

2. Ergonomics methods

The most widely used ergonomics methods are observational tools for posture and movement analysis, checklists for risk assessment, and quantitative evaluation techniques like RULA, REBA, and OWAS. These methods are applied to prevent musculoskeletal disorders and improve workplace design.

2.1. Commonly Used Postural Ergonomics Methods

1. Observational/Postural Assessment Tools

- **RULA (Rapid Upper Limb Assessment)**
 - Focuses on neck, trunk, and upper limb postures.
 - Common in office and manufacturing settings.
- **REBA (Rapid Entire Body Assessment)**
 - Evaluates whole-body postures, especially in dynamic tasks.
 - Widely used in healthcare, logistics, and construction.
- **OWAS (Ovako Working Posture Analysis System)**
 - Classifies postures of the back, arms, and legs.
 - Useful in heavy industry and repetitive manual work. [Ergonomics Nerd](#)

2. Checklists and Screening Tools

- **NIOSH Lifting Equation**
 - Calculates safe lifting limits and identifies risk factors.
- **Strain Index (SI)**
 - Assesses risk of distal upper extremity disorders (e.g., wrist, hand).
- **Manual Handling Assessment Charts (MAC)**
 - Used in UK workplaces to evaluate lifting, carrying, and team handling tasks. [CDC](#)

3. Quantitative/Instrument-Based Methods

- **Force Measurement Tools** (e.g., dynamometers, pressure sensors).
- **Motion Capture & Video Analysis** for detailed posture tracking.
- **Electromyography (EMG)** to measure muscle activity and fatigue. [aeasseincludes.assp.org](#)

Method	Focus Area	Strengths	Limitations	Common Use
RULA	Upper body posture	Quick, easy, office tasks	Limited for whole-body	Office ergonomics
REBA	Entire body	Covers dynamic tasks	More complex scoring	Healthcare, logistics
OWAS	Back, arms, legs	Good for heavy industry	Less detail on fine movements	Manufacturing
NIOSH Lifting Equation	Lifting tasks	Quantitative, standardized	Only for lifting	Warehousing
Strain Index	Hand/wrist	Focused on repetitive strain	Narrow scope	Assembly, typing

Notice factors such as industry-specific needs, ease vs. accuracy trade-off, and technology integration are to be taken in consideration when choosing methods.

While posture-based methods are the most visible, ergonomics also covers **mental workload**, **environmental comfort**, and **organizational design**. These are crucial in settings like aviation,

healthcare, IT, and office work where cognitive and environmental factors matter as much as physical ones.

2.2. Commonly Used Ergonomics Non Postural Methods

1. Environmental Ergonomics Methods

- **Lighting Assessment Tools**
 - Measure glare, brightness, and contrast to reduce eye strain.
- **Noise Measurement (Sound Level Meters, Dosimeters)**
 - Evaluate exposure to harmful noise levels.
- **Thermal Comfort Analysis**
 - Uses indices like **PMV (Predicted Mean Vote)** and **PPD (Predicted Percentage Dissatisfied)** to assess temperature, humidity, and airflow.

2. Cognitive Ergonomics Methods

- **Cognitive Task Analysis (CTA)**
 - Studies mental processes: decision-making, memory, attention.
- **NASA-TLX (Task Load Index)**
 - Measures perceived workload across dimensions (mental, physical, temporal, effort, frustration).
- **Situation Awareness Rating Techniques (SART)**
 - Evaluates how well workers perceive and understand their environment.

3. Organizational Ergonomics Methods

- **Workload Analysis**
 - Examines staffing levels, shift patterns, and task distribution.
- **Job Demands–Resources (JD-R) Model**
 - Balances demands (stressors) with resources (support, autonomy).
- **Participatory Ergonomics**
 - Involves workers directly in identifying problems and designing solutions.

4. Human–Machine Interaction Methods

- **Usability Testing**
 - Evaluates how intuitive and efficient tools/software are.
- **Interface Analysis**
 - Studies screen layouts, control placement, and feedback systems.
- **Link Analysis**
 - Maps relationships between tools, controls, and information flow to optimize layout.

2.3. Postural vs. Non-Postural Methods

Focus Area	Example Method	What It Evaluates
Postural	RULA, REBA, OWAS	Body positions, musculoskeletal risk
Environmental	PMV/PPD, Noise Dosimeters	Comfort, sensory strain
Cognitive	NASA-TLX, CTA, SART	Mental workload, decision-making
Organizational	JD-R, Workload Analysis	Staffing, schedules, stress
Human–Machine	Usability Testing, Link Analysis	Interface design, tool layout

2.4. Uses of Ergonomics Methods in Interventions

1. Risk Identification

- Tools like **RULA** and **REBA** highlight high-risk postures and movements.
- Example: If RULA shows a high score for neck posture in office workers, the intervention could be adjusting monitor height or chair design.

2. Prioritization

- Methods help decide **which tasks or workstations need urgent redesign**.
- Example: **OWAS** can show that repetitive bending in warehouse work is a priority risk compared to other tasks.

3. Design Solutions

- **NIOSH Lifting Equation** guides safe weight limits and lifting techniques.
- Interventions may include mechanical aids, team lifting, or redesigning storage heights.

4. Training & Behavior Change

- Results from **Strain Index** or **MAC charts** can be used to train workers on safer handling techniques.
- Example: Teaching proper wrist alignment in assembly line work.

5. Evaluation of Effectiveness

- After changes are made, the same methods are reapplied to check if risk scores have decreased.
- This creates a **feedback loop** for continuous improvement.

