

## Ergonomics –ME 502

### OWAS method

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E/04/162

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### OWAS

(The **Ovako Working posture Analysis System**)

- Created in the mid-1970s by **Ovako Oy**, a private steel company in Finland
- Developed as a joint effort between **Ovako Oy** and the **Finnish Institute for Occupational Health**
- Basic concepts have been incorporated into other posture analysis systems (e.g., **RULA**, **REBA**, **Univ. of Michigan**, etc.)

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### The OWAS posture classification system,

- **Trunk**
- **Arms**
- **Lower Body**
- **Neck**

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### Why We Measure Posture?

- **Job evaluation and redesign**
  - Determine if current postural demands are acceptable
  - Establish baseline to evaluate effectiveness of interventions
  - Identify job attributes associated with awkward postures
  - Evaluate intervention effectiveness by comparing to baseline
- **Epidemiology/Research**
  - Measure exposure for dose-response models

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### Using OWAS

- Standard postures for the trunk, arms, lower body, and neck
- User makes a series of instantaneous observations to record posture at these four joints
- Percentage of time in each pre-defined category is computed
- Results compared to benchmarks

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### Trunk Posture

Four Categories

1. **Straight/upright (“neutral”)**
2. **Bent forward (“pure” flexion)**
3. **Straight and twisted (“pure” axial twisting)**
4. **Bent and twisted (combination of flexion, lateral bending, and/or twisting)**

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### Trunk Posture Contd...

1 2 3 4

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### Trunk Posture -- Action Levels

Static and Dynamic Work (most common)

	Percentage of Time In Posture									
	0	10	20	30	40	50	60	70	80	90
Neutral	[Acceptable]									
Bent forward	[Slightly harmful]									
Twisted	[Disturctly harmful]									
Bent twisted	[Extremely harmful]									
Legend:										
Acceptable	[Light gray]									
Slightly harmful	[Medium gray]									
Disturctly harmful	[Dark gray]									
Extremely harmful	[Black]									

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### Arm Posture

- 1. Both arms below shoulder height ("neutral")
- 2. One arm above shoulder height -- defined as elbow above shoulder height
- 3. Both arms above shoulder height

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### Arm Posture contd...

1 2 3

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### Arm Posture -- Action levels

Static and Dynamic Work (most common)

	Percentage of Time In Posture									
	0	10	20	30	40	50	60	70	80	90
Both arms below shoulder	[Acceptable]									
One arm above shoulder	[Slightly harmful]									
Both arms above shoulder	[Disturctly harmful]									
Legend:										
Acceptable	[Light gray]									
Slightly harmful	[Medium gray]									
Disturctly harmful	[Dark gray]									
Extremely harmful	[Black]									

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### Lower Body Posture

- 1. Sitting
- 2. Standing -- weight on 2 legs, knees straight
- 3. Standing -- weight on 1 leg, knees straight
- 4. Standing -- weight on 2 legs, knees bent
- 5. Standing -- weight on 1 leg, knee bent
- 6. Kneeling -- 1 or 2 knees touching the ground
- 7. Walking or moving

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### Lower Body Posture      Contd...

1      2      3      4      5      6      7

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### Lower Body Posture      Contd..

	Percentage of Time In Posture									
	0	10	20	30	40	50	60	70	80	90
Sitting										
Stand, 2 feet--legs straight										
Stand, 1 foot--legs straight										
Stand 1 or 2 feet--knee(s) bent										
Kneel (one or two knees)										
Walking										
Legend:										
Acceptable										
Slightly harmful										
Distinctly harmful										
Extremely harmful										

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### Head And Neck Posture

- 1. Upright/free ("neutral")
- 2. Bent forward -- flexion more than 30°
- 3. Bent to side -- "pure" lateral bending more than 30°
- 4. Bent backward -- extension more than 30°
- 5. Twisted -- axial twisting more than 45°

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### Head And Neck Posture      Contd...

1      2      3      4      5

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### Head And Neck Posture      Contd...

	Percentage of Time In Posture									
	0	10	20	30	40	50	60	70	80	90
Neutral										
Bent forward, > 20°										
Bent to side, > 20°										
Bent backward, > 20°										
Twisted > 20°										
Legend:										
Acceptable										
Slightly harmful										
Distinctly harmful										
Extremely harmful										

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### OWAS Stress Ranking System

1. **Normal posture** -- no intervention required
2. **Slightly harmful** -- corrective action should be taken during next regular review of work methods
3. **Distinctly harmful** -- corrective action should be taken as soon as possible
4. **Extremely harmful** -- corrective action should be taken immediately

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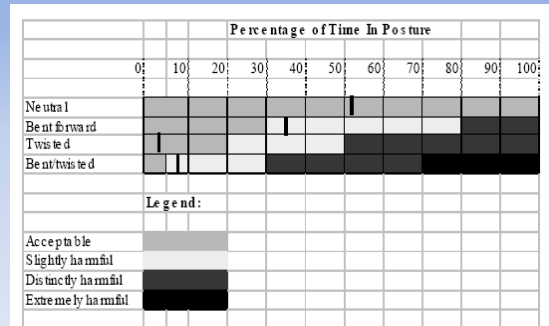
### Using OWAS

Example: In a 25-observation study, the following trunk posture categories were observed:

- Neutral : 13 (52%)
- Bent : 9 (36%)
- Twisted : 1 (4%)
- Bent & Twisted : 2 (8%)

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### Trunk Posture Action Levels



### Results

Look up action level for each category:

- Neutral : 52% (Acceptable)
- Bent : 36% (Slightly harmful)
- Twisted : 4% (Acceptable)
- Bent & Twisted : 8% (Slightly harmful)

For the trunk, this job would be rated **“Slightly harmful”**

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### OWAS Summary Advantages

- Relatively easy to learn and use  
Results can be compared against benchmarks to establish intervention priority
- Scores at each body part can be used for “before” and “after” comparisons to evaluate intervention effectiveness
- Scores at each body part can be used in epidemiological studies
- Relatively easy to customize system to specific user needs

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### OWAS Summary Weaknesses

- Posture categories are rather broad for the trunk and shoulders
- No information on duration of postures
- Method does not separate left and right arms
- Method gives no information for the elbow or wrist

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THE END