

Paris Session 2022



Experience with electric vehicle loads and substation capability

SC B3 PS1 Question 2

Are the specifications and requirements for new applications and their role in power systems adequately well understood?

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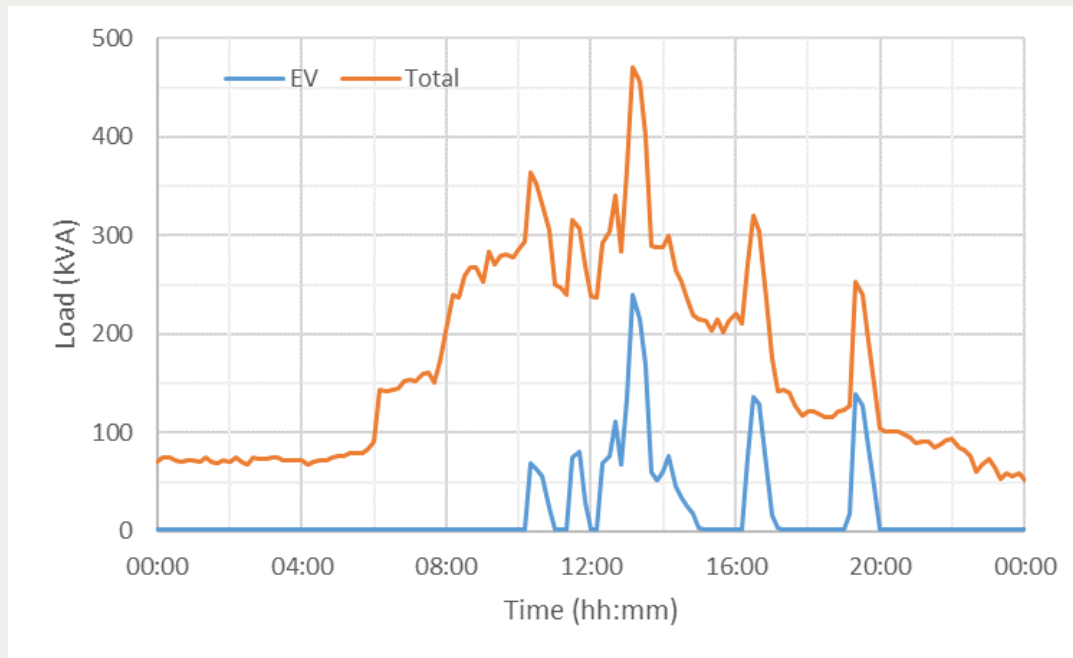


Experience with electric vehicle loads and substations

EV charging results in a very peaked load on distribution substations

Substations won't be well utilised with these peak loads. Don't want to upgrade early.

Is there anything we can do?



Group Discussion Meeting



Applying dynamic ratings:

Temperature and thermal inertia rather than just load as is currently done?

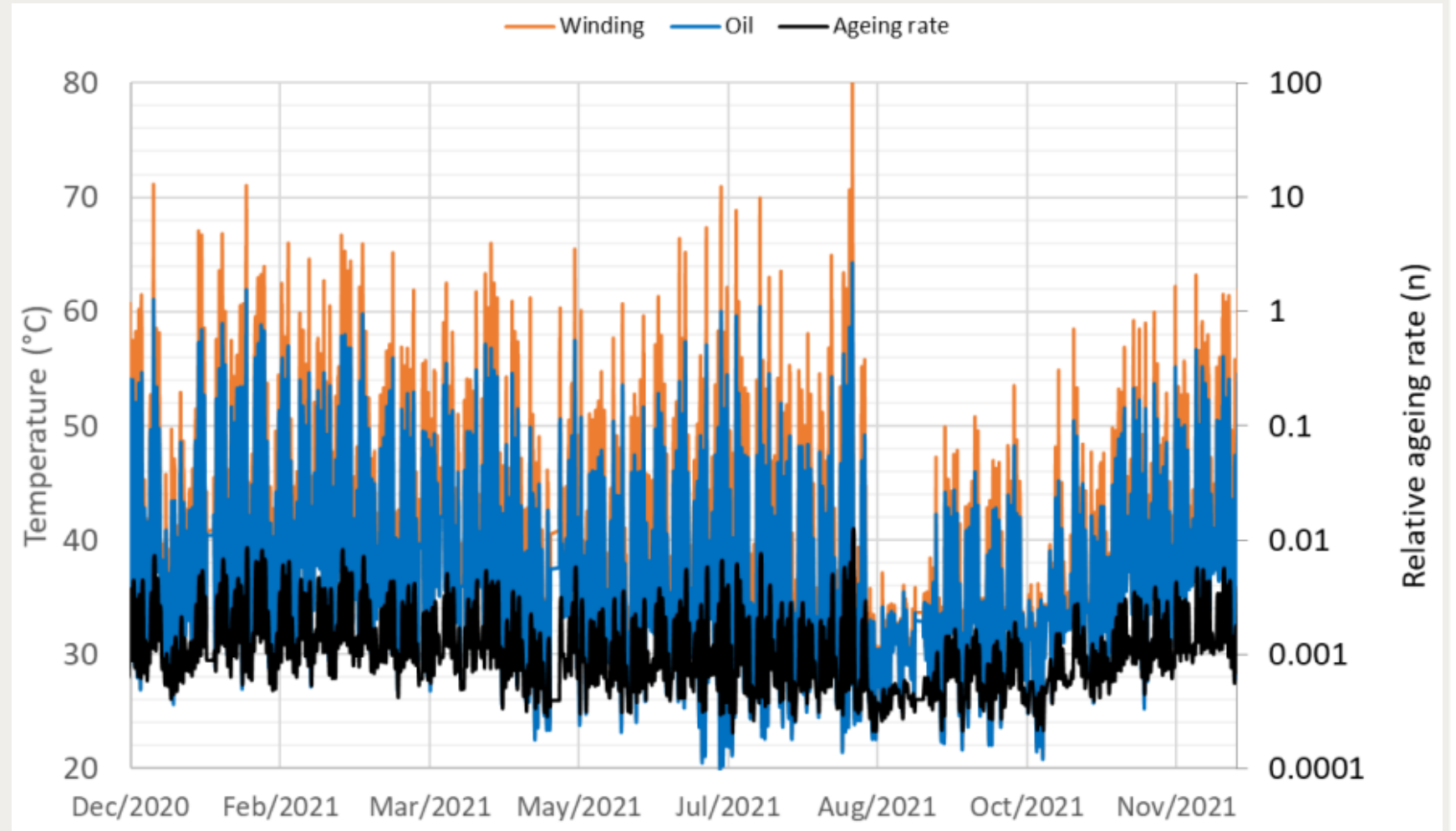
Allows substation to work harder on a cold day when batteries drain quicker?

This requires monitoring

Experience with electric vehicle loads and substation trials

EV charging trials show temperature of distribution transformers and relative ageing rate (based on paper insulation)

Despite the peak loads, the transformers temperature are well within specified 90°C ratings, and are not ageing quickly



Standards for electric vehicle loads and substations

- IEC 60137 specified bushings are rated at 120% load
- Transformers can use a normal cyclic rating of 150% where, from an insulating paper ageing point of view, over a 24-hour period the loading corresponds to 100% (IEC 60076/7)
 - However, suitable bushings will only be installed if the specifier requests it
- Prefabricated substations standard AS 62271.202 specifies a maximum temperature for accessible parts such as the surface as 70 °C.
 - This can limit loading lower than the rated capacity
 - In New Zealand, many kiosk substations are ground mounted in public areas, and so are accessible

A new Standard is recommended for distribution substations in use with EV's