

Quality at commissioning Right tool for right purpose

WETS'15 1.5 Jeroense

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WETS'15 Workshop

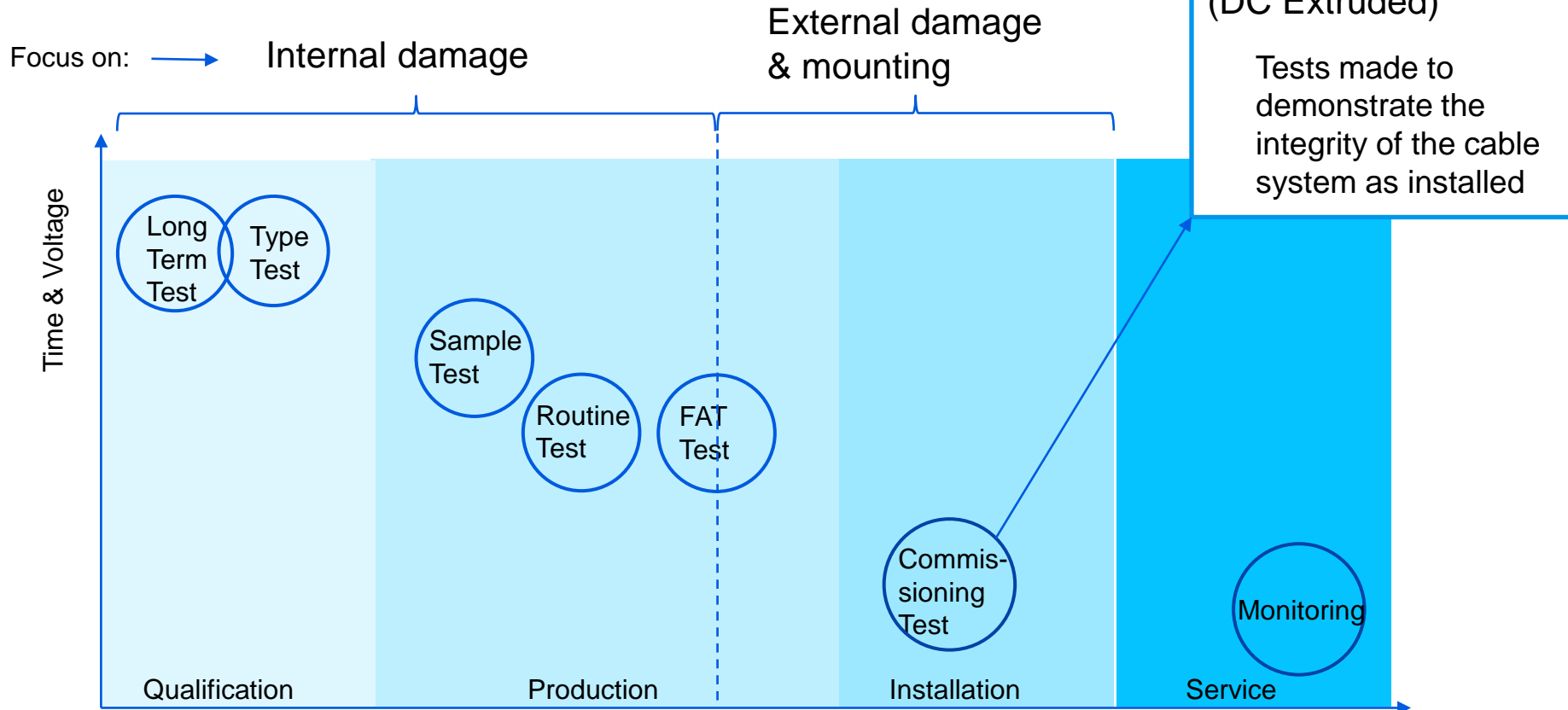
*Organization: Jicable and Prospective 2100
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WETS'15

What is the purpose of a commissioning test?

Recap of tests



BASE: NO test can replace Quality Control, good workmanship, good equipment, good materials!

Commissioning test

Different methods

Method	Pro's	Con's
AC 50 Hz	Most experience	Limitations for long lengths – test equipment size (not valid for soak test)
AC 10-50 Hz	Less limitation for long lengths	Still large equipment for longest lengths
VLF – "0.1 Hz"	Least limitations for long lengths	Higher voltage and/or longer time needed
DC	OK for DC cables	Questionable for AC cables
DAC	Small equipment size	More challenging to measure pd. Difficult to normalize No. of pulses and voltage level Depending on frequency: Cable length affects voltage shape and level
COS (square wave)	Small equipment size	Cable length affects voltage shape and level

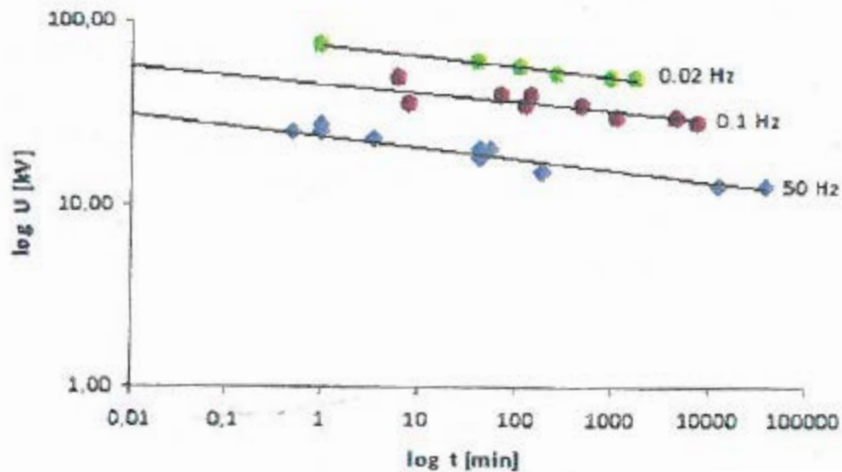


Other tests not stressing the internal electrical parts:

- Sheath test
- Opto fibre test (OTDR)

Electrical test – VLF Duration tests – cables

Just an example of one of several new Commissioning tests being researched on



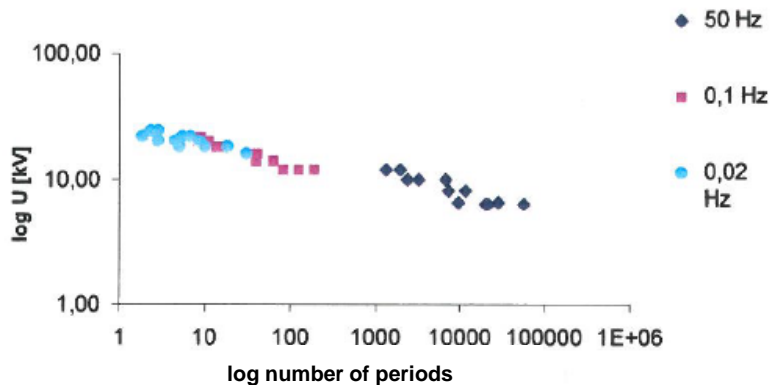
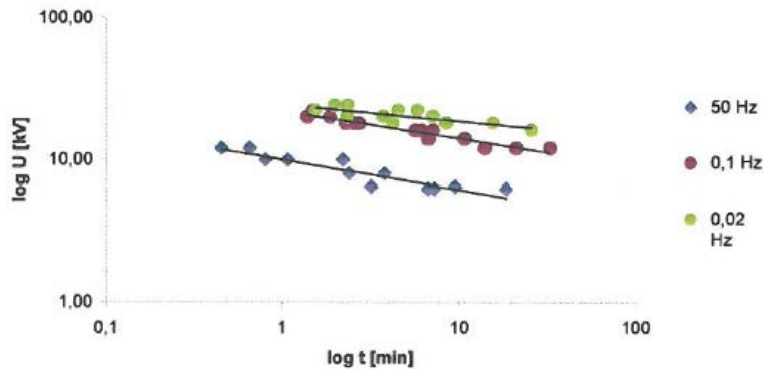
Work performed by NTNU, SINTEF Energy. Masters degree 2008, NORD-IS 2009, CEIDP 2008

- Tests made on extruded mini cables (4 mm iso)
- Well-defined defects (needle)
- The life-time factor n is not affected by the decrease in frequency
- Meaning: aging type is probably the same for the lower frequencies
- Higher voltage needed (factor 2-3) **or longer test time**

Electrical test – VLF

Duration tests – moulded square samples

Just an example of one of several new Commissioning tests being researched on



Work performed by NTNU, SINTEF Energy. Masters degree 2008, NORD-IS 2009, CEIDP 2008

- Tests made on moulded XLPE samples
- Well-defined defects (needle)
- Studied tree-growth & time until breakdown
- Conversion from *time* to *number of periods* supports further previous statement:
 - aging type is probably the same for the lower frequencies

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