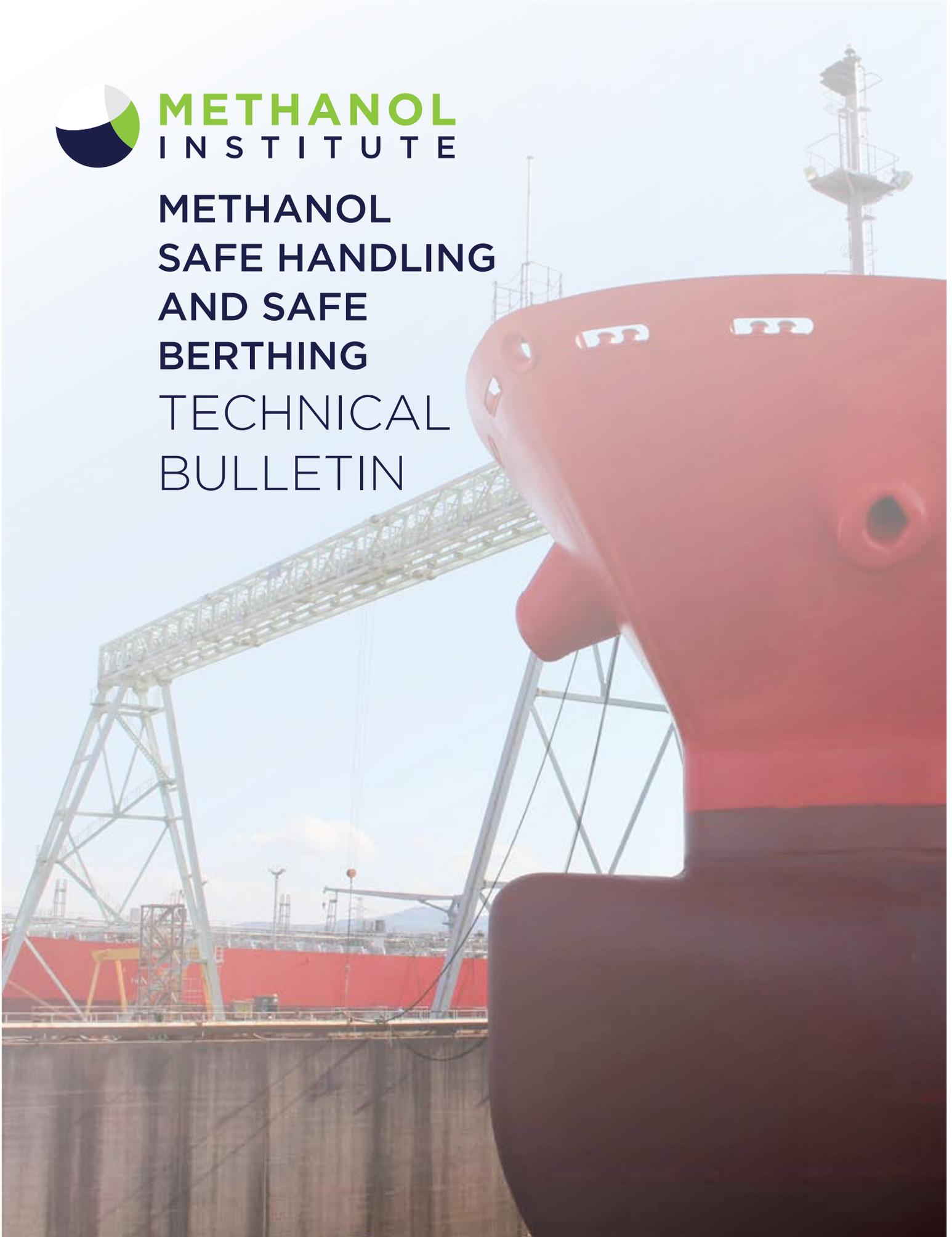




METHANOL
INSTITUTE

**METHANOL
SAFE HANDLING
AND SAFE
BERTHING
TECHNICAL
BULLETIN**





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METHANOL SAFE HANDLING AND SAFE BERTHING TECHNICAL BULLETIN

The ability to enter a port loaded with methanol and depart with methanol or any cargo requires the skills, knowledge, and experience of the ship's master, the pilots and a host of others to ensure safe passage. It is commonly agreed that the risk of an accident is highest when approaching or departing the berth, followed by the actual loading and unloading of product. The highest risk in regard to the berthing operation is environmental related which includes the weather and navigating into and out of the harbor as depicted in the chart below. However, as indicated by the chart, berthing as a whole has the highest risk of an incident!

POSSIBILITY OF AN ACCIDENT	● = SMALL POSSIBILITY ●●● = HIGH POSSIBILITY		
	BERTH STRUCTURE	PERSONNEL	ENVIRONMENTAL
ARRIVING OUTER HARBOR			●●●
TURNING BASIN	●		●●●
BERTHING	●●●	●●	●●●
MOORING	●●●	●	●
TRANSFER OPERATIONS	●	●●●	●●
BAD WEATHER AT BERTH	●●●	●	●●
DEPARTURE FROM BERTH	●●		●●●
DEPARTURE FROM HARBOR			●●●

Table from 3th Edition of the Port Designer's Handbook, Carl A. Thoresen, Institution of Civil Engineers, © Thomas Telford Limited 2014, London, Page 180

Because these risks of transiting the port involve both the ship's master and the pilot, they need the assistance of the agent who is communicating important data to the master about port conditions in order to prepare for the vessel's safe arrival at the terminal. This illustrates the importance of shore personnel as part of the team that makes safe berthing a success. Ship handling is both an art and a science. However, knowing the science and being prepared for both the arrival and departure of the vessel and the importance of safety procedures are keys to an efficient, and most importantly, a safe operation. Not only the ship or barge is responsible for a safe operations, but also the terminal plays a key role in the overall process.



550 TO 21

**MID-RANGE SPILLS
HAVE DROPPED FROM
NEARLY 550 IN THE
70'S TO 21 IN THE 5
YEARS 2010 TO 2014.**

The role of science and technology can be illustrated by reviewing the incident data for oil tankers. Incident data has been collected by organizations such as the International Tanker Owners Pollution Federation, and has shown a dramatic decline since the 1970's. Between 1974 and 2014 there were 9,678 incidents of which 3,598 or 37% occurred during loading or discharging operations. Another 1,001 or 10% were attributed to collisions. Looking at the statistics over

the years, larger spills in the 1970's were 54% of the total versus 8% in the most recent decade. Mid-range spills have dropped from nearly 550 in the 70's to 21 in the 5 years 2010 to 2014. These declines can be attributed to several factors not the least of which are improved hull design, better communications, improved navigation systems, better educated crews and better terminal procedures. However, heightened safety/security measures throughout the world have also driven the requirement to review safety and security information prior to transfer operation, as well as enhanced inspection processes of hoses, loading arms, and other transfer equipment to reduce the risk of incidents at the berth.

The intent of this Technical Bulletin is to begin the process of elevating the art of safe berthing and cargo transfer into a science. Just as methanol ships have evolved over the last 35 years to some of the most sophisticated and safest vessels in the world, so have the ship owners who operate them and the terminal operators who handle methanol. Today's terminal operators and methanol ship owners have evolved to introduce new and more efficient safety and cargo handling methods. The purpose of this Technical Bulletin is to point out best practices and to suggest changes in the way methanol is handled. Methanol has a great future both as a chemical and as a fuel. However, to ensure the successful marketing of this product, it must be carried both efficiently and safely. Today's methanol producers, ship owners and terminal operators are meeting that challenge with new vessels with double hulls, pumps that drain the cargo tanks virtually dry, nitrogen inerted cargo tanks and closed system testing of cargoes. Terminal operators have additionally expanded their safety procedures to protect personnel and the environment. In the future as we enter the second half of the current decade we are seeing both enhanced safety procedures and greater environmental considerations. Ship owners have introduced methanol vessels powered with the methanol burning dual-fueled diesel engines. Burning methanol in these diesel engines greatly reduces emissions of SOx, CO2 and NOx versus burning fuel oil.

01 SAFE PORT/BERTH:



For methanol ships and barges the question of safe handling of methanol starts with the initial order for product to be loaded/discharged on a barge or vessel. The charter party will always require loading and discharge at one or more **safe ports/safe berths**.

The meaning of **safe port/safe berth** is that the particular ship or barge can reach the berth (meaning within the vessel's size restrictions, LOA, beam, draft etc.), use the berth and depart from the berth free of any danger which would be avoided by good navigation and seamanship. The port must also be able to provide the tugs, pilots and other aids where the port and berth warrants such assistance. A **safe port or berth** may become temporarily unsafe due to unforeseeable or abnormal events; an example may be extreme tides or winds or an obstruction in the harbor. It is important to note that the fact that the charterer of the methanol barge or ship is required to nominate a safe port and berth does not relieve the vessel owner and his master from their obligation and their ultimate responsibility to determine if the port and berth are indeed safe for their vessel and to take all actions necessary to avoid endangering the vessel. In short, the vessel owner and master have the ultimate burden and responsibility to determine if it is safe to proceed to the port and berth the vessel. Generally speaking for methanol vessels and barges, safe port and safe berth have not been a major issue.

THE VESSEL:

Prior to contracting a barge or vessel, the charterer must make sure that the vessel or barge is in every way capable of the safe and efficient transport of methanol. This means that the vessel/ barge crew are properly trained and equipped to handle methanol. Additionally, the coatings, tanks, pumps, firefighting capabilities and equipment on board are designed for the transport of methanol. The vessel/barge shall have all appropriate government and industry certifications to carry methanol and have the appropriate insurance coverage. The owner/operator of the tonnage should undergo regular (annual) safety audits and the result of said audits are available to charterers on request from SIRE web site by paying a small fee. In addition, the vessels will likely be required to meet the vetting standards of the port-of-call/ terminal.

NOTE: One of the most significant safety initiatives introduced by Oil Company International Marine Forum (OCIMF) is the Ship & Barge Inspection Report Program (SIRE). The SIRE Program is a unique tanker risk assessment tool of value to charterers, ship operators, terminal operators and government bodies concerned with ship safety. The SIRE program offers a uniform inspection protocol that is predictable. Cost is (£40 per report for members and £50 for non-members barges are £20 for members & non-members).

02 ROLES & RESPONSIBILITIES:



CHARTER PARTIES:

Charter Parties is the contract between the charterer and ship owner. The agreement includes the specification of the vessel, methanol cargo details and may also include details such as appointment of the local agent, inspector/surveyor, loading and discharge orders, and laytime and demurrage.

THE AGENT:

Prior to berthing, the vessel' ship owner will generally appoint a local ship agent (barge companies who are local will fill this function internally). The agent plays a critical role for the owner of the vessel, they will have local knowledge of any unsafe conditions and is in contact with the terminal and port officials prior to the vessel's scheduled arrival. Generally the agent will be the single point of contact for the vessel with the terminal and also provides for any special needs of the vessel. The agent will know details of both the ship and terminal and will likely have a relationship with the line handlers, coast guard, pilots and tug boat operators. Their role is to provide the services and paperwork required for a safe berthing without unnecessary delays. The agent will also have local knowledge of the port and the facility to assist the ship owner.

Understanding the roles and responsibilities of those involved in the safe berthing for the arrival and departure of a vessel from a particular port is the first part in understanding what could be referred to as the Vessel Support Group (that is, those companies and individuals including agents, tugs, pilots, and mooring companies whose expertise combine to make possible the safe arrival and departure of a vessel).

HARBOR PILOTS:

A Notice of Readiness (NOR) is issued to the port terminal upon arrive at the port. Once all the documentation is completed and the vessel cleared by the local governmental agencies, and the NOR is accepted by the terminal, the harbor pilots are then ready to bring the vessel in to the berth. The harbor pilots are responsible for guiding the vessel to the berth and for providing navigation information to the vessel master for the safe transit in the port waters. The pilot is also responsible for coordination with port tugs which aid the vessel in transiting and docking within the port.

MOORING COMPANY:

A mooring company is notified to meet the vessel at a specific berth where representatives will assist in setting the proper number of lines to secure the vessels per the requirements of the terminal and the vessel.

DOCUMENTATION:

Once the vessel has successfully berthed, the first of several meetings will commence. The local agent will meet with the master to review all the necessary paperwork and the requirements of the vessel. The pre-transfer conferences will begin starting with a Declaration of Security and followed by the completion of the Declaration of Inspections. No cargo may be discharged or loaded until these documents are completed between the port/ terminal and vessel representatives. In addition, each party (both the vessel and the terminal) will have completed their own inspections and checklist prior to the transfer operation. We have included suggested checklists as attachments to this bulletin.

03 CHECKLISTS:

VESSEL PRE-ARRIVAL CHECKLIST:

A typical checklist for an arriving vessel should include the following (additional items may be included per local requirements or at the request of ship owner/operator):

1)	Personal protective gear and procedures checked
2)	Cargo Discharge Plan reviewed
3)	Nitrogen system inspected and operational (if vessel is so equipped)
4)	Vapor-return system inspected and operational (if ship is returning vapors to terminal)
5)	Ballast system checked and operational
6)	Pumps inspected and operational
7)	Environmental records reviewed
8)	Mooring lines and equipment checked
9)	Mooring line procedure checked
10)	Tank oxygen sensors, level gauges and alarms checked and verified
11)	Tanks and lines checked and verified ready to load methanol
12)	Safety and firefighting procedures reviewed with the crew and equipment checked
13)	Gangway checked and ready for use
14)	Ship's crane checked and verified operational
15)	Ship-to-shore radio communication checked
16)	Pressure vacuum valves inspected and flame arrester checked
17)	Loading Master and inspector/surveyor notified by agent
18)	Notice-of-Readiness issued to the terminal

BARGE PRE-ARRIVAL CHECKLIST:

A typical checklist for arriving barges should include the following:

	1)	Personal protective gear and procedures checked
	2)	Cargo Discharge Plan reviewed
	3)	Vapor return system inspected and operational (If barge is returning vapors to terminal)
	4)	Mooring lines and equipment checked
	5)	Mooring line procedure checked
	6)	Level gauges and alarms checked and verified
	7)	Tanks and lines checked and verified ready to load methanol
	8)	Safety and Firefighting Procedures reviewed with the crew and equipment checked
	9)	Ship-to-shore radio communication checked
	10)	Loading Master and inspector/surveyor notified by barge operational agent
	11)	Pressure vacuum valves inspected and flame arrester checked
	12)	Notice-of-Readiness issued to the terminal and verified by agent and terminal

VESSEL/BARGE/TERMINAL PRE- LOADING OPERATIONAL MEETING CHECKLIST:

	1)	Shore pre-meeting conducted with first officer, tanker man, terminal operator, and inspector/surveyor
	2)	Review personal protection procedures
	3)	Product quantity and load plan agreed
	4)	Start-up first foot load rate agreed
	5)	Maximum loading rate agreed
	6)	Maximum pressure agreed
	7)	Emergency contact lists exchanged
	8)	Communication channels tested and activated
	9)	Sampling plan and quantity gauging method agreed
	10)	Valves and pump line up completed and verified
	11)	Shore tank(s) verified
	12)	Review that the ISGOTT ship/shore checklist that is in place or fill out the DOI checklist
	13)	Watchman/tanker man placed at manifold
	14)	Mooring lines checked
	15)	Hoses or loading arms connected (both product and vapor)
	16)	Review safety procedures in case of fire or methanol spill or other emergency shutdown situation

VESSEL/BARGE/TERMINAL PRE- DISCHARGE OPERATIONAL MEETING CHECKLIST:

	1)	Shore pre-meeting conducted with first officer, tanker man, terminal operator and inspector/surveyor
	2)	Review personal protection procedures
	3)	Product quantity and load plan agreed, including shore tanks
	4)	Start-up first foot load rate agreed for shore tank
	5)	Maximum discharge rate agreed
	6)	Maximum pressure agreed
	7)	Emergency contact lists exchanged
	8)	Communication channels tested and activated
	9)	Sampling plan and quantity gauging method agreed
	10)	Valves and pumps line up completed and verified
	11)	Shore tank(s) verified
	12)	Review that the ISGOTT ship/shore checklist that is in place or fill out the DOI checklist
	13)	Watchman placed at manifold
	14)	Mooring lines checked
	15)	Hoses or loading arms connected (both product and vapor)
	16)	Review safety procedures in case of fire or methanol spill, or other emergency shutdown situation

04

VESSEL & BARGE SAFETY & ENVIRONMENTAL PROCEDURES:



SAMPLING:

- 1) All sampling **shall be conducted with closed hatches** by hermetic sampling or at barge manifold/vessel pump stack (barges may be sampled at point near the hose connection by and through a bleeder valve located on a coupling attached to the hose). It is no longer accepted practice to open the hatch and drop a sample bottle into the cargo tank. Personnel are required to wear proper Personal Protective Equipment (PPE) **(See Methanol PPE (Personal Protective Equipment))** when sampling methanol.
- 2) ***Hatches are never to be opened as this creates both an explosion hazard and exposure risk for personnel. Additionally for N2 blanketed tanks, this defeats the reason for blanketing in the first place.***
 - a. ***This practice of opening hatches has been largely eliminated by ship operators. However, the practice of opening the hatches on barges remains widespread among barge operators and should be totally discontinued.***

- 3) ***We recommend that wall wash testing be greatly reduced or eliminated to avoid having personnel entering the tank. Experienced methanol ship and barge operators should have sufficient experience to know exactly what it takes to clean from a prior product back to methanol and in most cases avoid the potential hazard of entering the cargo tank to conduct a wall wash test. Additionally we would recommend that once sufficient product is in the tank, the methanol cargo pumps be activated and product circulated through the line and back into the tank for a period of not less than 5 minutes after which a sample can be drawn at the pump stack and tested for hydrocarbons, chlorides, and other tests as recommended. (Note: Generally loading operations do not need to be shut down while awaiting test results unless the prior cargo was not methanol in which case it is recommended to await test results). It should be noted that the advent of nitrogen inerted methanol tanks increases the likelihood of having a tank that may not contain sufficient oxygen thereby increasing the danger of tank entry to conduct wall wash tests.***
- 4) Methanol flames are nearly invisible and difficult to detect and extinguish. As a result no non-explosion proof electronic equipment will be allowed to be used on the vessel deck, barge deck, or in the terminal during loading operations.
- This includes cell phones, cameras, and any other electronic devices that are not intrinsically safe.
 - No open flames, fires, smoking materials will be allowed.
 - Vessel and barge firefighting equipment shall be positioned and ready for immediate use at all times.
 - Vessels inerted with nitrogen shall maintain a positive pressure on all cargo tanks at all times.
 - Adequate electrical insulating means are in place to further protect the ship-shore connection including the use of grounding cables and insulating flanges (when required).
 - All overboard drains are to be closed or plugged to prevent deck spill from entering the waterway. Also, any overboard suction valves are to be closed and secured.

05

EMERGENCY SHUTDOWN OF TRANSFER OPERATIONS:



- 1) ***Loading and unloading operations will be shut down upon the onset of severe weather conditions such as an approaching thunderstorm, high winds, and/or lightning.***
 - a. ***Lightning within 5 miles of the terminal***
 - b. ***Sustained winds of 35 miles per hour***
- 2) Transfer operations will cease in the event of:
 - a. A terminal fire or explosion
 - b. A fire or explosion on the vessel or a nearby vessel
 - c. A spill or release at the vessel's berth
 - d. A breakdown of communications
 - e. A marine incident in the port such as a collision
 - f. A complete loss of communication between the ship and shore
 - g. Break of security or Dock/Terminal Regulation and/or Procedures
 - h. Mooring lines become slack or too tight

- 3) Operating procedures to be followed during an emergency shutdown:
 - a. Emergency communications will be initiated immediately through the following:
 - a.i. By terminal radio
 - a.ii. By digital media if available
 - a.iii. Through the terminal dock master
 - a.iv. Marine radio

- 4) ***It is recommend that personnel working on the ship or barge deck or in the terminal where they may be exposed to methanol vapors (because the vessel does not return vapors to the terminal) wear methanol detection monitors which will alert the operator that he has been exposed to a potentially dangerous level of methanol vapors. It is also recommend that all new methanol plants that are loading methanol return those vapors to shore so they may be captured in a Methanol Vapor Absorption Unit (MVAU), destroyed in a Vapor Destruct Unit (VDU) or vapors are returned to a shore tank(s) as part of a Marine Vapor Balancing System (MVBS). It is also recommend that existing plants around the world consider retro fitting the loading systems so as to return vapors to shore so they can be captured or destroyed. It is recommended that the monitor be set at a level below the recommended exposure limit for personnel of 200 ppm. A monitor alarm should alert personnel to immediately seek breathing air apparatus or a respirator sanctioned for use with methanol. Once personnel protection has been secured, affected personnel should alert the vessel or barge and terminal personnel and follow the safety procedures set out by vessel or terminal. Of course if there has been a spill or other release of liquid methanol, emergency shutdown procedures shall be initiated immediately.***

06

METHANOL PPE (PERSONAL PROTECTIVE EQUIPMENT):



The following PPE items are recommended for the safe handling of methanol:

- 1) FRC (Fire Retardant Clothing)
- 2) Coverall suitable for handling methanol (to be used when connecting and disconnecting hoses or loading arms)
- 3) Gloves suitable for the handling of methanol (to be used when connecting and disconnecting hoses or loading arms and when taking samples)
- 4) Safety shoes
- 5) Hardhat
- 6) Safety glasses
 - a. As required safety goggles, or
 - b. Face shield
- 7) Respiratory protection
- 8) Methanol exposure monitor

07 TERMINAL LOADING/ UNLOADING OPERATING PROCEDURE:



- 1) Prior to the arrival of the methanol vessel, the Terminal Dock Master must perform a Job Safety Analysis of the work area and surrounding area for any unsafe conditions.
 - a. Any unsafe condition must be reported to terminal supervision/management immediately.
 - b. Dock Job Safety Analysis should include the following on the dock:
 - b.i. Operating manuals including regulatory manuals (For example, Coast Guard Manual and a copy of the Methanol MSDS)
 - b.ii. Gangways, ladders, stairways and cranes are in working and safe condition
 - b.iii. All safety equipment including eye wash stations, emergency shutdown switches, fire extinguishers, fire monitors and fire hoses, foam system, lifesaving equipment, work vests and air breathing equipment (for example, Scott Air Pack) have been located and ready for use.
 - b.iv. Is the vessel manifold area and the berth adequately and safely lighted?
 - b.v. Dock area must be clean with clear and safe egress on and off dock.

- b.vi. Safety and environmental alarms (spill alarms) have been tested and are operational.
 - b.vii. Methanol Personal Protective Gear list is posted **Methanol PPE (Personal Protective Equipment)****
 - b.viii. *The Marine Vapor Destruction Unit (MVDU) must be checked and readied for operation.***
 - b.viii.1 *For those plants that are currently venting methanol vapors to the atmosphere, it is recommended that those plants consider installing and sending those vapors to an MVDU or MVAU or use a Marine Vapor Balancing System utilizing existing shore tank(s).***
 - b.viii.2 *All new plants being constructed should return vapors to shore to either a MVDU, MVAU or vapor balancing system.***
- 2)** The Terminal Dock Master will be provided with a Methanol Marine Loading/Unloading Order or equivalent specifying the following:
 - a. Berth number
 - b. Vessel nomination
 - c. Methanol shore tank(s) number(s)
 - d. Dock line(s) number
 - e. Methanol quantity
 - f. Are the tanks inert with nitrogen (required for calibrating the marine vapor handling system)
 - g. Special instructions, if any
 - 3)** The terminal supervisor/manager is responsible for verifying the vessel at the proper dock.
 - 4)** Terminal supervisor/manager is responsible for verifying the proper number of mooring lines have been installed to safely secure the vessel at the terminal dock/berth.
 - 5)** Once the vessel has been secured, the vessel's gangway is positioned and secured safely without impeding the safe egress on and off the dock.
 - a. The gangway and mooring lines must be monitored throughout the loading operation to assure personnel safety and vessel remains secure until the vessel is ready to depart.
 - b. Terminal firefighting equipment is positioned and ready for immediate use.
 - 6)** A pre-transfer meeting is held on board the vessels prior to methanol loading and must include the following personnel:
 - a. Terminal supervisors or representative
 - b. Terminal Dock Master (as the person-in-charge of the dock)
 - c. Vessel chief or first mate or designated Load Master
 - d. Inspector/surveyor

- 7) The pre-transfer meeting shall include the following information:
- a. Confirm methanol as the product
 - a.i. Review copy of the Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) and the hazards involved in handling methanol
 - a.ii. If loading/unloading a chemical parcel tanker and other products are to be loaded, confirm these products and designate which hoses/loading arms are to be connected to which vessel manifold valve connections
 - a.ii.1 Includes reviewing the MSDS/SDS and any special safety precautions that may impact methanol loading/unloading
 - b. Maximum dock-line and vessel header working pressure
 - c. Review Marine Vapor Recovery/Destruction Unit connections and pressure settings
 - d. Minimum and maximum working temperature
 - e. Transfer sequence if more than one loading arm or hose is to be used or more than one product other than methanol is loaded or unloaded
 - f. Ship's manifold and dock hoses/loading arms are labeled or marked with product name if vessels contain or will load/unload cargo other than methanol (chemical parcel tanker)
 - g. Methanol product flow rates
 - g.i. Initial flow rate
 - g.ii. Maximum flow rate
 - g.ii.1 Maximum cargo handling rate is compatible with the automatic shutdown system on the ship and shore.
 - g.iii. Unloading rates to the shore tank will be dictated by the terminal to protect the internal floating roof of the storage tanks. If there are exceptions, these should be discussed at the pre-transfer meeting.
 - h. Review emergency procedures including procedures for a safety or spill incident
 - i. Review radio procedures
 - j. Review personnel duties including watch/shift changes
 - k. Review dock regulations
 - k.i. All parties sign, date and time
 - l. Review the Declaration of Security (DOS)
 - l.i. All parties sign, date and time
 - m. Review Declaration of Inspection (DOI)
 - m.i. All parties sign, date and time
 - n. All parties sign, date and time the **Terminal and Vessel Pre/Post Transfer Checklist & Time Log.**
- 8) Connect grounding cable from dock prior to loading/unloading operation commencement.
- 9) If a third party surveying company has been hired by the customer to monitor the product transfer, the approval of the vessel header and the shore tank must be confirmed by the surveyor.

- 10) Dock personnel shall inspect and confirm the readiness and the cleanliness of the hoses and loading arms; that is, hoses are to contain no product.
- a. Caution should be taken that the loading hoses or loading arms do not contain product and are not under pressure.
 - b. Replace any hoses with external damage to the stainless steel braiding or the hoses are crimped or dented.
 - c. Cargo hoses must be clearly marked for methanol and include the installation date and date of last testing.
 - c.i. Loading and arms and hoses should be inspected for damage before each cargo handling/methanol transfer to assure the integrity of the loading arm or hose.
 - c.ii. Recommend hoses be removed and inspected by an outside party annually and replaced if necessary.
 - c.iii. Loading arms should be inspected and tested annually and marked with the date of the last inspection.
 - d. Loading arms and hoses shall be blind flanged and all securely bolted when not in use.
 - d.i. When bolted, all bolt holes will be secured by ASTM approved bolts and with a gasket between the flanges, secured using an approved bolt tightening pattern.
 - d.ii. **Cautionary Note: Treat all hoses and loading arms as if they were under pressure and/or contained methanol. Always carefully check to determine if the line is under pressure or contains liquids by having a bleeder line and valve installed in a coupler used between the end of the hose and the blind flange or the connection to the loading arm.**
- 11) ***The vessel is responsible for ensuring the overfill alarms and protection devices are in good working order prior to product movement.***
- 12) ***The terminal is responsible for ensuring that all controls are in place on the tank and transfer line and ensure that overfill protection on the tank is in place and operational prior to any transfer.***
- 13) ***No hoses or loading arms are to be connected until all personnel are out of the cargo tanks prior to loading operations.***
- 14) ***It is recommend that wall wash testing be greatly reduced or eliminated to avoid having personnel entering the tank. Experienced methanol ship and barge operators should have sufficient experience to know exactly what it takes to clean from a prior product back to methanol and in most cases avoid the potential hazard of entering the cargo tank to conduct a wall wash test. Additionally we would recommend that once sufficient product is in the tank, the methanol pumps be activated and product circulated through the line and back into the tank for a period of not less than 5 minutes after which a sample can be drawn at the pump stack and tested for hydrocarbons, chlorides, and other test as recommended. (Note: Generally loading operations do not need to be shut down awaiting test results unless the prior cargo was not methanol, in which case it is recommended to await test results). It***

should be noted that the advent of nitrogen inerted methanol tanks increases the likelihood of having a tank that may not contain sufficient oxygen and thus the danger of tank entry to conduct wall wash tests.

- 15) *No personnel and especially cargo inspectors or surveyor are to open ship hatches to inspect the cargo or take samples. Samples should be taken using closed system sampling devices on board the vessel or using the hermetic device of the ship's cargo tank or at the pump stack.***
- 16) *Inspectors and surveyor shall follow terminal procedures when sampling the designated storage tank for the cargo transfer.***
- 17) *No hoses (vapor or cargo) are to be connected until vessel personnel are present at the ship's manifold, blind flanges removed, and approval given by the chief mate/first mate or designated load master.***
- 18) Prior to dock line connection, Terminal Dock Master shall coordinate with the terminal pump operator that the transfer is about to commence and each verify the correct lines and shore tank are connected to the dock.**
- 19) The methanol product hose or loading arm may now be connected.**
- 20) Vapor line shall also be connected at this time if vapors are returned to shore.**
- 21) Once the product hose or loading arm is connected, the loading arm/hose is tested to the maximum allowable pressure per the pre-transfer meeting. At this time all flanges are to be leak tested.**
- 22) Once testing is completed, the air or nitrogen (preferred) is removed by using a bleeder valve at the vessel manifold.**
- 23) The terminal supervisor visually inspects and verifies that the hoses or loading arms are connected to the correct manifold location, terminal header, dock-line and shore tank.**
- 24) The Terminal Dock Master who remains in charge of the transfer operation checks the readiness of personnel and equipment, and if the result is affirmative, the dock man notifies the pumper to again verify the product, shore tank number, dock line number, quantity and vessel nomination. Upon the approval of all personnel, the transfer may commence.**
- 25) Terminal Dock Master or person designated as the marine dock/berth supervisor should remain at the dock until properly relieved, staying in communication with the vessel, terminal supervision and the pumper.**
- 26) The Terminal Dock Master is also responsible for monitoring the mooring line and notifying the vessel accordingly when adjustments are required.**
- 27) Terminal Dock Master shall maintain an accurate log of all activities.**
- 28) Terminal Dock Master has the full authority to shut down cargo loading operations.**

- 29) Terminal Dock Master is to notify the pumper of any changes in loading/unloading rate or pressure deviations. When nearing completion of the loading/unloading operation, the vessel should notify the Terminal Dock Master reasonably ahead of time (1 hour for example) in order to notify the terminal supervisor, vessel and the pumper to prepare for shutdown.
- 30) Once the vessel orders loading/unloading to stop, the Terminal Dock Master shall notify the pumper to shut down the pump and close the valve to the dock. The valves on the ship/barge are to remain open until it has been determined that the product flow has stopped.
- a. **Cautionary Note:** Most terminals, not all, do not allow the line to be blown back to the tank. Methanol is typically stored in Internal Floating Roof (IFR) tanks. When blowing back methanol using pressurized nitrogen there is always a danger of damaging the internal floating roof. Therefore, terminals will prefer to clear the dock line hose or loading arm to the vessel. ***It is recommended that lines always be blown back to the ship to prevent any problems.***
- b. **Reference here to clearing the dock line hose or loading arm does not include the entire dock line from the tank. This procedure applies only to that section of the line from the connection of the hose to the dock valve flange or from the dock valve flange to and through the loading arm.**
- 31) The Terminal Dock Master now prepares for the blow back of the product in the hose or loading arm to the vessel using nitrogen.
- 32) Once the dock line hose or loading arm is cleared of product, the vapor line valve on the vessel can be closed slowly. The vapor line will need to be cleared using nitrogen prior to disconnecting.
- 33) Before disconnecting the vapor line and product line from the vessel, the ship's manifold valves should be securely closed. Bleed off any pressure from the line prior to removing bolted flange. Once the disconnection has been made, re-install the blind flanges and fully secure with gasket and bolts.
- 34) Carefully remove the hose or loading arm from the vessel while observing the position of all personnel to prevent personal injury or damage to the surrounding area from the swing of the hose or loading arm.
- 35) Once all hoses and loading arms are removed, the ground cable can now be disconnected.
- 36) Terminal supervisor verifies all hoses and ground cables are disconnected and the crane is moved to a safe and secure position; the dock remains clean and safe egress on and off remains in place, radios returned to the dock man (if required), third party inspectors are off the vessel, and all necessary paperwork completed, signed and time recorded. Once all parties have approved the closure of operations and the pilot is on board, the vessel gangway may be removed from the dock and the vessel made ready for the removal of all lines by the mooring company.
- 37) Fill out the Terminal and Marine Vessel Transfer Checklist & Time Log.

08 CARGO DOCUMENTATION:

Upon completion of the loading operation and the work of the third party independent inspector, and based upon agreement by all parties, the following documents should be generated prior to departure:

- 1) Bill of Lading
- 2) Certificate of Origin
- 3) Certificate of Quantity and Quality
- 4) Cargo Manifest
- 5) Receipt of documents
- 6) Receipt for samples
- 7) Timesheet
- 8) Letters of Protest as required
- 9) Other documents as required by governmental agencies

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EXAMPLE OF CHECKLISTS:

- A. Declaration of Security
- B. Declaration of Inspection
- C. Methanol Personal Protective Equipment (PPE)
- D. Marine Terminal Checklist
- E. Marine Vessel/Barge Checklist
- F. Terminal and Vessel Pre/Post Transfer Checklist & Time Log



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The information supplied herein is believed to be correct but the accuracy thereof is not guaranteed. The company and its employees cannot accept liability for any loss suffered in consequence of reliance on the information provided. Provision of this data does not obviate the need to make further appropriate inquiries, analysis and inspections.

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