A Step-by-Step Guide to RULA

A Step-by-Step Guide to the RULA Assessment Tool

The Rapid Upper Limb Assessment (RULA) was developed to "rapidly" evaluate the exposure of individual workers to ergonomic risk factors associated with upper extremity MSD. The RULA ergonomic assessment tool considers biomechanical and postural load requirements of job tasks/demands on the neck, trunk and upper extremities.

RULA Employee Assessment Worksheet

Task Name: Date:

A. Arm and Wrist Analysis

Step 1: Locate Upper Arm Position:

+1 20°-20°   +2 20° (extension)   +2 20°-45°   +3 45°-90°   +4 90°+

Step 1a: Adjust...
If shoulder is raised: +1
If upper arm is abducted: +1
If arm is supported or person is leaning: -1

Upper Arm Score

Step 2: Locate Lower Arm Position:

+1 60°-100°   +2 0°-60°   +2 100°+

Lower Arm Score

Step 2a: Adjust...
If either arm is working across midline or out to side of body: Add +1

Step 3: Locate Wrist Position:

+1 0°   +2 15°-15°   +3 15°+   +3 15°+

Step 3a: Adjust...
If wrist is bent from midline: Add +1

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

Wrist Twist Score   Wrist Score

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

Posture Score A
+

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

Muscle Use Score
+

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

Force / Load Score
=

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

Wrist & Arm Score

Scores

Table A

Upper Arm	Lower Arm	Wrist Score 1		Wrist Score 2		Wrist Score 3		Wrist Score 4	
		Wrist Twist 1	Wrist Twist 2	Wrist Twist 1	Wrist Twist 2	Wrist Twist 1	Wrist Twist 2	Wrist Twist 1	Wrist Twist 2
1	1	1	2	2	2	2	3	3	3
	2	2	2	2	2	3	3	3	3
	3	2	3	3	3	3	3	4	4
2	1	2	3	3	3	3	4	4	4
	2	3	3	3	3	3	4	4	4
	3	3	4	4	4	4	5	5	5
3	1	3	3	4	4	4	4	5	5
	2	3	4	4	4	4	5	5	5
	3	4	4	4	4	5	5	5	5
4	1	4	4	4	4	5	5	5	5
	2	4	4	4	4	5	5	5	5
	3	4	4	5	5	5	6	6	6
5	1	5	5	5	5	6	6	6	7
	2	5	6	6	6	6	7	7	7
	3	6	6	6	7	7	7	7	8
6	1	7	7	7	7	7	8	8	9
	2	8	8	8	8	8	9	9	9
	3	9	9	9	9	9	9	9	9

Table C

Wrist / Arm Score	Neck, Trunk, Leg Score 1	2	3	4	5	6	7+
1	1	2	3	3	4	5	5
2	2	2	3	4	4	5	5
3	3	3	3	4	4	5	6
4	3	3	3	4	5	6	6
5	4	4	4	5	6	7	7
6	4	4	5	6	6	7	7
7	5	5	6	6	7	7	7
8+	5	5	6	7	7	7	7

Scoring (final score from Table C)
1-2 = acceptable posture
3-4 = further investigation, change may be needed
5-6 = further investigation, change soon
7 = investigate and implement change

RULA Score

B. Neck, Trunk and Leg Analysis

Step 9: Locate Neck Position:

+1 0-10°   +2 10-20°   +3 20°+   +4 in extension

Neck Score

Step 9a: Adjust...
If neck is twisted: +1
If neck is side bending: +1

Step 10: Locate Trunk Position:

+1 0°   +2 0°-20°   +3 20°-60°   +4 60°+

Trunk Score

Step 10a: Adjust...
If trunk is twisted: +1
If trunk is side bending: +1

Step 11: Legs:
If legs and feet are supported: +1
If not: +2

Leg Score

Table B: Trunk Posture Score

Neck Posture Score	Legs 1	Legs 2	Legs 1	Legs 2	Legs 1	Legs 2	Legs 1	Legs 2	Legs 1	Legs 2	Legs 1	Legs 2
	1		2		3		4		5		6	
1	1	3	2	3	3	4	5	5	6	6	7	7
2	2	3	2	3	4	5	5	5	6	7	7	7
3	3	3	3	4	4	5	5	6	6	7	7	7
4	5	5	5	6	6	7	7	7	7	7	8	8
5	7	7	7	7	8	8	8	8	8	8	8	8
6	8	8	8	8	8	8	9	9	9	9	9	9

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

Posture B Score
+

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

Muscle Use Score
+

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

Force / Load Score
=

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**.

Neck, Trunk, Leg Score

based on RULA: a survey method for the investigation of work-related upper limb disorders, McAtamney & Corlett, Applied Ergonomics 1993, 24(2), 91-99

The RULA tool uses a systematic process to evaluate required body posture, force, and repetition for the job task being evaluated. A single page worksheet (above) can be used to evaluate required or selected body posture, muscle use frequency, and forceful exertions.
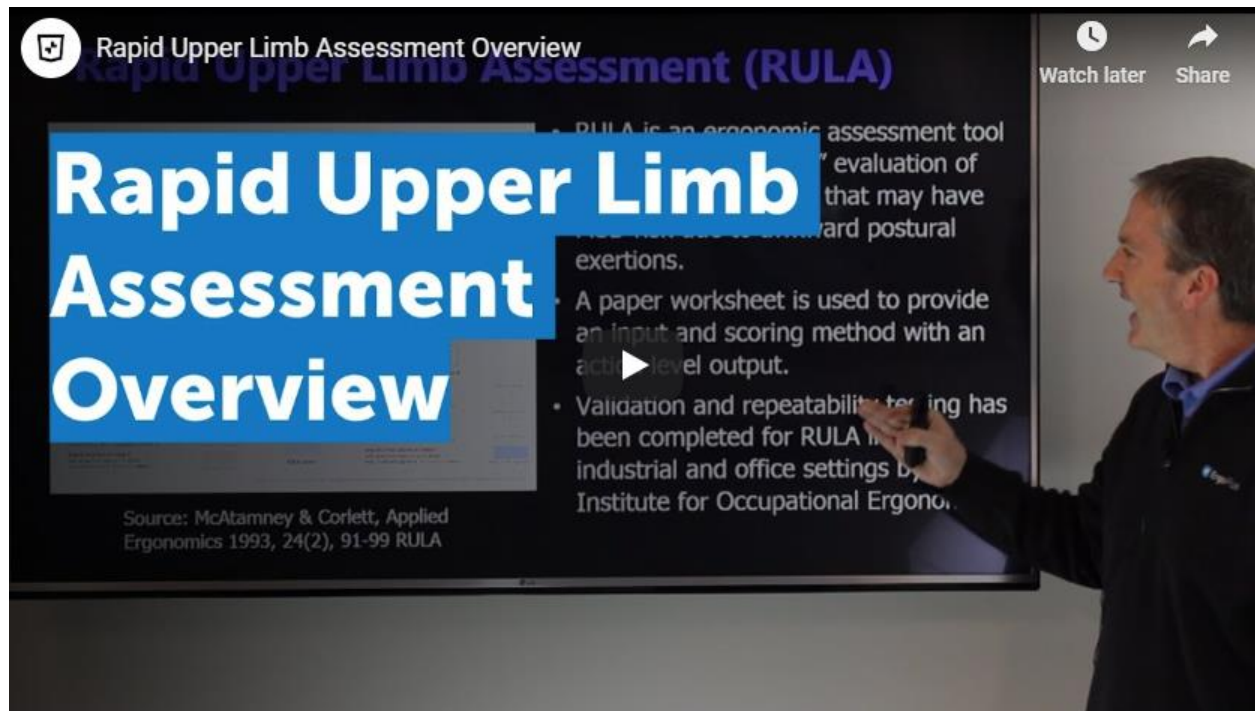
RULA was developed with the following objectives in mind:

1) To provide a method of screening a working population to assess exposure to significant risk of work-related upper extremity disorders.

2) To identify the muscular effort which is associated with working postures and excessive forces while performing static or repetitive work, and which may contribute to muscle fatigue.

3) To provide a simple scoring method with an action level output that identifies an indication of urgency.

4) To provide a user-friendly assessment tool that requires minimal time, effort, and equipment.

RULA Limitations:

1) Does not consider the duration of the task, available recovery time, or hand-arm vibration.

2) Only allows the evaluator to assess one employee's worst-case posture at one point in time, requiring the use of representative postures.

3) Requires separate assessment of right and left sides of the body, although in most cases you will be able to quickly determine which side of the body has the greatest exposure to MSD risk.

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

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. Outlined in the above chart are the RULA level of MSD risk descriptions and cut points.

ErgoPlus RULA Calculator:

Rapid Upper Limb Assessment (RULA)

Select Upper Arm Position

Upper Arm Adjustments
Select any that apply.

Select Lower Arm Position

Lower Arm Adjustments
☐ Is either arm working across midline or out to side of body?

Select Wrist Position

Wrist Adjustments
Select if applicable.

☑

Select Wrist Twist
☐ If wrist is twisted in mid-range
☑ If wrist is at or near end of range

Muscle Use
Arm and Wrist Analysis.
☐ Select if posture is mainly static (i.e. held > 1 minute), or if action repeated occurs 4X per minute or more.

Force / Load
Arm and Wrist Analysis.
Force/Load
4.4 to 22lbs. (stat... ▾

Select Neck Position

Neck Adjustments
Select any that apply.

Select Trunk Position

Trunk Adjustments
Select any that apply.

Select Leg Position

Muscle Use
Neck, Trunk, and Legs Analysis.
☐ Select if posture is mainly static (i.e. held > 1 minute), or if action repeated occurs 4X per minute or more.

Force / Load
Neck, Trunk, and Legs Analysis.
Force/Load
4.4 to 22lbs. (stat... ▾

CALCULATE

RESULTS

Risk

Risk Index	2.33

Assessment Results

RULA Score	7.00

We have developed a cloud based RULA calculator as a part of our ErgoPlus Industrial platform that can be used to efficiently conduct an assessment, calculate the score and save your results. Simply select the appropriate body segment positions/postures, load force and muscle use selections to calculate the RULA score and Risk Index. The ErgoPlus RULA web-based calculator is shown above and you can also check out the application here:

[ErgoPlus Industrial](#)

Getting Ready

The evaluator should prepare for the assessment by interviewing the worker being evaluated to gain an understanding of the job tasks, and by observing the worker's movements and postures during several work cycles. Selection of the postures to be evaluated should be based on:

1) the most difficult postures and work tasks (determined during worker interview and initial observation), 2) the posture sustained for the longest period of time, or 3) the posture where the highest force loads occur.

The RULA can be conducted quickly, so multiple positions and tasks within the work cycle can usually be evaluated without a significant time and effort. When using RULA, only the right or left side is assessed at a time. After interviewing and observing the worker, the evaluator can determine if only one arm should be evaluated or if an assessment is needed for both sides.

Determine Body Position Selections

The RULA assessment requires that you determine postural angles of six different body positions. In most cases, you will be able to determine the body position angle in the field as you observe the task. However, we find that it's very helpful to take pictures or video of the task being performed from several angles if possible. You can then display the pictures on your computer monitor and use a goniometer (as pictured on left) or an overlaid transparent protractor image (as pictured on right) to measure the body segment angles. These methods are both very quick and easy and will give you the assurance that you've obtained the correct body position angles for the assessment.

Using the RULA – Example

Arm & Wrist Analysis

Upper Arm Position:

Select Upper Arm Position

Upper Arm Adjustments

Select any that apply.

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). Upper Arm (shoulder) elevation and abduction are possible adjustments that may apply. Also note the scoring adjustment (-1) possibility that is used if the worker's shoulder is supported or the worker is forward leaning in such a way that gravity assists the shoulder position.

In this example, the shoulder is flexed slightly less than 90 degrees for a score of +3, with an upper arm adjustment (+1) selected for shoulder abduction.

Lower Arm Position:

Select Lower Arm Position

Lower Arm Adjustments

☐ Is either arm working across midline or out to side of body?

The lower arm score will be between 1-3. The score is based on the degree of elbow flexion or bending. Select the lower arm adjustment if either lower arm is working across the midline or to the outside of the body.

In this example, the elbow is flexed slightly less than 60 degrees for a score of +2. There is no adjustment for the arm working across the midline.

Wrist Position:

Select Wrist Position

Wrist Adjustments

Select if applicable.

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. Select wrist twist pronation or supination) if the wrist is twisted in the mid-range of if the wrist is twisted at or near the end of range.

In this example, the wrist is flexed greater than 15 degrees for a score of +3 and the wrist is deviated significantly, so the wrist adjustment (+1) should be selected as shown above.

Wrist Twist:

Select Wrist Twist

☑ If wrist is twisted in mid-range
☐ If wrist is at or near end of range

Determine and select the degree of wrist twist 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.

In this example, the wrist is twisted in the mid-range.

(Arm and Wrist) Muscle Use & Force/Load Analysis

Muscle Use

Arm and Wrist Analysis.

☐ Select if posture is mainly static (i.e. held > 1 minute), or if action repeated occurs 4X per minute or more.

Force / Load

Arm and Wrist Analysis.

Force/Load

4.4 to 22lbs. (sta... ▼

The muscle use (arm & wrist) score box will be checked if the posture of the task is mainly static (i.e. held>1 minute), or if action repeated occurs 4X per minute. If neither condition exists, there is no entry made for the muscle use score.

Make one of the following selections for the Load / Force score.

If load < .4.4 lbs. (intermittent) when action occurs < 4x per minute

If load 4.4 to 22 lbs. (intermittent) when action occurs < 4x per minute

If load 4.4 to 22 lbs. (static or repeated) when held > 10 minutes, or if action is repeated occurs 4x per minute

If more than 22 lbs. or if repeated or shocks such as hammer use is required

In this example, the muscle use score is 0 and the load weight is between 4.4 – 22 lbs.

Neck, Trunk, and Leg

Select Neck Position

+1 0-10°
+2 10-20°
+3 20° +
+4 in extension

Neck Adjustments

Select any that apply.

+1 Neck twisted
+1 Neck side bending

The neck position 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.

In this example, the neck position was determined to be between 10 – 20 degrees. In addition, side bending of the neck was observed.

Trunk Position:

Select Trunk Position

Trunk Adjustments

Select any that apply.

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 (think painting the ceiling).

In this example, the trunk position was observed to be flexed more than nuetral up to 20 degrees. There is no significant trunk twisting or side bending, so the trunk adjustments do not apply and neither box is checked.

Leg Position:

Select Leg Position

The leg position score will be 1 or 2. If legs and feet are supported with even weight distribution the score is +1. If the legs and feet are not supported or there is uneven weight distribution, the score is +2.

In this example, the legs and feet are supported and weight is evenly ditributed, therefore the leg score is +1.

(Neck, Trunk & Leg) Muscle Use & Force/Load Analysis

Muscle Use

Neck, Trunk, and Legs Analysis

☐ Select if posture is mainly static (i.e. held > 1 minute), or if action repeated occurs 4X per minute or more.

Force / Load

Neck, Trunk, and Legs Analysis.

Force/Load

4.4 to 22lbs. (sta... ▼

CALCULATE

The muscle use (neck, trunk & legs) score box will be checked if the posture of the task is mainly static (i.e. held>1 minute), or if action repeated occurs 4X per minute. If neither condition exists, there is no entry made for the muscle use score.

Make one of the following selections for the Load/Force score for the neck, trunk, & legs.

If load < .4.4 lbs. (intermittent) when action occurs < 4x per minute

If load 4.4 to 22 lbs. (intermittent) when action occurs < 4x per minute

If load 4.4 to 22 lbs. (static or repeated) when held > 10 minutes, or if action is repeated occurs 4x per minute

If more than 22 lbs. or if repeated or shocks such as hammer use is required

In this example, the muscle use score is 0 and the load weight is between 4.4 – 22 lbs.

Calculate Results

RESULTS

Risk

Risk Index	2.33

Assessment Results

RULA Score	7.00

After all entries are selected, press the calculate button for the results of the assessment. The ErgoPlus RULA calculator will display the overall RULA score and Risk Index. The RULA score represents the level of MSD risk for the job task being evaluated. The minimum RULA Score = 1, and the maximum RULA Score = 7. The design goal for the RULA assessment is a score of 3. The Risk Index answers the question... "How significant is the risk?" A Risk Index value of less than 1.0 indicates a nominal risk to healthy employees. A Risk Index of 1.0 or more denotes

that the task is high risk for some fraction of the population. As the Risk Index increases, the level of MSD risk increases correspondingly. Therefore, the goal is to design job tasks to accomplish a Risk Index of 1.0 or lower.

In this example, the final RULA score of 7 and a risk index of 2.33 indicates high risk and calls for further investigation and engineering and/or work method changes to reduce or eliminate MSD risk.

Implemented Ergonomic Improvements

To reduce the level of MSD risk, the assembly process was changed to install the access plate prior to riveting the can together. A fixture was fabricated to hold the can open while the access plate is being installed. A straight or "in-line" pneumatic screwdriver (on a tool balancer) is now used to improve upper extremity work postures and eliminate the force required.

INITIAL		RESULTS	
Risk		Risk	
Risk Index	2.33	Risk Index	0.33
Assessment Results		Assessment Results	
RULA Score	7.00	RULA Score	1.00

A follow-up analysis using the ErgoPlus Industrial software RULA calculator was performed upon completion of this ergonomic process and tool improvement. The

results are pictured above. When using the new work process and tools, the RULA total score is reduced from 7 to 1 and the risk index is reduced from 2.33 to .33.

ErgoPlus

Manage Ergonomics the Modern Way

Use cloud-based software to manage a consistent, best-in-class ergonomics process.

Schedule a demo