

Health risks caused by monotonous work with computers

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INTERREG project WASI

- Work ability and social inclusion- WASI- leded by the Arcada University of Applied Life, Helsinki; Riga Stradins University, Tallinn University of Technology
- The purpose of the project is to increase work ability, stress management, good leadership and thereby social inclusion in computer workers in Finland, Estonia, and Latvia.
- The project is using Metal Age method, KIVA questionnaire to compare occupational risk factors in Estonia, Latvia and Finland.

Work Ability and Social Inclusion

- Work places have become harder and more demanding which probably causes more stress, bad atmosphere and poor communication.
- **The overall objective of the project is to offer organizations means and tools to improve work ability and well-being at work by stress management and good leadership thus contributing to the sustainability of the work ability in the Baltic Sea region.**

ART tool

- Worked out by Health Executive (GB) for risk assessment of monotonous work

The head or neck is:



In an almost neutral posture

0

Bent or twisted part of the time
(eg 15-30%)

1

Bent or twisted more than half
of the time (more than 50%)

2

C2 Back posture

The back posture is considered awkward if more than 20° of twisting or bending is observed.

The back is:



In an almost neutral posture

0





Bent forward, sideways or
twisted part of the time

1

Bent forward, sideways or twisted
for more than half of the time

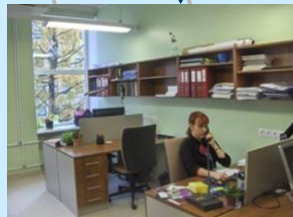
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ART tool- risk levels

 Exposure score	Proposed risk level	Actions needed
 0-11	low	consider individual circumstances
 12-21	medium	further investigation required
 22 or more	high	further investigation required urgently

Results (risk levels)

Work -place	A1/A 2	B	C1/C 2	C3/C 4	C5/D 1	D2/D 3	D4	RL	
4R 4L	3/3 3/0	4 2	0/1 0/0	2/2 0/1	1/2 0/2	1/1 1/1	1 1	20-medium 11-low	Fig.4
5R 5L	3/3 0/0	2 0	2/2 2/0	2/0 2/0	2/0 2/0	0/0 0/0	1 1	16-medium 6-low	Fig.5
6R 6L	3/3 3/2	2 0	2/2 2/0	0/0 0/1	2/0 0/0	0/0 0/0	1 1	14-medium 8-low	Fig.6
3R 3L	6/0 3/0	2 1	2/0 2/0	4/0 2/1	0 /6 1/6	1/1 1/1	1 1	22-high 18-medium	Fig 3
1R 1L	3/3 3/0	4 2	2/2 2/2	4/1 4/0	2/2 ½	1/1 1/1	1 1	25-high 18-medium	Fig 1
2R 2L	3/3 3/2	4 2	0/1 0/0	2/2 0/1	½ 0/2	½ 1/1	1 1	21-medium 13-medium	Fig.2



EVS-EN ISO 9241-5:2004

- Ergonomic requirements for office work with visual display terminals (VDTs)-
- Part 5: Workstation layout and postural requirements

Computer workers



Materials and methods

- 1. KIVA personnel questionnaire, Occupational Stress questionnaire, Work Ability Questionnaire
- 2. Measurements in the work environment
- 3. Health examinations
- 4. The data for 213 workers using computer are presented in the present study

Results of internet questionnaires

- 213 people; 69 male,
- 121 female analysed (181 quest. answers)
- A) 125 people worked with computers up to 10 years
- B) 56 people over 10 years

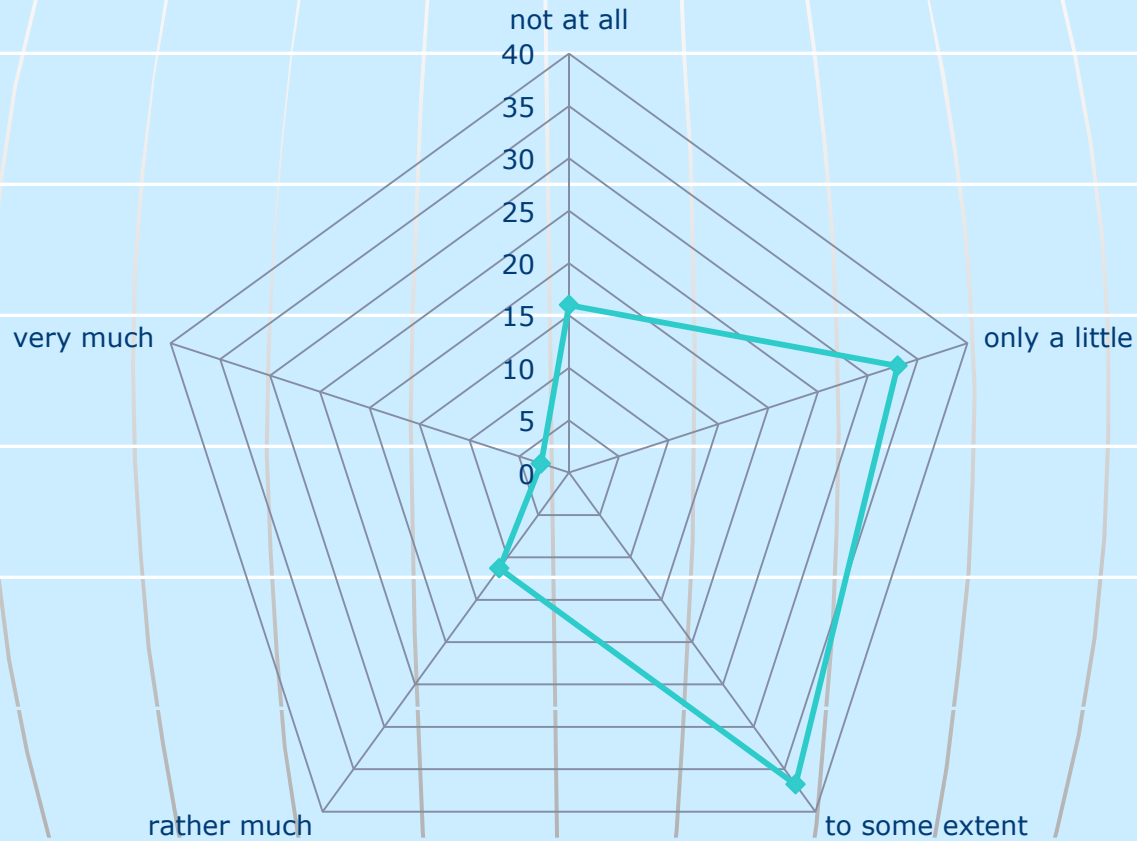
Results (2): Health complaints

- **Group A: MSD- 53.6% of people;**
 - Cardiovascular disturbances: 20%
 - Visual disturbances: 16%
 - The problem of overweight: 20% of people
 - The health status good: 55%
- **Group B: MSD- 50.0% of people;**
 - Cardiovascular disturbances: 45%
 - Visual disturbances: 23%
 - The problem of overweight: 25% of people
 - The health status good: 43%

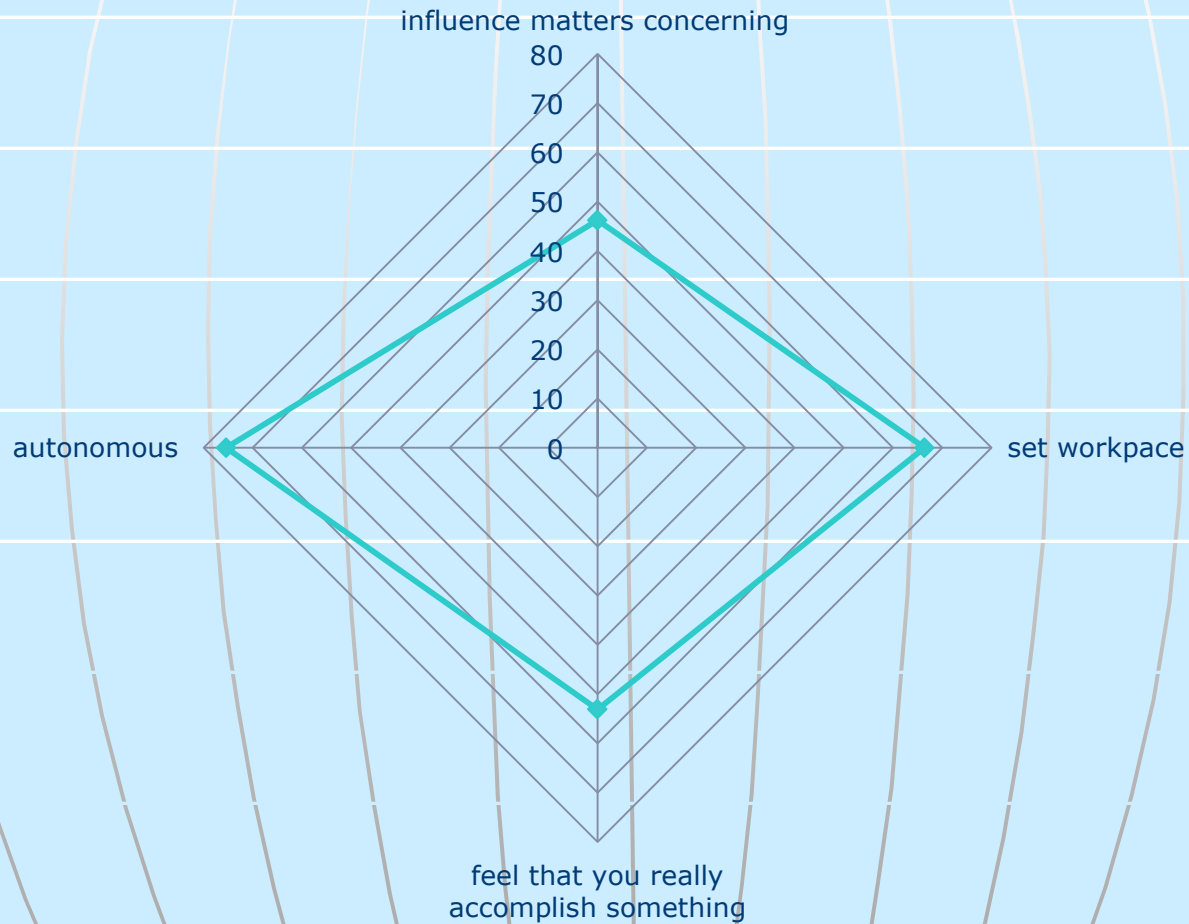
Results(3)- KIVA questionnaire

- The workers assessed the factor in 10 point scale (1-bad; 10-very good). The questions and answers were:
- 1. Have you enjoyed coming to work in the last weeks?
- 2. How meaningful do you regard your job?
- 3. How well do you feel in control of your job?
- 4. How well do you get on with your fellow-workers?
- 5. How well does your immediate superior perform as superior?
- 6. How certain you are that you will keep job with this employer?
- 7. How much can you influence factors concerning your job?
- The lowest mark (6.8) is given to the problem that the workers cannot influence factors concerning their work as much as they want.

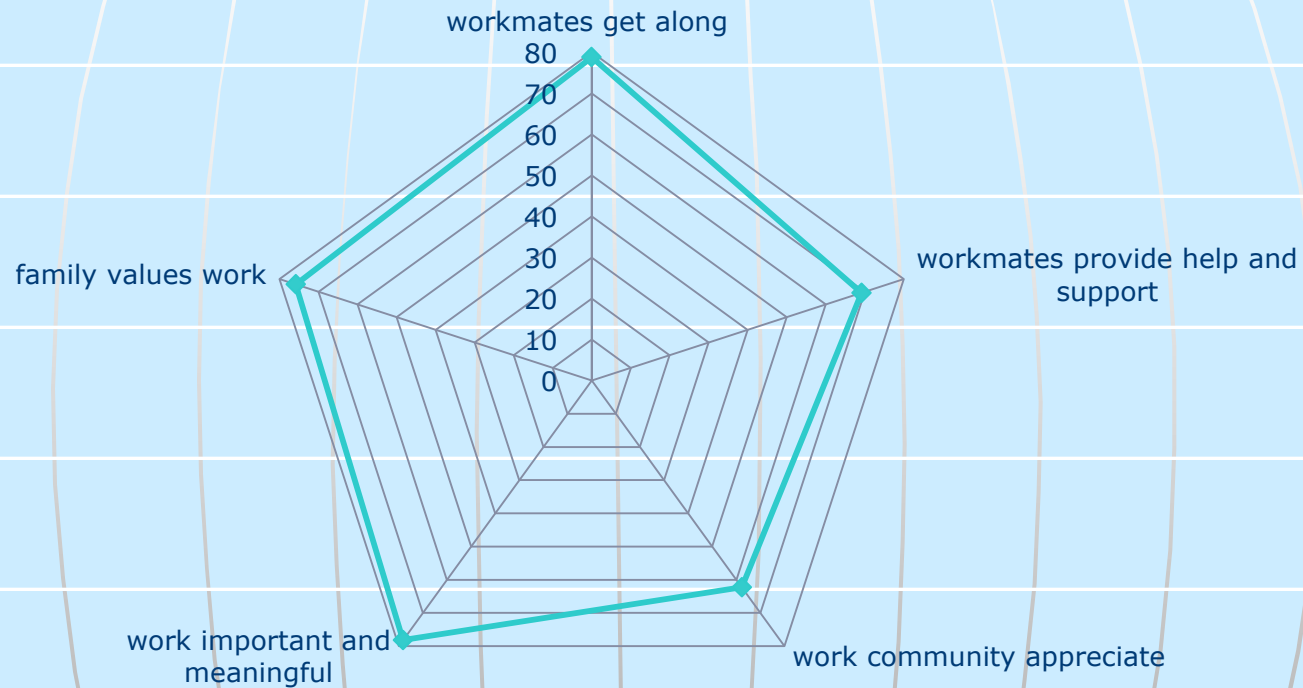
Feeling of stress



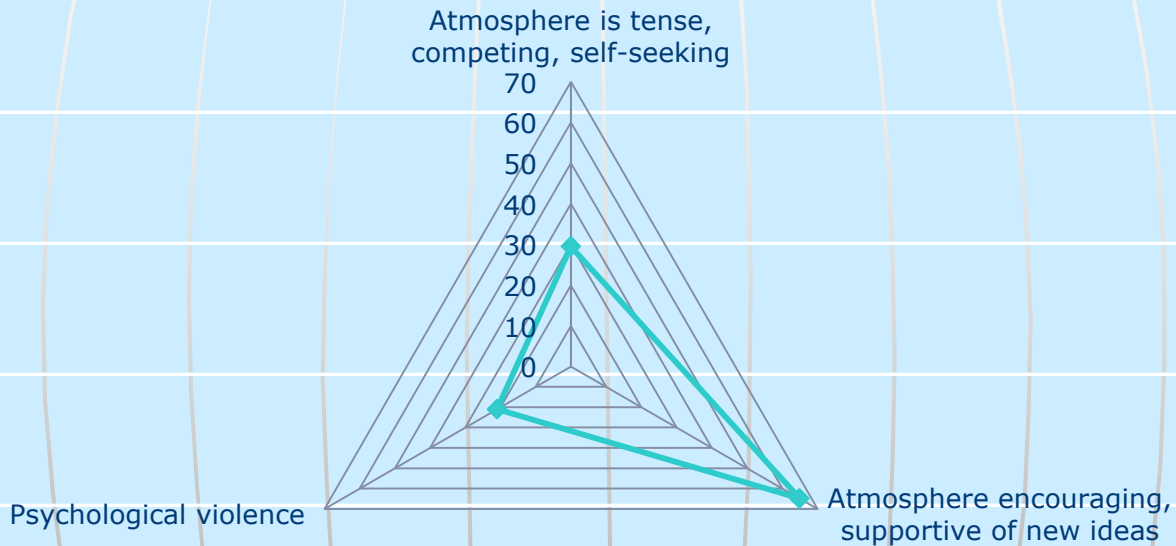
Possibility to control their own work



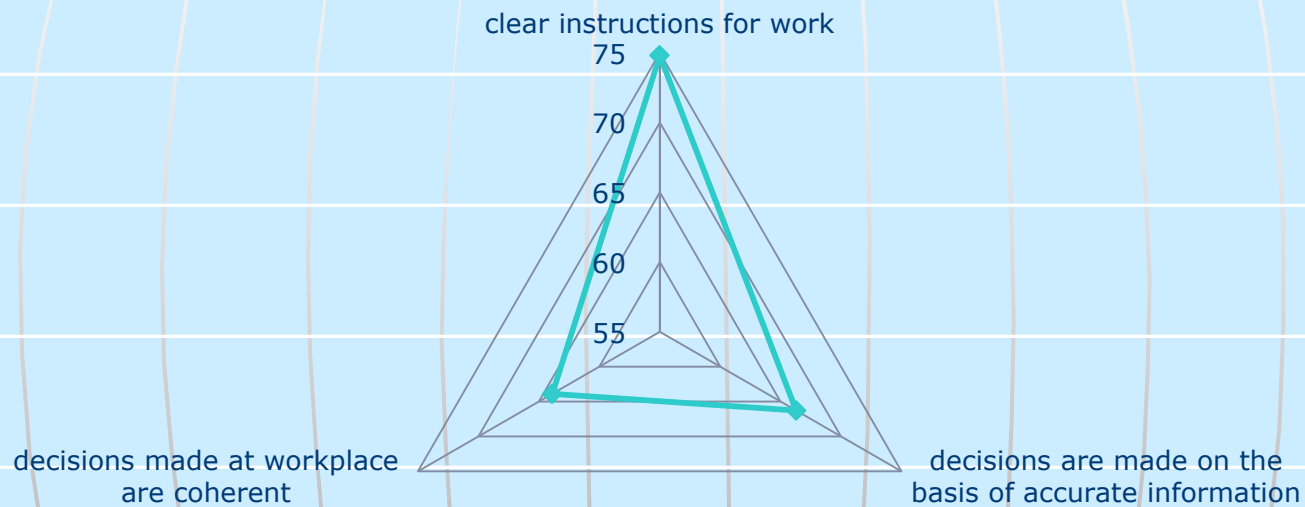
Social relationships and respect



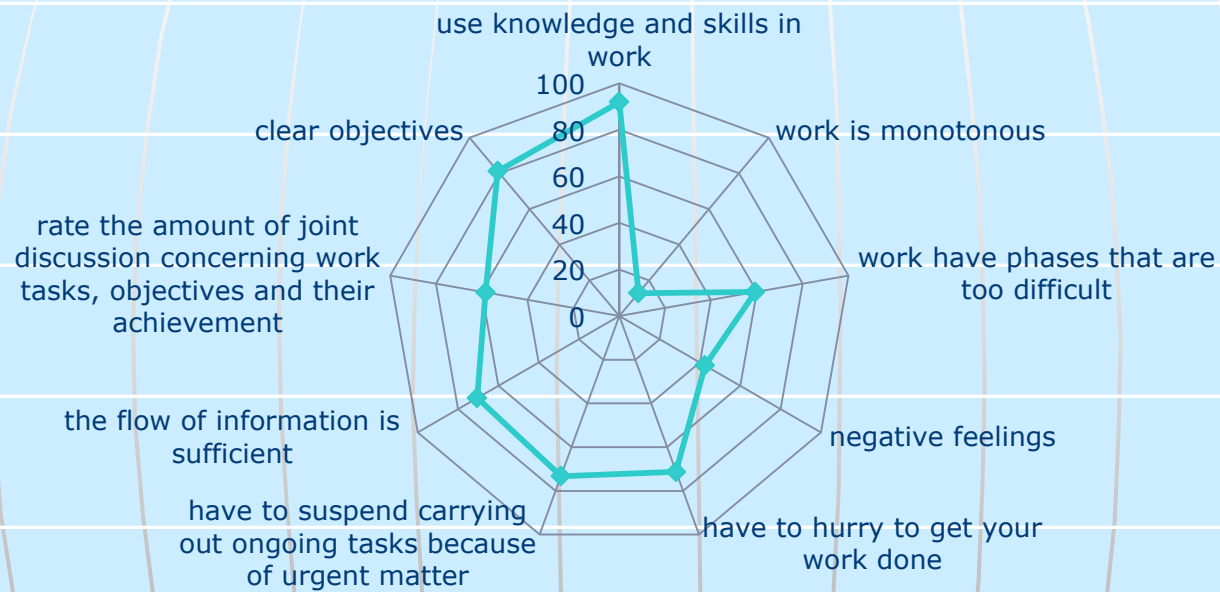
Work atmosphere and psychological violence (%)



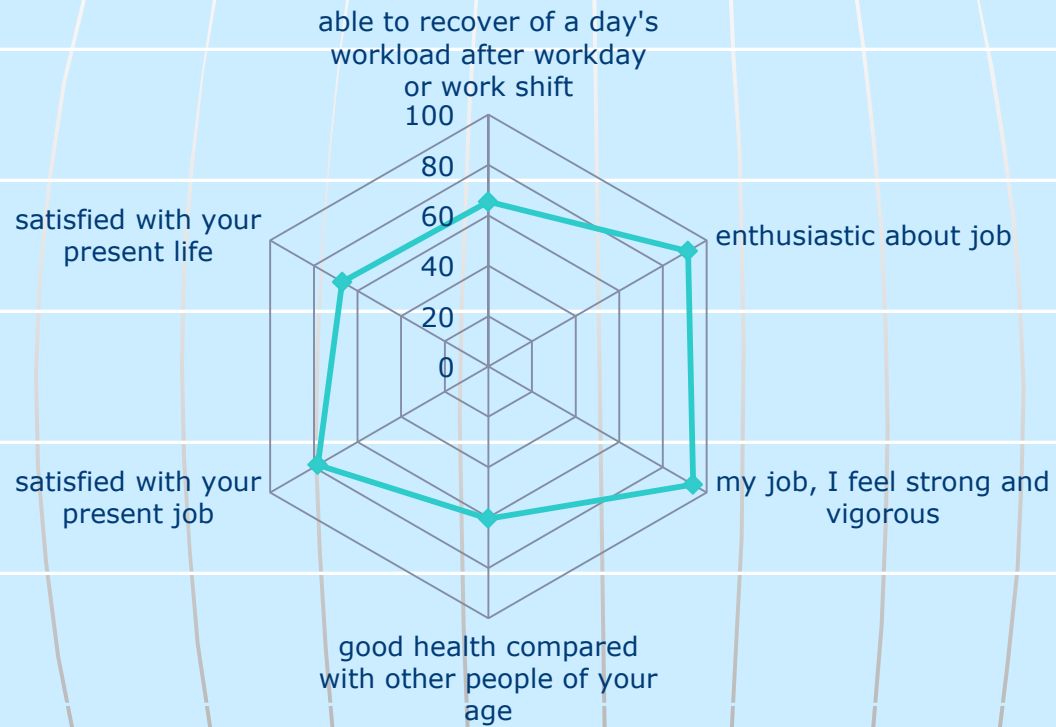
Management and supervision (%)



Work demands (%)



Well-being (%)



Assessment of lighting, noise and CO₂ concentration in the air of the work environment

Company	Lighting, lx U*=10.4%	Noise, dB(A) U*=2.0 dB	CO ₂ , ppm U*=10 ppm
The limit	300-500 lx	55-60 dB	<800 ppm
Public administration institution, computer workers (53)	306-704	45-50	650-731
Medium-sized industrial company 1, computer workers (20)	284-643	45-50	700-1091
Big trade company 1, workers at the till (10)	250-300	60	660
Big trade company 1, office workers (10)	300-350	55-60	850
Big trade company 2, workers at the till (10)	400	60-65	750
Medium-sized trade company 3, workers at the till (3)	400	65	760

The assessment of indoor climate at workplaces

Company	Risk level	Air temperature , °C, U*=0.6°C	Air velocity, m/s U*=0.01 m/s	Air humidity, % U*=2.0%
The limit	< 4	20-22 °C	<0.3 m/s	30-60%
Public administration institution, computer workers (53)	1-2	22-22.4	0.1	34-41.5
Medium-sized industrial company1,computer workers (20)	2-3	22.0-22.8	0	22.4-25.7
Big trade company 1, workers at the till (10)	2	19	0.03	50
Big trade company 1, office workers (10)	3	18-19	0.1-0.3	48.4
Big trade company 2, workers at the till (10)	3	19	0.01-0.03	50.5
Medium-sized trade company 3, workers at the till (3)	3	19	0.01-0.03	48.4

Results (4)- work conditions

- The indoor climate in office-rooms conduce to musculoskeletal disorders and carpal syndrome in the hands.
- The air temperature in the stores' offices is sometimes under the norms ($<20^{\circ}\text{C}$).
- The lighting at the till was insufficient ($<300\text{ lx}$) in some of the investigated firms.
- The info-technology workers often work with under-lighted working conditions although there is a possibility to raise the lighting to the normal limits (400 - 500 lx).

Myotonometer

The mechanical characteristics (tone, stiffness) of muscles were recorded using the hand-held Myoton-3 myometre.

We investigated m.trapez, adductor pollicis, flexor digitorum and extensor carpi radialis



Measurement of fatigue with myotonometer

Investigated workers:34

Male:9; Female: 25

Average age:46.7

Computer work 6.9
hours per day (mean
value)

Occupational life 12.6

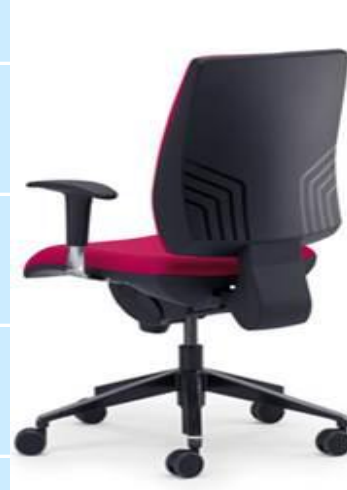
Kiva score 7.7



The health complaints

Pain region	Number of workers (34)	Severity of pain (0-10)
Neck	22	4.18
Shoulder, right	15	3.8
Shoulder, left	14	
Elbow, right	2	4.7
Elbow, left	2	
Wrist, right	7	4.57
Wrist, left	-	
Back	16	4.31

Good practise



Tools for sitting

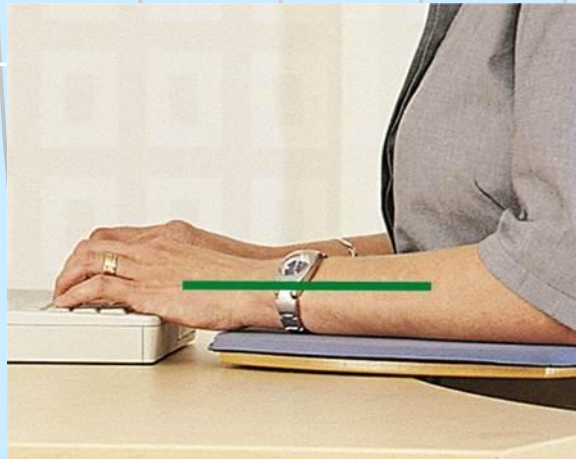
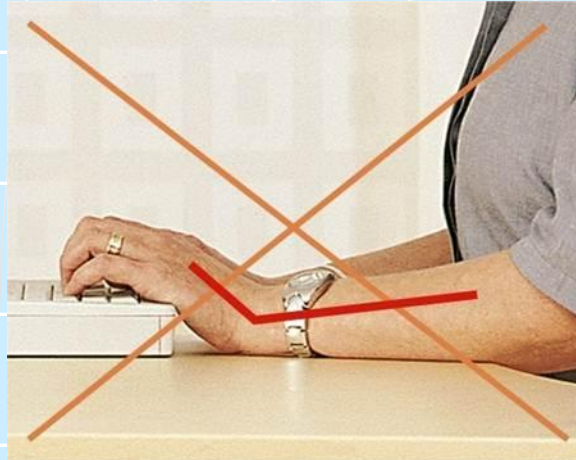


Conclusions

- The work in the office might be monotonous
- The risk scores for right and left hand are different.
- The interior architect has to follow the ergonomic principles of workplaces from the beginning of the design of the building.
- The rehabilitation is necessary for both type of the workers (in info-technology and trade companies).

Risks in work with computers

- Work in compulsory position
- Only some muscles are strained
- Strain of eyes
- Bad indoor climate (too dry air, bad ventilation etc.)
- Insufficient lighting



- Musculo-skeletal disorders
- Headache, ache in hands
- Overexertion of eyes and eyesight worsening
- High bloodpressure of ageing people

The background features a light blue grid with horizontal and vertical lines. Overlaid on this grid are several curved, vertical lines that create a sense of depth and perspective, resembling the lines of a globe or a stylized architectural structure.

Thank you very much !