An Approach to a Work and Safety Organisation in the LHC During Shutdown

The safety organisation in the LHC during shutdown, including the presentation of the stakeholders and their roles

Contents

- Safety organisation and machine mode
- Safety organisation during shut down
- Safety rules, procedures and control
- Tracing and controlling interventions
- Open questions
- Conclusion

Safety Responsibilities

- Following the restructuration beginning of 2009 the EN department took over the territorial safety responsibility for the machines.

- The beam related safety, e.g. radiological aspects and access control, will still be handled by BE, due to the concentration of this competence of the A&T sector in the beams department.

Safety Organisation and Machine Mode

- The work and safety organisation in the LHC depends on the mode of the machine. The basic modes for this purpose are:
  - Machine in shut down
  - Machine operational without beam
    - ✓ Technical stop, cold check-out, powering tests and hardware commissioning
  - Machine operational with beam.

Operation, With or Without Beam

- The safety, with the machine in operation, is based on
  - the absence of people in the machine,
  - the need to control the access,
  - the risks generated by exposure to radiation and by the electrical and cryogenic systems.
- This situation is primarily controlled through technical measures that will keep people out of harms way.
- It requires a good knowledge of the machine, of its operation and of the access control and alarm systems.

Machine in Shut Down

- The safety, with the machine in shut down, is based on
  - the need for presence of many people in the machine,
  - the need to trace the people intervening,
  - the risks generated by exposure to various systems undergoing maintenance or tests, and with the services operational,
  - limiting exposure to radioactivity.
- This situation is controlled mainly through organisational measures: rules, procedures, etc.
- It requires a good planning and co-ordination, intimate knowledge of the lay-out of the machine and of ‘best practice’.

Safety Organisation Depending on Machine Mode

- Based on the nature of the two situations, or machine modes, it is proposed that
  - the EN safety organisation supervises the safety during shut down,
  - the BE safety organisation supervises the safety during operation, with or without beam.
- This proposal requires a clear definition of the interfaces and responsibilities during transfer from operation to shutdown and back.
- It also requires a clear definition of WHEN the machine can be considered in shut down mode.

Transfer

- The transfer from operation to shut down – and back – will be complex.
  - It will be done sector by sector.

- How do we handle the transfer of safety supervision?
- How do we handle the safety in the machine with certain sectors in shutdown and others not? (Access, different organisation…)

Safety Organisation During Shut Down; Stakeholders

- The groups/sections intervening
- The contractors

- The shutdown planning and co-ordination
- The safety coordinators
- The safety officers
- The 'service provider' or safety inspection service

- The Safety Commission
- The Fire Brigade
- The CERN management

Safety Organisation During Shut Down, 1

- The safety organisation during the shut down is built around the EN safety organisation and the 4 safety coordinators
  - The shutdown planning and co-ordination (EN MEF)
  - The safety coordinators (All four in the context of their teamwork)
  - The EN safety officers: TSOs, RSO, DSO
  - The 'Service provider': Initial and periodical inspections

- This safety organisation will co-ordinate and supervise the safety of the activities of:
  - All groups/sections and
  - Their contractors

  These units and their contractors are responsible for the safety of their activities.

Safety Organisation During Shut Down, 2

- The shutdown planning and co-ordination (EN MEF)
  - The central point: Development of the shut down planning, allocating time slots for interventions, supervising the sum of ongoing activities….
- The safety coordination:
  - The safety on site: Supervising work-site safety, co-activities etc.
    See more in John Etheridge's presentation, later in this session.

Safety Organisation During Shut Down, 3

- The EN safety officers: TSOs, RSO, DSO
  - As EN is the department in charge of the territorial safety of the LHC, the officers of the departmental safety structure exercise their roles according to safety code A9.

Safety Organisation During Shut Down, 4

- A further element of the safety organisation is the Service Provider, or Safety Inspection service, that will perform all relevant initial and periodical inspections during shutdown.
  - These inspections will, like all other interventions, be planned and coordinated by the EN-MEF group.

Safety Organisation During Shut Down, 5

- The Safety Commission
  - In particular the DGS/RP group will supervise the activities from the radiological point of view. See D. Forkel-Wirth's presentation: 'How radiation will change your life', later this session.
- The emergency services will be ready to intervene according to the procedures presently being validated.
  - Emergency exercises should be regularly carried out to check the readiness and efficiency of the possible interventions.

Safety Rules and Procedures

- The basic referential are the CERN safety rules.
  - The Safety Commission is in the process of updating rules and instructions for Health & Safety in the Workplace and for Work Organisation.
  - Most groups have the procedures needed to control the safety of their activities. It is in the interest of the groups that this kind of documentation is available and up to date.
- These reference documents should form a coherent set, and must be available and understandable.

Application of Safety Rules and Procedures, 1

- The correct application of the rules will require the understanding of the rules. This implies *instruction*.
  - It is part of the responsibility of the CERN groups, and of the contractors, that their personnel follow the proper training. Time must be allotted to this.
- If properly trained elements do not respect the rules, *measures* will be taken.

- This double approach requires the support of the management.

Application of Safety Rules and Procedures, 2

- The personnel on site must respect the safety rules to assure their own safety and that of their co-workers.

- Users, that will be involved with the shut down activities in the LHC tunnel, must respect the tunnel safety rules.

  They must receive the proper training to obtain access

Application of the Safety Rules and Procedures, 3

- It is intended to hold safety information meetings with contractors before the start of the shutdown, as a complement to the specific safety training.

Tracing and Controlling Interventions, 1

- It is of great importance for occupational safety that planning and safety coordination knows what is happening in the machine.

- This is to:
  - Be able to validate the analysis of working methods
  - Have knowledge of the 'imported risks' of all activities
  - Avoid risks due to co-activities
  - Avoid rushed and ill-prepared interventions
  - Avoid surprises

Tracing and Controlling Interventions, 2

- All interventions must be declared to the work planning and coordination.
  - In the interest of the safety of the workers.
- It must be assured that access is granted only to those with activities approved by the shut-down planning and co-ordination.
- It must be possible for the central planning authority to know the situation at all times.

Tracing and Controlling Interventions, 3

- It must be known:
  - who ‘they’ are,
  - where ‘they’ are,
  - when ‘they’ are there,
  - what ‘they’ do,
  - how ‘they’ do it (Safety coordination),
  - whom ‘they’ are doing it for.

Tracing and Controlling Interventions, 4

- To trace the activities as described, we need a user friendly, rapid declaration of work or intervention.
- A tool that is flexible with respect to the details of the interventions, which is not easily tricked out 'to gain time' and which can condition the access.
- The business case for such a tool, currently under development, will be presented in more detail tomorrow :
  - ✓'How Should the Access System be Operated While LHC is not in Beam Operation?' by J. Coupard

Open Questions

- A number of questions still need to be addressed:
  - Are the rules governing safety during shut down complete and coherent?
  - Are the safety rules and procedures properly understood by all parties?
  - How do we define the start and end of operation and shut down for the transfer?
  - How do we handle the transitions between operation, test and shut down?
  - How do we handle the safety aspects of one sector of the machine in one mode and other sectors in another mode?
- The discussion of these issues should be started and the answers ready for the next long shutdown.

Conclusion

- A proposal for a safety organisation for the LHC shutdown exists.
  - It needs to be developed in detail.

- An efficient operating safety organisation requires:
  - The co-operation between all of its stakeholders
  - Good planning and co-ordination
  - Best practice
  - The support of the management.