



Facilitator Guide



Sector
Hydrocarbon

Sub-Sector
Midstream, Construction & Services

Occupation
Operations Oil & Gas Pipeline

Reference ID: **HYC/Q6304, V2.0, NSQF Level 2**

Excavator- Pipeline



Shri Narendra Modi
Prime Minister of India

“ Skilling is building a better India.
If we have to move India towards
development then Skill Development
should be our mission. ”

Acknowledgments

We would like to express our heartfelt gratitude to everyone, who in their own capacities or on behalf of their esteemed organisations, have contributed in various ways towards the development of this “Facilitator Guide” for Hydrocarbon Sector Skill Council (HSSC). This will go a long way in our endeavour to support the “SKILL INDIA” initiative.

The contents of this book are aligned to the Qualifications Pack - National Occupational Standards (QP NOS).

This Facilitator Guide is dedicated to the passionate trainers who are committed to quality and excellence in the ‘Hydrocarbon’ sector.

About this book

With the renewed focus on Pipeline projects, the demand for Gas Meter Reader is going up. The Gas Meter Reader market will see an increased demand which in turn will lead to a larger number of skilled operators being needed to operate these machines. This in turn will lead to an increased demand for trainers.

This Trainer Guide Book has been designed to enable facilitator to train participants for an operations and maintenance of Gas Meter Reader as Qualification Pack (QP). Each National Occupational Standards (NOS) is covered under separate unit(s).

The books elaborates how facilitators interact with the participants and train them by understanding their needs and explaining all the key concepts pertaining to the job roles. Also it helps the facilitator to complete all the topics to the participants in timely fashion.

Key Learning Objectives for the each NOS is listed at the beginning of each Unit(s). The symbols used in this book are given below.

Symbols Used



Steps



Time



Tips



Notes



Objectives



Do



Ask



Explain



Elaborate



Field Visit



Practical



Lab



Demonstrate



Exercise



Team Activity



Facilitation Notes



Learning Outcomes



Say



Resources



Activity



Summary



Role Play



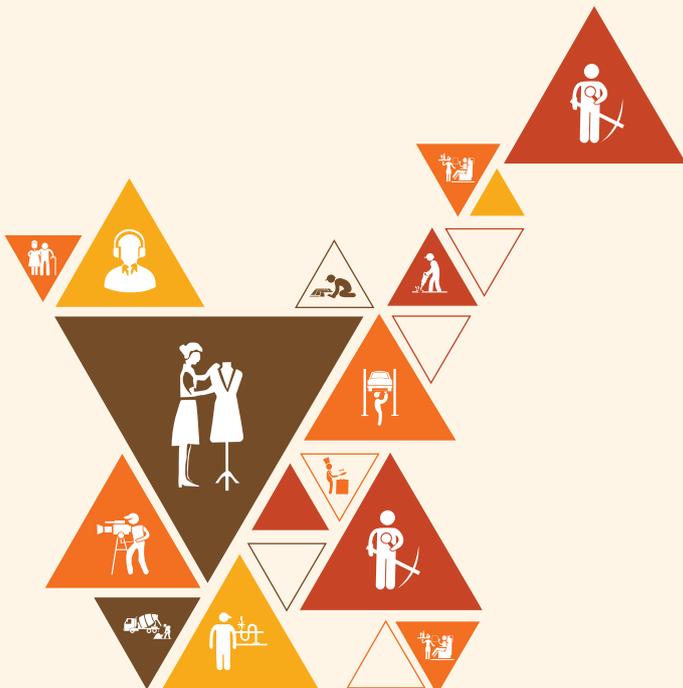
Example



1. Introduction to Hydrocarbon Sector

Unit 1.1 - Hydrocarbon Sector in India

Unit 1.2 - Roles and Responsibilities of a Pipeline Excavator



Key Learning Outcomes

At the end of this module, the trainees will be able to:

1. Describe oil and gas sector and its sub-sectors
2. List the three major segments in the hydrocarbon sector
3. State the functions of upstream, midstream and downstream segments
4. Describe the role of Hydrocarbon Sector Skill Council.
5. List the roles and responsibilities of Excavator - Pipeline

Unit 1.1: Hydrocarbon Sector in India

Unit Objectives

At the end of this unit, students will be able to:

1. Describe about the hydrocarbon sector in India
2. List the three major segments in the hydrocarbon sector
3. Identify about the achievements of hydrocarbon sector
4. Identify and perform about the roles and responsibilities of excavator - pipeline
5. State about the essential skills of Excavator - Pipeline

Resources to be used

- Available objects such as a whiteboard pen, notebook etc.
- Flip chart
- Attendance sheet
- Activities (role plays and games)

Ask

- Ask the participants to share their expectations from the program
- Ask them to tell what they know about the Hydrocarbon sector.

Do

- Introduce yourself to the participants.
- Give an overview of the program to the participants - duration of the program, objective etc.
- Give an overview of the hydrocarbon sector in India.

Explain

- List the three major segments in the hydrocarbon sector.
- State the functions of upstream, midstream and downstream segments
- Describe the role of Hydrocarbon Sector Skill Council
- Describe the responsibilities of a Pipeline Excavator

Notes for Facilitation

- Make sure that each participant understands the session objectives
- Answer questions and explain what seems confusing.
- Assess each participant's work and contributions
- Ensure that participants have mastered the skills listed in the beginning of each session.
- Help participants identify how to apply the skills taught in the course to their work.
- Give guidance and feedback as needed during classroom and practical sessions.

Activity 1 - Pair & Share

Objectives: Strengthen social interaction

Steps in Skill Practice	Time	Resources/ Material Required
<ul style="list-style-type: none"> • Social interaction is always necessary between trainer and trainees and among trainees. • Divide the participants into pairs and ask each pair to share their general information (name, hometown, hobbies etc.) with their partner. • Next, you may ask a question to anyone from each pair to tell about his/her partner. • In this exercise, trainer and the trainees get to know each other. 	1 Hour	Pen, Notebook

Conclusion: Practice social skills

Objectives: Identify the common health issues.

Steps in Skill Practice	Time	Resources/ Material Required
<ul style="list-style-type: none"> • Ask the participants to tell the class their favorite animal and three adjectives to describe that animal. • Next ask participants to write three adjectives on a name tag BEFORE their name (omit the name of the animal). • At last, ask participants to mingle with the crowd, sharing why these adjectives best describe their own personality. <p>EXAMPLES: Loyal, cuddly, offensive, defensive, clever etc.</p>	1 Hour	Pen, Notebook

Conclusion: Practice social interaction skills

Tips

- Go slow with information flow with participants
- Observe each participant's body language
- Keep a positive and supportive approach towards the candidates.
- Idea is to develop warmth and establish interpersonal communication and rapport and team spirit.
- Facilitate informal communication among participants.

Exercise

1. India's oil refining capacity was 249.9 million metric tons (MMT) as of October 1, 2020, making it the second largest refiner in Asia. (T/F)
2. In 2011, India became the fourth largest importer of Liquefied Natural Gas (LNG), after Japan, South Korea, and China. (T/F)
3. Production is another term used to describe the actual drilling and bringing of oil and natural gas to the surface, occasionally referred to as 'upstream'.
4. Oil and natural gas products are even used to make artificial limbs, hearing aids and flame retardant clothing to protect fire-fighters.
 - a. Oil and natural gas
 - b. Crude oil and natural gas
 - c. LPG and natural gas
 - d. Kerosene and heating oil
5. The full of OISD is **Oil Industry Safety Directorate**

Unit 1.2 Roles and Responsibilities of a Pipeline Excavator

Unit Objectives

At the end of this unit, students will be able to:

1. Identify roles and responsibilities of excavator - pipeline
2. Identify essential skills of excavator - pipeline

Resources to be used

- Whiteboard, erasable marker, board cleaner
- Flip chart
- Participant manual
- Projection screen and power point presentations
- Activities (role plays)

Ask

- Ask the participants to share their expectations from the program.

Do

- Give a brief introduction on the job description of Excavator-Pipeline outlining their personal attributes to the participants
- Provide the participants with a List of Roles and Responsibilities of Excavator-Pipeline.
- Talk about the skills and knowledge which are essential to become a Excavator-Pipeline.

Explain

- Describe about the Working Conditions of a Excavator-Pipeline.

Tips

- Go slow with information flow with participants.
- Observe each participant's body language.
- Keep a positive and supportive approach towards the candidates.

Activity: Team Spot

- Separate the class in 2 different teams.
- Each team will be assigned with 3 topics, being: Roles and responsibilities of Excavator-Pipeline
- Ask them to present the given topics team after team, and state examples individually to explain.

Notes for Facilitation

- Revise the important points discussed in this unit.
- Clear the doubts of the students, if any. Encourage them to ask questions.
- Discuss the question with the class and answer their queries satisfactorily.
- Help participants identify how to apply the skills taught in the course to their work
- Praise participants and the group on improving their performance and developing new skills.
- Encourage participants to move through the initial difficulties of learning new skills, by focusing on steps in their progress and the importance of what they are learning to do.

Summary

- The oil and gas industry includes different processes of exploring and extracting, collecting and processing and ultimately distributing the oil and natural gas for use.
- The energy sector has three key areas, upstream, midstream and downstream.
- Upstream involves the search for underwater and underground natural gas fields or crude oil fields.
- Midstream entails the transportation, storage, and processing of oil and gas.
- Downstream means refining crude oil and purifying natural gas.
- The Government is planning to set up around 5,000 compressed biogas (CBG) plants by 2023.
- Crude oil consumption is expected to grow at a CAGR of 3.60% to 500 million tonnes by 2040.
- Excavator-Pipeline is responsible for daily maintenance and safety checks of equipment
- Operating controls to excavate, break, drill, level, compact, gouge out, move, load and spread earth, rock, rubble, soil and other materials.

Exercise

1. Write any three roles and responsibilities of Excavator-Pipeline.

Answer:

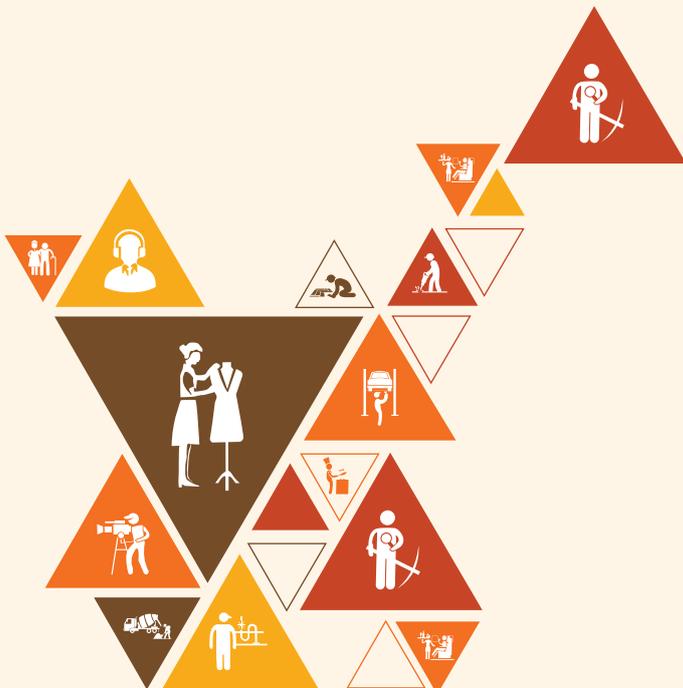
- Effectively and safely operates excavators, utilizing machine specific controls and machine attachments to complete all necessary tasks related to pipeline construction. This includes



2 Perform Excavation Work for Laying Pipeline

Unit 2.1 - Introduction to Natural Gas

Unit 2.2 - Maintain safety during excavation



HYC/N6307

Key Learning Outcomes

At the end of this module, the trainees will be able to:

1. Carryout excavation work
2. Maintain safety during excavation work

Unit 2.1: Introduction to Natural Gas

Unit Objectives

At the end of this unit, students will be able to:

1. Define excavation
2. Identify different types of excavation equipment
3. Prepare for excavation work
4. Illustrate excavation methods
5. Define trench excavation
6. Identify about the work procedure of excavation
7. Illustrate the installation process of Pipeline

Resources

- Whiteboard, erasable marker, board cleaner
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

Say

- What is Excavator
- Basic process of excavator
- Excavator Material Type
- Excavation Equipment.

Explain

- Describe Excavation and its process
- Identify the different types of materials of excavation
- Excavation Equipments for the operation
- Prepare for excavation work
- Identify and perform the excavation methods

- Trench Excavation and shape of the trench
- Trench Excavation Methods
- Work procedure of the excavation
- Perform the pipeline installation

Activity

- Have trainees divided into groups and ask them to choose topic from the given topics.
- Excavation and its process, Excavation Material Types, Excavation Equipment, Preparation of Excavation Work, Different methods of Excavation, Trench Excavation & different shape of the trench, Trench Excavation Methods, Work procedure of Excavation, Pipeline Installation.
- Now ask each group to explain working of any of the following system given above.
- Instruct other groups to create any 3 or more questions while the presentation is happening.
- At the end, when all the groups have presented their topics, each group will present their questions prepared from other group's presentation.
- Now it is the job of trainer to correct any mistakes in presentation or questions-answer round, and clear trainees' doubts.
- Once correction round is complete announce the winner for presentation and question answer round.

Notes for Facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

Exercise

1. formed from the remains of dead organisms that existed millions of years ago in a marine environment.
 - a. Natural Gas
 - b. Crude Oil
 - c. Gasoline
 - d. Hydrocarbon

Unit 2.2 Maintain safety during excavation

Unit Objectives

At the end of this unit, students will be able to:

1. Identify about the safety precautions in excavation
2. Identify about the personal protective equipment
3. Identify about the safety signs

Resources

- Whiteboard, erasable marker, board cleaner
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

Do

- Ask participants to share their views on ways to keep people safe.
- Give participants some time to think
- Brainstorm on the safety during the excavation process.
- Write down all the responses of participants on the board.
- Discuss how PPE kit is essential to wear during excavation process
- Give an overview of safety signs at the workplace.

Explain

- Describe the safety precautions in excavation.
- Do's & Don'ts in the safety precautions
- Different type of Personal Protective Equipments while preparing for the excavation
- Identify route planning and optimization for gas distribution
- Identify and Enlist the safety signs used at the workplace.

Activity

- Divide the class into 4 or 6 groups of equal number of trainees and ask each group to choose their contender group. (No team will select same group)
- Now each group will assign topic to each of their choice (Limited to the chapter)
- Once all the groups have their topics, each group will be asked to prepare any 5 important points related to that topic. (Give 10-15 min time to each group for the task)
- Now when all groups are prepared with their points they will share their points with the team who assigned them the topic
- Now this team will cross check their points and grade them on the basis of each point. (Grading will be done out of 5, if correct full points otherwise 0).
- The checking team will also explain at the end why they have given zero, if given
- At the end the team with maximum marks will be announced as star team.

Notes for Facilitation

- Review the objectives of the workshop.
- Give relevant information to participants and go slow in transferring it
- Clear the doubts of the students, if any. Encourage them to ask questions.
- Revise the important points discussed in this unit.
- Observe each participant's body language
- Encourage participation
- Conduct a simple test at the end of the topic to check the understanding of each topic.

Summary

- Excavation work involves the removal of soil or a mixture of soil and rock, and even some of the most experienced workers have been trapped, buried and injured in an excavation due to:
- Collapse of the sides or by external material falling in to the excavation or workers falling into the excavation.
- Unsafe access and insufficient means of escape in case of flooding.
- Vehicles driven into or too close to the edge of an excavation, particularly while reversing, causing the sides to collapse.
- Asphyxiation or poisoning caused by fumes heavier than air entering the excavation, e.g. exhaust fumes from diesel and petrol engines.
- Due to Insects, Leeches, Vermins, Snakes and Poisons plant present in soil.
- Avoiding use of personal safety equipments and not providing fence and guards and warning signals.
- Proper lighting arrangement and warning signal and boards should be displayed.

- Safety helmets shall be worn by all persons entering trench where hazards from falling stones, timber or other materials exist.
- Complete information on the underground structures (such as water pipelines, sewers, gas mains, electrical conduit system and other civic facilities) should be taken
- Personal protective equipment (PPE) is a clothing or equipment worn by workers to protect them from fire, exposure to toxic chemicals and direct impact. PPE should only be used when engineering designs and operating or maintenance practices do not provide a sufficiently safe work environment.
- Signs are widely used throughout the process industries to advise people of hazardous conditions and to provide directions as to what actions to take in various situations. It should, however, be remembered that “Red Lights Don’t Stop Cars—Brakes Stop Cars”; it is always best to engineer a solution to a hazard than to warn people about that hazard.

Exercise

Fill in the blanks

1. Excavations shall have at least one ladder per **15 m** of length in case of hazardous work and per **30 m** of length in case of less hazardous works.
2. Full form of the SCBA?

Self-Contained Breathing Apparatus

3. Prohibition sign mean “You must not” or “Do not do. . .,” or “Stop.”
4. Identify the following picture and name it

Mandatory Sign



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<https://youtu.be/nC9c3D3VknM>

Typical Stages of Pipeline Construction

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<https://youtu.be/Eqr3KobUqsk>

Excavations In Construction Soil Classification

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<https://youtu.be/cnmZ5jkcSCU>

Trencher in Action

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<https://youtu.be/cl8BBoCV7gU>

Horizontal Direction Drilling

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<https://youtu.be/-ZYb1cGQ-mw>

Pipeline Construction Process

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<https://youtu.be/zl6dGZY59r0>

Types of Excavation Equipments in Construction

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<https://youtu.be/CI7kENjXv20>

Massive Trenchers on Gas Pipeline

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<https://youtu.be/0QYpYWijb9E>

Excavation Safety Training

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<https://youtu.be/pP046HTKjkU>

Safety Toolbox Talks: Trenching and Excavation Safety

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<https://youtu.be/kUqBUJEqwKA>

Trenching: Prevention Video: Excavations in Construction

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<https://youtu.be/miPagtqT0IQ>

Union Gas Pipeline Installation

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<https://youtu.be/p6IryUsdpZE>

Excavation Safety

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<https://youtu.be/3vNRIW9p374>

Excavation Safety in Hindi

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<https://youtu.be/-Exp-0b4Wv0>

Excavation Safety

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<https://youtu.be/QEB7wE-YFXg>

Personal protective equipment

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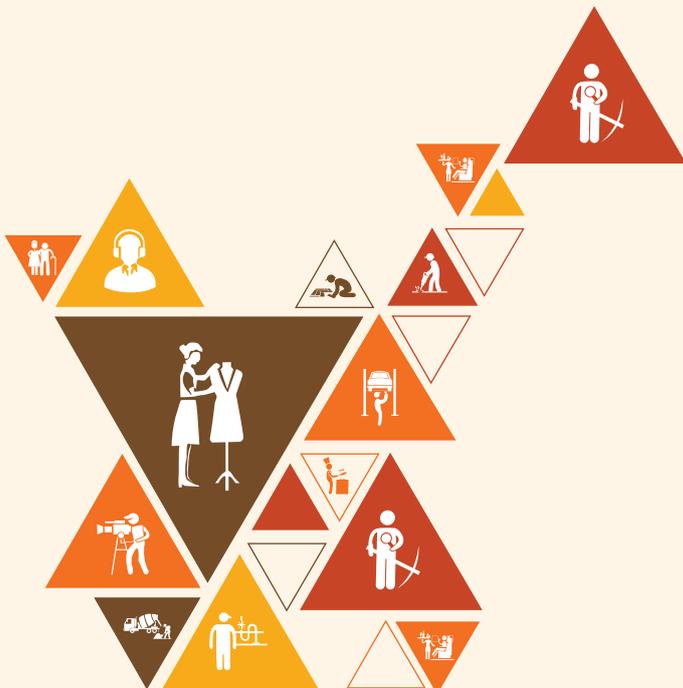
<https://youtu.be/2V2FFQUfxj0>

Types of safety signs and symbols



3 Work Effectively in a Team

Unit 3.1 - Work Effectively in a Team



HYC/N9301

Key Learning Outcomes

At the end of this module, the trainees will be able to:

1. Discuss the communication skills
2. Define the teamwork and communication in handling patient

3.1 Work Effectively in a Team

Unit Objectives

At the end of this unit, students will be able to:

1. Identify importance of effective communication.
2. List out essential skills required for effective communication.
3. Identify barriers to effective communication.
4. Define how to work effectively in team.

Resources to be used

- Whiteboard, erasable marker, board cleaner
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

Do

- Greet and welcome the participants to the next session of the program.
- Before starting the session ask them if they have any doubts pertaining to the previous unit.
- Acknowledge their responses and clear their doubts if any.
- Tell them they are going to learn about Effective Communication and Teamwork.

Ask

- What is effective communication?
- How do you communicate with supervisor?
- What is the importance of achieving goals in the workplace?

Discuss

- Discuss about the characteristics of effective communication.
- Effective Communication Skills
- Barriers to Effective Communication

- Barriers Involving People's Background
- five important aspects to remember when communicating with your supervisor.
- Achieve Goals in the Workplace
- How to accomplish goals
- Working Effectively in a Team

Activity



- Divide the class into 4 or 6 groups of equal number of trainees and ask each group to choose their contender group. (No team will select same group)
- Now each group will assign topic to each of their choice (Limited to the chapter)
- Once all the groups have their topics, each group will be asked to prepare any 5 important points related to that topic. (Give 10-15 min time to each group for the task)
- Now when all groups are prepared with their points they will share their points with the team who assigned them the topic
- Now this team will cross check their points and grade them on the basis of each point. (Grading will be done out of 5, if correct full points otherwise 0).
- The checking team will also explain at the end why they have given zero, if given
- At the end the team with maximum marks will be announced as star team.

Notes for Facilitation



- Explain the learning objectives
- Encourage and guide participants to think critically
- Listen to the participants' comments, questions, and feedback
- Help participants with observations and analysis
- Help participants arrive at appropriate conclusions
- Encourage participants to contribute to the discussion
- Help participants to reach an appropriate consensus
- Help identify opportunities and potentials
- Summarize the discussion or ask others to do so

Summary

- Effective communication is a process of exchanging ideas, thoughts, knowledge and information such that the purpose or intention is fulfilled in the best possible manner.
- Listening and understanding is the most crucial skill in a person is he must be a good, alert and patient listener.
- The effective communication certain characteristics such as clear, correct, precise, complete, and reliable message.
- Non-verbal communication includes, gestures, facial expressions, eye-contact, postures, etc.
- Effective communication is always a two-way process and providing feedback is an essential part of it.
- Certain obstacles sometimes hinder the process of communication, language barriers, ambiguity, overuse of abstractions, information overload.
- Physiological Barriers are the physical disability of the people involved. Some of these are hearing impairment, poor eyesight, stammering, etc.
- Goal setting gives direction and help with time management.
- SMART goals are a methodology for setting goals that makes them easier to track and accomplish.
- Working effectively in a team can lead to more effective and innovative solutions at workplace.

Exercise

1. The clear exchange of ideas and information is _____.
 - a) Listening
 - b) Communication**
 - c) Sympathy
 - d) Social isolation
2. The characteristics of communication when the sender must be sure from his end that whatever he is conveying is right by his knowledge is called _____.
 - a) Correct message
 - b) Complete message
 - c) Reliability
 - d) Sender's Courtesy**
3. Which type of barriers to effective communication is the physical disability of the people to communicate effectively?
 - a) Noise**
 - b) Jumping to Conclusions
 - c) Physical Barriers
 - d) Emotional Barriers

4. SMART goals are a methodology for setting goals that makes them easier to track and accomplish. What does S stand for in SMART?
- a) Sales
 - b) Specific**
 - c) Smart
 - d) Seamless
5. _____ as a team is a great way to come up with a range of new and exciting ideas.
- a) Reflection
 - b) Staying positive
 - c) Brainstorming**
 - d) Communication

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<https://youtu.be/EDMY39JE1sY>

5 steps to manage conflict between team members

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<https://youtu.be/9MO1aY1xC80>

Motivation - leader and teamwork!

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<https://youtu.be/6fbE52YDEjU>

Team work can make the dream work

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https://youtu.be/H_vOfqIpD60

Why team building is important

Key Learning Outcomes

At the end of this module, the trainees will be able to:

1. Practice health and safety measures
2. Follow fire safety procedures
3. Follow emergencies, rescue and first-aid procedures

Unit 4.1 Maintaining a Safe Working Environment

Unit Objectives

At the end of this unit, students will be able to:

1. Identify the importance of promoting a safe working environment
2. Identify how to reduce risk
3. Define hospital electrical safety measures
4. Define protective clothing/equipment
5. Explain the procedure of dealing with medical emergency
6. Identify the basic fire awareness
7. Explain the First Aid process
8. Identify common safety signs, displayed in various areas
9. Explain the Cardiopulmonary Resuscitation (CPR) process

Resources to be used

- Whiteboard, erasable marker, board cleaner
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

Do

- Greet and welcome the participants to the next session of the program.
- Before starting the session ask them if they have any doubts pertaining to the previous unit.
- Acknowledge their responses and clear their doubts if any.
- Tell them they are going to learn about health & safety measure against fire.

Explain

- Give the participants a detailed overview of health & safety requirements
- Talk about the Housekeeping at the workplace
- Discuss how to reduce the risk at the workplace

- Talk about near misses and dangerous occurrences
- Describe the categories of the incidents
- Elaborate the ergonomics
- Describe the occupational safety and Health risks
- Identify and explain the risk management process
- List down the medical emergencies
- Basic Fire Awareness
- Classification of Fire
- Fire Hazards, Risk and Controls Relating to Hydrocarbons
- Identify the ways to perform first aid related to fire injury.
- Perform CPR.

Activity



1. Ask the class about what they know about PPE and what are the types of PPE used in **Hydrocarbon Sector**
 - Divide the class into pairs of two and ask each student to choose any PPE and Represent themselves as that PPE, say, Safety Glasses, Foot protection, Different types of gloves, Head protection.
 - Now ask each student to explain function of his/her partners' PPE and their benefits to whole class.
 - Repeat the process for whole class and correct any mistakes at the end of activity.
2. Divide the class into three groups and give one topic to each group
 - Ask each group to prepare a short presentation on the given topic and present it in front of the class
 - Topics of presentation: Fire and explosion strategy
 - Only one group will give presentation at one time while other two groups will watch the first group perform.
 - The trainer may ask participants from other groups to ask questions or queries with the presenting group
 - The marks will be given at the end when all the presentations will be completed.
 - The criteria of evaluating presentation can be – knowledge of the topic, number of the questions answered, coverage content of the topic presented, confidence during presentation
 - The trainer may ask participants to set the ground rules for presentation and evaluating criteria
3. Randomly call participants one by one and ask them to list out steps for Performing CPR

Notes for Facilitation

- Explain the learning objectives
- Encourage and guide participants to think critically
- Listen to the participants' comments, questions, and feedback
- Help participants with observations and analysis
- Help participants arrive at appropriate conclusions
- Encourage participants to contribute to the discussion
- Help participants to reach an appropriate consensus
- Help identify opportunities and potentials
- Summarize the discussion or ask others to do so

Summary

- Health is a “state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.
- Safety is the state of being ‘safe’, the condition of being protected from harm or other non-desirable outcomes.
- Good housekeeping is central to all types of operational, maintenance, and safety work. The quality of housekeeping also provides auditors and other outsiders with an opportunity to provide a quick evaluation of the overall level of operational excellence in a facility.
- Reducing the risk at the workplace.
- Whether the incident is classed as an accident, a near miss or a dangerous occurrence, the investigation should carry the same degree of importance, and the findings will be as useful in any event in preventing a recurrence.
- Workers in Oil and Gas industry are generally susceptible to following agents which lead to various health and illnesses hazards: chemical hazards (toxic, corrosive, carcinogens, asphyxiates, irritant and sensitizing substances); physical hazards (noise, vibration, radiations, extreme temperature); biological hazards (virus, parasites, bacteria); ergonomic hazards (manual handling activities, repetitive motions, awkward postures); and psychosocial hazards (overwork, odd working hours, isolated sites, violence).
- Ergonomics is the science of studying people at work and of their working environment. Ergonomics seeks to make a better match between workers' physical capabilities and limitations and workplace conditions and activities. In practice, most ergonomics programs focus on preventing injury and illness by controlling or eliminating work-related musculoskeletal disorders (MSDs).
- The aim of occupational safety and health risk management is to identify and assess safety and health hazards existing at the workplace and to define appropriate control and retrieval steps. Risk management is crucial for preventing work related injury and illness.
- Different classes of fire are, class A, B,C, D, E, K

- Different types of fire extinguishers, water extinguisher, dry chemical powder, foam type extinguisher, carbon dioxide extinguisher, special dry powder.
- The fire extinguishers are used by following PASS technique.
- Flammable materials should be stored and used in a way that prevents exposure to ignition sources.
- Personal protective equipment (PPE) is a clothing or equipment worn by workers to protect them from various hazards
- Fire extinguishers are designed to tackle specific types of fire.
- A permit to work (PTW) system is a document which sets out the work to be done, precautions to be taken for all foreseeable hazards involved & records the state of equipment when handed over while it does not itself make the job safe.
- Hazardous areas are classified into zones
- Zone 0 is an area in which an explosive gas atmosphere is present continuously or for long periods of time.
- Zone 1 is an area in which an explosive gas atmosphere is likely to occur in normal operation.
- Zone 2 is an area in which an explosive gas atmosphere is not likely to occur in normal operation but, if it does occur, will only exist for a short period of time.
- Evacuation can be seen as having four distinct phases, alert time, pre-movement time, travel time, flow time
- The key to ensuring that the behavioural problems of people in an emergency situation are minimised is to develop a comprehensive emergency plan, which involves detection, warning signals, layout of escape routes, emergency instructions
- Mandatory signs indicate steps people must take to comply with fire regulations, which are designed to safeguard occupants.
- Warning signs are required to make people aware of the presence of flammable materials.
- An incident response plan (IAP) weighs the risk and benefits of emergency response and fire ground tactics to provide clear direction for effective operations while maximizing the safety of both first responders and people on the scene.
- First aid is the first assistance or treatment given to a casualty or a sick person for any injury or sudden illness before the arrival of an ambulance.
- The first aider should always remember PACT, which is Protect, Assess, Care, Transport triage
- First degree burns recovers by it-self in a few days, Second degree burns are serious but recovers in a few weeks. Third degree burns are very serious and requires skin grafting, Fourth degree burns are extremely serious and requires years with repeated plastic surgery and grafting to recover
- Cardiopulmonary resuscitation (CPR) is a lifesaving technique. It aims to keep blood and oxygen flowing through the body when a person's heart and breathing have stopped

Exercise



1. An example of two “Class B” fuels would be:
 - a. Cardboard, newspapers
 - b. Lamp, hot plate
 - c. Grease, paint thinner
 - d. None of the above
2. An APW (water extinguisher) is safe to use on an electrical fire. (True/False)
3. Carbon Dioxide extinguishers are designed for which types of fuels?
 - a. Class B and C
 - b. Class A, B and C
 - c. Class A and C
 - d. Class A and B
4. Which type of extinguisher has a hard horn on the end of a flexible hose or metal arm?
 - a. APW (air-pressurized water)
 - b. CO2 (carbon dioxide)
 - c. ABC (dry chemical)
 - d. H2O
5. As a general rule, you should not attempt to fight a fire if it is spreading rapidly.(True/False)
6. ABC fire extinguishers extinguish fire by cooling it down.(True/ False)
7. Water will not extinguish most flammable liquid fires.(True/False)
8. You should always keep an exit or means of escape at your back when trying to fight a fire.
(True/False)
9. The three elements of the fire triangle are:
 - a. Water, a heat source, and fuel
 - b. Oxygen, water, and fuel
 - c. Oxygen, fuel, and a heat source
 - d. Fuel, oxygen, and earth
10. What is starving in extinguishing the fire?
 - a. Adding fuel
 - b. Removal of fuel
 - c. Clearing the hazards
 - d. Stop the supply of oxygen
11. Which of the following is a chemical hazard?
 - a. noise
 - b. vibration
 - c. explosion
 - d. Radiation

12. The P.A.S.S technique must be adopted for extinguishing the fire.
13. A lightning strike is a massive discharge of electricity from the atmosphere, where the electrical charge has built up, to the earth.
14. Any time a liquid is forced against a solid, such as the inside of a pipe, it generates a static charge.
15. 15. What is the main purpose of hazard identification?

Answer: Hazard identification is the first step in risk assessment. The goal is to understand the concentration of toxins, spatial distribution and their movement.

16. The way an individual occupant of a building will behave to a fire danger is complex.
17. How should you open the airway of an unconscious casualty?
 - a. Head tilt and chin lift.
 - b. Jaw thrust.
 - c. Head tilt and jaw thrust.
 - d. Lift the chin.
18. How long would you check to see if an unconscious casualty is breathing normally?
 - a. No more than 10 seconds.
 - b. Approximately 10 seconds.
 - c. Exactly 10 seconds.
 - d. At least 10 seconds.
19. You are a lone first aider and have an unconscious non-breathing adult, what should you do first?
 - a. Start CPR with 30 chest compressions.
 - b. Give five initial rescue breaths.
 - c. Call 911/112 requesting AED (defibrillator) and ambulance.
 - d. Give two initial rescue breaths.
20. Which is the correct ratio of chest compressions to rescue breaths for use in CPR of an adult casualty?
 - a. **2 compressions:** 30 rescue breaths.
 - b. **5 compressions:** 1 rescue breath.
 - c. **15 compressions:** 2 rescue breaths.
 - d. **30 compressions:** 2 rescue breaths.
21. Which test should you use if you suspect that a casualty has had a stroke?
 - a. Face, Arms, Speech, Test.
 - b. Alert, Voice, Pain, Unresponsive.
 - c. Response, Airway, Breathing, Circulation.
 - d. Pulse, Respiratory Rate, Temperature

22. A nosebleed can be stopped by:

- a. Waiting
- b. Pinching briefly the nostrils
- c. Give something cold to drink
- d. put some cotton wool into the nose

23. How do you check for breathing?

- a. Listen
- b. Look for rising chest
- c. Feel with cheek
- d. Look, Listen and Feel

24. Most poisoning take place in the home. (T/F)

25. Second-degree burns are more serious burns that affect the outer layer of skin and the next layer, the dermis. They take longer to heal.

26. Full form of CPR is Cardiopulmonary resuscitation

27. What is the normal heart rate?

- a. 12-20
- b. 15-20
- c. 60-100
- d. 50-80

Notes

Scan the QR codes or click on the link to watch the related videos



<https://youtu.be/xnZZruGjKBA>
Classes of fire

Scan the QR codes or click on the link to watch the related videos



<https://youtu.be/XmPnXzQVLQg>
Clean agent fire suppression system

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<https://youtu.be/XmPnXzQVLQg>
Fire extinguishing agents

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<https://youtu.be/aU1P7-Cn72s>
Types of fire and fire extinguishers

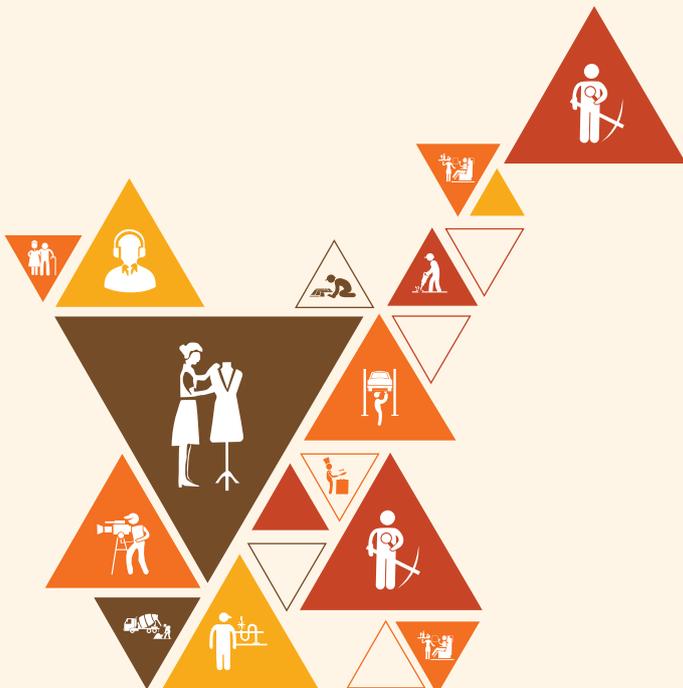
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<https://youtu.be/9igRiyURobE>
How to use a fire extinguisher



5. Employability Skills 30 Hours



DGT/VSQ/N0102

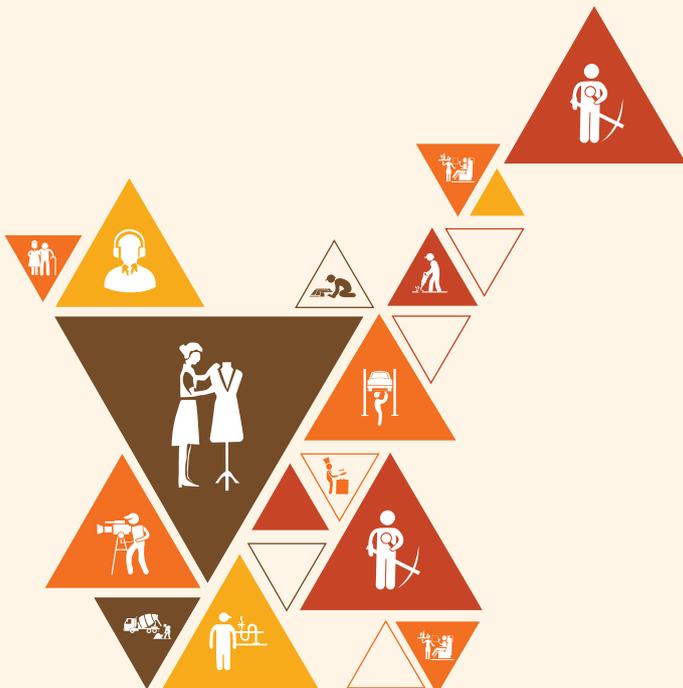
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Employability Skills (<https://eskillindia.org/NewEmployability>)



5. Annexure



HYC/N9302

Sl No.	Module No.	Unit No. and Name	Topic Name	Page No.	URL	QR Code (s)
1	Module 2	Unit 2.1 - Carry out excavation work	2.1.1 Introduction to excavation	17	https://youtu.be/nC9c3D3VknM	 <p>Typical Stages of Pipeline Construction</p>
2	Module 2	Unit 2.1 - Carry out excavation work	2.1.1 Introduction to excavation	17	https://youtu.be/ZYb1cGQ-mw	 <p>Pipeline Construction Process</p>
3	Module 2	Unit 2.1 - Carry out excavation work	2.1.1.1 Material Type	17	https://youtu.be/Eqr3KobUqsk	 <p>Excavations In Construction Soil Classification</p>
4	Module 2	Unit 2.1 - Carry out excavation work	2.1.2 Excavation equipment	17	https://youtu.be/zl6dGZY59r0	 <p>Types of Excavation Equipments in Construction</p>

Sl No.	Module No.	Unit No. and Name	Topic Name	Page No.	URL	QR Code (s)
5	Module 2	Unit 2.1 - Carry out excavation work	2.1.2 Excavation equipment	17	https://youtu.be/cnmZ5jkcSCU	 <p>Trencher in Action</p>
6	Module 2	Unit 2.1 - Carry out excavation work	2.1.4 Excavation Methods	17	https://youtu.be/CI7kENjXv20	 <p>Massive Trenchers on Gas Pipeline</p>
7	Module 2	Unit 2.1 - Carry out excavation work	2.1.4 Excavation Methods	17	https://youtu.be/cl8BBoCV7gU	 <p>Horizontal Direction Drilling</p>
8	Module 2	Unit 2.1 - Carry out excavation work	2.1.4 Excavation Methods	17	https://youtu.be/0QYpYWijb9E	 <p>Excavation Safety Training</p>
9	Module 2	Unit 2.1 - Carry out excavation work	2.1.5 Trench Excavation	18	https://youtu.be/pP046HTKjkU	 <p>Safety Toolbox Talks: Trenching and Excavation Safety</p>

Sl No.	Module No.	Unit No. and Name	Topic Name	Page No.	URL	QR Code (s)
10	Module 2	Unit 2.1 - Carry out excavation work	2.1.6 Work Procedure of Excavation	18	https://youtu.be/kUqBUJEqwKA	 <p>Trenching: Prevention Video: Excavations in Construction</p>
11	Module 2	Unit 2.1 - Carry out excavation work	2.1.7 Pipeline Installation	18	https://youtu.be/miPagtqT0IQ	 <p>Union Gas Pipeline Installation</p>
12	Module 2	Unit 2.2 - Maintain safety during excavation	2.2.1 Safety Precautions in Excavation	18	https://youtu.be/p6lryUsdpZE	 <p>Excavation Safety</p>
13	Module 2	Unit 2.2 - Maintain safety during excavation	2.2.1 Safety Precautions in Excavation	18	https://youtu.be/3vNRIW9p374	 <p>Excavation Safety in Hindi</p>
14	Module 2	Unit 2.2 - Maintain safety during excavation	2.2.1 Safety Precautions in Excavation	18	https://youtu.be/Exp-0b4Wv0	 <p>Excavation Safety</p>

Sl No.	Module No.	Unit No. and Name	Topic Name	Page No.	URL	QR Code (s)
15	Module 2	Unit 2.2 - Maintain safety during excavation	2.2.2 Use of personal protective equipments	18	https://youtu.be/QEB7wE-YFXg	 <p>Personal protective equipment</p>
16	Module 2	Unit 2.2 - Maintain safety during excavation	2.2.3 Signs	18	https://youtu.be/2V2FFQUfxj0	 <p>Types of safety signs and symbols</p>
17	Module 3	Unit 3.1 - Working effectively in a team	3.1.1 Conflict management	24	https://youtu.be/EDMY39JE1sY	 <p>5 steps to manage conflict between team members</p>
18	Module 3	Unit 3.1 - Working effectively in a team	3.1.3 Achieve Goals in the Workplace	24	https://youtu.be/9MO1aY1xC80	 <p>Motivation - leader and teamwork!</p>
19	Module 3	Unit 3.1 - Working effectively in a team	3.1.4 Working Effectively in a Team	24	https://youtu.be/6fbE52YDEjU	 <p>Team work can make the dream work</p>

Sl No.	Module No.	Unit No. and Name	Topic Name	Page No.	URL	QR Code (s)
20	Module 3	Unit 3.1 - Working effectively in a team	3.1.4 Work Effectively in a Team	24	https://youtu.be/H_vOfqIpD60	 <p>Why team building is important</p>
21	Module 3	Unit 3.1 - Working effectively in a team	3.1.4 Work Effectively in a Team	25	https://youtu.be/WTa4wvFVX_Y	 <p>How to manage conflict in a team</p>
22	Module 3	Unit 3.1 - Working effectively in a team	3.1.4 Work Effectively in a Team	25	https://youtu.be/fUXdrI9ch_Q	 <p>Good Teamwork and Bad Teamwork</p>
23	Module 4	Unit 4.1 - Maintain health, safety and security procedures	4.1.11 Types of fire	36	https://youtu.be/xnZZruGjKBA	 <p>Classes of fire</p>
24	Module 4	Unit 4.1 - Maintain health, safety and security procedures	4.1.11 Techniques of using the different fire extinguishers	36	https://youtu.be/aU1P7-Cn72s	 <p>Types of fire and fire extinguishers</p>

Sl No.	Module No.	Unit No. and Name	Topic Name	Page No.	URL	QR Code (s)
25	Module 4	Unit 4.1 - Maintain health, safety and security procedures	4.1.11 Techniques of using the different fire extinguishers	36	https://youtu.be/XmPnXzQVLQg	 <p>Clean agent fire suppression system</p>
26	Module 4	Unit 4.1 - Maintain health, safety and security procedures	4.1.11 Different methods of extinguishing fire	36	https://youtu.be/9igRiyURobE	 <p>How to use a fire extinguisher</p>
27	Module 4	Unit 4.1 - Maintain health, safety and security procedures	4.1.11 Techniques of using the different fire extinguishers	36	https://youtu.be/3nakKzM66hk	 <p>Fire extinguishing agents</p>



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