

Radiation Shielding Doors Design for the Accelerator & Beam application Building of PEFP

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1. Introduction

PEFP(Proton Engineering Frontier Project) was Launched in 2002 as one of the 21st Century Frontier R&D Programs of MOST(Ministry of Science & Technology). Gyeongju city was selected as the project host site in March, 2006, where 'Proton Accelerator Research Center' was going to be constructed. Since 2005, the Architectural and Civil design work has been performing.

In this paper, we describe the radiation shielding doors design for Accelerator & Beam Application Building of PEFP.

2. Radiation Zone Classification of PEFP

Accelerator & Beam Application Building consists of the accelerator tunnel, klystron gallery area, accelerator assembly area, accelerator control area, beam experiment hall and the beam application research area[1].

The accelerator tunnel is a space for installing the LINAC components. These components consist of the RFQ, DTL, etc. Therefore, the accelerator tunnel is a high radiation area of operation. Proper radiation shielding must be designed to reduce radiation levels in each area such as the Radiation Worker Area or General Public Area, etc. to acceptable radiation levels. For the proper radiation shielding design, a classification of each area of the proton accelerator conventional facilities is needed. Beam experiment hall contacts justly with the accelerator tunnel that generates the main cause of a radiation. Klystron gallery is arranged at the 2nd floor in the Accelerator Building. During accelerator operation, because radiation level inside the accelerator tunnel, target room and beam line enclosure is high, it is classified as high radiation area. Therefore, accelerator tunnel, target room and beam line enclosure access is not allowed during beam operation.

Accelerator & Beam Application Research Area		Classification
Accelerator Tunnel		High Radiation Area
Klystron Gallery		Radiation Worker Area
Beam Experiment Hall	Target Room	High Radiation Area
	Beam Line Enclosure	High Radiation Area
	Lab & Corridor	General Public Area
Office & Outside of a Building		General Public Area

Table 1 The Radiation controlled Area Classification

In Table 1, we described the classification of each area. Depending on each area classification, associated access restriction should be applied. In Fig. 1, we marked radiation zone classified results of Accelerator & Beam Application Research Area.

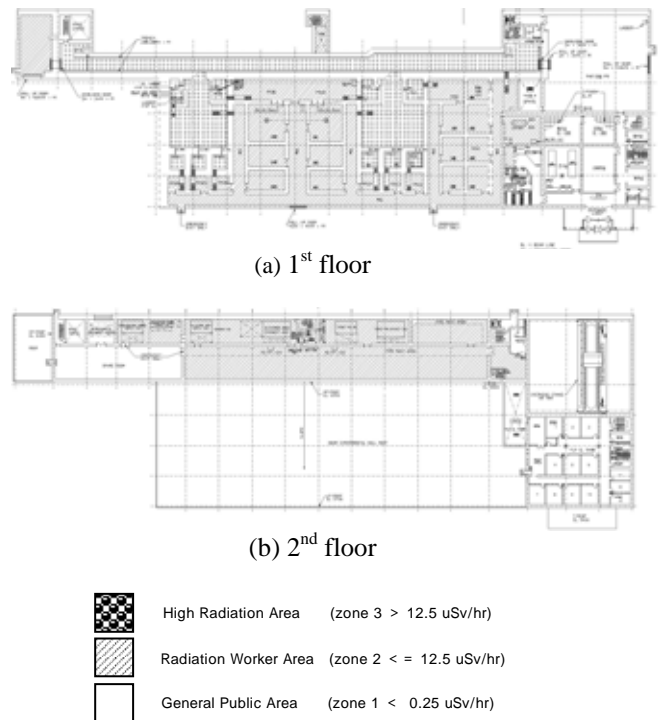


Fig. 1 Radiation zone classified results of Accelerator & Beam Application Research Area.

3. Shielding Door Design of Proton Accelerator Research Center of PEFP

In this chapter, we describe the shielding door design for the Accelerator & Beam Application Research Building of PEFP.

According to the radiation zone classification described in previous section, we installed 2 sliding doors and 13 plugging doors in Accelerator & Beam Application Research Building of PEFP, which are described in Fig. 2.

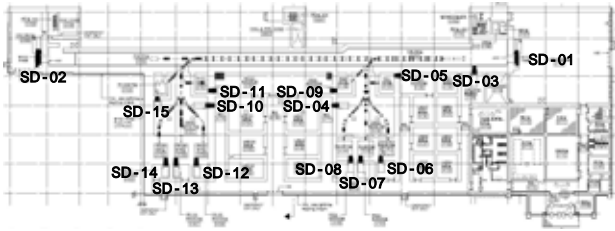


Fig. 2 Radiation Shield Doors of Accelerator & Beam Application Research Building of PEFP.

As shown in Fig. 3, the shielding doors are divided into two types. : sliding door type and plugging door type. SD-01 and SD-2 are sliding door type, and SD-03~SD-13 of plugging door type.

In case of enough space for installation and large size shielding, sliding type door is selected. In the other case, of small space for installation, plugging type door selected

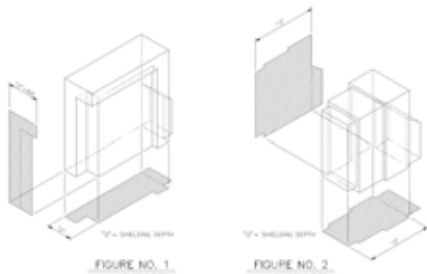


Fig. 3 Types of Radiation Shield Door

The detail drawing of sliding and plugging type door are as shown in Fig. 4 and Fig. 5.

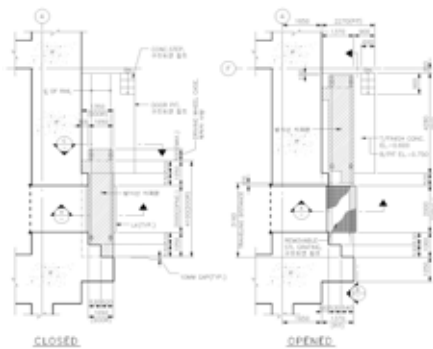


Fig. 4 The Sliding Type Door's Detail Drawing

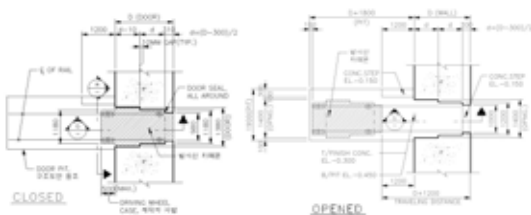


Fig. 5 The Plugging Type Door's Detail Drawing

Especially to keep radiation shielding, the plugging type doors of SD-11 ~ SD-14 including Iron shielding are designed as shown in Table. 2 and Fig. 6.

No. of Door	Thickness		
	df	dc	dr
	Conc.	Steel	Conc.
SD-11	500	900	650
SD-12	500	900	650
SD-13	500	900	650
SD-14	500	900	650

Table 2 The Radiation controlled Area Classification

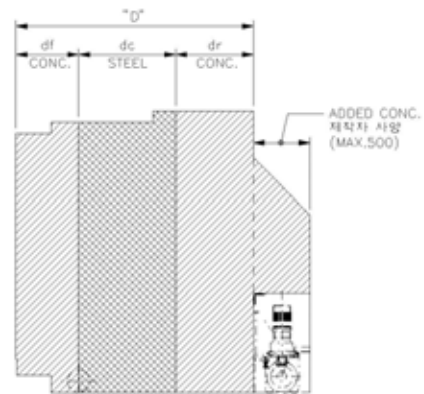


Fig. 6 The Plugging Type Door including Iron shielding

4. Conclusions

In this paper, the radiation shielding doors design for Accelerator & Beam Application Building of PEFP was studied. : Sliding and plugging types. To consider space and radiation shielding, SD-01 and SD-02 are designed as sliding type door and SD-03 ~ SD-13 plugging type door.

Acknowledgement

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