RESEARCH TOPICS RELATED TO OCCUPATIONAL RF EMF EXPOSURE

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INTRODUCTION

Research on radiofrequency (RF) electromagnetic field (EMF) exposure of workers has declined over the last 15 years as public and regulatory attention has shifted to concerns about mobile base stations, mobile phones and other consumer telecommunication products. However, there still remain many unresolved and interesting topics of research in defining and ensuring safe RF EMF exposure of workers. Occupational settings also offer a very diverse range of RF EMF exposures, including very high powered exposures over a large frequency range. Furthermore, with the cooperation of OH&S departments in work organizations, the exposure and health of occupational exposure populations can often be relatively easy to track. The purpose of this presentation is to highlight and promote occupational topics for further research.

DISCUSSION

Listed below are a range of occupational RF EMF research opportunities which will be discussed in the presentation.

RF EMF accident statistics

One of the very curious deficiencies in the RF EMF research database is an almost complete lack of information on the type and extent of RF EMF injuries experienced by occupationally exposed personnel. Without knowledge of what injuries occur, where they occur, their severity and their incidence rate, it is very difficult to devise meaningful RF safety standards and to assess their effectiveness. Workplaces that are genuinely interested in safety offer good possibilities for monitoring RF EMF accident statistics. It would be particularly interesting to observe differences in different industry settings, and between countries with different RF safety regulations, or perhaps even no RF safety regulations at all.

Induced current measurements

Although exposure limits for induced currents (i.e. contact and limb currents) are commonly specified in RF safety standards, they are rarely assessed for compliance in the workplace. This is partly because there is confusion about the appropriateness of different techniques for measuring induced currents, and the role of measurement uncertainty caused by variation in the assessor's body for current probe and stand on plate measurements. There is also a need to substantiate a commonly held view that E and H measurements can suffice for induced current measurements. For calculated evaluations, there is a need to define a standard model of body impedance for doing assessments.

Rethinking the role of SAR limits in the safety management of RF thermal hazards

The safety management of RF thermal hazards is based on the SAR dose model, which was borrowed from dosimetry practices in managing ionizing radiation hazards. However, how can this approach be reconciled to the distinctly different way in how other thermal load hazards in the work place (e.g. air temperature, conducted heat, radiant heat, metabolic work loads, etc) are managed, where safety practices, rather than dose limits are used. Also, given

the physical implausibility of experiencing adverse whole body heating effects from occupational RF exposures, should we still persist in retaining whole body average (WBA) SAR limits, and basing the derivation of E and H reference levels on limiting WBA SAR? Localised heating hazards are far more plausible and it would not be better to derive E and H reference levels on protecting against them. Recent huge advances in RF and thermal body modeling make this task possible.

Some other topics for research on occupational RF EMF exposure

How to quantify the shielding effectiveness of RF suits.

Do pregnant workers require extra special RF safety precautions?

How should uncertainty in RF exposure evaluations be used in assessing compliance with dose limits?

How can dose exposure limits be replaced with simple procedures to achieve safety?

What is the best way to communicate the safe control of RF hazards to workers