www.leenakorpinen.fi
The English version is a summary of the more extensive situation report bulletin in Finnish.

More Information on Exposure to Extremely Low-Frequency Electric and Magnetic Fields

Situation Report Bulletin 1 / 2011 - published 30 June 2011

Contents

Tampere University of Technology, Department of Energy and Process Engineering
Situation Report Bulletin ISSN 1799-4594

No. 01

Editorial

In the last six months, a number of international conferences or seminars – more than usual – have discussed the health issues related to extremely low-frequency fields. The European Bioelectromagnetics Association (EBEA) organised its tenth conference in Rome in February. The International Council on Large Electric Systems (CIGRE) held its EMF-ELF 2011 conference in Paris in March, and in May it was time for the NIR & Children’s Health conference in Ljubljana, co-organised by the WHO and the ICNIRP. This time I will start by

presenting some papers published by the Tampere University of Technology at the Rome conference. I have also included some articles from the CIGRE conference in the latter part of the bulletin.

The issues discussed at the CIGRE conference were also highlighted in Rome and Ljubljana. What was especially interesting for me to hear at the Rome conference was that a research group was planning to investigate the health effects of magnetic fields of more than 1000 μT. In recent years, the effects of clearly smaller magnetic fields have already been studied quite extensively.

In Ljubljana, my interest was piqued by a French study that found out that with children the higher than usual magnetic field exposure (more than 0.4 μT) is mostly caused by clock radios. The researchers had studied the exposure of about 1,000 children. I think their observations are quite significant – it will be interesting to see how this information influences future studies. The proportion of exposure caused by power lines is clearly lower than perhaps previously assumed.

I also found some interesting new scientific articles for this bulletin. They include an analysis on the relationship between magnetic field exposure and childhood leukaemia, and a study on human cognitive performance in a magnetic field. An Italian research group conducted an extensive follow-up study on workers' exposure at work, at home and outside the home.

Even though this bulletin focuses on extremely low-frequency electric and magnetic fields, I also included one article that deals with intermediate frequencies (300 Hz–100 kHz). The article in question presents a study on plasma balls, which mainly serve as decorative items or touchable toys in which a suitable voltage and ionised gas are used to create bursts of electric discharge. The plasma ball is a good example of facing a high-level exposure without even necessarily realising this is the case. People certainly come up with all sorts of interesting things!

As previously stated, this bulletin focuses on extremely low-frequency electric and magnetic fields, but I'd still like to mention that the IARC, the WHO's cancer research agency, classified the radiofrequency electromagnetic fields related to mobile phones as possibly carcinogenic to humans (Group 2B) in its 31 May 2011 decision. The news attracted a lot of attention in the media.

Just when I was about to publish this report, the European Commission gave its proposal for the directive on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields). The proposal includes the following values (for 50 Hz fields): orientation values 10 kV/m and 1000 μT, action values 20 kV/m and 13320 μT. It also proposes binding exposure limit values (internal electric field values in the human body), which in practice could only be exceeded at exposure levels higher than the external electric or magnetic field values mentioned above. The directive proposal will now be sent to the EU institutions for further action. I will return to the subject in the next bulletin.

Hope you enjoy reading this summary in English!

Leena Korpinen,
Editor-in-chief, Situation Report Bulletin
Tampere University of Technology, Environmental Health

The Finnish situation report bulletin includes summaries of the following publications, preceded by the editor-in-chief's comments.

No. 02

Articles on Exposure to Electric and Magnetic Fields Presented at the Rome Conference

Editor-in-chief's comment: Finnish research data were presented at the 10th International Conference of the European Bioelectromagnetics Association in Rome. The articles focused on occupational exposure, which is often quite low, with the measured values remaining low.

Sources:

Korpinen L, Lahtinen S, Gobba F 2011. Comparison between the occupational ELF magnetic field exposure in Finland and in Italy. 10th International Conference of the European Bioelectromagnetics Association, Rome, 21-24 February 2011

Alanko T, Pääkkönen R, Lahtinen S, Korpinen L, 2011. Examples of occupational ELF electric and magnetic field exposure in Finland. 110th International Conference of the European Bioelectromagnetics Association, Rome, 21-24 February 2011

Pääkkönen R, Lahtinen S, Korpinen L, 2011. The doors of operating devices mitigation influence to the electric field exposure at 100 kV substation on service platforms. 10th International Conference of the European Bioelectromagnetics Association, Rome, 21-24 February 2011

No. 03

Pooled Analysis of Recent Studies on Magnetic Fields and Childhood Leukaemia

Editor-in-chief's comment: The researchers came to the conclusion that the new studies on magnetic fields and childhood leukaemia did not warrant changes to the earlier view that exposure to magnetic fields is possibly carcinogenic.

Source:

Kheifets L, Ahlbom A, Crespi CM, Draper G, Hagihara J, Lowenthal RM, Mezei G, Oksuzyan S, Schüz J, Swanson J, Tittarelli A, Vinceti M and Wunsch Filho V. Pooled analysis of recent studies on magnetic fields and childhood leukaemia. British Journal of Cancer 2010;103, 1128–1135.

No. 04

Human Cognitive Performance in a 3 mT Power-Line Frequency Magnetic Field

Editor-in-chief's comment: The study did not verify the assumption that magnetic fields would have a clear impact on human cognitive performance. The researchers say, however, that extremely low-frequency magnetic fields may interfere with some neurological processes related to short-term learning effect.

Source:

Corbacio M, Brown S, Dubois S, Goulet D, Prato F.S, Thomas A.W, Legros A. Human Cognitive Performance in a 3 mT Power-Line Frequency Magnetic Field. Bioelectromagnetics 2011

No. 05

Occupational and Environmental Exposure to Extremely Low Frequency-Magnetic Fields: a Personal Monitoring Study in a Large Group of Workers in Italy

Editor-in-chief's comment: The article discussed a study on Italian workers' exposure at work, at home and outside the home. Median exposures were quite low (0.14 μT at work, 0.3 μT at home and 0.05 μT outside the home).

Source:

Gobba F, Bravo G, Rossi P, Contessa G, Scaringi M. Occupational and environmental exposure to extremely low frequency-magnetic fields: a personal monitoring study in a large group of workers in Italy. Journal of Exposure Science and Environmental Epidemiology (2011).

No. 06

Assessment of Exposure to Intermediate Frequency Electric Fields and Contact Currents from a Plasma Ball

Editor-in-chief's comment: An interesting example from our living environment: a device (toy) that causes surprisingly high exposure. Plasma balls function at intermediate frequencies (300 Hz–100 kHz), so the exposure they cause is not comparable with that caused by the electric system.

Source:

Alanko T, Puranen L, Hietanen M. Assessment of Exposure to Intermediate Frequency Electric Fields and Contact Currents From a Plasma Ball. Bioelectromagnetics 2011

No. 07

Extremely Low-Frequency Electromagnetic Fields Exposure and Female Breast Cancer Risk: a Meta-Analysis

Editor-in-chief's comment: This meta-analysis covered a total of 15 studies carried out between 2000 and 2009 including more than 24,000 diagnosed breast cancer cases. The researchers conclude that exposure to extremely low-frequency magnetic fields has no association with susceptibility to female breast cancer.

Source:

Chen C, Ma X, Zhong M, Yu Z. Extremely low-frequency electromagnetic fields exposure and female breast cancer risk: a meta-analysis based on 24,338 cases and 60,628 controls. Breast Cancer Res Treat 2010

No. 08

A Brief Overview of Epidemiology and Laboratory Science Concerning Power-Frequency Electric and Magnetic Fields

Editor-in-chief's comment: The researchers compiled an overview of the effects of power-frequency electric and magnetic fields. According to the researchers, there are no accepted results obtained in laboratory studies to prove the carcinogenic effect of magnetic field exposure on animals, nor have the mechanisms been explained in a generally accepted way.

Source:

Mezei G, Kavet R. A Brief Overview of Epidemiology and Laboratory Science Concerning Power-Frequency Electric and Magnetic Fields. EMF-ELF-2011: B-O-01

No. 09

Exposure of the French Population to 50 Hz Magnetic Fields: General Results and Impact of High Voltage Power Lines

Editor-in-chief's comment: An extensive study into public exposure to extremely low-frequency magnetic fields was conducted in France. The arithmetic mean of more than 0.4 μT was found with 3.1% of the children, whose main source of exposure was a clock radio.

Source:

Magne I, Souques M, Lambrozo J, Bedja M, Fleury G, le Brusquet L. Exposure of the French population to 50 Hz magnetic fields: general results and impact of high voltage power lines. EMF-ELF-2011: B-O-02

No. 10

EEG Frequency Analysis of 60 Hz Magnetic Field Exposure within the MRI

Editor-in-chief's comment: This research group explored the effect of magnetic fields on human neurophysiology. Its work showed that an EEG data taken during 60 Hz exposure within the MRI environment can be analysed without the various disturbing factors related to the testing arrangement distorting the results.

Source:

Modolo J, Juen N, Robertson J.A, Thomas A.W, Legros A. EEG frequency analysis of 60 Hz magnetic field exposure within the MRI. EMF-ELF-2011: B-O-04

No. 11

Multi-Modalities Investigation of 60 Hz Magnetic Field Effects on the Human Central Nervous System

Editor-in-chief's comment: The article reports on a study that used MRI to examine the effects of 3000 μT (60 Hz) magnetic fields on human cognitive performance and brain activation. The research group's plans for further study are also shared.

Source:

Legros A, Miller J, Modolo J, Corbacio M, Robertson J, Goulet D, Lambrozo J, Plante M, Souques M, Prato F.S, Thomas A.W. Multi-modalities investigation of 60 Hz magnetic field effects on the human central nervous system. EMF-ELF-2011: C-O-01

No. 12

Occupational and Residential Exposure to Extremely Low Frequency Magnetic Fields and Neurodegenerative Disease: a Meta-Analysis

Editor-in-chief's comment: The aim of the research group was to compile a comprehensive and critical assessment of the association between exposure to extremely low-frequency magnetic fields and neurodegenerative diseases. The authors think that the results will contribute to identifying methodological problems in the current data and to defining future research subjects.

Source:

Mezei G, Cho Y.S, Vergara X, Kheifets L. Occupational and Residential Exposure to Extremely Low Frequency Magnetic Fields and Neurodegenerative Disease: A Meta-Analysis. EMF-ELF-2011 – B-O-03

No. 13

‘‘Dirty Electricity’’: What, Where, and Should We Care?

Editor-in-chief’s comment: The researchers conducted a literature search using the terms “dirty electricity” and “high-frequency voltage transients”. They found significant methodological shortcomings in the existing studies.

Source:

De Vocht F. ‘‘Dirty electricity’’: what, where, and should we care?. Journal of Exposure Science and Environmental Epidemiology (2010) 20, 399–405

Editorial staff
Editor-in-chief: Leena Korpinen
Editorial assistant: Sonator Oy
Graphic and technical realisation: Zento Oy
The Finnish situation report bulletin is funded by Fingrid Oyj. The Finnish Ministry of Employment and the Economy is contributing to the work of the project’s management group.
The next situation report bulletin will be published towards the end of 2011.
The archive is available at www.leenakorpinen.fi.

Tampere University of Technology, Department of Energy and Process Engineering
Situation report bulletin ISSN 1799-4594