

Emergency Door Installation for the Accelerator and Beam Application Building of Proton Accelerator Research Center

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1. Introduction

Proton Engineering Frontier Project(PEFP) has been developing a 100MeV proton linear accelerator. Also, PEFP has been designing the Proton Accelerator Research Center in Gyeongju. The Proton Accelerator Research Center is scheduled for completion in 2012.

2. Zoning plan

The radiation protection design of the proton accelerator conventional facilities should be capable of minimizing the radiation levels, by keeping the occupational doses and doses to the members of the public as low as reasonably achievable(ALARA), and preventing a loss or degradation of the equipment performance caused by a radiation environment during normal operation conditions.

2-1. Radiation Partition

For the radiation protection design, we divided the proton accelerator research center into 3 different types of zones based on the dose limit(DL) ; general public area ($DL \leq 0.25 \mu\text{Sv/h}$), radiation worker area ($0.25 \mu\text{Sv/h} < DL \leq 1.25 \mu\text{Sv/h}$) and high radiation area ($DL > 1.25 \mu\text{Sv/h}$). For each radiation area, appropriate finishing materials should be adopted according to the radiation area classification for design and construction of Accelerator & Beam Application Research Building.

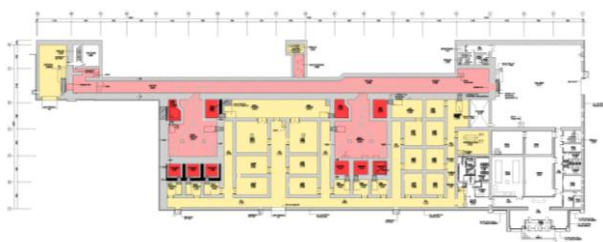


Figure 1. Accelerator & Beam Application Research building 1floor

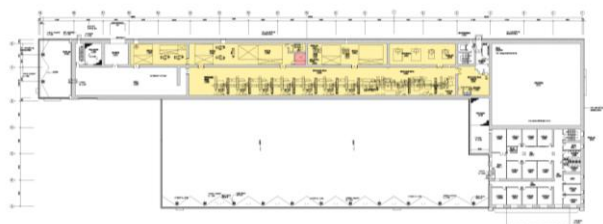


Figure 2. Accelerator & Beam Application Research building 2floor

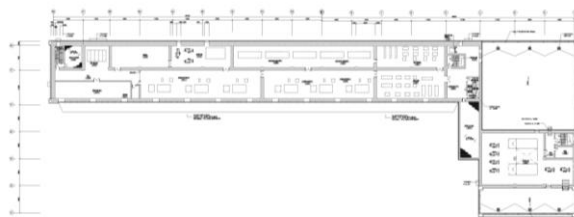


Figure 3. Accelerator & Beam Application Research building 2floor

- High Radiation Area ● Radiation Worker Area
- General Public Area

2-2. Fire Partition

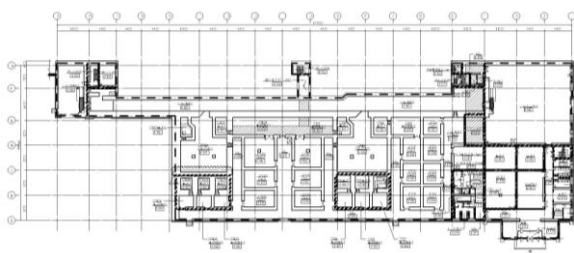


Figure 4. Accelerator & Beam Application Research building 1floor

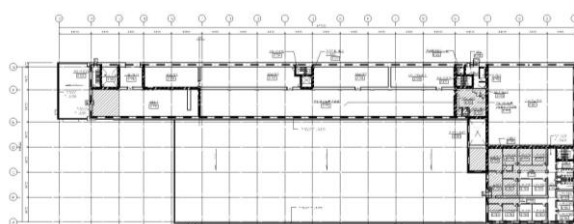


Figure 5. Accelerator & Beam Application Research building 2floor

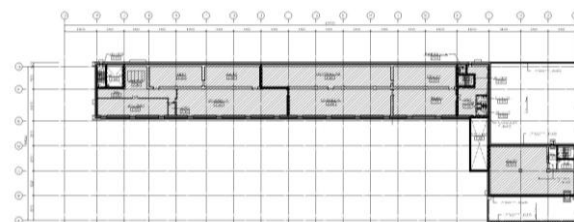


Figure 6. Accelerator & Beam Application Research building 3floor

Planned fire compartments, as shown in the following figure.

- : FIRE PARTITION
- ▨ : FIRE BARRIER(WALL), 2HR
- ▧ : FIRE BARRIER(SLAB), 2HR

3. Emergency Door System

All doors being installed in the area should satisfy the requirements of the ANSI standard.

MORTISE LOCKS, LATCHES – ANSI A156.13
EXIT DEVICES – ANSI A156.3
COORDINATORS – ANSI A156.3
BUTTS & HINGES – ANSI A156.1
DOOR CLOSER – ANSI A156.4

And all doors should be the series of VON DUPRIN or the approved same product and finish should be US26D(SATIN CHROMIUM PLATE).

4. Emergency door installation

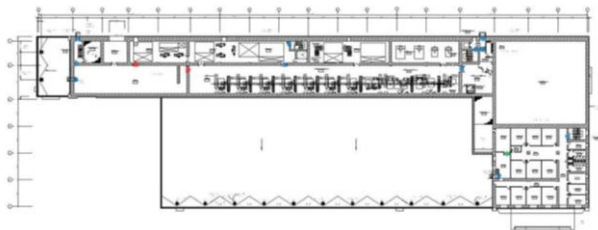


Figure 7. Accelerator & Beam Application Research building 1floor

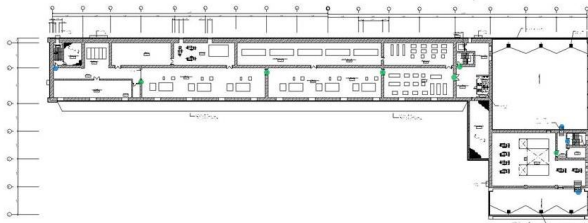


Figure 8. Accelerator & Beam Application Research building 2floor

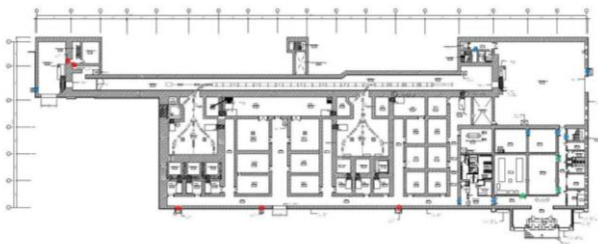


Figure 9. Accelerator & Beam Application Research building 2floor

- Exit only. No trim or blank escutcheon.
- Entrance by knob or lever. Key locks or unlocks knob or lever
- Entrance by trim when latch bolt is released by (Blank Escutcheon with lever only)

The emergency door which connect the general and radioactive districts cannot be opened. The only case in which this gate would be opened is under emergency situations.

The emergency door for the anti-fire zone were made with flame-resistant material. Active Leaf was installed when the gates had two doors.

The emergency exits are located in easily accessible areas so people can escape to the roof of the building or outside with ease.

5. Conclusions

In this paper, we describe emergency door installation for the Accelerator and Beam Application building of Proton Accelerator Research Center according to each radiation area and fire compartments plan.

This Door installation plans will help a number of people in the event of an emergency so that they can be easily evacuated.

Acknowledgement

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- [2] A comparative Study on the Domestic and Foreign Performance Criteria of Fire Doors, fire Shatters and Fire Window Applied to Building Fire Compartment.(In Hwan Yeo, Jae Hong An, Ki Ho In, Byung Yeol Min. Korea Institute of Construction Technology. Fire Test and Research Center)