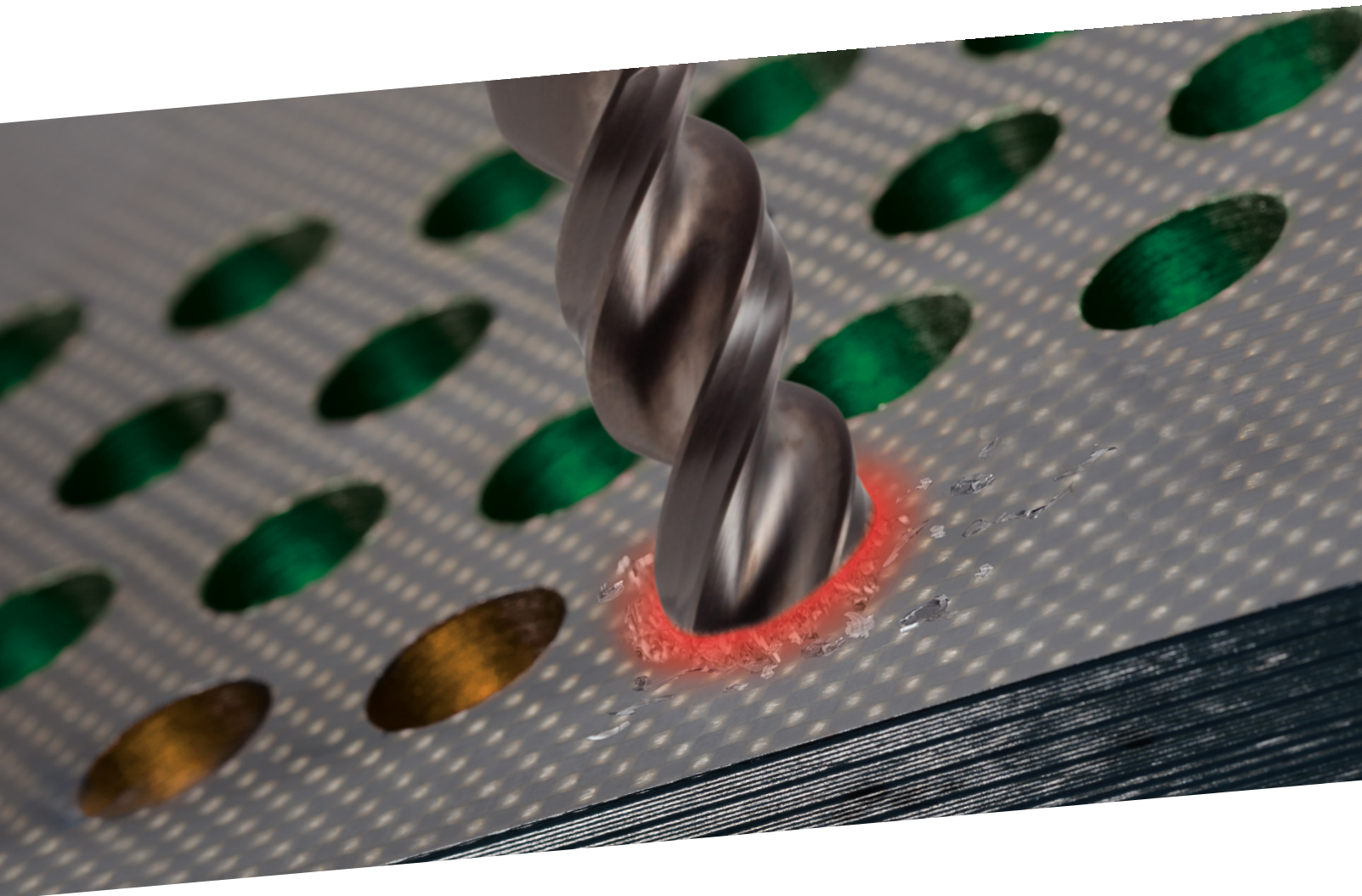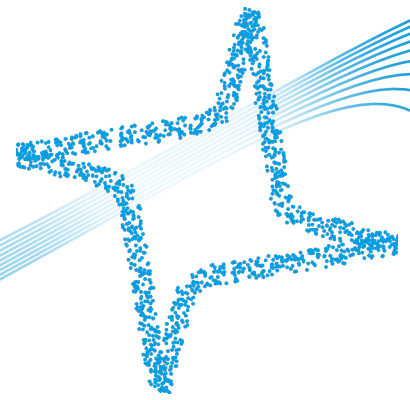# pro**m**icron

wireless solutions

DO YOU KNOW
YOUR CRITICAL
TOOL FAILURE POINT?

MACHINE DATA
with **pm**_connector

sp:ke® DATA

sp:ke®_polar

PROCESS DATA TRACKING

With *spike®*, it is possible to **measure the forces directly at the point of action** and **visualize them live during the process** per individual cutting edge.

This provides permanent feedback on the **condition of the cutting tool**(-wear) and thus indirectly **on the quality of the workpiece** achieved (surface, shape & position tolerances, dimensional accuracy, etc.).
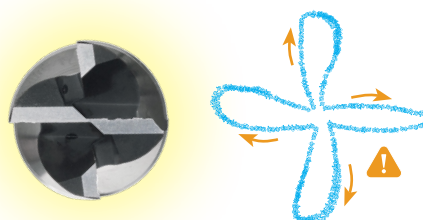
Measuring the forces enables the visualization of details others can't see. Our **highest sensitivity sensors** are especially relevant for **high-quality production**.
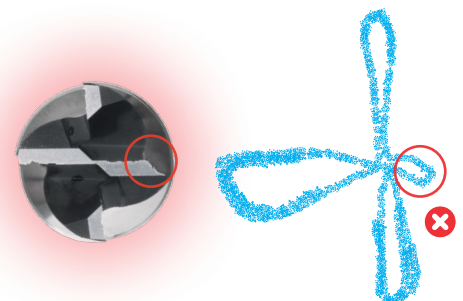
NEW TOOL

WORN TOOL

BROKEN CUTTING EDGE
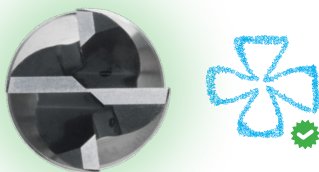
low forces,
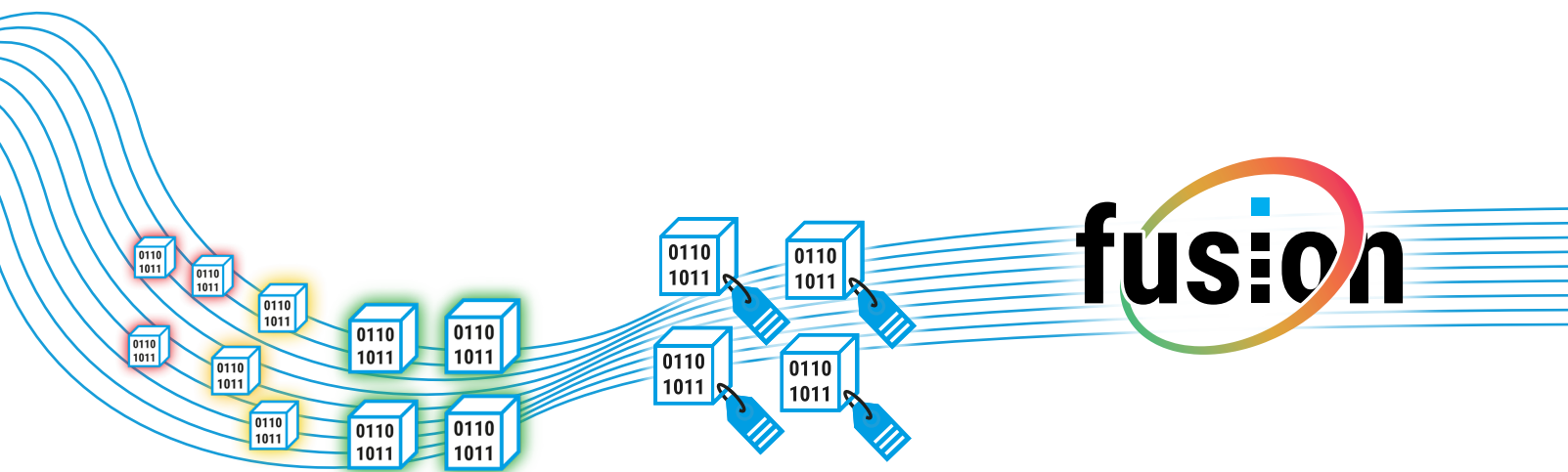symmetrical spike®_polar

increased bending moment,
spike®_polar enlarged

Cutting edge broken,
force dropped locally

SENSORS

Highly sensitive. Intelligent. Wireless. Machine integrated or plug&play.

RAW DATA
PREPARATION

DATA REFINING
& LABELING

DATA MANAGEMENT
& EXPORT / IMPORT

AUTOMATED DATA PREPARATION

To efficiently **manage the large amount of raw data** available, tools for automatically storing, sorting, labelling, synchronizing, validating, etc. are needed.

Within our web-based and open interface software *fusion*, the **data is prepared and refined** so that it can be efficiently **interpreted and correlated** without much manual effort.
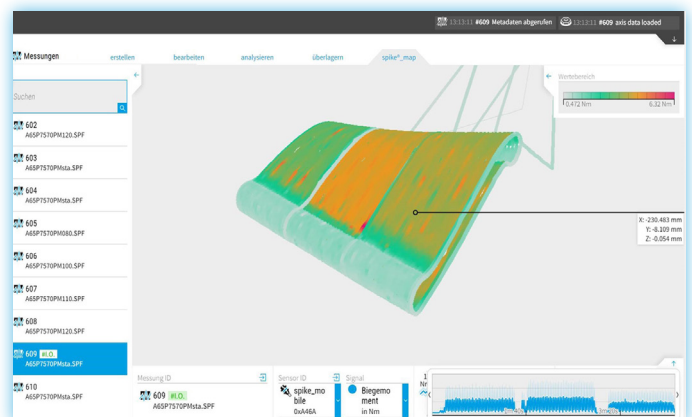
After that, your process data is **ready to be used for AI training** and, for example, **the creation of a digital twin**.

store | sort | label | sync
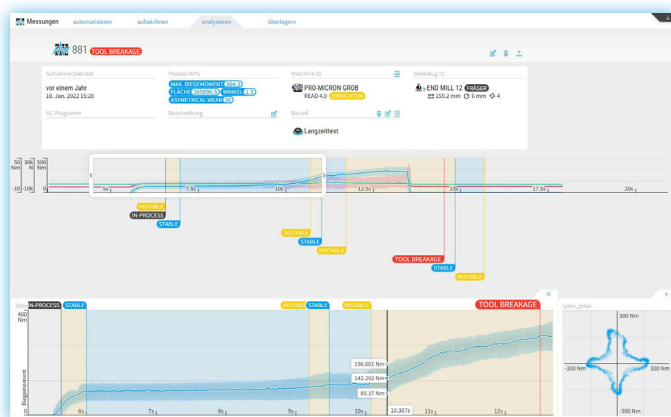
spike®_map

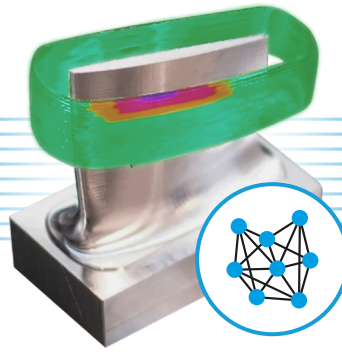Automated labeling of key points in the process inside fusion

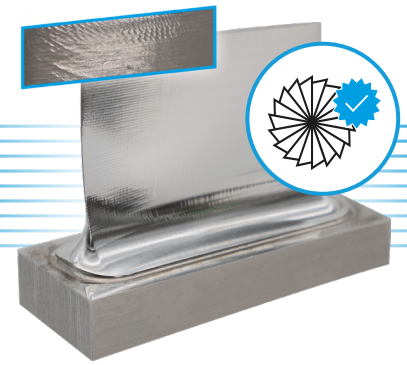Quality control with digital twin

SOFTWARE

For automated data preparation.

ANALYSIS & CORRELATION
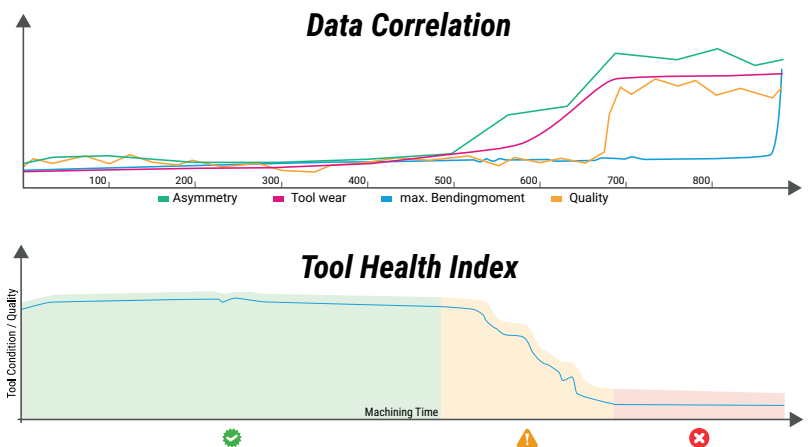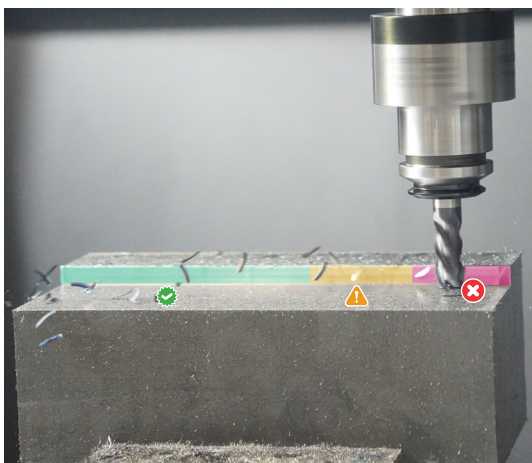
ALGORITHMS with **sp:ke**®_map

QUALITY CONTROL

TRANSFORMATION OF DATA INTO KNOWLEDGE

The **prepared data** can now be transformed into knowledge by various data science approaches.

Methods such as process specific indicators (***spike®_kpi*** *for symmetry or chatter)*, **digital twinning**, or **tool health indexes** enable the user to detect and even predict the critical ***TOOL FAILURE POINT***.

As a result these parts are now **protected from becoming scrap parts**, leading to **reduced downstream costs** and **increased production efficiency**.
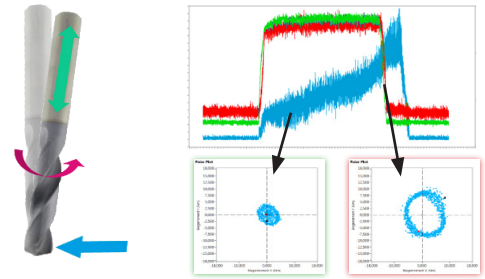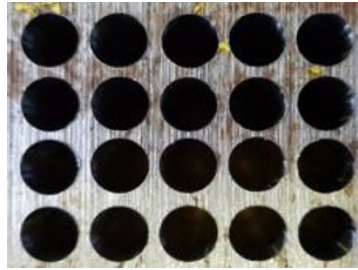

Data Correlation

100 200 300 400 500 600 700 800

■ Asymmetry   ■ Tool wear   ■ max. Bendingmoment   ■ Quality

Tool Health Index

Tool Condition / Quality

Machining Time

DATA SCIENCE

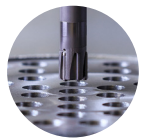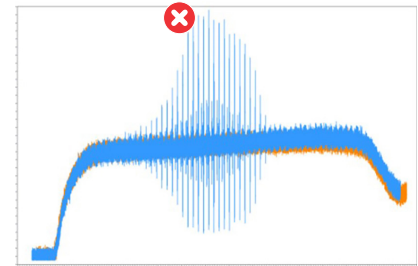Real-time quality result prediction using AI algorithms.

spike® USE CASES

DRILLING
run out / offset / wear / breakage

TURNING
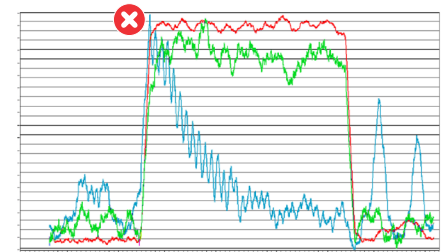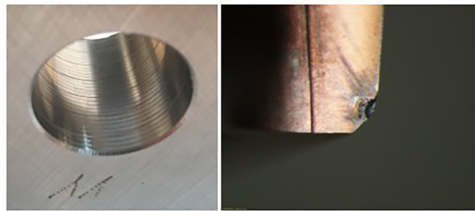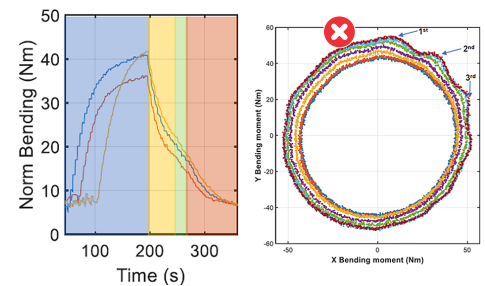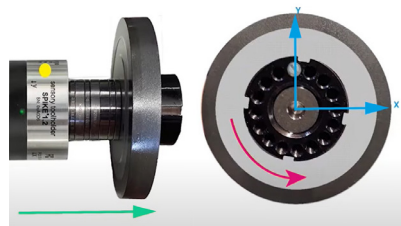*chatter / dimensions accuracy offset*

REAMING
tool wear / cutting edge breakage
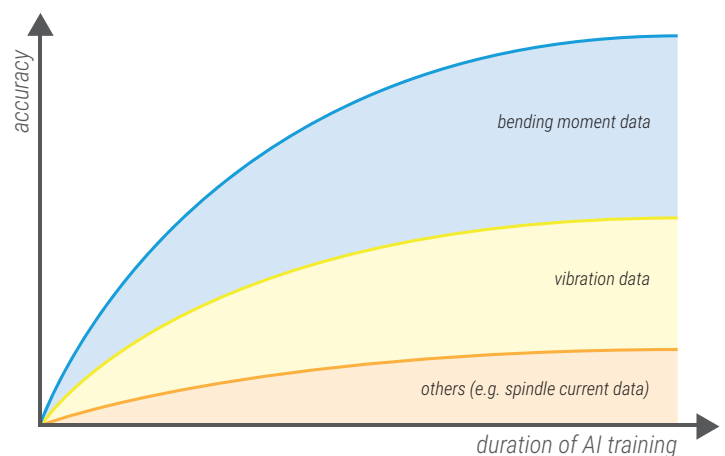
GRINDING
grinding burn / tool wear

FURTHER APPLICATIONS
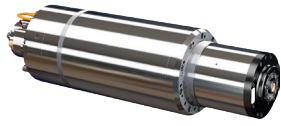
0,3mm drilling | 2,5mm threading | FSW | ...

WHY PRO-MICRON?

1 **spike**® *delivers the highest sensitivity & high quality data*

2 *Data collection and preparation for optimizing AI use in **fusion***

3 *AI training and digital twin by our data scientists*

accuracy
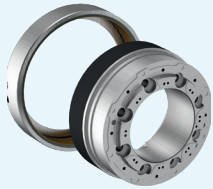
bending moment data

vibration data

others (e.g. spindle current data)

duration of AI training

AVAILABLE SENSORS
FOR HIGH QUALITY DATA COLLECTION

spike®_polar generative

COMING SOON

MACHINE DATA

- spindle torque
- axis data
- NC code
- meta data

spike®_inspindle

- machine integrated
- absolute values (Fz, Mx, My; SiS+)
- HSK-A63 / A-100 / A-80

spike®_mobile

- process specific
- absolute values (Fz, Mx, My)
- all holder types
- diff. sensitivity classes (finishing/roughing op.)

spike®_mobile_rs

- process specific
- relative signal & vibration (~ 8 kHz)
- < HSK-E40
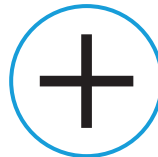- Highest sensitivity (for micro machining)
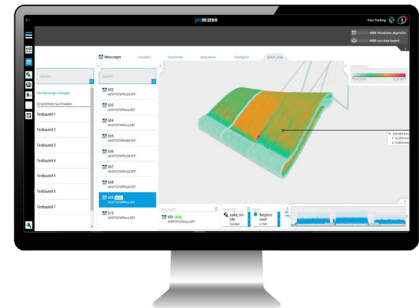- Up to 40.000 rpm

START NOW WITH

DATA-TRACKING SET

FLEXIBLE DIAGNOSTIC SET (MANUAL)

- Can be used across machines
- Laboratory use
- Plug&Play < 1 minute
- Laptop

RETROFIT SERIES / PILOT MACHINE (AUTOMATED)

- All sensors
- Automated data recording
- Retrofittable < 2 days
- Edge / IPC

+

ANALYSIS TOOL

fusion SOFTWARE

- Web based
- API possibility
- Export / Import
- Server / Laptop

YOUR spike® CONTACT

"Discuss your challenge with us, test our solution and take the next step towards autonomous machining in your production!"

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inquiry@pro-micron.de
www.pro-micron.de/spike-en/