

Progress Report on LHC Interconnection Works - DS regions

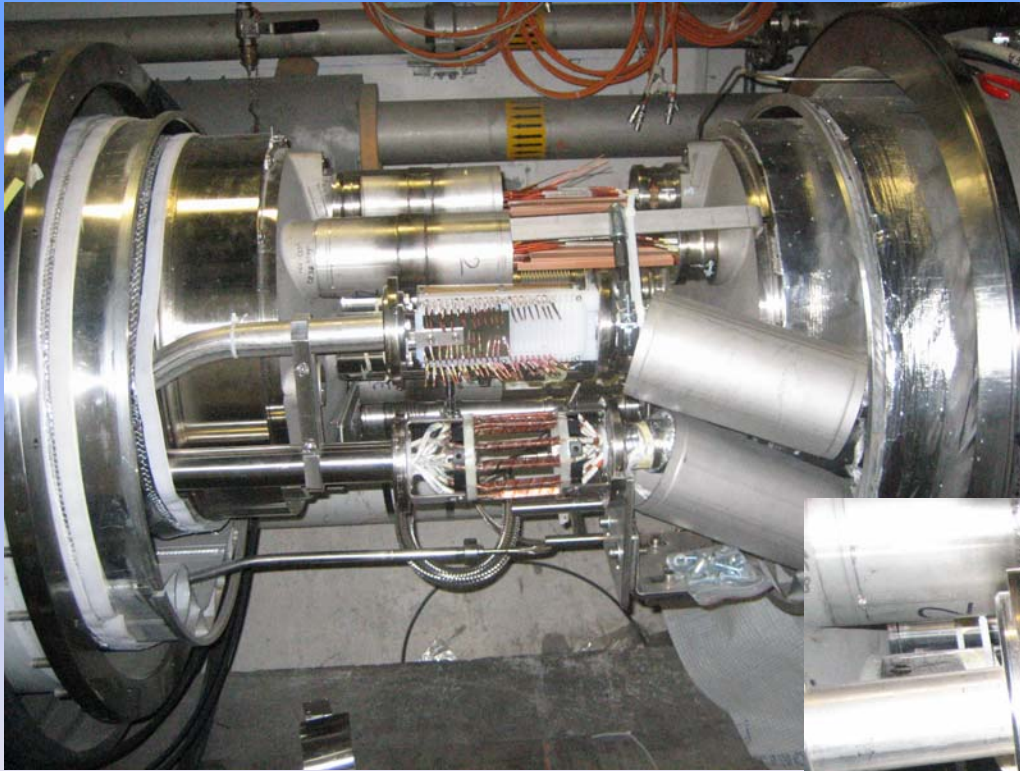
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on behalf of the sector coordination team &
all teams involved (AT-MCS, AT-MEL, AT-VAC)

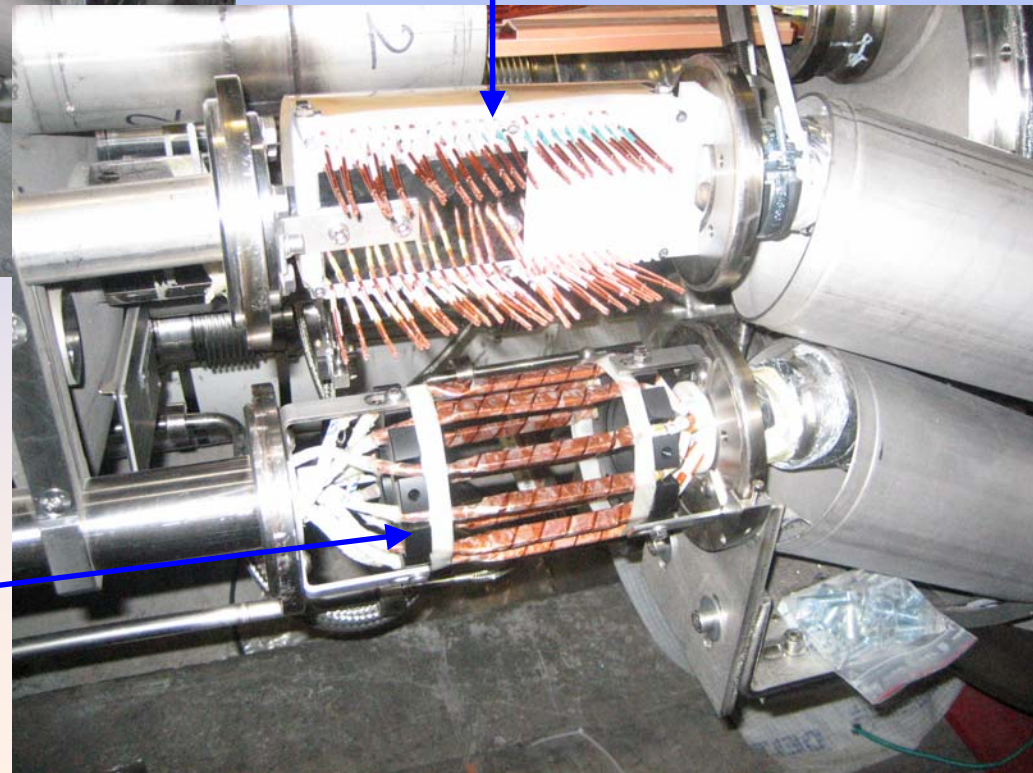
Summary

- Structure of DS interconnection works,
- DS compared to arc,
- NCR on 600A Nline in R4,
- Status of DS regions,
- Room for improvement / conclusions

6kA and 600A lines



600A line (cabling boards completed, before connection)



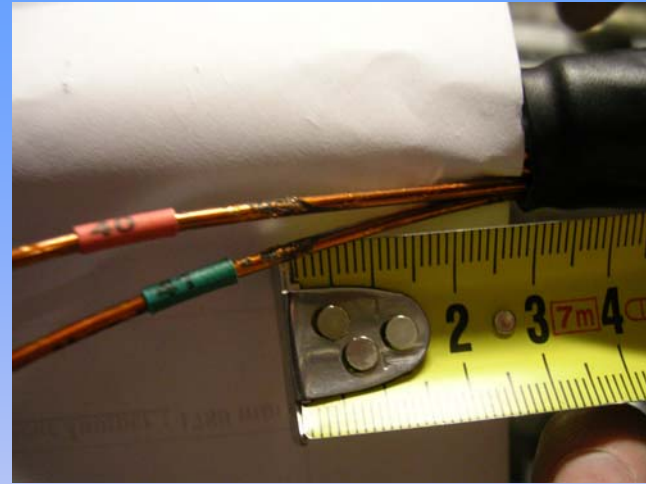
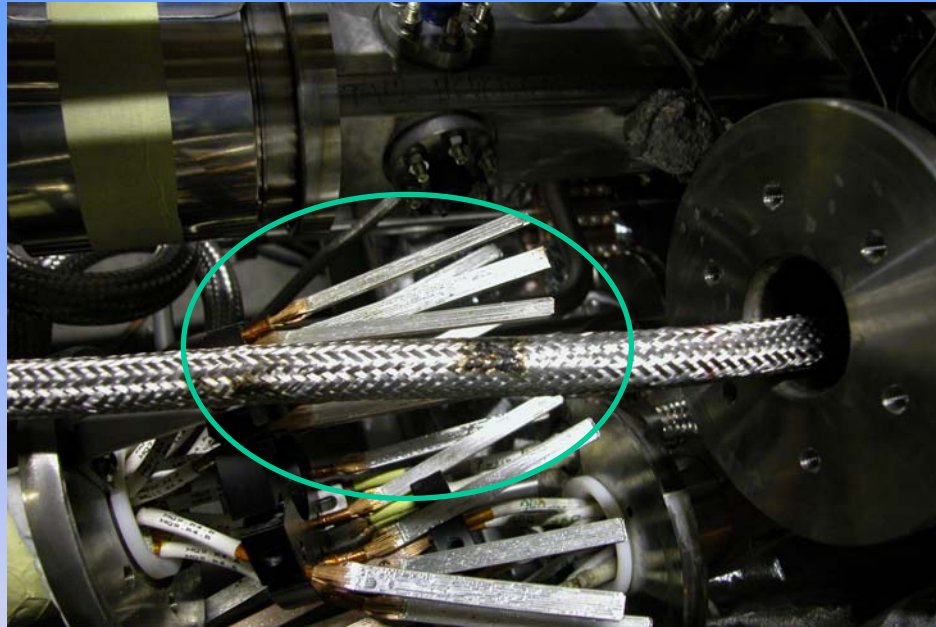
6kA line (completed, picture of Q7/DFBA IC in L5)

Coordination of DS regions

- **workflow shows only electrical part**, but also piping works, the VAC part, etc. has to be included in planning and coordination.
- in total, there are **6 different workflows for the 16 DS regions**: Left/Right + 4 DS regions at points 3 and 7 (no 6kA lines).
- VAC part: due to shape and positioning of the piping, limited access space, the **"normal piping works" are already not standard arc procedures**.
- Partially, welds can be done with CERN machine, only.
- **Electrical tests for DS were re-organized in MEL**, this organization is fixed now.

- Contrary to the arc activities, **teams are send in for one single operation** only (e.g. US connection in spools in Q7/DFBA...),
- this makes the interventions heavy and resource-consuming,
- **domino-effects** are produced if there is delay in previous activity,
(+ these type of delays are difficult to recover, other teams, etc.).
- Knowledge for 600A activities had to be transferred from MEL to IEG. Today is carried out by IEG (under CERN supervision).
- **Goal is to have the DS regions ready in time with the arc.**

Example of DS-R4



- metallic steel braid burned (prob. during pipe welding)
- test of wire showed no degradation (wires are used as spares today),
- NCR + training + missing procedure + flange & connection board problem produced a delay of three weeks in DS-R4.
- **TODAY:** procedure written (M. Felipe-Hernando) and under approval, flanges and polyethylene boards modified, training on 600A line completed.
- 600A cables are protected to avoid similar situation, NCR is closed.

Status of DS in Different Sectors / week 11

Sector	right	left
4-5	<p>6kA line: brazing finished</p> <p>600A line: finished</p> <p>Completion planned: week 13/14</p>	<p>1 electrical test missing.</p> <p>Completion planned: week 12</p>
3-4	<p>Blocked because of SSS issue (500 series).</p>	<p>6kA line: brazing finished this week</p> <p>600A line: finished in week 12</p> <p>Completion planned: week 15 (mid April)</p>
5-6	<p>6kA line: started this week</p>	<p>Nline insertion planned: mid April (DS region delayed because of IFS activities - interference with beam dump)</p>
8-1	<p>6kA line: brazing finished</p>	<p>Last electrical test finished.</p> <p>Completion planned: week 12</p>
2-3	<p>Nline insertion planned: week 14 (beginning of April)</p>	<p>Not started because of SSS issue.</p>
6-7 & 1-2	<p>Nline insertion planned: Beginning of May</p>	<p>---</p>
7-8	<p>finished</p>	<p>finished</p>

Conclusion

- With effort (!), the time needed for one DS could be 6 weeks, (for L5, 7-8 weeks were needed, for R4, 10 weeks were needed),
- we attempt to simplify the workflows (in agreement with MEL) by grouping activities together,
- Part of the brazing works could be taken over by CERN teams (high flexibility, high efficiency),
- from sector 2-3 on, the DS activities should start together with the arc (not possible before due to lack of magnets, e.g., Q11),