

## CASE STUDY – Picking/Stocking

<b>TASK TITLE: Picking/Stocking</b>	
<b>Task Description:</b>	<p>The Picking/Stocking task involves the placement and retrieval of items for storage areas. These storage areas are typically shelves or carousels. This can include storing small items inside bins, as well as larger boxes on pallets. In some cases the Picking/Stocking tasks are performed using a standing fork truck. In these cases the Fork Truck Standing Case Study should be referenced as well.</p> <p>Typical areas in which the Picking/Stocking task may be found can include:</p> <ul style="list-style-type: none"><li>• Logistics</li><li>• CE Warehouse</li><li>• Commissary Warehouse</li></ul>
<b>Job Performance Measures Most Often Impacted by Picking/Stocking:</b>	<p>Measure of work performance can include (not necessarily limited to):</p> <ul style="list-style-type: none"><li>• Orders filled per day</li></ul>
<b>Typical Employee Comments about Picking/Stocking:</b>	<p>Employees typically experience discomfort in the lower or middle back, attributed to lifting.</p> <p>The back/torso is the body area that most commonly receives a “High” priority rating. The remaining body areas, with the exception of the head/eyes, are more likely to receive “Medium” priority rating, or lower.</p>
<b>Suggested Level II Analysis:</b>	<p>NIOSH Lifting Equation, Biomechanical Lifting Analysis, Grip Force Analysis</p>

## 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>Object too high</li> <li>Object is too far away</li> </ul>	32. Lower the work piece/work surface	✓		low	low	low
		<ul style="list-style-type: none"> <li>place the heaviest items between shoulder height (50 in.)(127 cm) and knuckle height (25 in.)(64 cm)</li> </ul>	✓		low	med	med
		<ul style="list-style-type: none"> <li>place the most frequently accessed items on middle shelves of storage racks</li> </ul>	✓		low to med	med	low
		123. Raise the person	✓	✓	low to med	med	low
		<ul style="list-style-type: none"> <li>use a standing fork truck or portable stairs to access items stored above shoulder height</li> </ul>	✓		low	low	low
		38. Move closer to the work location	✓		low	low	low
		<ul style="list-style-type: none"> <li>step into the rack when possible</li> </ul>	✓		low	low	low
		41. Move work piece closer to body	✓		low	low	low
<ul style="list-style-type: none"> <li>reposition stock on the close side of the pallet</li> </ul>	✓		med	med	med		
55. Provide a hook-type tool to pull items				✓	med	med	med
127. Reduce depth of storage container				✓	med	low	low
<ul style="list-style-type: none"> <li>reduce depth of stock placed on pallets in the pick tunnel</li> </ul>							

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

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
2. Arm forces: Repeated arm forces or holding/ carrying materials	• Item is too heavy	61. Provide a mechanical lift device		✓	med	low	low
		4. Change a lifting/carrying task into a rolling or sliding task					
		• use a height adjustable cart to retrieve and deliver objects – the operator can slide objects rather than lift	✓	✓	low to med	med	med
		142. Use two or more persons to perform the transfer	✓		low	low	low
		131. Reduce weight of work piece	✓	✓	low to high	low	low
	• reduce number of items lifted at same time						
	37. Modify facilities to decrease handling				✓	high	med
• install an automated retrieval storage system (AR/RS) or mechanized (carousel) picking/stocking system							
• Item is stuck or wedged in place	13. Encourage ergonomic work techniques		✓		low	low	low
	• take time to remove obstacles interfering with movement rather than trying to “force the object free						
	55. Provide a hook-type tool to pull items			✓	med	med	med

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

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
2. Arm forces: Repeated arm forces or holding/ carrying materials	• Rolling/sliding resistance of cart causes high forces	119. Provide wheels		✓	med	low	med
		19. Improve wheel condition • repair wheels on carts or equipment	✓		low to med	low	high
	• Pulling object across shelf results in high forces	37. Modify facilities to decrease handling • use flow racks to cue items to the front of a storage rack		✓	high	low	high
		131. Reduce weight of work piece • reduce number of items or weight of items on cart	✓		low	low	low
	• Cart or piece of equipment is too heavy to be pushed manually	67. Provide a powered cart • provide a powered cart or have the object moved by using a fork truck		✓	high	low	high
	• Floor/surface condition causes high forces during a rolling or sliding task	17. Improve floor condition • improve housekeeping • repair cracks or gaps in floor	✓ ✓		low med to high	med med	med med
		• provide ramps to compensate for minor differences in floor height		✓	med to high	low	low

**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>Carry distance is more than three steps</li> </ul>	37. Modify facilities to decrease handling <ul style="list-style-type: none"> <li>arrange storage and work areas in a hub configuration to reduce travel distance</li> </ul>		✓	high	low	high
3. High speed, sudden shoulder movements	<ul style="list-style-type: none"> <li>Speed of lift</li> </ul>	55. Provide a hook-type tool to pull items		✓	med	med	med
		13. Encourage ergonomic work techniques <ul style="list-style-type: none"> <li>encourage person to avoid rushing while handling items</li> </ul>	✓		low	low	low
4. Head/neck bent or twisted	<ul style="list-style-type: none"> <li>Inadequate head room causes awkward postures</li> </ul>	82. Provide adequate work space	✓		low	med	med
		<ul style="list-style-type: none"> <li>store item in area where there is adequate headroom</li> <li>use flow-racks to cue items to the front of a storage rack</li> </ul>		✓	high	med	high
		55. Provide a hook-type tool to pull products off of deep shelves		✓	med	med	med

## 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>Gripping item results in awkward wrist positions</li> </ul>	94. Provide appropriate handles <ul style="list-style-type: none"> <li>provide cut-outs on boxes or containers</li> </ul>		✓	med	low	med
6. Repeated manipulations with fingers	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A					
7. Hyper-extension 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>Item is difficult to grasp</li> <li>Item has no handles</li> <li>Item is slippery</li> </ul>	94. Provide appropriate handles  147. Provide an alternate container <ul style="list-style-type: none"> <li>provide a smaller container</li> <li>request vendor supply items in a container with handles</li> </ul>		✓  ✓  ✓	med  low to med med	med  med med	med  med med

**Hands/Wrists/Arms (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>Item is too heavy</li> </ul>	4. Change a lifting/carrying task into a rolling or sliding task <ul style="list-style-type: none"> <li>use a height adjustable cart to retrieve and deliver objects – the operator can slide objects rather than lift</li> </ul>	✓	✓	low to med	med	med
		61. Provide a mechanical lift device		✓	med	low	med
		142. Use two or more people to perform the transfer	✓		low	low	low
		131. Reduce weight of work piece <ul style="list-style-type: none"> <li>request vendor ship unit on smaller bulk items or divide unit into multiple packages</li> </ul>	✓	✓	low to high	low	low
	<ul style="list-style-type: none"> <li>Item is stuck or wedged in place</li> </ul>	93. Provide appropriate gloves <ul style="list-style-type: none"> <li>use gloves with a high friction surface to improve the grip on slippery objects</li> </ul>	✓		low to med	med	low
9. High speed hand/wrist/arm movements or vibration, impact or torque to the hand	<ul style="list-style-type: none"> <li>Tearing open boxes</li> </ul>	148. Provide appropriate equipment <ul style="list-style-type: none"> <li>use a knife for opening boxes</li> </ul>	✓		low	med	med

**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>Item has small handles</li> <li>Handles have hard edges</li> </ul>	88. Provide an appropriate handle diameter <ul style="list-style-type: none"> <li>provide a wrap around the handle so that the diameter is no less than 1-1.5" (2.5-3.8cm)</li> </ul>	✓		low	med	med
		94. Provide appropriate handles <ul style="list-style-type: none"> <li>provide rounded slightly compressible handles</li> </ul>		✓	low to med	low	low
		61. Provide a mechanical lift device		✓	med to high	med	med
11. Hands and fingers exposed to cold temperatures	<ul style="list-style-type: none"> <li>Work area is too cold, for instance picking up stock in a freezer</li> </ul>	12. Encourage appropriate seasonal clothing	✓		low to med	med	med
		93. Provide appropriate gloves	✓		low to med	med	med

**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>Object is too low</li> </ul>	124. Raise the work piece/work surface	✓		low	med	med
		<ul style="list-style-type: none"> <li>place heaviest items between mid thigh and shoulder height</li> </ul>		✓	med	med	med
		<ul style="list-style-type: none"> <li>provide a fixed table to support work piece</li> </ul>		✓	med to high	med to high	med to high
		<ul style="list-style-type: none"> <li>provide an adjustable table or scissor lift for work piece</li> </ul>		✓	med	med	med
		<ul style="list-style-type: none"> <li>raise the height of the transfer cart or use a spring loaded cart</li> </ul>					
		13. Encourage ergonomic work techniques					
		<ul style="list-style-type: none"> <li>avoid storing items on lowest cart shelves</li> </ul>	✓		low	med	med

**Back/Torso**

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>Object is too far away</li> </ul>	38. Move closer to the work location <ul style="list-style-type: none"> <li>step closer to load</li> </ul>	✓		low	med	low
		41. Move work piece closer to person <ul style="list-style-type: none"> <li>slide load to edge before lifting</li> </ul>	✓		low	med	low
		37. Modify facility to decrease handling <ul style="list-style-type: none"> <li>use flow-racks to cue items to the front of a storage rack</li> <li>install an automated retrieval storage system (AR/RS) or mechanized (carousel) picking/stocking system</li> </ul>		✓	med to high	low	med
				✓	high	med	high
	<ul style="list-style-type: none"> <li>Lifting item out of a deep container causes awkward bending</li> </ul>	147. Provide an alternate container <ul style="list-style-type: none"> <li>provide a smaller container</li> <li>use a container with drop down sides</li> </ul>	✓	✓	low med to high	med med	med med
		<ul style="list-style-type: none"> <li>use a pallet instead of a bin</li> </ul>		✓	med 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
	<ul style="list-style-type: none"> <li>Person tends to use the back to lift instead of using the legs to assist in the lift. Check to make sure that there is no contributing factor in the workplace</li> </ul>	124. Raise the work piece/work surface <ul style="list-style-type: none"> <li>place heaviest items between mid thigh and shoulder height</li> <li>provide a fixed table to support work piece</li> <li>provide an adjustable table or scissors lift for work piece</li> <li>raise the height of the transfer cart or use a spring loaded cart</li> </ul> 13. Encourage ergonomic work techniques <ul style="list-style-type: none"> <li>provide training on ergonomics principles and lifting techniques</li> <li>encourage person to use leg muscles to lift</li> </ul>	✓          ✓  ✓	✓    ✓  ✓	low  med  med to high  med    low  low	med  med  med to high  med    low  low	med  med  med to high  med    low  low
13. Twisting of the lower back	<ul style="list-style-type: none"> <li>Work area layout</li> <li>Person tends to twist with the back instead of using the legs and feet to pivot</li> </ul>	130. Reduce the angle a person has to turn to transfer the item <ul style="list-style-type: none"> <li>if the transfer involves a 180 degree twist, move the source or destination to reduce the twist to 90 degrees or less</li> <li>reposition supplies/materials to reduce twisting</li> </ul>	✓   ✓		low to high   low to med	low   low	med   low

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

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
14. High speed, sudden movements or Lifting awkward, uneven, shifting or bulky items.	<ul style="list-style-type: none"> <li>Item is bulky, awkward and/or shifts easily</li> </ul>	61. Provide a mechanical lift device <ul style="list-style-type: none"> <li>store bulky and awkward items on pallets and use a fork truck to move them</li> </ul>		✓	med	low	low
		142. Use two or more persons to perform the transfer	✓		low	low	low
	<ul style="list-style-type: none"> <li>Person tends to lift with a jerky motion instead of a smooth motion</li> </ul>	4. Change a lifting/carrying task into a rolling or sliding task <ul style="list-style-type: none"> <li>use a height adjustable cart to retrieve and deliver objects – the operator can slide objects from the shelves on to and off the cart</li> </ul>		✓	low to med	med	med
		147. Provide an alternate container <ul style="list-style-type: none"> <li>contact vendor and request re-packing object in container with handles or increasing object density</li> </ul>		✓	med	low	low

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

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
15. Static, awkward back postures	<ul style="list-style-type: none"> <li>Object located too low</li> </ul> 	124. Raise the work piece/work surface <ul style="list-style-type: none"> <li>place heaviest items between knuckle and shoulder height (25"-50") (64-127 cm)</li> <li>provide a fixed table to support work piece</li> <li>provide an adjustable table or scissor lift for work piece</li> </ul> 38. Move closer to the work location <ul style="list-style-type: none"> <li>remove obstructions</li> </ul> 41. Move the work piece closer to person	✓		low	low	med
			✓		low	med	med
				✓	high	med	med
			✓		low	low	med
			✓		low	low	low

**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>Picking/stocking from a low location</li> </ul>	124. Raise the work piece/work surface <ul style="list-style-type: none"> <li>place the heaviest items between knuckle and shoulder height and on middle shelves of storage racks</li> <li>provide an adjustable table</li> <li>raise the height of the transfer cart or use a spring loaded cart</li> </ul>	✓		low	med	med
				✓	med to high	med	med
				✓	med	med	med
16. Lifting forces	<ul style="list-style-type: none"> <li>Item is too heavy</li> </ul>	4. Change a lifting/carrying task into a rolling or sliding task <ul style="list-style-type: none"> <li>use a height adjustable cart to retrieve and deliver objects – the operator can slide objects from the shelves on to and off the cart</li> </ul> 61. Provide a mechanical lift device 142. Use two or more persons to perform the transfer 131. Reduce weight of work piece <ul style="list-style-type: none"> <li>request vendor ship unit on smaller bulk items or divide unit into multiple packages</li> </ul>	✓	✓	high	med	med
			✓		low	low	low
				✓	med	low	low
			✓		low	low	low
			✓	✓	low to high	low	low

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

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
		37. Modify facilities to decrease handling <ul style="list-style-type: none"> <li>install an automated retrieval storage system (AR/RS) or mechanized (carousel) picking/stocking system</li> </ul>		✓	high	med	high
17. Pushing or pulling	<ul style="list-style-type: none"> <li>Rolling/sliding resistance of cart or piece of equipment causes high forces</li> <li>Floor/surface condition causes high forces during a rolling or sliding task</li> </ul>	19. Improve wheel condition <ul style="list-style-type: none"> <li>repair wheels on carts or equipment</li> </ul>	✓		low	low	med
		119. Provide wheels <ul style="list-style-type: none"> <li>provide wheels with appropriate bearings and tread composition</li> </ul>	✓		low	low	med
		67. Provide a powered cart <ul style="list-style-type: none"> <li>provide motorized assistance to transport cart or piece of equipment</li> </ul>		✓	med to high	med	med
		17. Improve floor condition <ul style="list-style-type: none"> <li>improve housekeeping</li> <li>repair cracks or gaps in floor</li> <li>provide ramps to compensate for minor differences in floor height</li> </ul>	✓ ✓	✓	low med med	med med med	med med med
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 in one position</li> </ul>	25. Increase task variety	✓		low	low	low
		20. Incorporate rest pauses	✓		low	low	med
20. Standing on hard surfaces or exposure to hard edges on legs, knees, and feet	<ul style="list-style-type: none"> <li>Standing on hard surface</li> <li>Leaning against bin during loading</li> </ul>	86. Provide an appropriate anti-fatigue mat		✓	med	low	low
		96. Provide shoe inserts	✓		low to med	low	low
		147. Provide an alternate container <ul style="list-style-type: none"> <li>use smaller container</li> </ul>	✓		low to med	low	med
		<ul style="list-style-type: none"> <li>use a container with drop down sides</li> <li>use a pallet instead of a bin</li> </ul>		✓	med to high	low	med
21. Awkward leg postures	<ul style="list-style-type: none"> <li>Work object is too low</li> </ul>	124. Raise the work piece/work surface <ul style="list-style-type: none"> <li>provide support for the work piece</li> </ul>	✓		low to med	med	med
		<ul style="list-style-type: none"> <li>provide an adjustable table for work piece</li> </ul>		✓	med to high	med	med
		<ul style="list-style-type: none"> <li>store frequently accessed items between 25"-50" (64-127 cm)</li> </ul>	✓		low	med	med

**Legs/Feet (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>Climbing/descending ladder stairs to access taller shelves (particularly when carrying a load)</li> </ul>	148. Provide appropriate equipment <ul style="list-style-type: none"> <li>use a standing fork truck for shelves instead of portable ladders</li> <li>use a ladder/lift cart combination allowing the person to climb and descend without holding the object</li> </ul> 142. Use two or more persons to perform the transfer <ul style="list-style-type: none"> <li>have a person stand on the floor and hand items to the person on the stairs</li> </ul>		✓  ✓	high  med	med  med	med  med
22. Awkward foot postures	<ul style="list-style-type: none"> <li>Work object is too low</li> </ul>	124. Raise the work piece/work surface <ul style="list-style-type: none"> <li>provide support for the work piece</li> <li>provide an adjustable table for work piece</li> </ul> 148. Provide appropriate equipment <ul style="list-style-type: none"> <li>use a ladder with at least 12" (30.5cm) deep steps in place of the small rungs</li> </ul>	✓	✓  ✓	low to med  med to high  med	med  med  low to med	med  med  low to med

**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>Low light level due to location of the component</li> </ul>	18. Improve visual access to work <ul style="list-style-type: none"> <li>provide a portable task light that can be moved around the area or clamped onto a support work surface to improve light levels (75fc to 100fc)</li> </ul>	✓		low to med	med	med
24. Intensive visual tasks, staring at work objects for long periods	<ul style="list-style-type: none"> <li>Rarely occurs</li> </ul>	N/A		✓	med	med	med

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