





Measured Variables of IML-RESI PowerDrill®

Drilling resistance and feed force measurement

With Passion and Precision



Advantages of the feed force measurement

Together with the drilling resistance, the measurement of feed force allows for realistic conclusions to be drawn regarding the evaluation of the wood.

The IML-RESI PD-Series additionally measures the feed force required to push the needle into the wood. Practical experience has shown that the feed curve is only minimally influenced by shaft friction, which facilitates the detection of areas with wood decay, especially in early stages of decay.





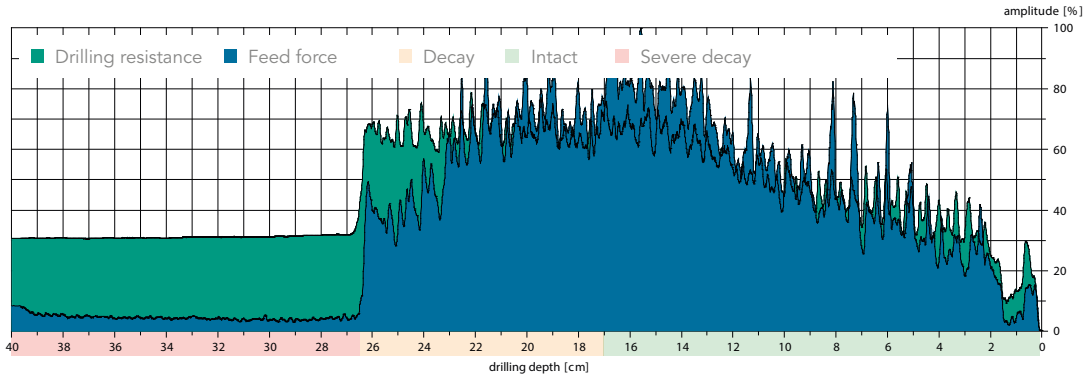
Shaft friction influences drilling resistance

Shaft friction creates an additional resistance and influences the drilling resistance measurement.

Drilling resistance and shaft friction

During drilling resistance measurement in wood, the 3mm-thick drilling needle at the tip is increasingly clamped by the wood shavings remaining in the drill channel as the bit's depth increases. This creates additional friction, known as shaft friction. Therefore, the drilling resistance consists of the measurement of the torsional force at the needle tip and the friction at the drill needle shaft.

For hard deciduous woods (such as oak, beech, and locust), this shaft friction is more pronounced than in softwoods (such as poplar and pine). In the drill profile, a high shaft friction can be identified by an increasing trend of the drilling resistance with increasing depth. Therefore, when the drill needle exits the tree or enters a cavity, the drilling curve does not fall back to the initial level.



Picture shows measurement on a beech tree with a defect

Beech with decay

The measurement curve is read from right to left. The bark can be assigned to the range from 0 to 1.5 cm. From 1.5 to 17 cm, the measurement curves of drilling resistance and feed force increase steadily, indicating the drilling through intact wood. At 17 cm drilling depth, the feed curve drops slightly, which is an indicator of incipient wood decay.

Drilling resistance remains constant in this range without an increasing trend. The drop in the feed curve is even more pronounced between 23 and 26.5 cm. From 26.5 cm, the feed resistance almost completely falls back to the initial level. However, due to shaft friction, the drilling resistance remains at around 30% amplitude.



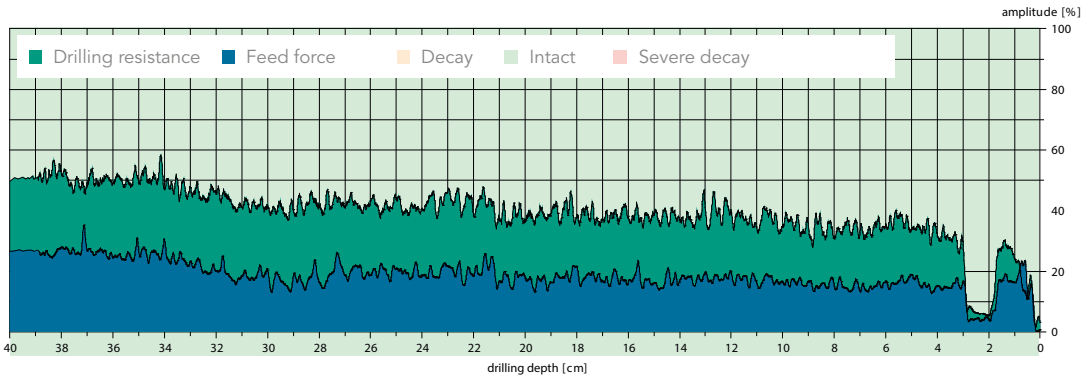


Estimating wood defects & remaining wall thickness

The feed force measurement facilitates the user's assessment of the remaining wall thickness and provides indications of the stage of decay.

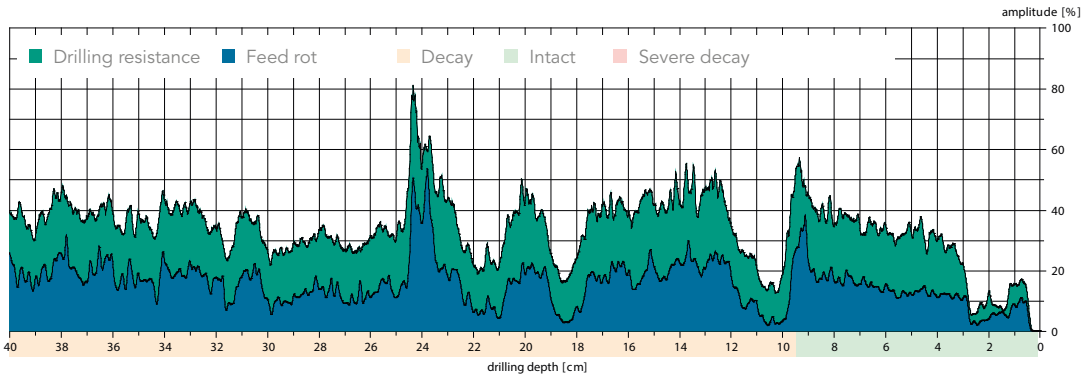
Chestnut tree with Kretzschmaria Deusta

The following example shows two measurements on a chestnut tree with brittle cinder fungus. Visually, the typical black discoloration of the brittle cinder was recognized on the bark, and both a reference measurement in the intact area and a measurement at the base of the trunk were taken. The reference measurement serves to compare the measurement curves and facilitates the identification of defects in the tree. In the example, it can be seen that both the drilling resistance curve and the feed curve have a constant course.



Picture shows reference measurement on a chestnut tree

The result of the measurement directly at the base of the stem shows clear differences compared to the reference measurement. From a drilling depth of 9.5 cm onwards, a first significant decrease in both measured values can be observed. A uniform course of the curves is also not visible in the following area, which is typical for wood decay caused by brittle cinder.



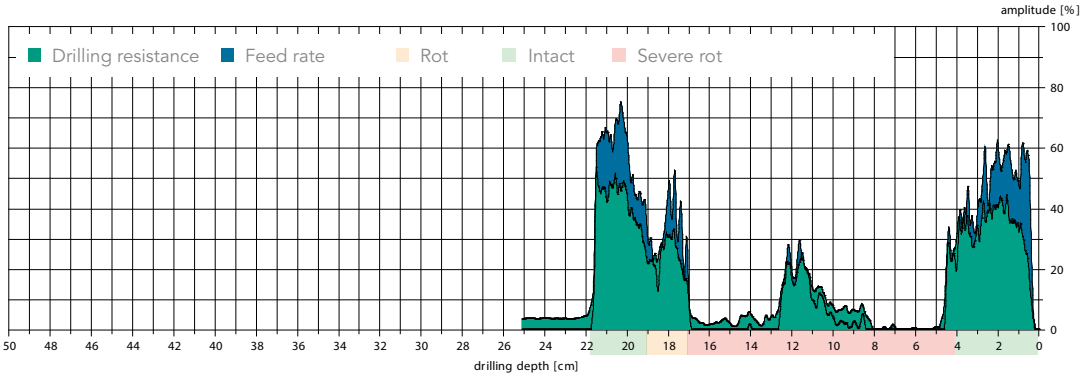
Picture shows measurement in a damaged area of a chestnut tree

Timber Inspections



The IML-RESI PowerDrill® provides clear measurement results when inspecting the structural integrity of timber.

The following example clearly shows the internal defect in both the drill resistance and feed force measurements. To inspect the area directly below ground level, the measurement was performed at a -30° angle at the base of the playground structure. Both measurements show a significant decrease from 4 cm drilling depth, and the damaged area extends to the increase in resistance from 19 cm. The exit of the drill bit from the structure is visible at a depth of 22 cm.



Picture shows measurement on a wooden play equipment at a playground



Further information
via QR-Code!

Do you have any
questions?
We are happy to
assist you personally
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