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Assessment of timber at

32-34 LAYSTALL STREET, M1 2JZ

INTRODUCTION



Following instructions from Tony McCaul of McCauls, I visited the property on 27.07.22.

The survey is in the form of a schedule of photo observations referenced to plans of the roof and floors at the end of the report. A microdrill was used to test integrity of larger section timber beam ends at ground floor, where embedded in masonry. This instrument drills a 2mm bit into the timber, recording density – which usually correlates with condition.

Where not self explanatory, recommendations follow the observation in bold type.

ROOF (and some lintels) – figure 1

1
The decking board and top and side of the embedded section of the joist in the corner have been wet up historically. The joist end has lost approximately 50% of its section in the bearing and would **benefit from some additional support such as a partner section.**



2
The joist closest to the W wall has suffered from decay along its top edge where the sarking has also deteriorated. There is some movement in this joist, probably due more to the fact it has lost its connection and therefore stiffening effect with the sarking. **The entire joist would benefit from replacement when the sarking is replaced where it has decayed in contact with the W wall.**



3
The joist has decayed in its N bearing. Again the sarking is decayed over the top of the joist **and it would probably benefit from complete replacement.**



4
The joist arrowed is decayed in its bearing as is the lintel of the window below.



5

The joist against the reveal has been wet up historically and has lost approximately a third of its section against the masonry (arrowed), although its connection with the trimmer is sound. As such it can remain. The trimmer is packed up off the masonry and runs across the central window-the bearing of which is sound.



6

The end of the window frame is decayed in the corner as is the end of the trimmer beam which has lost approximately 50% of its section where it runs into the masonry (arrowed) **and would benefit from some additional support.**



7

5 joists are decayed in their bearings together with the window lintel (window right-hand side).

The joists would benefit from additional support and the lintel requires replacement.



8

The edge joist has been damaged on its upper face and outer face against the masonry. As such it may be **necessary to replace this timber completely when the sarking board is repaired or cut out from over the top.** The 2 piece lintel below requires replacement also.



9

This joist has also deteriorated and would **benefit from replacement at the same time as the sarking.**



2ND FLOOR – figure 2

10
Showing the underside of the second floor. **There is a possibility of some decay to 1 or 2 joist bearings in the W wall at this point and possibly to the floorboards also** (which were concealed from above).



11
The lintel (which is probably 300 mm wide) is **decayed in its E bearing and will require replacement**.



12
Water ingress (presumably from the opening at this point) has caused decay to the floor structure to the approximately extent shown on plan. **The solid line represents decay to the floor joist and floor boarding (extent of damage the floor boarding is represented by the shaded area). The dashed line represents possible damage to the joist adjacent to the wall which should be checked from below when the ceiling is repaired.**

1st FLOOR figure 3

13
There is a stud and masonry partition laid on steel at mezzanine level. **Some exposure was made showing all the timber stud work to be decayed at least 1 m from the S wall.**



14

Close access was not possible from below. There is a continuation of the damage caused by the water ingress down through the building. Further exposure is required from below where the timber under boarding has decayed. **There is a possibility of 10 to 12 joists decayed in their bearings together with the floor boarding directly above. Exposure is required either from above or below to confirm.**



15

There are signs of an historic outbreak of dry rot to the underside of the first floor structure. The fungus is now dying back. However it would seem the joists bear into the S wall at this point and as such it is **possible that at least seven or eight joist ends might well be decayed in the bearings together with the floor boarding above. Exposure is needed at this point.**



16

An area of fractured plaster was removed from above a window revealing a narrow section lintel spanning over the window opening, just supporting the inner skin of masonry and plaster. The timber is sound.



The fractures in the plaster seems to have been caused by deflection of the timber owing to the length of span. The timber is approximately 4 in², although it doesn't span the full width of both windows but bears onto some brickwork at the central column.

GROUND FLOOR – figure 4

17

The underside of the suspended timber structure has been covered with corrugated iron. **Some of this was removed revealing joists decayed in their S bearings for all of the extent shown on plan.**



18

The joist adjacent to the W wall is decayed for pretty much the full extent of the elevation.



General. The fitting of the corrugated iron has not been beneficial to the condition of the joists given the water ingress from above. Away from the W and S masonry walls, as a minimum the surfaces of the joists are likely to have been affected by wood boring weevil and furniture beetle which will make fixing to it difficult. Worse case scenario is more significant structural decay which will require joist replacement. **Given the extent of damage to the existing joist bearings, it might be prudent to allow for full joist replacement in this area.**

19

There are signs of rusting and the possibility of one or two joist bearings being decayed in this corner. **The corrugated iron needs to be stripped from the underside of the floor for a full inspection. The lintel arrowed is also decayed and requires replacement.**



20

There are signs of dried up dry rot fruiting bodies on the wall and therefore almost certainly decayed timber directly above. The corrugated iron needs to be removed from the underside of the ceiling (inaccessible from above).



21

Two of the joists (circled) have lost section in the wall and **will require some additional support with partnered sections or similar**. The damage appears to be very slow and historic, caused by a combination of furniture beetle and wet rot. The arrowed joist was microdrilled (measurement no.11) and found to be sound.



22

The beam travelling into the wall-(red arrow) is decayed in its bearing.

The beam right-hand side (yellow arrow) was microdrilled (measurement nos 12 – 14), which showed some loss of section within the wall. **As such additional support is recommended for both beams in shot.**



23

Access was limited as there were a couple of joists which were loose. There has been a relatively recent outbreak of dry rot and mycelium is growing on the timber (most of the energy would have been derived from decay to the floorboards) – although it is now dying back. This is not reason in itself to dispose of the timber. The main trimmer beam (green line) was microdrilled in the wall (yellow arrow, measurement no 15) and found to be sound in the wall and along its length.

It is likely the three common joists which are in a state of partial collapse below the door entrance will not be suitable for reuse.



DISCUSSION & RECOMMENDATIONS

Much of the water ingress responsible for the previous outbreaks of fungal decay (predominantly dry rot) has now been stopped, and the fruiting bodies and mycelium are dead or dying.

Access was hampered in places due to stored materials, rubbish, and some fixtures – particularly the corrugated iron fixed to the underside of the ground floor.

The building material was all good quality softwood. A sample was taken showing it to be *Pinus sylvestris* – or Baltic pine.

All repairs should be carried out in accordance with the timber repair guidelines below. No general anti fungal treatments are required other than the focused guidelines below. It is important that consideration is given to the design of the surrounding perimeter. It is probable that after remediation, there may still be some ground floor timbers embedded in the lower walls. If water is trapped against the perimeter of the building, the subsequent wetting of the masonry and timber has the potential to cause future decay in embedded timber.

TIMBER GUIDELINES

Exposure

1. Remove plaster to expose the full extent of any fungus or wetting, starting from the foci of the wetting points and working outwards. This will maximise drying whilst retaining as much as possible of the original fabric.
2. If possible, cut decayed timber back to sound wood. Otherwise, use a paste preservative to coat any timber to 500mm past the last sign of decay. A formulation based on boron in glycol will give the best penetration in wet timber.
3. Remove any softwood timber lintels within the zone of decay, and replace with lintels made of inorganic materials. If damage is superficial it may be possible to retain hard old oak.
4. Remove all bonding timbers, grounds and embedded wood within the zone of fungus growth and decay. Brick up any cavities left by the timber removal.

Drying

5. Remove all sources of water penetration and promote air movement if practical. Quadrupling the rate of flow across a surface doubles the rate of drying. This can be achieved with cold air blowers when natural drying of concealed or sheltered areas becomes problematic.

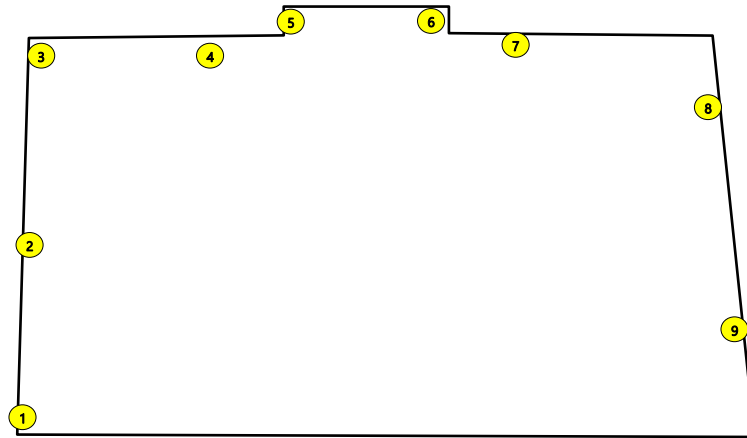
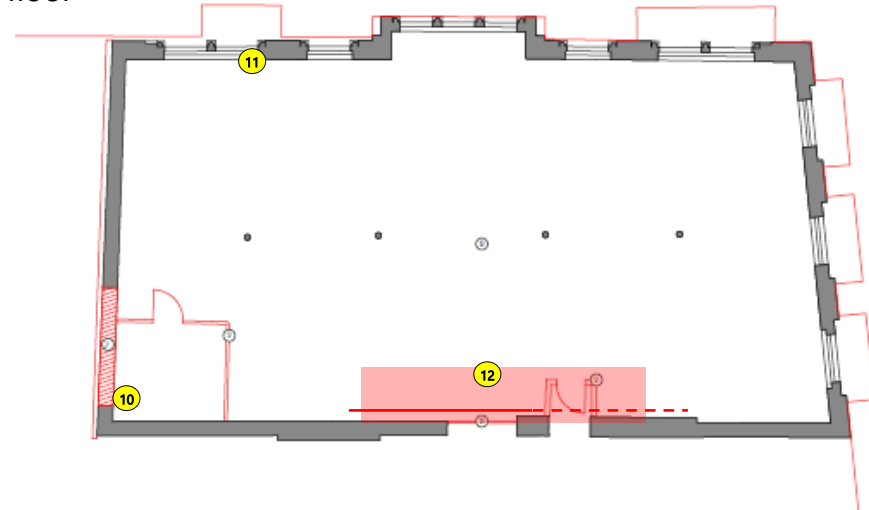
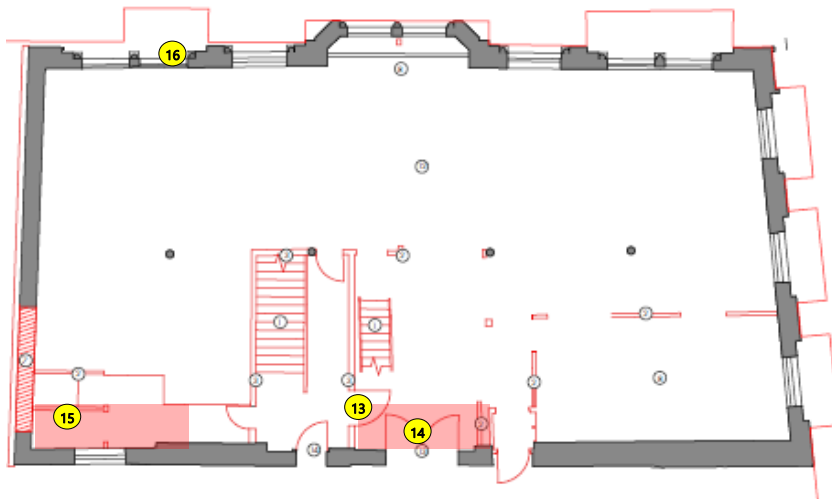
Repair/replacement

6. Re-support structural timbers as necessary using pre-treated softwood timber, chemically modified timber such as Accoya, oak or inorganic materials. The cut ends of pre-treated softwood should be brush treated or dip treated with a fungicide, or the end treatment fluid recommended by the timber supplier. All new softwood timber should be isolated from wet walls with an impervious membrane or some other efficient method. Damp proof membrane would be suitable for structural timbers. However, the membrane should not be allowed to form a dish under timbers in areas vulnerable to water penetration (a wall plate for example) or be able to trap water in any way.
7. Remove affected softwood windows, doors and other joinery items within the zone of wetting/decay. They should be stripped and repaired if possible or, if beyond repair discarded. If oak is only superficially decayed then it may be possible to leave *insitu*. If discarded then replace using oak or pre-treated softwood timber isolated from the wall as far as is practical (damp proof membrane or similar), or chemically modified timber. If repaired then apply two brush coats of a spirit-based or micro-emulsion based preservative to the edges or backs, and replace so that the joinery is isolated from the wall.

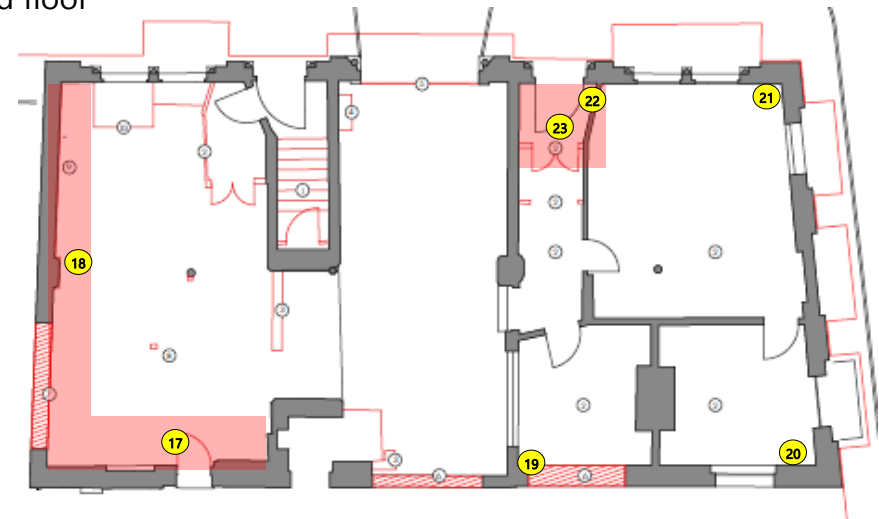
Other treatment

8. Spray treat exposed brickwork within the zone of decay with a fungicide containing boron in glycol. This will discourage the fungus from fruiting.

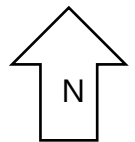
Roof

2nd floor1st floor

Ground floor



Numbers refer to observations in text
 Red shading indicates larger areas of confirmed or suspected decay



MICRO DRILL

The micro drill drills a 2mm diameter needle into the timber, measuring both the torque generated by the drill motor to turn the drill bit – known as 'drill' (dark green shaded curve on the graph) and-more importantly- the resistance being experienced by the motor responsible for sliding the whole mechanism forward at a pre-set rate – known as 'feed' (light green shaded curve).

The torque generated in the drill and the resistance experienced by the feed mechanism are generally correlative. However wet timber - or the existence of other materials such as resin which may have been used in past repair - can affect the drill to a greater or lesser extent than the feed.

Peaks in the graphs represent torque/resistance being experienced by the drill/feed. The Y axis is magnitude of resistance/torque, with 100(%) representing that value where the motor can no longer move the feed mechanism at its pre-set feed speed (which would require a reduction in the feed speed).

The machine has 5 pre-set feed speeds that can be used – dependent on the nature of the timber. For example, dense medieval oak generally requires a low feed speed of 25 - 100cm/min, softwood requires 100 – 150cm/min. The faster feed speeds of 175 and 250cm/min are more applicable to living trees (another application for this equipment). Adhering to these criteria means that any reading over around 30% amplitude (on the Y-axis) represents dense and sound timber – especially when lower feed speeds are used.

Information regarding the individual drilling points is presented on the graphs which are included at the end of the report – either as comments (bottom right) or in the status panel (top left) which shows details such as feed speed and orientation of the drill – shown as 'Tilt' and measured in degrees from horizontal (a drilling straight down from above would be indicated by -90°, straight up would be indicated by +90°, straight in horizontally would show as a tilt of 0°).

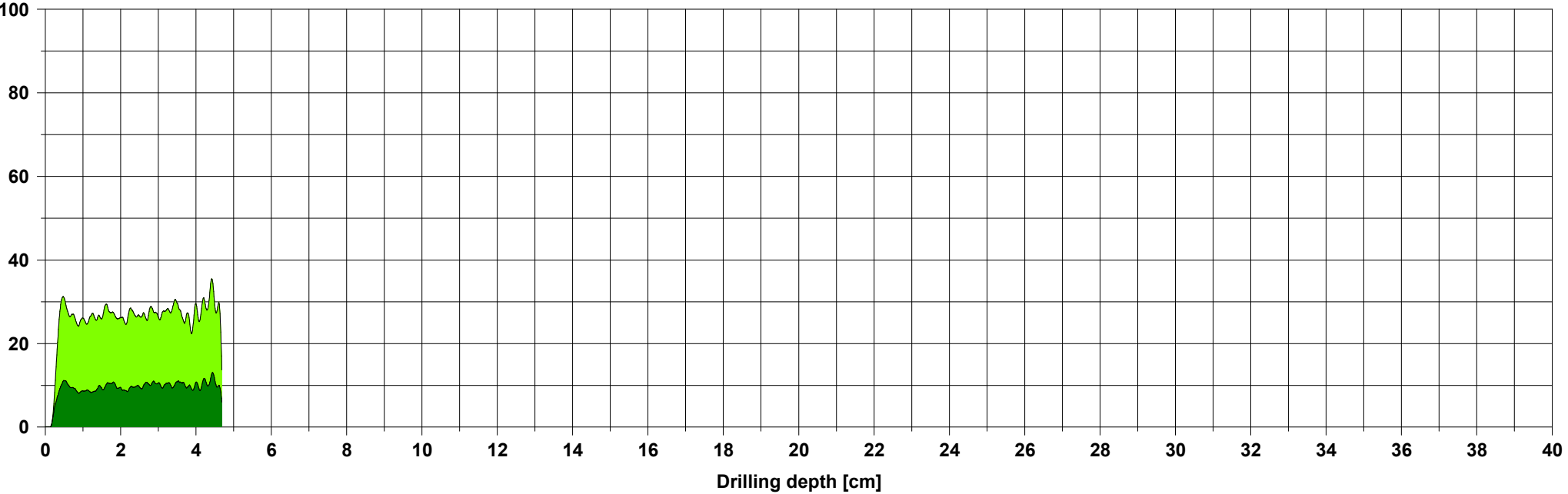
Those graphs – generally the first 1 or 2, described in the comments as 'calibration' are important, as they represent a trace through timber known to be sound – and as such form a baseline for interpretation of subsequent graphs.

Close centred peaks and troughs in the graph represent the early wood late wood boundaries (growth rings) – with early rapid spring growth resulting in softer material, producing a trough, and the later summer growth being slower, producing a narrower and denser growth phase marked by a peak in the graph.

Measuring / object data

Measurement no.:	9	Speed	: 2500 r/min	Diameter:	
ID number	: LAYS	Needle state:	---	Level	:
Drilling depth	: 4,69 cm	Tilt	: +57°	Direction:	
Date	: 27.07.2022	Offset	: 88 / 270	Species	:
Time	: 13:54:35	Avg. curve	: off / off	Location:	
Feed	: 50 cm/min	Name	:		

Amplitude [%]



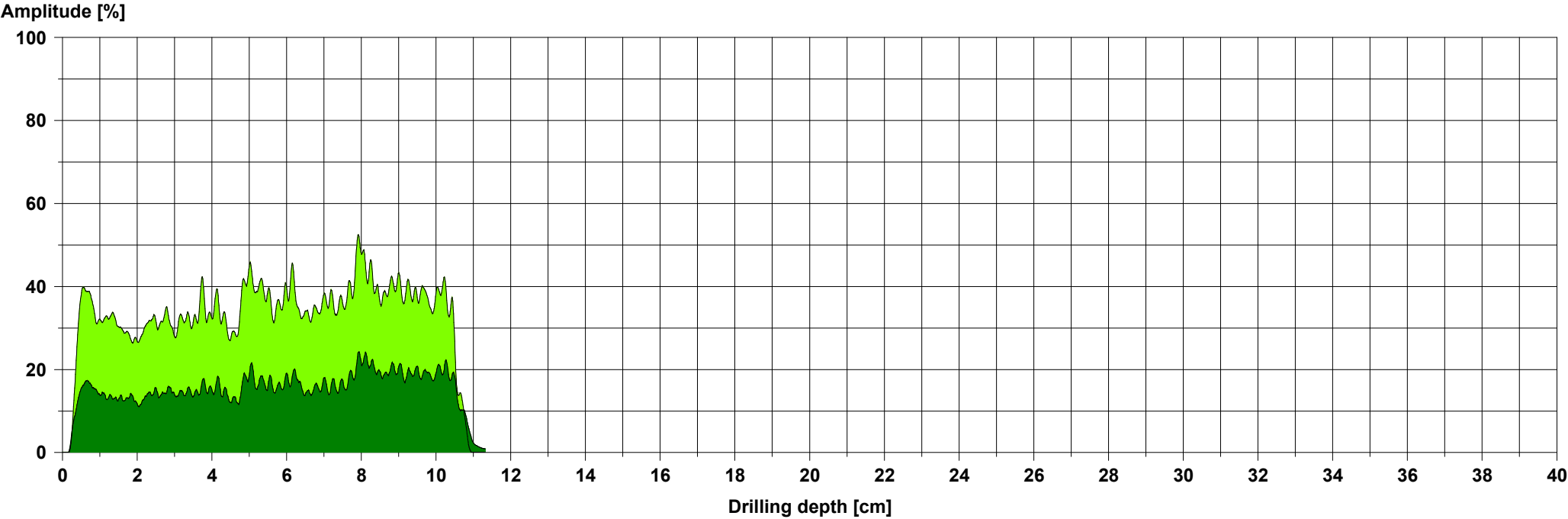
Assessment

Comment

CAL

Measuring / object data

Measurement no.:	10	Speed	: 2500 r/min	Diameter:	
ID number	: LAYS	Needle state:	---	Level	:
Drilling depth	: 11,32 cm	Tilt	: +55°	Direction:	
Date	: 27.07.2022	Offset	: 93 / 267	Species	:
Time	: 13:54:57	Avg. curve	: off / off	Location:	
Feed	: 100 cm/min	Name	:		



Assessment

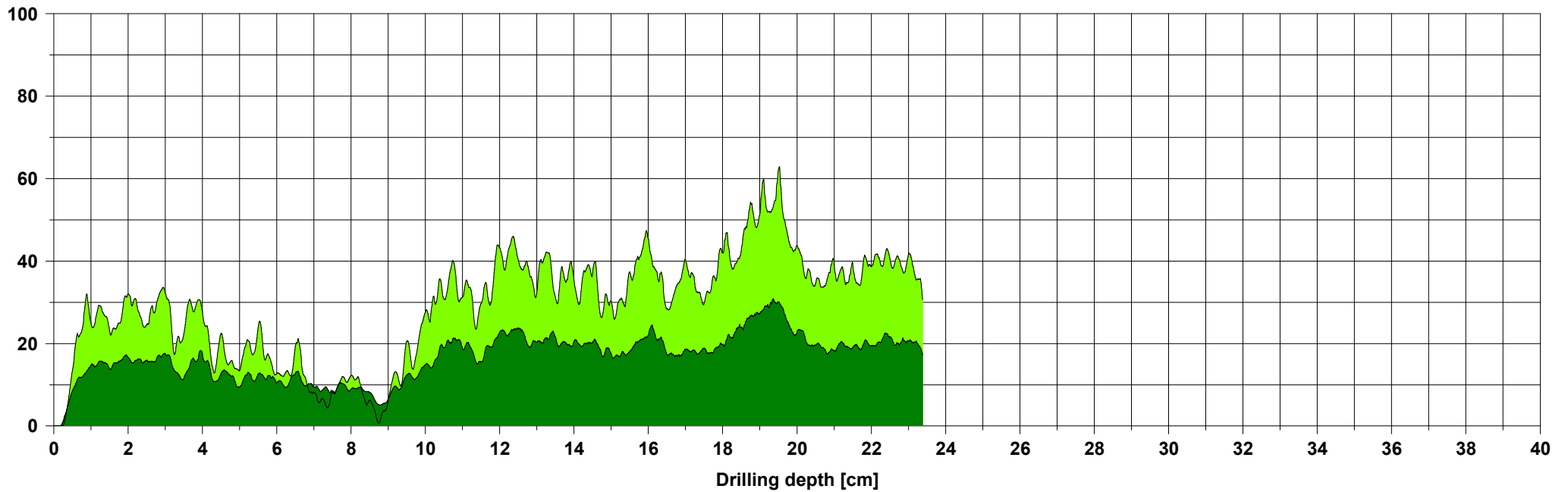
Comment

CAL

Measuring / object data

Measurement no.:	11	Speed	: 2500 r/min	Diameter:	
ID number	: LAYS	Needle state:	---	Level	:
Drilling depth	: 23,38 cm	Tilt	: +48°	Direction:	
Date	: 27.07.2022	Offset	: 92 / 266	Species	:
Time	: 13:55:20	Avg. curve	: off / off	Location:	
Feed	: 100 cm/min	Name	:		

Amplitude [%]



Assessment

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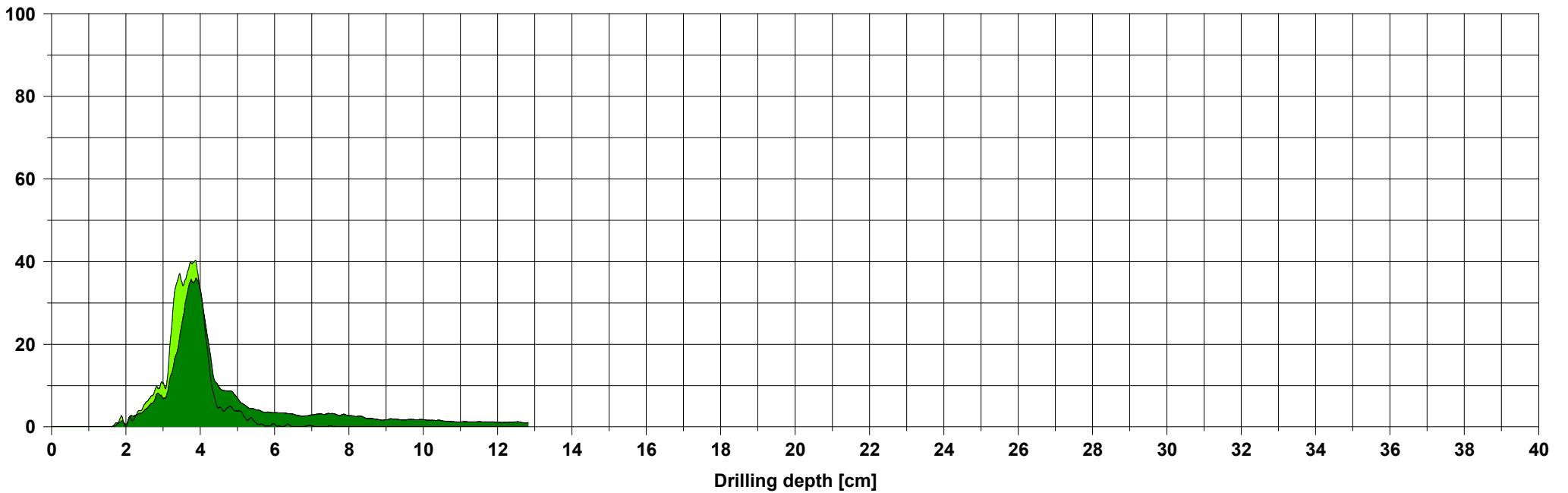
Comment

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Measuring / object data

Measurement no.:	12	Speed	: 2500 r/min	Diameter:	
ID number	: LAYS	Needle state:	---	Level	:
Drilling depth	: 12,82 cm	Tilt	: +47°	Direction:	
Date	: 27.07.2022	Offset	: 86 / 263	Species	:
Time	: 13:56:42	Avg. curve	: off / off	Location:	
Feed	: 100 cm/min	Name	:		

Amplitude [%]



Assessment

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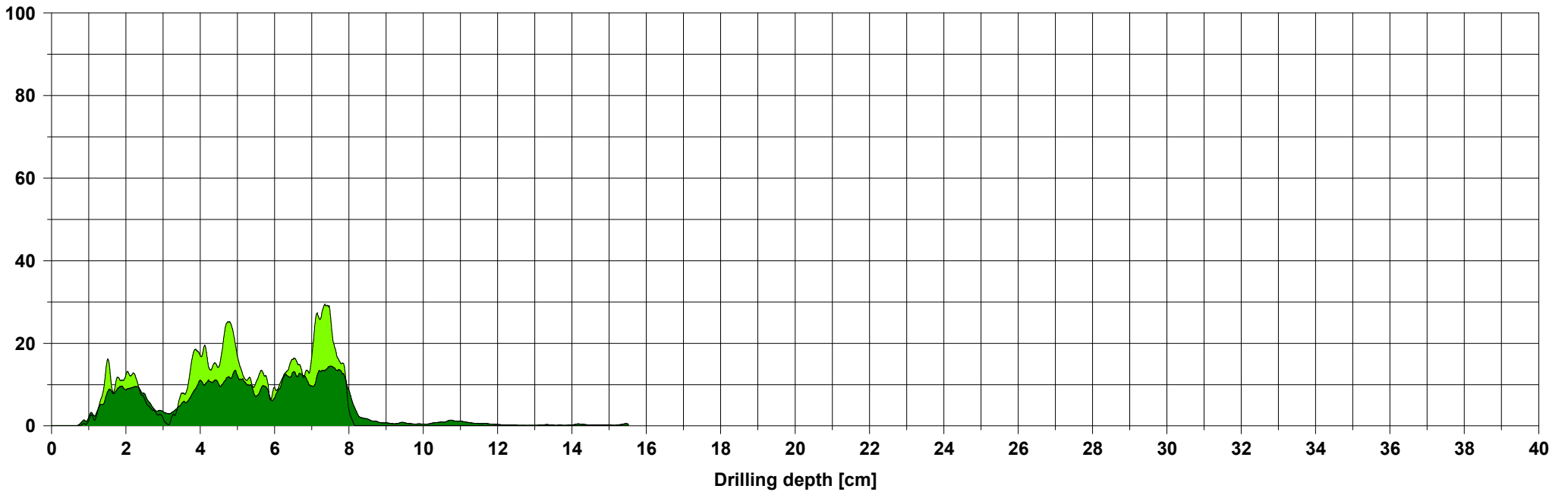
Comment

171

Measuring / object data

Measurement no.:	13	Speed	: 2500 r/min	Diameter:	
ID number	: LAYS	Needle state:	---	Level	:
Drilling depth	: 15,52 cm	Tilt	: +46°	Direction:	
Date	: 27.07.2022	Offset	: 83 / 266	Species	:
Time	: 13:58:24	Avg. curve	: off / off	Location:	
Feed	: 100 cm/min	Name	:		

Amplitude [%]



Assessment

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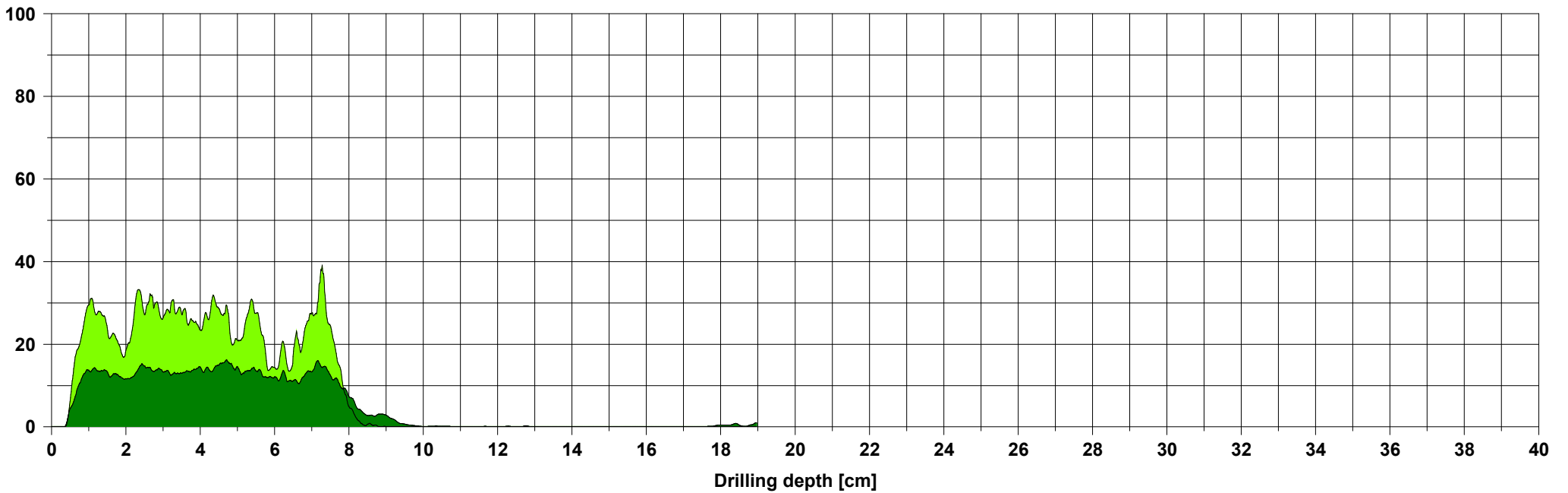
Comment

171

Measuring / object data

Measurement no.:	14	Speed	: 2500 r/min	Diameter:	
ID number	: LAYS	Needle state:	---	Level	:
Drilling depth	: 18,97 cm	Tilt	: +46°	Direction:	
Date	: 27.07.2022	Offset	: 82 / 265	Species	:
Time	: 13:59:33	Avg. curve	: off / off	Location:	
Feed	: 100 cm/min	Name	:		

Amplitude [%]



Assessment

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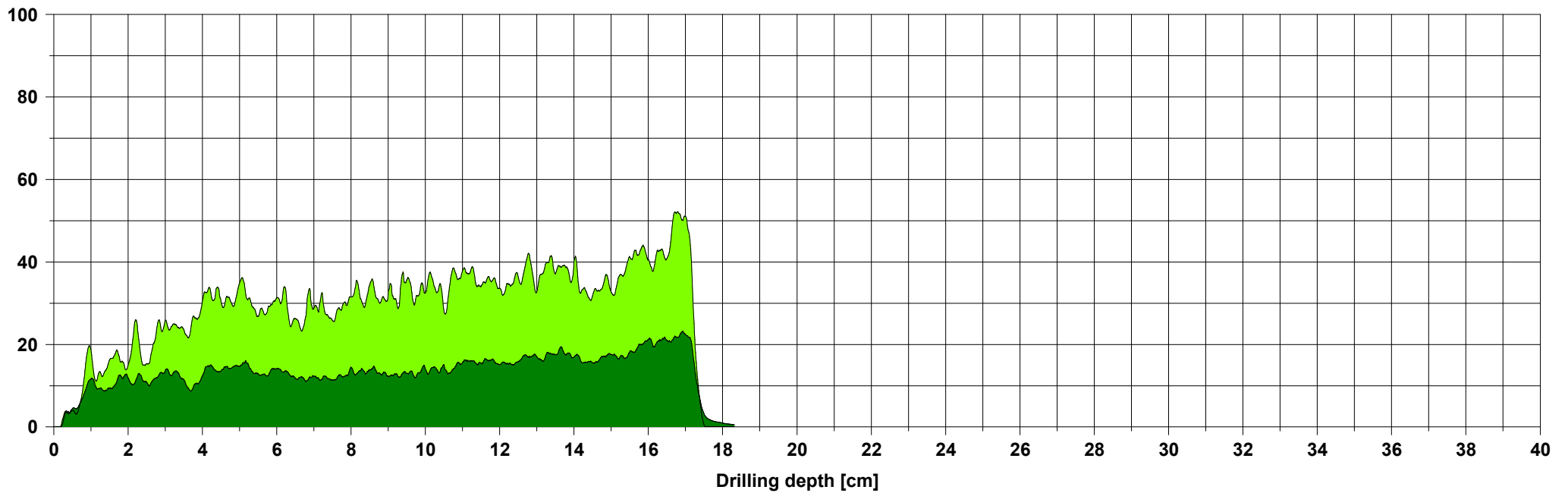
Comment

171

Measuring / object data

Measurement no.:	15	Speed	: 2500 r/min	Diameter:	
ID number	: LAYS	Needle state:	---	Level	:
Drilling depth	: 18,31 cm	Tilt	: +52°	Direction:	
Date	: 27.07.2022	Offset	: 85 / 265	Species	:
Time	: 14:02:25	Avg. curve	: off / off	Location:	
Feed	: 100 cm/min	Name	:		

Amplitude [%]



Assessment

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Comment

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