Welcome to the MP3 day 2022

1 Dec 2022, CCC

Indico: https://indico.cern.ch/event/1222548/

About 25 participants from MP3, OP, EPC, EE, ELQA, QPS, PIC, CB

7 presentations and 3 breaks, with lots of time for discussion

Wrap-up HWC 2011: https://indico.cern.ch/event/129805/
MP3 review 2015: https://indico.cern.ch/event/384361/

Aim:

- Learn from last HWC campaign
- Ideas for further automation of analysis
- Improve / smoothen future HWC campaigns and operation
- Define our software needs for the coming years
- Magnet training: Lessons from the past & idea for the future

Output:

- List the action points and suggestions for the coming 1-2 years, for ourselves but also for other groups/teams (EE, ELQA, EPC, QDS, OP, etc)

Agenda

08:30 → 08:45 **Introduction**

Convener: Arjan Verweij (CERN)

08:45 → 10:25 **Session 1**

Convener: Lucio Fiscarelli (CERN)

- 08:45 **Possibilities and need of Transfer Function Measurements** — 45m
  Speaker: Jaromir Ludwin (Polish Academy of Sciences (PL))
- 09:30 **FPA tests: Results and plans for the future** — 55m
  Speaker: Dr Emmanuele Ravaioli (CERN)

10:25 → 10:45 **Coffee break** — 20m

10:45 → 12:25 **Session 2**

Convener: Gerard Willering (CERN)

- 10:45 **Review of actual test program/procedure and plans for modifications** — 50m
  Speakers: Daniel Wollmann (CERN) , Sandrine Le Naour (CERN)
- 11:35 **The MP3 Twiki website: Maintenance, possible improvements or restructuring** — 50m
  Speakers: Lucio Fiscarelli (CERN) , Samer Yammine (CERN)

12:25 → 13:40 **Lunch** — 1h 15m

Agenda

12:25 → 13:40 **Lunch**

13:40 → 15:35 **Session 3**

Convener: Daniel Wollmann (CERN)

13:40 **Tests analysis using SWAN notebooks: Towards a (semi)-automatic coherent analysis of all tests on all circuits** 1h 15m

Speakers: Aleksandra Mnich (CERN) , Mr Zinour Charifoulline (CERN)

2022-12-01_SWAN_...

14:55 **Quench Database: Improving the structure & contents and possibilities to also use its contents in the FPA analysis notebooks** 40m

Speaker: Per Hagen (CERN)

15:35 → 15:55 **Coffee break**

15:55 → 17:10 **Session 4**

Convener: Sandrine Le Naour (CERN)

15:55 **Magnet training: Lessons from the past and ideas for the future** 1h 15m

Speakers: Bernardo Bordini (CERN) , Gerard Willering (CERN)

17:10 → 17:30 **Summary**

Conveners: Arjan Verweij (CERN) , Bernardo Bordini (CERN)

Have a nice day

Ask lots of questions

All ideas are welcome

Jaromir (TFM)

New during LS2: TFM on each magnet of RB (for some sectors)

Proposals:

- Increase nr of points per sweep from 101 to max 190. Would take more time.
- For few cases use 190 points in small f-range to see more resonance peaks
- Measure temp during measurements
- ELQA trends SHOULD be analysed systematically (part of report)
- Is the TFM of the QHs interesting to measure?
- What is effect of precycle (SC magn) at cold?
- Script for online comparison with historical data
- Perform always local TFM of all MB at warm
- Use spare LF QH’s as pick-ups during quenches -> SM18

Emmanuele (FPA)

- Any correlation with previous quenches?
- How to understand slow unbalanced?
- Distinguish FPA tests for 100 mV board and 200 mV board
- Find correlation between slow unbalanced and anything else (e.g. cable manufacturer)
- Include the effect of the change in output filter of PC (2009?)
- Once swap QPS board on a magnet and check A/B difference
- Any program for FPA's on RQD/F or other high field circuits
- 2 FPA's (2 kA, 11 kA) after YETS on all 13 kA circuits to be done.

Sandrine

- 24% of 11400 tests were signed manually. Why? Data come in too late for automatic analysis.
- 60 A: no change
- 80-120 A: reduce I_delta from 5 A to 0 A
- 600 A: reconsider I_PNO for some families
  - RQS to 500 A
  - RQTD to 450 A
  - RCBX to 300 A (single plane and combined)
  - RQTL to 500 A
- IPD: reduce to 6.8 TeV equivalent (and not 7 TeV as it is now)
- IPQ with MQM@4.5K: 4 kA except Q6L8 at 4.3 kA
- MQY @ 4.5 K: from 3.5 kA to 3 kA
- MQY at 1.9 K: no change

- IT: reduce from 7 to 6.8 TeV
- RB+RQD/F: no change
- PGC: no change, eventually forget about 3&4
- In AccTesting: FPA snapshot in RB and RQ, dedicated pyramid in RQ.23/78

Daniel

- Specific criteria for some circuits with values that are always a bit out of spec
- All checks should get criteria
- Compare test with previous test in notebooks
- FPA notebooks: review checks & criteria so automation is possible & Add diode failure criteria + check. Put FPA criteria in procedure.
- RSS: keep switches open. Mask the power permit at PIC level. QPS_OK. To be checked offline within MPE.

Lucio and Samer

- If we swap to Confluence or Fostwiki, will IT do the mitigation?
- Circuit tree works well
- Meeting page: >600 attachments. Is indico better?
- Attribute maintenance of pages to MP3 members
- Should we have a general webmaster?
- Twiki: keep it as long as supported by IT

Ola & Zinur

Other scripts should become part of set of 50 HWC notebooks. Improve programming and testing, and benefit from metadata.

All actuals tool to be maintained until end of Run-3. PM browser even for longer if needed.

Automation: hopefully starting after YETS 23/34

Notebooks could get possibility to plot any signals combined with time conversion if needed.

PowerSpy might be useful for online monitoring of one or more signals

Per

Should we move to proper database, or maybe database that already contains all (SM18) quenches from the past):

- easy export to, e.g., Excel for plotting etc.
- logging, vector,
- updated results,
- flexibility (new columns etc, e.g. for secondary quenches)

EE tools:

too often tests fail: require better input from hardware teams to perform better automatic analysis

Bernardo

Does a long time staying at high current has a beneficial effect on subsequent training?

Could we test in SM18? From statistical point-of-view seems difficult on one or a few magnets. Only possible if very close to 13 kA.

More subsequent thermocycles cause additional loss of memory. Can we check in SM18? E.g. take magnet with long training and give it 4 thermal cycles.

We have a model predicting nr of quenches after LS3, worst sector: 21 Q. Total 100-150 (t.b.c.). Any ideas how to improve our confidence in this number?

Gerard

Training level in SM18 seems to have impact on training in LHC.

Likely we will not have much more flat-top quenches in coming years.

Higher ‘overtraining’ results in less flat-top quenches

Firm 3 does not show flat-top quenches

I_delta=100 A looks at first glance rather good