Safety in the Experiments
Still Something to do

Christoph Schäfer
on behalf of the LHC experiments
Chamonix Workshop 2010
Outline

Main safety topics requiring attention:

- Ventilation
- Evacuation
- Emergency Procedures
- Automatic Alarm Action Matrix
- Radiation Protection
- Safety Systems
LHC experiments operated safely with and without LHC beam.

Safety for the LHC experiments and experimental areas have been significantly consolidated and improved in 2009.

Further safety consolidation required and underway for sustainable operation for the next 15 years.
Ventilation

- The ventilation system is of utmost importance for working in underground facilities - breathable air is what we need at least.

- A comprehensive safety assessment is required to ensure that this can be guaranteed in ALL situations.
Ventilation

Critical safety functions of the ventilation system shall be guaranteed, e.g.:

- Overpressure regimes between caverns and tunnel must be established and kept stable.
- Supply a sufficient air flow rate for underground safe areas.
- Alarm level 3 actions in case of ODH, smoke, etc.
- Reliable control system and adequate instrumentation.
Evacuation

The safe areas in front of the lifts are the backbone of all LHC evacuation scenarios.

Mandatory requirements:

- Work must continue to ensure that all underground Safe Areas, are safe indeed (ventilation and structure).
- Permanent availability of two independent and secured evacuation paths.
Evacuation

Required systems:

- Automatic signalization of evacuation paths including indication of those paths not useable, e.g. due to Helium release.
- Need for a public address system in caverns as safety supporting system (according to assessment of the experiments).
Emergency Procedures

- Ensuring that the Fire Brigade is always, immediately and duly informed about the CERN safety situation.
- Finalizing and validating of emergency procedures in the experiments.
- Regular training and emergency exercises for the experimental areas (interdepartmental, CERN and host states fire brigade).
Alarm Action Matrix

- Automatic alarm action matrices have to be reviewed. Ad hoc modifications have been implemented due to “19.09. type accident”
- According to risk analyses, development of a specific safety system dedicated to execute automatic actions for level 3 alarms must be done.
Radiation Protection

- Magnetic field resistant RP measurement devices are required. Today we are practically blind. (DGS-RP is working on it)
- Need to evaluate if additional RAMSES monitors in experimental caverns are required.
- RAMSES gate alarms must be connected to the access control system. Activated material shall not leave the site without permission.
Radiation Protection

- We are currently developing a global “ALARA strategy”: full traceability of material, integrating the RP sweep, work package procedures, database, new tools, etc.
- Access to RP database is required for the extraction of individual and collectives doses for each work package.
- Requirement to connect the individual dose rate measurements with the access system.
Today at CERN we have good definitions for alarm level 3 systems.

But we do not have a definition of a safety system (in work by SC)

There is a strong need to improve the maintenance and operation procedures and their application for AL3 and safety systems
Conclusion

- The experimental areas are equipped with a comprehensive set of safety equipment.
- In order to continue our very good safety records for the experimental areas, first priority must be to improve and consolidate the following areas:
  - Aspects of the ventilation system
  - Aspects of the underground evacuation