Data exchange for HL LHC magnets

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General remarks

- Each team is responsible of data reduction (transforming raw data in post-processed data)

- Post-processed data should be made available to all collaboration for analysis

- Systemic conflict between
  - Waiting all the necessary cross-checks to distribute the data
  - Having the data, even if incomplete, to be able to judge and fast react

General remarks

- Five types of data
  - I will not consider electrical checks, which are part of manufacturing
  - Mechanical measurements
  - Quenches: training, voltages, current, quench start time, MIITs
  - Magnetic Measurements (MM)
  - Optional:
    - Quench antenna
    - Optic fiber
- Two types of storage
  - Repository-like (developed in most cases)
  - Database (to be developed in some cases)
    - Databases can be different (as it is today for quench and MM) – or should we have just one?

Before the test

- We have a standard test plan
  - Indeed, in the prototype phase and possibly also during the production, different strategies can be adopted depending on the type and features of magnet
  - Meeting(s) to define the test plan
    - Should be like a menu, with priorities associated to each case
    - The test responsible carries out the day-by-day optimization
    - Temporal sequence is important since interruptions may happen due to different causes (test station, limitations of the magnet, etc)
    - Test plan should be stored in EDMS

During the test

- Experience shows that having a person in situ (in the place where the test is taking place) is useful, especially for the first tests
  - Helps the keep a strong link between CERN and the Labs
  - On the other hand, should we always have somebody from the manufacturing lab on the test site ? To be discussed
- It is findamental to have a daily report to an ad hoc distribution list
  - Including project engineer, key persons working on the magnet, and few persons at the management level
  - Even if nothing happens it is good to know

During the test

- The following major decisions should be agreed with CERN
  - Warming up
  - Test that might endanger the magnet (high MIITs)
  - Change of test plan or of the sequence
- Regular follow up meetings with the project engineer
  - In these meetings one does not need to have all the collaboration
- One or more WP meetings with the presentation and discussion of the results
  - With slides available to all collaborations

Data exchange: mechanical measurements

- Mechanical measurements are extremely important for understanding magnet performance
  - They are also the most difficult and fragile
  - Cross-check between systems is important
- Post-processing done by the team in charge of the equipment
- Diffusion of plots and Xcel tables during the test is necessary
  - Very efficient system at CERN: mechanical data available after each quench
  - Do we store numerical values in CERN DB ?

Data exchange: training

- Training data (communicated daily with Xcel table, plus plot) and stored in CERN DB
    - Time: Date, hour (sometimes forgotten but very important)
    - Temperature, Current, Voltage
    - Localization
- What to do with the signals (voltages, current, etc during a quench)?
    - Have a copy in a CERN DB (ideal, but is it possible?)
    - Store locally in the lab and make them available in case of need (more realistic)

Data exchange: magnetic measurements

- We should have the post-processed data distributed rapidly during the test (not after)
  - File with time, current, multipoles
  - Give priority to the most important measurements!
    - Machine cycle, w-c correlation, stairsteps first
    - Ramp rate has much lower priority
- As for mechanical measurements and for training, magnetic measurements extraction from raw signals is the task of the responsible of the measuring system
  - But a rapid distribution to the collaboration allow to detect if there are problems, and if some measurements should be repeated
- Also in this case, store the post-processed data in a CERN DB

After the test

- Test report to be written
  - Level of detail to be clarified – it can go from a few pages to 20-30
    - Equilibrium between completeness and too much paper

- Better an incomplete version available soon, with « in work » status, or final version much later?
  - I would prefer the first one