Practical aspects of EMF management

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EU DIRECTIVE 2004/40/EC

DIRECTIVE 2004/40/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

ON THE MINIMUM HEALTH AND SAFETY REQUIREMENTS REGARDING THE EXPOSURE OF WORKERS TO THE RISKS ARISING FROM PHYSICAL AGENTS (ELECTROMAGNETIC FIELDS) (18TH INDIVIDUAL DIRECTIVE WITHIN THE MEANING OF ARTICLE 16(1) OF DIRECTIVE 89/391/EEC)

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EU directive

"It is now considered necessary to introduce measures protecting workers from the risks associated with electromagnetic fields"

".....the employer shall assess and, if necessary, measure and/or calculate the levels of electromagnetic fields to which workers are exposed"

"Employers should make adjustments in the light of technical progress and scientific knowledge"

"..preventive measures into the design of workstations and by selecting work equipment"

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Documents to be applied

Directive 89/391/EEC

EU-directive 2004/40/EC

PrEN 50499: Determination of workers exposure to electromagnetic fields

PrEN 50413: Basic standard on measurement and calculation procedures for human exposure to electric, magnetic and electromagnetic fields (0 Hz – 300 GHz)

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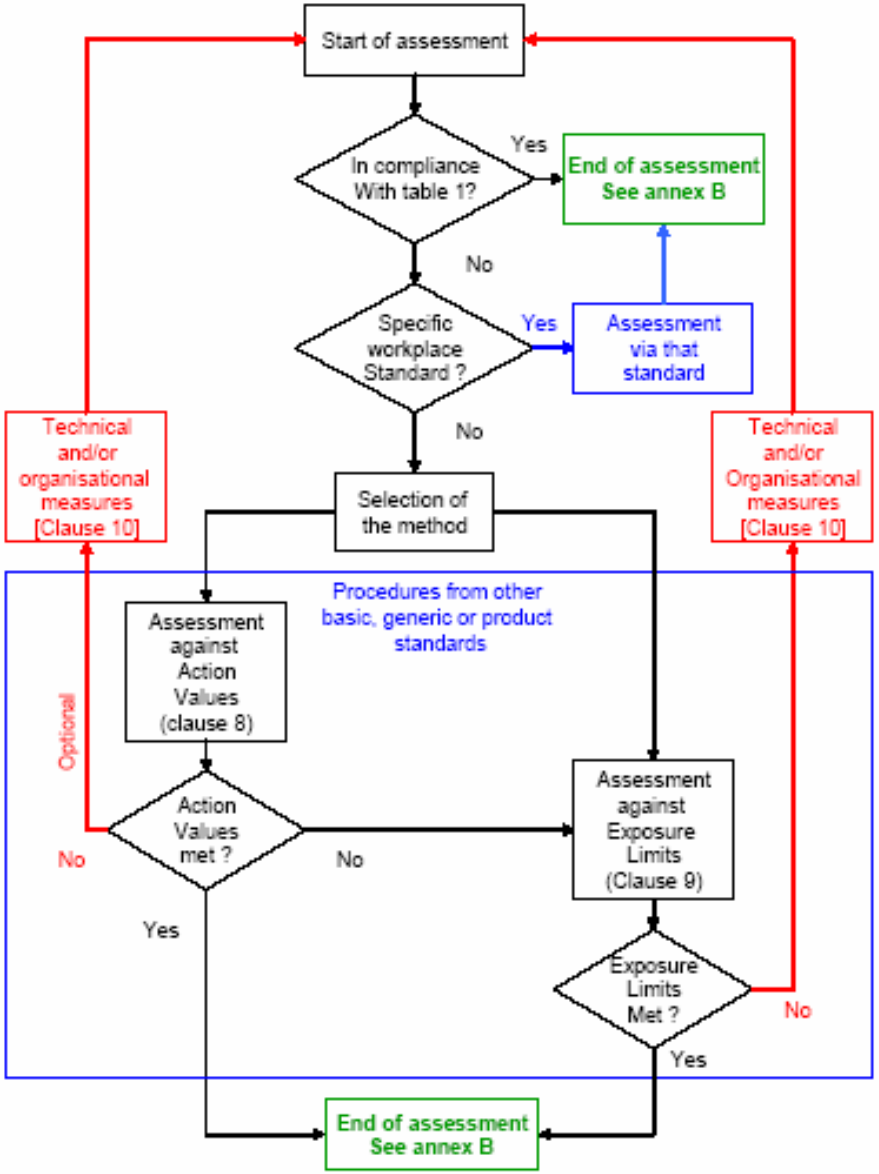
DRAFT EUROPEANSTANDARD prEN 50499



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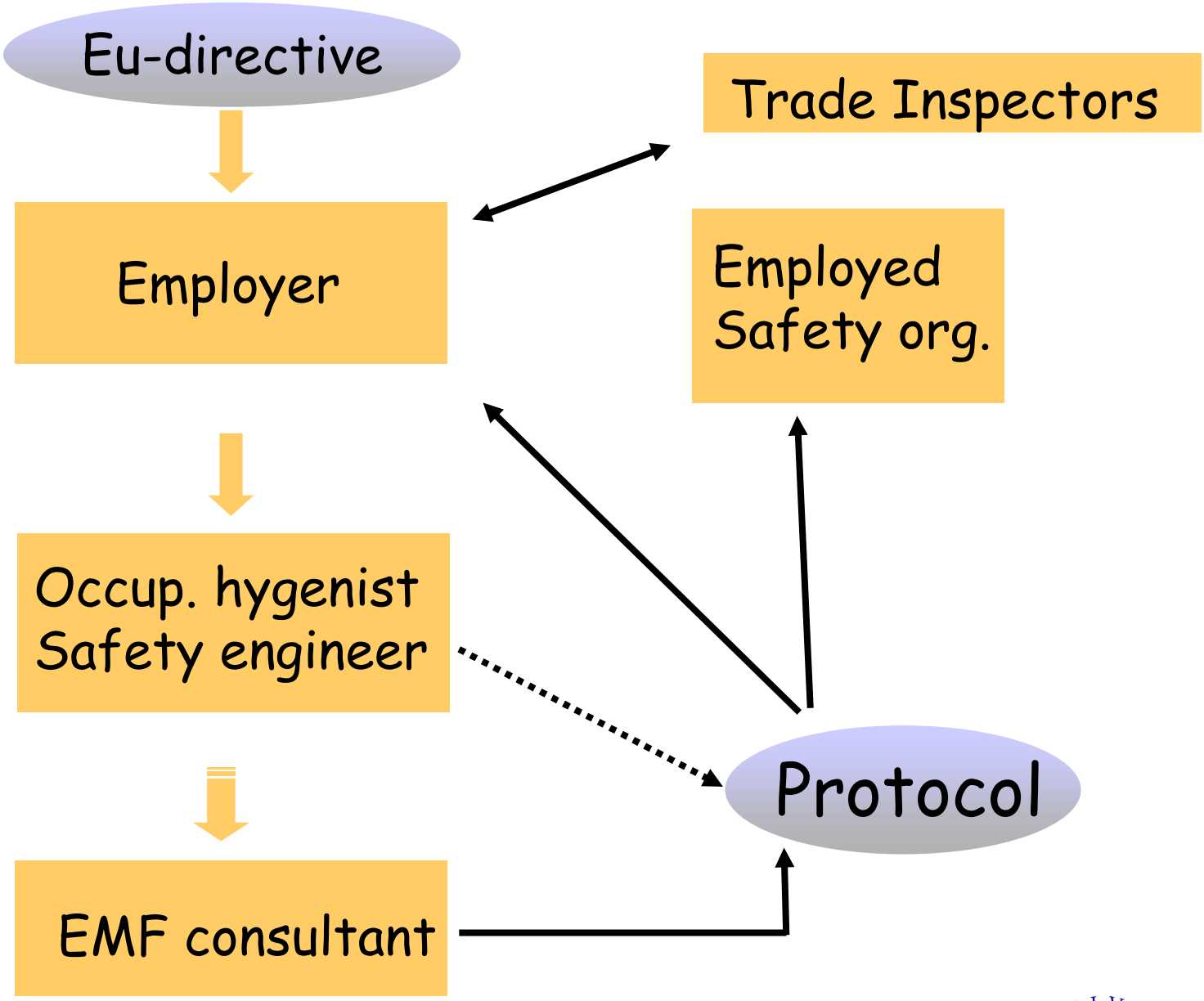

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Different levels of knowledge about EMF

Different education

The employer	What´s the obligation ?
The safety engineer	How to do the assessment ? What to ask for?
The EMF consultant	How to do the measurements ?
Trade inspectors	How to read the protocol ?

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Three levels of education

employer

- EU-directive – obligation

safety engineer

- Make the assessment
  Order the measurements

EMF consultant

- Take measurements
  Standards
  Emission-exposure
  Instrumentation

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prEN 50413

Chapter 8.2.2 Presentation of measurement results

The following information should be provided when measurement results are presented:

- identification of assessment report;
- date and time of measurements;
- persons who performed the measurement(s);
- location of measurement (e.g. room number, street address);
- characteristics of the relevant em field sources (e.g. frequency, modulation, model, serial number);
- identification of each measuring instrument: brand name, model (and serial number);
- operating conditions of the relevant em field source during measure (power);
- settings of the measurement equipment (e.g. measurement range, pass band, sampling frequency);
- environmental conditions (e.g. temperature);
- total measurement uncertainty;
- location of measurement positions;
- the rationale for the measuring positions (e.g. because of possible locations and activities of exposed persons);
- results of each performed assessment;
- date of last calibration of the measurement equipment.

Other information which may be provided, when appropriate, includes:

- drawings, photographs which describe the area and locations where measurements are performed;
- statistical information, e.g. the largest and smallest field values, median, geometric mean, etc.;
- frequency resolution of spectra for fields containing multiple frequencies.

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- Characteristics of the relevant em field sources (e.g. frequency, modulation, model, serial number)
- Settings of the measurement equipment (e.g. measurement range, pass band, sampling frequency)
- Total measurement uncertainty
- Date of last calibration of the measurement equipment
- Frequency resolution of spectra for fields containing multiple frequencies

EMF consultant

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EMF consultant
Safety engineer

Protocol

Information to the employer
and the employees

Take action depending on the result

Reduction
Shielding
Change way of working

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EMF source/workplace	Frequency range			
	Static	ELF	IF	RF
Power stations, switch yards		x		
Induction heating		x	x	x
RF dielectric heating				x
Arc-welding (MIG, MAG, TIG, etc.)		x	x	x
Spot welding		x	x	
Broadcasting systems and devices				x
Mobile telephony base stations				x
Electric handheld tools		x	x	
RFID/EAS and others anti-theft equipment	x	x	x	x
Industrial magnetizers/demagnetizers	x	x		
Surgical and physiotherapeutic diatermy			x	x
NMR/MRI medical diagnostic equipment	x	x		x
Transcranial magnetic stimulation		x	x	

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Electricity production and distribution (50/60 Hz)

At power stations, busbars carry high currents emitting relatively strong magnetic fields.

High voltage switch yards have E-fields about 10-20 kV/m

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RF sealers

Operates at 13 or 27 MHz

High power output, 5-30 kW

Worst case ? Take action ?

Tarpaulin worker

Ready-made clothing

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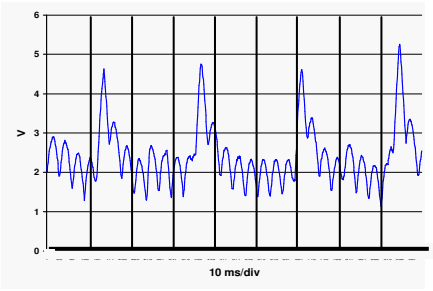
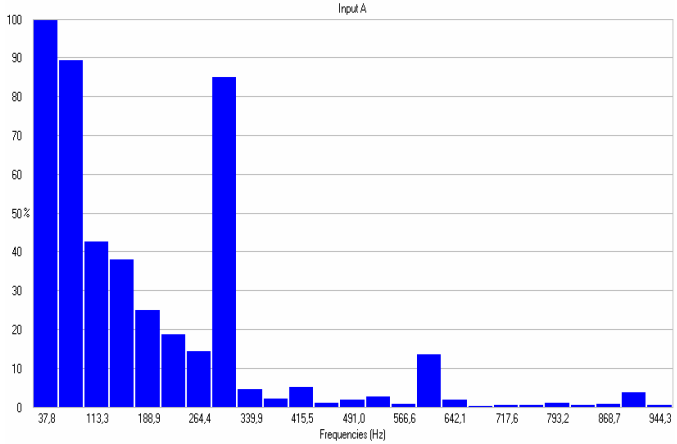
Arc welding





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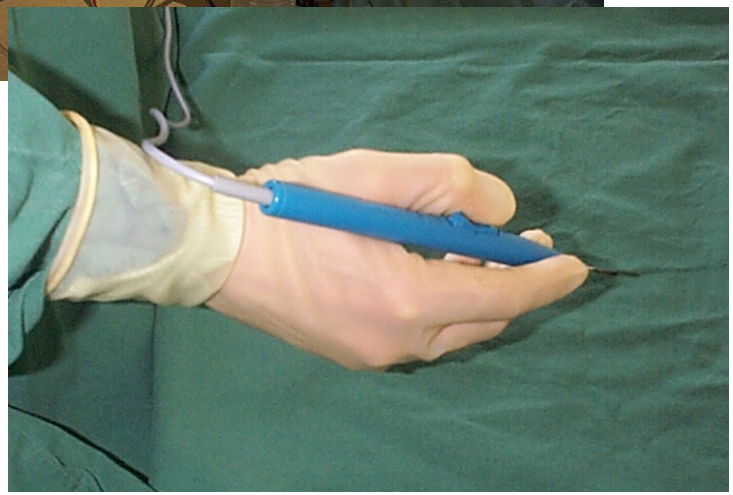
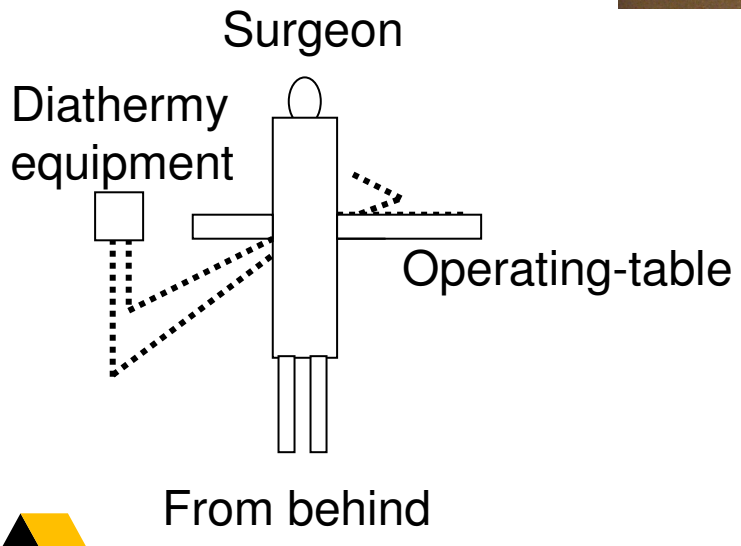
Surgical diathermy

Cutting mode:
The 0.5 MHz E field (*rms*) ranged typically from
0.5 – 1.0 kV/m





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Criteria on education/knowledge?

Requirement of basic education

EMF consultant

- Procedure
- Protocol
- How to present the results
- How to deliver information to the employer/the employees
- Advise for actions

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Noise

"Of importance that
the consultants who perform the
measurements have knowledge about
relevant standards, how to measure,
uncertainty, instruments and are confident
with the situation at the workplace."

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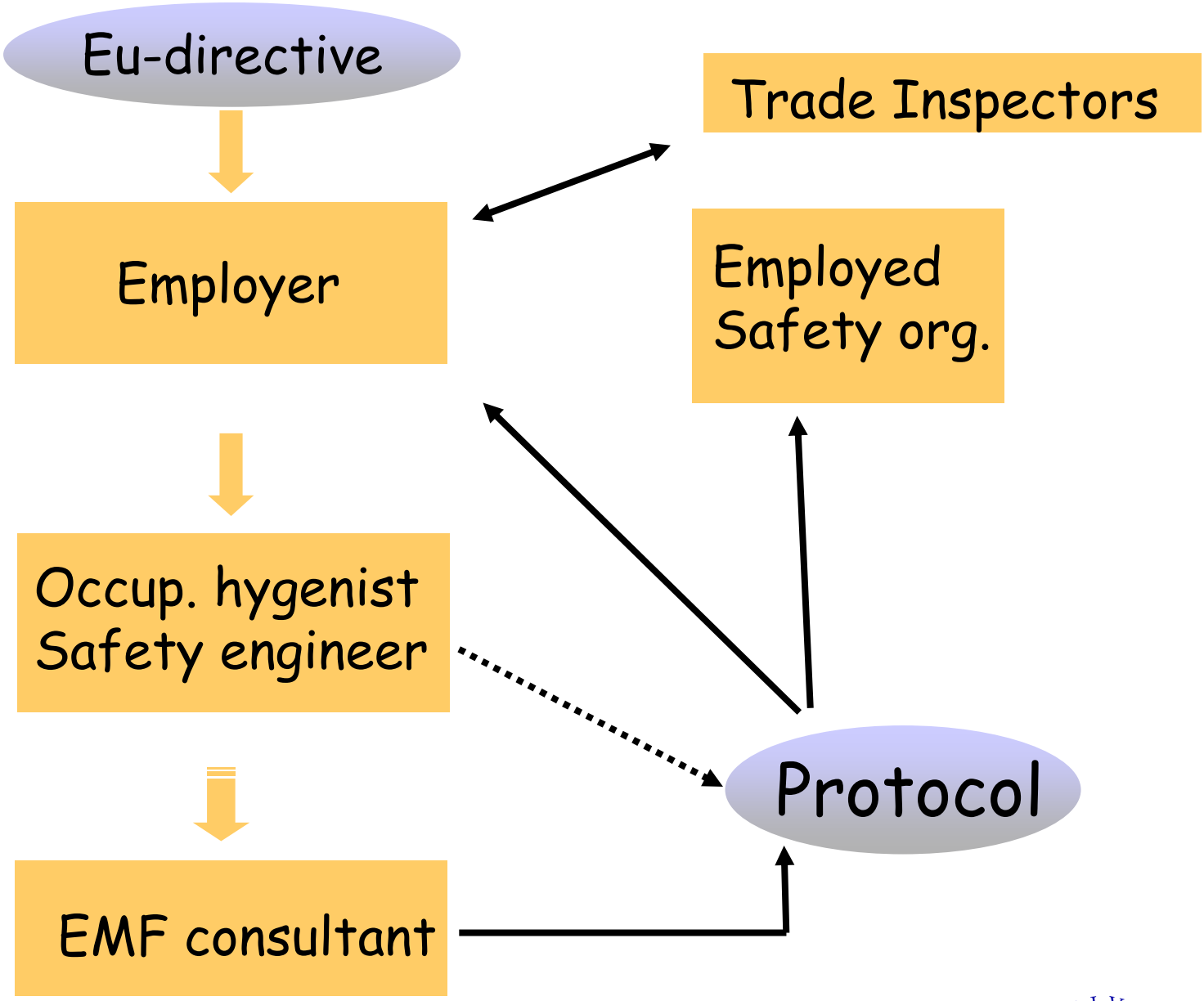

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Harmonized standards, measurements,

How about education/knowledge ?

National level – international level

WHO, ICNIRP, EU ?

Is there a need for a common certificate/licence ?

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