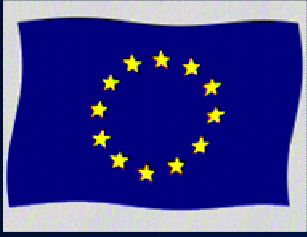


Electromagnetic Fields:

Protection of Workers Exposed to EMF in the European Union: **Directive 2004/40/EC**

1. The philosophy behind?
2. Possible implementation problems?

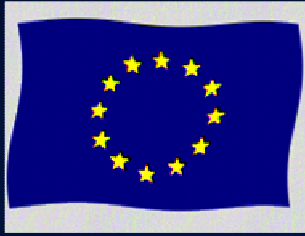
Georges HERBILLON
European Commission (DG EMPL/F4)



Health & Safety at Work

**Directive 2004/40/EC of the European
Parliament and of the Council
of 29 April 2004
on the minimum H & S requirements
regarding the exposure of workers to the
risks arising from physical agents
(electromagnetic fields)**

*Published in OJ L 184 of 24 May 2004 (corrected
version)*

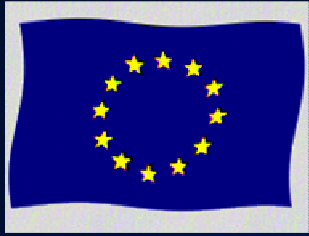


Electromagnetic Fields:

Exposure Limit Values in the directive = ICNIRP Basic Restrictions

Frequency range	Current density for head and trunk J (mA/m ²) (rms)	Whole body average SAR (W/kg)	Localised SAR (head and trunk) (W/kg)	Localised SAR (limbs) (W/kg)	Power density S (W/m ²)
Up to 1 Hz	40	–	–	–	–
1 - 4 Hz	40/f	–	–	–	–
4 - 1000 Hz	10	–	–	–	–
1000 Hz – 100 kHz	f/100	–	–	–	–
100 kHz – 10 MHz	f/100	0.4	10	20	–
10 MHz – 10 GHz	–	0.4	10	20	–
10 – 300 GHz	–	–	–	–	50

No ceiling values for Static Magnetic fields



EMF Directive

Annex of the directive:

1) Table 1

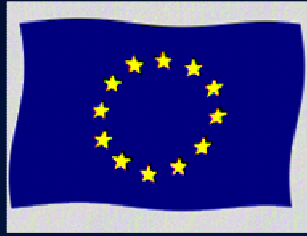
Exposure Limit Values

(Occupational Basic Restrictions)

2) Table 2

Action Values

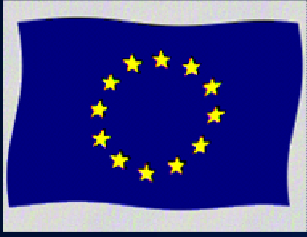
(Occupational Reference Levels)



- Carcinogens
- Biological Agents
- Chemical Agents
- **Physical Agents:**
 - **Noise (2003/10/EC)**
 - **Vibrations (2002/44/EC)**
 - **EMF(2004/40/EC)**
 - **Optical Radiation (2006/25/EC)**
- Manual Handling of Loads
- Asbestos
- Workplaces
- Work Equipment, Scaffolding
- Personal Protective Equipment
- Display Screen Equipment
- Safety Signs
- Pregnant Women
- Young People
- Construction Sites
- Mineral-extracting Industries
- Drilling in Mineral-extracting Industries
- Fishing Vessels
- Explosive Atmospheres

**Framework Directive
89/391/EEC**

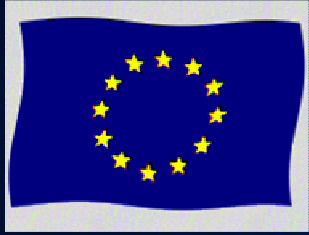
**to encourage improvements in health
and safety at work**



Health and safety at work

General philosophy of EU legislation:

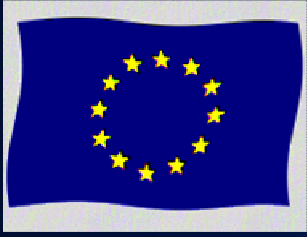
- *Responsibility on employer*
- *Ex ante risk assessment*
- *Eliminate or reduce risks*
- *Information, training and consultation of workers*
- *Medical surveillance*
- *Follow-up of implementation*



Health & Safety at Work

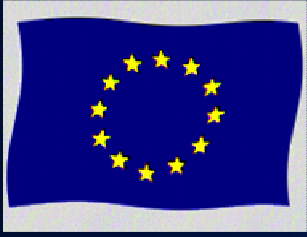
Some historical background...

- *Draft Proposal was adopted by the Commission on 23 December 1992 [COM(92) 560 final], included 4 physical agents: Noise, Vibrations, EMF and Optical radiation*



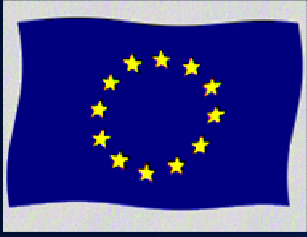
Health & Safety at Work

- *Discussions started at Council level in 1999 during German Presidency. Initial proposal was split in 4 directives.*
- *Two first directives “Vibrations” and “Noise” were adopted by the E.P. and the Council in 2002 and 2003.*



Health & Safety at Work

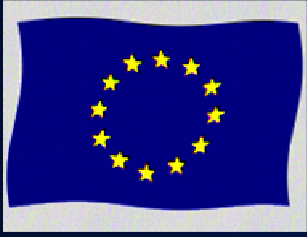
- *The Danish Presidency and the Commission services organised a Seminar in September 2002 to update knowledge on EMF.*
- *From September 2002 until October 2003: discussion in Council and European Parliament (compromise on static fields)*
- *Formal adoption on 29 April 2004*



EMF Directive

General Provisions :

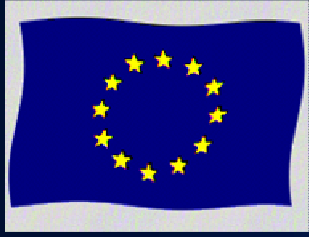
- **Article 1: “Aim and Scope”**
 - *Risks from exposure to electromagnetic fields - EMF (0 Hz to 300 GHz)*
 - *Risks due to **known short-term adverse effects** in the human body*
 - *It does not address the long-term effects*
 - *It does not address the risks resulting from contact with live conductors*
 - **Directive 89/391/EEC fully applies**



EMF Directive

General Provisions :

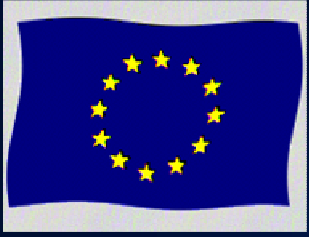
- **Article 2: “Definitions”**
- **Article 3: “Exposure limit values and action values”**
(following ICNIRP recommendations)



EMF Directive

Obligations of Employers :

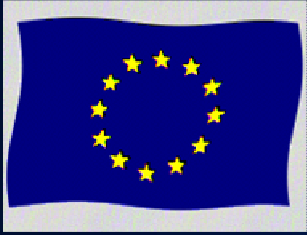
- **Article 4**: *“Determination of exposure and assessment of risks”*
- **Article 5**: *“Provisions aimed at avoiding or reducing risks”*



EMF Directive

Obligations of Employers :

- **Article 6: “Workers’ information and training”**
- **Article 7: “Consultation and participation of workers”**



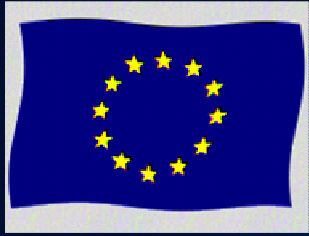
EMF Directive

Miscellaneous Provisions :

Article 8: “Health surveillance”

Article 9: “Sanctions”

Article 10: “Technical amendments”

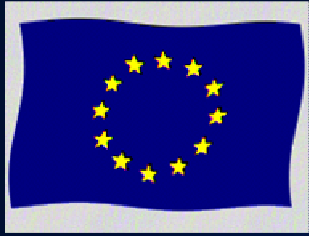


EMF Directive

Implementation problems ?

Concerns recently reported to the Commission:

- *In welding processes*
- *In medical MRI*

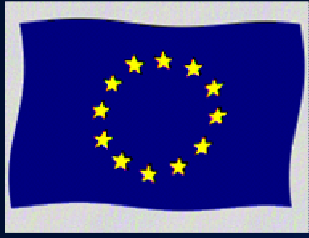


EMF Directive

Implementation problems?

Employers' obligations:

- **Thorough analysis of the workplace (including noise): quantification of the problems**
- **Possible organisational changes**
- **Possible changes in working procedures**
- **Possible behavioral changes**
- **Modification in design of equipment**
- **Use appropriate modelling**



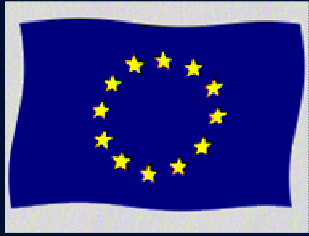
EMF Directive

Implementation problems?

Commission's duties:

(as « Guardian of the Treaties »)

- Comprehensive analysis of the situation
- Examine possible solutions with users
- Interrogate scientific community on possible readjustments of exposure limits **without reduction of workers' protection.**

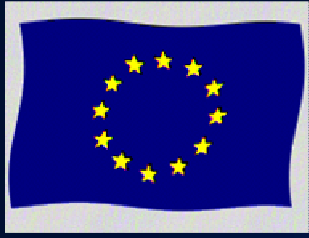


EMF Directive

Implementation problems ?

CONCLUSIONS:

- 1)* Scientists have found clear evidence that exposure to EMF can entail risks and the Directive has established rules based on these findings. Moreover, the EU provisions are in line with limitations imposed or recommended in other developed countries worldwide.

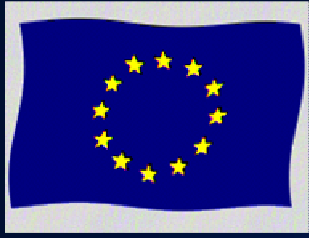


EMF Directive

Implementation problems ?

CONCLUSIONS:

- 2) Up to now it is not clear to what extent the provisions of the directive would jeopardize the use of MRI equipment by medical personnel. Therefore the Commission has initiated a thorough measurement campaign, with the active cooperation of the MRI practitioners and the MRI equipment manufacturers.

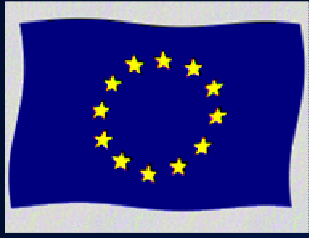


EMF Directive

Implementation problems ?

CONCLUSIONS:

- 3) Should the calculated levels of exposure of medical personnel using MRI equipment exceed the set ELVs despite appropriate correction measures in place, the Commission will re-examine the situation in light of such findings and report.

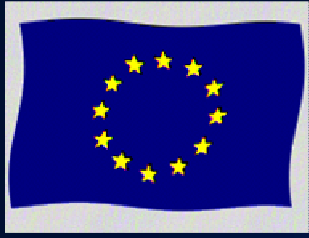


EMF Directive

Implementation problems ?

CONCLUSIONS:

4) In parallel, the Commission will, as provided for in the directive, consult experts and scientists, objectively analyse publications giving concrete indications in one direction or the other, follow the ongoing work on health risks from exposure to EMF, assess the practical implementation of the directive in all sectors and report.

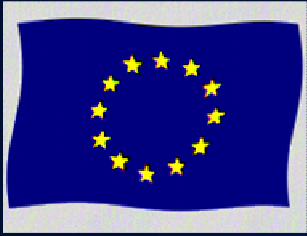


EMF Directive

Implementation problems ?

CONCLUSIONS:

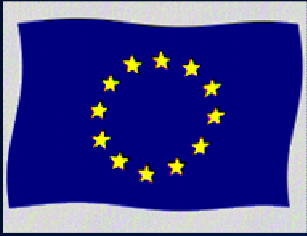
5) This is expected to happen in 2007. If the collected data and new scientific information justify it and indicate that a change will not affect the level of protection of the workers exposed to EMF, then – and only then – the Commission may (would be allowed to) make a proposal for a modification of the Directive.



EMF Directive for occupational exposure



*Thank you
for
your attention*



EMF Directive

The specific case of MRI

Magnetic Field (Frequency of)	Action Value (Magnetic flux density)	Exposure Limit Value Head & Trunk	Exposure Limit Value Whole Body (average SAR)	Exposure Limit Value Limbs
STATIC (0 Hz)	200 mT	None	None	None
Switched Gradient (ca 1000 Hz)	30.7 μ T	Current Density = 10 mA/m ²	None	None
RF field (10-110 MHz)	1) 0.2 μ T & 2) S_{eq} = 10 W/m ² 3) I_c = 40 mA 4) I_L = 100 mA	SAR = 10 W/kg	SAR = 0.4 W/kg	SAR = 20 W/kg