Case study Drill Navigation

PocketLIM 5G Installation - Drill Navigation

Table of contents :

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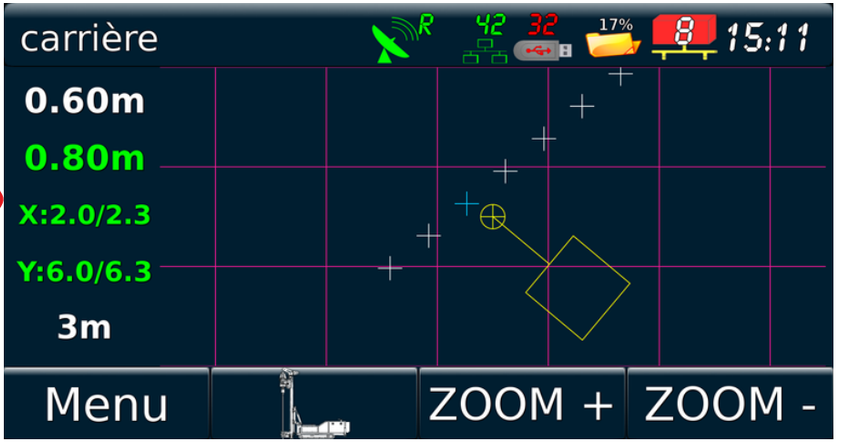
The **PocketLIM 5G** record and display drilling parameters but also provides navigation capabilities and precise drill bit positioning. The system has been installed on a RTDrill C-550 in Guinea on a beauxite mine.

Parameters recorded during the drilling:
Depth / Mast inclination / Position of the Drill rig / Penetration rate / Pressures

Coordinates of the Drilling pattern:
IREDES or csv files uploaded to the PocketLIM

BHID	SITE_ID	X	Y	Z	Depth
1	P20_173195_15_20	595123,05	1219921,2	202,545	5,892
2	P20_173195_15_21	595128,15	1219921,2	202,541	5,634
3	P20_173195_15_22	595133,25	1219921,2	202,479	5,317
4	P20_173195_15_23	595138,35	1219921,2	202,617	5,199
5	P20_173695_15_24	595143,45	1219921,2	202,626	5,187
6	P20_173695_15_25	595148,55	1219921,2	202,596	5,157

USB transfer



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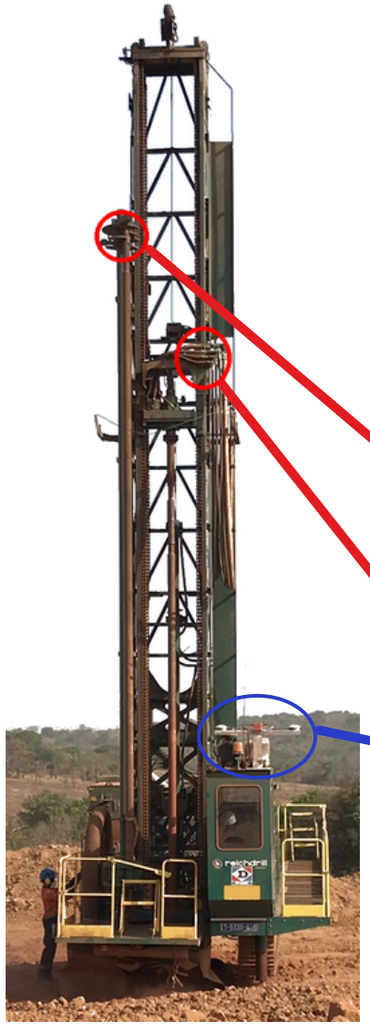
Case study Drill Navigation

Sensors installation



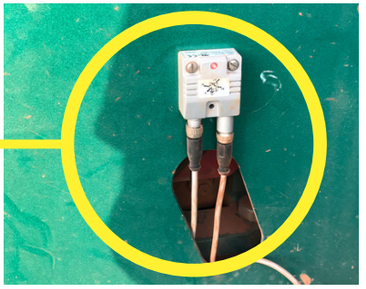
RTK base: It is supply by 12V supply, sending RTK centimetric precision trought UHF (~465Mhz). The base is immovable and knows its absolute position.

PocketLIM: Central unit receiving the drilling pattern and recording the drilling parameters.
It can installed in a cab or outside.

Rod adding system: automatic reading of rod adding.

Depth sensor: optical encoder measuring depth and penetration rate.

Inclinometer: It is installed on the mast of the drill rig.
The inclinometer sensor is measuring X/Y angle with high accuracy.



RTK receivers: The GPS/GLONASS and UHF antennas are installed on the top of the cab of the drill rig.
The spacing between both antennas (1m / 3.3ft) is offering an high enough accuracy.
They are “in motion” (moving along with the machine).
They receive the RTK correction and apply this correction.

Case study Drill Navigation

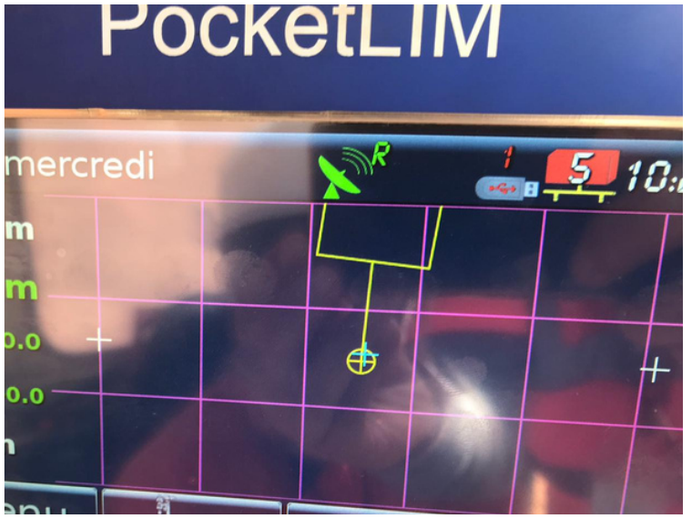
Results

Drilling conditions: bumpy ground, tool diameter: 152 mm (6 in)

*Δ: distance between the land surveyor planned holes and drilled holes

Without NaviLIM	x	y	%x	%y
Δ ≤ 5cm (2 in)	10	4	45	18
5 ≤ Δ ≤ 10 cm (4 in)	4	10	18	45
10 ≤ Δ ≤ 15cm (6 in)	2	2	10	10
Δ ≥ 15cm (6 in)	6	6	27	27

With NaviLIM	x	y	%x	%y
Δ ≤ 5cm (2 in)	18	15	82	69
5 ≤ Δ ≤ 10 cm (4 in)	3	6	14	27
10 ≤ Δ ≤ 15cm (6 in)	1	1	4	4
Δ ≥ 15cm (6 in)	0	0	0	0



Without using NaviLIM (off position)

64% drilled holes are respecting the customer request Δ ≤ 10

95% drilled holes are respecting the customer request Δ ≤ 10

With using NaviLIM (on position)

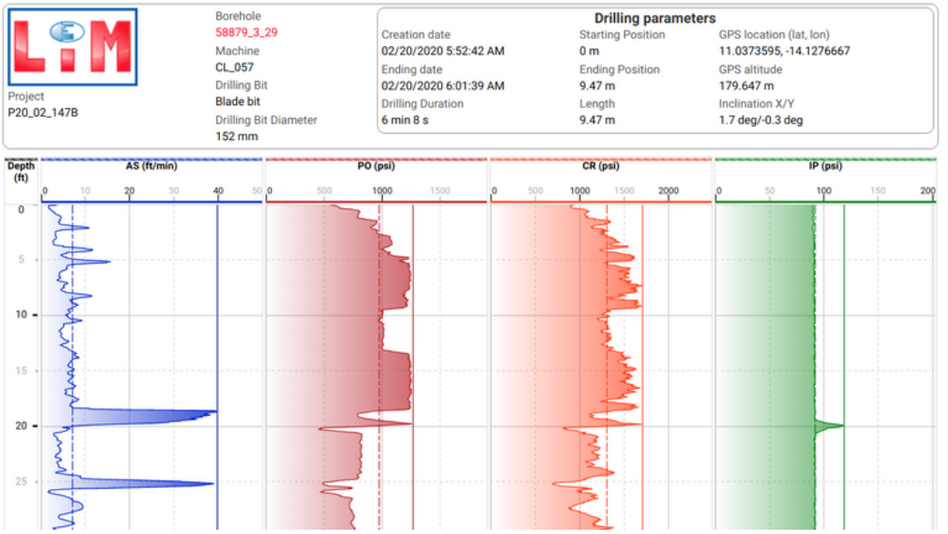
Case study Drill Navigation

Outcomes

Thanks to LIM solution, 95% (against 64%) of the holes were drilled with an acceptable error.

- No need for stone marking on the ground any more (avoiding stone movements).
- Application easy to handle for the operator.
- Higher precision than with driller helper.
- Drilling hole's name and depth automatically filled.
- Machine travel time optimized (about 40sec hole-to-hole travel time with the NaviLim).
- Real time update of the drilling plan.

Our customer is also using our geotechnical software – GeoLog 4 – to have the information about the softness and hardness of the ground:



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