Inside this issue:

Page 1: Newsletter editorial - L. Jensen
Page 2: Safety communication – J. Luis Barea-Saavedra for BE safety
Page 3: PJAS contracts – C. Heighton BE-HDO
Page 3: Status of the FCC-hh study – S. Arsenyev BE-ABP
Page 5: Data privacy considerations – K. Sigerud BE-CO
Page 7: Reminder for deadlines and BE news-letter correspondents

Editorial:

Dear readers of the BE Newsletter.

This second edition covers information about the behaviour in case you witness an accident in the workplace as well as what to think about if you would like to employ a project associate. The last two articles provide updates for the FCC study and data privacy considerations at CERN respectively.

I hope that you find the material interesting and it motivates you to contribute during 2019 with an article in French or English. In order to do so please contact your respective group contacts.

Lars Jensen, BE Newsletter editor-in-chief
Appelez et attendez les secours !
Depuis le début de l'année, deux collègues du département ont eu des accidents dans le SPS. Leurs blessures à la main ont entraîné contusions et saignements.

La BE Safety Unit souhaite vous rappeler les actions à prendre dans ces situations d'urgence :

Sans vous mettre en danger, mettez en sécurité la personne et la zone de travail pour éviter un sur-accident.

Appelez les pompiers du CERN : 74444 ou +41 227674444 et suivez leurs consignes.

En attendant l’arrivée des pompiers, ne déplacez pas la victime. Installez-la dans une position confortable.

Si vous êtes formé, donnez les gestes de premiers secours.

Si besoin, aller à la rencontre des secours pour les guider.

A leur arrivée, les secours décideront de la prise en charge médicale. Restez à leur disposition.


Call and wait for assistance!
Since the beginning of the year, two colleagues have had accidents in the SPS. They received hand injuries with bleeding and contusion.

The BE Safety Unit would like to remind you of the proper actions to be taken in this kind of situation:

Without putting yourself at risk, secure both the victim and the working area in order to avoid a second accident.

Call the CERN Fire Brigade (CFRS): 74444 or +41 227674444 and follow their instructions.

While you await the arrival of the CFRS, do NOT move the victim. Make sure the injured is comfortable.

If you have received the proper training, give first aid to the victim.

If necessary, help the assistance finding the correct place.

CFRS is responsible for the medical care of the victim. Stay at their disposal.

Warn the activity supervisor (CERN and Company) and declare the accident. Stay at the disposal of the departmental safety officers for the analysis of the accident.
Looking for a Project Associate (PJAS)?

I know what you’re thinking: PJAS Contracts! Easy, right? Well, yes and no but mostly no. In theory, getting yourself a project associate seems like a mild breeze, but in reality, it’s quite gusty. The first step is to contact the BE central secretariat, who will do their very best to unburden this heavy administrative process from your shoulders. Of course, we have a few things to define first before we go ahead…

What’s all this about a home institute declaration? I need an agreement? An addendum? What’s a deadline? Well, let me introduce you to a very good friend of ours: the procedure. To set off a PJAS contract, we initially need three things; 1) a legally binding agreement/addendum for your PJAS, 2) time, because you might not have the things we need, 3) a ready worker, hired by their home institute.

Anais Vandekerchove takes care of agreements, so the first part that needs to be defined is whether you have a valid agreement, so she is to be contacted for 1) checking that an agreement is valid and 2) setting up an agreement if there is no valid agreement/addendum already. In the second case, this can take a minimum of 2 months, so please bear this in mind when setting the PJAS start date.

Then I come in to deal with the contract creation, which takes a minimum of 6 weeks before the anticipated start date, because contract verification and creation, simple as it may seem, can be a complicated process. I need to ensure their entitlement to subsistence, looking at their past and future contracts and ensuring the documents are correctly filled in, as a mistake in the forms can set us back by days, if not weeks. From experience, getting the home institutes to sign, let alone re-sign documents can already take some weeks.

Once the PAF and documents are completed, the agreements and/or addendum is duly signed I am then able to create the contract with HR, with their deadline being 4 weeks’ before the anticipated start date.

With all this is mind, you are now ready for your Project Associate. Make sure they are well fed, watered and have health insurance. We’re here to help.

Cassandra Heighton BE-HDO

Status of the FCC-hh study

With the ongoing European strategy update and an Open Symposium in May 2019, the future of particle physics is approaching a decisive point. In preparation for it, the future circular collider (FCC) study team has published a conceptual design report (CDR), followed by public outreach. The CDR consists of four volumes: one for the physics opportunities, and one for each of the three collider options: an electron-positron collider FCC-ee, a hadron-hadron collider FCC-hh, and a high-energy upgrade of the LHC. After publishing the CDR, the FCC-hh study team is currently finalizing its extended version – a completely new document specifically focusing on the machine design. The extended CDR ensures that every aspect that went into the decision-making is properly documented and that the information is kept.

FIG. 1. In the FCC-hh, protons or heavy ions are injected from the LHC, and sent around a 100 km orbit encompassing the Saleve mountain.

Among the three options, the hadron-hadron collider FCC-hh (figure 1) is the most expensive and perhaps the most ambitious one. A bigger version of the LHC, it provides a 7-fold leap in the collision energy and at least 5 times more...
integrated luminosity than even the high-
luminosity LHC upgrade. Its focus is proton-
proton collisions, but the operational plan also
includes ion-ion and ion-proton collisions as in
the LHC.

Unlike the electron-positron version of the FCC,
the hadron-hadron collider relies on a major
advancement in technology. The cornerstone
of the design is the 16 Tesla dipole magnets, twice
stronger than the LHC ones. While ambitious,
the magnet design is based on a relatively
well-tested Nb3Sn technology and is more
conservative than the high-temperature
superconductor based magnets for China’s
SppC. Over the past years, several conceptual
designs of the FCC-hh dipole magnet were
developed, each implementing a different design
choice. These efforts allowed to minimize the
amount of conductor material and resulted in the
choice of the cosine-theta design as the baseline.

One of the striking features of the FCC-hh is the
energy stored in the particle beam – more than 20
times that of the LHC beam. At 8.3 GJ, it is
comparable to the kinetic energy of a flying
Boeing 747. The collimation, machine
protection, and beam extraction systems needed a
number of improvements relative to those used at
the LHC. The extraction system is highly
segmented to avoid losing the beam inside the
machine in case of a single misfired kicker. The
collimation system is made robust and capable of
handling bad beam conditions and is placed in
two dedicated insertions to avoid damaging
sensitive equipment.

The high luminosity causes collision debris with
an unprecedented power of up to 0.5 MW in the
main experiments, requiring a sophisticated
shielding to protect the final focusing system.
Part of this shielding is a 35 mm thick tungsten
tube that fits in relatively low gradient, large
aperture triplet quadrupole magnets. The present
interaction region layout incorporates triplet
quadrupole magnets with a total length of 107 m
and leaves enough space for the 66 m long
detector cavern.

Another dramatic difference from the LHC is the
synchrotron radiation power coming from the
bent particle beam that is typically marginal in
proton rings. However, due to the strong
dependence on the beam energy, the FCC-hh
emits 200 times higher radiation power than the
LHC and is comparable to that of a powerful light
source. This power is intercepted by the beam-
screen of a novel design (see figure 2). To extract
2.4 MW of heat-load per beam, the beam-
screen cooling channels occupy a big part of
its cross-section. Vacuum stability of the beam-
screen was tested in experiments at an actual light
source (Karlsruhe Research Accelerator) to
imitate the synchrotron radiation at a level of the
FCC-hh.

**FIG. 2.** One of the FCC-hh beam screen
prototypes tested at Karlsruhe Research
Accelerator.

In order to reduce the magnet cost, the
beam-screen is smaller in diameter than the LHC
one. This, together with the higher wall
temperature (50K), makes its coupling
impedance dramatically higher, potentially
leading to collective instabilities and a loss of
the beam. The prominence of the corresponding
low-frequency impedance peak is the main
difference between the impedance models of the
LHC and the FCC-hh. Although the growth rates
of collective instabilities are naturally reduced by
the higher beam energy, so is the effectiveness of
the stabilizing octupole magnets. Considering all
these aspects, the proposed stabilization scheme
was optimized to give a factor 3 safety margin in
beam stability.

For the first time in hadron colliders, the
reduction of beam emittance due to radiation
damping becomes significant. The reduced
emittance increases the luminosity, but at the
same time leads to beam-beam forces of
unprecedented strength for normal operation of
existing hadron colliders. Performance of the machine strongly depends on the balance between these mechanisms, taking a step in partially unknown territory. Beam-beam effects were also studied with respect to the beam stability and the impact on the dynamic aperture. The collide-and-squeeze scheme was implemented to prevent the long-range beam-beam effects from acting against the stabilizing effect of the octupole magnets.

The present status of the FCC-hh is a result of 5 years’ work by scientists from 34 countries and 133 institutes. A big part of the studies was funded by the European Union’s Horizon 2020 programme through the ‘EuroCirCol’ project. At CERN, the BE department played a central role in the overall design integration, and made significant contributions to its major aspects. In particular, BE covered the interaction region design, the collimation system, the physical aperture and the dynamic aperture studies, single beam and beam-beam collective effects, the RF system, the transverse feedback, instrumentation and controls studies, the availability and operational considerations.

Sergey Arsenyev and Daniel Schulte BE-ABP

Data privacy considerations
The topic of data privacy protection has gotten a lot of attention in the media in recent years with reports of serious data breaches and abuses. You may remember in May last year when we started to receive emails from any company website that you had ever visited (or so it seemed) asking you to reconfirm that you would like to continue receiving marketing emails from them. This was due to the approaching deadline for when the EU regulation on data protection GDPR, would enter into force, introducing important changes to the applicable legal regime in the EU countries. CERN, being an international organization, we deal with personal data of persons from around the world and we should apply high standards to how we treat their data. It is also an obligation for CERN, as national regulation, forces our partners to ensure the safe treatment of the personal data that they transfer to us. The leading principles for data privacy were already present in the CERN Code of Conduct, and since January this year, there is the Operational Circular No.11 (OC11) setting out the associated rights and obligations.

“Personal Data” is any data, relating to an identified or identifiable person. Examples of Personal Data are: name, passport, CERN ID number, banking information, images and CCTV footage, online and device identifiers, address and telephone number. A sub-category concerns “Sensitive Personal Data” relating to Physical or mental health; Genetic or biometric data; Racial or ethnic origin; Sexual orientation and gender identity; Political, religious or philosophical opinions or beliefs.

What activities are considered in the processing of Personal Data? Everything from the initial collection of the Personal Data to its final destruction is included. This involves its use, the retention period, where it is stored, who can access, and where it is transferred.

Central to the activities at CERN related to data privacy is the Office of Data Privacy (ODP) created by the DG in 2017. It was established to offer help to services at CERN that process Personal Data and to anyone who is concerned about how their Personal Data is being handled by CERN. A “service” in this scope is one or more activities involving the processing of Personal Data on a regular basis for the benefit of CERN. The CERN Service Catalogue will be used to register these services.

To ensure common approaches to the implementation of rights and obligations set out in OC11, the DG created the Data Privacy Coordination Committee (DPCC), chaired by J. Purvis, HR DH. Topics to be addressed by the committee relates to the definition of common retention periods, review of organisational processes, consolidation of Personal Data handling and common approaches to records keeping and policies for data transfers.

The OC11 is in force since January this year, however its implementation will be done according to a schedule. The first deadline is 31 March 2019, when all Services shall be registered in the CERN Service Catalogue.
The BE management appointed me as representative to the DPCC and to coordinate the work in the department related to the implementation of the OC11 with these link persons:

<table>
<thead>
<tr>
<th>Group</th>
<th>Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE-ABP</td>
<td>A. Valenza</td>
</tr>
<tr>
<td>BE-ASR</td>
<td>C. Gaignant</td>
</tr>
<tr>
<td>BE-BI</td>
<td>J. J. Gras</td>
</tr>
<tr>
<td>BE-CO</td>
<td>K. Sigerud</td>
</tr>
<tr>
<td>BE-HDO</td>
<td>A. Vandekerchove</td>
</tr>
<tr>
<td>BE-ICS</td>
<td>F. Chapron</td>
</tr>
<tr>
<td>BE-ICS</td>
<td>J. Nielsen</td>
</tr>
<tr>
<td>BE-RF</td>
<td>E. Davies</td>
</tr>
</tbody>
</table>

As requested by the DPCC, and to respect the first deadline of 31 March 2019, we performed an inventory of where Personal Data is being used. This resulted in a list of services, where some existed already, and others were created only for data privacy purposes.

To implement what is stipulated in OC11 will require us to review current procedures and practices with regard to how we process personal data. We are all concerned: as persons working for CERN to allow the Organisation to ensure people’s privacy and maintain our collaborations with our European partners, and as individuals whose personal data is being processed by CERN.

If you would like to get better acquainted with the topic, a good place to start is the e-learning module available in the Learning Hub, “Respecting Privacy in the processing of personal data at CERN”.

For questions, please contact your group link-persons or the ODP directly: privacy.protection@cern.ch

Katarina Sigerud (BE-CO)
Reminder of deadlines:

TECHNICAL STUDENTS COMMITTEE (TSC)

<table>
<thead>
<tr>
<th>Committee (09.05.2019)</th>
<th>Applications by</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25.04.2019</td>
</tr>
</tbody>
</table>

TECHNICIAN TRAINING EXPERIENCE (TTE)

<table>
<thead>
<tr>
<th>Committee (13.06.2019)</th>
<th>Applications by</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>29.05.2019</td>
</tr>
</tbody>
</table>

BE Newsletter Contacts

- **ABP Correspondent**
  - Nicolo Biancacci

- **BI Correspondent**
  - James Storey

- **ICS Correspondent**
  - Timo Hakulinen

- **RF Correspondent**
  - Wolfgang Höfle

- **ASR Correspondent**
  - Marc Tavlet

- **CO Correspondent**
  - Eve Fortescue-Beck

- **OP Correspondent**
  - Sandy Easton

- **HDO Correspondent**
  - Cassandra Marie Heighton

- **Editor-In-Chief**
  - Lars Jensen