

# OCCUPATIONAL HEALTH

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# Occupational Environment

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**Man and physical, chemical  
and biological agents**



**Man and machines**

**Man and man**





## OCCUPATIONAL HAZARD:

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**``Source or situation with a potential for harm in terms of injury or ill health, damage to property, damage to the workplace environment, or a combination of these``**



# OCCUPATIONAL HEALTH HAZARDS

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## TYPES OF OCCUPATIONAL HEALTH HAZARDS

- A. Physical
- B. Chemical
- C. Biological
- D. Mechanical
- E. Psychosocial



# PHYSICAL HAZARDS

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- ★ ***Temperature - Heat / Cold***
- ★ ***Illumination***
- ★ ***Noise***
- ★ ***Vibration***
- ★ ***Radiation***
- ★ ***Atmospheric pressure***

# DISEASES DUE TO PHYSICAL AGENTS

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**Heat** - Heat hyperpyrexia, Heat Exhaustion, Heat Syncope, Heat Cramps, burns

**Cold** - Frost bite

**Light** – Occupational Cataract

**Atmospheric-pressure**-Caisson disease, air embolism

**Noise** - Occupational deafness

**Radiation**

Cancer, Leukemia, aplastic anemia, Pancytopenia

**Electricity** - Burns, Shocks



# Heat Illness

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## **Predisposing Factors**

- **Physical activity**
- **Extremes of age, fatigue**
- **Excessive clothing**
- **Dehydration**
- **Cardiovascular disease**
- **Skin disorders**
- **Obesity**
- **Drugs**
  - **Phenothiazines, anticholinergics, B and Ca channel blockers, diuretics, amphetamines, cocaine**



# Heat Stroke

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## **SYMPTOMS**

- **True emergency**
- **Altered LOC**
- **Any neurological finding**
- **And elevated temperature**
- **May still be sweating initially**
- **Syncope**



# CHEMICAL HAZARDS

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Routes of entry - Inhalation, Ingestion, skin absorption. (inhalation is the main route of entry)

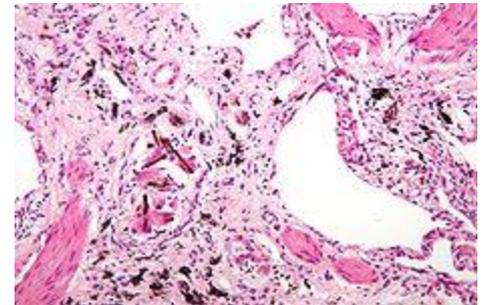
Chemical agents can be classified into-

- 1) **Metals** - Lead, Hg, Cd, Ni , Co
- 2) **Aromatic Hydrocarbons** - Benzene, Toluene, phenol
- 3) **Aliphatic Hydrocarbons** - Methyl alcohol
- 4) **Gases**
  - \* Simple asphyxiants : N<sub>2</sub>, CO<sub>2</sub>
  - \* Chemical asphyxiants : CO, H<sub>2</sub>S
  - \* Irritant gases : Ammonia, SO<sub>2</sub>

# Pneumoconiosis

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Pneumoconiosis is an [occupational lung disease](#) and a [restrictive lung disease](#) caused by the [inhalation](#) of dust, often in mines



# Pneumoconiosis

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**Dust particles 0.5 – 3 micron**

**Chemical composition , fineness,  
concentration, period of exposure,  
individual susceptibility.**

**Inorganic and organic dusts**



# DUSTS (Pneumoconiosis)

## Inorganic Dust

- 
- |   |                  |              |
|---|------------------|--------------|
| - | <b>Coal Dust</b> | -Anthracosis |
| ◆ | <b>Silica</b>    | -Silicosis   |
| ◆ | <b>Asbestos</b>  | -Asbestosis  |

## Organic Dusts

- |   |   |                      |
|---|---|----------------------|
| ◆ | <b>Cane Fiber</b><br>gets affected)       | -Bagassosis (Bronchi |
| - | <b>Cotton dust</b><br>Textile industries) | -Byssinosis (In      |
| ◆ | <b>Grain Dust</b><br>-Farmer's Lungs      |                      |

# INORGANIC DUSTS

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## Silicosis

Free silica/silicon dioxide

Mining, pottery, sandblasting

Irritant cough, dyspnoea on exertion, chest pain

Snow storm appearance

Dust control measures:

substitution, enclosure, isolation, hydroblasting,

good housekeeping.

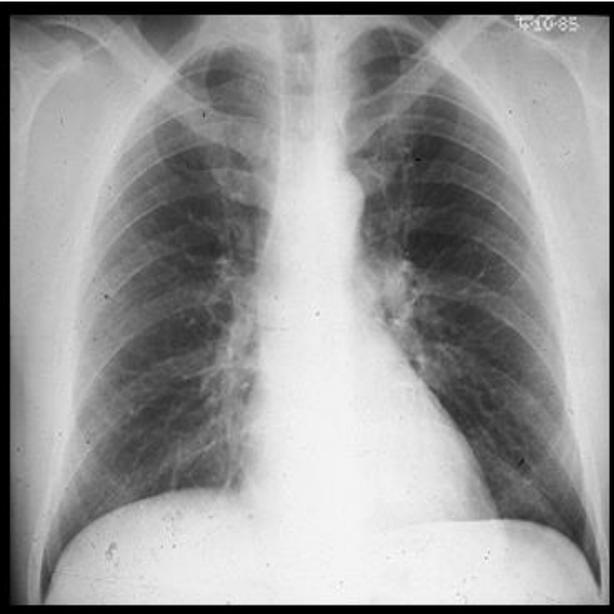
Regular examination

# Chest x-rays – silicosis

normal x-ray

silicosis (upper lobes)

silicosis -- diffuse

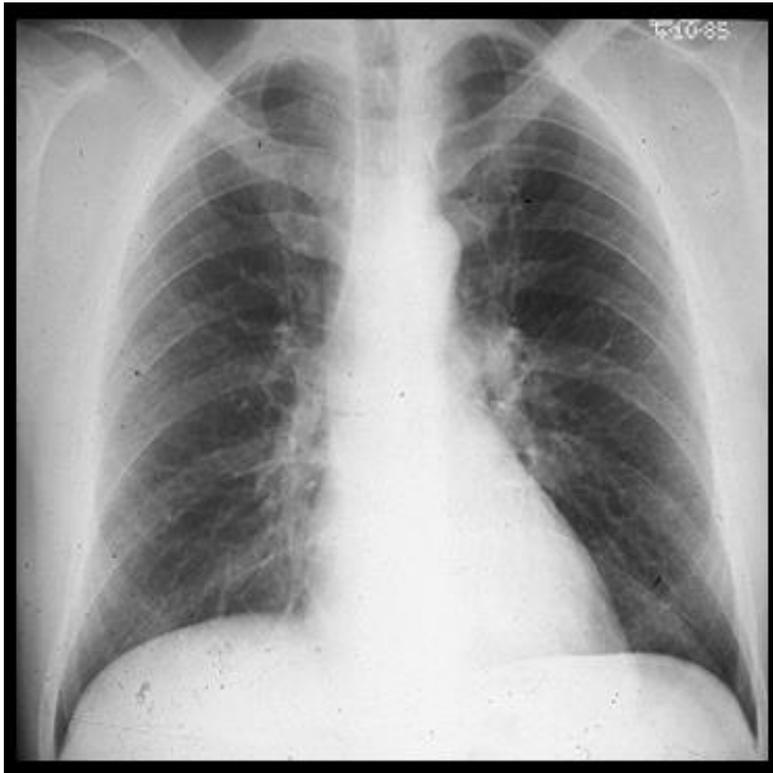


# Simple Silicosis

normal chest x-ray

simple silicosis

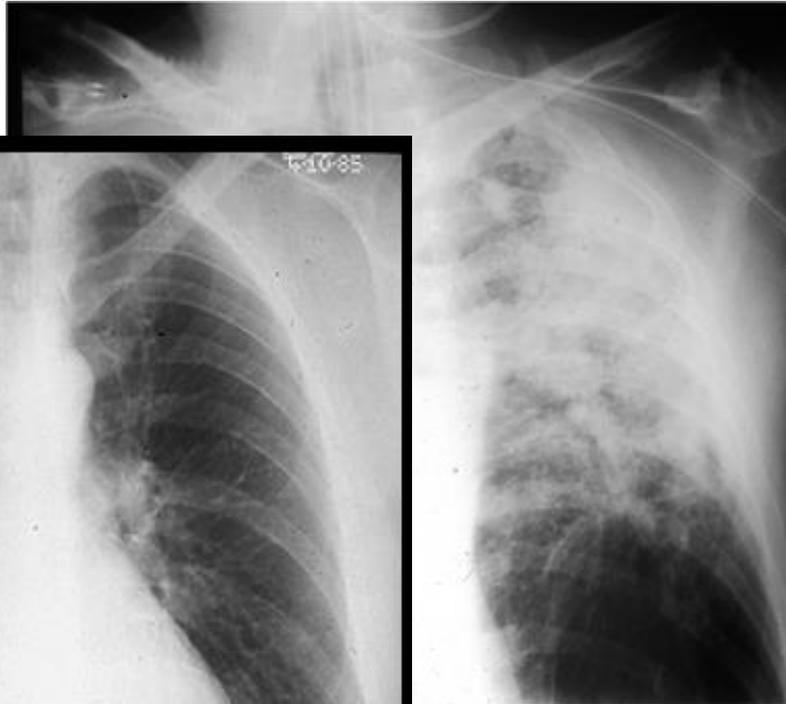
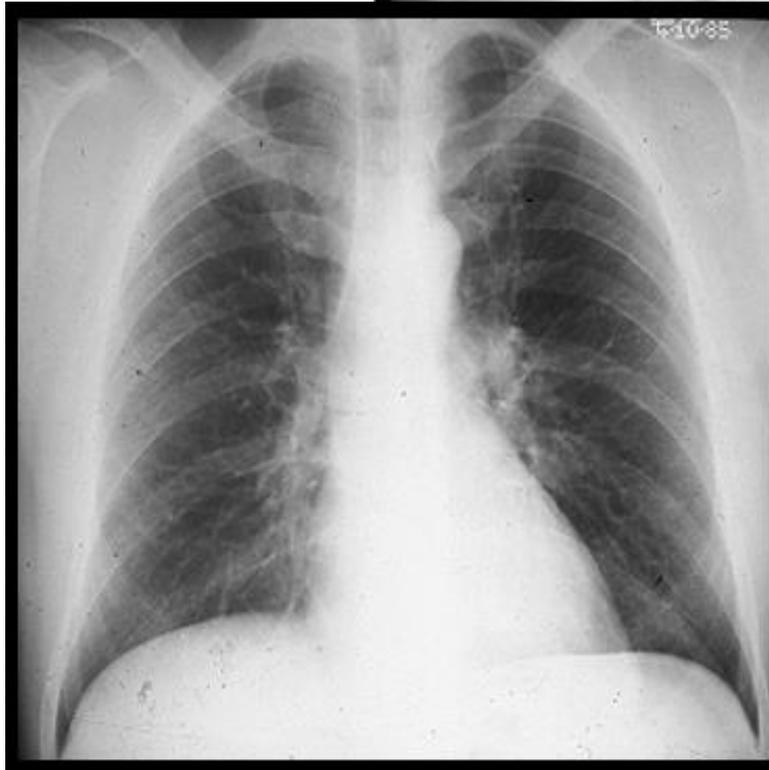
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# Accelerated Silicosis (= Progressive Massive Fibrosis)

normal chest x-ray

PMF



**is (PMF)** Patient with end-respiratory failure. There is the lower zones are darker.

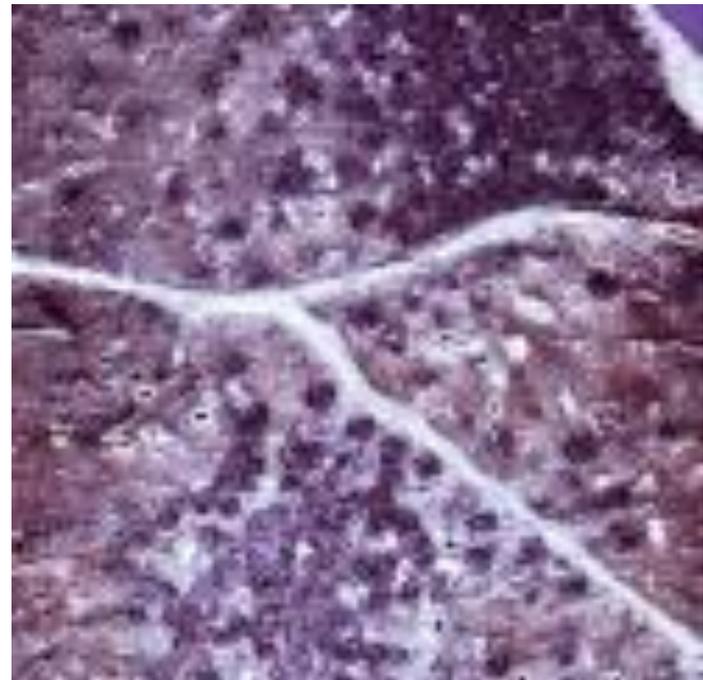
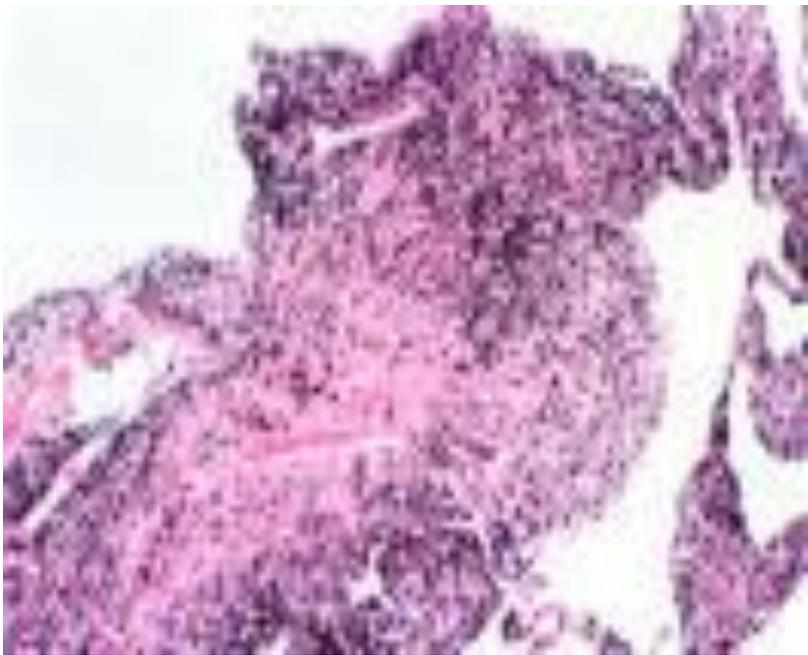
# Eggshell calcification – almost exclusively silicosis

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# Lung pathology – autopsy specimens

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# Diagnosis of Silicosis

**Abnormal chest X-ray (or chest CT scan) consistent with silicosis (egg shell calcification)**

**History of *significant* exposure to silica dust**

**Medical evaluation to exclude other possible causes of abnormal chest x-ray**

***Pulmonary function tests are helpful to gauge severity of impairment, but NOT for diagnosis.***

# Silicosis – associated risks

Having silicosis increases risk of contracting **tuberculosis** & lung cancer.

Degree of increased risk is highly variable; depends on several OTHER factors, including immune system & exposure history (for TB), and amount of lung scarring, age & smoking history (for cancer).

Silicosis also strongly associated with scleroderma and rheumatoid arthritis.

Other associations less well established: lupus, systemic vasculitis, end-stage kidney disease.

# How Can Silicosis Be Prevented?.

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**SUBSTITUTION**

**ENGINEERING**

**WORK PRACTICES**

**PERSONAL PROTECTIVE EQUIPMENTS**

# Substitution

**Substituting the silica means using a different, safer material in place of the silica-containing substance.**

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**It is true that in some cases it is not possible to use a substitute in place of silica, but for many operations, such as abrasive blasting, there are many possible substitutes, including those below.**

- Aluminum Oxide**
- Ambient Polycarbonate**
- Cryogenic Polycarbonate**
- Glass Beads**
- Melamine Plastic**
- Polycarbonate**
- Silicon Carbide**
- Stainless Cast Shot**
- Steel Grit**

# Personal Protective Equipment

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**PPE against silica includes respirators and masks. Respirators should be used only when the dust controls cannot keep dust levels below the Recommended Exposure Level.**

**There are many types of respirators, from air-purifying to air-supplying and from a nose and mouth covering to a full body respirator.**

# INORGANIC DUSTS

## Anthracosis

### Coal

Simple pneumoconiosis,  
progressive massive fibrosis.

mines act,

## Asbestosis

Silicates of Mg, Ca, Na. Serpentine /Amphibole

Asbestos,cement,fireproof,

textiles, roof lining

Respiratory

insufficiency,Cancer bronchus, **mesothelioma**

Safer types, substitution,

rigorous dust control

measures, periodic

examination, continuing

research.

# What is Asbestos?

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**All types of asbestos tend to break into very tiny fibers.**

**These individual fibers are so small they must be identified using a microscope.**

**Some fibers may be up to 700 times smaller than a human hair.**

# What is Asbestos?

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**Because asbestos fibers are so small, once released into the air, they may stay suspended there for hours or even days.**

# Where is Asbestos Found?

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**Asbestos may be found in many different products and many different places. Examples of products that might contain asbestos are:**

**Sprayed-on fire proofing and insulation in buildings**

**Insulation for pipes and boilers**

**Wall and ceiling insulation**

**Ceiling tiles**

**Floor tiles**

**Cements (such as in chemical carrying cement pipes)**

# Health Effects

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Because it is so hard to destroy asbestos fibers, the body cannot break them down or remove them once they are lodged in lung or body tissues. They remain in place where they can cause disease.

There are three primary diseases associated with asbestos exposure:

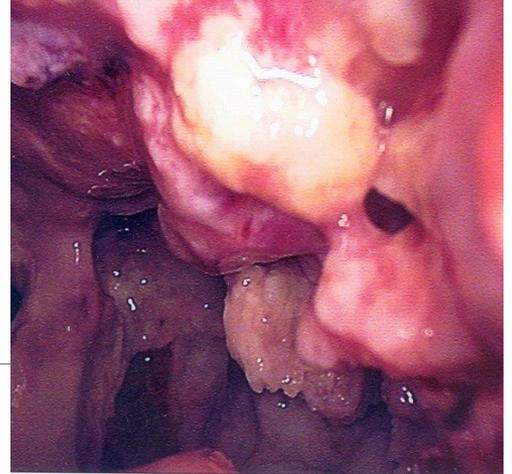
Asbestosis

Lung Cancer

**Mesothelioma**

# Asbestosis

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**Asbestosis is a serious, chronic, non-cancerous respiratory disease. Inhaled asbestos fibers aggravate lung tissues, which cause them to scar.**

**Symptoms of asbestosis include shortness of breath and a dry crackling sound in the lungs while inhaling. In its advanced stages, the disease may cause cardiac failure.**



# Mesothelioma

- Mesothelioma is a rare form of cancer that most often occurs in the thin membrane lining of the lungs, chest, abdomen, and (rarely) heart.
- All cases of mesothelioma are linked with asbestos exposure.
- Approximately 2 percent of all miners who work with asbestos, and 10 percent of all workers who were involved in the manufacture of asbestos, contract mesothelioma.

# ORGANIC DUSTS

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## **Bagassosis**

Sugar cane dust, thermoactinomyces sacchari,

Cane sugar industry, paper, rayon, cardboard

Breadthlessness, cough, haemoptysis, slight fever,

Mottling in lung shadow.

Dust control,

Personal protection,

Medical control,

Bagasse control-moisture 2% propionic acid.

# ORGANIC DUSTS

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## Byssinosis

- Cotton fibre
- Textile industry
  
- Chronic cough,
- dyspnoea, prog. Chronic
- bronchitis, emphysema

## Farmer's Lung

- Mouldy hay, grain dust
- 30% moist,
- micropolyspora faeni,  
>Temperature
  
- General and respiratory
- symptoms, physical signs.

# Biological Hazards



**Bacteria**-Tetanus, Tuberculosis, Anthrax, Brucellosis

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**Virus** - Hepatitis, AIDS

**Protozoal&Parasitic**-Malaria,Hydatid(Dog handlers),Hookworms, tapeworms (Agri-workers), etc.

**Fungi-(Agri-workers)**-Tinea-infections, Coccidiomycosis, Psittacoses, ornithosis, etc.



# MECHANICAL HAZARDS

## Injuries-

Falls, cuts, abrasions, concussions, contusions

## Ergonomic Disorders-

Musculo-skeletal disorders (MSDs), Cumulative-trauma-Disorders (CTDs)

**Ergonomics:** ``Adjustment of Man & Machine``

Application of human biological sciences with engineering science to achieve optimum mutual adjustment of man & his work, the benefit being measured in terms of human efficiency and well being

Tool / machine design to fit to work. Ergo tools/ ergofriendly tools : Tools which reduce the stresses or problems resulting in CTD's / MSD's.)

# Ergonomics

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**Fitting the job to the worker**

**Designing machines, tools,  
equipment, processes**

**Methods of works and  
environment**

Ergon = work



Nomos=



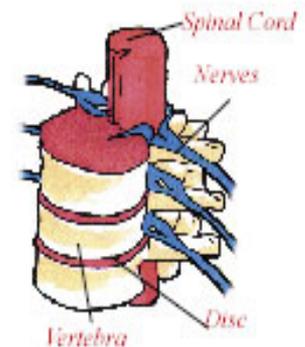
# Manual Handling - Back Injuries

All forces which come down the spine compresses discs and as a result of Continuous squeezing they can rupture and bulge causing severe pain.

Most back injuries are built over along period of time by repetitive pounding on discs caused by improper methods. After sometime some minor lift can produce such rupture

``Straight back rule``

**‘Thinking before lifting’**





# Manual Handling - Back Injuries

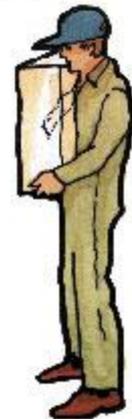
**\*CONTROL** any risk by **reducing necessity for manual handling** by using alternative means of handling

\*consider the load; size, awkward shape, etc

\*consider need for mechanical or manual assistance

\***position legs apart - one foot level with the load**

\***keep back straight, look up**





# PSYCHOSOCIAL HAZARDS

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- ❖ ❖ **Lack of job satisfaction**, insecurity, poor interpersonal relations, work pressure, ambiguity, etc.
- ❖ ❖ **Psychological & behavioral changes** – hostility, aggressiveness, anxiety, depression, alcoholism, drug addiction, sickness absenteeism.
- ❖ ❖ **Psychosomatic disorders-** Hypertension, headache, body-ache, peptic ulcers, asthma, diabetes, heart disorders, etc.

# Occupational hazards of agricultural workers

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Zoonotic diseases

Accidents

Toxic hazards

Physical hazards

Respiratory diseases



# PREVENTION OF OCCUPATIONAL DISEASES.

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<b>MEDICAL MEASURES</b>	<b>ENGINEERING MEASURES</b>	<b>Legislation</b>
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**Thank you**