

ON THE SCHEME OF RADIATION WORKS IN THE KEK

Genichi HORIKOSHI

KEK, National Laboratory for High Energy Physics

Many radiation works must be done to maintain and operate a high energy accelerator. In most case, these radiation works will be concentrated to a fixed part of the staffs. As a result, these fixed group must be undully exposed to the radiation. In the Accelerator Division of KEK, a consensus to share radiation works as equally as possible has been established among the staffs. The details of the consensus are as follows. When a large radiation work is required, the leader of the work can call for helps of other staffs. Staffs who have been less exposed to radiation in the past are selected in order and requested to join the radiation work. A list on which all staffs are ranked in order of the individual "reduced dose", Q_{red} , will be used to select these staffs. Q_{red} is defined as

$$Q_{red} = \int_{-\infty}^0 \frac{1}{A-18} \frac{t}{e^{\tau}} qdt \quad (\tau = 2 \text{ year})$$

where A is the age of the staff and qdt is radiation dose from t to t + dt. After some adjustments between each nominated staff and the leader of the radiation work, a tentative team will be organized for the work. This scheme is expected to reduce the undully concentration of radiation dose to a fixed part of the all staffs.

In figs. 1, 2 and 3 some statistics are summarized. In the figures, a new quantity Q (= dose) is introduced, which is

$$Q = \int_{-\infty}^0 \frac{t}{e^{\tau}} qdt \quad (\tau = 2 \text{ year})$$

These figures show some clear tendencies as follows, i.e.,

- 1) The ratio of ΣQ to ΣQ_{red} increases with time. This implies that the average age of the staffs who are mainly sharing the radiation dose is increasing with time.
- 2) The normalized standard deviation of the individual dose distribution shows a considerable decrease in the last one year. This means that the new scheme has some preferable effect on the distribution of the individual radiation dose.

In the last, it must be mentioned that a remote control assembling device (robot) is also under a development.

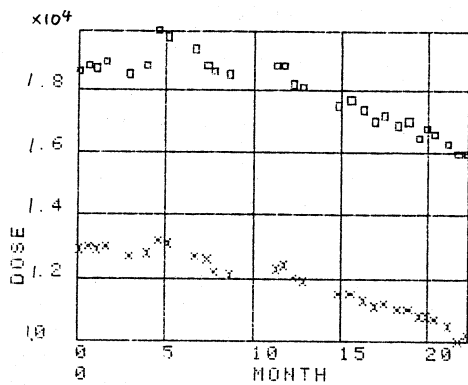


Fig. 1. Summation of dose and "reduced dose" as a function of time(month). (□ : dose and × : reduced dose.)

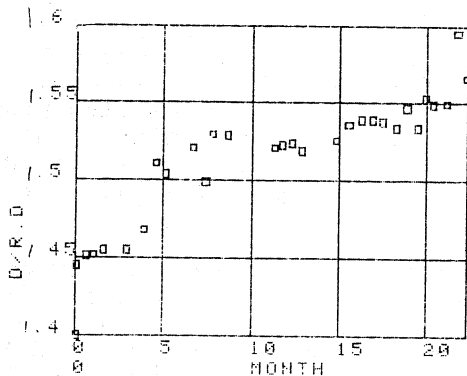


Fig. 2. Ratio of ΣQ to ΣQ_{red} as a function of time.

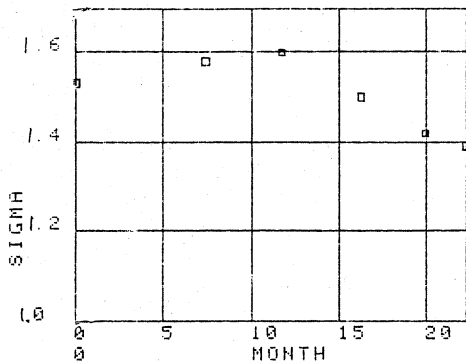


Fig. 3. Normalized standard deviation of Q ($= \sigma / \bar{Q}$) as a function of time.