

BEAM AND RADIATION SECURITY SYSTEM OF KEK PS

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A beam and radiation security system of high energy accelerators have to work without any error throughout operation and maintenance periods, and the system of KEK PS is carefully designed and is working without trouble.

The accelerator enclosure of KEK PS has one main gate, eight subgates and four entrances for large devices. In order to keep evacuation from the above area during operation and check residual radioactivity of every thing being carried out during maintenance, the beam interlock and the centralized gate control system are being used. These consist of personal keys, door limit switches, remote control electric door locks, emergency switches, gate monitor TV, a hand-foot-clothing monitor and the logging computer system. Fig.1 shows a block diagram of the system.

1. The Beam Interlock System

The personal keys are assigned for every staff working in the accelerator enclosure. These are usually inserted in the key switch panel and the electric door lock can be released by the personal key, so one must to take out his key from the switch when he enters the enclosure. Status of all key switch is displayed on the accelerator control desk with the personal names. All key switch circuits and door switches interlock to the accelerator beam switch. Actual beam acceleration starts some time (~ 20 sec) after the beam switch is turn on. If anyone is accidentally left in the accelerator enclosure, he can interrupt the beam by the emergency switches distributed in the enclosure during the above period. However such a case has not yet occurred.

The beam from the ion source is controlled by the trigger pulses that is gated by the logic circuit connected with the beam switch and the beam stop is insured by the beam shutter in the beam line to the linac tank, even in case of accidental beam acceleration in the preinjector.

2. The Centralized Gate Monitor and Control System

Every gate door is equipped with an electric lock and it can be released by the personal key under control of the guardman on duty in the central control station. He can watch and check entrance and exit at each gate by TV monitor, and the interphones are used to communicate between the gates and the central station.

Prior to going out from the accelerator enclosure, everyone has to check his own body and all things carried by him using the hand-foot-clothing monitor at the main gate.

3. The Logging Computer System

The personal key switches and all door switches are connected to the minicomputer system and it records the name and the time of going in and out for each person, and also each gate open time. Measurements of thermoluminescence dosimeters for each person are also recorded in the computer, and it make a list of the personal data concerning the number of entrance times, the total hours in

the accelerator tunnel and the total radiation dose. This computer also summarizes the operation record through the link with the touch key board and the accelerator beam control system.

A new gate radiation monitor system is being developed by the KEK Radiation Safety Group, and this will enable automatic and high accurate survey of human body and others.

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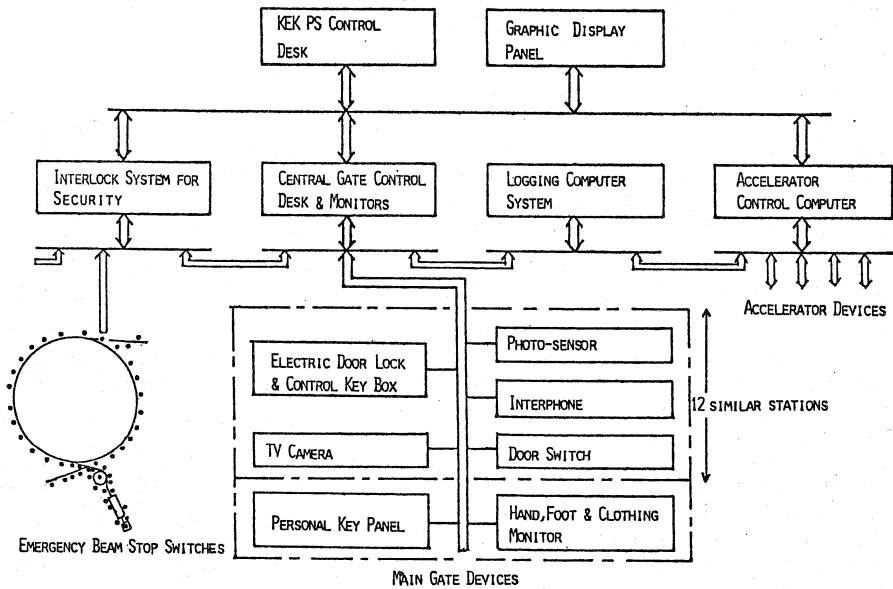


Fig. 1