Biomekanika
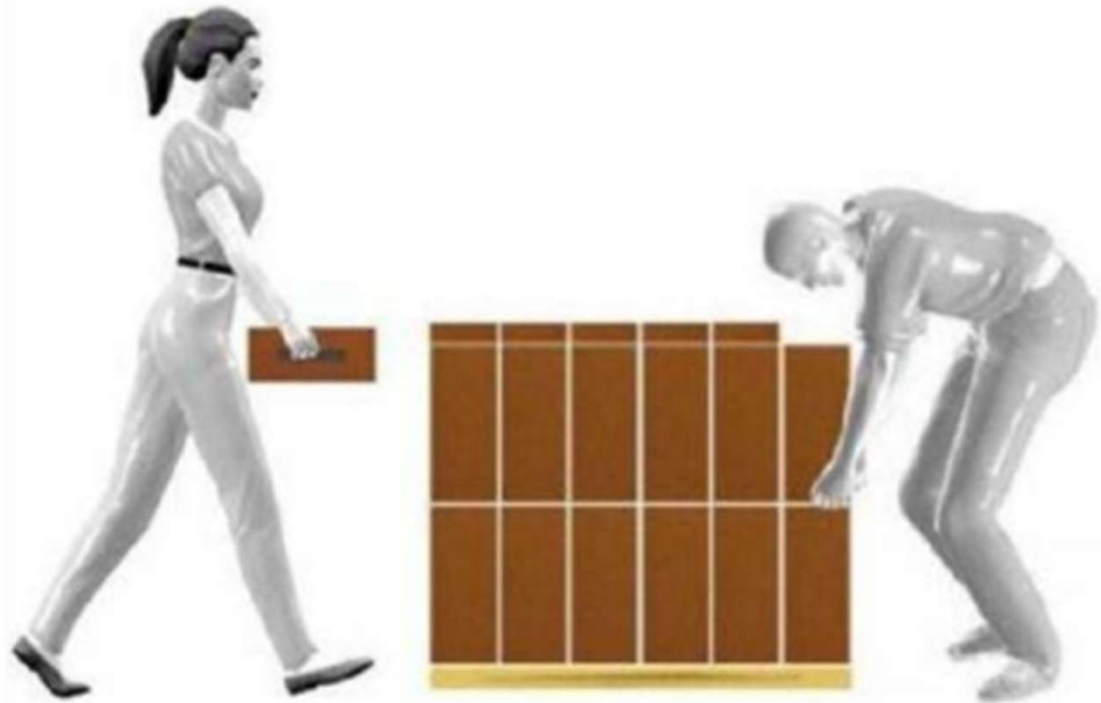# POSTUR KERJA

Amalia

METODE ANALISIS POSTUR KERJA

- OWAS
- NIOSH
- REBA
- RULA
- PEI
- QEC
- PLIBEL

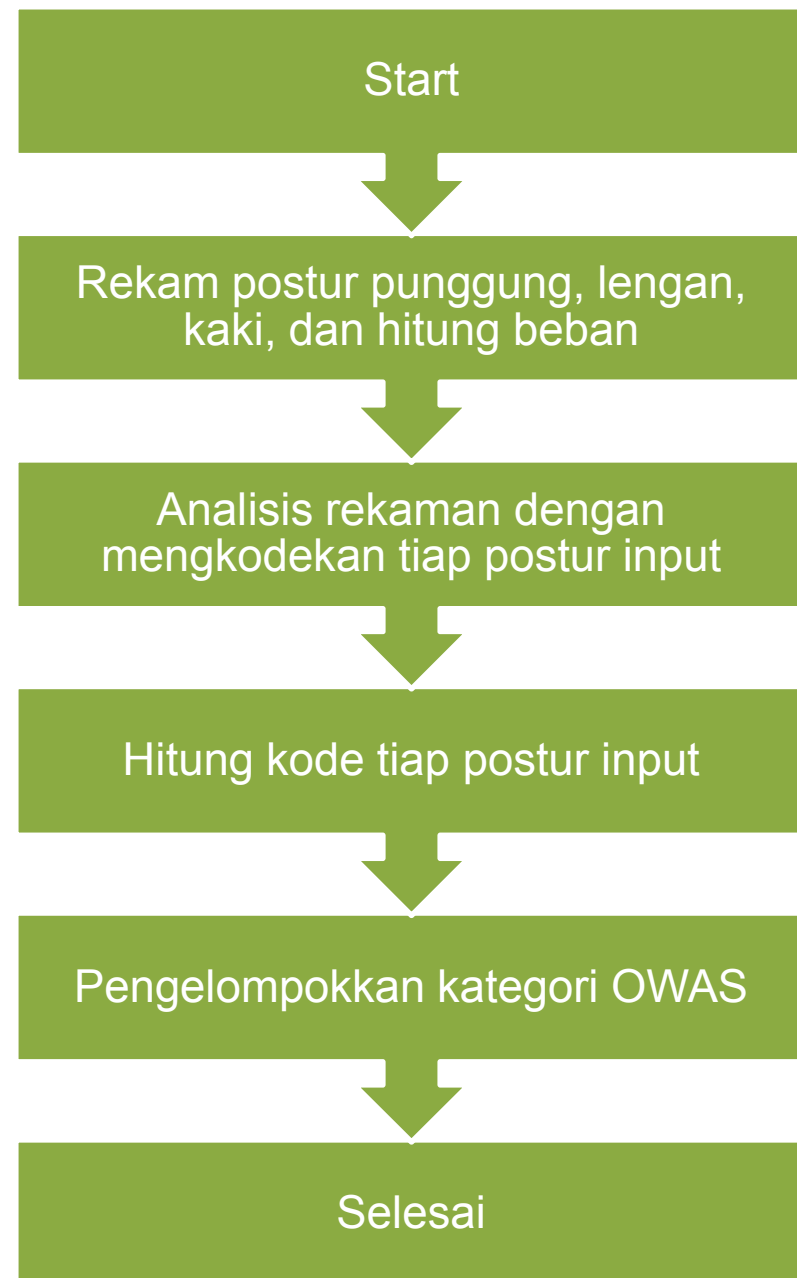# Metode OWAS
(Owako Work Posture Analysis)

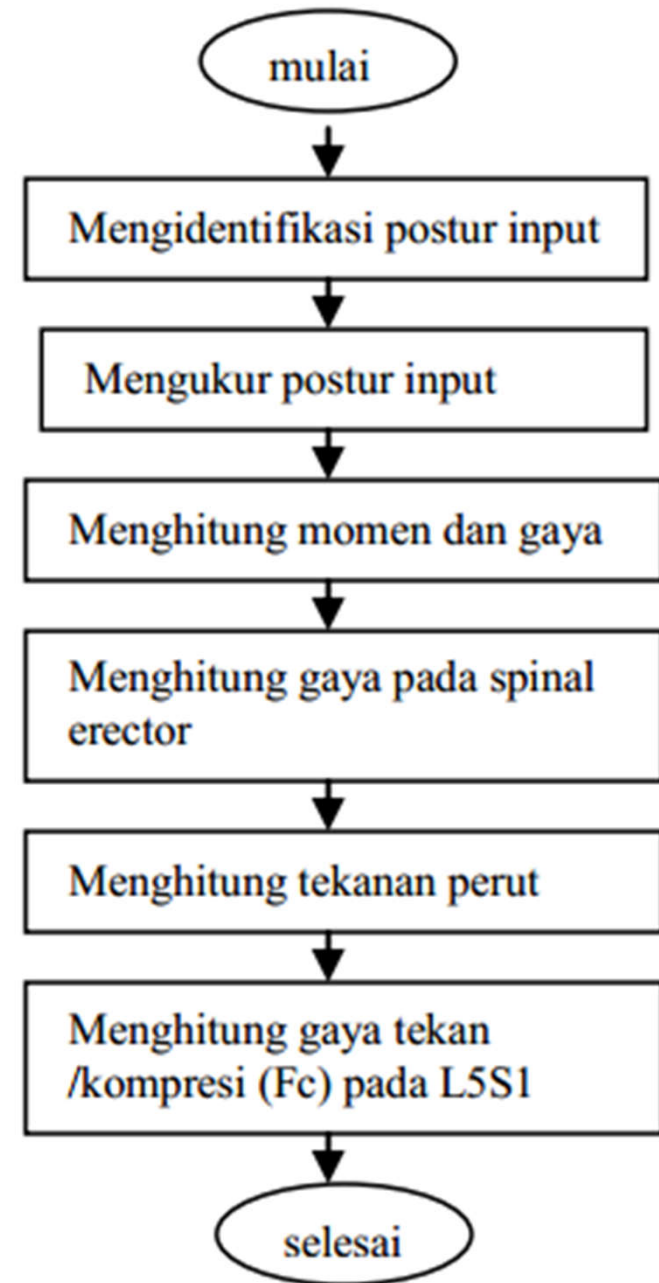▫ Analisis postur seluruh bagian tubuh dengan posisi duduk dan berdiri

Ktg	Action
1	Bisa diterima jika tidak berulang dan periode lama
2	Perlu pemeriksaan lanjutan dan perubahan-perubahan
3	Pemeriksaan dan perubahan perlu dilakukan segera
4	Pemeriksaan dan perubahan perlu dilakukan sangat segera

Start

↓

Rekam postur punggung, lengan, kaki, dan hitung beban

↓

Analisis rekaman dengan mengkodekan tiap postur input

↓

Hitung kode tiap postur input

↓

Pengelompokkan kategori OWAS

↓

Selesai

Metode NIOSH

- Identifikasi problem back injuries
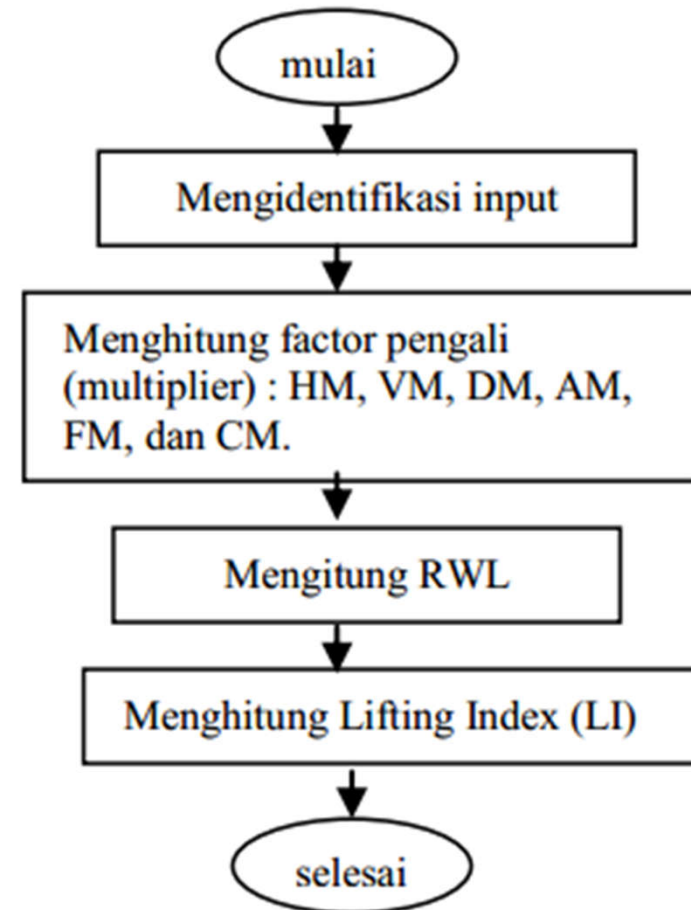- Mengetahui gaya di punggung (L5S1)
- Metode: MPL dan RWL

STANDAR MPL	
Fc<AL	Aman
AL<Fc<MPL	Perlu hati-hati
Fc>MPL	berbahaya
Standar: Besar gaya tekan < 6500N Batasan gaya angkat 3500	

```
       mulai
         │
         ▼
┌─────────────────────────┐
│ Mengidentifikasi postur input │
└─────────────────────────┘
         │
         ▼
┌─────────────────────────┐
│   Mengukur postur input  │
└─────────────────────────┘
         │
         ▼
┌─────────────────────────┐
│ Menghitung momen dan gaya │
└─────────────────────────┘
         │
         ▼
┌─────────────────────────┐
│ Menghitung gaya pada spinal │
│         erector          │
└─────────────────────────┘
         │
         ▼
┌─────────────────────────┐
│ Menghitung tekanan perut │
└─────────────────────────┘
         │
         ▼
┌─────────────────────────┐
│   Menghitung gaya tekan   │
│ /kompresi (Fc) pada L5S1 │
└─────────────────────────┘
         │
         ▼
       selesai
```

Metode NIOSH

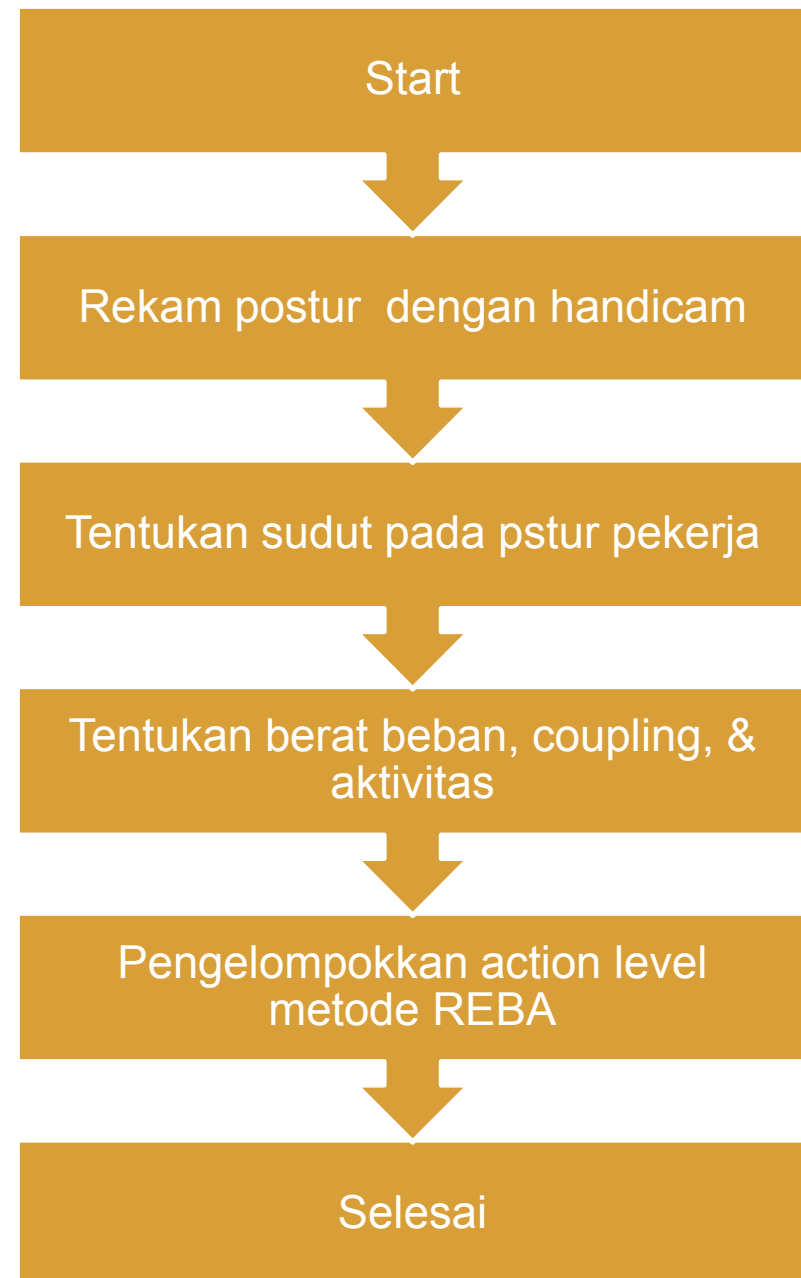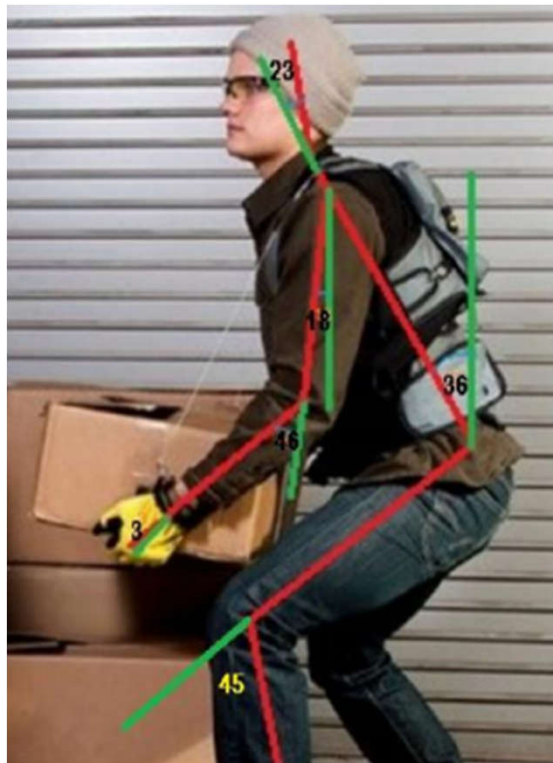- Metode RWL (Recommended Weighted Limit)

STANDAR RWL	
LI ≤ 1	Aktivitas tidak mengandung resiko
LI > 1	Aktivitas mengandung resiko cidera tulang belakang

Metode REBA
(Rapid Entire Body Assessment)

▫ Analisis postur kerja tubuh dengan cepat


```
Start
  ↓
Rekam postur dengan handicam
  ↓
Tentukan sudut pada pstur pekerja
  ↓
Tentukan berat beban, coupling, & aktivitas
  ↓
Pengelompokkan action level metode REBA
  ↓
Selesai
```

Metode REBA
(Rapid Entire Body Assessment)

Metode REBA
(Rapid Entire Body Assessment)

REBA : SCORING

Lv	REBA score	Risk Level	Action
0	1	Negligible	Non necessary
1	2-3	Low	Maybe necessary
2	4-7	Medium	necessary
3	8-10	High	Necessary soon
4	11-15	Very High	Necessary now

Metode RULA
(Rapid Upper Limb Assessment)

- Metode cepat penilaian postur tubuh bagian atas
- Grup A (lengan atas dan bawah, dan pergelangan tangan
- Grup B (leher, tulang belakang, dan kaki)
- Tujuan metode RULA:
  - Menyediakan perlindungan yg cepat dalam pekerjaan
  - Identifikasi usaha yang dibutuhkan otot yang berhubungan dengan postur tubuh saat kerja
  - Memberikan hasil untuk penilaian ergonomi
  - Dokumentasi postur tubuh saat kerja

```
Start
  ↓
Rekam postur tubuh pekerja
  ↓
Penilaian postur berdasarkan RULA Scoring sheet
  ↓
Tentukan nilai otot, kekuatan beban
  ↓
Hitung skor berdasarkan tabel RULA
  ↓
Kelompooka ke action level metode RULA
  ↓
Selesai
```
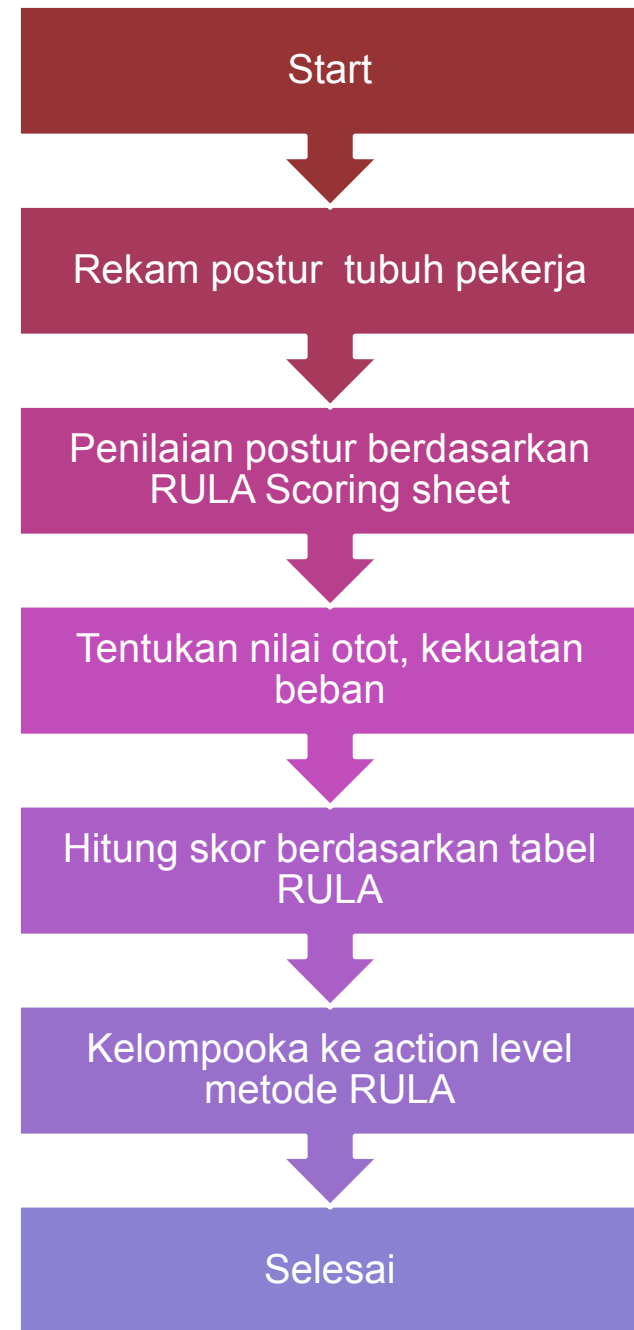
Metode RULA
(Rapid Upper Limb Assessment)

A. Arm and Wrist Analysis

Step 1: Locate Upper Arm Position:

+1 +2 +2 +3 +4

20° 20° 20° 20-45° 45-90° 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 +2

Add +1   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 +2 +3   Add +1

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>10 minutes).
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	4	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	5	6	6
5	1	5	5	5	5	6	6	7	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	8	8	9	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

Muscle Use Score
+
Force / Load Score

RULA Score

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

B. Neck, Trunk and Leg Analysis

Step 9: Locate Neck Position:

+1 +2 +3 +4

Neck Score

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

Step 10: Locate Trunk Position:

+1 +2 +3 +4

20-60° 60°+

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

Trunk Score

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

Leg Score

Table B Trunk Posture Score

Neck Posture Score	Trunk Posture 1		Trunk Posture 2		Trunk Posture 3		Trunk Posture 4		Trunk Posture 5		Trunk Posture 6	
	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	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	7	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>10 minutes).
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

Metode RULA
(Rapid Upper Limb Assessment)

Score	Tingkat Resiko
1-2	Resiko diabaikan, tidak perlu penanganan
3-4	Resiko rendah, perubahan dibutuhkan
5-6	Resiko sedang, penanganan lebih lanjut, butuh perubahan segera
6+	Sangat beresiko, lakukan perubahan sekarang