

CASE STUDY - Dishwashing

TASK TITLE: Dishwashing	
Task Description:	<p>The Dishwashing task involves cleaning pots, pans, plates, silverware and/or trays. The task can involve a combination of scrubbing by hand and stacking items in wash rack trays.</p> <p>Typical environments in which the Dishwashing task occurs can include (but are not necessarily limited to):</p> <ul style="list-style-type: none">• Cafeterias and mess halls• Restaurants• Clubs
Job Performance Measures Most Often Impacted by Dishwashing:	<p>Measures of work performance can include (but are not necessarily limited to):</p> <ul style="list-style-type: none">• Hours daily to complete washing• Cleanliness of plates <p>These are not formal measures currently in use.</p>
Typical Employee Comments about Dishwashing:	<p>Employees typically experience discomfort in the lower back and shoulders. They generally attribute this discomfort to lifting and handling items.</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 a “Medium” priority rating, or lower.</p>
Suggested Level II Analysis:	Dynamic Task Analysis, Biomechanical Lifting Analysis, Push/Pull Force Analysis

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"> Reach distance for pulling tray from conveyor  <ul style="list-style-type: none"> Reach when flipping and aligning trays Height of dishwasher door when opening and closing 	<p>38. Move closer to the work location</p> <ul style="list-style-type: none"> relocate the worker to the end of the conveyor to avoid reaching across intervening surface <p>41. Move work piece closer to body</p> <ul style="list-style-type: none"> reduce the width of the sort area design conveyor to flow directly to personnel with little or no intervening counter <p>149. Provide appropriate tools</p> <ul style="list-style-type: none"> provide a “rake” type tool to pull dishes <p>11. Eliminate unnecessary tasks</p> <ul style="list-style-type: none"> use consistent, standard size trays <p>11. Eliminate unnecessary tasks</p> <ul style="list-style-type: none"> install an auto open and close door sequencer 	<p>✓</p>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	<p>low</p> <p>med to high</p> <p>med to high</p> <p>low to med</p> <p>low to high</p> <p>med to high</p>	<p>med</p> <p>med</p> <p>high</p> <p>low</p> <p>high</p> <p>low</p>	<p>med</p> <p>med</p> <p>med</p> <p>low</p> <p>med</p> <p>med</p>

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"> Height of dishwasher door when opening and closing (continued) Throwing trash in garbage can 	32. Lower the work piece/work surface <ul style="list-style-type: none"> provide a rope extension to minimize vertical reaching 38. Move closer to the work location <ul style="list-style-type: none"> relocate trash cans provide trash cans with wheels 	✓		low to med	low	med
2. Arm forces: Repeated arm forces or holding/carrying materials	<ul style="list-style-type: none"> Carrying stacks of plates and pans 	48. Provide a cart <ul style="list-style-type: none"> use existing carts use carts with spring loaded bottoms to accommodate greater loads 4. Change a lifting/carrying task into a rolling or sliding task <ul style="list-style-type: none"> change the work process to keep wash areas closer together in order to minimize carrying objects 	✓	✓	low med to high	low low	med med
				✓	low to high	med	med

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"> Lifting full dish trays from washer to cart 	<p>4. Change a lifting/carrying task into a rolling or sliding task</p> <ul style="list-style-type: none"> reduce the height of the wash basins to allow the dish trays to slide onto carts -a sloping surface could limit water spilling on the floor while allowing easy lift over 		✓	med	med	med
	<ul style="list-style-type: none"> Pulling dish trays along washer 	<p>35. Maintain tracks, rollers, and movement mechanisms</p> <ul style="list-style-type: none"> keep the bottom edges of the trays smooth install Teflon feet on the bottoms of the trays to ease movement 		✓	low to med	low	med
	<ul style="list-style-type: none"> Opening and closing washer door 	<p>35. Maintain tracks, rollers, and movement mechanisms</p> <ul style="list-style-type: none"> perform routine lubrication and maintenance on the sliding door to limit force requirements 	✓		low to med	low	med
		<p>11. Eliminate unnecessary tasks</p> <ul style="list-style-type: none"> install an auto open and close door sequencer 		✓	med to high	low	med

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"> Rolling/sliding resistance of cart or piece of equipment causes high forces 	19. Improve wheel condition <ul style="list-style-type: none"> repair wheels on carts or equipment 		✓	med	med	med
		119. Provide wheels		✓	med	med	med
	<ul style="list-style-type: none"> Cart or piece of equipment is too heavy to be pushed manually 	151. Reduce weight of the load placed on the cart <ul style="list-style-type: none"> reduce number of items or weight of items on cart 	✓		low	low	low
	<ul style="list-style-type: none"> Floor/surface condition causes high forces during a rolling or sliding task 	17. Improve floor condition <ul style="list-style-type: none"> improve housekeeping repair cracks or gaps in floor provide ramps to compensate for minor differences in floor height 	✓ ✓	✓	low high med	med med med	med med med
	<ul style="list-style-type: none"> Scrubbing and scraping pots 	128. Reduce force required to install or remove component <ul style="list-style-type: none"> soak pots repeatedly in warm, soapy water. Wipe the pots every few minutes to loosen residues provide high friction surface to stabilize pots while scrubbing 	✓	✓	low low to med	med med	high med

Shoulder/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"> Opening and closing washer door Scrubbing and scraping pots Throwing trash in garbage can 	35. Maintain tracks, rollers, and movement mechanisms <ul style="list-style-type: none"> perform routine lubrication and maintenance on the sliding door to limit force requirements 	✓		low to med	low	high
		128. Reduce force required to install or remove component <ul style="list-style-type: none"> soak pots repeatedly in warm, soapy water. Wipe the pots every few minutes to loosen residues provide high friction surface to stabilize pots while scrubbing 	✓	✓	low to med	med	med
		38. Move closer to the work location <ul style="list-style-type: none"> relocate trash cans provide trash cans with wheels 	✓	✓	low med	med med	med med
4. Head/neck bent or twisted	<ul style="list-style-type: none"> Location of work too low for good visual access, yet desirable height for arm forces applied. 	12. Incorporate rest pauses	✓		low	med	med
		83. Provide an adjustable height lift table <ul style="list-style-type: none"> provide a riser to raise the level of the work provide adjustable height work surfaces 	✓	✓	low to med med to high	med 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"> Repeated movements from scrubbing and scraping pots Repeated movements sorting silverware and plates into bins 	128. Reduce force required to install or remove component		✓	low to high	med	high
		<ul style="list-style-type: none"> soak pots repeatedly in warm, soapy water. Wipe the pots every few minutes to loosen residues provide high friction surface to stabilize pots while scrubbing 	✓		low	med	high
		11. Eliminate unnecessary tasks		✓	low to med	med	med
		13. Encourage ergonomic work techniques	✓		low	low	low
6. Repeated manipulations with fingers	<ul style="list-style-type: none"> Repeated movements sorting silverware and plates into bins 	11. Eliminate unnecessary tasks		✓	low to high	med	high
		<ul style="list-style-type: none"> institute a customer sort procedure to reduce sorting in the dish room 					

Hands/Wrists/Arms (cont'd)

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
7. Hyper-extension of finger/thumb or repeated single finger activation	<ul style="list-style-type: none"> • Handling multiple plates in one hand 	13. Encourage ergonomic work techniques <ul style="list-style-type: none"> • use a two-handed transfer • remove one plate at a time and stack beside tray, transfer stack to the cart • avoid handling large stacks of dishes all at once 142. Use two or more persons to perform the transfer <ul style="list-style-type: none"> • have two people share the task 	✓		low	med	med
			✓		low	med	med
			✓		low	med	med
			✓		low	med	med
8. Hand/grip forces	<ul style="list-style-type: none"> • Scrubbing and scraping pots • Forces from handling multiple plates in one hand 	128. Reduce force required to install or remove component <ul style="list-style-type: none"> • soak pots repeatedly in warm, soapy water. Wipe the pots every few minutes to loosen residues • provide high friction surface to stabilize pots while scrubbing 13. Encourage ergonomic work techniques <ul style="list-style-type: none"> • use a two-handed transfer • remove one at a time and stack beside tray, transfer stack to the cart • avoid handling large stacks of dishes all at once 142. Use two or more persons to perform the transfer	✓		low	med	high
				✓	low to med	med	med
			✓		low	med	med
			✓		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
	<ul style="list-style-type: none"> Fingertip forces from prying apart pans that are stuck together 	149. Provide appropriate tools <ul style="list-style-type: none"> use a small wedge to separate pans use a spoon or small pry bar to perform the prying task 	✓		low	low	low
			✓		low	low	low
9. High speed hand/wrist/arm movements or vibration, impact or torque to the hand	<ul style="list-style-type: none"> Opening and closing washer door Scrubbing and scraping pots 	35. Maintain tracks, rollers, and movement mechanisms <ul style="list-style-type: none"> perform routine lubrication and maintenance on the sliding door to limit force requirements 	✓		low to med	low	high
		128.Reduce force required to install or remove component <ul style="list-style-type: none"> soak pots repeatedly in warm, soapy water. Wipe the pots every few minutes to loosen residues provide high friction surface to stabilize pots while scrubbing 	✓		low	med	high
				✓		low to med	med
10. Exposure to hard edges	<ul style="list-style-type: none"> Hard edges from handing trays, pans and utensils 	93. Provide appropriate gloves	✓		low	low	low
11. Hands/fingers exposed to cold temperatures	<ul style="list-style-type: none"> Rarely occurs 	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"> Reach distance for pulling tray from conveyor Reaching under sink to retrieve dish trays 	38. Move closer to the work location <ul style="list-style-type: none"> relocate the worker to the end of the conveyor to avoid reaching across intervening surface 	✓		low	med	med
		41. Move work piece closer to body <ul style="list-style-type: none"> reduce the width of the sort area design conveyor to flow directly to personnel with little or no intervening counter 	✓	✓	high high	med med	med med
		11. Eliminate unnecessary tasks <ul style="list-style-type: none"> institute a customer sort procedure to reduce sorting in the dish room 		✓	low to high	med	high
		149. Provide appropriate tools <ul style="list-style-type: none"> provide a rake type tool to pull dishes 		✓	low to med	low	low
		37. Modify facilities to decrease handling <ul style="list-style-type: none"> Install shelves that roll out for easy access 		✓	low to med	low	med
		147. Provide an alternate container <ul style="list-style-type: none"> use a cart with a spring loaded base for storing dish trays 		✓	med	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"> Stacking items on low cart causes awkward bending Person tends to use the back to lift instead of using the legs to assist in the lift (check for contributing factor in the workplace) Sink too low 	147. Provide an alternate container <ul style="list-style-type: none"> use a cart with a spring loaded base 13. Encourage ergonomic work techniques <ul style="list-style-type: none"> provide training on ergonomics principles and lifting techniques encourage person to use leg muscles to lift 124. Raise the work piece/work surface <ul style="list-style-type: none"> provide a false bottom insert into sink to raise the work raise the sink 		✓ ✓ ✓	med low low low to med med to high	low med med low high	med low low low high
							

Back/Torso (cont'd)

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
13. Twisting of the lower back	<ul style="list-style-type: none"> • Work area layout • Person tends to twist with the back instead of using the legs and feet to pivot 	130. Reduce the angle a person has to turn to transfer an item <ul style="list-style-type: none"> • if the transfer involves a 180 degree twist, move the source or destination to reduce the twist to 90 degrees or less • increase space slightly between starting and ending points to encourage use of legs to turn 	✓		low to med	low	med
		12. Encourage ergonomic work techniques <ul style="list-style-type: none"> • provide training on ergonomics principles and lifting techniques • encourage person to use legs to pivot when handling a load 	✓		low to med	low	med
			✓		low	med	low
			✓		low	med	low
14. High speed, sudden movements or Lifting awkward, uneven, shifting or bulky items.	<ul style="list-style-type: none"> • Person tends to lift with a jerky motion instead of a smooth motion • Slippery floors 	4. Change a lifting/carrying task into a rolling or sliding task <ul style="list-style-type: none"> • use a cart to minimize carrying wet items across floor 	✓		low	med	low
		13. Encourage ergonomic work techniques <ul style="list-style-type: none"> • encourage person to use smooth fluid movements while handling items 	✓		low	med	med
		17. Improve floor condition <ul style="list-style-type: none"> • provide a non-slip walking surface that drains effectively and is easy to clean 		✓	med to high	low	med

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"> Bending into sink to reach/scrub pans 	79. Provide a work surface which is adjustable in height <ul style="list-style-type: none"> provide a false bottom insert into sink to raise the work raise the sink 	✓	✓	low to med med to high	low high	low high
16. Lifting forces	<ul style="list-style-type: none"> Lifting full dish trays from washer to cart 	4. Change a lifting/carrying task into a rolling or sliding task <ul style="list-style-type: none"> reduce the lift over height on the edge of the wash basins to allow the dish trays to slide onto carts - a sloping surface could limit water spilling on the floor while allowing easy lift over 		✓	med	med	med

Back/Torso (cont'd)

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
17. Pushing or pulling	<ul style="list-style-type: none"> Rolling/sliding resistance of cart or piece of equipment causes high forces Cart or piece of equipment is too heavy to be pushed manually Floor/surface condition causes high forces during a rolling or sliding task 	119. Provide wheels <ul style="list-style-type: none"> provide wheels with appropriate bearings and tread composition 		✓	med	med	med
		19. Improve wheel condition <ul style="list-style-type: none"> repair wheels on carts or equipment 	✓		med	med	med
		151. Reduce the weight of the load placed on the cart <ul style="list-style-type: none"> reduce number of items or weight of items on cart 	✓		low	med	low
		17. Improve floor condition <ul style="list-style-type: none"> improve housekeeping repair cracks or gaps in floor provide ramps to compensate for minor differences in floor height 	✓ ✓	✓	low med high	med med med	high high high
18. Whole body vibration	<ul style="list-style-type: none"> Rarely occurs 	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"> • Prolonged standing 	20. Incorporate rest pauses	✓		low	med	med
		25. Increase task variety	✓		low	med	med
		52. Provide a footrail or footrest		✓	low to med	low	med
20. Exposure to hard edges on legs, knees, and feet or Standing on hard surfaces	<ul style="list-style-type: none"> • Standing on a hard surface 	96. Provide appropriate shoe inserts	✓		low to med	low	med
		86. Provide an appropriate anti-fatigue mat <ul style="list-style-type: none"> • matting should drain well and be easy to clean 		✓	med to high	med	med
		143. Wear appropriate shoes	✓		low	low	low
21. Awkward leg postures	<ul style="list-style-type: none"> • Lack of legroom 	132. Remove obstructions	✓		low	med	med
22. Awkward foot postures	<ul style="list-style-type: none"> • Lack of foot room 	132. Remove obstructions	✓		low	med	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"> Rarely occurs 	18. Improve visual access to work <ul style="list-style-type: none"> Light levels should be 50 fc – 100 fc for work 		✓	low to med	med	med
24. Intensive visual tasks, staring at work objects for long periods	<ul style="list-style-type: none"> Rarely occurs 	N/A					

This page intentionally left blank