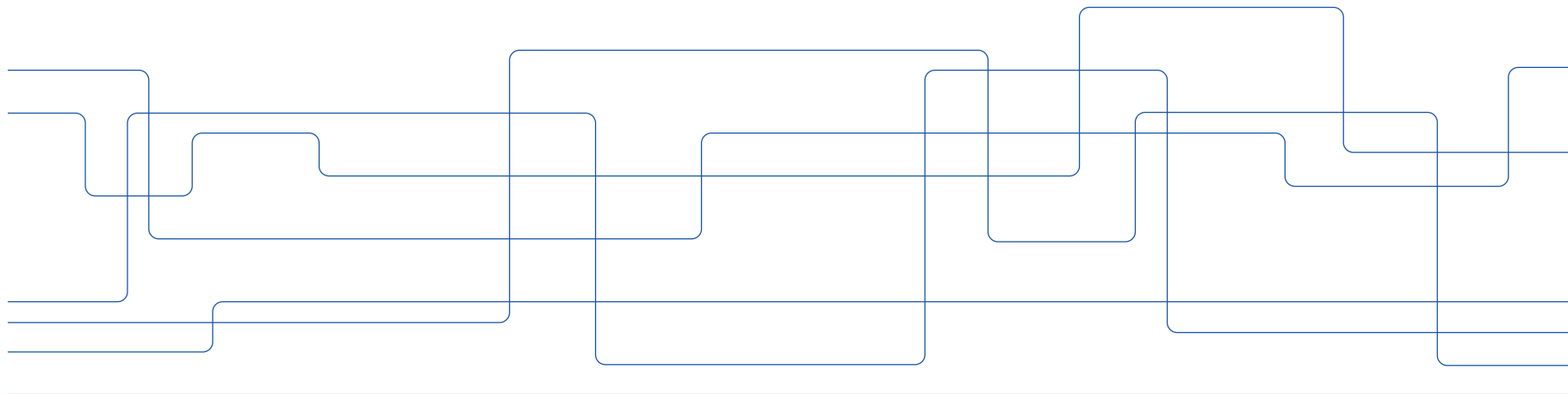




Kombinerad risk- och tillgänglighetsanalys för primär och sekundärutrustning

Patrik Hilber

KTH

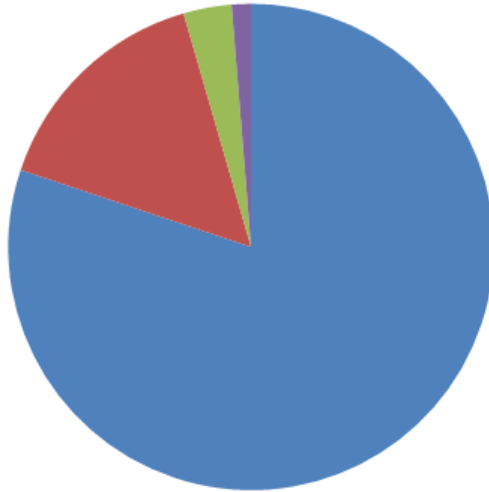


Customers: connected Vs affected

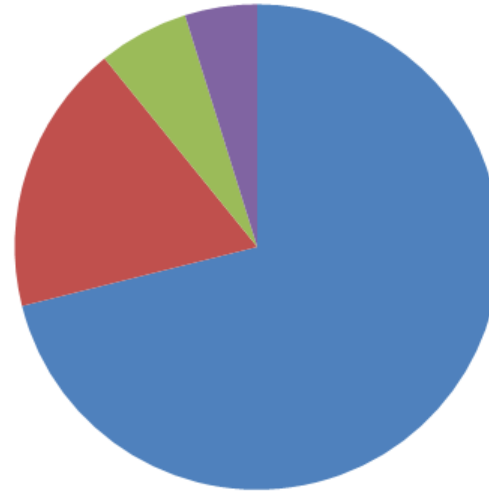
Fault Categorisation

- A** The most common one. The feeder breaker works properly and the interruption is limited to just one MV-line
- A+** The feeder breaker of the MV-line where the failure has occurred breaks, and some of the other customers connected to a near feeder (can be different busbar) will break.
- B** The feeder breaker of the MV-line where the failure has occurred breaks, and some of the other (perhaps all) feeder breakers connected to the same busbar will break.
- C** Transformer breaker/station breaker operate.

A, A+, B, C; Less frequent high impact faults



Jan 2008 - Dec
2012
~ 20%

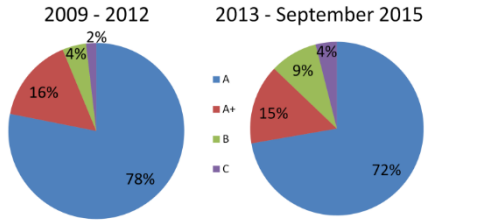


Jan 2013 - Sep
2015
~ 29%

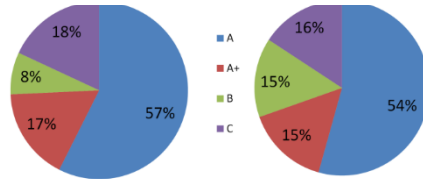
■ A
■ A+
■ B
■ C

Number of faults

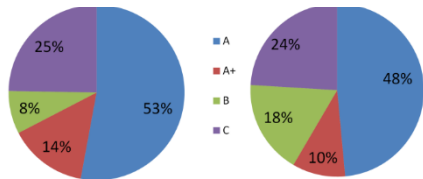
Failure Events and Minor Escalation case



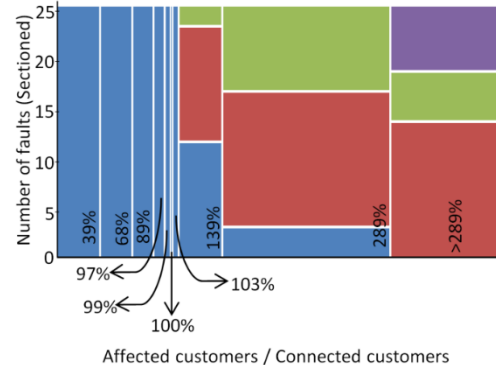
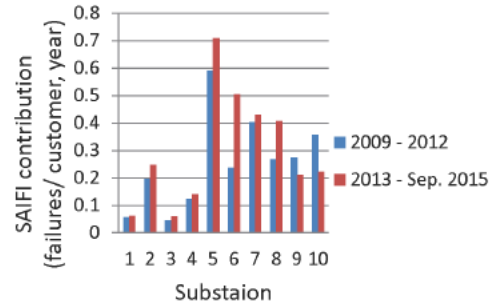
Total number of registered faults



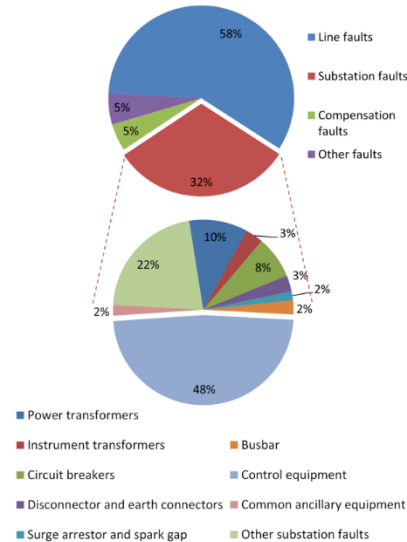
Total number of customers affected



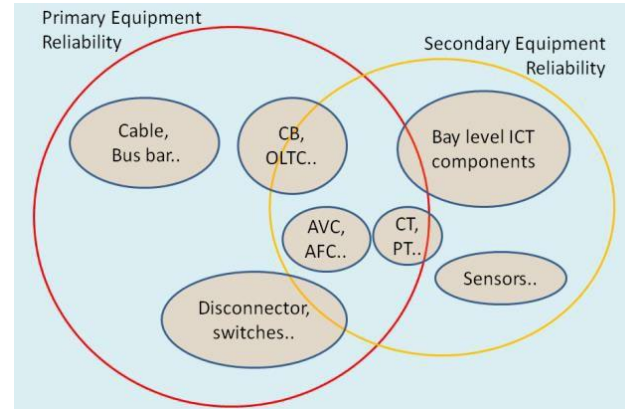
Energy Not Delivered



Part 1: Correlated Events in Power Distribution Systems



System and component fault classification



Distribution of component reliability over primary and secondary sides



Conclusions and continuation

- Important but difficult to work with
- Control equipment settings are important
- Configuration; open points, fuses, number of customers, ...
- Continuation on the optimization track: Sanja Duvnjak Zarkovic at the QED asset management research group.



Frågor?