

Setting an Anchor for the Future.

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Abstract: fischer offers digital solutions for the building's entire life cycle. Its range of products comprises global innovations in robotics and sensor technology, BIM services, the fischer FiXperience design software and digital services such as the fischer plug-finder app for selecting and using products. These solutions optimize the planning, construction and operation of buildings.

Keywords: Tunnelling; Innovation; Safety; Monitoring; Automation; Productivity

1 Introduction

Starting with a patented plastic expansion plug in 1958, the fischer Group of Companies continued to develop and now offers system solutions and services for planning, construction and operation throughout a building's entire supply chain. The company also offers digital services in areas such as BIM (Building Information Modelling), automated construction, connected fastening products on the Internet of Things as well as practical tools to design, select and use products.



Figure 1 BauBot Ceiling Installation

2 fischer BauBot: Automation in construction

The fixing expert is taking the system idea to the next level with its BauBot robot. The fully automated construction site helper creates drill holes and installs fischer fixing solutions in walls, floors and ceilings in a manner never seen before. By using the BauBot in combination with a digital building plan, construction site processes can be almost fully automated and documented. Using the robot increases work efficiency, takes the workload off of installers, reduces errors and saves time, ultimately ensuring the project's success.

2.1 Productivity and precision

By using the fully automatic fastening robot in combination with a digital construction plan, you are able to automate your construction site processes. This results in large increases in productivity. Through precise drilling and setting of anchors in the right place defined in the construction plan, rework and delays can be avoided. This is even further optimized by a complete simulation of the drilling and setting processes of the robot before the execution has started. Exceeding budgets and delays in the project schedule will be reduced or even avoided.

2.2 Shortage of skilled workers and the health of your employees

It is more important than ever in times of a shortage of skilled workers to support your team. The fischer BauBot takes on physically demanding, exhausting tasks and reduces the risk of injury. With the integrated dust extraction system the robot makes a great contribution to the dust-free construction site and thus ensures a cleaner and healthier working environment.

2.3 Documentation and Safety

Through the use of innovative sensors, the robot detects any deviation from the standard drilling and setting process and responds with a predefined strategy. The process parameters of each step are documented in the BIM-model. A complex manual documentation can be omitted. To ensure safety during operation the robot is always operated and supervised by an fischer operator. In addition, the robot is equipped with LiDAR-sensors that create a security zone around the robot to prevent unauthorized entry to the working area of the robot.

3 fischer Construction Monitoring: Intelligent, connected fixing technology

fischer Construction Monitoring's mission is to make the

world a little bit safer. We offer an unprecedented combination of a smart monitoring tool and strong fastenings with our system solutions to document and monitor facilities and buildings. Join us in taking a key step towards a digital future in construction.

3.1 The SensorAnchor

Creeping, shrinking and setting construction materials - changes and deformations such as these present structural engineers with challenges when it comes to tunnels, wind turbines and bridges. It's a good thing that our SensorAnchor provides a reliable, all-in-one solution offering maximum data transparency through the real-time transfer of preload and operating forces. This provides an early automatic warning for critical connections, allowing you to easily and conveniently monitor the data on the end device of your choice, resulting in minimal maintenance for structures of all sizes.



Figure 2 fischer SensorAnchor

3.1.1 Preliminary prevention of more extensive damage

A built-in sensor in the anchor transfers real-time preload and operational forces to the fischer Construction Monitoring evaluation platform. This data can be accessed at any time and is used for the early detection of vulnerable connections.

3.1.2 Receive alerts based on custom limits

Every structure is different. That's why being able to rely on individual safety assessment parameters is all the more important. fischer Construction Monitoring and an integrated warning system allow you to set critical limits in the system. Once these limits have been reached, you'll automatically receive a push notification.

3.2 The SensorDisc

Every screw has to sit right. Users are on the safe side with our SensorDisc, a digital fastening to check and document conventional screw connections. It all works exactly the same as conventional washers, be it during initial installation or retrofits. Simply scan your SensorDisc in the

fischer PRO app to obtain a quick and convenient reading of the recorded data.

Figure 3 fischer SensorDisc

3.2.1 Easily read data via smartphones

Any place, any time. Identify all types of screw connection failures early on and increase their safety and service life



with fischer's new SensorDisc.

3.2.1 Monitor the preload force of screw connections

Simple, quick and precise. Here's how to read the fischer SensorDisc via NFC transfer. Simply select the disc in the fischer PRO app and measure the current force level. All values are automatically stored in the cloud.

4 Conclusions

With the BauBot Robot and the SensorAnchor fischer increases productivity and safety through digitization, automation and monitoring. The technologies decreases the challenges the tunnel engineers face in their day to day life.

5 References

[fischer Construction Monitoring - The innovation for more safety - YouTube](#)

Prager Offshore application

Peri – Construction site