

Collimator Design Meetings

Minutes of the meeting 47 (29/10/2004)

Present: Aberle, Assmann, Bertarelli, Calatroni, Chiaveri, Dallochio, Kadi, Losito, Mayer, Perret

Minutes # 46: No comments were given on previous minutes.

REPORT FROM VISIT TO TATSUNO/ ACROSS (MANFRED)

1. Manfred reported on his visit to Tatsuno/Across plant in Japan. The outcome is globally very positive and the impression is that this firm can easily handle the manufacturing of the required jaws. Details were given on the manufacturing procedure.
2. It is worth noting that to reduce the electrical resistivity more prolonged high temperature cycles have to be performed and this normally leads to a decrease in the C.T.E. and, possibly, mechanical properties. A trade-off must then be found between these requirements. More details can be found in the attached document:
3. Delivery time was confirmed in 3 months (including machining) in a single batch.
4. Required tolerances were basically accepted for the jaw clamped on a marble.
5. Each delivered lot will be accompanied by a Conformity certificate.
6. The Geometrical Reference System defined by the C/C manufacturers is different from that adopted for the collimator blocs. In order to avoid possible confusion, the manufacturer R.S. will be adopted.

REPORT FROM VISIT TO CARBONE LORRAINE

1. On October, 28th Alessandro, Oliver and Raymond visited Carbone Lorraine to assess its capability to supply required jaws in graphite or C/C.
2. From the technical point of view, CL seems to have the capabilities to produce graphite jaws with the required specification, while CL C/C (a 2D continuous carbon cloth) characteristics are not in line with what we require (in particular for mechanical and surface roughness properties)
3. The delivery times required by CL are very long: for a single production lot (~80 pieces) 4 months including machining for graphite and 50 weeks for C/C.
4. High density graphite ($\geq 1.9 \text{ g/cm}^3$) is not produced by CL

REPORT ON COLLIMATOR TESTS IN SPS (RALPH)

1. Ralph reports on the outcome of tests in LSS5. Unfortunately scheduled tests in TT40 were postponed to November, 8th due to a problem triggered by an extraction septum magnet malfunctioning. Test results in LSS5 are still being analyzed, but everything seems to have worked fine and according to expectations. Detailed results will be given in next Collimator Working Group meeting.
2. It looks like RF higher order modes are excited in the collimators leading to some material heating. It was proposed to add some absorbing material in the collimator (Ferrite), but this doesn't seem compatible with current design.

THERMO-MECHANICAL CALCULATIONS WITH DIFFERENT JAW MATERIALS (ALESSANDRO B., ALESSANDRO D.)

1. A.D. presented the results of the thermo-mechanical analysis for the steady-state case with two different load cases (Old Fluka simulation and new Fluka simulation) and two materials (C/C AC150K and graphite R4550), whose properties were experimentally measured.
2. Results for these load cases are globally acceptable though graphite shows a better behavior for displacements. A new added contact gasket between clamps and main beam gave very positive results: this component will be adopted for the series design.
3. New Fluka distribution worsens the displacement pattern for both materials, but, most of all, leads to a higher heating of the metallic parts (the hot spot being much more inward) with possible undesirable consequences for springs, RF contacts etc.
4. The transient load case is still being analyzed, but first results seem to predict a much higher deflection than with old energy distribution. If this is confirmed a detailed assessment shall have to be done to check impact on beam performances (action Ralph)

5. Given the new energy distribution pattern, a new Fluka simulation has to be done also for the 7 TeV accident case (**action** Vasilis)
6. Detailed results are given in [ADalocchioCDM291004.pdf](#)

SERIES DRAWING STATUS

1. TCDI: the design phase is now stopped since all details have not been defined for connections, plug-in, mounting position etc... Design activity will be restarted as soon as these informations will be supplied.
2. Roger presented a new lay-out for the various collimator positions. It allows an easier access and handling.
3. Roger presented as well the drawings of the RF test bench which is under manufacturing, but will not be ready before end of November.

AOB

1. Given the long lead-times of Glidcop, a decision on pipe materials has to be taken ASAP. A visit to LNI to check for possible material alternatives will be organized by next week.
2. A data-base giving information on each single collimator item, including material, supplier, responsible etc will be prepared by next week (**action** Oliver)
3. Shielding issue: based on latest decisions, Ralph / Oliver confirms that no shielding is necessary for the collimator.
4. Sergio informs that a test to braze a 40 μm Cu plate onto graphite has been successfully conducted. This could help for the RF contact issue.

ACTION LIST to be followed up:

Divisional request for motors MS	#31	Oliver, Fabrice, Stefano
"Plug-in" position control unit	#32	Roger, Fabrice
Drilling holes after phase one – grooves in tunnel floor	#33	Oliver
Contact fingers – model for tests top and side	#34	Sergio, Roger
Play between motor spindle and jaw	#34	Roger
Non-symmetric heating of vacuum flanges	#34	Vasilis, Oliver, Miguel, Rathjen
"Remote control" collimator exchange	#35	Keith, Roger
Radiation issues – heat evacuation, air duct, space, shielding		Ralph
Electrical plug-in	#36	Oliver, Fabrice, Roger
Preparation of all raw-material list and order (URGENT)	#40	Oliver, Raymond
Detailed information on electrical plug-in and sensors (URGENT)	#45	Fabrice, Roberto
Detailed information on water plug-in (URGENT)	#45	Manfred
New Fluka simulation for 7TeV accident case	#47	Vasilis
Collimator item data-base	#47	Oliver