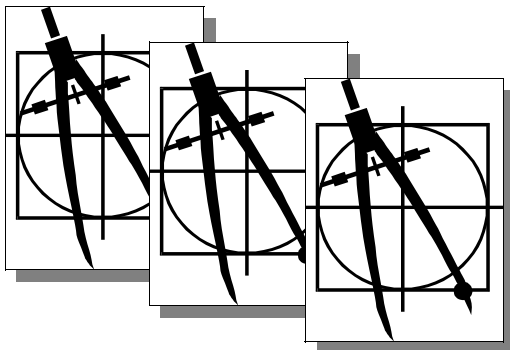


# **The Ergonomics**

# **INNOVATION WORKBOOK**

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

**A Strategy to Develop In-house Expertise**



**ErgoSystems Consulting Group, Inc.  
Minneapolis, Minnesota**

## 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**

# People

## 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

## Work Behaviors

### Unsafe behaviors

Are unsafe work behaviors observed? YES  
NO

List them: \_\_\_\_\_ Why are they occurring? \_\_\_\_\_

# Workstation Design

## 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

### Other

## Environment

### 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

## Management

### 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?      YES NO
- 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

# The Ergonomics

# INNOVATION WORKBOOK

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

---

**A Strategy to Develop In-house Expertise**

---

---

The information contained in this training workbook has been developed in good faith and is believed to present good ergonomics principles and practices. ErgoSystems Consulting Group, Inc. and all other participating organizations make no representations or warranties as to the completeness or accuracy of the materials thereof. Persons using this information must make their own determination as to its suitability for their purposes. ErgoSystems Consulting Group, Inc. and all other participating organizations are in no way responsible for damages of any nature resulting from the use of this information.

### **ErgoSystems Consulting Group, Inc.**

19285 Shady Hills Road  
Minneapolis, MN 55331-9156

Phone: (952) 401-9296

Fax: (952) 470-8526

[www.ergosystemsconsulting.com](http://www.ergosystemsconsulting.com)