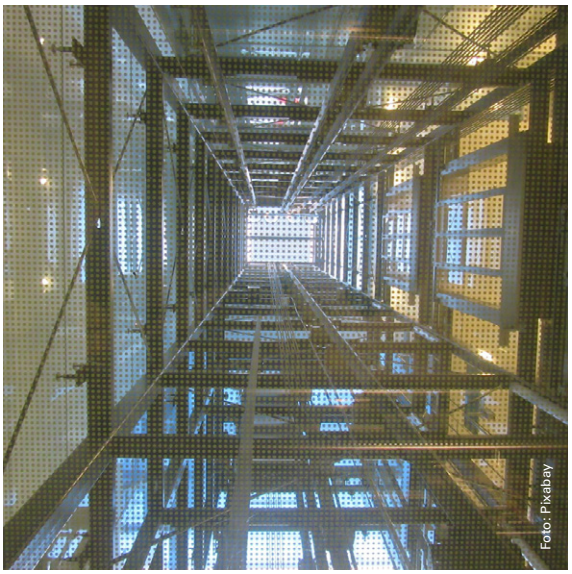
University of Stuttgart
Institute of Mechanical Handling
and Logistics

ROPE TECHNOLOGY



Ropes in application

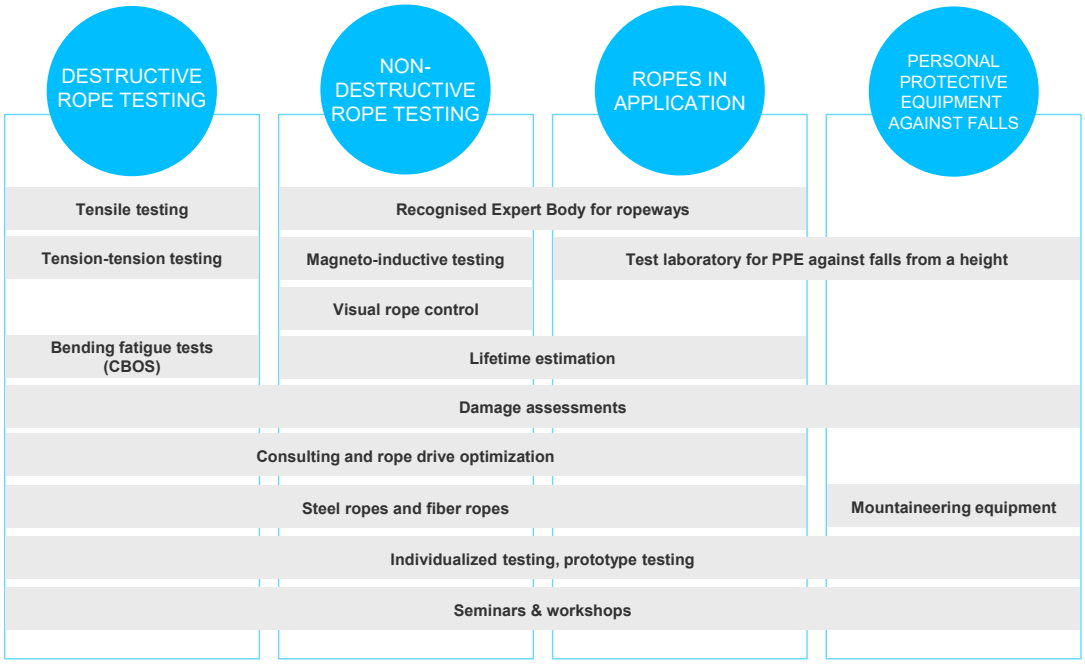
ROPE TECHNOLOGY AT IFT

RESEARCH | DEVELOPMENT | TESTING SERVICES

The Rope Technology department conducts application-oriented research and development and implements it in a wide variety of research and industrial projects. The range of services includes a variety of different testing methods, both destructive and non-destructive. Testing is performed on steel wire ropes and fiber ropes in stationary or running applications. Non-destructive rope tests are mainly used in ropeway technology, elevators, materials handling equipment in the industry or constructions.

Another focus is on new and further developments of rope testing devices, test rigs and their components. For rope testing, the IFT's 1300 m² testing laboratory is equipped with testing machines and devices, most of which were developed in-house.

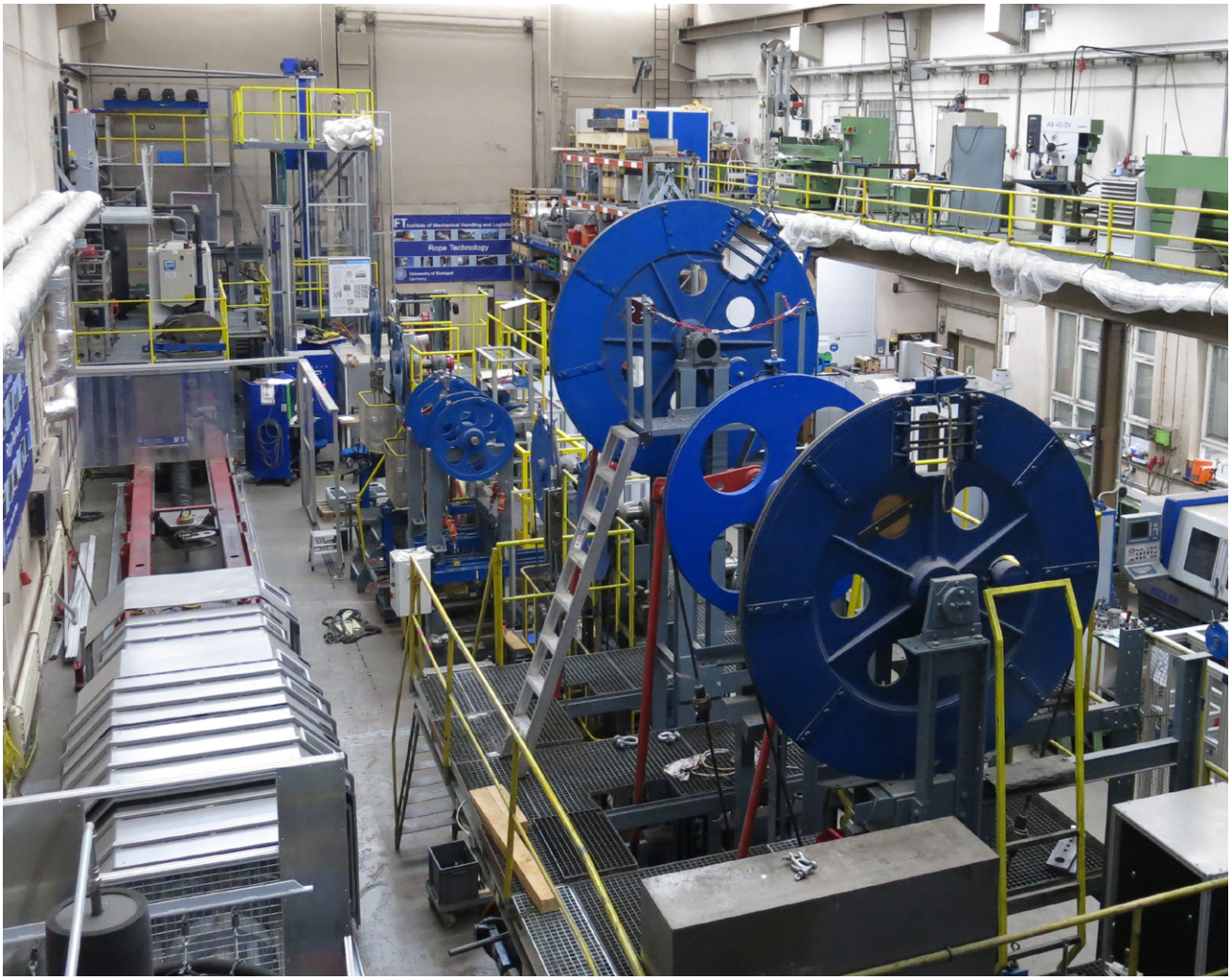
As a worldwide recognized testing and expert body, the department prepares damage assessments as well as safety and risk analyses. Furthermore, the department advises industrial companies as well as operators of facilities and constructions with regard to the customer-specific application of ropes.



DESTRUCTIVE ROPE TESTING

ROPE LABORATORY WITH TEST EQUIPMENT FOR DESTRUCTIVE ROPE TESTING

The testing facilities for ‘destructive rope testing‘ are located in the rope laboratory on an area of almost 1,300 square meters with hall heights of up to 14 meters. In addition to wire tests, such as bending tests, rotating bending tests or the determination of coating layers, static and dynamic rope tests such as tensile, tension-tension and fatigue bending (CBOS) tests can be carried out under laboratory and practical conditions. There are 4 tensile testing machines with a maximum tensile force of up to 2,500 kN (dynamic up to 2,000 kN) available for the tests. For extensive serial tests the IFT has 20 test stands on 15 fatigue bending machines with a rope tensile force of up to 500 kN and rope diameters of up to 60 mm available.



The testing facilities in teh rope laboratory at IFT

APPLICATION AND TEST METHODS FOR ROPES AND SIMILAR TENSION MEMBERS

CBOS Test stand, max. test load 500 kN

Range of activities and services

Calculations are carried out using analytical formulas and the finite element method for the verification and characterization of facts such as stress curves and service life or for the derivation of principles as well as for the optimization of materials.

Bending Fatigue Tests (CBOS)

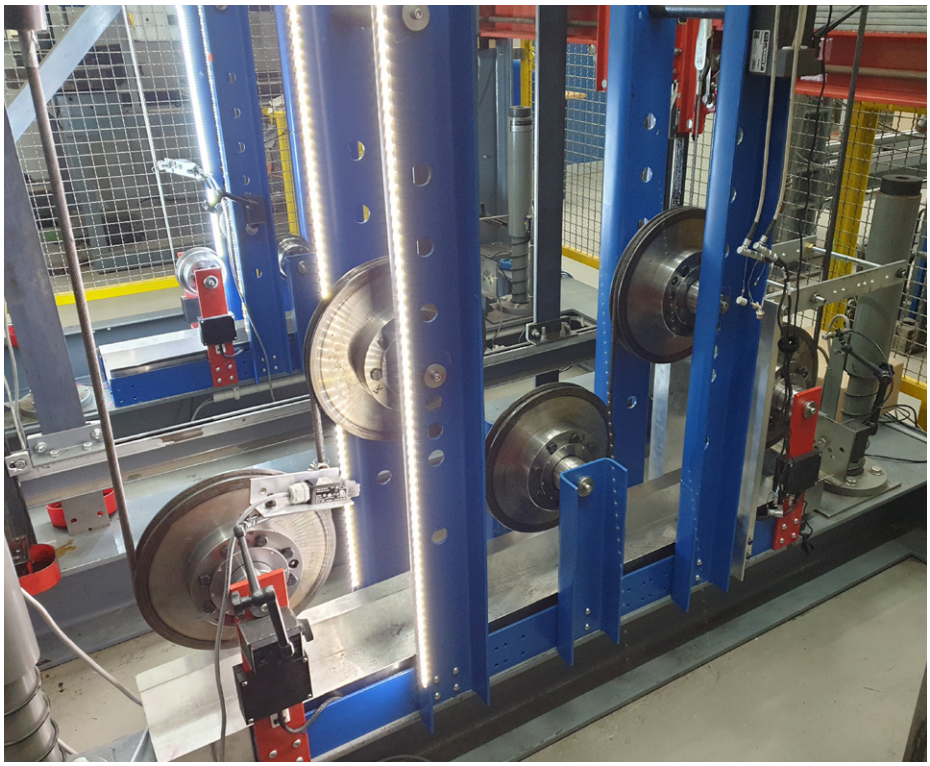
For the correct dimensioning of ropes, tests with ropes under cyclic bending over sheave (CBOS) are carried out in which the rope is bent over a test sheave over a large number of bending cycles and the number of wire breaks is read off at a regular interval. The bending cycles determined from this up to discard are a fixed value that specifies the operating time in the respective application. The lengthening behavior of the ropes can also be recorded on 13 bending machines during the continuous cyclic bending of the rope.

Rope research

In-house developed specialized test equipment, that can be used for example to investigate the rotational behavior of rope constructions, reverse-bending, the influence of deflection, the pairing of rope and pulley or to analyze the influence of groove profiles in the elevator area, are available for innovative research.

For example, a test stand was developed and constructed to investigate the loads on elevator ropes. The elevator test stand is equipped with five deflection sheaves switched in alternating direction one after the other. Due to these many deflections, the ropes are very quickly damaged and and their lifetime is reduced until they are ready to be discarded and until they break. The damage mechanisms that occur are analyzed in order to obtain a better understanding of the arrangements of deflection sheaves that occur in practice. Any arrangement of a large number of deflection pulleys is possible here.

Looking into test rig for crane and elevator ropes under reverse bending



The five deflection pulleys connected in series in alternating direction

TEST METHODS

Tensile tests

Ropes are tested in tensile tests with a continuous increase of the test load until their complete failure. This determined breaking load is an important parameter, especially for safe dimensioning of ropes. For static tensile tests or dynamic tension-tension tests, IFT has testing machines with tensile forces up to 2,500 kN statically and up to 2,000 kN dynamically. Furthermore, it is possible to carry out strain and creep measurements on ropes while performing endurance tests and to record deformations at the rope end connections using strain gauges. Additionally, the ropes can be monitored during tests with the non-destructive magneto-inductive testing method.

For special cases, the ropes can be examined under conditions simulating the intended application. For example, IFT did already conduct tension-tension tests of over 1 mio. cycles with the sample lying under water.

Tensile testing machine 2,500 kN

Tension-tension tests on ropes

Changing deformations of the rope structure occur for wire and for fiber ropes. Wire ropes in particular are often subject to a stress spectrum consisting of bending and torsional stresses as well as other so-called secondary stresses and pressures. To determine the rope lifetime for this type of load setup or to ensure an economical operating time for rope and end connection, tension-tension tests are necessary. To that end, the rope is cyclically loaded with a specific load amplitude, starting from a constant mean load. For example these tests are used to simulate different traffic loads or wind loads.

The results of the tests are eventually used to make statements about the point of time when the rope needs to be renewed, the so-called point of discard, and can be finally used in the application-dependent dimensioning.

Testing machines for tensile and tension-tension testing

HIGH MODULUS FIBER ROPES

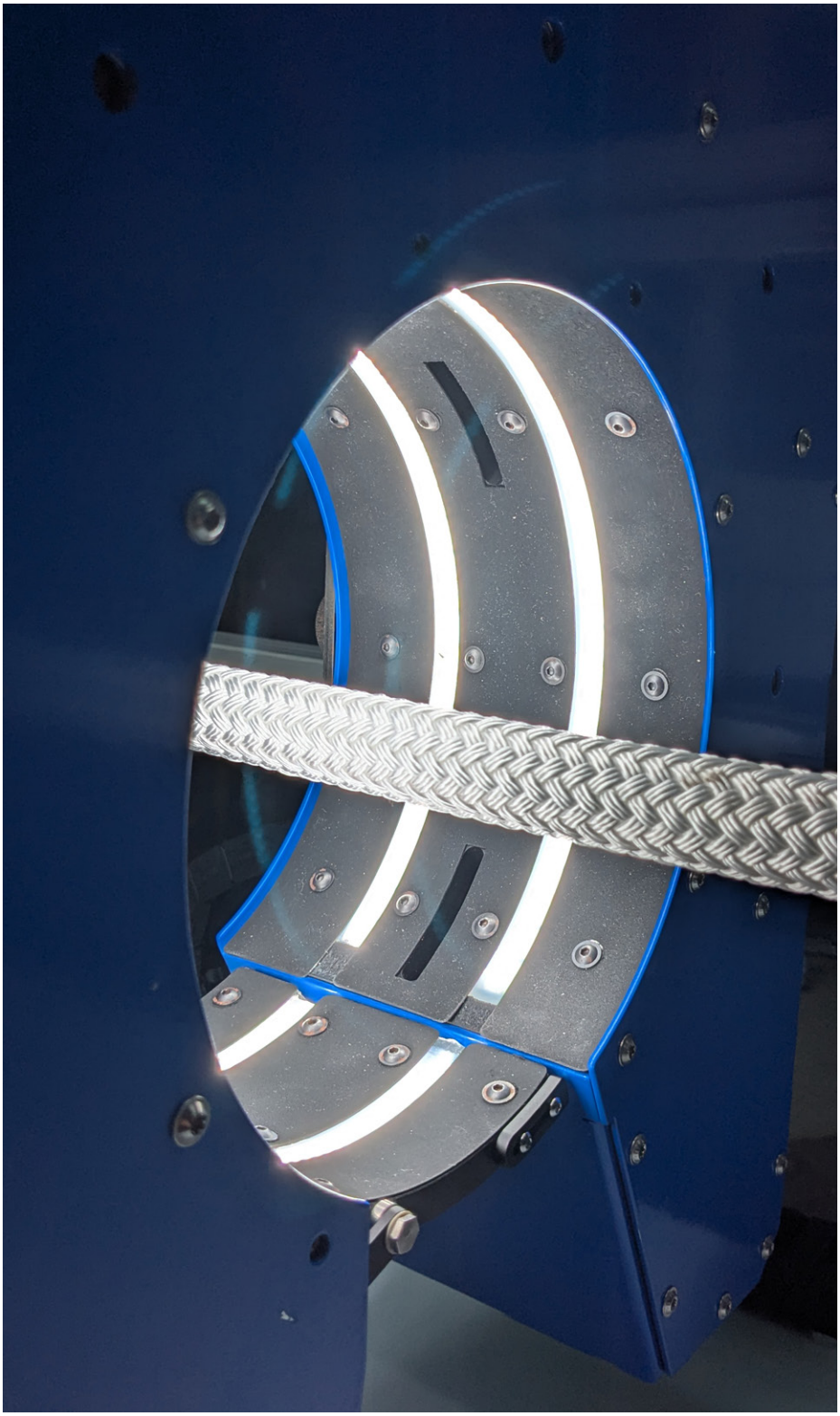
DESTRUCTIVE AND NON-DESTRUCTIVE TESTING

Fiber Ropes

IFT is investigating the usability, service life and discard detection of fiber ropes in a wide range of applications. In research projects, for example, the possible applications of high modulus fiber ropes for storage and retrieval machines or the influence of highly dynamic movements in cable driven parallel robots were investigated. In addition to these publicly funded projects, student projects are regularly carried out in order to gain more detailed knowledge.

Compared to steel wire ropes, fiber ropes have often significantly higher bent fatigue strengths, which means that much higher numbers of bending fatigue cycles can be achieved until discard with the same bend radii. Alternatively, smaller bend radii can be realized without having to accept the loss of service life known from steel wire ropes

Fiber rope on single layer winch



Digital visual surface inspection of Fiber Ropes

Additional lubricants are not required due to chemical surface coating of the fibers. This simplifies maintenance and inspection and opens up new fields of application and areas. The widespread use of fiber ropes still faces many questions that have not yet been sufficiently researched. These are processed by IFT within the framework of industrial and funded rope research (e.g. DFG, AiF).

Destructive and Non-Destructive Testing

Approaches to non-destructive testing are being investigated at IFT in industrial and publicly funded projects. For instance, the in-house developed visual rope inspection device SVRT, originally developed for ropeways, is being enhanced to enable non-destructive monitoring of highly modular fiber ropes. This advancement allows for the digital visual surface inspection displayed here."

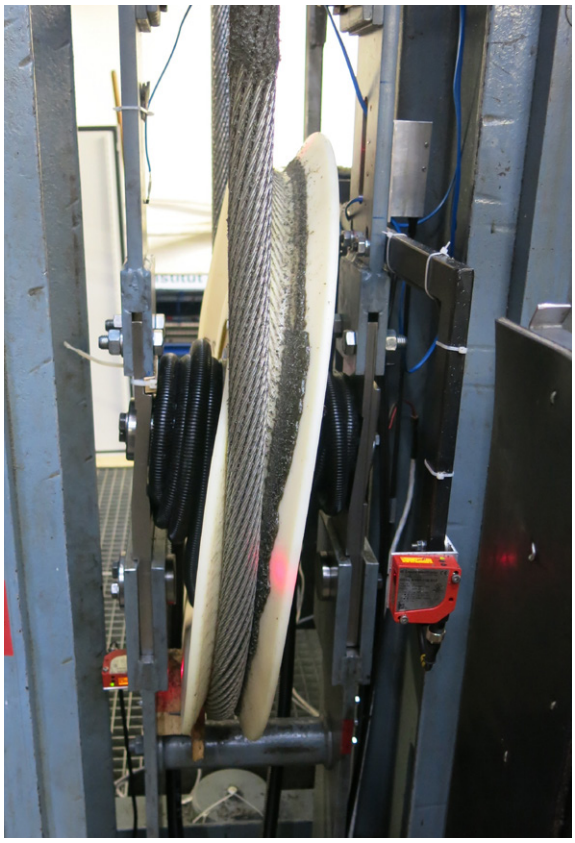
INDIVIDUALIZED TESTING
PROTOTYPE TESTING

Destructive and non-destructive rope testing

By merging the many years of experience available at IFT and the competence in the field of destructive and non-destructive rope testing, as well as measurement technology, a flexible reaction to individual test requirements is possible.

Specific requirements for the test setup, the required measurement technology, and necessary auxiliary constructions and devices can be flexibily planned and produced in-house. In this way, a large number of special tests could be carried out in the past. Examples include tensile tests with stainless steel wire ropes to determine their breaking load at very low temperatures (with the help of liquid nitrogen), fatigue bending and tension-tension tests in normal water and salt water surroundings, simulations of safety-relevant defects in rope drives such as rope derailment with running ropes or diagonal pull bending and tensile tests with large polyamide deflecting sheaves.

All tests can be combined with non-destructive testing methods such as magneto-inductive or visual testing.



Top right image: Examination of diagonal pull tensile strength of PA sheaves
Bottom right image: Test setup for the determination of the influence of salt water on the tension-tension fatigue for ropes in offshore applications

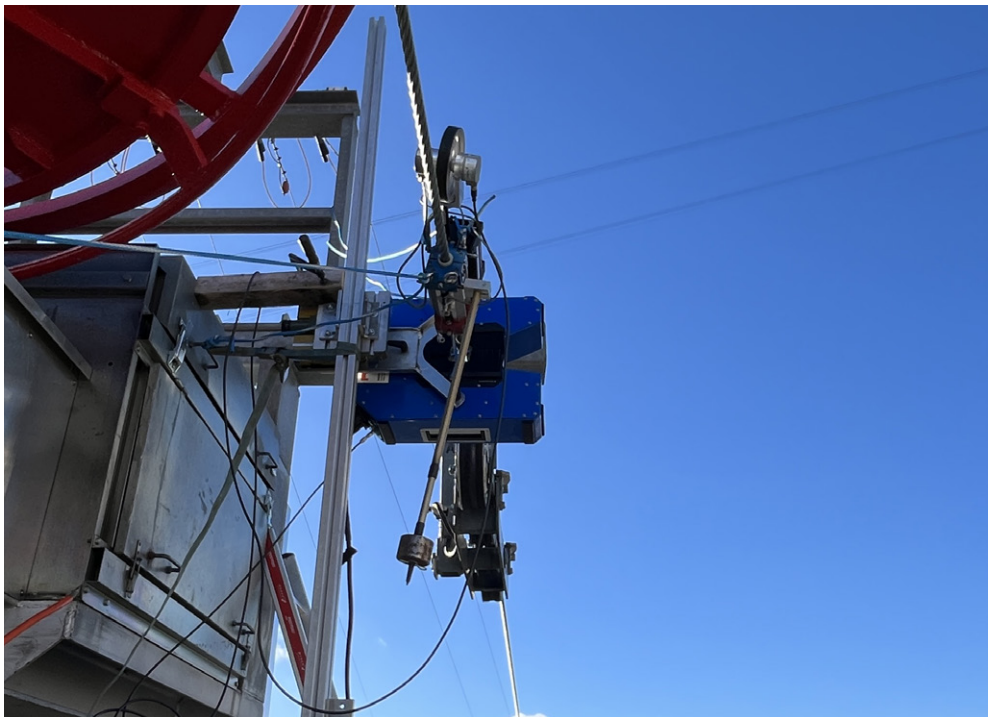
NON-DESTRUCTIVE ROPE TESTING, ROPEWAY TECHNOLOGY

The area of 'non-destructive rope testing' is mainly concerned with rope testing in passenger transportation technology and is in close contact with operators all over the world due to many years of cooperation and trust.

Fields of activity and services offered:

- Magneto-Inductive Testing
- Visual Rope Testing
- Regular Inspections
- New Construction Inspections
- Special Inspections
- Damage Assessments
- Destructive Rope Testings

Magneto-inductive rope testing using SMRT test device in use



In-house developed visual rope inspection device SVRT used to inspect ropeway ropes

Our work focuses on various new and further developed practice-oriented rope testing methods, the testing and monitoring of installations as well as questions concerning ropeway technology.

As a service, both magneto-inductive rope testing and the calibration of rope testing devices are offered and carried out. The magneto-inductive testing devices and the mobile PC data acquisition and processing, both developed at the institute, are constantly being further developed.

Our team regularly inspects ropes and ropeways

TEST METHODS AND DEVELOPMENTS

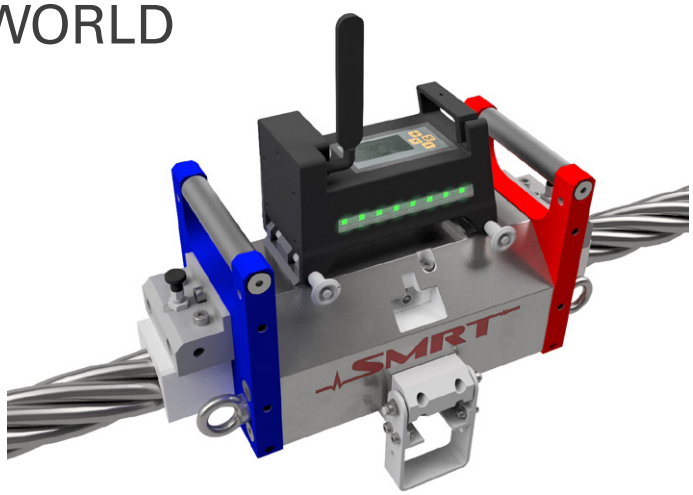
TECHNOLOGY FOR ROPE TESTING

The safety of ropes has been the focus of IFT's development work for many decades. With the new SXRT product family, IFT is setting new standards in the field of non-destructive rope testing. In addition to the further development of the familiar series, the portfolio also includes new products such as devices for automatic diameter measurement. The combination of various test parameters and procedures enables a detailed statement to be made about the condition of the rope. All devices in the SXRT product family are compatible with each other and can be used in combination. The series-ready SMRT products are developed in collaboration with our cooperation and sales partner MESOMATIC GmbH & Co. KG.

Magneto-inductive rope testing with the SMRT test device with measuring box

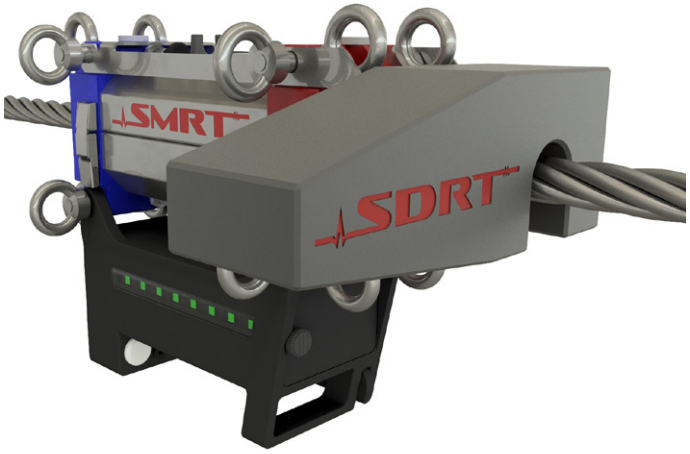
THE NEW SXRT PRODUCT WORLD

SMRT | magneto-inductive rope testing
The well-known SMRT series (**S**tuttgart **M**agnetic **R**ope **T**esting) for magneto-inductive testing of steel ropes has been supplemented with additional technologies for non-destructive rope testing. New sensor heads offer higher measurement quality and greater user comfort. The higher measurement quality is achieved, among other things, by digitizing the measured values directly in the sensor head. The IFT has implemented a new type of circuit board concept that can be used for all sizes of test device. An important aspect is complete downward compatibility with existing test equipment. In addition, the concepts that have now been incorporated to reduce the amount of documentation required enable location data, weather data and the status of the test equipment to be logged automatically, for example.



SMRT 1.8 – **S**tuttgart **M**agnetic **R**ope **T**esting
mit neuer Messelektronik

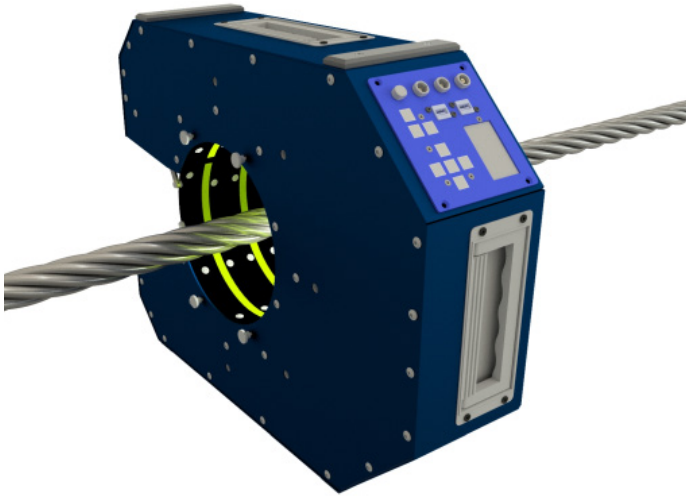
SDRT | Optical diameter measurement
The non-contact, fully automatic and precise SDRT measuring system has been further developed and improved. Thanks to the modular design of the device, the system can be expanded to include additional measuring levels. This makes it possible to integrate the testing system into tensile machines. As a result, the diameter progression of ropes can be documented during tensile tests without interrupting the test for manual measurement.



SDRT – **S**tuttgart **D**iameter **R**ope **T**esting

SVRT | Visual rope tester
New manufacturing processes and updated components have allowed a reduction in the size of the visual rope tester. The SVRT inspection device can now also be used on ropeways that were previously difficult to inspect with existing camera systems. Another new feature is the option to combine visual and magnetic-inductive rope testing.

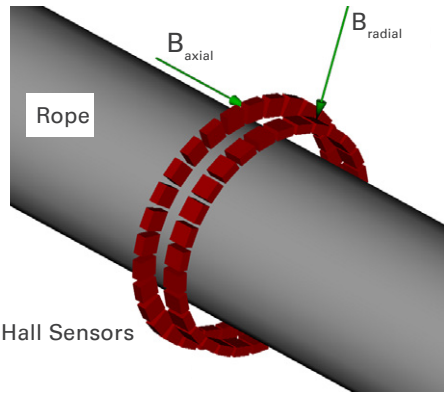
SCRT | Permanent magnet inductive rope testing during production
High investment and development costs as well as high safety requirements demand precise documentation and monitoring during the manufacture of ropes. The SCRT testing device developed at IFT is characterized by its simple operation and reliable function. An innovative wireless sensor concept for the transducers enables the tester to be adapted to new rope diameters without the use of aids or tools. Continuous diameter measurement has also been integrated into the system. The system automatically generates a test report that the rope manufacturer can pass on to its customers.



SVRT – **S**tuttgart **V**isual **R**ope **T**esting

TEST METHODS AND DEVELOPMENTS

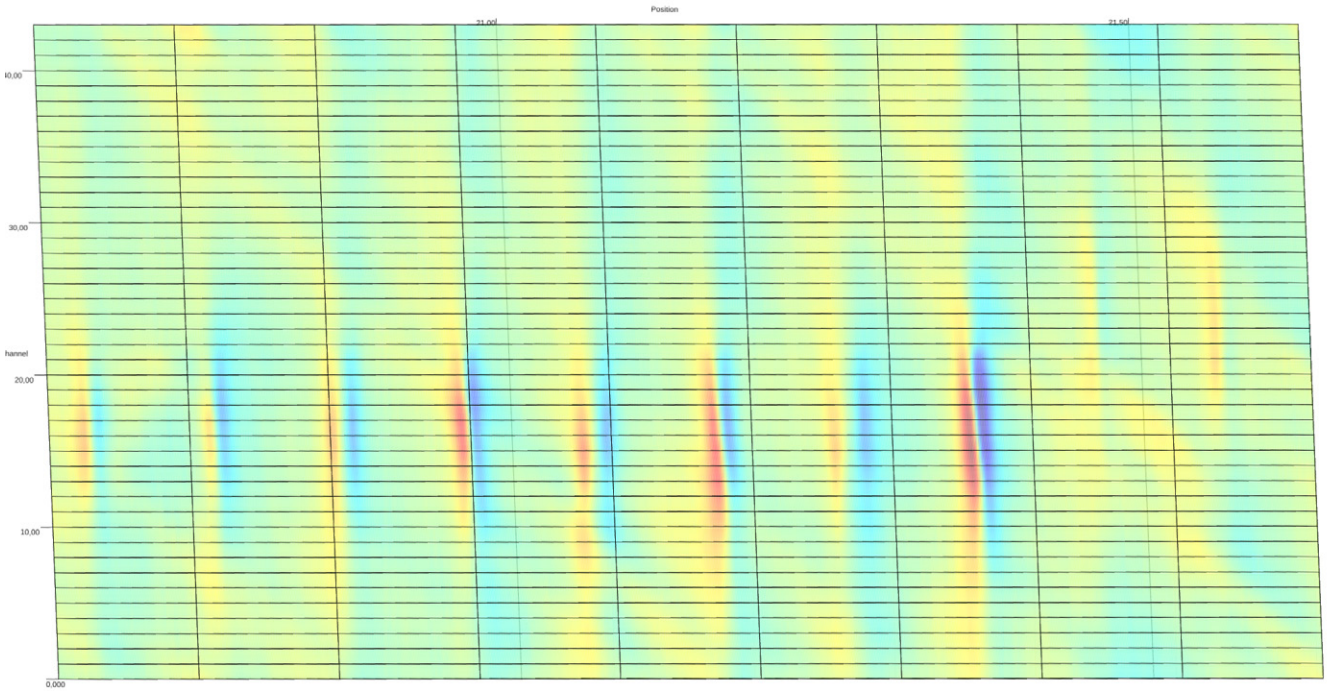
MAGNETIC HIGH-RESOLUTION TESTING



Magnetic high-resolution rope testing with Hall Sensors

In magneto-inductive testing, a rope-surrounding coil is usually used as the measuring sensor. However, by this, it is not possible to determine the exact position of the wire breaks on the cross-section of the rope with the rope-surrounding coil. The evaluation of the measurement signals of wire breakage accumulations is also extremely complex.

In comparison, the high-resolution magnetic rope testing method developed at IFT offers the possibility of three-dimensional resolution and display of the measurement data recorded with the aid of Hall sensors. This makes it possible to clearly determine the position of wire breaks in the rope and to assess wire break accumulations more precisely.



Visualization of measurement data as 3-dimensional graph

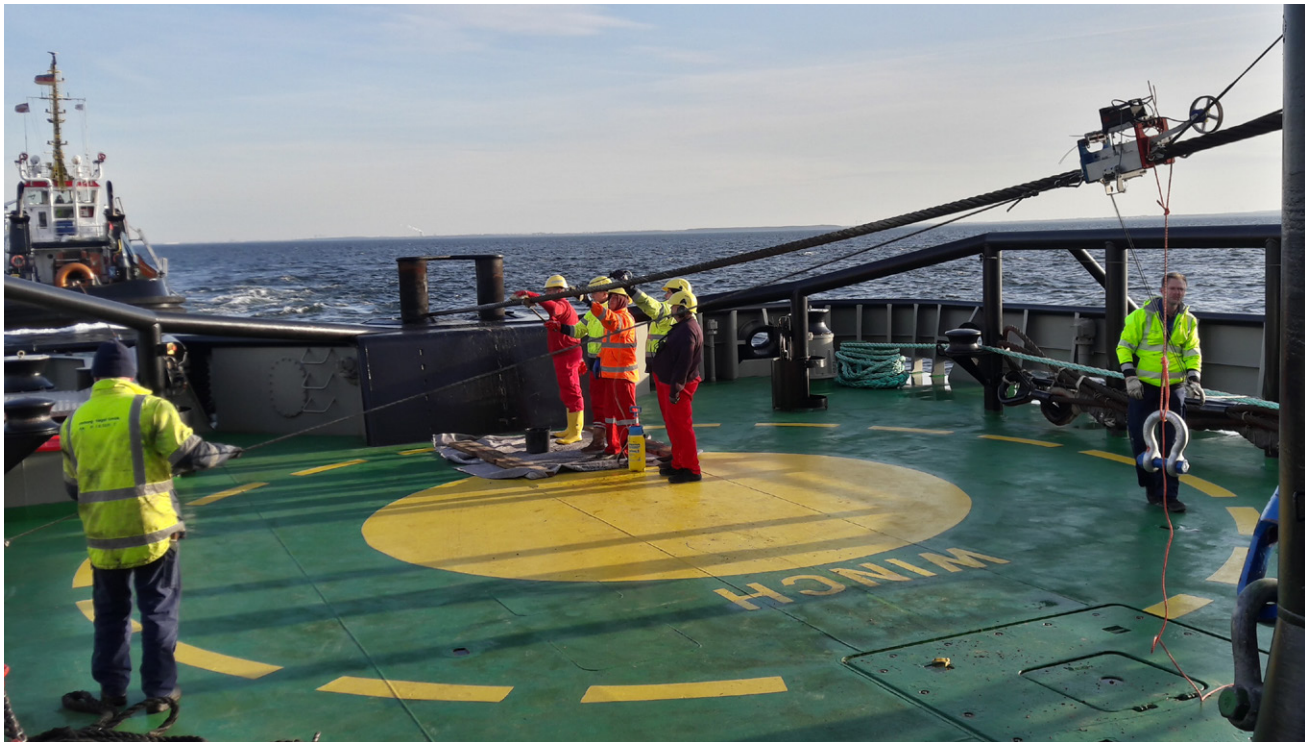
OFFSHORE TECHNOLOGY

COMBINED USE OF DESTRUCTIVE AND NON-DESTRUCTIVE ROPE TESTING TECHNOLOGY

Offshore technology has its own requirements when it comes to ropes. In addition to the aspects of destructive and non-destructive basic research, the area of offshore technology addresses the aspects of environmental impact and material behavior in particular.

The rope drives in offshore applications must be differentiated from those operated on shore. The high effort for maintenance requires extraordinary reliability and availability of the ropes. At the same time, the high dead weights resulting from the large rope lengths and diameters used for example for installations on the seabed, lead to very special demands regarding the rope drives. This results in research fields that deal with issues such as rope elongation, multi-layer spooling or the active heave compensation (dynamic rope loads).

Furthermore, the use of high modulus fiber ropes is becoming more and more common. The advantages are the weight reduction and the low density of the fibers which makes them in some cases floatable on the water. There are open questions regarding the tensile, bending, elasticity and failure behaviour of fiber ropes as well as their service life in offshore applications. By developing specific test rigs, these questions are analysed in detail in close cooperation with component manufacturers and end users (e.g. operators of pipeline laying vessels). Real life load cases on the rope are reconstructed and discard criteria are defined.



Magneto-inductive rope testing in offshore technology

DAMAGE ASSESSMENTS AND ROPE DRIVE ANALYSES

$$lgN = b_0 + \left(b_1 + b_3 * lg\frac{D}{d}\right) * \left(lg\frac{S}{d^2} - 0{,}4 * lg\frac{R_0}{1770}\right) + b_2 * lg\frac{D}{d} + lgf_d + lgf_L + lgf_E$$

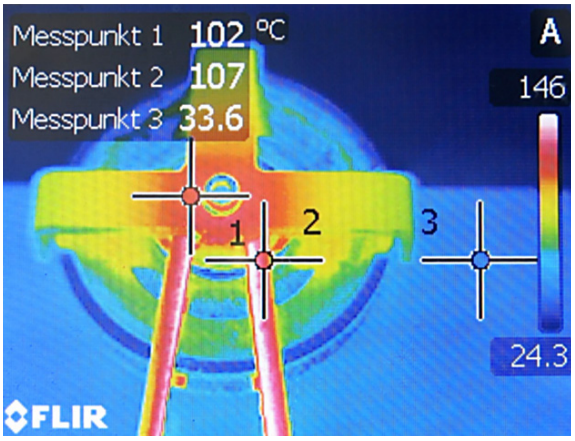
Lifetime-formula developed by Prof. Feyrer

Lifetime and stress calculations

Based on the lifetime formula for running steel wire ropes empirically developed at IFT, analysis of real applications of rope drives are done. For this purpose, we can rely on extensive experience from more than 80 years of rope research in the definition of key figures for different rope constructions, rope diameters and materials.

The calculation with the aid of the lifetime formula enables the detection of possible weak points and provides information for a good rope use and at the same time economical design of the rope drives. The range of calculated rope drives extends from hoists and cranes to ship lifts and elevators to amusement facilities. Calculations using other methods, such as those described in the standards, are also possible.

As an independent institute, IFT also deals with damage cases in which the expected rope service life has not been reached or damage has occurred to elements of the rope drive. Among other things, a modern digital microscope is used to perform high-resolution investigations in the micrometer range and is mainly an important tool for fracture analyses.



Images on the right: Simulation of rope derailment of a running fiber rope

RESEARCH AND DEVELOPMENT

OPTIMIZATION OF MEASURING AND TESTING METHODS

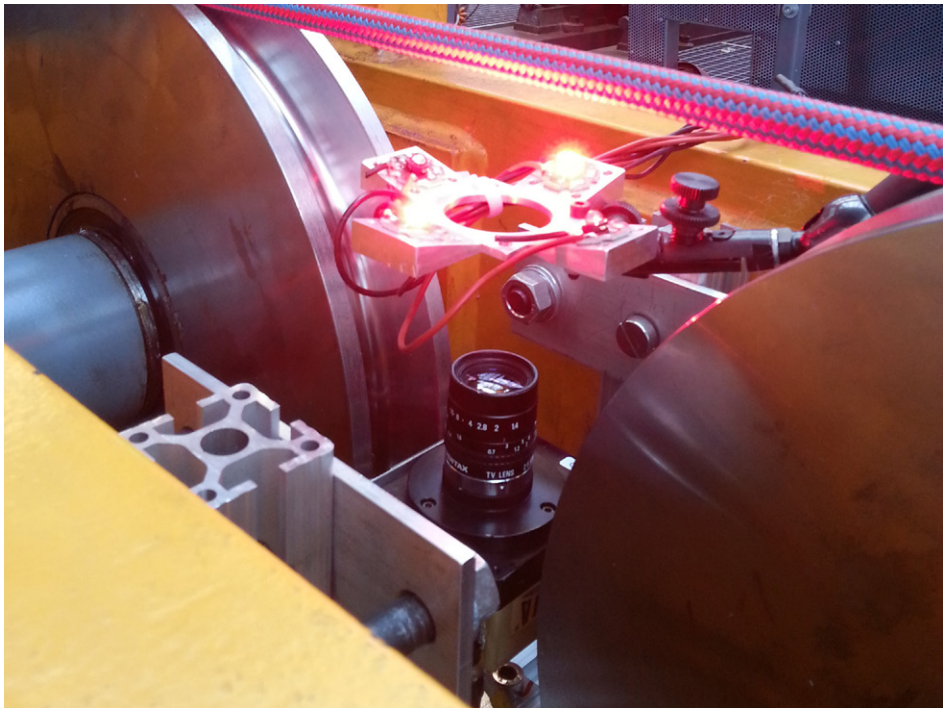
The Rope Technology Department constantly develops within the scope of research and industrial projects new methods for destructive and non-destructive rope testing, for example terminations for high modulus fiber ropes. In the field of destructive rope testing, for example, modifications were made to bending machines to perform tests with defined twisted ropes. Furthermore, complete testing machines are designed and developed to meet specific customer requirements.

Rope production monitoring

Wire breaks or faults can occur in ropes not only during use, but also during rope production. The rope production monitoring system developed at IFT offers automatic fault monitoring and shutdown of the production unit and thus timely and reliable supervision of the production process. The quality control, integrated in the rope manufacturing process, also provides the user with a decisive advantage in rope production and for the customer due to the reliable and precise documentation.

Development of an image-based method for detection of discard with high modulus fiber ropes

Reliable detection of discard is important for the full use of running high modulus fiber ropes in storage and retrieval machines. Unlike steel ropes, for which a point of discard is defined in ISO 4309, there is no such regulation for high modulus fiber ropes. In research projects, the IFT determines the time of discard using a line camera. During operation, this camera takes regular images of the rope in a rope-driven system over its entire service life. These recordings are evaluated on a software basis. The measurement data can help determine and predict the discard maturity of a high-strength fiber rope. The findings of the research project are to be incorporated into a market-ready device.



Automated monitoring of fiber ropes with a camera

RESEARCH AND DEVELOPMENT

FIRST WIRE – **FI**BER **R**EINFORCED **ST**EEL **WIRE**

First Wire – An innovative project for the steel industry

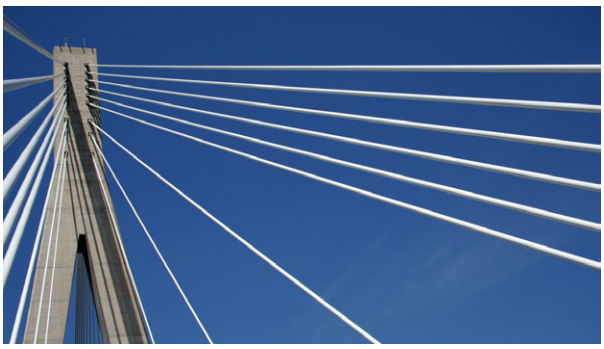
The European research project FIRST-WIRE aims to develop a steel wire for ropes and cables with improved performance and lower weight. The project is co-financed by the Research Fund for Coal and Steel, an EU funding program to support research projects in the coal and steel sector.

Together with 7 other partners from a total of 4 European countries, research is being carried out on the new carbon fiber-reinforced steel wires. The aim is to develop a lightweight yet highly resilient wire for demanding onshore/offshore rope applications, such as anchoring ropes for offshore platforms or guy ropes for suspension bridges.

In certain demanding technical applications, the use of steel wire ropes is limited by their enormous own weight and unsatisfactory structural performance. The underlying concept of the research project is a forward-looking innovation combining stainless steel elements and carbon fiber reinforcements with high strength and modulus. It combines the low weight and high mechanical performance of the fibers with the good behavior of steel in terms of corrosion resistance, wear and ductility.

First Wire is an innovative project for the steel industry that can promote the use of steel-based products in markets where composites and synthetic products are currently very competitive. Specifically, the technology is intended for use in extremely demanding scenarios, e.g. offshore deep-sea applications, lifting operations, mooring lines for floating platforms, structural cables for civil engineering, but also in onshore applications such as for suspension bridge cables and supporting structures. For the installation of offshore platforms, such as floating wind turbines in deep sea areas, there are advantages due to weight savings combined with high axial rigidity and excellent wear resistance.

Mooring ropes:
floating offshore platforms



Guy ropes:
Structures for bridges and supporting structures

Hoisting ropes:
Offshore deep sea applications

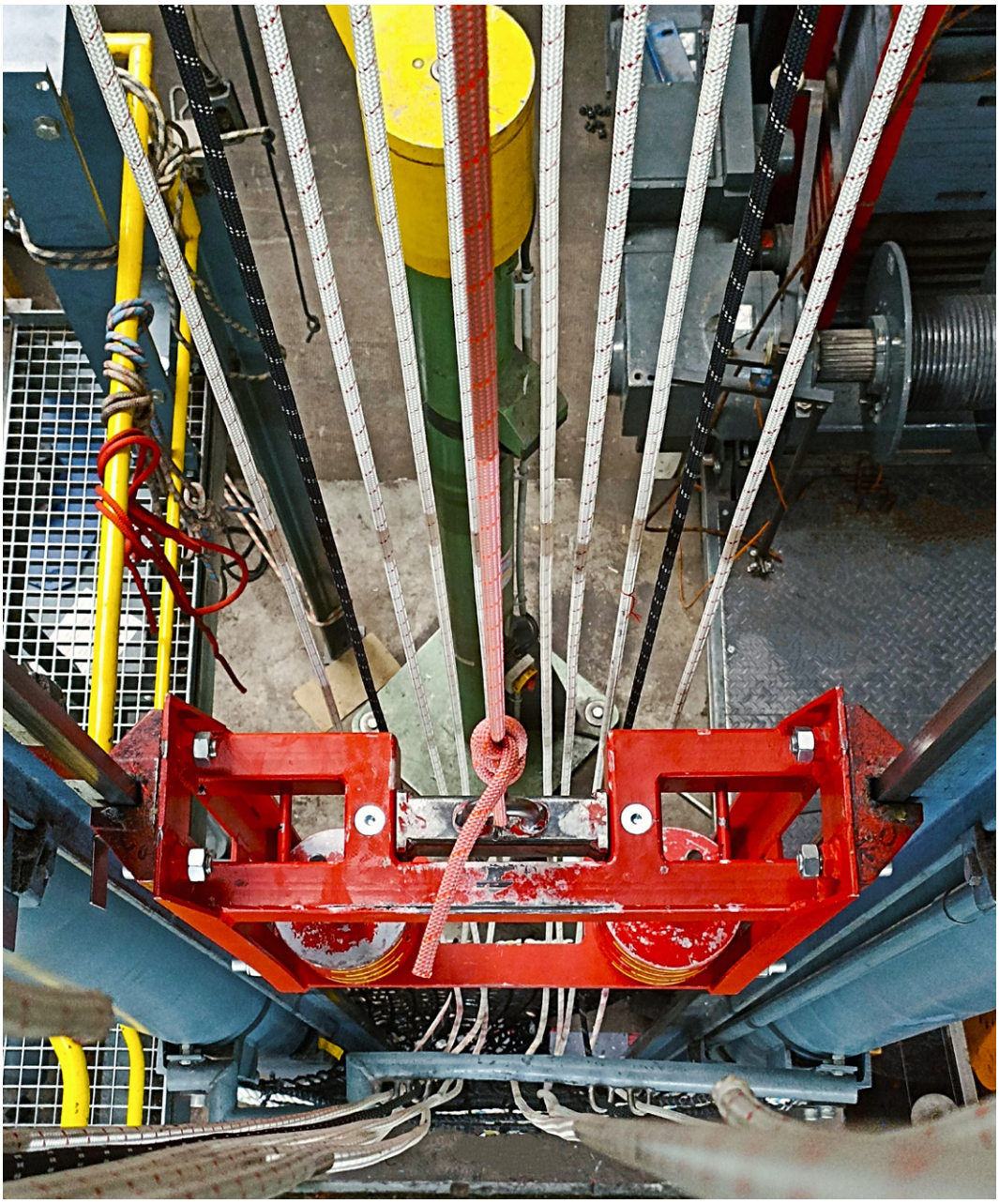
In the building industry, hybrid solutions offer advantages in the areas of deflection, resonance and consequently fatigue life for guyed supporting structures with large spans, such as cable-stayed bridges. durability.

In offshore applications, such as deep-sea mining or deep-sea laying of pipelines with uncoiling and recovery winches, conventional steel wire ropes are currently limited to a sea depth of ~2000m due to their high dead weight. Innovative lightweight high performance wire ropes extend the possibilities and offer an increase in extraction depth and capacity.

The project includes all steps from the production of the fiber-reinforced steel wires to the production of the ropes and experimental determination of mechanical properties to the dimensioning and calculation as well as computer-aided finite element modeling of various applications comparing conventional to fiber-reinforced ropes. In addition, several types of rope construction are considered, which are typical for the various applications.

Lightweight ropes for various industrial and construction applications

NOTIFIED BODY AND TEST LABORATORY FOR PERSONAL PROTECTIVE EQUIPMENT (PPE)

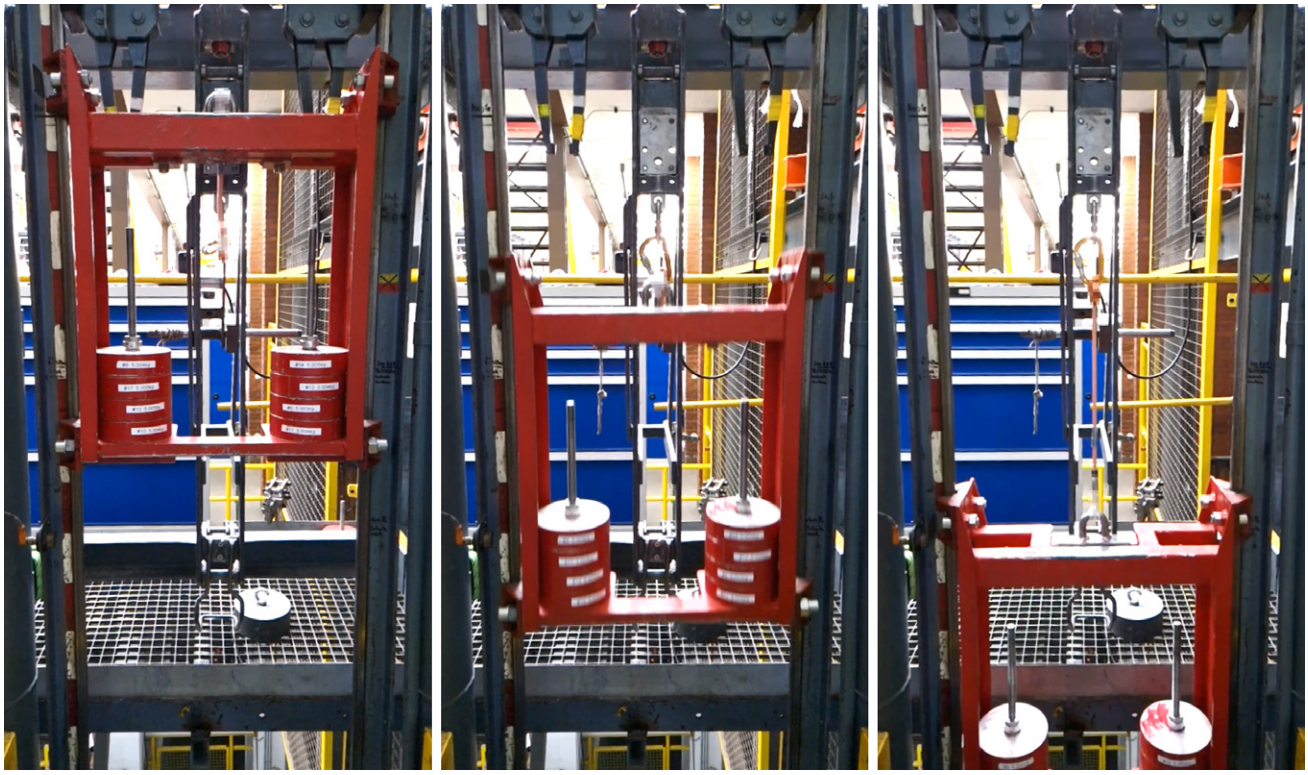


Dynamic drop tower for drop heights of about 8 m

IFT carries out standardised testing of mountaineering equipment in the field of personal protection equipment (PPE) against falls from height. The tests covered by the IFT include mountaineering equipment such as dynamic mountaineering ropes, via ferrata sets, low-stretch kernmantle ropes, carabiners, harnesses, slings and many more. The IFT is also an approved testing laboratory for testing according to the testing regulations of the UIAA, the International Mountaineering and Climbing Federation.

For standard testing in the field of mountainee
ring equipment, IFT provides a dynamic drop tower with a maximum drop height of approximately 8 m, in which mountaineering equipment is tested for the requirements listed in the relevant standards. For example, via ferrata sets are tested according to EN 958, which had a last revision in 2024, as well as dynamic mountaineering ropes according to EN 892 or low stretch kernmantle ropes according to EN 1891. Additionally, tests are often carried out on slings and tapes, as well as accessory cords or (adjustable) lanyards. In the area of additional UIAA tests, the IFT can perform measurements of energy, absorbed energy before rupture and water repellent tests for mountaineering ropes in accordance with the current UIAA 101 standard.

Due to the flexibility and adaptation possibilities of the different test stands used, existing test methods are regularly evaluated and revised, new test procedures or test stands developed and implemented within the scope of the initial tests. Through the cooperation of the IFT in standardization in the field of mountaineering, newly developed test methods can be incorporated directly into the work of corresponding standardization committees. Thus IFT can offer its customers from the mountaineering and safety industry flexible testing facilities adapted to customer requirements, as well as cooperation in the field of research.



Drop test of a personal belay lanyard according to EN 17520 | left: falling mass lifted to drop height | middle: falling mass released, falling | right: falling mass at lowest point and maximum rope elongation

RECOGNISED EXPERT BODY FOR ROPEWAYS

Since 1950, IFT has been certified and recognised as an expert body for ropeways and ski lifts. The recognized field of activity of the expert body include expert advice on all aspects of ropeways technology, the appraisal of installations, their safety components or subsystems, as well as the compilation of damage and condition reports for construction, maintenance and operation of ropeways and ski lifts.

The following services are offered:

- Examination of the technical documents and the operational safety of ropeways and the preparation of corresponding test reports and expert opinions.
- Execute the certification of ropes.
- Examination of the technical documentation of new ropeway installations as well as the acceptance of significant modifications to existing installations.
- Regular inspection of the technical condition of the installations.

Acceptance of the Zipline Astenkick in Altastenberg

Magneto-inductive rope testing at Stuttgart Cable Car

TESTING EQUIPMENT

Destructive Rope Testing

	Type of Test Equipment	max. Rope Force	Quantity	Range of Rope Sheaves	Deflection possible	Tests under rotation possible	Reverse Bending possible
Running Ropes	Bending machine (CBOS)	0,2 kN	1	30 up to 50 mm	No	No	No
		2 kN	1	30 up to 50 mm	No	No	Yes
		10 kN	2	120 up to 500 mm	No	No	Yes
		15 kN	4	120 up to 500 mm	No	No	No
		30 kN	4	120 up to 500 mm	No	Yes	No
		100 kN	3	200 up to 1000 mm	Yes	Yes	No
		130 kN	1	200 up to 600 mm	No	No	No
		200 kN	1	200 up to 800 mm	Yes	No	Yes
		500 kN	1	300 up to 3000 mm	No	No	Yes (with special construction)

	Type of Test Equipment	max. static Rope Force	Quantity	Maximum Test Length	Possible Special Tests
Stationary Ropes	Tensile Test Machines	200 kN	1	10 Meter	Testing of Rope Torque, Youngs-modulus, longtime tests, and more
		2500 kN	1	10 Meter	Testing of Rope Torque (up to 1250 kN),Youngs-modulus, longtime tests, and more

	Type of Test Equipment	max. dynamic Rope Force	Quantity	Maximum Test Length	Possible Special Tests
Stationary Ropes	Tension-Tension Test Machine	60 kN (static: 75 kN)	1	3,1 Meter	Testing of Youngs-modulus
		640 kN (static: 800 kN)	1	4,7 Meter	
		2000 kN (static: 2500 kN)	1	8 Meter	

	Type of Test Equipment	max. Rope Force/ Loading	Quantity	Maximum Test Length	Rope Diameter	Additional
Special Tests (Examples)	Friction test stand	10 kN	2	8 Meter	bis zu 16 mm	Reverse bending possible
	Multi-layer test stand	29 kN	2	14 Meter	16 mm	Three different D/d-ratios for the drum possible (20, 25, 40), smaller rope diameters possible with changes
	S/R-machine for fibre ropes	15 kN	1	8 Meter	16 mm	
	High dynamic test stand	5 kN	4	5 Meter	2 und 6 mm	Reverse bending possible
	Drop test tower	150 kg	1	7 Meter	bis zu 14 mm	For testing of dynamic and static climbing ropes, Via Ferrata sets, and more

	Type of Test Equipment	max. Wire Diameter	Quantity
Wire Tests	Reverse bending test stand	2 mm	1
	Rotary test stand	2 mm	1
	Rotary bending test stand	2 mm	1
	Wire transverse pressure test stand	2 mm	1

Non-destructive Rope Testing

Type of Test Equipment	Test Device	Range of Rope Diameter	LMA-capable	High-resolution testing
Magneto-inductive devices	SMRT 16	6 up to 16 mm	No	No
	SMRT 25	10 up to 25 mm	No	No
	SMRT 40	25 up to 40 mm	No	No
	SMRT 60	40 up to 60 mm	Yes	Yes
	SMRT 70	50 up to 70 mm	No	Yes
	SMRT 100	70 up to 100 mm	Yes	No
	SMRT 140	100 up to 140 mm	Yes	No
Visual devices	SVRT	20 up to 80 mm		
	Bridge cable device	90 up to 140 mm		

TRANSFER OF RESEARCH FINDINGS

COMMITTEES AND CONFERENCES

For application-oriented research, membership in rope technology associations and participation in committees form a platform for professional exchange, cooperation and development. The Rope Technology department is represented in the following technical committees and technical standardization committees and thus plays an active role in shaping innovations and developments:

Steel wire ropes / Cranes:
- CEN/TC147 Cranes-Safety
- ISO/TC96/SC3
- VDI Fachausschuss FA 304 „Krane“
- VDI Fachauschuss FA 629 „Seilschwingungen“
- CEN/TC242/WG3 Ropes
- DIN NA 099-00-04 AA Drahtseile
- European Federation of Steel Wire Rope Industries (EWRIS)

Fiber ropes:
- European Association of Rope, Twine and Netting Industries (EUROCORD)
- ISO/TC38/WG21 Ropes, Cordage, Slings and Netting

PPE:
- CEN/TC136/WG5 Mountaineering and Climbing Equipment
- UIAA Safety Commission

Ropeways:
- FSF-DIN Arbeitsausschuss Seilbahnen
- I.T.T.A.B. Internationale Tagung der Technischen Aufsichtsbehörden
- O.I.T.A.F. - Direktionskomitee
- O.I.T.A.F. Studienausschuss Nr.II: Eigenschaften und Prüfung der Seile
- Seilbahnausschuss im Länderausschuss für Eisenbahnen und Bergbahnen

General organizations:
- OIPEEC Management Committee

Imparting and exchanging knowledge – we achieve this with our training for users and industrial customers. We supervise lectures and final theses in the fields of rope technology, safety engineering and passenger conveyor technology at the University of Stuttgart. At conferences and trade fairs we present our research activities and inform us about the latest developments, here are listet some:

- European Lift Congress
- Fachkolloquium Innozug – TU Chemnitz
- IMCA Rope Seminar
- Messe Wire
- OIPEEC Conference
- Seilbahntagung des Verbandes der Deutschen Seilbahner und Schlepplifte e.V. (VDS)
- Sommerbahntagung des Verbandes der Deutschen Seilbahner und Schlepplifte e.V. (VDS)

SEMINARS & WORKSHOPS

As a university research institute, the IFT offers a wide range of seminars and opportunities for further training and qualification. These range from the general requirements for ropes and their applications to specific areas such as testing, calculation, design and optimization. In seminars or workshops, the employees of the Rope Technology department impart their knowledge on issues related to ropes.

The Rope End Terminations seminar is held regularly in the Institute's rooms and laboratories in Stuttgart. In addition to in-depth theoretical content, practical knowledge is also imparted here and put into practice by the participants in a workshop. The current dates are published on the website, desired dates for companies or users are possible.

Seminars with individual training content are also offered, tailored to the respective application or the needs of the target group. The offer ranges from pure lecture units to online offers and workshops lasting several days. Based on the respective content, the seminars can also take place on site or at the company.

Participants of the seminar Rope End Connections at the IFT

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