

GEOTECH. ENG. IN OFFSHORE WIND **DERIVING CHARACTERISTIC SOIL PARAMETERS**

WHY ARE WE HERE?

HOW DO WE GET THERE?

INTRODUCTION

Involved in:

- Interpretation of in-situ and lab tests
- Establish design profiles
- Design of offshore structures

AGENDA

Characteristic values

Interpretation of in-situ and lab tests

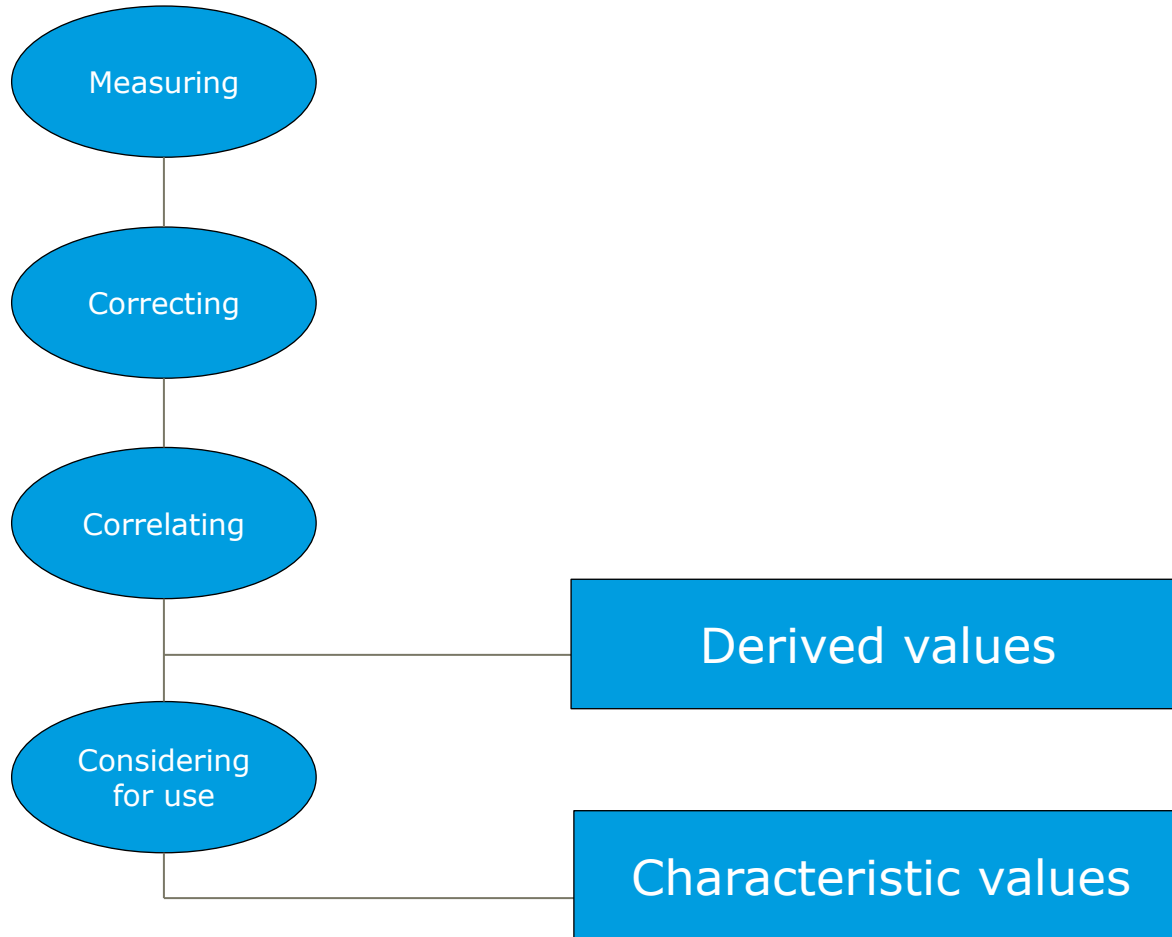
Example: Design profile

Summary

CHARACTERISTIC VALUES

CHARACTERISTIC VALUES

Characteristic values
Interpretation of tests
Design profile
Summary



[www.femern.com]

CHARACTERISTIC VALUE

Characteristic values
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ISO 19902

*Value assigned to a basic variable associated with a **prescribed probability** of not being violated by unfavourable values during some reference period.*

*NOTE The characteristic value is the **main representative value**. In some design situations a variable can have two characteristic values, **an upper and a lower value**.*

CHARACTERISTIC VALUE

Characteristic values
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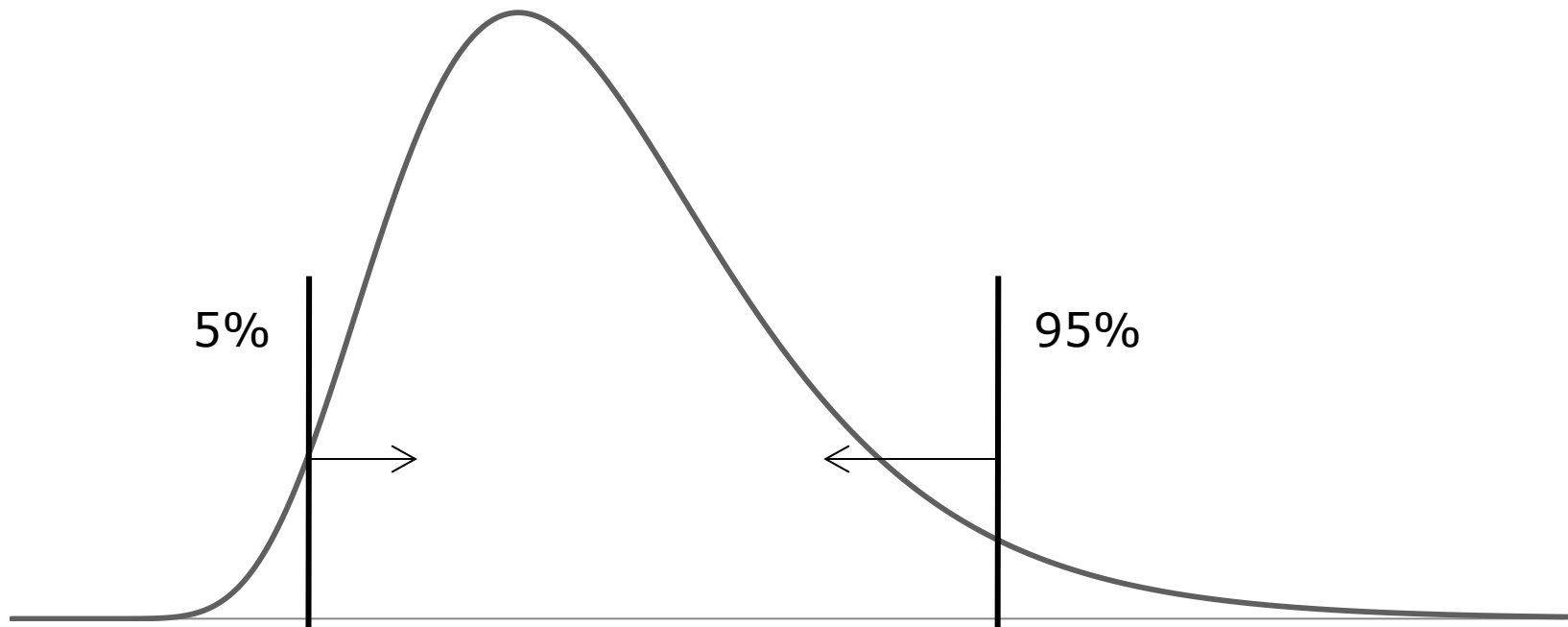
DNV-RP-C207

*(...)The definition of a characteristic value is much governed by the **design problem in question** and by the geometry. A definition as the **mean value** of the property typically applies in cases where local fluctuations of the soil property can be assumed to average out over large soil volumes, such as in the case of the axial capacity of long friction piles. A definition as a **lower-tail quantile** in the distribution of the property typically applies in cases where a local soil strength is governing, such as in the case of the tip resistance of an end-bearing pile.*

CHARACTERISTIC

Characteristic values
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Minimised band → Optimised design



INTERPRETATION OF IN-SITU AND LAB TESTS

DESIGN ASPECTS

Characteristic values
Interpretation of tests
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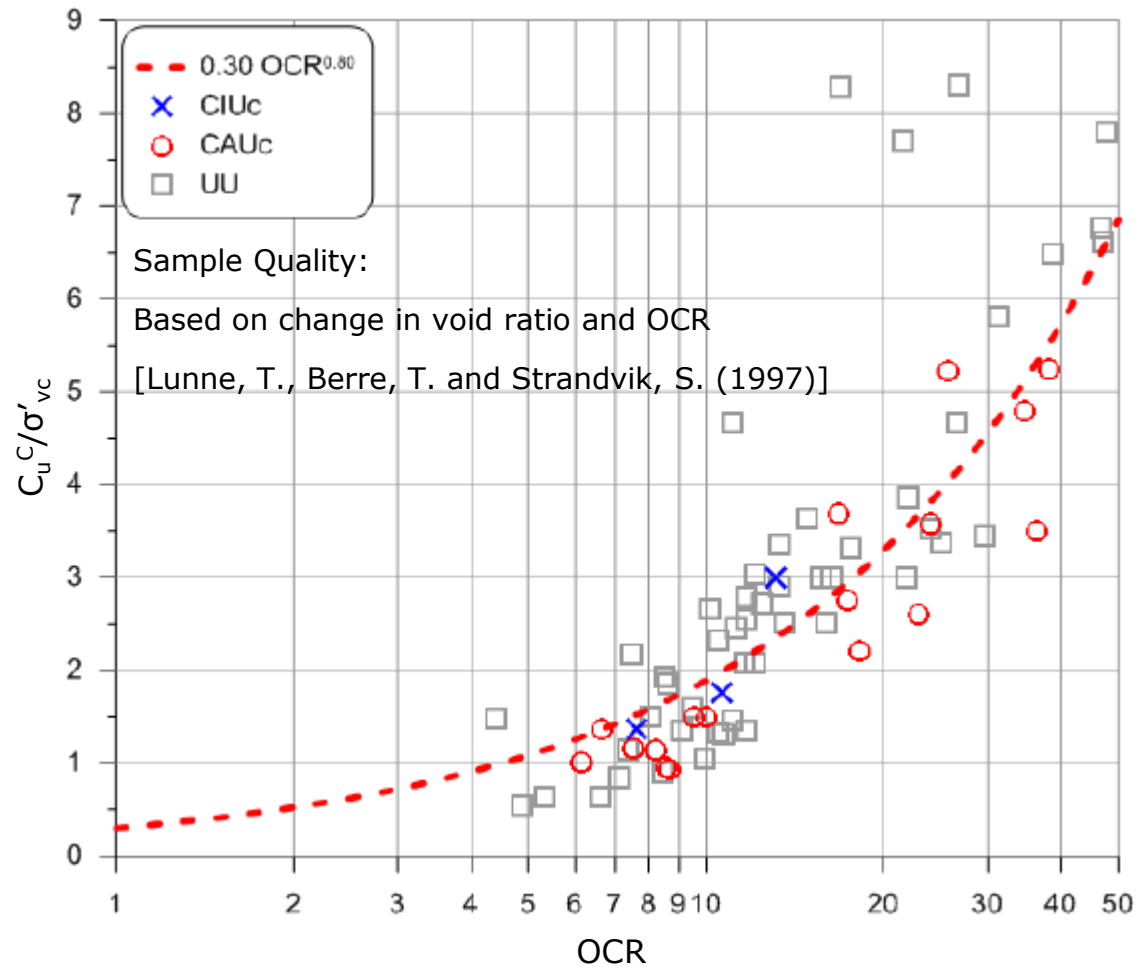
Deformation prop. → SLS

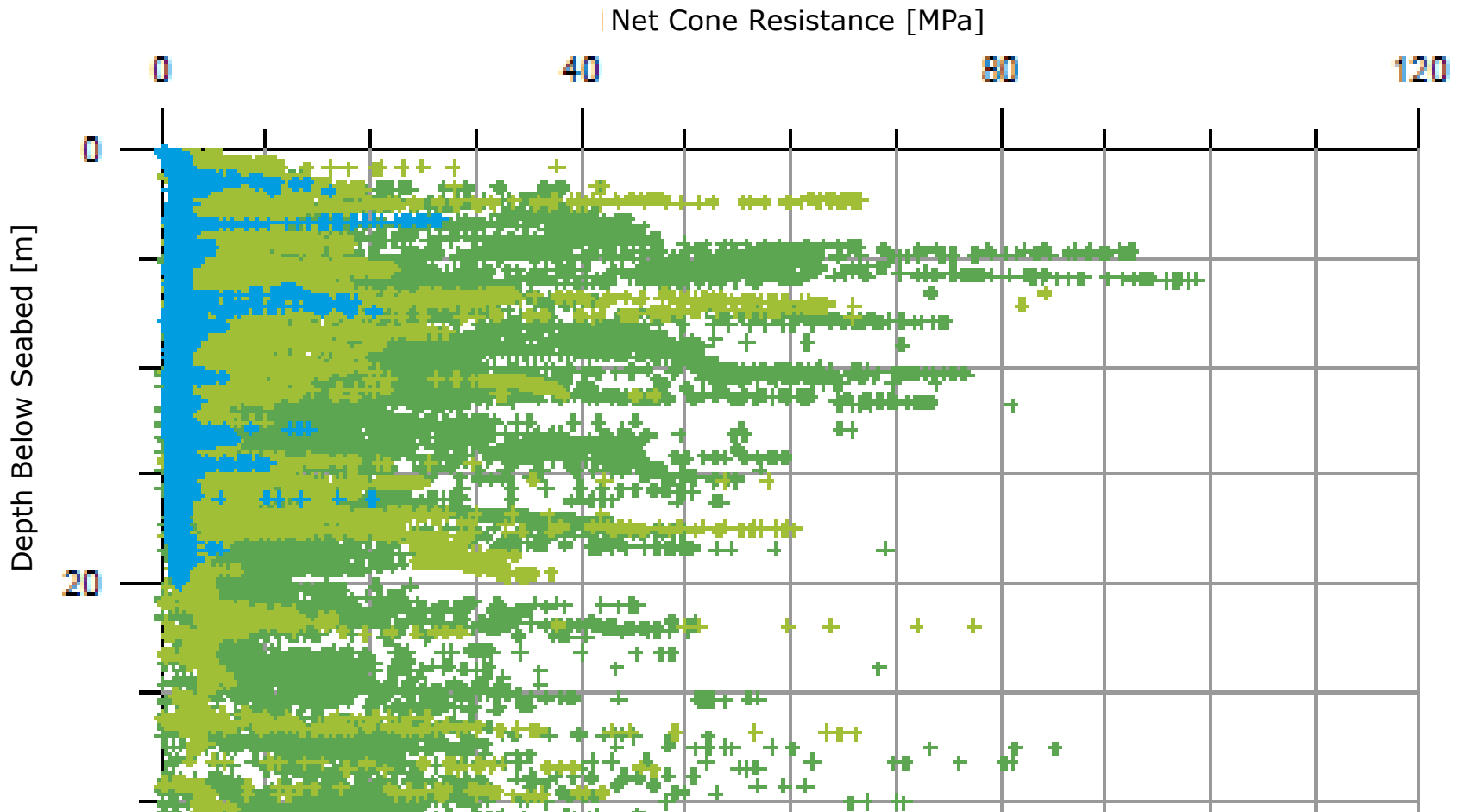
Strength prop. → ULS

(Focus of the presentation)

SAMPLE DISTURBANCE

Characteristic values
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CONE RESISTANCE VS. LAB STRENGTH

Characteristic values
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Summary

[Kjekstad, O., Lunne, T. and Clausen., C.I.F. (1978)]:

- OC North Sea Clay
- 46 triaxial tests
- 37 CPTs

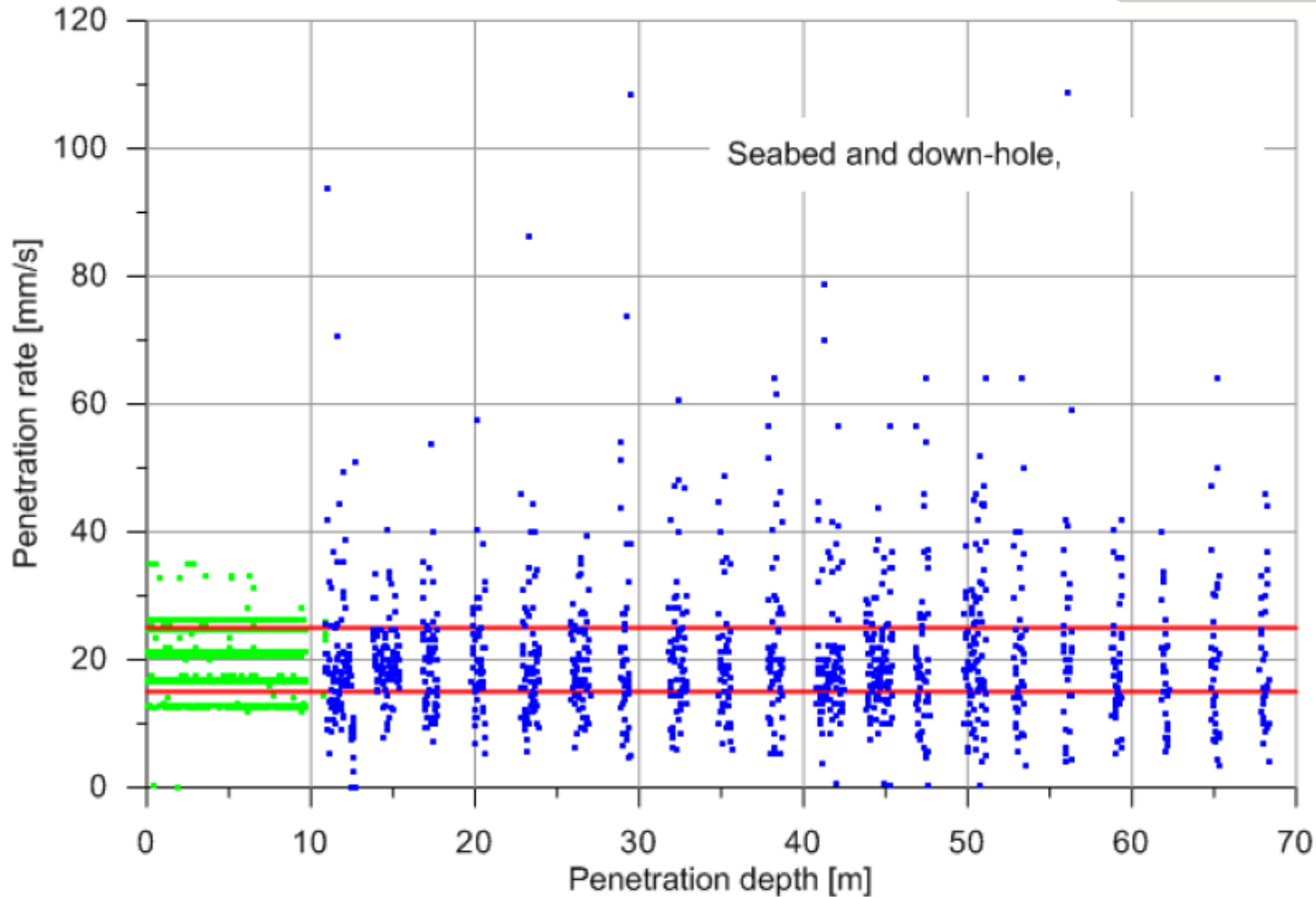
Coefficient of variation

$$\mathbf{COV_{mean, lab} = 0.25}$$

$$\mathbf{COV_{mean, cone} = 0.09}$$

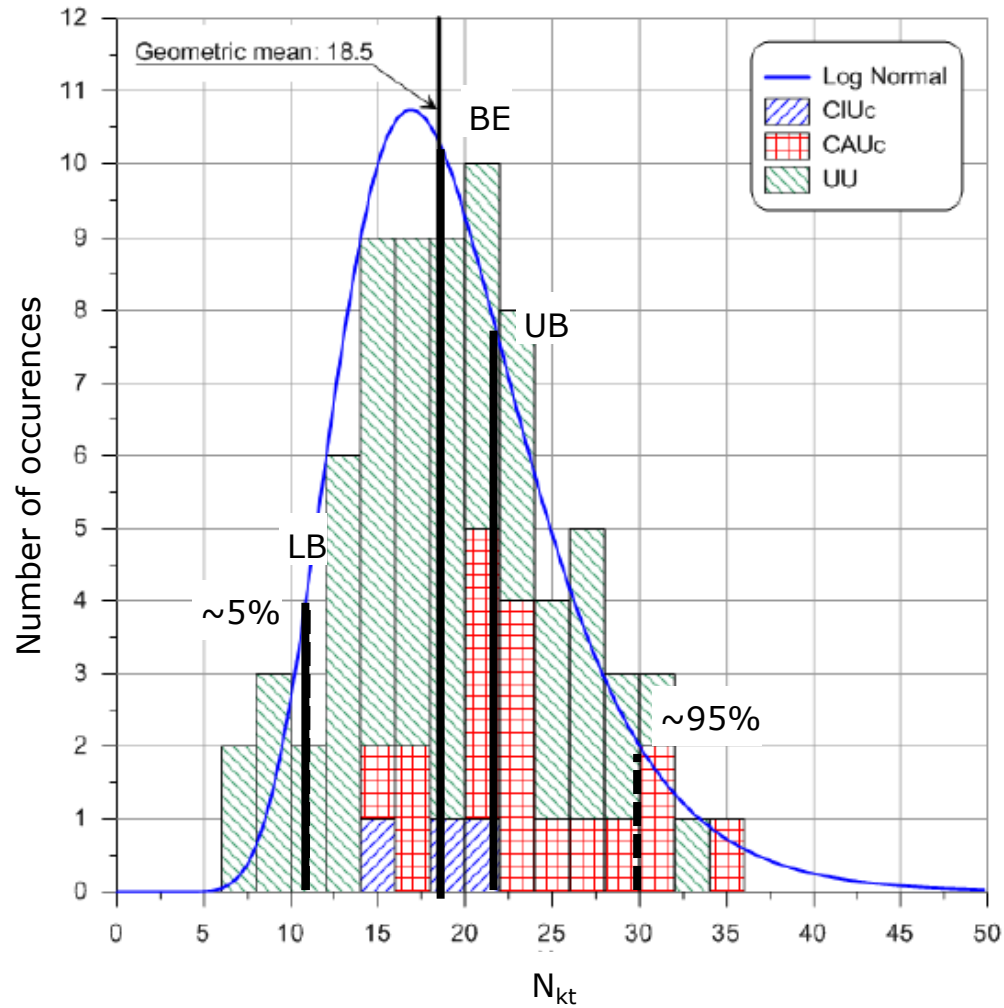
CPT – RATE OF PENETRATION

Characteristic values
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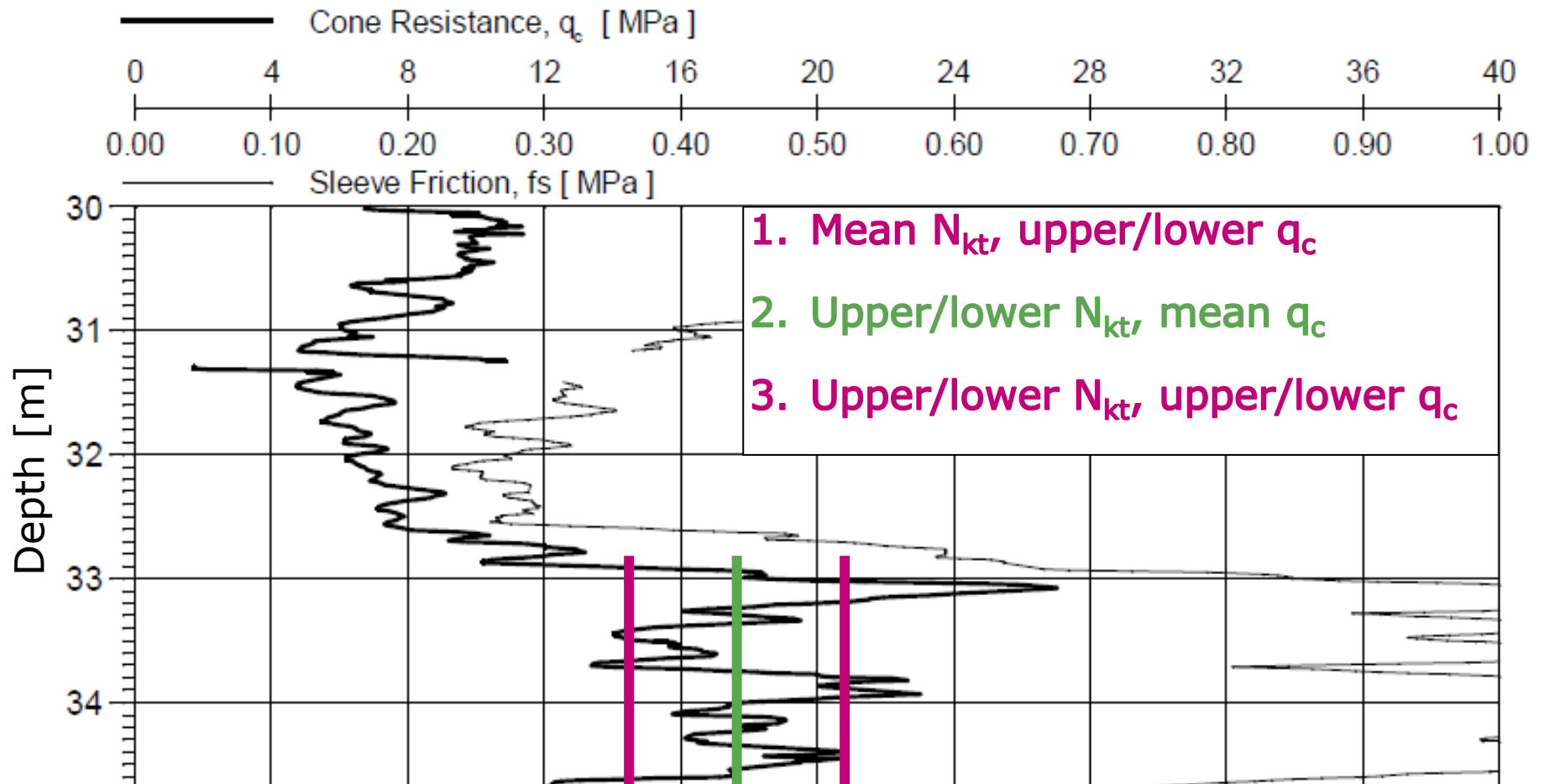
CONE FACTOR

Characteristic values
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HOW TO USE CONE FACTOR

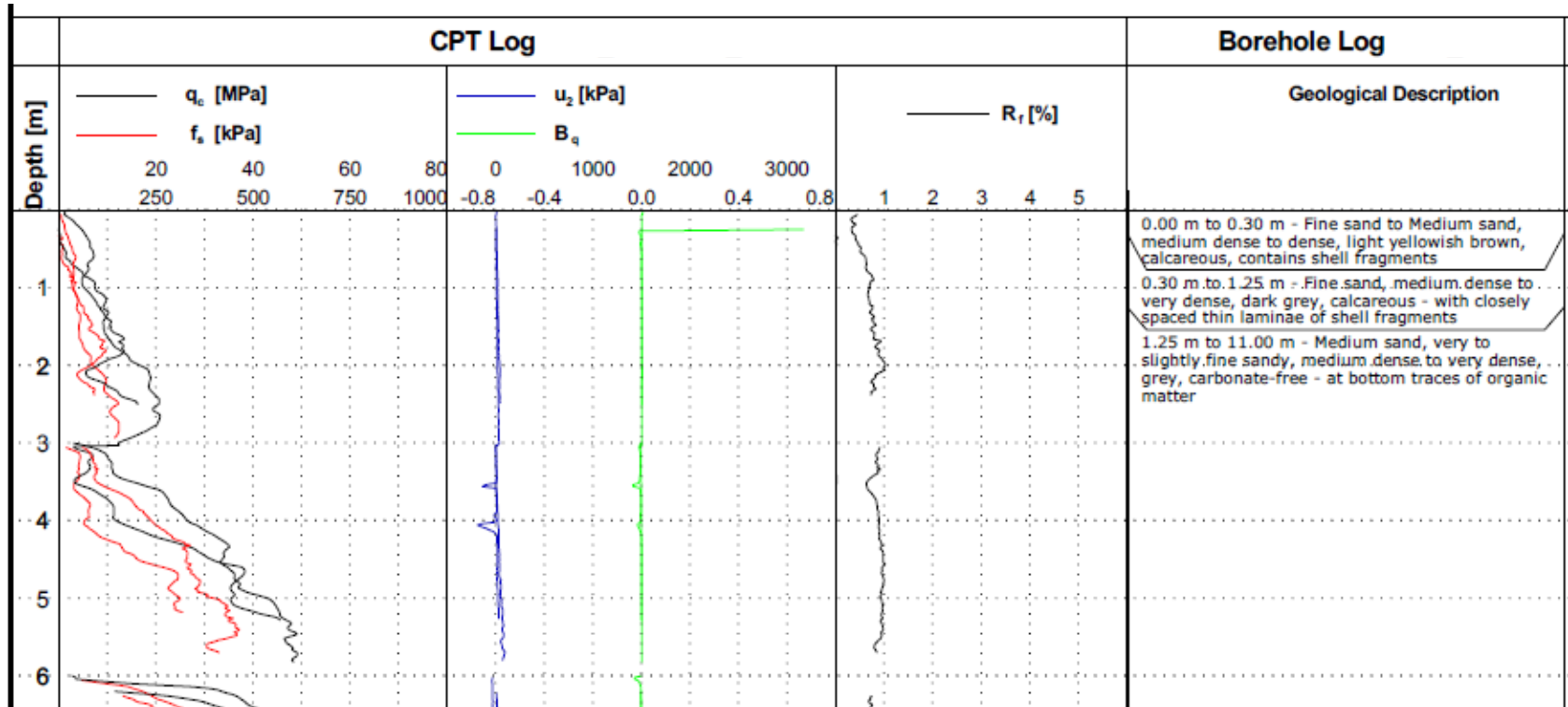
Characteristic values
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EXAMPLE: DESIGN PROFILE

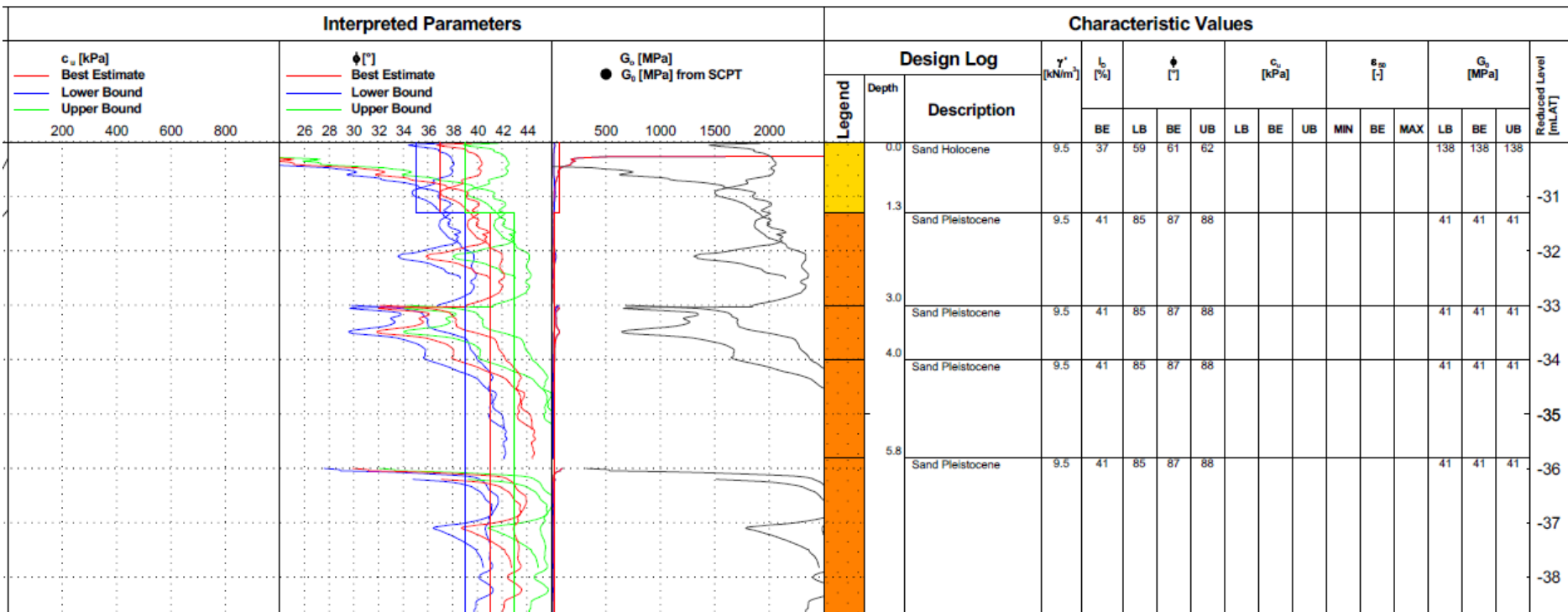
MEASURED VALUES

Characteristic values
 Interpretation of tests
Design profile
 Summary



INTERPRETED VALUES

Characteristic values
Interpretation of tests
Design profile
Summary



SUMMARY

SUMMARY

Characteristic values
Interpretation of tests
Design profile
Summary

Engineering judgement

- Use all available information

Uncertainties

- Correlations, sample disturbance

Foundation types

- Cautious mean/lower/upper

