Ergonomic Evaluation Tools: RULA and REBA

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Session Objectives

• Have a basic understanding of RULA and REBA
• Understand the differences between RULA and REBA
• Be able to analyze a task using RULA and REBA
Rapid Upper Limb Assessment (RULA)  
(McAtamney & Corlett, 1993)

Rapid Entire Body Assessment (REBA)  
(Hignett & McAtamney, 2000)
RULA and REBA – 6 Steps

1. Observe the task
   – photos vs. video
2. Select postures for assessment
   – worst vs. most frequent
3. Score the postures
4. Process the scores
5. Determine final score
6. Confirm action level
RULA

- Survey method
  - assess postures of neck and upper limb loading
- Best for sedentary, seated tasks
- Final risk assessment score
  - combines arm/wrist risk with neck, trunk, leg risk
- Final score magnitude (between 1 and 7)
  - overall injury risk due to musculoskeletal loading
RULA

- One of the most popular ergonomic assessment tools in industry
- User-friendly, charts can be confusing
- Not as good for determining risk due to repetition
- No major calculations needed, quick
- Validated
RULA
RULA Employee Assessment Worksheet

Complete this worksheet following the step-by-step procedure below. Keep a copy in the employee's personnel folder for future reference.

**A. Arm & Wrist Analysis**

**Step 1: Locate Upper Arm Position**
- **Step 1a: Adjust...**
  - If shoulder is raised: +1
  - If upper arm is abducted: +1
  - If arm is supported or leaning: -1
  - **Final Upper Arm Score =**

**Step 2: Locate Lower Arm Position**
- **Step 2a: Adjust...**
  - If arm is working across midline of body: +1
  - If arm out to side of body: +1
  - **Final Lower Arm Score =**

**Step 3: Locate Wrist Position**
- **Step 3a: Adjust...**
  - If wrist is bent from midline: +1
  - **Final Wrist Score =**

**Step 4: Wrist Twist**
- If wrist is twisted in mid-range = 1;
- If twist at or near end of range = 2
- **Wrist Twist Score =**

**Step 5: Look-up Posture Score in Table A**
- Use values from steps 1, 2, & 4 to scale Posture Score in table A
- **Posture Score =**

**Step 6: Add Muscle Use Score**
- If posture mainly static i.e., held for longer than 1 minute or:
  - If action repeatedly occurs 4 times per minute or more: +1
  - **Muscle Use Score =**

**Step 7: Add Force/Load Score**
- If load less than 2 kg (intermittent): +0
- If 2 kg to 10 kg (intermittent): +1
- If 2 kg to 10 kg (static or repeated): +2
- If more than 10 kg load or repeated or shocks: +3
- **Force/Load Score =**

**Step 8: Find Row in Table C**
- The completed score from the Arm/Wrist analysis is used to find the row on Table C
- **Final Wrist & Arm Score =**

**B. Neck, Trunk & Leg Analysis**

**Step 9: Locate Neck Position**
- **Step 9a: Adjust...**
  - If neck is twisted: +1
  - If neck is side-bending: +1
  - **Final Neck Score =**

**Step 10: Locate Trunk Position**
- **Step 10a: Adjust...**
  - If trunk is twisted: +1
  - If trunk is side-bending: +1
  - **Final Trunk Score =**

**Step 11: Look-up Posture Score in Table B**
- Use values from steps 5, 6, & 7 to scale Posture Score in Table B
- **Posture B Score =**

**Step 12: Add Muscle Use Score**
- If posture mainly static or:
  - If action 4 minutes or more: +1
  - **Muscle Use Score =**

**Step 13: Add Force/Load Score**
- If load less than 2 kg (intermittent): +0
- If 2 kg to 10 kg (intermittent): +1
- If 2 kg to 10 kg (static or repeated): +2
- If more than 10 kg load or repeated or shocks: +3
- **Force/Load Score =**

**Step 14: Find Column in Table C**
- The completed score from the Neck/Trunk & Leg analysis is used to find the column on Chart C
- **Final Neck, Trunk & Leg Score =**

**Subject:**
**Company:**
**Department:**
**Scorer:**

**FINAL SCORE:** 1 or 2 = Acceptable; 3 or 4 investigate further; 5 or 6 investigate further and change soon; 7 investigate and change immediately

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**A. Arm and Wrist Analysis**

**Step 1: Locate Upper Arm Position:**
- 1: Adjust...
  - If shoulder is raised: +1
  - If upper arm is abducted: +1
- 2: Add +1

**Step 2: Locate Lower Arm Position:**
- 1: Adjust...
  - If either arm is working across midline or out to side of body: Add +1

**Step 3: Locate Wrist Position:**
- 1: Adjust...
  - If wrist is bent from midline: Add +1

**Step 4: Wrist Twist:**
- 1: Adjust...
  - If wrist is twisted in mid-range: +1
  - If wrist is at or near end of range: +2

**Step 5: Look-up Posture Score in Table A:**
Using values from steps 1-4 above, locate score in Table A

**Step 6: Add Muscle Use Score**
- If posture mainly static (i.e., held >10 minutes), or if action repeated occurs 4X per minute: +1

**Step 7: Add Force/Load Score**
- If load < 4.4 lbs (intermittent): +0
  - If load 4.4 to 22 lbs (intermittent): +1
  - If load 4.4 to 22 lbs (static or repeated): +2
  - If more than 22 lbs or repeated or shocks: +3

**Step 8: Find Row in Table C**
Add values from steps 5-7 to obtain Wrist and Arm Score. Find row in Table C.

**Scores**

**Table A: Wrist Posture Score**

<table>
<thead>
<tr>
<th>Upper Arm</th>
<th>Lower Arm</th>
<th>Wrist Twist</th>
<th>Wrist Twist</th>
<th>Wrist Twist</th>
<th>Wrist Twist</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Step 9: Locate Neck Position:**
- 1: Adjust...
  - If neck is twisted: +1
  - If neck is side bending: +1

**Step 10: Locate Trunk Position:**
- 1: Adjust...
  - If trunk is twisted: +1
  - If trunk is side bending: +1

**Step 11: Legs:**
- If legs and feet are supported: +1
  - If feet = 2

**Table B: Trunk Posture Score**

<table>
<thead>
<tr>
<th>Legs</th>
<th>Legs</th>
<th>Legs</th>
<th>Legs</th>
<th>Legs</th>
<th>Legs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

**Step 12: Look-up Posture Score in Table B:**
Using values from steps 9-11 above, locate score in Table B

**Step 13: Add Muscle Use Score**
- If posture mainly static (i.e., held >10 minutes), or if action repeated occurs 4X per minute: +1

**Step 14: Add Force/Load Score**
- If load < 4.4 lbs (intermittent): +0
  - If load 4.4 to 22 lbs (intermittent): +1
  - If load 4.4 to 22 lbs (static or repeated): +2
  - If more than 22 lbs or repeated or shocks: +3

**Step 15: Find Column in Table C**
Add values from steps 12-14 to obtain Neck, Trunk and Leg Score. Find column in Table C.

**Scoring:**
- 1 or 2 = acceptable posture
- 3 or 4 = further investigation, change may be needed
- 5 or 6 = further investigation, change soon
- 7 = investigate and implement change
## RULA Action Level

<table>
<thead>
<tr>
<th>Final RULA Scores</th>
<th>Requirements for Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 or 2</td>
<td>Indicates that posture is acceptable if it is not maintained or repeated for long periods.</td>
</tr>
<tr>
<td>3 or 4</td>
<td>Indicates that further investigation is needed and changes may be required.</td>
</tr>
<tr>
<td>5 or 6</td>
<td>Indicates investigation and changes are required soon.</td>
</tr>
<tr>
<td>7</td>
<td>Indicates investigation and changes are required immediately.</td>
</tr>
</tbody>
</table>
# Posture Risk Factor Assessment for Group B
*(neck, trunk, and legs)*

## Neck Analysis
*(reference diagram)*

### Ranges of Movement of the Neck

<table>
<thead>
<tr>
<th>Ranges of Movement of the Neck</th>
<th>Select any of the Following if True</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 to 20 degrees of flexion</td>
<td>☑ Condition 1: The neck is twisted</td>
</tr>
<tr>
<td></td>
<td>☑ Condition 2: The neck is in side-bending</td>
</tr>
</tbody>
</table>

## Trunk Analysis
*(reference diagram)*

### Ranges of Motion of the Trunk

<table>
<thead>
<tr>
<th>Ranges of Motion of the Trunk</th>
<th>Select any of the Following if True</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-60 degrees of trunk flexion from a standing position</td>
<td>☑ Condition 1: The trunk is twisting</td>
</tr>
<tr>
<td></td>
<td>☐ Condition 2: The trunk is in side-bending</td>
</tr>
</tbody>
</table>

## Leg Analysis

### Ranges of Motion of the Leg

<table>
<thead>
<tr>
<th>Ranges of Motion of the Leg</th>
<th>Select any of the Following if True</th>
</tr>
</thead>
<tbody>
<tr>
<td>The legs and feet are well supported with the worker seated and the weight evenly balanced</td>
<td></td>
</tr>
</tbody>
</table>

## Muscle Use and Repetitive Motion

### Select if True

- For the neck, trunk, and legs, the muscle use/body motion of the worker is mainly static (held for longer than one minute), or it is repetitive (repeated more than four times/minute)

## Muscle Use and Repetitive Motion for the Neck, Trunk, and Legs

### Force or Load

<table>
<thead>
<tr>
<th>Force or Load</th>
<th>Select any of the Following if True</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.4 to 22 lbs (2 to 10 kgs) of static or repeated load or force</td>
<td></td>
</tr>
</tbody>
</table>
Stack and Spray
Stack and Spray

<table>
<thead>
<tr>
<th>Task</th>
<th>Arm &amp; Wrist</th>
<th>Neck, Trunk &amp; Leg</th>
<th>FINAL SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Posture Score</td>
<td>Muscle Use Score</td>
<td>Force/Load Score</td>
</tr>
<tr>
<td>1 - Lam Assembly</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2 - Re-Load</td>
<td>7</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3 - Spray</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
REBA

- Same principles as RULA, validated
- Better tool for whole body
  - static, dynamic, unstable or rapidly changing postures
- User-friendly, tables used to compute scores
- Good for health care & service industries
  - Not as useful for production line work
# Rapid Entire Body Assessment (REBA)

## Task

<table>
<thead>
<tr>
<th>Group A</th>
<th>Score</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posture/Range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trunk Upright</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Flexion: 0-20°</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Extension: 0-20°</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Flexion: &gt;60°</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

## Group B

<table>
<thead>
<tr>
<th>Posture/Range</th>
<th>Score</th>
<th>Total: Left and Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Arms (Shoulders) L</td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Flexion: 0-20°</td>
<td>1</td>
<td>Arm Abducted / Rotated: +1</td>
</tr>
<tr>
<td>Extension: 0-20°</td>
<td>2</td>
<td>Shoulder Raised: -1</td>
</tr>
<tr>
<td>Arm Supported: -1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Arms (Elbows) L</td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Flexion: 60-100°</td>
<td>1</td>
<td>No Adjustments</td>
</tr>
<tr>
<td>Extension: &gt;60°</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

## Legs

<table>
<thead>
<tr>
<th>Posture/Range</th>
<th>Score</th>
<th>Total: Left and Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilateral Wt Bearing; Walk; Sit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Unilateral Wt Bearing; Unstable</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

## Score from Table A

<table>
<thead>
<tr>
<th>Score from Table B</th>
<th>L</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load / Force</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 5 kg</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5 - 10 kg</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11 - 22 lb</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

## Score from Table B

<table>
<thead>
<tr>
<th>Score A</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Table A + Load/Force Score)</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

## Activity

<table>
<thead>
<tr>
<th>Score B</th>
<th>L</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>One or more body parts are static for longer than 1 minute</td>
<td>+1</td>
<td></td>
</tr>
<tr>
<td>Repeat small range motions, more than 4 per minute</td>
<td>+1</td>
<td></td>
</tr>
<tr>
<td>Rapid large changes in posture or unstable base</td>
<td>+1</td>
<td></td>
</tr>
</tbody>
</table>

## Score C (from Table C)

<table>
<thead>
<tr>
<th>Score C</th>
<th>L</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity Score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>REBA Score</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## REBA Action Level

<table>
<thead>
<tr>
<th>Action Level</th>
<th>REBA Score</th>
<th>Risk Level</th>
<th>Action (including further assessment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>Negligible</td>
<td>None necessary</td>
</tr>
<tr>
<td>1</td>
<td>2-3</td>
<td>Low</td>
<td>May be necessary</td>
</tr>
<tr>
<td>2</td>
<td>4-7</td>
<td>Medium</td>
<td>Necessary</td>
</tr>
<tr>
<td>3</td>
<td>8-10</td>
<td>High</td>
<td>Necessary soon</td>
</tr>
<tr>
<td>4</td>
<td>11-15</td>
<td>Very High</td>
<td>Necessary NOW</td>
</tr>
</tbody>
</table>
How can these tools help?

- Determine injury risk
- Set priorities
- Identify Training Needs
- “What If” Scenarios
- Others?
Thank You! Questions?