feliX switching to innovation

Railway switch inspection robot
Felix is the first mobile robot for the automatic railway switch inspection; developed by Loccioni Research for Innovation and RFI (Rete Ferroviaria Italiana) with the objective to increase railway switches reliability, guarantee railways safety and solve maintenance planning problems.

Felix robot is able to monitor switches and crossings (S&C) status. It is equipped with profilometers to create a 3D reconstruction of the inspected part.

**THE SYSTEM**

Felix performs the automatic inspection of switches and wearing components, by scanning the segment inspected.

The system stores, processes and displays in real time all measurements, creating specific reports. It improves the quality of measurement, makes surveys objective and avoids errors in data acquisition and data transfer phases. During the measurement, the system is remotely managed with a PDA (Personal Digital Assistant) and a handheld remote control unit, ensuring greater safety to the operators.

The motorized device makes it possible to analyze a sequence of several switches. Speed and minimum distance between two consecutive measurements can be set on customer requirements.

Felix brings innovation to railway maintenance processes, facilitating and enhancing them. The automation of measurement makes it faster and easier to perform diagnosis and quality control, with a significative impact on the safety of operators and ultimately of final users.

**MEASURES**

Continuous measure of track geometry
- Track gauge
- Sliding average on 100 m track gauge
- Cross level
- Twist on 3 m base
- Twist on variable base
- Crossed distance
- Characteristic distances of S&C (switches and crossings)

Punctual measures and geometry checks
- Gauge
- Break spaces
- Free wheel passage
- Crossed distance

Implementable measures
- Wear rail-stock rail
- Other measures on request

**SYSTEM MODULES**

1. Handling module
   - Motors for handling wheels
   - 8 wheels (4 with encoder)
   - Engine for handling trim gauge

2. Instrumentation module
   - Vision devices
   - Electrical and electronic components
   - Acoustic and visual devices
   - Battery
   - Emergency buttons

3. Safety
   - Anticollision sensors
   - Antislip handles
   - Mechanical and electrical plug & play connections

4. Radio remote control

5. PC/tablet with management interface and data display
**TECHNICAL FEATURES**

- Resolution: 0.1 mm
- Minimal distance between two consecutive measurements: 5 mm
- 18 month metrological performances guaranteed after calibration
- Transportation, assembly and measurement on site with 2 track workers
- Continuous working for at least 6 hours
- Performing in any weather condition
- Temperature range: -10°C to +50°C
- IT maintenance platform interface through PC tablet
- Customized data report

**CERTIFICATIONS**

- EN 13848 track geometry quality
- EN 13232 switches and crossings
- EN 45014 declaration of conformity

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1. Felix during the automatic inspection
2. Remote control
3. Bumpers
4. 3D railway reconstruction
5. Software