XFEL DAQ infrastructure meeting

WP76

Minutes of the 21st May 2008 meeting (Revised 22.5.2008)

1. Present

IG (Ingeniers Gemeinschaft): Per Dost
XFEL: Walter Graeff, Andreas Schoeps and Christopher Youngman
XFEL/WP-73: Liubov Samoylova.

2. Aims

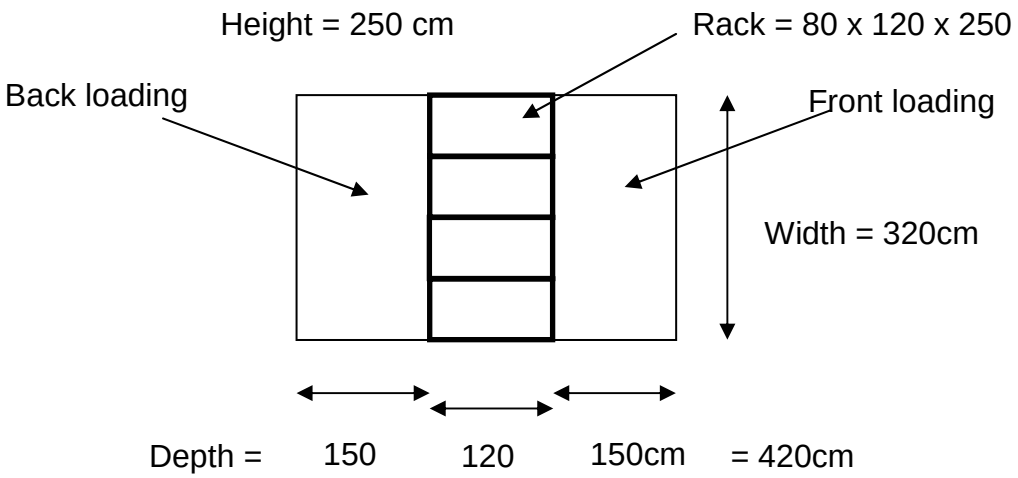
Review the actions list in the conclusions of the 23.4.2008 meeting minutes (EDMS D00000001112121). Identify any other issues before producing a final summary.

3. Actions from 23.4.2008 meeting

1) A plan of the floor space required for the end point switch racks in the underground hall needs to be made. This needs to be checked with the other XFEL groups like T.Tschentscher. When accepted the space needs to be reserved, appear on official plans, so that it cannot be used by other groups.

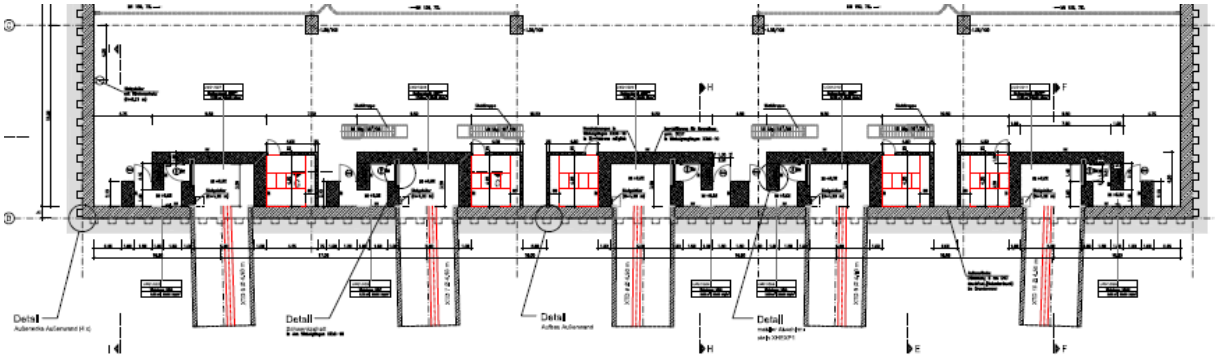
Each beam line requires end point switches to handle network connections from systems in the tunnel and the associated hall hutches. Each end point consists of 4 racks; 3 (switch rack and two connection racks) and 1 spare rack. The footprint of the 4 racks required is shown below.

Footprint: 4 end point racks per beam line

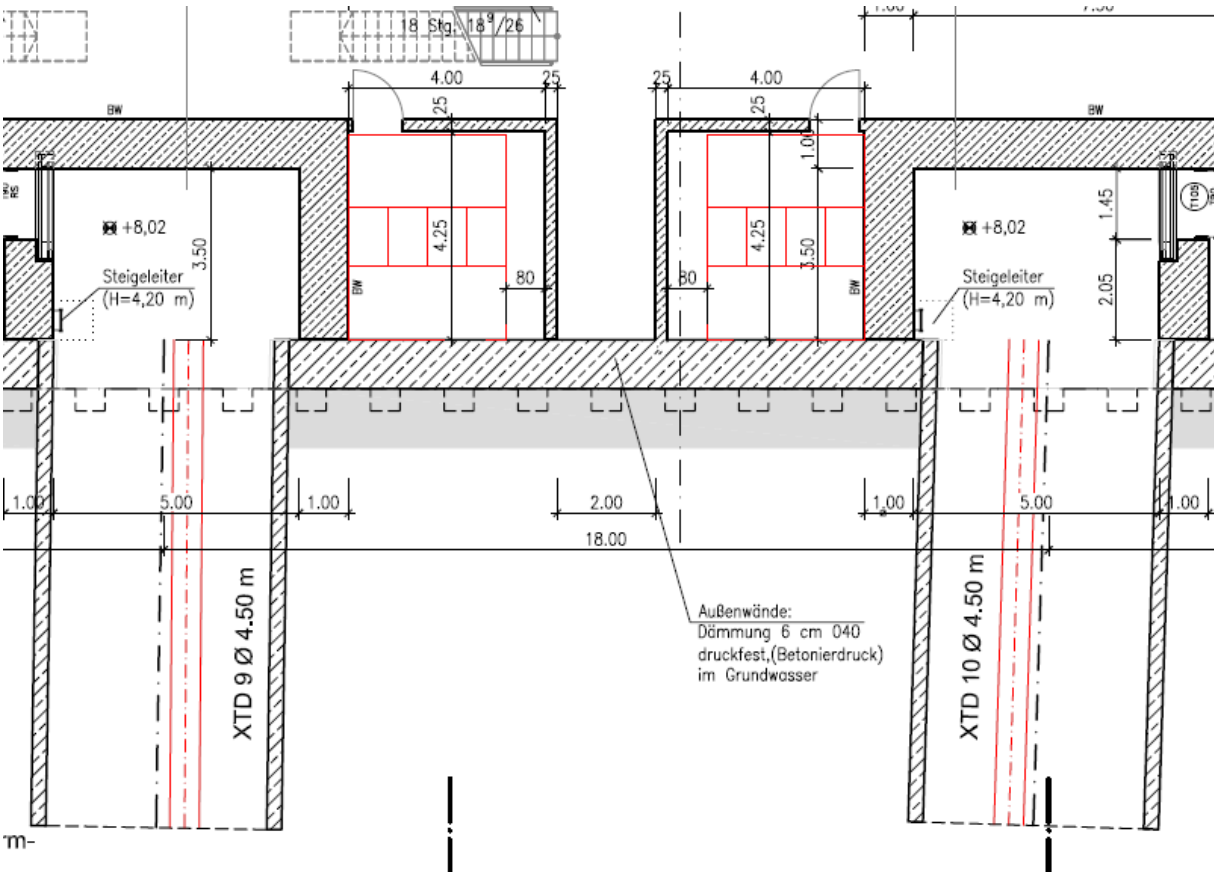


Footprint = width x depth x height = 320 x 420 x 250

The foot prints, in red, have been added to the official drawing of the hall experimental area, see below.



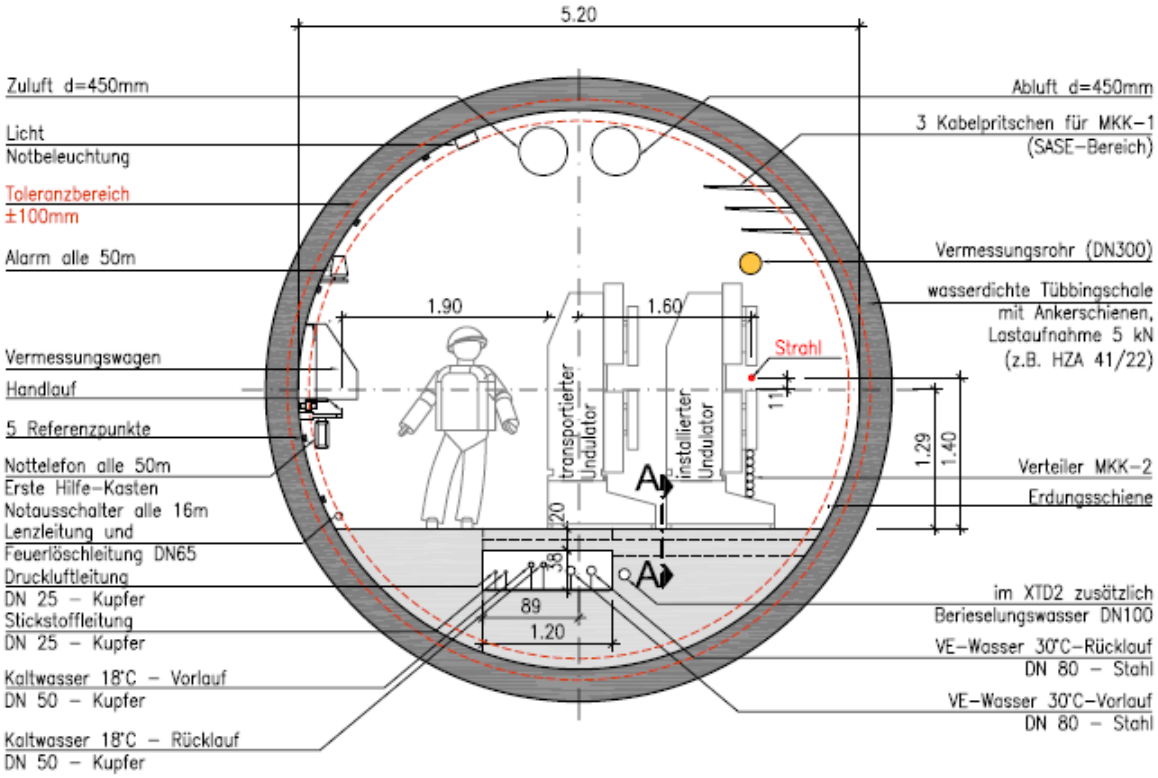
The zoom below shows that the footprints have been placed in separate walled off areas.



Note that the hutch to end point connection route will be specified later.

2) Cable trays in the tunnel are required. As with the end point switch floor space these need to be defined, approved and inserted on the official plans.

Following the last meeting it was discovered that 3 cable trays have been foreseen in the photon beam line tunnels. These appear to be associated with the undulator installation and probably run from XS1 to the last undulator section in each beam line **– confirmation is required**. The trays are visible in the drawing of the XTD1 undulator tunnel cross-section below.



Two cable trays are allocated for use with undulator power and undulator control network cables. The third was allocated for power cables associated with the quadrapoles of the phase shifters, but as these now use permanent magnets the cable tray **may be free ask**.

In the non undulator sections of the photon beam line tunnels one cable tray is required for the network connections foreseen in the network infrastructure minutes (EDMS D00000001071551). Whether additional cable trays are required e.g. for power needs to be determined – **ask Th.Hott.**

Note that cooling water pipes are shown in the underground conduit**; are these only in the undulator section of the tunnel; are they available for use in the rest of the photon tunnel**, e.g. by the beam line systems?

3) The requirements for cable shaft and rooms space in the in the hall upper floors needs to be reviewed/improved.

DESY-IT has confirmed the requirement for one 15 m^2 room per floor in XHEXP1.

The cable dimensions of the cable shaft linking the 15 m^2 and other computer related rooms will be specified by DESY-IT in the next few weeks.

The space required for computer installations in the ground floor of XHEXP1 has been estimated using the following input after discussions with DESY-IT:

- Floor space required per rack = 2.4 m^2
- UPS, power supply, cooling per rack = 1.2 m^2
- 3.5PB data cache storage = 2 racks

The current DAQ and control estimate of the number of racks required in 2013 is:

- 3.5PB for 2-3 day full rate storage from 1Mpixel detector
- expect three 4Mpixel detectors = 3*4*2 = 24 racks
- 1Mpixel computing (guess 2 racks) = 3*4*2 = 24 racks

Thus a 115 m^2 space is required for 48 racks plus an additional 57 m^2 for their cooling and power requirements.

Uncertainties: assumption about number and size of 2D detectors; assumption that no other large data sources are present, use of maximum data rate caching, etc.

The rack room requires a raised floor (under floor power and water), overhead cable trays, a room height above floor ~2.5m (racks are ~2.30 high), and the correct weight loading strength of the raised floor. Note that the current XHEXP1 plan foresees a 6m floor height in the ground floor and 3m for the upper stories.

4. Other issues

The end point foot print is located on the same side of the tunnel as the undulator section cable trays, see the drawings above. If the non undulator trays are on the same side, then the connection path (Kernbohrung), tray to end point, is straightforward. Radiation shielding at the connection path is not expected to be an issue. The connection path must be specified.

It was mentioned that three 60cm diameter pipes run in a trench from XS1 to XHEXP. Two pipes contain heating water pipes and 1 power cables. These pipes have no use for the infrastructure discussed here.

Detailed planning of XHEXP1 will probably start at the end of 2008.

Liubov agreed to review any additional (cooling water…) infrastructure requirements from the beam line system with Harald. Kai Tiedtke will also be asked to review any additional requirements he has.

5. Conclusions

We now have a good overall understanding of the DAQ and control network connectivity and room space requirements.

The following points need be addressing:

- **C.Youngman/A.Schoepps** – do the undulator cable trays run only to the end of the undulator sections?
- **A.Schoepps** – is the third undulator cable free for use?
- **C.Youngman** – do the under tunnel floor water pipes available in the entire length of the tunnels and can they be used by other groups?
- **C.Youngman** – clarify with Th.Hott how power cables for non undulator beam line systems will be installed in the photon tunnel, with a cable tray?
- **C.Youngman** – receive DESY-IT cable shaft requirements.
- **L.Samoylova** – additional WP-73 requirements?
- **K.Tiedtke** – additional WP-74 requirements?

Thereafter a final summary of the infrastructure requirements should be made and distributed. Once agreed to a check should be made that the requirements are in the latest technical drawings.