

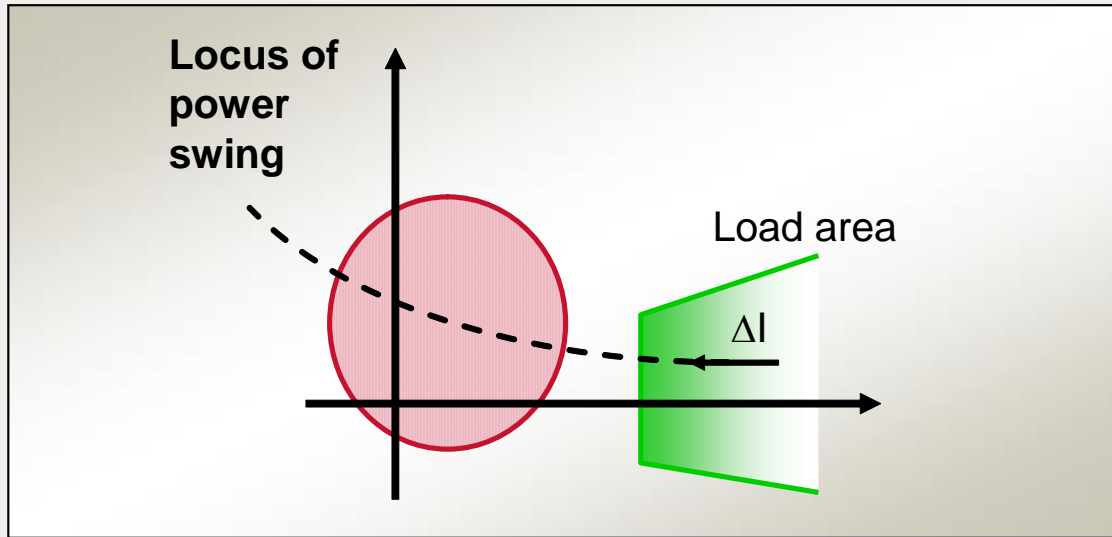
Power Swing Algorithms

Questions 1.05: Are there any changes to power swing characteristics in lower inertia grids which would prompt changes to power swing blocking or out of step tripping protection settings or schemes?

Simon Richards (UK)



Delta I based Power Swing Blocking (PSB)



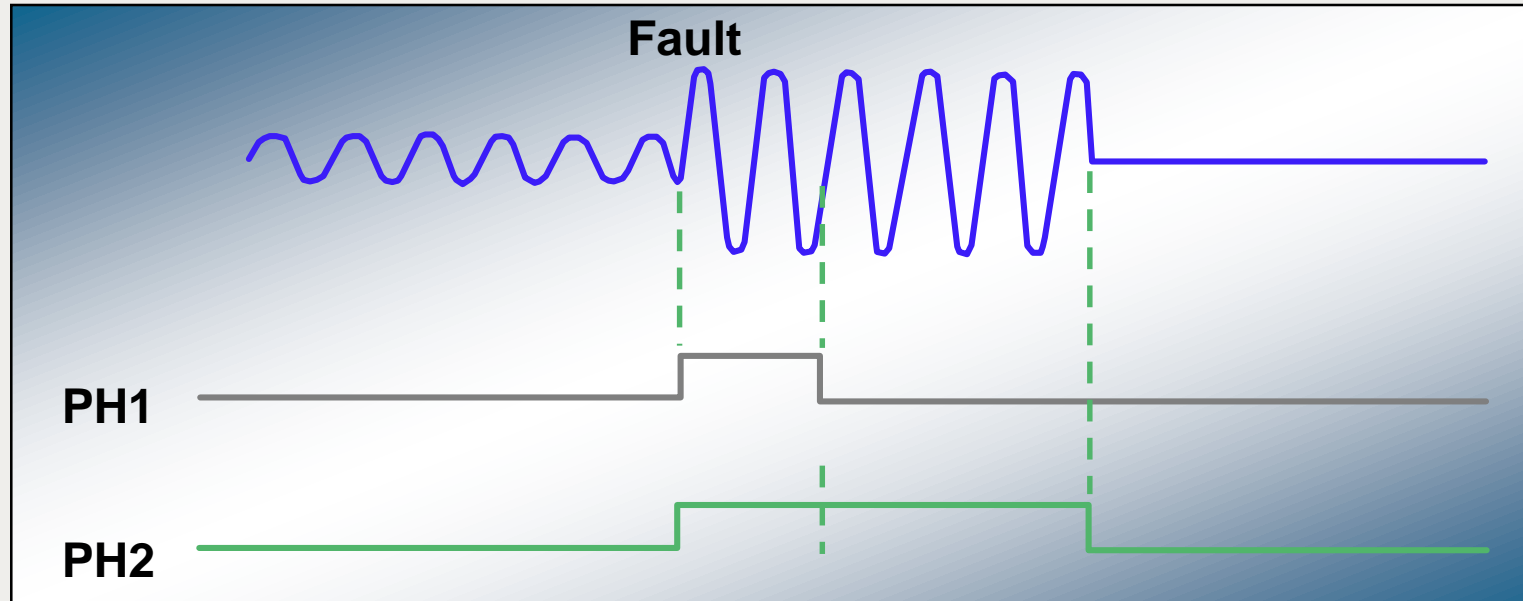
“Setting-Free” Power Swing

- Power swings are detected by continuous superimposed current presence - “ ΔI ”
- Swings are detected much earlier than for conventional devices - where the locus must cross into a band which surrounds the trip characteristics
- No PSB start-up zone, blinders needed just in extreme cases of very slow swings when the superimposed current remains below the minimum threshold ($5\%I_n$) i.e. around 0.5 Hz

Group Discussion Meeting

Delta I based PSB

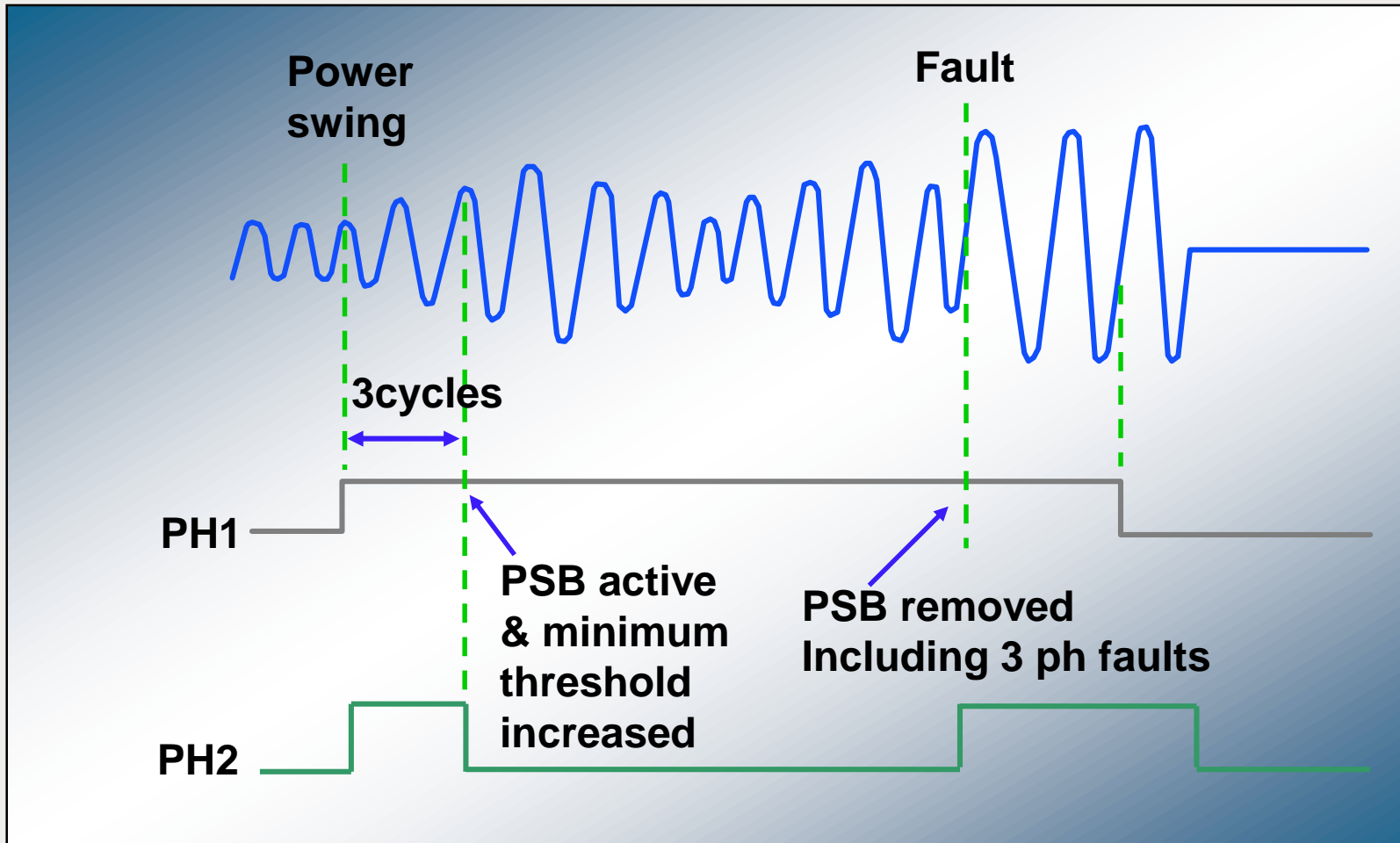
Phase Selector Operations: Load + Fault Condition



- PH1 : Phase selector 1, starts PH2 and primes PSB. Compares current value with previous 2 cycles
- PH2 : Phase selector 2, enables distance elements. Compares current value with pre-fault value.

Group Discussion Meeting

Delta I based PSB (Power Swing and Fault)



- The trip time for any fault occurring during a power swing is exactly the same as had the swing not been present
- No unblocking delay, no compromise
- Always a sub-cycle distance trip