Incident Investigation Report

Title: HAUV Garage LARS Integration Testing

Project: EA / OGGS Pipeline Inspection survey

Investigation committee

The Interim report shall be completed by **28/10/2024**.

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1. Method of Work

Compass Survey Limited/ Fadfae Engineering services Limited applies the Kelvin TOP-SET root cause analysis methodology. A small investigation team, as specified in the Terms of Reference (TOR), was formed.

After a short initial planning and advance discussion session the investigators studied the scene, took photographs, and examined records and documents.

A significant part of the investigation is the interviewing of all witnesses including any injured parties.

2. Terms of Reference

An investigation is required into the circumstances leading to and the causes of the HAUV GARAGE LARS INTEGRATION TEST FAILURE that occurred on 24/10/2024 at 15:56 local time.

Investigation Teams

Investigation Team - Vessel: VEGA NBA BLESS

Name	Title
1. IMRAN MUBARAK	SDPC REP
2. JAJA TAMUNODIENYE	CSL REP
3. ONYECHEFULE TOCHUKWU	FADFAE REP
4. OPARAJI GERALD	CSL SAFETY COACH
5. MATTHEW GOSSETT	PXGEO HAUV SUPERVISOR
6. JONATHAN RYDING	MANTA HAUV TECHNICIAN

Investigation Review Team-

Name	Title
1. Peter Halim	Project Owner, SPDC
2. Olajide Fagbewesa	Project Manager, SPDC
3. Joshua Oriero	Project Manager, CSL
4. Bright Adieze	Project Manager, FADFAE
5. Derren Plaister	Operational Support Manager, Manta

The intended outcome of this investigation is to:

- Determine the sequence of relevant events leading up to the incident.
- Identify the Immediate, Underlying and Root causes
- Make suitable recommendations (SMART Actions) to prevent the same or similar occurring again.
- The report shall be supported with photographs and/or diagrams including Root Cause Analysis.

The investigation has considered the following:

- Requirements and compliance with company standards
- The effectiveness of safety critical barriers.

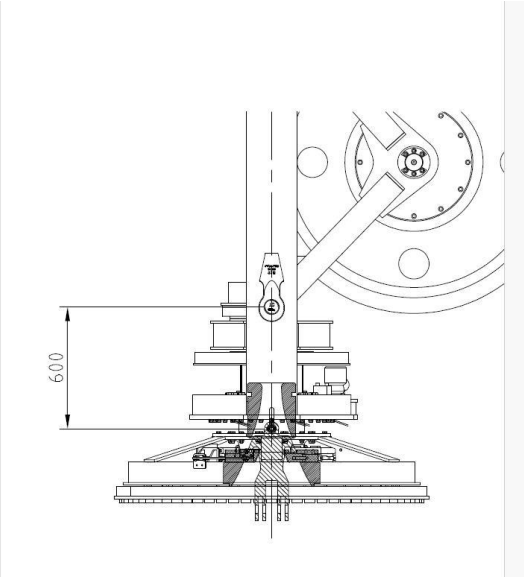
3. Incident Details

Executive Summary

The swage of the Steel Wire Rope (SWR) separated during onboarding tests of the manta HAUV garage. Only the LARS umbilical and spelter socket fell to the quayside after striking the LARS A-frame base. The HAUV Garage remained latched in the snubber of the A-frame and suspended around 4-5m above the ground. The garage was safely recovered to the deck of the A-frame and no personnel were injured.

What Happened

When tension was applied to the umbilical to raise the SMD interface bullet above the snubber, the SWR parted. see diagram below *indicating SMD snubber arrangement:*



Smd snubber arrangement

Detailed Description of the Incident

Toolbox talk carried out on the morning of 24-10-2024 detailing the actions of the day and highlighted LARS integration testing that afternoon. JHA was also carried out by safety coach before commencement of operations. At approximately 1400 a mobile crane was used to load the HAUV garage from the quayside to the LARS A-frame deck. The connection between the HAUV garage and the LARS SWR was made and secured. A group discussion, about testing procedure and sharing responsibilities, took place amongst the following:

- HAUV Supervisor
- HAUV Technician
- LARS Operators
- Project Engineer
- Safety Coach

After the initial discussion, the Project Engineer and HAUV Technician proceeded to the operational area (quayside) to ensure no access of persons to the operational area and the Bosun was informed to secure the gangway to ensure no access of personnel to the operational area from the vessel. Safety coach remained at the gangway position onboard with the Bosun to enforce this.

HAUV supervisor and LARS operators proceeded to their position on the mezzanine deck next to the operator's console. At 1525hrs the LARS was energized and the HAUV Supervisor instructed the LARS operator to center the A-frame and take the weight of the garage. The operator was then instructed to come up and lock the garage into the snubber. The HAUV supervisor then instructed the operator to take the weight of the garage and release from the snubber and come back down to complete function test and deemed successful.

Operator was then instructed to take the weight and lock back into the snubber; done successfully. The operator was then instructed to extend the A-frame to full extension; done successfully. HAUV supervisor then instructed operator to rotate the garage 90 degrees; done successfully. The next phase was to test lowering to 'seabed'. The HAUV supervisor instructed the operator to take the weight of the garage to release from the snubber, at this point during tensioning a breakage occurred and the main umbilical and spelter socket was roved back through the sheave wheel, made contact with the base of the LARS A-frame and then fell to the ground.

Consequences

Actual Outcome with risk severity rating – SWR parted, no casualties, minor damage to equipment: Severity - HIGH

Potential Consequences with risk severity rating – serious injury / permanent total disability / fatality: Severity - HIGH

Personnel Involved

The incident investigation process involved discussions/interviews with a number of witnesses directly or indirectly involved in the events that lead to the incident:

Name	Title
1. Oparaji Gerald	Safety Coach
2. Onyechefule Tochukwu	Project Engineer
3. Matthew Gossett	HAUV Supervisor
4. Jonathan Ryding	HAUV Technician
5. Jude Onyeishi	LARS Supervisor
6. Kennedy Akuocha	LARS Technician

4. Findings of the Investigation

Incident Timeline

Event Description	Time Before Incident (minutes)
1. Garage Loaded	1400
2. LARS energised	1525
3. Integration tests started	1530
4. Incident occurred	1556
5. Site made safe / Garage back on LARS A frame base	1610

Immediate Causes of the Incident

1. Parting of lifting wire when under tension

Underlying Causes of the Incident

1. Inadequate inspection of equipment / SWR sling
2. Improper review of testing certificate for SWR sling prior to use
3. Poor quality of SWR
4. Over-tensioning of LARS umbilical
5. Potential incorrect set-up of LARS (awaiting document review)

Root Causes of the Incident

1. Management System
2. Standards not followed during equipment manufacture

5. Conclusions

1.Inadequate Policies or Procedures

- If there aren't clear policies or documented procedures for certain operations, employees may not have enough guidance to carry out tasks safely and effectively. This gap often leads to inconsistent practices, which increases the likelihood of incidents.

Ensure adequate policies and procedures for operations are in place that follow best practice / industry standards.

These standards and procedures must be enforced and adequately documented by management team and subject to periodic review.

2. Insufficient Training or Competency Requirements

- A management system that fails to ensure employees are trained, qualified, and competent in their roles can lead to errors. When staff lack the necessary skills or awareness, mistakes or unsafe actions may follow, leading to incidents.

Ensure relevant training and competency review of staff regarding the operations / role / task they are assigned and where/when necessary, retrained.

3. Weak Communication and Reporting Channels

- Communication is critical in managing risks and responding to incidents. If the management system doesn't encourage open communication, or if reporting channels are unclear, it can prevent safety concerns being raised or captured and the necessary reporting of near misses that could prevent future incidents.

The management system should adopt clear and open lines of communication and embrace a 'no blame' culture so staff feel confident that they can report safety hazards / risks without fear of repercussions.

4. Lack of Accountability and Oversight

- A management system should define roles and responsibilities clearly. If there's a lack of accountability, oversight, issues may not be addressed promptly. This can foster a culture where shortcuts go unchallenged, raising the likelihood of incidents.

Terms of reference should be clearly defined and agreed to by individuals who are assigned a particular role/task.

5. Inadequate Resources

- If the management system doesn't allocate sufficient resources— finance, staff, equipment, or time—this can lead to overworked employees, deferred maintenance, or the use / procurement of inadequate tools or equipment, all of which increase risk.

The management system is to ensure time/resource management is delegated appropriately and allowances made for delays and unforeseen circumstances.

In summary:

- When the management system itself is the root cause, it often indicates a failure in creating a safe and effective work environment. Fixing systemic issues at the management level can significantly reduce the likelihood of incidents by ensuring that employees are equipped, informed, and encouraged to work safely.

6. Recommendations

The following are recommended either corrective or preventive actions to be taken as a result of this investigation.

Action Description (Specific, Measurable & Achievable)	Action Type (corrective/preventative	Priority (H/M/L)	Target Date (DD-MMM-YY)	Action Owner
1. Full torque check of garage	Corrective	H		CSL / Fadfae
2. NDT of garage welds	Corrective	H		CSL / Fadfae
3. New bushings procured to replace defective items	Corrective	H		CSL / Fadfae
4. New shackle with adequate documentation / load test cert	Corrective	H		CSL / Fadfae
5. New SWR with adequate documentation / load test report	Corrective	H		CSL / Fadfae
6. Load test carried out of garage	Corrective	H		CSL / Fadfae
7. Energy chain inspected by competent person	Preventative	H		CSL / Fadfae
8. Pull test of LARS + Mezz load calculations	Corrective	H		CSL / Fadfae
9. Load test carried out on LARS and certificate issued	Corrective	H		CSL / Fadfae
10. Re-termination of spelter socket IAW wirelock procedure	Corrective	H		CSL / Fadfae

7. Appendix A – Root Cause Diagram

8. Appendix B – Witness Statements

9. Appendix C – Diagrams, Photo's and/or Graphics

(Which may help explain the incident and how it occurred)

10. Appendix D – Supporting Documentation

(any supporting documentation which may help provide insight into the occurrence, whether scans of Ships Log book, maintenance records, department logs, PTW's or other Management System documentation)

Table of Amendments