RADON CONCENTRATIONS IN TAIPEI METROPOLITAN RAILWAY STATION

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INTRODUCTION

For routine airborne radon monitoring, including use in field conditions, the technique based on electret ion chamber technology seems to be the most suitable choice in many applications (1). However, this simple and relatively inexpensive method has some specific drawbacks: poorer reproducibility at lower radon concentrations, some uncertainty in the use of manufacturer suggested gamma correction factors, and limited reusability (2).

A modified electret ion chamber method has been proposed (2), but it is mainly for water borne radon measurement. Therefore, we still applied the simple method recommended by the manufacturer to survey radon concentrations in Taipei Railway Station.

MATERIAL AND METHOD

Taipei City is the capital of Taiwan. Its metropolitan railway station was built with concrete elements, two stories underground, and equipped with mechanical ventilation system. The daily number of passengers is about 100,000, and during long weekend it may reach 300,000 per day.

Three types of instrument were used for a period of one-year survey between June 1994 and June 1995. For the radon survey the electret ion chamber was used with a commercial name of E-PERM. For the survey of radon progeny the electret ion chamber equipped with an air pump and filter system was used with a commercial name of E-RPISU. Since both instruments mentioned above cannot detect the instantaneous fluctuation in radon concentrations, a third instrument was added to the one-year monitoring program. It is a pulse type ion chamber equipped with temperature, barometric and humidity gauges (3). The ambient gamma exposure was measured with thermoluminescent dosimeters $CaSO_4$:Dy. All calibrations were performed inside a radon chamber installed at the Taiwan Radiation Monitoring Center.

RESULTS AND DISCUSSION

Radon concentrations at the platform which is located at second basement below the ground floor are shown in Fig.1 while those at the passengers' waiting area which is located at the first basement below ground floor are shown in Fig.2.

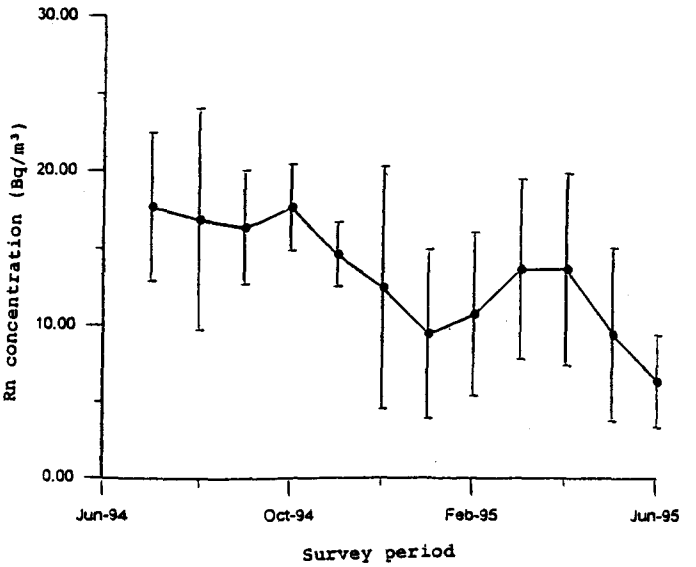

Fig.1 Yearly survey of ^{222}Rn concentrations at the platform.

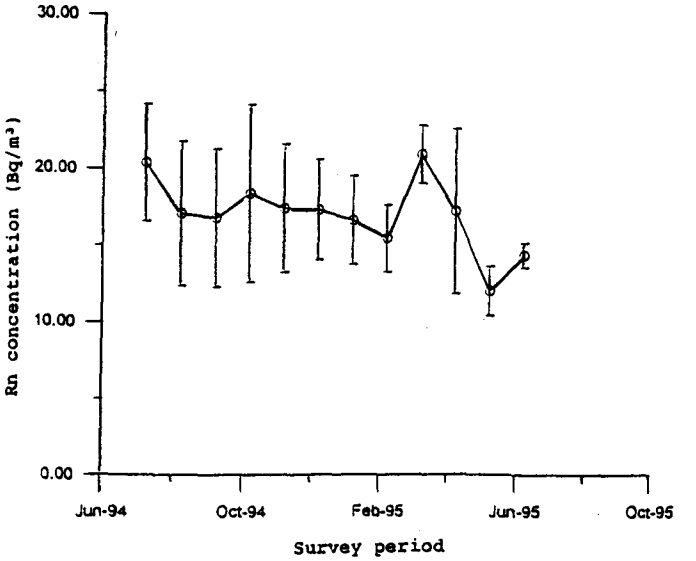

Fig.2 Yearly survey of ^{222}Rn concentrations at the waiting area.

The decrease in radon concentrations as a result of ventilation improvement can be seen in both Figs. 1 and 2. The equilibrium factors varied from 0.29 in hot and humid summer to 0.39 in cold winter with a yearly average of 0.35. The gamma background was rather low with an average energy of about 0.23 MeV.

The annual effective dose received by the Taipei Railway Station personnel is estimated to be about 87 uSv while the annual equivalent dose to lung is about 71 uSv.

ACKNOWLEDGMENTS

Financial support from the Atomic Energy Council of the Executive Yuan (Cabinet) is much appreciated.

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