Aging at workplace from ergonomic point of view

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ERGONOMICS REASONING:

- Rule of law and of Health promotion standards of VW Group
- Demographic development
- Social reform
- Higher number of work-related diseases and musculoskeletal disorders
Demographic development from 2010 to 2050

Věková skladba obyvatelstva: 2010
Česká republika

Věková skladba obyvatelstva: 2050
Česká republika

Aging at workplace from ergonomic point of view, Mackova, 19.10.2012
Automotive industry – 1st sector with the highest number of work-related disease in the Czech Republic 2011

Institute of Health Information and Statistics of the Czech Republic
WHAT IS ERGONOMICS

The applied science of equipment design, as for the workplace, intended to maximize productivity by reducing operator fatigue and discomfort

Simply

The science of fitting the work to the user, making products and tasks comfortable and efficient for the user
The objective of ergonomics SKODA AUTO

- Health promotion of workers
- Modify work environment and create workplaces suitable for all employees and so maintain the high level of work ability to and work capability during the whole period of productive age
- The main activities to reach this objective are professional ergonomic supervision and counseling in the phases of product development and technology planning
- The key point of interest is the reduction of physical load, non-physiological postures and musculoskeletal disorders
Ergonomics elements

Terms and conditions
- Communication
- Education
- Methodology
- Law
- IT
- Financial and personal capacity

Workplace and task conditions
- User ergonomics
- Preventive ergonomics in the phases of product development and technology planning
- Workplace and work task assessment
- Workplace safety

Worker conditions and abilities
- Work place risk assessment
- Workplace health promotion
- Occupational therapy

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Ageing simulating dress

Muscle strength and the range of motion are reduced. Endurance and the coordination of movements get worse. Fine movement is worse. ....
The process of ergonomics

Analysis of the current workplace

ČSN EN 1005 – 1-5 and EAWS
3D Simulation (static) and Motion capture – 3D dynamic simulation
Benchmarking
Assessment of local physical load – EMG

Immediate arrangement

Technological arrangement
  Fast technology arrangement
Organization arrangement
  Tact change
  Rotation of employee
Health arrangement
  Health surveillance
  Health program

Long-term arrangement

Long-term technological arrangement
Long-term health arrangement
Static simulation of work posture – Assembly line

- From ergonomic view is the posture on the first illustrated picture acceptable. This fact is shown by green highlighted part.
- On the second illustrated picture you can see that the position is highlighted in yellow colour. This position is less acceptable from the ergonomic point of view.
Static simulation of work position – Assembly line

- On the illustrated picture you can see that this work posture is not acceptable from the ergonomic point of view. This posture is especially dangerous for shoulders, highlighted in red colour.

- Recommendation: lower the work plane level
Montage of side window

› On the pictures below you can see load for joint.

› On the **1st picture** you can see that the load for left shoulder and wrist is not acceptable from the ergonomic point of view. The right side upper extremity and neck are more acceptable compare with previous one.

› On the **2nd picture** you can see that this posture could be danger for right wrist and shoulder. The rest of used joints are in yellow colour which is more acceptable.

› Recommendation: Special tools for better grip and health surveillance.
The dynamic demonstration of the montage of side window

- 3D dynamic demonstration by infra-camera which is scanning position of markers put on employees body. Result follow on the next page.
Procentage of acceptable (green), less acceptable (yellow) and non-acceptable (red) range of motion during work operation.

- **Right shoulder**: 69% (green), 31% (yellow), 6% (red)
- **Right elbow**: 69% (green), 6% (yellow), 25% (red)
- **Right wrist**: 37% (green), 6% (yellow), 60% (red)
- **Left shoulder**: 56% (green), 13% (yellow), 31% (red)
- **Left elbow**: 70% (green), 30% (yellow), 12% (red)
- **Left wrist**: 88% (green), 12% (yellow), 0% (red)
Work place ergonomics

old

new
Work place ergonomics – work position simulation – non acceptable
Work place ergonomics

old

new
Thank you
Ageing at Workplace from Ergonomic Point of View

A human body starts to age only after 20 years of life. Muscle strength and the range of motion are reduced, endurance and the coordination of movements gets worse. The aim of ergonomics is to optimize work environment and its activities in order to achieve greater productivity and at the same time not to overload employees. It is desired that all employees are able to carry out their maximum performance no matter their health limitations and age.

Accordingly, the objective of ergonomics is to modify work environment and create workplaces suitable for all employees within all company and so maintain the high level of ability to work and work capability during the whole period of productive age. The main activities to reach this objective are professional ergonomic supervision and counselling. Supervision activities are carried out primarily in the phases of product development and technology planning. The key point of interest is the reduction of physical load, non-physiological postures and musculoskeletal disorders.

Assessment of upper extremities’ load, complex assessment of a physical load, based on European technical standards and national legislation, and 3D simulations of motion are the groundwork for proposed changes of technologies and organization of work. As a result of these activities, there are a high number of occupations suitable for the majority of a people with a very small risk of musculoskeletal disorders caused by performance of work tasks.