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Date of the meeting : 09 September 2021

WP6a Technical follow-up : Meeting Minutes #5

Project/Activity: HL-LHC – Cold Powering (WP6a)

Participants : F.Di Ciocchis (FdC), Y.Leclercq (YL), F.Pillon (FP), R.Betemps (RB), P.Cruikshank (PC), C.Halbert (CH), A.Gharib (AG), M.Careil (MC)

Agenda:

Indico event <https://indico.cern.ch/event/1055245/>

1. Action list follow-up
2. DFHX blank assembly progress
3. Planning of new activities
4. AOB

Discussion & comments:

1. Action list follow-up

DFH

- Action #1: Follow-up weld qualification campaign (FdC, YL, RB)
Qualification plan on-going - few remaining points to be addressed in the next dedicated meeting. **Thibaut from the AP engaged a dedicated person for designing the samples for the burst tests. They will start with the DFHX main shuffling box. Additional points to be addressed :**
 - ~~RB to provide Current leads pressure retaining welds list (to be checked if it has already been done) – not provided yet.~~
 - ~~RB to inform Pierre Moyret that he can contact Julien Debeux to get details about the CL lip welds qualification campaign.~~
- Action #2: Finalize feet design ensuring compatibility with installation sequence (RB)
Activity on-hold.
Tunnel floor unevenness has been measured. Results presented by Stephane Maridor, available [here](#).



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- Action #6: flexible's tests follow-up (YL)

Performing flexible's tests based on what Jerome Fleiter intends to assess before approving the dedicated reports. YL has proposed to postpone this activity until we get the parts for the test. **There has been a long discussion between YL and Jerome JF concerning the test of the CL flexibles. The plan is to insert the 18kA CL flexible in the central vacuum chamber. As a first step we will try to insert the 18kA CL without the cables (only with the flexibles) and then after this first test we will add the copper cables. RB pointed out that we need a dedicated part to insert the cables that is currently on his desk. It is important to install this part before inserting the cables.**

 - **YL to contact Jerome Fleiter to set up the flexible's tests.**
- Action #7: IFS flange design validation (YL, RB, FP)

PC reminded that the IFS flange of the DFHX is not included in the current manufacturing dossier. YL mentioned that the finalization of the IFS flange would have been taken over by AG but it still needs to be confirmed. YL confirmed the design is converging. **YL stated that the design is progressing although is not fully finalized. We will wait for JF feedback about the final electric layout.**

 - **FP to share information about the design, JF to check the design from the electrical point of view, JB to prepare a mock up, follow-up the procurement and assess assemblability.**
- Action #8: Blank assembly follow-up (YL, FdC, MRC, AJ)

Completed "*Sleeve support assembly – LHCDFHX_0112*", some remarks concerning the shafts interconnection. The helium sleeves have been inserted into the G10 collars, everything fitted properly. Partially assembled "*Assembly rear part cryogenic box2 – LHCDFHX_0199*" – we got stuck in assembling the shafts (the same issue came up in the *LHCDFHX_0112*). Found scratches on "*Stopped Shaft – LHCDFHX_0111*" – they do not affect the functionality. Placed one cradle on the rail – it does not seem to work properly, difficult to slide it without losing the alignment with the rail. Some pictures available [here](#).

AG underling the importance of representing the real assembling conditions also during the blank assembly tests. Specifically, he suggested to install the spacer around the CL helium flexible.

DFM

- Action #1: Follow-up DSHM-DFM installation study in the LHC tunnel (YL, PS)

PS showed the main plan and status of the study. The study is progressing. Some feedback to be shared with Amalia. PS will model PC's proposal about the routing and check if it improves the design.



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DFX

- Action #1: Production follow-up (YL)
Production on-going. Found issues with the helium bellows – they have been delivered with damages and, therefore, we need to reorder them. The order has not been placed yet. We don't expect to receive the new bellows before end of October (three months delay). **YL commented the bellow's order is done and there is a fatigue strength qualification campaign on-going. He expects to receive the bellows by end of November/ beginning of December.**

DSH (SC Link)

- Action #2: Reel procurement follow-up (MC)
Contract signed. MC is following-up the procurement. Delivery expected by November 2021 and test to be done by Q1 2022.
MC commented that in about two weeks we should know the exact delivery date of the ordered reel.
- Action #3: Reel design validation (PC, MC)
PC, MC and Erik Richards agreed to perform a test on the existing spool. The test is foreseen to be performed in early September. MC underlined the need of reducing the spool speed and adding a brake to keep constant the cable's tension. The objective is to test how the spool is performing and to see how the cables behave during the operation.
Dedicated presentation from Erik Richards about the SC Link transport operations, available [here](#). **MC commented that there are still some parts to be manufactured for performing the test. According to the current schedule the test is foreseen to be performed in two weeks. RB will help MC with the manufacturing of the parts at the AP.**

DFLH (Current Leads)

- Action #2: Production follow-up (RB, PC)
PC underlined the need of arranging regular meetings with Pierre Moyret (EN-MME, in charge of the CL production planning) to identify any potential stopper/issue in the manufacturing in order to ensure on-time delivery. PC underlined that as baseline they will arrange regular meeting to follow up the progress. PC mentioned that at a certain point would be useful to invite Pierre Moyret to come to SMI2. **PC stated that all the CL are foreseen to be manufactured by the end of the year.**
 - ~~PC to contact Pierre Moyret to discuss and agree on the best collaborative way to follow up the CL manufacturing.~~
- Action #4: Review models and integration of CL's transformers boxes (RB, AG)
Transformer's boxes have been modelled and integrated in SM18/Tunnel. RB confirmed that the concept is done and the space is defined. They need to design also the dedicated supporting frame. RB and AG will have a dedicated discussion before starting the detailed drawings. RB pointed out that the design responsibility is still to be defined. RB underlined there are still some points from integration to be addressed.
RB mentioned that for him is not clear the final arrangement in the machine. AG confirmed that for the machine this point is still under discussion. AG underlined that we can proceed



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with the design activities for cluster F. He also stressed the urgency of the frame design. PC suggested to have a dedicated meeting with RB and AG in front of the models to converge on the remaining points.

Cables & Splices

▪ Action #1: Splices & tooling design (RB, FP, PS)

FP confirmed that the design activities are still on-hold. FP and RB are waiting for Jerome Fleiter/Julien Hurte feedbacks before finalizing the design. FP confirmed the design activities have been re-started and he is progressing on the DFX. **FP stated that the DFX splices have been designed. They are now working on the insulation. They will then move on the DFHX splices.**

▪ Action #2: Design splices anti-pulling system (PC, RB, FP)

A first meeting was held to initiate the discussion. During the meeting Julien Hurte raised uncertainties concerning the actual flexibility of HTS. PC underlined the need of arranging dedicated recurrent meetings to follow-up these activities. As a starting point, a summary table of the HTS cable's requirements is needed. This action is currently on-hold because PC underlined the need of Jerome Fleiter (on holiday) to progress. **PC suggested to conceptualize the system by taking advantage of the DFHX blank assembly.**

- ~~PC to prepare an action plan to be then shared with Amalia Ballarino and Jerome Fleiter. The action plan will be circulated to the team.~~

2. AOB

- ~~YL requested to discuss the nominal position in the LHC tunnel of the DFX's top plate.~~
 - a. ~~PC underlined that the objective is to make sure that everyone is using the same origin and coordinate system. MRC mentioned he is waiting for comments about the SCLink extremities from Marian Gonzalez and Stephane Maridor and he expects to receive them by end of next week.~~ **All the information have been sent to Marcin, we can close the point.**
- PC mentioned they are working on a document – “TE-VSC Contribution to WP6a” – concerning the vacuum instrumentation configurations in WP6a, which will also underline the impact of the vacuum barriers on the vacuum instrumentation. **PC underlined that the document has been updated so as to include all the related costs. Concerning the vacuum barrier AB wants to keep the VB until the test to decide then if we can modify or not the function of the VB.**
- PC asked about the leak test configuration in AP. PC underlined that we would need to ask to AP formal leak test reports.
- **YL had a discussion with JF about the cable's configuration in the DFM. The current “S” shape seems not suitable anymore. They will twist the cable forming a pre-S shape ending up with the same layout we have in the SCLink.**
- **They have restarted the design modifications on the DFX fixation system. Stefanos Spathopoulos is working on it. YL needs to clarify with DO the need of the spherical joints and what was the plan when they designed it.**



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Next Meeting: 30th of September 2021**Prepared by:** F.Di Ciocchis**Date:** 29-09-2021**List of actions:**

| N. | Action | Owner | Due date | Status |
|--|--|------------------|----------|---------|
| DFH | | | | |
| 1 | Follow-up weld qualification campaign | FdC, YL, RB | | Ongoing |
| 2 | Finalize feet design ensuring compatibility with installation sequence | RB | | On-hold |
| 6 | Flexible's tests follow-up | YL | | On-hold |
| 7 | IFS flange design validation | YL | | Ongoing |
| 8 | Blank assembly follow-up | FdC, YL, MRC, AJ | | Ongoing |
| DFM | | | | |
| 1 | Follow-up DSHM-DFM installation study in the LHC tunnel | PS, YL | | Ongoing |
| DFX | | | | |
| 1 | Production follow-up | YL | | Ongoing |
| DSH (SC Link) | | | | |
| 2 | Reel procurement follow-up | MC | | Ongoing |
| 3 | Reel design validation | PC, RB, MC | | Ongoing |
| DFLHA/ DFLHB/ DFLHD (Current Leads) | | | | |
| 2 | CL production follow-up | PC, RB | | Ongoing |
| 4 | Review models and integration of CL's transformers boxes | RB, AG | | Ongoing |
| Cables & Splices | | | | |
| 1 | Finalize splices & tooling design | RB, FP, PS | | Ongoing |
| 2 | Design splices anti-pulling system | PC, RB, FP | | On-hold |

