



# QUALITY IS NOT A MATTER OF CHANCE

Precise planning, development, testing and application

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1,117 days of testing in one year



# WE LEAVE NOTHING TO CHANCE!

People's safety - and sometimes even their lives - depend on the reliability of steel wire ropes. Therefore, we leave nothing to chance! For the selection of a high performance steel wire rope, reliable specifications such as breaking force, discard criteria, but also rotating characteristics, service life, and spooling characteristics are key for multilayer spooling use. Each parameter has a direct impact on the total operating costs. Each step of the development work performed by TEUFELBERGER is based on the real conditions prevailing on site at our customers. Using one-of-a-kind and state-of-the-art systems for testing and analyzing we can examine ropes in every detail. This is how we develop premium high performance steel wire ropes excelling in each specific application.



“For more than 20 years, I’ve been developing steel wire ropes for TEUFELBERGER with enthusiasm, and I know that the performance of a rope in the field can depend on a trifle. If you notice certain behavior of a rope when using it on site, it will be too late. Therefore, we at TEUFELBERGER consider all conceivable aspects like design, ambient temperatures, reeving systems, as well as specific applications right from the start when developing a rope.”

Robert Traxl - head of R&D for steel wire ropes

## Precise planning: CAD (Computer Aided Design)

Precision, simulation, perfection - these are the prerequisites for successful development work with a lasting effect. By applying a specially developed CAD program, TEUFELBERGER is able to optimize every detail of its high performance steel wire ropes as early as in the development phase.

## Turning the inside out: the MRT-method (Magnetic Rope Testing)

By means of this method, TEUFELBERGER analyzes what happens inside a rope when it is heavily loaded. They permit the detailed analysis of damage mechanisms in order to develop ropes whose discard criteria are clearly visible from the outside.

13 million bending cycles per year

## Service life under scrutiny: bending fatigue testing machines

Already in the development phase, we consider numerous practical factors with a potential influence on the service life of our high performance steel wire ropes: e.g. sheaves of plastic or steel, different fleet angles or different loads. Our bending fatigue testing machines provide us with significant information regarding the point of discard and also the service life - the basis for durable and reliable ropes.

## Precision with a big impact: electronic measuring equipment for efficiency testing

To ensure the smooth lifting and lowering of the hook block, maximum efficiency is required. Where wire rope drive systems with a high number of rope sheaves are used, efficiency plays a particularly important role. By means of electronic measuring methods we can test the efficiency of our high performance steel wire ropes as a function of tensile load. Using different rope sheaves, for example, a realistic situation can be created. Electronic measurement permits a precise analysis of efficiency, thus providing us with plausible data which may unmistakably tell us, for example, to pick a markedly lighter hook block.

## Determining breaking forces and analyzing torsional behavior: tensile testing machines

While many manufacturers have to rely on external institutes for analyzing rotation properties and breaking forces, TEUFELBERGER has various in-house facilities available. Tests with load capacities of up to 3000 kN and torsions up to 14000 newton meters can be performed quickly and efficiently.

### Reliable data regarding breaking forces:

The prerequisite for the safety of a steel wire rope are high breaking forces. At TEUFELBERGER, the breaking forces are determined not only during rope development, but also continuously during production. Thus, a statistically relevant volume of significant data is obtained.

### Rotation properties:

The rotation properties of a hoist rope substantially affects the performance and economic efficiency of a rope. As it is the most important parameter for the lifting and lowering of loads, it should be determined in advance as precisely as possible. On our tensile testing machine we simulate realistic application loads.

### On determining the torsional behavior, we also ascertain

- ✓ the torsion factor
- ✓ the torsion angle under load
- ✓ torsional stiffness
- ✓ restoring torque
- ✓ the behavior of the rope in case of torsion caused by external influences

Up to 20 testing ropes  
per design





7,863 hours field and in house testing

## Rope end terminations subjected to endurance testing: dynamic fatigue tests and tensile testing machines

By means of dynamic fatigue tests and tensile testing machines we analyze the influence of rope end terminations on the breaking forces of our high performance steel wire ropes. Our unique technical equipment allows us to carry out tests up to 3000 kN.

Only suitable and correctly mounted rope end terminations make a rope complete. The information obtained ensures that the different rope types manufactured by TEUFELBERGER work safely and reliably in combination with the right termination.



“We leave nothing to chance. Which termination is the right fit for which rope in which application? We test our high performance steel wire ropes with a multitude of possible terminations in advance, so our customers are not faced with unpleasant surprises in daily use. Time and again, I enjoy bringing our steel wire ropes to perfection.”

Diethart Güttler - strategic development engineer of steel wire ropes



# WE DON'T TALK ABOUT QUALITY – WE DELIVER IT!

TEUFELBERGER has an extraordinary number of measuring and test facilities on hand. A rope is subjected to quality control from development, incoming inspection and production through to product testing and the analysis on site at the customer's premises.



“Quality is not a matter of chance but the result of well-engineered operational procedures, precise analyses and comprehensive tests. Day after day I thoroughly enjoy the task of ensuring that the creation of a rope and all the steps required before it's actually used follow and meet the highest standards.”

Johann Schwabeneder - QM coordinator for steel wire ropes

## The base product must be right: meticulous testing of the individual wire

Only premium wire can be the basis of a perfect high performance steel wire rope. Therefore, we hand-pick our wire suppliers and test and evaluate each individual wire very strictly.

## To make everything run smoothly: unique lubricant tests

The functional greasing of high performance steel wire ropes is a constant balancing act. The grease has to adhere under the most extreme temperature conditions and at various time speeds of rope operation, while never losing its lubricating properties. In a special test, TEUFELBERGER tests the adhesion of lubricants to ensure that it uses the best possible types of grease in the right quantities.

## Putting products to the acid test: high-tech labs

Superficial testing does not satisfy TEUFELBERGER. We also apply micro hardness tests and various microscopic examinations, e.g. by means of incident light microscope or stereo microscope, to expand into the interior of our high performance steel wire ropes. Nothing remains hidden to us.





19,439 hours of development

# WITH END-USER KNOW-HOW TO SERIES PRODUCTION

A development environment is one thing, the actual use of high performance steel wire ropes on site is another. We at TEUFELBERGER have unique technical equipment available to test our ropes in advance under realistic conditions.



“To see our high performance steel wire ropes playing to their strengths on a crane is the greatest pleasure for me. Already on installing the rope we set the course for long-term performance. If there is any unexpected trouble, I’ll be there round the clock to provide help quickly, unbureaucratically and competently.”

Mario Hartl - head of applications engineering for steel wire ropes

## Transferring requirements from the crane directly into the rope

The unique crane rope test rigs have been developed together with leading crane manufacturers and fully reflect the real conditions of use for our high performance steel wire ropes.

On our crane wire test rigs we test and/or simulate

- ✓ wear in multi-layer spooling
- ✓ fleet angles
- ✓ rope sheaves of plastic or steel
- ✓ spooling behavior with different d/D ratios
- ✓ temperature changes
- ✓ different groove geometries

TEUFELBERGER’s application engineers are always present during field tests. The findings obtained in these tests are directly incorporated into the development work. In this process, the permanent know-how exchange between crane manufacturers and TEUFELBERGER plays an important role - especially in the phase before series production. The know-how of the application thus gained by us at TEUFELBERGER is unrivaled in the industry. Our extraordinary test and simulation facilities enable us to correct 75% of the errors even before the field tests are carried out.

Our crane rope test rigs create realistic conditions.



„The newest rope solution from TEUFELBERGER is a direct result of studying the cranes and corresponding applications themselves. Naturally, comparative testing and understanding of the other ropes in the market is required to develop a new product which is both unique and several years ahead of any other current designs. As a user I can say that the latest released boom hoist rope EVOLUTION P9 keeps its promises - safe use, reliable external discard criteria, longest service life.”

Bill Adams - Premier Wire Rope USA





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