

## CASE STUDY - Monitoring

### TASK TITLE: Monitoring

<b>Task Description:</b>	For maintenance and inspection tasks, monitoring is generally performed within the context of another task such as machining or pressure checking. Monitoring refers to the process of continually or repeatedly viewing gauges or computer screens. The monitoring task is similar to using a computer and to machine aided visual inspection. Monitoring differs from using a computer in that using a computer involves keying or other data entry while monitoring is primarily limited to viewing of the information. The distinction between monitoring and inspection is that monitoring involves processed information (a gauge, dial or readout) while inspection is looking at the item itself.
<b>Job Performance Measures Most Often Impacted by Monitoring:</b>	<ul style="list-style-type: none"><li>• Ensuring that the system performs appropriately</li><li>• Detection and correction of parameters which impact safety, system performance, and product quality.</li></ul>
<b>Typical Employee Comments about Monitoring:</b>	Employees most often report fatigue or discomfort in the following body regions: shoulders/neck, or head/eyes.
<b>Suggested Level II Analysis:</b>	Postural Analysis, Light measurement

## Shoulder/Neck

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
1. Reaching	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					
2. Arm forces: Repeated contraction of the muscles of the arm or holding/carrying materials	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					
3. High speed, sudden shoulder movements	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					
4. Head/neck bent or twisted	<ul style="list-style-type: none"> <li>Display is improperly positioned               <ul style="list-style-type: none"> <li>-too high</li> <li>-too low</li> <li>-off-center</li> </ul> </li> <li>Display is too far away</li> </ul>	18. Improve visual access to work <ul style="list-style-type: none"> <li>position frequently accessed displays 0-4" below eye level</li> <li>position frequently accessed displays directly in front of person</li> <li>angle off-center displays towards the person</li> </ul> 39. Move monitor/screen closer to body <ul style="list-style-type: none"> <li>position displays between 18"-30"(46-76 cm) 22-24"(56-61 cm) is a good distance for general tasks</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>med</li> <li>med</li> <li>med</li> <li>med</li> </ul>	<ul style="list-style-type: none"> <li>med</li> <li>med</li> <li>med</li> <li>med</li> </ul>	<ul style="list-style-type: none"> <li>low</li> <li>low</li> <li>low</li> <li>med</li> </ul>

**Shoulder/Neck (cont'd)**

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
	<ul style="list-style-type: none"> <li>Readouts are too small</li> </ul>	18. Improve visual access to work <ul style="list-style-type: none"> <li>use digital displays only when exact values are needed</li> <li>use analog displays when trends, ranges or status values are needed</li> <li>ensure that all numbers and messages are easily readable (character height at least .25") for normal (18-30"(46-76 cm)) viewing distances</li> </ul>		✓  ✓  ✓	low to high  low to high  low to high	med  med  med	med  med  med
	<ul style="list-style-type: none"> <li>Light levels are too low</li> </ul>	22. Increase light levels <ul style="list-style-type: none"> <li>provide a task light which is easy to adjust</li> <li>increase room lighting</li> </ul>	✓	✓	med  high	med  high	med  high

**Hands/Wrists/Arms**

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
5. Bent wrists/repeated wrist movements or repeated forearm rotation	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					
6. Repeated manipulations with fingers	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					
7. Hyperextension of finger/thumb or repeated single finger activation	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					
8. Hand/grip forces	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					
9. High speed hand/wrist/arm movements or vibration, impact, or torque to the hand	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					

**Hands/Wrists/Arms (cont'd)**

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
10. Exposure to hard edges	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					
11. Hands and fingers exposed to cold temperatures	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					

**Back/Torso**

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
12. Repeated forward or sideways bending movements	• Display is too low	30. Lower the monitor screen • position frequently accessed displays 0-4" (0-10cm) below eye level	✓		low	med	low
	• Display is too far away	39. Move monitor/screen closer to body • position displays between 18"-30" (45.7-76.2 cm) • 22"-24" (55.9-61 cm) is a good distance for general tasks		✓	low to high	med	med
	• Display readout is too small	18. Improve visual access to work • use digital displays only when exact values are needed • use analog displays when trends, ranges or status values are needed • ensure that all numbers and messages are easily readable (character height at least .25"(.64 cm)) for normal (18-30"(46-76cm)) viewing distances		✓	low to high	med	med

**Back/Torso (cont'd)**

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
		14. encourage person to have visual disorders corrected <ul style="list-style-type: none"> <li>• regular eye exams</li> <li>• use of trifocals or other prescription glasses suited to viewing monitor distances without backwards neck bending</li> </ul>	✓	✓	med med	med med	med med
13. Twisting of the lower back	<ul style="list-style-type: none"> <li>• Display is off center</li> </ul>	18. Improve visual access to work <ul style="list-style-type: none"> <li>• position frequently accessed displays directly in front of person</li> <li>• angle off-center displays towards the person</li> </ul>	✓		med	med	med
			✓		med	med	med
14. High speed, sudden movements	<ul style="list-style-type: none"> <li>• Rarely occurs</li> </ul>	N/A					
15. Static, awkward back postures	<ul style="list-style-type: none"> <li>• Display readout is too small</li> </ul>	124. Raise the work piece/work surface <ul style="list-style-type: none"> <li>• raise the monitor</li> </ul>	✓		low	low	med

**Back/Torso (cont'd)**

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
	<ul style="list-style-type: none"> <li>Inadequate lower back support</li> <li>Inappropriate chair adjustment.</li> <li>Inappropriate chair design</li> </ul>	115. Provide support for the lower back <ul style="list-style-type: none"> <li>adjust back rest to support lower back</li> <li>pull chair forward and lean back while working</li> <li>attach a small pillow to back rest to support lower back</li> <li>provide a chair with adequate lower back support</li> </ul>	✓		low	low	med
			✓		low	low	med
			✓		low	low	med
				✓	med	med	med
16. Lifting forces	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					
17. Pushing or pulling	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					
18. Whole body vibration	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					

## Legs/Feet

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
19. Fixed position, standing	<ul style="list-style-type: none"> <li>Standing surface is hard</li> </ul>	86. Provide an appropriate anti-fatigue mat		✓	med	med	med
		96. Provide appropriate shoe inserts	✓		low	low	low
20. Exposure to hard edges on legs, knees, and feet	<ul style="list-style-type: none"> <li>Front edge of seat is hard or square</li> </ul>	64. Provide a padded, compressible surface to sit on	✓		low	med	med
		<ul style="list-style-type: none"> <li>use a cushion eliminate exposure to pressure point</li> </ul>					
	87. Provide an appropriate chair/stool		✓		med to high	med	med
	<ul style="list-style-type: none"> <li>Work station has hard edges</li> </ul>	9. Eliminate exposure to hard edges					
		<ul style="list-style-type: none"> <li>provide padding for edges</li> <li>round off exposed edges</li> </ul>	✓ ✓		low low	med med	med med
21. Awkward leg postures	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					
22. Standing foot pedal	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					

## Head/Eyes

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
23. Difficult to see/light levels too low/too high	<ul style="list-style-type: none"> <li>Light levels are too low</li> <li>Light levels too high</li> </ul>	22. Increase light levels <ul style="list-style-type: none"> <li>provide a task light which is easy to adjust</li> <li>increase room lighting</li> </ul>		✓	med	med	med
		27. Lower the light levels		✓	high	high	high
		18. Improve visual access to work <ul style="list-style-type: none"> <li>position frequently accessed displays 0-4" (0-10 cm) below eye level</li> <li>position frequently accessed displays directly in front of person</li> <li>angle off-center displays towards the person</li> </ul>	✓	✓	med	med	med
	<ul style="list-style-type: none"> <li>Gauges/Displays are poorly positioned</li> <li>Glare reflected on monitor or off work surface</li> </ul>	109. Provide protection from glare from overhead lights/task lights <ul style="list-style-type: none"> <li>provide screen hood/visor.</li> <li>install parabolic louvers to direct light down on the surface.</li> <li>position monitor between overhead lights.</li> <li>tilt monitor down to change the angle of reflection</li> </ul>	✓	✓	med	med	med
			✓	✓	med	med	med
			✓	✓	med	low	low
			✓		low	low	low

**Head/Eyes (cont'd)**

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
	<ul style="list-style-type: none"> <li>Task light causes glare</li> </ul>	109. Provide protection from glare from overhead lights/task lights <ul style="list-style-type: none"> <li>direct task light away from screen and eyes</li> </ul>	✓		low	low	low
	<ul style="list-style-type: none"> <li>Position of window in relation to monitor (in front or behind person) causes glare</li> </ul>	108. Provide protection from glare (from natural light) <ul style="list-style-type: none"> <li>place monitor perpendicular to the window.</li> <li>adjust window coverings</li> <li>provide window coverings</li> </ul>	✓	✓	med	low	low
	<ul style="list-style-type: none"> <li>Monitor positioned too close to eyes.</li> </ul>	40. Move monitor/screen further away from body <ul style="list-style-type: none"> <li>position monitor 18 -30" (46-76 cm) from the eyes</li> </ul>	✓	✓	low med	med med	med med
			✓	✓	med	med	med

**Head/Eyes (cont'd)**

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
	<ul style="list-style-type: none"> <li>• Monitor positioned too far from eyes.</li> <li>• Uncorrected visual disorders.</li> </ul>	39. Move monitor/screen closer to body <ul style="list-style-type: none"> <li>• position monitor 18 -30" (46-76 cm) from the eyes</li> </ul> 14. Encourage person to have visual disorders corrected <ul style="list-style-type: none"> <li>• encourage person to have eyes checked and corrected for visual disorders.</li> <li>• use of trifocals or other prescription glasses suited to viewing monitor distances without backwards neck bending</li> </ul>		✓	med	med	med
			✓		low	med	med
				✓	med	med	med
24. Intensive visual tasks, staring at work objects for long periods	<ul style="list-style-type: none"> <li>• Task lacks variety</li> </ul>	20. Incorporate rest pauses  25. Increase task variety	✓		low	med	med
			✓		low	med	med