tunnel in the world; it is also one of the most geologically challenging, The Gotthard crosses nine geological zones. It cuts through granite and quartz, along fault lines and beneath a sugar like layer of dolomitic marble – a challenge to anything going through it.

## **No rock too hard, no mountain too high: Loctite and Herrenknecht**

Herrenknecht has been growing ever since its foundation in the 70s. It now employs around 3000 people worldwide and sales reach one billion Euro for the first time in 2008. This impressive success story is partly due to the fact that Herrenknecht took advantage of the opportunities offered by globalisation. China is one of the countries which Herrenknecht focused on early and in 2008 they were able to celebrate the delivery of the 100th machine to the powerhouse of the world economy. Wherever one of the machines operate, Malaysia, China, Switzerland or Brazil, Henkel's Loctite products always play an important role during the construction of those insane pieces of engineering. Loctite threadlocker 243 is used to lock all the screws in the machine, which has to withstand enormous pressure while it eats its way through the rock.

Another application which makes good use of the reliability that Loctite stands for, is the machine's rotating cutting head. The cutting head's power unit relies on a variable number of single engines. The superstructural part's flange ring and main bearing as well as transmission case and main bearing are cemented repeatedly in a laminary fashion, using Loctite 586. This process allows to transmit more than twice the turning movement that would be possible otherwise. The cementing with Loctite enhances the reliability and allows the power unit to withstand the forces that can come to bear on it underneath the earth. Loctite Sales Engineers are also involved in the planning process of the machines, liaising with the various

Herrenknecht departments in order to meet the customer's construction needs as early as possible. Henkel and Loctite are ideal partner for Herrenknecht's tunnel-boring machines, which never quite know what kind of rock they will have to taste next. Loctite's Rapid Response Process, allows us to respond to new requirements in a matter of weeks. The next stop for the tunnel boring machines is Paris, where the new tunnel for the Metro 12 has to be drilled.

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