Chapter Six: Workstation Design

6.1. Introduction

A well-designed workstation is important for productive work\(^1\). Most garment workers repeat the same or similar tasks throughout each shift, which, if performed efficiently and quickly, can result in greater productivity. Further, each workstation should be designed to suit the needs of the individual worker (dependant upon height, reach, size, etc) and take into account the type of machine being used and the task being performed. A well-organised workstation (and workplace), that is well-lit, free from chemical hazards and noise, and that minimises material handling, will improve efficiency and reduce worker fatigue. Sometimes even minor ergonomic changes in the design of equipment, workstations or job tasks, that cost very little, can make significant improvements in worker comfort, health, safety and productivity.

6.2. Core Information

In this section we will look at some of the key areas in workstation design including:

- Workstation layout;
- Sitting and chair design;
- Standing work positions;
- Hand tools and controls;
- Lifting; and
- Job design.

**Workstation Layout**

When you consider that most workers sit at the same workstation to perform the same tasks on a daily basis, it makes sense to almost “personalise” the machine, chair etc or make it easy for such equipment to be adjusted to suit each worker. If the workstation is poorly designed it can lead to:

- lower back injury;
- the development or aggravation of RSIs (Repetitive Strain Injuries)\(^2\); and
- circulatory problems in the legs.

**REMEMBER – When considering a workstation:**

1. If it feels right, it probably is right. If it feels uncomfortable, there is probably something wrong with the workstation design, NOT the worker!
2. “The more you use it, the closer it should be to the worker”.

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\(^1\) The section on practical workstation and product design in ILO manual *Improving Working Conditions and Productivity in the Garment Industry*, by Hiba, outlines some of the key factors that need to be addressed.

\(^2\) RSIs are also referred to as Upper Limb Disorders (ULDs) are problems with the shoulder and arm, including the forearm, elbow, wrist, hand and fingers. The symptoms can include tenderness, aches and pain, stiffness, weakness, tingling, numbness, cramp or swelling. Although such symptoms may be minor at the beginning they get worse and can lead to permanent damage. It is mainly caused by performing forceful or repetitive tasks, or by poor working postures. Accordingly, the solution for reducing the risk of RSI/ULD relies upon:- reducing repetition; finding the most comfortable working position; reducing the amount of force being used in the task; and, reducing the duration of the task.
Figure 10 shows the dimensions for normal and extended reach for an “average” worker which can obviously be adapted for shorter or taller workers.

**Figure 10: A worker’s reach**

![Diagram showing reach dimensions](image)

There are also a number of sensible provisions that managers can take to improve the workstation. These include:

- identify the tools that are used the most frequently;
- place these most frequently used tools in the usual work area so that they can be reached without stretching;
- tools such as nippers and scissors which are used frequently should be attached to the sewing machine or bench by cord – this minimises the time spent searching. On no account should these tools be hung around the worker’s neck as is a common practice. The reason for this is that many of the machine parts are unguarded and any cord could get caught in the gear.
- items such as pins can be kept in one place by using magnets attached to the case of a machine or a pin cushion. Other small accessories such as buttons, hooks, etc., can be kept in small, clearly labelled boxes within easy reach;
- where possible, containers should be provided for material inputs and outputs – make sure the containers are not too deep and consider if they can be mobile for faster transport to the next operation.

**Sitting and Chair Design**

Lower back problems are on the increase as more workers sit at their workstations all day. Often, workers are provided with simple benches with no backrest (refer back to picture 20). A well-designed chair is essential – one that is adjustable for individual workers, for the height of the worktable and task, and that provides full lower back support. The chair should allow workers to lean forward and backwards easily. The worker should have adequate leg room under the worktable so that he/she can change the position of the legs easily. The feet should be flat on the floor or the worker should be provided with a footrest – this will eliminate pressure on the thighs and knees. Figures 11 and 12 give some guidance on correct seating:
Figure 11: Correct seating as shown on the left.

Even though both pictures show a worker with an adjustable chair, the work position on the right is poor. The arrows indicate problem areas for the body. The height of the chair needs to be lowered, tilted slightly forward and the worker should be provided with a footrest.

Figure 12: Adjustable chairs with a backrest should be provided for all seated workers.
There is a legal requirement for workplaces in Cambodia to provide suitable chairs in each workstation for employees whose work requires sitting positions or occasional sitting positions\(^3\). It does not however give guidance on what constitutes a “suitable” chair.

**Standing Work Positions**

Many garment workers stand all day at their workstation (refer back to picture 21). Standing for long periods on hard concrete floors, often in bare feet, can cause back pain, sore feet and tired muscles. If a job must be done in a standing position, a chair or stool should be provided for the worker so that he/she can sit down at regular intervals (see figure 13).

**Figure 13: A standing workstation**

Footrest allows workers to shift their weight and reduce strain on legs and backs.

Workbench should be adjustable if possible

A non-slip mat on the floor cushions the strain on joints, legs and back. The mat can be put on top of a platform in the case of high benches and short workers.

\(^3\) Prakas 53 on Providing Sitting Chairs at Workstations.
When considering the height of workbenches, the job should be designed to allow the worker to keep his/her arms low and the elbows close to the body, either by lowering/raising the bench if at all possible, or by raising the worker with a platform (see figure 14).

**Figure 14: Height of workbenches**

![Image of bad and good design of workbenches]

**Hand Tools and Controls**

Hand tools should be designed according to ergonomic requirements – that means:

- choose tools that allow workers to use larger muscles in the shoulders, arms and legs, rather than the smaller muscles in the wrists and fingers;
- do not use tools with spaces where fingers and skin can get caught (see figure 15);
- choose tools that do not require the worker to bend the wrist, stoop, stretch or twist (see figure 16);
- choose tools with handles that are long enough to fit the whole hand;
- where possible, tools should be appropriate for right and left-handed workers.

**Figure 15: Tools that can catch fingers**

![Image of tools that can catch fingers]
Figure 16: Good and bad tool design showing bent handles as opposed to bent wrists. The figure also shows the use of tools at different working heights – note it is better to have tools that don’t require wrists to be bent all the time.

As with tools in the workplace, control switches, levers and knobs also need to be designed with the worker and the task in mind. All switches, levers and knobs should be within easy reach of the machine operator from a normal standing or sitting position. If two-handed controls are in use for safety reasons, the switches should be within easy reach and not involve stretching as in the case below on the left.
Lifting

It is important to organise the work so as to minimise the amount of lifting and, where necessary, to use mechanical means. Here are a number of do’s and don’ts for lifting and carrying properly.4

Lift with the legs and keep a straight back. Lift in easy stages.

Stand close to the object and keep your feet apart to maintain your balance.

Lift with both hands if possible. Make sure that you grip the load with your palms and not your fingers. Don’t change your grip while carrying. Don’t let the load obstruct your view – get help and make sure that the route is clear before you start moving.

If you are lifting to the side, place your feet in a walking position with one foot pointing slightly in the direction of the lift. Lift the object and then shift the weight of the body on to the foot in the turning direction.
If you have to lift a load above shoulder level, place your feet in a walking position and raise the load in easy stages.

If the load is too heavy (Prakas 124 – specifies 25 kg for women and 50 kg maximum load for direct lifting), get help. Lift together at the same time and speed. Carry objects close to your body and spread the weight evenly in both hands.
Job Design

Well designed jobs consider the worker’s mental and physical characteristics and tries to minimise the amount of work that is boring, repetitive and lacks stimulation or interest (see figure 17).

Figure 17: Boring, repetitive work can lead to lack of motivation, stress and loss of productivity. Job rotation, varied work, rest periods and giving workers a sense of accomplishment can all help to improve the situation.

6.3. Checklist for Workstation Design

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<th>Yes</th>
<th>No</th>
<th>Action Required</th>
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<tbody>
<tr>
<td>Are all materials, tools, switches and controls within easy reach of workers?</td>
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<td>For those workers sitting for most of the shift (eg sewers), are appropriate seats (with lower back support, and adjustable heights) and footrests provided?</td>
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<tr>
<td>For those workers who stand for much of the shift are benches of the correct height; are prop stools and cushions, non-slip mats provided?</td>
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<td>Are suitable tables with stable and smooth work surfaces provided at the necessary workstations?</td>
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<td>Can the height of chairs or benches be altered to suit different workers and avoid unnecessary bending or high hand positions?</td>
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<td>Are any mechanical devices in use to avoid lifting/moving heavy loads?</td>
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<td>Can workers rotate jobs to alternate between sitting and standing for long periods at work?</td>
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6.4. Summary

A well-designed workstation is important for improving productivity. Improvements can be made by designing the way jobs are done so that the contents of the task and the methods in which they are carried out, take into account individual workers. Many of these improvements are simple to introduce and cost very little.