Hand Tool Ergonomics – Workspace Design – Fact Sheet

HOW CAN WORKSPACE DESIGN HELP PREVENT WORK-RELATED MUSCULOSKELETAL DISORDERS (WMSDS) RESULTING FROM THE IMPROPER USE OF HAND TOOLS?

Tool selection is of critical importance for user safety, comfort and health. However even the best tool on the market will not transform a poorly designed workstation into a safe and comfortable one for the operator.

Many work space components such as work surfaces, seats, flooring, tools, equipment, environmental conditions, etc., determine whether or not the job is safe and healthy. If the workplace design does not meet your physical needs, it can create risk factors for discomfort, aches and pains, fatigue, and eventually, WMSDs. On the other hand, in a well-designed workplace, where you have the opportunity to choose from a variety of well-balanced working positions and to change between them frequently, work can be carried out safely and injury-free.

How can you control a working body posture?

Avoid bending over your work; instead keep your back straight and, if possible, elevate the work area or task to a comfortable level. Keep your elbows close to the body, and reduce the need to stretch your arms overhead or out in front of you. Tool extensions can help where it is difficult to reach the object of work. Using a stepladder or step-stool can improve the working body position where the task requires elevating your arms above the shoulder. At the same time, frequent stretching breaks will relieve any built-up muscle tension. If standing, distribute your weight evenly between the feet. Even better, use a foot stool or rail to rest your legs, and shift from one to the other periodically.

Proper chairs and sit/stand stools offer support during many hand tool tasks.

How should one design the workstation for precision work?

- Provide the worker with a height-adjustable workstation (Figure 1a)
- For a fixed-height workbench:

- provide work platforms to accommodate shorter workers;
- raise the work surface for taller workers.

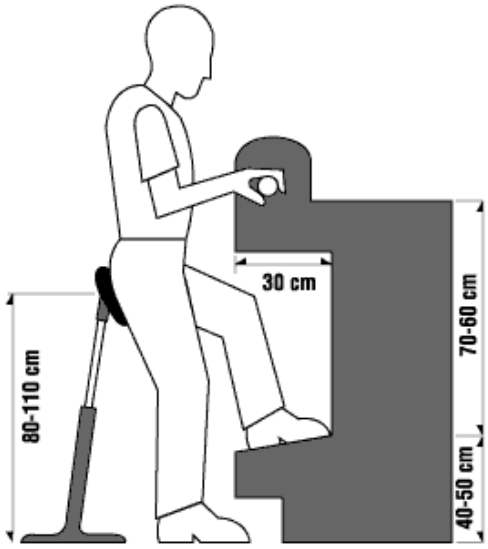

Figure 1a

- Provide sufficient leg clearance to allow the worker to get close to the work object, thereby reducing the need to bend the torso.
- Provide a foot rest as foot support that will improve body balance and minimize the static load on the workers back.
- Anti-fatigue matting reduces lower back and leg discomfort and minimizes fatigue.
- Consider using chairs or stools to allow work in a sitting or standing position.
- Where feasible provide the worker with a tilted workstation. This reduces static load on the back and upper body (Figure 1b).

Figure 1b

- Use jigs or vices to hold the work object steady and secure at the proper height and position for optimum comfort (Figure 1c).

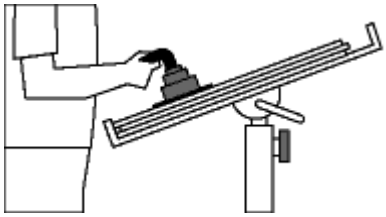

Figure 1c

- Use vices to minimize pinching and gripping forces.

How should one design the workstation for assembly work?

In assembly work, static load, awkward postures and forceful movements are major risk factors for WMSDs. Prolonged standing and the fatigue resulting from it additionally contribute to WMSDs.

- Use jigs and vices to hold the work object steady at the right height and position for optimum comfort (Figure 2a).

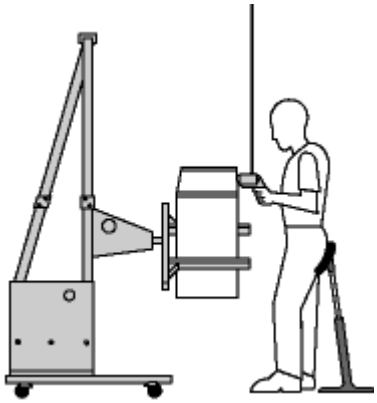

Figure 2a

- Use tool balancers to reduce the effort of holding and operating the tool (Figure 2b).

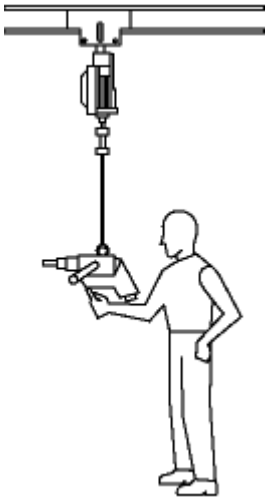

Figure 2b

- If possible use the lightest tool that can get the job done properly, preferably one weighing less than 1 kg (2 lbs).
- Anti-fatigue matting reduces lower back and leg discomfort and minimizes fatigue.