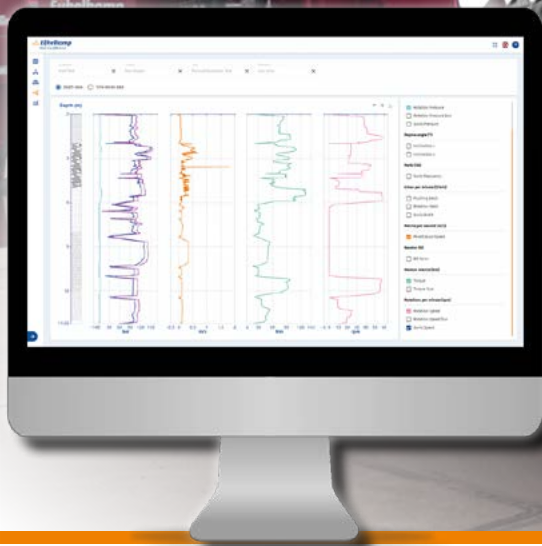


Monitoring While Drilling and the Data Platform

NEW!

The next step in efficient
drilling



Monitoring While Drilling and the ROAK Data Platform

Discover an easy-to-use tool that lets you boost the efficiency and productivity of drilling campaigns through rig setting recommendations, automated operations and real-time insights on fleet performance, environmental footprint metrics and project (geological) information.

The Monitoring While Drilling system combines the latest in sensor and data technology to provide you with all the insights and tools to manage, monitor, and optimise drilling projects – and make them more sustainable.



Boost the efficiency of your drilling campaigns

Boost efficiency and make drilling campaigns more productive thanks to detailed insights on drilling operations. With a fully digital system that tracks your drilling operations in real time and provides data on current and historic drillings, you can build a database of insights. The overview of your (sonic) drilling history provides valuable input and guidelines for future drills.

Monitoring While Drilling (MWD) is not a new technique. But ours is different: the Royal Eijkelkamp MWD system is specially made for sonic drilling. It's also designed to work seamlessly with our data platform. The data is generated by physical sensors on the rig and collected together with the engine data to deliver real-time insights on every aspect of the rig performance.

Features that make the difference

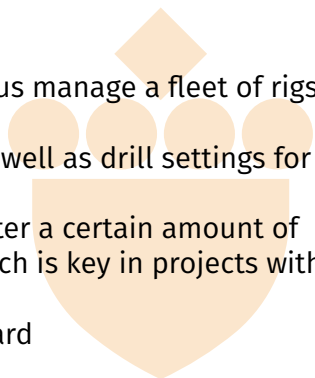
- Overlay Geo-data on your rig performance data
- Rig details & service dashboard
- Always-online 4G two-way communication
- Data analysis and predictive power, brought to each individual rig
- A sophisticated data platform for every stakeholder



Benefits of our Monitoring While Drilling system

The data collected with the Monitoring While Drilling system lets you manage your assets more efficiently. The system monitors various aspects of both the drilling process and the machine, offering the following benefits:

- You learn how your machine performs in different geological contexts
- It's possible to monitor the drilling operations from a distance and thus manage a fleet of rigs more appropriately
- Every drilling project feeds a database with historical drilling data, as well as drill settings for specific geological contexts, drilling equipment and circumstances
- The system predicts when your rig is likely to require maintenance, after a certain amount of operating hours. This predictive maintenance prevents downtime, which is key in projects with a tight deadline or in remote areas with no easy access to spare parts
- Data can be transferred via a generic industrial modem with 4G sim card



ROAK: the new home for your data

The data you collect through MWD will be collected on ROAK: our new innovative online platform specially designed to help you make the most of your drilling data.



Key features of ROAK

- **Operational Efficiency:** Improve your processes and make the best use of your resources.
- **Risk Management and Cost Savings:** Reduce risks and save on operational costs.
- **Environmental and Compliance Benefits:** Stay compliant with environmental regulations and enhance your sustainability efforts.
- **Advanced Data Integration and Sharing:** Easily integrate and share data across your systems.

Convenient

ROAK is your all-in-one solution for data management. It offers real-time status displays, reports, alerts, user, and role management – everything you need in one place.

Customisation

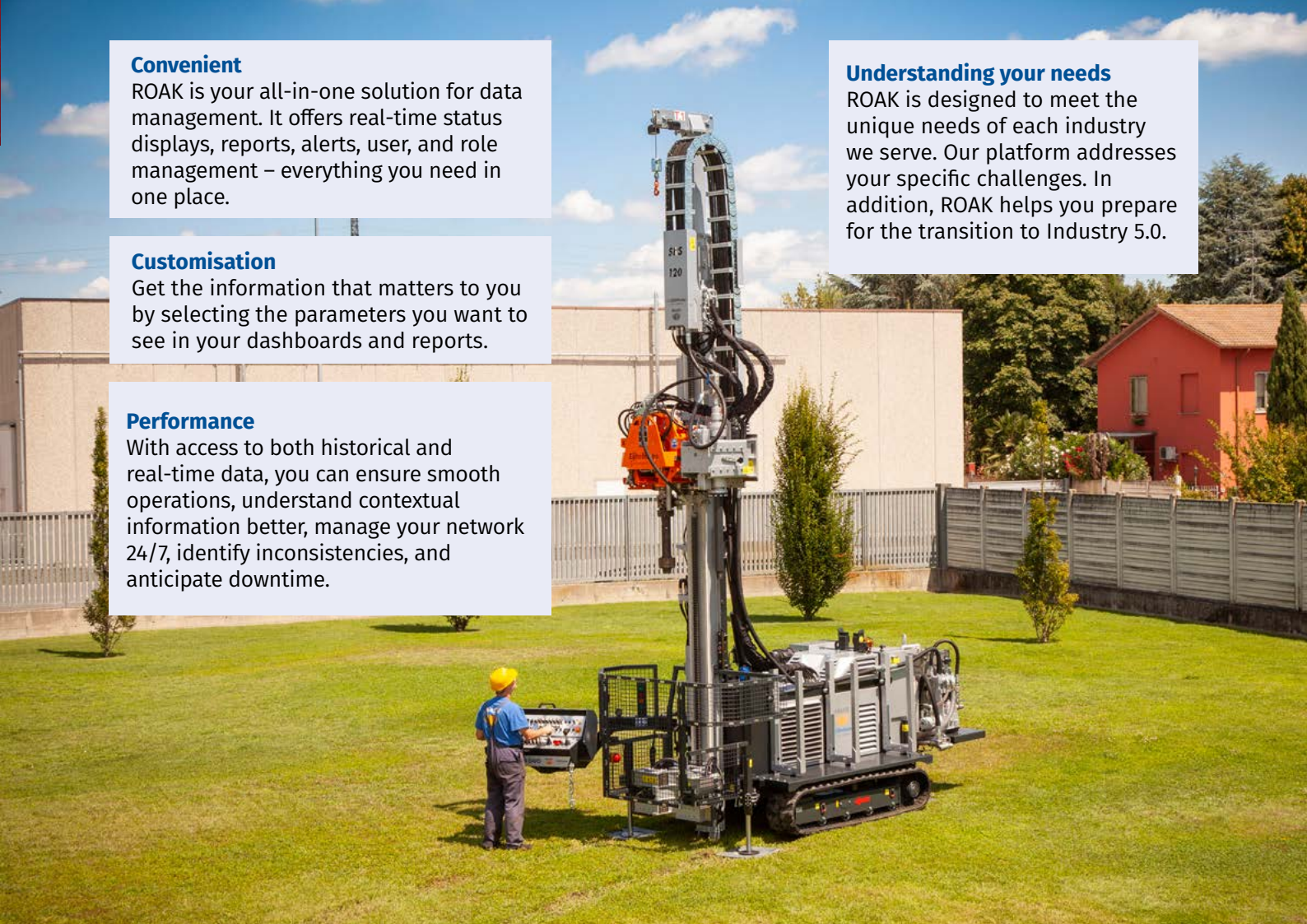
Get the information that matters to you by selecting the parameters you want to see in your dashboards and reports.

Performance

With access to both historical and real-time data, you can ensure smooth operations, understand contextual information better, manage your network 24/7, identify inconsistencies, and anticipate downtime.

Understanding your needs

ROAK is designed to meet the unique needs of each industry we serve. Our platform addresses your specific challenges. In addition, ROAK helps you prepare for the transition to Industry 5.0.



From planning drilling campaigns to gaining data insights



Plan drilling campaigns

Through either an Excel file upload or manual input, drilling campaigns and boreholes can be planned ahead in our data platform. The drill crew on site can access the list of planned boreholes through the touchscreen on the rig, find the nearest location through GPS and execute the borehole. Once finished, the borehole status is automatically updated from 'planned' to 'completed'.

Monitor every step in the drilling process, on-site and remotely

The drill rig operator can monitor important drilling parameters and adjust drill settings through the touchscreen display. The graphs are interactive and can be configured to show all relevant data of the last 5 metres drilled. The touchscreen was designed to be used whilst wearing gloves.

Meanwhile, the project manager in the office can follow the process remotely and in real time* through the data platform.

**In case the rig is remotely located without a 4G connection, the data is stored in the system to be transferred later.*



Export reports of drilling performance

While most monitoring systems only record data when new depths are drilled, the Royal Eijkelpkamp MWD system records data passively. This way we make sure that no relevant datapoints are missed while providing other interesting insights such as total amount of operating hours, total drilling fluid used during the campaign, effective drilling time and much more.

Reports also shows specific data, such as fuel consumption or water usage. This helps to calculate the environmental footprint of a campaign. It is even possible to create reports across different projects or within a specific project or job-site.



Still to come: features in development

Start Monitoring While Drilling now so you can make the transition to Industry 5.0 and benefit from our upcoming features:

- **GeoWhileDrilling** makes geological analysis possible while you drill. It lets the system to recognize geologies based on the rig performance.
- **Adaptive Drilling** helps to make sonic drilling easier by automatically adjusting the sonic frequency for best performance, based on the changing operating conditions.





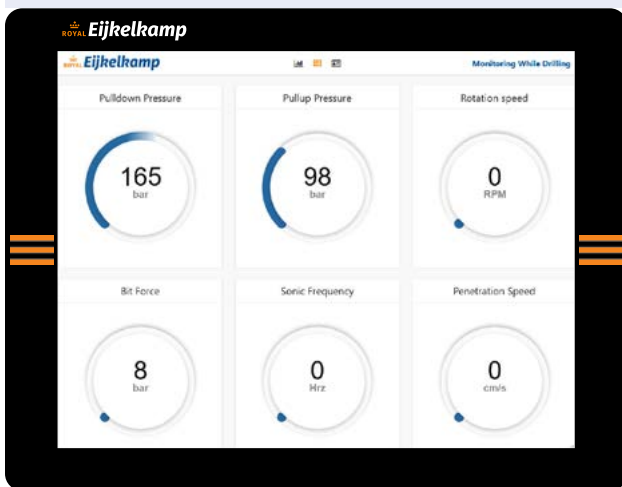
Real-time insights in the field

The drill operator can monitor various parameters on the Rig Screen, which is designed for easy usage in the field:

- Touchscreen
- Works with gloves
- Customisable
- Continue where you left off after rig restarts

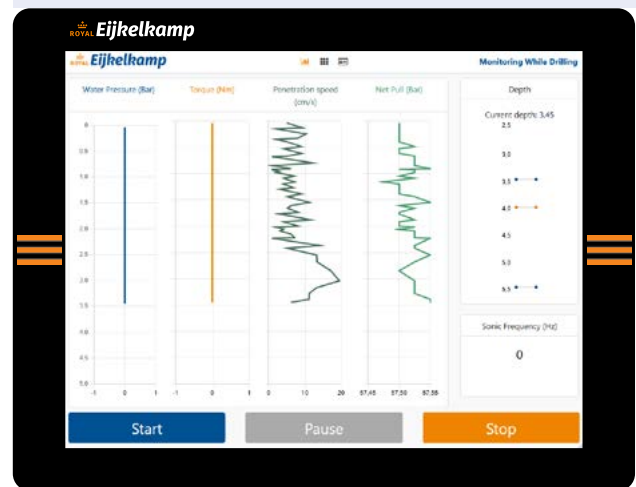
Classic Dashboard

- View rig parameters in one glance
- Swipe to see other pages



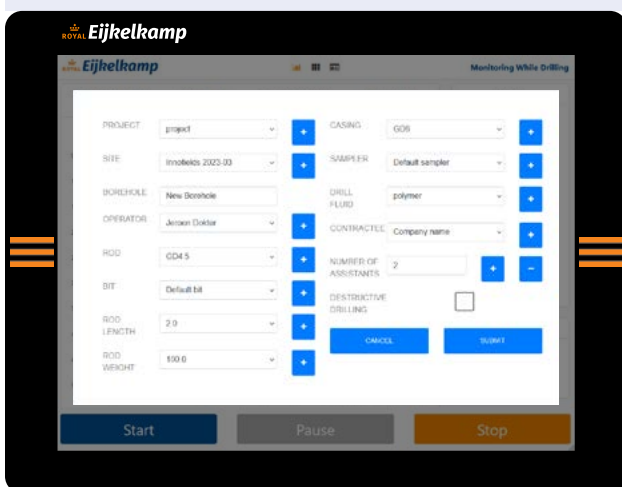
Advanced Operator Dashboard

- Live drawing of graphs as drilling deepens
- Indicates start drilling depth at bottom of borehole



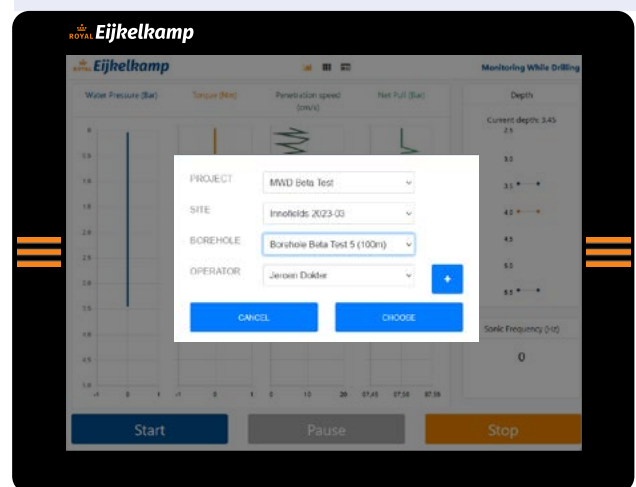
Borehole metadata

- Automatically load last rig configuration
- Dropdown functions
- Add custom configurations

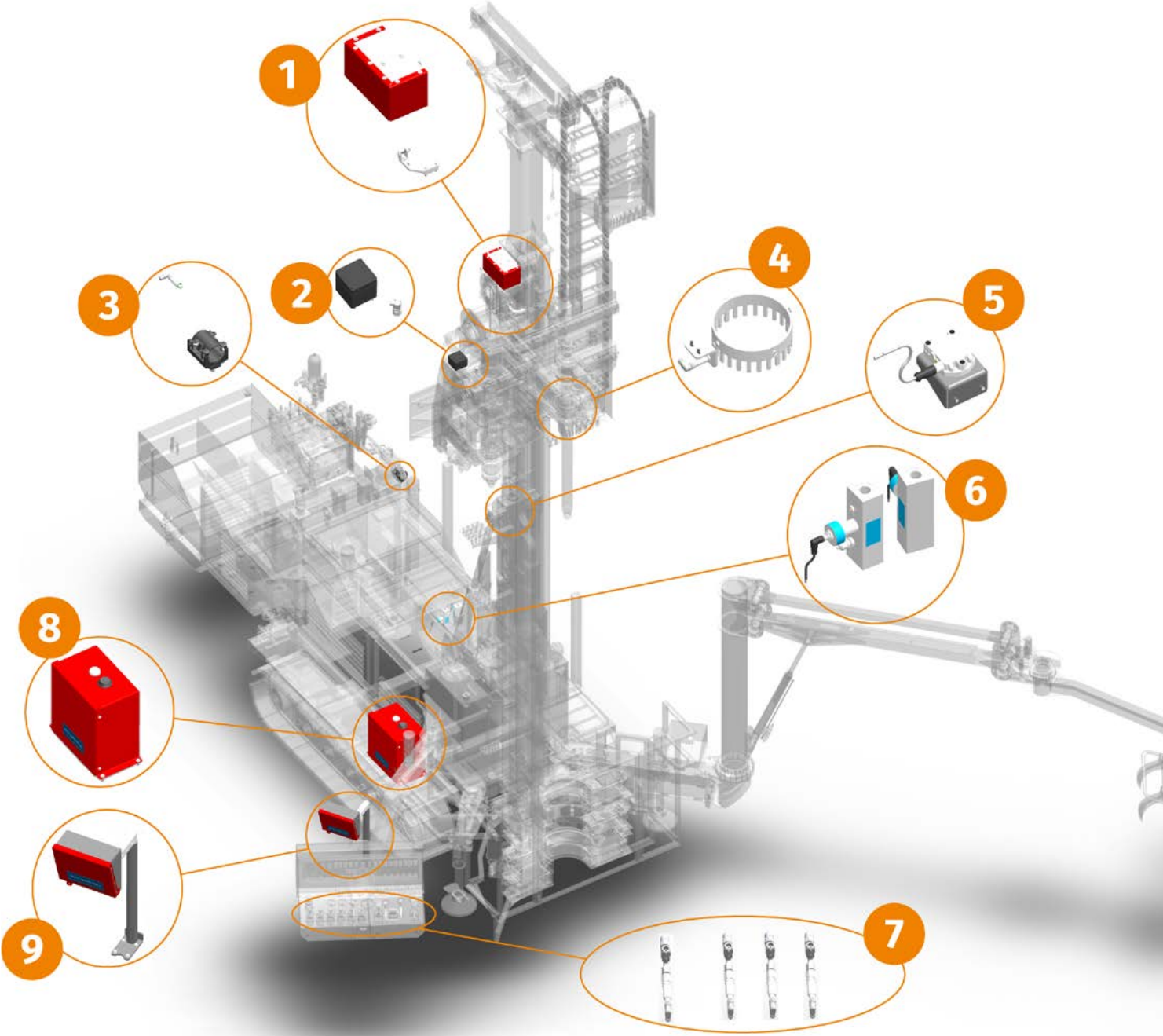


Drill a planned borehole

- No borehole configuration required
- Sorted by closest planned boreholes
- Just click on a planned borehole and start drilling!



Sensor & technology overview





1. Depth encoder + wire box

Measures the pulses and depth of the drill head.

2. Accelerometer

Measures the acceleration of the sonic vibration of the drill head.

3. Waterflow sensor

Measures the amount of fluid (water and/or mud) used in the drilling process to cool the drill bit and flush cuttings. This indicates how to optimise fluid usage in specific types of geology, measuring also the impact on local aquifers.

4. Duo rotary counter (only on the DUO drill head)

Measures the rotary speed of the drill rod attached to the conventional drill head.

5. Inclinometer

Measures the drilling angle on two planes parallel to the earth.

6. Hydraulic flows on the Sonic head

Measures the amount of hydraulic fluid flowing through the hydraulic tubing that controls the rotation and sonic frequency.

7. Hydraulic pressures & Water pressure

Measures the hydraulic pressures in the system, such as torque on the drill rod, pressure required to maintain the sonic vibration, pull-up and pulldown pressures and water pressure (the required pressure to deliver water to the drill head at great depths - also providing information on the hydrostatic properties of the drilled geology).

8. General technology, IOs and Compute module

Includes GPS and 4G-LTE.

9. Pressure sensitive touchscreen

Operable with gloves. It shows live drawings of graphs as the depth increases. It is customisable to show different parameters.





ROYAL  **Eijkelkamp**
Meet the difference

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