

CASE STUDY - Mediablasting - High Pressure Gun

TASK TITLE: Mediablasting -High Pressure Gun

Task Description:	<p>Media blasting involves using a high pressure fluid or air system in which grit is entrained making a very abrasive stream. This combination is effective for removing paint, rust, and other coatings. It is particularly effective for removing coverings and coatings from irregularly-shaped surfaces (generally metals) where sanding or liquid dunking is not possible or practical.</p> <p>This task is performed while standing inside of a large enclosure with the part(s) to be cleaned/stripped. The worker is in full body protective clothing including helmet and face shield.</p> <p>The abrasive stream is aimed, via the nozzle, to the surfaces of the part to be cleaned/stripped. The part is then moved, rotated, or otherwise manipulated such that all necessary surfaces are accessible to the operator. Parts are loaded and unloaded through a door in the side of the enclosure.</p> <p>Typical jobs in which media blasting is performed include (not necessarily limited to):</p> <ul style="list-style-type: none">• coating and plating operations• finishing/painting operations• rework operations
Job Performance Measures Most Often Impacted by Media Blasting-High Pressure Gun:	<ul style="list-style-type: none">• Complete removal of desired material• Completion of task in desired period of time
Typical Employee Comments about Media Blasting-High Pressure Gun:	<p>Employees typically complain about discomfort and/or stiffness in the hands/wrists/arms, the shoulders, the neck, and the legs/feet.</p> <p>The primary body regions of concern are: shoulders/neck, hands/wrists/arms</p> <p>The secondary body regions of concern are: In cases where heavy components must be repositioned or lifted, the back may also be impacted, legs/feet.</p>

Shoulder/Neck

Job Factor	Potential Causes	Corrective Action	Level of Changes		Cost	Impact On	
			✓ Minor Modification	✓ Major Change		Quality	Productivity
1. Reaching	• Work location is too high	123. Raise the person					
		<ul style="list-style-type: none"> • provide a fixed platform • provide an adjustable platform 	✓	✓	low med	med med	med med
	• Work location is fixed	32. Lower the work piece/work surface					
		<ul style="list-style-type: none"> • modify/lower existing table • provide an adjustable height work table 	✓	✓	med	med	med
		136. Rotate the work piece					
		<ul style="list-style-type: none"> • provide a turntable to allow the work piece to be rotated • rotate the work piece manually 	✓	✓	high	med	high
• Surfaces that must be sprayed are flat/horizontal orientation	136. Rotate the work piece						
	<ul style="list-style-type: none"> • provide a turntable to allow the work piece to be rotated from flat to upright • turn the work piece to an upright position, manual 	✓	✓	med	med	med	
			✓		low	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 contraction of the muscles of the arm or holding/carrying materials	<ul style="list-style-type: none"> Force required to control blasting nozzle Inadequate gripping surface Hose must be manually supported, held or steadied 	116. Provide support for the tool <ul style="list-style-type: none"> provide a tool balancer to support and resist the reaction force of the blasting nozzle 		✓	med	med	med
		94. Provide appropriate handles <ul style="list-style-type: none"> attach an auxiliary handle with a hose clamp 	✓		low	med	med
		113. Provide support for the tool <ul style="list-style-type: none"> provide a tool balancer to support the hoses 		✓	med	med	med
		<ul style="list-style-type: none"> use a hanger or hook to keep the hose off the floor 	✓	✓	med	low	low
		<ul style="list-style-type: none"> put hose over shoulder/use shoulder as hose support 	✓		low	med	med
3. High speed, sudden shoulder movements	<ul style="list-style-type: none"> Rarely occurs 	N/A					
4. Head/neck bent or twisted	<ul style="list-style-type: none"> Rarely occurs 	N/A					

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"> Inappropriate tool handle for the task Work location is too high 	77. Provide a tool with an appropriate handle angle <ul style="list-style-type: none"> provide a tool with a pistol-type handle provide a tool which can be angled/bent for different tasks attach a pistol-type handle to tool 		✓	med	med	med
				✓	med	med	med
				✓	med	med	med
			123. Raise the person <ul style="list-style-type: none"> use a step stool or a ladder provide a fixed platform provide an adjustable platform or scaffolding 	✓	✓	med	med
		32. Lower the work piece/work surface	✓	✓	med	med	med
6. Repeated manipulations with fingers	<ul style="list-style-type: none"> Rarely occurs 	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
7. Hyperextension of finger/thumb or repeated single finger activation	<ul style="list-style-type: none"> • Use of tool with single finger trigger 	62. Provide a multi-finger trigger <ul style="list-style-type: none"> • provide a tool with a two-finger or a four-finger trigger • extend trigger on existing tool (if feasible and safe) 		✓	med	med	med
			✓	✓	med	med	med
8. Hand/grip forces	<ul style="list-style-type: none"> • Tool must be manually supported, held or steadied; force from nozzle increases force • Nozzle provides high force to hands • Tool is too heavy 	113. Provide support for the cable or hose <ul style="list-style-type: none"> • provide a hook to hang cable in work area 		✓	med	med	med
				✓	high	med	high
			59. Provide a lighter weight tool	✓	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"> Handle diameter is too large 	88. Provide an appropriate handle diameter <ul style="list-style-type: none"> provide a tool with a handle diameter of between 1"-1.5" (2.5-3.8cm) is appropriate for this task 		✓	med	med	med
9. High speed hand/wrist/arm movements or vibration, impact, or torque to the hand	<ul style="list-style-type: none"> Blasting causes exposure to vibration 	116. Provide support for the tool <ul style="list-style-type: none"> provide a tool balancer; an articulating arm absorbs shock and vibration 		✓	high	med	med
		74. Provide a tool that minimizes exposure to vibration/impact/torque <ul style="list-style-type: none"> provide a tool with vibration dampening material built into the handle wrap the handle with vibration damping material 		✓	high	med	med
		20. Incorporate rest pauses	✓		low	med	med
		25. Increase task variety	✓		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"> Rarely occurs 	N/A					
11. Hands and fingers exposed to cold temperatures	<ul style="list-style-type: none"> Work area is too cold Metal tool body is not insulated 	23. Increase room temperature		✓	med	med	med
		105. Provide portable heaters		✓	med	med	med
		104. Provide handles with temperature insulating material		✓	med	med	med
		93. Provide appropriate gloves	✓	✓	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"> • Work location is too low 	124. Raise the work piece/work surface <ul style="list-style-type: none"> • provide a fixed table to support work piece • provide an adjustable table for work piece 		✓	med	med	med
				✓	high	med	high
	<ul style="list-style-type: none"> • Work location is too far away 	136. Rotate the work piece <ul style="list-style-type: none"> • rotate the work piece manually • provide a turntable fixture (that locks) to allow the work piece to be rotated 	✓		low	med	med
				✓	med	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"> • Rarely occurs 	N/A					

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	• Work location is too low	124. Raise the work piece/work surface		✓	med	med	med
		<ul style="list-style-type: none"> • provide a fixed table to support work piece • provide an adjustable table for work piece 		✓	high	med	high
	• Work location is too far away	38. Move closer to the work location	✓	✓	med	med	med
		• remove obstructions	✓		low	med	med
		41. Move work piece closer to body	✓		low	med	med
		136. Rotate the work piece	✓		low	med	med
		<ul style="list-style-type: none"> • rotate the work piece manually • provide a fixture to allow the work piece to be rotated 		✓	med	med	med
20. Incorporate rest pauses	✓		low	med	med		

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"> Rarely occurs (if it occurs, see the Lifting case study) 	N/A					
17. Pushing or pulling	<ul style="list-style-type: none"> Rarely occurs 	N/A					
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"> Standing surface is hard 	96. Provide appropriate shoe inserts	✓		low	low	low
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"> Rarely occurs 	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"> Light levels are too low 	22. Increase light levels <ul style="list-style-type: none"> increase enclosure lighting 		✓	med	high	high
24. Intensive visual tasks, staring at work objects for long periods	<ul style="list-style-type: none"> Rarely occurs 	N/A					