

**Department of Labor and Employment**  
Philippines

***ILO/UNDP/DOLE***  
***Work Improvement in Small Enterprises***  
***(WISE) Project***  
December, 1995

***Industry Specific Action Manual for the Garment Subcontractors***

PHI  
08.09.3  
DWO  
1995

**Agro-Industrial Management and Consultancy, Inc.**  
Office Address: 1167 Chino Roces Avenue, Makati, Metro Manila  
Mailing Address: P.O. Box 1775 MCC, Makati, Metro Manila  
Tel. Nos. 890-7198; 896-55-56 to 59 loc. 121

# **HIGHER PRODUCTIVITY AND A BETTER PLACE TO WORK**

**Practical Ideas For Owners and Managers of Small and  
Medium-Sized Garments Subcontractors**

## **Action Manual**

# Contents

## Chapter 1: Introduction

- 1 What this book is all about
- 5 How to use this book

## Chapter 2: Checklist

- 7 How to use the Checklist
- 8 Checklist

## Chapter 3: Material Storage and Handling

- 20 Better organized storage
- 20 If in doubt take it out
- 21 Avoid placing materials on the floor
- 21 Save space by introducing multi-level racks
- 22 Provide a "home" for each tool and work item
- 22 Fewer and shorter transport and handling operations
- 23 The more you use it, the closer it should be
- 23 Use mobile storage
- 24 Provide containers for operation outputs
- 24 Clear and mark passageways
- 25 Fewer and more efficient lifting operations
- 25 Don't lift loads higher than necessary
- 25 Move materials or perform operations at working height
- 26 Make lifting more efficient and safer

## Chapter 4: Work-Station Design

- 27 Position materials, tools and controls within easy reach
- 29 Improve work posture for greater efficiency
- 30 Use guides to easily check measurements of the garment
- 31 Use devices that would save time and effort
- 31 Improve displays and controls to minimize mistakes

## Chapter 5: Productive Machine Safety and Maintenance

- 34 Give your machine a productivity check
- 35 Eliminate the hazard; or install guards; or, as a last resort, use personal protective equipment-always in this order
- 35 Purchase safe machines
- 36 Maintain machines properly
- 37 Teach workers to troubleshoot common machine problems
- 37 Troubleshooting Guide

## Chapter 6: Control of Hazardous Substances

- 40 Clean regularly and properly-don't spread dust

- 41 Make local ventilation cost-effective
- 41 Use proper fans
- 41 Use natural airflow

#### **Chapter 7: Lighting**

- 44 Make full use of daylight
- 45 Avoid glare
- 46 Choose an appropriate task background
- 46 Find the right place for light sources
- 47 Use the right lighting device and fixture
- 48 Avoid shadows
- 49 Ensure regular maintenance

#### **Chapter 8: Work-Related Welfare Facilities**

- 51 Make sure essential facilities serve their purpose
- 52 Drinking Water
- 53 Sanitary Facilities
- 54 Be ready for emergencies
- 56 Make sure that rest means recovery
- 56 Rest Breaks
- 56 Rest Areas
- 57 Use low-cost facilities to attract and retain the best workers
- 57 Work Clothes
- 57 Lockers and Changing Rooms
- 58 Eating Areas
- 59 Canteens
- 59 Health Facilities
- 60 Transport Facilities
- 60 Recreational Facilities
- 61 Child Care Facilities
- 61 Factory Days

#### **Chapter 9: Premises**

- 63 Protect your factory from outside heat
- 64 Let nature help you
- 64 Improve heat insulation
- 64 Use shades to protect against heat from the sun
- 64 Let natural air-flow improve ventilation
- 65 Make better use of horizontal air-flow
- 65 Eliminate or isolate sources of pollution
- 66 Improve your floor
- 67 Build flexibility and adaptability into plant layout
- 67 Prevent fires and electrical accidents
- 67 Fire
  - 67 Prevention
  - 67 Escape routes
  - 68 Fire fighting
- 68 Electrical Hazards
  - 68 Prevention

**Chapter 10: Work Organization**

- 70 Get rid of extra tasks and operations
- 71 Defeat monotony to keep workers alert and productive
- 72 Install buffers to make the work flow smoothly
- 73 Design responsible, flexible jobs
- 74 Set-up autonomous groups to improve efficiency and cut on supervisory costs
- 76 Arrange the production layout to meet the company objectives
- 79 Types of Layout
  - 79 Conventional Bundle (Central Storage)
  - 80 Straight Line (Conveyor Type)
  - 81 Progressive Line (Synchronized Flow)
  - 82 Progressive Bundle Unit
  - 83 Interflow System
  - 84 Flexible Flow System

**Chapter 11: Implementation of Improvements**

- 88 Develop complete action
- 89 Make sure your ideas will work
- 90 Mobilize worker support
- 92 Make improvements which will last
- 93 Manage change
- 93 Supervise improvements carefully
- 94 Make improvement a systematic process
- 95 Take action

## Chapter 1 INTRODUCTION

If you own or manage a small or medium-sized factory, you are responsible for an important contribution to the national economy. People depend on you for jobs and for your products. Most of the growth in almost every country is expected to come from enterprises like yours.

In spite of their importance, many small or medium-sized businesses fail to grow and even to survive. It isn't easy to succeed in business. Problems of finance, production and marketing lead thousands to bankruptcy every year.

This is a book about survival and growth through building a more effective enterprise. The ideas you will find in this book are practical and low-cost. Many of them may already be applied in your own enterprise and in similar companies nearby.

As an entrepreneur, you are no doubt very busy. You have to face so many problems that you may not have had the time to take a close look at some parts of your operation to see if they can be improved. There are probably a number of limits on productivity and quality which have built up over time. A small investment of your time could have a big impact.

### ***What this book is all about***

The practical ideas you will find here are the result of several years of ILO action in cooperation with the owners and managers just like you. In each case, the starting point was a concern for survival and growth of the enterprise. Many entrepreneurs were asked the question, "How can you reduce costs and improve your production operations?" Their answers are probably a lot like yours, such as to:

- minimize waste of raw materials;
- cut damage to work items;
- increase quality of work;
- improve maintenance and repair of machines and equipment;
- introduce more efficient layout;
- cut idle machine time;

- reduce wasted time of workers;
- reduce stocks;
- allow more efficient change-over to new products;
- prevent accidents;
- introduce better work methods;
- organize more effectively.

A second question was also asked, "How can workers help?" It is no surprise that workers could improve in many ways, including:

- learning more skills;
- paying more attention to productivity and quality;
- taking better care of machines and equipment;
- avoiding absences and lateness;
- keeping the company's interests in mind;
- using proper work methods and organization;
- working harder;
- adapting faster;
- following rules;
- meeting quotas and standards;
- being more disciplined and co-operative;
- avoiding accidents;
- making useful suggestions.

An enterprise which can constantly reduce costs, increase productivity and improve quality is much more likely to survive and grow. This means that you need to:

- make the best possible use of your facilities, machines and equipment; and;
- get the highest level of efficiency from your workers.

Neither of these goals is simple to accomplish. There are constant problems to be solved in a small or medium-sized factory. You may have to cope with inappropriate machines; too small a building; problems with electricity, water or transport; poor-quality raw materials; and unskilled or poorly motivated workers.

This book indicates some basic principles and gives many examples of improvements which have a direct impact both on your production facilities and operations and on the motivation and efficiency of your workers. The

improvements are low-cost, concrete and very practical. They fall under the following headings:

- *Materials Handling and Storage.* The storage and handling of parts and products is an essential part of all production processes. Done efficiently, it ensures that work flows smoothly and helps to avoid many delays and bottlenecks. However, storage and handling by themselves are not sources of additional value or profit. During these operations, goods do not acquire any new qualities. Just the opposite happens: materials are damaged or deteriorate, capital costs must be paid and accidents occur. For the entrepreneur, improved materials storage and handling mean recovery of misused space, less production time spent searching for tools and materials, lower capital costs due to less work-in-progress, simplified inventory control, fewer unnecessary operations and a better overall factory appearance.
- *Work-Station Design.* Most work is carried out at work-stations where workers perform the same task a hundred of times per day. The benefits from small improvements are thus multiplied many times. Awkward work postures and movements mean lower productivity and quality as well as greater fatigue. Simple improvements such as jigs, fixtures, stable work-surfaces or placing tools and materials within easy reach can have large payoffs.
- *Productive Machine Safety and Maintenance.* Breakdowns and accidents affect production operations resulting in delays or poor quality. Still, many companies consider machine maintenance and safety as cost and are thus given low priority. Regular maintenance, however, is an investment for higher productivity, better quality and lower repair cost.
- *Control of Hazardous Substances.* Hazardous substances of one form or another can be found in almost all small and medium-sized enterprises. Exposure to many chemical substance causes fatigue, headache, dizziness and irritation of eyes and air passageways, resulting in a reduction of productivity and quality and increased absenteeism and turnover of staff. High levels of dust, oil, and other sprays, etc., interfere with efficient operations, require extra



inspection and cleaning and may spoil materials or final products. Through simple and inexpensive means, it is possible to control most of these problems.

- *Lighting.* Better lighting and related visual improvements very often increase productivity and reduce difficulties and strain for workers. This is specially important for rapid or detailed work or for quality products. Better lighting does not need to mean higher cost. Use of daylight and regular cleaning and maintenance can improve lighting while reducing the electricity bill.
- *Welfare Facilities and Services.* Welfare facilities are essential part of any enterprise. During each working day, workers need to drink water or some other beverage, eat meals and snacks, wash their hands, visit a lavatory, and rest and recover from fatigue. Welfare facilities are not something extra, nor a luxury to be attended to when all other conditions are satisfied and productivity is high. Good welfare facilities are essential to higher productivity. They improve the workers' health and morale, motivation, job satisfaction and attendance.
- *Work Premises.* Most small enterprises are located in buildings which were not carefully designed for their current use. In addition, new equipment is often placed wherever there is the most space, which gradually results in a haphazard layout. Much can be done, even with older buildings, to improve ceilings, walls and floors. The impact of simple measures on ventilation, heat and pollution can be dramatic.
- *Work Organization.* Improvements in the way production is organized and scheduled can have a very large impact on productivity and motivation. Modern work organization techniques such as recombining tasks, setting up buffer stocks, introducing multiskilling, developing group work-stations and using product-based organization have numerous advantages. These include smoother and more efficient work flow, higher product quality, greater flexibility, reduced downtime of expensive machines and reduced need for supervision. These techniques are sources of dangerous competition from large

companies: their introduction makes the smaller enterprise more likely to survive and grow.

In addition to these eight technical themes, this book contains two chapters which are practical tools to help you identify improvements and take action. Chapter 2 is a checklist designed to introduce you to the technical subjects and to suggest practical ideas for improvement. Chapter 11 completes the book with a procedure for the systematic implementation of improvements, especially complicated and difficult ones. It also explains how improvements can become a permanent process in your company, not just a one-time measure.

### ***How to use this book***

Some of the entrepreneurs using this book will be participants in courses organized by employers' organizations, productivity centers, labor ministries or other agencies. They will be able to go through the chapter in an organized and systematic way and will have an opportunity to move very quickly to a continuing process of making improvements and profiting from them.

If you are using this book by yourself, you should try to arrange to develop some of the opportunities provided by the courses. One of the best ideas is to work together with other owners and managers of similar enterprises. This will allow you to get free advice, to learn how others have solved the same problems you have, to see other enterprises in action and in general to benefit from the knowledge and experience of people you can respect because they have successfully built up their own company. You may be able to find a group of five to eight owners and managers through a trade organization or chamber of commerce, among neighboring enterprises or among your friends. If you can organize a small group you should try to follow these basic steps:

- Carry out the checklist exercise (Chapter 2) in each enterprise in the group. Discuss the results together and let each owner come up with a list of the priority actions.
- Discuss together each of the technical chapters (Chapter 3 to 10) and see if you can improve on your list of actions.
- Ask each group member to try one of the more complex improvements in this list in the way suggested by Chapter 11 on the implementation of changes. Discuss the results as a group.

- Carry-out improvements on your list. Meet with the group occasionally to talk about problems and new ideas.

It may seem to you that organizing a group is a lot of effort and that you would be better off to spend the time in your own factory. You will be surprised how many good ideas can come from practical people like you who look at your factory and production methods with a fresh eye. You will also find that helping other owners and managers based on your own experience is often enjoyable.

If you cannot organize a group of people like yourself, you can still profit from the ideas in this book. Use the checklist, study the chapters, try out some improvements and then repeat the process. Change and improvement are dynamic. If you stop, you will lose what you had. If you continue, you will consolidate and build on what you have already accomplished.

**One final point:** It is always a good idea to be in touch with a trade association, productivity center or government agency or other source of information and support. If you have followed a course they have organized, try to continue to benefit from follow-up and other activities. If you are working alone or in a small group, you may still be able to get technical help. If you feel that courses should be organized, suggest that a local agency or institute take a look at the *Trainers' Manual* which accompanies this *Action Manual*. They may be interested in setting up a programme which can expand your possibilities for action and growth.

## Chapter 2 CHECKLIST

The checklist found in this chapter is a powerful tool for identifying improvements which can be made in your enterprise. The items it contains are ideas for action, not simply areas to check for possible problems. Most of the ideas are simple and can easily be applied. More information on each point is found in the following chapters.

The checklist should be filled out individually. It helps a great deal if several people fill out the checklist separately and then discuss their responses as a group. If you are taking a course, these group discussions will be part of the programme. If you have organized your own small group, make photocopies of the checklist to give everyone a chance to use it in each enterprise. If you are working alone, consider asking supervisors or some of your workers to fill out the checklist and discuss it with you. It is an effective suggestion scheme.

Once the checklist has helped you identify improvements in your workplace, use the rest of this book to learn how to design and introduce improvements. The chapters follow the same order as the checklist.

### ***How to use the checklist:***

1. If you are not looking at your own factory, you will need some general information. Ask the owner or manager any questions you have. You should learn about the main products and production methods, the number of workers (male and female), the hours of work (including lunch break, other breaks and overtime) and any important operational and labour problems.
2. Define the work area to be checked. In the case of a small enterprise the whole production area can be checked. In the case of larger enterprise, particular work areas can be defined for separate checking.
3. Read through the checklist and spend a few minutes walking around the work area before starting to check.
4. Read each item carefully. Look for a way to apply the measure. If necessary, ask the owner or workers questions. If the measure has

already been applied or it is not needed, mark **"NO"** under "Do you propose action?" If you think the measure would be worth while, mark **"YES"**. Use the space under **REMARKS** to put a description of your suggestion or its location.

5. After you have finished, look again at the items you have marked **YES**. Choose a few where the benefits seem to be most important. Mark **PRIORITY** for these items.
6. Before finishing, make sure that for each item you have marked **NO** or **YES**, and that for some items marked **YES** you have marked **PRIORITY**.

**Checklist for  
Garments Industry**

Remarks:

---



---

**PART I.**

**Checklist for Planning Action of the Enterprise on Safety, Health and Working Conditions.**

1. Establish a written policy on safety, health, working conditions and productivity.

Do you propose action?

No  Yes  Priority

Remarks:

---



---

2. Inform all employees of the policies through a meeting, bulletin board announcement and distribution of copies of policy.

Do you propose action?

No  Yes  Priority

3. Organize group walk-through surveys at regular intervals, as joint activity of management and workers for identifying improvement ideas.

Do you propose action?

No  Yes  Priority

Remarks:

---



---

4. Involve workers in problem solving by establishing small group activities to solicit suggestions and establish mechanisms that will enable workers to participate in the improvement efforts of the company.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

properly label these for easy stocking and withdrawal of cloth materials and supplies.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

**PART II.**

**Checklist of Workplace Condition**

**Material Storage and Handling**

5. Arrange layout to minimize transport and handling.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

8. Use push-carts, mobile racks, gravity chutes and other devices with rollers to move heavy materials.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

6. Put line marks to distinguish the aisles and remove obstructions in these areas for faster movement of materials and workers.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

9. Clear work-tables and benches of unnecessary items for efficient movement and visibility of materials.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

7. Provide multi-level storage racks and containers and

10. Level floor surface or use inclined planes for easy movement of material handling

equipment and to prevent accidents.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

eliminating input and output containers.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

11. Ensure that all material handling equipment do not have rough edges that may cause damage to the garment.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

12. Provide containers to hold input materials and collect outputs of every operation.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

13. Install devices like long tables to connect line operations so workers could just push their outputs to the next operation

**Work Station Design**

14. Put materials, tools, switches, and other controls within easy reach of workers to prevent standing, leaning, bending and twisting which are unnecessary movements.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

15. Provide suitable tables with stable and smooth work surface for marking, bundling, cutting, inspection, and trimming.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

16. Provide sewers with seats comfortable enough for whole day seating.

Do you propose action?

No  Yes  Priority

Remarks:

\_\_\_\_\_  
\_\_\_\_\_

17. Provide non-sewers with benches of appropriate height or prop stalls where they could lean their buttocks while standing or sit if they wish.

Do you propose action?

No  Yes  Priority

Remarks:

\_\_\_\_\_  
\_\_\_\_\_

18. Provide inspection, bundling, and marking tables with adjustable foot rest and good lighting.

Do you propose action?

No  Yes  Priority

Remarks:

\_\_\_\_\_  
\_\_\_\_\_

19. Provide labeled boxes for needles, ribbons, buttons,

hooks, threads, and other small tools and materials.

Do you propose action?

No  Yes  Priority

Remarks:

\_\_\_\_\_  
\_\_\_\_\_

20. Provide each sewing machine and working table with litter bag to contain thread trimmings and other garbage.

Do you propose action?

No  Yes  Priority

Remarks:

\_\_\_\_\_  
\_\_\_\_\_

### **Machine Safety**

21. Attach and maintain proper guards to power transmission belts, blades of cutting machines, generators, and other hazardous machines.

Do you propose action?

No  Yes  Priority

Remarks:

\_\_\_\_\_  
\_\_\_\_\_



22. Provide irons and other machines with visual controls so workers can easily determine if machine is switched on or not.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

23. Schedule regular maintenance of machines and keep a record for each and of common problems encountered.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

24. Ensure safe installation of electrical connections and circuits and schedule regular check-up by an electrician.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

25. Place signs on out-of-order machines.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

26. Train workers to do routine maintenance tasks on their machines.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

### **Control of Hazardous Substances**

27. Provide affected sections or rooms with adequate ventilation to disperse effect of fumes from the fabrics to safeguard workers' health.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

28. Store all organic solvents for cleaning, dyeing, etc. in areas where contamination and fire is unlikely to happen.

Do you propose action?  
 No  Yes  Priority

Remarks:  
\_\_\_\_\_  
\_\_\_\_\_

29. Properly label containers of hazardous substances.

Do you propose action?  
 No  Yes  Priority

Remarks:  
\_\_\_\_\_  
\_\_\_\_\_

**Lighting**

30. Build or add skylights and windows and keep them clean for more effective use of daylight.

Do you propose action?  
 No  Yes  Priority

Remarks:  
\_\_\_\_\_  
\_\_\_\_\_

31. Provide adequate light level for different operations.

Do you propose action?  
 No  Yes  Priority

Remarks:  
\_\_\_\_\_  
\_\_\_\_\_

32. Use white paint for ceilings and light colors on walls to create a brighter workplace.

Do you propose action?  
 No  Yes  Priority

Remarks:  
\_\_\_\_\_  
\_\_\_\_\_

33. Provide separate switches for lights.

Do you propose action?  
 No  Yes  Priority

Remarks:  
\_\_\_\_\_  
\_\_\_\_\_

34. Clean lamps and fixtures regularly to get better lighting.

Do you propose action?  
 No  Yes  Priority

Remarks:  
\_\_\_\_\_  
\_\_\_\_\_

35. Increase illumination in marking, cutting, and inspecting operations and provide workers

with vision problems with special lamps.

Do you propose action?  
 No  Yes  Priority

Remarks:  
\_\_\_\_\_  
\_\_\_\_\_

36. Provide light shields or position the workers against glaring light sources.

Do you propose action?  
 No  Yes  Priority

Remarks:  
\_\_\_\_\_  
\_\_\_\_\_

37. Arrange lights in sewing areas such that shadows on workpiece are prevented and proper illumination is provided for the worker.

Do you propose action?  
 No  Yes  Priority

Remarks:  
\_\_\_\_\_  
\_\_\_\_\_

**Welfare Facilities**

38. Provide a separate, comfortable, and hygienic place for meals.

Do you propose action?  
 No  Yes  Priority

Remarks:  
\_\_\_\_\_  
\_\_\_\_\_

39. Provide an adequate supply of cool, safe drinking water and hot water for coffee breaks.

Do you propose action?  
 No  Yes  Priority

Remarks:  
\_\_\_\_\_  
\_\_\_\_\_

40. Provide adequate, clean and separate comfort rooms for female and male workers.

Do you propose action?  
 No  Yes  Priority

Remarks:  
\_\_\_\_\_  
\_\_\_\_\_

41. Provide lockers for workers' personal belongings.

Do you propose action?  
 No  Yes  Priority

Remarks:  
\_\_\_\_\_  
\_\_\_\_\_

42. Provide rest areas or recreation areas for workers to rest or relax during breaks.

Do you propose action?

No  Yes  Priority

Remarks:

\_\_\_\_\_  
\_\_\_\_\_

43. Maintain adequate supply of medicines for common ailments.

Do you propose action?

No  Yes  Priority

Remarks:

\_\_\_\_\_  
\_\_\_\_\_

44. Train some workers on first aid and make special arrangement with a hospital or clinic for emergencies.

Do you propose action?

No  Yes  Priority

Remarks:

\_\_\_\_\_  
\_\_\_\_\_

**Premises**

45. Establish regular system to remove dust and cobwebs on ceilings and walls.

Do you propose action?

No  Yes  Priority

Remarks:

\_\_\_\_\_  
\_\_\_\_\_

46. Remove unnecessary items under the stairs, in aisles, in passageways, on walls, in corners, in open areas and around fire extinguishers.

Do you propose action?

No  Yes  Priority

Remarks:

\_\_\_\_\_  
\_\_\_\_\_

47. Increase natural ventilation by having more roof and wall openings, windows or open doorways.

Do you propose action?

No  Yes  Priority

Remarks:

\_\_\_\_\_  
\_\_\_\_\_

48. Provide enough fire extinguishers within easy reach and remove all obstructions around it.

Do you propose action?

No  Yes  Priority

Remarks:

Remarks:

\_\_\_\_\_  
\_\_\_\_\_

49. Provide at least two unobstructed ways out of every floor or every big room to facilitate in and out traffic and exit in case of emergencies.

52. Designate smoking area and provide enough number of ashtrays. Prohibit smoking in working area.

Do you propose action?

No  Yes  Priority

Do you propose action?

No  Yes  Priority

Remarks:

Remarks:

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

50. Mark aisles, sub-aisles, exits, entrance and clear these of obstructions.

53. Provide adequate number of waste baskets, litter bags to keep the place clean.

Do you propose action?

No  Yes  Priority

Do you propose action?

No  Yes  Priority

Remarks:

Remarks:

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

51. Provide adequate number of electrical outlets above work stations.

54. Arrange and keep office tables, chairs and cabinets clean and orderly.

Do you propose action?

No  Yes  Priority

Do you propose action?

No  Yes  Priority

Remarks:

Remarks:

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

55. Clean external areas, gardens, and the whole workplace to make the factory pleasant and bright to work in.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

56. Update bulletin boards and use it to communicate useful information to the workers.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

**Work Organization**

57. Arrange layout for efficient workflow and material handling.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

58. Reduce number of operations by determining operations that can

be combined, rearranged, simplified or eliminated.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

59. Improvise measurement guides that can be taped on the work tables or machines to facilitate measurement and avoid errors.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

60. Make production lines more efficient by analyzing operations and conducting work study.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

61. Minimize fatigue by scheduling short breaks.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

62. Provide input and output containers for every worker to increase efficiency and facilitate movement of work-in-process.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

63. Provide good and appropriate music to keep workers alert and prevent boredom.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

64. Secure sufficient rest periods by avoiding long working hours and minimizing night shifts.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

65. Introduce group activity for workers to improve safety, health, working conditions, quality and productivity.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

### PART III.

#### Checklist for Implementation

66. Involve workers in problem solving by forming small group activities to discuss improvements in material handling and storage, safety and health, lighting, productivity, work organization and others.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

67. Solicit workers' ideas and opinions on problems encountered and possible solutions.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

68. Sustain workers' support, involvement and enthusiasm by giving them feedback on improvements and sharing necessary information with them.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

69. Implement priority improvement measures to show your concern and sincerity in improving the workplace and make sure they work.

Do you propose action?

No  Yes  Priority

Remarks:

---

---

70. Share with the workers productivity gains brought about by improvement activities participated in by workers.

Do you propose action?

No  Yes  Priority

Remarks:

---

---



## Chapter 3 **MATERIALS STORAGE AND HANDLING**


The storage and handling of raw materials, components and products is an integral part of all production processes. Done efficiently, it can ensure that work flows smoothly and helps to avoid delays and bottlenecks. However, storage and handling by themselves are not source of additional value or profit. During these operations, goods do not acquire any new qualities. Just the opposite happens: materials are damaged and lose their value, accidents occur and scarce capital is tied up in unnecessary stock.

In this chapter, we discuss ways of attaining three goals:

- Better organized storage.
- Fewer, shorter and more efficient transport and handling operations.
- Fewer and more efficient heavy lifting operations.

In each of these areas you will find ideas arranged according to a few basic rules. If you apply these ideas in your enterprise, you can expect numerous benefits, including recovery of space for production, more efficient materials flow, faster capital turnover, improved inventory control, reduction of time lost on unproductive work and a more orderly and attractive factory.

### **BETTER ORGANIZED STORAGE**


 If in doubt, take it out.

Extra stock is a waste. It requires storage, record keeping and handling. It ties up capital and some materials become soiled or obsolete.

Leaving stock, work-in-process in the production area reduces the space available for production operations and impede movement of workers. The more cluttered your shop-floor is, the more likely materials and work-in-process will be mixed up or will be lost. Workers spend valuable time looking for things.

Consider each piece of raw material, each box, each container, each tool, each machine. Is it in use? Is it really needed? If not, take it away.

Figures 1 and 2 show the same work area before and after unnecessary items were removed. Do you feel the change has contributed to efficiency? To quality? Is it likely to make a better impression on customers?


 **Avoid placing materials on the floor.**

The owners of small enterprises often complain about the shortage of space in their workshops. But if we take a critical look, very often almost half the floor space is occupied by work items, tools, raw materials and scrap. Some of these goods have been sitting there for years, getting dusty and dirty.

Are we so rich as to tolerate the luxury of wasting half of our production space? To face constantly the danger of accidents and fire? To bear the expenses of extra handling, damage to materials, and cleaning smudged products?

The best way to stop this bad habit is to prohibit placing anything on the floor and to monitor strictly the execution of this rule.

The rule by itself is not likely to work unless special storage and containers are made available for each item. It is not difficult to obtain storage racks, shelves, and containers. For heavy items use wooden pallets. For light items, use overhead space by installing overhead racks along not so busy walls.


 **Save space by introducing multi-level racks.**

The total wall space can be larger than the floor area of your production shop. Multi-level racks help you to use it fully. This means:

- savings in floor space;
- easy accessibility of work items and tools;
- improved inventory control.

Here are some examples:

Figure 3 - Movable rack for garment parts or bundles. Figure 4 - Shelves designed to use wall space fully. Figure 5 - A wall cabinet for tool storage.

 Provide a "home" for each tool and work item.

Observe your production process closely and it is very likely that you will find that some of your workers lose time in search of "lost" tools, supplies and small work items. Even if you urge them to put everything in order, in a few days you will find the same problems as before unless care is taken to allocate a special, permanent place and a holder or a container for each tool, supply or work item.

Consider the size, shape and weight of the item in order to choose the most appropriate means and place of storage.

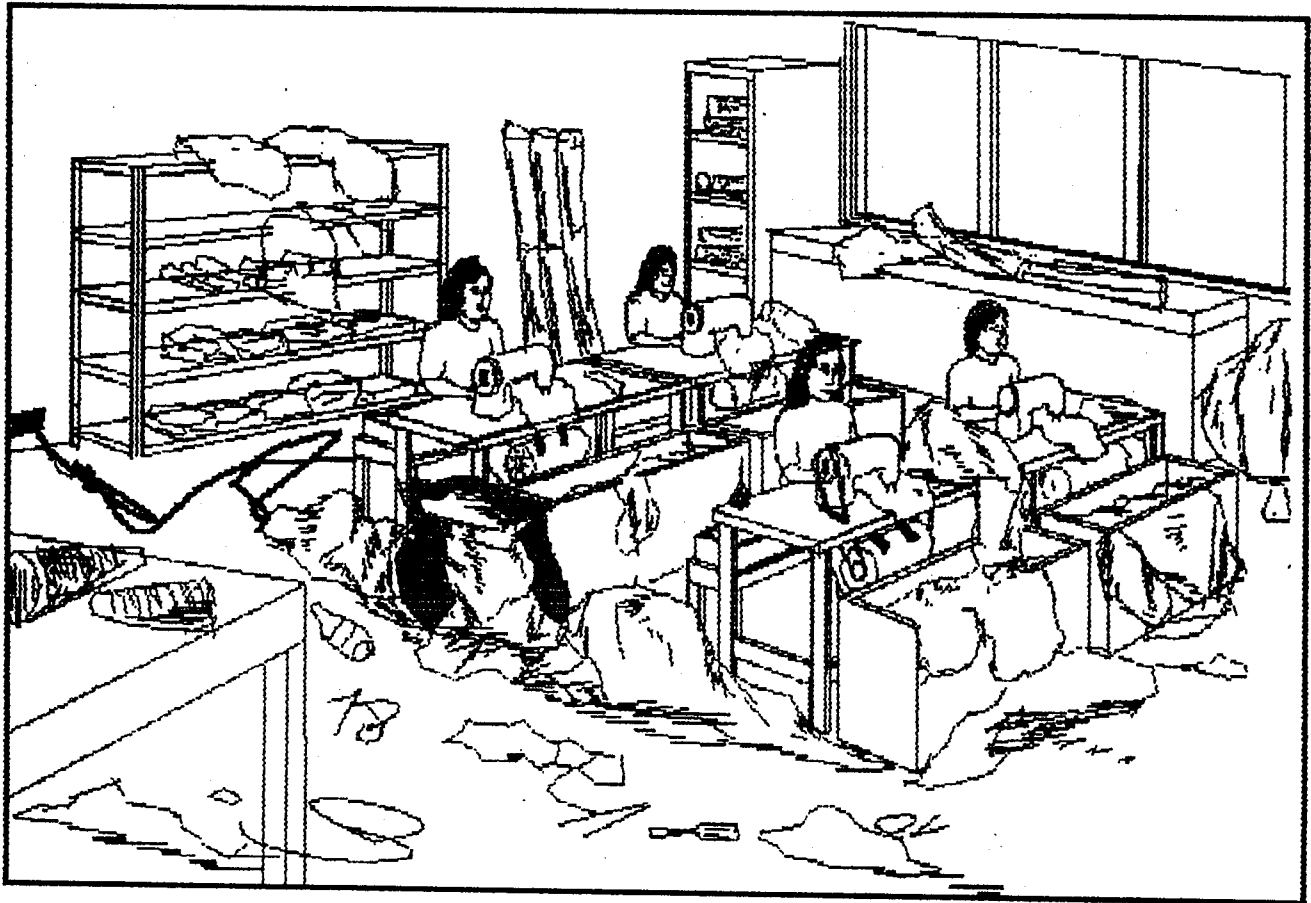
Figure 6 - Rotating bins. Revolving shelves save space, increase visibility and make storage and retrieval of things easier. This is appropriate for small parts and accessories like buttons, snaps, hooks and others. Figure 7 - Hand bin containers for storage of small parts, garters, ribbons, lace or labels. The front opening makes the contents easy to see and provides ready access to the stock. The bins can be stacked at the work-bench or on rotary racks.

#### **FEWER, SHORTER AND MORE EFFICIENT TRANSPORT AND HANDLING OPERATIONS**

Every time a worker handles a work item, time and energy are lost. Analyze your work operations and see whether each handling operation is really justified. If not, find a way to eliminate it.

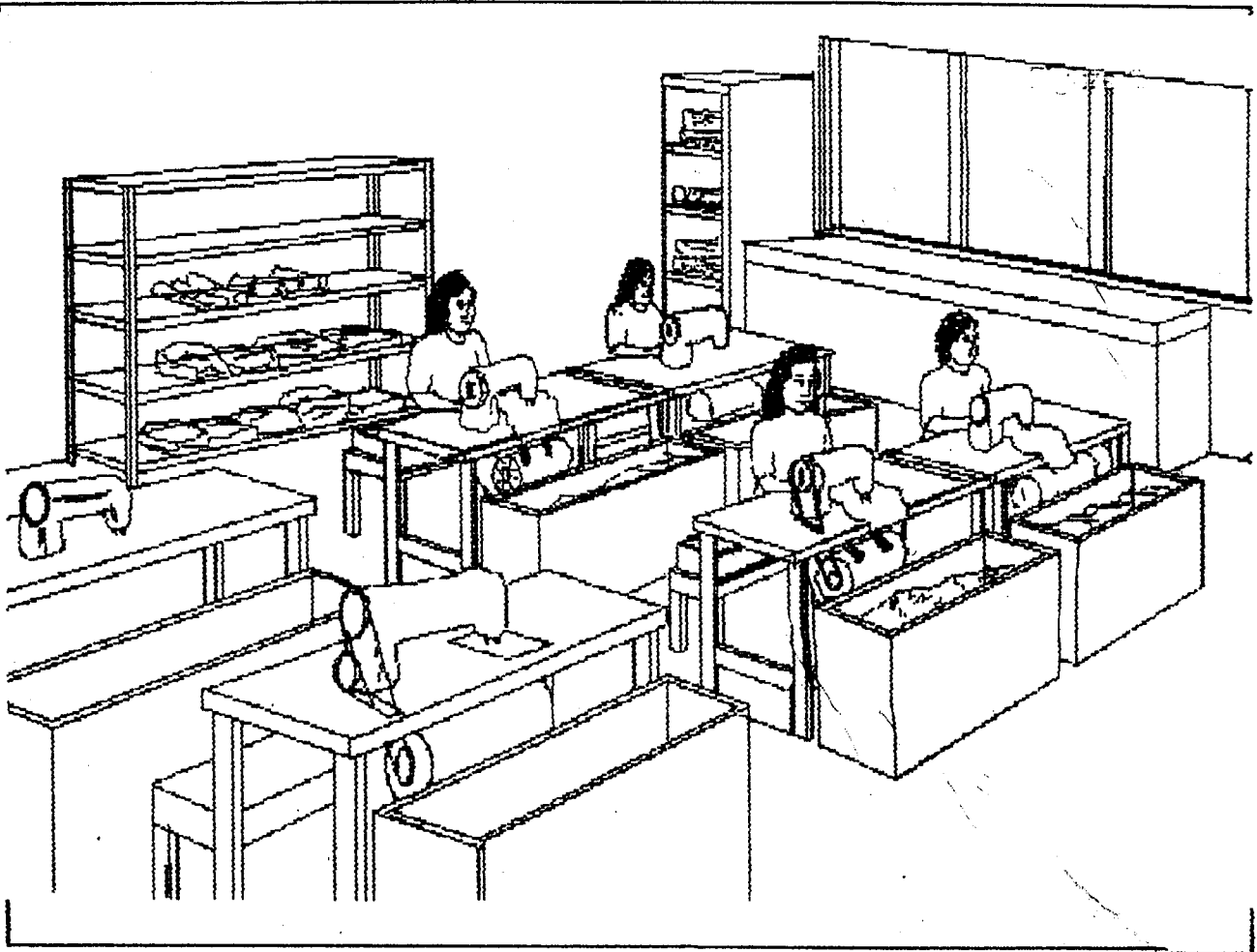
The number of handling operations is of course closely related to the number of different tasks in the production process. It is also related to the order in which machines and work stations are placed around the shop. These subjects are part of the overall organization of production and layout of your factory. They are covered in Chapter 10 because you

Figure 1



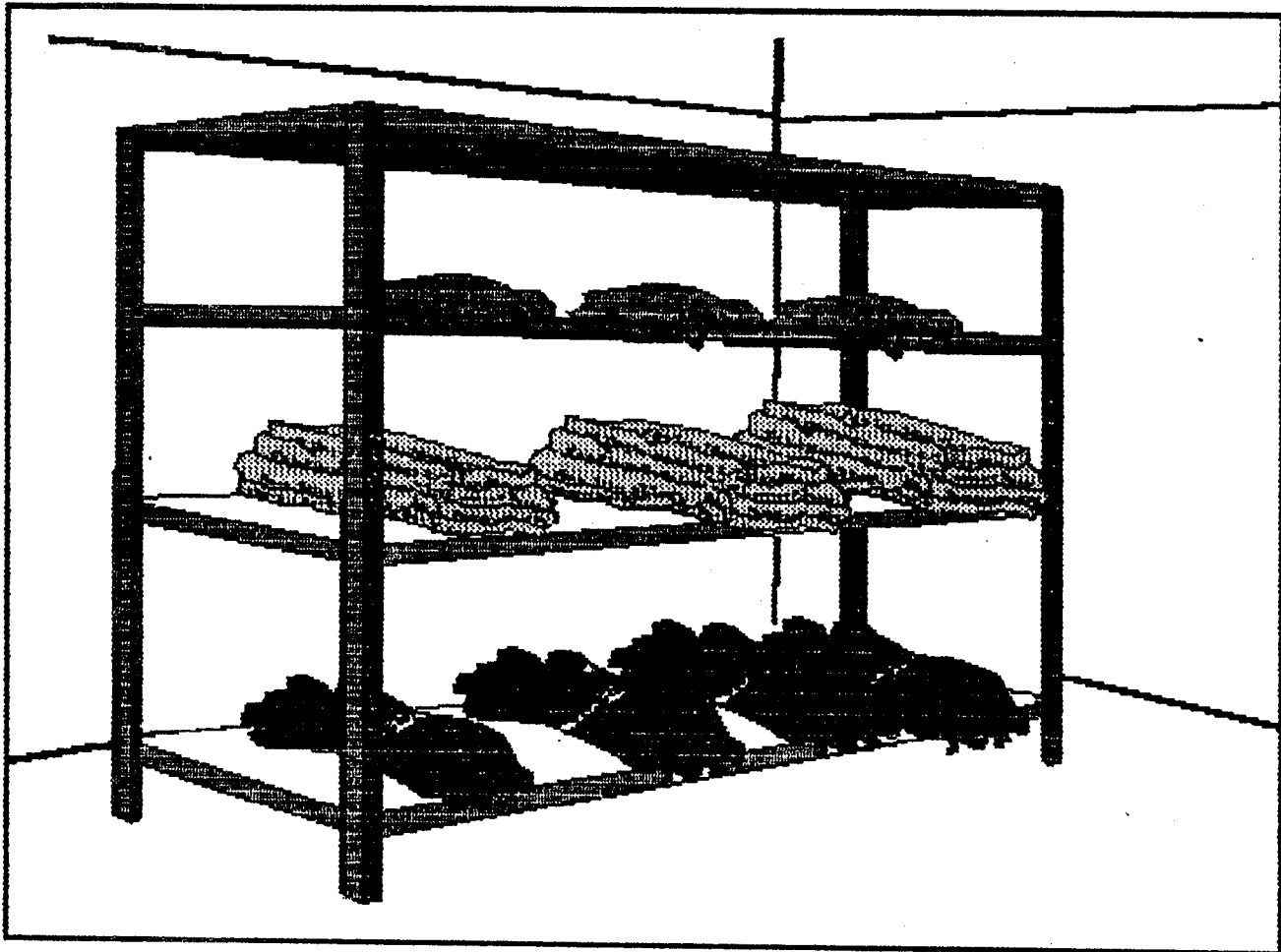
**A cluttered shop floor.**

**Figure 2**



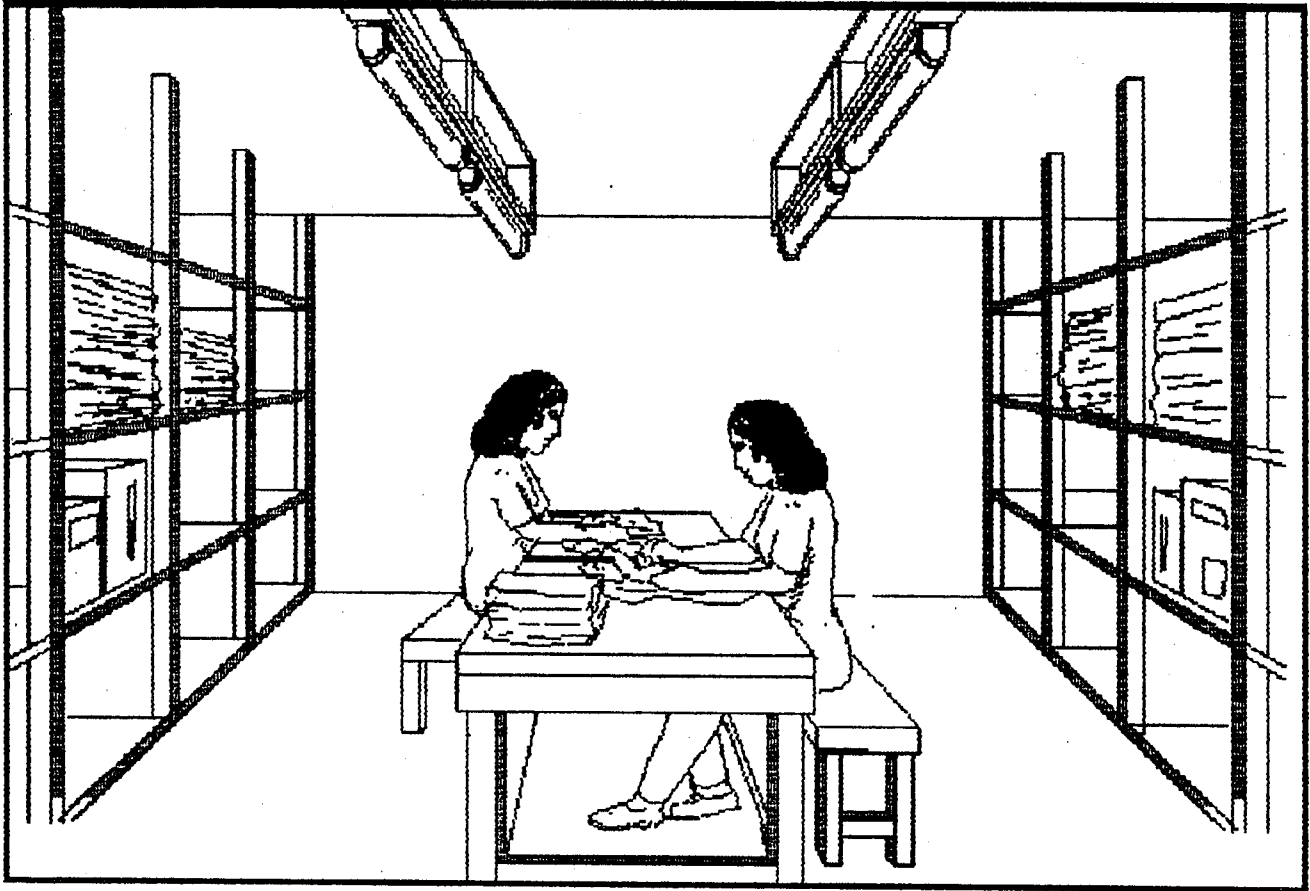
**The same shop floor after removal of unnecessary items.**

Figure 3



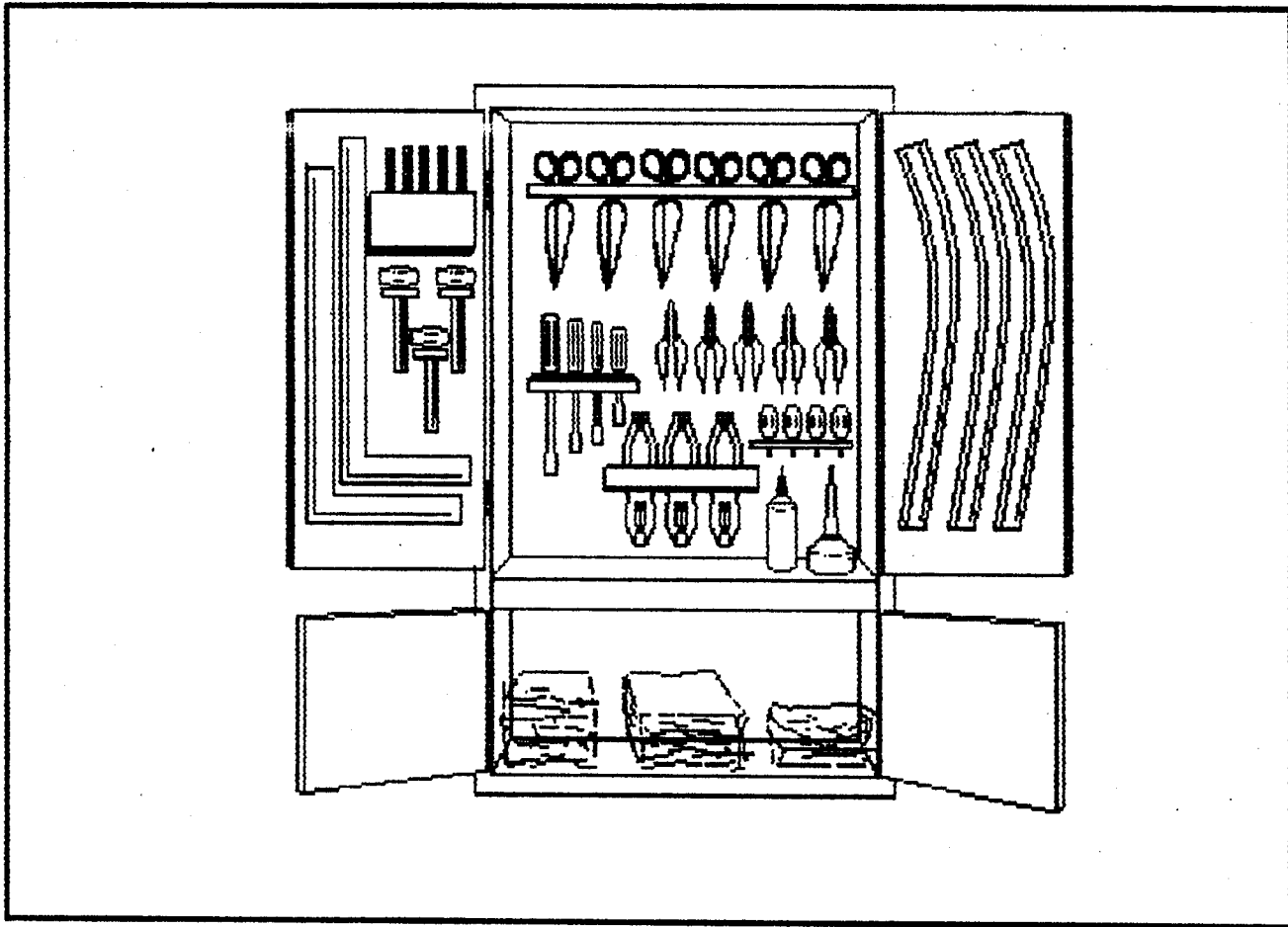
**Multi-level racks save space and temporarily stores materials  
in an orderly manner.**

Figure 4



Shelving designed to use wall space fully.

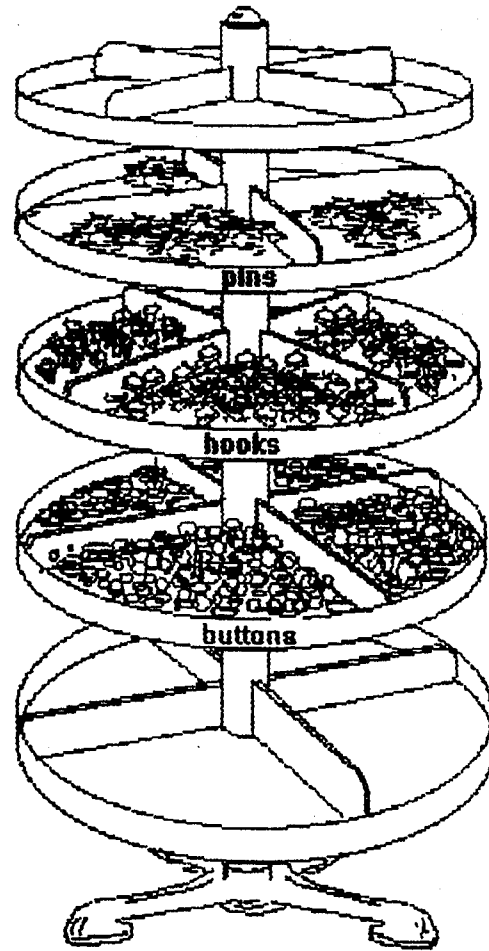
Figure 5



**A wall cabinet for tool storage. Made of wood panels and equipped with four locking doors, it provides easy access to any tool and takes an absolute minimum of floor space.**

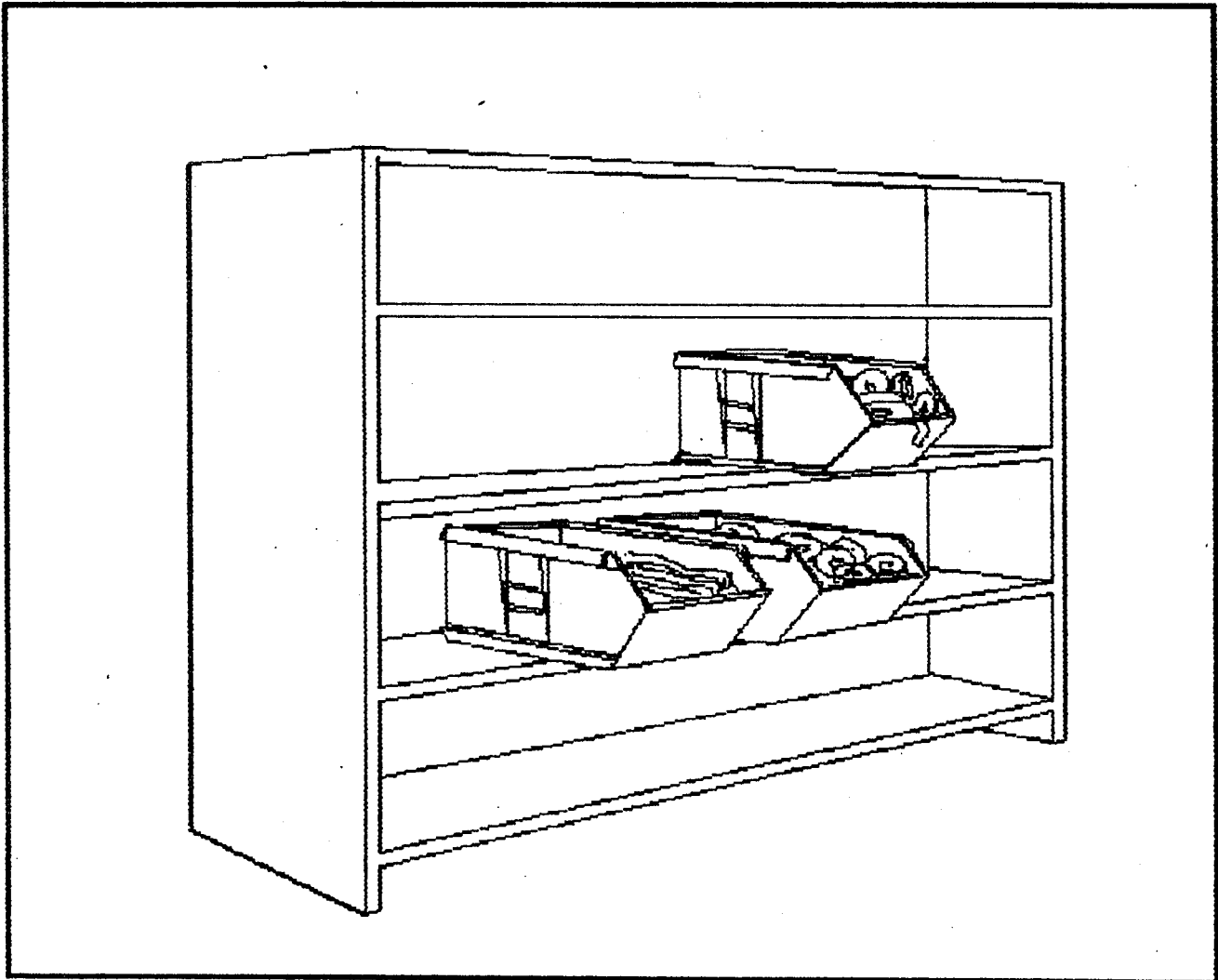


Figure 6



**Rotating bins. Revolving shelves eliminate wasted space usually found at the back of a shelf. This is very appropriate for servicing a group of operators sharing one work-station.**


**Figure 7**




**Hand bin containers for storage of small parts.  
The front opening makes the parts easy to see and provides ready access to the  
stock. The bins can be stacked at the work-bench or placed  
on special racks or on rotary racks or regular shelves.**

will need to take into account the ideas from several chapters before you are ready to make complex improvements in work organization.

However, there are several things which you can do to improve handling operations without making any major organizational changes.

 The more you use it, the closer it should be.

In the next chapter, on work station design, we will see how to ensure that all frequently used tools, (scissors, nippers, tape measures), supplies (threads, needles, zippers) and accessories for a particular design (buttons, lace) are in easy reach of the worker. If it is possible to attach this to the work-table or to hang this near the work station then do so for more convenience. Less frequently used tools and supplies can be placed on shelves and racks next to the work-station or in a corner within the production area. Tools needed only once or twice a day can be held in central storage.

 Use mobile storage.

Even after you have removed everything which is unnecessary from the shop-floor, you will have a large number of items which need to be moved from one operation to the next, or between work-stations or between storage areas and work areas. Often this is done in a haphazard way, which can mean many extra trips, additional manpower and loose inventory control. If you think about handling at the same time that you design your storage arrangements, you can achieve the following:

- fewer material handling operations;
- less idle machine time;
- increased layout flexibility;
- reduced physical strain and injuries;
- simple, effective inventory control;
- reduced damage to work items;
- cheaper and more efficient housekeeping.

A good first step is to design racks or containers with rollers or casters to move several items at the same time. Figure 8 is a container with ball casters for the purpose of transporting materials. Often this is not done because it is easier to scoop several work items from a container manually and carry these to the next process. But if you consider the number of times one has to go back and forth as well as the inconvenience and the possible damage this procedure may cause to the work item, then it will be better to use mobile containers.

 Provide containers for operation outputs.

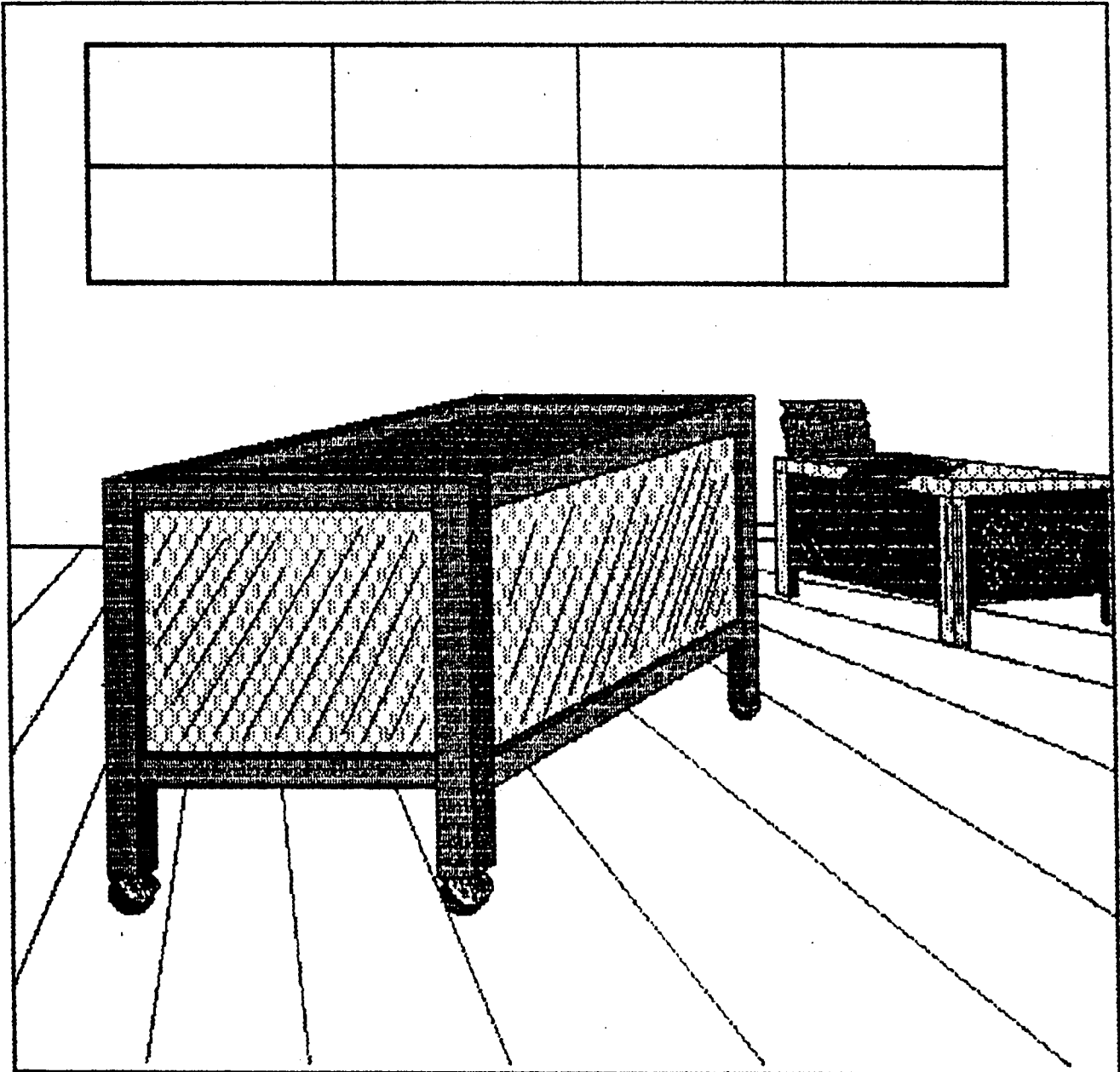
In line assembly systems like garments manufacturing, movement of work-in-process is very critical to the next operation. Thus, there should be easy means for moving work-in-progress from one operation to the next. Long tables could be installed along the row of machines in the line so workers could just push work-in-progress from the first operation to the next. Receptacles for outputs of every operation could also be used and then transferred to the next process. Different types of receptacles are available but one has to consider the following: a) size of bundles and products produced, b) space requirement, c) cost, d) appearance, e) appropriateness, and f) convenience. Make sure that the containers produce minimum crushing/crumpling, and soiling to the material and they are easy to move where they are needed.

Figure 9 shows hangers for long items to prevent crumpling. Figures 10, 11, 12, 13, 14, 15, 16 are some examples of output and input containers used in the garment industry.

 Clear and mark passageways.

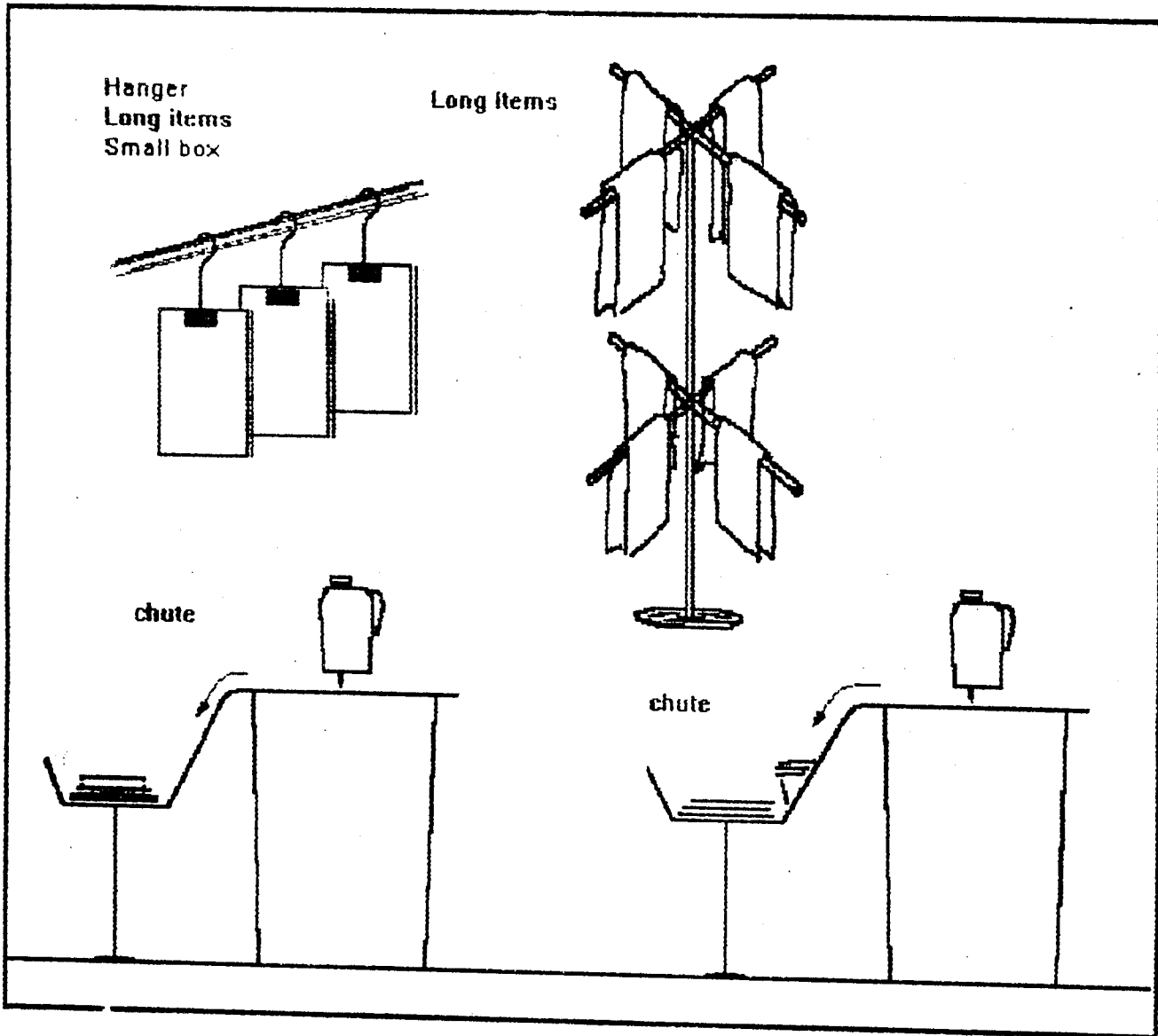
Movement of handling equipment are hampered by items scattered in the floor or by protruding containers and boxes. If the passageways are marked and cleared then handling equipment could pass through easily and quickly without accidents and saving time and energy. Workers should kept their containers within the boundary lines. Keeping only necessary items within the work place will help clear passageways.

Figure 8



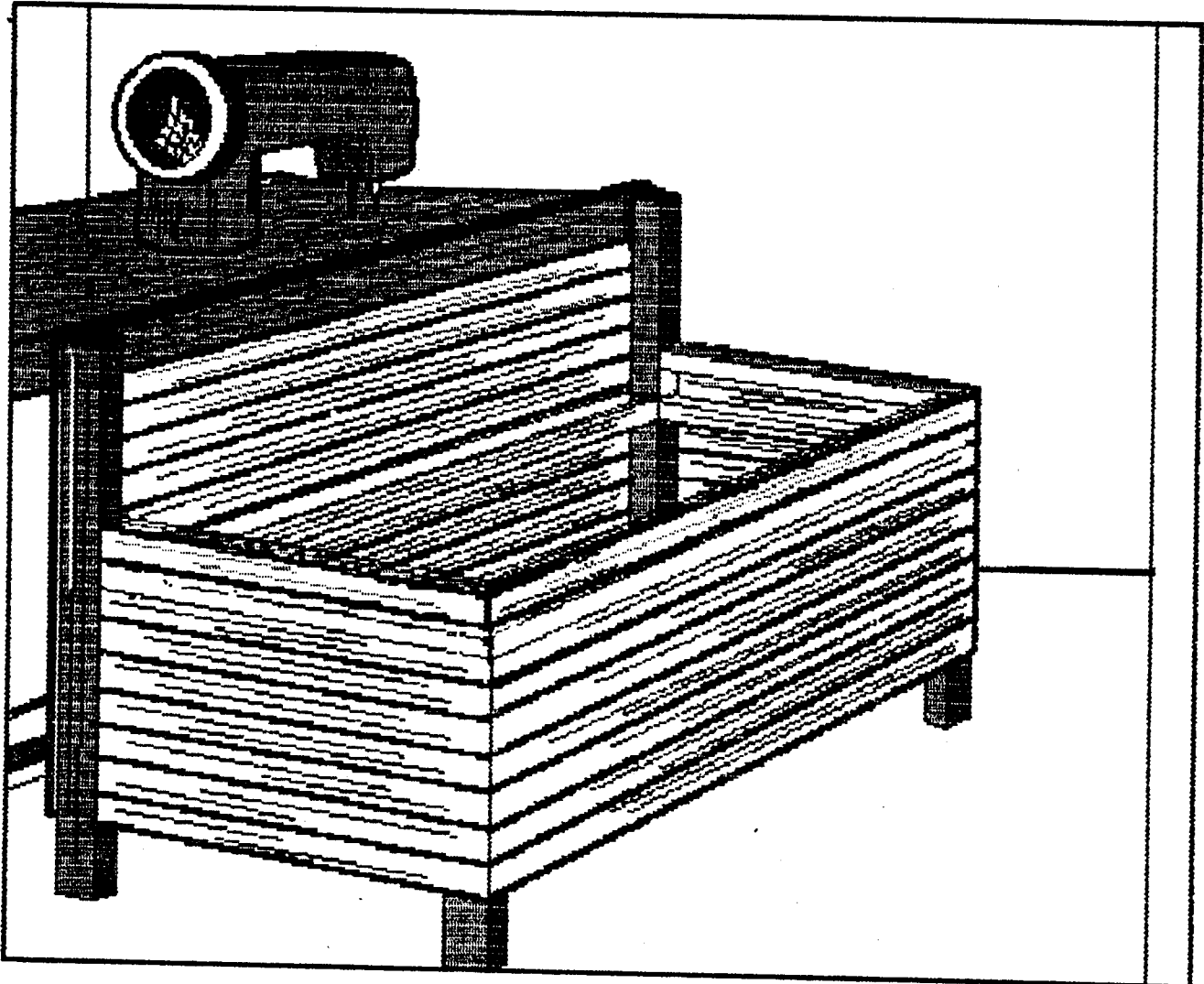
**Stationary containers can be made of woods while containers for the purpose of transporting materials can be fabricated by installing ball casters.**

Figure 9



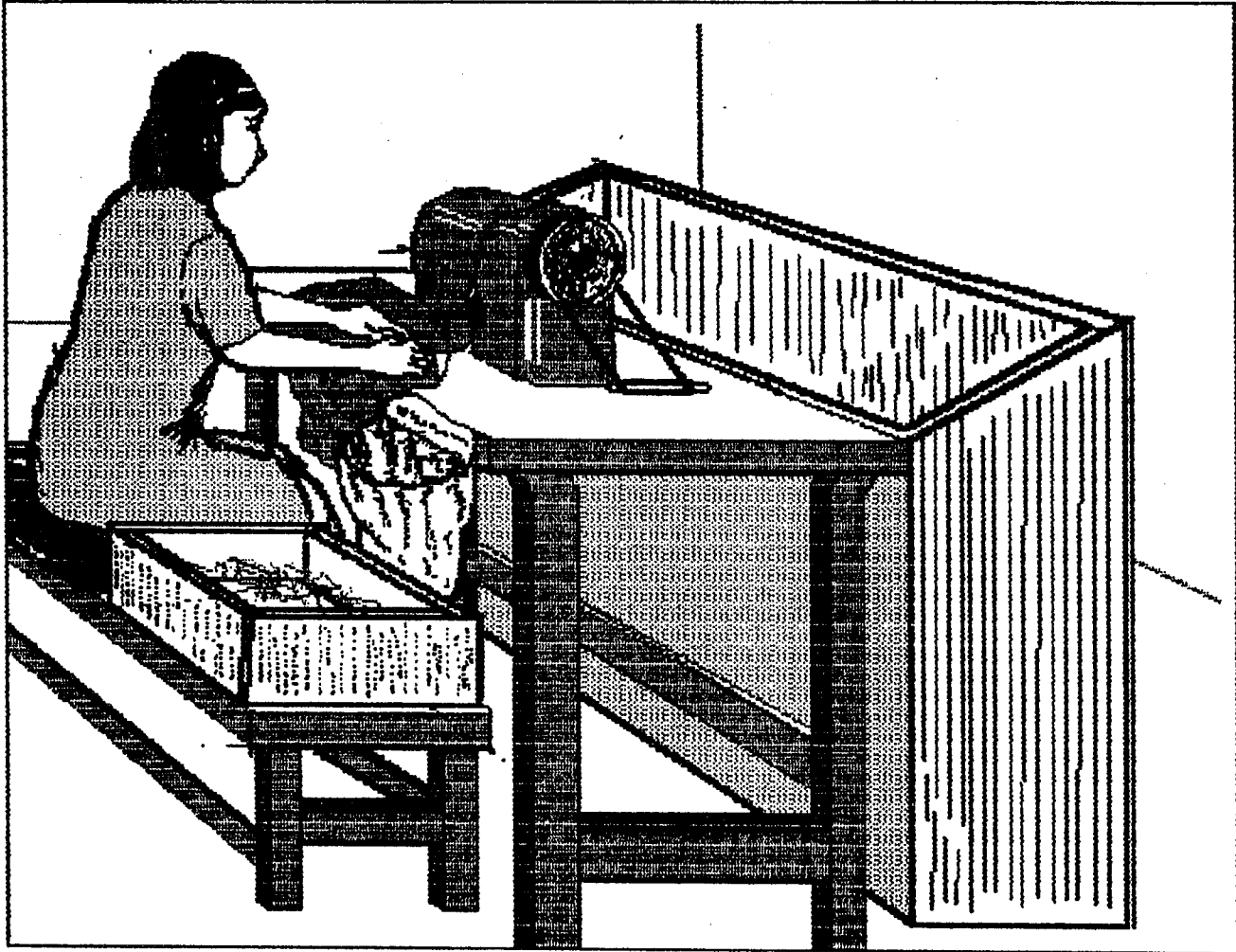
Labor saving devices of preparatory and posterior work.

Figure 10



**A shorter wooden container for outputs of one work station. Outside covers are shorter for easy grasping of materials from the container to the next operation. Side covers at the machine side is higher to make sure material does not fall on the floor from the machine.**

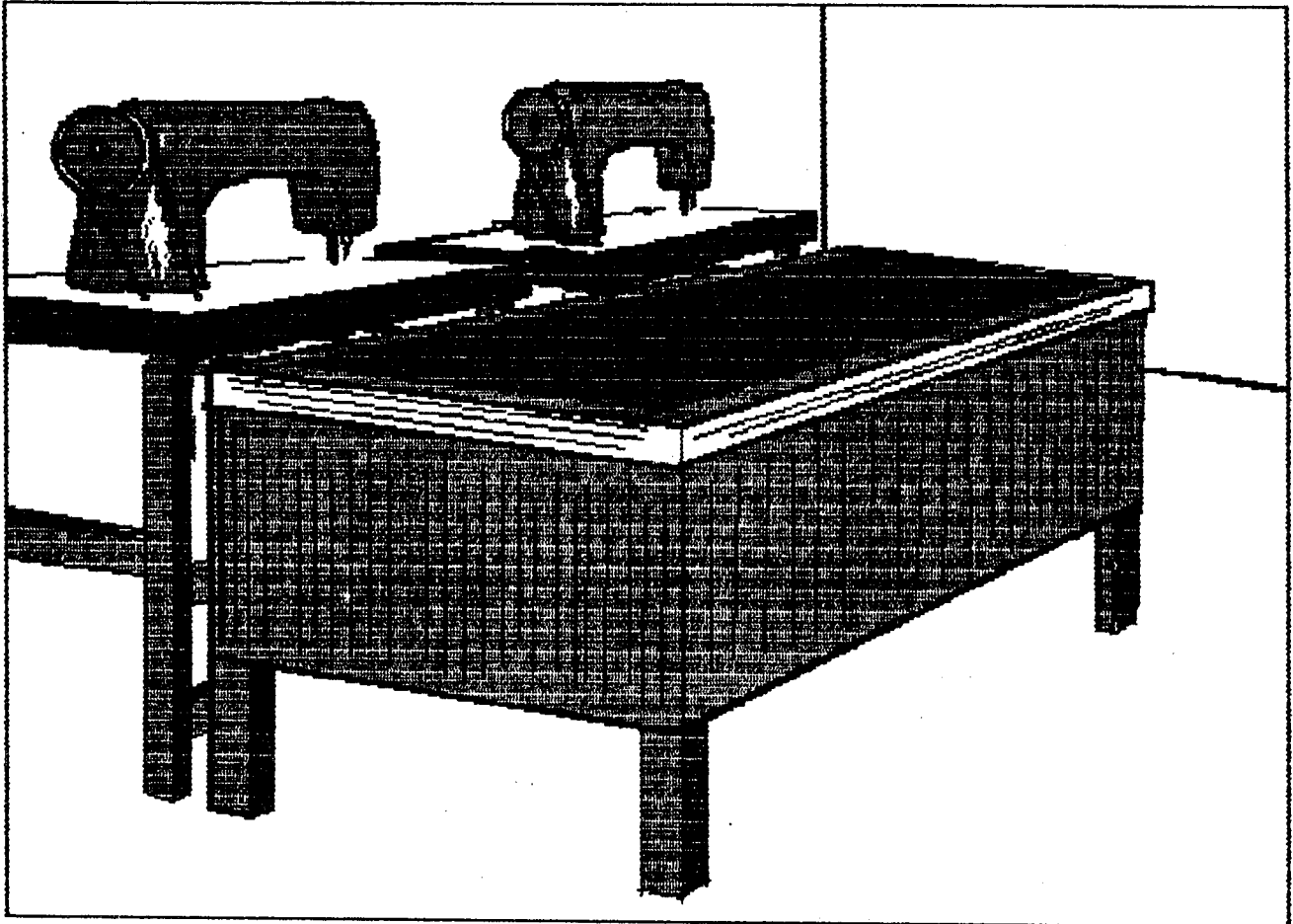
Figure 11



**Wooden containers with sides slightly slant upward assures that materials do not fall on the floor.**

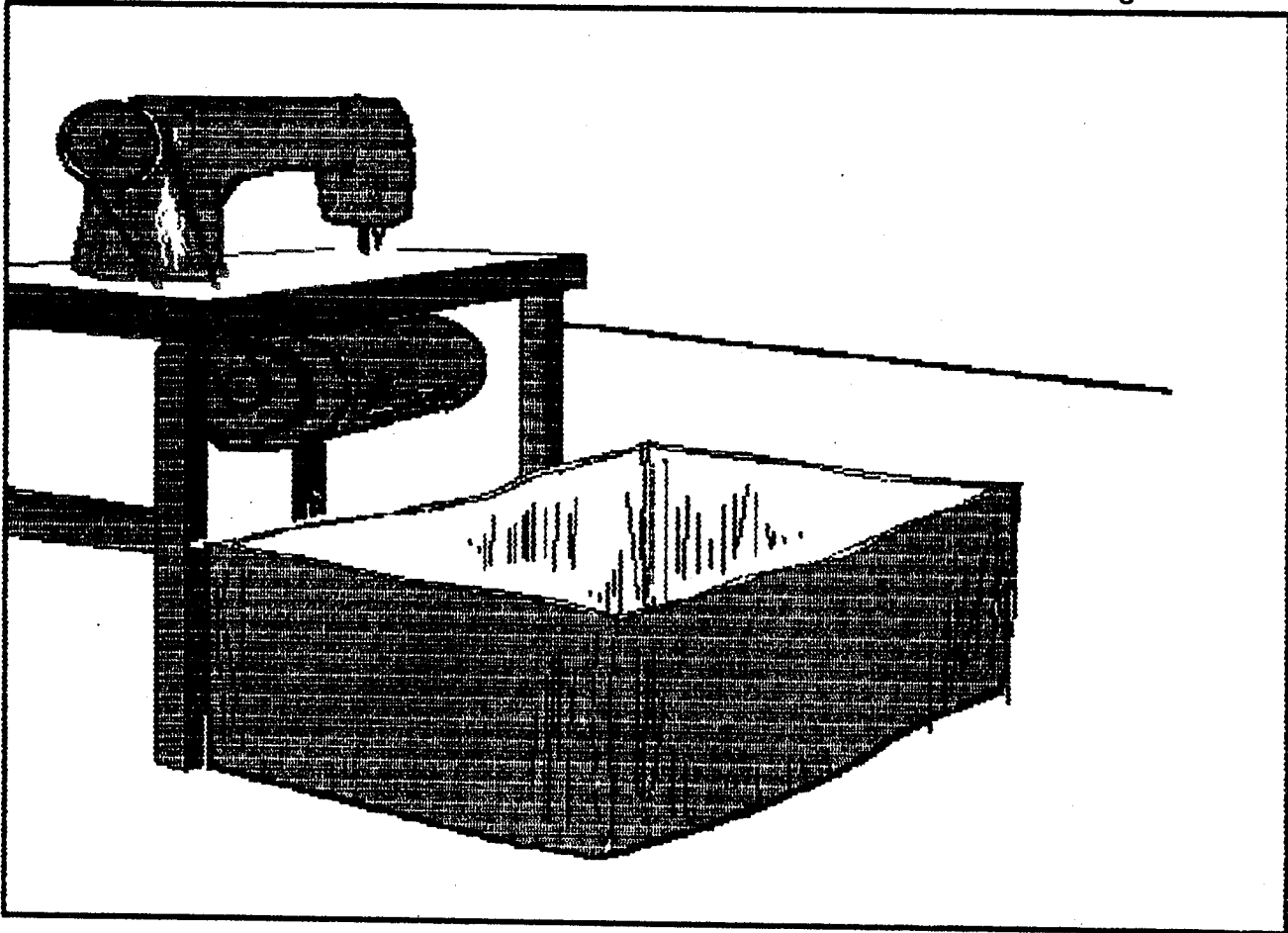


Figure 12



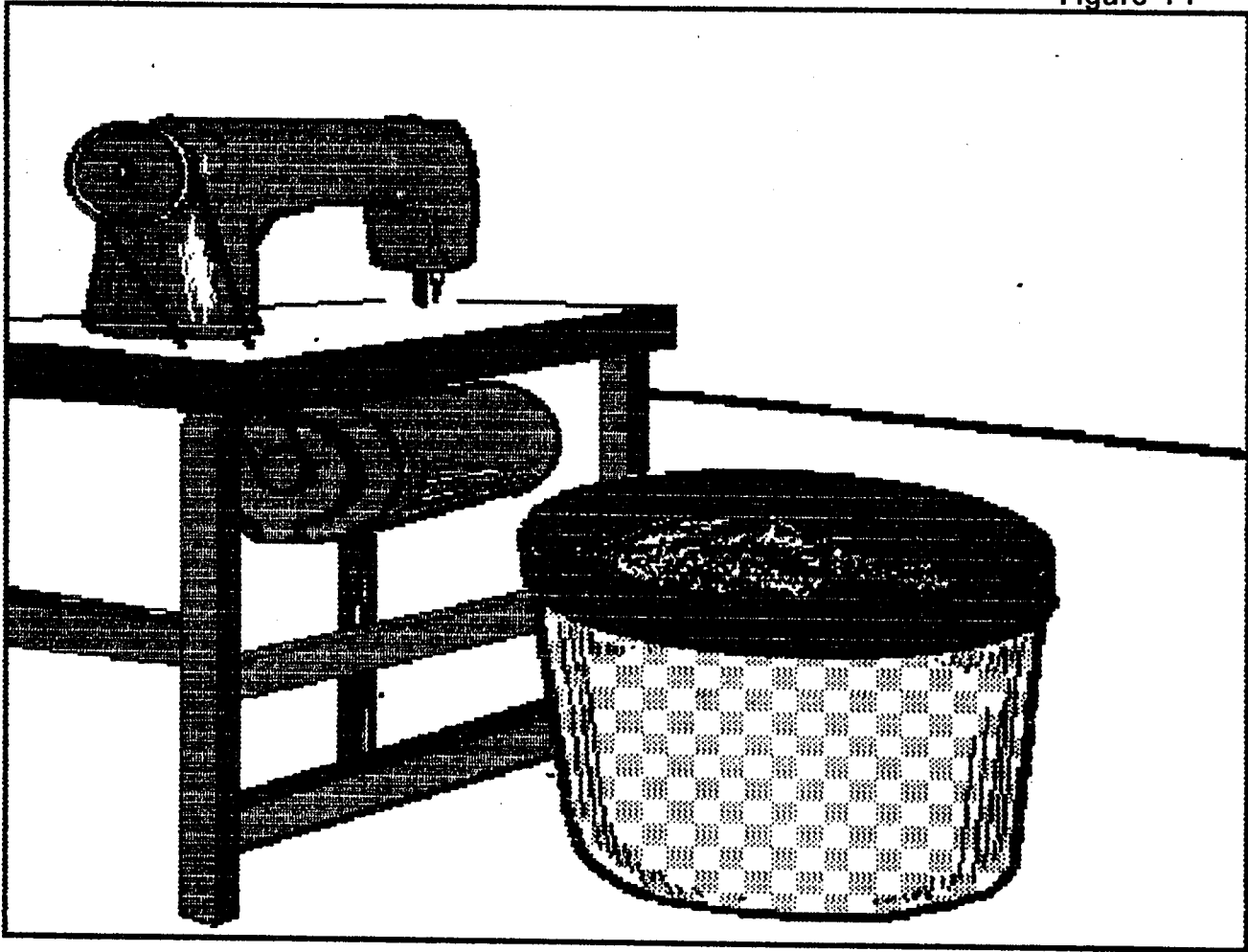
**One big shallow wooden container that can accommodate  
the outputs of two workers.**

Figure 13



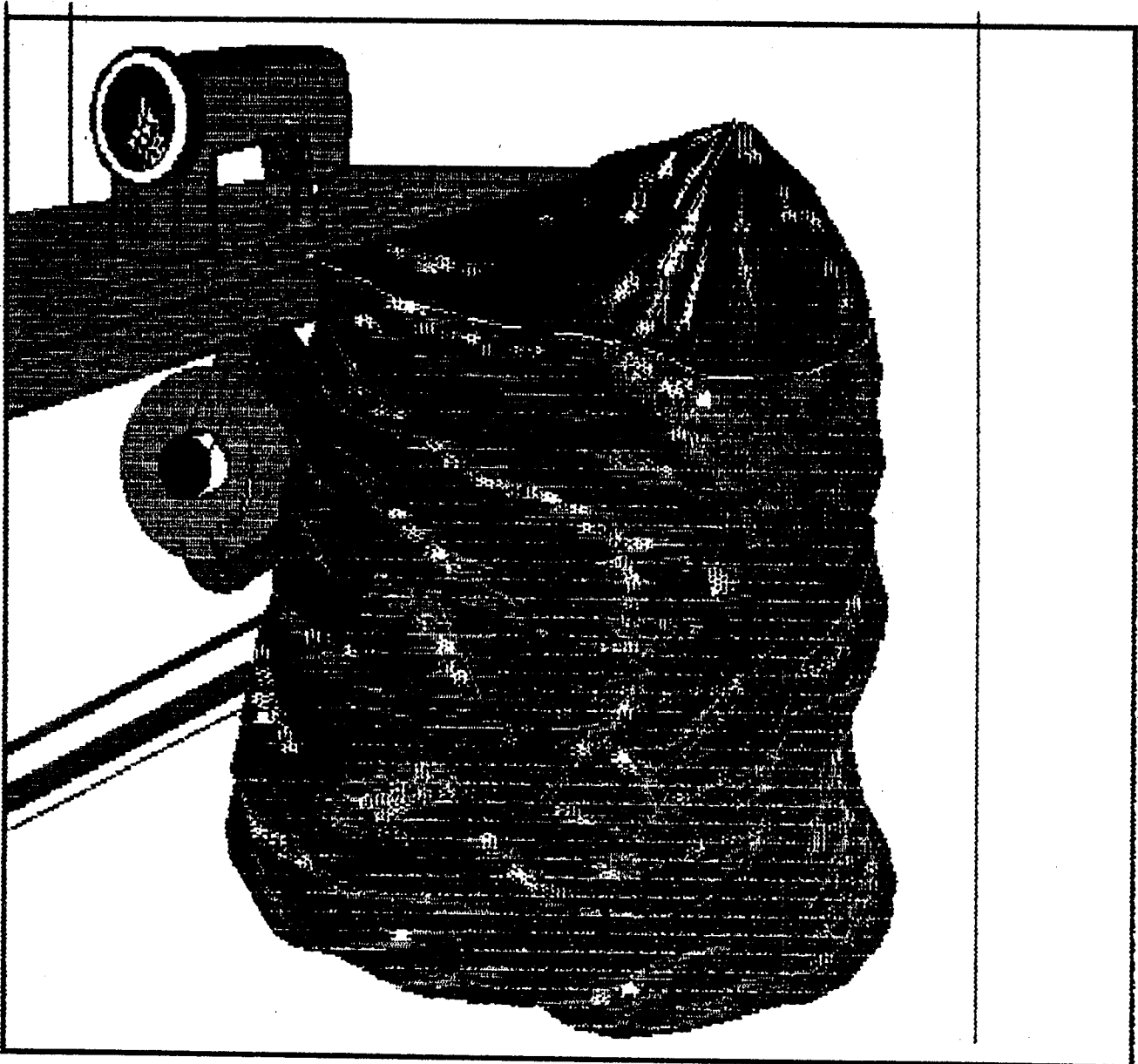
**Polyethylene bags as well as used cartons can also serve the purpose without much cost.**

Figure 14



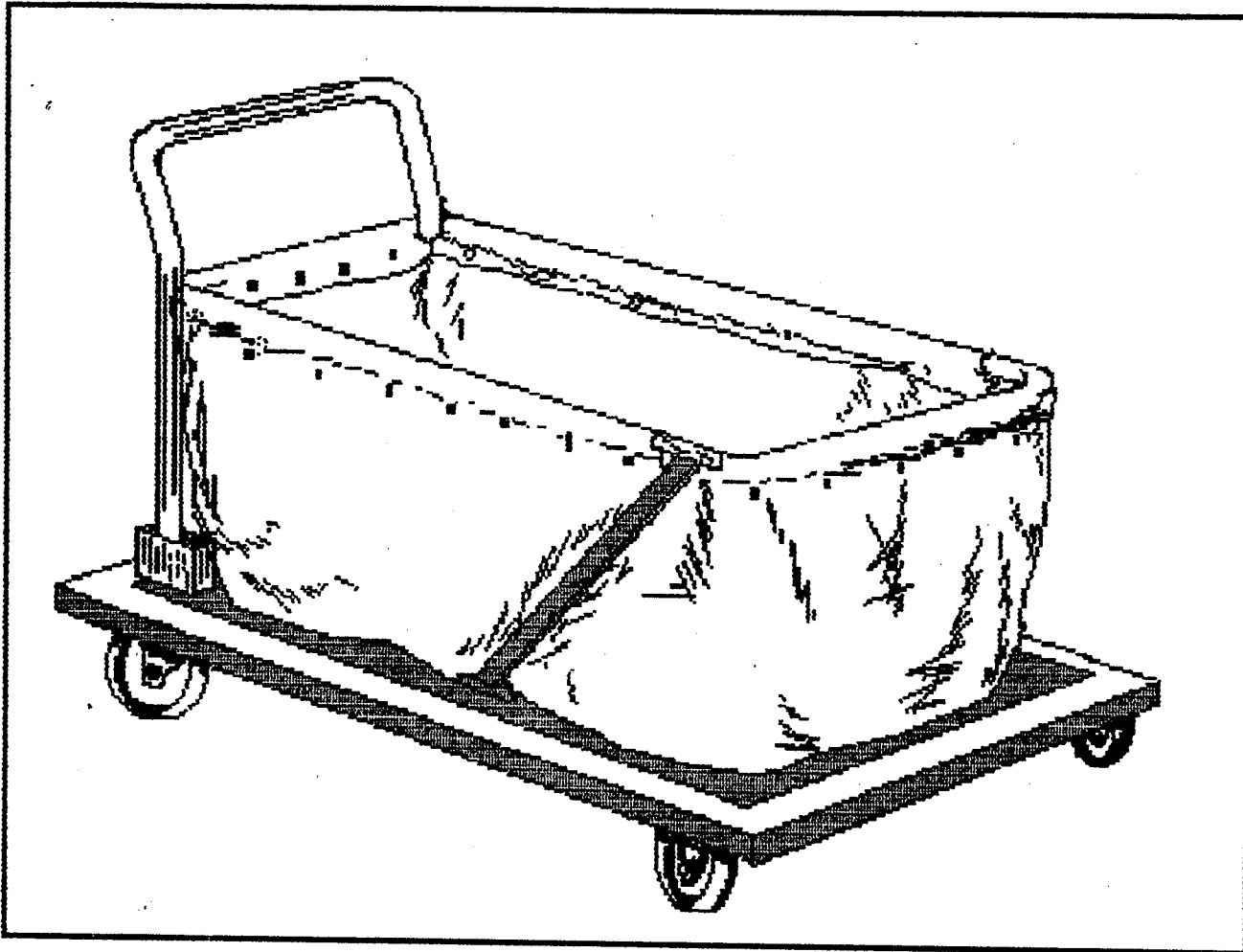
**Plastic containers can also be used especially for materials that are prone to "runs".**

Figure 15



**Polyethylene bags as well as used cartons can also serve the purpose without much cost.**


Figure 16



**Scraps of metal and cloth can be used to make material handling equipment. Such is advantageous for garments since it can minimize "runs" on garments.**

Figure 17 shows a plant layout with clear marks for passageways.


## FEWER AND MORE EFFICIENT LIFTING OPERATIONS

 Don't lift loads higher than necessary.

Lifting operations are a prime source of accidents, damage and unproductive costs. It is therefore always better to eliminate lifting whenever possible. Time and effort can be saved by using platforms so that goods do not have to be lifted during loading and unloading operations. Where resources are available, design the loading area so as to match the height of the vehicle bed. If this is not possible, provide material handling devices to reduce carrying before loading and after unloading.

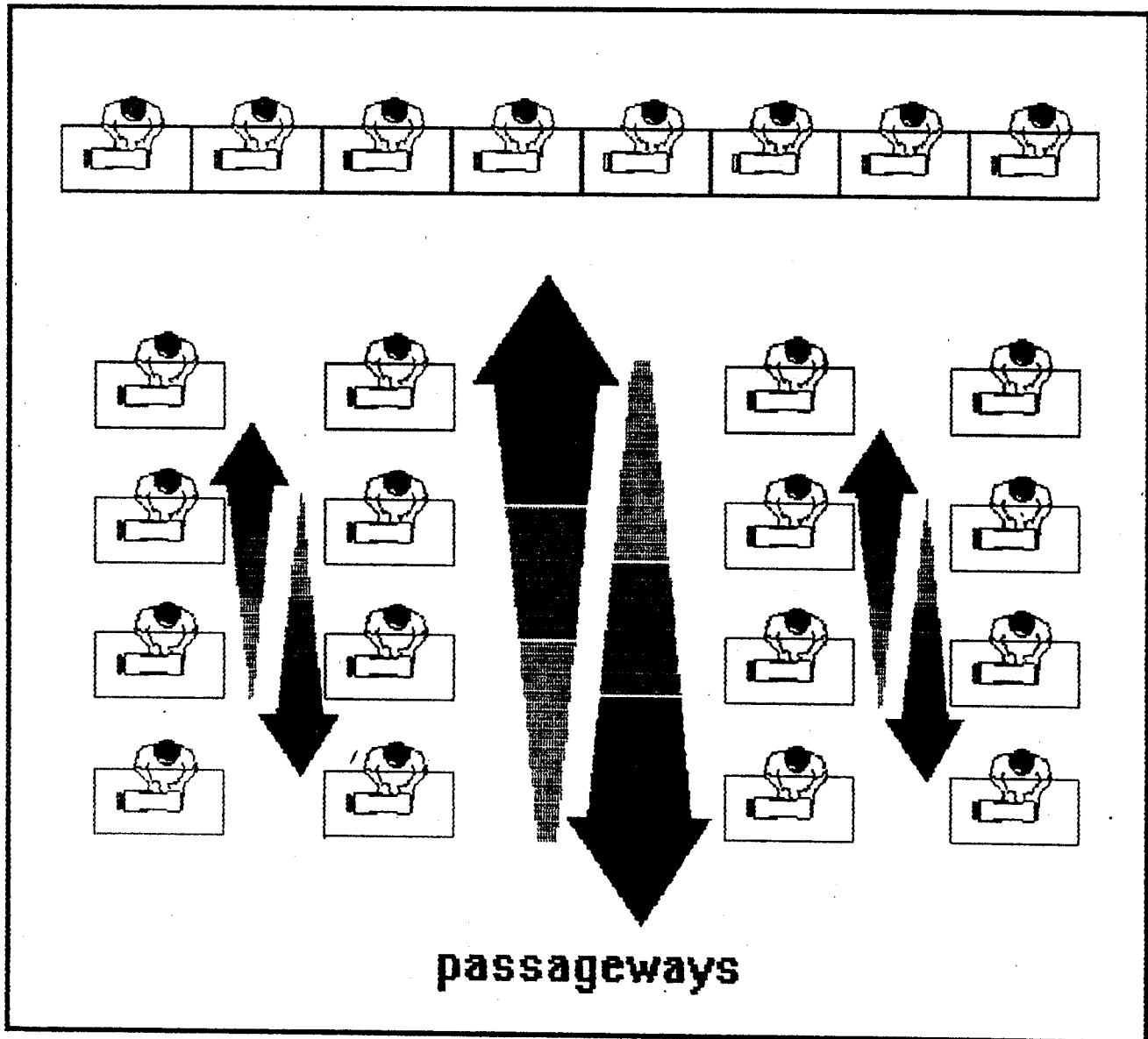
Figure 18 shows a sack trolley. Figure 19 shows a loading area which height matches the vehicle bed.

In designing methods of manual carrying, you should keep in mind the fact that the higher the load, the bigger the percentage of energy spent on lifting and less on actual transport. To the extent possible, do not assign lifting jobs to women, especially those who are pregnant. Studies have found out that lifting heavy loads or heavy manual labor is associated with less favorable outcomes of pregnancy, primarily the birth of low-birth-weight babies or the premature onset of labor.

 Move materials or perform operations at working heights.

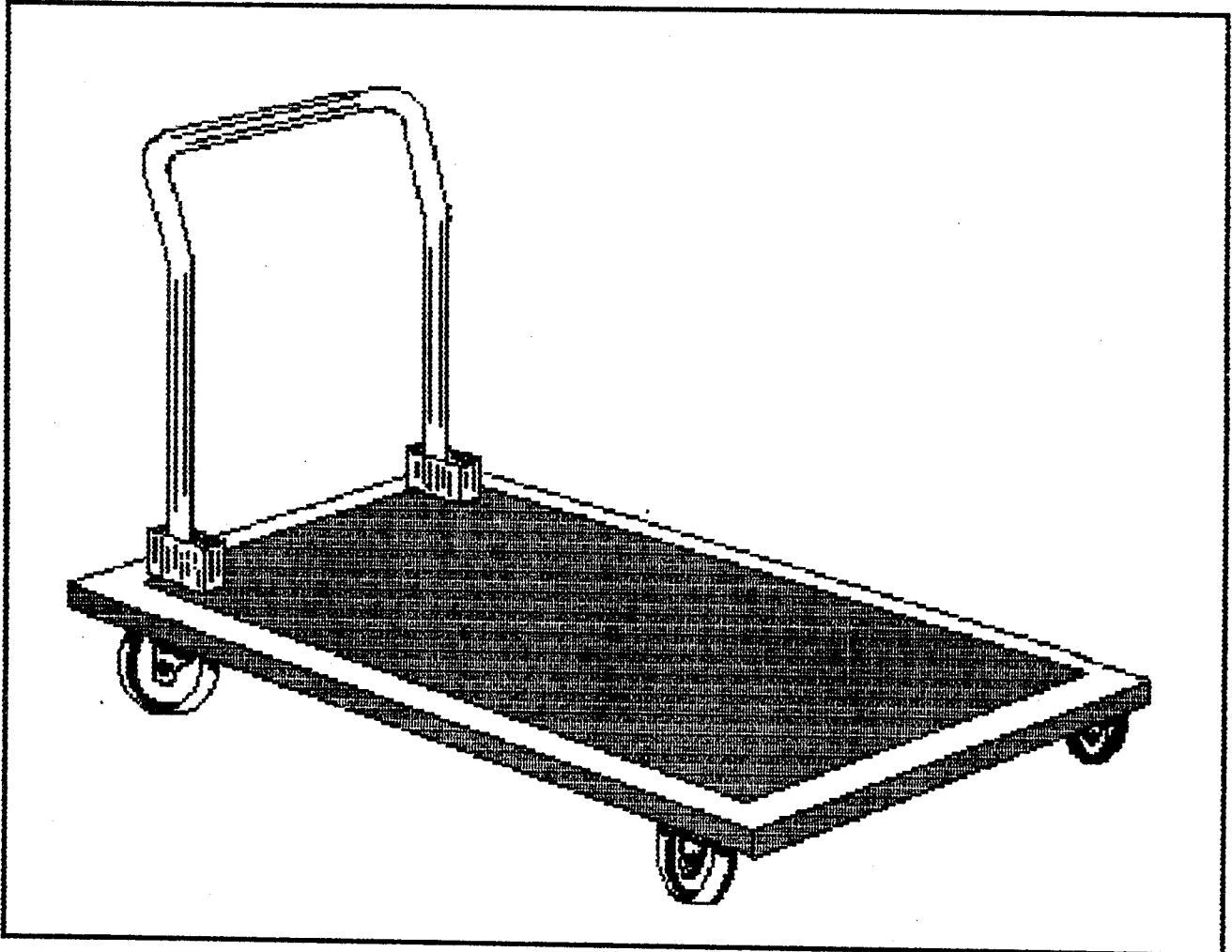
Avoid placing work-in-progress in the floor to save time and energy in picking up the same. This may also cause back injuries. You should also avoid doing work in the floor. Some workers sort and inspect incoming raw materials squatting in the floor. This uncomfortable position affects productivity. Work-tables and chairs should be used. Sewing machines can be connected by specially designed long tables so work-in-progress are just pushed in the same level from one operation to the next.

Figure 17



Arrangement of passageways inside a factory.

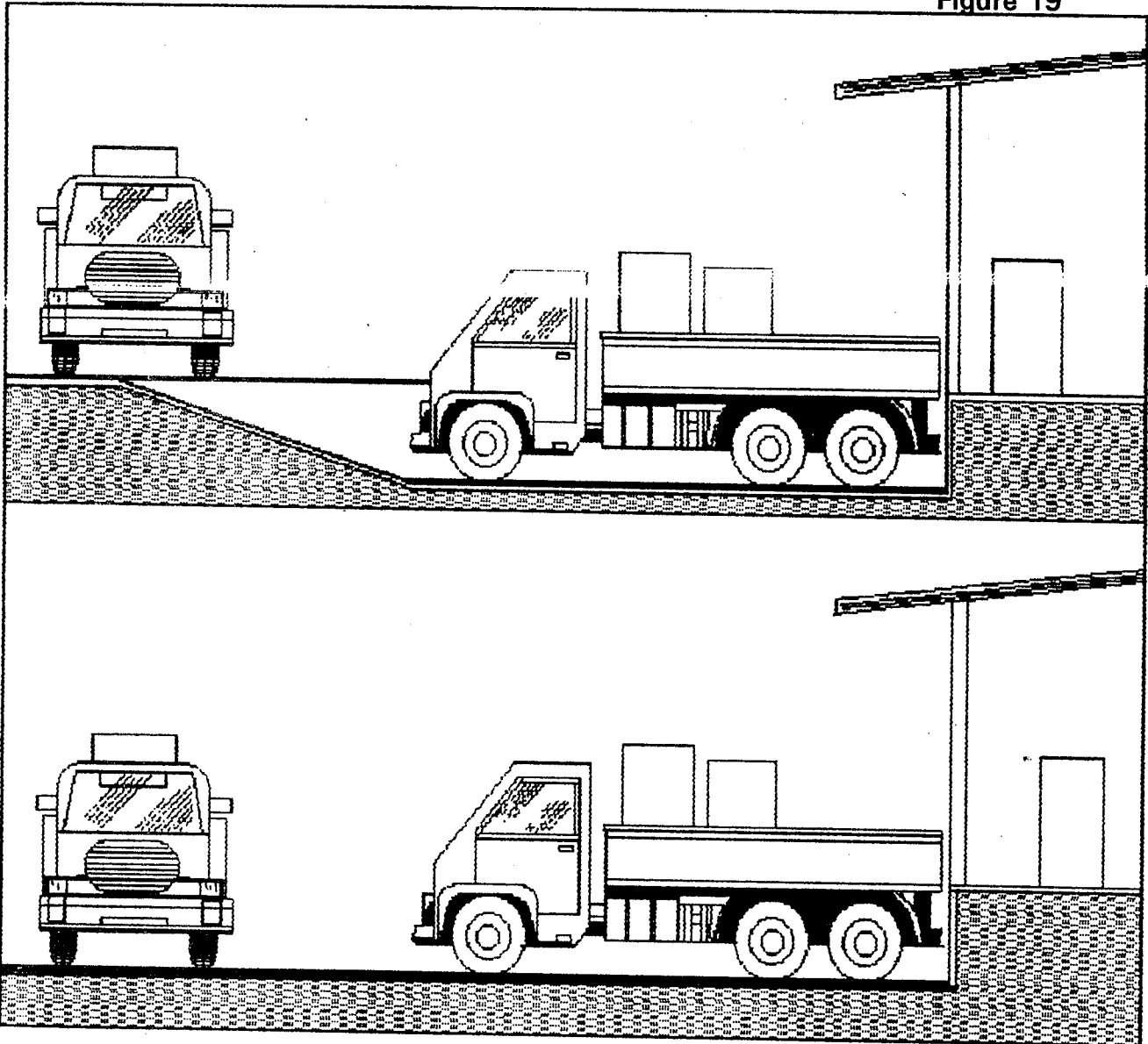
Figure 18



**Sacks of raw materials can be loaded on this baggage platform  
for easy transporting of materials.**

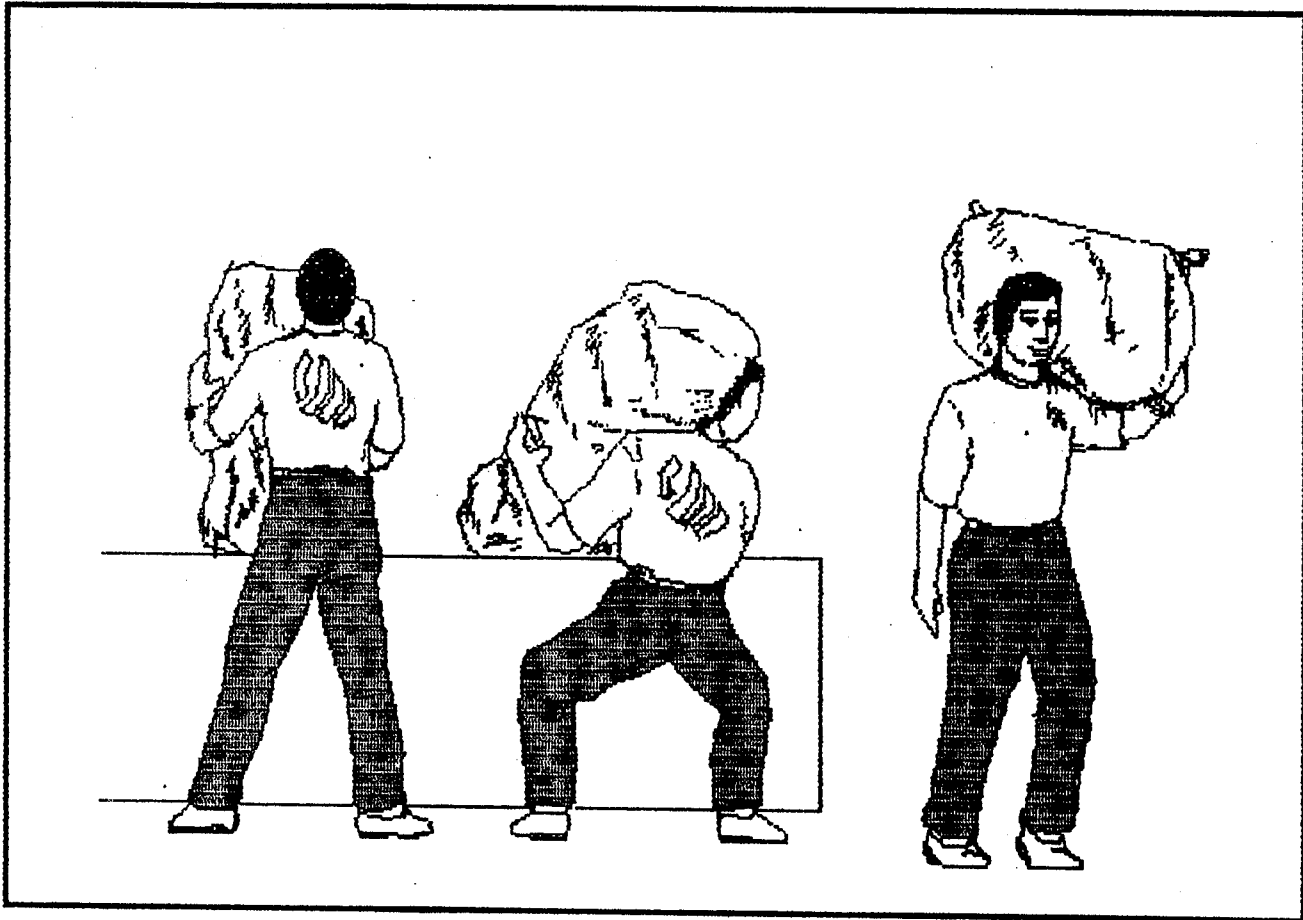


Figure 19




**Match the height of the vehicle bed to that of the loading area.**

Figure 20



**Lifting of heavy loads from a platform.**

 **Make lifting more efficient and safer.**

Manual lifting of heavy loads should not be tolerated. Manual lifts should be considered as a last resort in special cases when the application of mechanical means is not feasible.

In organizing lifting work, remember that lowering and raising the body weight in taking weights up from the floor increases the required energy by 50 percent when compared with lifting a weight from 0.5 meter. That's why we always recommend platforms for loading and unloading heavy items.

You can help your workers to avoid back injuries by teaching them the correct lifting technique. The idea is to keep the back straight and to raise the load, using the muscle power of the legs and the grip of the hands.

Handling of smaller weights should not be associated with lower productivity. It has been proved in practice that maximum efficiency is usually attained with weights below 20 kg. The physical capacity of a woman is about one-third lower than that of a man and her reach is also considerably shorter. Women should not be assigned jobs involving lifting heavy weights above shoulder level. Figure 20 shows a good way to lift heavy loads.

**Summary:**

**Rules for Efficient Materials Storage and Handling.**

1. If in doubt, take it out.
2. Avoid placing materials on the floor.
3. Save space by introducing multi-level racks.
4. Provide a "home" for each tool and work item.
5. The more you use it, the closer it should be.
6. Use mobile storage.
7. Provide containers for operation outputs and inputs.
8. Clear and mark passageways.
9. Don't lift loads higher than necessary.
10. Move materials at working height.
11. Make lifting more efficient and safer.

## Chapter 4

# WORKSTATION DESIGN

A workstation is a place which a worker occupies when performing a job. The place may be occupied all the time or may be one of the several places where work is done. Example of a workstation is the area covered by the sewing machine, work bench, input and output containers and the space in which the worker can move. Ideally, this space is about four (4 ) square meters.

A well-designed workstation is important for productive work. Workers in garment factories for instance, repeat similar operations for the entire production lot which, if done efficiently and quickly could be an opportunity for higher productivity and better quality.

Each workstation presents a unique combination of workers and tasks. It is important to design the workstation with both the tasks and the worker in mind so that work can be done efficiently without the disruptions.

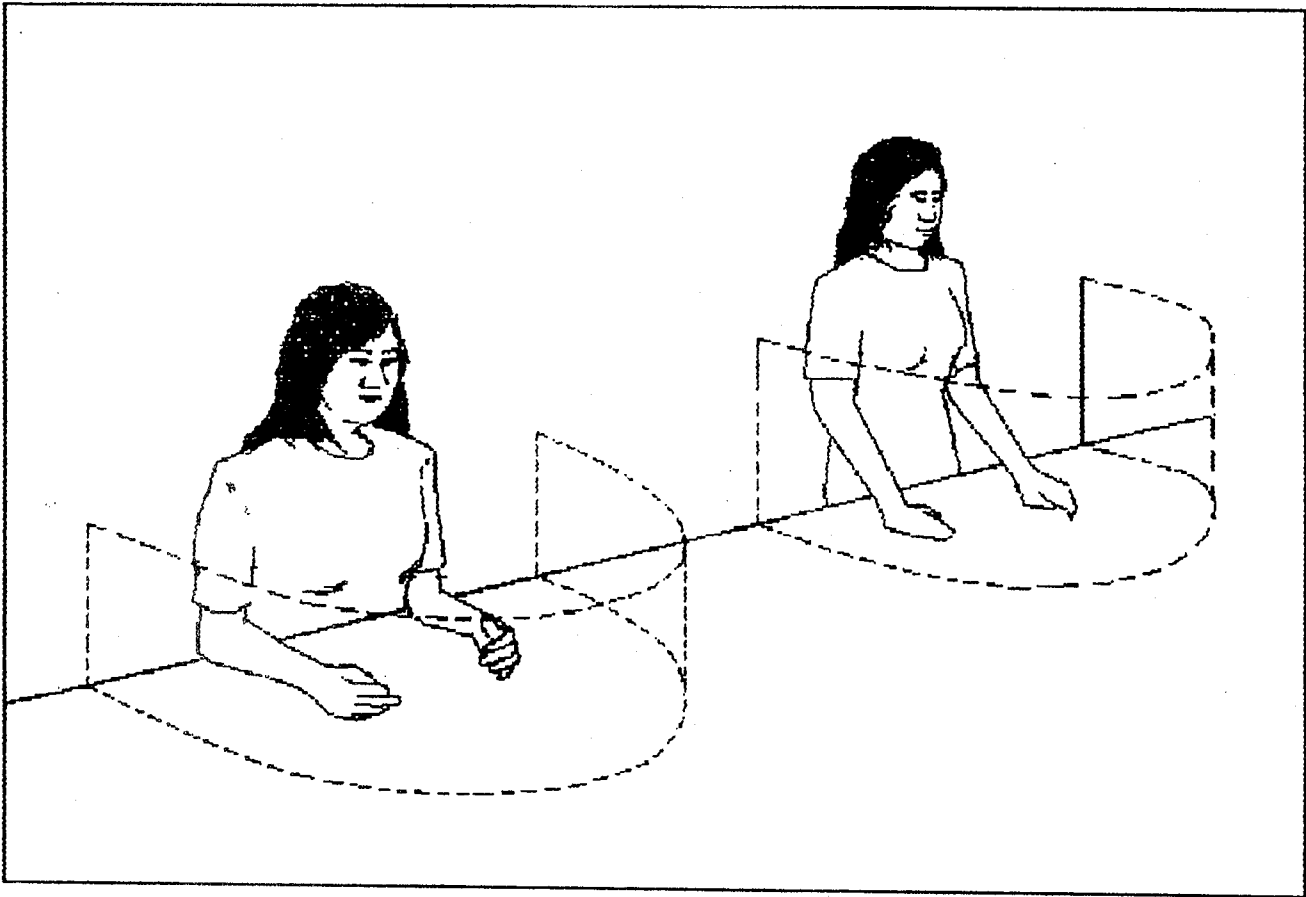
Rules in creating an efficient workstation are described below. Each case presents an opportunity for the company to improve and gives an idea of how other areas of the company can be designed for efficiency. The costs of the following suggestions are minimal yet these offer benefits that are worth the time and effort.

### Position materials, tools and controls within easy reach.

Time and effort can be saved by placing materials, tools, and controls (such as switch and levers, etc.) within easy reach of the worker. Long reaches require extra time and effort from the worker. So the rule for an efficient workstation is, "The more you use it, the closer it should be."

The distance that can be reached without leaning forward or stretching is quite small. Figure 21 shows appropriate reach distance for sitting and standing workers. Any object that is frequently grasped or used should be located between 15 to 40 cm from the front of the work-surface.

Figure 21



**Appropriate reach distance for sitting and standing workers.**

Material inputs should be placed beside the worker to avoid unnecessary standing and walking. Movable containers must also be provided for the material inputs and outputs so that all materials will be accumulated in one place and orderliness can be maintained in every workstation. Other things that should be kept in mind are the following.

- Use containers that are not too shallow to prevent bending and twisting of the worker.
- Make sure that the edges of the containers are smooth and can facilitate easy grasping of the material.
- Use containers that are movable for faster transport to the next operation.

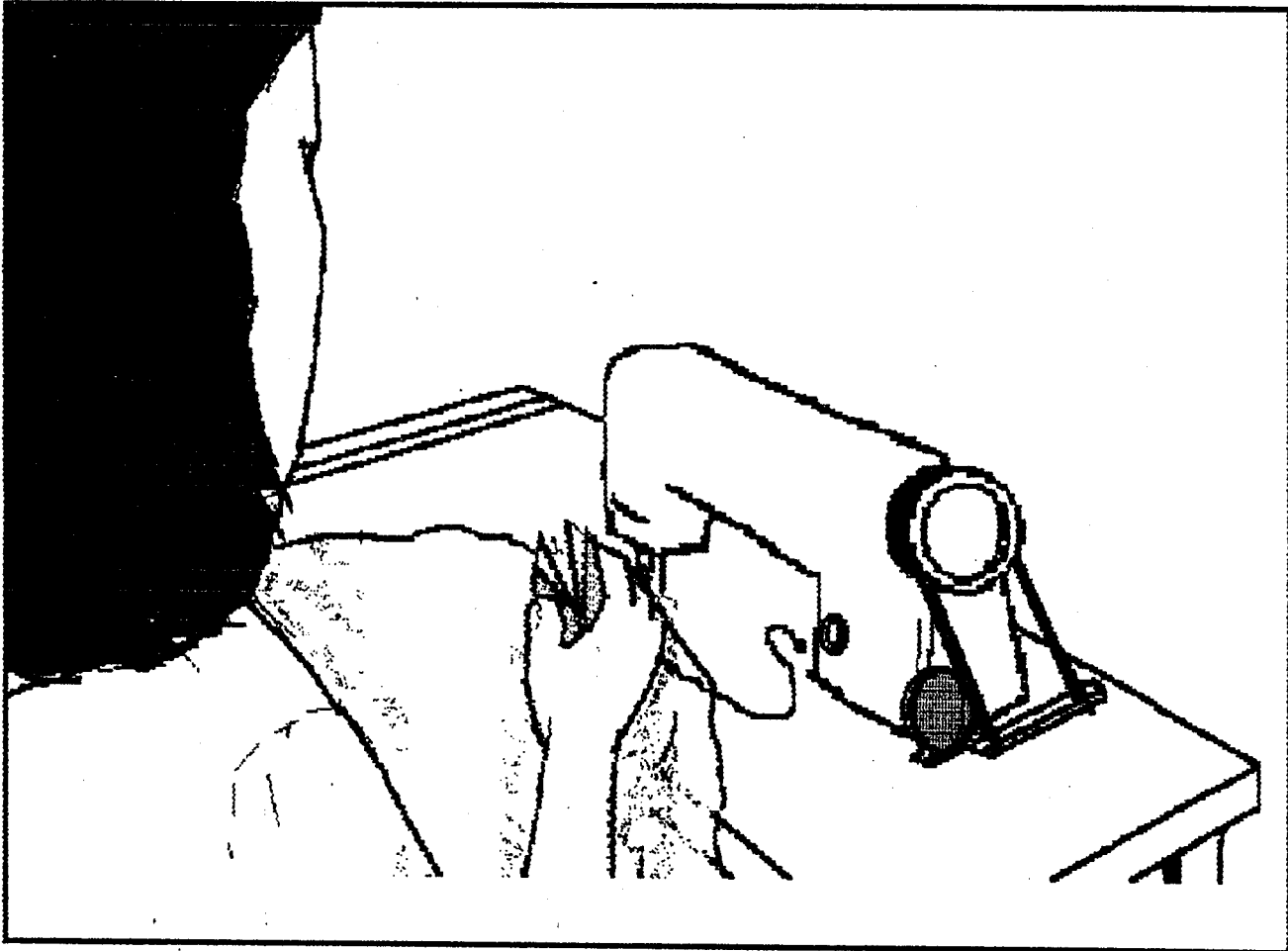
Tools like nippers and scissors which are constantly used could be attached to the machine with a stretchable cord. With this provision, the worker could easily pull the tool from the stretchable cord whenever she needs it and release her grasp after using it. Take note however, that the cord should not be so elastic to prevent the likelihood of having the nipper spring back to the worker. Figure 22 shows a nipper attached to the sewing machine.

Pointers in positioning the tools necessary for the operation are:

- Identify the tools that are most frequently used.
- Place the most frequently used tools in a location where they can easily be reached without leaning. The most frequently used object should be located at a minimum distance equivalent to the distance between the knuckles and the wrist and a maximum distance equivalent to the length between the knuckles and the elbow. Both distances mentioned should be in reference to the front edge of the working table.
- Tools like pins could be kept in place by using magnets attached to the case of the machine.

Other small accessories for sewing, e.g. buttons, hooks, etc. could be placed in rotary bins or gravity bins with tray for automatic dispensing or in boxes with proper labels.

Figure 22



**Nippers used in trimming-off threads can be attached to the sewing machine to minimize searching.**

 Improve work posture for greater efficiency.

When a difficult work position is required, work not only takes longer but also leads quickly to fatigue. For example, operations with the arms raised tire the shoulder muscles rapidly. Operations while bending forward or twisting the body can easily cause back strain. The operation time gradually increases and the worker becomes more likely to damage goods or have accidents.

The following measures help to avoid difficult work positions:

- provide a stable, non-wobbling work surface on which work items can be firmly placed;
- place materials, tools and controls where they can be reached easily by the worker without bending or twisting the body;
- use platforms so that short workers can be at proper work height;
- provide good chairs of correct seat height;
- provide enough leg space to allow easy leg movement.

Recommended dimensions for standing and seated work are given in Figures 23 and 24.

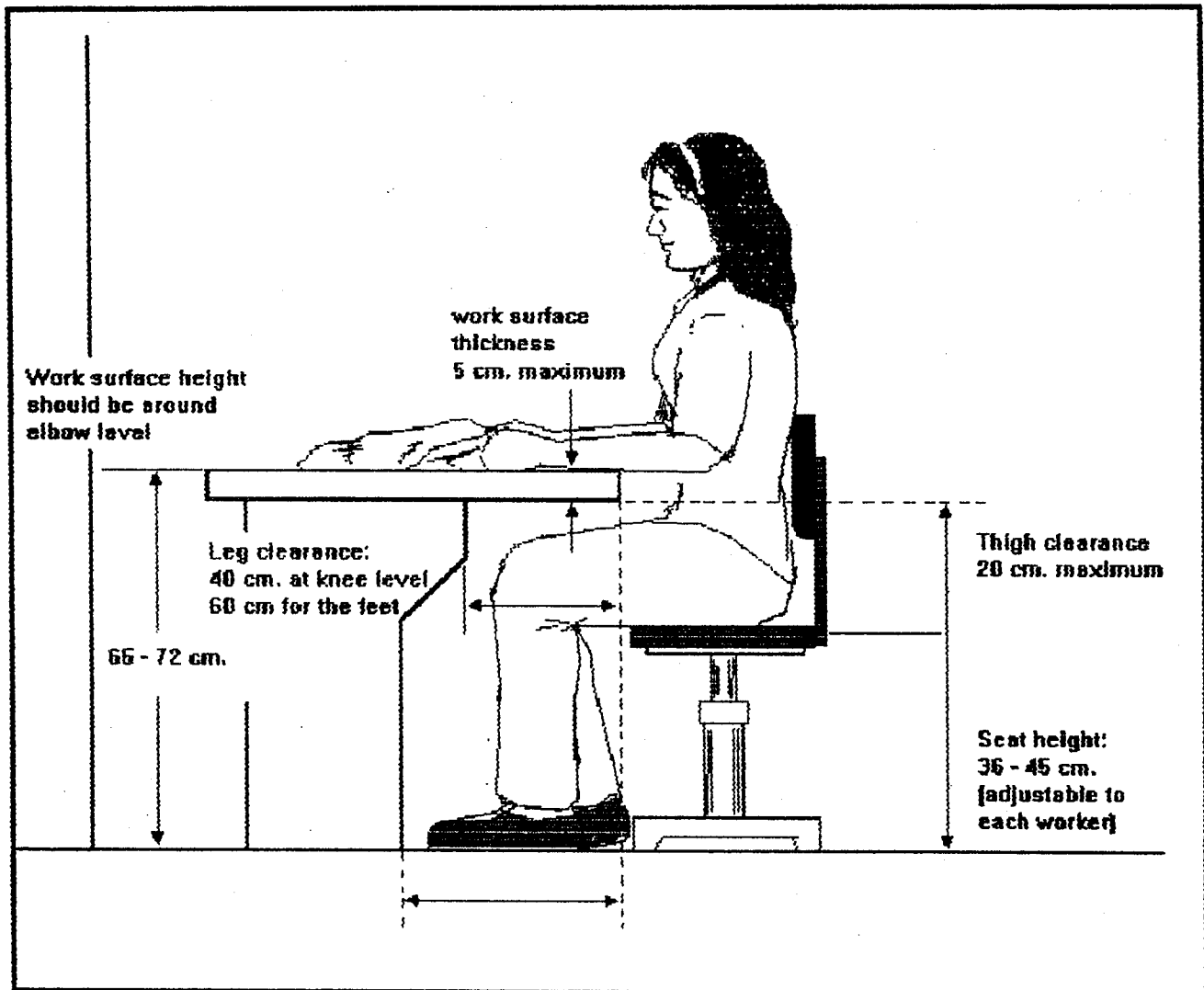
The height of places where work is done with the hands is also an important factor. The elbow rule should be applied to determine the correct hand height. Most work operations are best performed around elbow level.

Work surface height or seat height could be adjustable according to each operator's size by using a lift table or a seat with adjustable height. Adjustments can also be made by putting wooden platforms under the table. Footrest for the sewers' idle foot can have a relaxing effect.

Benches for sewers could be designed with extra space for raw material inputs as shown in Figure 25. This saves floor space for containers but benches may not be adequate for bulky or big materials. Some factories provide container-stands and stools instead of benches. Wooden benches and stools are usually used to keep better posture while sewing. Cushions made out of scrap raw materials could be provided to make

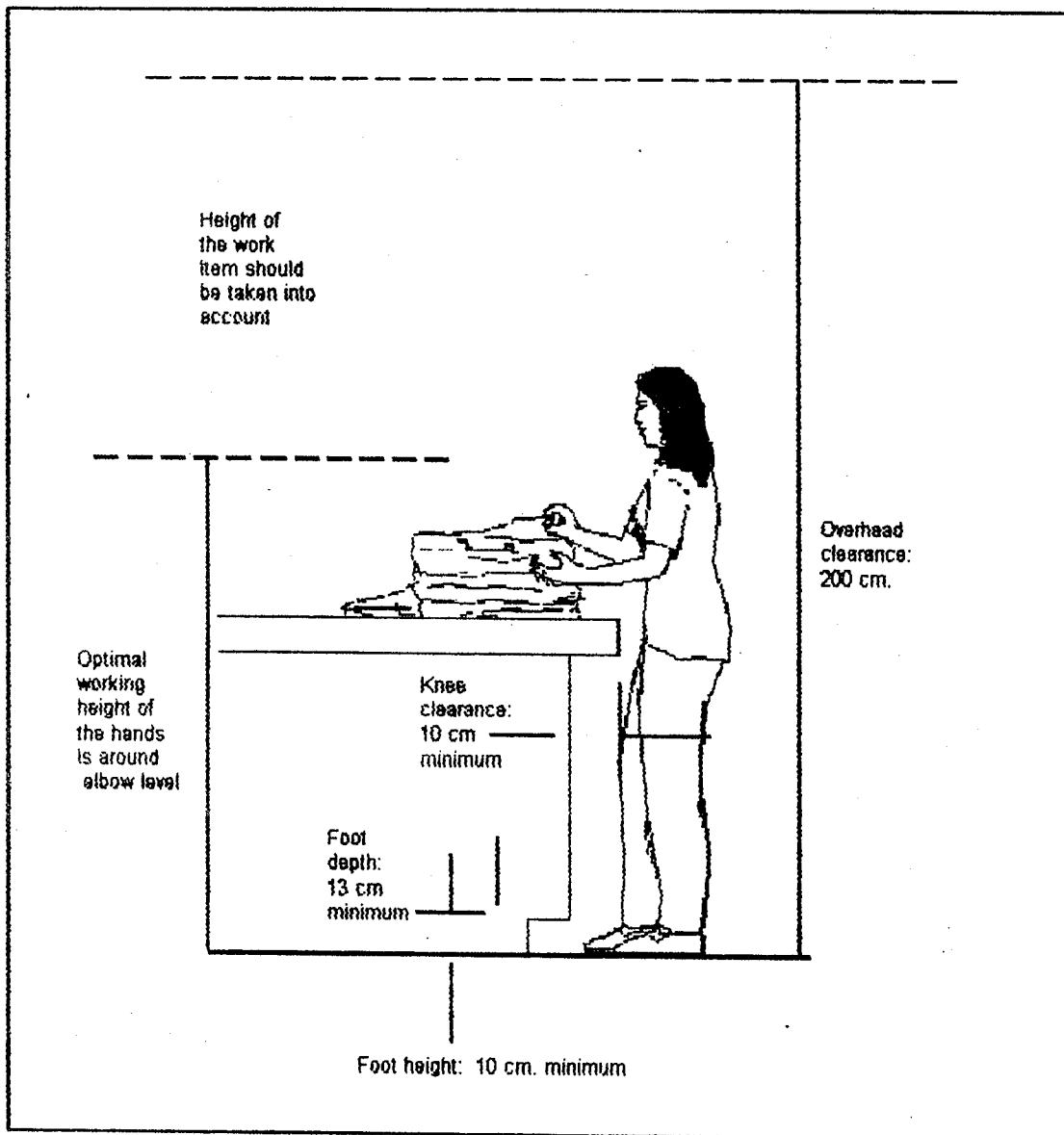


Figure 23



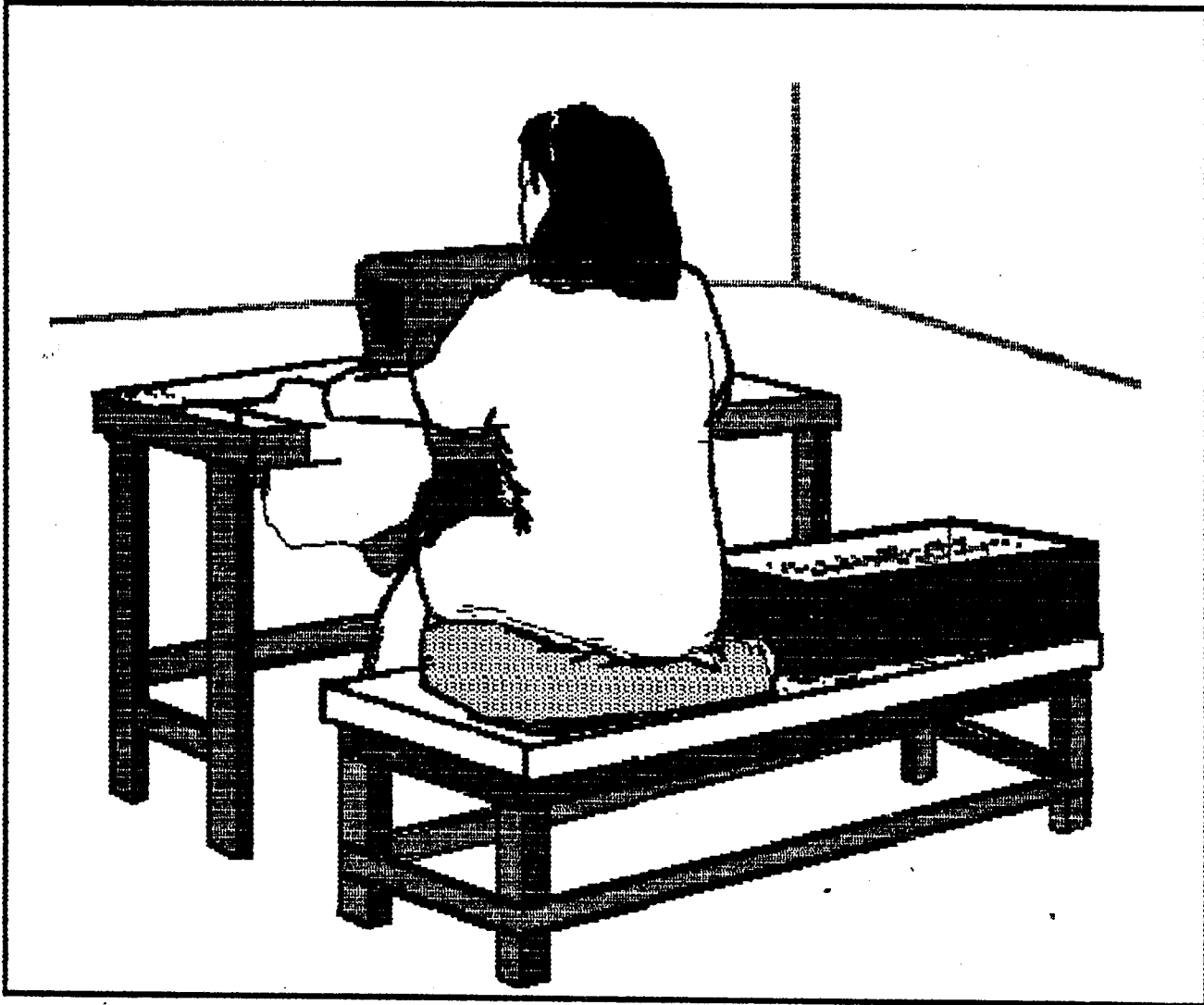
Recommended dimensions for most seated task.

Figure 24



**Recommended dimensions for standing work.**

Figure 25




**Work bench with proper cushion provides a comfortable seat for the sewers.  
Materials can be placed on the sides for easy grasping.**

sitting the whole day more comfortable and bearable. Some workers, however, may prefer the benches with slits in between the wood panels because this could be cooler since air circulates under the bench. Opportunities for sewers to stand up such as pushing filled containers to the next operation will enable them to stretch their limbs and back. Chairs with backrest could also be provided to enable the workers, especially pregnant women, to lean their backs every now and then.

Special considerations should be given to pregnant sewers and non-sewers. They should be assigned jobs that will allow alternate sitting and standing. Long standing or sitting affects venous pressure in the lower limbs. Studies have shown that high venous pressure in the legs accounts for the commonness of lower limb edema in normal pregnancy.

For tasks like inspection, workers can alternate standing and sitting while at work. Prop stools could be provided since it allows the workers to maintain a standing position yet place his/her weight on the stool. Figure 26.

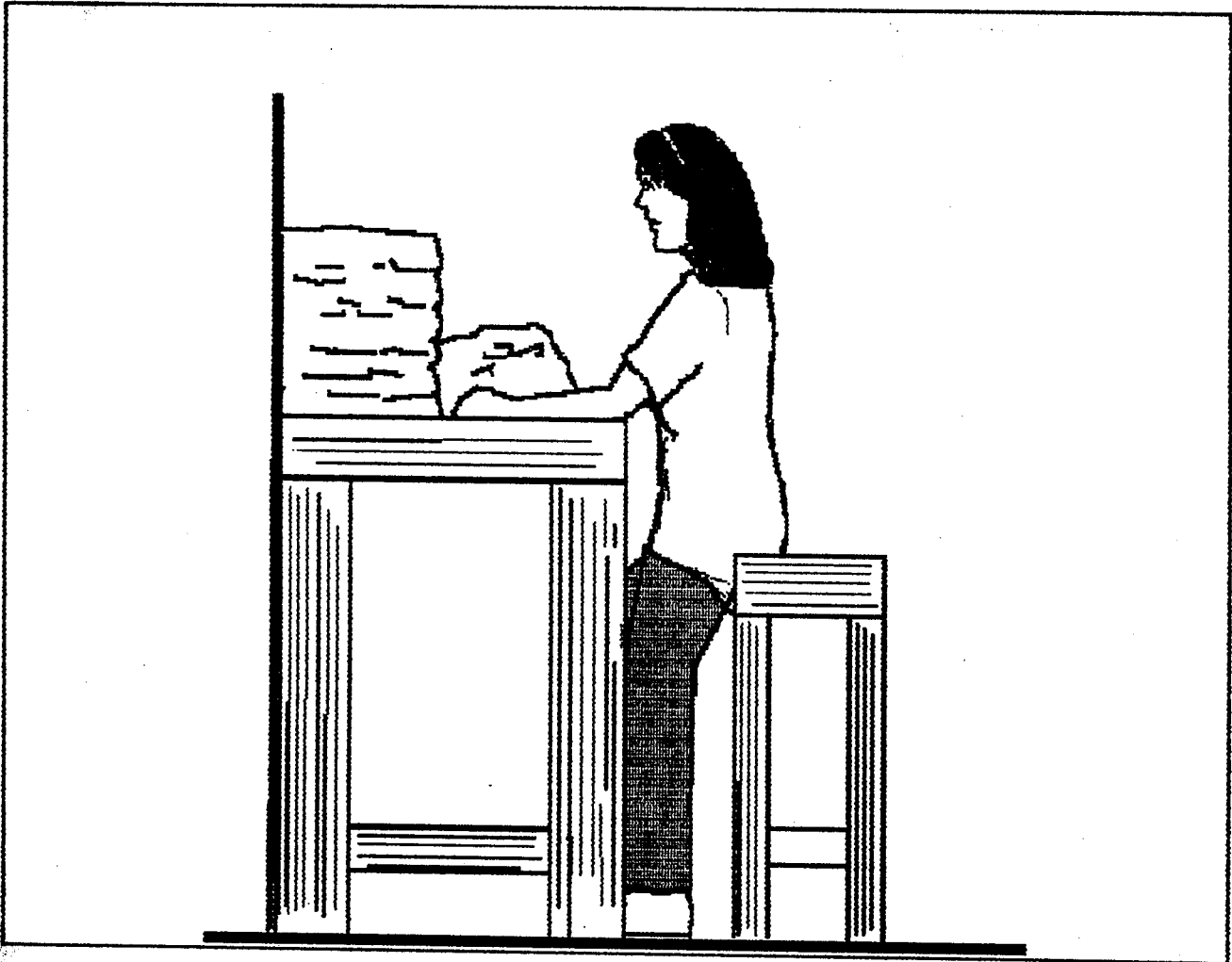
Inspection tasks could also be done in sitting position. The worktable, bench and light positioning should be appropriately designed. Inclined worktables for inspection or marking operations are also good because visibility is increased. See Figure 27.

 Use guides to easily check measurements of the garment.

Checking of the measurement of the garment would be easier with the use of measuring guides attached on the worktable. Masking tapes that are measured and cut according to the measurement of the part to be checked can serve as a guide. With this, the worker would just have to lay the garment flat on the table and compare its measurement against the guide.

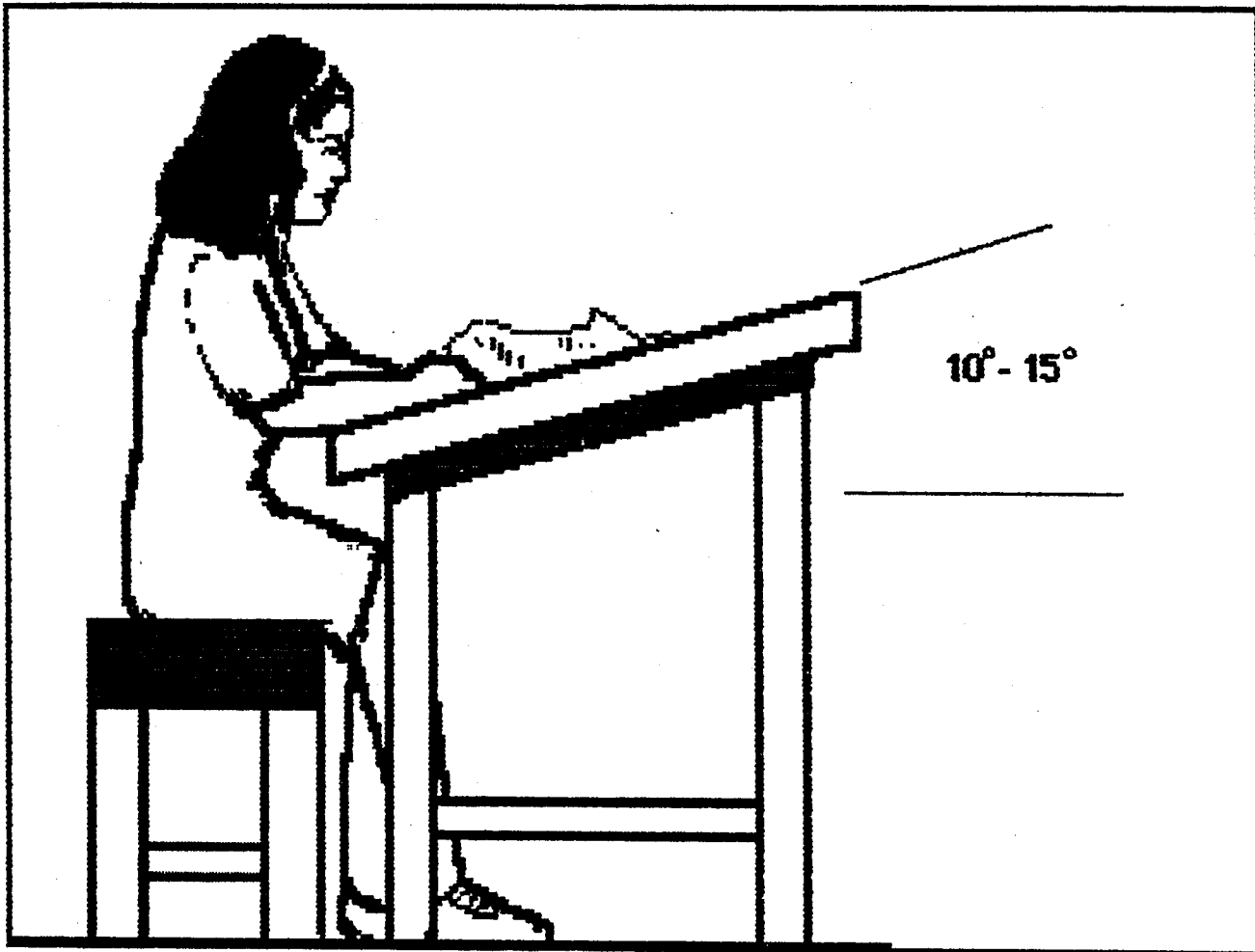
Other markings on materials can be efficiently done if patterns are used. Patterns made of scrap cardboard can be fabricated at low cost. To minimize the normal wear and tear effects of handling, cover the edges of

**Figure 26**




**Revising and marking task can be provided with stools for occasional standing and sitting. Footrest will also be of great help for the workers.**

Figure 27



**Slightly slanting the worktable by about 10 - 15 degrees can widen the visual span of the worker. This is applicable for operations like marking and inspection.**

the cardboard pattern with a scotch tape or laminate the cardboard pattern with a plastic.


 Use devices that would save time and effort.

One of the basic principles of motion economy is to use both hands simultaneously and productively. In many cases, the work can be done more skillfully and efficiently when the hands are free from efforts like controlling the machine levers which other parts of the body can do as effectively. Take for example the knee lifter. By transferring the control of the presser foot on the knee through the knee-lifter, the workers' hands are spared of manipulating the presser foot and positioning of the garment on the sewing machine is done more accurately with the use of both hands.

Small parts to be sewed could be clamped in the machine table using a garter wrapped around the sewing table. Similarly, garters could be measured and cut easily with the use of a measuring fixture attached on the worktable to hold a garter in place while it is being measured for the desired length and then cut. This is shown in Figure 28.

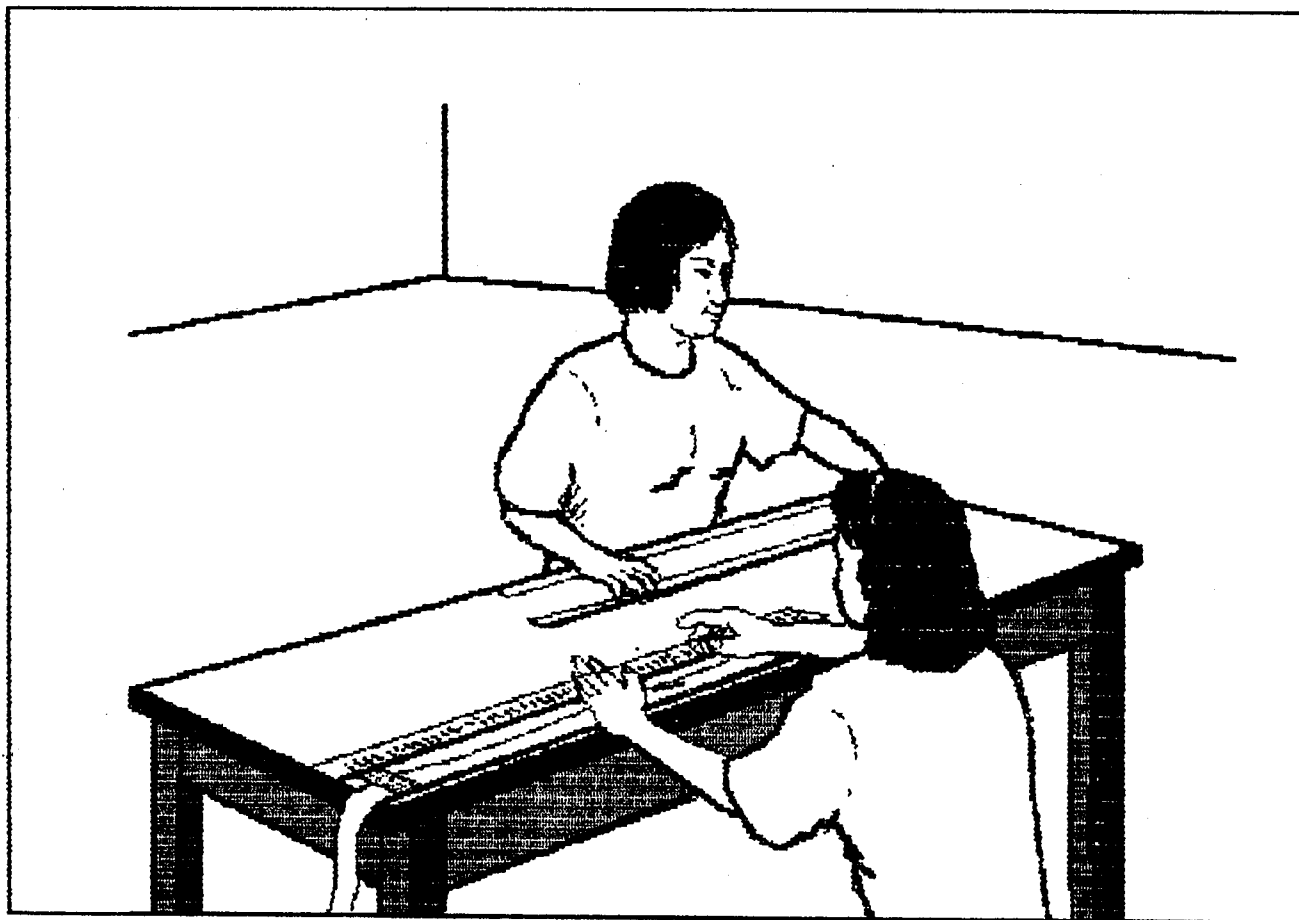
Outputs can be dropped on a container placed right at the back of the sewing machine using the law of gravity. Through this set-up, the natural movement of the material from the sewing machine can be taken advantaged of and no extra effort is needed to put the materials into the container. Appropriate containers should be used as shown in Chapter 3.

Litter bag attached to the case of every sewing machine can help maintain a clean and neat workstation. This is shown in Figure 29.

 Improve displays and controls to minimize mistakes.

Products and machines are often damaged by mistake. Accidents are also often ascribed to human mistakes. An effective way to avoid such mistakes is to ensure that each worker can see and identify clearly what he or she is working on. For example, the sample of the finished product

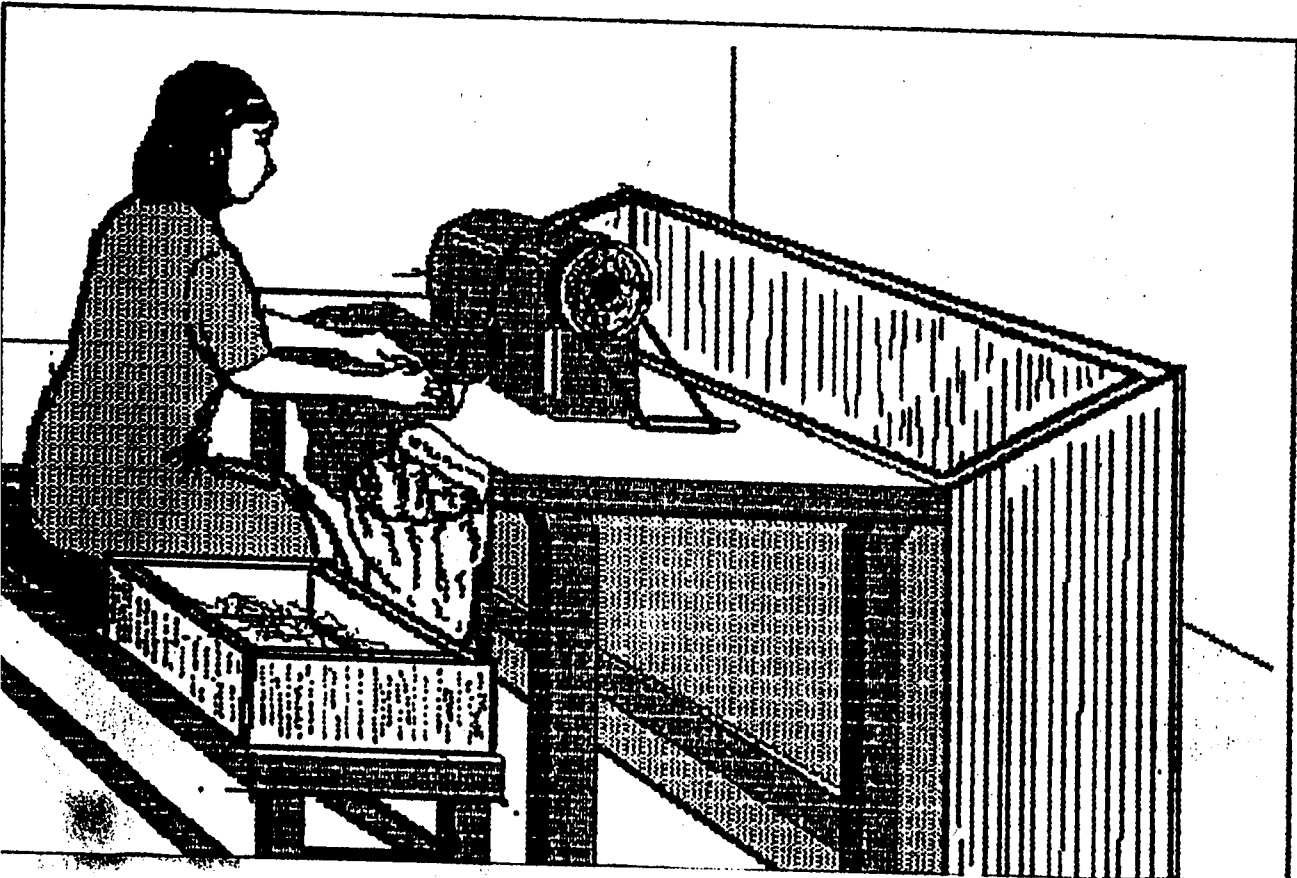
**Figure 28**



**Measurement of materials like garters, lace and others can be made easy with the use of fixtures and guides attached on the worktable.**



**Figure 29**



**Litter bag for excess threads and trimmings can be placed on side of the worktable to help the worker keep their workstation clean.**

he or she is working on. For example, the sample of the finished product being sewn by a line could be displayed in a strategic place within view of all workers so they could visualize the use of the parts they are sewing. Figure 30 shows a movable display rack. This is a basic condition for good work and for avoiding mistakes. The following points are important:

- keep things which are seen, touched or controlled (visual displays, materials, switches, etc.) within easy sight of the worker;
- make displays and controls easily distinguishable; and
- use good lighting (covered under Chapter 7).

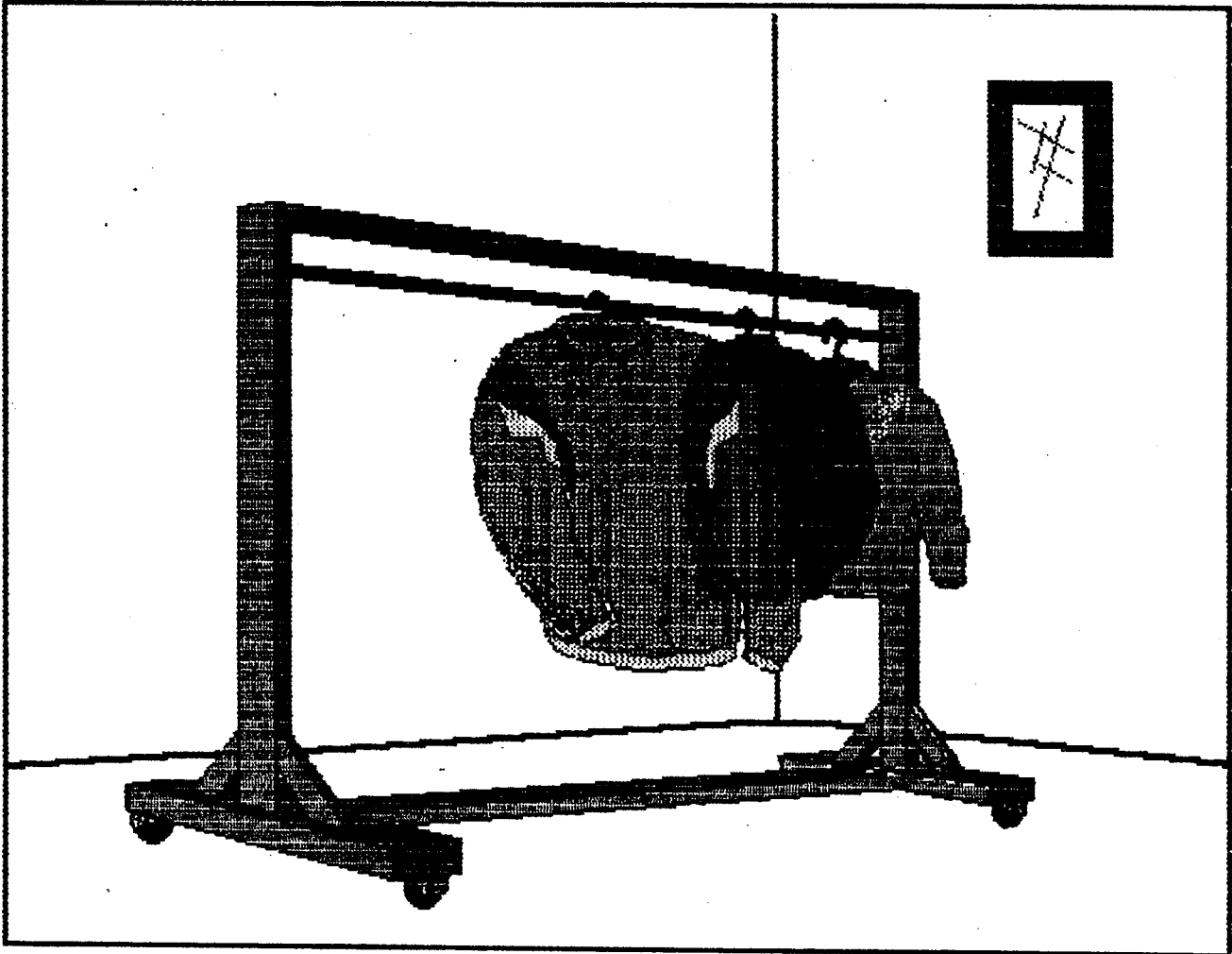
Distinguishability is as important as the location. For example, a stop switch should be clearly distinguishable from a start switch, an emergency signal from a normal-condition signal. This can even be enhanced by:

- using standard layouts for switches, gauges, etc. (Grouping mutually related displays and controls using the same on-off directions, placing displays and controls according to easy-to-identify sequences, etc.);
- attaching clearly visible, simply worded labels; and
- using different sizes, shapes or colours for different kinds of switches or signals.

In order to improve displays (signals, dials, gauges and other visual devices), it is useful to make it clear what action is expected. An emergency signal should be outstanding in its position and size and should be in red color. A switch for machine X should be placed near a gauge for machine X or in a position easily understood as related to machine X. Further, displays should be arranged so that indicator positions requiring action are easy to see.

Sometimes, workers are confused about the direction of operations. This happens with on-off switches or increase-decrease controls. These directions must be made easy to understand according to common sense and properly labeled.

Figure 30



**Movable jacket hangers for easy arrangement of styles in-process.**

**Summary:**

**Rules for Design of Efficient , Comfortable Work Stations.**

1. Position materials, tools and controls within easy reach.
2. Improve work posture for greater efficiency.
3. Use guides to easily check measurements of the garments.
4. Use devices that would save time and effort.
5. Improve displays and controls to minimize mistakes.

## Chapter 5

# PRODUCTIVE MACHINE SAFETY AND MAINTENANCE

Machines are essential to modern production. However, along with increased productivity, they have brought hazards into the workplace. Proper control of machine hazards has traditionally been seen as costly and a constraint on productivity. Moreover, it has been observed that the workers may remove guards or refuse to wear personal protective equipment while working with or around machines. It is not surprising that machine safety is a low priority in many enterprises.


Machine breakdown is a common cause of production delay affecting delivery schedules. Considering the importance of meeting delivery dates, an enterprise could not afford penalties due to machine breakdowns. Thus, proper maintenance of machines to prevent defective outputs, prolong economic life, reduce breakdowns and ensure safe operations of machines should be given importance. Maintenance and safety measures to eliminate hazards and increase machine productivity are discussed in this chapter.

 Give your machines a productivity check.

Walk through the plant and take note of the following:

- a) Are there any delays or bottlenecks caused by specific machines?
- b) Do any machines operate slowly because of wear and tear?
- c) Is there fear or hesitation caused by dangerous machines or processes?
- d) Are there situations where machine guards have been altered, removed or destroyed?

If you have answered yes to any of the above questions, the remainder of this guide will assist you in dealing with the problems of machine productivity and safety.

 Eliminate the hazard; or install guards; or, as a last resort, use personal protective equipment - always in this order.

Sewing machines are relatively safe machines. Only minor accidents occur, but they should be eliminated. You certainly do not want an accident to happen: they are always linked with financial losses as well as human suffering. However, avoiding accidents in a workshop is not an easy task. You need a well-developed strategy.

The best idea of all is to remove the hazard entirely. Does this sound impossible? If you cannot eliminate a hazard, place a guard around it. However, guards must be very carefully designed or they may get in the way. Have any guards in your factory been removed?


It is well known that just providing personal protective equipment does not ensure that this will be used. Even if you put a lot of effort into persuading your workers to use personal protective equipment you cannot be absolutely certain that it will be used properly at times. We therefore recommend that you use personal protective equipment as a last resort.

Remember:

*First:* Remove or substitute the hazard with a less dangerous machine or process.

*If this is impossible:* Erect guards around the hazard.

*As a last resort:* Provide personal protective equipment until the hazard can be eliminated or guarded.

 Purchase safe machines.

When a new machine is ordered, care should be taken to specify a machine which is safe by construction. Dangerous parts should be situated in a position where they cannot harm the worker. In particular, points of operation should be free from danger.

Manufacturers or sales personnel may recommend a machine without guards to reduce cost. Catalogues may offer unsafe versions at a lower price. Such machines are usually illegal and can cause you many

problems once they are installed. You can save yourself a lot of trouble and expense by choosing the right machines.

You should also make sure that you have a manual for the machine and that any operating instructions and labels are in the correct language and readily available to the worker.

### **Maintain machines properly.**

A poorly maintained machine can be dangerous. It will also have more breakdowns and quality problems. Proper maintenance is not lost production time, it is an investment for higher productivity and lower repair cost.

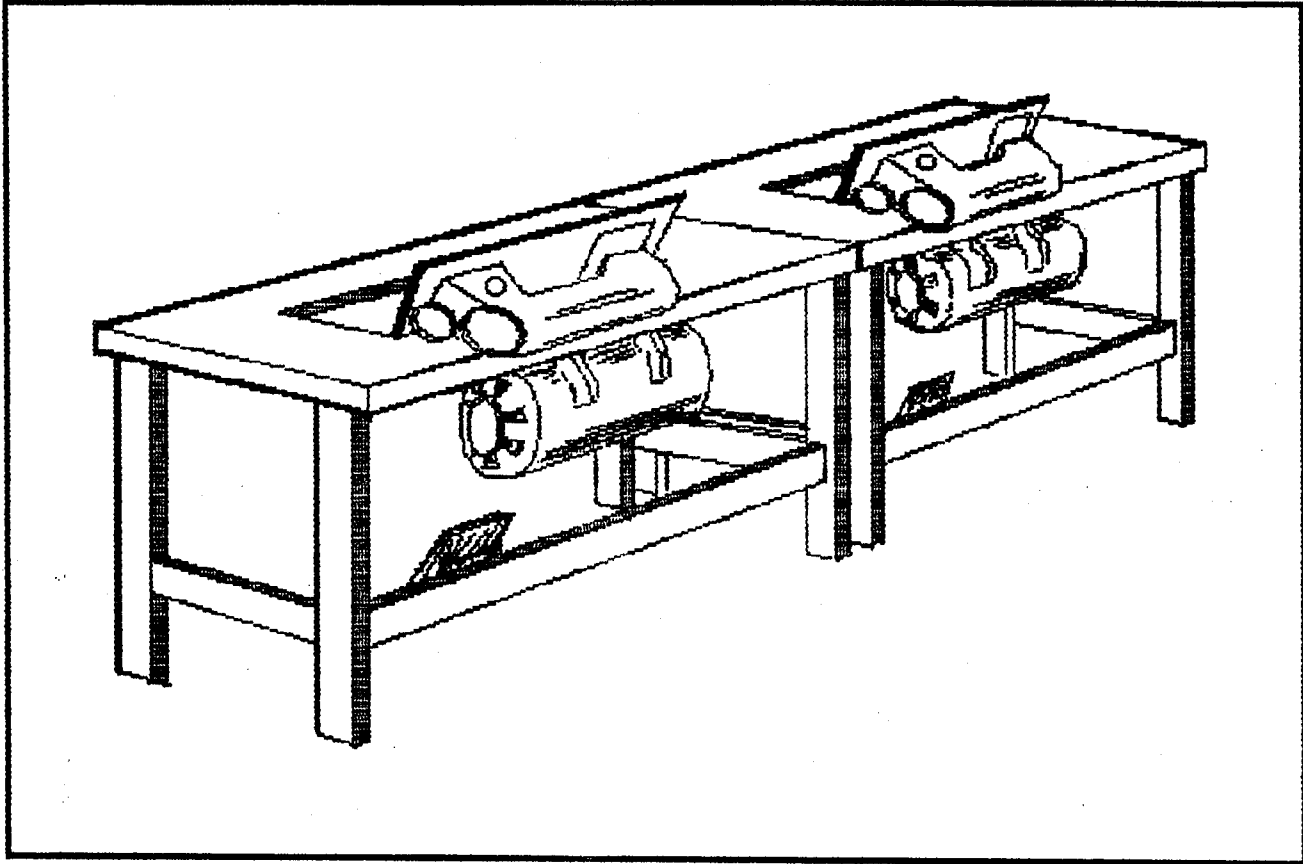
Yet in many companies, machines are maintained only when they break down. This is due to a number of reasons:

- 1) Machines are owned by the contractors or they are leased.
- 2) No maintenance personnel.
- 3) No time to maintain machines.
- 4) Maintenance means cost.
- 5) Machines are easy to maintain.

Machine downtime affects production and causes delays. Defects are also produced causing quality and productivity problems. Machine maintenance should therefore be planned and coordinated with the production department. Workers should be involved in machine maintenance. They should be trained to do routine maintenance work such as:

- cleaning of the back of the plate, the feed dog, the inside of the rotating hook, bobbin case holds and around the rotating hook.
- cleaning of the iron surface, iron mat cover, and change of the cover.
- confirmation of the oil level, removal of waste thread in the oil pan, and around the motor.
- inspection of needles, needle location holes and the presser.
- cleaning of the arm and the table.

Figure 31




During regular preventive maintenance, machine heads can be turned upside down so that used oil can drip and a new oil can be placed. Accumulated dust fibers under the machine head can also be removed with a used toothbrush.



The workers could be involved in preparing the schedule for doing the above tasks. Some activities are normally carried out weekly, bi-weekly, and monthly. Figure 31 shows machines turned upside for regular maintenance.

It is a common practice to assign a machine to a worker and as such the worker could detect abnormal functioning of her/his machine. If workers were trained to trouble shoot common problems then machines could be put back to operation immediately. With this practice, maintenance becomes a responsibility of everyone. Preventive and repair maintenance are left to maintenance personnel who could be on full-time or retainer basis depending on the number and condition of the machines in your factory.

 Teach workers to trouble shoot common machine problems.

A sewer is expected to know how to trouble shoot common problems encountered with her/his machine. Yet in many cases, simple problems are still brought to the attention of the in-house technician whose job is to wait for trouble to happen, otherwise he may not be doing anything. Yet there are times when machine troubles happen all at the same time that there are not enough technicians around. Thus, involving workers in trouble shooting common problems will save valuable time and improve productivity and quality.

Causes of common problems encountered with zigzag and overlock sewing machines are discussed below:

<b>A. STRAIGHT / ZIGZAG SEWING</b>	
Condition	Cause
1. The needle thread	1. The needle thread is not threaded properly. 2. The needle thread tension is too tight. 3. The needle is bent or blunted. 4. The needle is incorrectly inserted. 5. The fabric is not being drawn to the rear when sewing is finished. 6. The thread is either too fine or too heavy for the needle. 7. Both threads are pulled back under the presser foot.

<b>A. STRAIGHT / ZIGZAG SEWING</b>	
<b>Condition</b>	<b>Cause</b>
2. The bobbin thread breaks.	<ol style="list-style-type: none"> <li>1. The bobbin thread is not threaded properly in the bobbin holder.</li> <li>2. Lint has been collected in the bobbin holder and/or tension spring.</li> <li>3. The bobbin does not rotate smoothly.</li> </ol>
3. The needle breaks.	<ol style="list-style-type: none"> <li>1. The needle is incorrectly inserted.</li> <li>2. The needle is bent or blunted.</li> <li>3. The needle clamp screw is loose.</li> <li>4. The tension of needle thread is too tight.</li> <li>5. The fabric is not drawn to the rear when sewing is finished.</li> <li>6. The needle is too fine for the fabric being sewn.</li> <li>7. The pattern selector dial had been turned while the needle was in the fabrics.</li> </ol>
4. Skipped stitches.	<ol style="list-style-type: none"> <li>1. The needle is incorrectly inserted.</li> <li>2. The needle is bent or blunted.</li> <li>3. The needle and/or the thread are not suitable for the fabric being sewn.</li> <li>4. The needle thread is not threaded properly.</li> <li>5. A BLUE TIPPED needle is not being used for the sewing stretch, very fine fabrics and synthetics.</li> </ol>
5. Seam puckering.	<ol style="list-style-type: none"> <li>1. The needle thread tension is too tight.</li> <li>2. The needle thread and/or bobbin thread are not threaded properly.</li> <li>3. The needle is too heavy for the fabric being sewn.</li> <li>4. The stitches are too coarse for the fabric being sewn.</li> </ol>
6. Stitches loop behind the fabric.	<ol style="list-style-type: none"> <li>1. The needle thread tension is too loose.</li> <li>2. The needle is either too heavy or too fine for the thread.</li> </ol>
7. The fabric is not being fed smoothly.	<ol style="list-style-type: none"> <li>1. The feed dog is packed with lint.</li> <li>2. The stitches are too fine.</li> <li>3. The fabric is not fed at the beginning of sewing.</li> <li>4. The feed dog is dropped.</li> </ol>
8. The machine does not operate.	<ol style="list-style-type: none"> <li>1. The machine has not been plugged-in firmly.</li> <li>2. Thread is jammed in hook mechanism.</li> <li>3. The pattern selector dial has been set at "overlock sewing".</li> <li>4. The bobbin winder spindle has been pushed to the winding position.</li> </ol>
9. The machine is noisy.	<ol style="list-style-type: none"> <li>1. The machine is in need of oil.</li> <li>2. Dust and lint have collected in the hook mechanism.</li> <li>3. The feed dog is packed with lint.</li> </ol>

<b>B. OVERLOCK SEWING</b>	
<b>Condition</b>	<b>Cause</b>
1. The cloth is not being fed smoothly.	1. The feed dog is packed with lint. 2. The presser foot has been raised.
2. The needle breaks.	1. The needle is incorrectly inserted. 2. The needle is bent or blunted. 3. The fabric is forcibly pulled. 4. The thread is jamming with spool spin.
3. The needle and/or looper thread break.	1. The machine is incorrectly threaded. 2. The needle or the looper thread tension is too tight. 3. The needle is incorrectly inserted. 4. The needle is bent or blunted. 5. The thread is jamming with spool spin.
4. Skipped stitches.	1. The needle is incorrectly inserted. 2. The needle is bent or blunted. 3. The machine is not correctly threaded.
5. The seam is not sewn neatly.	1. The needle and/or looper thread tensions are not correctly adjusted. 2. The machine is not correctly threaded. 3. The needle and/or the thread are not suitable for the fabric being sewn.
6. Seam puckering.	1. The machine has not been plugged-in firmly. 2. The stitch selector dial has been set at "Straight Zigzag Stitch". 3. The bobbin winder spindle has been pressed to the winding position.

**Summary:**

**Rules for Productive Machine Safety and Maintenance.**

1. Give machines a productivity check.
2. Eliminate hazards; or install guards; or, as a last resort, use personal protective equipment - always in this order.
3. Purchase safe machines.
4. Maintain machines properly.
5. Teach workers to trouble shoot common machine problems.

## Chapter 6

# CONTROL OF HAZARDOUS SUBSTANCES

Hazardous substances of one form or another can be found in almost all small and medium-sized enterprises. The garments industry for one generates a lot of dust from fabrics being cut and sewed. Some fabrics releases chemicals which saturates the air causing hard breathing and eye irritation.

A polluted working environment is often harmful to production. High level of dust or fumes interfere with efficient production, require cleaning operations and may spoil materials and finished products. There is excellent potential for increasing productivity and quality.

There are simple and inexpensive ways to control most of the problems. Improvements often result in cost savings, productivity benefits and safety of workers.

 Clean regularly and properly - don't spread dust.

Dusts originate from fabrics and threads from cutting to sewing to packing operations. Thus, it is very common to see garment factories with ceilings and walls full of dust-cobwebs. Even machines which are not regularly cleaned could be full of dust which may cause machine breakdown.

Dust increases wear and tear on machinery, necessitating more maintenance. It also negatively affects the quality of raw materials and finished products. Dust entering the respiratory system can damage the worker's lungs. Some dusts can also cause allergies.

Dust should be removed regularly and eliminated from the source. More comprehensive cleaning should be carried out as often as necessary. This cleaning should include walls, ceilings, storage racks and other areas where dust accumulates. Dust on windows, walls and lamps will significantly reduce the lighting in the workplace.

**Warning:** Do not blow dust away. Sweep the floor carefully with an appropriate broom and accompanying dust pan to prevent dust from spreading. Dust containing very small particles does not fall immediately to the floor after being raised by sweeping and blowing. A 0.001 mm particle will only fall 1 m in 3.5 hours in static air. This means that a particle remains airborne most of the working day and can be inhaled. Frequently, dust cannot be seen in the air, but the next day it can be found covering the floors, work tables, machinery and materials.

Effective method of controlling dust include using a vacuum cleaner or a wet mop.

 Make local ventilation cost-effective.

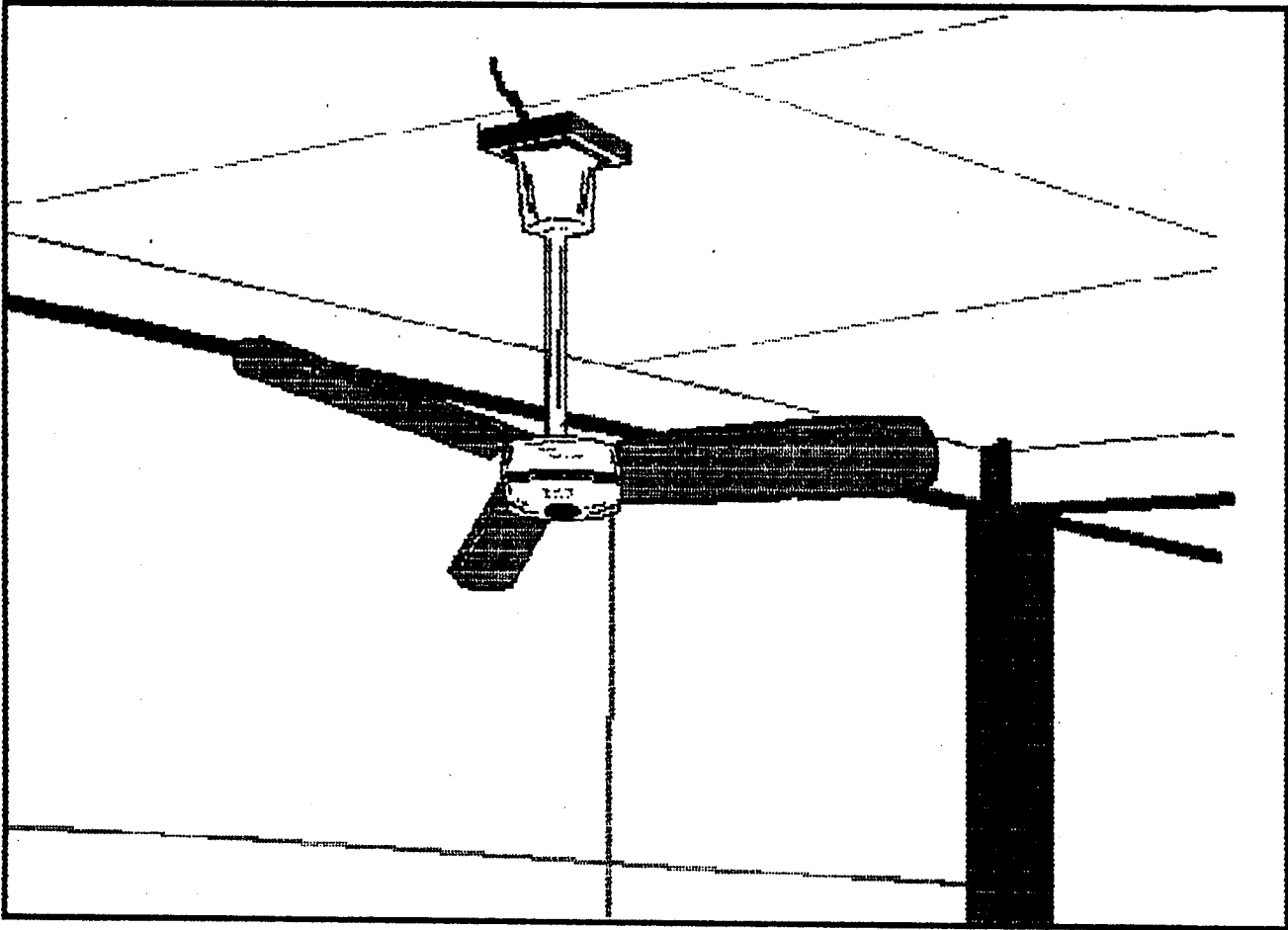
Local ventilation should only be considered as a means of reducing chemical hazards when other means have failed. There are cost-effective ways of improving ventilation.

#### ***Use proper fans.***

Fans may be utilized to remove dangerous substances from the workplace. Contaminated air can be pushed or blown outside by having more windows. In some cases dust can be blown into a collection hood. A few points should be considered:

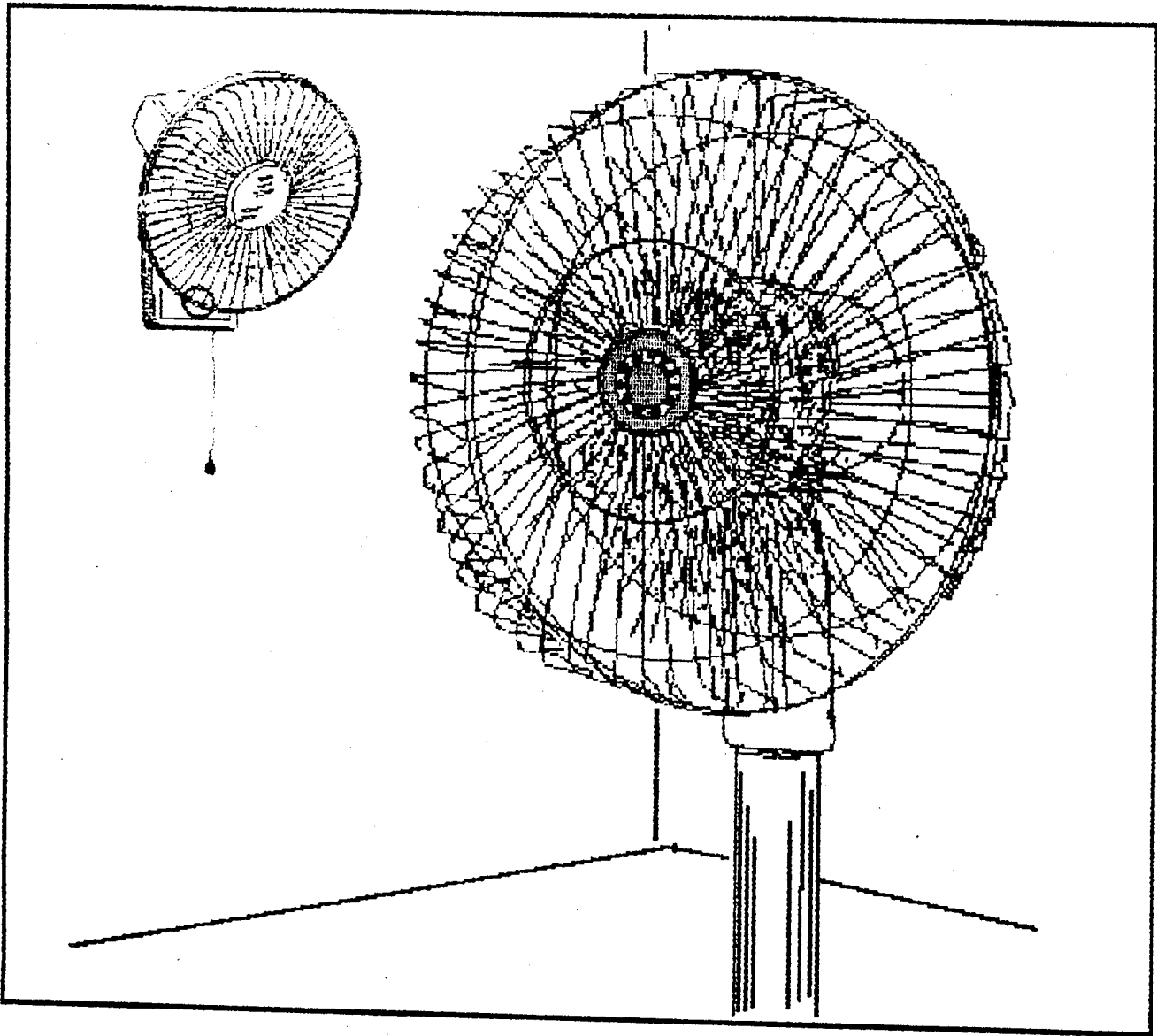
- There should be no obstacles between the fan and opening. Anything in the way significantly reduces the desired effect.
- The air speed should be low to reduce turbulence. In the garments industry, different fans are used. Some use industrial fans, ceiling fans or walls fans as shown in Figures 32, 33. There are advantages and disadvantages for these types of fans. Industrial fans are very powerful that workers near them may be affected. Ceiling fans of the rotary type may lift the cloth being sewed, hence speed should be controlled.
- Contaminated air should not pass workers on the way to the opening.
- Air expelled from the workplace should not affect people outside the enterprise.

**Figure 32**



**Ceiling fans serve the purpose of circulating the air inside the factory without much turbulence on the garments being sewed.**

Figure 33



**Example of a wall fan and industrial fan commonly used in garment factories.**

***Use natural airflow.***

Air temperature influences air movement. Even a few degrees difference can result in considerable movements of air. Hot air will move upwards, thus air exhaust should be installed on roof tops.

Natural air flows such as wind blowing through and around buildings should also be used to advantage. Install windows for more efficient airflow.

**Summary:**

**Rules on Control of Hazardous Substances.**

1. Clean regularly and properly.
2. Make local ventilation cost effective.
  - Use proper fans.
  - Use natural air flow.



## Chapter 7 LIGHTING

It is well-known that we receive 80 per cent of all information through our eyes. Although the human eye is very adaptable and can allow a worker to work with an absolute minimum of light, bad lighting leads to low productivity and poor quality as well as eye strain, fatigue and headaches for the worker. It has been confirmed by numerous studies that better lighting pays off through higher efficiency. Improvements in lighting conditions conducted in a number of industries have very often resulted in 10 per cent productivity growth and reduction of errors by 30 per cent.

Better lighting does not mean that more light bulbs must be bought and more electricity used. Natural lighting is often better than artificial lighting. The way lighting is arranged and maintained is equally important. For example, a change in the visual background can enable a worker to perform a task efficiently which otherwise would require tripling the lighting level.


You will learn from this chapter how to attain better lighting. This is a good chance as it can be done without an increase in the electricity bill, and you may even pay less. But in any case, your business as well as the workers will definitely benefit from these improvements.

First of all, before starting to do anything, we have to decide whether the existing lighting facilities need improvement. Lighting requirements are dependent on three main factors:

- the nature of the task;
- the sharpness of the worker's eyesight;
- the environment in which the work is done.

These factors make it difficult to calculate the required level of lighting using instruments and tables. However, we can learn much from going around the workplace, observing the workers and asking them about their visual problems. If workers adopt an awkward posture, with their eyes very close to their work, it is very likely that there is a problem. If there is a naked light in the worker's field of view, it definitely reduces efficiency.

Your programme of improvement may not have much impact if the workers' eyesight is insufficient. One study conducted in a factory discovered that 37 per cent of workers wearing glasses needed a new prescription and 69 per cent of those without glasses needed them. The same may be true for your company. That is why we suggest that you conduct an eyesight test for workers. Even if some of the workers do not follow advice about acquiring glasses, you will be aware of the problem and possible reasons for low efficiency.

 **Make full use of daylight.**

Natural light is the best and cheapest source of illumination, but very often small enterprises do not make full use of it. Measure the surface area of your shopfloor and your windows and skylights. If you do not have at least one-third as much window surface as floor surface, you are probably not benefiting fully from natural light. Be careful, however: windows and skylights provide heat as well as light.

When thinking about new windows and skylights, remember that the higher the window, the more light it gives. Skylights can give double the light of a low window, even if the low window was not blocked by machines or storage arrangements. If your factory doesn't have a skylight, consider replacing one roof panel with a translucent plastic panel.

Lack of regular cleaning can result in the loss of 10 to 20 per cent of light, if not more. Special care should be taken about skylights, which are difficult to reach, so no one cleans them.

Well-chosen paint and finishes on the ceiling, walls and equipment can help to cut lighting bill by one-quarter. At the same time, this helps to produce better visual conditions and a pleasant, cheerful working environment which encourages high standards of cleanliness and housekeeping. Gains are achieved from: lower losses of reflected light, better light diffusion and reduction of brightness contrast. In order to spread reflected light diffusely and evenly throughout the interior, ceilings should be made as near white as possible. The matt finish of

whitewash is very good. To avoid harmful glare, don't use bright, shiny, gloss paint for walls. Pale colours are better than white. A slightly darker colour below eye level is helpful. Equipment such as machines, work-benches and desk-tops should normally be darker than walls, and their colours should be different from walls and floors so they can be seen easily.

Unless you have a full skylight system, you are likely to have problem of unequal light distribution over the work area. Take this into account and change the layout of benches or machines in order to minimize shadow zones. Work-stations with high lighting requirements should be moved closer to the windows and possibly be grouped together for the provision of additional lighting.

#### Avoid glare.

Glare means especially bright points or areas within the field of vision. Glare is often a reason for low quality and productivity. It causes a reduction in the ability to see, discomfort, annoyance and eye fatigue. Visibility can be considerably improved by elimination of glare without increasing light intensity.

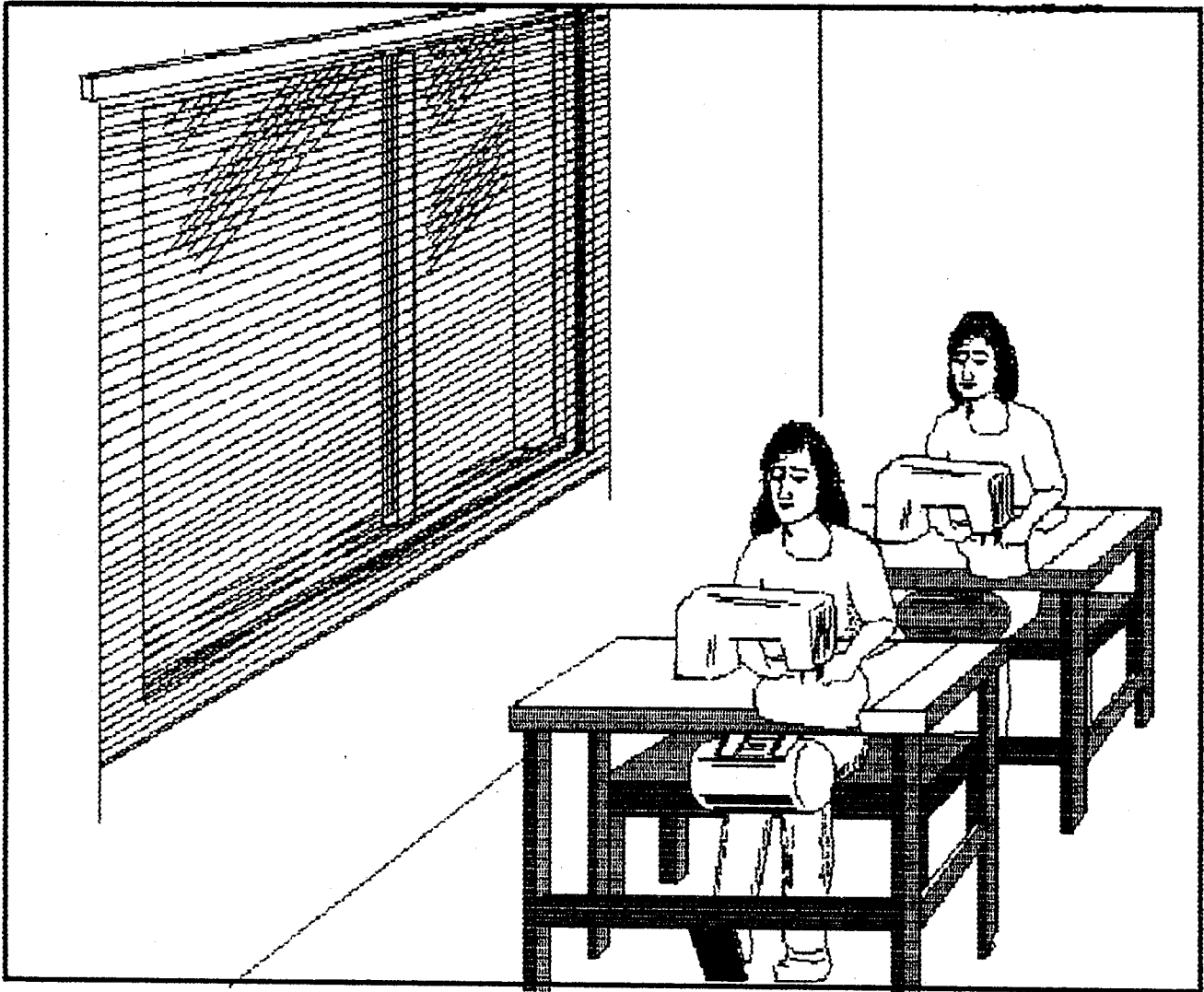
There are two types of glare: direct glare and reflected (indirect) glare.

Direct glare is caused by a light source within the field of view or sun light.

To reduce glare from windows:

- use blinds, curtains, louvers, shades, trees or vines;
- change the windows to translucent instead of transparent;
- change the orientation of the work-stations. The workers, instead of facing the windows, should have their sides towards the windows. Some shadows will still be created, but better than having the back towards the window because the whole body of the worker will create a shadow covering the machine and the needle area.

Figure 34



**Tall windows promote natural lighting for higher productivity of workers.  
Blinds can be provided to minimize glare.**

To avoid glare from lamps:

- no naked light bulbs or tubes should be in the view of the worker;
- deep shades or shields should be employed. The inside edge of the shades should be painted in dark matt colour;
- shades should be mounted low enough to ensure that all bright surfaces are completely hidden, or high enough to ensure that they are well outside the normal field of view..

Reflected (indirect glare). Even if we are protected from direct glare, we can still be bothered by reflected glare. (Figure 35) To reduce the distraction from light reflection on polished surfaces such as shiny table tops or the sides of machines, we can:

- change the position of the light source;
- lower the brightness of the source;
- make the immediate background brighter by placing a light-coloured surface behind the task.
- cover the table top with clean paper or other appropriate material.



Choose an appropriate visual task background.

Visual tasks that demand close, continuous attention are performed with much less strain if their background is free from eye-catching distractions. Elimination of potential distractions contributes much to efficiency and safety.

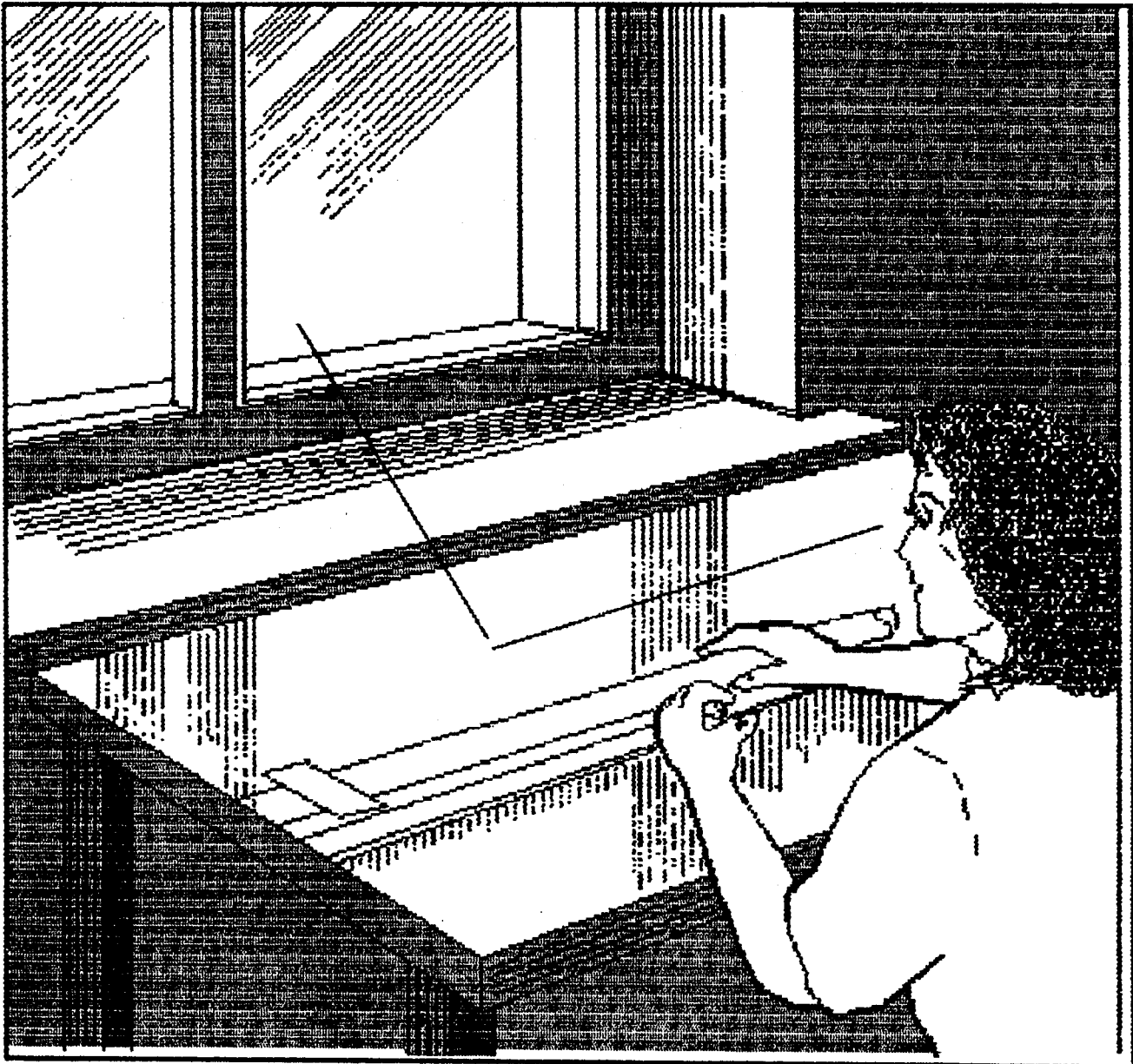
For marking and inspection operations, try using incline work tables. A 10 to 15 degree inclination will improve visibility of work being done. Use of pale colors as background for these operations will also be helpful considering the varying colours of cloth materials used.



Find the right place for light sources.

By changing the position of lamps and the direction of light falling on an object, it is possible to improve visibility dramatically without increasing the quantity of illumination.

Figure 35



**Glare reflected from a polished surface reduces visibility.**

In garment factories, lights are either arranged perpendicular or parallel to the machines. Depending on how these are positioned vis-à-vis the machines, either is good. If perpendicular, the lights should be positioned along the machine heads not above to prevent shadows. A one on one ratio is ideal - that is - one fluorescent lamp per machine. If the line is properly spaced, the row of fluorescent lamp is between 1.5 to 2.0 feet apart. (Figure 36).

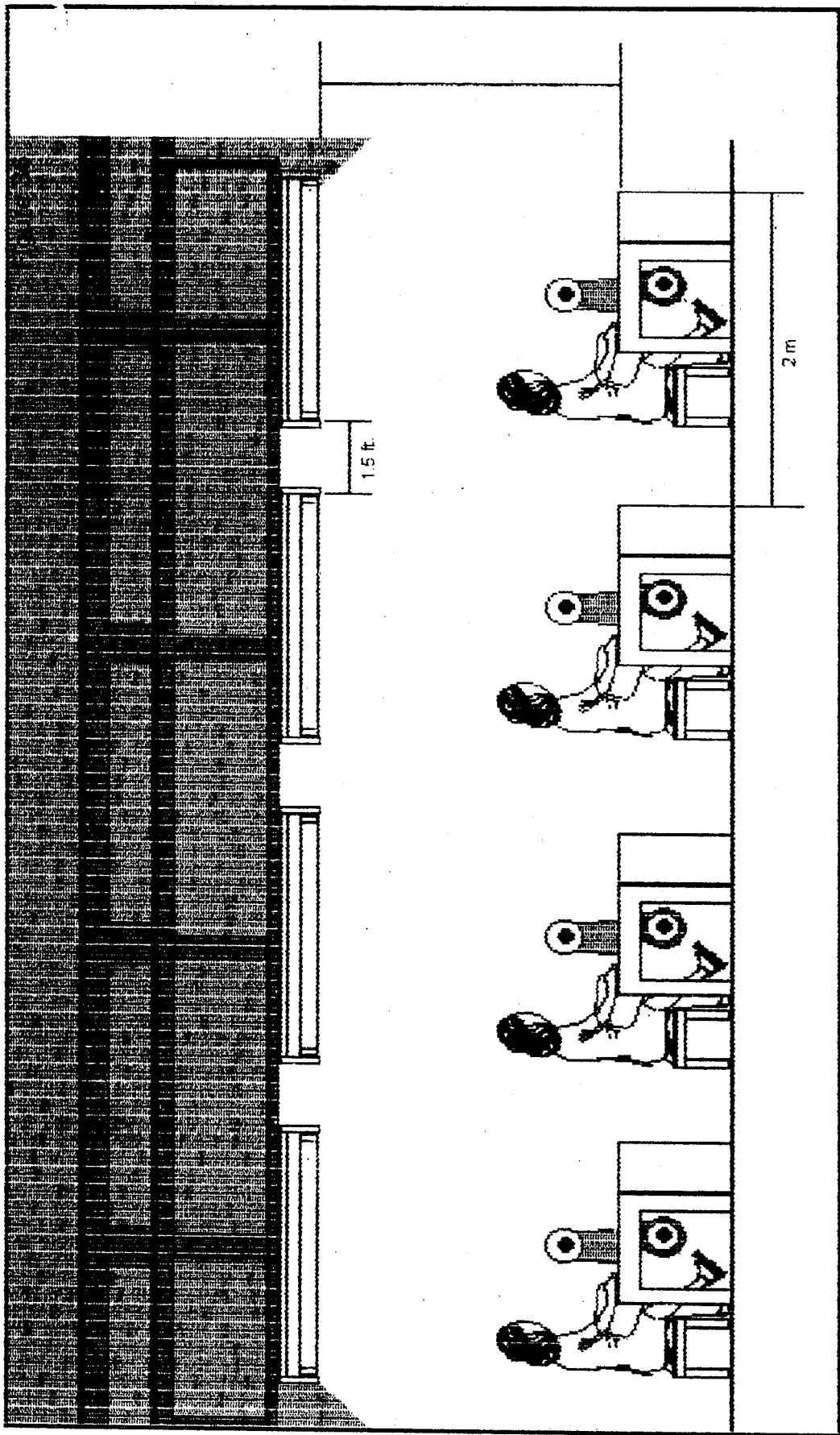
In parallel arrangement, the light should be positioned in front of the machine. Again, if the line is properly spaced, the illumination is uniform in front and back thereby preventing shadows.

The height of the lights from the work table is another important factor not only for maximum illumination but for the comfort of the workers. Too low lights will generate heat causing discomfort while too high lights will disperse light. You have to determine the most appropriate light direction in order to:

- distinguish an object from its background;
- reveal its surface texture;
- enable any marking on its surface to be seen easily.

**Use the right lighting device and fixture.**

Different lighting device and fixtures are available in the market. Electricity consumption, illumination and cost are affected by the type of lighting device and fixture used. Fluorescent lamps are recommended because of their higher lumen and longer life as compared to an incandescent bulb. While the tube type of fluorescent lamp is commonly used at present, compact fluorescent lamps which are energy savers are now available. These types are relatively expensive and would require high initial investment, but the savings on electricity consumption will be substantial. A Department of Energy study shows the following comparative data:



An ideal set-up for an assembly line. Sequential operations can be placed in a straight line.

Correct positioning of lights in the sewing area. Fluorescent bulbs are perpendicular to the head of the machine to avoid shadows on the workpiece.



Type of Lamp/Bulb	Lumen	Life	Cost of Lamp/Bulb
Incandescent			
50 watts	500-550	600 hrs.	X amount
25 watts	180-200	600 hrs.	X amount
TLD Fluorescent Lamp			
36 watts	800	8,000-10,000 hrs.	4.0 X
Compact Fluorescent Lamp			
18 watts	800	8,000-10,000 hrs.	15 X
Standard Fluorescent Lamp			
40 watts	800	8,000-10,000 hrs	3.5 X

The TLD type is a more advanced linear fluorescent lamp which has a better color rendering quality. This helps in determining color shades. To save on electricity, it will also be wise to install individual switch for every fluorescent lamp as shown in Figure 37.

#### Avoid shadows.

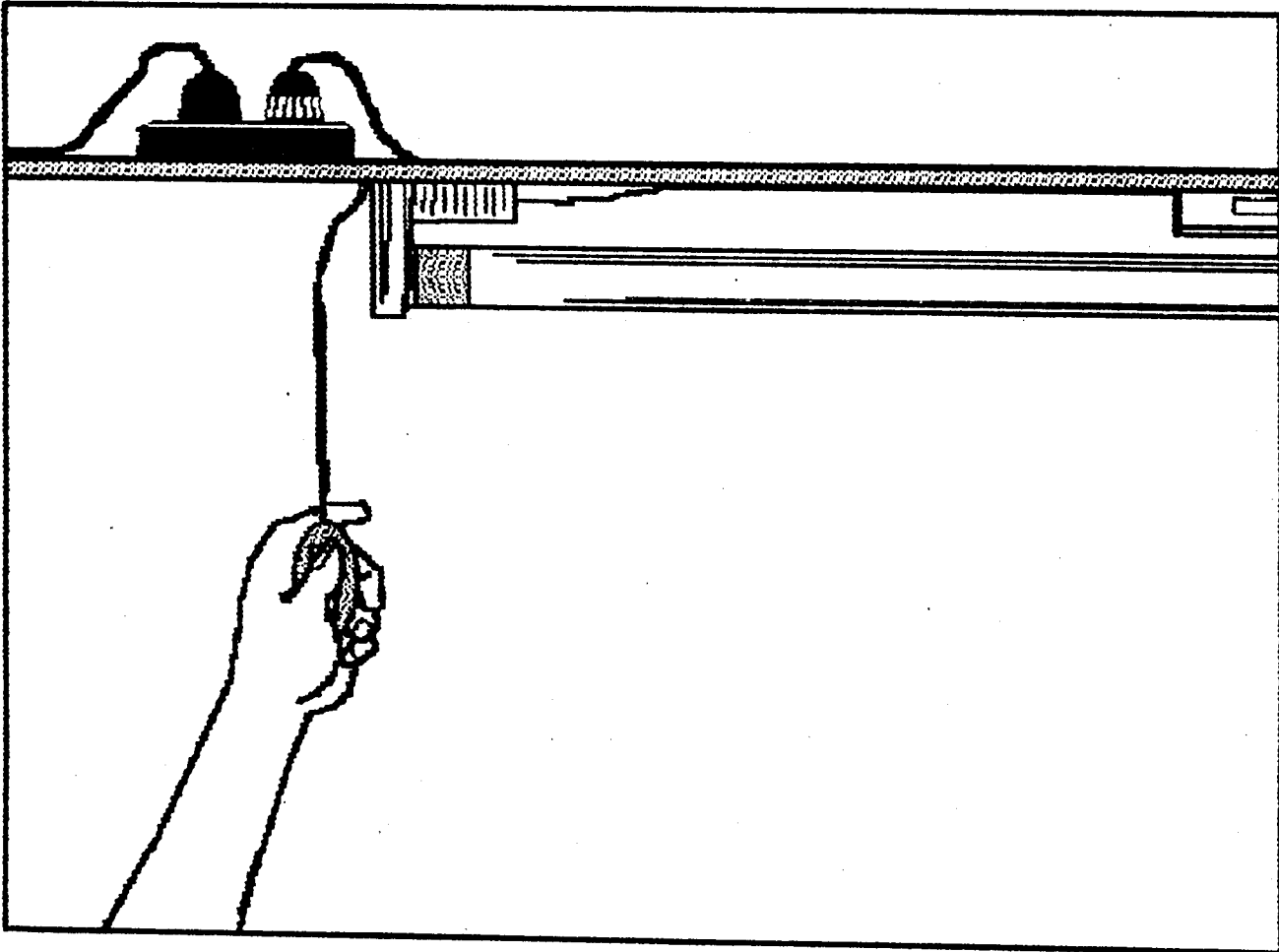
Shadows make it difficult to work. It is hard to see into a shadow because the eyes will adjust to the surrounding light. Sharp shadows on the work surface are a source of poor work quality, low productivity, eyestrain, fatigue and sometimes accidents. See Figures 38, 39, and 40.

Many of the suggestions made so far will help to avoid shadows. If you have made improvements in any of the following areas, you have already reduced shadows:

- more and clearer windows and skylights;
- light-coloured, matt-surfaced ceilings and walls;
- layout which avoid shadow zones;
- rows of lights for rows of machines;
- use of reflected lights to avoid glare;
- better light direction.

There is more you can do. For example, you can improve the quality of lighting considerably by allowing from 10 to 40 per cent of light to escape upwards. In this case, light will be much better dispersed due to reflection from the ceiling. The ceiling should be reasonably low and not obstructed and should be painted white.

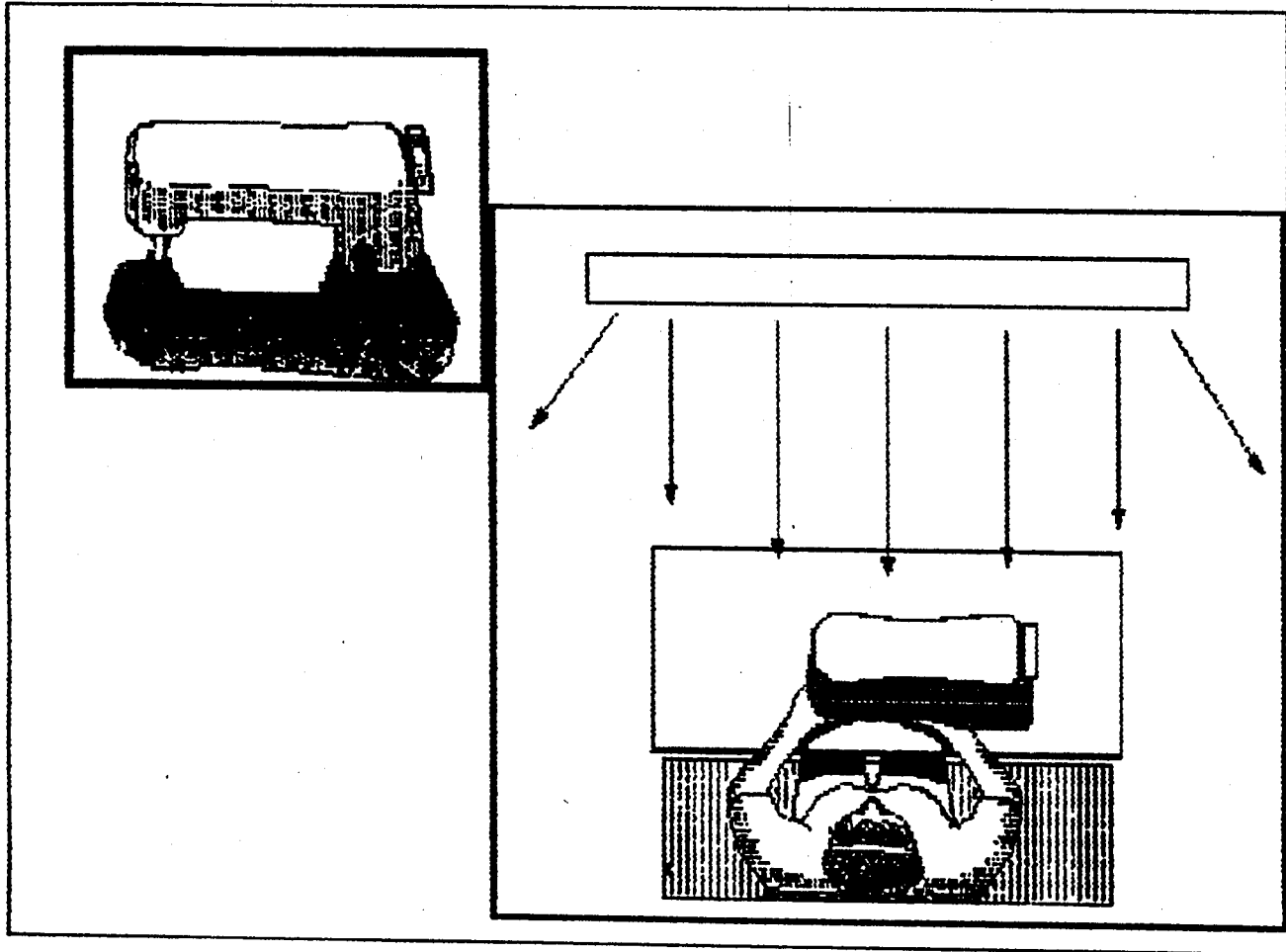
Figure 37



**Individual switches for every employee could save electricity consumption of the company.**

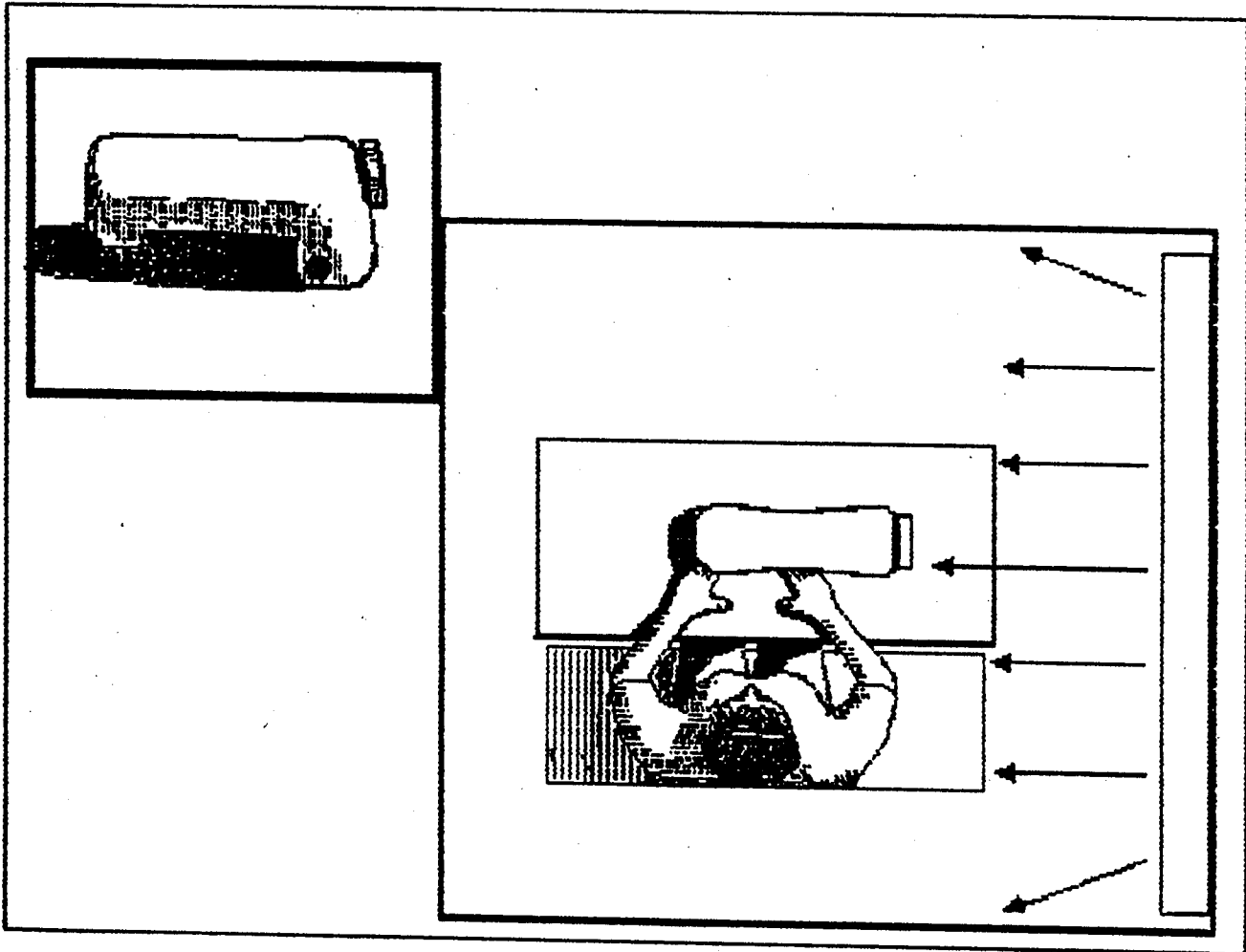
**Connection of the light to the power source can be made more stable if socket is positioned like this.**

Figure 38



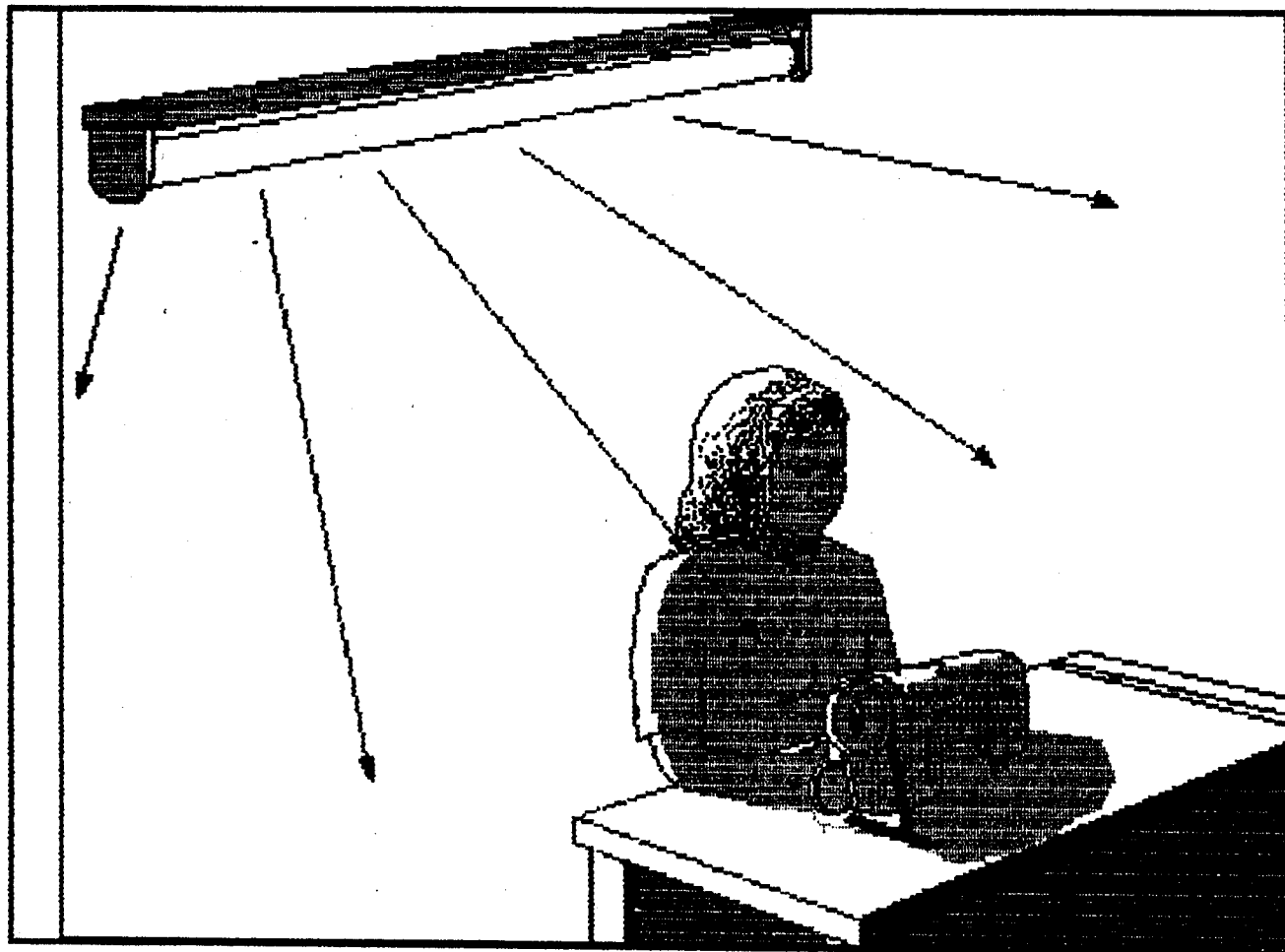
**Light from above and behind. The object is difficult to see and there is often a glare.**

Figure 39



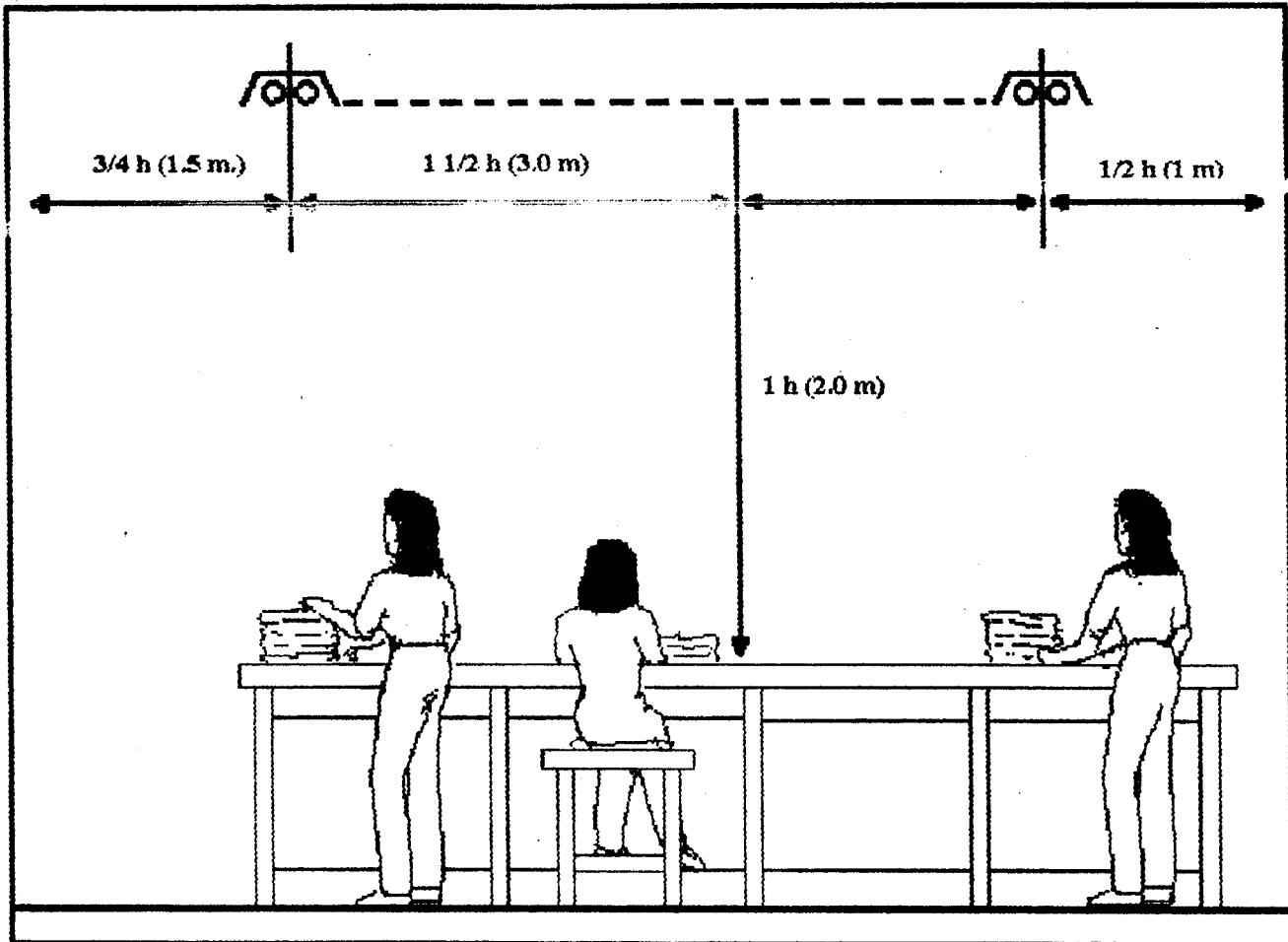
**Light from the side and above. This is better but much of the work item is still in shadow.**

Figure 40



**Sharp shadows make it difficult to work.**

Figure 41




**Recommended spacing for industrial type lighting units. The distance from the work-surface to the light fixture is  $h$ . When there is passageway next to the wall, the fixture should be  $3/4 h$  from the wall. When work is done close to the walls, the fixture should also be closer.**

The openings in the top of industrial lighting units allow ceiling illumination, better lamp ventilation and lower dirt accumulation than closed-top units. For general lighting, it is often true that the higher the lights, the better the uniformity and dispersion of light.

For work areas where only artificial light is used, the spacing of the lights is very important. Figure 41 gives guidance on how to attain more even lighting conditions.

As was mentioned earlier at the beginning of this chapter, the specific light requirements at workplaces would differ very much depending on the nature of the task as well as on the sharpness of the worker's eyesight. To compensate for the difference, local lights should be used. Properly arranged local lights not only contribute to quality and productivity but also help keep lighting expenses low.

 **Ensure regular maintenance.**

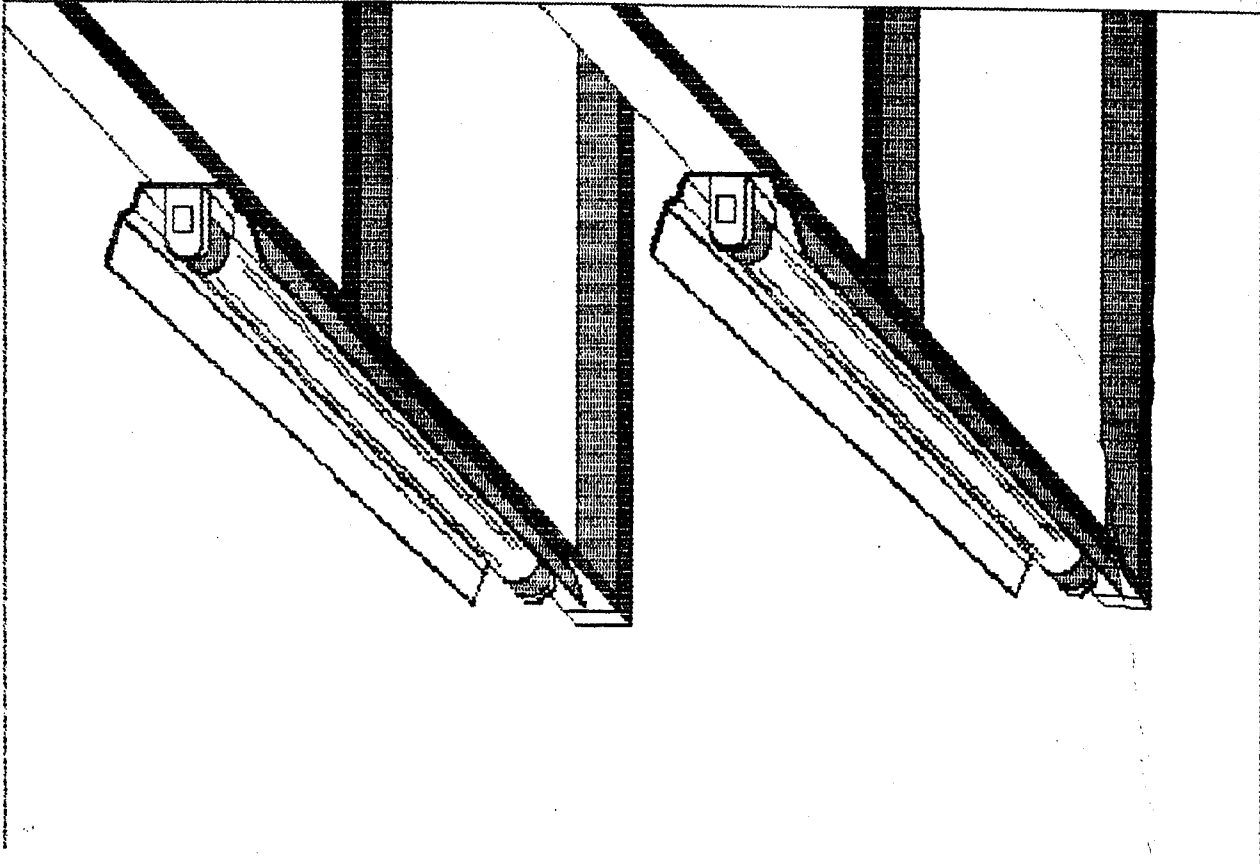
Even with the best new lighting installation, it is essential to establish a proper maintenance routine. You may be surprised to learn that without maintenance, in a few months' time the actual level of illumination could be half of the initial level.

There are a few main causes for loss of illumination.

- Dust or other deposits on lamps. The need for regular cleaning of lamps is often overlooked because dust collects relatively slowly and evenly. Dust which may be absorbing a large proportion of the light is often difficult to detect. The table shows that the type of fitting makes a big difference. If you decide to use a closed-top reflector or fitting (Figure 42), clean it every month.

	MONTHS			
	3	6	9	12
	% OF ILLUMINATION LOSS			
CLOSED-TOP FITTING	18	25	35	40
OPEN-TOP FITTING	8	12	15	18

Figure 42



**Fluorescent lamp with closed-top reflector or fitting have to be cleaned every month.**



- Output from bulbs and fluorescent tubes falls steadily throughout their life. For example, a fluorescent lamp can lose 25 to 30 per cent of its initial output before it burns out. That is why one should consider introducing a system of lamp group replacement at the same pre-determined time. Lamps which are removed need not be scrapped; they may be used in places such as corridors or little-used stores. Some of them can be kept to replace lamps from the next batch which fail early.
- Dirt on windows, skylights, ceilings and walls. A 20 per cent increase in illumination or more can often be gained by regular cleaning of all windows and skylights inside and outside. It is also important to clean ceilings, walls and other interior surfaces.

**Summary:**

**Rules for Better Lighting Without Increase in the Electricity Bill.**

1. Make full use of daylight.
2. Avoid glare.
3. Choose an appropriate visual task background.
4. Find the right place for light sources.
5. Use the right lighting device and fixture.
6. Avoid shadows.
7. Ensure regular maintenance

## Chapter 8

# WORK-RELATED WELFARE FACILITIES

Work -related welfare facilities are often ignored. Who cares about toilets, first-aid kits, lunch rooms or lockers? What do they have to do with the hard realities of production?

One answer is that workers care. During each working day, workers need to drink water or some beverage, eat meals and snacks, wash their hands, visit a lavatory and rest and recover from fatigue. This can be difficult or easy, unpleasant or comfortable, a health risk or an aid to hygiene and nutrition. The essential facilities in your factory show whether you care about your workers as much as you care about your machines. Worker dissatisfaction can be costly.

A more positive reason for better facilities is that extra efforts are often appreciated far beyond the time and money invested. Work-related facilities help workers to overcome problems which are important to them. Let your workers express their priorities for improvements and ask them to take responsibility for the work which is required. You may be surprised at the results.

The small enterprise can be a community where workers are loyal, industrial relations are smooth and morale is high. It can also be a place where workers look for the first opportunity to leave and care little about the owner's success. Which kind of enterprise do you want?



Make sure essential facilities serve their purpose.

Fatigue and disease are enemies of efficient work. Essential facilities are more than just a legal requirement. They can do much to reduce fatigue and maintain health. It is important that the quality of such basic facilities is high: otherwise they can spread disease instead of preventing it.

## ***Drinking Water***

Drinking water is essential for all types of work. Especially in hot environment, each worker can easily lose several liters of water per shift. If not provided with drinking facilities, workers become thirsty and gradually dehydrated. This greatly increases fatigue and lowers productivity.

Water kept close to workers will minimize the time lost in going to get a drink. Place water containers near each group of workers, or provide taps or fountains with clean water in a central place. However, drinking water should not be placed in washrooms or toilets, near dangerous machines or other hazards, or in places where it can be contaminated by dust, chemicals or other substances.

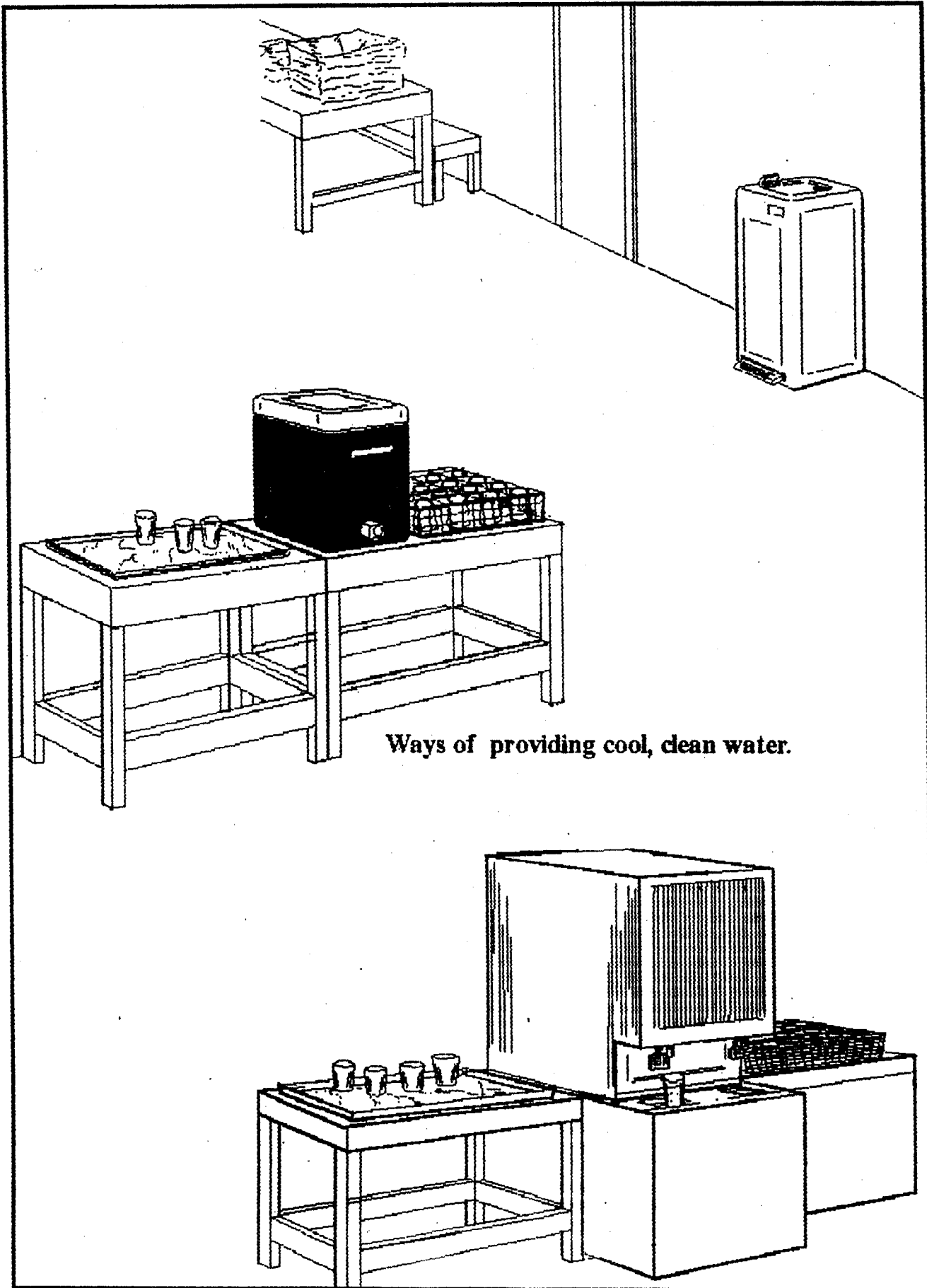
Whenever there is doubt about contamination, water must be thoroughly boiled or properly filtered or treated. Before starting to use a new water source for drinking purposes, it is advisable to have it tested to make sure that it conforms to the criteria set in the latest approved National Standards for Drinking Water. The design, construction and operation of deepwells for the abstraction of groundwater should be subjected to the provisions of existing water codes. Piped water can only be used when a hygienic water supply is guaranteed. Precautions are needed to make a clear distinction between potable and non-potable water taps. A "Safe Drinking Water" sign should be put up at each applicable tap.

Drinking water vessels should be made from materials that can easily be cleaned. Even if the vessels are filled with fresh water, the water inside, if kept for days, can become unhygienic. It should therefore be changed frequently.

It is also important to make sure that the drinking water is cool. If a water cooler is too expensive, the water can be placed in the coolest location in the factory. It should not be left in the sun or in a hot place.

Drinking fountains for production areas are very advantageous from the hygiene point of view. (Figure43) They can be fitted with a jet or bubbler outlet and/or goose-neck or other outlet for filling drinking cups. The

Figure 43



Ways of providing cool, clean water.

fountain should be free from sharp angles and designed to prevent unnecessary splashing. Water outlets should be above the rim or overflow level so that they will not be contaminated with waste water. The water outlet should be shielded in a manner that prevents the lips of a drinker from being placed against it.

To avoid the possible spread of infection, it is preferable to use disposable cups or to provide separate cups for each worker and to arrange for regular washing. When containers are used, it is important to clean them regularly. Cleaning and other necessary maintenance should be assigned to a specific person.

In addition, the provision of hot water or the facility for boiling water will enable some people to drink coffee or other hot beverage during breaks. Hot water is also required if the enterprise has a childcare facility.

### ***Sanitary Facilities***

There are several reasons why an opportunity to wash is important:

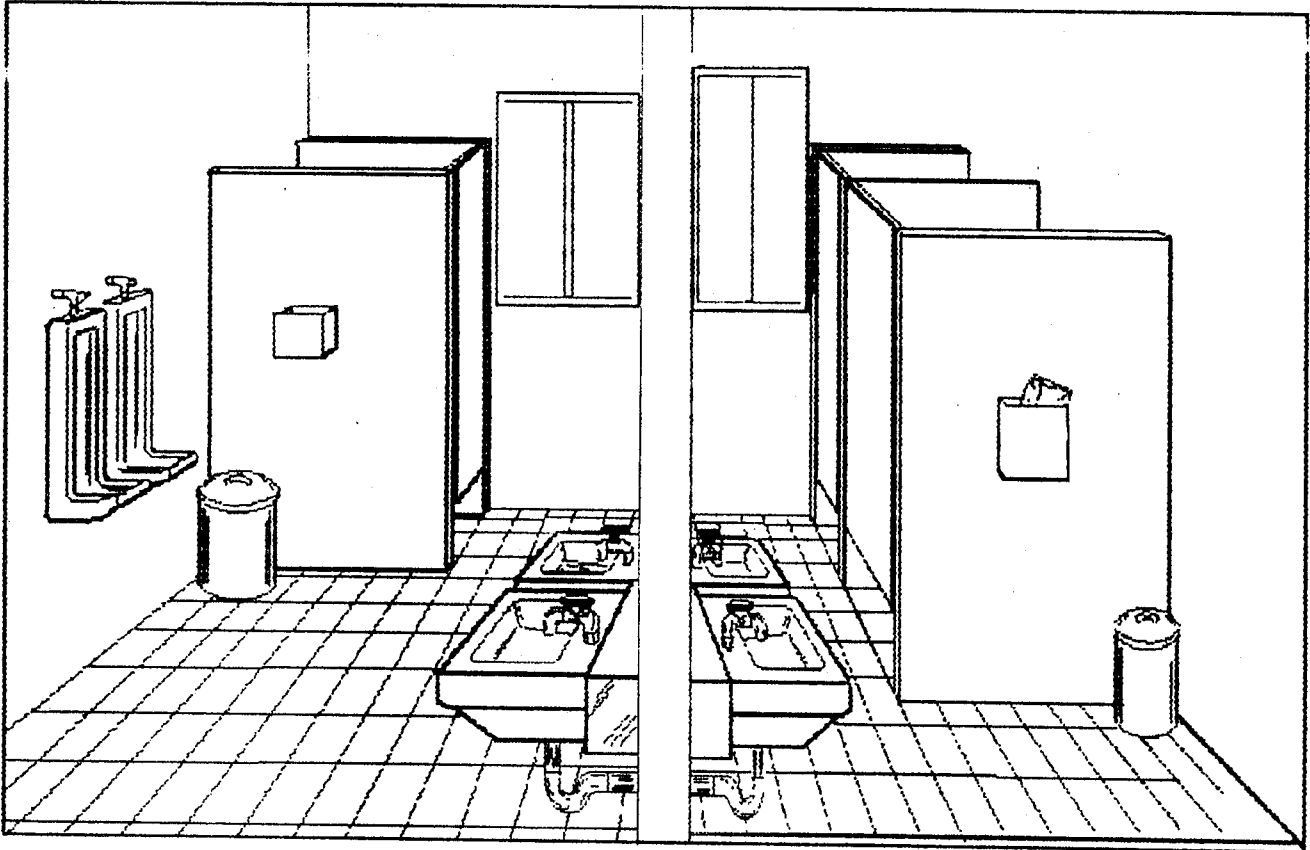
- dirt and grime can be ingested and cause sickness or disease, and they are in any case unpleasant and demotivating;
- washing is required for basic hygiene after using the toilet;
- washing is a necessity when women have their monthly periods.

Sanitary facilities are required by law aside from the fact that workers really need them for obvious reasons. Oftentimes, customers create an impression of the company through its sanitary facilities. (Figure 44).

In providing a sanitary facility, it must be remembered that there would be a sufficient number of these in the company premises and each is conveniently located to avoid long walks, waiting and frustration. The following are the minimum requirements.

- one (1) toilet is required for up to five (5) men while two (2) toilets will be required for six (6) to forty (40) men;
- one (1) separate toilet for up to five (5) women and two (2) toilets for six (6) to thirty (30) women;

Figure 44



Toilet with wash basin for men and women.

- one (1) wash basin for every fifteen (15) workers.

Ideally, there should be a separate toilet for men and women. These should be characterized as follows:

- The toilet bowl must be free from stain and odor and functioning properly.
- Walls of the toilet must be clean and tiles unstained.
- Ceiling of the toilet must be free from cobwebs and dust.
- Floors must be clean and safe (No broken tiles, not slippery).
- Proper illumination must be provided inside the toilet.
- Toilets must have a continuous supply of water. In case water is limited in the area, water can be stocked in containers and refilled regularly.
- Mirrors should be provided inside the comfort room.
- Soap and toilet paper must be provided.
- Garbage baskets should be available.
- Should ensure complete privacy to users.

Towels for each worker should be provided. An alternative to towels is an electric hand dryer fixed to the wall. And if you could afford it, sanitary napkins should be provided, otherwise, this item and other toiletries such as toilet papers, toothpaste, toothbrush, soap, lotions and other items should be included among the goodies sold in the canteen.

The design of sanitary facilities makes a big difference in the cost and effort required for cleaning. You should design for easy maintenance. Avoid wooden floors and difficult -to-reach corners. Provide proper drainage. It is best to use tiles for walls and floors, or at least to make sure that surfaces are smooth and easy to clean. If you do not use tiles, choose the paint carefully. Porcelain is best for washbasins, toilets and urinals.



**Be ready for emergencies.**

Accidents can happen anywhere, anytime even if proper preventive measures are installed so it is best to be always prepared for emergencies like cuts and bruises, eye injuries, burns, poisoning, and

electric shocks. Every enterprise therefore have to maintain a well-stocked first-aid box and assign at least one person for every shift to handle emergencies.

First-aid boxes should be clearly marked and located so that they are readily accessible in an emergency. (Figure 45) They should not be more than 100 meters from any place in the worksite. Ideally, such kits should be near a wash basin and in good lighting conditions. Their supplies need to be regularly checked and replenished. The contents of a first-aid box are often regulated by law, with variations according to the size and the likely industrial conditions of the enterprise. A typical basic kit may include the following items in a dustproof and waterproof box:

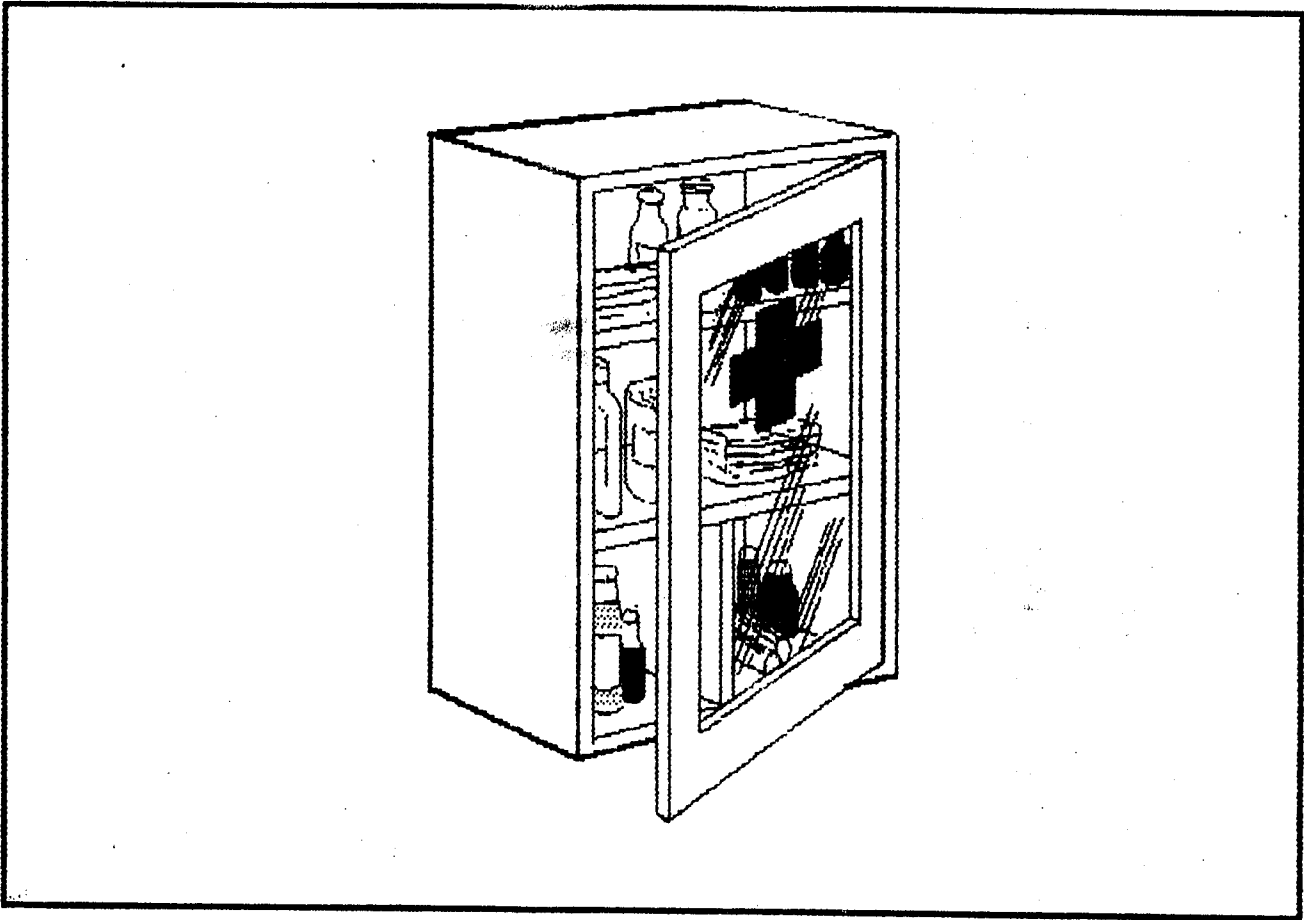
- sterile bandages, pressure bandages, dressings (gauze pads) and slings. These should be individually wrapped and placed in a dustproof box or bag. Sufficient quantities of the different sizes should be available at all times to treat small cuts and burns. Medical adhesive tapes (strip plaster) for fixing bandages and dressings are also needed;
- cotton wool for cleaning wounds;
- scissors, tweezers (for splinters) and safety pins;
- an eye bath and eye wash bottle;
- ready-to-use antiseptic solution and cream;
- simple over-the-counter medicines such as aspirin and antacids; and
- a booklet or leaflet giving advice on first-aid treatment.

First aid requires some training, but this is not difficult to arrange in most places. The names and location (including telephone number) for first-aiders should be put on a noticeboard. Workers in remote or isolated areas should be given additional training in first aid to take account of the probable long delays in obtaining medical aid in the event of an emergency. Worker involvement can be tapped during emergency situations. They just have to be informed of the procedures for obtaining medical assistance.

Small establishments without their own facilities should keep contact with a nearby clinic or hospital so that the time between the occurrence of an accident and medical assistance is very short, preferably much less



**Figure 45**



**A basic first-aid box.**

than 30 minutes. Transport to the clinic or hospital should also be pre-arranged. An outside ambulance may be called-in, if necessary. It is also desirable for the company to have a stretcher.



Make sure that rest means recovery.

### ***Rest Breaks***

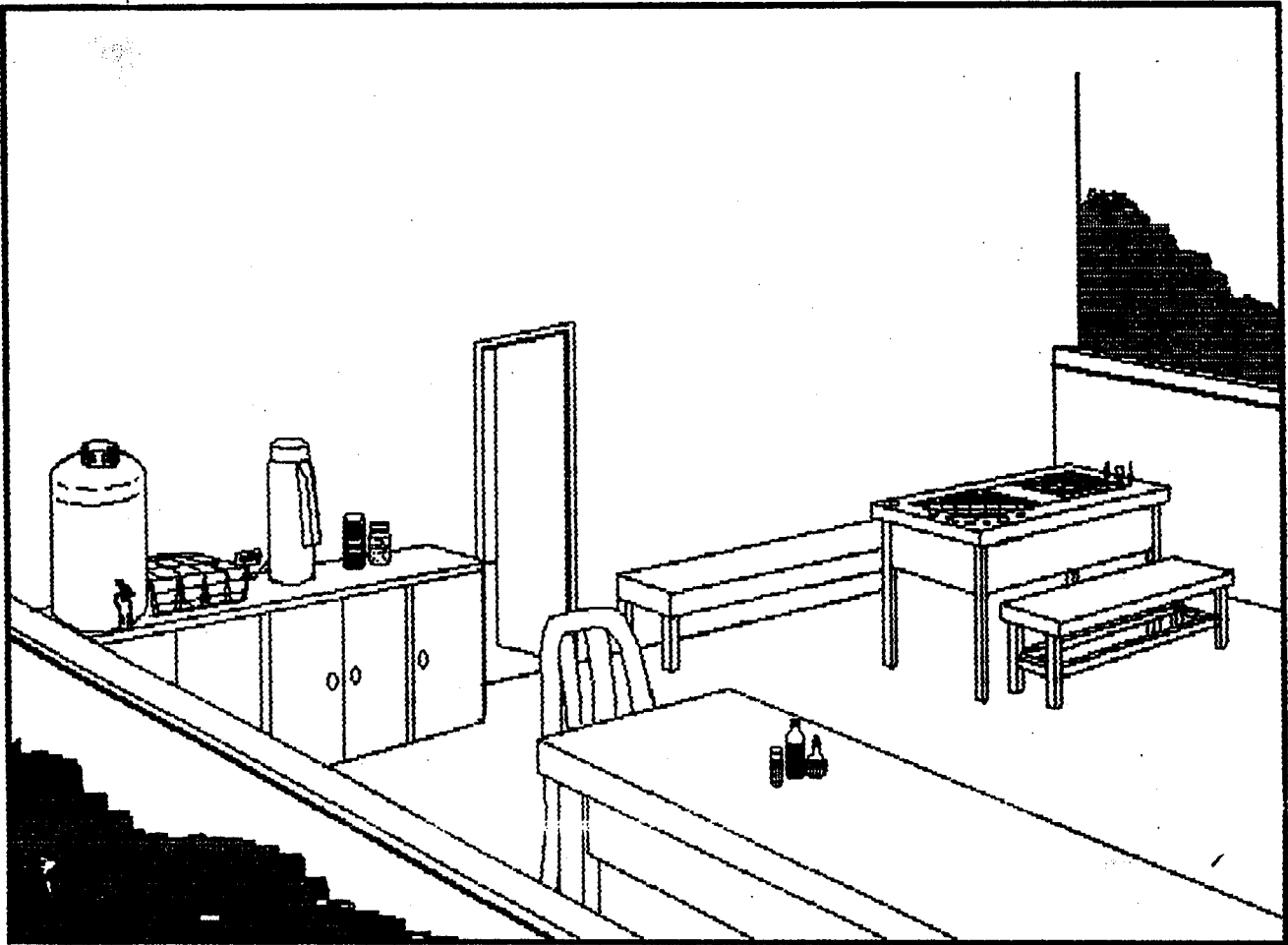
Workers usually start the day alert and productive, but their activity level decreases as the day goes on. Fatigue grows gradually before it begins to have strong effects. If the worker rests before he or she shows signs of being really tired, recovery is much faster. Short breaks taken frequently are much better than infrequent long breaks. For most types of work, workers will produce more with breaks than they could working continuously.

Workers may continue working until they feel very tired, so you should plan breaks. At least one ten-minute break in the morning and one in the afternoon in addition to a longer break for lunch, is absolutely necessary. A five-minute break every hour is an excellent idea.

### ***Rest Areas***

A good rest area also helps to reduce fatigue. (Figure 46) This will hasten the recovery of workers from fatigue and will get them ready for continued productive work. Getting away from a noisy, polluted or isolated work-station helps them to relax and recover from fatigue. Rest areas should therefore be away from the workstation and free from disturbances. A simple canopy outside the factory may provide a shady rest area, especially if there are plants and breezes. Avoid bright sunlight: the eyes need to rest as well as the body. Benches and a place to lie down should be provided. This is an effective way to recharge one's energy. And if there are pregnant workers, the opportunity to lie down during breaks will prevent excessive swelling of the legs and feet due to the additional weight being carried, especially in the latter part of pregnancy.

**Figure 46**



**Rest areas can be provided for workers to lie down or to play or watch television during breaktime.**



**Use low-cost facilities to attract and retain the best workers.**

Smaller enterprises have a great deal of difficulty in competing for high-quality labor. A common complaint is that as soon as workers are fully trained, they leave for the higher pay and better benefits of larger enterprises. While in some this may be true, other workers give more value on the closeness and feeling of belongingness a small enterprise can provide. So, if it would be very difficult to compete in terms of wages, accomplish a great deal at low cost by paying attention to the needs of the workers. Treating workers as part of a "family" can gain their loyalty and support.

Workers' needs vary. These may include meals, transport or other work-related needs, work clothes, lockers or even an opportunity for sports after work. It is in these areas that entrepreneurs can make some improvements, one at a time, if a drastic one would be hard to do.

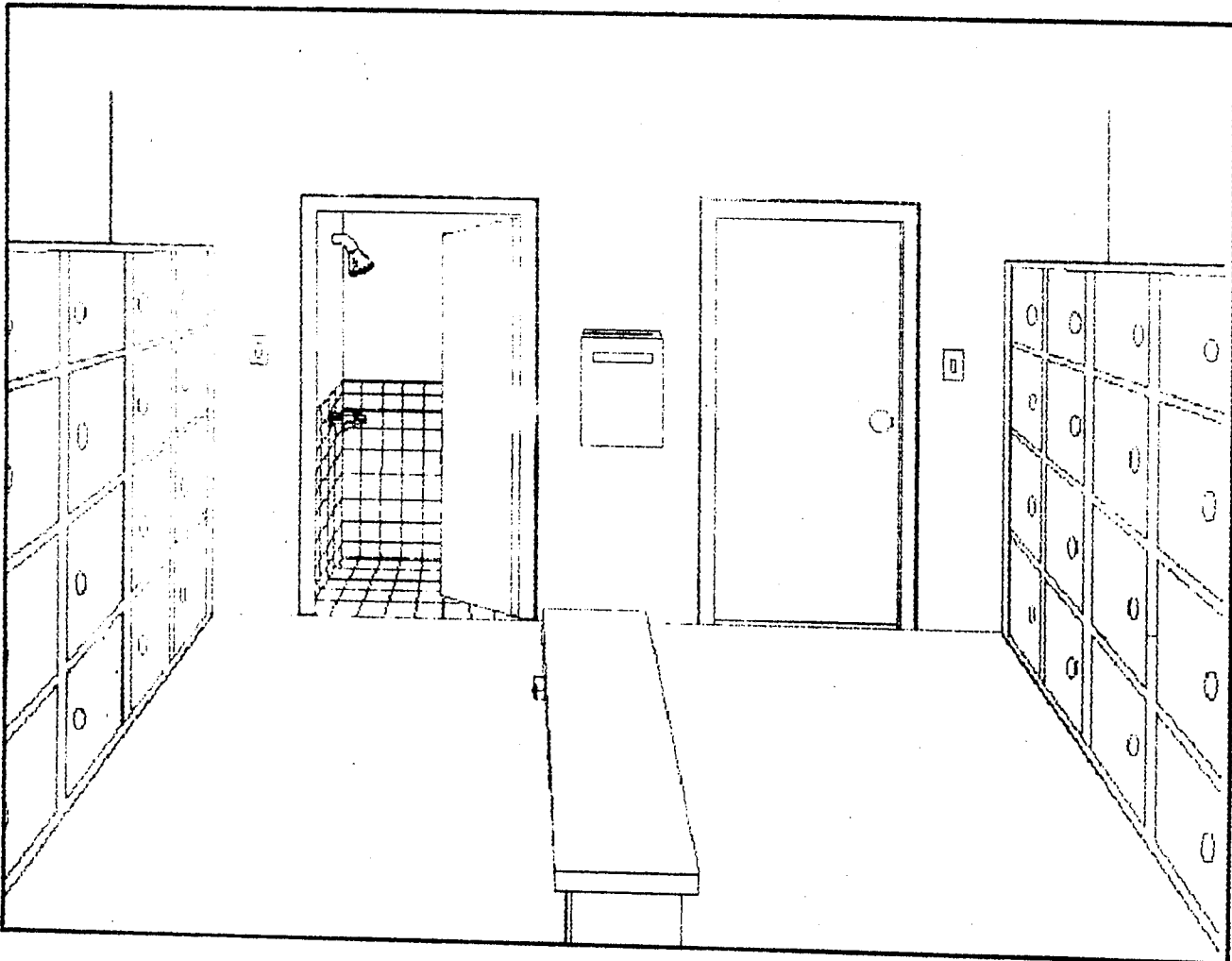
### ***Work Clothes***

Work clothes can be provided to the workers if it would be necessary. Uniforms may include special work clothes and footwear designed according to the work conditions to enhance their productivity. Neat and well-designed work uniforms decorated with the factory logo contribute to the company loyalty and work discipline. Also, specially designed work clothes often help reduce accidents as this would prevent serious accidents that occur when loose garments are caught by rotating equipment motors or gears.

### ***Lockers and Changing Rooms***

Facilities for secure storage of clothes and other personal belongings, such as locktable lockers and changing rooms, greatly assist workers with their personal hygiene, appearance and tidiness, and avoid anxiety about the theft of personal possessions. (Figure 47).

**Figure 47**



**A changing room with lockers and showers.**

Storage facilities should be located where they will not impede work or obstruct light or ventilation. They should also be arranged in such a way that clothes and personal belongings can be kept safe from damage and theft. This can be achieved by placing storage facilities or lockers near the workers' entrance door or within changing rooms or moving them as far as possible from the workstations.

Changing rooms are particularly important where the duties of the workers require them to change from street clothes into uniforms or protective clothing. Changing rooms should provide privacy to all workers. This means that a separate changing room must be provided for the males and another will be provided for the females. If the number of workers are too small that providing separate changing rooms would be too costly, management would just have to make sure that the room would be properly screened and secured.

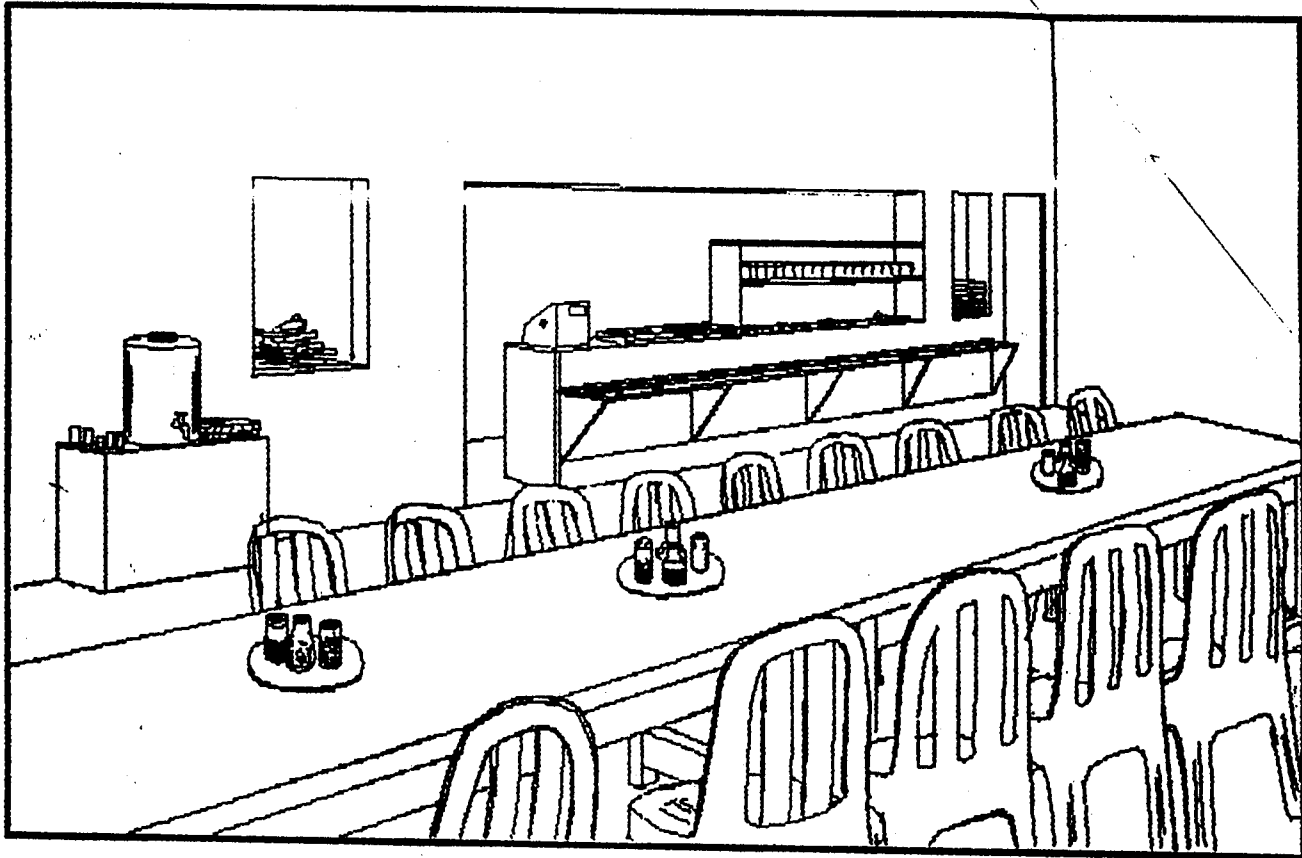
Washing facilities such as washbasins or showers should either be placed inside the changing areas or closeby. Combining dining and changing rooms in the same area is not recommended on hygienic grounds.

Adequate seats, mirrors and rubbish bins in the changing room or close to the lockers will assist workers in giving attention to personal appearance and tidiness.

### ***Eating Areas***

Some small enterprises may not have the capital to start a canteen immediately. The first step for them is to provide an eating place or room in which the workers can eat their packed lunch or food bought from vendors. This lunchroom could include a small area where workers can prepare drinks or heat their food. It should be situated away from the work-stations to avoid any contact with dirt, dust or dangerous substance and should be as comfortable as possible to enable workers to relax during meal-breaks. It is advisable to set-up the eating room or area with the provision of having it upgraded or developed into a small canteen as the enterprise grows. (Figure 48).

**Figure 48**



**The eating area must be able to provide a decent and comfortable place for the workers to eat their meals.**

## ***Canteens***

Establishing canteen services is the best way to guarantee that workers eat sufficient nutritious food during a reasonably short break from work. Sending workers home for meals may not be feasible due to distances involved, the high cost of transport, lack of commuting facilities or simply because the meal break is not long enough. Eating facilities near the workplace may also be unsuitable due to the high cost of meals, the poor hygienic conditions of some food stalls or the poor nutritional value of the food.

Different facilities may be provided, some of which can be quite inexpensive:

- a canteen for cooked or pre-cooked meals;
- a buffet to serve packed meals, snacks and beverages;
- facilities (including space, shelter, water and rubbish bins) for vendors to sell hot food;
- a group restaurant jointly set-up by a group of employers; and
- arrangements with a restaurant or canteen near the enterprise.

When a meal is served, it is important to pay attention to hygienic conditions and the nutritional value. It may be a good idea to get advice on both from an expert.

The space needed for setting up a canteen is often less than you might expect. An eating place or room for 50 workers requires only 25 square meters, if the workers share the space by eating in different sittings.

## ***Health Facilities***

Access to health care by employees of small enterprises is often inadequate. You can help by providing a workplace medical facility such as a small clinic which can give treatment for any occupational injuries and in addition provide general health care. This can help avoid delays, lateness and absence which result from using local services. In case the enterprise is too small for a clinic, several enterprises may be able to establish one together. If not you can still:



- provide treatment at a local hospital or clinic if a worker gets sick or has an accident;
- arrange regular visits by a doctor or nurse;
- assist in establishing a community health service near the workplace;
- grant loans or salary advances to workers to help meet medical costs; and
- provide health insurance for all workers or encourage workers to join private insurance schemes by covering part of the premiums.

### ***Transport Facilities***

Getting to and from the workplace may be difficult, lengthy and tiring. This, in turn, can cause fatigue, anxiety and financial hardship for the workers, and result in undue lateness, increased worker absenteeism, high labor turnover or declining efficiency of the enterprise.

Small scale enterprises sometimes pay a transport allowance. If they are unable to do this, they could help organize shared private transport among the workers themselves or to encourage private transport operators to make reasonable arrangements.

For workers who want to purchase their own means of transport such as motorcycles or bicycles, it may be possible to secure cheap bank loans without any cost by guaranteeing suitable repayment schemes.

### ***Recreational Facilities***

Many workers enjoy spending their time on sports or other recreational activities during their lunch break or after work. Besides being fun, such activities are also likely to increase the physical and mental well-being of the workers.

One important impact of recreational facilities is improved social relations within the enterprise. If supervisors or managers participate in recreational activities, this may greatly help in terms of communication and mutual understanding. The improved morale may also lead to a reduction in absenteeism and staff turnover and facilitate recruitment.

Recreational facilities are often very inexpensive. Providing simple sports equipment such as a ball, goals, nets, or some board games, and magazines may be all that is necessary.

Singing during breaks is a favorite pastime of workers. A guitar and other musical instruments will be a good investment. Some workers may even form a singing group which may compete with other enterprises or sing in religious and other activities that the enterprise may organize.

### ***Child-Care Facilities***

Many employers find that working mothers are especially loyal and effective workers, but they often need help with the special problems of caring for their children.

A clean room, preferably with access to an enclosed space outside, is the main thing you need. A few items of simple furniture and toys help. Access to cooking facilities can solve the feeding problem. (Figure 49).

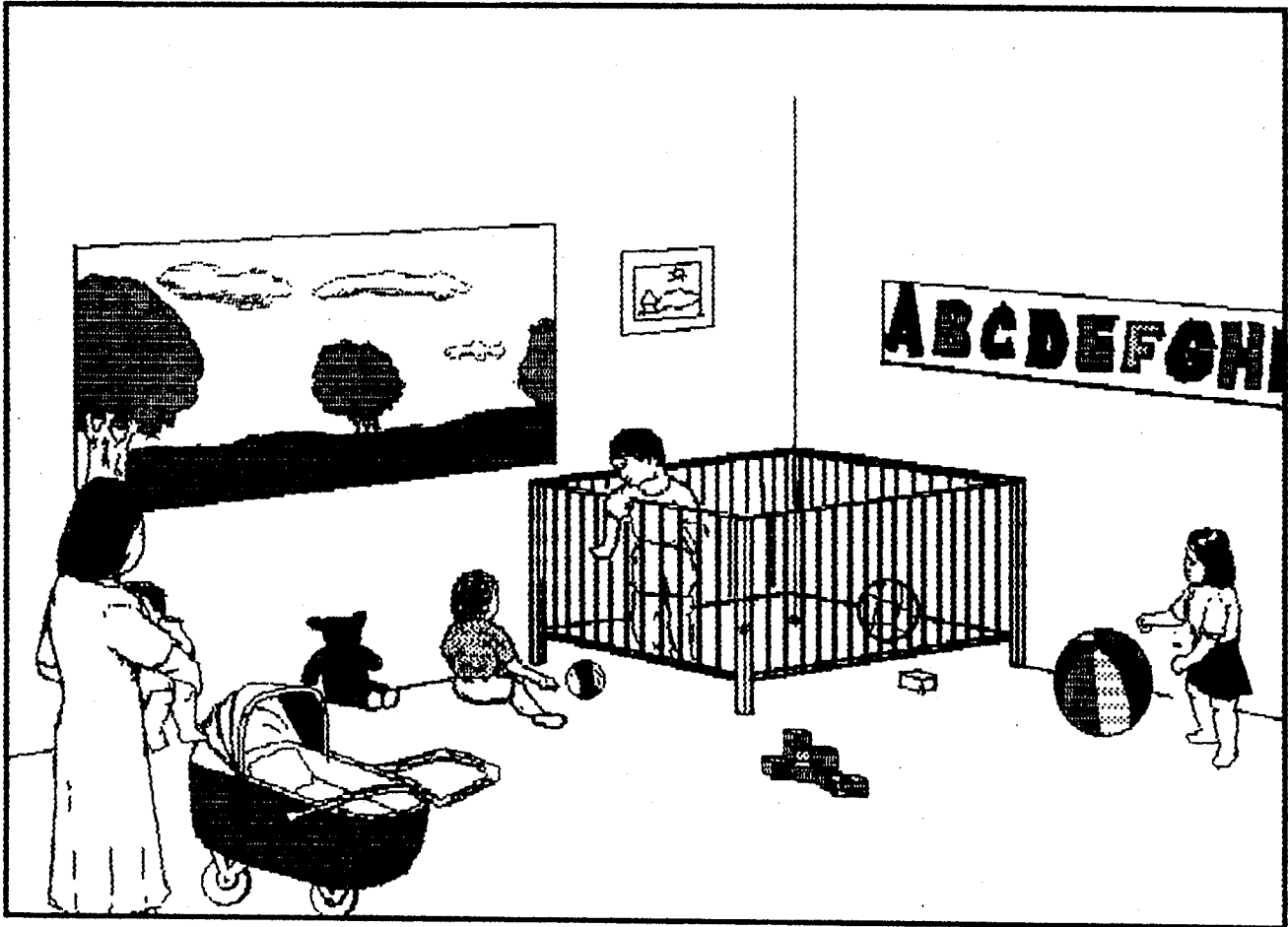
Children should never be allowed on the factory floor. There may be hazardous machines and chemicals and there are certainly dusts or fibers in the air which are especially dangerous for the young.

You may be able to find someone who could care for the children at a very low cost or the mothers themselves could take turns. Mothers, especially nursing mothers, should be able to visit the children during breaks.

### ***Factory Days***

Many enterprises have a special day once a year for all the workers and their families. It is an excellent opportunity to build company loyalty. Good food, games, awards and prizes and a pleasant location help to make such days successful.

Figure 49



A factory child-care room.

**Summary:**

**Rules for Work-Related Welfare Facilities Which  
Contribute To Productivity and Good Labor-Management Relations.**

1. Make sure essential facilities serve their purpose
2. Be ready for emergencies
3. Make sure that rest means recovery
4. Use low-cost facilities to attract and retain the best workers

## Chapter 9 PREMISES

Few owners of small businesses are able to design their own factory building or choose one which meets all their needs. For many subcontractors, the factory is a leased building, or an extension of the owner's house. Given this situation, very few companies have ideal workplaces.

Still there are many ways by which the working premises could be improved without undertaking major repairs and renovations. This chapter will discuss these simple and practical ways to improve the premises. Temperature control, better ventilation, properly designed floors and layout and attention to fire and electrical safety can increase your workers' efficiency and avoid large losses. They can also make your factory more attractive to customers and improve your image.

### Protect your factory from outside heat.

One of the most important conditions for productive work is the correct temperature inside the work premises. The optimum will vary according to the local climatic conditions, the season, and the type and intensity of work. A comfortable temperature will be from 20 to 25 C. Deviations from the optimum temperature result in lower productivity. However, maintaining the optimum temperature inside the work premises can be very costly unless proper measures are taken to reduce the penetration of heat.

There are two basic ways heat gets inside the factory: direct (through openings such as windows, doors, gaps, skylights) and indirect (due to conduction throughout the roof and walls). In addition, sunlight coming through windows and skylights falls on objects inside the factory and heats them up.

Construction of a ceiling is an effective way of reducing heat penetration from the roof. Provision of sufficient and appropriate ventilation will ensure circulation and replacement of air.



### Let nature help you.

Keep the factory premises green by planting trees and flowers. (Figure 50). If there are existing trees, trim trees surrounding the factory building at least 3 meters (10 feet) from the ground to allow fresh breeze to get into the factory. Install some benches under the trees for workers to rest during their break time. Fresh air will invigorate them. Keep bushes shorter than 1.6 meters (five feet).



### Improve heat insulation.

Use double walls to prevent heat from penetrating through the walls. A layer of air between two walls is a good insulator. Invest on the construction of a ceiling to improve the thermal conditions in the factory. Insulating the ceiling with a layer of any heat-insulating material will improve thermal conditions in the workshop. Painting the ceiling with white will also help.



### Use shades to protect against heat from the sun.

Properly designed shades or curtains work in two ways: they protect the walls from solar radiation and also absorb outside heat without transmitting it to the interior. Shades can do a lot to keep the temperature down in your factory. Moreover, they help to improve lighting conditions by reducing glare and dispersing the light more evenly.

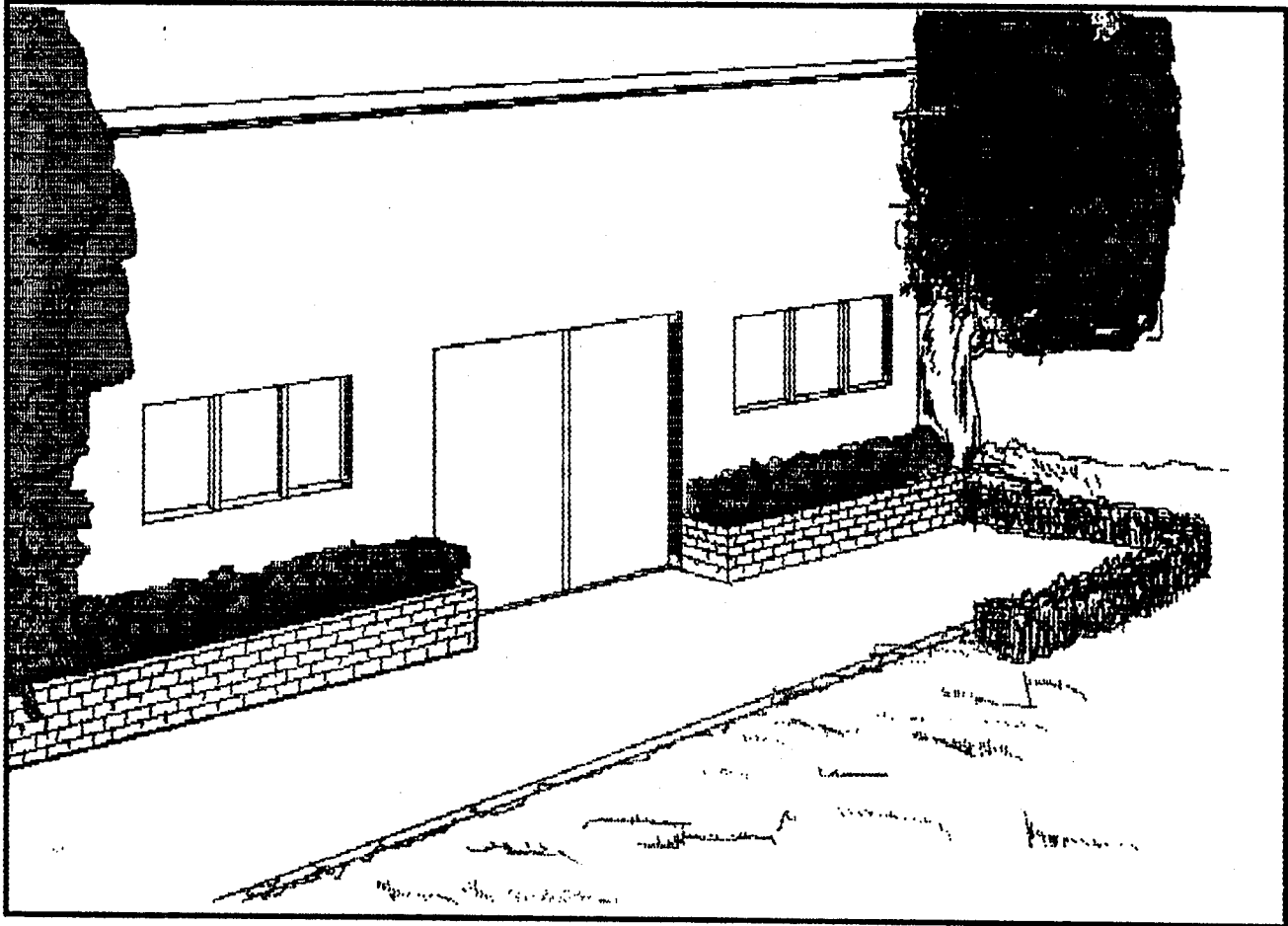
Good evergreen trees on the sides of the building are natural and efficient means of providing shade.



### Let natural air-flow improve ventilation.

If there is not sufficient exhaust or fresh air, the air in the production area quickly becomes contaminated by dust, fumes and gases. In the

**Figure 50**



**Trees and bushes are a natural protection against heat.**

average workshop, the air needs to be changed between eight and 12 times per hour. There should be at least 10 cubic meters of air per worker. The smaller the room, the higher the air-flow should be. All working premises have some natural ventilation, but in the Philippines this fresh air supply is seldom sufficient.

Ventilation should not be confused with air circulation inside the factory: the first replaces contaminated air with fresh air, whereas the second is intended only to improve thermal comfort by moving the air without renewing it. (Figure 51).

 **Make better use of horizontal air-flow.**

Horizontal air-flow helps to improve thermal comfort and remove pollution. Open windows are a popular and simple way of providing cross ventilation. Multi-section windows help to regulate airflow according to wind conditions. (Figure 52).

 **Utilize the tendency of hot air to rise.**

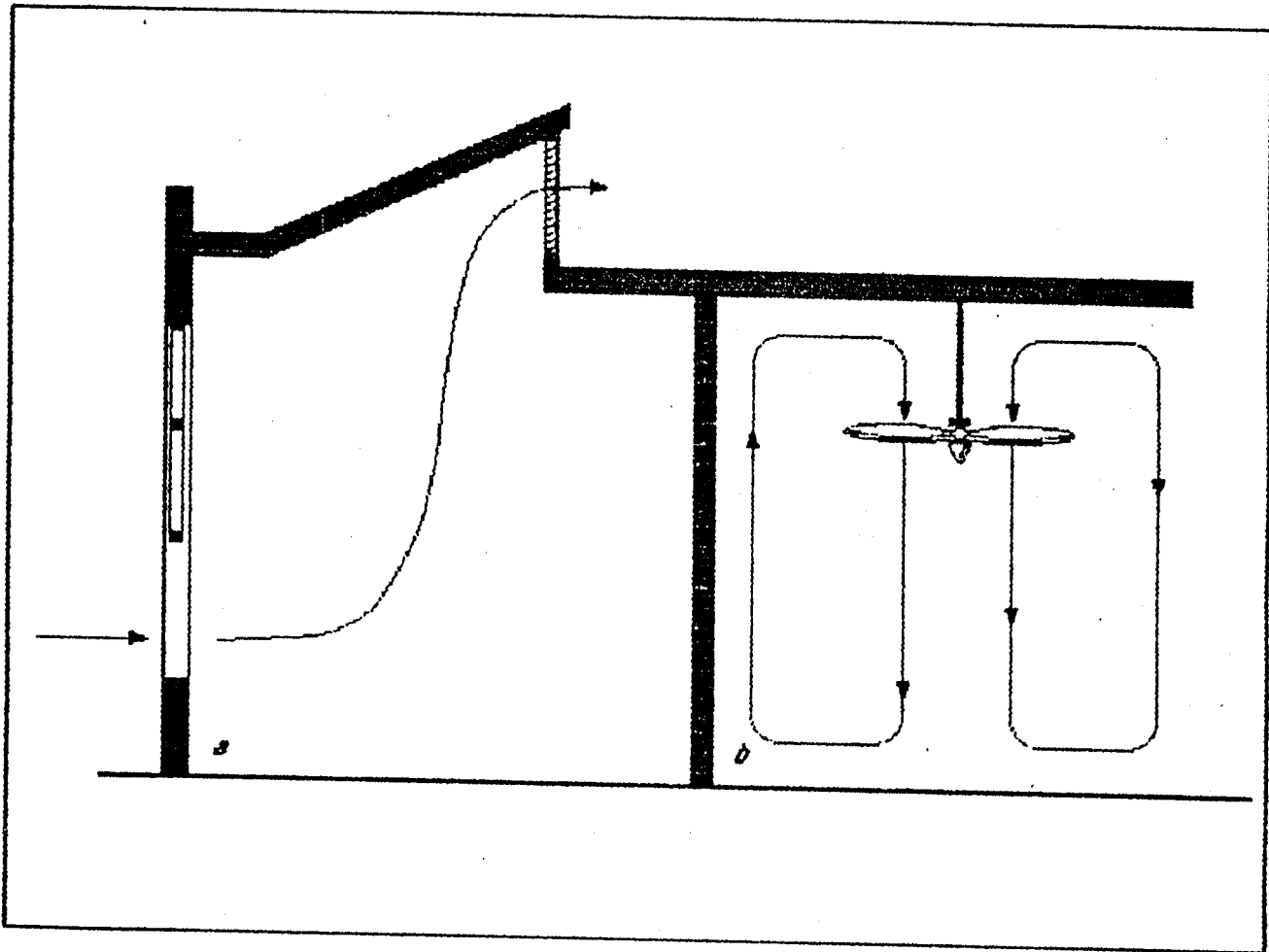
Usually it is not possible to provide sufficient ventilation in a large production area by opening windows or using wall fans. Inevitably, in the middle of the workshop there will be an area with no air movement at all. This problem can be resolved by using the natural upward flow of heated air, the "chimney" effect. This can be done by providing sufficient openings in the roof, i.e. adjustable louvers. The shape of the roof very much influences the effectiveness of natural ventilation. (Figure 53). Inclination of the ceiling towards the roof helps to avoid pockets of hot air.

 **Eliminate or isolate sources of pollution.**

One problem among some garment producers is some fabrics emits fumes which are harmful to the eyes and makes breathing difficult. Should this be the case, raw materials should be stored in a separate

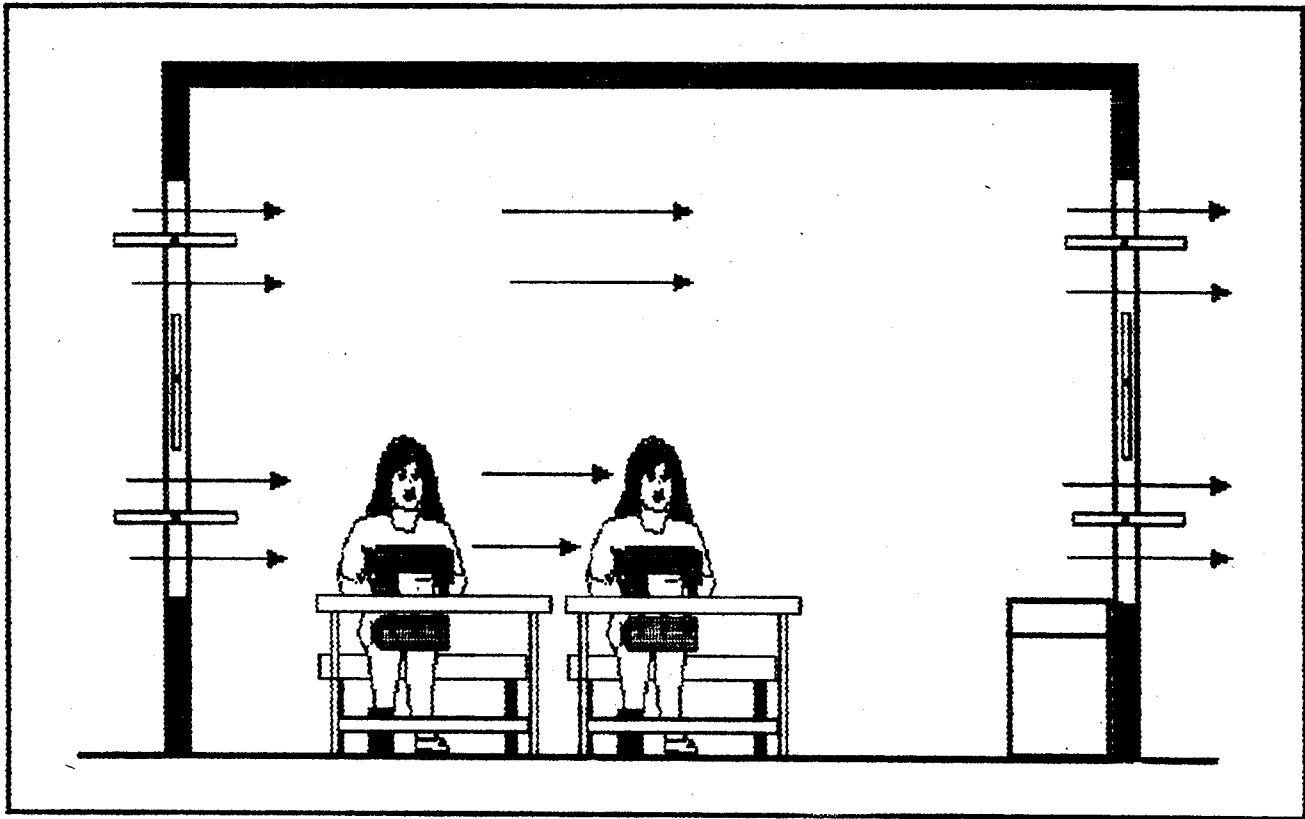


Figure 51



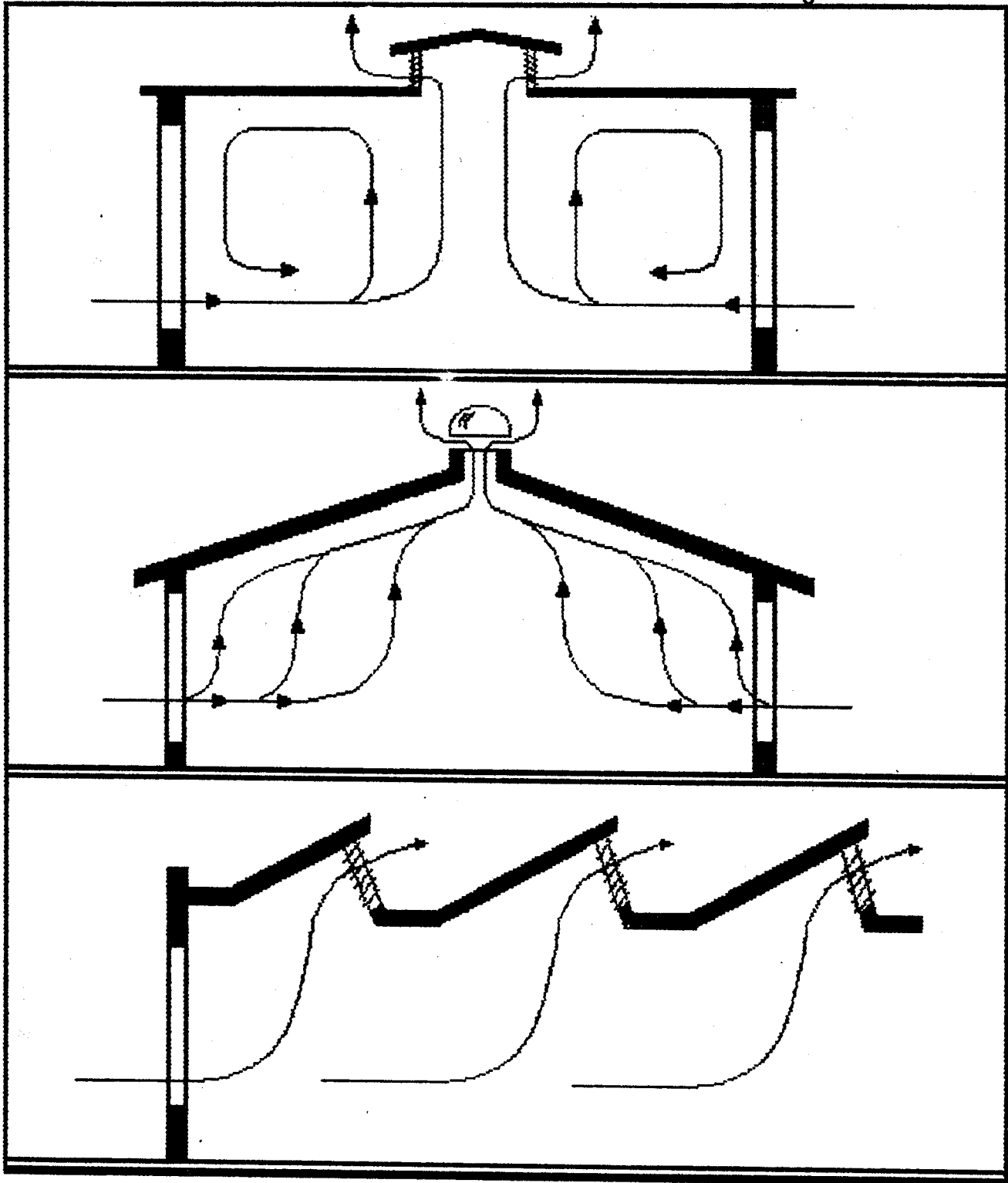
a. Ventilation  
b. Air circulation

Figure 52



**Natural ventilation from adjustable openings on opposite sides of a room.**

Figure 53



**Air-flow routes of building of different design.**

room provided with good ventilation so fumes could be contained in the room and easily driven outside the building.



#### Improve your floor.

We are inclined to underestimate the importance of the floor for productive, smooth and safe work. However, inappropriate floor surfaces or poorly maintained floors can be a major source of accidents, work interruptions and product damage.

For garment subcontractors, the floors should be flat to ensure stability of machines, efficient and safe movement of workers and material handling equipment. To the extent possible, the start to finish of the whole process should be located in one floor level.



#### Build flexibility and adaptability into plant layout.

When you are setting up or modernizing your production facilities, it is the right time to improve space allocation, transport arrangements, production routes and the infrastructure of the building.

Reserve free space in the work area - otherwise you will find it quickly becomes overcrowded, with no space for extra tasks or increased production. This will help to avoid blockages of passageways.

Allocate sufficient passageways and make sure that they are kept clear. Often in small enterprises, little care is taken to provide adequate passageways for efficient and safe movement of materials. In addition, passageways tend to become filled with materials and scrap. You should define passageways clearly. Mark passageways as well as work and storage areas by drawing easily visible border lines of different colors (for example, green - work area, brown - passageways, grey - storage area, yellow - lines marking boundaries). Make sure that everyone knows that the zones are to be respected. Never allow to put anything down except where it belongs.

Since positioning of lighting is critical to the position of machines, operation layout should be thought of thoroughly. Provide space for additional machine in case of expansion or transfer of special machines to a particular process.



Prevent fires and electrical accidents.

## **FIRE**

Fire in your work area can ruin your whole business and cause serious injuries or even deaths. Fire protection should always be a priority. Following these simple rules can help you prevent fires or reduce fire damage if one occurs.

### Prevention:

Prevent fires by making sure that rubbish and other burnable materials are cleaned up and placed in metal containers. In addition, follow the rules below concerning common sources of fire:

- Electricity: ensure that electrical circuits are enclosed, insulated, earthed and properly fused; see that electrical circuits are not overloaded.
- Friction: lubricate properly moving parts of machines; make sure that moving belts or drives do not rub against housing.
- Hot iron: make sure irons do not overheat. Use appropriate irons with clear controls.

### Escape routes from the work area.

Make sure that every floor or large room has at least two ways out and that these exits are kept unobstructed and unlocked. Clearly mark escape routes and exits and provide sufficient lighting and directional signs so that there is no confusion in reaching exits. Make a plan for emergency escape, including a place to gather outside the factory where you can account for everyone and be sure no one is still inside. Finally, make sure everyone knows what should be done in case of fire.

### Fire fighting

Provide appropriate fire extinguishers and fire fighting equipment near the sources of potential fire. Check the readiness of equipment regularly. Assign responsibilities for the fire fighting and train workers in how to fight fires.

## **ELECTRICAL HAZARDS**

Workers tend to ignore electrical hazards. The abuse of safety rules in work with electricity is a prime reason for fatal accidents and fire. The following rules can help you to reduce electrical hazards.

### Prevention

Establish a firm rule that any repair or maintenance work on machines should only be done when the power is off and the switch is locked in the off position. The key to the lock of the power switch box should be in the pocket of the person doing the work.

In addition to the basic rule:

- Be sure that all electrical wiring is identified and protected. There should not be any exposed wiring.
- All circuits should be protected with circuit breakers or fuses. This protects the machines against damage and the plant against fire.
- All equipment should be earthed. A separate earthing wire should run from the machine to an independent earthing rod.
- Portable tools and equipment should be double insulated and earthed.
- Be certain that electrical power can be shut off immediately in case of emergency. The main power switch should be in easy reach and clearly marked. All other switches should be clearly labeled as to what they control.

### Emergency action

Everyone in the plant should know how to help a person suffering an electric shock:

- Turn off the power and remove the person from the source.

- If the switch is not accessible, find a long, dry, clean, and non-conducting object to remove the person from the source or the source from the person. This is very dangerous.
- Once the person is clear of the power source, be prepared to administer mouth-to-mouth resuscitation or cardio-pulmonary resuscitation.

**Summary:**

**Rules for Making Your Premises a Better Place to Work.**

1. Protect your factory from outside heat.
2. Let nature help you.
3. Improve heat insulation.
4. Use shades to protect against heat from the sun.
5. Let natural air-flow improve ventilation.
6. Improve your floor.
7. Build flexibility and adaptability into your plant layout.
8. Prevent fires and electrical accidents.

## Chapter 10 WORK ORGANIZATION

Improving work organization is one of the best ways to increase productivity, especially since it can be done without additional capital investments. However, better organization is not always easy. If you have followed the advice in the previous chapters, you will have established many of the preconditions for efficient organization. You are ready for more advanced improvements.

Not all the ideas suggested in this chapter can be implemented immediately. Changing the design of machines and products or the layout of the shop-floor can be expensive and time-consuming. There are, however, a number of ideas which can be set up immediately at no cost, such as changing work assignments. You can start with these ideas and work towards the others over a longer period.

Some of the ideas you will find in this chapter may seem "soft" on workers. You may be used to the idea that only strict supervision and strong pressure give good results. Remember that supervision is expensive and that workers, however much they need their jobs, are not fools. They would rather work well for a boss they respect and admire and who treats them fairly.

On the other hand, do not fall into the trap of thinking that being nice to workers is sufficient. Efficient work is difficult to plan and design. You will need to think hard about products, machines, work flow and job assignments.

The benefits of better organization do not usually show up immediately. New procedures and work methods take time for workers to learn. Adjustments may be necessary before the new system works well. There is normally a "dip" in productivity when organizational change is introduced, followed by a strong improvement if you have done it well. Chapter 11 will help you to do a good job of implementing change.



**Get rid of extra tasks and operations.**

Each work operation is an extra cost - it takes space, machine and operator time and energy. Your first step should therefore be to examine



critically every production task and operation. In doing this, ask yourself whether this task or operation is really needed. Can it be eliminated altogether? Can it be performed in combination with other tasks and operations? Can it be changed or simplified?

We can eliminate tasks by:

- introducing changes into the design of the product;
- switching to new production methods
- performing a number of tasks in one operation by using special multi-task machines;

Extra tasks and operations are those that do not add value to the product or service. These are the tasks which incur costs for the company but are not paid by the customers.

To achieve an efficient and effective production operation, the following are the guides:

- Identify tasks that do not add value to the product or service. Specifically, these are the delays caused by machine breakdowns, incomplete raw materials, missing tools and parts, blocked passageways, transportation of materials from one operation to another, and reworks caused by lack of understanding about the task that must be done.
- Determine the effect if the non-value adding task or operation is removed from the production process.
- Determine the best way to get rid of the task. Some tasks can be eliminated, combined with other tasks, simplified or changed.
- Apply the idea.



**Defeat monotony to keep workers alert and productive.**

In garment production, operations are simple and repetitive. Usually, workers have specializations and do the same tasks everyday. While this practice makes workers experts in their particular tasks and improves productivity, it creates monotony. Repetition of the same movements results in muscle strain and general stress. Thus there is a need to combat this problem through organizational changes. Some simple steps to defeat monotony include the following:

- Rotate workers to different work stations. This will require training workers multi-skills which will be helpful in the event of absenteeism.
- Opportunities to change from sitting to standing or standing to sitting. Provide appropriate chairs and stools.
- Frequent, short breaks. No one can keep perfect attention for a long time. When attention drops, mistakes are made. Jobs which are repetitive, fast paced, or which demand close attention to quality will be done much more productively with frequent short breaks. These breaks can also be an opportunity to move around and even to exercise.
- Pipe-in music helps in breaking the boredom. Music stimulates the workers without interrupting their work. It can be played at specific time of the day like before breaktime and after the lunch break.



**Install buffers to make the work flow smoothly.**

In machine-paced assembly-line work like garment production, the use of buffer stock helps to make the work flow smoothly. Buffer stocks should be kept for components that are difficult to make. This will eliminate delays caused by workers waiting for the next work-piece. You have to take note, however, of the bundle tickets to prevent mixing the parts and offshading.

The type, design and capacity of the buffer depend on product design, work-pace variations, space available and others. In the case of small items, simple bins are usually sufficient.

In designing buffers one should try to:

- minimize the floor space taken up by the buffer;
- ensure easy maintenance, transport and replacement;
- choose the appropriate height for the buffer and design it to minimize the effort needed to put stock in or take it out;
- store work-pieces in a systematic manner so you can get an exact idea at a glance of what is available.

When buffer stocks are present, workers can build up a small advance which they can use to take a few seconds' rest, or correct machine settings. Buffer stocks help to make production continuous and flexible. While they are a simple idea, they are used in all the most modern production systems.



#### Design responsible, flexible jobs.

Look around. Your workers are different from each other. One may be quick but error prone, another may be slow but precise. One may like to learn new skills while another avoids any changes. The physical capacities of individuals also differ to a considerable degree. It is obvious that there is no "average" worker. But, nonetheless, we continue to design work for the "average" worker who do not exist. As a result, one part of the workforce is under constant strain as their capacity is lower than "average" and we have low quality, work interruptions and absenteeism. Others are underutilized as their capacities exceed the "average".

Poorly designed work leads to many lost opportunities and extra costs. Careful design offers many benefits. For instance, if the task of a worker starts by inspecting her inputs, there's no way of further processing an item only to end up as a reject. Timely feedback on the quality of the output of the preceding process can be taken. The supplier-customer relationship among sewers in the production line could be explained and inculcated to ensure quality products. This will also reduce the need for inspection and quality control. Here are some characteristics of well-designed jobs:

- jobs should make clear who is responsible for output and quality;
- jobs should help workers to develop skills and become interchangeable;
- jobs should occupy each worker fully but should remain within each worker's capability.

It should be noted that workers perform well if they know what is expected of them and they are equipped with the necessary skills to meet the requirements. Additional responsibilities can be productive if they are

given authority to decide on certain situations. Clarification therefore of their authority should be done during meetings so that everybody is well informed of his/her functions.

Efficiency of the work organization can be achieved by taking note of the following:

- Workers need to know what is expected of them.
- Workers should be given a clear idea of what to do in certain situations. What can be addressed at their level and what should be raised to management for solution.
- Management must take the initiative to enhance worker's skills through training.
- Quality inspection can be done in every operation by integrating it into their tasks. For instance, a sewer must check the parts received before proceeding with her operation. Similarly, she has to make sure she is doing her work right so errors are not incurred in the line.



Set-up autonomous groups to improve efficiency and cut on supervisory cost.

Many companies find it feasible and beneficial to assign work to groups instead of individuals. You may already be doing this in certain cases.

Such group work assignments have several advantages:

- it is much easier, and less time-consuming, to formulate objectives and set tasks for a group than for an individual;
- the work flows more smoothly, and less supervision is needed;
- it takes less time for new workers to learn a skill, and workers have better opportunities for acquiring multiple skills;
- continuous co-operation between the workers helps them to spot mistakes more promptly and makes it easier to improve methods and eliminate unnecessary work.

Many of the most advanced large companies have introduced group work and experienced very large productivity increases. They have discovered that groups can work faster and better than the same number of separate

individuals, even if there are extra supervisors and work study experts. They have also learned that quality circles and other schemes for motivating workers and improving methods are much more effective when work is organized in groups. You can benefit from their experience. Consider the following comparison of cost, productivity and quality of work.

<u>Individual Jobs</u>	<u>Group Work</u>
<ul style="list-style-type: none"> <li>• The pace of work is limited to the slowest job in the line. Bottlenecks must be overcome through intervention by a supervisor.</li> </ul>	<p>Workers can flexibly help to overcome bottlenecks by exchanging tasks and sharing work.</p>
<ul style="list-style-type: none"> <li>• A change of products means that someone must redesign all jobs.</li> </ul>	<p>Workers can work out a new arrangement by themselves.</p>
<ul style="list-style-type: none"> <li>• Absent workers, machine breakdowns, problems with raw materials, etc., require intervention by a supervisor, who must decide what each worker must do.</li> </ul>	<p>Workers can work out a new arrangement by themselves.</p>
<ul style="list-style-type: none"> <li>• Each worker learns how to do one job.</li> </ul>	<p>Workers can learn all jobs in the group.</p>
<ul style="list-style-type: none"> <li>• Each worker is responsible only for his or her task. Delays, mistakes and other problems can be blamed on someone else.</li> </ul>	<p>The group is collectively responsible for productivity, quality and discipline.</p>
<ul style="list-style-type: none"> <li>• A separate supervisor must be paid a higher wage for overcoming problems, planning and assigning work, discipline and other tasks.</li> </ul>	<p>All these tasks can be handled by the group.</p>

The efficiency of group work depends very much on the individual's attitude towards work as well as on the "work climate" inside the group. Group members should have the right skills for the work being done and be able to "get along" with each other. It is also important that groups be

the right size. There should be enough workers to perform the task, but not too many (ideally four to eight).

*Rewards* should depend on the performance of the group as a whole and not on the performance of individual group members.

Links should be set up between the work group and any other groups who have information and/or expertise that the work group needs (for example, concerning supplies or maintenance).

The group should have control over the methods used to do the work, and the way the work is shared among the group members.

The group should be given regular information about its performance. Displaying group performances in the bulletin board generates competition and if managed and rewarded properly could bring about continuous productivity increase.

 Arrange the production layout to meet the company objectives.

Thus far we have discussed ways to improve efficiency at separate work stations and work areas. In order to attain full efficiency, we have to find the most appropriate way to link work together, or to put it another way, we need to select a general pattern of production flow.

In designing a plant layout, you have to consider the following factors: the type of product, volume of production, the equipment, process flow, materials flow, information flow, space requirement, safety, warehousing and service areas. In addition to these factors, the convenience of communication and flexibility should be considered. The ability to respond to customer's demand for quality, cost and timely delivery should be the end objective.

How can you organize your production to meet this objective? It can be done by redesigning work arrangement in such a way that:

- there is one simple, preferably straight-line flow of materials for each product or family of products;
- everyone is concerned not only with the quality of his or her own operation but with the total quality of the product;
- there is constant and quick feedback between the customer and everyone engaged in production;
- individual reward depends not only on performance of a given task but on attaining a common final goal.

The plant layout will facilitate the production process. The layout also affects the utilization of the following resources of the company:

#### **Human Skills and Talents**

With an effective layout, human skills and talents can be utilized better since lesser walking and movement from one process to another will occur. Delays caused by unclear aisles for instance, steals the opportunity for the worker to do more.

#### **Money**

The company incurs cost for all tasks that are done in the company. A properly designed layout saves the company from incurring costs for non-value-adding tasks like delays, transportation, etc.

#### **Machine Operating Hours**

In sewing, too much unnecessary movement of materials and people in the workplace can cause idleness of a machine since a machine runs only if there is an operator running it.

#### **Material**

The longer the material travels, the greater the likelihood that it can catch dirt and be damaged. A good layout will lessen material handling since machines and movement of materials are logically arranged.

## **Time**

Time is a limited resource hence should be managed and used properly. Poor layout affects materials handling and production operations which involve man-hours and machine-hours.

Some pointers that should be considered in designing the layout are the following:

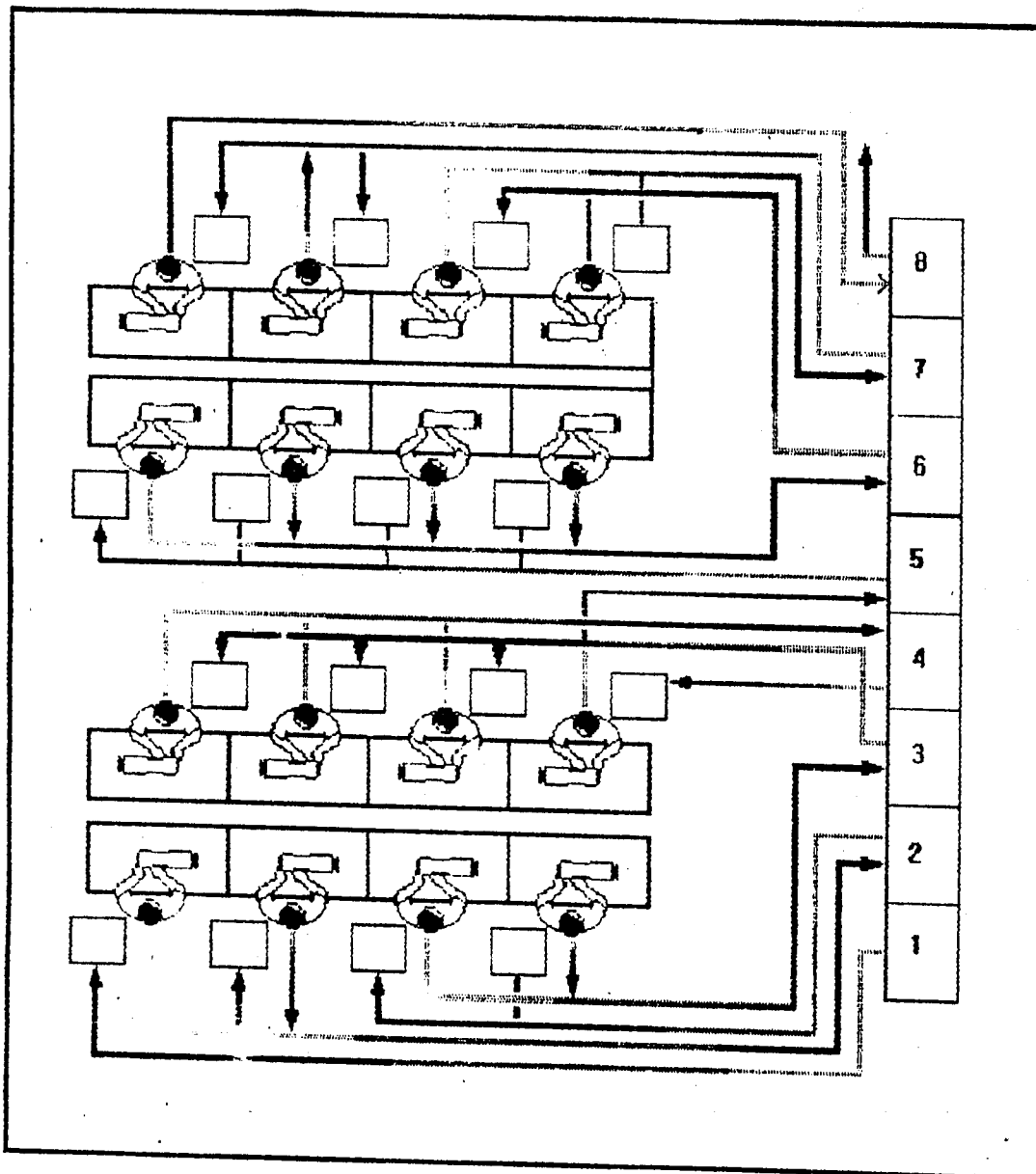
- Materials should flow logically, ideally, in one straight line. As much as possible, the start to finish of a production line must be located in one floor.
- In cases where space is a constraint, make sure that no operation is extended to the next floor.
- Lanes should be able to distinguish one production line from the other. Each production line must be provided with an aisle that would facilitate the transport of work-in-progress.
- Balance the production line.
  - Determine the time requirement of each operation.
  - Determine the limiting operation (operation that requires the longest time to finish a unit of a product).
  - Assign a number of people required in the limiting operation so that it can cope with the rate other operations are going or adjust the number of people doing the other operations such that they can synchronize their rate with the limiting operation.
  - Simulate the manpower assignment. If the difference in rate by which each piece of component comes out from each operation is very minimal, the operation is balanced.
  - Apply the balanced production schedule.

The following types of layout can be considered by the entrepreneurs:



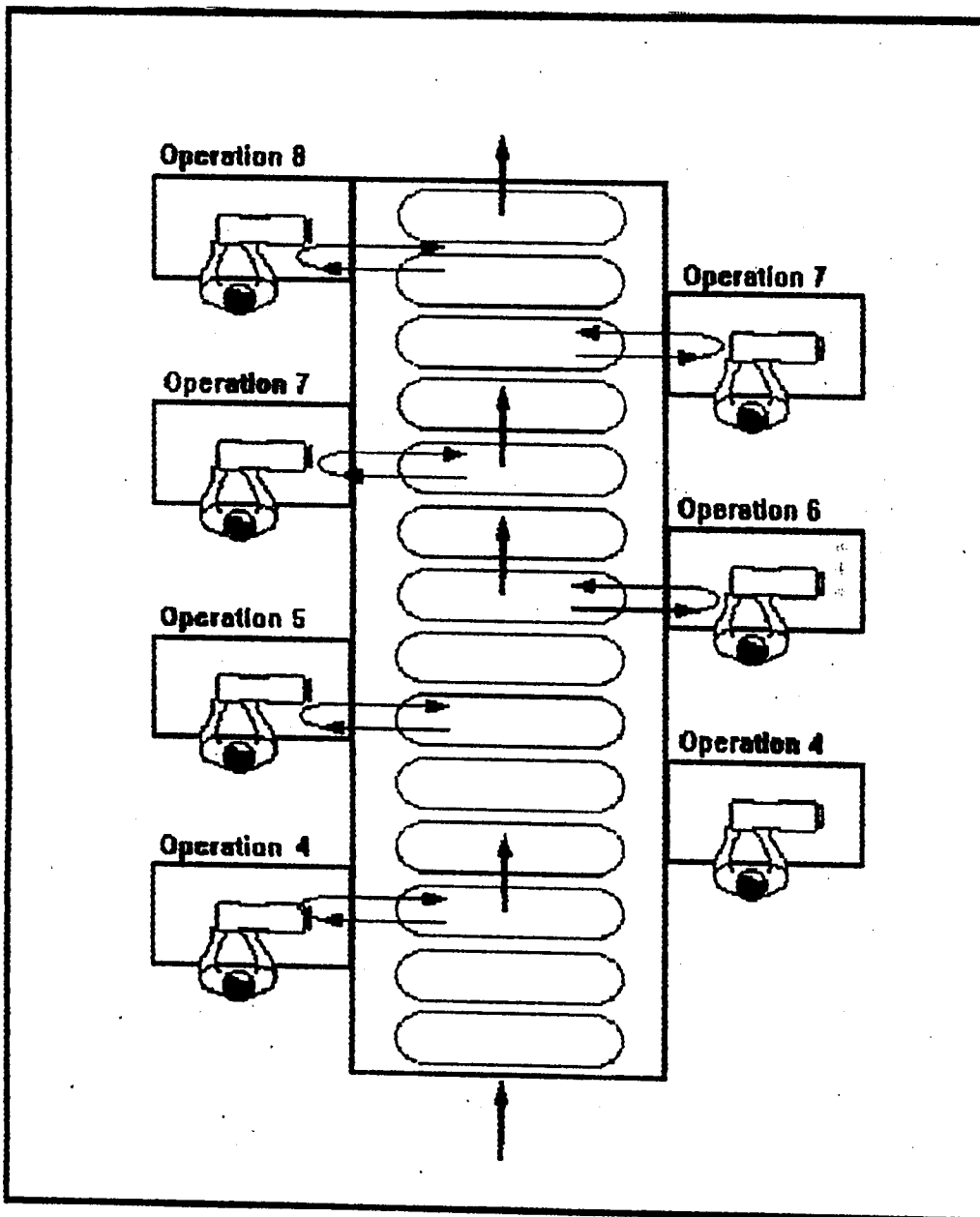
- Conventional Bundle (Central Storage)

- Garments are collected from and return to central store in between operations.
- Heavy materials handling.
- Long searching time for bundles.
- Visual control is essential.

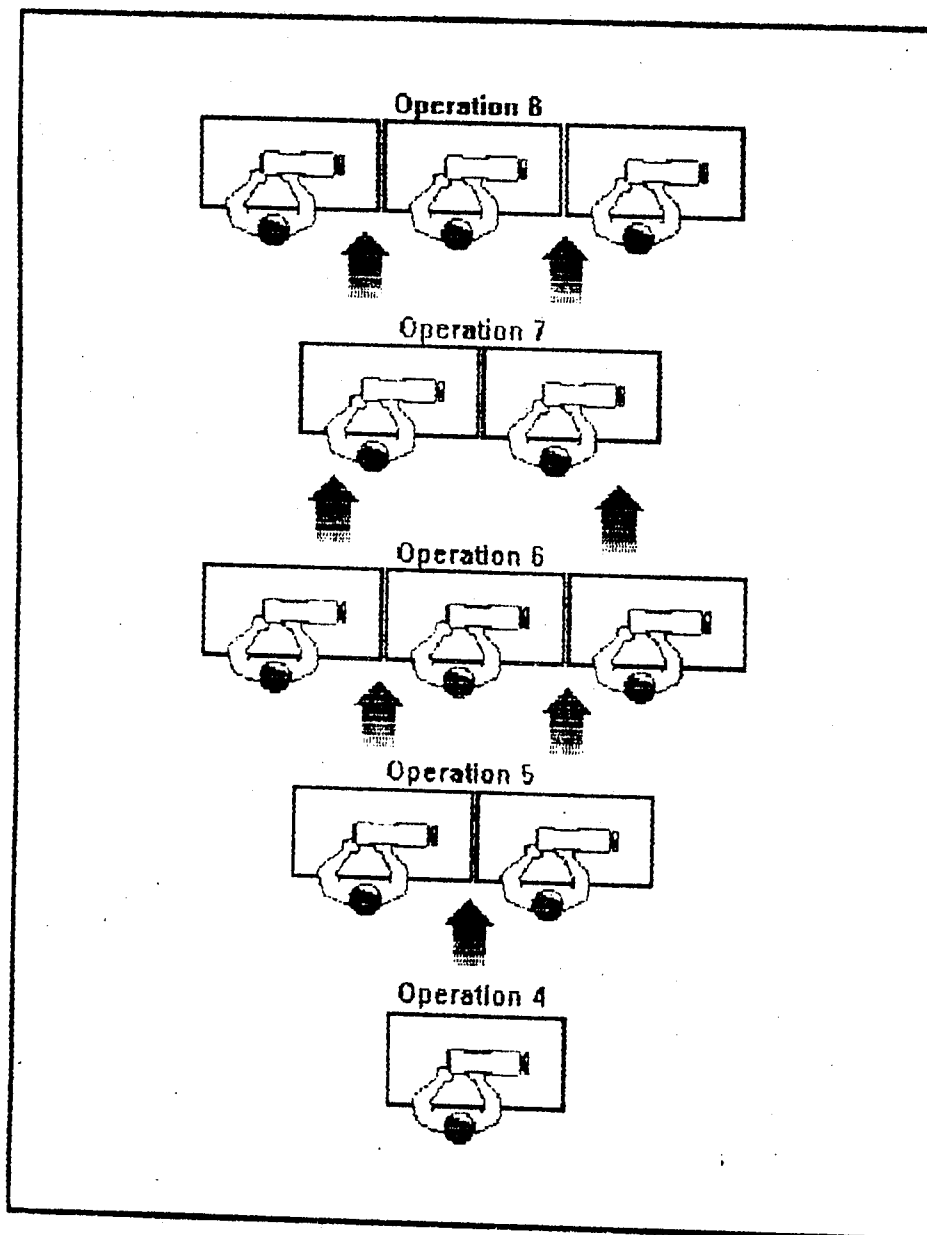


- **Straight Line (Conveyor-Type)**

- The manufacturing sequence is broken down so that cycle times of each work station is about the same.
- 2 or more operators may be assigned to one (1) station.
- Traditionally, the pace is dictated by the slowest operator.
- Storage space is restricted.
- Unsuitable for high labor turnover and absenteeism.

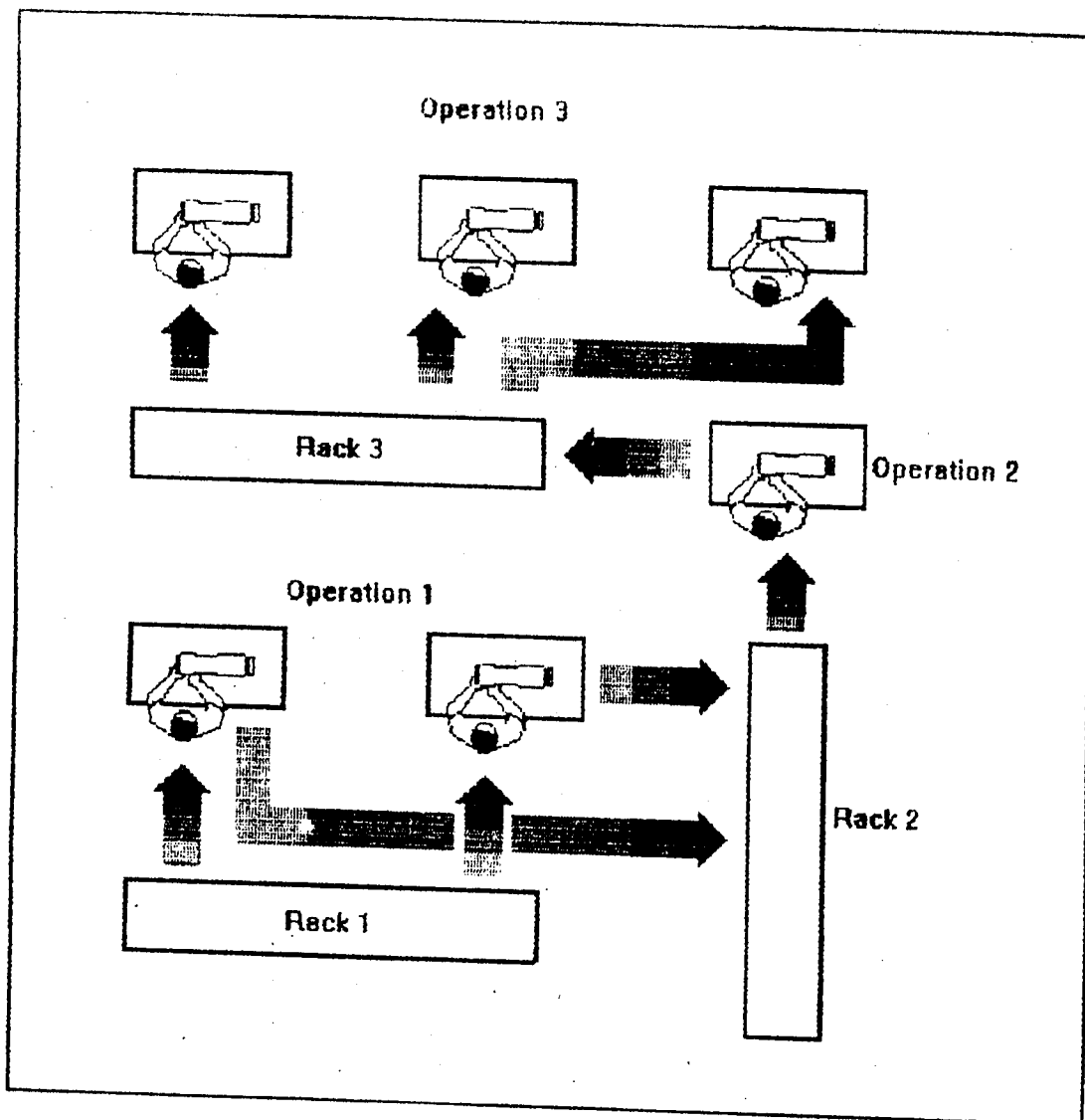


- Progressive Line (Synchronized Flow)
  - Line balancing is critical.
  - More storage space requirements than straight line.
  - Space allocation of about 45 sq. ft. per station is adequate.



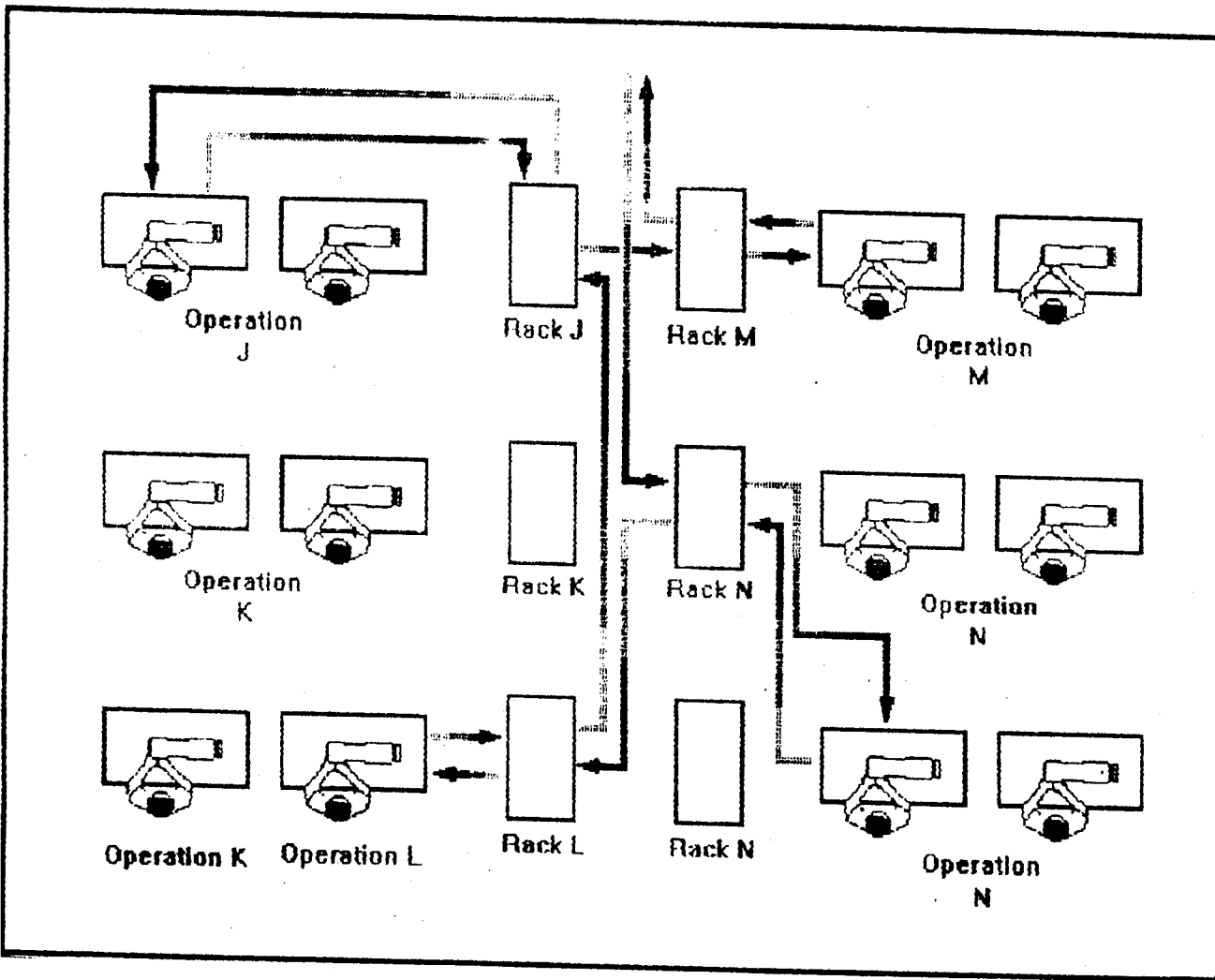
- Progressive Bundle Unit

- Line Balancing is also critical.
- Operations are laid out in sequence with storage in between each one.
- Work-in-process inventory is usually larger than in the progressive line.
- Close supervision is necessary to keep within the standard times.
- Appropriate for the manufacture of stable or larger volume products.



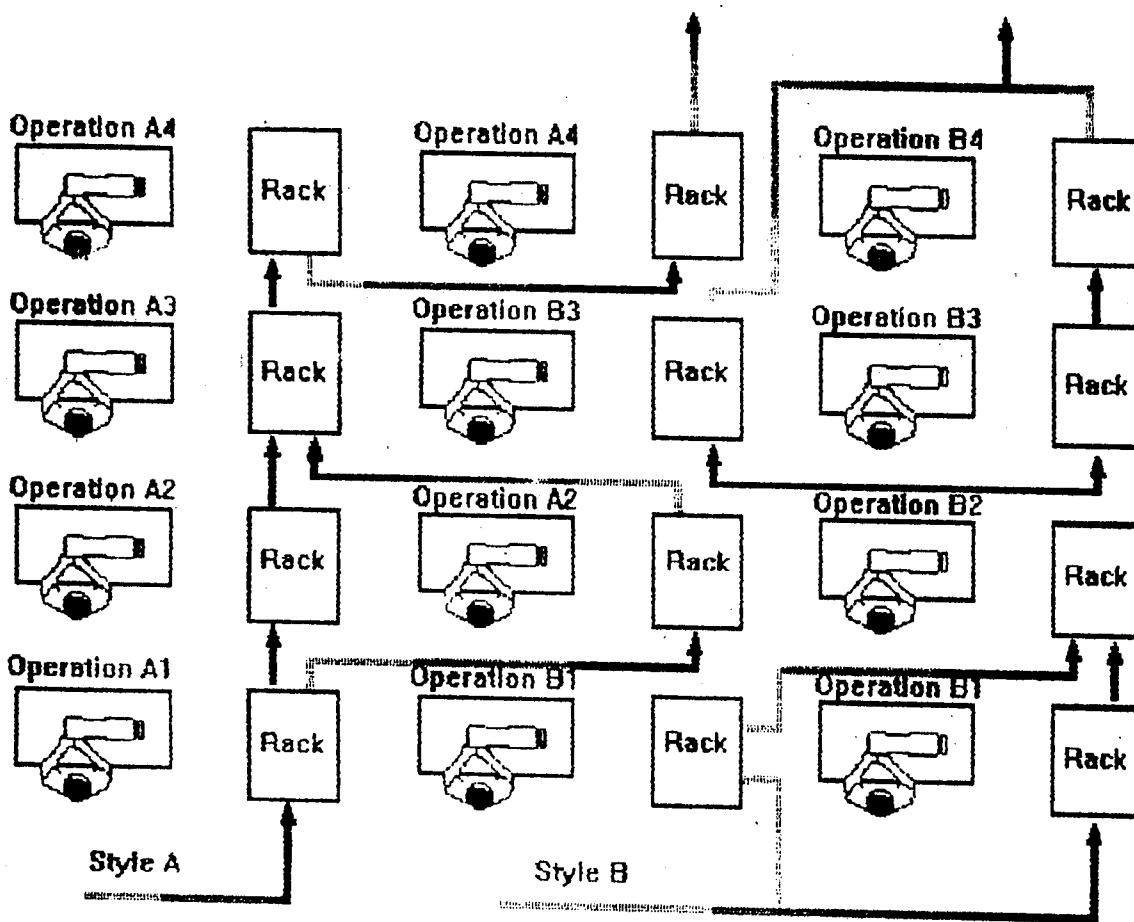
- Interflow System

- Characterized by work specialization but movement of work may not follow an established pattern.
- Capable of handling a wide variety of styles and products.
- Materials flow may be confusing.
- Special handling devices may be needed.
- Flexible.



- Flexible Flow System

- Workers are multi-skilled and perform numerous operations.
- Suited for short runs.



The best layout is one that is suitable to your own particular situation. You have to consider all the factors discussed above.

### Set-up Progress Control.

The purpose of progress control is to meet the specified delivery date and to reduce the number of product items in the lines. The progress of work is checked by comparing the plan and the actual results. In this way, work delays are prevented.

With progress control, you can monitor individual production by knowing how far has the work progressed. For continuous production, you can monitor the quantity of products finished. Progress control also enables you to monitor location and quantity of work-in-progress in each production line.

The checking cycle and the checking method depend on the objectives of the progress control. For individual or division/section outputs, checking is done every one or two hours. Data are entered in the progress control board which should be located prominently in one wall of the production area.

The sewing division has three objectives when checking the progress made so far:

- Final process to complete the parts. Example: Marking three points on the collar.
- Process to join the garment body with a part. Example: Attaching the collar to the neckline.
- Process to join one garment body with another garment body. Example: Seam side.

Below is an example of a sewing control board. This will enable the enterprise to monitor and check the progress made by the entire factory, the progress made by a division or section, and the progress of an individual worker. It should be noted that the introduction of a computer will help realize the off-line control of progress from the level of the entire factory to the level of the individual worker.

The use of signals is an effective method for controlling progress. The controller evaluates the actual output indicated on the sewing control board and makes her/his evaluation using signals in different colors. An example of an evaluation standard using color is: blue when target achievement rate is 100% or more; yellow when target achievement rate is 90% or less than 100%; and red when target achievement rate is less than 90%.

**Progress Control Board**

November 3, 1995

Production Number	173011	Target Number of Pieces Produced Per Day	210	Remarks
Product Name	Skirt	Actual Number of Piece Produced Per Day		
Lot Size	800 pieces	Actual Number of Workers	14	
Name of workers absent from work	none			
Number of Workers Late for Work	none			
Name of workers leaving early	none			

Name of Worker	Time Target	1 0	1 2	3	End	Date	Daily Workflow	Remaining Quantity	Input Lot Order
		45	90	150	210		100	700	Navy Blue
Miss A	Sew facing to the front	40	80	145	200	10	175	525	7 1 10 2 10 3 10 4 10 5 10 6 10 7 10 8 10 9 5
Miss B	Runstitch the pleat	46	90	153	209	11	203	323	85
Miss C	Runstitch the lining	50	100	160	200	12			9 1 10 2 10 3 10 4 10 5 10 6 10 7 10 8 10 9 10 10 10 100
									11 1 10 2 10



**Summary:**

**Rules for Work Organization:**

1. Get rid of extra tasks and operations.
2. Defeat monotony to keep workers alert and productive.
3. Install buffers to make work flow smoothly
4. Design responsible, flexible jobs.
5. Set up autonomous groups to improve efficiency and to cut supervisory costs.
6. Arrange the production layout to meet the company objectives.
7. Set-up progress control.

## Chapter 11 IMPLEMENTATION OF IMPROVEMENTS

The small and medium-sized enterprise must cope with a very rough world, and it is rapidly getting rougher. If you want to survive and grow, your enterprise must be dynamic. To compete you need constant improvement. Otherwise you will not be able to take advantage of opportunities or resolve problems rapidly.

When you first looked at Chapters 1 and 2 and used the checklist in your factory, you probably found several measures that were worth while. There are a number of ideas which can be quickly and easily applied in almost all small and medium-sized enterprises, and we hope you have already benefited from these ideas.

Now it is time to go further. Chapter 3 to 10 have given you the information you need to take a fresh, intensive look at your factory.

Start with a small, specific area where there are only a few operations. Try to see if you can find ways to make it operate really efficiently. The rest of this chapter will help you to apply the lessons from the Action Manual as a whole.

You may have read about quality control circles or other advanced management ideas and wondered if they can be applied in your company. They can. You will have to discard some of your old assumptions and habits and put some real time and work into making your enterprise tough and flexible. If you do, you will be surprised by the opportunities and energy which have been hidden inside your company.



**Develop complete action.**

If you have a bottleneck operation or problem area in your workplace, it probably results from a combination of factors. For example, suppose you have a problem regarding the movement of work-in-process from one operation to another because of improper machine layout and sequence of operation. You want to improve machine layout to improve material handling. In doing so, you have to consider the positioning of your lights and electrical outlets. You may also want to provide containers for easy

movement. Thus to improve material handling, you have to consider many factors and evaluate a number of options to minimize impact on the whole production process.

Many of the improvements you will implement will usually need to take several actions at the same time in order to meet the objective you have set. Use the whole checklist to look for ways of achieving a complete solution of your problem. Remember that the limits on the productivity of your workers come from several sources, some of which may at first seem unrelated to your objective. Develop a complete solution. Recheck and see if there is something you have left out in each of the technical areas covered in this book:

1. material storage and handling
2. work-station design
3. productive machine safety
4. control of hazardous substances
5. lighting
6. welfare facilities
7. premises
8. work organization

If the problem is especially complex, establish a group of workers to give advice on it. More will be said about this later.



**Make sure your ideas will work.**

Suppose that one of the changes you have decided on is to improve lighting at a critical work-station. Consider, for example, a worker with a poorly lit work-station, with no source of natural light, with dark walls and ceiling and with a single light source facing him or her. How would you solve this problem?

Many things can go wrong when you try to improve lighting. For example:

- You could create glare or too much contrast between light and dark areas by installing a more powerful lamp.

- You could create heat and glare from an improperly designed and placed skylight.
- You could create glare and distraction by placing a worker facing a window.
- You could improve the situation by cleaning windows, skylights and lamp fixtures only to have the same problem return in a few weeks because of the lack of regular cleaning.
- You could increase the quantity of light when the real problem is the direction of light or the task background.

How could you increase the probability of success? There are several ways to try and be sure that the improvement you have chosen is the best one for your enterprise and that it will work.

- Before starting, consider alternative solutions and see which one suits you best.
- Try your ideas first in a small way and see how they work. For example, before you decide to relocate a whole row of sewing machines in order to take advantage of light from windows, try it first with one machine and evaluate the results.
- Observe a similar improvement in the same conditions in another enterprise. It is always better and cheaper to learn from the mistakes of others than from your own.
- Get the advice of someone who has experience in solving similar problems. This is especially important when your enterprise is trying to solve this problem for the first time.

 Mobilize worker support.

If you make a worker's job more difficult, the result will be lower productivity and resentment, not higher productivity and appreciation. If

your improvements are intended to build loyalty and motivation and to be fully effective, you need to be sure that the workers understand how they will benefit. This requires taking a look from the worker's point of view at the impact on job security, pay, level of responsibility, type of supervision, difficulty or ease of work, etc. The workers will certainly be thinking about these things.

Ask yourself who will be affected by the change. This means not only, for example, the worker who uses a cart but everyone who has been using the space in the passageway. In what ways will workers be affected positively? Be sure they know about these positive effects, so that they will appreciate and support your actions. In what ways will workers be affected negatively? Could anyone lose their job or have their pay reduced? Workers who expect to be hurt by a change will often find very good ways of making sure that it does not work very well. You need to do two things: avoid any negative impact on workers; and make sure that they know they have nothing to fear.

The following steps help to make sure that changes are accepted:

- Make it known that no one will lose their job, have their pay cut or otherwise be hurt by the change.
- Explain your plans to the workers and give them a chance to make suggestions.
- Provide any necessary training. Even where formal training is unnecessary, you may need to relax performance standards during a brief period of adaptation to the new situation.
- Issue clear instructions and assign specific responsibilities.
- Show your support for the change by paying close attention to developments, by praising progress, and by reaching to any sign of going back to the old methods.
- Consider incentive pay or other rewards based on performance.

- Make sure that workers know they should report any problems to you and take action if unforeseen difficulties arise.

One of the best ways to introduce change smoothly and effectively is to assign responsibility for it to a group of workers. If workers are part of the process planning and implementing the change, they can be confident that their interests will be taken into account. They will be able to suggest their own ideas and they will feel responsible for the success of the improvement. They will therefore not only be co-operative, they will monitor the change carefully and propose or carry out any necessary adjustments.

Remember, changes which are accepted by the workers will be implemented more smoothly. Information about what you are trying to do is very important for the workers' loyalty and motivation.



**Make improvements which will last.**

Even simple and immediately productive ideas are not always followed. Old habits are strong, and they do not die easily. There are two basic strategies which help to make sure that improvements are smoothly introduced, effectively implemented and lasting.

- Change people's habits and behavior.
- Build the change into equipment and facilities.

For most changes you will need to do both to be successful.

If you follow the advice in the previous section on mobilizing worker support, you will do a great deal to make sure that workers are ready to change. The points on management of improvements in the next section will help you to monitor the changes in behavior and to take any necessary corrective action. These steps are very important, but for many types of change they are not enough to see that your objectives will be met.



### Manage change.

If nothing new ever happened, management would not be easy so you have to change constantly. You have to respond to orders, improve your products, overcome problems with raw materials and equipment, train new workers and in general cope with many challenges every day. Some managers run from one problem to another and never develop any real strategy. Others are able to go beyond their problems, and can build real management system which generates constant improvements in their workplaces.

This book offers you the opportunity of improving your management skills. Don't waste the opportunity.



### Supervise improvements carefully.

Each individual improvement is a challenge to your consistency and determination as a manager. If you pay no attention to what is happening to the improvement, everyone will quickly understand that it is not important to you.

One way to ensure that you will not delay completing an improvement and forget about it is to establish a firm deadline and clearly announce it to everyone concerned. It is especially important that the deadline is not a general intention but the same kind of commitment you would give to completing an order on time.

It is important that you make someone responsible for completing the improvement. If no supervisor or worker knows that the improvement is clearly their responsibility, then everyone may wait for someone else to do the job. In addition, there will be no one with an incentive to get work started and monitor progress.

Of course, most changes which are worth making will require some workers' time, some materials and perhaps some purchases. You should allocate adequate resources to get the job done.

Once the improvement has started you should request regular reports on progress from the person responsible. This will enable you to make corrective action if necessary and it will make sure that the improvement is not forgotten.

After the improvement is completed and is in operation you should check to ensure that it works well. It is also important to see that the change is accepted by the workers and that it has no unexpected results.

You should make sure that, throughout the improvement process, you and your supervisors lead the way by strictly following the new rules and frequently praising workers who respond correctly to the improvement.



**Make improvement a systematic process.**

Once you have the experience of making a few improvements, you will begin to see the potential for developing a systematic, dynamic approach to the management of change. Each improvement tends to lead to new possibilities. Improvement can become a habit, with everyone trying to find a better way of working. The implications for productivity and motivation are very powerful.

Improvement requires ideas. If you are working with a group of other factory owners and managers, you know how valuable the exchange of ideas and experiences can be. In addition to other entrepreneurs, you can try:

- visits to other factories;
- productivity and training centers;
- employers' organizations, trade associations and chamber of commerce;
- government agencies.

All these are useful sources of ideas and technical information. The best source of information, however, is already in your factory. Your workers can help you a great deal. Many advanced organizational ideas, such as quality control circles, are based on using workers as a constant source of ideas for improvement.



Some entrepreneurs do not want to ask questions of their workers. They feel that it is a manager's job to decide what to do, and the worker's job to do it. There is much truth in this. The boss must remain the boss. You will find, however, that asking the opinion of workers does not reduce your authority or responsibility for decisions. Instead, it gives you the information you need to make better decisions. At the same time, it gives workers a feeling that they have something to contribute to the company, which increases their loyalty and motivation.

You will only get ideas from your workers if you make it clear that you want their ideas. The following steps are effective ways of doing this:

- Hold a meeting during company time. Explain your goals to the workers (you may find it very useful for yourself to spell out your goals). Make it clear that they have a stake in your company and that they will benefit if your company succeeds. Their jobs and their wages depend on your profits.
- Make it easy for the workers to give you their suggestions. Set aside a time when you are available. Walk through the workshop and ask questions. Thank anyone who makes an effort.
- Above all, take action on suggestions in a very obvious way. Even if the first suggestions do not seem very interesting, give them a try. The workers will be watching to see if you sincerely intend to pay attention to their advice.

You can also let a group of workers fill out the checklist, discuss the results and present you their conclusions. None of the ideas on the checklist are dangerous. They have been carefully chosen to save money and raise your productivity. Why not give your workers a chance to get interested in these goals?

 **Take action.**

Now is the time to act. The annex that follows is a worksheet which summarizes this chapter. Take it and a copy of the checklist onto your shopfloor, and start the process of making your enterprise a better place to work.

**Summary:**

**Rules for Successful Implementation of Improvements.**

1. Develop a complete solution.
2. Make sure your ideas will work.
3. Mobilize worker support.
4. Make improvements which will last.
5. Manage change.
6. Supervise improvements carefully.
7. Make improvement a systematic process.
8. Take action.

## Annex: Summary of Chapter 11

### How to Implement Improvements

Don't waste your time and money implementing important improvements in a careless way. Even simple improvements often fail because of a lack of foresight and planning. This guide gives five simple rules that will help you to be successful. In addition, they will help you to make improvements happen frequently instead of stopping after three or four have been completed. Continuous improvement is the road to survival and growth.

 **Develop a complete solution.**

Improvements sometimes don't work because they are incomplete. For example, if you want to use carts, you should take a look at the shop-floor. What additional changes may be necessary to make the improvement work well:

in material storage and handling? \_\_\_\_\_

in work-station design? \_\_\_\_\_

in productive machine safety? \_\_\_\_\_

in control of hazardous


substances? \_\_\_\_\_

in lighting? \_\_\_\_\_

in welfare facilities? \_\_\_\_\_

in premises? \_\_\_\_\_

in work organization? \_\_\_\_\_


 **Make sure your ideas will work**

Very often, even improvements which seem simple do not meet your expectations in practice. Anticipate design problems and make sure that all important factors have been taken into account. Ask yourself what makes you believe that this improvement will work well:

because you have tried out different ways of solving the same problem and this one works best.

Provision of additional training.

Financial rewards.

 **Make improvements which will last.**

Four innovations out of five eventually disappear because no specific actions were taken to make them last. There are two main strategies which will help to counteract this:

- Change people's habits and behaviour.
- Build the change into equipment and facilities.

For most changes you will need to do both to be successful.

If you follow this method carefully and involve workers fully, you should make much progress in changing workers' habits and motivation. However, if the improvement is fully dependent on the behaviour of the worker (for example, preventing the cluttering of passageways), it is very likely that it will not last long. Old habits are

very strong. To prevent this, we have to find ways to incorporate the change into machines and facilities, reject the old routine (for example, provide storage racks and bins, or clearly mark passageways).

Which steps will you take to make the change last by building it into your plant and equipment?

Remove any tools or equipment which make it possible or easier to return to the old situation.

Build the improvement into machines so that it cannot be removed.

Financial rewards.

Design new or modified equipment so that it is easier to use and maintain in the new way.

Provide barriers, painted lines, bins, or make other changes which make the improvement easily visible and natural to follow.

\_\_\_\_\_  
\_\_\_\_\_

Manage change.

Be sure that changes will be effectively implemented. Foresee the following steps:

- Establish a firm deadline.
- Make someone responsible for implementation.
- Allocate adequate resources (time, materials, money).
- Request regular reports on progress.
- Check that the implemented improvement works well, is accepted by the workers and has no unexpected results.
- Make sure that you and your supervisors lead the way by following rules and by frequently praising workers who respond correctly to the improvement.

An important management responsibility is to make sure that the improvement becomes a permanent part of the way work is done. Ask yourself:

- Do you receive a constant flow of ideas from your staff and workers?
- Is everyone in search of ways for more productive or higher-quality work?

Each individual improvement is an opportunity to become a real manager of change. The following steps will help to make your company more dynamic. How many will you take?

- A regular suggestion scheme with rewards for the best ideas.
- Regular meetings at which workers are encouraged to explain their problems and give their ideas.
- An exercise in which groups of workers use the checklist and make proposals to you.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**CONSULTING ORGANIZATION**

## **CONSULTING ORGANIZATION**

### **AGRO-INDUSTRIAL MANAGEMENT & CONSULTANCY, INC.**

Suite 402 CLF Building I  
1167 Chino Roces Avenue Makati City, Philippines  
Tel. Nos. 890-7198; 890-7433; 896-55-56 to 59 loc. 121  
Fax No.: 890-7198; 890-7192

**DR. CEFERINO L. FOLLOSCO**  
President and Chairman

**DR. EDUARDO R. MAGTOTO**  
Vice President

#### **PROJECT TEAM:**

**MARILOU M. CALZADO**  
Principal

**MARICAR C. CORDERO**  
Research Assistant

#### **RESOURCE PERSONS:**

**MR. SERGIO A. GARCIA**  
President  
Metrogate Garment Industries

**MR. ILDEFONSO G. CABLES**  
President  
First United Garment Subcontractors  
Association of Rizal, Inc. (FUGASAR)