

**Ergonomics**

**CHECKLISTS**

**ERGONOMICS CHECKLIST**

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A broad guideline for a modular-structured work systems checklist is suggested here, covering five major aspects (mechanistic, biological, perceptual/motor, technical and psychosocial). Weighting of the modules varies with the nature of the job(s) to be analysed, the specific features of the country or population under study, organizational priorities and the intended use of the results of the analysis. Respondents mark the "primary statement" as Yes/No. "Yes" answers indicate the apparent absence of a problem, although the advisability of further careful scrutiny should not be ruled out. "No" answers indicate a need for an ergonomics evaluation and improvement. Responses to "secondary statements" are indicated by a single digit on the severity of agreement/disagreement scale illustrated below.

- 0 Do not know or not applicable
- 1 Strongly disagree
- 2 Disagree
- 3 Neither agree nor disagree
- 4 Agree
- 5 Strongly agree

**A. Organization, worker and the task                      Your answers/ratings**

*The checklist designer may provide a sample drawing/photograph of work and workplace under study.*

1. Description of organization and functions.

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2. Worker characteristics: A brief account of the work group.

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3. Task description: List activities and materials in use. Give some indication of the work hazards.

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**B. Mechanistic aspect****Your answers/ratings****I. Job Specialization**

4. Tasks/work patterns are simple and uncomplicated. Yes/No

If No, rate the following: (Enter 0-5)

4.1 Job assignment is specific to the operative.

4.2 Tools and methods of work are specialized to the purpose of the job.

4.3 Production volume and quality of work.

4.4 Job holder performs multiple tasks.

**II. Skill Requirement**

5. Job requires simple motor act. Yes/No

If No, rate the following: (Enter 0-5)

5.1 Job requires knowledge and skilful ability.

5.2 Job demands training for skill acquisition.

5.3 Worker makes frequent mistakes at work.

5.4 Job demands frequent rotation, as directed.

5.5 Work operation is machine paced/assisted by automation.

*Remarks and suggestions for improvement. Items 4 to 5.5:*

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Analyst's rating

Worker's rating

**C. Biological aspect****Your answers/ratings****III. General Physical Activity**

6. Physical activity is entirely determined and regulated by the worker. Yes/No

If No, rate the following: (Enter 0-5)

6.1 Worker maintains target-oriented pace.

6.2 Job implies frequently repeated movements.

6.3 Cardiorespiratory demand of the job:   
sedentary/light/moderate/heavy/ extremely heavy.  
(What are the heavy work elements?):

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(Enter 0-5)

6.4 Job demands high muscular strength exertion.   
6.5 Job (operation of handle, steering wheel, pedal brake) is  
predominantly static work.   
6.6. Job requires fixed working position (sitting or standing).

**IV. Manual Materials Handling (MMH)**

*Nature of objects handled: animate/inanimate, size and shape.*

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7. Job requires minimal MMH activity. Yes/No

If No, specify the work:

7.1 Mode of work: (circle one)  
pull/push/turn/lift/lower/carry

(Specify repetition cycle):  

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7.2 Load weight (kg): (circle one)  
5-10, 10-20, 20-30, 30-40, >>40.

7.3 Subject-load horizontal distance (cm): (circle one)  
<25, 25-40, 40-55, 55-70, >70.

7.4 Subject-load height: (circle one)  
ground, knee, waist, chest, shoulder level.

(Enter 0-5)

7.5 Clothing restricts MMH tasks.

8. Task situation is free from risk of bodily injury. Yes/No

If No, rate the following: (Enter 0-5)

- 8.1 Task can be modified to reduce the load to be handled.
- 8.2 Materials can be packed in standard sizes.
- 8.3 Size/position of handles on objects may be improved.
- 8.4 Workers do not adopt safer methods of load handling.
- 8.5 Mechanical aids may reduce bodily strains.  
List each item if hoists or other handling aids are available.

*Suggestions for improvement, Items 6 to 8.5:*

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#### **V. Workplace/Workspace Design**

*Workplace may be diagrammatically illustrated, showing human reach and clearance:*

9. Workplace is compatible with human dimensions. Yes/No

If No, rate the following: (Enter 0-5)

- 9.1 Work distance is away from normal reach in the horizontal or vertical plane (>60 cm).
- 9.2 Height of work desk/equipment is fixed or minimally adjustable.
- 9.3 No space for subsidiary operations (e.g., inspection and maintenance).
- 9.4 Workstations have obstacles, protruding parts or sharp edges.
- 9.5 Work surface floors are slippery, uneven, cluttered or unstable.

10. Seating arrangement is adequate (e.g., comfortable chair, good postural support). Yes/No

If No, the causes are: (Enter 0-5)

- 10.1 Seat dimensions (e.g., seat height, back rest) mismatch with human dimensions.
- 10.2 Minimum adjustability of seat.
- 10.3 Workseat provides no hold/support (e.g., by means of vertical edges/extra stiff covering) to work with the machinery.
- 10.4 Absence of vibration damping mechanism in the workseat.

11. Sufficient auxiliary support is available for safety at the workplace. Yes/No

If No, mention the following: (Enter 0-5)

- 11.1 Non-availability of storage space for tools, personal articles.
- 11.2 Doorways, entrance/exit routes, or corridors are restricted.
- 11.3 Design mismatch of handles, ladders, staircases, handrails.
- 11.4 Handholds and footholds demand awkward position of limbs.
- 11.5 Supports are unrecognizable by their place, form or construction
- 11.6 Limited use of gloves/footwear to work and operate equipment controls.

*Suggestions for improvement, Items 9 to 11.6:*

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#### **VI. Work Posture**

12. Job allows a relaxed work posture. Yes/No

If No, rate the following: (Enter 0-5)

- 12.1 Working with arms above shoulder and/or away from the body.
- 12.2 Hyperextension of wrist and demand of high strength.
- 12.3 Neck/shoulder are not maintained at an angle of about 15°.
- 12.4 Back bent and twisted.
- 12.5 Hips and legs are not well supported in seated position.
- 12.6 One-sided and unsymmetrical movement of the body.

12.7 Mention reasons of forced posture:

(1) machine location

(2) seat design,

(3) equipment handling,

(4) workplace/workspace

12.8 Specify OWAS code. (For a detailed description of the OWAS method refer to Karhu et al. 1981.)

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Suggestions for improvement, Items 12 to 12.7:

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**VII. Work Environment**

(Give measurements where possible)

**NOISE**

[Identify noise sources, type and duration of exposure; refer to ILO 1984 code].

13. Noise level is below the maximum sound level recommended. (Use the following table.) Yes/No

Rating	Work requiring no verbal communication	Work requiring verbal communication	Work requiring concentration
1	under 60 dBA	under 50 dBA	under 45 dBA
2	60-70 dBA	50-60 dBA	45-55 dBA
3	70-80 dBA	60-70 dBA	55-65 dBA
4	80-90 dBA	70-80 dBA	65-75 dBA
5	over 90 dBA	over 80 dBA	over 75 dBA

Source: Ahonen et al. 1989.

Give your agreement/disagreement score (0-5)

14. Damaging noises are suppressed at the source. Yes/No

If No, rate countermeasures: (Enter 0-5)

14.1 No effective sound isolation present.

14.2 Noise emergency measures are not taken (e.g., restriction of working time, use of personal ear defenders/protectors).

**15. CLIMATE**

Specify climatic condition.

Temperature \_\_\_\_

Humidity \_\_\_\_

Radiant Temperature \_\_\_\_

Draughts \_\_\_\_

16. Climate is comfortable. Yes/No

If No, rate the following: (Enter 0-5)

16.1 Temperature sensation (circle one):

cool/slightly cool/neutral/warm/very hot

16.2 Ventilation devices (e.g., fans, windows, air conditioners) are not adequate.

16.3 Non-execution of regulatory measures on exposure limits (if available, please elaborate).

16.4 Workers do not wear heat protective/assistive clothing.

16.5 Drinking fountains of cool water are not available nearby.

### 17. LIGHTING

Workplace/machine(s) are sufficiently illuminated at all times. Yes/No

If No, rate the following: (Enter 0-5)

17.1 Illumination is sufficiently intense.

17.2 Illumination of work area is adequately uniform.

17.3 Flicker phenomena are minimal or absent.

17.4 Shadow formation is nonproblematical.

17.5 Annoying reflected glares are minimal or absent.

17.6 Colour dynamics (visual accentuation, colour warmth) are adequate.

### 18. DUST, SMOKE, TOXICANTS

Environment is free from excessive dust, fumes and toxic substances. Yes/No

If No, rate the following: (Enter 0-5)

18.1 Ineffective ventilation and exhaust systems to carry off fumes, smoke and dirt.

18.2 Lack of protection measures against emergency release and contact with dangerous/toxic substances.

List the chemical toxicants:

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18.3 Monitoring of the workplace for chemical toxicants is not regular.

18.4 Non-availability of personal protective measures  
(e.g., gloves, shoes, mask, apron).

### 19. RADIATION

Workers are effectively protected against radiation exposure. Yes/No

If No, mention the exposures  
(see ISSA checklist, *Ergonomics*): (Enter 0-5)

19.1 UV radiation (200 nm – 400 nm).

19.2 IR radiation (780 nm – 100 µm).

19.3 Radioactivity/x-ray radiation (<200 nm).

19.4 Microwaves (1 mm – 1 m).

19.5 Lasers (300 nm – 1.4 µm).

19.6 Others (mention):

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### 20. VIBRATION

Machine can be operated without vibration transmission  
to the operator's body. Yes/No

If No, rate the following: (Enter 0-5)

20.1 Vibration is transmitted to the whole body via the feet.

20.2 Vibration transmission occurs through the seat  
(e.g., mobile machines that are driven with operator seated).

20.3 Vibration is transmitted through the hand-arm system  
(e.g., power-driven handtools, machines driven  
when operator is walking).

20.4 Prolonged exposure to continuous/repetitive source of vibration.

20.5 Vibration sources cannot be isolated or eliminated.

20.6 Identify the sources of vibration.

*Comments and suggestions, items 13 to 20:*

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### VIII. Work Time Schedule

Indicate work time: work hours/day/week/year, including seasonal work and shift system.

21. Pressure of work time is minimum. Yes/No

If No, rate the following: (Enter 0-5)

21.1 Job requires night work.

21.2 Job involves overtime/extra work time.

Specify average duration:

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21.3 Heavy tasks are unevenly distributed throughout the shift.

21.4 People work at a predetermined pace/time limit.

21.5 Fatigue allowances/work-rest patterns are not sufficiently incorporated (use cardio- respiratory criteria on work severity).

Comments and suggestions, items 21 to 21.5:

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Analyst's rating

Worker's rating

### D. Perceptual/motor aspect

### Your answers/ratings

### IX. Displays

22. Visual displays (gauges, meters, warning signals) are easy to read. Yes/No

If No, rate the difficulties: (Enter 0-5)

22.1 Insufficient lighting (*refer to item No. 17*).

22.2 Awkward head/eye positioning for visual line.

22.3 Display style of numerals/numerical progression creates confusion and causes reading errors.

22.4 Digital displays are not available for accurate reading.

22.5 Large visual distance for reading precision.

22.6 Displayed information is not easily understood.

22.7 Displayed information changes before an action can be taken.

23. Emergency signals/impulses are easily recognizable. Yes/No

If No, assess the reasons:

23.1 Signals (visual/auditory) do not conform to the work process.

23.2 Flashing signals are out of visual field.

23.3 Auditory display signals are not audible.

24. Groupings of the display features are logical. Yes/No

If No, rate the following:

24.1 Displays are not distinguished by form, position, colour or tone.

24.2 Frequently used and critical displays are removed from the central line of vision.

### **X. Controls**

25. Controls (e.g., switches, knobs, cranes, driving wheels, pedals) are easy to handle. Yes/No

If No, the causes are: (Enter 0-5)

25.1 Hand/foot control positions are awkward.

25.2 Handedness of the controls/tools is incorrect.

25.3 Dimensions of controls do not match the operating body part.

25.4 Controls require high actuating force.

25.5 Controls require high precision and speed.

25.6 Controls are not shape-coded for good grip.

25.7 Controls are not colour/symbol-coded for identification.

25.8 Controls cause unpleasant feeling (warmth, cold, vibration).

26. Displays and controls (combined) are compatible with easy and comfortable human reactions. Yes/No

If No, rate the following: (Enter 0-5)

26.1 Placements are not sufficiently close to each other.

26.2 Display/controls are not sequentially arranged for functions/frequency of use.

26.3 Display/control operations are successive, without enough time span to complete operation (*this creates sensory overloading*).

26.4 Disharmony in movement direction of display/control (e.g., leftward control movement does not give

leftward unit movement).

Comments and suggestions, items 22 to 26.4:

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Analyst's rating

Worker's rating

## E. Technical aspect

## Your answers/ratings

### XI. Machinery

27. Machine (e.g., conveyer trolley, lifting truck, machine tool) is easy to drive and work with.

Yes/No

If No, rate the following:

(Enter 0-5)

27.1 Machine is unstable in operation.

27.2 Poor maintenance of the machinery.

27.3 Driving speed of the machine cannot be regulated.

27.4 Steering wheels/handles are operated, from standing position.

27.5 Operating mechanisms hamper body movements in the workspace.

27.6 Risk of injury due to lack of machine guarding.

27.7 Machinery is not equipped with warning signals.

27.8 Machine is poorly equipped for vibration damping.

27.9 Machine noise levels are above legal limits (refer to items No. 13 and 14).

27.10 Poor visibility of machine parts and adjacent area (refer to items No. 17 and 22).

### XII. Small Tools/Implements

28. Tools/implements provided to the operatives are comfortable to work with.

Yes/No

If No, rate the following:

(Enter 0-5)

28.1 Tool/implement has no carrying strap/back frame.

28.2 Tool cannot be used with alternate hands.

- 28.3 Heavy weight of the tool causes hyperextension of the wrist.
- 28.4 Form and position of the handle are not designed for convenient grip.
- 28.5 Power-driven tool is not designed for two-hand operation.
- 28.6 Sharp edges/ridges of the tool/equipment can cause injury.
- 28.7 Harnesses (gloves, etc.) are not regularly used in operating vibrating tool.
- 28.8 Noise levels of power-driven tool are above acceptable limits (refer to item No. 13).

*Suggestions for improvement, items 27 to 28.8:*

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**XIII. Work Safety**

29. Machine safety measures are adequate to prevent accidents and health hazards. Yes/No

If No, rate the following: (Enter 0-5)

- 29.1 Machine accessories cannot be fastened and removed easily.
- 29.2 Dangerous points, moving parts and electrical installations are not adequately guarded.
- 29.3 Direct/indirect contact of body parts with machinery can cause hazards.
- 29.4 Difficulty in inspection and maintenance of the machine.
- 29.5 No clear instructions available for machine operation, maintenance and safety.

*Suggestions for improvement, items 29 to 29. 5:*

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Analyst's rating Worker's rating

## F. Psychosocial aspect

## Your answers/ratings

### XIV. Job Autonomy

30. Job allows autonomy (e.g., freedom regarding method of work, performance conditions, time schedule, quality control). Yes/No

If No, the possible causes are: (Enter 0-5)

30.1 No discretion on the starting/finishing times of the job.

30.2 No organizational support as regards calling for assistance at work.

30.3 Insufficient number of people for the task (teamwork).

30.4 Rigidity in work methods and conditions.

### XV. Job Feedback (*Intrinsic and Extrinsic*)

31. Job allows direct feedback of information as to the quality and quantity of one's performance. Yes/No

If No, the reasons are: (Enter 0-5)

31.1 No participative role in task information and decision making.

31.2 Constraints of social contact due to physical barriers.

31.3 Communication difficulty due to high noise level.

31.4 Increased attentional demand in machine pacing.

31.5 Other people (managers, co-workers) inform the worker as to his/her effectiveness of job performance.

### XVI. Task Variety/Clarity

32. Job has a variety of tasks and calls for spontaneity on the part of the worker. Yes/No

If No, rate the following: (Enter 0-5)

32.1 Job roles and goals are ambiguous.

32.2 Job restrictiveness is imposed by a machine, process or work group.

32.3 Worker-machine relation arouses conflict as to behaviour to be evinced by operator.

32.4 Restricted level of stimulation (e.g., unchanging visual and auditory environment).

32.5 High level of boredom on the job.

32.6 Limited scope for job enlargement.

**XVII. Task Identity/Significance**

33. Worker is given a batch of tasks and arranges his or her own schedule to complete the work Yes/No

(e.g., one plans and executes the job and inspects and manages the products).

Give your agreement/disagreement score (0-5)

34. Job is significant in the organization. It provides acknowledgement and recognition from others. Yes/No

(Give your agreement/disagreement score)

**XVIII. Mental Overload/Underload**

35. Job consists of tasks for which clear communication and unambiguous information support systems are available. Yes/No

If No, rate the following: (Enter 0-5)

35.1 Information supplied in connection with the job is extensive.

35.2 Information handling under pressure is required (e.g., emergency manoeuvring in process control).

35.3 High information-handling workload (e.g., difficult positioning task—no special motivation required).

35.4 Occasional attention is directed to information other than that needed for the actual task.

35.5 Task consists of repetitive simple motor act, with superficial attention needed.

35.6 Tools/equipment are not pre-positioned to avoid mental delay.

35.7 Multiple choices are required in decision making and judging risks.

(Comments and suggestions, items 30 to 35.7)

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### **XIX. Training and Promotion**

36. Job has opportunities for associated growth in competence and task accomplishment. Yes/No

If No, the possible causes are: (Enter 0-5)

36.1 No opportunity for advancement to higher levels.

36.2 No periodic training for operators, specific to jobs.

36.3 Training programs/tools are not easy to learn and use.

36.4 No incentive pay schemes.

### **XX. Organizational Commitment**

37. Defined commitment towards organizational effectiveness, and physical, mental and social well-being. Yes/No

Assess the degree to which the following are made available: (Enter 0-5)

37.1 Organizational role in individual role conflicts and ambiguities.

37.2 Medical/administrative services for preventive intervention in the case of work hazards.

37.3 Promotional measures to control absenteeism in work group.

37.4 Effective safety regulations.

37.5 Labour inspection and monitoring of better work practices.

37.6 Follow-up action for accident/injury management.

*(Now go to the Summary Evaluation Sheet ERG02CE)*