

Minutes and Actions of
Module Loading Feedback (MLF)
Phone conference – 25th of July 2005
& Site Qualification Task Force (SQTF)
Phone Conference – 28th of July 2005

Module Feedback Meeting – MLF
25th of July 2005

Present: A. Andreazza, G. Darbo, J.C. Clemens, W. Dietsche (?), M. Garcia Sciveres, F. Hügging, K. Reeves, J. Walbersloh, W. Walkowiak (+ somebody joining later).

CPPM.

There are 43 modules available for loading in addition to the 13 needed for the current loading stave: S4086.

Out of the 43 modules there are 10 that need to be qualified. There are 4 staves that are fully loaded, tested and with "collars" ready for integration: S4098, S4041, S4097, S4096 (for this survey is still missing).

Stave S4091 have been shipped to CERN to be then sent to Bonn for MCC's repair. Next stave will be loaded next week: 3 bare staves are available with collars, but corroded(S4057, S4059, S4052). They will be cleaned before loading. Other 6 modules have been shipped today from Siegen.

Genova.

Stave no. 16 is currently under loading. There are 17 modules ready for next staves and 6 under test. Several more under assembly. The module testing is still the bottle neck for the production in Genova. Modules will be shipped next week to LBL, as agreed, for speedup in testing. LBL needs type0 cables. Three type0 cables will be sent form Bonn to LBL. Bonn has prepared 60 FlexMCC that will be shipped this week to Genova.

Wuppertal.

There are 35 modules ready for loading in Wuppertal. Current stave is S4064.

LBL.

Sector loading started again last week after 3 weeks shut down due to missing bare sectors. No problem with module availability.

Site Qualification Task Force - SQTF

Present: A. Andreazza, J.C. Clemens, G. Darbo, F. Djama, K. Einsweiler, M. Garcia-Sciveres, M. Gilchriese, D. Giugni, F. Hügging, V. Kostyukhin, G. Lenzen, A. Rozanov, E. Vigeolas, M. Zdrazil.

Module Loading Site Qualification TF - SQTF

Agenda

1. Update on Stave Loading/Qualification with status of stave reworking (delamination clamp, corrosion, MCC rework, etc).
2. Module buffers for the stave loading sites.
3. Update on Sector loading.
4. Bares stave inventory and related issues. (Vadim + contributions)
5. Corrosion update and actions (Eric and Sasha)
6. Delamination fix, bare stave fix (Danilo) and update on S4030. Next steps.
7. More on thermal cycles.
8. Restarting of stave/bi-stave activities at CERN (Danilo)
9. Tooling: pipe cooling extensions, etc.

1. Update on Stave Loading/Qualification

CPPM reports that they finished loading stave #13 (S4086). They found that the previously loaded stave (S4096), during qualification tests at $T = -10^{\circ}\text{C}$, has a module (510475, M1C) with a FE chip (FE#10) no longer working in digital scan. No MCC errors, no errors on registers (FE chips can be correctly configured as far power consumption can tell) but no hits back during scan.

Increase of the temperature to $+15^{\circ}\text{C}$ brings the FE chip back to work. A value of the temperature between the two values gives intermittent functioning of the FE chip (the hits in digital scan progressively increase when temperature approach the highest value).

The malfunctioning could be due to wirebond failure on the FE chip.

Action: The stave will be sent to bond for FE rebond. If this doesn't solve the problem the stave will be qualified with a not working FE chip.

There are 3 staves with delamination clamp, that have been leak tested, (4050, 4051, 4061, one has "yellow flag") available for loading.

There are 48 modules available for loading. All of them are not encapsulated: 20 L1/2-ranking, 18 B-layer and 10 to be qualified.

Genova reports that last loaded stave (No.16, S4065) was found to be not parylened. A total of 5 staves have been found without parylene: 1 loaded and 1 bare in Genova and 3 bare in Marseilles. The next stave to be loaded in Genova will be S4044, this has been tested for leak and has delamination clamp applied. The delaminated stave (S4030) that was fixed at CERN with the clamps has been tested back in Genova. The result plots of the thermal resistance and of the dead pixel are in fig.

http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-07-28_aux/S4030_BeforeAfter_DelFix.pdf

The first plot shows that the thermal resistance for the first two modules remains higher. The number of dead pixels in the second plot did not change significantly for all the modules but M6C where the number doubles (from ~200 to ~400 dead pixels). This is known to happen for AMS modules when even not very intrusive manipulations are made.

Action: it was decided to put the clamps on 2 Genova staves at CERN: S4016 and S4024. An electrical test will be performed afterwards to check for no damage occurring.

Wuppertal reports that they have loaded their 13th stave (S4040). They have 3 staves ready to be loaded with clamps and a 4th one in on the way to Wuppertal.

A total of 42 staves have been loaded up to now. Summary information is available in: http://www.ge.infn.it/ATLAS/SQTF/StaveProduction/Summary_All_050728.xls

2. Module buffers for the stave loading sites

CPPM has 48 modules available for loading: 20 of L1/2 rank, 18 B-layer and 10 to be qualified. All of them have the MCC not encapsulated.

Genova has a buffer of 18 modules qualified for next stave: 10 of L1/L2-rank, and 8 of B-rank. Also Wuppertal has a module buffer for several staves. Genova will send to LBL some modules to be tested at the beginning of next week.

3. Update on Sector loading.

Marian reported that 33 sectors have been loaded and qualified. The results are available in: <http://www.ge.infn.it/ATLAS/SQTF/SectorProduction/Sectors.xls>.

Marian also reported of the thermal cycles performed on Sector S9025 with MCC encapsulated “a là LBL”. After 225 thermal cycles + 1000 power cycles there are 3 MCC related module failures. More details are explained in an email from Marian (http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-07-28_aux/Marian_email.rtf) and in a presentation he prepared (http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-07-28_aux/LBL_MCC_failure.pdf). The defective sector will be shipped to Bonn for MCC rebonding. It is not decided whether to perform rebonding of all the sectors with encapsulated MCCs. In case of rebonding work, it must be considered if this can be made in LBL, with the risk of killing 10÷20% of the MCC's (rate measured when MCCs were bonded in LBL), or in Bonn.

4. Bares stave inventory and related issues.

Vadim reported that his work of bare stave inventory is almost completed and PDB information is consequently updated. There are 4 staves that are still missing and their location is unknown. Vadim prepared a spreadsheet where he collected all the information about the staves:

http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-07-28_aux/StaveStatus_050728.xls

Sasha, during the revision of the staves found that 17 staves out of 124 were not sent to the parylene deposition for the following reasons:

- a) yellow/red staves

- b) staves not yet delivered to CPPM
- c) errors in the accounting

Some of the staves were reclassified recently from yellow to green without the check on the parylene. Unfortunately we do not have the full list of them (3 are at CPPM, 2 at Genova; see section 1 above).

Five of the last 20 staves sent from Genova to Comelec for parylene coating lost the staff ID written with a supposed permanent ink on the staff pipe. Identification was then obtained by matching the cap numbers with staff numbers in the database. Also 5 ruby balls of 3 staves went off.

5. Corrosion update and actions

Marseille is working on the cleaning procedure for corroded aluminium pipes. They estimated that about 2 weeks from now would be necessary to setup the procedure and to instruct a technician. The cleaning of all staves will be done at CERN. Also pipe leakage test will be performed at CERN. Danilo reported that 17 bare staves have been tested for leakage and two were found faulty. In both cases inspection showed a mechanical damage and not a direct prove of corrosion fault. A photo of one of the leaking staves is shown in http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-07-28_aux/PipeLeak.JPG; the damage is circled in red. Also 3 loaded staves have been leak tested and one is faulty (S4055 from Wuppertal). In this case corrosion seems guilty even if evidence is not very strong being the leak detection not very sensitive to position of the leak. It is very dubious if a leaking staff can be repaired. Danilo suggest that epoxy glue of proper viscosity could be used for such repairs.

After the scaring news of leaking staves, it is felt that all staves must be kept in dry places in the shortest time. Genova already keeps loaded staves in a dry nitrogen container and they are preparing a box with dry air for bare staves. Addition of silica gel and sealed bags filled with nitrogen should be an even better way of keeping low humidity. Also cups must be removed to avoid trapped humidity in the pipes. All the sites are requested to follow procedures to keep very low humidity (~few percent).

Another problem is the flaking nickel inside the pipes. This must be removed, but unfortunately it removal is made more difficult by the depth of the nickeling in the pipes that sometime reaches the 5 cm.

6. Delamination fix, bare staff fix and update on S4030

Delamination fix is going on at CERN, all the bare staff will be fixed. Other 72 collars made in Genova will be shipped tomorrow. For test results on fixed S4030 staff see section 1.

7. More on thermal cycles.

A final report on the thermal cycles performed on the system test staff (S4079) in Marseilles is available by Patrick: http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-07-28_aux/Burning_Report_Staff4079.pdf.

Both LBL and Genova MCC encapsulation show that they are not completely immune to glue delamination and wirebond breaking, even if the failure rate is by far lower. It is not decided what to do with such staves and sectors.

8. *Restarting of stave/bi-stave activities at CERN.*

Danilo reported that the tooling necessary for half shell skin cut-outs would be available next week. IVW will be at CERN the week of 8/8/2005 to make the modifications to the half shell. The same week Wolfgang will be at CERN to restart the cabling of the staves. Danilo has prepared some clips made by 3D fast prototyping as possible option to fix the pigtailed to the stave omega. Planning for restarting integration at CERN is not defined yet.

9. *Tooling: pipe cooling extensions, etc.*

Nothing to report.

Next SQTF phone-conference: Thursday 11th of August at 17:30.

Next MLF phone-conferences: Monday 1st and Monday 8th of August at 17:15.