

Bitumen Storage Tank Content Gauges and High Level Alarms

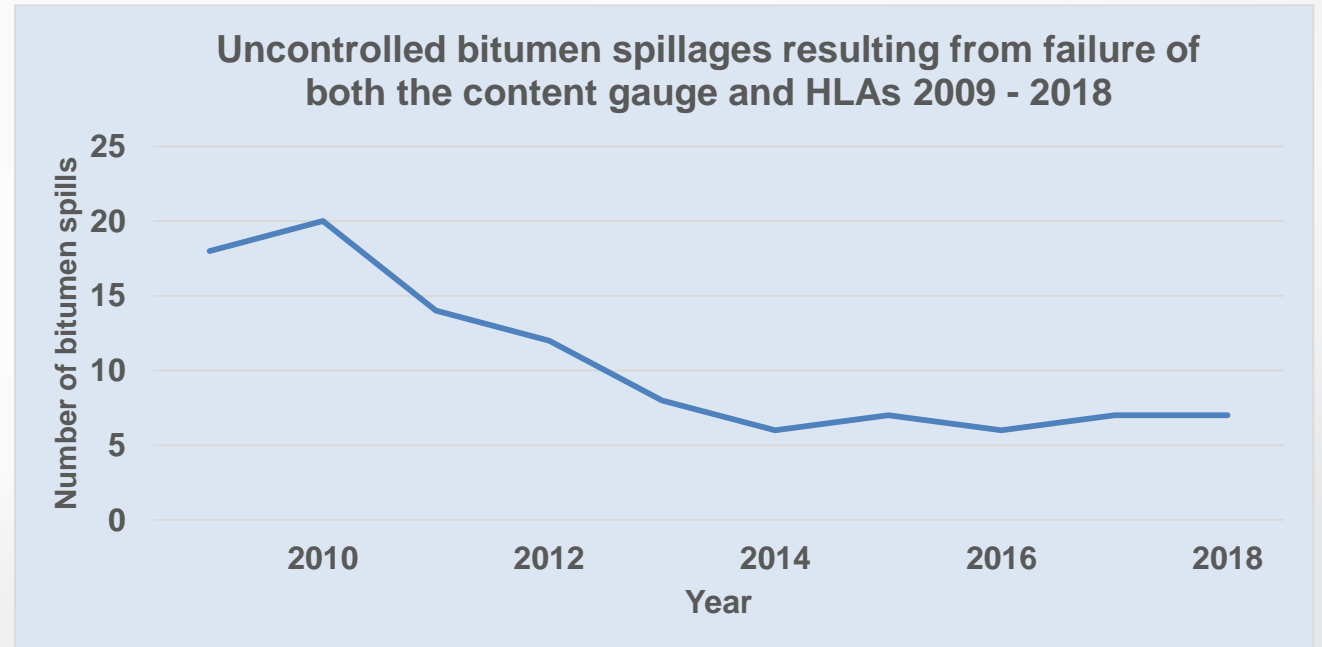
Contents

- Introduction
- Content Gauges
- High Level Alarms
- Storage tank Safe Working Capacity
- Further guidance documents and toolbox talks



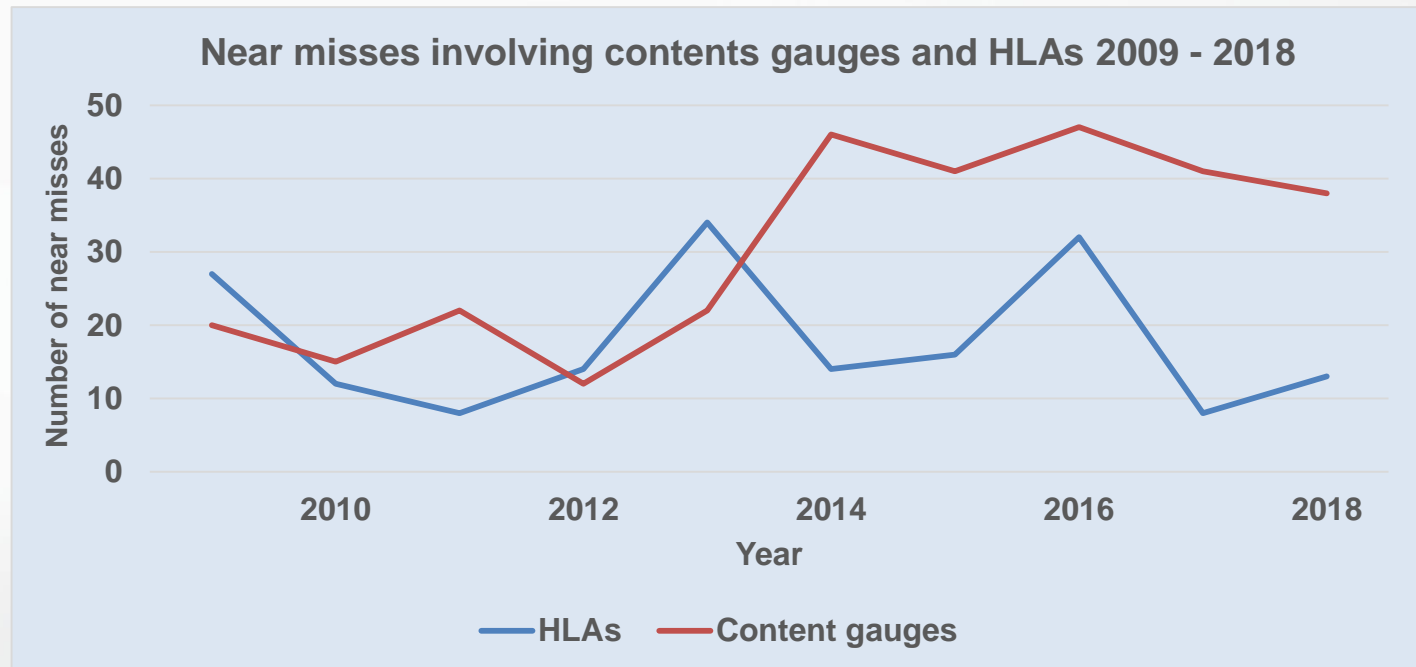
Introduction

- The number of uncontrolled spills of hot bitumen, resulting from failure of both the content gauge and High Level Alarms (HLAs), has fallen significantly over the last 10 years.
- However, in the last 5 years the number has plateaued with 6 or 7 bitumen spills per annum.



Introduction

- The number of near misses involving HLAs vary significantly from year to year. However, there is no clear evidence that the number of near misses involving HLAs is reducing.
- The number of near misses involving content gauges has been significantly higher in the last 5 years.



Content Gauges

- It is important that content gauges are able to operate reliably in the extreme environment within a bitumen storage tank.
- There are a number of options available. Discuss these with gauge manufacturers and your bitumen supplier.
- Content gauges require regular maintenance. Service logs should be kept and maintained up to date.

Calibration of Content Gauges

Calibration Certificate
Company x

Certificate of Calibration
Form NBT (Version 1.1.1, Version 1.1.1, 2007)
Certificate Number 228412

Customer: Christus Kluiters
NBT Sales Center/A: 0411521
Gage Model: 502-05 S/N: 0902852
Gage Status: New Transducer Status: 500
Operational Software: 1.1.1.2.0 S/N: 50208
Transducer Model: 070 S/N: 50208
Temperature: 22 Humidity: 35

This certifies that calibration of the above ultrasonic thickness gauging system has been verified within the tolerance and measurement range indicated below, using calibration standards with measured thickness traceable to the National Institute of Standards and Technology (N.I.S.T.). The calibration standard material is GAGEBLOCKS. The test procedure used conforms to the requirements of ISO 9001 section 7.6.

All units below are: 0.0008

Test Block S/N	System Calibration Data		Deviation	Tolerance	Within Tolerance?
	Certified Length	Measured Length			
1200	0.00000	0.000	.0000	.004	YES
1201	0.07015	0.070	.0000	.004	YES
1202	0.14030	0.140	.0011	.004	YES
1203	0.21045	0.210	.0000	.004	YES
1204	0.28060	0.280	-.0000	.004	YES
1205	0.35075	0.351	.0011	.004	YES
1206	0.42090	0.420	-.0001	.004	YES
N/A	N/A	N/A	N/A	N/A	N/A

Gage Serial: 502
Gage Status after Calibration: 50208 (Active)
Gage Zero after Calibration: 500

Note: The measurement accuracy of any ultrasonic gauging system is dependent on the performance and proper usage of both the gage and transducer. The operator of calibration identifies the part number and serial number of the gage and transducer used to make the actual measurements. System performance with other transducers may differ, especially with transducers that have been subjected to excessive wear or overheating. The user assumes responsibility for verifying system accuracy if the gage is used with transducers other than the one described on this certificate. It is the responsibility of the user to periodically verify system calibration as outlined in the instrument operating manual.

Comments: 502
With the exception of currently tests on repaired gages, show the above gage pass all test requirements of Parametric procedure 020.1002-1122019
Special Setup Approval: 502

Technician: Hoang, Naveen, Electronic Technician Date: 10/20/2008 at 8:45:10 AM

Signature: _____

Telephone: 761-419-3800
Fax: 761-419-3800
http://www.parametric.com
http://www.parametric.net

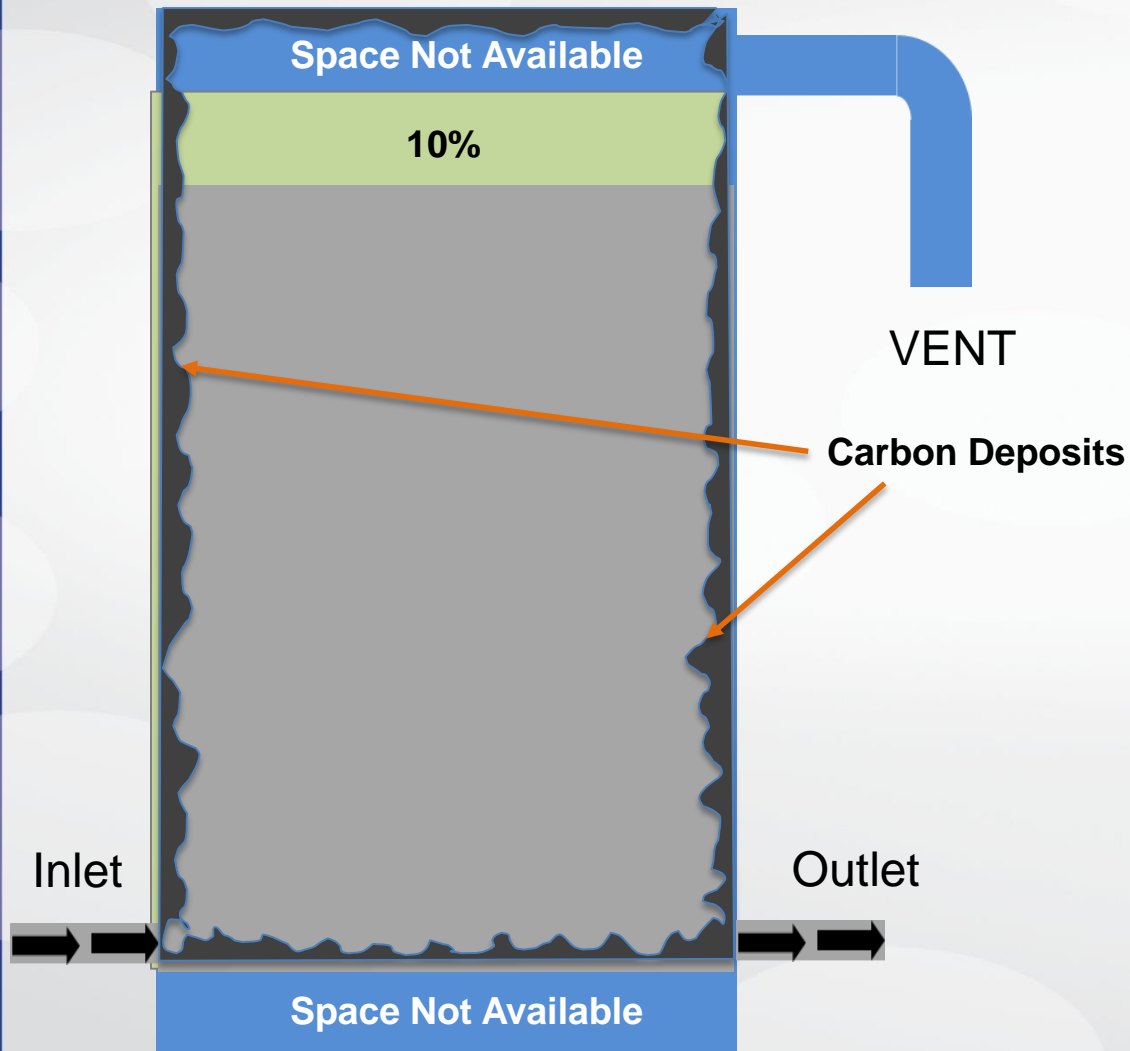
- Many companies calibrate content gauges every 12 months.
- Industry best practice suggests that calibration of content gauges should be carried out at least every six months.
- On-going validation of the content gauges by comparing the gauge readings with a manual bitumen inventory is highly recommended.

Validation of Content Gauges

BITUMEN INVENTORY CHECK					
DATE	TIME	DAY START STOCK (T)	BITUMEN RECEIVED (T)	BITUMEN USED (T)	STOCK BALANCE (T)
25/02/19	06:05	25.65	27.83	9.65	43.83
26/02/19	06:10	43.83	0	10.56	33.27
27/02/19	06:07	33.27	0	5.65	27.62

- Carry out a manual bitumen inventory check (usage reconciliation) to compare with the gauge readings.
- Check the bitumen stocks at the start and end of the day match the gauge readings.
- Incidents have occurred where the content gauge has been 9 Tonnes out. A manual bitumen inventory check would have identified this inaccuracy.
- **NEVER** solely rely on electronics...build in layers of protection.

'Actual' Storage Tank Safe Working Capacity



- Knowing the 'actual' Safe Working Capacity (SWC) of the storage tank is critical to ensure the safe delivery of bitumen.
- Carbon deposits can develop in the storage tank over time which can significantly reduce the SWC.
- Carbon deposits can also affect the accuracy of the content gauges.
- Do you know the 'actual' SWC of your storage tanks?

Storage Tank High Level Alarms



- Two High Level Alarms are mandatory:
 - ✓ High Level Alarm (HLA).
 - ✓ High High Level Alarm (HHLA).
- The HLA can be electronically linked with the content gauge....the weakness is that if the gauge fails, so does the HLA.
- The HHLA must be independent of both the content gauge and the HLA.
- If either the HLA or HHLA is triggered the driver and plant operatives must be aware...via a klaxon, beacon and computer alarm.

High Level Alarm (HLA) Activation



- If the HLA or HHLA activates during a bitumen delivery the delivery must stop and must not resume until the reason for the activation has been thoroughly investigated and resolved.
- The activation of a HLA or HHLA is a loss of control and should be classed as a serious breach of safety and thoroughly investigated.

Bitumen Safety Documents

Guidance documents on a range of bitumen safety related subjects can be downloaded free from the Eurobitume website:

- UK Version of the 2018 Guide to Safe Delivery of Bitumen.
- Safety Showers
- Eurobitume Bitumen Burns Card
- Safety Footwear Risk Assessment for Bitumen Delivery Drivers
- Operational considerations for Hot Bitumen Storage Tanks and Off-loading Systems.
- Design and use of Ground Based Pumps (EBUK/MPA document).
- Safe Bitumen Tank Management (EBUK/MPA document).
- Returning Bitumen Storage Tanks to Service.

See also the Energy Institute Model Code of Safe Practice Part 11: Bitumen Safety Code

www.eurobitume.eu

Other Bitumen Toolbox Talks

The following toolbox talks can be downloaded free from the Eurobitume website:

- Bitumen Delivery Driver Induction
- Bitumen Discharge Permit
- Personal Protective Equipment
- Emergency Safety Showers
- Ground Based Pumps
- Trace Heating of Bitumen Pipelines
- Blocked and Partially Blocked Pipework
- Emergency Shutdown of Bitumen Delivery Vehicles
- 'Pocket' Guide to the Safe Delivery of Bitumen

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