



**REPUBLIC OF CYPRUS
MARINE ACCIDENT AND INCIDENT
INVESTIGATION COMMITTEE**

**Investigation Report 49E/2022
Very Serious Marine Casualty
Fatal Accident onboard “SAIPEM FDS” on 02 April 2022
at Limassol Roads**



The logo for the Marine Accident and Incident Investigation Committee (MAIC) is located at the bottom left of the page. It features the acronym 'MAIC' in a large, bold, white sans-serif font. The background of the logo is a horizontal band of blue water with a subtle wave pattern. Below the acronym, the full name of the committee is written in a smaller, white sans-serif font.

MAIC

Marine Accident and Incident Investigation Committee
Cyprus

Foreword

The sole objective of the safety investigation under the Marine Accidents and Incidents Investigation Law N. 94 (I)/2012, in investigating an accident, is to determine its causes and circumstances, with the aim of improving the safety of life at sea and the avoidance of accidents in the future.

It is not the purpose to apportion blame or liability.

Under Section 17-(2) of the Law N. 94 (I)/2012 a person is required to provide witness to investigators truthfully. If the contents of this statement were subsequently submitted as evidence in court proceedings, then this would contradict the principle that a person cannot be required to give evidence against themselves.

Therefore, the Marine Accidents and Incidents Investigation Committee, makes this report available to interested parties, on the strict understanding that, it will not be used in any court proceedings anywhere in the world.

This investigation was carried out as a joint investigation with Bahamas Maritime Authority.

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List of Acronyms and Abbreviations

CPR	Cardio-Pulmonary-Resuscitation
DPA	Designated Person Ashore
FDS	Field Development Ship
ISM Code	International Management Code for the Safe Operation of Ships
LT	Local Time
m	Meter
MC	Management Company
MT	Metric Tons
MRCC	Marine Rescue Coordination Centre
NM	Nautical Mile
RPM	Revolutions per Minute
ST	Ship's Time
2/O	Second Officer
SMC	ISM Safety Management Certificate
SMS	Safety Management System
SMSM	Safety Management System Manual
SOLAS	Safety of Life At Sea Convention
STCW95	International Convention on Standards of Training, Certification and Watch keeping for Seafarers 1978, as amended
VDR	Voyage Data Recorder
CSWP	UK Code of Safe Working Practices
UTC	Universal Time Coordinated
VHF	Very High Frequency Radio

1. Summary

An Investigator of the MAIC boarded the Bahamas-flagged Field Development Ship “SAIPEM FDS”, while anchored at Limassol roads. The Investigator conducted extensive witnesses’ interviews, reviewed documents provided by the ship’s Master, shot photographs and performed analyses to determine the causal factors that contributed to the accident.

Accident Description

A fatality during routine maintenance occurred on 02 April 2022 at Limassol roads, after the 15:00 coffee break. The weather was calm, and the vessel was neither rolling nor pitching.

The victim was working for a specialist company named “Top Rope”, which provides personnel capable of performing work at height. He was medically fit and well rested.

At the time of the incident, he was wiping a metal surface at a height of about 8 meters from the main deck. He was using a flammable liquid cleaner (thinner) in an open metal can, which was secured in some way near his side. He was properly secured with a rope and harness, and was wearing proper personal protective equipment. The victim was assisted by a co-worker, an employee of the same specialist company.

At a higher level, about 3m in the horizontal and 4m in vertical distance, a team of welders were performing hot work.

The “Top Rope” workers saw sparks coming towards them, and falling down on the main deck, from the area where hot work was carried out. However, it was decided that the sparks were falling at a safe distance from their work place, so they continued their task.

Nevertheless, sparks from the welders fell into the can with thinner, which caught fire. The “Top Rope” worker tried to get rid of the can by pushing it, but by doing so the thinner splashed on his body. He was suddenly completely ablaze, the rope and safety harness burnt and he fell down to the main deck.

Intervention by the ship’s doctor and emergency team was unsuccessful, as the casualty succumbed to his injuries. The Master requested a service boat from the ship’s agent and the casualty was transferred by the service boat ashore, where his death was confirmed.

2. Factual Information

2.1 Ship Name “SAIPEM FDS”



2.1.1. Ship Particulars

Name of ship: SAIPEM FDS

IMO number: 9210749

Call sign: C6RK6

MMSI number: 311066000

Flag State: Bahamas

Type of ship: Pipe-Layer

Gross tonnage: 21049

Length overall: 163.46m

Breadth overall: 30.04m

Classification society: ABS

Registered shipowner: SAIPEM (Portugal) Comercio Maritimo, S.U., LDA-IMO 3018805

Ship's company: SAIPEM (Portugal) Comercio Maritimo, S.U., LDA-IMO 3018805

Year of build: 2000

Deadweight: 9,353MT

Hull material: Steel

Hull construction: Single / Double Hull

Propulsion type: ICE

Type of bunkers: IFO, MGO

Number of crew on ship's certificate: 20

2.1.2. Voyage Particulars

Port of departure: Zohr Field-Egypt
Port of call: Limassol Anchorage
Type of voyage: International
Cargo information: Ballast condition
Manning: 22
Number of passengers: 116 Not Seafarers

2.1.3 Marine Casualty or Incident Information

Type of marine casualty/incident:	Very Serious Marine Casualty
Date/Time:	02/04/2022 @ 15:30 Hours LT
Location:	Limassol Anchorage
Position (Latitude/Longitude):	Lat.:34°40'N – Long.:033°04'E
External and Internal Environment:	Sea State: Calm, Wind: SW/2, Day, Vis: Good
Ship operation and Voyage segment:	Anchored
Human Factors:	Yes
Consequences:	Fatality

2.1.4. Shore authority involvement and emergency response

The ship's Doctor was in the ship's clinic when one of the Electricians knocked on the door, informing him that there was an accident related with fire on the main deck. The Doctor grabbed the Emergency Response Bag (ERB) along with a Burn Kit and rushed to the Main Deck, followed by the Electrician. They arrived on scene in 10 - 20 seconds. At the scene, the doctor saw a body partially on fire being extinguished by one of the crew, taking a couple of seconds.

Doctor reached the body and found the clothes to have burnt off. He examined the casualty, observing there was no breath, pulse, or heartbeat. The casualty was deceased. Doctor tried to open his airway, but it was impossible due to accident related injuries.

The body of the casualty was transferred to the ship's clinic with a stretcher and examined one more time. The Doctor's aim was to put air in his pharynx, but opening the mouth was not possible. The Doctor attempted 6 cycles of cardio-pulmonary-resuscitation (CPR), without result.

At 17:00 Hrs LT, the ship's agent "ATLAS" sent the Service Boat "LEDRA PIONEER".

At 17:40 Hrs LT, the victim was lowered by basket and stretcher to the Service Boat "LEDRA PIONEER" and was transferred ashore, to Limassol General Hospital.

The Doctor went ashore with the body of the casualty and gave a statement to Cyprus Police.

At about 20:30 Hrs LT, Cyprus Police boarded the vessel and carried out investigation.

3. Narrative

3.1. Sequence of Events

1. On 13 March 2022 “SAIPEM FDS” departed from Naples, on a destination to Zohr Field-Egypt.
2. On 31 March 2022, “SAIPEM FDS” departed from Zohr Field-Egypt.
3. On 01 April 2022, at 09:00 Hrs ST (Ship’s Time) [UTC+1], “SAIPEM FDS” dropped anchor, 6 shackles in the water at Limassol Roads.
4. Two days before arrival at Limassol Roads, vessel commenced maintenance of the J-Lay Tower (JLT), in accordance with the JLT Maintenance Plan. The job was being carried out by workers of the Construction Department’s Sub-Contractor, “Top Rope”.

(Vessel’s Departments: Marine, Technical, [Mechanic, Electronic] and Construction.

The maintenance of the JLT, was being performed by the Sub-Contractor “Top Rope” as specialist for work at height and rope access. (Nick name: Acrobats).

The vessel operations are continuous, with the exception of the Marine Department [Seafarers]. All Technical and Construction personnel, work in shifts of 12 hours on – 12 hours off. The workers of the Sub-Contractor “Top Rope”, work from 0700-1900.)

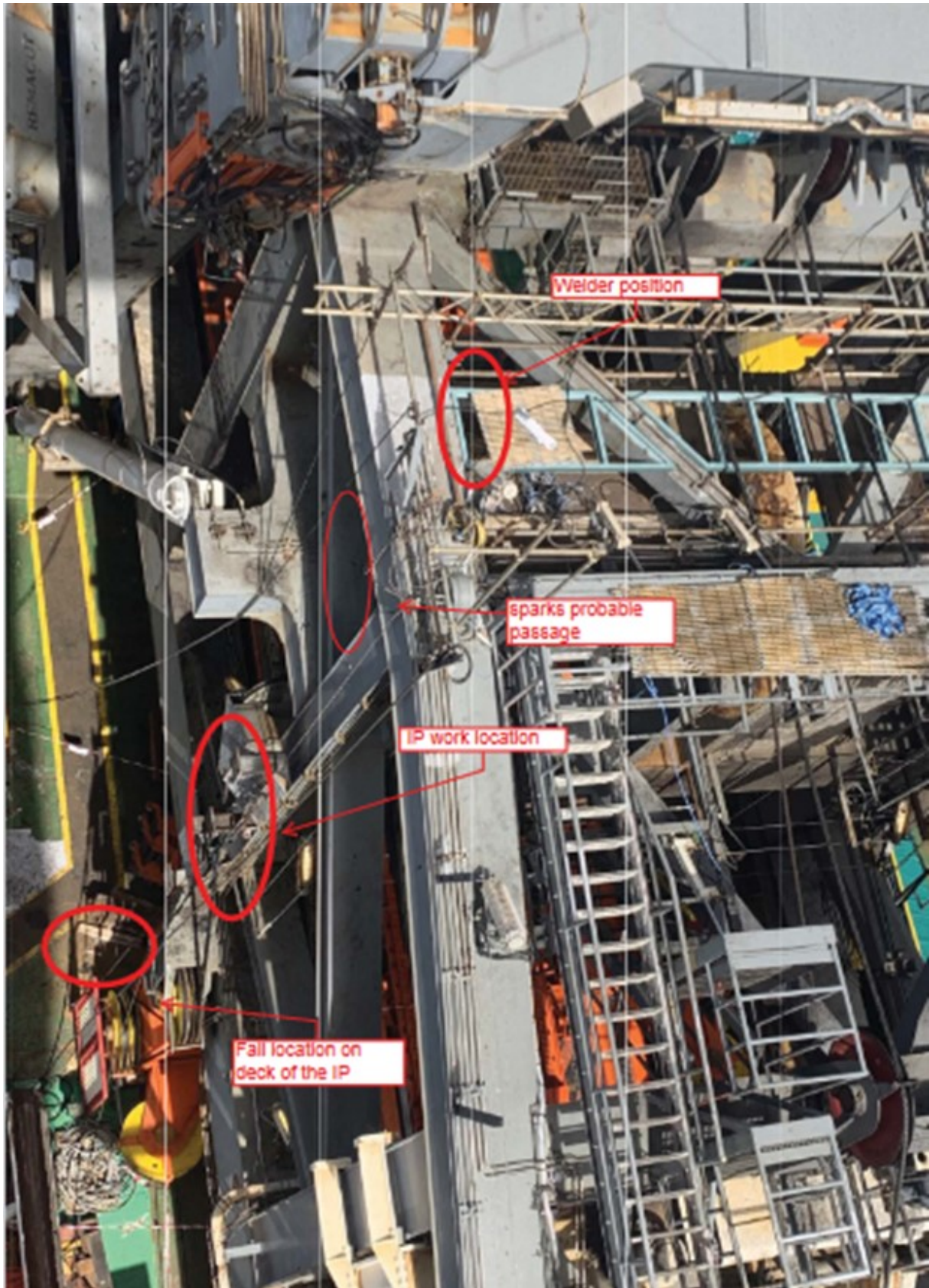
5. On 02 April 2022, the scheduled maintenance work on the JLT (which was in horizontal position) was continued by the two (2) workers of the Sub-Contractor “Top Rope”. Hereinafter referred to as “IP” and “IP Assistant”. At 06:50 Hrs ST, the IP re-applied for the Generic Permit -To-Work (PTW) No. 408, with respect to rope access works on deck area, for the 6th time. The initial issue was on: 27/03/2022. The “SAIPEM” First Assistant Superintendent who was their Supervisor, signed the PTW as Authorising Person and the Health, Safety and Environment Officer (HSE), as Permit Controller. The PTW No. 408 provided the following for Safety Equipment / Precaution: Gloves, Warning Signals / Barriers, Radio, Fall Protection Devices, and Fall Rescue Equipment.
6. From 07:00 Hrs ST, the IP Assistant, secured with a safety harness and safety line, was chipping on a surface of the JLT at about 8m height, in preparation for painting. The IP was attending on main deck. They had to change duties after the coffee time of 15:00 -15:30.
7. At 10:30 Hrs ST, the Vessel’s Management Team (VTM) and all Supervisors, attended the 12/Hour - Look Ahead meeting.
8. At 11:00 Hrs ST, the “Top Rope” employee IP Assistant, was chipping on the JLT.
9. At 14:40 Hrs ST, Construction Team Welders barricaded the area under the JLT for scaffold lifting and execution of the welding operation.
10. After coffee time from 15:00 - 15:30, the IP Assistant left the tea room and proceeded to the main deck. The IP was already there, below the JLT maintenance location.
11. At 15:30 Hrs ST, the Construction Team Welders returned from coffee break. Their Supervisor, the Off - Shore Pipeline Welding Foreman instructed the team (three Welders plus one Fitter), to prepare the installation of a new access platform.

He explained what to do: On JLT top scaffold, perform installation of new bridge platform (scaffold) – start tack welding on the new structure platform. The Off - Shore Pipeline Welding Foreman then left to do another job. The Construction Team Welders, lifted the new access platform (scaffold) on the JLT and began the welding operation, tack welding the scaffold in place. According to the Off- Shore Pipeline Welding Foreman, while instructing the welders, he was unaware of “Top Rope” IP working on the JLT. The Welders also stated they did not see the IP while they were working. The IP was working lower than the welders, but on the other side. The location of the Welders was a horizontal distance of 2 – 3m and vertical distance about 3– 4m higher from the position where the “Rope Access” workers were working.

12. According to the IP Assistant, shortly after the welders commenced welding, the IP was climbing up on the JLT, and the IP assistant told him that sparks were coming from the Welders working nearby on the other side. The IP replied that they were far from the Welders, and “is OK”.
13. The IP instructed the IP Assistant to bring paint.
14. The IP climbed up on the JLT, at about 8m height, and the IP Assistant proceeded to the paint room.
15. The IP was secured with a safety harness and safety line, in order to work at that height. He tied a can with thinner to his second safety line, which was hanging at his side. The IP used a needle gun and hard paper for grinding the metal surface of the JLT, followed by thinner for cleaning. His intention was to paint the metal surface of the JLT on the same day.
16. The Second Assistant Supervisor stated that at 16:10 Hrs ST, while he was on top of the main crane, he observed the IP working.
17. At about 16:15 Hrs ST, sparks emanating from the welding operation area, fell into the thinner can hanging to the side of the IP and ignited. After the thinner can caught fire, the IP panicked and tried to get rid of it by pushing the can away. The can came back and as a result, the thinner splashed and the flame spread onto him. The fire burned the safety harness and the rope securing it, causing him to fall down to the main deck. After falling on the main deck, he continued to burn.
18. In the meantime:
The IP Assistant arrived at the paint room, which was unlocked. Nobody was there to mix paint. While he was looking for the Bosun in order to mix paint for him, he heard someone shouting “fire-fire”. He ran back to where IP was working and saw people on deck. Looking up, he saw that the IP was burning. The IP Assistant ran around to go up the stairs intending to lower the rope of the IP. While climbing the stairs, he noticed the IP had fell down.
The First Assistant Superintendent received a call on VHF Ch.1 (construction channel) from the Second Assistant Superintendent, reporting a fire at stbd side. He went from port to stbd side, called the Navigation Bridge on VHF Ch.4, and said “Fire on JLT”. This was prior to him noticing the IP was burning. He called the Navigation Bridge again and said “Man on Fire at JLT”. The First Assistant Superintendent prepared a seawater hose and fixed it on a valve nearby, but before seawater started coming, the IP fell down on the main deck. The First Assistant Superintendent dropped just a bit of water on the IP and the ignited can with thinner, thus extinguishing the fire.
The Master was informed by the OOW that there was fire on deck and went to the Operation Control Room (OCR), where he saw a small fire on deck and a crew member with a hose

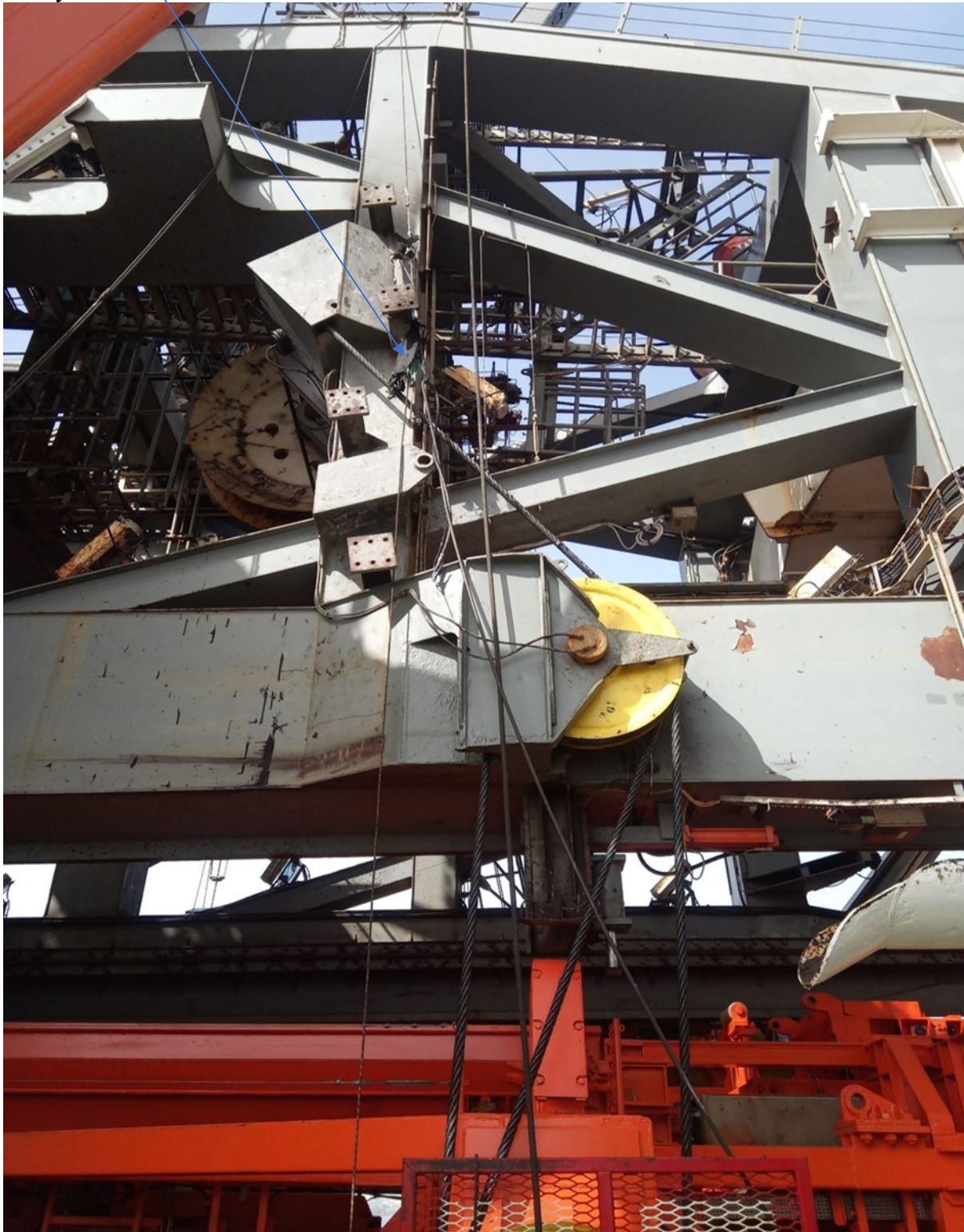
extinguishing the fire. The Chief Officer informed the Master on VHF Ch.4 that a man was burning, which prompted the Master to try and call the ship's Doctor in order to arrange a medical evacuation (MEDEVAC). The Master requested a boat from the ship's agent ATLAS before going on the main deck, to see what happened. The Doctor told him that it was too late. **The Doctor** arrived and examined the IP. He had no breath, pulse, or heart activity. The casualty was already deceased. The Doctor tried to open his airway, but it was impossible. The Doctor suggested transferring the casualty to the ship's clinic. At this time, his diagnosis of the casualty was: Thermal Injury 95% 3rd – 4th degree.

19. Crewmembers put the IP on a stretcher and transferred him to the ship's clinic, where the Doctor conducted his final examination of the casualty. The Doctor carried out 6 cycles of cardio-pulmonary resuscitation (CPR) without results.
20. At about 17:10 Hrs ST, the Service Boat "LEDRA PIONEER" arrived alongside the vessel.
21. At 17:40 Hrs ST, the IP was lowered by basket and stretcher to the Service Boat "LEDRA PIONEER" and was transferred ashore, to Limassol General Hospital.
22. The Doctor went ashore with the body and gave a statement to the Cyprus Police.
23. At about 20:30 Hrs, Cyprus Police Members boarded the vessel and carried out an investigation.
24. On 05 April 2022 Port State Control (PSC) Surveyors of the Deputy Ministry of Shipping, boarded the vessel and carried out a PSC inspection.



The possible route followed by the sparks.

Safety Harness remains



A burnt safety harness can be seen which remained stuck.

Analysis

(The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar accidents occurring in the future).

The following analysis is based on witnesses' interviews taken by the Investigator at Limassol anchorage, as well as documents provided by the Master.

4.1. The Crew

4.1.1 Certification

“SAIPEM FDS”, was manned with crew licensed, qualified and medically fit in accordance with the requirements of the International Convention on Standards of Training Certification and Watchkeeping (STCW) Convention as amended.

The victim was certified as a Level 3 Rope Access Technician by “IRATA” (IRATA is an acronym for the Industrial Rope Access Trade Association, that was formed in the UK in the late 1980’s). He was assessed at Level 3, which is the highest level. IRATA Certificate No.: 3/44127, Assessment Date: 03/12/2021, Expiry: 02/12/2024.

He also held a certificate of competence, having successfully completed the “Scaffold Erector Program” and “Scaffold Inspection Program” of the MBA Training Academy, registered with the Construction Education and Training Authority of South Africa (CETA).

A lack of certification was not a contributory factor to the accident.

4.1.2 Fatigue

The operation of the vessel is continuous. All crew works shifts of 12 hours on – 12 hours off. The victim was on a day-man shift. He rested the previous day from 19:00 until 07:00 in the morning i.e. 12 hours. Therefore, the victim was well rested.

Fatigue was not considered as a factor to the accident.

4.1.3 Manning Level

At the time of the incident the vessel was manned with a marine crew of 22, well in excess of the vessel’s Minimum Safe Manning Document (MSMD) providing for 20 crew.

Manning level was not a factor to the accident.

4.1.4 Working and living conditions

At the time of the incident the vessel had a Maritime Labour Certificate (MLC) along with a Declaration of Maritime Labour Compliance (DMLC) issued by her Flag State, Bahamas.

There was no evidence to suggest that the working and living conditions on board, were a contributory factor to the accident.

4.1.5 Physiological, Psychological, Psychosocial Condition

The victim was South-African. He was working for the Sub-Contractor company “Top Rope” with a specialty in working from height /acrobatic activity. According to the Master, he received no reports of any abnormalities, or strange behaviour regarding the casualty. At the time of the incident, the IP was not working alone, as he was working with his colleague who was down on the main deck. There is no evidence to suggest he was under the influence of drugs and / or alcohol which are prohibited on board the “SAIPEM FDS”.

The victim held a Seafarer Medical Certificate issued by the South African Maritime Safety Authority on 10/01/2022, in compliance with the STCW and MLC, 2006 Conventions as amended. He was certificated as Fit - No limitations or restrictions on fitness (without restrictions and not suffering from any medical condition likely to be aggravated by service at sea or to render the seafarer unfit for such service or to endanger the health of other persons on board) and Fit To Work At Heights, as well as Fit For Offshore Duty.

There was no evidence to suggest that the victim’s physical, physiological, psychological, or psychosocial condition was such that could have contributed to the accident. He was physically and mentally fit to perform his job.

4.1.6 Post Mortem Examination

At the time of writing this report, the Post-Mortem examination report was not yet issued. It is noted that the death certificate and the autopsy report are to be issued by the Local authority. The death certificate and autopsy report are to be issued by the Local Authority.

4.2 The Ship

SAIPEM FDS

“SAIPEM FDS” ship type is a Field Development Ship (FDS). “SAIPEM FDS” is a multi-purpose, Dynamic Positioning 3 (DP3) and self-propelled vessel, designed to lay rigid pipes, umbilicals & flexibles and install subsea structures in ultra-deep-water fields of over 2,000 meters. The pipe lay system is of J-Lay type, capable of launching 22” diameter pipes in J-lay configuration on the sea bed. The J-Lay tower has a holding capacity of up to 750 MT and a lifting capacity of up to 600 MT.

Pipelay tower (J-Lay Tower) in vertical position



J-Lay system's technical details

Pipe joints of 12m are pre-assembled into groups of four (quad) or six (hex), in a multi-joint facility, before being upended into the tower and deployed to the sea bed. End terminations and manifolds can be attached to the pipeline using the dedicated handling system, and lowered to the sea bed.

- Multi-joint pipe facility, for pre-assembling pipe joints
- Pipelay tower
- Loading arm, for elevating the pipe joint into the tower and aligning it with an outboard pipe for welding
- Workstations for welding, testing and coating the pipe joint prior to deployment, and for attaching pipe line accessories
- Friction clamps for holding onto the pipe line and lowering to the sea bed
- Pipe line end terminal (PLET) handling system, for inserting large structures in to the tower, and aligning with the pipe line for welding
- Abandonment and recovery (A&R) system, for lowering completed pipe line to the sea bed
- Automated pipe tracking.

Builder: Samsung Heavy Industries Co., Ltd.

ISM Manager: SAIPEM (Portugal) Comercio Maritimo, S.U., LDA – IMO 3018805
Ship Manager/Commercial manager: SAIPEM (Portugal) Comercio Maritimo, S.U., LDA – IMO 3018805
Registered owner: SAIPEM (Portugal) Comercio Maritimo, S.U., LDA – IMO 3018805

Flag: The Commonwealth of the Bahamas - Port of registry: Nassau
P&I Club: Standard P&I Club - Charles Taylor & Co

Class Society: American Bureau of Shipping (ABS) /(IACS) - Class #: 00152381,
ABS Services: Load Line Certification, ISM Certification, MLC Certification, ISPS Certification
ABS Class Notations: A1, Pipe Lay, AMS, ACCU, DPS-3
Additional Notations: CRC (I), PMP, RRDA, HELIDK, ENVIRO
ABS Last Renewal Survey 31/12/2020 / Next Renewal Survey 31/12/2025
Safety Management Certificate: Date of Survey 09/02/2022 - Date of Expiry 21/02/2027

Previous Class Society: Det Norske Veritas. Vessel originally classed by DNV and assigned with notation(s): Class DNV 1A1 ICE-C - Pipe Laying Vessel Crane Vessel SF COMF-V (1) HELDK E0 DYNPOS-AUTRO Operating Draught 7.4 m Propulsion System 2 x azi 2,200 kW, 2 x tun 2,000 kW, 2 x azi 4,400 kW POWER 25 MW (excl. emergency generator)
Displacement 26,600MT-Length 163m-Breadth 30m-Accommodation up to 245 beds

Port State Control (PSC) Inspections

Last PSC Initial Inspection by Paris MOU / Spain at Motril on 04/04/2021 with zero deficiencies.
Last More Detailed Inspection by Paris MOU / Netherlands, at Rotterdam on 23/01/2020 with zero deficiencies.

After the incident, a More Detailed PSC Inspection by Paris MOU / Cyprus at Limassol Roads, on 05/04/2022 with 5 deficiencies.

1. ISM - ISM related deficiencies / Not as required
2. MLC, 2006 - Ship's occupational safety and health policies / Not as required
3. Radio Communications - Inmarsat ship earth station / Not as required
4. Safety of Navigation - Monitoring of voyage or passage plan / Not as required
5. Safety of Navigation - Voyage data recorder (VDR) / Not as required

No.1 deficiency regarding MLC, 2006 - Ship's occupational safety and health policies / Not as required, was noted because of the hot work performed on board. On 02 April 2022, a Hot Work Permit was not requested from the Cyprus Ports Authority (CPA) for the hot work performed on the JLT. This factor will be considered under the Safety Management chapter of this report.

At the time of the accident the vessel had valid certificates including ISM, ISPS and MLC certificates. There were not any class or statutory conditions. There was no evidence of any defect or malfunction that could have contributed to the accident.

4.3 The Environment

The weather conditions on 02 April 2022 at 15:30 - 16:30 Hours, at Limassol Anchorage in position Lat.:34°40'N – Long.:033°04'E were: Sea State: Calm, Wind: SW/2, Day, Vis: Good. The vessel was neither rolling nor pitching. There were no waves or swells causing sudden movements of the vessel which could have caused the victim to fall from the safety harness.

There was no evidence that physical environmental factors, affected the actions of the victim.

4.4 Safety Management

4.4.1 General

“SAIPEM” is a leading company in engineering, drilling and construction of major projects in the energy and infrastructure sectors. “SAIPEM” is a global solution provider with distinctive skills and competence, with high-tech assets. Listed on the Milan Stock Exchange, it is present in over 70 countries worldwide and has 32,000 employees of 120 different nationalities.

4.4.2 Risks Connected with Health, Safety and the Environment (HSE)

For risks connected with health, safety and the environment, “SAIPEM” is using internal personnel and sub-contractors. “SAIPEM” has implemented internal procedures for the execution of its operations and regularly carries out maintenance work on its assets in order to monitor their quality and level of reliability.

An HSE (Health, Safety and Environment) management system has been developed in line with the requirements of international standards ISO 14001 and OHSAS 18001, the latter being superseded by ISO 45001. In particular, the HSE risk management is based on the principles of prevention, protection, awareness, promotion, and participation. Its aim is to guarantee the workers' health and safety and to protect the environment and general well-being.

A Safety Management System has been developed, as required by the International Safety Management Code for the safe operation of ships and for pollution prevention (ISM Code).

With regard to all vessels of its fleet, “SAIPEM” renews the statutory certifications issued by the classification societies and by flag states, including ISM, ISPS and MLC subsequent to audits carried out by recognised organizations on board the vessels and offices ashore.

In addition, on the basis of the technical characteristics and type of each vessel, “SAIPEM” fleet satisfies the requirements of the international regulations applicable in the Maritime and the Oil & Gas industry.

4.4.3 Vessel “SAIPEM FDS” Safety Management System

“SAIPEM FDS”, has a comprehensive Safety Management System (SMS) as required by the International Safety Management Code (ISM Code), which is well documented in the Safety Management System Manual (SMSM).

ISM-SMS Certificate was issued by Flag State, “The Commonwealth of the Bahamas” Certificate Number: 00152381-5123069-005.

Term: Full Term-Issue Date: 09-Feb-2022 - Expiry Date: 21-Feb-2027-State: Renewed 09-Feb-2022.

4.4.4 Vessel “SAIPEM FDS” Safety Management System Manual (SMSM)

The UK Code of Safe Working Practices (CSWP) is adopted by Flag State, “The Commonwealth of the Bahamas”. The vessel's Safety Management System Manual (SMSM) - Work Procedures and Operational Risk Management, is in line and complies, with the CSWP.

Requirements for all work procedures, including hot work, cold work and work at height, are contained in the ship's Safety Management System Manual (SMSM).

4.4.5 Preparation and Precautions Before Painting

Regarding preparation and precautions before painting, the CSWP provides that:

Quote

Painting

1 Introduction

1.1 Based on the findings of the risk assessment, appropriate control measures should be put in place to protect those who may be affected.

2 Preparation and precautions

2.1 Because the origin of any paint to be removed may be unknown, precautionary measures should be taken in all circumstances. Painted surfaces should always be rubbed down wet to reduce dust from the old paint, which may be toxic if inhaled. Where the dust is known to contain lead, other dust-treating methods should be used. Appropriate respiratory protective equipment should be worn as protection against other dusts.

2.2 If the surface to be rubbed down is known to contain lead, then methods that do not create dust should be adopted. It is safer to avoid or minimise dust creation than to try to clean up the dust afterwards. Sanding or abrasive blasting should be avoided. Lead-based paint should never be burnt off because fumes will contain metallic lead in a readily absorbed form.

2.3 Rust removers are acids and contact with unprotected skin should be avoided.

Eye/face protection should be worn against splashes (see Chapter 8, Personal protective equipment). If painting aloft or otherwise near ropes, care should be taken to avoid splashes on ropes, safety harness, lines, etc.

2.4 Interior and enclosed spaces should be well ventilated, both while painting is in progress and until the paint has dried.

2.5 There should be no smoking or use of naked lights during painting or until the paint has dried hard. Some vapours even in low concentrations may decompose into more harmful substances when passing through burning tobacco.

2.6 When painting is done in the vicinity of machinery, the power supply should be isolated and the machine immobilised in such a way that it cannot be moved or started up inadvertently. Appropriate warning notices should be posted.

3 Application of new paint

3.1 Paints may be considered hazardous substances and mixtures, and may present risks that require precautions to be taken. Packaging is required to be marked with warning signs, which will give the first indication of any risks. A risk assessment should be carried out using the safety data sheet provided with the product. Seafarers using such paints should be warned of the particular risks arising from their use.

Unquote

It has been underlined in the above extract from the CSWP that after a risk assessment has been made, preparation and precautions to be taken, include that painted surfaces should always be rubbed down wet to reduce dust from the old paint, which may be toxic if inhaled and where the dust is known to contain lead, other dust-treating methods should be used.

No reference is being made in the CSWP for the use of thinner in preparation before painting. Additionally, the Master and the SAIPEM First Assistant Superintendent reported to the Investigator categorically, this is not the practice being followed on board the vessel, and there are no instructions for the use of thinner before painting. Moreover, according to “SAIPEM”, thinner is kept on the dedicated store, not allowed to be used on deck”. Nevertheless, the IP Assistant stated, that before painting the surface is always cleaned (with thinner).

Paint and Thinner is controlled by the Marine Department. The Engine Department controls chemicals. “Top-Rope” have control over the materials they use, such as safety harnesses, ropes etc. The SAIPEM First Assistant Superintendent and the IP Assistant both stated that they did not know who gave the thinner to the IP.

The thinner was stored in the paint room, which is near the tea-room. The IP Assistant supposes that after coffee time, the IP left the tea-room and went to the paint room to take the thinner. This is because when the IP Assistant went out, the IP was already on the main deck at the area of their job. The IP Assistant also stated that he found the paint room’s door unlocked when he went to bring paint, and was looking for the Bosun in order to mix paint for him. If the door was locked and contents controlled (paints, thinner etc.) by a responsible person (e.g. the Bosun), the IP may not have taken and used the thinner on his own initiative. Therefore, the fact that the paint room’s door was unlocked and the sub contractors’ personnel had uncontrolled access, resulting in the use of flammable liquid by the IP without the knowledge of the IP’s supervisor, indicates that inadequate control was a contributing factor to the accident.

The use of thinner either as a practice being followed on the vessel, or as a private initiative, was a contributing factor to the accident.

The Paint room’s inadequate control was a contributing factor to the accident.

4.4.6 Hot Work permit not requested by the Local Competent Authority

The PSC No.1 deficiency regarding MLC, 2006 - Ship's occupational safety and health policies / Not as required, was noted because, for the hot work performed on board, on 02 April 2022, on JLT tower, a Hot Work Permit was not requested from the Cyprus Ports Authority (CPA). If a Hot Work Permit had been requested, either given or not, supervisors and ship’s management would have been more careful. Therefore, no request for Hot Work Permit from the Local Competent Authority, i.e., the CPA, as required by the vessel’s SMS, (for the hot work performed on 02 April 2022, on JLT tower), which resulted in inadequate supervision and no proper fire watch for hot work, was a contributing factor to the accident.

No request for Hot Work Permit from the Local Competent Authority was a contributing factor to the accident.

4.4.7 Operational Risk Management

Regarding Operational Risk Management, the CSWP provides for:

Quote

- Risk Assessment (RA)
- Permit-To-Work (PTW)
- Tool-Box-Talk (TBT)
- Management of Change (MOC)

Risk Assessment (RA)

The objective of a RA is to identify and mitigate risks to an acceptable level.

Risk Assessments should identify the following:

1. All hazards associated with the proposed operation.
2. The probability of a hazard causing harm to personnel, assets or environment.
3. The likely extent of the harm that may be caused.
4. Mitigation measures.

5. Assessment of the residual risk.

Associated with Item 4 above, changes in circumstances will prompt the work being stopped or the management of change process being invoked should be identified.

Permit to Work (PTW)

A permit-to-work system is a formalised and documented process used to control work which is identified as being potentially hazardous. It is also a means of communication between facility, vessel or base management and personnel who carry out the hazardous work.

PTW must be effectively communicated to all parties involved.

Permits to work are normally required for: hot work and working at height.

PTW is to:

1. Identify physical or other barrier arrangements to be put in place.
2. Be issued for a specific task, and for time period not exceeding 12 hours.
3. Make reference to RA and its outcome.
4. Identify all lock-outs and tag-outs which should be in place before the work commences.
5. Identify restrictions or limitations in concurrent tasks.
6. Be approved and signed off by an issuing authority.
7. Identify correct PPE is in place for the task to which the permit relates.
8. Where relevant, identify appropriate emergency response arrangements for the task to which the permit relates.

Toolbox Talk (TBT)

Immediately prior to the task being carried out personnel involved in the task should carry out a toolbox talk. This should include (but not limited to):

1. Individual roles
2. Tools, methods and procedures to be used.
3. Review RA and relevant PTW.
4. Promote “Stop the Job” culture.
5. Highlight all emergency actions and exit routes from the work site.
6. Confirm PPE required for the task.
7. Where relevant, confirm emergency response arrangements are in place.

Personal Protective Equipment (PPE)

Personnel shall be supplied with PPE appropriate to the tasks being undertaken and as identified within the procedures, risk assessments and other control measures established to ensure their health and safety.

- Use PPE correctly.
- Look after PPE properly.
- Get PPE checked, maintained or replaced as appropriate.

Management of change (MOC)

A management of change process should be in place for all tasks. MOC is an important tool in preventing accidents, incidents and near misses.

Tasks will normally commence and proceed in accordance with previously agreed procedures.

However, should unexpected changes in circumstance occur in the course of the task, the MOC process will be invoked at which time all relevant permits to work will be suspended.

The task should be stopped or suspended whilst the implications of the change are reviewed.

If appropriate, the RA should be reviewed before resumption of the task or the TBT revisited, prior to the suspensions of relevant permits to work being lifted.

Simultaneous Operations (SIMOP)

Those responsible for managing Simultaneous Operations, should ensure that the risk management processes are complied with and that, where relevant, representatives of the respective vessel management teams are fully involved or consulted.

Unquote

4.4.8 The following forms were completed:

Look Ahead Meeting

FORM OF SCTOF-HSE-001-E Offshore Construction Vessels 12 Hours Look Ahead Meeting.

Working at Height

SMSM Offshore Construction Vessels HSE Procedures Manual (Doc. No. STD-OF-SCTOF-HSE-004-E) paragraph 2.13: describes safe methods for working at height.

Specifically provides that due to the complexity of operations, “Rope Access” activities can be executed only by “IRATA” qualified sub-contractors.

Work at height shall be performed by minimum two workers from the work at height team, one working at height, and one acting as work at height attendant.

Risk Assessment

Doc. No. STD-OF-SCTOF-HSE-004-E paragraphs 2.13.2,3,4 provides for Risk Assessment (RA): Risk Assessment, Generic RA and Specific RA on a case-by-case basis is required for the assessment of the place of work at height, the selection of personnel, the selection of safety equipment and Personal Fall Protection Equipment (PFPE).

Permit To Work

Doc. No. STD-OF-SCTOF-HSE-004-E paragraph 2.9 provides that Permit-To-Work (PTW) is required when Hot Work and Cold Work activities are to be carried out, as well as activities identified by a Risk Assessment.

The Permit-To-Work (PTW) contains the execution of a Tool Box Talk (TBT) and the required Personal Protective Equipment (PPE).

Hot Work

Permit To Work (PTW) Form No.424

Dated 29/03/2022 @ 11:00 – Revalidated every 12 hours

On 02 April 2022 at 11:00 Hrs ST, the Welder Foreman requested revalidation for 8th time.

The “SAIPEM” First Assistant Superintendent who was their Supervisor, signed the PTW as Authorising person and the Health, Safety and Environment Officer (HSE), as Permit Controller.

Tasks to be performed: Hot Work on Jay Lay Tower & on Scaffolding

Person in charge of the work: Weld/Foreman & Pipe Fitter

JSA (Job Safety Analysis) Reference: JSA Weld 3

The PTW No. 424 provided for Safety Equipment / Precautions, the following: Hearing Protection – Gloves – Full Face Visor – Warning Signs / Barriers – Fire Extinguishers - Fall Protection Devices.

Job Safety Analysis

Doc. no. Form-OF-SCTOF-HSE-007-E (Rev.03)

Activity description: Hot work at Height JLT

JSA Ref. Number: Weld 3 - Dated: 29/03/2022

No.1 Job Preparation - Check-List no.4: No simultaneous operations were identified (SIMOP).

No.3 Welding and Oxy gas cutting-Check-List no.7: No Fire-resistant barriers were placed to prevent sparks reaching flammable materials.

No identification of simultaneous operations in the Job Safety Analysis (Hot work at Height JLT) Doc. no. Form-OF-SCTOF-HSE-007-E (Rev.03), as well as during the 12 Hours Look Ahead Meeting (FORM OF SCTOF-HSE-001-E), was a contributing factor to the accident.

No placement of Fire-resistant barriers to prevent sparks reaching flammable materials, was a contributing factor to the accident.

Tool-Box-Talk

Location: JLT Tower
Dated: 02/04/2022 @11:00
Signed by Supervisor and 6 Welders
Based on JSA Weld 3
Contains in Discussion Notes: Fire Watch for Hot work

Cold Work

Permit To Work Form (PTW) No.408
Dated 27/03/2022 @ 11:00 – Revalidated every 12 hours
Tasks to be performed: “Rope Access” work on main deck areas
Person in charge of the work: Construction RAT Level 3

On 02 April 2022 at 06:50 Hrs ST, the IP re-applied for 6th time (initial issue: 27/03/2022), for the Generic Permit -to-Work (PTW) No. 408, for rope access works on deck area. The “SAIPEM” First Assistant Superintendent who was their Supervisor, signed the PTW as Authorising person and the (HSE), as a Permit Controller. The PTW No. 408 provided for Safety Equipment / Precautions, the following: Gloves-Warning Signals / Barriers - Radio - Fall Protection Devices - Fall Rescue Equipment.

No placement of Warning Signals / Barriers as provided in the PTW No. 408 resulted in the activity to be unnoticed by the Welders who were working nearby, but in a position without visibility for the Rope Access activity. Despite the provisions of the PTW No.408 as above stated, “SAIPEM” alleges without having any evidence thereof, that the area underneath was barricaded and safe.

No placement of Warning Signals / Barriers as provided in the PTW No. 408 was a contributing factor to the accident.

Job Safety Analysis

JSA (Job Safety Analysis) Reference: RAT-01
Dated: 27/03/2022
Activity description: Non overboard “Rope Access” work.
JSA Ref. Number: JSA RAT 01

Tool-Box-Talk

Location: Main Deck Stbd
Dated: 02/04/2022 @07:00
Based on JSA RAT 1
Signed by Supervisor (Victim) and Assistant
Contains in Discussion Notes: All stop if anything observed unsafe (Stop Work Authority)

4.4.9 The Operational Risk Management requirements neglected are:

The Management Company’s Safety Management System (SMS) requirements were mostly implemented, and the required documents contained in the ship’s Safety Management System Manual were normally completed.

Regarding Operational Risk Management, the requirements of the CSWP which provides for Risk Assessment, Permit-To-Work, Tool-Box-Talk, Management of Change, as well as requirements regarding Simultaneous Operations, were mainly implemented, except some requirements which were neglected, as follows:

Requirements for Simultaneous Operations (SIMOP)

On 02 April 2022, at 10:30, the vessel's management team (VTM) and all Supervisors attended the 12-Hour look-ahead meeting. They were responsible for managing Simultaneous Operations. According to the CSWP, those responsible for managing such operations should ensure that the risk management processes are complied with and where relevant, representatives of the respective vessel management teams are fully involved or consulted.

The activity was carried out by the Construction Department, headed by the Off-Shore Construction Manager (OCM), He manages about 80 workers.

The Permits-To-Work are signed by the OCM, or his deputy, the First Assistant Supervisor. The Supervisor of the Construction department failed to ensure that the risk management processes complied with simultaneous operations, which were to be performed after the lunch break. Subsequently, sparks which were generated during welding activities were not contained and fell down to the area where "Top Rope" workers were working.

Therefore, no identification of simultaneous operations in the Job Safety Analysis (Hot work at Height JLT) Doc. no. Form-OF-SCTOF-HSE-007-E (Rev.03), as well as during the 12 Hours Look Ahead Meeting (FORM OF SCTOF-HSE-001-E), was a contributing factor to the accident.

Inadequate management of simultaneous operations was a contributing factor to the accident.

Stop work authority

Tool-Box-Talk on 02/04/2022 at 07:00 Hrs ST at Main Deck Stbd, based on JSA RAT 1, signed by Supervisor (Victim) and Assistant, contains in Discussion Notes: All stop if anything observed unsafe

While IP was climbing up on the JLT, his IP Assistant told him that sparks were coming from the welders who were working nearby. IP said that they are far from the welders and is OK. The IP then told to IP Assistant to bring paint. IP climbed up about 8m height, while the IP Assistant proceeded to the Paint Room. It is assumed that had the IP Assistant implemented his Stop Work Authority and disregarded instructions from the IP, the incident would not have occurred.

No implementation of Stop Work Authority was a contributing factor to the accident.

Management of Change (MOC)

Whilst preparation for painting tasks normally commenced and proceeded in accordance with SMS procedures, an unexpected change in circumstances occurred when welding operation started and sparks emanating from the welding operation area were falling at the painting task's area. The MOC process was not invoked and relevant permits to work were not suspended by the Supervisor of the "Rope Work" and the Off- Shore Pipeline Welder Foreman.

The job should have stopped or been suspended, whilst the implications of the change were reviewed. The Risk Assessments were not reviewed, nor the Tool Box Talks repeated, prior to the suspensions of relevant Permits-To-Work being lifted.

No implementation of Management of Change was a contributing factor to the accident.

4.4.10 Safety Management System overall implementation

No hot work permit was requested and received by the local Port Authority
No placement of Fire-resistant barriers
No placement of Warning Signals / Barriers
Uncontrolled use of thinner
Inadequate management of simultaneous operations
Permit-To-Work relevant to Top Rope activities not suspended nor withdrawn
No implementation of the Management of Change
No implementation of the Stop Work Authority

The above causes indicate a flaw in the implementation of the Safety Management System. It is considered, that this flaw, i.e., this inadequate implementation of the vessel's Safety Management System, collectively, was the root cause of the accident, as evidenced by the above-mentioned contributing factors of shipboard safety management system procedures, that were not effectively implemented to prevent the fire incident.

Inadequate implementation of the vessel's Safety Management System, was the root cause of the accident.

6. Conclusions

Root Cause(s)

(If corrected, the same accident will not happen again)

Inadequate implementation of the vessel's Safety Management System, was the root cause of the accident.

Direct Cause:

(The immediate events or conditions that caused the accident)

Sparks generated during welding activities were not contained and fell down to the area where "Top Rope" subcontractor workers, were working, caused the ignition of the liquid contained in the can hanging next to the victim and subsequent fatality.

Contributing Cause(s):

(An event or condition that collectively with other causes increases the likelihood of an accident but that individually did not cause the accident)

Inadequate management of simultaneous operations was a contributing factor to the accident.

Permit-To-Work relevant to Top Rope activities, not suspended nor withdrawn was a contributing factor to the accident.

No implementation of Management of Change, was a contributing factor to the accident.

No implementation of Stop Work Authority was a contributing factor to the accident.

The use of a flammable liquid cleaner (thinner), either as a practice being followed on the vessel, or as a private initiative, was a contributing factor to the accident.

No placement of Fire-resistant barriers (blanket) during hot work activity, to prevent sparks reaching flammable materials was a contributing factor to the accident.

No placement of Warning Signals / Barriers during work at height as provided in the PTW No. 408 was a contributing factor to the accident.

Paint Room's inadequate control was a contributing factor to the accident.

Safety Issue:

No request for hot work permit from the Local Competent Authority, i.e., the Cyprus Ports Authority, for the hot work performed on 02 April 2022, on J-Lay Tower.

7. Recommendations

To the Vessel's Management Company

An ISM Follow-Up Internal Audit to be carried out. (Within 3 months)

In the SMSM a requirement to be inserted, that all subcontractors to participate in the Vessel Management Team 12 hours look ahead meeting. (Within 3 months)

Training to be provided to all involved personnel on board “SAIPEM FDS” regarding:

- Risk Assessment (RA)
- Permit-To-Work (PTW)
- Tool-Box-Talk (TBT)
- Management of Change (MOC)
- Management of Simultaneous Operations (SIMOPS) (Within 3 months)

A Circular to be distributed to all “SAIPEM” vessels of the incident, highlighting the importance of:

- Risk Assessment (RA)
- Tool-Box-Talk (TBT)
- Management of Change (MOC)
- Management of Simultaneous Operations (SIMOPS) including inspection of the area before starting an activity
- Stop-Work-Authority
- Permit-To-Work (PTW) including its withdrawal when necessary
- Proper fire watch and protection including the use of fire blanket during hot work activities (Within 3 months)

Subcontractors to be trained as per “SAIPEM” Health-Safety-Environment (HSE) training matrix. (Within 3 months)

Management Company to advise Masters to follow the Local Port Authorities regulations and procedures including Hot Work Permit from the Local Competent Authority. (Immediately)

Bosun to be advised to use padlock and control paints, thinners, solvents etc. (Immediately)

To Local Ship Agents

Local Ship Agents to advise ship masters to implement Cyprus Port Authority's regulations, as notified by their circular, regarding scheduled works in ports and anchorages of the Republic, including hot work. (Immediately)