



Safety Management

Yildiz Technical University

Civil Engineering Department

Construction Management Division

➔ What is the basic right of the human beings?

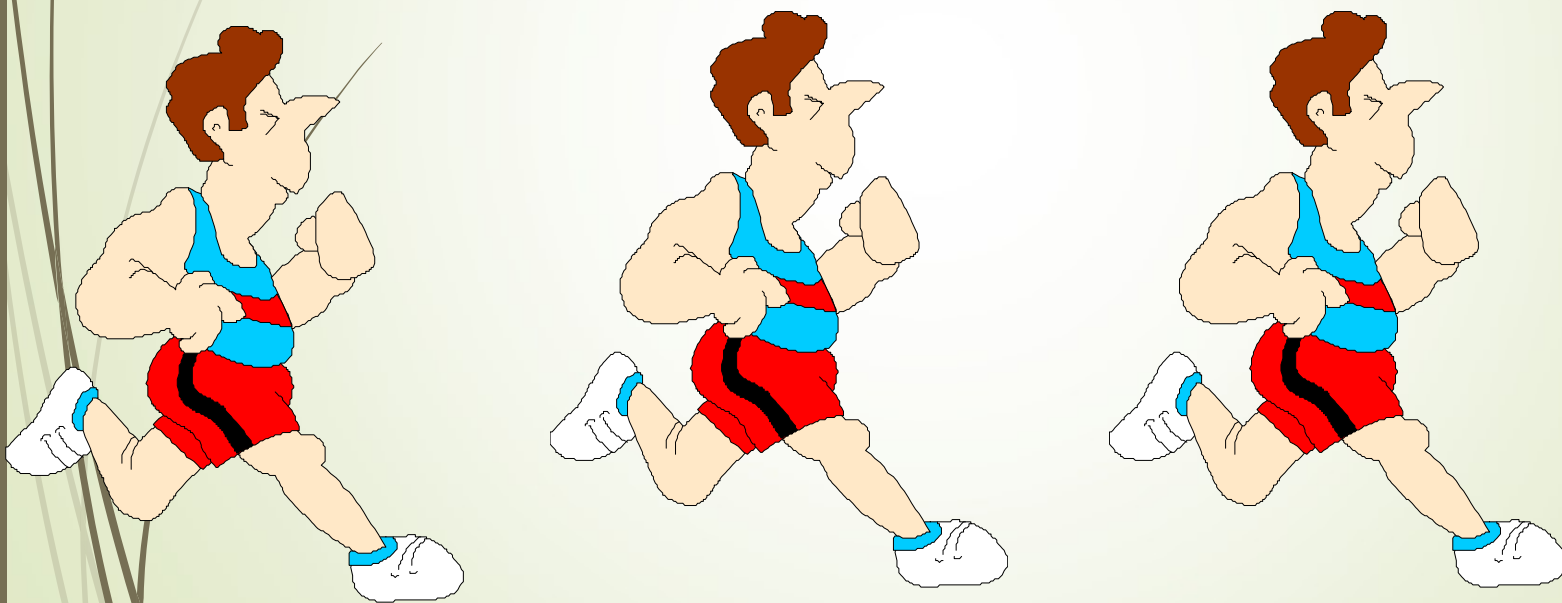


A photograph of six children running through a grassy field. The children are of various ethnicities and are dressed in casual summer clothing like t-shirts, tank tops, and shorts. They are all smiling and appear to be having fun. The background is a soft-focus landscape with green grass and distant hills under a clear sky.

Living

What kind of a life?

Being in the good conditions in terms of health, physical and social perspective.

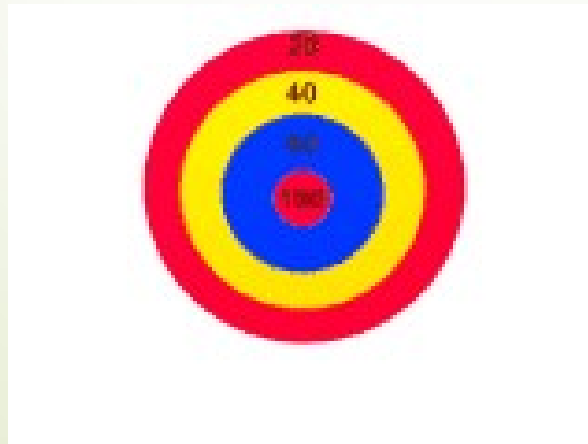


What is health?



Is not only about not being ill and disabled, but also being in good conditions in physical and mental perspective (WHO)

Physical + social wellness = Health



Safety Management?

Is a process conducted in a **systematic and scientific** manner to prevent from the conditions, which affect the health of the workers, are emerged due to the different reasons during the activities.

(EFFECTIVE-PERMANENT-SYSTEMATIC)



Purpose of safety management:

- Provide a sound and safe working environment,
- Provide health and safety of the workers
- Provide the safety and continuity of the production,
- Protect the ecological environment,
- Improve the quality and productivity.
- **Priority is;**
protecting the workers from occupational accidents and occupational diseases !!!

Basic terms related to safety management

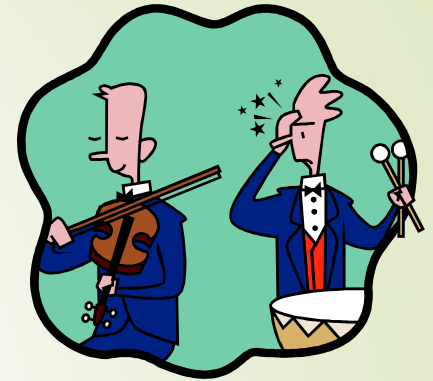
Accident

An accident is an incident plus its consequences; the end product of a sequence of events or actions resulting in an undesired consequence (injury, property damage, interruption, delay)



Basic terms related to safety management

Occupational accident



discrete occurrence in the **course of work**, which leads to physical or mental harm.

The phrase 'in the course of work' means during the course of work or at work (even if the accident happens off the company's premises, or if it is caused by third parties) according to Eurostat; and 'while engaged in an economic activity, or at work, or carrying on the business of the employer' according to ILO.

For example, a traffic accident occurs while transporting the workers to a workplace, the worker who has recently had a child has an accident while suckling her child at the work hours.

Basic terms related to safety management

Occupational disease

Is "any abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to factors associated with employment." Some of the common types of occupational illnesses include asthma and other respiratory problems, pesticide poisoning, and lead poisoning.



Profile of occupational accidents in the world

According to the data provided by ILO (International Labour Organization) in 2009;

 **The number of accidents: 270 millions**

 **Fatalities due to the accidents: 360 thousands**

 **Fatalities due to occupational illness: 1 million 950 thousands**

 **Fatalities due to toxic materials: 651 thousands**

 **Number of occupational illness: 160 millions**

 **The loss in the annual GDP is %4**

Profile of occupational accidents in European Union

- The cost of occupational accidents and occupational diseases is 20-30 billion Euro/Year
- Each year, 10 million workers in EU are affected from occupational accidents and diseases and 8000 workers are died because of these.

Occupational Accidents in Turkey

- First in the number of occupational accidents
- Third in the number of occupational accidents and occupational illness after Bengali and Pakistan
- In 2012;
 - 🛑 **Number of occupational accidents: 74.871**
 - 🛑 **Number of fatalities: 745**
 - 🛑 **Number of permanent incapacity: 2209**
 - 🛑 **Number of occupational diseases: 395**

Occupational Accidents in Turkey

According to the employment injury and occupational diseases statistics in 2012 (SGK);

Branches of activities	Number of occupational accidents	% of occupational accidents
Coal and Lignite Mining	8828	11.8%
Fabricated Metal Industry	7045	9.41%
Textile Manufacturing Industry	5127	6.85%
Base Metal Industry	4938	6.60%
Construction Industry	4511	6.03%

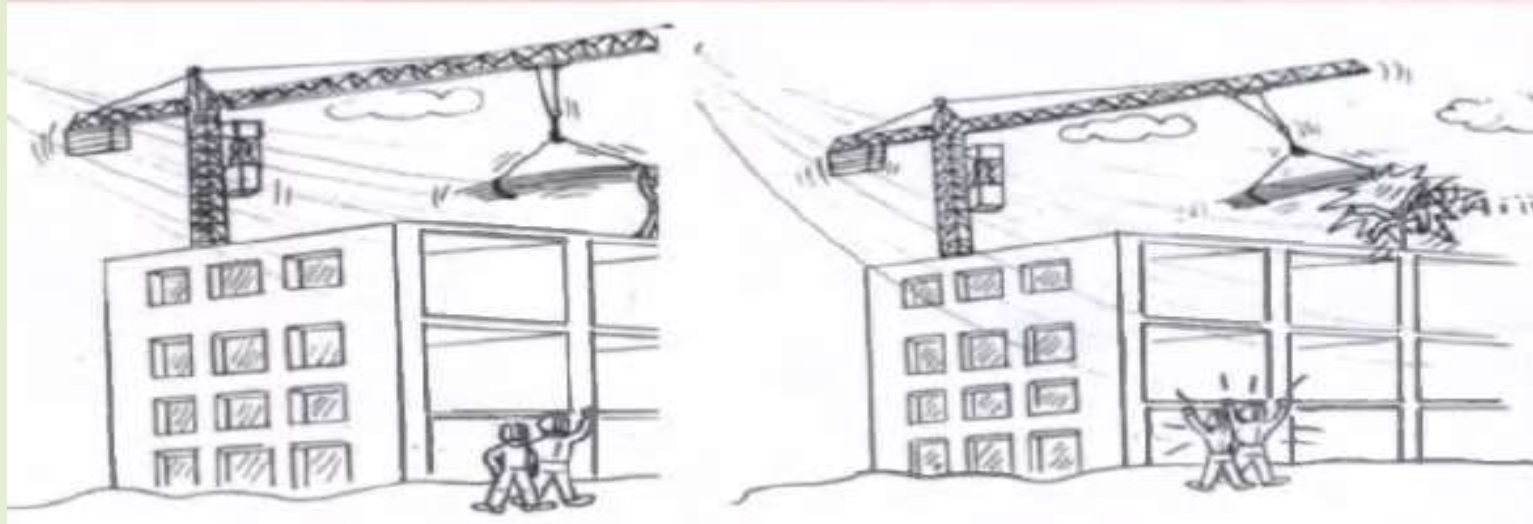
Occupational Accidents in Turkey

According to the employment injury and occupational diseases statistics in 2008;

Branches of activities	Number of occupational accidents in sector	Number of occupational accidents
Falling from high places (trees, buildings, scaffolds, ladders, machines, vehicles) and into depths	893	3,212
Accident caused by machinery	552	10,377
Struck by falling objects during handling	503	7,288
Pressing of the body or members between two objects	502	7,579
Falling on the same level	468	5,269
Accident due to a sharp piercing device	349	7,249
Struck by falling objects, not elsewhere classified	223	3,890
Injury due to the striking by any agent or to a collapsed agent	200	1,393
Exposure to or contact with electric	124	445
Caught in an object	104	1,657

Accidents in European construction industry

Falling from heights: **Fatality ratio is % 43**



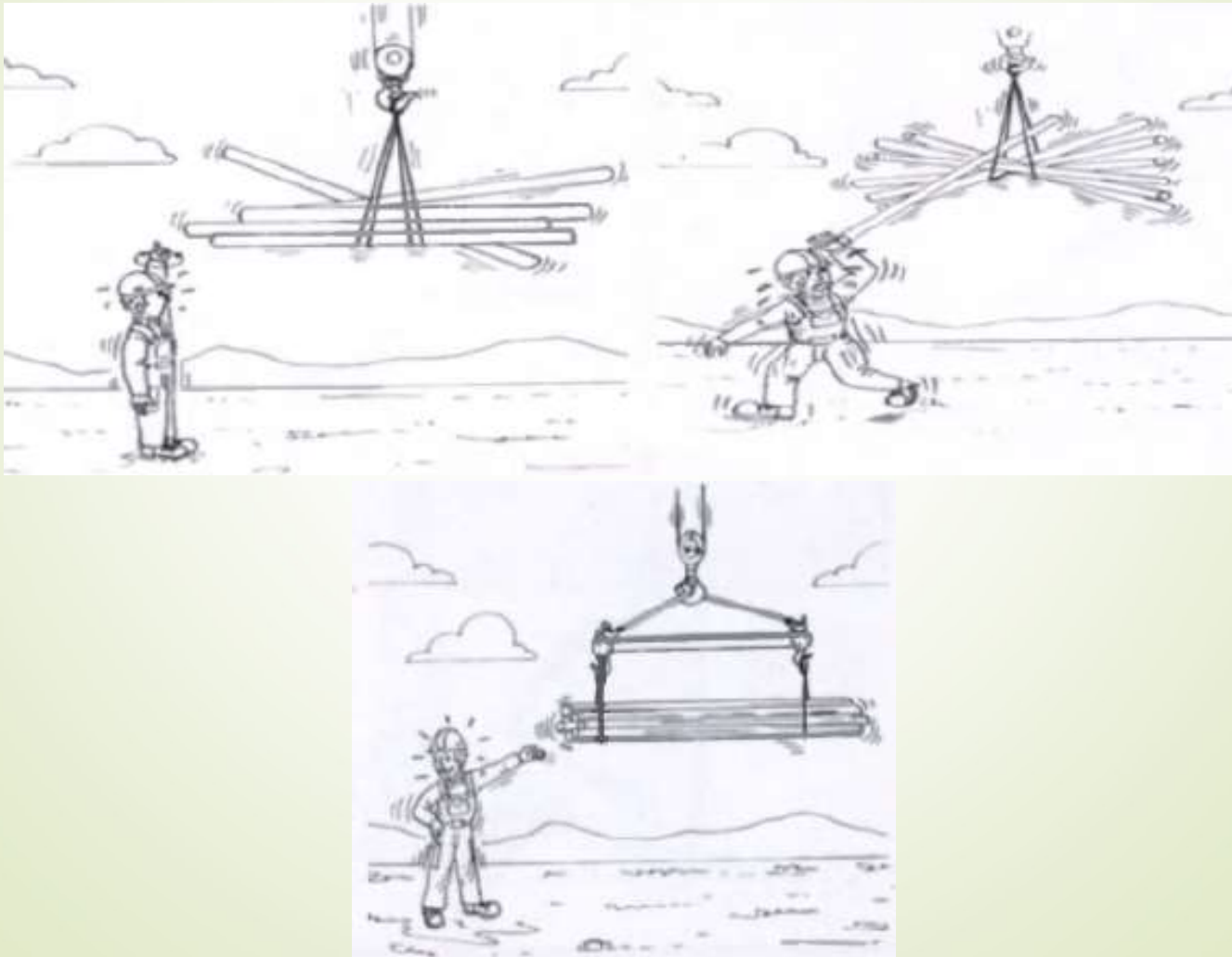
Accidents in European construction industry

Falling objects: **Fatality ratio is % 12**



Accidents in European construction industry

Struck by falling objects during handling: **Fatality ratio is % 11**



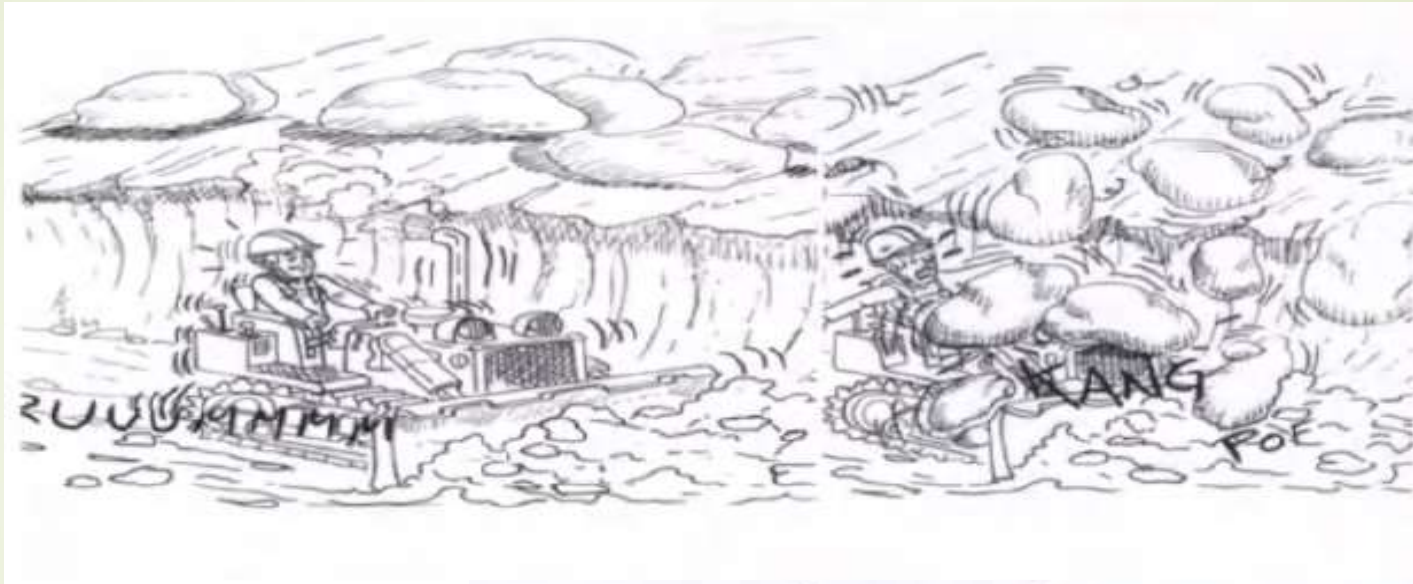
Accidents in European construction industry

Traffic accidents in construction site: **Fatality ratio is % 8**



Accidents in European construction industry

Excavation works: **Fatality ratio is % 5**



Accidents in European construction industry

Exposure to or contact with electric: **Fatality ratio is % 4**





OCCUPATIONAL ACCIDENTS

ACCIDENTS ARE EXPENSIVE!



**Incapacitate
Skill workers**

Death

Compensations

Costs

Injuries

**Disruption in
Construction
Activities**

**Physiological
effects**

Costs of occupational costs

Direct costs:

- Hospital, physician, and allied health services, rehabilitation
- Insurance administrative costs for medical claims
- Compensations,
- Property damage,
- Lawsuits

Costs of occupational accidents

Indirect Costs:

■ Workforce loss due to:

- ✿ the productivity losses of the victim which include wage losses and household production losses,
- ✿ the first aid performed to the victim,
- ✿ the productivity losses of the friends of the victim,
- ✿ administrative costs which include the cost of administering workers' compensation wage replacement programs and sick leave.

Costs of occupational accidents

Indirect costs:

■ Product losses due to:

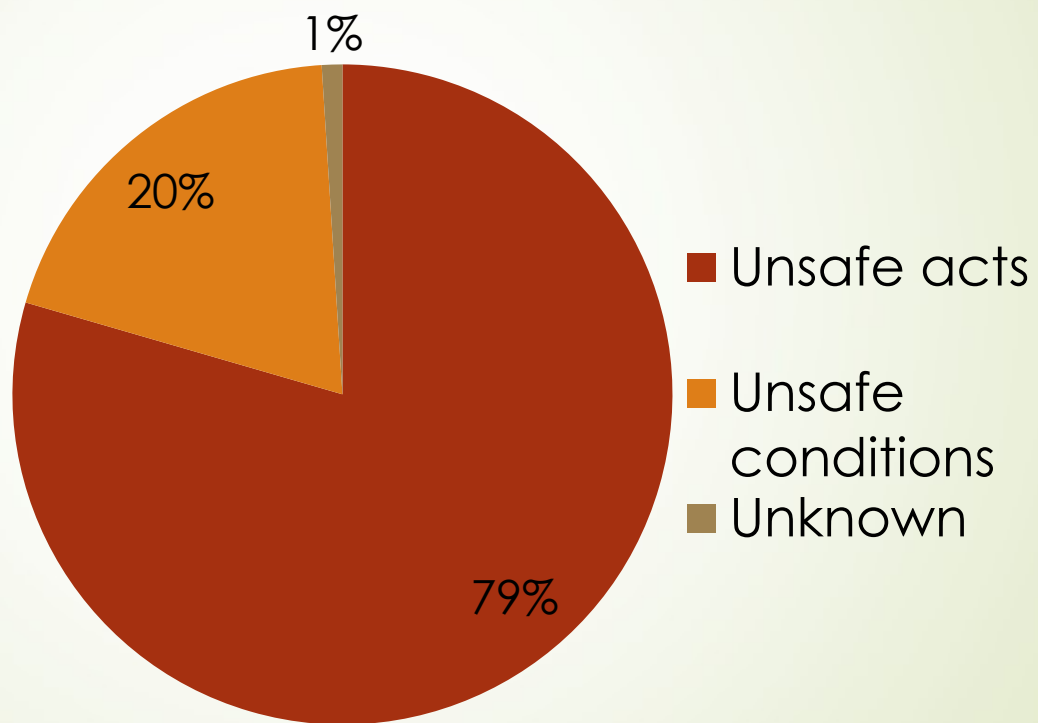
- ✿ Interrupt in the activities,
- ✿ Damages to the machines,
- ✿ Waste of materials,

Costs of occupational accidents


Indirect costs:

- Damage to company image and reputation
 - Loss of market competition
- Increase in project duration:
 - ✱ Damage to the reputation,
 - ✱ Penalties due to late delivery,
 - ✱ Losses of premiums based on early delivery
- Human conflicts and civil penalties


What causes accidents?



Unsafe acts

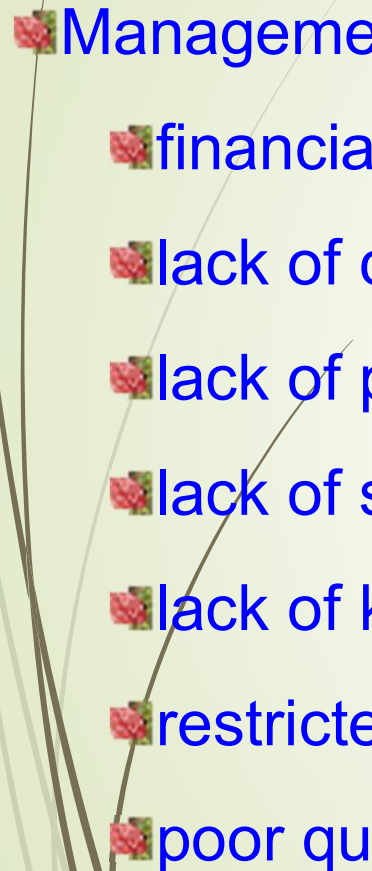
- 
- Working without authority
 - Failure to warn others of danger
 - Leaving equipment in a dangerous condition
 - Using equipment at the wrong speed
 - Disconnecting safety devices such as guards
 - Using defective equipment
 - Using equipment the wrong way or for the wrong tasks
 - Failure to use or wear personal protective equipment
 - Bad loading of vehicles
 - Failure to lift loads correctly
 - Being in an unauthorized place
 - Unauthorized servicing and maintaining of moving equipment
 - Horseplay
 - Smoking in areas where this is not allowed
 - Drinking alcohol or taking drugs

Unsafe Conditions

- 
- ❑ Inadequate or missing guards to moving machine parts
 - ❑ Missing platform guardrails
 - ❑ Defective tools and equipment
 - ❑ Inadequate fire warning systems
 - ❑ Fire hazards
 - ❑ Ineffective housekeeping
 - ❑ Hazardous atmospheric conditions
 - ❑ Excessive noise
 - ❑ Not enough light to see to do the work

Secondary causes of accidents



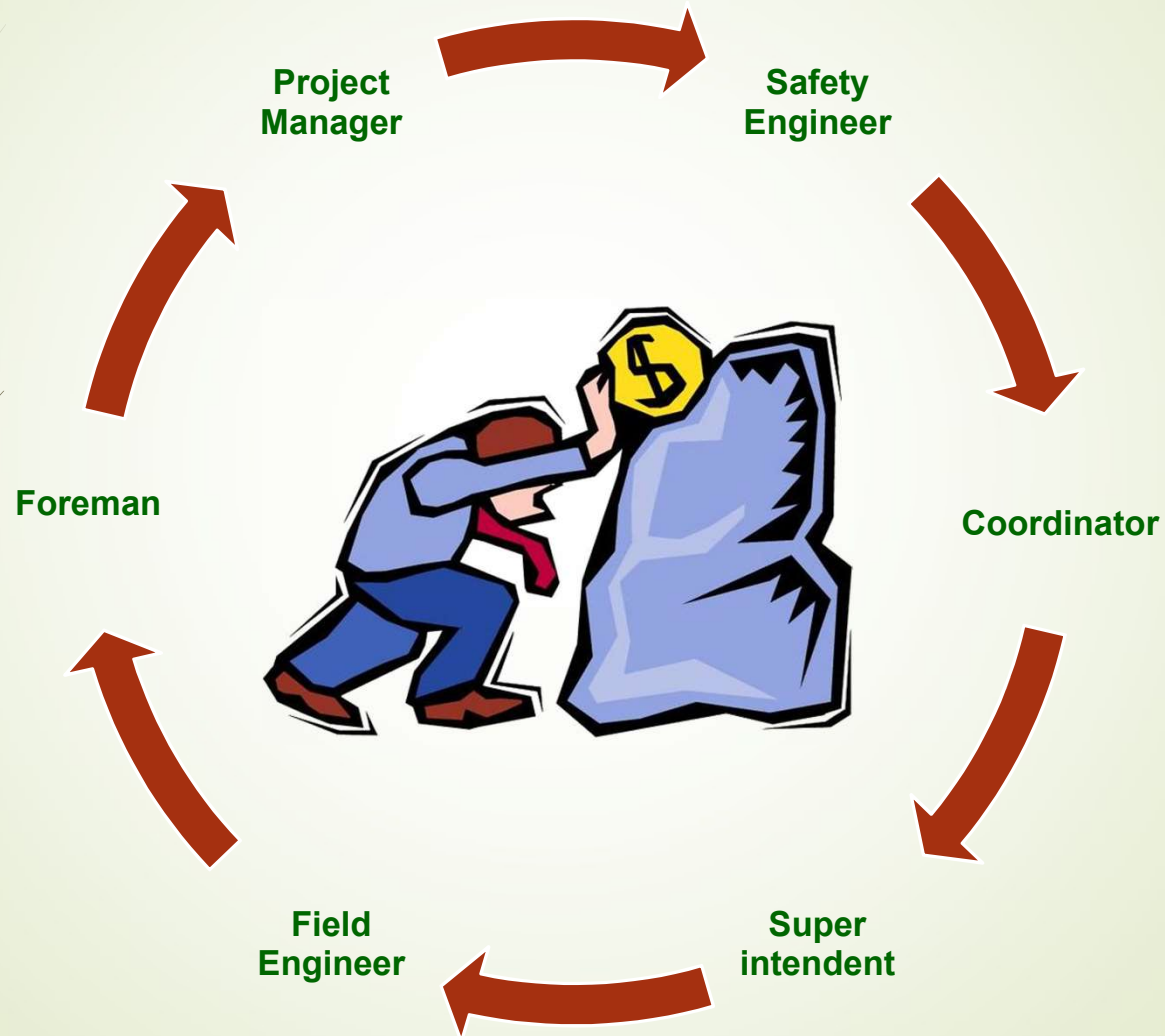
- Management system pressures
 - financial restrictions
 - lack of commitment
 - lack of policy
 - lack of standards
 - lack of knowledge and information
 - restricted training and selection for tasks
 - poor quality control systems resulting from the above
- 

Secondary causes of accidents

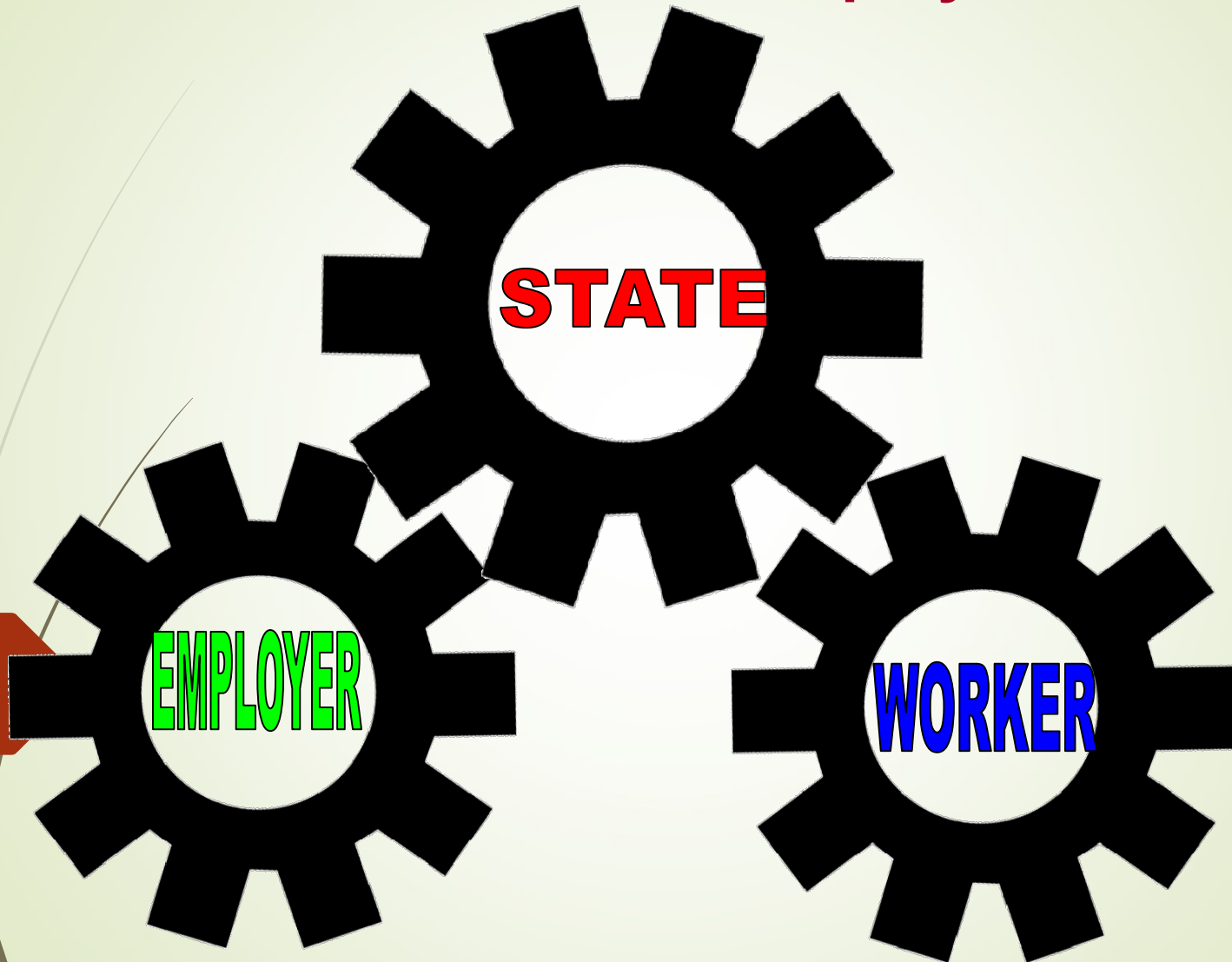


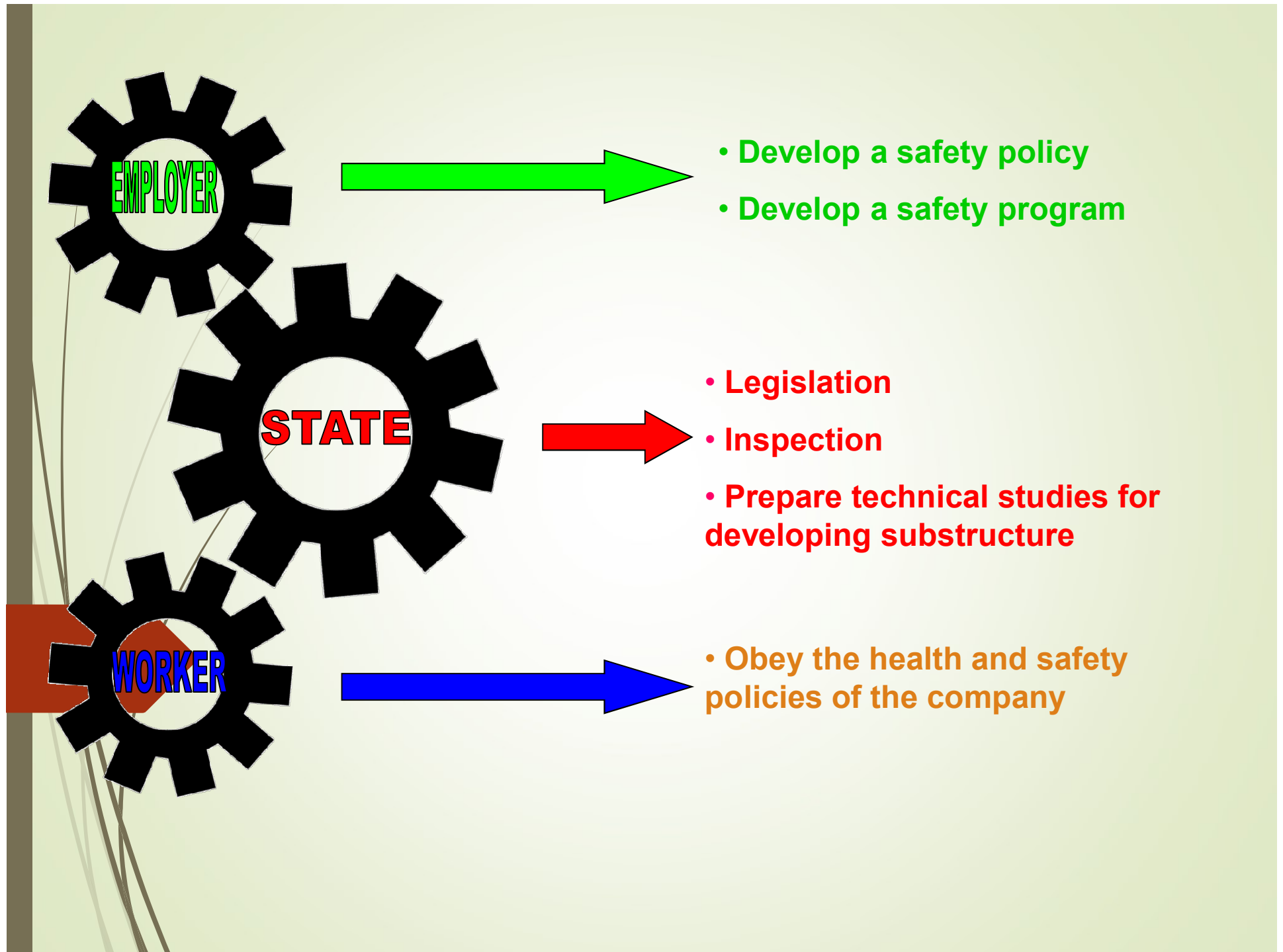
- Social pressures
 - group attitudes
 - trade customs
 - industry tradition
 - society attitudes to risk-taking
 - 'acceptable' behaviour in the workplace
 - commercial/financial pressures between contractors

Accidents can be prevented!

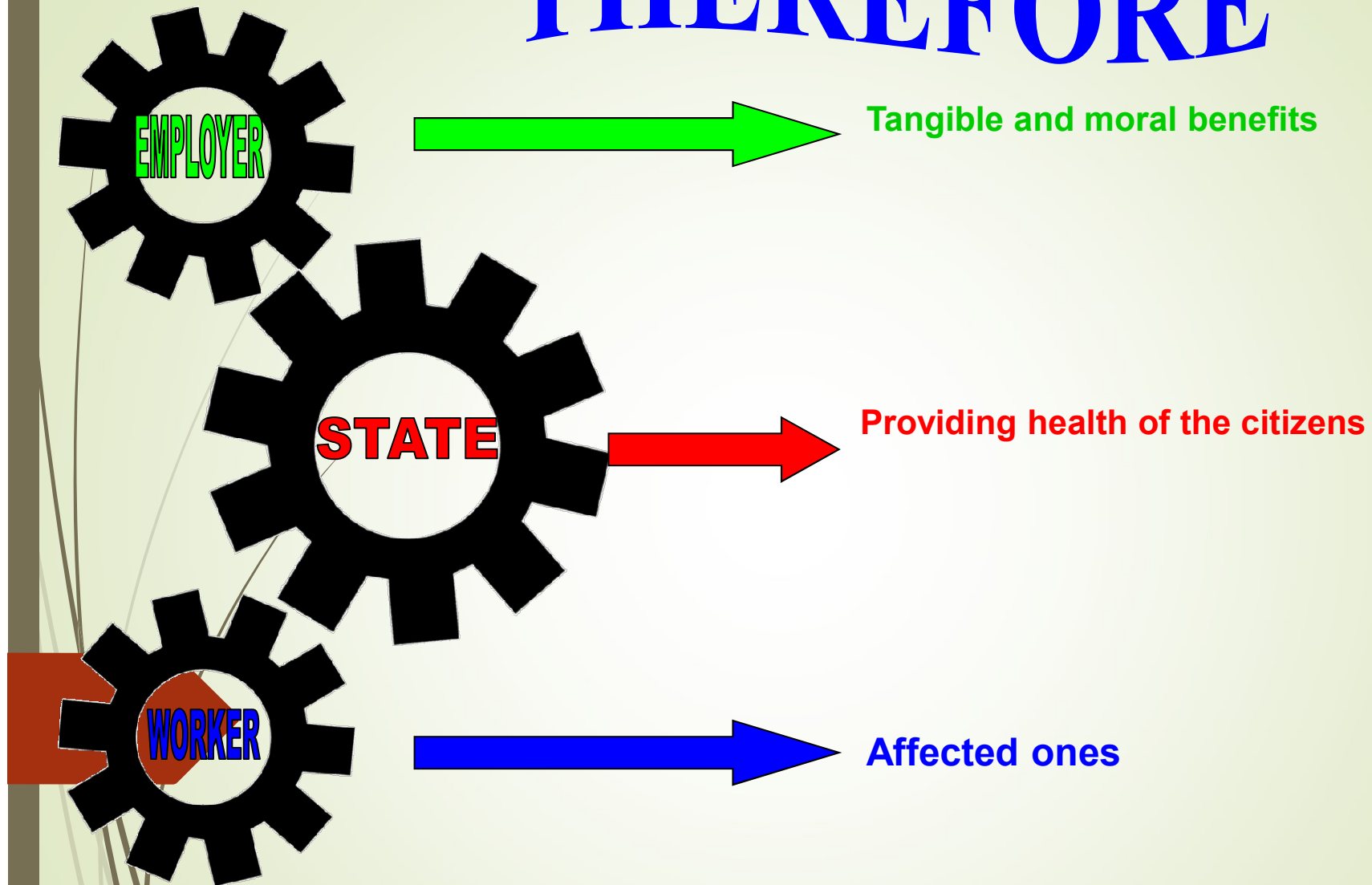


**Safety can be achieved only by the
collaboration of the state, employer and worker**





THEREFORE



Obligation to deal with the health and safety closely.

STATE

LEGISLATION

- **Laws:**
- **3308 LABOR LAW(08.06.1936 legislated, 15.06.1937 Constitution)**
- **1475 LABOR LAW (25.08.1971 Constitution)**
- **4857 LABOR LAW(10.06.2003 Constitution)**
- **6331 SAYILI İŞ SAĞLIĞI VE GÜVENLİĞİ KANUNU (30.06.2012 Constitution)**

There are also many regulations, standards, contracts, codes related to the health and safety.

EMPLOYEER

Employer is responsible for the health and safety of work environment, since:



danger also means responsibility.



the one who is benefited from the production is the employer, then the employer should be also responsible of the production.



the worker is weaker than the employer in economic perspective, therefore they should be protected.



the worker is also weaker than the employer in social perspective, therefore they should be protected.

Therefore, the laws related to health and safety considers the employer as the responsible for the accidents occurred in the workplace.

Employer

Safety training
program for all new
employees

Periodic refresher
for each worker

Hire the appropriate
worker

Site visits by safety
personnel to review and
control job hazards

Training programs for all
supervisors

İŞVEREN

**Adequate personal
protective equipment**

**Adequate first aid
Program and trained
Emergency personnel**

**Maintain
safety records**

**Develop procedure of
the emergency evacuation
of injured workers**

**Risk değerlendirmesi
yapmak**

EMPLOYER

- If possible, avoid a risk altogether by eliminating the hazard
- Tackle risks at source
- Adapt work to the individual when designing work areas and selecting methods of work
- Use technology to improve conditions
- Give priority to protection for the whole workplace rather than to individuals
- Ensure everyone understands what they have to do to be safe and healthy at work
- Make sure health and safety management is accepted by everyone, and that it applies to all aspects of the organization's activities.

EMPLOYER

- **Safety precautions in the construction works**

- Construction work should be carried out in daylight. Otherwise, appropriate lighting should be provided.
- Workers should be given safety equipment such as safety belts, special glasses, boots, gloves, hard-hats etc.
- All safety equipment and precautions should be in good condition, strong enough to resist possible accidents
- Dangerous places within the site should be clearly indicated by limits and signposts and red lights at night.
- Material which has cutting edges or pointed ends should be thrown disorderly manner. They should be stored in an orderly way like all other material.
- Holes in slab should be covered temporarily and railings should prevent people from falling.
- The workers should use safety belts.
- Trucks should park at preset places, and maneuvering should be directed by the helper.

New approach; OHSAS 18001 Standard

The OHSAS 18000 standards provide organizations with the elements of an effective OHSMS that can be integrated with other management requirements and help organizations achieve better occupational health and safety performance and economic objectives. This type approach is called as **“PROACTIVE” approach**.



In other words, by using this approach, the companies can change their health and safety behavior from reactive to proactive.

Hazard and risk


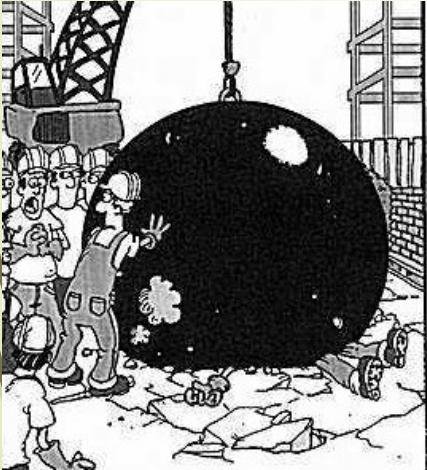
Hazard: the inherent property or ability of something to cause harm the potential to interrupt or interfere with a process or person.

Risk: the chance or probability of loss, an evaluation of the potential for failure.



$$\text{RISK} = \text{Probability} \times \text{Impact}$$

Basica hazards and risks in construction industry

Hazard	Risk
<p data-bbox="195 354 674 402">Working above ground</p> 	<p data-bbox="793 386 1247 435">Falling from heights</p>
<p data-bbox="216 850 653 954">Working with moving equipment</p> 	<p data-bbox="793 906 1367 954">Struck with an machinery</p>

Hazard

Risk

Using electricity



Excavation



Hazard

Risk

Falling objects



Lifting heavy materials



Hazard

Risk

Working with dangerous materials



Noise





*Safety
management
can save lives!!!*



**HEDEFİMİZ
SIFIR İŞ
KAZASI**

