

Esposizione professionale a campi magnetici a 50 Hz in lavoratori addetti a varie mansioni

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KEY WORDS

ELF magnetic fields; job exposure

SUMMARY

«Occupational exposure to 50 Hz magnetic fields in workers employed in various jobs». Background: Information on occupational exposure to ELF magnetic fields (MF) in workers is largely insufficient, and is mostly based on results obtained in Scandinavian countries and North America. Accordingly, the collection of further data is needed, especially in workers exposed in other countries, including in Italy. **Methods:** One hundred and fifty workers (84 males and 66 females) employed in 28 different jobs in the Emilia-Romagna Region of Italy were examined. Individual exposure was measured using personal monitors worn on the hip in a belted pouch during three whole work-shifts (8 hours each) of a normal working week. A sampling interval of 10 seconds was adopted, resulting in the collection of more than 8600 measurements for each worker. The individual Time-Weighted Average (TWA) occupational exposure of workers was calculated as the arithmetic mean of all measurements during each work-shift. Environmental non-occupational exposure was also measured. **Results:** The 50° percentile of individual TWA in the whole group was $0.15 \mu T$, and the 5°-95° percentile was respectively $0.02-1.45 \mu T$. Job-related exposure (expressed as the mean of the TWA measured in all workers engaged in that job) was highest in substation electric power plant workers ($1.12 \mu T$) and in sewing machine workers ($0.84 \mu T$), but was lower than $0.2 \mu T$ in more than the 70% of the examined jobs. Considering the geometric mean of individual TWA are 27 out of 28 the jobs inducing an exposure lower than $0.2 \mu T$. The lowest exposure was observed in infant school teachers. A high variability was observed among different workers engaged in the same occupation, mainly in substation electric power plant workers, machine testers and grinders in the engineering industry and in sewing machine workers and quality control in garment production. A marked variability of the pattern of exposure during the work-shift was also observed. The overall environmental (non-occupational) exposure was $0.044 \mu T$, and individual exposure was lower than $0.2 \mu T$ in about 97% of the examined subjects. Occupational exposure was usually higher and was not correlated with environmental exposure. **Conclusions:** The results show that the occupational component of overall exposure must be considered in studies on the biological effects of ELF-MF in populations. The high variability observed among workers engaged in the same occupation and the variability of the pattern of exposure certainly

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constitute major problems and could be a cause of the scarce coherence of the results of epidemiological studies on biological effects of ELF-MF to date. An improvement in protocols for the evaluation of exposure in workers, including the use of personal monitoring, is certainly needed.