

Personnel Safety Systems Integrity Management

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<http://www.jlab.org/accel/ssg/>

Safety Systems Group

- Personnel Safety Systems
 - Access Controls
 - Radiation Interlocks
 - Audible/Visual Warning Devices
 - RF Interlocks
 - Accelerator Magnet Interlocks
 - Public Address Systems
 - Oxygen Deficiency Monitoring
- Machine Protection Systems
 - Fast Shutdown Systems
 - Beam Loss Monitoring
 - Ionization Chamber Monitors
- Beam Envelope Monitoring Systems

Recent Unauthorized Work Affecting PSS



Personnel Safety Systems

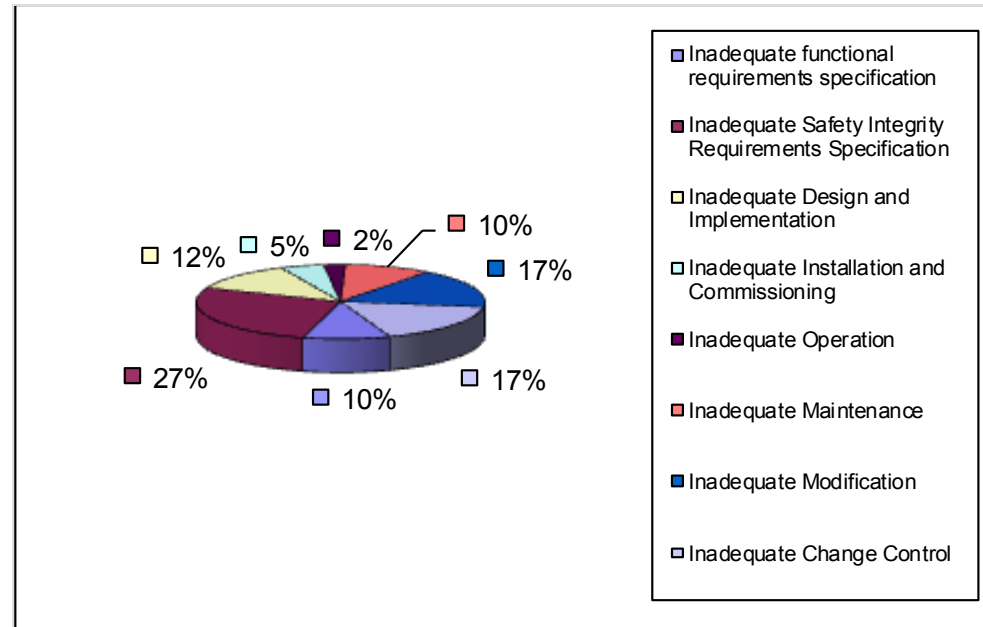
- Required Risk Reduction is combination of engineered controls, administrative controls, and personnel training.
- Safety Reliability of engineering controls is based on a sufficiently low probability of an unsafe/undetected failure between checks.
 - System Redundancy
 - Diversity of Critical Components
 - Independent/Isolated From Other Systems
 - Competency of Personnel Managing, Designing, Implementing, Maintaining, Operating System
 - Configuration Management



UK Study of Major Industrial Accidents

- In order of decreasing frequency, the underlying causes were found to be:

- Maintenance management
- Design
- Procedure
- Training
- Hardware
- Communication
- Organisation



- Accidents due to poor permit-to-work systems or failures to follow the systems have been discussed, as they are by far the most common causes of accidents involving maintenance.

<http://www.hse.gov.uk/research/otopdf/2001/oto01007.pdf>

Availability

Production Availability

Safety Availability

Machine Availability

Experiment Availability

Hard Down

Degraded Performance

Hard Down

Degraded performance

Hard Down

Degraded Performance

Safe Failures

Unsafe Failures

Fail-safe

Detected
Unsafe
Failures

Undetected
Unsafe
Failures

Physics PSS Infrastructure

A/B/C Counting House - Beam Enclosure Level

- Hall Enclosure
 - Throughout Hall
 - Beam Transport Tunnel
 - Truck Ramp
 - Entry Labyrinth
 - Vertical Cableway (Hall C)
- Labyrinth
 - Throughout
 - Vertical Cableway (Halls A and B)
 - Electrical Room

Physics PSS Infrastructure

A/B/C Counting House (Ground Floor)

- Counting Rooms
 - Control Console
 - Under Floor
 - Vertical Cableways
- 1st Floor Hallways
 - Throughout

Physics PSS Infrastructure

A/B/C Counting House – 2nd Floor

- South End
 - PSS Racks
 - A/B/C PSS
 - Public Address
 - Oxygen Deficiency Electronics
- Vertical Cableways
- Horizontal Cable Tray

PSS Configuration Control Labels

- **Critical Device**
 - Prevents Beam Transport into and occupied area
- **Safety System Equipment**
 - All Equipment and Infrastructure Owned by the Safety Systems Group
- **PSS Configuration Control**
 - Non-SSG Equipment used to perform Safety Function

**SAFETY SYSTEM
CRITICAL DEVICE**

DO NOT TAMPER
CALL SAFETY PERSONNEL

**SAFETY SYSTEM
EQUIPMENT**

FOR SAFETY PERSONNEL ONLY
PLEASE DO NOT TAMPER

Attention: This component is under PSS configuration control. Contact the safety systems group before removal.

Identifying PSS Infrastructure and Equipment

- Use Work Planning Tools
 - ATLis
 - HAList
 - HBList
 - HCList
 - HDList
- Walk through affected work area
- Follow cables and conduits to check for PSS labels
- Check Electrical Panels for PSS and RadCon Circuit breakers

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