Why do we have to deal with these issues?

- The revision of the European Directive on working time shows an intention to react to these request, by
  - increasing the number of max. working hours per week to 65
  - extending the periods for balancing working times to one year
  - offering the possibility for workers to opt out

Towards standard working hours - by country

Costa et al., 2003 3rd European Survey

Why non-standard working hours?

- there is a clear trend towards non-standard working hours
- non-standard working hours are already the standard, at least within the EU
- we will face an increasing development towards non-standard working hours
- where shift-work is merely one special case of the problem – although an important one

But what are the effects of non-standard working hours for workers?

- their safety
- health
- and well-being
How acceptable are such working hours? *from an ergonomics point of view*

**Ergonomics criteria**
- task must be executable
- must not lead to damages or disorders to health
- must not lead to impairments
- should support personal development

**Indicators**
- Accidents
- Health
- Physical and psychosocial impairments

*Topics of this presentation*
- extended or long working hours
- (shift work)
- flexible work hours
  - safety
  - health
  - psychosocial effects
  - productivity

**Accidents**

*Accident Risk by Time on Task*
Registered Accidents 1994 - 1997 (FRG, HVBG)

*Relative risk of fatal accidents as a function of time on task*

*Accident Risk as a Function of time Task*
Results from four Studies using Aggregated Data
Accident risk as a function of time on task and time of day

![Graph showing accident risk](image)

**Reported days lost due to accidents**

![Graph showing reported days lost](image)

Accidents and flexible working hours

- Not much known!
- Perhaps worth while looking at some of the European data

Health effects

- of extended working hours
- of flexible work hours
- (of shift work)
- and some combinations

Frequencies of health complaints as a function of working hours per week

![Graph showing health complaints](image)
Frequencies of health complaints as a function of working hours per week

- z-standardized

- Working hours [h/week]

- z-scores

- Sleep z
- Fatigue z
- Stress z
- Stomach z

Health complaints as a function of working hours - groups of disorders

- Factor scores

- Musculo-skeletal
- Psychovegetative
- General

Comparing EU und CC Trends

- Musculo-skeletal and psychovegetative disorders

- Factor scores

- Musculo-CC
- Musculo-EU
- Psycho-CC
- Psycho-EU

Impairments [z]

Mean z
Moving AVG
Psychovegetative complaints as a function of working hours and shift work

Musculo-skeletal disorders as a function of working hours and environmental work load (noise, vibrations, etc)

Psychovegetative complaints and working hours by age group

Flexible work hours

Psychovegetative complaints by number and flexibility of working hours

Musculoskeletal disorders by number and flexibility of working hours

Flexible
Regular
Sleep problems under different kinds of flexible work hours

Digestive problems under flexible work hours

Heart Disease

Sleeping problems

Ability to do the same job at the age of 60

Psychosocial impairments
Productivity

Conclusions

• Non-standard working hours are already the standard
• Non-standard working hours increase the risk of safety, health and psychosocial impairments
• Some of the mechanisms for these detrimental effects are well known and / or can be derived from theory,
  – e.g. via biological and social desynchronization

Working hours and productivity in the EU
Conclusions (2)

• It is important to transfer the available knowledge into occupational safety & health practice
• It is important to transfer this knowledge to the (social) political parties involved
• It is important to develop political and shop floor strategies to avoid the adverse effects of non-standard working hours

Conclusions (3)

Besides applying the available evidence
• more research is needed on the theoretical background of these impairments
• more research is needed on effective intervention strategies, based on empirical evidence on the mechanisms of the effects of working time – its chronometry, chronology, and dynamics – on human well being and economic efficiency

Thank you for your attention!

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