

Minutes ITS engineering meeting 16 July 2002

Summary

Corrosion

Start of tests of tubes, documentation of the study required.

Production thin walled pipes

Production tests at one firm, results expected around September.
We need to look for alternative manufactures.

Tests of thin walled tubes

Further tests needed for recognising local defects.

Cooling sub detectors

SPD will use C₄F₁₀ as coolant.

Cooling services

Services on the muon plug will be put in cooled cable trays.
For the cone array more study is necessary.
Cooling of services should be seen as separate cooling problem.

Air cooling

A strategy should be developed for the air flow for the ITS.

Services

The data base is online at
http://est-div-lea.web.cern.ch/est-div-lea/its_services
Preliminary design patch panel each sub detector for next Alice week.
Bus bar development is still ongoing

Beam pipe support

1st support point at 640 mm from IP (RB26)
2nd support point proposed at 1100 mm from IP (RB24)
3rd support point proposed at 2700 mm from IP (RB24)
First natural frequency (60 Hz) of support will be difficult to attain.

Space frame

All services will be connected to the space frame at RB24, requiring a patch panel at both sides of the space frame.

Installation

The regenerating of the NEG coating in the beam pipe might require a yearly de-installation of the SPD.

Alignment

Position monitoring of the muon plug relative to the ITS was requested for the beam pipe monitoring.

Action points

Document regarding corrosion, cooling fluid and tests thin walled pipes.

Jarl Buskop due at the next Alice week.

Simulation effect localised material cooling pipes.

Flavio Tosello, simulations group, first simulations not before
½ September

Document regarding the power dissipation in the services.

The document has to be integrated in the cooling document.

Jarl Buskop, Beppe Giraudo, Adriano Pepato, due at the next Alice week.

Design patch panel segment.

Jarl Buskop, Beppe Giraudo, Adriano Pepato, due at the next Alice week.

Procurement document thin walled pipes

Draft version at next ITS week

Person to be appointed after coordination with Flavio Tosello.

X-ray test thin walled pipes

Jarl Buskop, due at the next Alice week.

Sketch beam pipe support

Gerhard Schneider, due at the end of July

Sketch to be transferred to Luciano Simonetti for detailing.

Main points meeting

Corrosion

Tests of the thin walled pipes are about to start at the external company, first results are expected at the next Alice week. The study needs to be documented, see action points.

Production thin walled pipes, visit Medelec

The company is reluctant to produce the pipes as they are currently specified. The given tolerance on the wall thickness was seen as unrealistically tight ($\pm 2\mu\text{m}$). Proposed was to produce pipes with wall thickness of $50\mu\text{m} \pm 10\mu\text{m}$. Taking this as a start they will do some tests to see what they can produce. They expect to finish these tests around September after which we should have another discussion about what they could produce.

We are currently starting to look at other companies, for this the request should be based on the same drawings (tolerances). This drawing should be made available on a ftp location.

Testing of the thin walled tubes

The current proposal is to test the pipes by eddy current, helium leak test and the intention was to also do ultrasonic tests.

Ultrasonic tests do not give sufficient resolution there as an alternative the intention is to X-ray tests. Though first the resolution of the available X-ray equipment should be checked. (see action points).

Cooling sub detectors

It was confirmed that the SPD will use C_4F_{10} as coolant.

Cooling services

It is assumed that with an extra cooling circuit the heat of the services on the muon plug can be removed. An extra cooling line in the cable trays of the power supplies lines should provide the needed cooling. Taken this idea the available space on the muon plug will be verified. It has to be verified whether this idea can also be used at the RB24 side without too much influencing the PMD.

For the services in the cone region the problem is a little more difficult, as only a relative slow airflow can be used for cooling the services. Estimates for the SDD and SSD indicate that the temperature for the power lines would be approximately 10 K above ambient. The power density is the highest for the SPD, it was suggested to do a simple mock up test to verify the temperature of the power lines.

The cooling of the services should be seen as a separate cooling problem, which should also be documented. (see action points).

Air cooling

A strategy should be developed for the airflow true the detector. Given should be the inputs, outputs and the expected flow pattern. This should deliver a course understanding of the air flows true the detector. It is important that also the RB24 side is considered.

Services

The date base prepared by Pier Luigi Barberis can be found at http://est-div-lea.web.cern.ch/est-div-lea/its_services. The page can be best viewed with Microsoft Explorer.

To allow further progress on services layout work more detailed information is needed about the patch panels. The sub detector groups are requested to make a design of a single patch panel. (see action points)

Bus bars seem to be preferable alternative for the power supply. The main obstacle at the moment are the costs for prototypes, which is dominated by the cost for tooling. The current view is that the design of the power supplies needs to be more stabile before prototypes can be made. The idea is that incase the prototypes are good enough the same tooling can be used for the final cables.

Some links <http://www.busbars.com/>
<http://www.rogerscorporation.com/nv/busbarindex.htm>
<http://www.stormcopper.com/>
<http://www.methode.com/netbus/lambar.htm>

Beam pipe support

Lusciano Simonneti put forward a proposal for the support of the beam pipe. For the first support point there is an agreement with the vacuum group about the position of the support point (center of the support point at 460mm from IP). Gerhard Schneider should provide a sketch of the support of the beam pipe, which sketch will be further detailed by Lusciano, for the ring around the beam pipe a thickness of 15 mm and width of 15 mm are used. The stiffness requirements are then still to be verified by the vacuum group.

The second support point was proposed at approximately 580 mm from IP. It would be preferable if the third cone could also be used for the second support point, which in the current design would imply the second support point would be at approximately 1100 from IP, making the distance between the first and the second support point approximately 1560 mm (smaller then the required 1800 mm).

The proposal is to place the third support point at 2700 mm from IP. The distance between the second and third support point would then be 1140 mm.

It was pointed out that it might be difficult to find a compromise in terms of the needed stiffness for the beam pipe support and the extra material needed to obtain this requested stiffness (60 Hz first natural frequency of the third cone).

Space frame

The general installation at the RB24 side has been revised. An extra vacuum valve will be placed after the central beam pipe section. This would have no implication on the installation sequence of the ITS. Except that the valve would need to be supported from the rails. The ITS cables coming from the services support cylinder would be routed on the space frame, this implies we need connectors / patch panels and both sides of the space frame.

Installation

According to the view of the vacuum group it is most likely necessary to regenerate NEG coating inside the central beam pipe. The regeneration is done by heating the beam pipe to 250°C – 300°C. This would require the de-installation of the SPD, FMD, T0 and V0. Remark from Lars Leistam whether it really requires all the NEG coatings to be regenerated or the ITS section of the beam pipe can be left out is not clear and will only be known when the machine is operational.

Alignment

For the deflection monitoring of the bellow section of the beam pipe it is not necessary to monitor this directly at the bellow section. It would be sufficient if the position of the ITS is known in absolute coordinates, assuming also the absolute coordinates are available from the muon plug. As a check it was requested that the ITS also monitors its relative position to the muon plug.