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Post Project Ergonomic Evaluation Schnitzer Steel, Portland, Oregon September 2001 By Rob Strickland, OTR

An on-site ergonomic evaluation of the new adjustable height work platform was conducted in the Auto Shredder Residue (ASR) sorting area of Schnitzer Steel on 9/20/01 at the request of Pat Kraft, Manufacturing Consultant and Project Manager. Videotaping and digital photos of the work station areas were performed and are available for review. Employee discomfort surveys were completed.

Purpose/Background: The purpose of this evaluation is to provide an assessment and documentation of the improvements in the musculoskeletal disorder (MSD) risk factors associated with the use of the new adjustable height work platform. This is being done as part of the Oregon OSHA Worksite Redesign Grant Program project which has been awarded to Schnitzer Steel. The intended goal of this project is to make engineering improvements to reduce the identified risk factors in order to prevent work injury.

General Description: The overall work task has not changed as a result of this project. Employees continue to stand on an elevated platform next to a moving conveyor belt which contains small ground-up auto parts. Their task is to pull out small pieces of non ferrous metals and toss them into bins or chutes. Workers are now positioned on both sides of the conveyor, opposite each other as well as side to side (rather than one side as previously arranged). They are exposed to this job activity for 8 hours per day.

Device description/ relevant dimensions:

Work platforms: (integrated into elevated work floor next to conveyor) 42" x 30" with rubber anti-fatigue matting on top (presently there are two platforms in use). Platforms are height adjustable from 2.5" below to 6" above work floor, using electric push button control (8.5" adjustment range). The platform contains receiver mounts to accept adjustable height, sit/stand stools on suspension columns. (These have not yet been installed but will give employees the option of sitting or leaning on the stool while remaining close to the conveyor).

Conveyor height: (work floor to top of leaning support)- sloping from 38" on right to 45" on left over the 8' length of conveyor passing by the work platforms.

Belt width: 49" (accessed now by workers on each side rather than one side only)

Effective reach distance: Closest reach = 5", furthest reach is 29.5" (this distance is measured from the edge of leaning support in front of the conveyor to the mid point of the conveyor).

MSD Risk Factor Assessment: All of the primary MSD risk factors have been reduced

1. Static postures- have been reduced by giving the worker control over the standing platform height (8.5" adjustment range) and the option to sit or lean (when the sit/stand stools are installed).
2. Awkward postures of the trunk and shoulders have been significantly reduced by providing an adjustable height standing platform and by reducing the reach distance (26 to 50% reduction in reaching distance).
3. Repetition- frequency of movements of the trunk and shoulders have decreased with the improvements in that many more of the metal materials are accessible while standing in an upright (or nearly upright) position, reaching forward in a more optimal range (up to 14" distance).
4. Forces & loads- for reasons stated above, the extensors of the back and flexors of the shoulders are exposed to significantly reduced load while resisting the forces of gravity because the employee's posture is much improved while sorting at the conveyor belt.
5. Muscle recovery time- is much improved in that workers can attain more neutral postures of the trunk and shoulders for a majority of the time with the ability to change the platform height and to obtain postural support from leaning or sitting.

Employee Discomfort Survey Results

Pre-project: Job Title- Laborer, ASR Number of surveys completed= 9

Discomfort Area	Number of employees with discomfort	Percentage of the total (n= 9)	Average Rating (0-10 scale)
Neck	6	67%	6.5
Shoulder	6	67%	5.8
Upper back	5	56%	7.0
Lower back	8	89%	6.6
Elbow/forearm	4	44%	5.7
Hand/wrist	3	33%	4.0
Hip/thigh	4	44%	6.8
Knee	4	44%	5.8
Lower leg	4	44%	4.3
Ankle/foot	4	44%	6.5

Employee Discomfort Survey Results (cont)

Post-project: Job Title- Laborer, ASR Number of surveys completed= 9

Discomfort Area	Number of employees with discomfort	Percentage of the total (n= 9)	Average Rating (0-10 scale)
Neck	0	0%	0
Shoulder	0	0%	0
Upper back	0	0%	0
Lower back	0	0%	0
Elbow/forearm	0	0%	0
Hand/wrist	0	0%	0
Hip/thigh	1	11%	4
Knee	1	11%	4
Lower leg	2	22%	5
Ankle/foot	2	22%	5

Employee Discomfort Survey Summary

The post-project employee discomfort surveys indicate a marked improvement in all categories of discomfort indicating a tremendous improvement in employee comfort as a result of the re-designed conveyor and height adjustable platform. Prior to the ergonomic improvements, up to 89% of the employee group reported discomfort (lower back) with an average discomfort rating of up to 7.0 on a 0 -10 scale (upper back). The post-project surveys show no employees reporting upper or lower back discomfort. Only two employees (out of 9) report any discomfort at all. These are primarily related to the lower extremities with an average rating of 4.5 on the 0-10 scale. It is likely that these reported symptoms will diminish after the implementation of sit/stand stools, allowing employees the reduce weight bearing stress to the feet and legs.

Worksite Re-design Project Completion Summary

The reduction in MSD risk factors as discussed above, combined with the extremely favorable discomfort survey results, indicate that the engineering controls involving the adjustable height work platform and re-designed conveyor equipment have been very successful. The employees who have used the device report high satisfaction in the over-all outcome of the engineering improvements. Productivity levels remain essentially unchanged.

Height of work platform can be easily adjusted with a hand control switch from 2.5" below to 6" above the surrounding work floor



Adjustable work platform and reduced reach distance at conveyor allow worker to stand and work in more neutral postures of the trunk and shoulders



For further assistance or questions regarding this report please contact Rob Strickland
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Respectfully,

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