Ergonomics – ME 502

OWAS method

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E/04/162

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.)

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

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

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)
Trunk Posture – Action Levels
Static and Dynamic Work (most common)

<table>
<thead>
<tr>
<th>Percentage of Time in Posture</th>
<th>0</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral</td>
<td>One arm on the back</td>
<td>Two arms behind back</td>
<td>Forward</td>
<td>Bent-over</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legend:</td>
<td>Acceptable</td>
<td>Slightly hazardous</td>
<td>Hazardous</td>
<td>Extremely hazardous</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

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

Arm Posture – Action levels
Static and Dynamic Work (most common)

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
Head And Neck Posture

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

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
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%)

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”

OWAS Summery

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

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

THE END