

CASE STUDY - Pumping

TASK TITLE: Pumping

Task Description:	The pumping task is generally performed within the context of a larger job or task. The pumping task can vary in scope from a small hand pump requiring very little force, to a large pump such as a floor jack involving significant forces.
Job Performance Measures Most Often Impacted by Pumping:	<ul style="list-style-type: none">Completion of task in a reasonable amount of time.
Typical Employee Comments about Pumping:	<p>Due to the wide variety of work situations, employees may report fatigue or discomfort in any of the following body regions: shoulders/neck, hands/wrists/arms, or back/torso.</p> <p>The primary body regions of concern are: shoulders/neck, back/torso The secondary body regions of concern are: hands/wrists/arms</p>
Suggested Level II Analysis:	Grip Force Measurement, Elemental Task 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"> • Pump handle position is too high • Pump handle covers too much travel 	<p>123. Raise the person</p> <ul style="list-style-type: none"> • provide a stable platform <p>32. Lower the work piece/worksurface</p> <ul style="list-style-type: none"> • position the pump handle near elbow level <p>77. Provide a tool with an appropriate handle angle</p> <ul style="list-style-type: none"> • change the pump handle angle or bend the handle <p>51. Provide a foot pump</p> <ul style="list-style-type: none"> • for low frequency high force tasks <p>66. Provide a power tool</p> <ul style="list-style-type: none"> • use electric or air power to activate the pump 	✓ ✓ ✓ ✓ ✓	med med med med med	med med med med med	med med med med med	
2. Arm forces: Repeated contractions of the muscles of the arm or holding/carrying materials	<ul style="list-style-type: none"> • Pumping forces are high 	<p>76. Provide a tool which requires minimal force to use</p> <ul style="list-style-type: none"> • install a longer handle to increase leverage • use a multiplying gear • use a foot pump 	✓ ✓ ✓	med med med	med med med	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
3. High speed, sudden shoulder movements	<ul style="list-style-type: none"> • Inappropriate use of manual pump. 	106. Provide powered assistance for a manual activity <ul style="list-style-type: none"> • use electric or air power to activate the pump 	✓	med	med med
4. Head/neck bent or twisted	<ul style="list-style-type: none"> • Visual Access is limited due to awkward pump position or obstructions 	18. Improve visual access to work <ul style="list-style-type: none"> • position the display towards the operator's line of vision while the person is activating the pump • remove obstructions 	✓	med to high low	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"> Pump handle is too small 	103. Provide extensions for tools <ul style="list-style-type: none"> provide a longer handle so that the activity is more focused on the arm than the hands/wrists 		✓	med	med
6. Repeated manipulations with fingers	<ul style="list-style-type: none"> Rarely occurs 	N/A				
7. Hyper-extension of finger/thumb or repeated single finger activation	<ul style="list-style-type: none"> Rarely occurs 	N/A				
8. Hand/grip forces	<ul style="list-style-type: none"> Rarely occurs 	N/A				
9. High speed hand/wrist/arm movements or vibration, impact, or torque to the hand		91. Provide appropriate tool <ul style="list-style-type: none"> use electric or air power to activate the pump 		✓	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"> • Tool handle has hard edges 	9. Eliminate exposure to hard edges <ul style="list-style-type: none"> • wrap the handle • provide a handle of at least 5" (12.7 cm) in length; add an extension 		✓ ✓	med med	med med
11. Hands and fingers exposed to cold temperatures	<ul style="list-style-type: none"> • Work area is too cold 	105. Provide portable heaters 12. Provide appropriate gloves	✓	✓ 	med low	low 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"> Pump handle position inappropriate 	124. Raise the work piece/worksurface <ul style="list-style-type: none"> position the pump handle near elbow level 77. Provide a tool with an appropriate handle angle <ul style="list-style-type: none"> change the pump handle angle or bend the handle 103. Provide extensions for tools <ul style="list-style-type: none"> Install a longer handle 	✓ ✓ ✓	med med med	low med med	low med med
13. Twisting of the lower back	<ul style="list-style-type: none"> Rarely occurs 	N/A				
14. High speed, sudden movements	<ul style="list-style-type: none"> Pumping forces are high 	76. Provide a tool which requires minimal force to use <ul style="list-style-type: none"> use a multiplying gear 66. Provide a power tool <ul style="list-style-type: none"> use electric or air power to activate the pump 	✓ ✓	med med	med 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
15. Static, awkward back postures	• Rarely occurs	N/A				
16. Lifting forces	• Rarely occurs	N/A				
17. Pushing or pulling	• Pumping forces are high (see Figure 1.1) 	<p>76. Provide a tool which requires minimal force to use</p> <ul style="list-style-type: none"> • install a longer handle • use a multiplying gear <p>66. Provide a power tool</p> <ul style="list-style-type: none"> • use electric or air power to activate the pump 		✓ ✓ ✓	med med med	med med med
18. Whole body vibration	• Rarely occurs	N/A				

Figure 1.1

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"> Standing surface is hard 	86. Provide an appropriate anti-fatigue mat 96. Provide appropriate shoe inserts	✓ ✓	✓ low	med med	med med
20. Exposure to hard edges on legs, knees, and feet	<ul style="list-style-type: none"> Rarely occurs 	N/A				
21. Awkward leg postures	<ul style="list-style-type: none"> Rarely occurs 	N/A				
22. Standing foot pedal	<ul style="list-style-type: none"> Foot pump is used regularly 	58. Modify foot pedal <ul style="list-style-type: none"> recess foot pedal to keep both heels on floor add a heel block 	✓ ✓	med low to med	low 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 	N/A				
24. Intensive visual tasks, staring at work objects for long periods	<ul style="list-style-type: none"> • Rarely occurs 	N/A				