

Minutes and Actions of Site Qualification Task Force

Phone Conference – 13th of October 2004

Present: G. Darbo, (G. Gilchriese), M. Garcia-Sciveres, D. Giugni, P. Gerlach, F. Huegging, (V. Kostioukhine), L. Rossi, E. Vigeolas.

CPPM: Toward the pre-production stave.

Eric reported that before the loading of the pre-production FE-I3 stave (S4013) they did some tests of positioning accuracy by loading 5 bad-quality modules on a stave. The results were in $\pm 40 \mu\text{m}$ in Z, X respect to nominal. For X the suspected reason is a bow of the long movement slide that probably has a bow that is translated in a rotation of the stave respect to the loading robot head. For Z the cause is the sliding of the module when this is turned by 90° to apply the glue on stave. A test made on a module by vacuum aspiration, turning it by 90° and then placing it again in garage position showed $25 \mu\text{m}$ displacement from original position. The loading procedure has been modified by placing again the module in the garage position while glue is applied (module is never rotated by 90°).

FE-I3-module loading is started on the pre-production stave; 1/2 of the stave is complete. More investigation has been made to understand the failure of one module on the S4000 stave. This module had already a chip not configurable anymore after loading on stave and complete control of the module is now lost after thermal cycles. From connectivity (resistance) test on DCI/DTO/CK lines it is excluded a wire-bond damage on those lines. If this stave would be a production one, this module has to be considered for MCC or complete module replacement. CPPM will make an exercise test of module replacement.

Genova: Report on pre-production stave.

The S4004 pre-production stave loaded last August in Genova has two problems: one FE chip not responding and out of tolerances in Z of module position for one half of the stave. The stave, after completion of the electrical/thermal test has been taken off the cold box. A visual inspection didn't show any damage of wire-bonds for the module with faulty FE chip. A production stave with a single faulty FE chip may be accepted for the outer layer. Genova has not developed experience in removing potting glue and remaking wire-bonds on stave yet. Repair of this stave will be not made for the moment.

Vadim reported on the possible sources of errors in positioning of the modules in Z. The causes considered are:

1. Initial Z tuning was not symmetrical: position of M6C was at $400 \mu\text{m}$ from step, position of M6A at $500 \mu\text{m}$ from step. A more symmetric tuning ($450/450 \mu\text{m}$) would have reduced the offset of $50 \mu\text{m}$. In future the initial Z tuning will be made by symmetrization of the 4 step-module distances: M6C, M1C, M1A, M6A. (note: or use of only M1A/M1C that are the ones used to define the load reference system?).

2. Temperature effect is suspected to be cause of error (Al has thermal expansion coefficient of 23 ppm). A test has been made by changing the room temperature while keeping a dummy sensor (aspirated by robot head) on top of previously glued dummy sensor on stave. Measurement of displacement has been done with a microscope with a 10 μm reticle. Up to 22 $\mu\text{m}/^\circ\text{C}$ has been observed when stave is screwed on both sides on cradle. Unfortunately this effect does not explain the sign of the error in Z that is opposite to the one observed. In any case the temperature effect can contribute to the error in the positioning. Because room temperature stabilization is not possible with available cooling system, temperature will be monitored by digital thermometer and modules will be applied all at the same temperature.
3. Another possible source of error is the bad positioning of the module in the garage position. The module sensor has to be placed in contact with a pin in the garage position. This pin is hidden by the flex hybrid expanding from the sensor short edge and in case of glue (used to glue the flex) overflow it may not be in contact with the sensor edge. An error on this positioning is reproduced as an error on stave. A piece of silicon with metal pattern (part of a sensor) has been glued on the garage module table. Microscope will be used to control the alignment of module FE chip pads with respect to the piece of sensor.
4. Another point (not in the ones considered by Vadim) that may explain the error could be the module slip observed in CPPM. The slipping is in the correct direction to explain the effect seen in Genova. A test will be performed in Genova the next days.

Copy of the results presented by Vadim can be found on the WEB at:

www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_04-10-13_aux/Check.ppt

A.o.B.

Overflow in discussion time of the former items did not left time to talk of the other points in agenda and in particular of LBL and Wuppertal. Next time we will reverse the order of site presentations.

Eric reported that he received the SE4445 glue and that it is already half expired having production date Jul '04 and so expiring in Jan '05. Maurice commented that he was lucky because he received already expired glue! In any case it seems not easy to have not expired glue in the 4 sites for the next year and half of production. Eric will study the best options.

Vadim has to send bare staves requested by CPPM. In addition Eric asked about the need of bare stave box he has in CPPM.

Next phone conference: Thursday 21st of October 2004 at 17:30

Draft Agenda of next meeting:

1. LBL: report on 2 pre-production sectors + status of initial production.
(Please LBL send updated results from the loaded sectors before the meeting)
2. Wuppertal: short update on Stave 2020
3. Genova: results from "module slip" in the robot head, discuss qualification to initial production.
4. CPPM: update on the first pre-production stave
5. Survey: what measure and how to do it. An introduction from Vadim and a
f i r s t d i s c u s s i o n .
(till now the effort on survey was in the direction of understanding that loading process is correct, but we must also make sure that the survey is able to give the necessary geometrical data will be used in the alignment of the detector)
6. Cooling issues for test.