

## **Summary of the Beam Pipe and Shielding Meeting from March 9, 2010 W.Z.**

Subject of the meeting was a review of the beam pipe protections for different opening scenarios. Boki provided a file with 6 typical opening scenarios which were used for different installation, repair and maintenance work in the past.

The file with the different scenarios will be uploaded to Indico page of this meeting.

**Scenario 1:** YE1 opened to 3.74m; all three endcap disks are placed close to each other. In this position is used to bake out the beam pipe. Access to the vactank is in principle possible, but will be only granted if the Surkov frame is installed. During bakeout no beam pipe protection will be installed, the beam pipe is covered by heating jackets. Access is permitted exclusively to personnel involved directly in the bake out. Outside bake out, a beam pipe protection is available for inside of the vactank. It is connected to the Surkov frame. In this configuration the beam pipe is supported at 10.6m from inside YE1 and at 6m, either from the vactank (spider or column support) or from the Surkov frame (column).

The connection, currently done with standard scaffolding pieces should be optimized with dedicated pieces that can be easily and quickly mounted and dismantled.

**Scenario 2:** The endcap is fully opened to about 10.4m. This scenario is used to install the Surkov table. For removal and installation of the pixel detector and any major repair work on the ES and/or EE, CMS has to be opened in this way. The beam pipe has to be supported at 6m and at 10.6m. The first one is done either with a column from the Surkov frame or with a spider support from the vactank, the latter one with column on the Surkov table or a column on a light support tower underneath the 10.6m flange. For the entire length of the beam pipe up to the vactank, protection exists, which is supported from the beam pipe supports. For the hopefully unlikely case that the “enfournneur” needs to be used again a protection has to be designed for the part of the beam pipe covered by it. (A Question that came to my mind afterwards: Is it true that the enfournneur does not permit the usage of the 6m support – in that case the beam pipe would be supported only at 10.6m?)

**Scenario 3:** YE1 is closed and YE2&YE3 are opened to 3.05m. The beam pipe at 10.6m is supported by a cantilevered support from YE2. The 6m support is a spider support inside YE1. This configuration allows access between YE1 and YE2 and has been used during the previous technical stop and in earlier shutdowns for last maintenance work prior to final closing. Currently the beam pipe can be protected only with a net. The design of a rigid protection will be investigated by Dan and Boki.

**Scenario 4:** YE1 open to 3.74m, YE2 close to YE1 and YE3 at 6.74m. The beam pipe is supported as in scenario 1. Outside the vactank the beam pipe does not need further protection. In this configuration the 13.6m pump is rather exposed. To comply with the ALARA principle a radiation shielding must be considered for this setup. Such radiation protection must be supported from YE2.

W.Z. will try to find out quantitative predictions on the radiation level of the pump. Dick and Boki will check possible fixations of a shielding support without interfering with TOTEM T1 truss fixations.

**Scenario 5:** Endcap fully open to 10.4m as in scenario 2, plus barrel wheels YB2 and YB1 in maintenance position. This is a favorite position for highly parallel DT work. In this setup the beam pipe is supported at 10.6m from inside YB2, which defines its position. A rigid, well supported beam pipe protection does not exist for this scenario. Hubert has developed a hanging support from the vactank, which extends above the beam pipe just up to 10.6m. It allows supporting the beam pipe and a light weight but rigid protection. The opening of the wheels is large enough that there are no limitations on their position if this support is used.

Hubert will provide the 3D model to Boki. A few questions need to be checked: compatibility with the Surkov frame, in both configurations – fully inserted and partly retracted. Load on the vactank and necessary rigidity of the structure.

Also for scenario 2 this support could be used.

**Scenario 6:** as scenario 5 but YE1 closed to 7.9m. In this configuration also some work on the endcap can be done in parallel. The support and protection issues are the same as for scenario 5.

---

**Comments are welcome!!**

**During the meeting I was not aware that next week will be CMS week. It is therefore practically impossible to find a room with EVO and I guess many participants want to attend a large variety of parallel sessions which will run all afternoon of March 16.**

**Therefore I propose to have our next meeting on Tuesday March 23 (this time it is really Tuesday) at 15:30. The room will be announced shortly before the meeting.**