



***OCCUPATIONAL
DISEASES IN
INDUSTRIES
&
ITS PREVENTION***

DR. S. K. HALDAR

**FORMER DY. DIRECTOR GENERAL
DGFASLI, MOLE, GOVT. OF INDIA, MUMBAI
&
FORMER DY. PRINCIPAL MEDICAL OFFICER
HINDUSTAN CABLES LTD (PSU), W.B.**

OCCUPATIONAL HEALTH

**O.H. IS THE PROMOTION & MAINTENANCE
OF THE HIGHEST DEGREE OF PHYSICAL,
MENTAL & SOCIAL WELL BEING OF
WORKERS IN ALL OCCUPATIONS.**

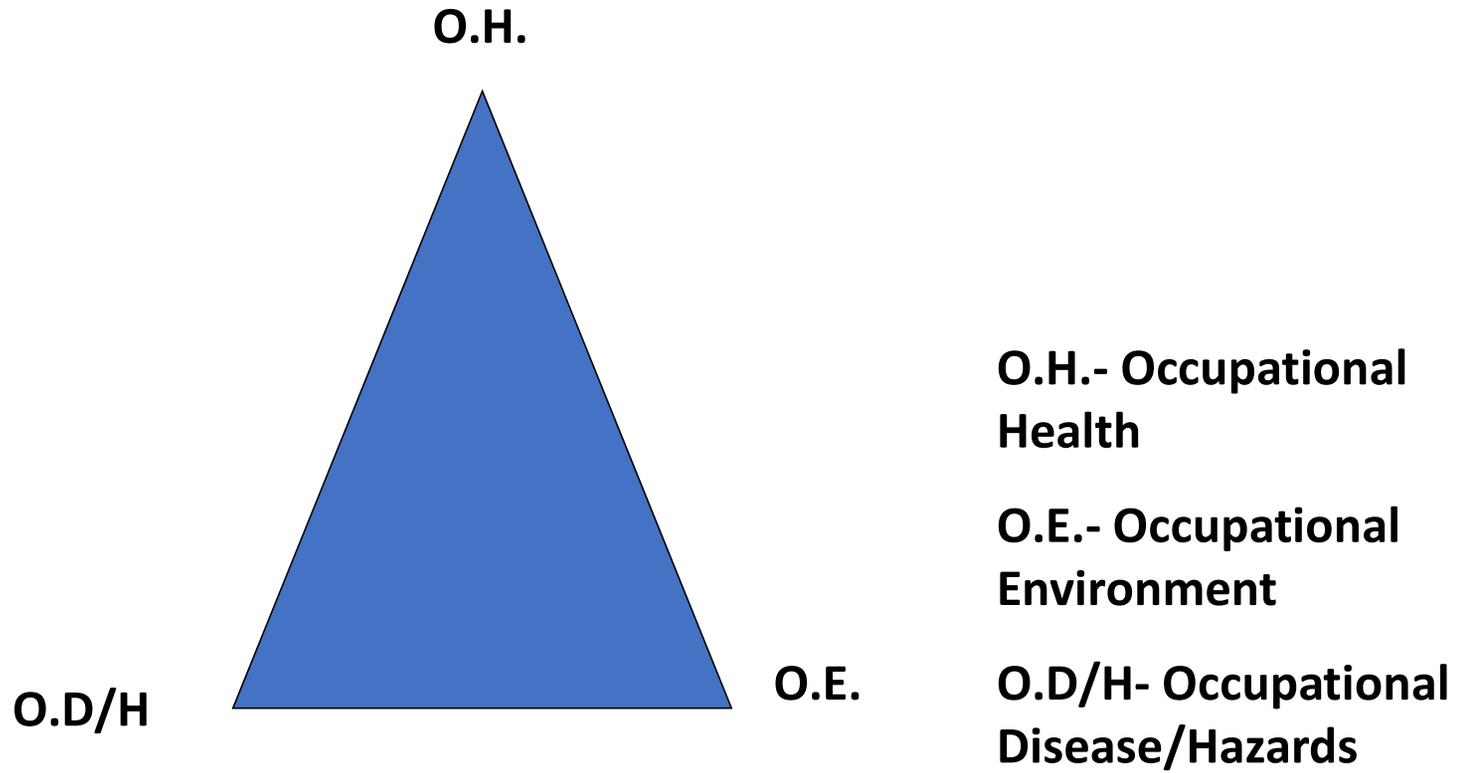
**IT IS A DIVISION OF GENERAL MEDICINE
AND IS DEVOTED TO THE PREVENTION
OF OCC. DISEASE & INJURY
AND TO THE PROMOTION OF
HEALTH OF PEOPLE
AT WORK.**

OCCUPATIONAL ENVIRONMENT

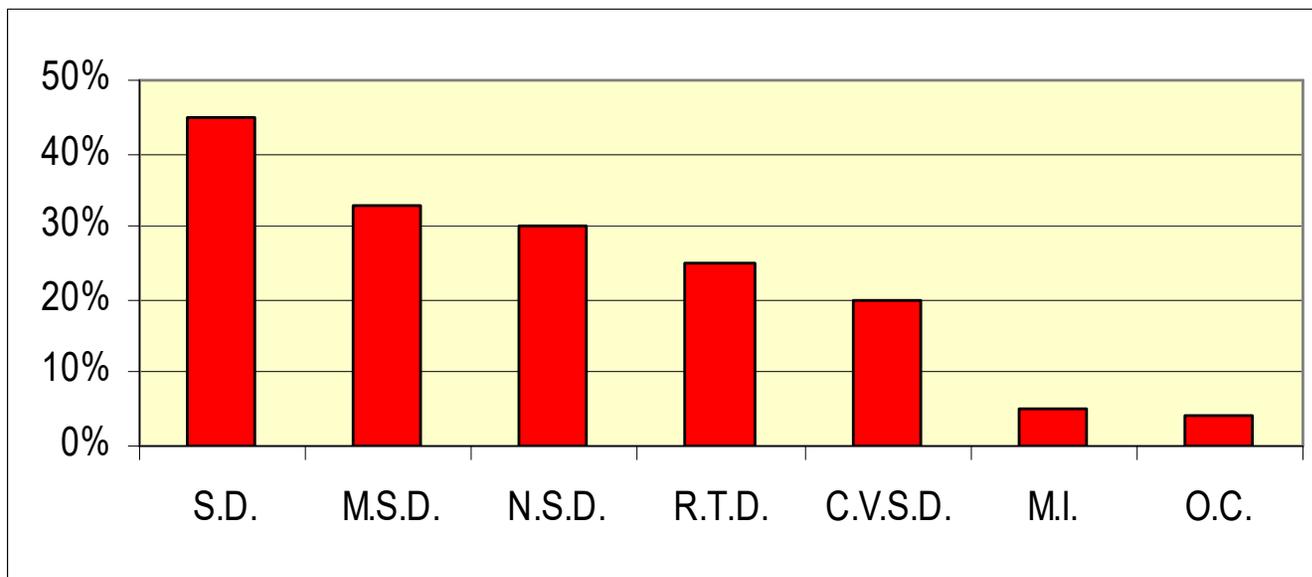
**O.E. IS THE EXTERNAL
CONDITIONS & INFLUENCES
PREVAILED AT THE PLACE OF
WORK & WHICH HAS A
BEARING (DIRECT AND/OR
INDIRECT EFFECT) ON THE
HEALTH OF WORKING
POPULATION.**

OCCUPATIONAL DISEASE

**THE DISEASE WHICH ARRISES
OUT OF OR IN COURSE OF
OCCUPATION IS KNOWN AS
OCCUPATIONAL DISEASE**



ETIOLOGICAL FRACTION OF O.D.



Occupational Disease Symptoms

Early Stage



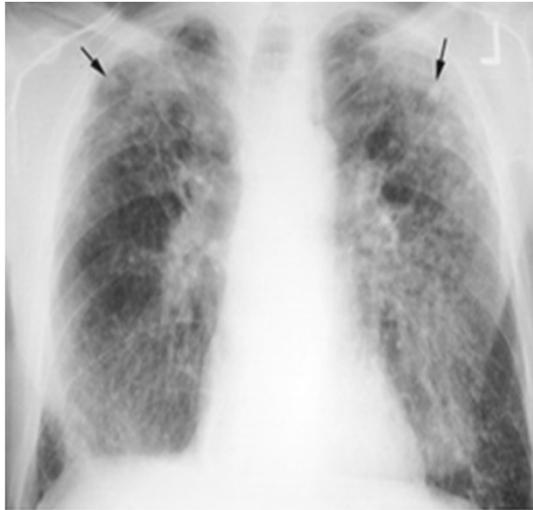
Advance Stage





Problem in Diagnosis

Silicosis



Tuberculosis



INTERACTION IN OCCUPATIONAL ENVIRONMENT

- 1. WORKERS vs. PHYSICAL AGENTS*
CHEMICAL AGENTS
BIOLOGICAL AGENTS
- 2. WORKERS vs. MACHINE*
- 3. WORKERS vs. WORKERS*

TYPE OF HAZARDS

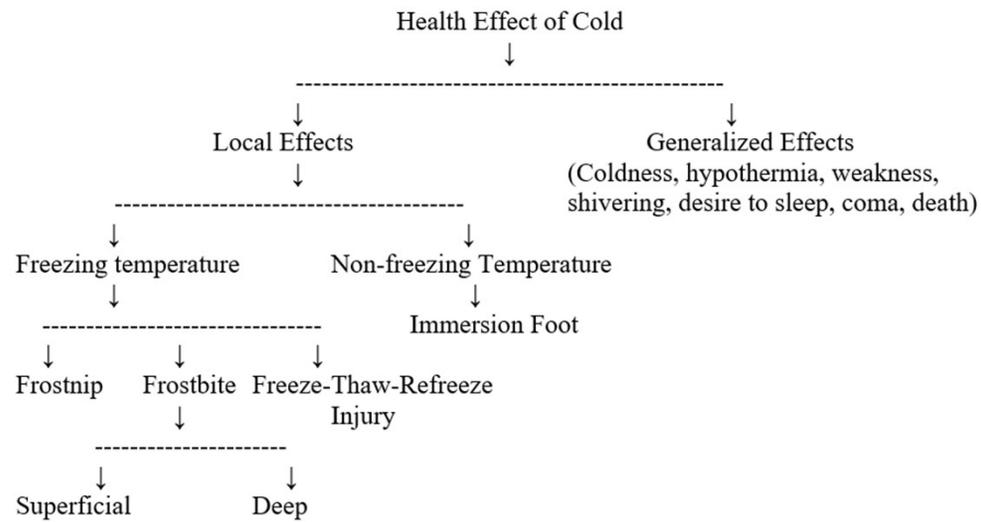
- **PHYSICAL**
- **CHEMICAL**
- **BIOLOGICAL**
- **MECHANICAL**
- **PSYCHOSOCIAL**

HEAT





Cold Injury



Frost Bite



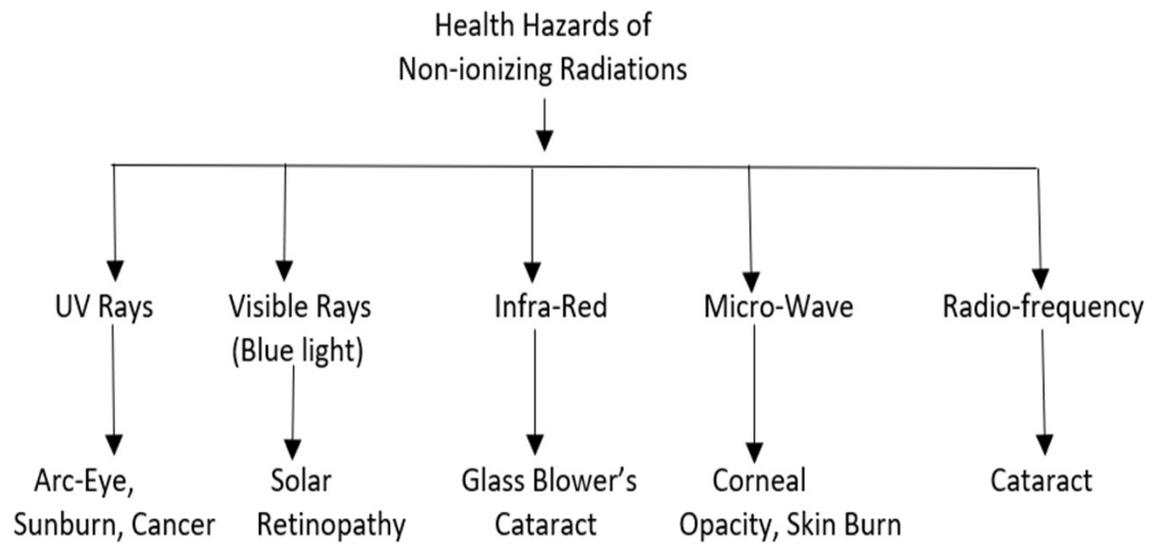
Source: Fauci AS, Kasper DL, Braunwald E, Hauser SL, Longo DL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine*, 17th Edition: <http://www.accessmedicine.com>

Copyright © The McGraw-Hill Companies, Inc. All rights reserved.



Picture of Raynaud's phenomenon.

Non-ionizing Radiation



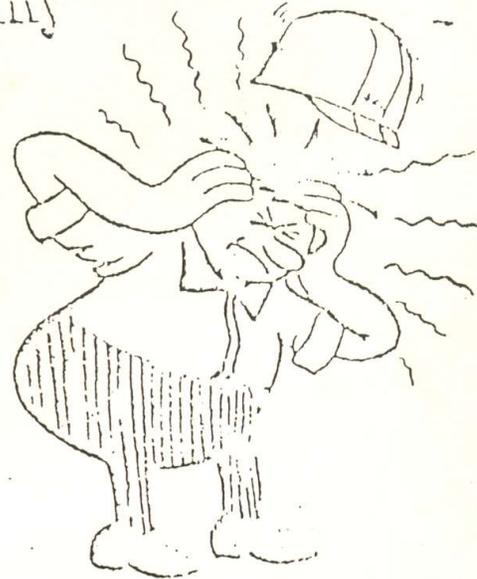
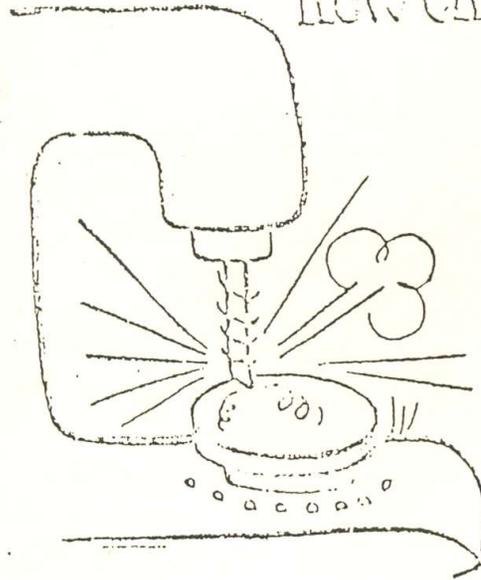


Ionizing Burn





noise our
new enemy



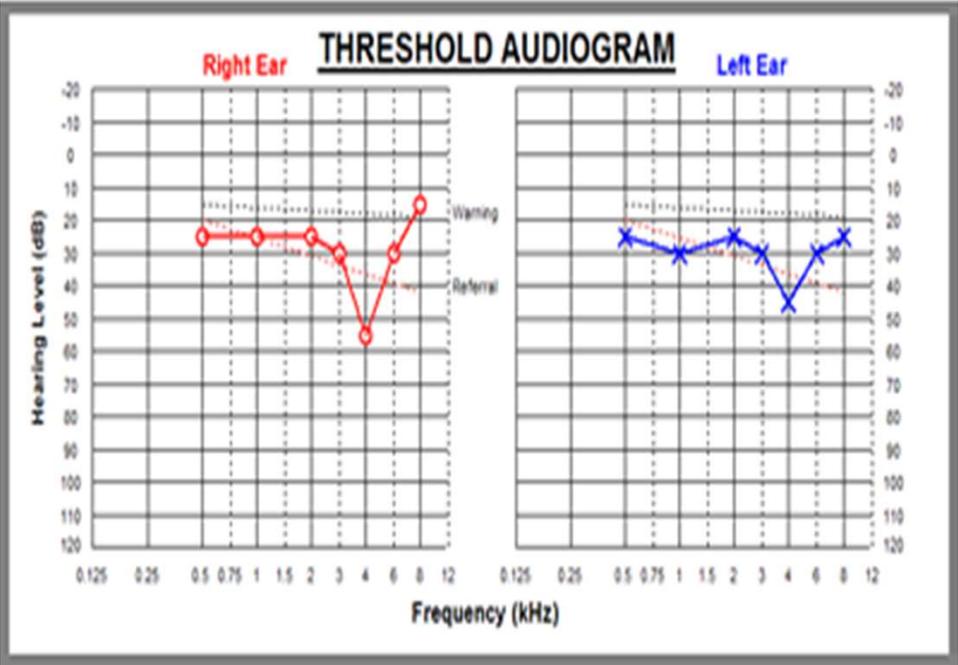
NOISE HAZARD REDUCED

Permissible Level of Noise
(continuous Noise)

Duration /day in Hr	Sound Level(dBA)
8 Hrs.	90
6 Hrs	92
4 Hrs.	95
3 Hrs.	97
2 Hrs.	100
1 Hrs.	105
½ Hrs	110
¼ Hrs.	115
1/3 Hrs.	-

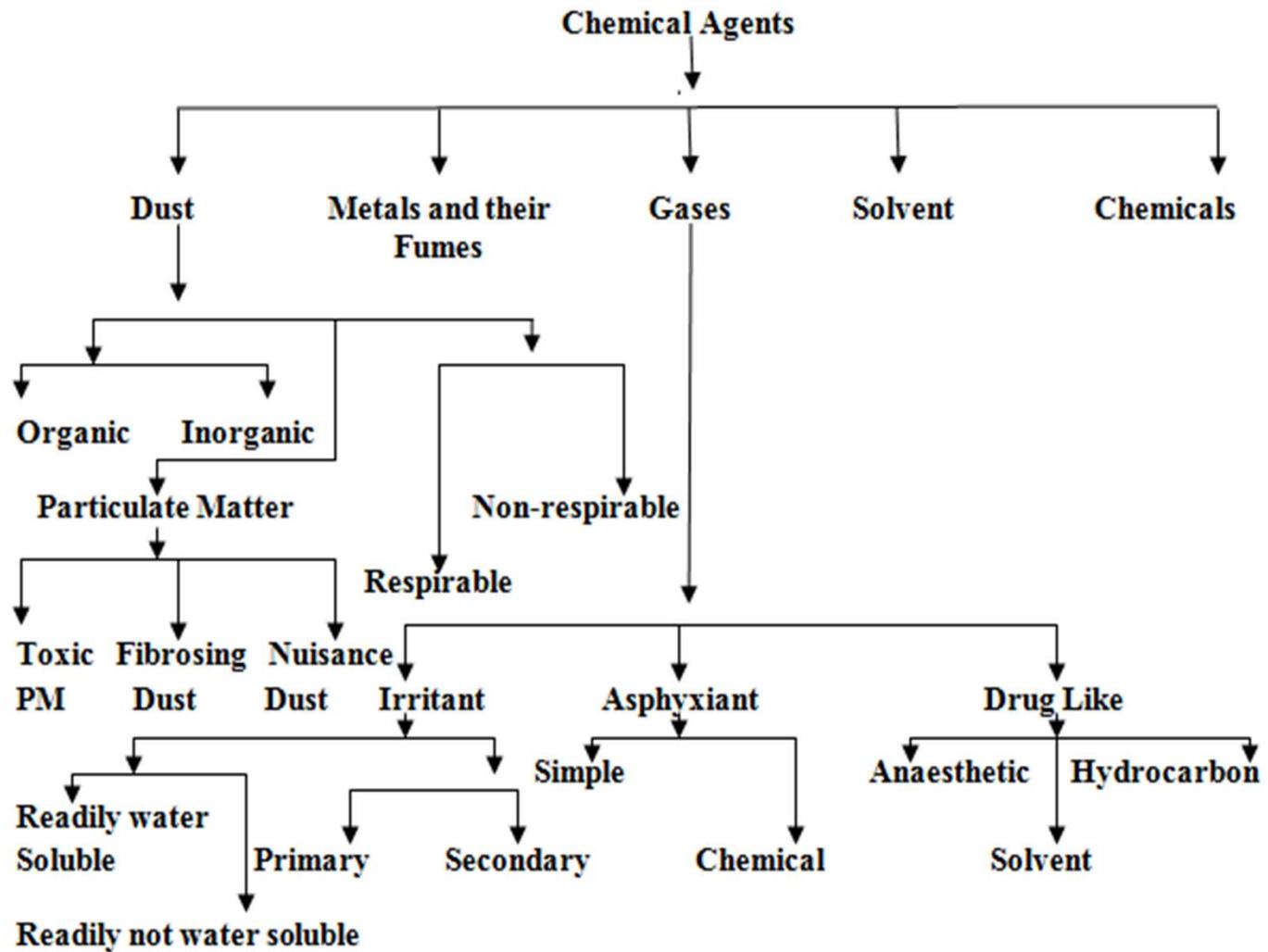
Permissible Level of Noise
(Impulse Noise)

Noise in dBA	Impulse per day
140	100
135	315
130	1000
125	3160
120	10,000

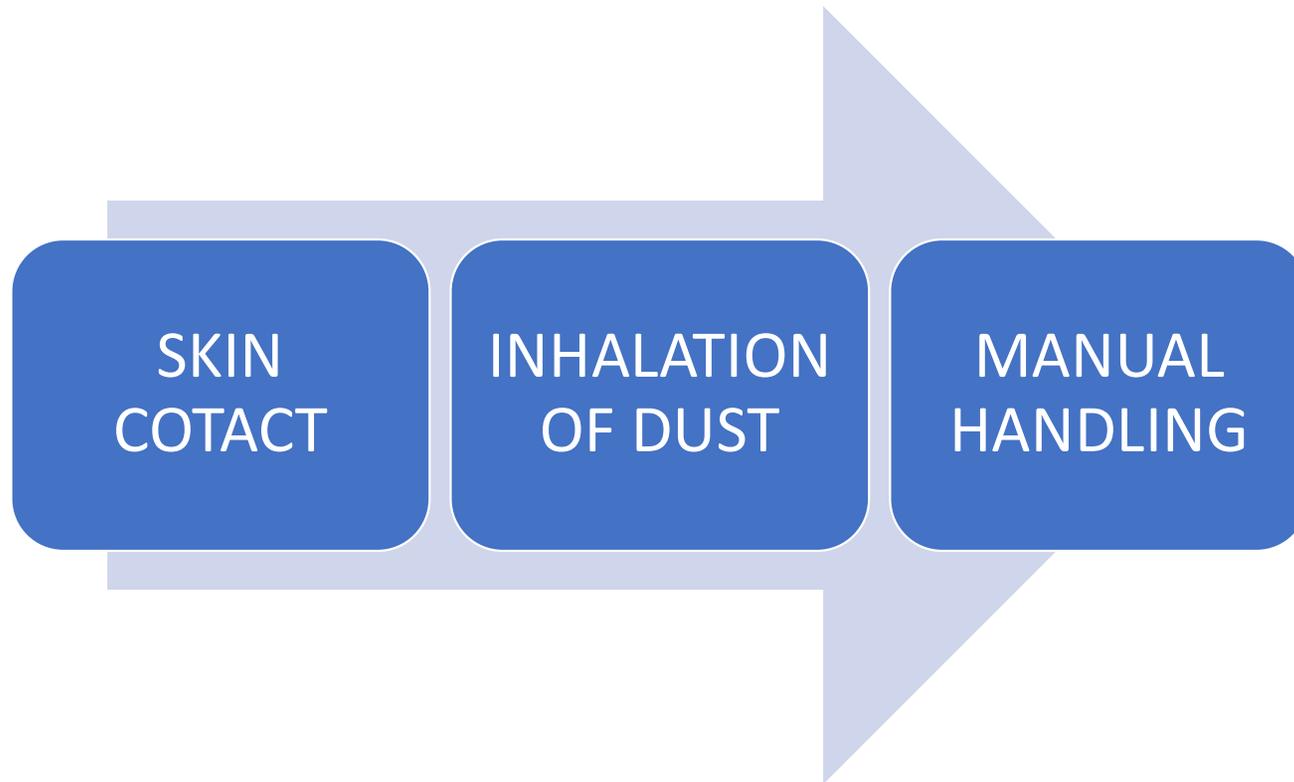


Characteristics of NIHL

1. Gradual
2. Painless
3. Bilateral
4. Preventable at initial stage
5. In early stage speech range is not affected
6. Hearing loss can be measured
7. It depends on individual susceptibility
8. It usually starts at 4000 Hz.
9. It gradually expands to upper & lower frequency range
10. It is not amenable to treatment
11. It is S.N type of deafness
12. Irreversible



Health Effect of Cement Dust



Dermatitis



Source: Fauci AS, Kasper DL, Braunwald E, Hauser SL, Longo DL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine*, 17th Edition: <http://www.accessmedicine.com>
Copyright © The McGraw-Hill Companies, Inc. All rights reserved.



Plate 7 (Figure 37.2) *Allergic contact dermatitis from chromate cement.*



Plate 9 (Figure 37.4) *Immunological contact urticaria from natural rubber latex gloves.*

Cement Burn



Oil Acne



Source: Fauci AS, Kasper DL, Braunwald E, Hauser SL, Longo DL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine*, 17th Edition: <http://www.accessmedicine.com>

Copyright © The McGraw-Hill Companies, Inc. All rights reserved.

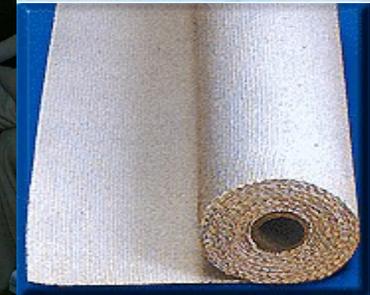
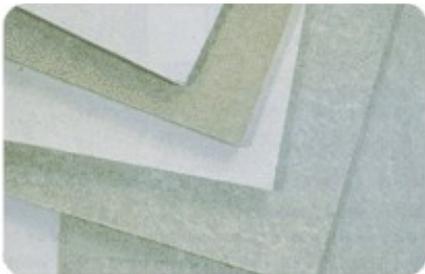
Occupational Lung Disease (OLD)

Damage to the lungs caused by dusts or fumes or noxious substances inhaled by workers in certain specific occupations are known as Occupational Lung Disease

ASBESTOS



- roof tile(slate)
- brake pad
- asbestos cement
- textile
- packing
- tape
- blanket(fire-proof)



ASBESTOS RELATED DISORDERS

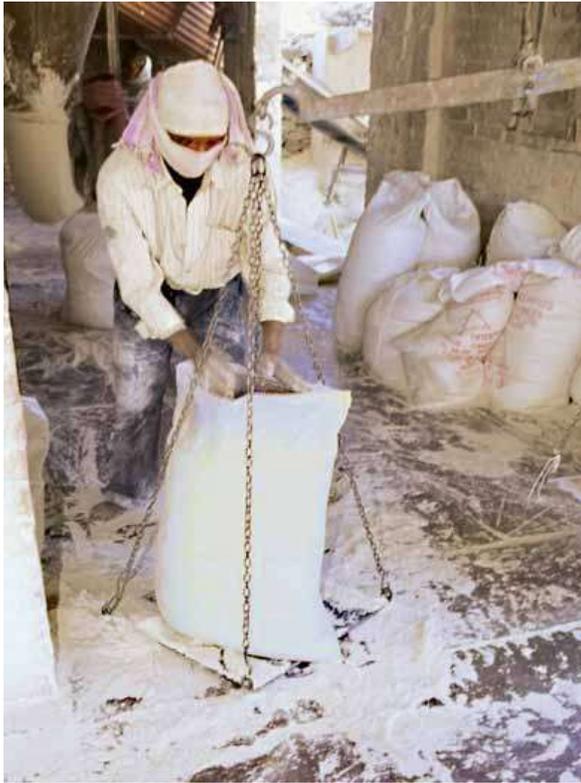
Asbestos bodies in the sputum

Transient Pleural Effusions

Pleural Plaques and Pleural Thickening

ASBESTOSIS	DOSE DEPENDENT	15 + yrs	PREVENTABLE
LUNG -CANCER	Dose dependant +SMOKING MULTIPLES	20 + yrs	”
MESOTHELIOMA	BLUE FIBRE	30 + yrs	”

ASBESTOSIS



Lung Cancer

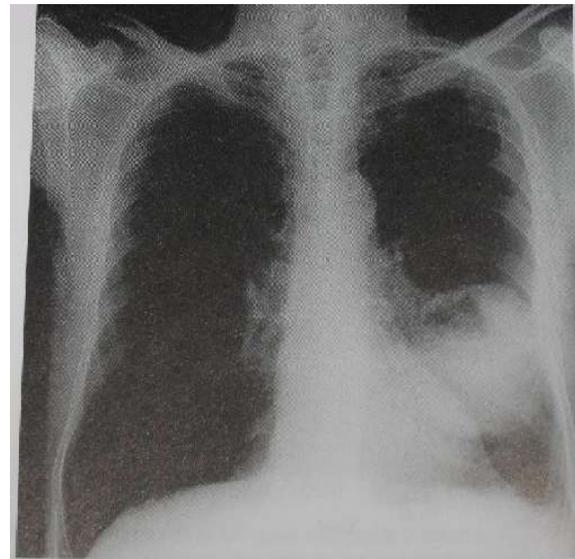
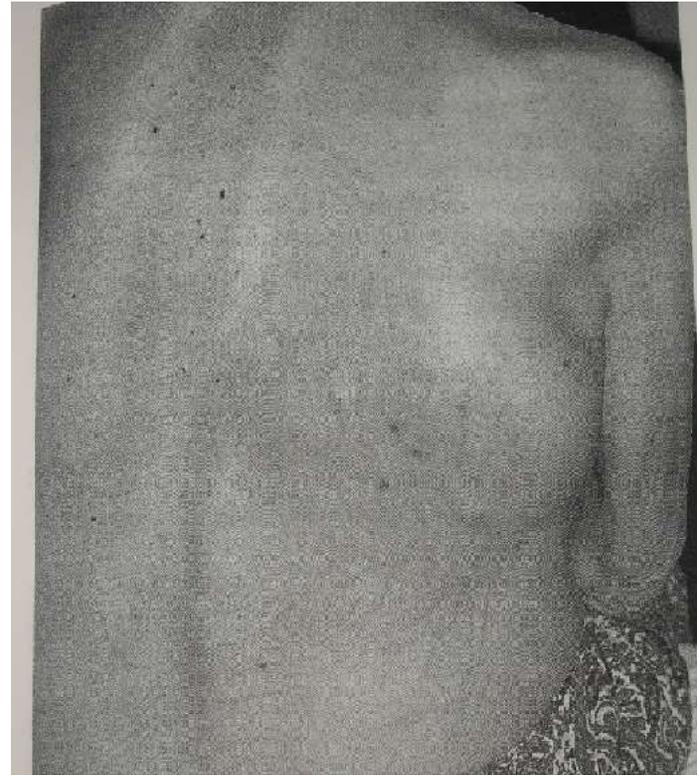


Fig. 19.41 Large cavitated bronchial carcinoma in left lower lobe.

Mesothelioma





**Dry Mechanical Drilling Producing
Clouds of Dust.**



Construction industry is one of India's largest employers

Growing at a rate of 15 percent a year



**It employs 30 million workers,
of which over 30% are women**



**Conservative estimates of
women workers would put the
number of children at sites
in millions**

Agate industry

Vertical grinding



Raw material



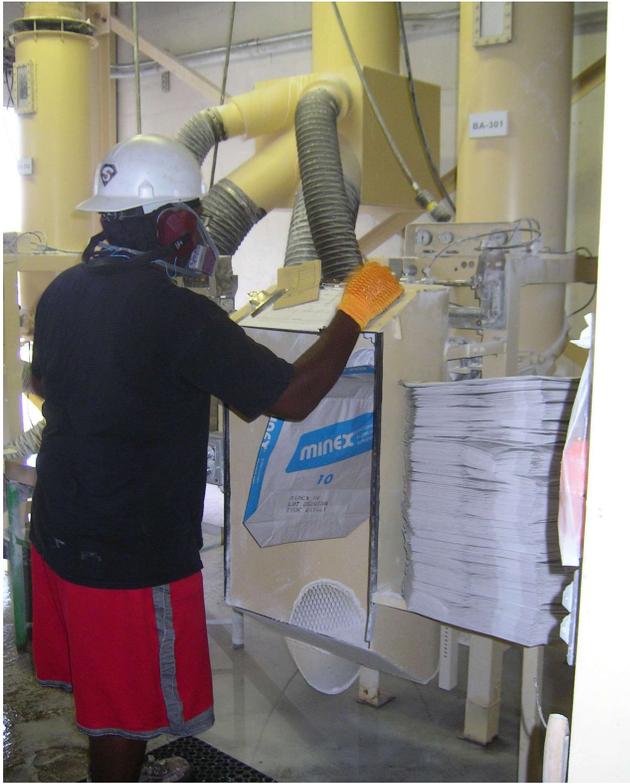
Horizontal grinding



Final product

Bagging(before & after)

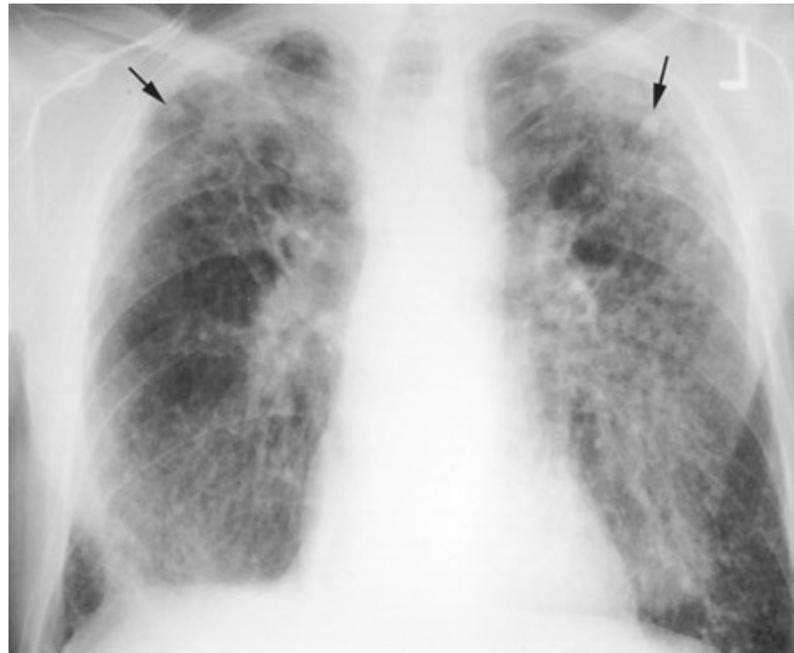




Stone Crusher Unit



Silicosis



A

Source: Fauci AS, Kasper DL, Braunwald E, Hauser SL, Longo DL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine*, 17th Edition: <http://www.accessmedicine.com>

Copyright © The McGraw-Hill Companies, Inc. All rights reserved.

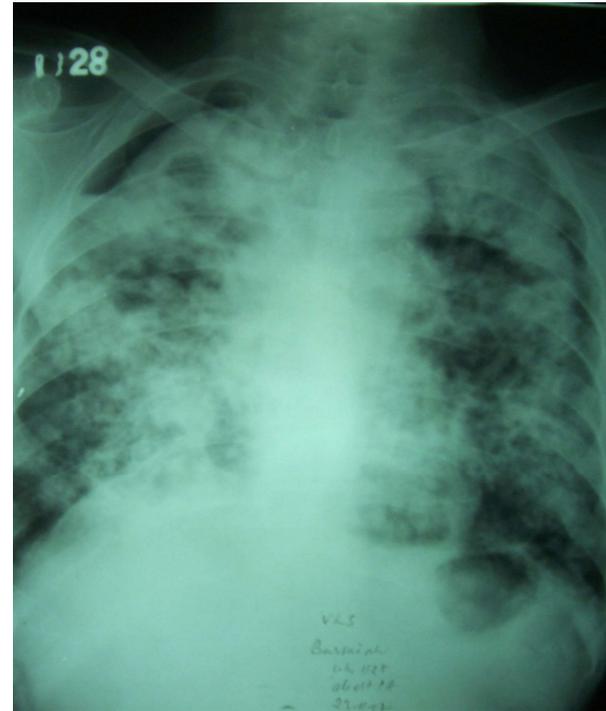


Nodular Silicosis



Classical Silicosis Courtesy Dr. Koich Honma

Silicosis in Gold Mine



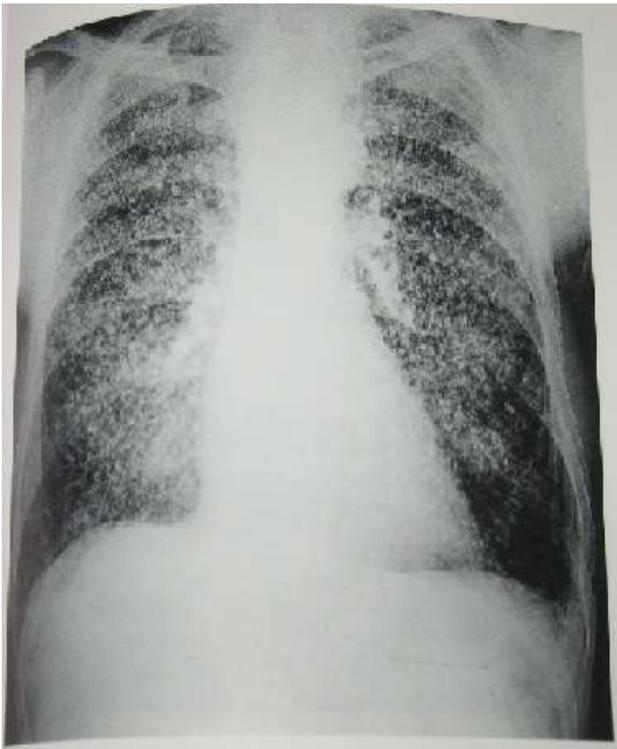
TREATMENT

- **No Specific treatment.**
- **Symptomatic treatment.**
- **Treatment of Silico-Tuberculosis with appropriate ATT.**
- **Surgery**
- **100 % Preventable.**

CWP



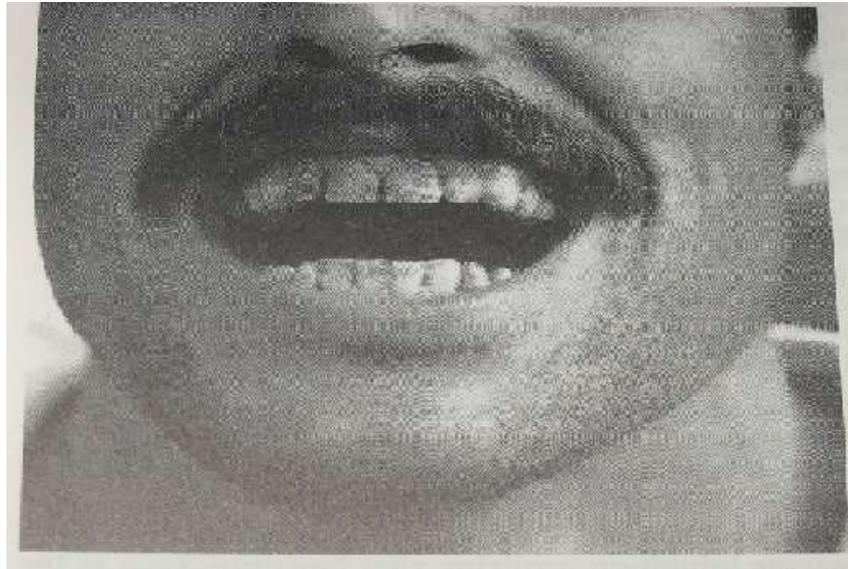
Stannosis



Inorganic Lead Poisoning



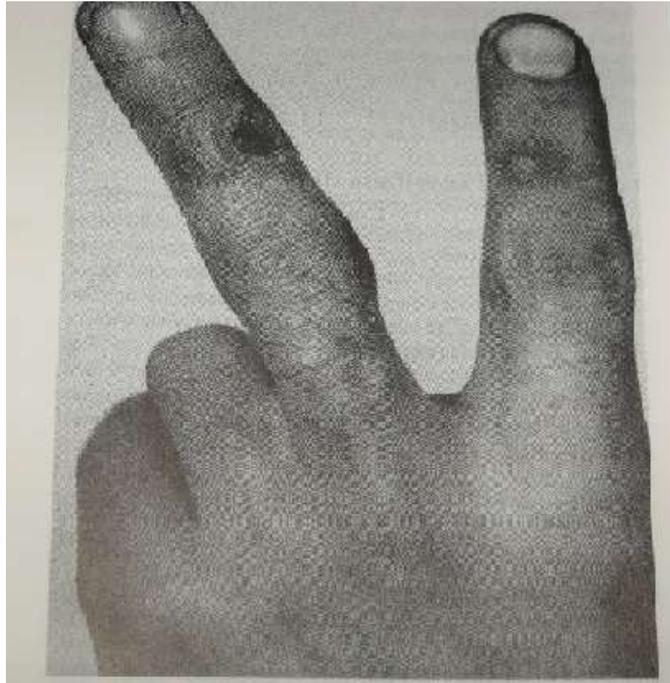
Dental Fluorosis





Allergy from nickel in wrist strap.

Chrome Hole

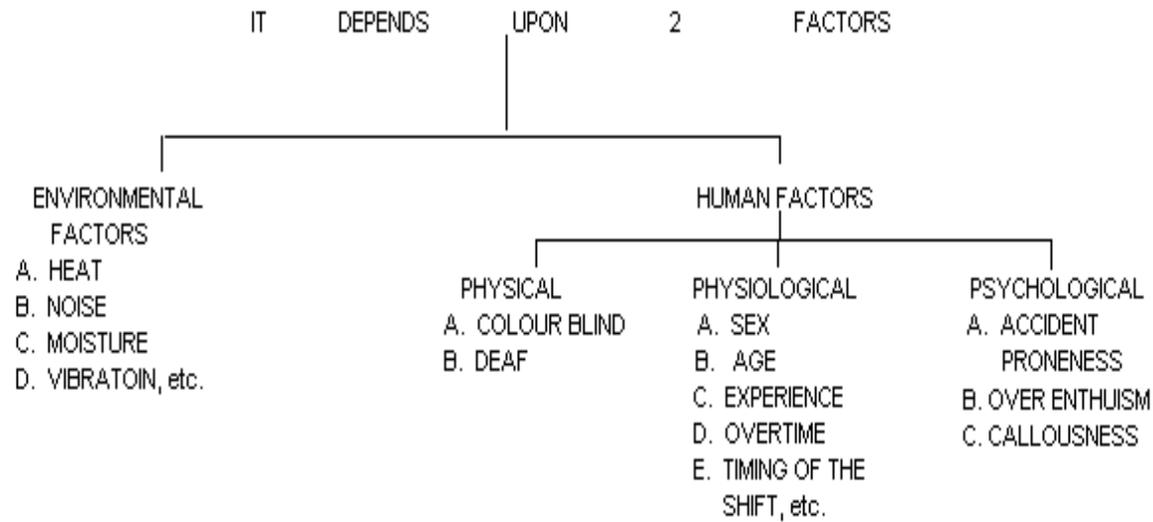


C. BIOLOGICAL AGENTS

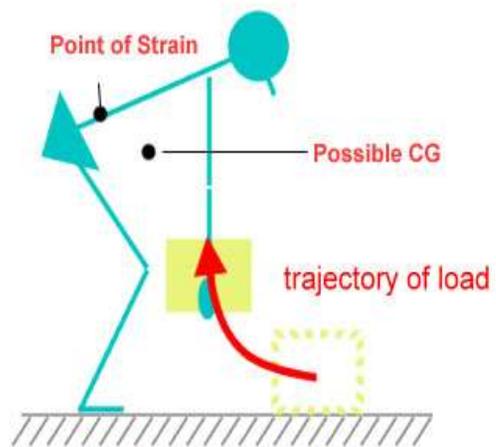
- **BACTERIA**
- **VIRUS**
- **FUNGUS**
- **PROTOZOA**
- **ANIMALS**

**e.g. rat bite, cat bite, snake bite,
dog bite**

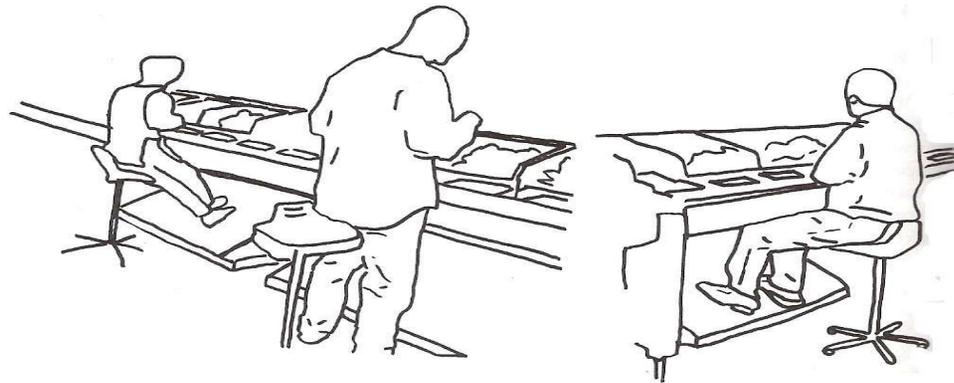
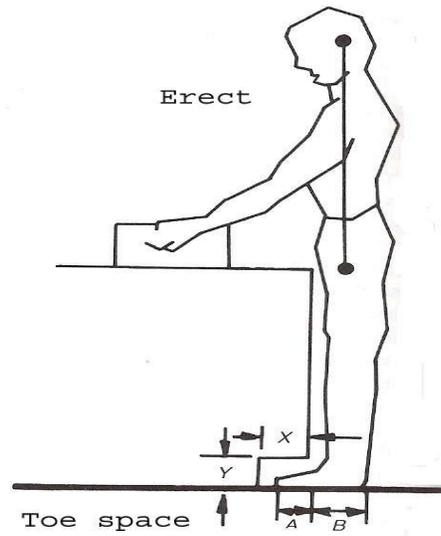
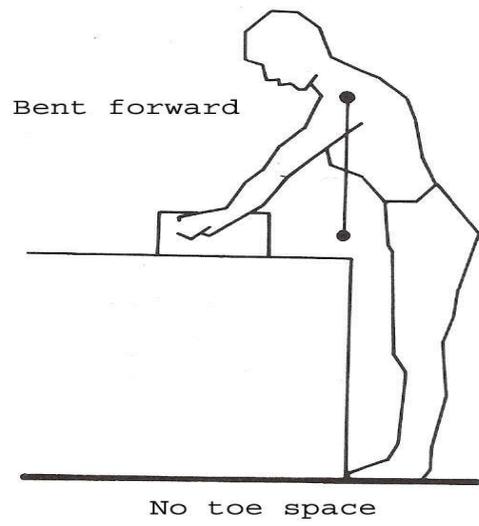
D. MECHANICAL HAZARD - causes accidents & injuries



Work-Related Musculoskeletal Disorders



**Musculoskeletal disorders
are the problem
and ergonomics is
a solution.**



Foot rest & adjustable seat height

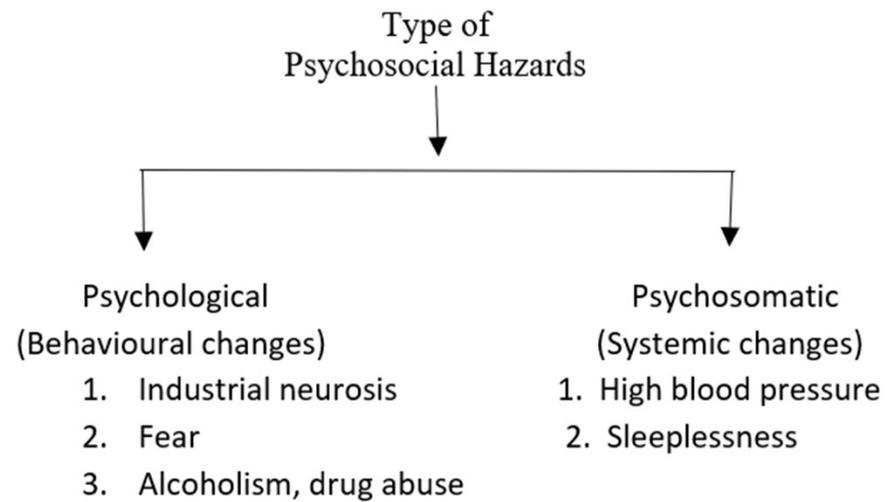
Low Back Pain - A Modern Epidemic

Common Causes of Low Back Pain

**Posture And Poor
Alignment Overexertion
Traumatic Back Injuries
Degenerative Wear And
Tear
A Bulging Or Herniated
Disc
Structural Abnormalities
Emotional Stress And
Muscular Tension**



E. Psychosocial Hazards



Occupational stress

Stress is an increasingly important occupational health problem and a significant cause of economic loss. Occupational stress may produce both overt psychological and physiological disability; however, it also may have more subtle manifestations that can affect personal well-being and outcomes of organizational importance such as productivity.

PREVENTIVE MEASURES

1. MEDICAL MEASURE

2. SAFETY MEASURE

3. STATUTORY/LEGISLATIVE MEASURE

4. ADMINISTRATIVE MEASURE

Occupational History



Medical Examination

PFT



X-Ray Chest-PA View



Medical Record Keeping



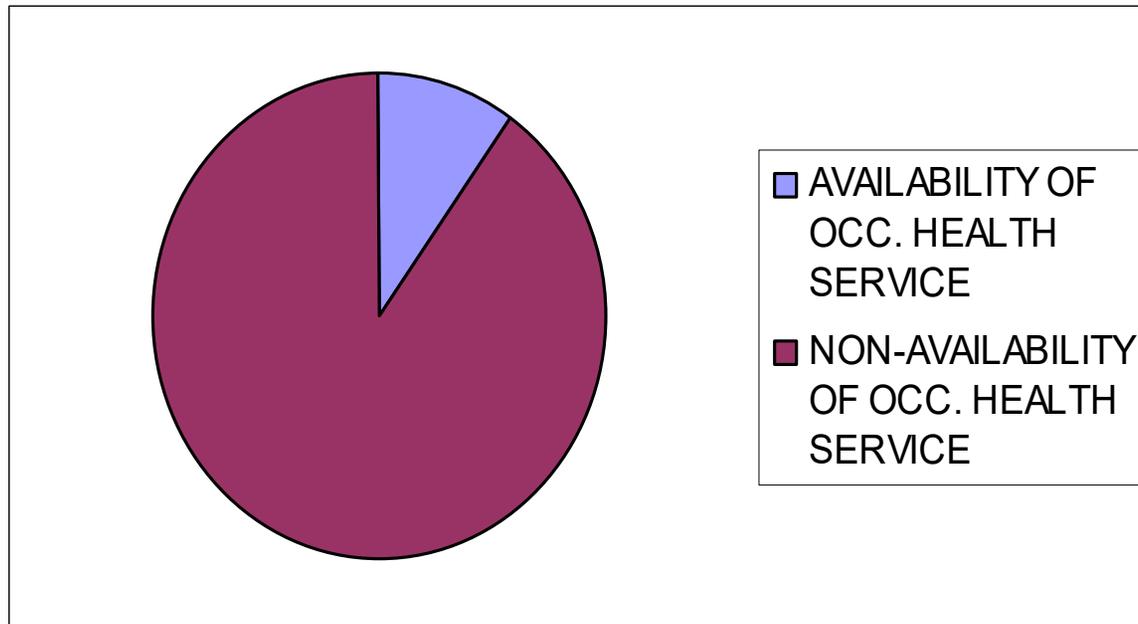
Occupational Health Service

OHS ARE HUMAN-SERVICE ORGANIZATIONS IN MODERN SOCIETY WHICH HAVE BEEN DESIGNED TO MANAGE AND PROMOTE THE SAFETY, HEALTH, AND WELFARE OF CITIZENS AT WORKS.

Principles:

- a. preventive**
- b. promotive**
- c. protective**
- d. adaptation**
- e. cure & rehabilitation**
- f. primary health care**

OHS IN INDIA



SUPERVISION OF WORKING ENVIRONMENT

Work Environment



Dust Monitoring



ENGINEERING MEASURES

Mechanization



Manual



SANDBLASTING



Wet Method

Wet Method



Local Exost Ventilation



THREE METHODS OF DRILLING



Wet Drilling



Dry Drilling



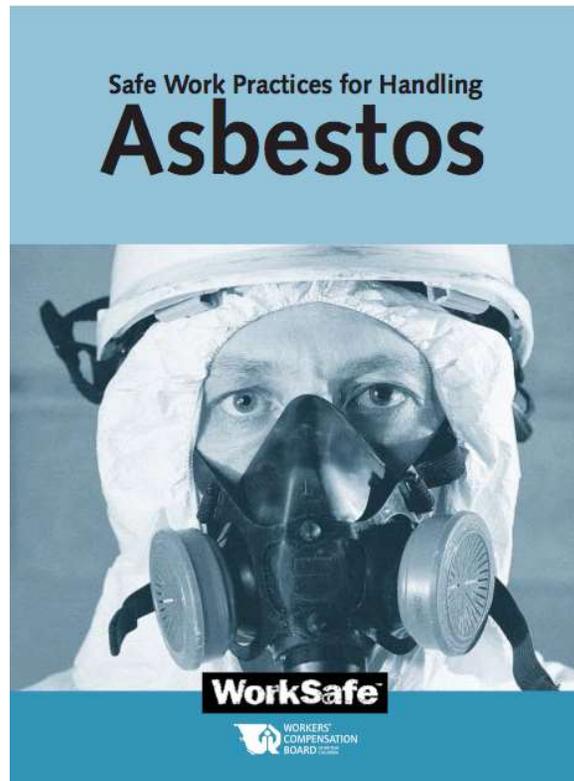
Dust Extractor Used

FIBRE STORAGE AREA --- MAINTENANCE



Centralized Vacuum Cleaning

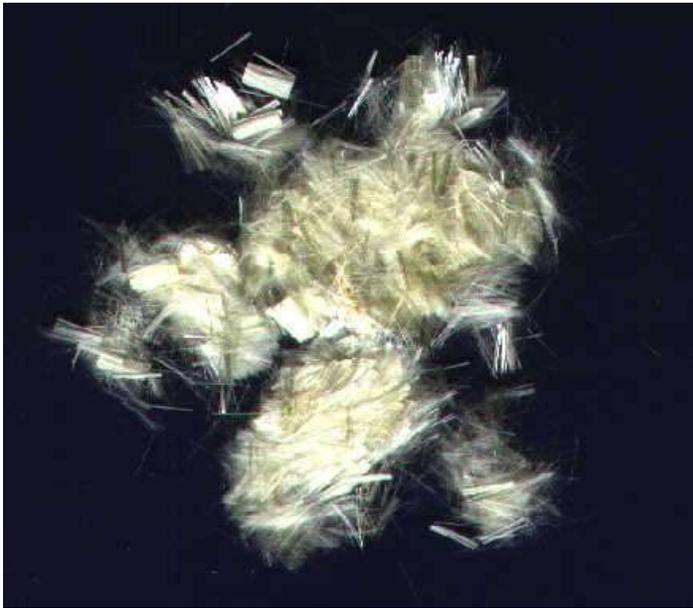
Personal Protective Equipment



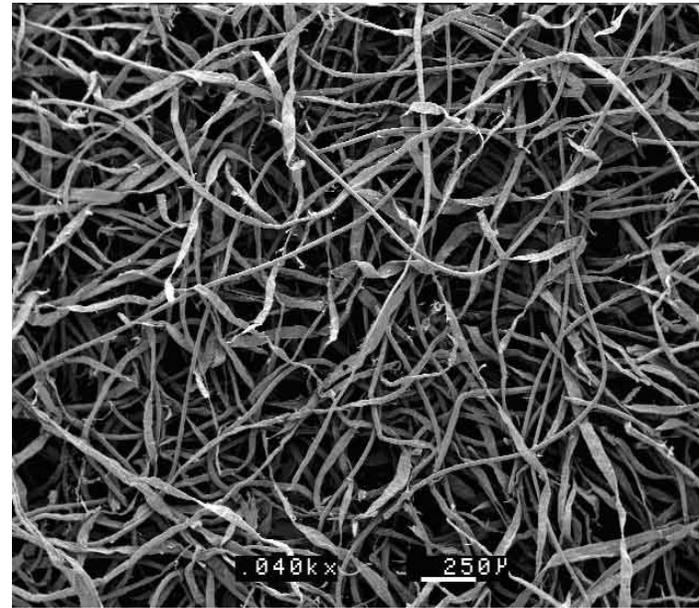
PPE use during asbestos removal

Substitution of Asbestos Fibre

PVA Fibre



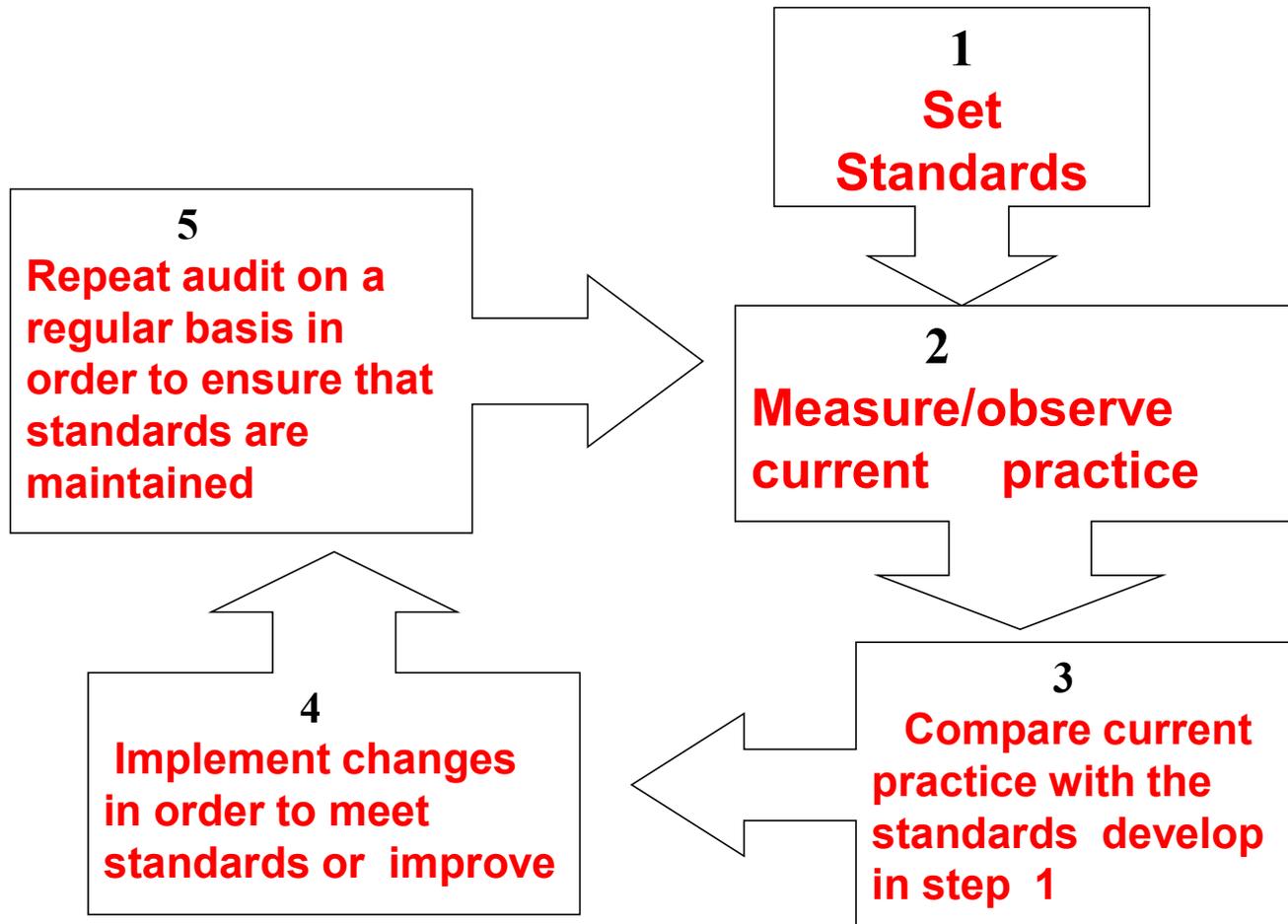
Cellulose Fibre



**SOME OCCUPATIONAL HEALTH DEPARTMENTS
HAVE ADOPTED THE ISO-9000 / BS-5750 APPROACH
AND HAVE INCORPORATED ELEMENTS OF
MEDICAL AUDIT INTO QUALITY SYSTEM.**

**BIS-14489 HAS INCORPORATED THE
OCCUPATIONAL HEALTH AUDIT INTO
OCCUPATIONAL SAFETY AUDIT AND RENAMED AS
OCCUPATIONAL SAFETY & HEALTH AUDIT.**

Donabedian's Model



The common model for occ. health audit

HIRA Concept
From
Occupational Health point of view

Industrial Toxicology

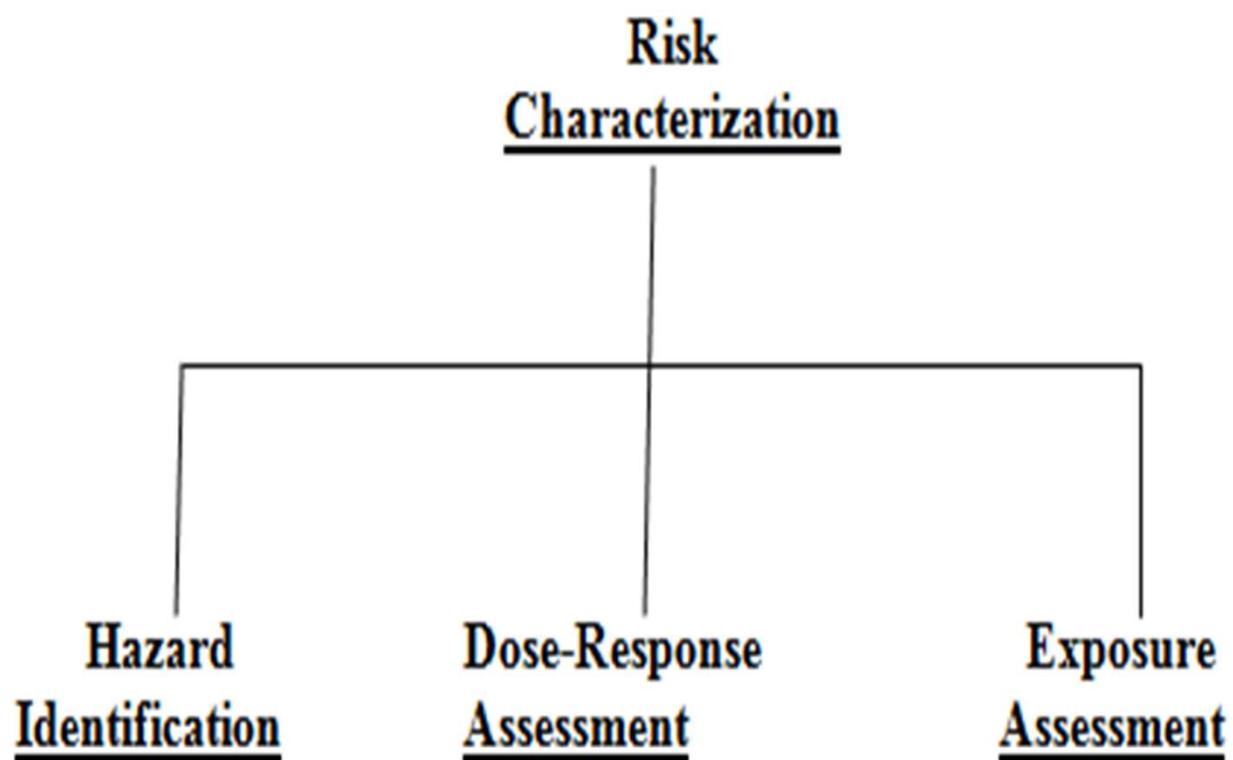
In occupational medicine, three applications of the scientific aspects of toxicology are particularly important, they are: risk assessment, individual variation in clinical toxicology, and biological monitoring.

Risk Assessment

Risk assessment is a process of estimating the probability of harm or damage occurring within a population as a result of a particular hazard, a means of evaluation of a possible threat to health.

Steps of Risk Assessment

- **Hazard Identification**
- **Dose-response Assessment**
- **Exposure Assessment**
- **Characterization**



Elements of risk assessment Adapted from National Academy of Science

Risk Management

The second process is called *risk management*, and it uses a value-based approach to determine what level of risk to human health will be considered significant and to formulate options for identifying, selecting, and implementing action to prevent, reduce, or maintain risks below that level. Risk management considers risk along with other technical, economic, legal, and social factors.

Risk Communication

The third element of the risk assessment model, *risk communication*, was added later with the intent of linking risk assessors with the public by presenting information in the most effective way.



DGFASLI, MOLE, INDIA

"SILIC



Silicosis is a fibrotic disease of the lung caused by the inhalation of, retention of and pulmonary reaction to crystalline silica.

DIAGNOSIS

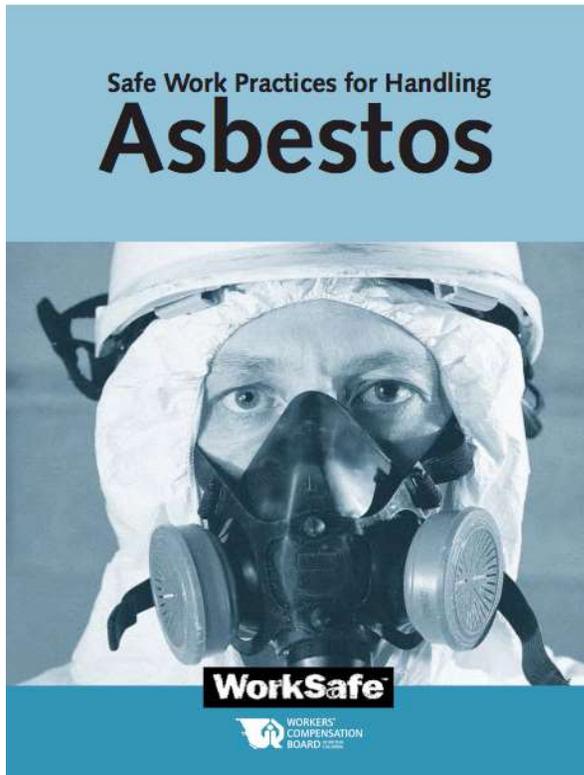
- Occupational History
- Clinical Examination
- PFT & Radiological Examination
- CT & HRCT
- Lung Biopsy

PREVENTION

There is no specific therapy for silicosis. Prevention remains the cornerstone of eliminating this occupational lung disease. The education of workers and employers regarding the hazards of silica dust exposure and measures to control exposure is important. Improved ventilation and local exhaust, process enclosure, wet technique, personal protection including the proper selection of respirators and where possible, industrial substitution of agents less hazardous than silica reduce exposure.



DGFASLI, MOLE, INDIA



Asbestos Lung Injury

- Benign asbestos-induced pleural disease
 - pleural effusions
 - pleural fibrosis or hyalin fibrous plaques
 - rounded atelectasis a mimic of cancer
- Benign asbestos-induced parenchymal lung disease
 - asbestosis or lung fibrosis
 - small airway disease still controversial
- Malignant asbestos-induced disease
 - lung cancer
 - malignant mesothelioma

Diagnosis

- History
- Clinical Features
- Physical Signs
- Investigations : PFT, X-ray Chest
- Lung Biopsy
- CT Scan/ HRCT
- Positron Emission Tomography (PET)

Challenging encounters

- Implementation of laws
- Awareness programme
- Safety Measures
- Substitution
- Ban