



Failure cases studied so far by WP7

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Failure cases studied or under study (1/2)

- Powering failures of D1/D3 revisited for HL → existing interlocking strategy (FMCM) sufficient
- Criticality of missing coherent beam-beam kick (run3 & HL) – revisited → HW linking of BIS loops required for HL-LHC
- Effect of quench heater firing on circulating beam → quench heater connection schemes to cause quadrupole/higher order fields & interlocking of discharge in HL triplet → beam screen filtering to be understood
- Effect of CLIQ firing on circulating beam → updated connection scheme
- Crab cavity failures in combination with the loss of the beam beam kick
- Quench in HL triplets → symmetric quench detection & BLMs
- Criticality of the ADT – simulations & experiments → failures slow enough to allow protection via BLMS

Failure cases studied or under study (2/2)

- Criticality of beam-beam compensating wires (for run2 / run3) → interlocking of powering, wire temperature, positions etc., for Run 3 interlock matrix of WIC fast enough before critical losses appear → to be specified for HL
- Crab cavity failures in the SPS & MP tests & fast interlocks → fast interlocks for phase and voltage
- UFO dynamics studies - ongoing
- Magnet component damage limits due to direct beam impact
- Numerical simulations of energy deposition caused by 50 MeV - 50 TeV proton beams in copper and graphite targets
- Hydrodynamic tunnelling studies
- Safe disposal of the LHC beam in very unlikely case of non-working beam dumping system → batch-by-batch excitation of beam with ADT

