

SWAGELOK HOSE ADVISORY SERVICES

Swagelok Hose Advisory Services (HAS) is a service program offered by Swagelok in which we use our industry expertise in fluid system design to help improve hose life and hose performance at your facilities.

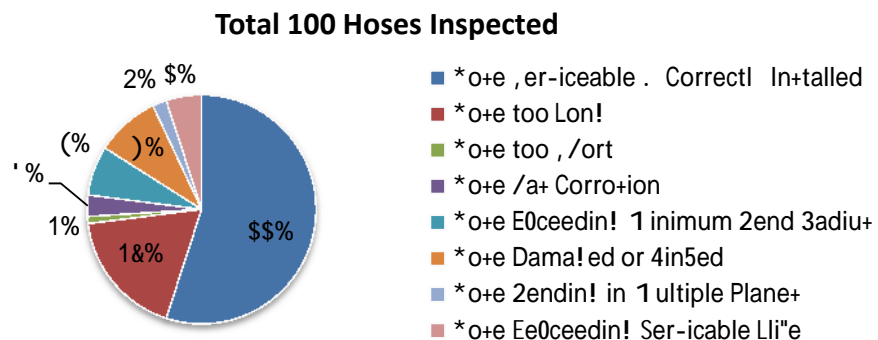
A Swagelok Hose Advisor serves as your partner and trusted advisor to troubleshoot hose-related problem areas that may exist at your facilities. The service can be tailored to the your requirements but can consist of;

- Inspection, evaluation and advice on installed hoses
- Audit of installed hoses and development of a detailed Hose Bill of Materials
- Compilation of hose datasheets
- Development of a hose management plan

EXECUTIVE SUMMARY

The executive summary provides an overall summary of the hoses installed. The main points in the executive summary are;

- An introduction to the service carried out onsite
- Summary of the main findings and common themes found during the survey
- Highlighted areas of concern
- General recommendations for improvement
- Statistics of issues found. For Example;



SURVEY SCOPE OF WORK

- Details the scope of work conducted on site
- Sets out the objectives that were to be achieved
- Details the deliverables on completion of the survey

METHODOLOGY

- Explains how the survey was conducted
- Details the tools and technologies used to carry out the survey, for example;
 - An intrinsically safe Tablet was used to recorded information during the survey
 - An intrinsically safe camera was used for photography during the survey
 - Ultrasound equipment and a liquid surfactant were used to find gaseous leaks



TEAM MEMBERS

Swagelok works closely with your organisation to understand your pain points, how they affect your operation, the criticality of your systems and what you want to achieve. The Swagelok team and your personnel involved in this evaluation are listed below.

Client Personnel

Name
Company
Position

Swagelok Personnel

Name
Company
Position
Email

FACILITY AREAS INSPECTED

This section lists the areas of the facility that were inspected, using the client's terminology, tag numbers and reference documentation.

STRATEGIC OBSERVATIONS

This section explains the common issues identified during the survey. For each issue type, the issue is explained and potential causes and remediation suggested.

- Identify the issue and explain why it is an issue and the potential consequences if not rectified.
- Potential causes of the issue are identified and explained.
- A solution to rectify the issue and prevent it reoccurring is proposed.

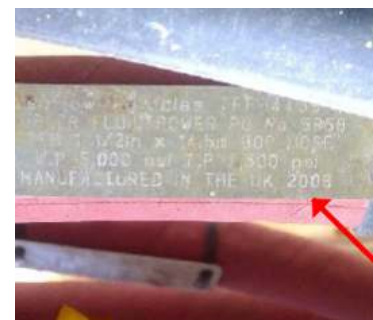
Other issues indirectly related to the condition of the hoses such as handling of hoses, hose selection for application, environmental factors and maintenance may be discussed in this section.

Example Only

Hoses exceeding their serviceable life.

The majority of hoses installed on the swivel were manufactured in 2008 according to their hose tags. For the hoses that were able to be fully inspected (access permitting), all of them were showing signs of degradation of the outer casing. Degradation of the outer casing can allow moisture to ingress the steel reinforcing wire causing corrosion which compromises the structural integrity of the hose.

Hoses installed on equipment critical for safety or operation should be replaced every 4 years. Swagelok recommend all Swivel hoses older than 4 years be replaced at the next available maintenance interval. A maintenance schedule should be put into place for regular inspections and replacement at the recommended interval.



SUMMARY OF HOSE ISSUES

Table format showing a summary of the hoses tagged during the survey.

Example Only

Tag ID	Hose ID	Category	Location	Findings	Suggested Improvements
#	#	1	(Area & ID No.)	Hose has corrosion	Replace immediately
#	#	3	(Area & ID No.)	Hoses too long	Replace hose with correct length
#	#	3	(Area & ID No.)	Hose exceeding minimum bend radius	Replace hose and reroute
#	#	2	(Area & ID No.)	Hose exceeding serviceable life	Replace at next maintenance interval

Note: Refer to Appendix A for detailed information on each inspected hose in the table above.

REFERENCES

All client and Swagelok documentation used for the survey will be listed here, in addition to any relevant standards and specifications.

SWAGELOK PRODUCTS, SERVICES & CONTACT INFORMATION

Swagelok offer a wide range of hoses, compression fittings, pipe fittings and valves which can help to improve the reliability and safety of your systems.

Swagelok also provide site support services which include design of small bore tube and hose installation, training and site support or supervision of small bore tube and hose installation.

Thank you for allowing Swagelok to be of service. Please contact Swagelok if we can be of further assistance on any items contained within this report.

Email: [XXXXX](#)
 Phone: <https://anz.swagelok.com>
 Website: +61 8 9331 1111

Disclaimer


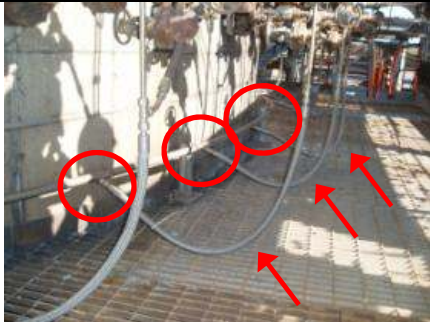


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APPENDIX A

Hose Installation Survey Findings

Example Only

Area and Condition	Image	Recommended Solution
<p>[Area & Tag No.] Hose is in contact with a scaffold pole. Vibration has caused the outer casing of the hose to wear through allowing the inner hose wire to start corroding. This hose is pressurised to system working pressure of 350Bar.</p>		<p>Corrosion of the reinforcing wire has compromised the structural integrity of the hose. The hose should be depressurised immediately and replaced.</p>
<p>[Area & Tag No.] Hoses are too long for the installation. This allows the hoses to rest on the ground, increasing the likelihood that the braid will be damaged. Hoses also pose a trip hazard to personnel. The hose connection to the ring manifold (circled) could also be improved by adding an elbow to reduce stress on the hose end connection.</p>		<p>Use proper length hoses throughout the facility. Focus on good routing practices that minimise stresses in the hose assembly, including using elbows into component or manifold connections.</p>
<p>[Area & Tag No.] Hose on the left is exceeding its minimum bend radius. Hose kinking can occur, eventually causing collapse of the hose.</p>		<p>Hose on the right is routed correctly. Suggest the left hose be installed with an elbow on the pump to produce a large radius bend in the hose. Suggest a new hose be installed.</p>
<p>[Area & Tag No.] Cracks evident in the hose outer casing. Manufacture date on hose is 2008. Cracks in the outer casing can allow moisture to ingress the inner reinforcing wire, causing corrosion.</p>		<p>The hose is beyond its serviceable life and showing signs of degradation. Considering the criticality of this hose to production, the hose should be replaced at the next available maintenance interval.</p>



APPENDIX B

Hose Inspection Criteria & Preventative Maintenance – Hoses in Service

Example Only

Hose inspection interval and replacement is predicated by Swagelok’s position that symptoms like leaks or hose issues are safety incidents. Hoses should be inspected when installed and regularly when in service, for the following conditions. More frequent spot inspections might be necessary for unforeseen circumstances.

Condition	Correct Installation	Incorrect Installation	Remedy
<p>Minimum Bend Radius Follow minimum bend radius requirements for your hose. Installing hose with smaller bends may kink hose and reduce hose life.</p> <p>Hose rupture or leakage may result from bending too close to the hose/fitting connection.</p>	<p>Correct</p>	<p>Incorrect</p>	<p>Reinstall the hose to correct the installation. A longer hose may be necessary to achieve the necessary bend radius.</p>
	<p>Correct</p>	<p>Incorrect</p>	
<p>Hose Strain Elbows and adapters should be used to minimize or relieve hose strain, especially at the end connections.</p>	<p>Correct</p>	<p>Incorrect</p>	<p>Reinstall the hose using an elbow or adapter to alleviate the strain on the hose. A different length hose may be necessary once the elbow or adapter is installed.</p>



APPENDIX D

Hose Datasheets

Example Only

The Hose Datasheet provides detailed information on each hose including, system parameters, hose parameters & construction, testing requirements and installation notes.

Data Sheet for HOSE			
1	Tag No. :	05SP21935	Parent Tag No : AU05.05A040001A
2	Service :	LUBE OIL RETURN LINE	Equipment Class (SAP) : HSHY
3	P & ID No. :	EH2200XP1007.0001	Manufacturer : SWAGELOK
4	Installation/Facility :	OKHA FPSO	Model: PB SERIES
5	Plant Location :	VRU BLOWER A, MODULE 7	Model Rev No. :
6	Project :		Serial No. :
7	Purchase Order No. :	4510207329	Year of Manufacture : 2012
8	Calculation Ref. :		Construction Type (SAP):
9	Project Equipment No.		Design Book No. Page:
10	Contr. Job No.		SAP Material No.
GENERAL DATA			
12	Design Code		AS 3791
13	Design Specification		SAE 100R6
14	Fluid Service		LUBE OIL
15	Hose Size	mm	19
16	Hose Service		LUBE OIL RETURN LINE
17			
PROCESS INFORMATION			
19	Maximum System Pressure	kPag	1500
20	Hose/End Connections Pressure Rating		2000
21	Fluid Temperature Range (min/max)	*C	0 90
22			
PIPING INFORMATION			
24	Piping Class		Vendor package
25	Line Size	mm	19
26			
HOSE MATERIAL			
28	Core		SMOOTH BORE BUNA N
29	Reinforcement		RAYON FIBER BRAID
30	Cover		BUNA N
31	*Additional Hose material information such as class, type or material, please add it to the Additional Data Section.		
32			
HOSE CONSTRUCTION DETAILS			
34	Working Pressure Max	kPag	2000
35	Burst Pressure Min	kPag	8000
36	Length of Hose	m	3.2
37	Min Bend Radius (without injury to hose)		178
38	Type of Coupling/End Conn.(Note 3) - Upstream Conn		3/4" NPT MALE STRAIGHT
39	Type of Coupling/End Conn.(Note 3) - Downstream Conn		3/4" NPT MALE STRAIGHT
40	Coupling/End Connection Material		316SS
41	Method of mounting coupling or end connection onto hose (Note 4)		PUSH ON
42	Abrasion Resistant Internal Lining Required		Not Applicable
43	Abrasion Resistant Body Cover Required		Yes
44	Body Marking for Hose Required		No
45	End Couplings/Connection Marking Required		No
46	Fire Resistant Hose Required/Applicable Standard		No Not Applicable
47	Electrical Characteristics		Antistatic
48			
TESTING REQUIREMENTS			
50	Hydrostatic Test Pressure	kPag	3
51	Pneumatic Test at Design Pressure (Note 1)		Not Applicable
52	Electrical Continuity Tests (AS1180.13) (Note 1)		Not Applicable
53	Deformation Under Pressure Test (AS1180.5) (Note 1)		Note 1
54	Burst Pressure Test (AS1180.5) (Note 1)		Note 1

