

## CASE STUDY - Cutting/Shearing

### TASK TITLE: Cutting/Shearing

<b>Task Description:</b>	<p>Cutting/shearing involves using hand shears, powered hand shears, manual or powered table-top cutting boards to cut materials. Hand cutting/shearing typically occurs at a work bench or table. Using the cutting board sometimes involves carrying and holding the material.</p> <p>Typical jobs in which cutting/shearing is performed include (not necessarily limited to):</p> <ul style="list-style-type: none"><li>• sheet metal fabrication</li></ul>
<b>Job Performance Measures Most Often Impacted by Cutting/Shearing:</b>	<ul style="list-style-type: none"><li>• Efficient completion of work</li><li>• Minimal errors/dimensional accuracy</li></ul>
<b>Typical Employee Comments about Cutting/Shearing:</b>	<p>Employees typically complain about discomfort and/or stiffness in the hands/wrists/arms (from operating a manual hand shear) and legs/feet (from using manual foot control to operate table top cutting board).</p> <p>Primary: Hands/Wrists/Arms Secondary: Legs/Feet</p>
<b>Suggested Level II Analysis:</b>	Grip Force, Dynamic Task Analysis

## Shoulders/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>• Work location is too far away from worker</li> <li>• Work location is too high</li> <li>• Operation of the table-top cutter involves shoulder movements</li> </ul>	21. Increase handle length to improve leverage		✓	med	med	med
		<ul style="list-style-type: none"> <li>• lengthen handle to increase leverage</li> </ul>					
		32. Lower the work piece/work surface	✓	✓	med	med	high
		123. Raise the person	✓	✓	med	med	high
		66. Provide a power tool			med	med	med
		<ul style="list-style-type: none"> <li>• provide a powered cutter</li> <li>• use a cutting board instead of manual hand shear</li> </ul>		✓ ✓	med med	med med	med high
2. Arm forces: Repeated contraction of the muscles of the arm or holding/carrying materials	<ul style="list-style-type: none"> <li>• Manual shears require high forces</li> </ul>	34. Maintain hand tools/power tools	✓		low	high	med
		<ul style="list-style-type: none"> <li>• sharpen shears or replace cutting surfaces regularly</li> <li>• lubricate and adjust moving parts to reduce forces</li> </ul>	✓		med	med	med
		21. Increase handle length to improve leverage					
		<ul style="list-style-type: none"> <li>• lengthen handle to increase leverage</li> </ul>			✓	med	med
		66. Provide a power tool					
		<ul style="list-style-type: none"> <li>• provide a power cutter</li> </ul>		✓	med	med	med

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

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
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>Rarely occurs</li> </ul>	N/A					

## Hands/Wrist/Arm

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>• Angle of handles on scissors</li> <li>• Using hand shears on horizontal surface</li> </ul>	77. Provide a tool with an appropriate handle angle <ul style="list-style-type: none"> <li>• provide shears with a handle orientation which allows a more straight wrist while cutting</li> </ul>		✓	med	med	med
		136. Rotate the work piece <ul style="list-style-type: none"> <li>• angle the work piece (e.g., incline upward, drafting table style) to improve wrist posture</li> </ul>	✓	low	med	med	
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>• Use of powered hand shear with single finger trigger concentrates stress</li> </ul>	62. Provide a multi-finger trigger <ul style="list-style-type: none"> <li>• extended current trigger</li> <li>• provide an appropriate tool with a multi-finger trigger</li> <li>• provide an automatic cut repeat to eliminate constant hold down of trigger</li> </ul>	✓	✓	med	med	med
				✓	med	med	med
				✓	med	med	med

**Hands/Wrist/Arm (cont'd)**

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
8. Hand/grip forces	<ul style="list-style-type: none"> <li>Inappropriate use of manual tool for repetitive or forceful task</li> <li>Handle diameter is too large</li> </ul>	66. Provide a power tool <ul style="list-style-type: none"> <li>provide a powered cutter</li> <li>use cutting board instead of manual and sheet</li> </ul> 88. Provide an appropriate handle diameter <ul style="list-style-type: none"> <li>handle diameter between 1-1.5" (2.5-3.8 cm) on power tool</li> </ul> 116. Provide support for the tool <ul style="list-style-type: none"> <li>provide a tool balancer for power tool</li> </ul>		✓ ✓ ✓	med med med	med med med	med high med
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/Wrist/Arm (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>• Hard/sharp edges present on work station or work piece</li> </ul>	9. Eliminate exposure to hard edges	✓		low	med	med
		<ul style="list-style-type: none"> <li>• round off edges</li> <li>• covering hard edges</li> </ul>	✓		low	med	med
	93. Provide appropriate gloves		✓	med	med	med	
	<ul style="list-style-type: none"> <li>• Tool handle has sharp edges</li> </ul>	9. Eliminate exposure to hard edges		✓	med	med	med
<ul style="list-style-type: none"> <li>• provide shear handles with round, smooth, compressible grips</li> <li>• provide shear handle sizes with adequate space for fingers for persons with large hands</li> <li>• wrap handles with padding</li> </ul>		✓	✓	med	med	med	
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	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					
13. Twisting of the lower back	<ul style="list-style-type: none"> <li>Work location is blocked or is in an inappropriate orientation</li> </ul>	136. Rotate the work piece <ul style="list-style-type: none"> <li>turn the work piece manually</li> <li>provide a fixture to allow the work piece to be rotated</li> </ul>	✓	✓	low 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>Work surface too low</li> <li>Location of work too low</li> </ul>	124. Raise the work piece/work surface <ul style="list-style-type: none"> <li>provide a fixed table to support work piece</li> <li>provide an adjustable table for work piece</li> </ul>	✓	✓ ✓	med med	med high	med high
		31. Lower the person <ul style="list-style-type: none"> <li>provide a chair/stool to sit on</li> </ul>	✓	✓	med	high	high

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

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
16. Lifting forces	<ul style="list-style-type: none"> <li>If occurring, see Lifting Case Study</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>Rarely occurs</li> </ul>	N/A					
21. Awkward leg postures	<ul style="list-style-type: none"> <li>Excessive stroke or travel of manual foot lever</li> </ul>	50. Provide a foot pedal which requires the correct amount of force to use <ul style="list-style-type: none"> <li>provide electric or power foot pedal</li> </ul>		✓	med	med	high
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>Glare directly from a light source: looking towards an overhead light</li> <li>Glare from an overhead light reflected off equipment or worksurface.</li> </ul>	109. Provide protection from glare from overhead lights/task lights <ul style="list-style-type: none"> <li>position work between overhead lights.</li> <li>remove glossy or shiny surfaces from work area</li> <li>place the work station so that it faces a wall or partition.</li> <li>install parabolic louvers to direct light down on the surface.</li> </ul>	✓		low	med	med
			✓		low	med	med
			✓	✓	med	med	med
				✓	high	med	med
	<ul style="list-style-type: none"> <li>Glare directly from a light source: looking towards an uncovered window</li> <li>Glare from an uncovered window reflected off equipment or worksurface.</li> </ul>	108. Provide protection from glare from natural light <ul style="list-style-type: none"> <li>orient work station so that the person faces perpendicular to the window.</li> <li>adjust window coverings</li> <li>provide window coverings</li> </ul>	✓		low	med	med
			✓	✓	low med to high	med med	med med
	<ul style="list-style-type: none"> <li>Glare directly from a light source: looking towards a task light</li> <li>Glare from a task light reflected off equipment or worksurface.</li> </ul>	109. Provide protection from glare from overhead lights/task lights <ul style="list-style-type: none"> <li>adjust the task light to reduce glare.</li> <li>turn off the task light.</li> <li>shield task light to prevent it from shining into eyes.</li> </ul>	✓		low	med	med
			✓	✓	low low to 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>Light levels too high.</li> <li>Light levels too low.</li> <li>Uncorrected visual disorders cause the person to lean forward to see work</li> <li>Text too small to read.</li> <li>Text is difficult to read (poor quality)</li> </ul>	<p>27. Lower the light levels</p> <ul style="list-style-type: none"> <li>remove pairs of fluorescent light bulbs from overhead fixtures.</li> </ul> <p>Note: this should be done with the appropriate technical assistance and the agreement of co-workers in the area.</p> <p>22. Increase light levels</p> <ul style="list-style-type: none"> <li>provide task light</li> <li>increase overall light levels to meet the needs of tasks</li> </ul> <p>14. Encourage person to have visual disorders corrected</p> <p>18. Improve visual access to work</p> <ul style="list-style-type: none"> <li>increase size of text</li> <li>increase the legibility of text</li> </ul>		<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	<p>low to med</p> <p>med med</p> <p>low</p> <p>med med</p>	<p>med</p> <p>med med</p> <p>med</p> <p>med med</p>	<p>med</p> <p>med med</p> <p>med</p> <p>med med</p>
24. Intensive visual tasks, staring at work objects for long periods	<ul style="list-style-type: none"> <li>Length of work task without a change of position for the eyes.</li> </ul>	<p>8. Distribute intensive activities throughout the process</p> <ul style="list-style-type: none"> <li>perform intensive visual tasks for short periods throughout the day (as opposed to in one continuous session).</li> </ul>	<p>✓</p>		<p>low</p>	<p>med</p>	<p>med</p>

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

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
		20. Incorporate rest pauses <ul style="list-style-type: none"> <li>periodically look away from screen.</li> </ul>	✓		low	med	med