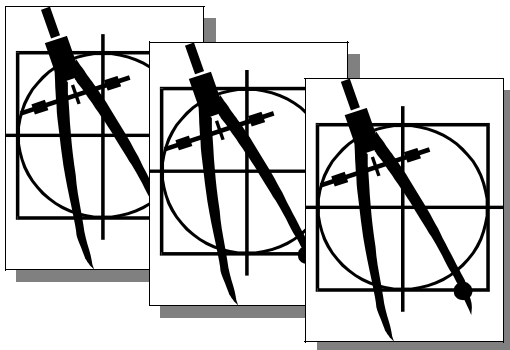


The Ergonomics

INNOVATION WORKBOOK

**How to Identify Performance Problems
and Generate Innovative Solutions**

A Strategy to Develop In-house Expertise



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Optimizing the Workspace and Work Process through Ergonomics

Analyzed by:

Project Number:

Date:

Time:

Workstation/
Employee:

Job Title:

Department/
Division

Building Location:

Supervisor/Contact:

Employment history (if individual)

Other information:

Sketch Layout

Brief Summary of Job/Task

List Major Job/Task Steps

Work Force

Demographics

Age

What is the **age range** of the work force? _____
to _____

What is the **average age**? _____ yrs

Is **age** considered to be a significant factor? YES
NO

Gender

What is the **ratio of men to women** in the workplace? _____:

Is **gender** considered to be a significant factor? YES
NO

Stature

What is the **stature range** of the workforce (shortest/tallest)? _____
to _____

Is **stature** considered to be a significant issue? YES
NO

Hand dominance

Does the job design cause left-handed people to have **more difficulty** than right-handed people? YES
NO

Is **hand dominance** considered to be a significant factor? YES
NO

Fitness level

Job Match

Does there appear to be a **large discrepancy** between physical job demands and physical fitness of worker/workforce? YES
NO

Is the discrepancy considered to be a significant issue? YES
NO

Health and Wellness

Does there appear to be a general **poor level** of health and wellness of worker/workforce in general? YES
NO

Is health and wellness of the worker/workforce considered to be a significant factor? YES
NO

Training

Technical

Is the workforce **inadequately** trained in the technical aspects of the job process and demands? YES
NO

Safety

Is the workforce **inadequately** trained in the safe performance of the job tasks? YES
NO

Is the workforce **inadequately** trained in methods (breaks, stretching, and warm-up activities) to control job fatigue? YES
NO

Experience

Level

What is the general level of **work experience** of the workforce or worker? (circle one)

LOW MODERATE HIGH

Is the **level of experience** considered to be a significant factor in performing the job task? YES
NO

Scope

What is the **scope of work experience** of the workforce or worker? (circle one)

NARROW MODERATE BROAD

Are they not **cross-trained** in other job demands, YES
NO

Are they not able to deal with **emergency situations, etc.?** YES
NO

Is the scope of experience of the workforce or worker considered to be a significant issue? YES
NO

Comments

Workstation

Stationary or mobile

Is the workstation **stationary** (used primarily in one position) or is it **mobile** (taken from job site to job site)? (circle one)

STATIONARY MOBILE

Is this considered to be a significant issue? YES
NO

Adjustability Features

Work height

Does the height of the work surface **prevent** a comfortable view of the job being done? YES
NO

Is the height of the work surface fixed? YES
NO

Does the height of the work surface **prevent** satisfactory arm/shoulder/neck/back/hip/leg posture? YES
NO

If the work height is **unsatisfactory**, is it due to: (circle one or more)

Machine Configuration / Work Surface Height / Position of Controls

Reach Envelope

Does the worker frequently **reach outside** the range of the normal reach envelope? YES
NO

Chair/Stool

If a chair is provided, is its design and adjustability **unsatisfactory**? (back support, vertical adjustability, etc.) YES
NO

Do workers **sit on the front edge** of their chairs, not using back supports? YES
NO

Do workers frequently **add cushions and pads** to their work chair? YES
NO

Tool/equipment position

Position of tool/equipment controls **can not** be adjusted to suit the worker? YES
NO

Floor Height

If seated, are the feet **unsupported**? YES
NO

Does floor height **prevent** proper work position? YES
NO

Worker Movement

Is it **not** possible for the worker to alternate sitting and standing when performing the task? YES
NO

Space and Clearance

If containers/bins/tubs/carts are used, are they **inconveniently** placed? YES
NO

Is there **inadequate** space at the workstation to perform the work effectively and comfortably? YES
NO

Is the workplace **inaccessible** to material handling equipment? YES
NO

Is clearance space in the workplace **inadequate** for maintenance tasks? YES
NO

Tools/Equipment

Are power tools used? YES
NO

• Any problems with tools noted? If so, what? YES
NO

Are manual tools used? YES
NO

• Any problems with tools noted? If so, what? YES
NO

Are foot/knee control pedals used? YES
NO

• Does the operator have to operate foot/knee pedals while standing? YES
NO

• To operate foot pedals or knee switches, must the worker assume an unnatural or uncomfortable posture? YES
NO

• Are pedals too small to allow the operator to alter the position of the foot/knee? YES
NO

• Are pedals triggered at a high repetition rate? YES
NO

Are hand controls used? YES

• Placed to **not** allow neutral hand/arm/body position? YES
NO

• Difficult (require excessive force) to operate? YES
NO

• Not properly designed to take into account amount and types of force required for operation? YES
NO

Personal Protective Equipment

Are there conditions that require personal protective clothing or equipment? YES
NO

Is proper PPE **not** always used? YES
NO

Physical Demands

Metabolic Demand

Does the job involve peak loads of muscular effort? YES
NO

How often do peak loads occur and how long do they last?

Are there signs of **unacceptable** fatigue on the worker's part? (i.e. profuse sweating, red flushed face, heavy and labored breathing, poor coordination, etc.) YES
NO

Frequent daily stair or ladder climbing? YES
NO

Is recovery time **not** figured into the work process? YES
NO

Force - Lift/Push/Pull

Do workers have to **lift** objects, boxes, parts, materials? YES
NO

If YES, does the task require:

- Strenuous one-hand lifting? YES
- Strenuous two-hand lifting? YES
- Lifting over too great a vertical distance? YES
NO
- Lifting at too great a horizontal distance? YES
NO
- Difficult-to-grasp items? YES
- Two-person lifting? YES
- Handling of oversized objects? YES
NO

Is help for heavy lifting or exerting force **unavailable**? YES
NO

Does the job **lack** material handling aids such as air hoists or scissors tables? YES
NO

Do workers have to **push or pull** objects? YES
NO

If YES, does the task require:

Large **breakaway forces** to get the object started? YES
NO

Pushing or pulling **hand trucks or carts** up or down inclines or ramps? YES
NO

Force - Grip

What **type of grip** is commonly used? (circle one)

Pinch Power

Do workers have to **exert high levels of power grip** force to perform tasks? YES
NO

Do workers have to **exert high levels of pinch grip** force to perform tasks? YES
NO

Force - Manual Materials Handling

Does the job require **continual manual materials** handling? YES
NO

If YES, **describe the material** (size, weight, handles)

Force - Static Muscle Loading

Does the job involve **static muscle loading** (such as holding or carrying)? YES
NO

If YES, describe the activity (load, duration, coupling)

Position - Sustained/Awkward

To perform task, must worker maintain same body posture (either sitting or standing) all or most of the time? YES
NO

Does the job require worker to use non-neutral positions: (if so, what?) YES
NO

• Prolonged or repeated **non-neutral spinal**. YES
NO

• **Wrist deviations** greater than 15 degrees. YES
NO

• **Forearm rotation**. YES
NO

• Elbows sustained **above mid-chest height**. YES
NO

• Reaching frequently **behind the body or above the shoulders**. YES
NO

Repetition - Pacing

Is the work pace rapid? YES
NO

Is the pace of material handling determined by a machine? (Feeding machines, conveyors, etc.) YES
NO

Repetition - Manual Handling

Are workers frequently required to **lift and carry** heavy weights? YES
NO

Does the task require the worker to **repeat** the same manual material handling movement pattern at a high rate of speed? YES
NO

Repetition - Arm/Hand

Does task require worker to **repeat** same movement pattern of arm/hand at a high rate of speed?

Does task require **continuous use** (or nearly so) of both hands and both feet in order to operate controls or manipulate work object? YES
NO

Repetition - Tool Use

Does the job involve frequent use or manipulation of tools? YES
NO

Is the frequent considered to be a significant problem?

Vibration - Segmental

Is there a high level of **hand tool** vibration on the worker's arm/hand? YES
NO

Is it significant enough to have an adverse effect on the worker? YES
NO

Vibration - Whole body

Is the **body as a whole** subjected to vibration? YES
NO

Is the level of vibration high enough to have adverse effects on the worker? YES
NO

Contact Stress - Hard surface

Must the worker **stand on a hard surface** for 45 percent or more of the work shift? YES
NO

Is the **texture of the work surface** uncomfortable, taking into account hardness, elasticity, and smoothness? YES
NO

Contact Stress - Sharp edge

Is the worker in **contact with sharp edges** in the work place (machine guards, tool handles, desk edges, etc.)? YES
NO

Mental Demands**Level of complexity**

Is the task complex? YES
NO

Is the job so complex it takes a long time to train workers? YES
NO

Does the worker have to evaluate data before taking action? If YES: YES
NO

• Must the operator sense and respond to information signals occurring simultaneously from different machines without sufficient time to do so? YES
NO

• Must the operator process information at a rate, which might exceed his or her capability? YES
NO

• Does the task require a great deal of accuracy? YES
NO

• Does this work situation require monitoring several machines? YES
NO

Is the task monotonous? YES
NO

Does the worker repeat the same task without change for the entire shift? YES
NO

Does the worker lose track of the task at hand because it is overly monotonous? YES
NO

Standards of Use

Does the design of any instrument increase reading errors? YES
NO

Is it difficult to recognize controls by shape, size, labeling or color? YES
NO

Perceptual Demands

Illumination - General

Is the general work area including egress and ingress areas poorly lit? YES
NO

Illumination - Task

Are controls, instruments and equipment poorly lit? YES
NO

Is the lighting not suitable for the task? YES
NO

Illumination - Contrast

Is the contrast between the workspace and its surroundings not suitable? YES
NO

Illumination - Glare

Is glare present in the workplace? YES
NO

If so, where is it a problem and what is the source?

Auditory

Does the noise level prevent or impair verbal communication? YES
NO

Are there auditory signals? YES

• Are some auditory signals hard to hear in general? YES
NO

• Are auditory signals difficult to distinguish from one another? YES
NO

Touch

Is there a need to tell the difference between parts by touch? YES
NO

Is it difficult to recognize controls and tools by touch and/or position? YES
NO

Visual Acuity

Does the task require fine visual judgments? (This includes the need to detect small defects, judge distances accurately, etc.) YES
NO

Are dials and instruments difficult to read quickly and accurately? YES
NO

Cognitive Sense

Is the dial too complex for the level of information required? YES
NO

Does the design of any instrument increase reading errors? YES
NO

When all readings are correct, do the pointers in a group of dials point in different directions? YES
NO

Is it difficult to see immediately how a control is set? YES
NO

Preventive Maintenance

Regular schedule

Is there **not** a regular maintenance schedule? YES
NO

Ease of maintenance

Is the equipment designed or placed in such a way that cleaning and maintenance activities are **difficult**? YES
NO

Housekeeping

General

Does the general workplace have clutter and obstructions, which could create the risk of slips, trips or falls? YES
NO

Are floors slippery? YES
NO

Workstation

Does there seem to be too much clutter in the workstation? YES
NO

Is housekeeping at the workstation poor? YES
NO

Noise

Is there so much process noise that hearing loss could occur? YES NO

Are there noise levels that interfere with conversation or performing the job? YES NO

Is the noise level high enough to cause hearing loss? YES NO

Air**Temperature**

Is the air temperature too cold? Too hot? YES NO

Are radiant heat sources placed near any workstations? YES NO

Are there rapid changes in temperature in the work environment? YES NO

Quality

Are suspended dust, mists and other particulates present in the air? YES NO

Flow

Is air circulation too low? too high? YES NO

Are workers exposed to rapid environmental changes? YES NO

Humidity

Is the humidity frequently uncomfortable enough to interfere with the job? YES NO

Are there wet locations that may produce shock hazards for powered equipment? YES NO

Other**Work Process****Trends**

Are back injuries or cumulative trauma disorders of the arm/hand occurring frequently? YES NO

Are trends and patterns apparent? If YES, what are they? YES NO

Supervision

How is supervision given and received?

Are expectations unclear and ambiguous? YES NO

Is there a lack of a reporting system for problems: injuries, production, etc.? YES NO

Production

Is production efficiency too low? YES NO

Is there too much equipment damage? YES NO

Is there too much waste rework? YES NO

Is product quality low? YES NO

Are workers frequently away from their workstations?

Are employees making subtle workplace changes? YES NO

Are workstations used during more than one shift each day? YES NO

Other

Innovation Worksheet

ISSUES: look for any YES you circled. This indicates a potential area of concern.

RECOMMENDATIONS: for each problem you identify generate a list of potential solutions.

- | | |
|----|----|
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |
| 4. | 4. |
| 5. | 5. |

COST ANALYSIS: Project the costs associated with the making the changes, also project the costs if the changes are NOT made.

Finalize your recommendations:

Action Plan

Issue	Recommendation	Team Members

Date	Action	Progress

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