

Ergonomics

The science to enhance human performance

By fitting the job to the worker

Why are we here



Every 18 seconds a worker gets a musculoskeletal disorder (MSD) such as a sprain, strain or back injury.

Source: American Federation of Government Employees,



More than 60% of workplace illnesses reported each year are related to repetitive stress injuries resulting from continuous repetition of the same motions.

OSHA



“Lower design and construction costs can be obtained when equipment and facilities are (ergonomically) designed right the first time. The cost of correcting ergonomic design at the initial part of a design project is about 10% of the cost that will occur later.”

(Alexander, D.C., 1999)

Current situation



Within two years of beginning my career in the IT sector, I suffered from severe back pain. & I had to undergo spine surgery at the age of 26

Rahul Sharma, Software Engineer, Age 27

I was suffering from severe low back pain. As the pain became unbearable, I am forced to deny the job asked by the superior.

An Employee of Tata steel

I am battling severe neck pain because of long hours of research at a microscope which requires me to keep my neck bent at a certain angle. Despite my complaints, the HR department did not look into the ergonomics and even refused to grant me leave.

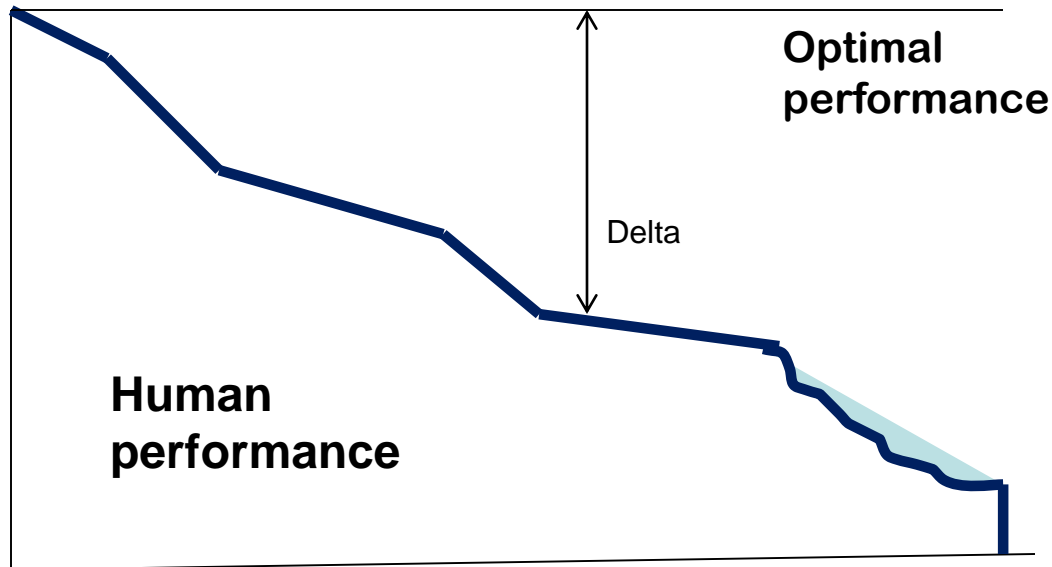
Mitali Shah, Professional pharmacy lab, Age 27

I am having serious wrist pain which caused tingling effect on whole shoulder. So it has become very difficult for me to do my routine job also.

D C Roy, Mechanic, Tata motors, Age 48

* Times Of India – Is back pain spreading like epidemic?

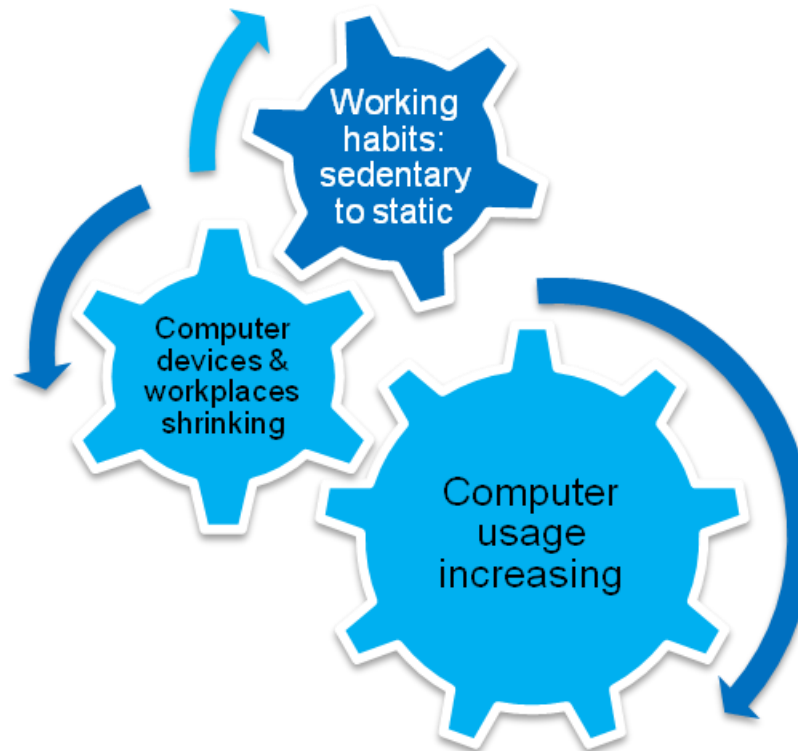
Human Performance



Work Eco-system...

- Not only working population demographics is changing
- Work environments are changing
- Work tools are changing
- Work styles are changing
- Number of hours at work are changing
- Work is becoming sedentary from being static
- And so is changing the **work posture**

Work Eco-system...



These issues are further complicated by Low Awareness of “RIGHT WAY of working.”

Leading to NEW HEALTH PROBLEMS at the workplace

1. Workstation design & Set up

Adjust the working height for each worker at elbow level or slightly below it.

If the work surface is too high, the neck and shoulders become stiff and painful as arms must be held high.

If the work surface is too low, low back pain easily develops as the work has to be done with the body bent forward.

RISKS / SYMPTOMS

- **muscular strain**
- **excessive reach**
- **excessive fatigue**
- **low back pain**
- **upper limb disorder**
- **wrong operation**

1. Workstation design & Set up

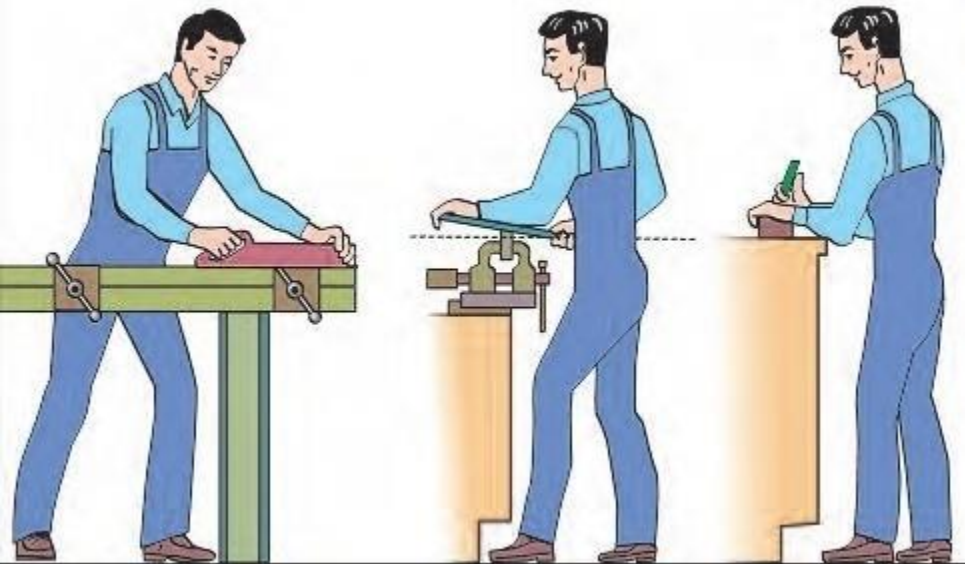
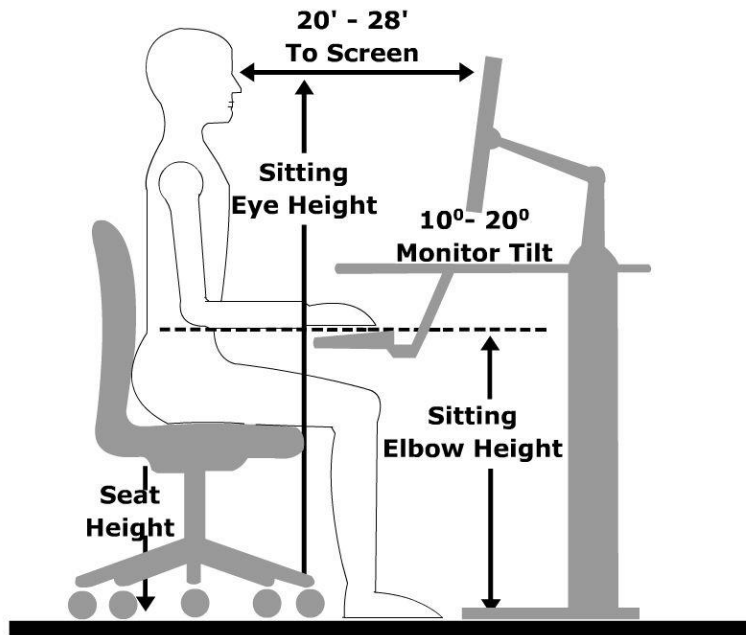


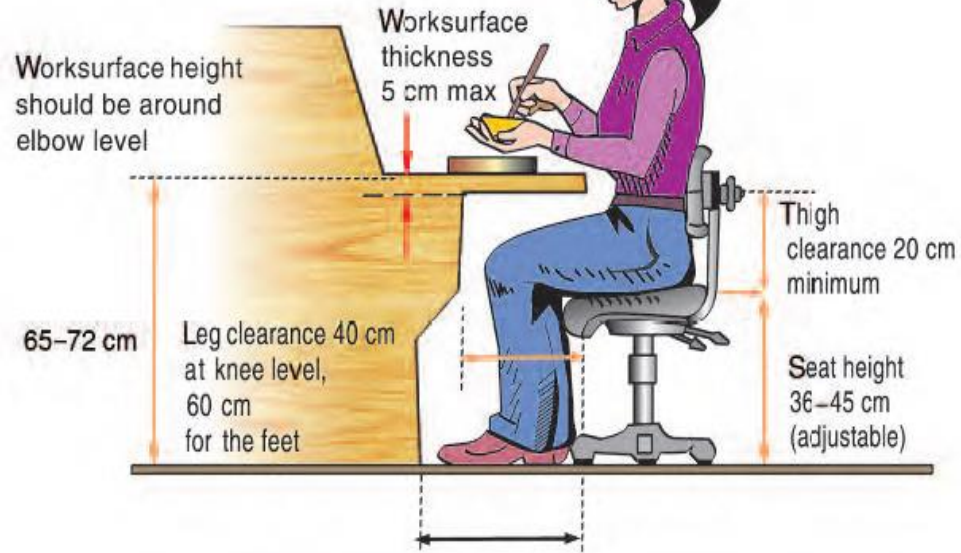
Figure .Most work operations are best performed around elbow level.



Sitting Workstation



Recommended dimensions for most seated tasks.



Defining - Ergonomics?

Ergo = “Work”

Nomos = “Law” or “ Science”



Defining - Ergonomics?



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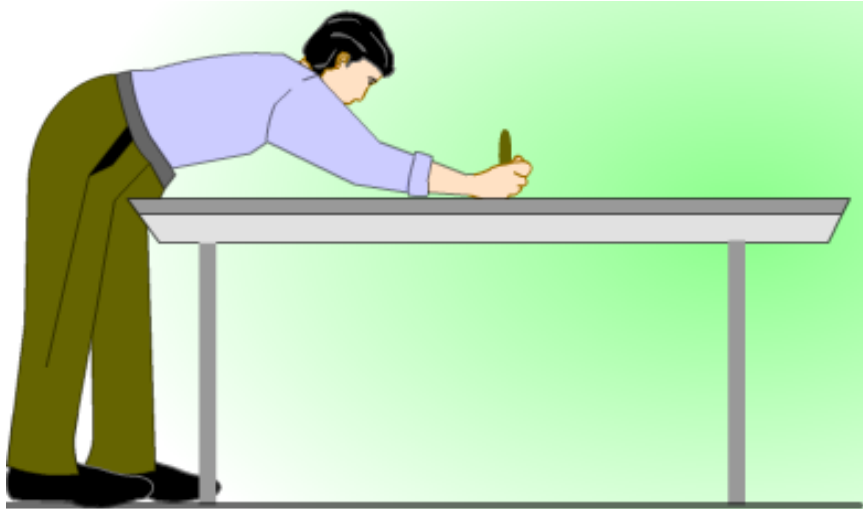


Ergonomics is an attitude,

A way of looking at the workplace

Keep in mind that people , not machine are the sole source of producing products, fixing equipment and ensuring product quality.

Ergonomics Principle



Painful & Inefficient



Easier & Faster

What is Ergonomics?

- Ergonomics means
 - “Ergonomics is a science and practice of designing jobs and workplaces to match the capabilities and limitations of the human body”

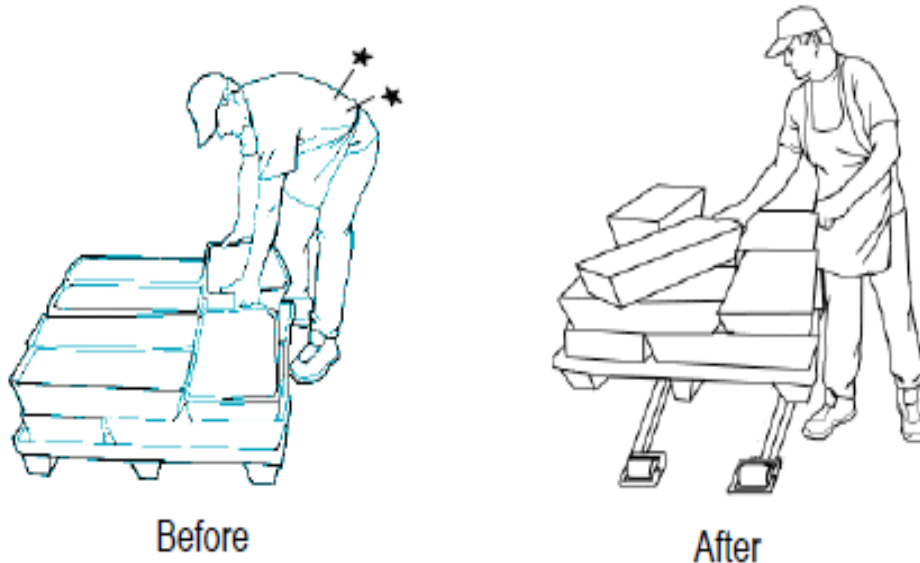
"FITTING THE JOB TO THE WORKERS"



Economics of ergonomics I

Time savings from a pallet lift – Distribution center

This example from a distribution center shows how a standard pallet lift reduced cycle time by 14 – 20%, plus reduced the load on the spine by 66%.



Source: *The Ergonomics Kit for General Industry*

ERGONOMICS IS

- E** Eliminate distraction that can hinder your job
- R** Rest your eyes from prolonged exposure to a screen
- G** Get cushioned heads or mats that promote comfort
- O** Organize your tools and materials so that they are easy to reach
- N** Never bend at the waist or twist when lifting heavy objects
- O** Only apply the necessary amount of force needed to complete a task
- M** Maintain body posture that are comfortable and neutral
- I** Invest in a good chair that supports your entire back
- C** Conduct stretches periodically to engage muscles from inactivity
- S** Switch between work tasks to use different muscle groups

Industrial Athlete



- Skill
- Will (motivation)
- Good coaching
- Great equipment

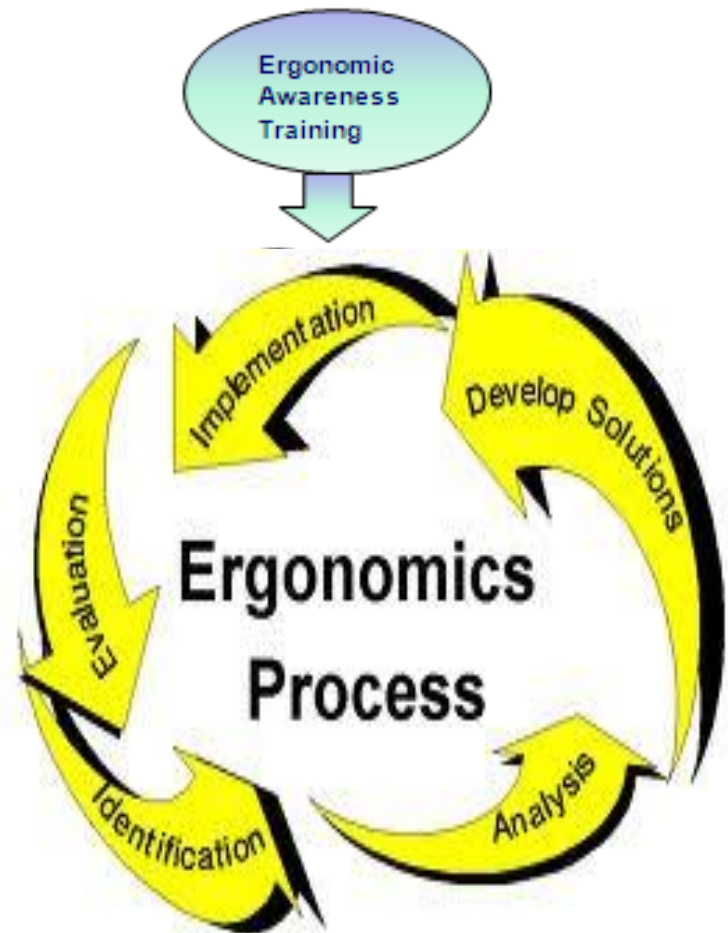
Man – machine metaphor



The law of work defines the limits of human capability much like the specifications for a machine defines its limit.

Ergonomics

A Process not a Program



Trauma Bucket



Trauma Bucket



Why Ergonomic Changes

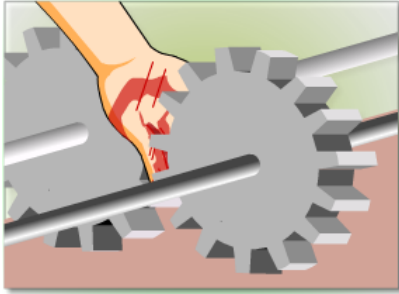
Why should companies make ergonomic changes to the work environment?

- **Improve the safety and health of workers**
- **Reduce the company's costs**
- **Address productivity/quality issues**
- **Respond to regulatory concerns**

Ergonomics can

- Reduces the potential for accidents;
- Reduces the potential for injury and ill health; and
- Improves performance and productivity.

Ergonomics can



Reduce the risk of injury, fatigue and error

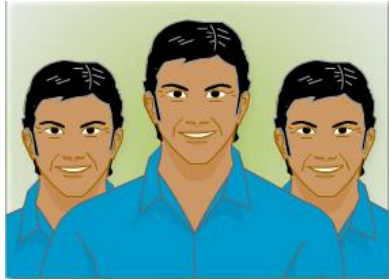


Reduce absenteeism and disability



Reduce the cost spent on health care

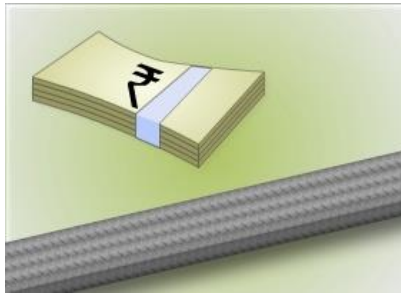
Ergonomics can



Improve the morale of the employees



Improve employees health

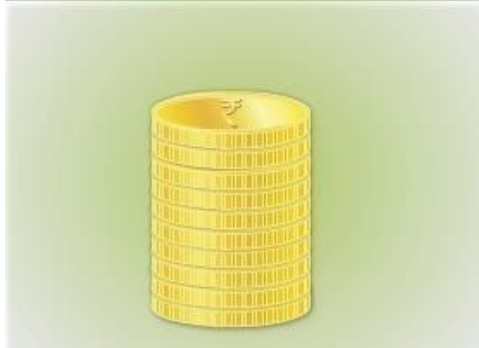


Improve productivity and quality

Ergonomics can



Improve quality of work environment

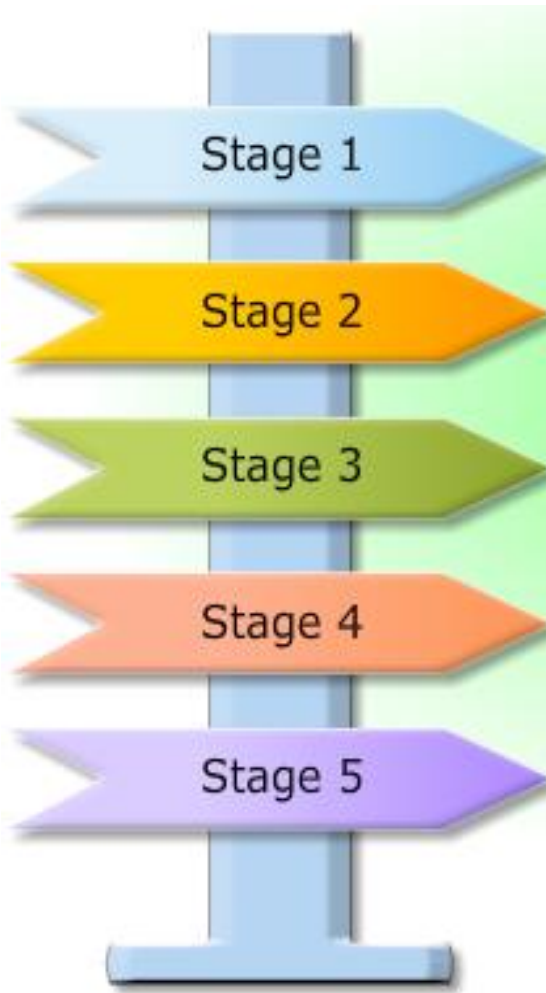


Increase profit

Ergonomics

- Provide Healthy work Environment
- Maintain Good body mechanics
- Follow Right work practices

Effect on health



Fatigue and uneasiness is felt at workplace but feels comfortable at home.

Fatigue and uneasiness is felt at workplace and persists at home.

Discomfort and pain weaken the functioning of a particular body part.

Frequent medical treatment is needed to improve the condition.

Temporary / Permanent disability of a particular body part.

Affect of MSDs

On Employee



Fatigue



Pain



Illness
(sprains, backache etc.)



Low Morale



Frustration and Irritation

Affect of MSDs

On Employer



Poor Quality



Absenteeism



Higher Costs



Higher Employee Turnover
and Training

Because of those effects

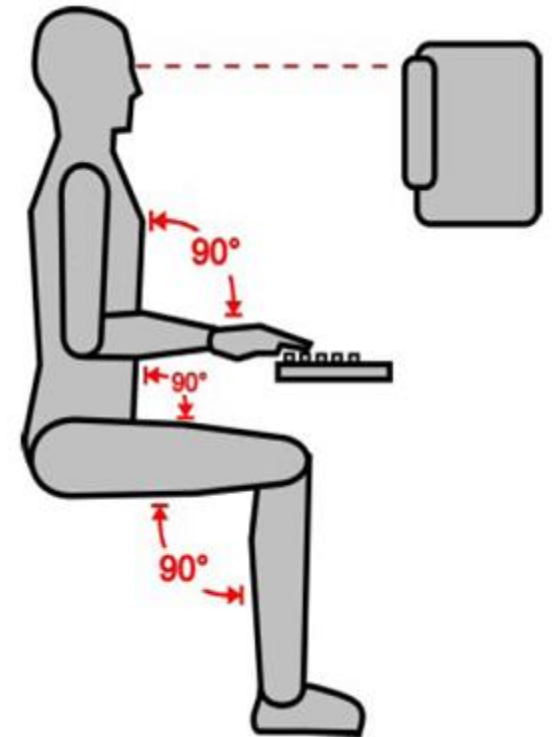
We have productivity loss

Productivity lost from

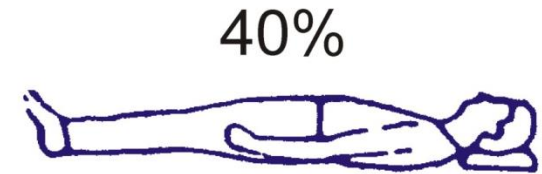
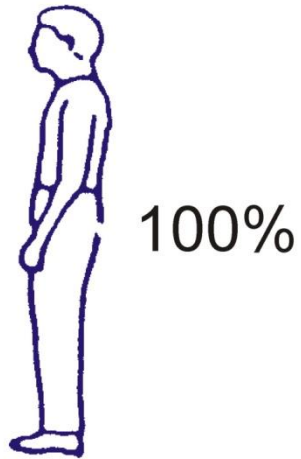
- Sick leaves
- Direct cost
 - Insurance claim, medical cost
- Indirect cost
 - Hiring temporary employees, training
- Poor employees performance
 - Rejections, Rework

Can be minimized by

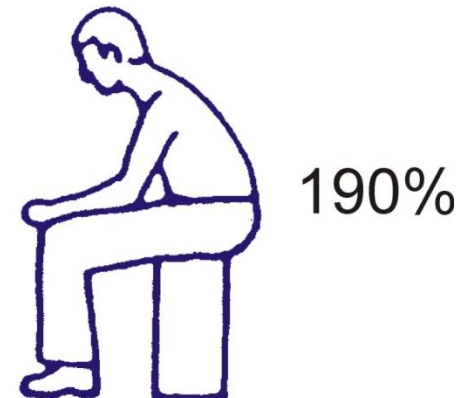
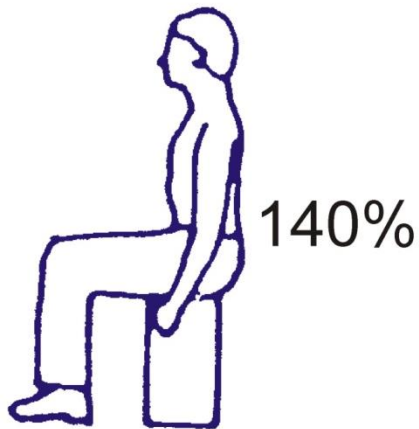
Posture



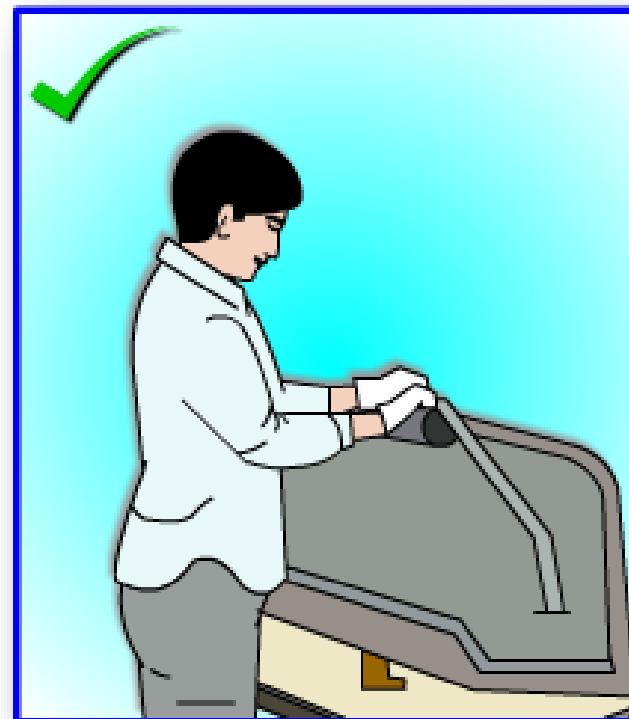
Interesting facts - Posture



**The effect of postures on your
back bone
(intervertebral disc pressure)**

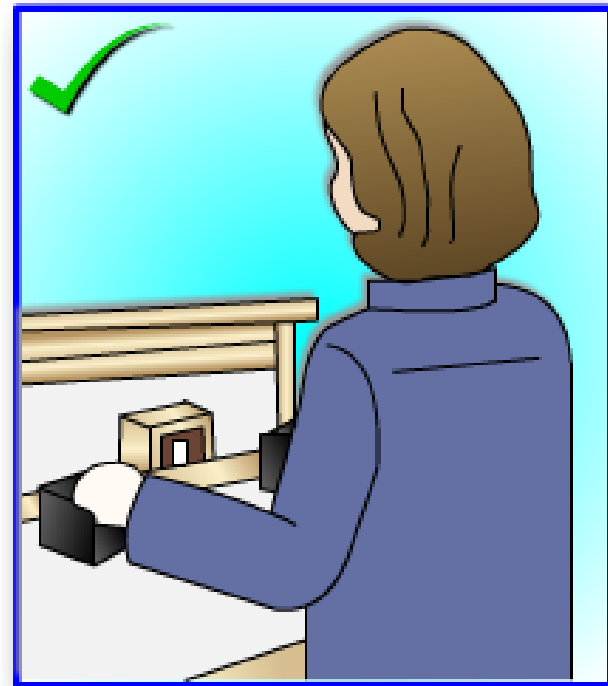
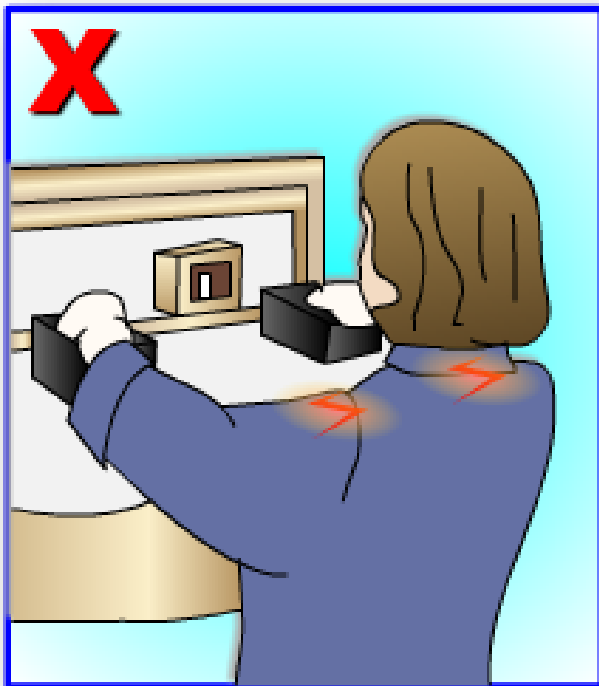


Ergo Hit List



Ergo Hit List

Shoulder too High/Low Activities



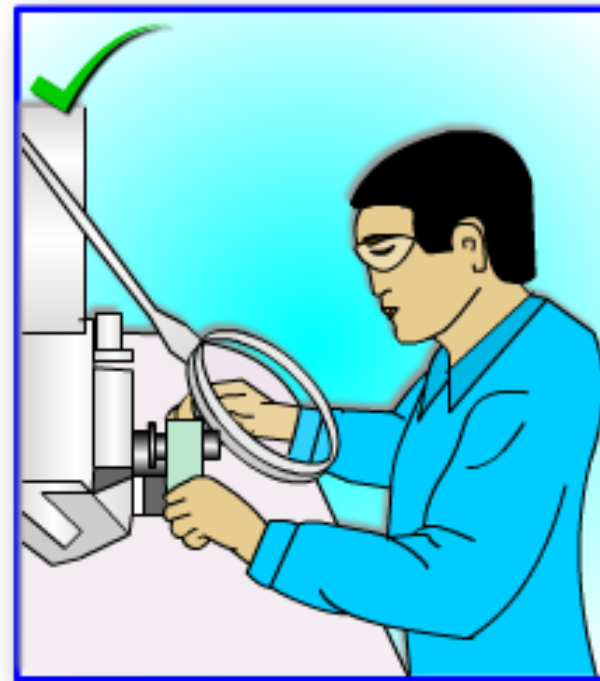
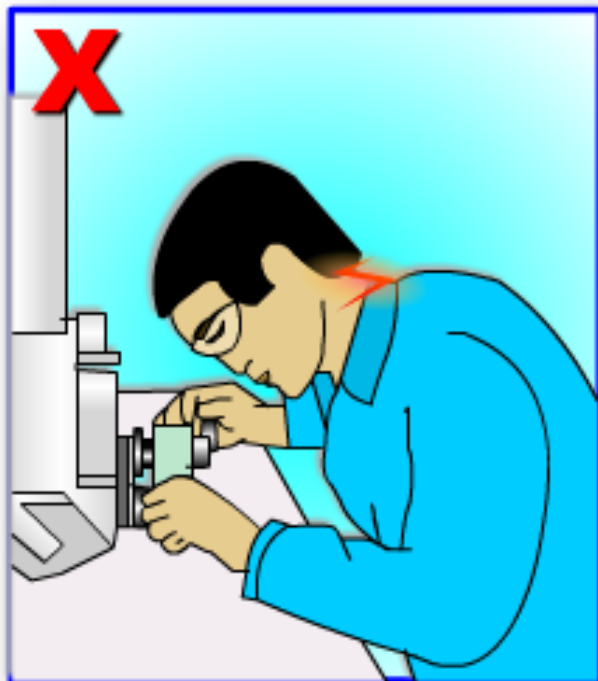
Ergo Hit List

Butts Up



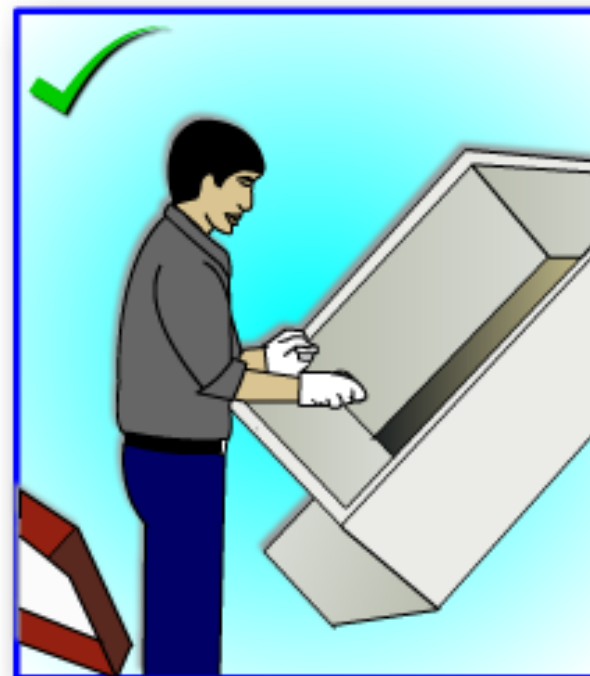
Ergo Hit List

Hungry Head



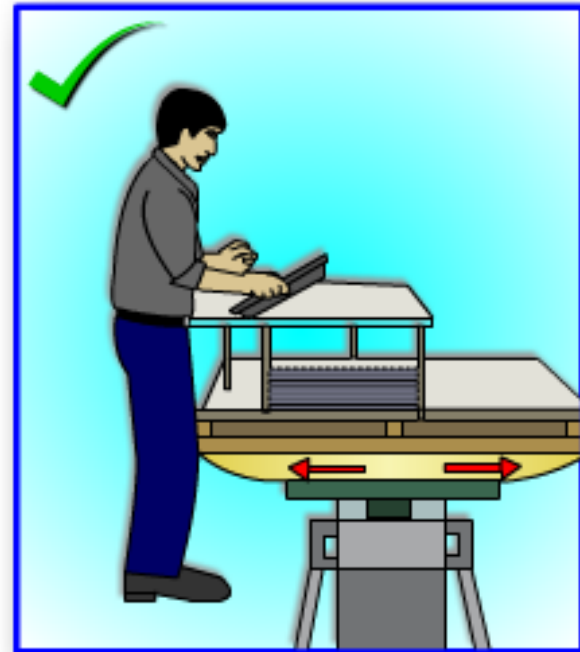
Ergo Hit List

Twist and Shout



Ergo Hit List

Horizontal Distance



Ergo Hit List

Sit vs. Stand



Ergo Hit List

Bad Vibes



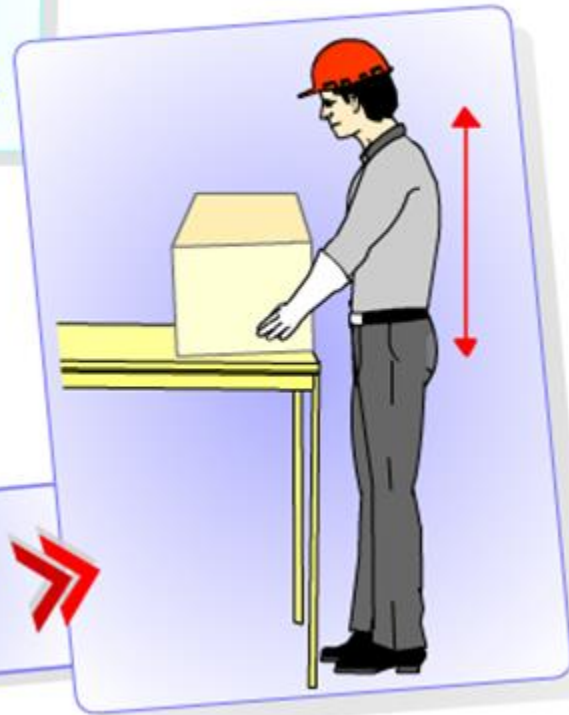
Ergo Hit List

Comfort Zone

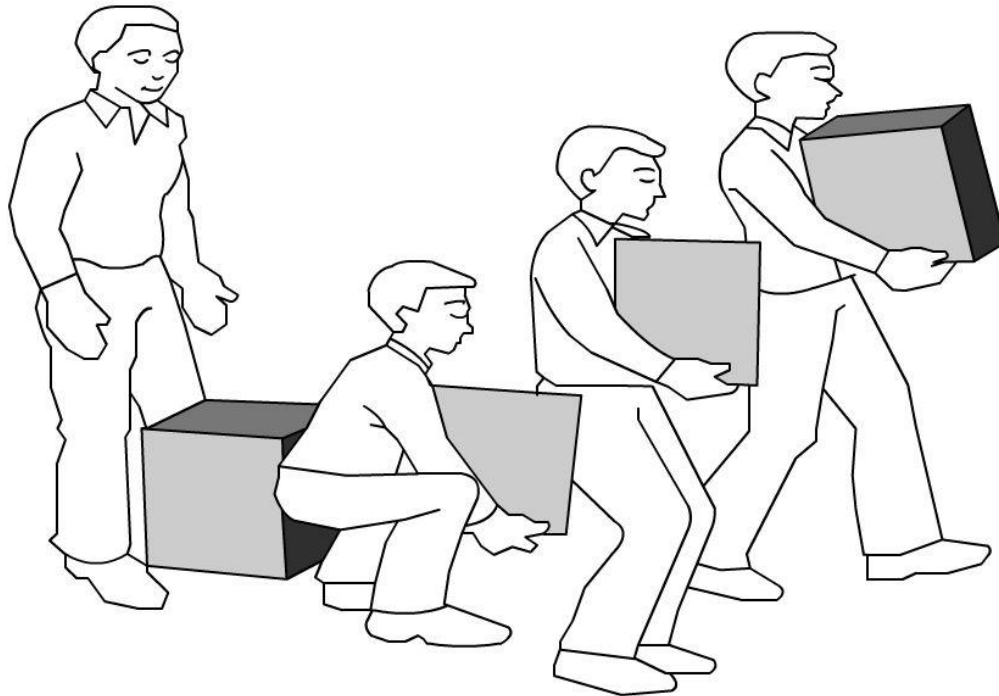


Extreme postures increase exposure to ergonomic risk.

Perform work between the shoulders and the waist.



Material lifting Techniques



1. Correct grip
2. Straight back
3. Head up
4. Correct foot position
5. Arm close to the body
6. Use your body weight

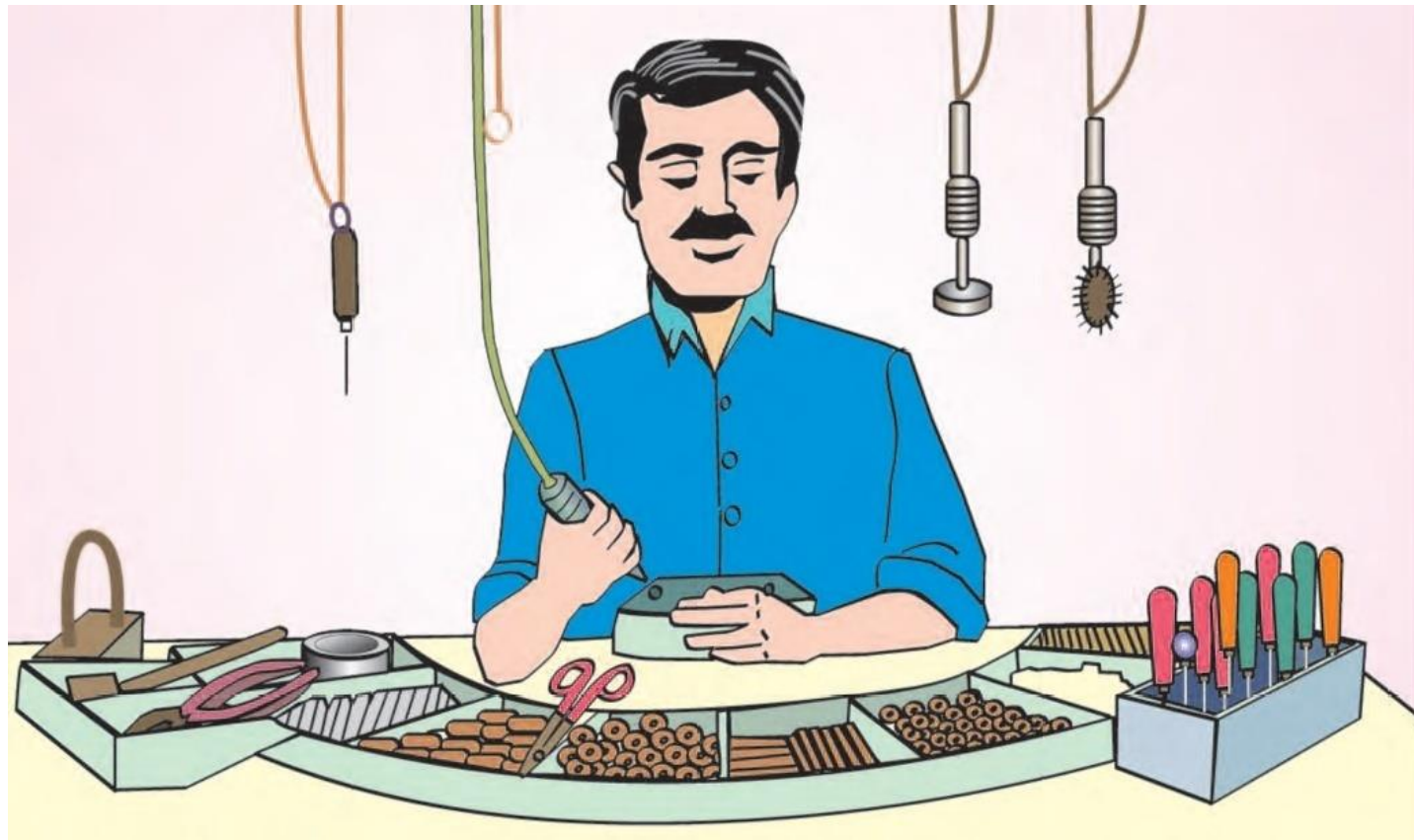
Cases of ergonomics- V

Convenient & safe platform for quick maintenance of skip motor blower Unit.



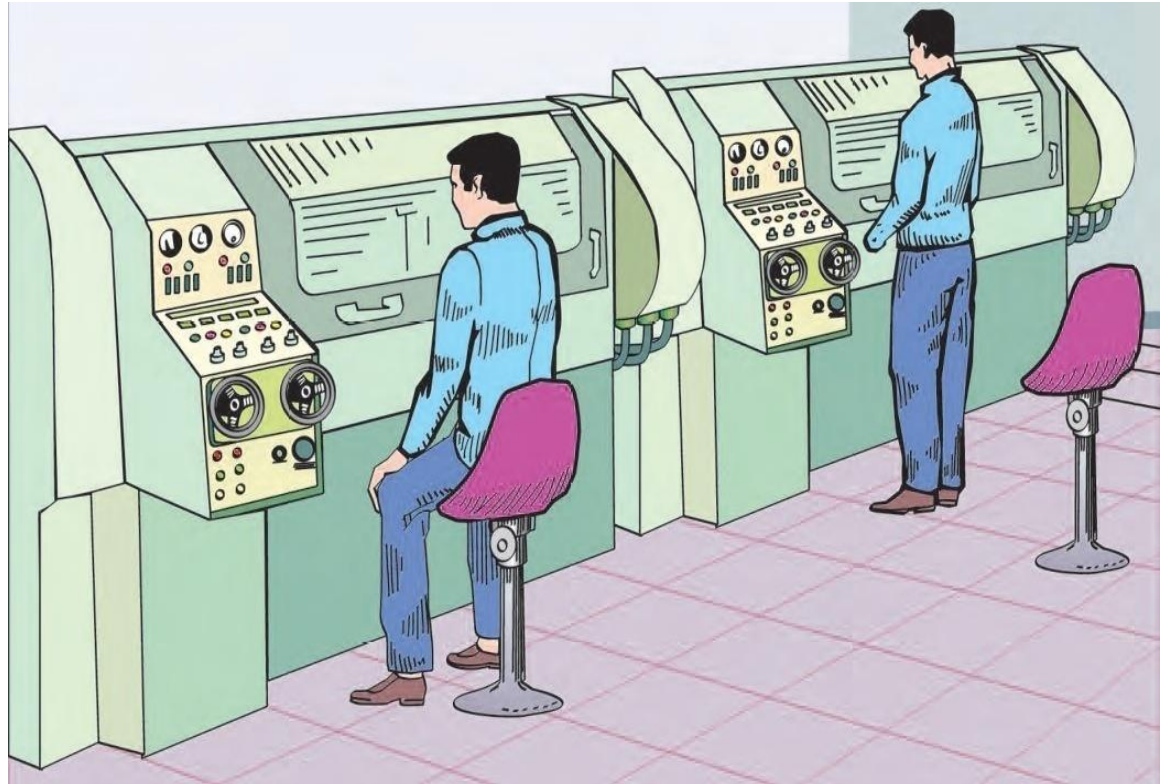
3. Workstation design & Set up

Place frequently used materials, tools and controls within easy reach.



6. Workstation design & Set up

Provide standing workers with chairs for occasional sitting.



THANK

YOU