

WHY CPT IS THE “BEST” GEOTECHNICAL TOOL



CPT VS OTHER IN SITU TESTS



Standard
Penetration Test
(SPT)

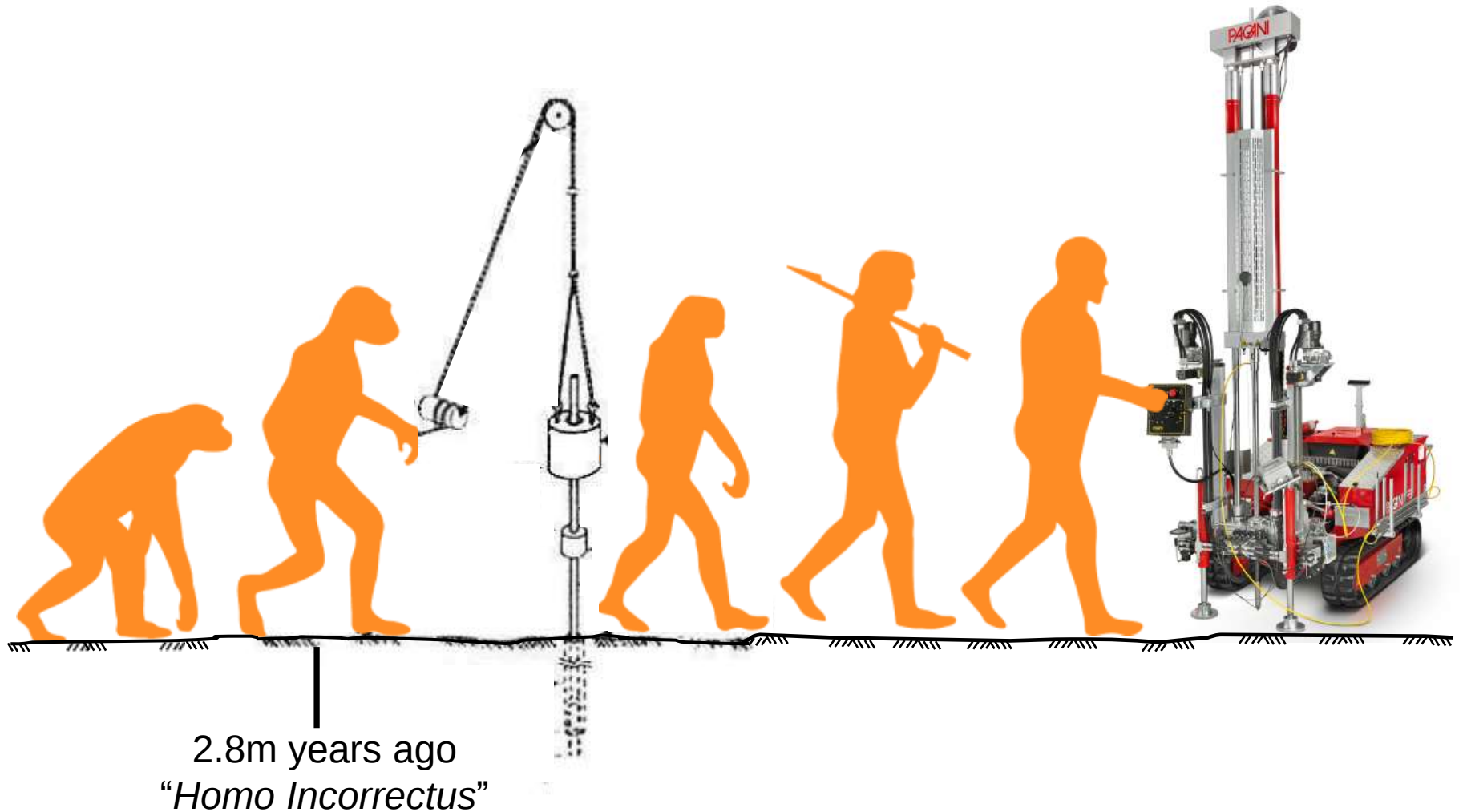


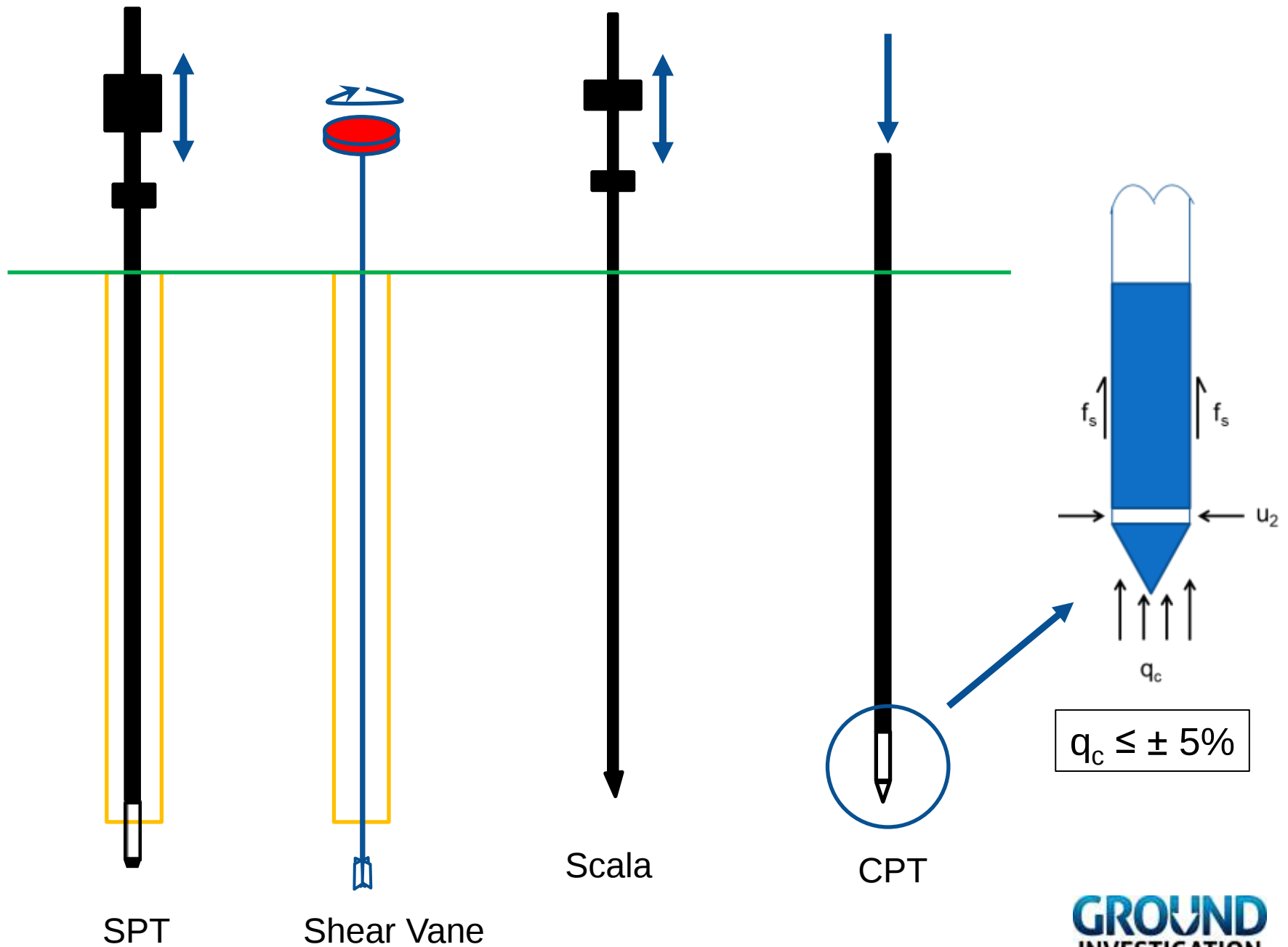
Scala
Penetrometer
Test



Hand-held Shear
Vane Test

EVOLUTION OF IN SITU TESTING





STANDARD PENETRATION TEST (SPT)



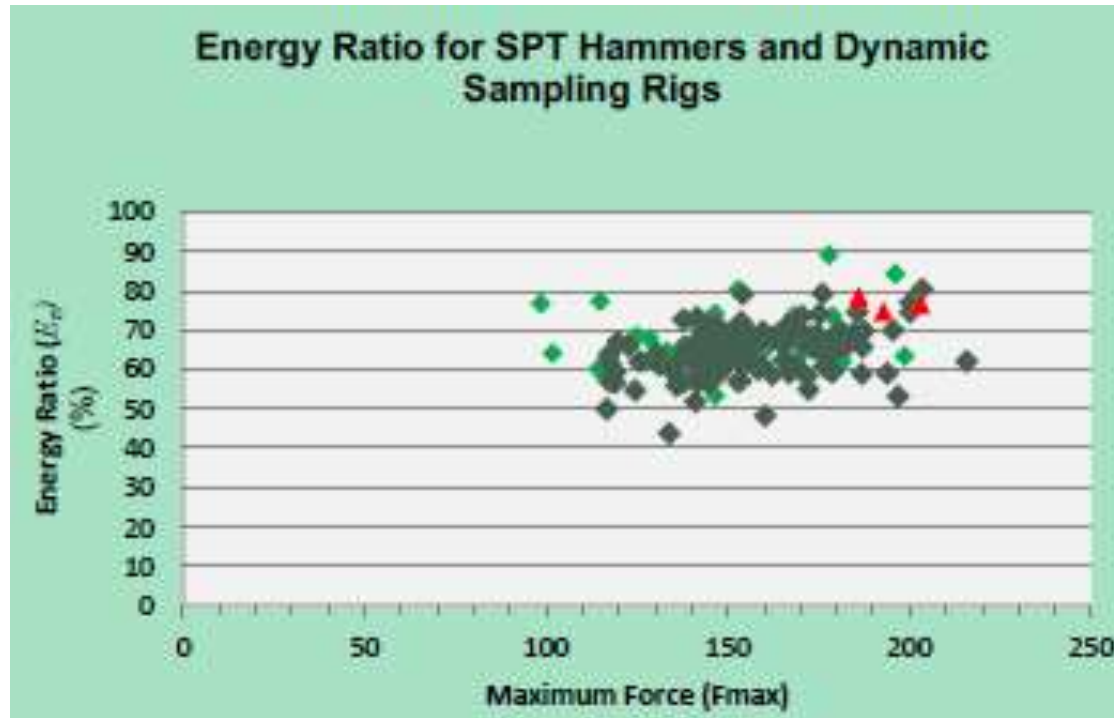
Energy ratio:

$$E_R = E_{\text{meas}}/E_{\text{theor}}$$

$$N_{60} = N^*(E_R/60)$$

(dispute: 55%, 60%, 70% ?)

STANDARD PENETRATION TEST (SPT)



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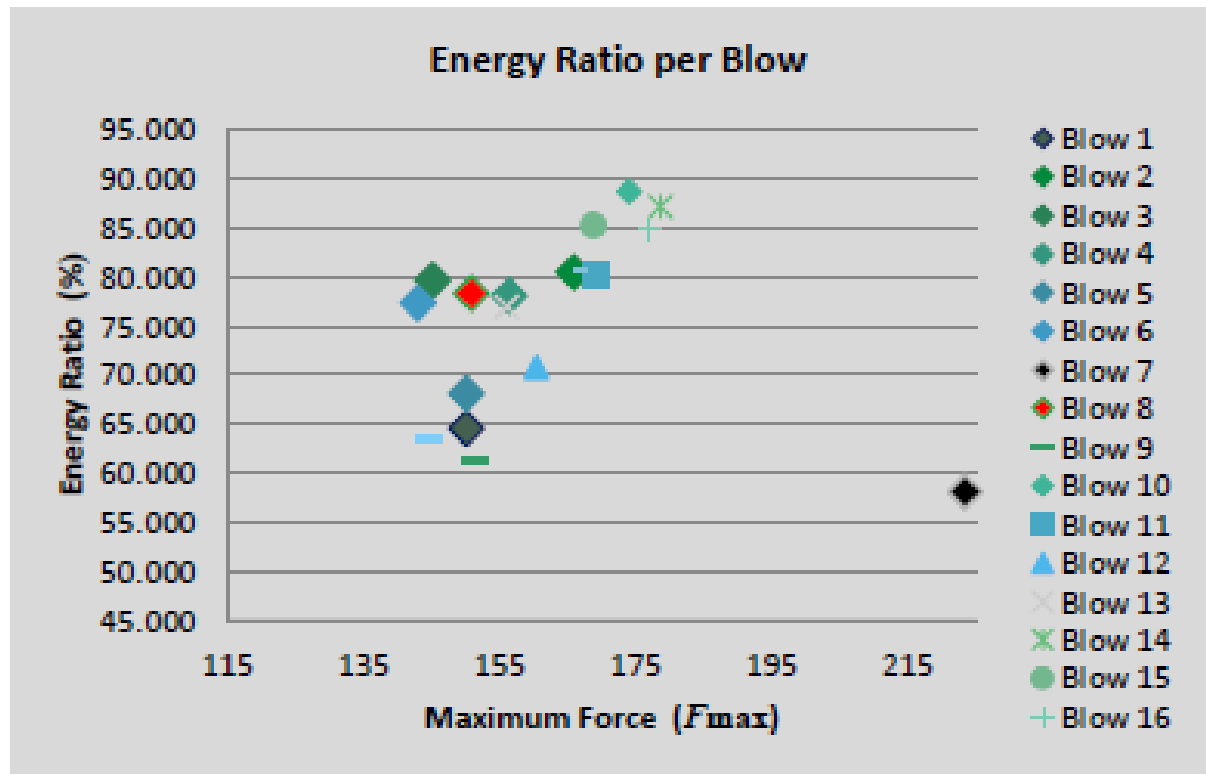
E_R Ranging from 40% to 90%

$E_R = 30\% \text{ to } 96\%$

(US study)

$N = 20$, gives $N_{60} = 10 \text{ to } 32$ ($\approx \pm 50\%$)

STANDARD PENETRATION TEST (SPT)



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Ranging from 58% to 89%

$N = 20$, $N_{60} = 19$ to 30

STANDARD PENETRATION TEST (SPT)

Energy ratio:

		Year	2012	2013	2013	2014	2015	2016	2017	2018	2019
	Hammer				Re-test						
Test house A	A	Er %		65		64			70	54	
Test house B	B	Er %				69	66				59
Test house C	 C	Er %		75	65	59	70		72	47	56
Test house D	D	Er %	66	65		66	70	72	77	75	74
Test house E	E	Er %	70	70		68	73	66	75	73	79

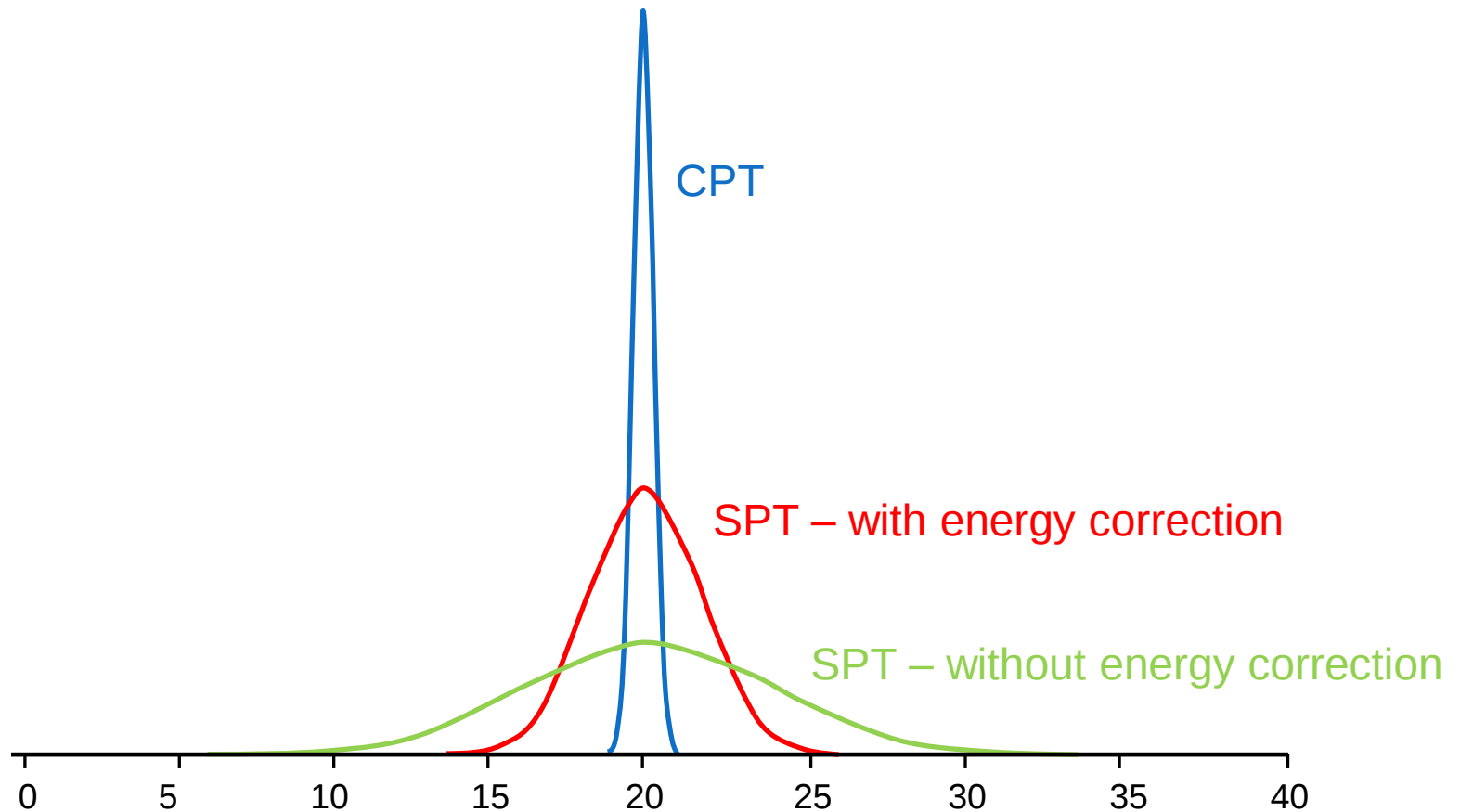
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Energy ratio for any hammer varies:

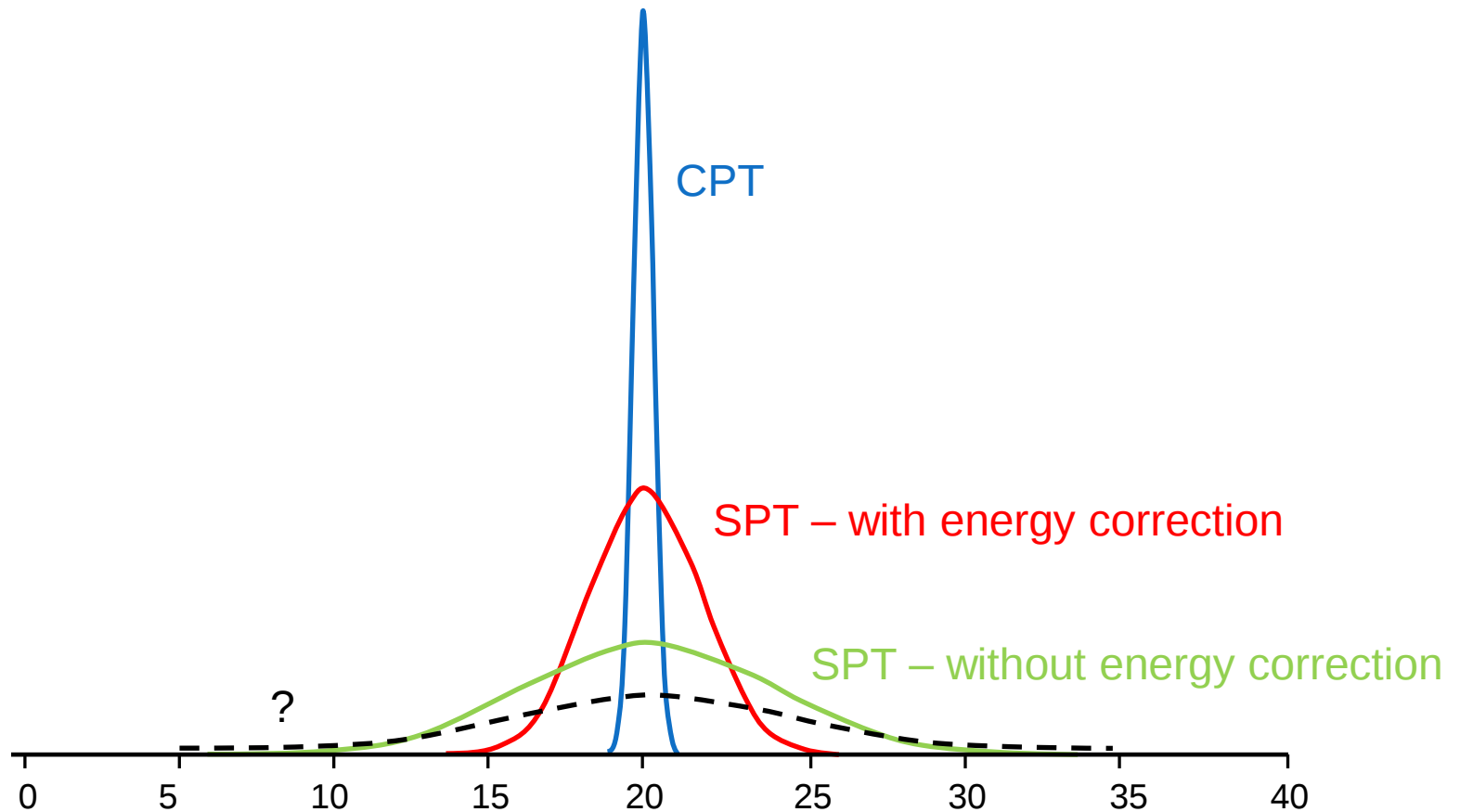
Could be between 47% and 75%

$N = 20$, $N_{60} = 16$ to 25 ($\approx \pm 25\%$)

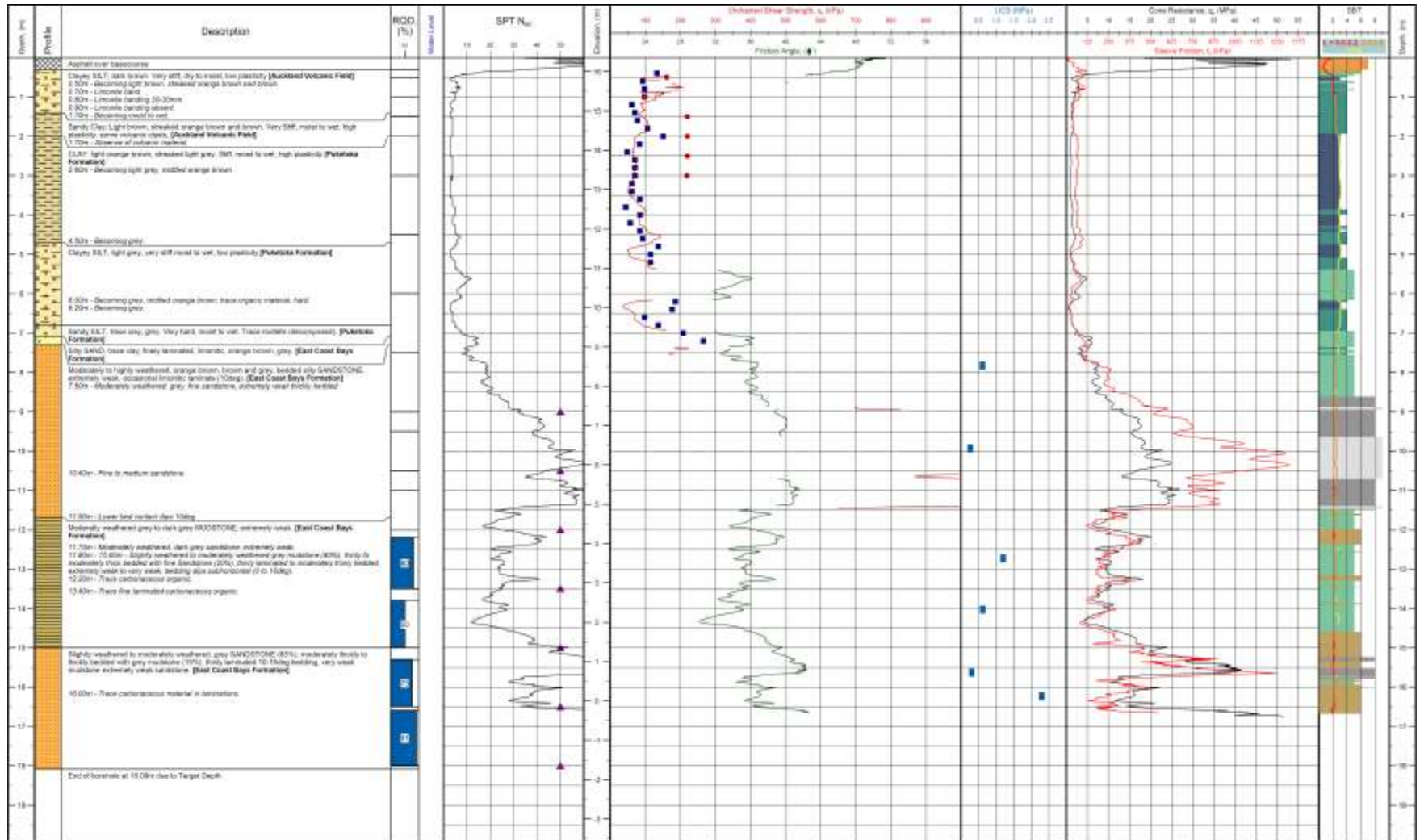
CPT VS SPT



CPT VS SPT

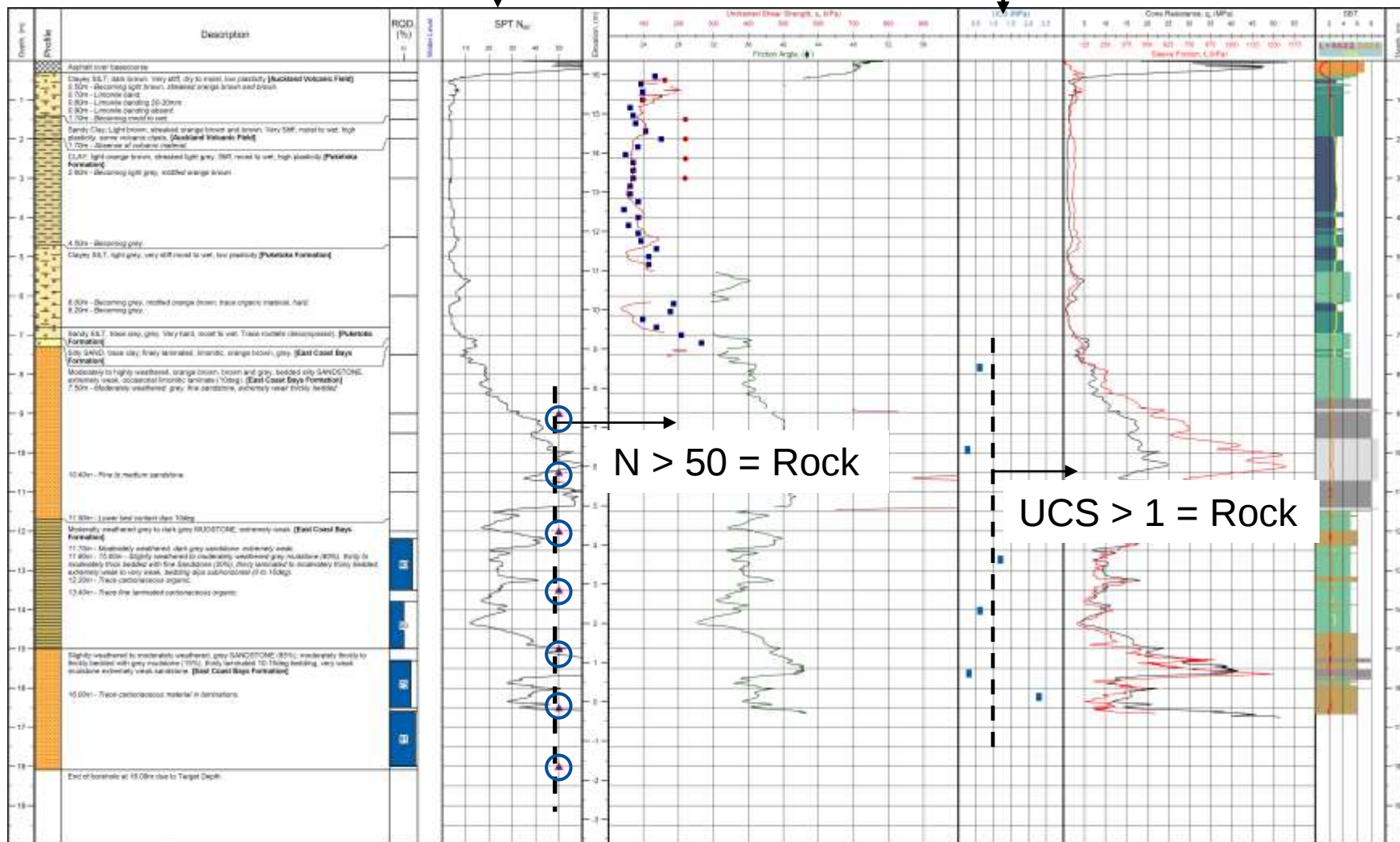


EXAMPLES

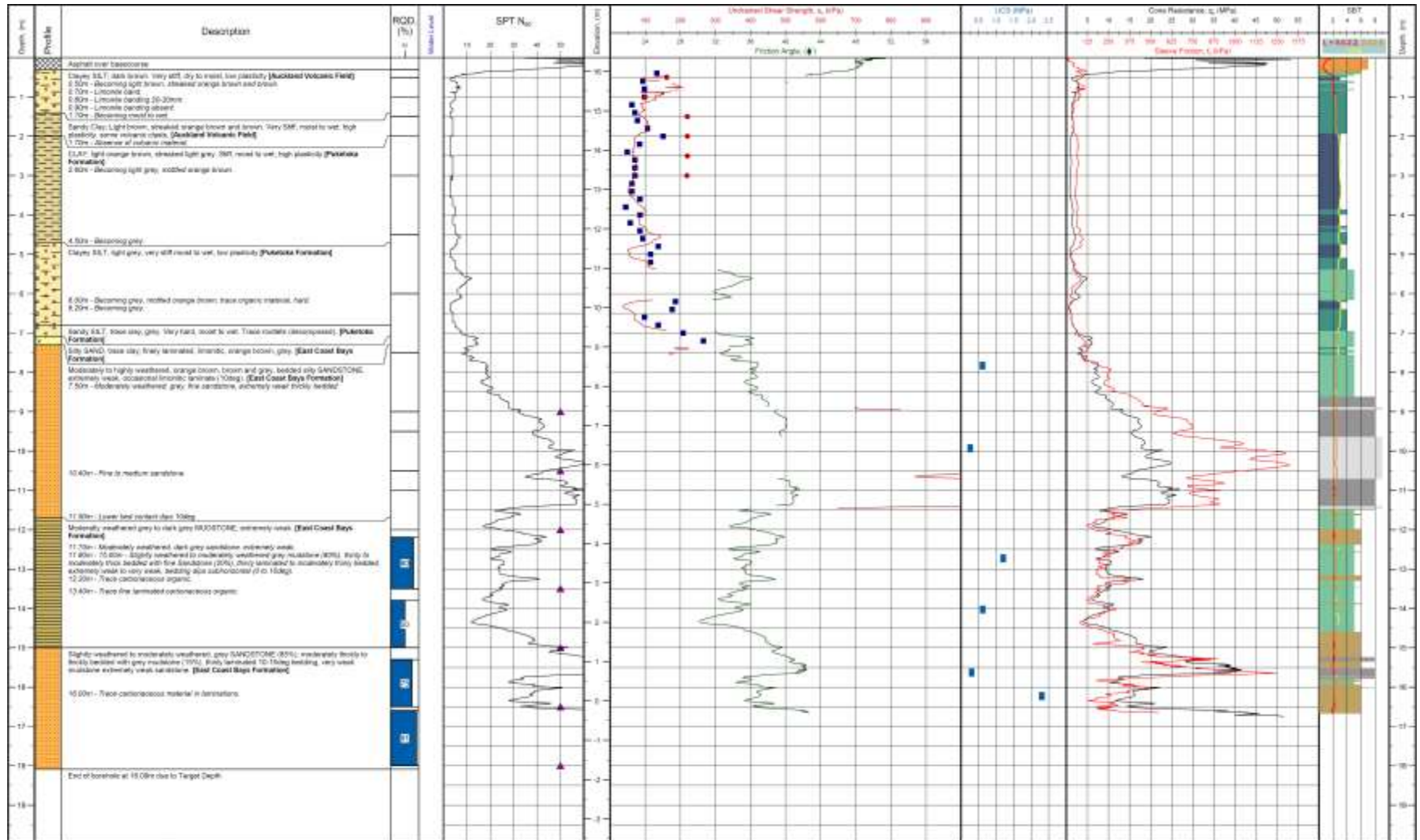


SPT N

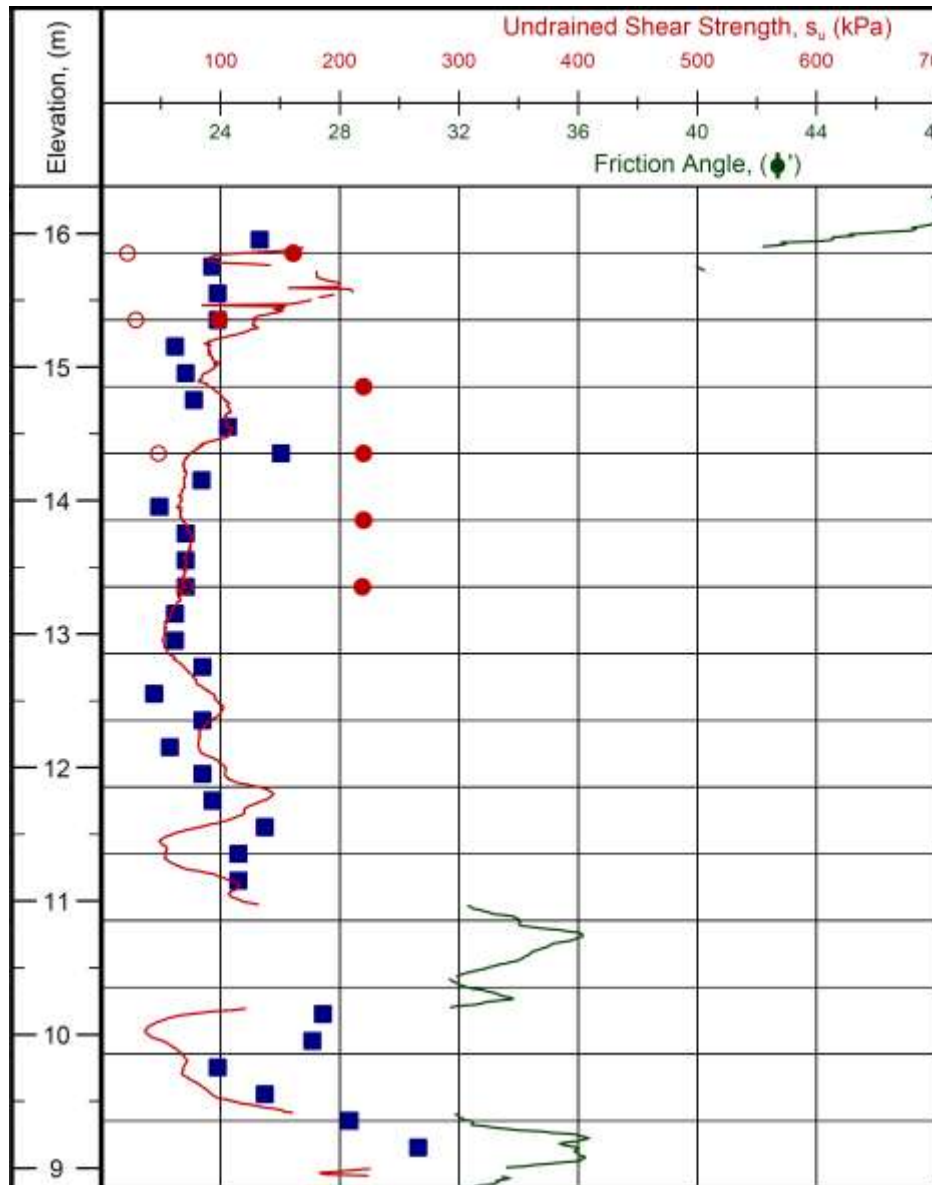
UCS



EXAMPLES

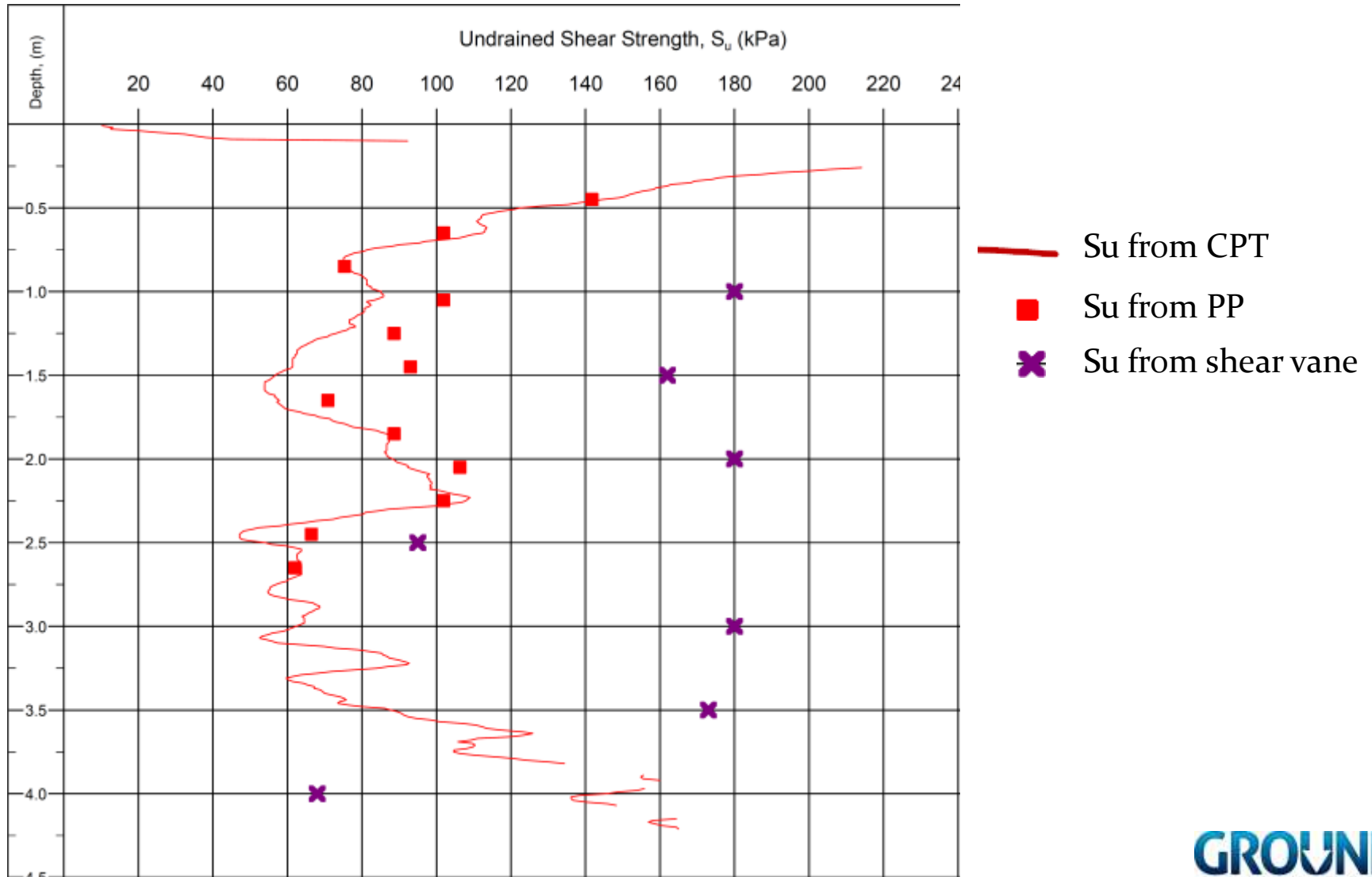


EXAMPLES

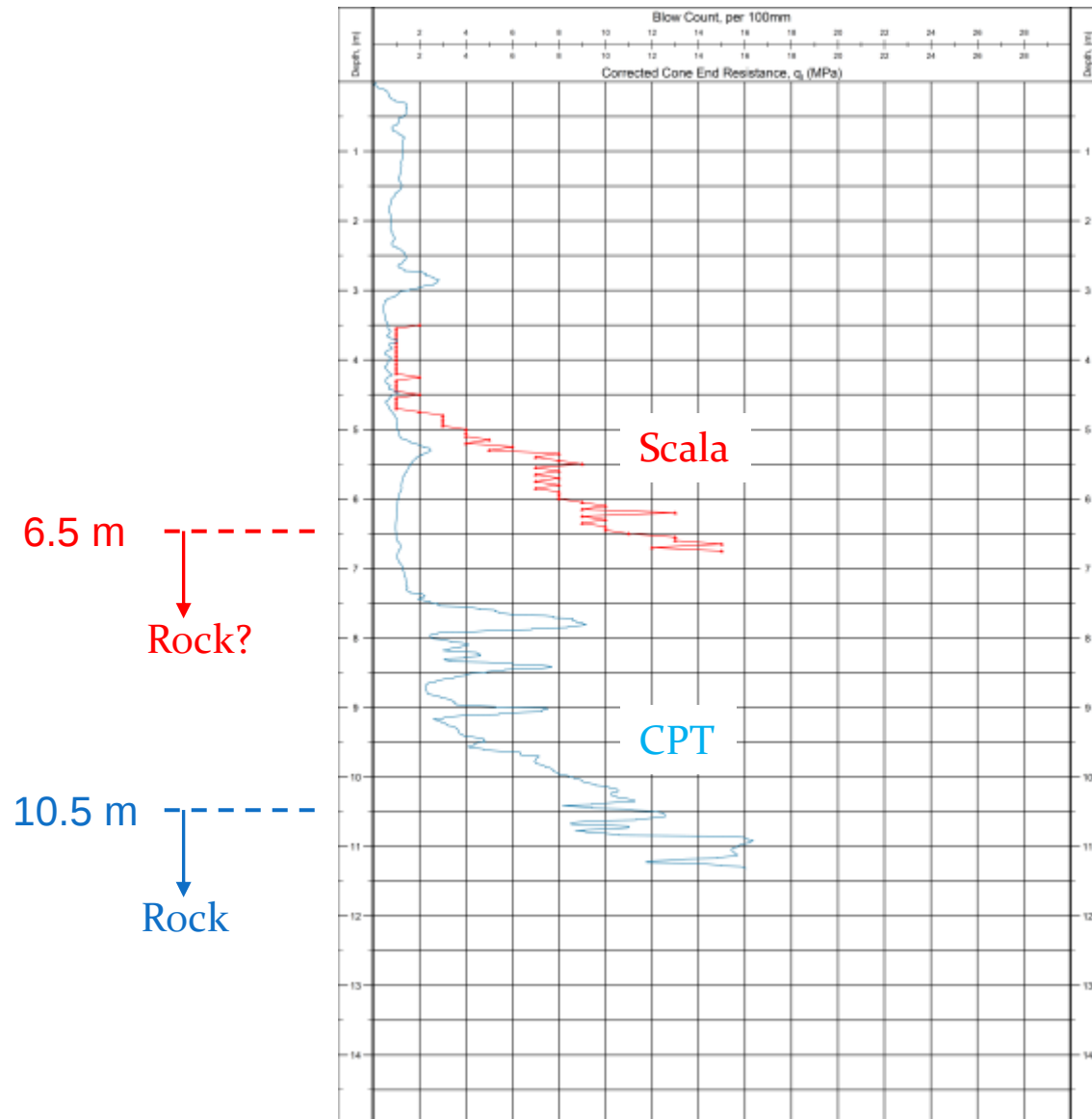


-  s_u from CPT
-  s_u from PP
-  s_u from shear vane

EXAMPLES



EXAMPLES



WHY CPT IS THE “BEST” GEOTECHNICAL TOOL

In comparison to other conventional in situ tests, CPT:

- Provides continuous information with depth
- Provides a huge amount of valuable data
- Is a rapid test
- Presents excellent value for money
- Has much lower level of uncertainty

Surely, we have evolved and should
stop hitting things with hammers!