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GROUP REF. : SC B5  
PREF. SUBJECT : 1  
QUESTION N° : 4

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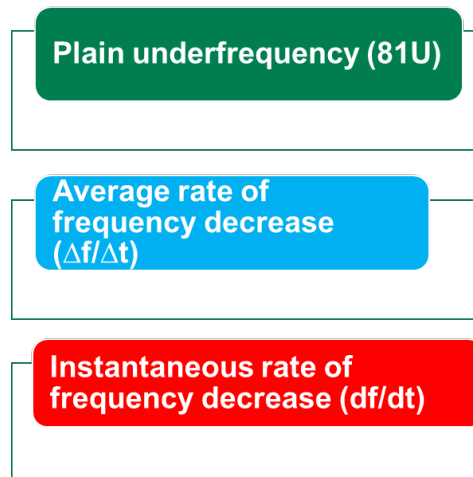
**Q1.04 Are there any key consideration for securing the ROCOF protection against maloperation?**

**RoCOF: Measurement, utilization in AUFLS for existing and emerging low-inertia networks**

- This contribution based on TB 629 material and the understanding of this contribution based on TB 810
- One of the emerging consequences of low-inertia network is modelled (Transient and Dynamic) and observed (PMU) changes to network frequency dynamics.
- These changes are being observed during normal, abnormal and extreme event progression. Three examples given here to answer question PS 1: Q 1.03.
- AUFLS (Automatic Under Frequency Load Shedding) enabled through protection relay coordinated setting is typically the very last defense before large-scale blackout event. (Details available from TB 810)

**ROCOF from viewpoint of measurement, use and AUFLS design for low-inertia networks**

The set of figures below graphically identifies the ROCOF issues that might affect low-inertia power system networks



- None of the above measuring method, as illustrated in the Figure above. is fully selective from protection scheme setting viewpoint.

Figures below picked up from TB 629, illustrates this.

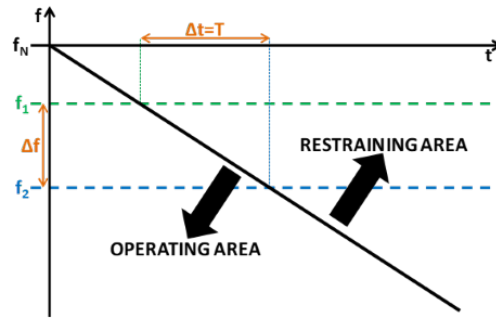


Figure 45 –  $\Delta f/\Delta t$  Measuring Philosophy (TB 629)

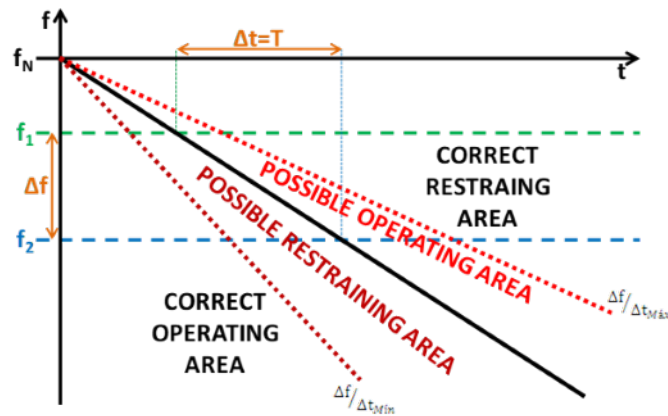


Figure 46  $\Delta f/\Delta t$  Measurement Warranted Accuracy (TB 629)

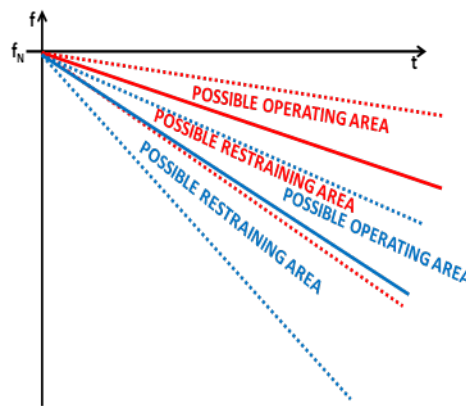


Figure 47  $\Delta f/\Delta t$  Measurement Risk Overlapping (TB 629)

- Thus, any load-shedding scheme designed using the above is likely to lead to very conservative load shedding