

TST FDSYS.P™

FOR

PORTABLE WIRE ROPE INSPECTION



TST FLAW DETECTION TECHNOLOGY CO.,LTD.



**LUBRICATION
EQUIPMENT**
ENGINEERED LUBRICATION

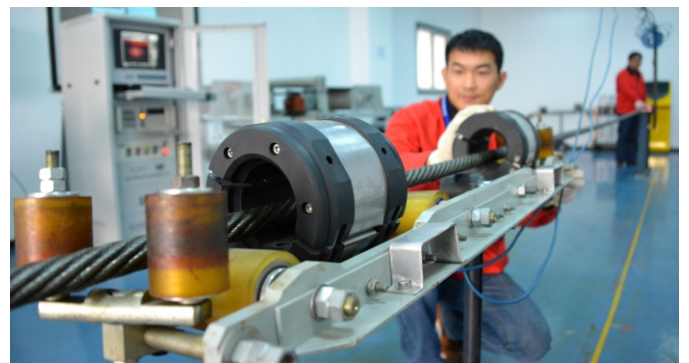


ABOUT US



TST Flaw Detection Technology Co., LTD (TST) incorporated in 2010 is specialized in designing, manufacturing and marketing the flaw detection systems for wire ropes and rope core conveyor belts. TST's mission is to continually develop flaw detection solutions for the safest wire rope operation and the most cost-efficient business outcome for wire rope and steel-cord conveyor belt users. With years of experience in the fields, TST realizes that the company's responsibility is not just a technical answer to safety inspection but a comprehensive business solution with full regards of people and environment, which means that our system must firstly be the keeper of the safe wire rope operations, furthermore our solution should be the enhancer for the business achievements and prosperity.

In the catalog of TST-FDSys™(Flaw Detection System) and TST-FDSol™(Flaw Detection Solution), we are providing a wide range of solutions that can be applied to different industries and diverse wire rope and steel-cord conveyor belt operating scenes. The applications include open-pit mine conveyor-belts, underground conveyor belts, underground mine hoisters, port cranes, construction cranes, residential and commercial elevators, cableways and etc. TST-FDSys™ and TST-FDSol™ can be installed in the forms of portable, realtime wire-rope, realtime conveyor-belt, real-time elevator or customized detecting systems for specific tasks. The commitment of TST Team is to find solutions for more efficient and safer wire rope operations, and materialize real economic benefits from the improvement of safety management.



INTRODUCTION



System Description

TST FDSys.P Flaw Detection System is developed on basis of magnetic inductive sensing technology and MFL(magnetic flux leakage) wire rope inspection technique. The system can be applied for the portable inspection of steel wire ropes and steel pipes for the physical damages or material deteriorations.

TS-X1124\X1142\X1160(X) are the 3 standard models in the portable series for the inspection of steel wire ropes with diameters of 6mm-70mm.

Customized models can be developed based on specific applications of the clients, such as for extra wide wire ropes up to 120mm, and for environments that require Intrinsic Safe and Explosion Proof design.

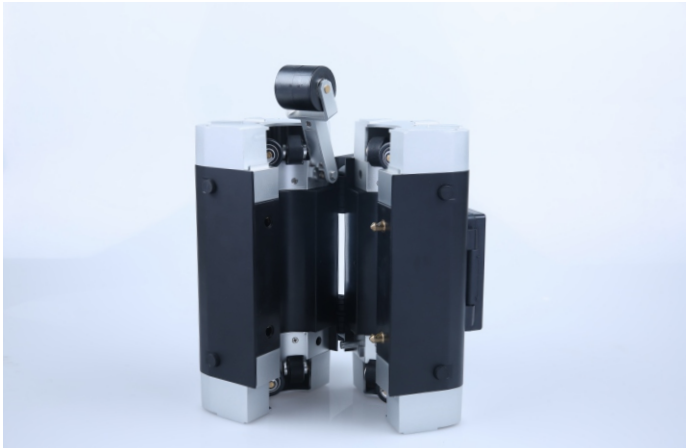


Customized Model for Intrinsic Safe and Explosion Proof



Customized Model for Extra Wide Wire Rope

SYSTEM FEATURES



General

- Nondestructive inspection of wire rope with diameter from 6-70mm
- Detection powered by TST sensor array
- Portable detection of various flaw types including broken wire, corrosion, pitting, abrasion, fatigue etc. for which a magnetic signature will be left due to the occurrence of a flaw event.
- Instant monitoring and evaluation of inspection process with portable 'Control Panel' and 'Screen'
- Data processing with built-in signal processor for portable application
- Evaluating and reporting with built-in and PC software set for portable application

Inspection Speed

- < 15 m/s (or as limited for safe operation)

Defect Types

- LF(Local Fault) LMA(Loss of Metallic Area)
- Physical Damages: Broken wire, Abrasion, Structure Deformation
- Material Deteriorations: Corrosion, Fatigue

Flaw Detection

- Qualitative Flaw Detection
- Quantitative Flaw Detection
- High Repeatability
- High Accuracy
- Waveform Inspection Diagram Output
- Statistical Inspection Result Table Output


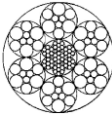
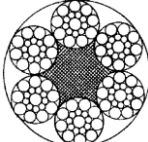
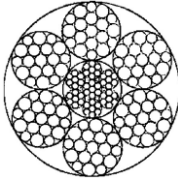
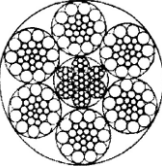
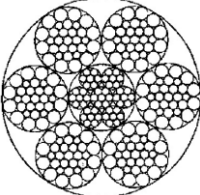
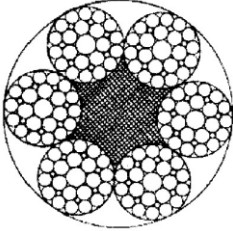
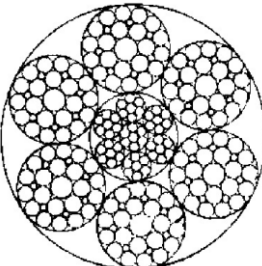
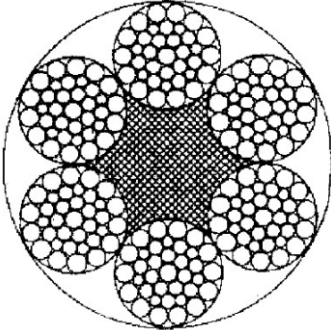
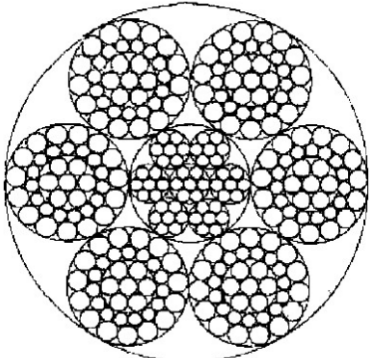
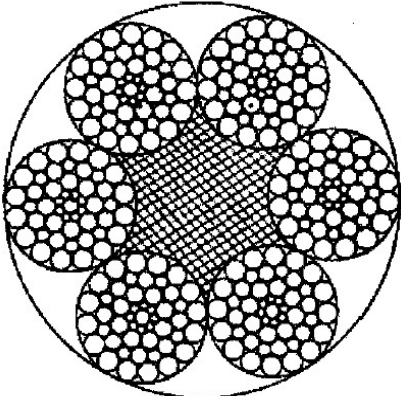
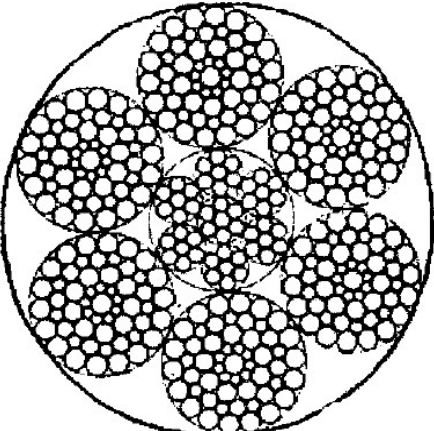


SYSTEM FEATURES

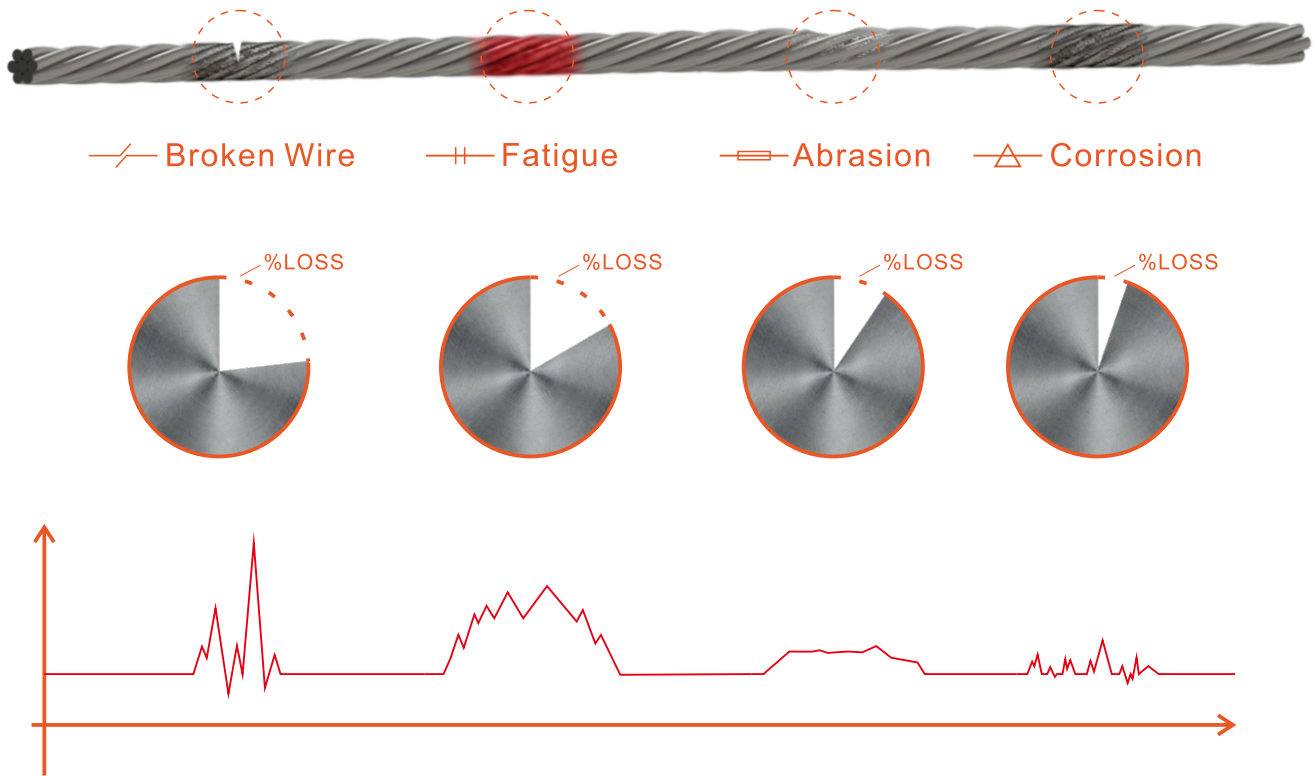
M-Regulator Field Strength	< 50mT	Sensor Dissipation Power	<50mW
Continual Detection Capacity	>10 ⁴ m	Sensing Range	0-30mm
Detection Response Time	≤0.5ms	Sensor Lifetime	>27 *10 ⁴ hours
E/M Sensitivity	≥1.0V/mT	S/N Ratio	S/N>85dB
Working Temperature	-20-50 °C	Relative Humidity	<95%
Storage Temperature	-40-60 °C	Cleaning	Volatile organic solvent (ABS safe, Insulation safe, Non-toxic, Non-conductive)
Charge Time:	4-5 hours	Service Time:	>8 hours



PRODUCT SPECIFICATIONS

MODEL	ROPE DIAMETER SPECS	SAMPLE REMARK			
TS-X1124	ϕ 6mm - 24mm	 6×7+FC ϕ 8	 6×9W+IWR ϕ 15	 6×19S+FC ϕ 20	 6×19W+IWR ϕ 24
TS-X1142	ϕ 22mm - 42mm	 6×26WS+IWR ϕ 25	 6×31WS+IWR ϕ 30	 6×29Fi+FC ϕ 35	 6×29Fi+IWR ϕ 40
TS-X1160	ϕ 40mm - 65mm	 6×36WS+FC ϕ 45		 6×37S+IWR ϕ 50	
TS-X1160X	ϕ 40mm - 70mm	 6×49SWS+FC ϕ 55		 6×55SWS+IWR ϕ 60	

SYSTEM PERFORMANCE

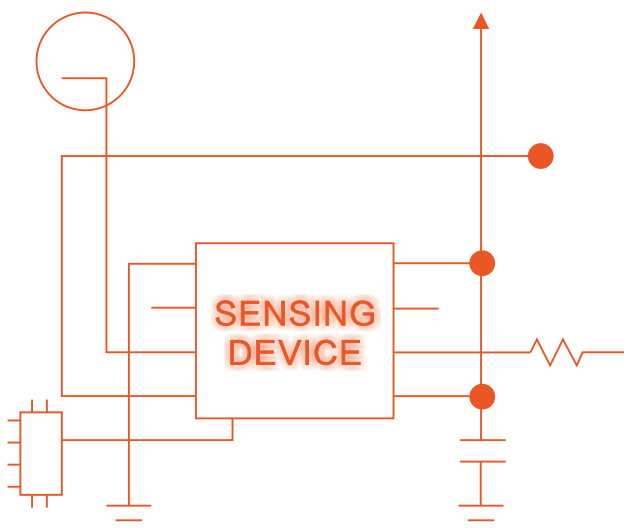


Qualitative Inspection

FDSys.P is able to inspect the wire rope and determine the defect types, such as Local Fault(LF) or Loss of Matallic Area (LMA).

Quantitative Inspection

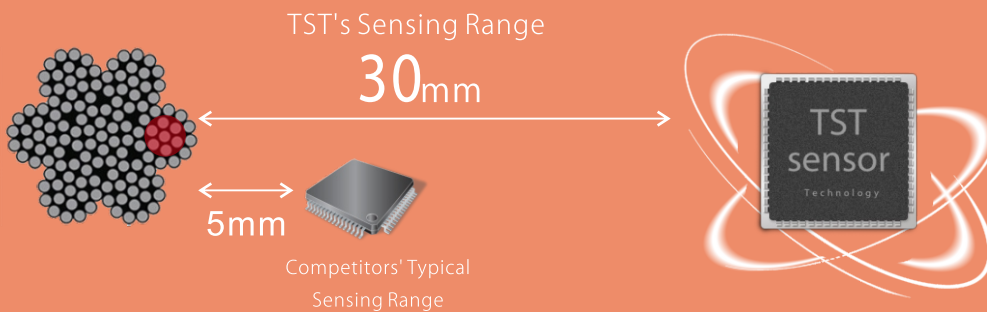
FDSys.P is able to inspect the wire rope and determine the respective defect values and severity with respect to the % loss of cross sectional metallic area and output in the statistical table with % values and positions.



Reliable Inspection

With the advanced sensor technology, FDSys.P is able to detect the defects with high repeatability and accuracy

SYSTEM PERFORMANCE

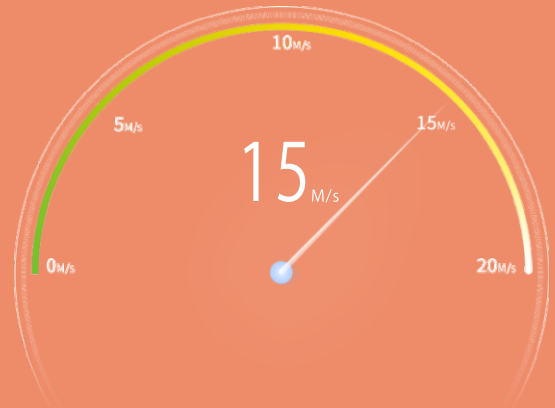


Wide Range Inspection

Due to the optimization of sensor array, the sensor of FDSys.P is able to pick up signals at wide range from the target and inspect the wire rope without interfering the relative movement between rope and device so that good passing ability is achieved. Work efficiency and operation safety is assured.

High Speed Inspection

FDSys.P is able to inspect the wire rope at a high speed without compromising the inspection performance and result.

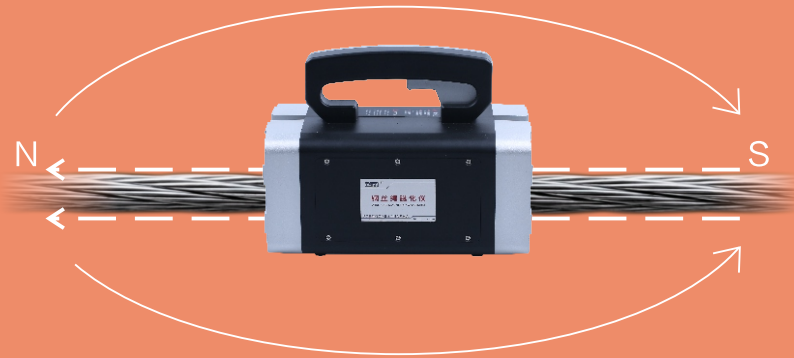


Intelligent Inspection

FDSys.P is integrated with intelligent data analysis and processing algorithm on a user-friendly operating interface to provide a unmatched inspection experience and solution.

INSPECTION PROCESS

1



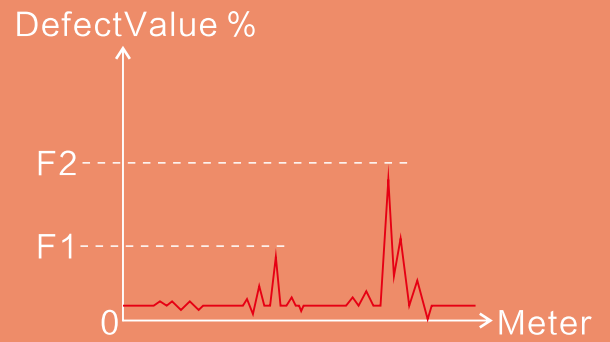
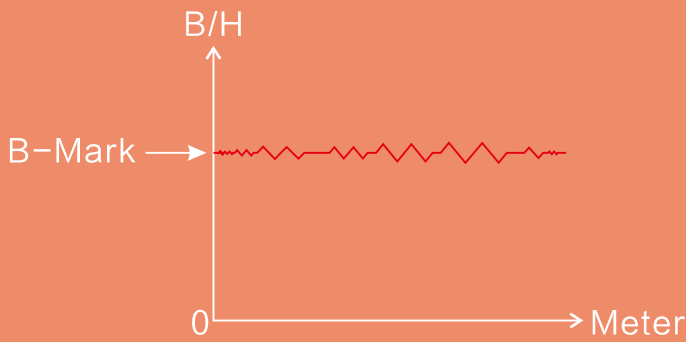
Field Regulating (Magnetizing)

2



BENCHMARKING

INSPECTING



INSPECTION PROCESS

3

TST FDsys.P for Portable Inspection of Steel Wire Rope

Flaw Detection Result Sheet

View Result: [Flaw Detection Result Sheet] Rope No.: [1] Task No.: [1]
 Task Dates: 2023-1-20 Metric Date: 2023-1-20 Inspection Length: 143.5m Benchmark: 230 Rope Speed: 04'10"-28.0 Ref Length: 0
 Viewer Range: 143.5m Signal Factor: 2000 Total Flaw Count: 219 Utilized Value: 10%

Severity Rank	Flaw Value %	Flaw Position m	Flaw Class	LFI Equivalent (mm)	LMA Equivalent (mm)
1	13.39	24.20	LMA		0.11
2	5.94	24.00	LMA		
3	5.18	3.85	LMA		

Data Uploading & Analysis

4

TST TSD FDsys.P for Portable Inspection of Steel Wire Rope

INSPECTION REPORT

Inspection Objective: Non-Destructive Inspection of Steel Wire Rope
Inspection Scheme: by Schedule(Day/Week/Month)
Inspection Device Model: 32-X1132
Device Serial Code: 0001
Inspection Site:

Inspector:
Auditor:

TST Statement of Using TST Systems

- TST FDsys Series are inspection systems designed and developed by TST Flaw Detection Technology Co., Ltd for the non-destructive inspection of steel wire ropes and steel cord conveyor belts.
- The inspection technique and inspection output of TST FDsys Systems comply with the recommended approach in ISO 3309 standard and ASTM E2211 standard for the non-destructive inspection of steel wire ropes.
- Inspection using TST FDsys Series to inspect steel wire ropes and steel cord conveyor belts must be properly trained by TST or TST certified agencies and receive "Certificate of Inspection" by TST.
- Technical Support and Diagnostic Service can only be provided by TST or TST certified agencies to inspection scenarios where TST certified inspectors have operated.
- TST certified inspectors are strongly recommended to obtain the knowledge of target operation and background information of the inspection target.
- Essential documentation of inspection tasks is strongly recommended for FDsys.P Models, e.g. Inspection Info Sheet, "Inspection Report".
- Inspector and Auditor using TST FDsys.P Models are responsible for making the inspection reports in which TST or TST Certified Agencies should provide essential technical support and expert opinion case by case.
- Any inspection result either from TST Systems or other NDT inspection approach is not supported to be the sole source of evidence to interpret complicated inspection scenarios. In cases where conflicts arise, further investigation should be required.
- If not proved to be system fault or system malfunction, TST should reserve the rights and responsibilities to interpret and justify the inspection data and result generated by TST Systems.
- Maintenance policy and standard criteria of inspection target should be acknowledged to TST or TST Certified Agencies to justify the compliance of TST reporting process thus to notify and interpret different results that may arise.
- TST does not take collateral responsibilities for the conducts of any Un-certified 3rd party inspection service vendor using TST FDsys Systems for business purpose.

TST INSPECTION SUMMARY REPORT

Inspection Scheme	Inspection Date	Device Model	Ref Length
Portable	2023-01-20	32-X1132	143.5m

Inspection Objective: Portable Non-destructive Inspection and Flaw Detection of Steel Wire Rope

Inspection Technical Reference: National Standard of the PRC GB/T818-2008

Item	Value	Unit	Standard
Inspection Length	143.5	m	GB/T818-2008
Inspection Speed	10	%	GB/T818-2008
Inspection Angle	8.43	°	GB/T818-2008
Inspection Time	4.53	min	GB/T818-2008
Inspection Temperature	23.42	°C	GB/T818-2008
Inspection Humidity	23.16	%	GB/T818-2008

Inspection Summary: 219 flaws detected, 10% utilized value.

TST Flaw Severity Statistics

Severity Class	Flaw Count (or Flaw Total Length Count)	Statement
Level I	1	100.00% of Level I
Level II	1	50.00% of Level II
Level III	0	0.00% of Level III
Level IV	1	50.00% of Level IV

Inspection Summary Result: Flaw Status is Serious. Please consider more frequent inspections and a rope replacement to be scheduled to ensure maintenance safety.

Flaw Class Statistics

Flaw Class	Flaw Count	Flaw Value of Count %	Flaw Value Position in
LFI	1	100.00	1
LPI	1	100.00	1
LMA	1	100.00	1
SN	1	100.00	1

Reference Flaw Class Characteristics: None or general. There are no characteristics in a broken strand with 0.1% loss of strength. There are no characteristics in a broken strand with 0.1% loss of strength. There are no characteristics in a broken strand with 0.1% loss of strength.

TST Flaw Detection Result Sheet

Item No.	Flaw Position (m)	Flaw Value(%)	Flaw Class	LFI Equivalent (mm)	LMA Equivalent (mm)
1	2.22	3.42	SN	0.22	
2	1.64	5.11	SN	0.15	
3	2.3	4.53	SN	0.10	

Inspection report

FIELD APPLICATIONS





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