

**Minutes and Actions of
Module Loading Feedback (MLF) &
Site Qualification Task Force (SQTF)
Phone Conference – 3rd of June 2005**

Present: A. Andreazza (MLF only), G. Darbo, K. Einsweiler P. Gerlach, D. Giugni (SQTF only), C. Glitza, J. Grosse-Knetter, F. Hügging, V. Kostyukhin, A. Rozanov (SQTF only), D.B. Ta, E. Vigeolas (SQTF only), W. Walkowiak.

Excused: J.C. Clemens, M. Garcia-Sciveres, G. Gilchriese, M. Zdrzil.

Module Loading Feedback – MLF

No special thing to report from Loading Sites to Module Assembly Sites due to stopped activity on staves and absence of key LBL persons. Modules with no MCC potted are available for restarting stave production. Marseilles has none, Module Task Force next Monday must select some to be shipped to CPPM. Giovanni did some qualitative test on potting dummy MCC and trying the subsequent polymerization by a flood high intensity UV lamp (like the one used in Bonn) and with a spot lamp (like the one still now used in Genova). Adhesion on MCC is poor in both cases, but the flood lamp polymerizes the glue completely and makes it stiffer. In case of spot lamp the surface of the glues remains softer. Can this make the difference for the thermal cycles? More test are going on. Wolfgang asked to move the MLF phone conference to a different day of the week because Thursday is usually dedicated to the Physics Colloquium. We decided to move the meeting on Monday morning at 17:15 before the Module Task Force phone conference.

Module Loading Site Qualification TF - SQTF

Agenda.

1. Update on Stave Production/Qualification and news from laboratories.
2. MCC potting: thermal cycling of stave 4079 in CPPM
3. Stave storage and transport boxes
4. Pipe cooling extensions, Cap Removal Tool, replacement of aluminium caps.
5. Stave delamination: testing of good staves (GE/PPM), fastener fix (Danilo).
6. Restarting of stave/bi-stave activities.
7. Documents: production tables/plots, qualification documents, checklists.

1. Update on Stave Production / Qualification

No update received from the loading/testing sites. Eric said that he succeeded in reducing the bow of modules loaded on stave by 50 % on dummies. He has modified the pins on the robot head and he also ordered

2. MCC potting: thermal cycling of stave 4079 in CPPM

Jean-Claude circulated a report on the thermal cycles made on the system test stave in CPPM. The stave under test is the 4079. The test was decided to extensively test MCC encapsulation on Genova and Bonn/Siegen/Dortmund modules. Encapsulation has been added on 3 German modules. The stave has been stressed by 30 cycles (-30, +30) made with a chiller, followed by 10 “thermal shocks” (from +20 to -25 deg, with a 100 deg/min slope) by evaporative cooling. No change seen in the module behaviour.

After an additional series of 14 thermal shocks one module shown the typical behaviour of broken MCC wire-bond: FE#8 did not respond. The module is a Bonn module where potting was added in the corners to improve glue adhesion. More details are in Jean-Claude report:

http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-06-03_aux/Rapport_cycles30052005.pdf

The plot of the last 14 thermal shocks is:

http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-06-03_aux/20050602-14cycles.jpg

and a zoom in of the last cycle:

http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-06-03_aux/20050602-lastcycle.jpg.

The module M6C, that got a broken wire-bond, is the one with the orange curve. The temperature excursion for this module is reduced by stave delamination (+20/-22°C).

It looks more and more that the adding of pot glue does not fix the MCC wire-bond problem. It may be necessary to remake the wire-bonds on all the Bonn(/Dortmund/Siegen) MCC's. The implication is heavy on those labs and must be quantified in the module task force.

3. Stave storage and transport boxes

Eric looked into metal boxes to use to transport staves. The box is 1000 x 80 x 80 cm³ and has holder for the cradle. The box is a custom design and it will cost 145 €/pc in number of 20 or more (from SARL Gi-meca). He has ordered 2 for evaluation that should be ready in two weeks. If the box is satisfactory, Genova and Marseilles will use it to transport staves.

For storage at CERN or in Genova and Marseilles the cheaper cables trails made at Genova are good enough. Danilo does not like the transfer from the metal box to the cable trail, seeing a risk of damage for the stave. Eric and Giovanni consider the additional operation not risky and worth the saving in buying a larger quantity of metallic boxes.

4. Pipe cooling extensions, Cap Removal Tool, replacement of aluminium caps.

Pipe cooling extension. The fittings made by Eric have been sent to Genova and Wuppertal. The changes requested are the replacement of the metal bolts with plastic ones (to reduce the stress on the stave pipe thread and the weight) and to use a more flexible extension (silicone pipe). Eric will look for both. The idea is to put the fitting on

after module loading and survey using the “*cap removal tool*”. The fitting may be used also for bi-stave test if they are proven to be leak free.

Cap removal tool. Seen the weakness of the staves to sustain torque on the pipe, a tool that permits to apply stain relief on it is considered essential in every operation of screw/unscrew of parts to the cooling pipe. Danilo has circulated drawings for such a tool. It looks to be a reasonable design; one of each must be made for the 3 loading sites and also for CERN. We need soon such tools. A first evaluation made in Genova of the time needed to produce one in house is of about two weeks. Eric has also asked in his workshop. Alternatively can be produced outside, even if is not clear if can be faster and at what price. Drawing of the tool is at:

http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-06-03_aux/CapRemovalTool_1.0.pdf

Two computer generate rendering of the tool are:

http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-06-03_aux/Cap_Removal_Tool_1.bmp

and:

http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-06-03_aux/Cap_Removal_Tool_4.bmp.

Aluminium cap replacement. Eric found that plastic caps used for protect optical fiber connectors have the same 8 mm diameter size as the aluminium caps. The proposal is to put them on after parylene coating. They looks fine and we accepted them. Eric will probably have them for free. Photos of the caps are:

http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-06-03_aux/RedCaps_1.JPG

and:

http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-06-03_aux/RedCaps_2.JPG.

5. Stave delamination: testing of good staves (GE/CPPM), fastener fix.

Vadim reported on the delamination test he made on 37 staves: 10 after “joule test” and before machining and 27 after machining. He applied 1 kg force by a weight suspended on the aluminium pipe. He checked by microscope for delamination: none seen!

The 1 kg was chosen being of the order of ½ of the delamination force measured by Eric on few stave samples (see:

http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-06-03_aux/DelaminationInvestigations.pdf).

The results from Vadim test are:

http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-06-03_aux/DelamGE_1kilo.pdf. This result is comforting, but we still have to remind that pipes are very sensitive to torque as Eric found to be enough 0.3 N/m to produce delamination! (see:

http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_05-06-03_aux/StaveTorqueResistance.pdf).

Danilo reported on the status of the delamination fix he is applying to a delaminated stave in CERN. He received the peek collars from Genova, he grinded the conductive glue on the backside of the TMT, he bored the 1 mm holes in the TMT+Omega without problem and he tried to screw the two peek collar. Next week he has to test the procedure of glue deposition between Omega and peek (thru two holes in the peek collar? Or by some alternative solution). After repair the stave will be sent to Marseilles to do pull test and compare the strength of delaminated with integer side. If the fix works it can be considered for strengthening of all bare staves and not only to repair delaminated ones. It is not clear yet how to do the fix for loaded staves and there is also no concordance of opinion whether the fix must be applied to all loaded staves or only to the two that shows delamination. Impact of this decision is also on the schedule of bi-staves and half shell

loading. Another test that is necessary is the measure of the thermal conductivity after applying the fix to a delaminated stave. This will be done on a second delaminated bare stave after repair. Danilo wants to keep on hold the production of more collars until he has terminated the test.

6. Restarting of stave/bi-stave activities.

The discussion on the restart of the stave loading was divided by who is in favour of restarting loading before ID week (Giovanni, Eric,...) and who wants to qualify the fix and start with reinforced bare staves (Danilo,...). The argument of who is in favour of restart soon being that the schedule is now very tight, looks difficult to produce more than a stave/week per site, and we have in any case already 26 loaded staves that we must use in the detector and a few more made do not change the solution of the problem. Other worries are the time required to qualify the fix that may be longer than a couple of weeks. The persons in favour of the complete qualification are worried that we may have to apply a delicate fix to more staves. Finally the consensus was on starting again loading the week of Monday 13th of June. No decision on resuming bi-stave and half-shell activity.

7. Documents: production tables/plots, qualification documents, checklists.

Marseilles has in his draft version the qualification document on the analysis of the first 5 staves loaded. They will circulate it for comments. Danilo will give an EDMS reference to it.

Next SQTF phone-conference: Thursday 16th of June at 17:30.

Next MLF phone-conference: Monday 13th of June at 17:15