

Safety in the Experiments Still Something to do

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on behalf of the LHC experiments

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Outline

Main safety topics requiring attention:

- ✦ Ventilation
- ✦ Evacuation
- ✦ Emergency Procedures
- ✦ Automatic Alarm Action Matrix
- ✦ Radiation Protection
- ✦ Safety Systems

Introduction

- ✦ 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 collective doses for each work package.
- ✦ Requirement to connect the individual dose rate measurements with the access system.

Safety Systems

- 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