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TOPICAL SESSIONS
Reports of Co-Chairmen for Highlight Sessions

T-4: Occupational Exposure to Cosmic Radiation

Monday, 15 May 2000

Chair and Keynote: J. Boehm Co-Chair: K. Fujitaka

The topical session "The occupational exposure to cosmic radiation" was started with a keynote T-4-1"Radiation Exposure of Air Crew to Cosmic Radiations" by Dr J.Boehm on behalf of Dr.K.Schunuer of European Commmission who was unable to attend the meeting. He outlined updated scientific and technical information which are related to practical application and legislation.

A problem is that aircrews are quite likely to receive more than 1 mSv in a year, while it is unlikely that they receive more than 20 mSv in a year. Considering this, the keynote started general description on the concenpt and guildlines of what documents of ICRP and European Council Directorate indicated.

To solve the problem, we need to make efforts to do two categories of works, i.e., technical assessment of dose, and considerations on non-technical issues which we need before getting into regulation or legislation procedures.

To assess the dose precisely, we need to develop accurate and reliable instruments and/or computer codes. The instruments include passive and active monitors for ionizing components, neutron specific detectors, and TEPC (Tissue Equivalent Proportional Counter) which covers the both. As to computer code, currently most popular one is CARI-ver.5E which is based on Luin code by Keran O'Brien. But European countries have developed a very practical code EPCARD (European Computer Package for the Calculation of Aviation Route Doses). We need to verify the codes with many on-board measurements.

Beside such technical subjects, we need to pay attention to various non-technical subjects for practical application. For example, we need to design appropriate roster program of aircrews and need to devise ways to avoid excess exposure of pregnant personnels. We also need to know that frequent traveller such as air travel attendants may receive even larger dose than aircrews although they belong to the general public. The keynote was followed by four oral papers.

The paper T-4-3"Cosmic Ray Exposures in Aircraft and Space Flight" by Dr.T.Kosako et al., Japan, discussed the concept as well as scientific basis of any possible dose limit or regulation of cosmic radiation exposure. A poster P-1a-37 by Dr.K.Katoh et al., Japan, also covers the similar subject.

The paper T-4-4 "Aviation Route Dose Calculation and its Numerical Basis" by Dr. H.Schraube et al., Germany & Switzerland, discussed the assessment by the European computer code(EPCARD) while a poster P-1a-44 by Dr.F.Spurny et al, Czech, compared measurements and calculations with another computer code CARI-5E. Large doses of high altitude flights like Concorde's were also discussed.

The paper T-4-5" Assessing Exposure to Cosmic Radiation During Long-haul Flights", by Dr.J.Bottollier-Depois et al., France, presented results of on-board measurements by TEPC in various intercontinental flights. Related to this, four posters (P-1a-36 Dr.N.Vana, Austria; P-1a-41 Dr.K.Fujitaka et al., Japan; P-1a-43 Dr.R.Stokes et al., UK; P-1a-43 Dr.R.Stokes et al., UK) presented measured data with various detectors including TLD, Bonner sphere spectrometer, siebert-counter, Si-pocket dosimeter, CR39 and TEPC, covering either ionizing and neutron doses.

The paper T-4-2 "Organ/Tissue Doses Measured with Integrating Solid Dosemeters in a Low-Earth-Orbit Space Mission" by Dr.H.Yasuda et al., Japan, is related to the spacecraft. It was the first estimation of the effective dose which astronauts would receive in space missions. The measurement, on board MIR/Shuttle STS-91, was done with a human phantom made of tissue equivalent plastic in which numbers of passive detector tips were installed. The estimated effective dose was about 90% of skin dose, and this information would be useful in practising the dose control.

Compared to previous meetings, the number of papers on cosmic radiation dose have obviously increased, and it was realized that the radiation protection in airflights has become an important core of IRPA activities.