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RULA

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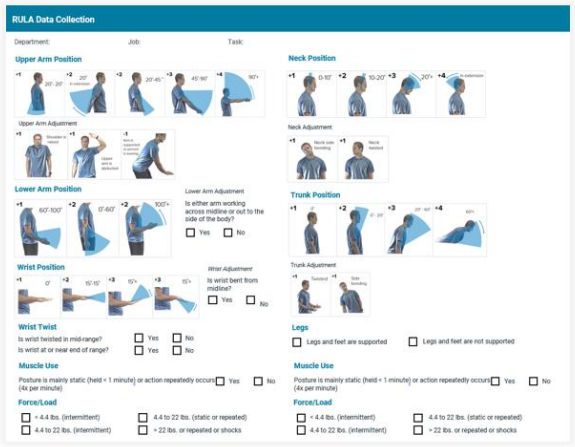
When to Use RULA

When To Use It

- When tasks have been flagged by the Job Screen
- Task-level upper limb postural evaluations



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RULA (or Rapid Upper Limb Assessment) is a task-level assessment tool used to evaluate biomechanical and postural load requirements of job tasks/demands on the upper extremities, neck, and trunk.

There are some things to keep in mind when using RULA:

1) RULA does not consider the duration of the task, available recovery time, or hand-arm vibration.
2) RULA only allows the evaluator to assess one employee's worst case posture at one point in time, requiring the use of representative postures.
3) RULA requires separate assessment of right and left sides of the body.

RULA Inputs

Inputs

Arms and Wrists:

- Upper Arm
- Lower Arm
- Wrist
- Wrist Twist
- Muscle Use & Load/Force

Neck, Trunk, and Legs:

- Neck
- Trunk
- Leg Score
- Muscle Use & Load/Force

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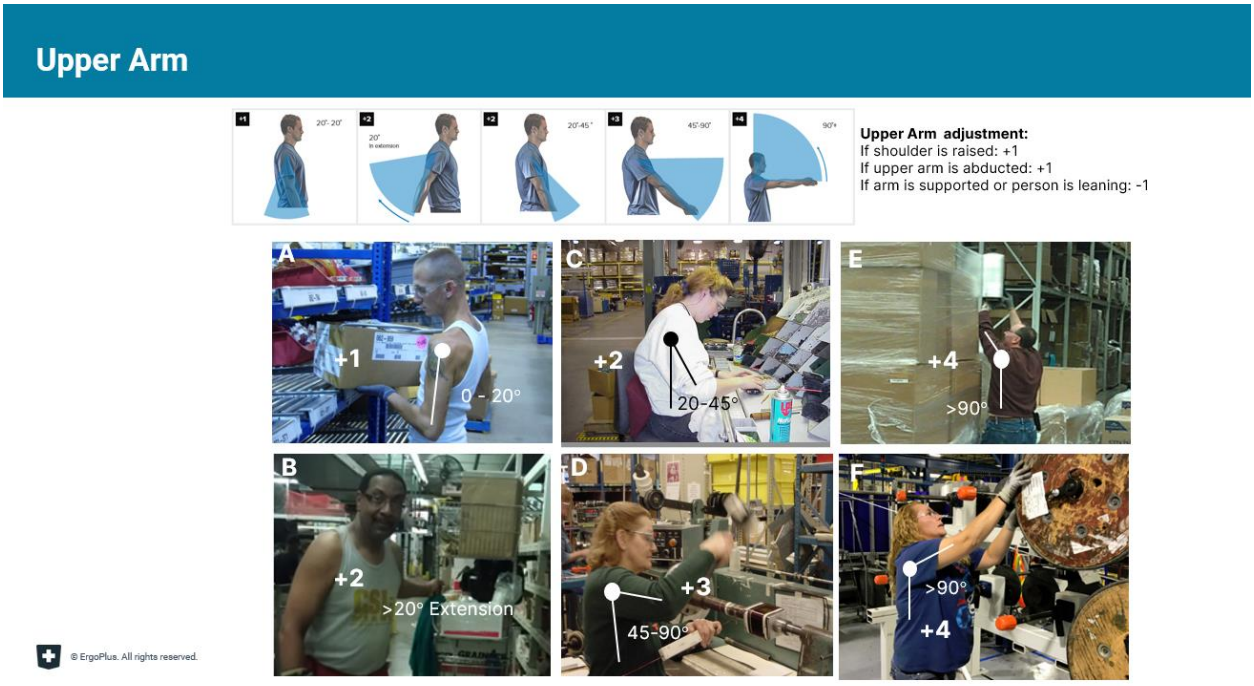
There are 9 inputs to the RULA assessment tool. The goal of this lesson is to get you comfortable with each of these task variables. Let's get started!

Upper Arm



Now, let's review how to determine and measure the RULA task variables in detail.

Upper Arm Position:

Step 1: Locate the upper arm position to determine the upper arm score. The upper arm score will be between 1-6. The score is based on the degree of shoulder flexion or extension, along with any adjustment for the shoulder being raised and/or abducted. Shoulder flexion is defined as anterior movement of the upper arm in the sagittal plane (forward reaching). Shoulder extension is defined as posterior movement of the upper arm in the sagittal plane (backward reaching). Shoulder abduction is defined as sideways movement of the upper arm away from the body.

Let's review the upper arm position scoring examples in this slide:

A: Shoulder is neutral between 0-20 degrees of flexion and extension, the upper arm position score for this example is +1.

B: Shoulder is extended beyond 20 degrees. So in this case the upper arm position score is +2.

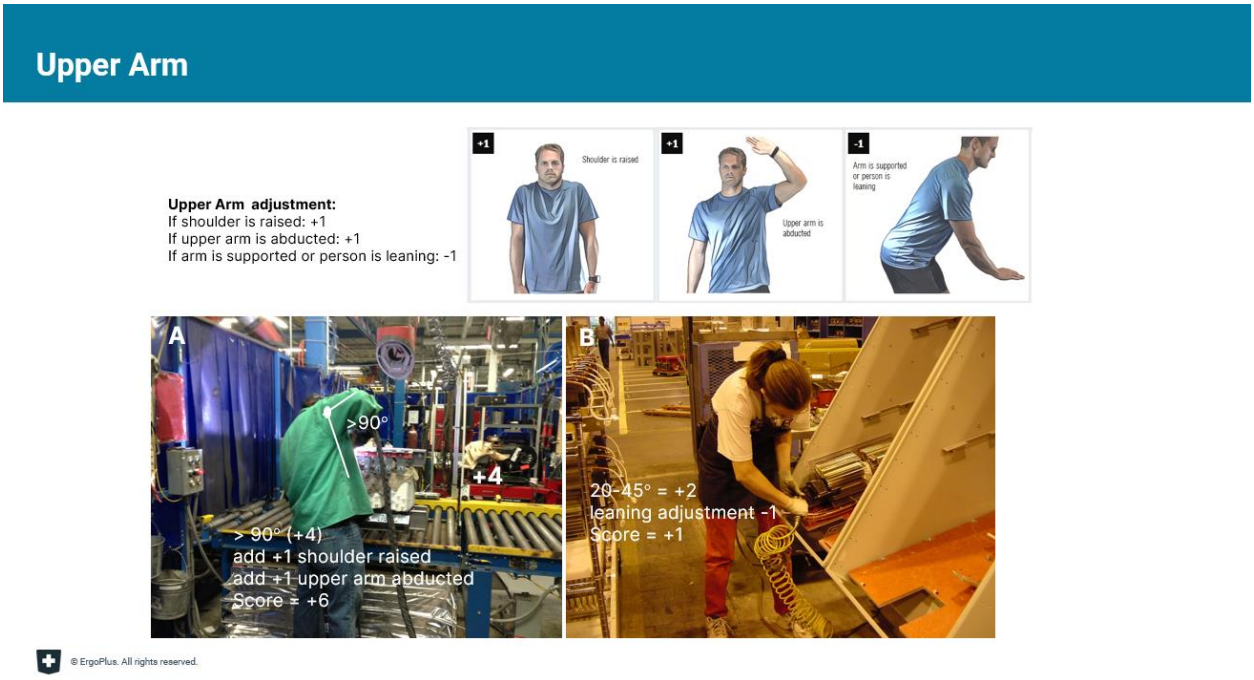
C: Shoulder is flexed between 20- 45 degrees, therefore the upper arm position score is +2.

D: Shoulder is flexed between 45 - 90 degrees, so the upper arm position score is +3 in this example.

E: Shoulder flexion is greater than 90 degrees, so the score in this case is +4.

F: Again, shoulder flexion is greater than 90 degrees and the score is +4.

Upper Arm (continued)



Upper Arm adjustments for Step 1:

If shoulder is raised: +1

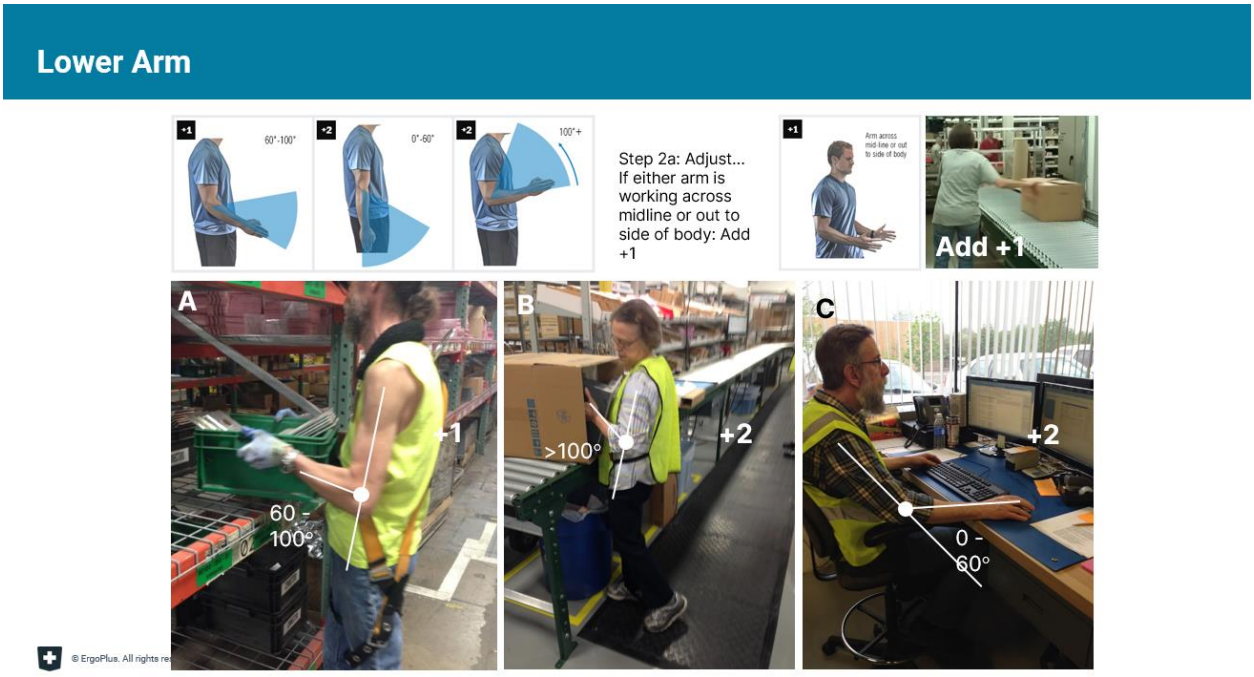
If upper arm is abducted: +1

If arm is supported or person is leaning: -1

A: Shoulder flexion is greater than 90 degrees, so the base score in this case is +4. In addition the shoulder is raised and abducted, adding +1 adjustments for both. Therefore, the total score is 4 + 1 + 1 = 6.

B: In this example, the shoulder is flexed between 20-45 degrees yielding an upper arm position score of +2. However, in this case the worker is leaning creating an assist by gravity in this position and a -1 adjustment in the score. The total score in this case is +2 -1 = +1.

Lower Arm



Step 2: Locate the lower arm position and determine the lower arm score. The lower arm score will be between 1-3. The score is based on the degree of elbow flexion or bending.

Lower arm position scoring examples:

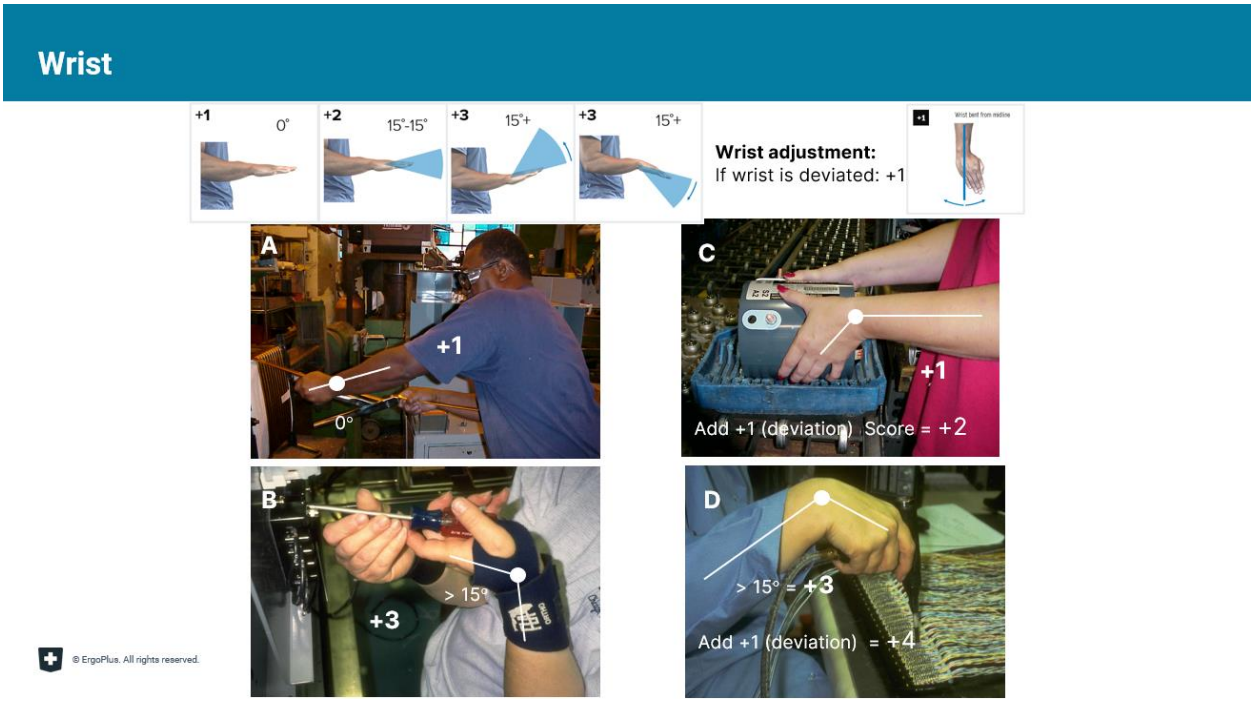
A: Elbow is flexed between 60 – 100 degrees, so the lower arm position score for this example is +1.

B: Elbow is flexed more than 100 degrees. Score = +2

C: Elbow is flexed between 0 – 60 degrees. Score = +2

In Step 2a, an adjustment of +1 is added to the score if either arm is working across the midline or out to the side of the body (as shown in the picture in the upper right corner of this slide).

Wrist



Step 3: Locate the wrist position and determine the wrist score. The wrist score will be 1-4. The score is based on the degree of wrist flexion or extension, along with a potential adjustment of +1 if wrist deviation is required.

Now let's review four wrist position scoring examples:

A: Wrist position is neutral or 0 degrees of flexion/extension with no adjustment for deviation, so the wrist position score for this example is +1.

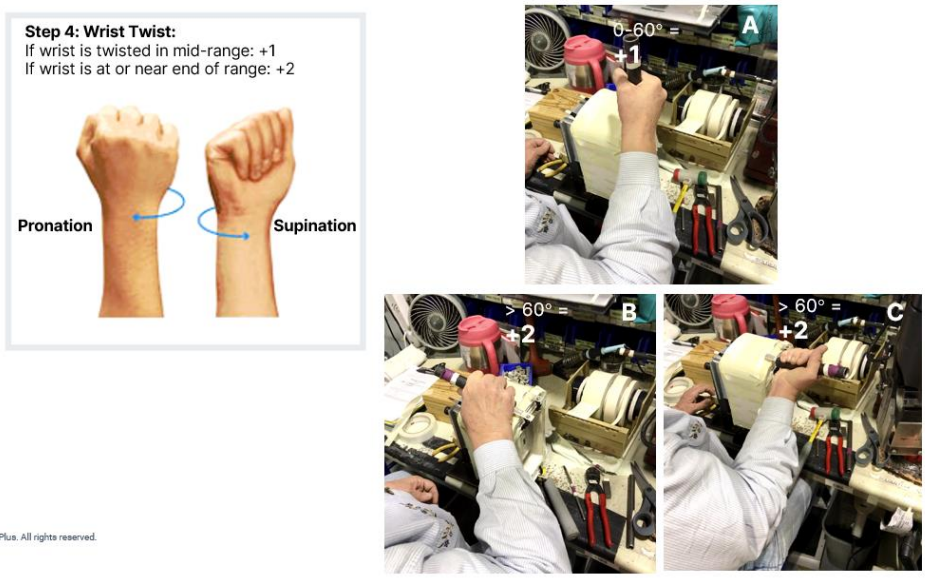
B: Wrist is extended > 15 degrees with no adjustment for deviation. Score = +3

C: Wrist flexion position is neutral or 0 degrees for a base score of +1. However, the wrist is ulnar deviated when performing this task, so add a +1 adjustment. Total score = +2.

D: Wrist is flexed > 15 degrees for a +3 base score. The wrist is also ulnar deviated, so add a +1 adjustment. Total score for this example = +4.

Wrist Twist

Wrist Twist



Step 4: Determine the wrist twist score. The wrist twist score will be either +1 or +2, depending on the degree of forearm pronation or supination. Pronation is defined as rotation of the hand or forearm from a neutral (thumb up) position so that the surface of the palm is facing downward. Typical range of motion for pronation is 80-90 degrees. Supination is defined as rotation of the hand or forearm from a neutral (thumb up or handshake) position so that the surface of the palm is facing upward. Typical range of motion for supination is 70-80 degrees.

If wrist is twisted in mid-range: +1

If wrist is at or near end of range: +2

The original RULA article doesn't give precise guidance regarding "mid-range" and "near end of range". To be conservative in my assessment, I consider >60 degrees of pronation or >50 degrees of supination to be "near end of range" and will use a +2 score if this range of motion is required by the job task being assessed.

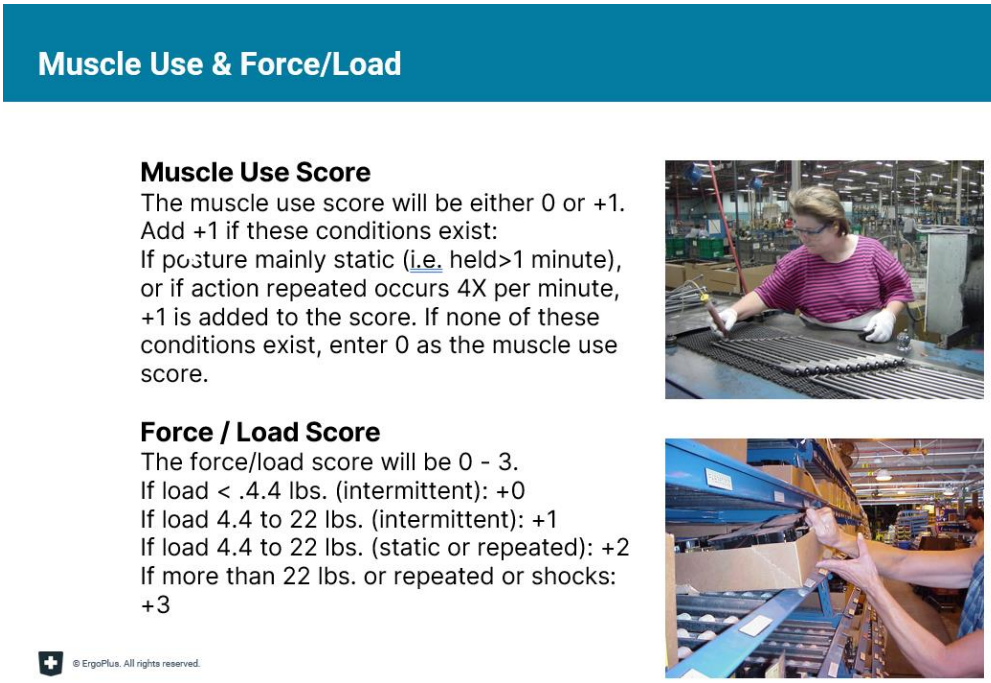
Wrist twist scoring examples:

A: Wrist position is mid-range (0-60 degrees), so the position score for this example is +1.

B: Wrist position is greater than 60 degrees of pronation. Score = +2

C: Wrist position is greater than 50 degrees of supination. Score = +2

Muscle Use & Force/Load



Step 5:

Muscle Use Score – Arm & Wrist

The muscle use score will be either 0 or +1.

The score will be+1 if these conditions exist:

If posture mainly static (i.e. held>1 minute), or if action repeated occurs 4X per minute, +1. If neither condition exists, enter 0 as the muscle use score.

Force / Load Score – Arm & Wrist

The force/load score will be 0 - 3.

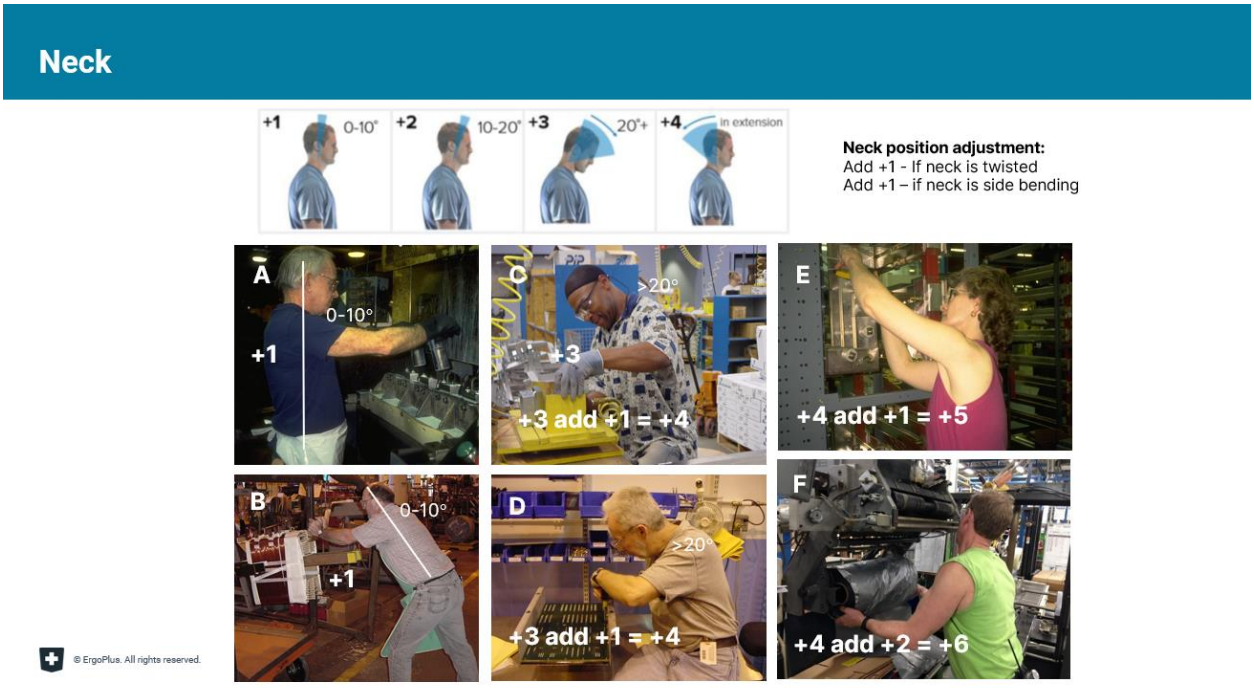
If load < .4.4 lbs. (intermittent): +0 (action occurs <4X per minute)

If load 4.4 to 22 lbs. (intermittent): +1

If load 4.4 to 22 lbs. (static or repeated): +2 (i.e. held>10 minutes, or if action repeated occurs 4X per minute)

If more than 22 lbs. or repeated or shocks (such as hammer use): +3

Neck



Neck, Trunk, and Leg Analysis (right side of the worksheet)

Step 6: Neck Position Score

The neck posture score will be between 1-6. The score is based on the degree of neck flexion or extension, along with any adjustment for neck twisting or side bending (lateral flexion). Neck flexion is movement of the chin towards the chest from a neutral neck position. Neck extension is moving the chin away from the chest (backwards) from a neutral neck position. Experts in biomechanics use a variety of landmarks and methods to define the neutral position (or the zero point between flexion and extension) of the neck. To keep it really simple, I would define neutral as the posture of the head/neck when the trunk of the body is erect (sitting or standing up straight) and looking at a visual target directly ahead at eye level.

The base score for the neck position will be 1-4.

Neck Position Adjustments:

Add +1 to the base score if neck is twisted.

Add +1 if neck is side bending.

Neck position scoring examples:

A: Neck flexion is less than 10 degrees with no twisting or side bending, therefore the neck position score is +1.

B: Even though the trunk is flexed 30 degrees, the neck is not flexed (chin to chest) more than 10 degrees. So in this case, the neck position score is +1. Note: Be sure to look at neck flexion relative to the trunk position.

C: Neck flexion is greater than 20 degrees (+3) and neck is twisted (+1) in this example (neck twist or side bending is best observed from a position directly behind the worker). The neck position score in this example is +4.

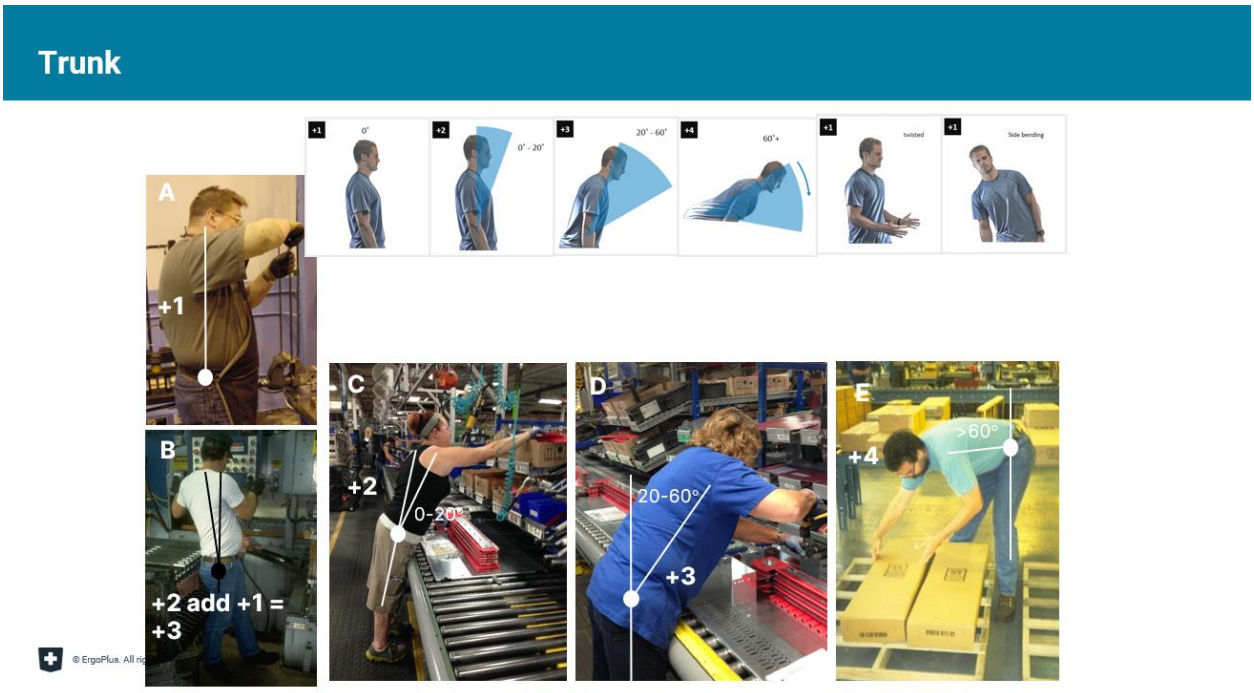
D: Neck flexion is greater than 20 degrees (+3) and the neck is twisted (+1), therefore the neck position score is +4.

E: Neck is extended and side bending, so neck position scoring is +4 for neck extension and add +1 for the neck side bending adjustment. The neck score in this example is +5.

F: Neck is extended, twisted, and is side bending. So, the proper scoring is +4 for extension. Add +1 for twisting and +1 for side bending adjustments. Therefore, the neck score in this example is +6.

Note: Neck extension is typically caused by a physical or visual obstruction.

Trunk



Step 7: Trunk Position

The trunk position score will be between 1-6. The score is based on the degree of trunk flexion or extension, along with any adjustment for twisting or side bending (lateral flexion) of the trunk/back. Trunk flexion is defined as anterior (forward) movement of the trunk in the sagittal plane (think toe touching). Trunk extension is defined as posterior (backward) movement of the trunk in the sagittal plane.

The base score for the trunk position will be 1-4.

Trunk Position Adjustments:

Add +1 to the base score if trunk is twisted.

Add +1 if trunk is side bending.

Trunk position scoring examples:

A: Trunk is neutral with no twisting or side bending, therefore the trunk position score is +1.

B: Trunk is extended between 0 - 20 degrees and the trunk is also twisted. So in this case, the trunk position score is +2 for extension and we need to add a +1 adjustment for twisting.

C: Trunk flexion is between 0 - 20 degrees with no twisting or side bending, therefore the trunk position score is +2.

D: Trunk flexion is between 20 - 60 degrees, therefore the trunk position score is +3.

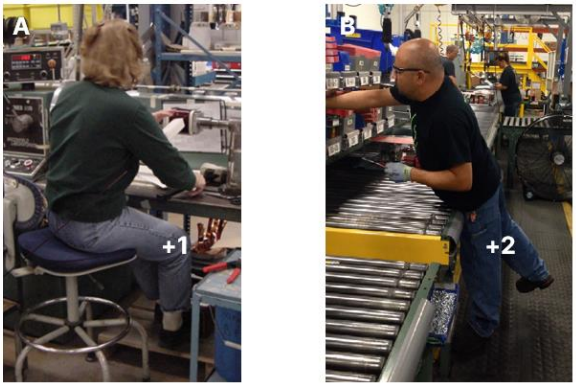
E: Trunk flexion is greater than 60 degrees, so the score is +4.

Note: If trunk flexion is greater than 60 degrees (+4) and trunk twisting is required, an adjustment of +1 would be added for a total score of +5. If trunk flexion is greater than 60 degrees (+4) and twisting (+1) and side bending (+1) is required, an adjustment of +2 would be added for a total score of +6. (maximum trunk position score).

Leg

Leg

Leg score:
If legs and feet are supported: +1
If not: +2



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Step 8: Leg Score

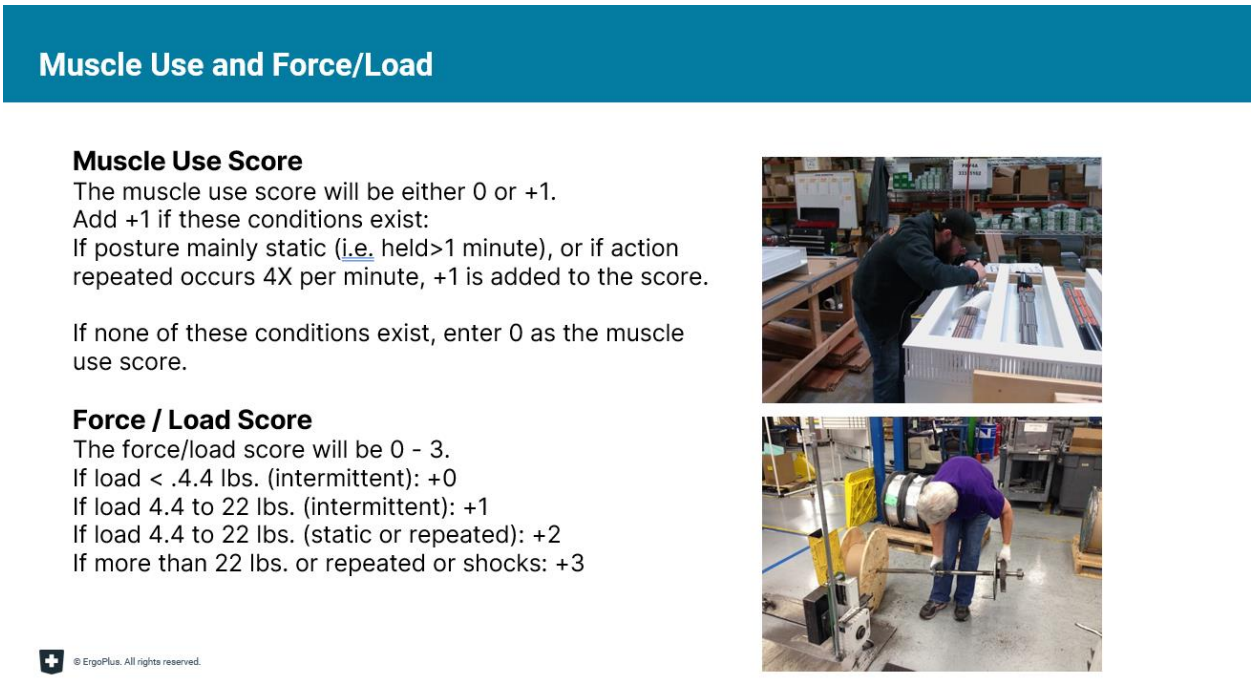
The leg position score will be between 1-2. If legs and feet are supported the score is +1. If the legs and feet are not supported, the score is +2.

Leg position scoring examples:

A: Legs and feet are supported, therefore the leg score is +1.

B: Legs and feet are not supported, therefore the score is +2.

Muscle Use and Force/Load



Step 9: Muscle Use & Force/Load Scores (note: scoring in this section is based on muscle use and force on the neck, trunk and legs.

Muscle Use Score – Neck, Trunk & Leg

The muscle use score will be either 0 or +1.

The score will be+1 if these conditions exist:

If posture mainly static (i.e. held>1 minute), or if action repeated occurs 4X per minute. If neither condition exists, enter 0 as the muscle use score.

Force / Load Score - Neck, Trunk & Leg

The force/load score will be 0 - 3.

If load < .4.4 lbs. (intermittent): +0 (action occurs <4X per minute)

If load 4.4 to 22 lbs. (intermittent): +1

If load 4.4 to 22 lbs. (static or repeated): +2 (i.e. held>1 minute, or if action repeated occurs 4X per minute)

If more than 22 lbs. or repeated 4x/minute or shocks (rapid build-up or a jolting action) present: +3

RULA Outputs

Outputs

The output of the RULA assessment tool is the final RULA Score, which is a single score that represents the level of MSD risk for the work task being evaluated:

Score	Level of MSD Risk
1-2	neglibible risk, no action required
3-4	low risk, change may be needed
5-6	medium risk, further investigation, change soon
6+	very high risk, implement change now

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The output of the RULA assessment tool is the final RULA Score, which is a single score that represents the level of MSD risk for the job task being evaluated. The minimum RULA Score = 1, and the maximum RULA Score = 7.