

# **SKM 4353**

# **SAFETY IN PETROLEUM ENGINEERING**

# **CHAPTER 1: Introduction to Oilfield Safety**

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## REMEMBER.....

No job is so important and No service is so urgent - that we cannot take time to perform our work safely.



**SAFETY**.....is part of everyday living. It is an important consideration for everyone in everything he/she does, in the home, at work or play, on streets and highways – wherever he/she goes.

Safe operating practices and procedures are vital in the drilling business because the work is hazardous, involving massive machinery, heavy tools and great physical strength.

When accidents do occur, the work can be a serious peril to life and limb. Drilling personnel must know how to work safely on a rig in order to protect themselves, costly rig equipment, and the expensive hole being drilled.

Everyone loses from an accident. Injuries result in pain and suffering and may leave a person disabled or handicapped for life. Even minor injuries may cause loss of time from work and lost pay.

Insurance benefits are helpful, but compensation payments cannot restore a life, hand, eye or leg. Damaged machinery and equipment can usually be repaired but almost always at considerable cost, particularly if down time is taken into account.

An expensive well may be lost because of the oversight of the incompetence of one person. Blowouts and fires cause losses of life and equipment and waste precious oil and gas from underground reservoirs.

More than **90 % of all accidents are avoidable**, being caused by human error rather than by mechanical failure.

It is extremely important that every person on a drilling rig **develop a sense of safety** in drilling operations.

That person must use this sense in combination with the kind of good judgment it takes to drive a car safely, or to do anything else in a safe manner.

# Vocabulary

## ***Listing of select vocabulary words***

- ANSI – American National Standards Institute.
- Approved – Sanctioned, endorsed, accredited, certified, or accepted by a duly constituted and recognized authority or agency.
- Authorized Person – A person approved or assigned by the employer to perform a specific type of duty or duties or to be at a specific location or locations at the job site.

# Vocabulary – cont'd

- **Competent Person** – One who is capable of identifying existing and predictable hazards in the surround or working conditions which are unsanitary, hazardous, or dangerous to employers and who has authorization to take prompt corrective measures to eliminate them, or who can recommend directly to persons in authority that such corrective measures be taken.

# Vocabulary – cont'd

- Guarded – Covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers, or casings, barrier rails, safety bars, or screens to eliminate the possibility of accidental contact with, or dangerous approach by persons or objects.
- Hazard – Any occupational condition or circumstance which is likely to cause death, injury or illness.



# Vocabulary – cont'd

- Hazardous Substance – one by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, or otherwise harmful, is likely to cause occupational death, injury or illness.
- Qualified—one who by possession of a recognize degree certificate, or professional standing, or who by extensive knowledge, training and experience has successfully demonstrated ability to solve or resolve problems relating to the subject matter, the work, or the project.

**Oil Company/Operator** – Has control of the casing and the mud program being followed drilling the well.

**Drilling Contractor** – Head of drilling operation. Determines the overall safety practices/policies and the manner in which a safety program is carried out by the various supervisors.

**Drilling Superintendent** – Represents top management of the drilling contractor. Supervises the operations of several rigs in the area.

**Tool pusher** – Directly responsible to the drilling superintendent for carrying out work assigned to the rig. Supervise all personnel, ensures machinery is in a safe operating condition. Investigates each accident or injury to determine its cause.

**Driller** – Works directly under the tool pusher. Responsible for work of the crew and operation of the rig. The driller sets the pump speed and pressure, operates the draw works and rotary and manipulates the controls to operate the rotary and drill stem to make hole.

**Crew Members** – Must work for safety as a team! Must know his/her job and stay constantly alert to what is going on. Use PPE. Use proper tools. Learn to foresee and prevent accidents. Use stairs and ladders as intended.

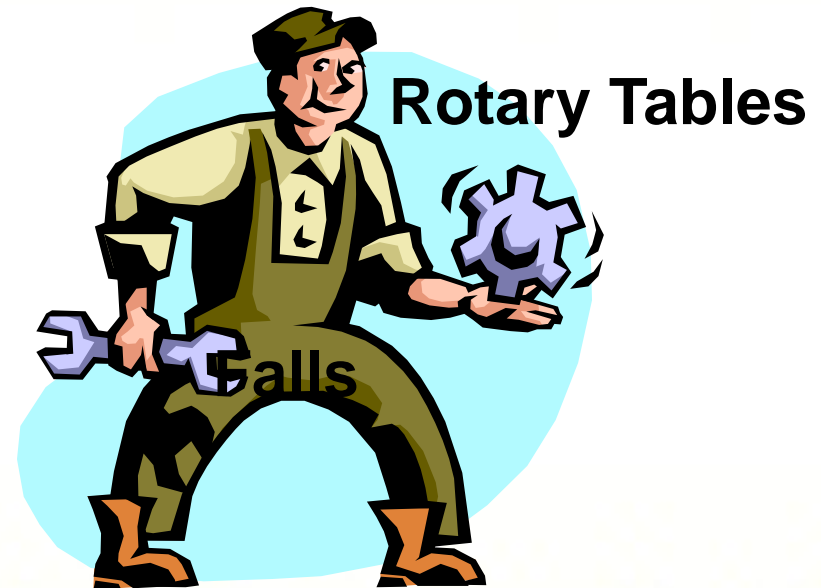
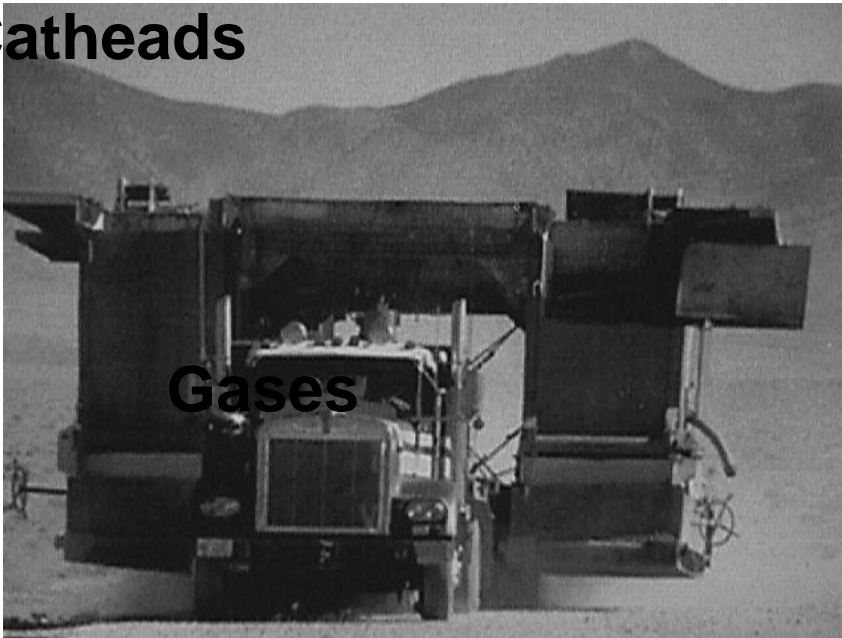
# HAZARD AWARENESS



# UNIQUE HAZARDS TO THE OIL AND GAS INDUSTRY

## Poor Machine Guarding

Catheads



Slipping

High Pressure Hoses

Tripping



# Health and Safety Procedures

Always give careful consideration to:

**Man.....**

**Machine.....**

**Environment.....**

**And, the interaction of each with the other!!**

# Health and Safety Procedures

## Some elements of a GOOD safety program

- ✓ Management policy
- ✓ Employee selection/placement
- ✓ Employee orientation/training
- ✓ Educational activities
- ✓ Employee meetings
- ✓ Inspections
- ✓ Accident reporting
- ✓ Safety responsibilities

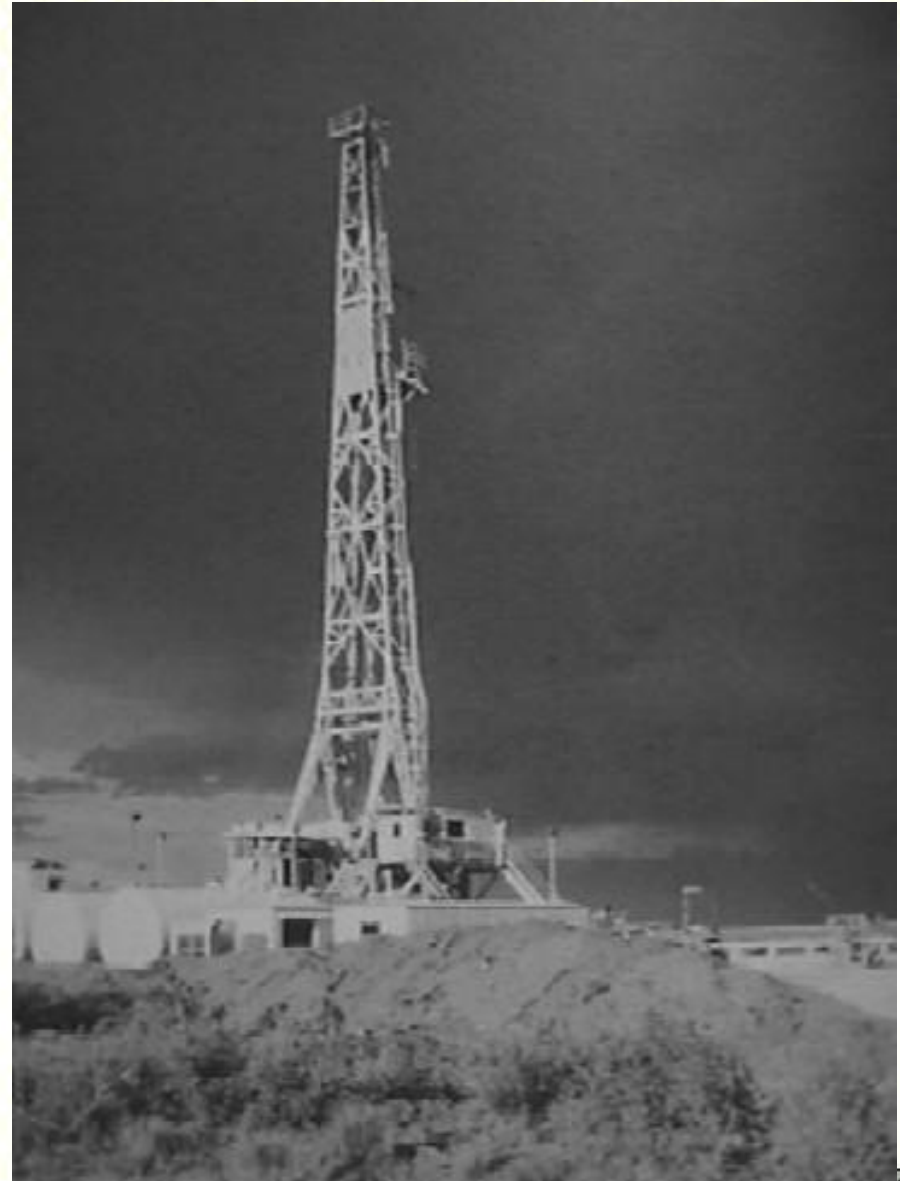
# HAZARD RECOGNITION





**New Mexico based land  
drilling rig.**

**If you are the derrick man  
and weather like this is  
approaching, what do you  
do?**

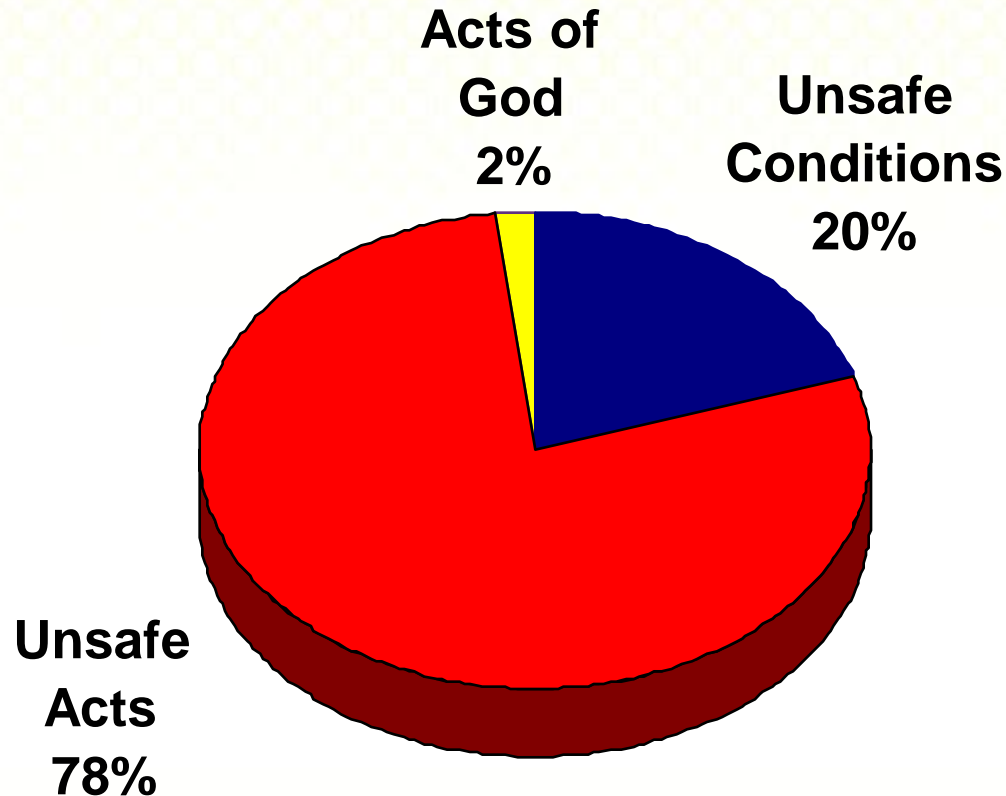


**Hazards are generally grouped into two (2) broad categories:**

- 1. Safety and Injury Hazards**
- 2. Health and Illnesses Hazards.**

**Always remember to include hazards that involve property and Environmental damage.**

# What Causes Injuries?



**■ UNSAFE CONDITIONS ■ UNSAFE ACTS**  
**■ ACTS OF GOD**

# Recognition of Hazards

- Identify unsafe acts and conditions
- Determine the corrective actions
- Implement corrective actions

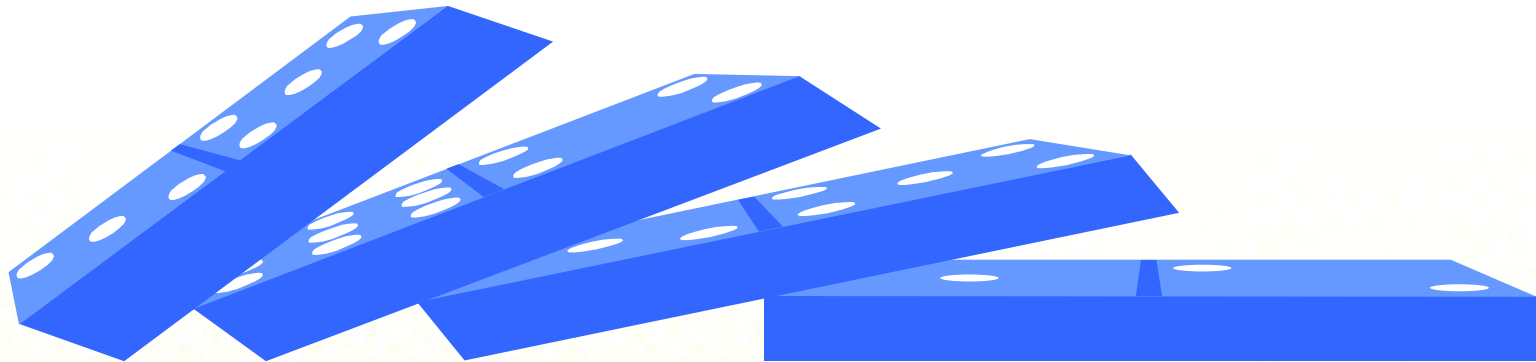


**ACCIDENTS don't just happen...**

**“THEY ARE CAUSED!!!”**

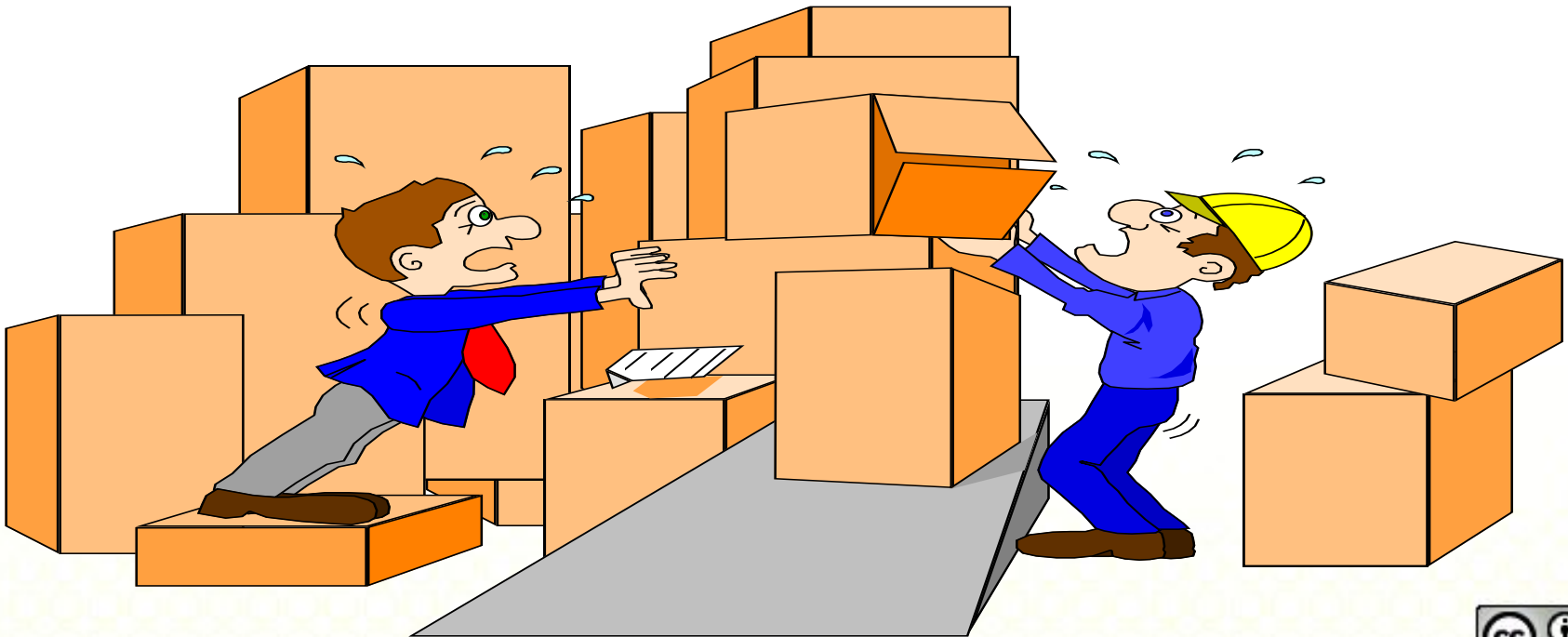
# ACCIDENT SEQUENCE

- **Worker** – *(Present at the work site.)*
- **Faults** – *(Unsafe Act or condition exists)*
- **Cause** – *(Unsafe Act or condition occurs)*
- **Accident** – *(Occurs)*
- **Result** – *(Frequency-Severity)*



# ACCIDENTS ARE CAUSED BY:

- **Unsafe Acts**
- **Unsafe Conditions**





# MOST ACCIDENTS WERE CAUSED BY BOTH:

- UNSAFE ACTS, and
- UNSAFE CONDITIONS



## **UNSAFE CONDITION (Hazard):**

**Is a physical condition or circumstance that permits, or is likely to cause an accident.**

## **UNSAFE ACT (Work Practice):**

**Is any violation of (or departure from) an accepted normal, or correct, procedure or practice.**

# ACCIDENT INVESTIGATION

**Accident:** *An unplanned, undesired event, not necessarily resulting in injury, but damaging to property and/or interrupting the activity in process.*

**Incident:** *An undesired event that may cause personal harm or other damage. (OSHA specifies incidents of a certain severity be recorded.)*

**With proper hazard identification and evaluation, management commitment and support, preventive and corrective procedures, monitoring, evaluation and training, unwanted events can be prevented.**

# ACCIDENT INVESTIGATION

The ultimate purpose of investigations is to **prevent** future incidents.

- Investigations must produce **factual information** leading to corrective actions that prevent or reduce the number of incidents.

- Investigations must be **FACT FINDING** not **FAULT FINDING**

# ACCIDENT INVESTIGATION

The investigation concentrates on the fact surrounding the incident. After the incident is fully investigated, responsibility will be fixed where personal fault has caused the injury.

**No person should be excused from the consequences of their actions.**

Disciplinary actions must not be from the investigating individual or committee, but from management, for violating company policies/procedures.

# ACCIDENT INVESTIGATION

The purpose of an incident investigation is twofold.

- 1. Identify facts about each injury and the incident that produced it and to record those facts.**
- 2. Determine a course of action to eliminate a recurrence.**

The investigation includes the entire sequence of events leading to the injury, as far back in time as the investigator feels is relevant.

# ACCIDENTS

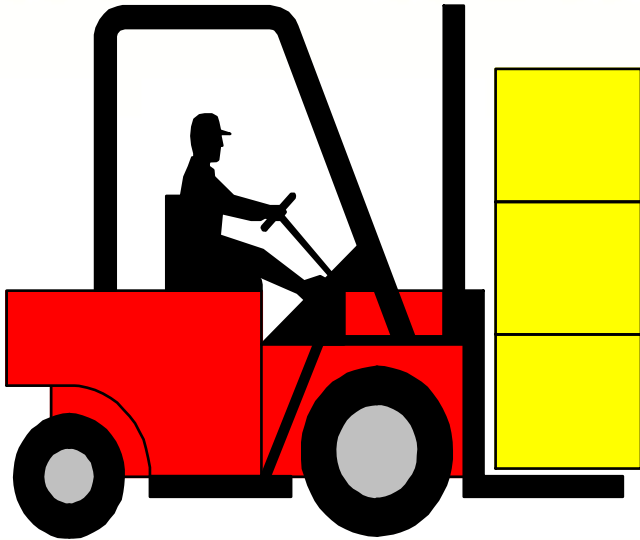


- Injuries
- Illnesses
- Property Damage
- Near-Misses



# ACCIDENTS

An undesired event that could involve:



Workers  
Materials  
Tools  
Equipment  
Environment

# DOCUMENTATION

1. Training Records
2. Maintenance Records
3. Job Descriptions
4. Job Safety Requirements

# Safety Facts

- Over 90% of accidents are avoidable
- Workplaces don't cause accidents; people do
- Safety is everyone's responsibility

# Main Components of an Effective Loss Prevention Program

**Management**

**Safety analysis**

**Record keeping**

**Training**

**Inspection**

**Reporting & investigating**

**Program review**

# Summary

- **Oilfield Safety is no different than Safety anywhere else. Different tools, different equipment, but the same **COMMON SENSE** principles.**
- **Look for Hazards, protect you and your co-worker. Remember, Identify the Hazard, Develop a plan to fix it and then Fix it!**

**Fix Your Hazards = No Accidents**

- **Get everyone interested. Its for you good and theirs.**

# References

- Bill Luther, *Oil Field Safety - Texas Oil and Gas*, APS-FSR, 2010.