OITAF
Bozen/Bolzano
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Newest findings about possibilities and limits of visual rope inspection

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Overview

- Introduction
- Current situatuion
- Field trials
- Evaluation and findings of field trials
- Optical inspection device – Winspect
- Development of a rating system

Introduction – Aim of project

- Determine the reliability and limits of the visual rope inspection type A and C
- Development of a system to improve the visual rope inspection
- Intervals (frequencies) of visual inspections were **not** part of the project
- Recommendation of OITAF Committee No. II regarding visual inspection

Table 18 — Definition of inspection types

Parameter	Type A	Type B	Type C
Speed	<0,3 *m/s*	0	<1 *m/s*
Stop on demand	yes	Not applicable	yes

Source: PrEN 12927:2016

Introduction – Necessity of visual rope inspection

Magnetic Rope Testing		**Visual Inspection**
Inner wire breaks Wire breaks in strand valley	Heavy corrosion Heavy wire damaging Outer wire breaks Former clamp areas Lightning strike	Notches, scratches, hair lines Touching of strands Beginning corrosion Wire Distortion Disturbance in rope symmetry Lightning strike

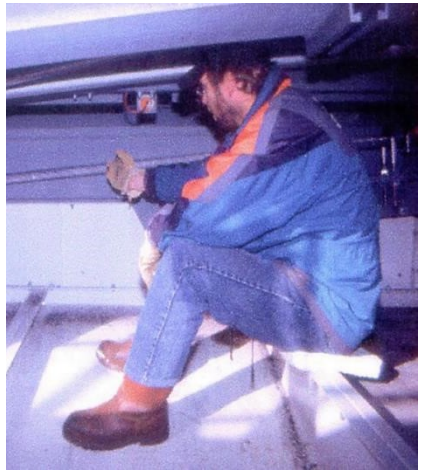
Introduction – Necessity of visual rope inspection

Example: Damage of slipped clamp

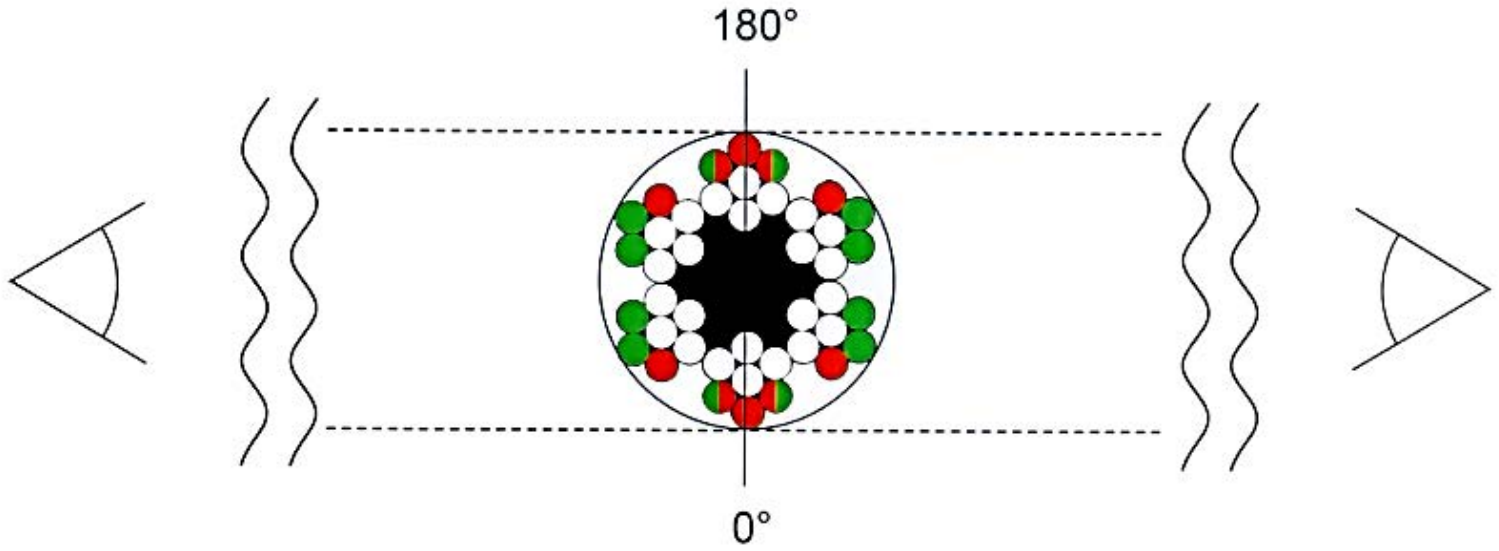
- Martensite and brittle surface at a length of 41 cm
- Discovered at MRT testing → 40 % loss of metallic area

Current situation

- Work environment often not ideal
  - Narrow work platform or no work platform at all
  - Inspection on ladders (could be unsafe if ladder is not permanently installed)
  - Insufficient light situation (blinding sun, dark environment, …)
- Inspection without any breaks (Decreasing concentration)



Current situation



Inspection with two people: hardly possible to see whole rope circumference

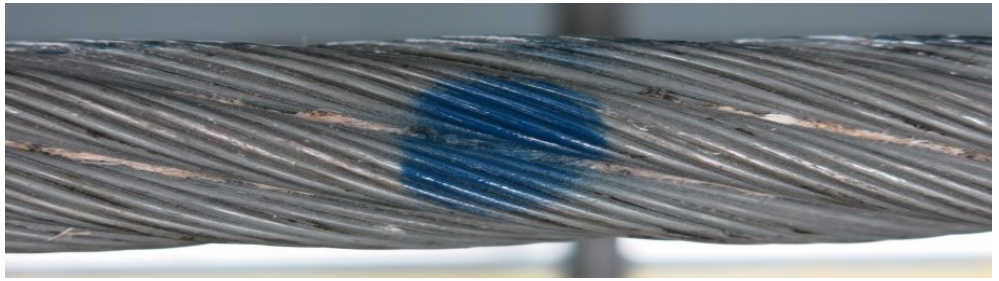
Field trials

Examples for artificial damages

corrosion

hair lines

clustering of wire breaks

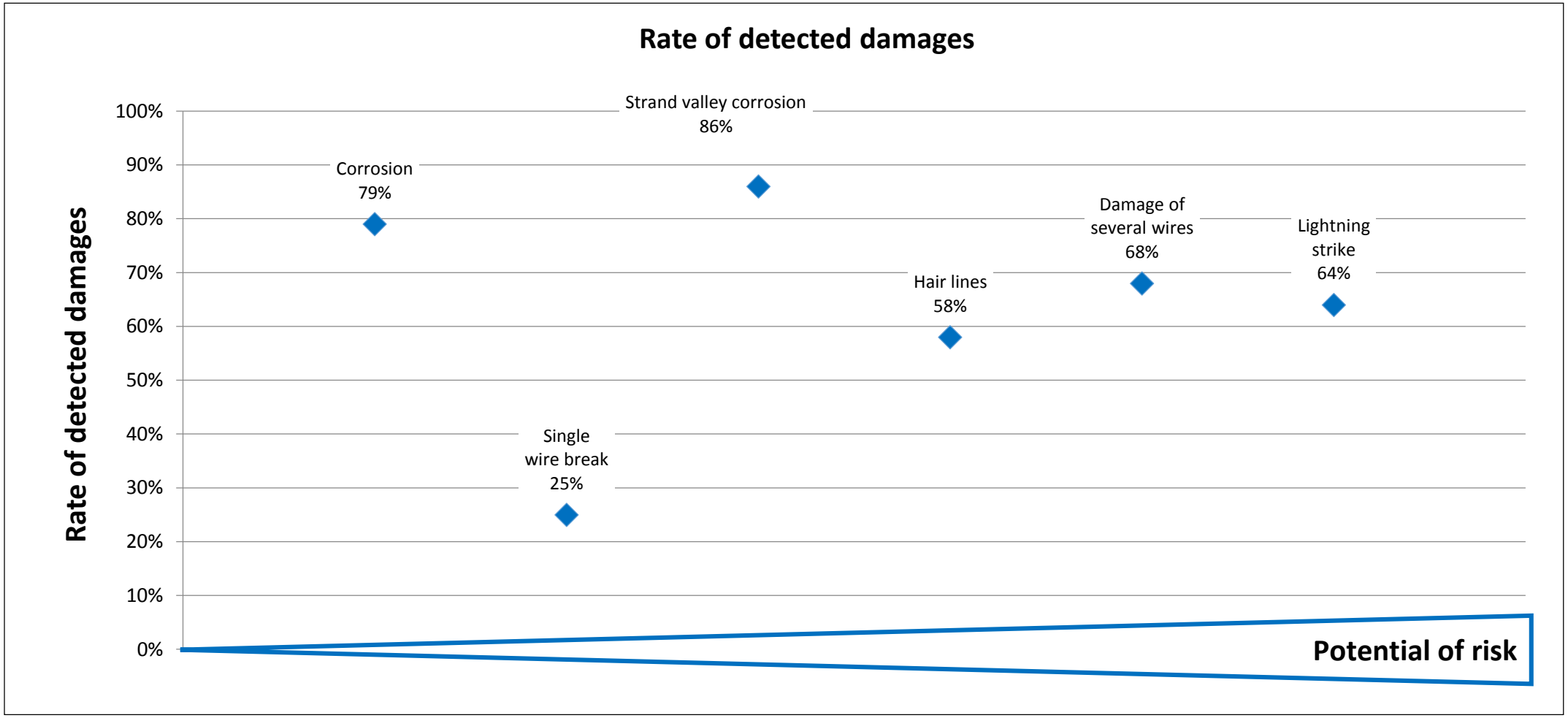


lightning strike

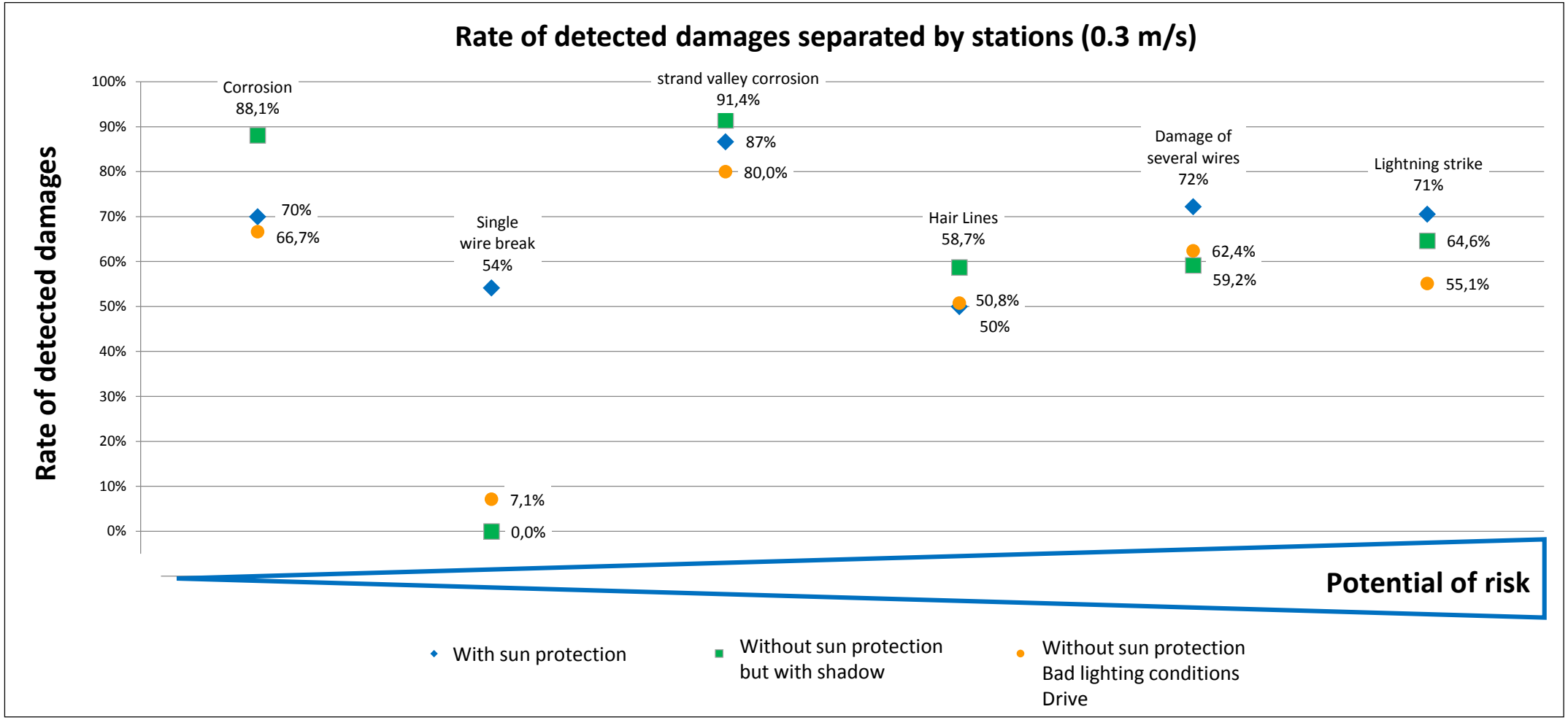
Field trials

- Inspections at 4 installations / 5 stations
- Different speeds
- Different workplace environments
- With and without tools
- 21 participants

Evaluation of field trials

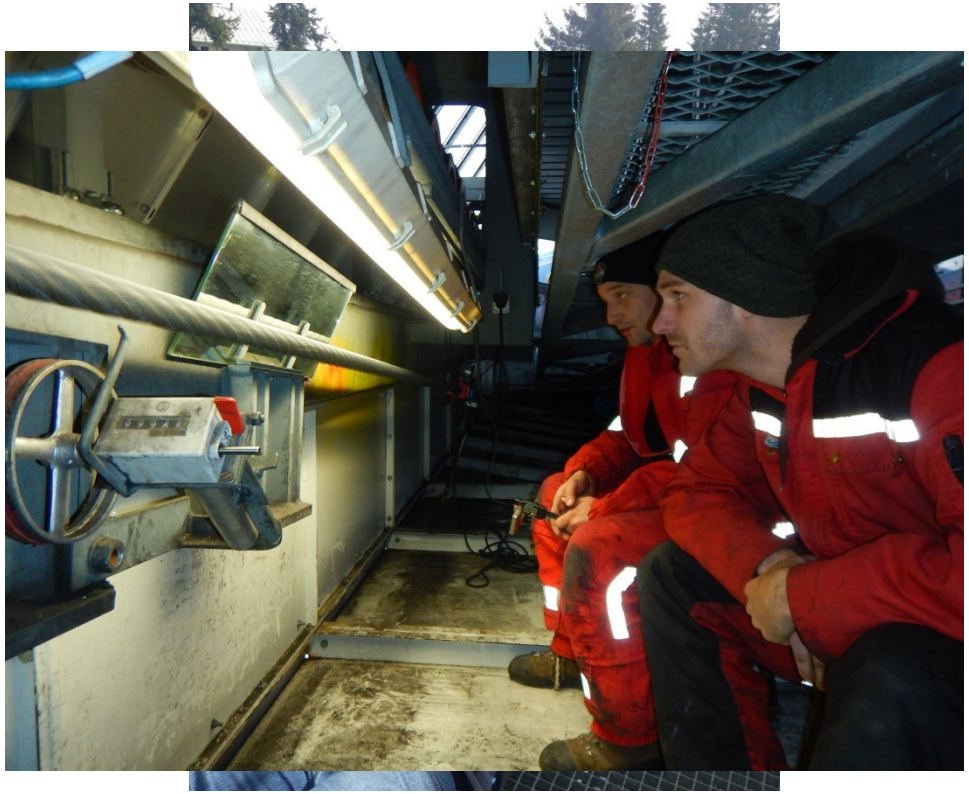


Evaluation of field trials

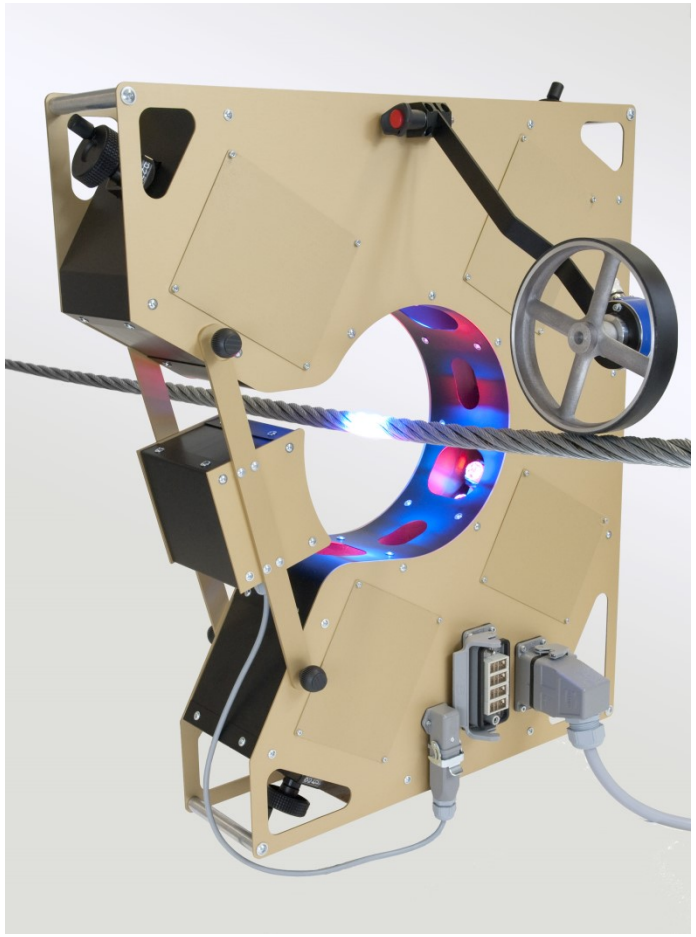


Evaluation of field trials

- Biggest influences during an inspections according to research results
  - Lighting conditions
  - Sun protection
  - Background
  - Workplace environment
    - Possibility to sit or lie down
    - Secure
    - Sufficiently comfortable
    - Sufficient distance to rope



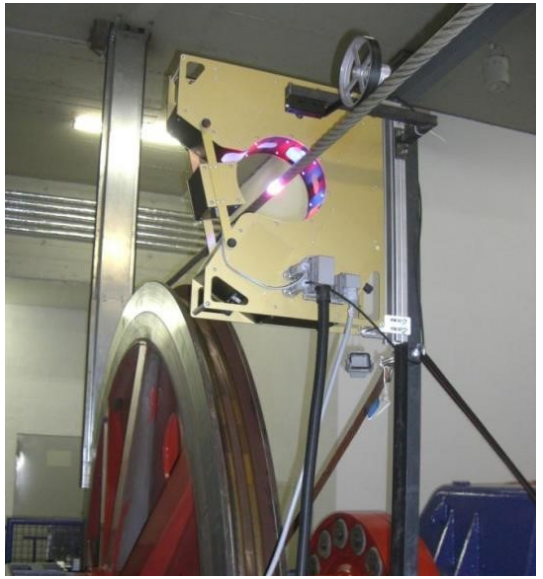
Optical inspection device



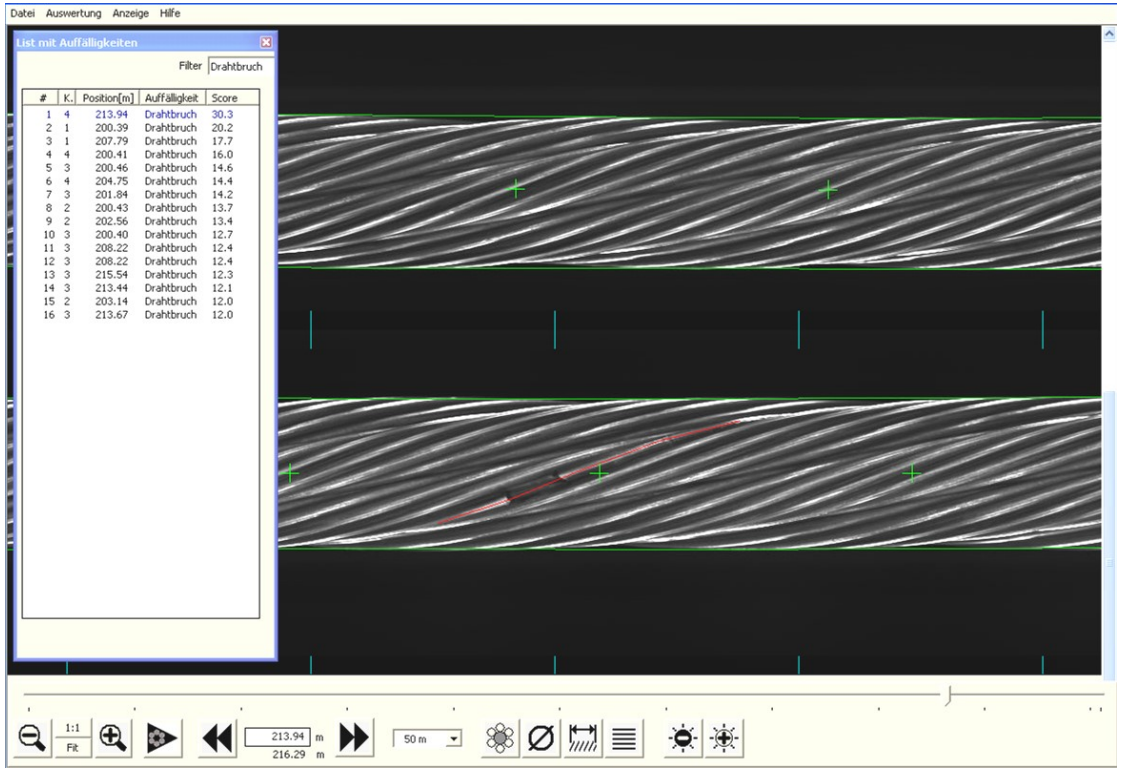
- Recording of the whole rope circumference by four cameras
- Analysis and Evaluation of the image data by the software
- Advantages:
  - High inspection speed
  - Inspection with one person possible
  - Documentation
  - Extension of inspection intervals possible (depending on local regulations)

Source: http://www.winspect.info/

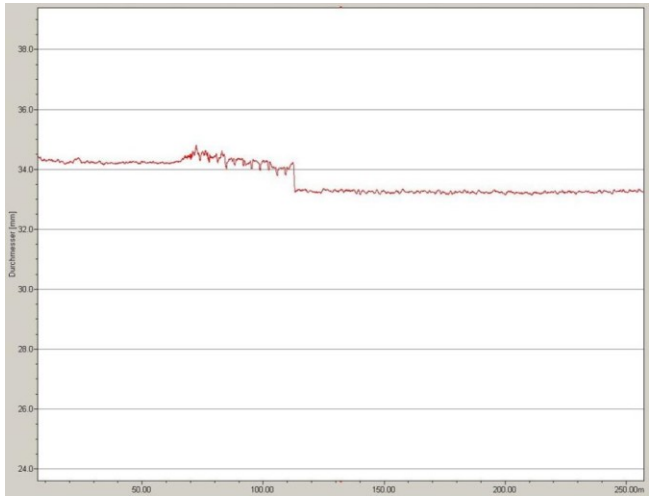
Optical inspection device

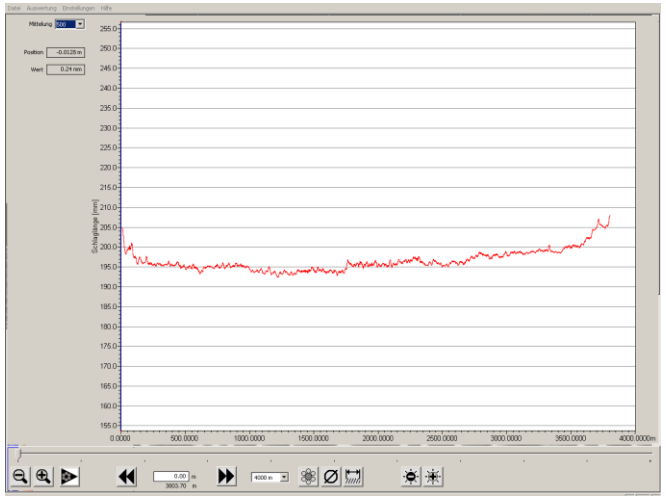


Evaluation of the rope



Evaluation of the rope diameter and lay length





Development of a rating system

- Aim: Operator gets an impression regarding the quality of the inspections
- Content:
  - Rating of the workplace environment
  - Rating of inspection conditions
  - Rating of inspector

- Classification of results in three categories

Development of a rating system

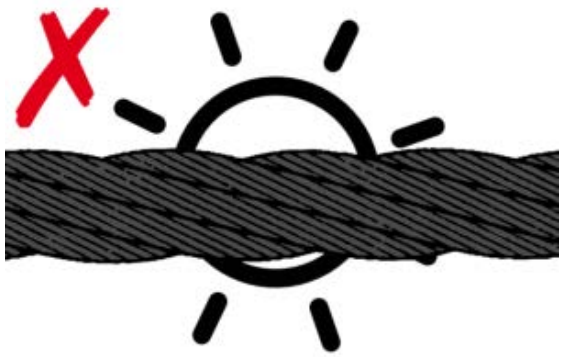
Nr.	Criterias	max. points
2	Sun protection	4
4	Background	4
6	Switch to stop rope	1
8	Distance to rope	2
10	Duration of inspection until taking a break at 0,3 m/s	2
12	Rope alignment	2
	Sum	**30**

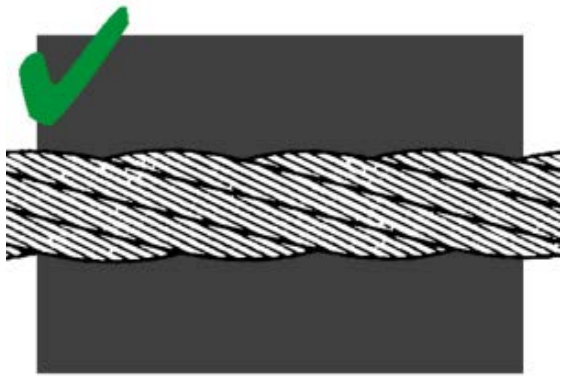
Development of a rating system

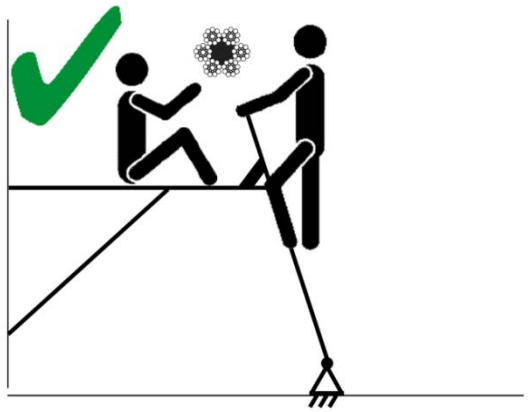
23-30 points Category 1	17-22 points Category 2	Less than 17 points Category 3
No improvements necessary	Improvements possible to increase rate of detected damages	Improvements recommended, rate of detected damages not sufficient

Development of a rating system

- Useful Illustrations to demonstrate possible improvements for example:







Thank you very much for your attention