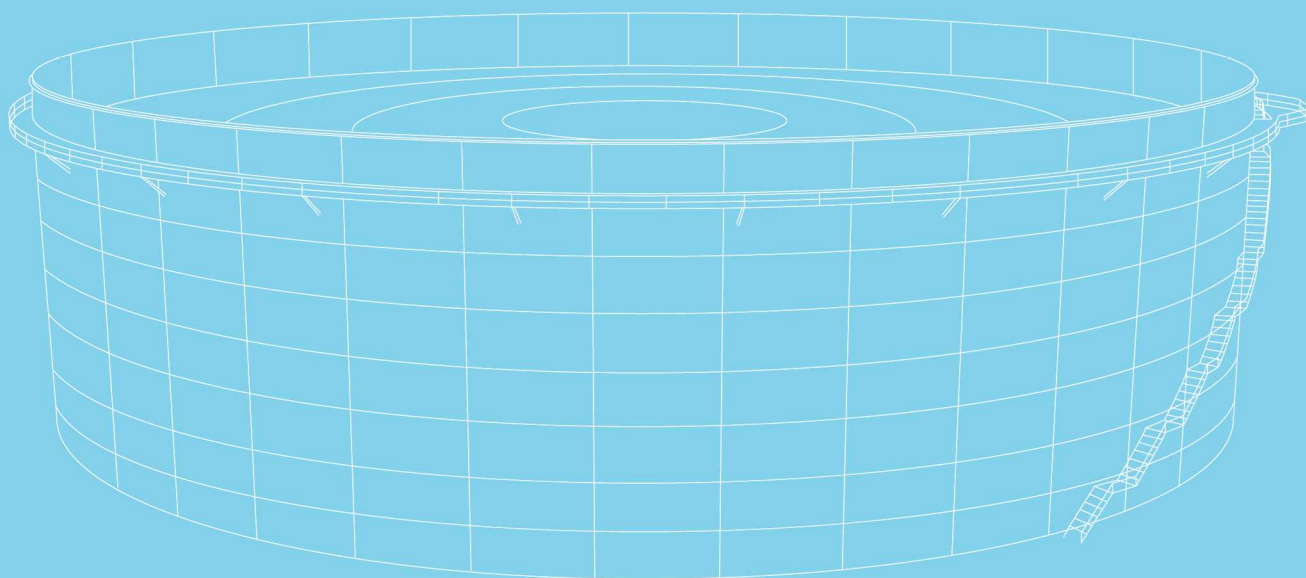




Study according to BPRR Site Technical Practice

based upon EEMUA 159 3rd edition



Tank:	TK149
Client:	BP Raffinaderij Rotterdam
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1 Summary

The conclusions and recommendations mentioned in this case study are based on a qualitative assessment of the several investigations and inspections conducted on the storage tanks. The interpretation of the individual measurements are valued against the rejection limits stated within the EEMUA 159 3rd edition. Engineering judgement is used to combine the individual results into an overall judgement and to compose mitigating actions.

Onstream	TTAR
[mm-yyyy]	[mm-yyyy]
10-2021	08-2028

1.1 Results of analysis

Study according to BPRR Site Technical Practice

Component	Part	DM	RL		K	Inspection interval	Manual interval
			[yr]		[-]	[yr]	[yr]
Roof	Roof plates	general-thinning	50.00		1.00	20.00	8
Shell	Course 8	general-thinning	36.29		1.00	20.00	8
	Course 7	general-thinning	36.29		1.00	20.00	8
	Course 6	general-thinning	36.29		1.00	20.00	8
	Course 5	general-thinning	36.29		1.00	20.00	8
	Course 4	general-thinning	36.29		1.00	20.00	8
	Course 3	general-thinning	36.29		1.00	20.00	8
	Course 2	general-thinning	36.29		1.00	20.00	8
	Course 1	general-thinning	36.29		1.00	20.00	8
Floor-to-shell	Fillet weld	fillet-weld-thickness	Status: undefined				
Floor	Membrane	general-thinning	50.00		0.60	20.00	-
	Membrane	pitting	20.41		0.60	12.25	20
	Annular	general-thinning	50.00		0.60	20.00	-
	Annular	pitting	16.32		0.60	9.79	19.8
	Annular proj.	annular-projection	Status: ok				
	Sump 1	general-thinning	50.00		0.60	20.00	-
	Sump 1	pitting	17.72		0.60	10.63	20
	Sump 2	general-thinning	50.00		0.60	20.00	-
	Sump 2	pitting	17.72		0.60	10.63	20
	Sump 3	general-thinning	50.00		0.60	20.00	-
	Sump 3	pitting	17.72		0.60	10.63	20
	Sump 4	general-thinning	50.00		0.60	20.00	-
	Sump 4	pitting	17.00		0.60	10.20	20
Foundation	Tank pad	planar-tilt	Status: ok				
	Tank pad	sagging	Status: undefined				
	Tank pad	bottom-ripples	Status: undefined				
	Tank pad	voids	Status: undefined				
	Tank pad shoulder	edge-settlement	Status: undefined				
	Tank pad shoulder	differential-settlement	Status: ok				
Nozzles	No data to display						

Component	Part	DM	Last inspection	Next inspection
			[mm - yyyy]	[mm - yyyy]
Roof	Roof plates	general-thinning	10-2013	10-2021
Shell	Course 8	general-thinning	10-2013	10-2021
	Course 7	general-thinning	10-2013	10-2021
	Course 6	general-thinning	10-2013	10-2021
	Course 5	general-thinning	10-2013	10-2021
	Course 4	general-thinning	10-2013	10-2021



Component	Part	DM	Last inspection [mm - yyyy]	Next inspection [mm - yyyy]
	Course 3	general-thinning	10-2013	10-2021
	Course 2	general-thinning	10-2013	10-2021
	Course 1	general-thinning	10-2013	10-2021
Floor-to-shell	Fillet weld	fillet-weld-thickness	undefined	undefined
Floor	Membrane	general-thinning	10-2008	10-2028
	Membrane	pitting	10-2008	10-2028
	Annular	general-thinning	10-2008	10-2028
	Annular	pitting	10-2008	08-2028
	Annular proj.	annular-projection	10-2013	10-2033
	Sump 1	general-thinning	10-2008	10-2028
	Sump 1	pitting	10-2008	10-2028
	Sump 2	general-thinning	10-2008	10-2028
	Sump 2	pitting	10-2008	10-2028
	Sump 3	general-thinning	10-2008	10-2028
	Sump 3	pitting	10-2008	10-2028
	Sump 4	general-thinning	10-2008	10-2028
	Sump 4	pitting	10-2008	10-2028
Foundation	Tank pad	planar-tilt	12-2013	12-2033
	Tank pad	sagging	undefined	undefined
	Tank pad	bottom-ripples	undefined	undefined
	Tank pad	voids	undefined	undefined
	Tank pad shoulder	edge-settlement	undefined	undefined
	Tank pad shoulder	differential-settlement	12-2013	12-2033
Nozzles	No data to display			

Roof load

Note the following control measures have been applied:

CM 2 Roof plates control measure. Adjusted roof plates rejection limit 2.25 mm.

1.2 Conclusions

Conclusie

 2E 05-08-2016

Om voor tank TK149 middels RBI de inspectietermijn te bepalen, is de aanwezige historische data, documenten en metingen bestudeerd en beoordeeld.

Dak:

Het tankdak voldoet niet aan de maximum te verwachten belastingscombinatie en mag niet zomaar meer betreden worden.

Men gaat uit van een combinatie van sneeuw of meer dan 3 personen op een kleine ruimte en de maximaal te verwachten onderdruk (volgens ontwerp)

Echter wanneer 1 van deze items wordt uitgesloten mag het dak WEL worden betreden.

Betreding onder voorwaarden welke in de vergunning moeten worden opgenomen, zijn:

- ┐ Er mag geen sneeuw op het dak aanwezig zijn of verwacht worden;
 - ┐ Er mogen niet meer dan 3 personen tegelijk op het dak aanwezig zijn.
- Of
- ┐ Een onderdruk dient te worden voorkomen. Er mogen dus geen pompbewegingen zijn tijdens werkzaamheden.

Wanneer hieraan wordt voldaan, is er geen bezwaar tegen betreding van het dak van de tank.

Wand:

De wand is prima in orde bevonden.

Bodem:

De bodem is in 2008 vervangen en er is een coating toegepast. Daarnaast is er een SLOD aangebracht. CR's zijn niet te bepalen omdat er maar 1 meting is uitgevoerd in het verleden. Er zijn 2 zusters tanks, er is gekozen om de CR's van zusters tank 148 in te voeren omdat deze tank een jaar voordat deze tank de laatste TAR heeft gehad ook in TAR is geweest, daarbij is toen ook de gehele bodem vervangen. Ook heeft deze tank op het moment de hoogst voorkomende CR t.o.v. tank 151, dit is nu dan ook de kritische factor waar op de tank in 2028 weer inwendig geïnspecteerd zal moeten worden.

Fundatie:

De scheefstand en differentiele randzetting is acceptabel.

Historisch zijn er nog geen metingen verricht m.b.t. „sagging, bottom ripples, en voids“. Deze metingen zijn afhankelijk van de eerst volgende tank TAR.

Op basis van het opgeslagen product valt de tank in groep 4 van tabel B.3.1, waardoor de volgende ISI 8 jaar na de laatst uitgevoerde ISI zal worden ingepland.

De volgende on-stream inspectie zal in 2021 plaats moeten vinden.

De bodem voldoet, i.c.m. de huidige terp aan de Nederlandse Richtlijn Bodembescherming ten tijde van de geprojecteerde datum.

Palm olie additief

 2E 27-09-2019

In 2019 is de tank in gebruik genomen voor de opslag van LGO + Palm olie. (┐ 70 / 30 %)

Omdat het huidige product minder toxisch is en een hoger flashpoint dan LGO, is er geen wijziging op de maximum termijn van 20 jaar voor de inwendige inspectie.

De termijn voor uitwendige inspecties is niet vastgelegd in EEMUA 159 editie 5 tabel B1.

Er is besloten om de termijn van LGO te blijven handhaven.

2 Remaining life

2.1 Roof

Part	DM	ABT	t_{last}	$t_{min.acc.}$	TA	CR	RL
		[mm]	[mm]	[mm]	[mm]	[mm/yr]	[yr]
Roof plates	general-thinning	4.76	3.64	2.25	1.39	0.017	50.00

2.2 Shell

Part	DM	ABT	t_{last}	$t_{min.acc.}$	TA	CR	RL
		[mm]	[mm]	[mm]	[mm]	[mm/yr]	[yr]
Course 8	general-thinning	8	7.5	6.74	0.76	0.021	36.29
Course 7	general-thinning	8	7.6	7.24	0.36	0.010	36.29
Course 6	general-thinning	8	7.6	7.24	0.36	0.010	36.29
Course 5	general-thinning	9.7	9.6	9.21	0.39	0.011	36.29
Course 4	general-thinning	12.1	12	11.64	0.36	0.010	36.29
Course 3	general-thinning	14.6	14.7	14.31	0.39	0.011	36.29
Course 2	general-thinning	17.8	18.1	17.74	0.36	0.010	36.29
Course 1	general-thinning	21	20.5	19.98	0.52	0.014	36.29

2.3 Floor-to-shell

Part	DM	t_{nom}	t_{last}	$t_{min.acc.}$	TA	CR	RL
		[mm]	[mm]	[mm]	[mm]	[mm/yr]	[yr]
Fillet weld	fillet-weld-thickness	Status: undefined					

2.4 Floor

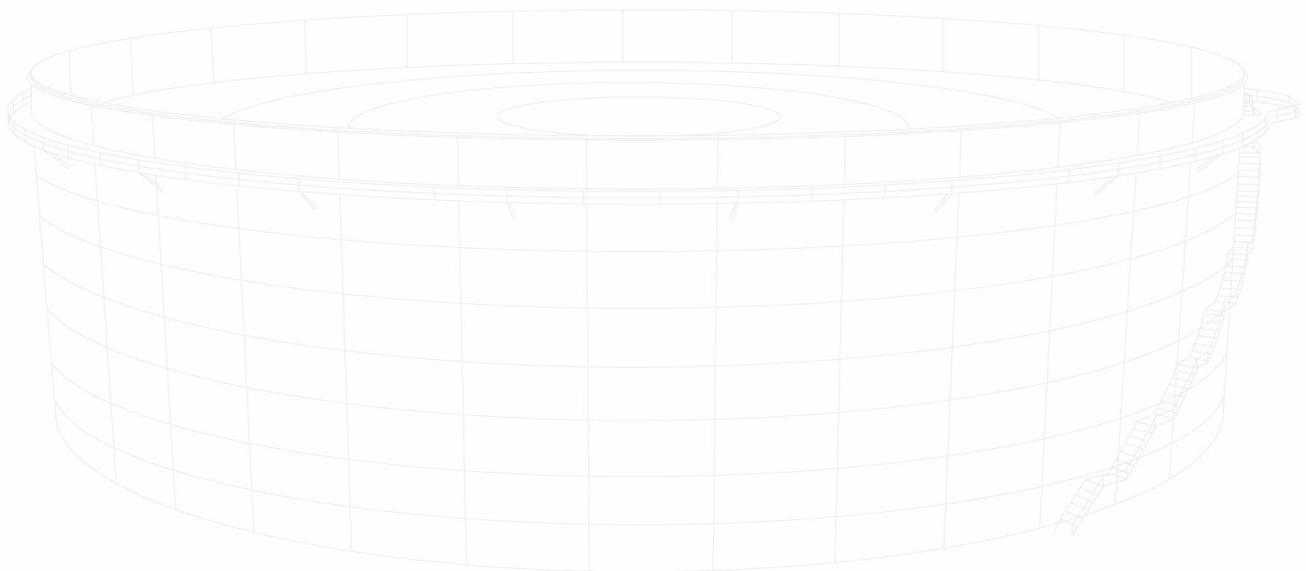
Part	DM	t_{nom}	t_{last}	$t_{min.acc.}$	TA	CR	RL
		[mm]	[mm]	[mm]	[mm]	[mm/yr]	[yr]
Membrane	general-thinning	8	7.7	2.5	5.20	0.039	50.00
Membrane	pitting	8	7.7	1.25	6.45	0.316	20.41
Annular	general-thinning	12	11.8	5.55	6.25	0.035	50.00
Annular	pitting	12	11.8	2.775	9.03	0.553	16.32
Annular projection	annular-projection	Status: ok					
Sump 1	general-thinning	10	11.8	4	7.80	0.035	50.00
Sump 1	pitting	10	11.8	2	9.80	0.553	17.72
Sump 2	general-thinning	10	11.8	4	7.80	0.035	50.00
Sump 2	pitting	10	11.8	2	9.80	0.553	17.72
Sump 3	general-thinning	10	11.8	4	7.80	0.035	50.00
Sump 3	pitting	10	11.8	2	9.80	0.553	17.72
Sump 4	general-thinning	10	11.4	4	7.40	0.035	50.00
Sump 4	pitting	10	11.4	2	9.40	0.553	17.00



2.5 Foundation

2.5.1 Non-trendable parts

Part	DM	Status
Tank pad	planar-tilt	ok
Tank pad	sagging	undefined
Tank pad	bottom-ripples	undefined
Tank pad	voids	undefined
Tank pad shoulder	edge-settlement	undefined
Tank pad shoulder	differential-settlement	ok



3 Notes and assumptions

3.1 Data analysis

CR's

 2E 11-08-2016

Dak:

Doordat er meerdere metingen op het dak zijn uitgevoerd is gekozen voor CR LS-Fit.

Wand:

Doordat er meerdere metingen op de wandingen zijn uitgevoerd is gekozen voor CR LS-Fit.

Bodem:

Er zijn weinig historische meetgegevens van de verschillende bodemcomponenten. De CR's die zijn berekend voor zustertank 148 zijn bij deze ingevoerd. Deze tank ligt qua laatste TAR datum en werkzaamheden (2007 en ook hele bodem vervangen) het dichtst bij deze tank. Alleen voor de general corrosion van het membraam is de CR op basis van de meetgegevens van de betreffende tank ingevoerd omdat deze hoger ligt dan die voor tank 148.

3.2 Fitness for purpose

Dak afkeur

 2E 11-08-2016

Onderlinge boogafstand tussen opvolgende ondersteuningspunten is groter dan 1,7 meter. Afkeur is dan 80% van ontwerpdikte. $4,76 * 0,8 = 3,808 \text{ mm}$

4 Tank details

This chapter displays all tank specifications and component properties. Note that when a foundation or a floor-to-shell connection has been installed this will not appear in this chapter as these components have no configurable properties.

4.1 Tank specifications

Property	Value
Tank name	TK149
Tank nr.	0041-0149
Location	OME
Date of construction	01-01-1972
Design code	BS 2654
Type	-
Diameter [m]	48.77
Height [m]	19.51
Maximum filling height [m]	19.51
Capacity [m ³]	36000
Design pressure [mbar]	7.5
Design vacuum pressure [mbar]	2.5
Design wind speed [m/s]	45
Operational max. temperature [°C]	60
Operational min. temperature [°C]	-10
Has heating coil	No
Group	-
Class	K3
PV vents	-
Comments	-
Circumference [m]	153
Surface [m ²]	1868

4.2 Roof specifications

Property	Value
Roof type	Cone roof
Seal range	-
Superimposed load [N/mm ²]	1200
Roof plates load [N/mm ²]	0
Roof framing load [N/mm ²]	749
Top angle load [N/mm]	0.1
Roof columns	No
Roof insulation	No

4.3 Shell specifications

Property	Value
Shell insulation	No
Youngs modulus [N/mm ²]	210000



4.4 Floor specifications

Property	Value
Floor type	
Youngs modulus [N/mm^2]	210000
Coated	Yes
Double bottom with leak detection	No
External coating applied at	-

4.5 Product details

Property	Value
Product name	LGO + Palm oil
Product group	LGO + Palm oil
Specific gravity [-]	0.92
Flash point [$^{\circ}C$]	314
Toxicity	Non-toxic substance

4.6 Product group details

Product group '**LGO + Palm oil**' with service condition group '**Group 4**' has the following theoretical corrosion rates:

Tank part	Theoretical corrosion rate
Bottom plates [mm/yr]	0
Shell liquid exposed area [mm/yr]	0
Shell vapour exposed area [mm/yr]	0
Fixed roof plates [mm/yr]	0
Fixed roof supporting structure [mm/yr]	0
Floating roof plates [mm/yr]	0
Floating pontoon area [mm/yr]	-

5 Risk analysis tank roof

5.1 Analysis results

Probability rating	Risk assessment matrix						Risk rating	Factor K	Established factor K
$\xi = 1.43$	Probability	H	L	H	E	E	*N*	*0.9*	0.9
Consequence rating		M	L	M	H	E	L	0.8	Sum of credit and debit points
$\chi_{ecc.} = 1.00$		L	N	L	M	H	M	0.7	0.20
$\chi_{h.\&s.} = 1.33$		*N*	N	*N*	L	M	H	0.6	Adjusted factor K
$\chi_{env.} = 2.00$			N	*L*	M	H	E	0.5	1.00
						Consequence			

5.2 Probability of failure analysis

Question	Answer
Internal coating is applied on tank roof plates	Internal coating not existing
External coating is applied on tank roof plates	External coating applied and quality is sound
Storage conditions	Between 40 and 85 °C
Vapour corrosivity	Group 4, Risk L
The tank is operated with an inert blanket system above product	No, but storage temperature is below 85 °C
Is roof supporting structure located below roof plates?	Yes, but crevice corrosion is likely to occur
Is roof supporting structure located on top of roof plates?	No, roof supporting structure is not located on top of roof plates and proper water draw-off is secured at all times
Is tank roof insulated and rain water may cause corrosion under insulation (CUI)?	No, tank roof is not insulated

5.3 Consequence of failure analysis

5.3.1 Economical

Question	Answer
Time to repair	No internal entry required, limited repair, no limitation on repair time
Cost of repair	Negligible, or less than 5% of capital cost
Probable magnitude of product loss	No release of product

5.3.2 Health & safety

Question	Answer
Likelihood of injury to personnel	No injury or near miss
Product flammability	Class III(1) and unclassified product
Product toxicity	Non-toxic substance
Location of tank farm	Flat tank farm
Is tank near public fence	No

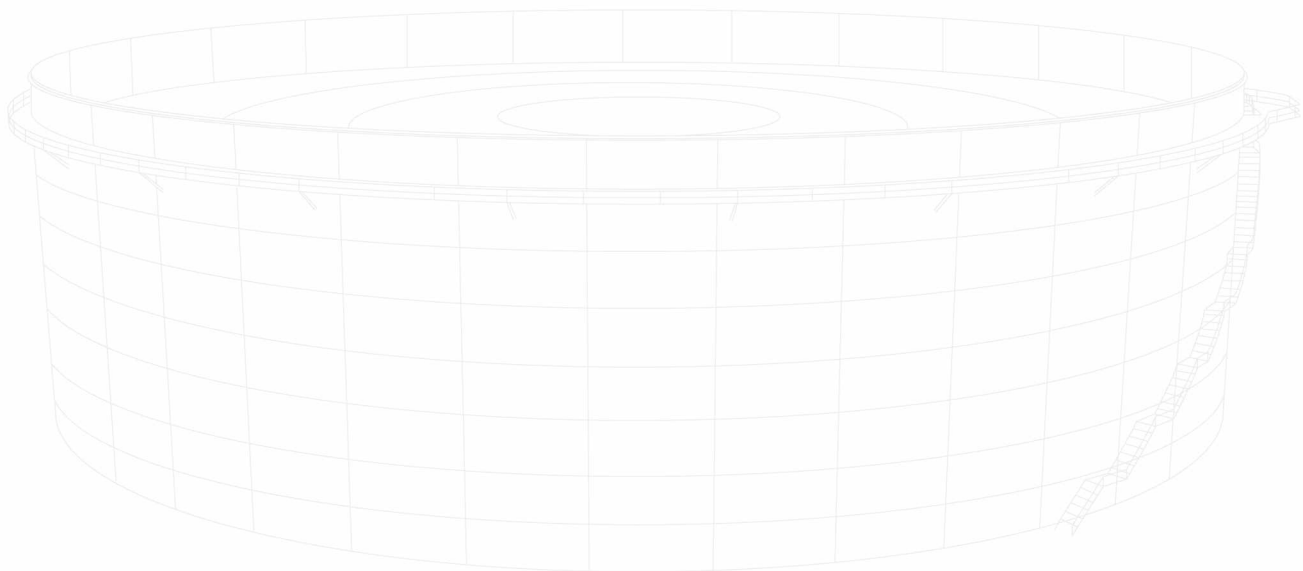
5.3.3 Environment

Question	Answer
Environmental hazard to soil and water has the potential to cause	Environmental nuisance affecting neighbourhood
Vapour emission	No or negligible harmful (toxic) release



5.4 Confidence analysis

Question	Answer
NDT method used and extent of coverage (number of readings) to establish actual roof plate thickness	US on gridline system
Frequency of internal inspections performed during service life of tank	Multiple inspections carried out
Differential settlements between the tank structure and the supports of the piping to/from the tank will affect the allowable minimum thickness of roof plates	No moments in roof nozzles or supporting structures



6 Risk analysis tank shell

6.1 Analysis results

Probability rating	Risk assessment matrix						Risk rating	Factor K	Established factor K
$\xi = 1.36$	Probability	H	L	H	E	E	*N*	*0.9*	0.9
Consequence rating		M	L	M	H	E	L	0.8	Sum of credit and debit points
$\chi_{ecc.} = 2.00$		L	N	L	M	H	M	0.7	0.20
$\chi_{h.\&s.} = 2.00$		*N*	N	*N*	L	M	H	0.6	Adjusted factor K
$\chi_{env.} = 2.00$			N	*L*	M	H	E	0.5	1.00
						Consequence			

6.2 Probability of failure analysis

Question	Answer
Internal coating is applied to tank shell plates	Internal coating not existing
External coating is applied to tank shell plates	External coating applied and quality is sound
Storage conditions	Between 40 and 85 °C
Heating coils in tank	No, or not in direct contact with shell plates
Product corrosivity	Group 4, Risk L
Vapour corrosivity	Group 4, Risk L
Tank shell has been insulated, and rain water may cause corrosion under insulation (CUI)	Tank shell is not insulated

6.3 Consequence of failure analysis

6.3.1 Economical

Question	Answer
Time to repair	Internal entry required, limited repair (< 3 months)
Cost of repair	5-10% of capital cost
Probable magnitude of product loss	< %5 of tank contents

6.3.2 Health & safety

Question	Answer
Likelihood of injury to personnel	Minor injury
Product flammability	Class III(1) and unclassified product
Product toxicity	Non-toxic substance
Location of tank farm	Flat tank farm
Is tank near public fence	No

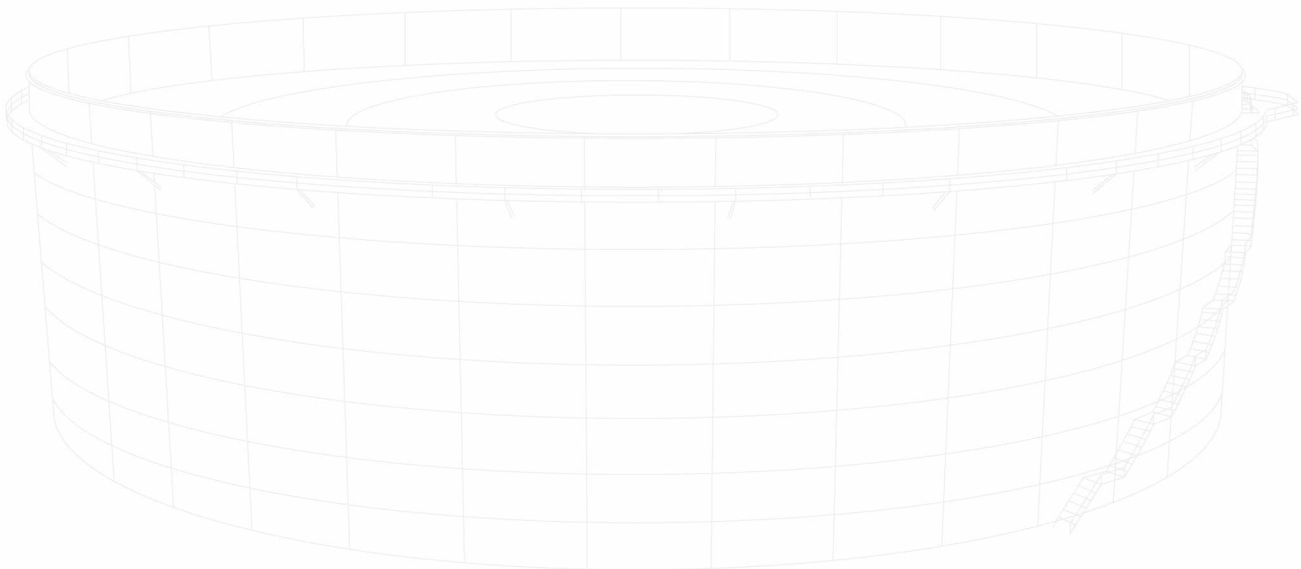
6.3.3 Environment

Question	Answer
Environmental hazard to soil and water has potential to cause	Environmental nuisance affecting neighbourhood
Vapour emission	No or negligible harmful (toxic) release



6.4 Confidence analysis

Question	Answer
NDT method used and extent of coverage (no. of readings) to establish actual shell plate thickness	Crawler / beetle + US
Frequency of internal inspections performed during service life of tank	Multiple inspections carried out
Corrosion on wind girders will effect the tank's stability and thus the allowable minimum thickness of shell plates under external loads (wind and vacuum)	No corrosion on windgirder
Buckles in shell plates will effect the tank's stability and thus the allowable minimum thickness of shell plates under external loads (wind and vacuum)	No buckles on tank shell plates
Bending moments in shell nozzles, induced by differential settlements between the tank structure and the supports of the piping to/from the tank, will effect the allowable minimum thickness of shell plates	No moments in shell nozzles or structures available which reduce nozzle loads



7 Risk analysis tank floor

7.1 Analysis results

Probability rating	Risk assessment matrix						Risk rating	Factor K	Established factor K
$\xi = 1.94$	Probability	H	L	H	E	E	N	0.9	0.7
Consequence rating		M	L	M	H	E	L	0.8	Sum of credit and debit points
$\chi_{ecc.} = 3.00$		L	N	L	M	H	*M*	*0.7*	-0.10
$\chi_{h.\&s.} = 1.33$		*N*	N	N	L	*M*	H	0.6	Adjusted factor K
$\chi_{env.} = 2.00$			N	L	M	*H*	E	0.5	0.60
						Consequence			

7.2 Probability of failure analysis

Question	Answer
Impressed cathodic protection	Readings are below 0.60 V thus no effective CP existing or CP does not exist
Sacrificial cathodic protection	Sacrificial CP not available nor operating
Internal coating or lining is applied to bottom plates	Internal coating applied and quality is sound
External coating is applied to bottom plates (other than shop primer)	Not existing
Storage conditions temperature of product	Between 40 and 85 °C
Type of bottom	Cone up
Heating coils in tank	No, or not in direct contact with bottom plates
Product corrosivity	Group 4, Risk L
Foundation type	2E pad with annular ring of coarse granular material
Tank bottom free from contact with water	Yes
Effectiveness of drainage	Slope of tank pad shoulder allows for adequate drainage away from tank bottom

7.3 Consequence of failure analysis

7.3.1 Economical

Question	Answer
Time to repair	Internal entry required, major repair (3-8 months)
Cost of repair	10-50% of capital cost
Probable magnitude of product loss	> 5% of tank contents

7.3.2 Health & safety

Question	Answer
Likelihood of injury to personnel	No injury or near miss
Product flammability	Class III(1) and unclassified product
Product toxicity	Non-toxic substance
Location of tank farm	Flat tank farm
Is tank near public fence	No



7.3.3 Environment

Question	Answer
Environmental hazard to soil and water has the potential to cause	Environmental nuisance affecting neighbourhood
Vapour emission	No or negligible harmful (toxic) release

7.4 Confidence analysis

Question	Answer
NDT method used and extent of coverage (number of readings) to establish actual bottom plate thickness	Visual + spot ultrasonic (US)
Frequency of internal inspections performed during service life of tank	No or minimal inspection data available
Type of interconnecting bottom plate welds outside of annular section	Double pass lap welds



A Tank history

This chapter describes the tank history of the storage tank for the tank components which are evaluated within RBIT360°, it is therefore not necessarily the complete tank history. The Tank Integrity Assessor notes on the individual measurements are also presented here. The actual values of these individual measurements are left out of this overview and can be found in RBIT360°.

Date	Type	Subtype	Note
01-01-1972	Measurement	Roof plates	Ontwerpdikte als '0-meting' ingevoerd.
01-01-1972	Measurement	Membrane, annular, sump	Ontwerpdikte als '0-meting' ingevoerd.
01-01-1972	Measurement	Course	Ontwerpdikte als '0-meting' ingevoerd.
01-10-1978	Measurement	Course	Metingen langs de trap uitgevoerd. De minimaal gevonden dikte minus 0.7 mm coatingcorrectie zijn ingevoerd. Bron: TK149 OUDE WIN FILES.PDF
01-10-1978	Measurement	Roof plates	Kruismeting op het dak uitgevoerd. De minimaal gevonden dikte minus 0.7 mm coatingcorrectie is ingevoerd. Bron: TK149 OUDE WIN FILES.PDF
01-05-1985	Measurement	Roof plates	Kruismeting op het dak uitgevoerd. De minimaal gevonden dikte minus 0.7 mm coatingcorrectie is ingevoerd. Bron: TK149 OUDE WIN FILES.PDF
01-05-1985	Measurement	Course	Metingen langs de trap uitgevoerd. De minimaal gevonden dikte minus 0.7 mm coatingcorrectie zijn ingevoerd. Bron: TK149 OUDE WIN FILES.PDF
01-04-1991	Measurement	Roof plates	Kruismeting op het dak uitgevoerd. De minimaal gevonden dikte minus 0.7 mm coatingcorrectie is ingevoerd. Bron: TK149 OUDE WIN FILES.PDF
01-04-1991	Measurement	Course	Metingen langs de trap uitgevoerd. De minimaal gevonden dikte minus 0.7 mm coatingcorrectie zijn ingevoerd. Bron: TK149 OUDE WIN FILES.PDF
01-04-1991	Measurement	Membrane, annular, sump	Kruismeting op de bodem uitgevoerd. De minimaal gevonden dikte is ingevoerd. Er is geen coatingcorrectie toegepast. Bron: TK149 OUDE WIN FILES.PDF
01-01-1999	Measurement	Roof plates	Kruismeting op het dak uitgevoerd. De minimaal gevonden dikte minus 0.7 mm coatingcorrectie is ingevoerd. Bron: TK149 OUDE WIN FILES.PDF
01-01-1999	Measurement	Course	Metingen langs de trap uitgevoerd. De minimaal gevonden dikte minus 0.7 mm coatingcorrectie zijn ingevoerd. Bron: TK149 OUDE WIN FILES.PDF
14-06-2005	Measurement	Course	Beetlemeting uitgevoerd, geen coatingcorrectie toegepast op de ingevoerde waarden. Bron: TK149_2007.12.21.AANVRAAG_OVERSCHRIJDING_TERMIJN.PDF
27-06-2005	Measurement	Roof plates	De dakplaten zijn d.m.v. 5-puntsmeting gemeten, de kleinste van de gemiddelde plaatdikte is bij deze toegevoegd. De gemeten waarden zijn exclusief coating. Bron: TK149_2005.06.27.SGS_US_RAPP_NR_22328.PDF
14-10-2008	Measurement	Membrane, annular, sump	Nulmeting na nieuwbouw tankbodem. Voor de platen geldt dat de kleinste van de gemiddelde diktes per plaat is ingevoerd, bij de sumps is de kleinst gevonden waarde ingevoerd. Bron: TK149 2008-10-23 RAP. NR. 744 0-METING.PDF
09-01-2009	Measurement	Differential settlement	Differentiele zetting is gemeten door ^{2E} is. Bron: TK149 2009-01-09 VAN STEENIS ZETTING RAPP. 013561.PDF
09-01-2009	Measurement	Planar tilt	Scheefstand is op 16 locaties gemeten rondom de tank. De grootste afwijking per 4 opeenvolgende meetpunten is ingevoerd. Het meetrapport geeft als conclusie dat de afwijking niet acceptabel is. Bron: TK149 2009-01-09 VAN STEENIS ZETTING RAPP. 013561.PDF
02-10-2013	Measurement	Roof plates	5-puntsmeting op de dakplaten uitgevoerd. De kleinste van de gemiddelde plaatdikten is ingevoerd. Er is geen coatingcorrectie toegepast. Bron: TK149 2013-10-02 RTD UT-RT RAPP.40097749.PDF
02-10-2013	Measurement	Annular projection	De uitwendige annularrand is op 77 locaties rondom de tank gemeten. De minimaal gevonden waarde is ingevoerd. Bron: TK149 2013-10-02 RTD UT-RT RAPP.40097749.PDF
21-10-2013	Measurement	Course	Beetlemeting uitgevoerd, geen coatingcorrectie toegepast op de ingevoerde waarden. Bron: TK149 2013-10-21 BEETLE ONDERZOEK IP19.PDF



Date	Type	Subtype	Note
19-12-2013	Measurement	Planar tilt	Scheefstand is op 16 locaties rondom de tank gemeten, de grootste afwijking per 4 opeenvolgende meetwaarden is ingevoerd. Bron: TK149 2013-12-19 IP5,24,25 RAPP.34613.PDF
19-12-2013	Measurement	Differential settlement	Differentiele zetting gemeten bij een vulhoogte van 14,53 meter door Van Steenis. Bron: TK149 2013-12-19 IP5,24,25 RAPP.34613.PDF

