

Bringing reality to WIRE ROPE TESTING

BY PATRICIA GLYNN

What if there was a wire rope bending fatigue test machine which could, for example, more accurately reproduce the conditions typically encountered on a crane? And what if this same machine could also supply all the information normally gathered from eleven separate trials in just one testing cycle?

For Roland Verreet, owner of Aachen, Germany's Wire Rope Technology, a steel wire rope failure analysis corporation, a testing machine should, at the very least, "tell you if you have a good rope or bad one." Yet much of the existing conventional equipment, he observes, isn't even meeting this very reasonable expectation.

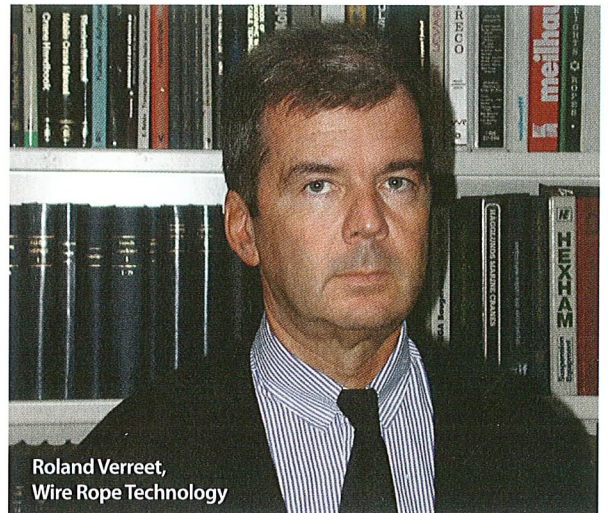
It is, he asserts, a very disconcerting problem.

Fortunately, he has a solution – and his answer, he promises, is poised to upend traditional testing as we know it.

The importance of testing wire ropes can't be emphasized enough. Every rope, after being subjected to corrosion, abrasion, and fatigue, will eventually fail. And so the better and more sophisticated your testing equipment, the more likely you'll be able to predict where and when the inevitable failure will occur. This, in turn, can lead to significant savings in terms of time, money, and, most importantly, lives.

What is perhaps Verreet's biggest criticism of conventional testing machinery involves the number of testing sheaves normally included. "With the typical machine, there is usually only one test sheave. Given this, you may actually never find out if you're working with a bad rope," he cautions, "because unfortunately the sole test sheave will milk any looseness from the test zone. This means that if the rope was, for instance, manufactured with an incorrect backtwist, an issue that on a crane would lead to problems over time, the length differences created during manufacture will be milked out of the test zone and the test machine will end up analyzing a good rope."

A typical crane will, in all likelihood, feature multiple sheaves. If an issue does arise then one



Roland Verreet,
Wire Rope Technology

sheave will push any length differences between the rope elements, or as Verreet's suggests, "milk the looseness," onward to a fellow sheave. The fellow sheave will milk it back, and the looseness thus remains in the reeving system., The rope," Verreet points out, "will deteriorate prematurely."

Verreet began to think of how he might better reproduce reality during the testing phase so as to increase the probability of exposing faults. Eventually, after calling upon his nearly forty years worth of experience and knowledge, it came to him: "Ideas like this come in the flash of a second," he says.

He designed a bending fatigue machine incorporating five separate sheaves.

"The rope is subjected to five times as many bending cycles," remarks Verreet. "One section of the

rope will move over the five sheaves in both directions, resulting in ten bending cycles. Another will travel over four sheaves, completing eight bending cycles. And so on.”

In the end, testers will be able to analyze one broken section which has been processed through the full number of bending cycles, along with two other intact pieces which have moved through fewer cycles. “One section can be analyzed externally and then taken apart to explore its internal condition at the given number of bending cycles. Further, another section can undergo a pull test to determine how strong it is.”

The feat is impressive, particularly when you consider how the identical process would otherwise look. In competitor’s machines, he notes, “to examine the external condition of the rope, you have to stop mid-test to do

temperature build-up. An equitable level of heat is generated at varying sections along the rope and there will be no temperature gradient.”

The outcome, he asserts, is highly undesirable. “The rope will heat up and the lubricant will drop off.”

Before building a prototype, Verreet demanded added input.

“Designing the details always takes much longer. And a great part of the process was completed by my partner, Jean-Marc Teissier.”

A France-based engineer, Teissier is the founder and CEO of dep engineering in Grenoble. dep engineering currently manufactures and sells Verreet’s new test machine.

The first prototype of Verreet’s alternative machine was built in 2008. It did some of its first testing trials for NASA. The fatigue machines are presently on the



Rendering of Verreet's New Testing Machine

“WE HAVE SUCCESSFULLY CREATED A TOOL WHICH ALLOWS USERS TO PERFORM TESTS UNDER FAR MORE REALISTIC CONDITIONS.”

– Roland Verreet, Wire Rope Technology

the analysis. Additionally, you have to do this while the rope is still inside the machine, meaning the lighting will be very poor. Moreover, you won’t be able to remove the lubricant as that wholly changes conditions for the following bending cycles.”

With Verreet’s machine, on the other hand, things play out in a markedly different fashion: “The bending fatigue tests will not have to be halted in order to count breaks and evaluate the rope’s condition. You can do this after the one test. All told, it will save you a tremendous amount of time.”

Interestingly, Verreet also resolved concerns regarding temperature. “Steel wire rope is normally a good heat conductor and the heat which is generated by bending it will commonly be conducted to cooler area. However, conventional machines featuring two or more sheaves will, in reality, usually suffer tremendous

market at a cost ranging from \$100,000 to \$400,000. Further, dep., according to Verreet, has recently introduced a larger version which is available for approximately \$1 million.

Thus far, customers, he shares, are “amazed” and have found the machine to be a true “value-add” for their business.

“We’ve managed to avoid the main disadvantages of conventional test machines. We have successfully created a tool which allows users to perform tests under far more realistic conditions. What’s more, they will be able to accumulate a wealth of information with only a limited number of tests.”

In the end, when asked why industry leaders should purchase his equipment rather than one from a competitor, Verreet unhesitatingly responds: “That’s easy: There is simply no alternative to what we’ve built.” ■