

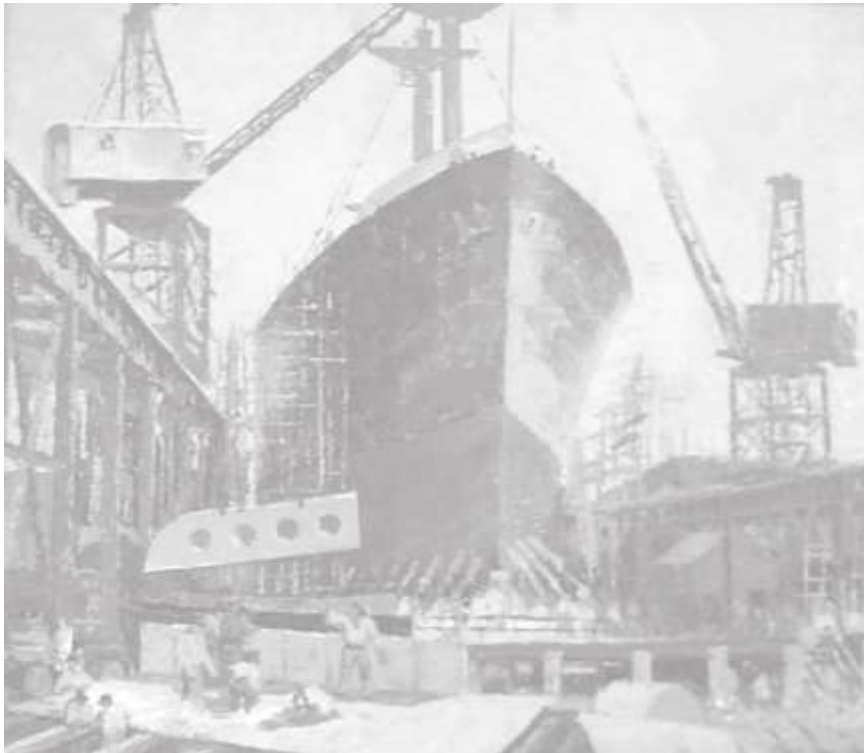


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SSIC – Painter Trade

Learner Guide





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LG - Shipyard Safety Instruction Course – Painters Trade

Information about the course

Course Objective:

The aim of the course is to provide Learners with the requisite WAH knowledge to manage work-at-height activities, so that work can be carried out safely. At the end of the course, the Learner shall be able to explain:

- Hazards of Spray painting / manual painting works.
- Protection against harmful paint vapours.
- Importance of permit to work systems.
- To prevent fire and explosions due to spray painting works.
- To ensure safety precautions while painting in confined spaces.
- First aid and fire fighting procedures.
- To respond in case of emergency.

Training format:

Day/ Evening Class

Assessment:

1. Learners need to take assessment at the end of course
2. Written Test (WT)

Training Methodologies

1. Learners are required to take part in group discussion and presentation
2. Training methodologies consists of :
 - Lecture with Q&A and sharing of workplace practices
 - Case studies
 - Group discussion
 - Videos and other e-resources and instructional media

Attendance Requirement: Min 100%

Certification:

Upon successful completion of the course of training and pass the assessments, learners will be awarded the certificate of "SSIC Painter" Certificate

Duty of Care

- Above all, we are dedicated to ensuring your Health, Safety and Wellbeing.
- Risk management has been applied to all general and practical activities.
- All staff are First Aid & Emergency Trained.
- All Equipment is fully inspected.
- All activities are voluntary. If you feel unwell, unfit, or unsure just tell us.
- If any accident occurs, tell us.
- No tolerance policy for intentionally endangering the health or safety of other students.

Learning Objective 1

Introduction to painter trade

Learning Objective

At the end of the Topic, learner is able to identify and explain:

- Types of Paints
- Methods of Painting
- Types of Hazards in the Painting Trade

Types of paint

- Solvent Based Paints
- Water Based Paints
- Alkyd Resin Paints
- Latex Paints
- Primers
- Textured Paints
- Drip less Paints
- Rubber Based Paints



Methods of Painting



Brush or roller painting



Spray Painting

Types of Hazards in Painting Trade

- Long Term Health Hazards due to inhalation of toxic paints.
- Paint injection due to high-pressure equipment.
- Static electricity as a source of ignition produced while working in protective clothing and boots.
- Chemical absorption due to skin exposure to toxic paints and solvents.
- Static electricity as a source of ignition produced while working in gloves.
- Electrical Hazards.
- Fire and Explosion Hazards.
- Physical Hazards such as falling from height



Learning Objective 2

Fire And Explosion Hazards And Safety Measures

Learning Objective

At the end of the Topic, learner is able to identify and explain:

- Fire and explosion hazards & safety measures
- Chemistry of fire – Fire triangle
- Characteristics of flammable liquids and vapors.
- Volatility
- Flash point of a liquid
- Flammable range/Lower explosive limit/Upper explosive limit.
- Densities of vapors and gases.
- Material Safety Data Sheets (MSDS):
- Fire and explosion hazards in painting work.
- Safety measures for preventing fires; and explosions in painting works.

Fire Triangle

If any one of these elements is not present (or is not present in a proper proportion) the fire or explosion will not occur.

- Any combustible material – Solid, Liquid or Gas.
- Sufficient oxygen must be present in the atmosphere surrounding the fuel for fire to burn.
- Ignition source – such as hot work.

Common Ignition Sources

- Hot-work;
- Lighted cigarette butt;
- Static electricity;
- Lighted match, spark igniter;
- Non-flameproof lighting.

Common fuel source

- Storage of acetylene gas cylinders.
- Storage and Use of flammable solvents such as thinner etc..
- Diesel Storage in Bulk.
- Storage of Engine oils and Hydraulic Oils.
- Poor housekeeping.
- Leakage of acetylene gas.
- Leakage and spillage of diesel oil from diesel tank.
- Leakage and spillage of hydraulic oil and engine oil.
- Leakage of oil from machine.
- Accumulation of thinner vapours during cleaning.
- Leakage of thinner from thinner container





Characteristics of flammable liquids and vapours.

Properties of Flammable Liquids

Flashpoint

Defines as the minimum temperature required for the flammable liquid to produce sufficient vapour to form a flammable mixture; With air and will produce a fire when an ignition source is applied at the surface of the liquid.

Volatility

Defined as the ability of a liquid to vaporize. The volatility of a liquid will increase as heat is applied to the liquid.

Density

Defined as the mass of the material per unit volume. It is usually measured in kilograms per cubic meter.

Gas

It is a substance whose boiling point is below normal ambient temperature at atmospheric pressure.

Vapour

It is gaseous state of a substance which normally exists as a solid or liquid at normal condition.

Units of Measurement of Gases / Vapours

Due to significance of the result, the concentrations of the components of the confined space atmosphere, including natural and contaminants, are expressed in variety of units- (%), ppm, mg/m, % of LEL.

These units are inter-related and can be converted from one another.

% by Volume

It is the volume of gas to the total volume occupied by all the components of a mixture of gases present in the space at the same pressure and temperature. The ratio is expressed as a percentage (out of 100).

This is often used where the volume has a greater significance, for example oxygen content, for explosive gas mixtures.

Mass Concentration (mg/m)

This unit is commonly used in medical and metallurgical industries in situation where the chemical is either in liquid or solid state at room temperature. To convert mg/m to percent or ppm, the ideal gas law must be used.

The Ideal gas law states that one gram mole of molecules will occupy 24.5 litres of volume at 25⁰ c and at 760 mm of mercury.

If the mixture is not under these condition then the correct volume must be evaluated and used.



Flammable Limits and Range

Flammable limits indicate the minimum and maximum concentrations in the air of flammable vapour at which ignition can occur.

There are two types of flammable limits:

- Lower Explosive Limit (LEL)
- Upper Explosive Limit (UEL)

Flammable range is the range of flammable vapour and air mixture between the LEL and the UEL.

Concentrations below the Lower Explosive Limit (LEL), are referred to as 'too lean' to burn and concentrations above the Upper Explosive Limit are referred to as 'too rich' to burn.

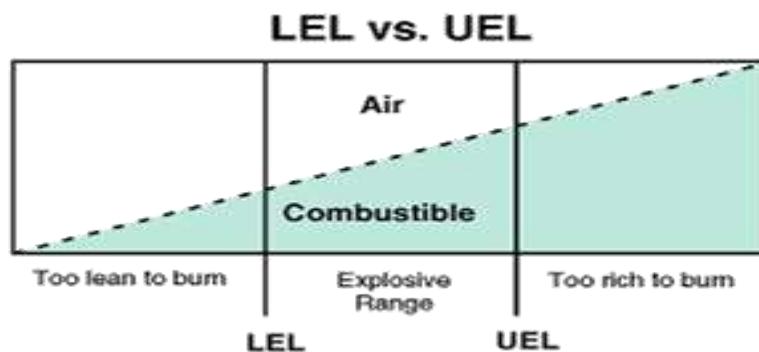
Lower Flammability Limit

Lowest concentration of gas or vapour in % by volume in air that burns; or explodes if an ignition source is present.

If the gas-air mixture is below the LEL for a gas, ignition cannot occur because the mixture is too "lean" to burn.

Upper Flammability Limit

Highest concentration of gas or vapour in % by volume in air that burns or explodes if an ignition source is present. Ignition will not occur if the gas-mixture is above the UEL because the mixture is too "rich".



Safety Data Sheets (SDS)

Provides information on environmental, health and safety hazards of chemicals.
Provides necessary information to work safely with chemicals.



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Where any hazardous substance is used, handled or stored in a factory, occupier must assess the information in SDS and take precautionary measures to ensure safe use of the substance.

SDS shall be made available to all persons who are liable to expose to the substance.

Safety Data Sheets (SDS)

- The identity of the substance;
- The safety and health hazard information pertaining to the substance;
- The composition of and ingredients used in the substance;
- First-aid measures;
- Fire-fighting measures;
- Accidental release measures;
- The precautions to be taken for safe handling and storage;
- The exposure controls and personal protection needed;
- The physical and chemical properties of the substance;
- The stability and reactivity of the substance;
- Toxicological information;
- Ecological information;
- Disposal considerations;
- Transport information;
- Regulatory information: and
- Any other relevant information.



Requirement

- Any seller or agent of any seller who fails to provide a safety data sheet; or
- Any person who provides inaccurate, inadequate; or
- Misleading information in a safety data sheet shall be guilty of an offence; and
- Shall be liable on conviction to a fine not exceeding \$10,000.

Fire and Explosion Hazards

Fire and explosion hazards associated with paint and coating applications depend upon the flashpoint and volatility of the substance.

Lower flashpoint liquids (less than 80° F) present greater hazards and require additional controls

Requirements and Example Solutions

The following control requirements and hazard solutions have been separated into two categories:

- Liquids/substances with flashpoints above 80° F.
- Liquids/substances with flashpoints below 80° F.



Safety Measures for Preventing Fires and Explosions

1. Spray Painting must not be performed in the space or adjacent spaces during Hot work operations.
2. Rags soaked with solvents must be kept in covered metal containers.
3. Paints, thinners, and solvents must be kept in fire-resistant covered containers when not in use.
4. Smoking and open flames must be prohibited in the area

Safety Measures for Preventing Fires and Explosions

5. Arc and spark producing equipment and tools must not be used.
6. Equipment that may generate static electricity (e.g., ventilation systems) must be grounded/bonded to the vessel's structure.
7. Only approved explosion-proof lights must be used.
8. Adequate ventilation must be maintained in storage, mixing, and transfer areas.
9. Frequent tests by a Competent Person must be required during painting operations to determine if air concentrations are below 10 percent of the lower explosive limit (LEL). Suitable fire fighting equipment must be immediately available.
10. Drums and containers of flammable or toxic liquids must be placed in an area where they will not be subject to physical damage.
11. Drums containing flammable or toxic liquids must be surrounded by dikes or pans.
12. Power and lighting cables must be inspected by a person competent to evaluate electrical hazards, and ensure that there are no connections within 50 feet of the painting operation.

When paints and tank coatings are dissolved in highly volatile, flammable solvents with flash points below 80° F, the following additional precautions must be taken:

- If the concentration exceeds 10 percent of the LEL, work must be stopped until the concentration falls below 10 percent of the LEL.
- Ventilation must be continued after painting is completed until the space or compartment is "gas-free."
- Exhaust ducts must discharge clear of working areas and away from sources of possible ignition.
- Periodic tests must be conducted by the Shipyard Competent Person to ensure that the exhausted vapours are not accumulating in other areas within or around the vessel or dry dock.
- Explosion-proof motors, fan blades, and portable air ducts must be non-ferrous.
- All footwear worn during painting operations must be non-sparking.
- PPE must not produce static electrical sparks.
- No matches, lighted cigarettes, cigars, pipes, cigarette lighters, or other ferrous articles are allowed into the work area.



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- “No Smoking” sign shall be displayed near paint storage areas.
- All solvent drums taken into the compartment where painting operations are being performed must be placed on nonferrous surfaces and grounded to the vessel.
- All metallic parts of spray painting equipment must be electrically bonded and the assembly grounded to the vessel to protect against fires due to static electricity.

Learning Objective 3

Airless Spray Painting Hazards And Safety Measures

Learning Objective

At the end of the Topic, learner is able to explain:

- Hazards and safety measure in airless spraying works.

Hazards During Airless Spray Painting

- Falling Objects
- Slip, trip and fall
- Sharp edges
- High Noise Levels
- Leakage and splashing of paints
- Fire and Explosion Hazard
- Falling of persons from height
- Inhalation of Paint Vapours
- Skin contact with paints
- Exposure to high pressure spray
- Exposure to toxic vapours
- Exposure to high pressure spray
- Moving vehicles



Safety Measures During Airless Spray Painting

- Competent MEWP operators.
- Proper housekeeping.
- Proper laying of cables and hoses.
- Barricading and displaying signboards.
- Use of proper Fall Prevention system/PPE.
- Ensure no incompatible work (hot work etc.) nearby.
- No smoking.
- Coordination of incompatible works through VSCC Meetings.
- Use of explosion proof lighting.
- Valid Permit to Work (Entry Permit and Painting Permit).
- Keep finger or body away from spray gun tip and other pinch points.



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- Release the pressure from equipment and hoses.
- Clear all empty paint drums.
- Do housekeeping after completion of work.
- Keep work area clean and dry at all times.
- Ensure that ground is not obstructed by foreign materials.
- Proper securing of materials.
- Ensure that lifting equipment is not overloaded.
- Ensure that painters are trained.
- All equipment must be checked prior use.
- Manual lifting must be within person's lifting capacity.
- Keep unauthorized persons clear from work area.
- Blank off all openings.
- Display the signage "Painting in progress".
- Observe buddy system.

Learning Objective 4

Health Hazards and Preventive Measures

Learning Objective

At the end of the Topic, learner is able to explain:

- Health hazards in painting trade
- Safety measures to eliminate or minimized risk.

Potential Health Hazards

Toxic vapours and mists from paints and paint solvents may present significant health hazards due to inhalation during painting operations.

Respiratory Hazards

Requirements and Example Solutions

- A risk assessment must be conducted to determine the proper selection of respirators.
- The components may be particularly dangerous to workers' health and requires special precautions.
- Many of these paints cause respiratory, skin sensitization and allergic reactions, which may be life threatening.
- Respirators must be used.

Work Environment & Temperature-Related Hazards

- Environmental conditions such as temperature, humidity, and air movement within the work area may cause hazards.
- A combination of PPE use, heat-producing equipment, work activity, and environmental conditions can cause temperature-related illnesses.

Heat-Related Illnesses Include:





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- Heat Stress
- Heat Stroke
- Heat Cramps
- Dehydration

Cold-Related Illnesses Include:

- Frostbite
- Hypothermia

Heat Exhaustion and Heat Stroke

Heat exhaustion is a heat-related illness that can occur after you've been exposed to high temperatures for several hours and have become dehydrated.

Symptoms of Heat Stroke

- Headache
- Dizziness and light-headedness
- Lack of sweating despite the heat
- Red, hot, and dry skin
- Muscle weakness or cramps
- Nausea and vomiting
- Rapid heartbeat
- Rapid, shallow breathing
- Seizures
- Unconsciousness

What to do, if you see a Heat Stroke

- Notify your supervisor immediately.
- Move victim to a cool place.
- Loosen or remove clothes.
- If conscious slowly give fluids.
- Cool body down with external fluid and fanning.



Preventing Heat Stress and Heat Stroke

- Drink plenty of water
- Take appropriate breaks as necessary to account for work load, temperature, and humidity
- Shaded areas for work and rest

Continual Air Monitoring

When paints are mixed with toxic chemicals or when solvents are sprayed, the following respiratory protection procedures are required:



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The competent person may require continual monitoring to determine that vapour / mist air concentrations are within the permissible exposure limit (PELs) and below immediately dangerous to life or health (IDLH) levels while workers are in the area.

If the concentrations are above appropriate levels, additional administrative controls (e.g., exposure time limits), engineering controls (e.g., ventilation), or PPE (e.g., respirators) are required.

Use of Air-Line Respirators

Airline respirators are required in confined spaces to protect employees who are continuously exposed to toxic materials during coating operations.

Airline respirators are required in enclosed spaces to protect workers when mechanical ventilation is not provided, or when the flash point of the paint or solvent is less than 80° F.

Use of Air-Line Respirators

In tanks and compartments where mechanical ventilation is provided, employees continuously exposed must be protected by filter respirators. In large and well-ventilated areas, employees exposed to spray painting must be protected by filter respirators.

All employees doing exterior spray painting with material containing solvents with flash points below 80° F must be protected by suitable filter cartridge-type respirators.

Employees continually in a compartment where spray painting is being done with paints containing solvents with a flash point below 80° F, for a limited time, must be protected with filter cartridge type respirators.

Non-Spray Painting / Coating

When coatings are applied by non-spray methods, the following respiratory protection procedures are required:

Air Purifying Respirators (Filter Respirators).

When brush application of paints containing toxic solvents in confined spaces or in other areas where lack of ventilation creates a hazard, employees must be protected by suitable filter respirators.

Health Hazard and Risk Assessment

A risk assessment for each operation and condition must be conducted to determine the proper selection of PPE. This assessment should include:

- The nature of the hazardous materials involved;
- Anticipated concentrations of materials;
- How the materials will be used;
- Performance of the PPE; and
- Actions workers will perform.



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Before using any toxic or flammable paints, check safety data sheet (SDS) on hazards and also safety measures to be observed. All body parts, including face, eyes, head, and hands must be protected from highly volatile paints.

Spills or other releases of painting materials should be cleaned up as soon as possible. Workers must be trained about potential hazards.

If a chemical / paint splash into eye / skin, flush with water for at least 15 minutes and then seek medical assistance.

First Aid Stations in Shipyard

- Full body shower and washing facilities for clean their body after work.
- Eye wash stations available for use in case of contamination in eye.
- If a chemical splash into eye / skin, flush with water for at least 15 minutes and then seek medical assistance.

Learning Objective 5

Health Hazards and Preventive Measures

Learning Objective

At the end of the Topic, learner is able to identify and use:

- Personal Protective Equipment (PPE)

Foot Protection

Potential Hazards

- Paint injection due to high-pressure equipment.
- Static electricity as a source of ignition produced while working in protective clothing and boots.
- Chemical absorption due to skin exposure to toxic paints and solvents.

Requirements and Example Solutions

Boots (for example chemical resistant, or waterproof) should provide skin protection from toxic paints or solvents that may be spilled, sprayed; or splashed during their use.

If flammable solvents are involved in the operation, non-static discharge producing shoes / boots and shoe covers must be used.

Boots should be worn with the legs of the protective clothing over them to prevent liquids from entering the boots.

Protective impermeable covers should be used over the shoes/boots when shoes/boots are not liquid proof.

Slip-resistant soled boots should be worn when working on slippery surfaces.



Hand Protection (i.e. Gloves)

Potential Hazards

- Chemical absorption due to skin exposure to toxic paints or solvents.
- Static electricity as a source of ignition produced while working in gloves.

Requirements and Example Solutions

PPE should provide skin protection from:

- Toxic paints or solvents that may be spilled, sprayed or splashed during their use.
- Paint injection during high-pressure spraying.
- Gloves should be sealed to the protective clothing to prevent liquids from entering the glove
- For specific operations, inner gloves may be required.
- Gloves should be under the sleeves of the protective clothing or sealed to them with tape.
- If flammable solvents are involved in the operation, non- static discharge producing gloves must be used.

Respiratory Protection

- Air-Line Respirators
- Air-Purifying Type Respirators





Learning Objective 6

Safe Storage of Paints And Solvents on Board Vessels

Learning Objective

At the end of the Topic, learner is able to explain:

- Safe storage of paints and solvents on board vessels.

Safe storage of paints

- Paints and solvents shall be stored at designated storage areas on board vessels.
- “No Smoking” signs shall be displayed at paints and solvent storage areas.
- Fire extinguisher shall be kept available in storage area.
- All paints and solvent storage containers shall be properly labelled.
- Safety Data Sheets shall be kept available for all solvents.
- No hot work or other incompatible works shall be carried out in vicinity of paint or solvent storage areas.
- Container lids must be securely fastened.
- Keep containers away from traffic areas.
- Avoid opening of paint containers until you need to use them.
- Supply of sufficient forced ventilation.
- Provision of adequate flame proof lights with cables in good condition.





Learning Objective 7

Vessel Safety Coordination Committee (VSCC) Meetings

Learning Objective

At the end of the Topic, learner is able to :

- Explain what is VSCC meeting
- List requirement if VSCC meeting
- Explain function of VSCC meeting

Vessel Safety Coordination Committee

Where any hazardous work is to be carried out on board any ship a VSCC shall be established for that ship by the occupier of the shipyard; or by the employer or principal, if the person is working under the direction of the principal, where the ship is in the harbour.

- VSCC shall comprise a chairman, a secretary and as many members as may be necessary for the functions of the Committee to be effectively carried out.
- SRM shall be the chairman of the vessel safety co-ordination committee.
- WSHO or such other persons as may be appointed by SRM shall be the secretary of VSCC.
- The master, owner or agent of the ship or his representative and the supervisors (including the contractor's supervisors) from each trade involved in any work on board the ship shall be members of VSCC.
- Review and discuss regularly all matters relating to the safety, health and welfare of the workers involved in the work;
- Draw up a plan for co-ordination of the work to ensure that where different types of work are being carried out at the same time, the types of work are compatible;
- Ensure that all relevant first-line supervisors and the master, owner and agent of the ship or their representatives are informed of the plan;
- Review on a daily basis all work in progress on the ship;
- Plan and co-ordinate the movement and storage of hazardous materials;
- Review on a daily basis the validity of all permits issued;
- Review on a daily basis all work in progress on the ship;
- Plan and co-ordinate the movement and storage of hazardous materials;
- Review on a daily basis the validity of all permits issued;
- Specially monitor all hot-works and to ensure that all safety measures are maintained throughout the period of such work;



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- Ensure that every confined space is checked:
 - Before any worker enters into it; and
 - Regularly while work is being carried out, review the results of such checks;
- Review on a daily basis the validity of all permits issued;
- Review on a daily basis all work in progress on the ship;
- Plan and co-ordinate the movement and storage of hazardous materials;
- Review on a daily basis the validity of all permits issued;
- Ensure that every worker is provided with and uses the appropriate PPE for his work; and
- Make arrangements and determine the locations for the display of safety signs. and permits on board the ship.

Vessel Safety Coordination Committee

VSCC shall meet daily (including Sundays and public holidays) when any hazardous work is being carried out on the ship and at such other times as the chairman may decide.

Unless the chairman otherwise decides, it shall be the duty of every member of VSCC to attend such meetings.





Learning Objective 8

Permit to Work System – Application for Painting Permit

Learning Objective

At the end of the Topic, learner is able to :

- List the procedure for the application of permit to work for painting trade.

The objective of the Safe Work Permit system is to identify hazards associated with a non-routine job, and to develop precautions required to control each hazard identified.

- Workers must be informed of inherent hazards, safe work procedures, required emergency procedures, location and operation of emergency equipment.
- Material Safety Data Sheets must be supplied and special precautions reviewed with workers and their supervision.
- “Safe Work Permit Required” for Spray painting, confined space entry, blasting works. These areas are posted always require a safe work permit.
- Other safe work permits may be required at the discretion of the Safety Representative, the Contract Administrator, or the Contractor.
- Permits will be issued by a qualified safety representative

Safe Work Permit

Precautions Always required:

- o Emergency procedures review by:
- o Emergency equipment & location review by:
- o Area inherent hazards review by:
- o Material Safety Data Sheet(s) review by:

Painting Permit

- Hot work permits are issued by the Fire Marshal.
- Permits are issued to specific persons for a specific time period and for a specific job.
- Permits must be signed at the time issued by the safety representative, job supervisor, affected workers, and the manager of the area in which work is being done.



Permit to Work Procedure

Application

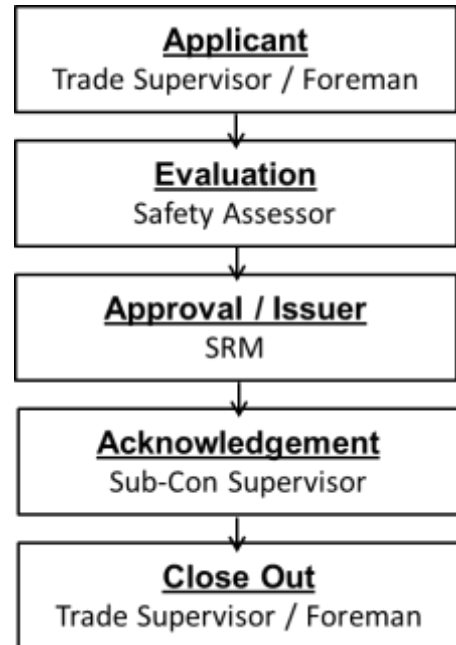
The trade foreman or supervisor who is familiar with the work schedule, the nature of the work to be carried out and the risks and hazards involved in respect of the work to be done shall submit his application for a permit-to-work to the safety assessor.

Evaluation

On receipt of the application for permit-to-work, the safety assessor shall:

- Familiarize himself with the work schedule, nature of the work to be carried out and the risks and hazards involved in respect of the work to be done; and
- Make a physical inspection of the site of the intended work and its surrounding areas to ensure that there are no hazards or dangers present.

If the safety assessor is satisfied with results of his inspection, he shall then endorse the application for the permit-to-work and forward the endorsed application to SRM.



Approval

On receipt of the endorsed application from safety assessor, SRM shall:

- Evaluate the information given to him relating to the work to be carried out and the risks and hazards involved;
- Ensure that no incompatible work will be carried out at same time in the same vicinity as the work for which the permit-to-work is being applied;
- Ensure that all possible safety precautions and measures have been implemented and enforced; and
- Cause a thorough inspection and proper assessment of the intended work area and its surroundings to be made.

Issue of Permit to Work

- Ship-Repair Manager shall, upon approving the application for permit-to-work, issue permit-to-work to trade foreman or supervisor and trade foreman or supervisor shall retain the permit-to-work.
- Trade foreman or supervisor to whom permit-to-work is issued shall display a copy of permit-to-work at prominent location and in vicinity of work.

Completion of Work

On completion of the work, the trade foreman or supervisor shall inform the ship repair manager accordingly.



Learning Objective 9

Worker's Safety Checklist For Painting Works

Learning Objective

At the end of the Topic, learner is able to :

- List the item in the worker checklist.

S/N	Description	Status			Remarks
		Yes	No	NA	
1	Is there a painting permit available and approved by safety department?				
2	Is there adequate ventilation for painting area?				
3	Are explosion proof lights and fixtures used?				
4	Is there adequate PPE (respirators, gloves, goggles etc.) available?				
5	Are metallic parts of spray painting equipment grounded?				
6	Is there a equipment available for continuous air monitoring in painting area?				
7	Is painting area free from any incompatible works?				
8	Are painters working at height equipped with safety harness?				

Dealing With Emergencies

In the event of an emergency, the emergency alarm will be activated.

- Remain calm.
- Listen for announcements.
- When an emergency is confirmed, stop work and switch off all equipment/machinery.
- Evacuate the ship in an orderly manner.
- Follow the evacuation signs to the emergency assembly area.
- Remain at the assembly area for head count and do not leave the assembly area until told to do so by your supervisor.

End



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Aid Memories

Shipyard Safety Instruction Course for workers - Painter Trade

Types of Paints

Solvent Based Paints
Water Based Paints
Alkyd Resin Paints
Latex Paints
Primers
Textured Paints
Dripless Paints
Rubber Based Paints

Touch Up Painting (Using Brush / Roller)



Spray Painting



Fire Triangle



Any combustible material -solid, liquid or gas.



Sufficient oxygen must be present in the atmosphere surrounding the fuel for fire to burn.



Ignition source – such as hot work

Common Ignition Sources

- Hot-work;
- Lighted cigarette butt;
- Static electricity;
- Lighted match, spark igniter;
- Non-flameproof lighting

Flammable Range

Lower Explosive Limit (LEL)

Upper Explosive Limit (UEL)



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Hazards during Airless Spray Painting

Falling Objects.

Slip, trip and fall.

Sharp edges.

High Noise Levels.

Leakage and splashing of paints.

Fire and Explosion Hazard.

Falling of persons from height

Inhalation of Paint Vapours.

Skin contact with paints

Exposure to high pressure spray

Exposure to toxic vapours.

Exposure to high pressure spray.

Moving vehicles

Personal Protective Equipment



Vessel Safety Coordination Committee

- VSCC shall comprise a chairman, a secretary and as many members as may be necessary for the functions of the Committee to be effectively carried out.
- SRM shall be the chairman of the vessel safety co-ordination committee.
- WSHO or such other persons as may be appointed by SRM shall be the secretary of VSCC.
- The master, owner or agent of the ship or his representative and the supervisors (including the contractor's supervisors) from each trade involved in any work on board the ship shall be members of VSCC.