

## MEASUREMENT OF RADIONUCLIDES INDUCED IN ACCELERATOR STRUCTURE

AT KEK-PS

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## 1. Introduction

Radionuclides induced in accelerator structure by high energy particles are enormous in variety and cannot be identified separately with a NaI(Tl) Scintillator. Therefore, measurements have been done mainly with concern of the variation in gross activity until present. Recently, however, appearance of pure germanium detectors and developing in miniturizing of multichannel pulse height analyzer have helped to provide a portable analyzing system and made the measurement in field possible. Upon providing a system of this kind, measurement of induced activity in the field such as in the accelerator room, has been possible both qualitatively and quantitatively some of the results obtained so far will be reported.

## 2. Method of Measurement

Measurements were performed at various places of KEK-PS facility [Linac (20MeV), Booster (500MeV), Main Ring (8GeV)] by using of a pure Ge detector having the detection efficiency of 3 % to a 3"φ × 3" NaI(Tl) scintillator and a portable multichannel pulse height analyzer on the 77th day after the beam was off. Radionuclides were identified from the pulse height distributions and their relative activities at measurements were obtained from peak areas of the γ rays aimed at and their relative detection efficiencies.

## 3. Results and Discussion

Measured pulse height distribution at Main Ring I-6B is shown in Fig.1 as an example. The identified radionuclides there are  $^{46}\text{Sc}$ ,  $^{48}\text{V}$ ,  $^{51}\text{Cr}$ ,  $^{54}\text{Mn}$ ,  $^{59}\text{Fe}$ ,  $^{56}\text{Co}$ ,  $^{58}\text{Co}$ ,  $^{60}\text{Co}$  and  $^{65}\text{Zn}$ . All of these nuclides have half lives longer than 10 days. The nuclides having half lives shorter than few days may be decayed out during the cooling time (77days). The variation in composition of the activity from place to place are shown in Fig.2 in the form of activity and exposure dose rate. From these figures it is seen clearly that the contribution of  $^{56}\text{Co}$  decreases rapidly and those of  $^{46}\text{Sc}$  and  $^{54}\text{Mn}$  increase rapidly as the proton energy increases.

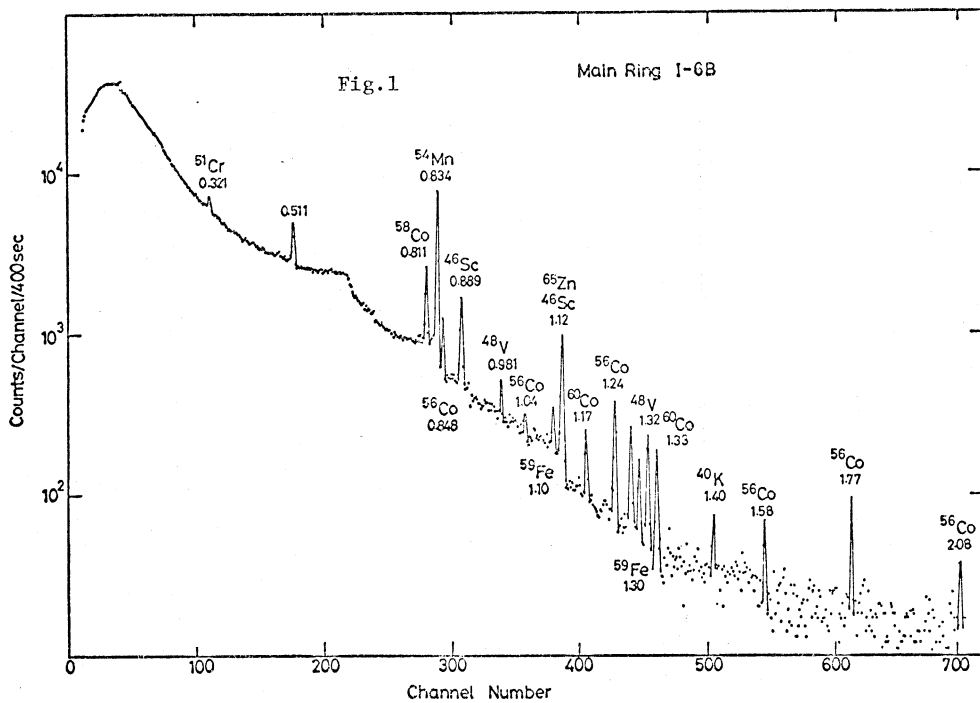


Fig. 1  $\gamma$ -ray pulse height distribution at Main Ring

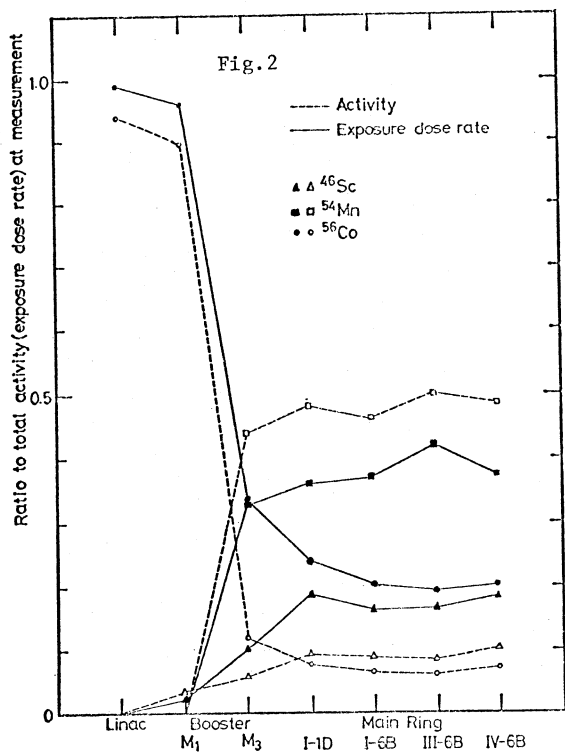


Fig. 2 Variation in composition of activity from place to place