中美和公司台中廠興建計畫
環境影響說明書申請備查內容
(新建備用成品儲槽)

開發單位：中美和石油化學股份有限公司

中華民國106年12月

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一、開發單位名稱

中美和石油化學股份有限公司。

二、營業所或事務所地址

1. 營業所在地

郵遞區號 43550 台中市梧棲區草湳里南堤路 2 段 89 號。

2. 公司所在地

郵遞區號 11492 台北市內湖區堤頂大道 2 段 413 號 6 樓。

第二章 符合環境影響評估法施行細則第 36 條第 2 項之情形、申請變更理由及內容

一、 符合環境影響評估法施行細則第 36 條第 2 項之情形

中美和公司台中廠環境影響說明書申請備查內容(新建備用成品儲槽)

本案係依據「中美和公司台中廠環境影響說明書」(定稿本)圖 5.3.1 廠區配置圖提出新建成品儲槽變更。因原成品儲槽材質無法承受長期負載變化等反覆應力改變而發生內、外部焊道龜裂，為了避免因嚴重損壞有洩漏、倒塌風險所產生之安全顧慮，必需新建備用成品儲槽以進行原成品儲槽長期維修工作。此新建備用成品儲槽，不增加產量、不增加空氣污染物排放量、不涉及製程調整且符合原環評承諾，故無涉環境保護事項，變更符合環評法施行細則第 36 條第 2 項第 2 款及第 8 款，不立即改善有發生災害之虞及其他經主管機關認定非涉及環境保護事項。

二、 申請變更理由及內容

(一) 變更理由

中美和公司台中廠與股東英國石油(BP) 大陸珠海 PTA 廠為相同技術世代之工廠，根據 BP 專家之檢查報告(附錄二)，珠海 PTA 廠成品槽有嚴重龜裂現象，無法繼續使用，必須全面檢修。中美和公司在 BP 建議下，也對台中廠成品儲槽(XF-610B)進行檢查，檢查結果發現有類似情況(附錄一)，且已經出現桶槽漏粉現象。

台中廠現有成品儲槽和大陸珠海廠約為同時期以相同鋁製材質製造，經十多年使用，發現槽壁外部裙座表面補強肋條焊道及內部檢查發現不同高度位置圓周焊縫有多處龜裂，其中椎角和直部圓周焊縫處共有 31 處龜裂(圖 1、圖 2)，總龜裂長度 27 公尺占 53 公尺圓周的 52%。這些損壞現象與大陸珠海廠完全一致。由於發生龜裂範圍廣泛，中美和目前僅能侷限針對重要位置進行修護，操作中觀察桶槽仍出現桶槽

漏粉現象。目前本廠暫時使用填縫材料在外部將洩漏處封住止漏，以避免洩漏進一步擴大，但為了避免因設備嚴重損壞所產生之安全顧慮，必需要有長期維修計畫，否則其發生粉體洩漏、設備斷裂倒塌之風險將越來越高。因原儲槽須排空檢修，為了使現有損壞的成品儲槽在維修期間，能持續供料給客戶，因此規劃新增儲槽當成品備用儲槽。

(二) 變更內容

本廠現有純對苯二甲酸(PTA)成品儲槽二座，設置於成品儲存及包裝區，裝置容量分別為 6,000 噸/座。中美和公司已增建一座新成品備用儲槽(XF-610C)，目前其排放氣體經過頂部袋式過濾器及第二道過濾器後連通至既有成品儲槽(XF-610A/B)再經其頂部袋式過濾器排放至大氣，未來此備用儲槽排氣系統也將修改為密閉輸送系統。但由於此成品備用儲槽容量僅 3,000 公噸，不足以應付原有成品儲槽之維修需求，台中廠擬在既有環評規畫區之成品儲存及包裝區(圖 3)中再新建一座相同容量(3,000 公噸)之新成品備用儲槽。此次增加的成品備用儲槽(XF-610D)，使用密閉輸送系統，不增加額外排放管道，廠區之產量、空氣污染量、廢水量、廢棄物量等均未變更(詳如表 1)。

本工程施工期間可能產生之污染包括施工之揚塵、噪音、廢棄物與廢水。本計劃預估施工期間開挖之土方約 3000 立方米，土壤改良整地工程，所需土石在廠內挖、填可達平衡，營建廢土將回填於基座與廠區內不會運出廠外，無土石區外運送問題且施工前及施工期間定時灑水避免揚塵。預估施工期間每日產生的生活廢棄物約 0.03 公噸，最大產生量約 0.06 公噸，廢建材產生量約 2 公噸，所有廢棄物依應回收廢棄物相關規定，予以分類回收，工程廢棄物則要求承包商依「廢棄物清理法」規定，委託經主管機關許可清除、處理該類廢棄物之公民營廢棄物清除處理機構清除、處理。本工程因為沒有採用打擊式樁，而

採用植入式基樁，故不會產生高噪音，最大噪音值低於 85 分貝。 工地之廢水導流至廠區廢水處理廠，經處理合格後排放，對承受水體影響有限。

施工期間將依工程興建期間之環境保護計畫(附錄三)執行污染防治措施，將空氣污染量、廢水量、廢棄物產生量控制在原環評許可範圍內。整體而言，本計劃工程施工期間對環境影響輕微。

表 1 歷次環評產量、空氣污染量、廢水量、廢棄物對照表

原環差內容	第三次變更內容對照表內容	本次備查內容
年產量(萬噸 PTA/年) **70→76**	(萬噸 PTA/年) **76**	年產量(萬噸 PTA/年) **76**
溫室氣體排放量 (萬公噸 CO_2e/年) **27.67→25.52**	溫室氣體排放量 (萬公噸 CO_2e/年) **25.52→25.00** (108 年 1 月 1 日起)	溫室氣體排放量 (萬公噸 CO_2e/年) **25.00** (108 年 1 月 1 日起)
空氣污染物排放量 (公噸/年) TSP ：2.11 SO_X：2.93 NO_X：39.37 VOC：38.9	空氣污染物排放量 (公噸/年) TSP ：2.11→1.69 (108 年 1 月 1 日起) SO_X：2.93→2.05 (108 年 1 月 1 日起) NO_X：39.37 VOC：38.9	空氣污染物排放量 (公噸/年) TSP ：2.11→1.69 (108 年 1 月 1 日起) SO_X：2.93→2.05 (108 年 1 月 1 日起) NO_X：39.37 VOC：38.9
平均廢水量(CMD) 3,461	平均廢水量(CMD) 3,461	平均廢水量(CMD) 3,461
廢棄物量(公噸/年) 3,100	廢棄物量(公噸/年) 3,100	廢棄物量(公噸/年) 3,100

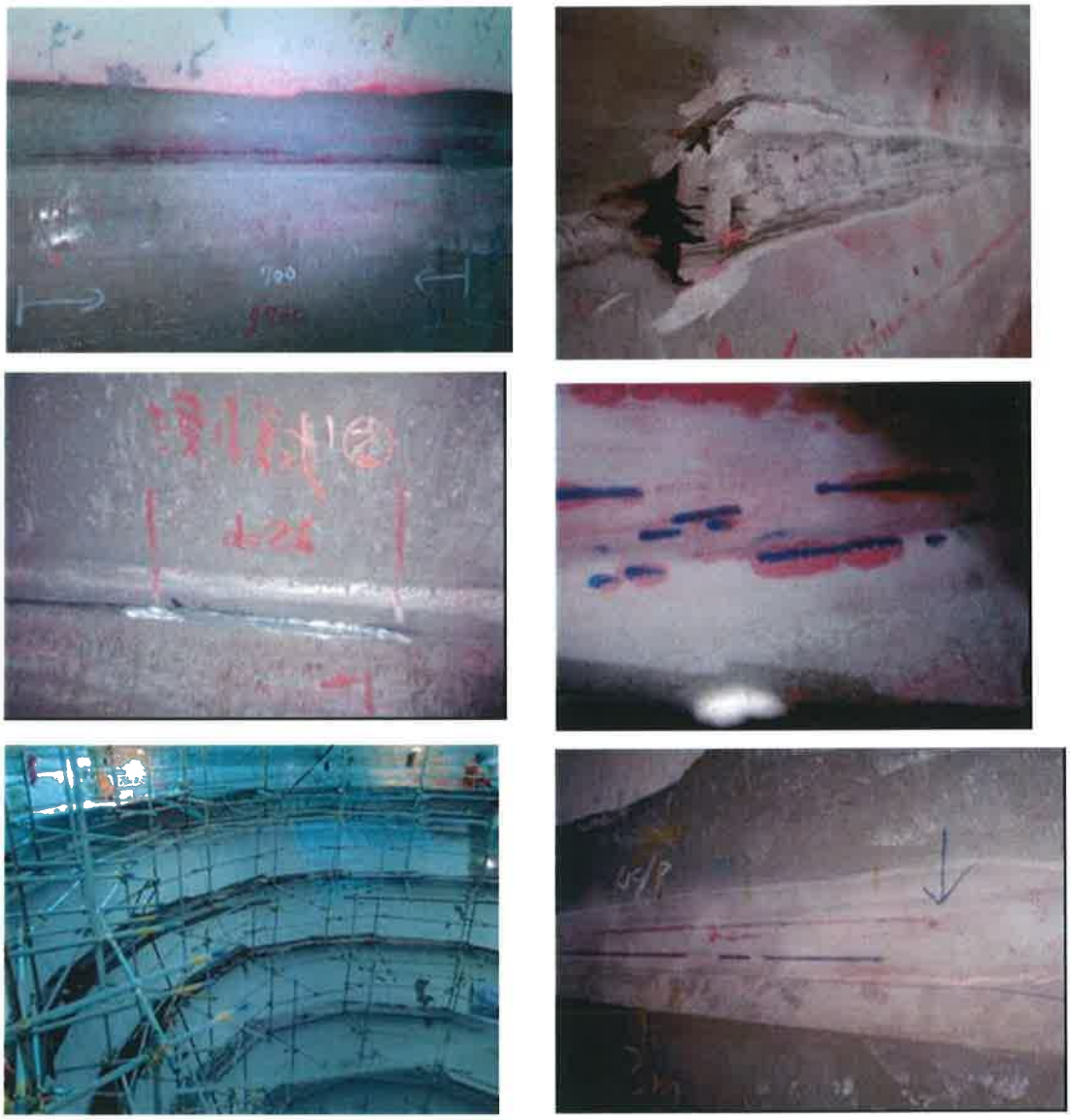


圖 1. 成品儲槽內部搭架檢查修理焊道龜裂情形

圖 2. 成品儲槽外部焊道龜裂情形及漏粉位置

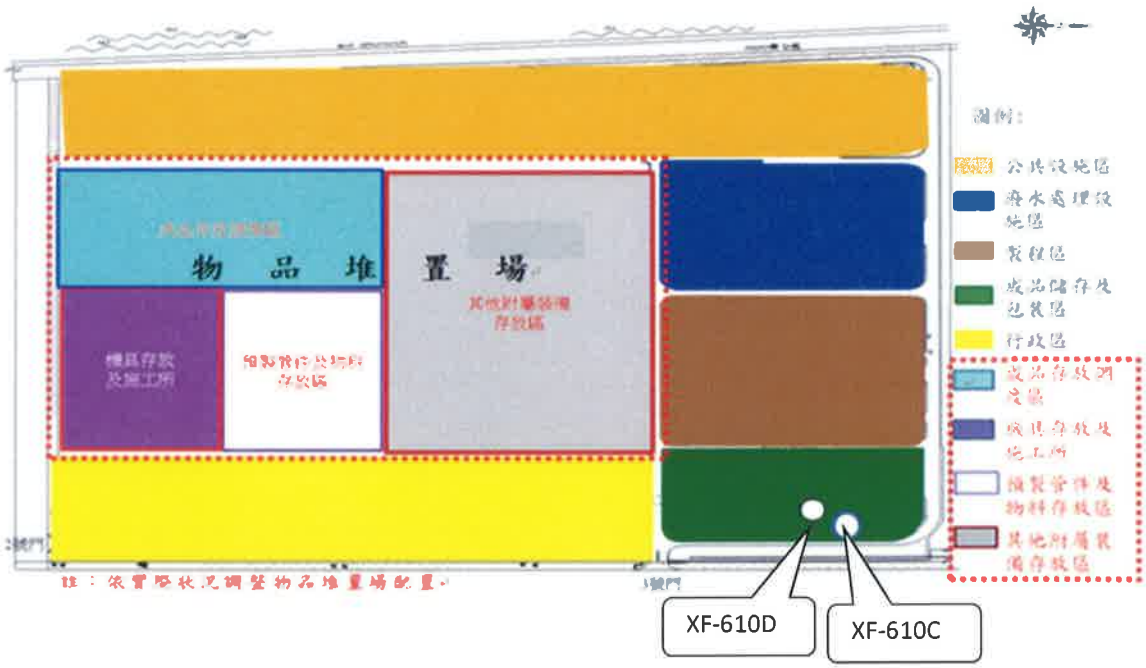


圖 3. 成品儲槽 XF-610 D 位置示意圖

表 2 中美和公司台中廠環境影響說明書申請備查內容(新建成品儲槽)

原環境影響說明書內容	本次備查內容	備查理由
原環說書 5-9 頁之 5.3.4 主要設備與環保設施說明本擴建計畫主要設施設備如表 5.3.4-1 所示，包括氧化反應器、結晶罐、真空過濾機、乾燥器、PTA 儲槽等。其座落位置如原書件圖 5.3.1 廠區配置示意圖所示。	1. 中美和公司台中廠現有成品儲槽材質為鋁製，經十多年使用，發現槽壁外部裙座表面補強肋條焊道及內部檢查發現不同高度位置圓周焊縫有多處龜裂，其中椎角和直部圓周焊縫處共有 31 處龜裂(圖 1、圖 2)，總龜裂長度27公尺占 53 公尺圓周的 52%。為了避免因嚴重損壞有洩漏、倒塌風險所產生之安全顧慮，必需要長期維修。 2. 因原儲槽須排空檢修，為了使現有損壞的成品儲槽在維修期間，能持續供料給客戶，因此規劃新增儲槽當成品備用儲槽。中美和公司已增建一座新成品備用儲槽(XF-610C)，但因容量不足以應付原有成品儲槽之維修需求，台中廠擬在既有環評規畫區之成品儲存及包裝區(圖 3)中再新建一座新成品備用儲	1. 本次申請新建備用成品儲槽，不增加產量、不增加空氣污染物排放量、不涉及製程調整且符合原環評承諾，故無涉環境保護事項。 2. 故依「環境影響評估法施行細則」第 36 條第 2 項第 2 款及第 8 款，辦理本次備查作業。

	槽。 3. 此次增加的備用成品備用儲槽(XF-610D)，使用密閉輸送系統，不增加額外排放管道，廠區之產量、空氣污染量、廢水量、廢棄物量等均未變更。工程興建期間之營建廢土將回填廠區內不會運出廠外。	

第三章 其他經主管機關指定之事項

無

附錄

附錄一　中美和台中廠既有成品儲槽(XF-610B)檢查報告

附錄二　BP 珠海 PTA 工廠成品儲槽檢查報告

附錄三　工程興建期間之環境保護計畫

附錄一　中美和台中廠既有成品儲槽(XF-610B)檢查報告

摘要說明:

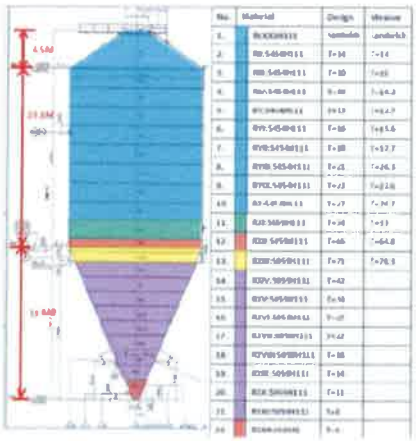
1. 經內部檢查發現成品儲槽(XF-610B)在“a”位置發現滲漏和焊縫裂縫。這很可能是焊縫“b”已經產生裂縫了。在焊縫“b”上發現了三種不同的圓周裂紋（I，II，III)。
2. 槽壁鋁材外部圓周向補強肋條位置、焊縫與板材有 31 處出現龜裂，總龜裂長度 27 公尺占 53 公尺圓周的 52%。
3. 最長的連續裂縫長度接近 3m。
4. 最深的裂縫約 48 毫米。
5. 此設備若未整修而繼續使用，其發生粉體洩漏、設備倒塌之風險將越來越高。目前本廠暫時使用填縫材料在外部將洩漏處封住止漏，避免洩漏進一步擴大，但為了避免因設備嚴重損壞所產生之安全顧慮，必需要長期維修。

CAPCO TCP Product Silo Inspection Report

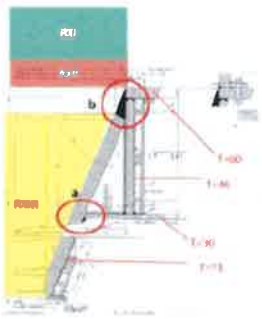
By shyang

TAR job 2: XF-610B internal welding seams check and repair--background

- There were leakage and weld seam crack finding at "a" position before TAR. It was very likely the weld seam "b" had crack already.
- This job scope is focus on weld seam "b" inspection and repair.

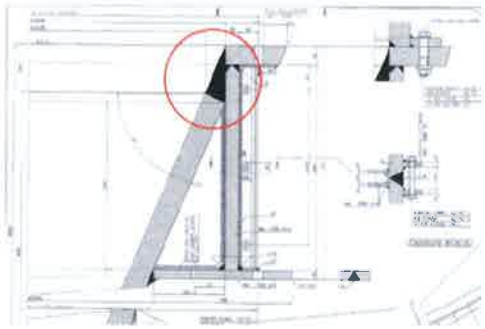


XF-610A/B :OD=17,012mm

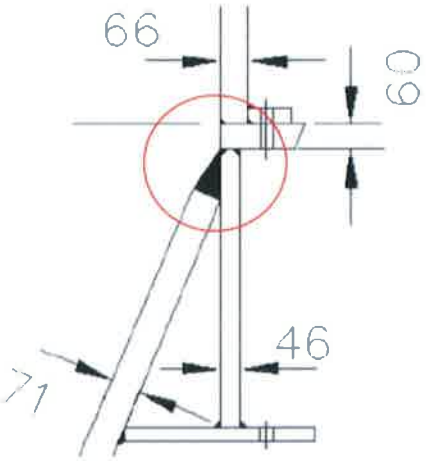


TAR job 2: XF-610B internal welding seams check and repair-- weld seam "b" detail

- DWG of manufacturer J&D

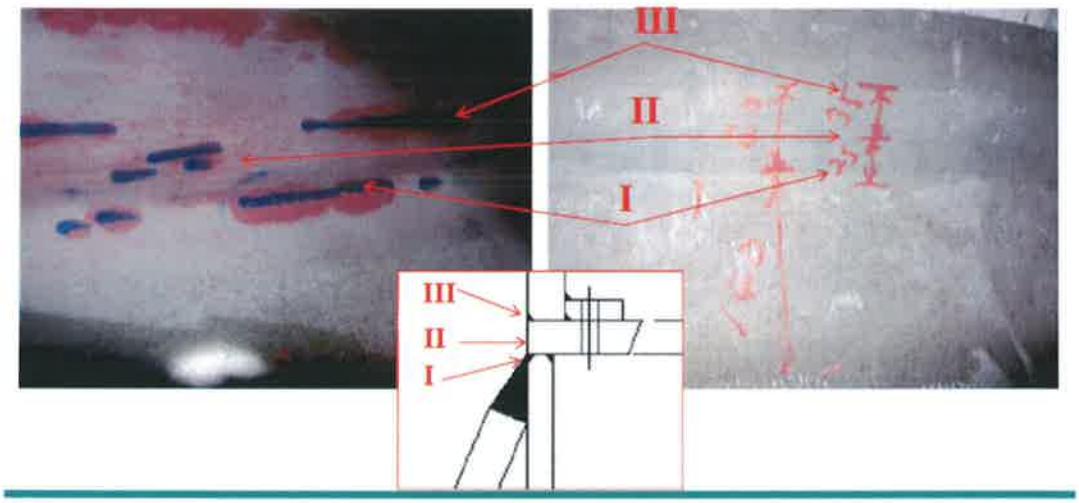


- DWG of site as built



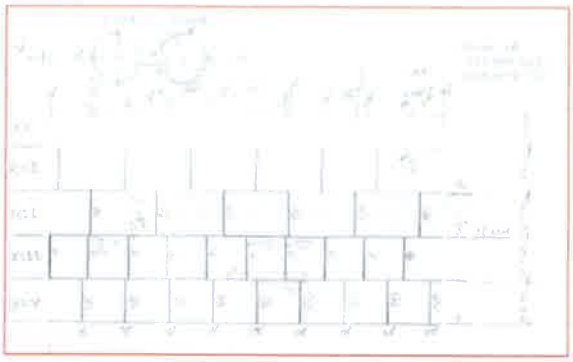
TAR job 2: XF-610B internal welding seams check and repair --- weld seam "b" site finding

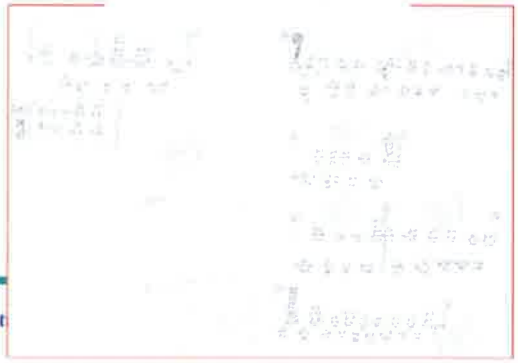
There were three different circumferential cracks finding (I,II,III) on weld seam "b".



TAR job 2: XF-610B internal welding seams check and repair --- weld seam "b" crack finding statistics

(1)This weld seam is for RXII and RXIII see below "B*" weld seam layout showing.
(2)The circumferential weld seam "I" is focus we need to inspect and repair, this time.
(3)There were total 27m(approx.) discontinued circumferential crack finding, i.e. 51.7% of 53 m a circle of circumferential weld seam of I.
(4)The most long continuous crack length is near 3m .
(5)Below attached files show finding statistics.





TAR job 2: XF-610B internal welding seams check and repair --- repair method

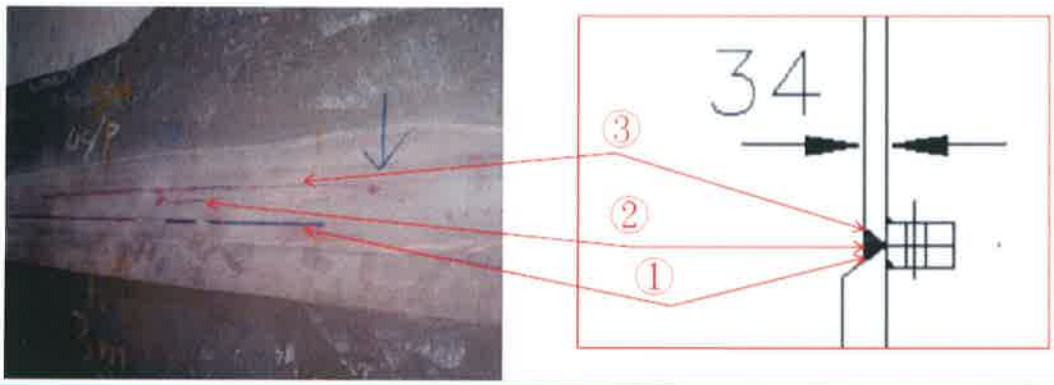
- Back gouging crack weld seam depth by grinder until no crack extend.
- The most deeper crack is approx. 48mm.
- Re-build weld seam, by dia. 1.6 mm aluminum weld rod ,ER-5556A.

TAR job 2: XF-610B internal welding seams check and repair --- others weld seams check

- Weld seam no. "C" showing on weld seam layout DWG, which is below "b" ' s 1st circumferential weld seam. 9.32 m long was inspected by PT without defect finding.
- Weld seam no. "A" showing on weld seam layout DWG, which is upper "b" ' s 1st circumferential weld seam.

  *There are also different circumferential crack finding on "A" , like ①②③

  *About 50% of defect finding of a circle circumferential weld seam ① , it have not been repaired this time.



附錄二　BP 珠海 PTA 工廠成品儲槽檢查報告

摘要說明(縱向焊點檢查總結):

珠海 PTA 廠成品儲槽經非破壞性檢測-滲透檢測（PT）及超聲波探傷（UT）檢查 RX / RXI 殼板接頭周向焊縫，隨機檢查發現 4x2000mm，4 個搭架平台，4 個方向，東/南/西/北，90/180/270/350 度，槽體發現裂縫情形如下。

1. 11 號殼板：共 6 縱向焊縫。 抽查 7.5 / 127.5 / 187.5 / 247.5 / 307 度，187.5 度裂紋疑，內表面深 16-29mm，連續長度為 450mm。
2. 12 號外殼板：共 6 根縱向焊縫。 現場檢查 37.5 / 97.5 / 157.5 度，發現裂紋，內表面深度為 18-58mm，原厚度為 64mm，裂紋繼續或斷裂，長度為 900mm。
3. 13 號錐板：總共 10 個縱向焊縫。 現場檢查 0/36/180 度，原始厚度為 71mm，發現裂縫，內表面深度為 19-64mm，連續長度為 2000mm。
4. 由於施工架平台有限，另一個殼板未被檢查。

AF610B PTA Product Silo Internal Inspection report

Wang shaohui

2014. 12.12

AF610B PTA Product Silo Inspection

AF610B Inspection report content

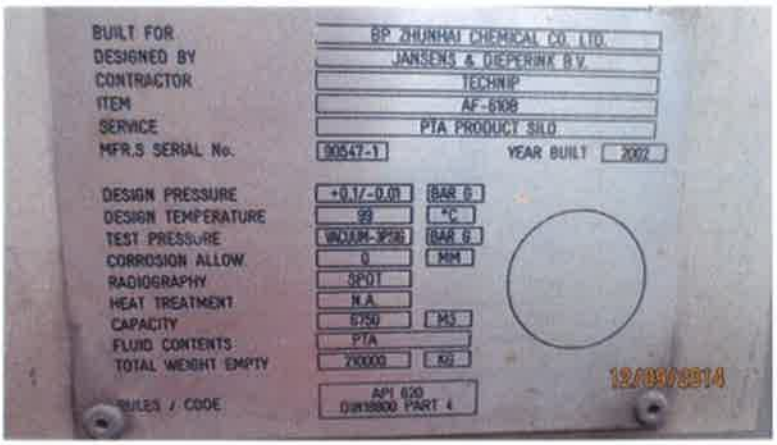
Topic 1 AF610B information and basic data
Topic 2 PT result and summary
Topic 3 UT result and summary

AF610B PTA Product Silo Inspection

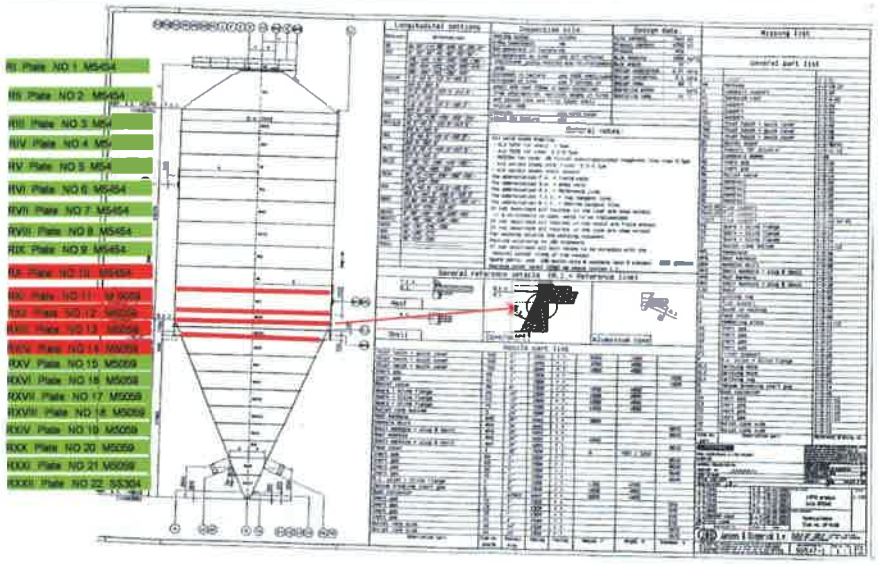
Inspection topic 1
AF610B information and basic data

AF610B PTA product Silo outlook

AF610B PTA product Silo data



AF610B PTA product Silo data



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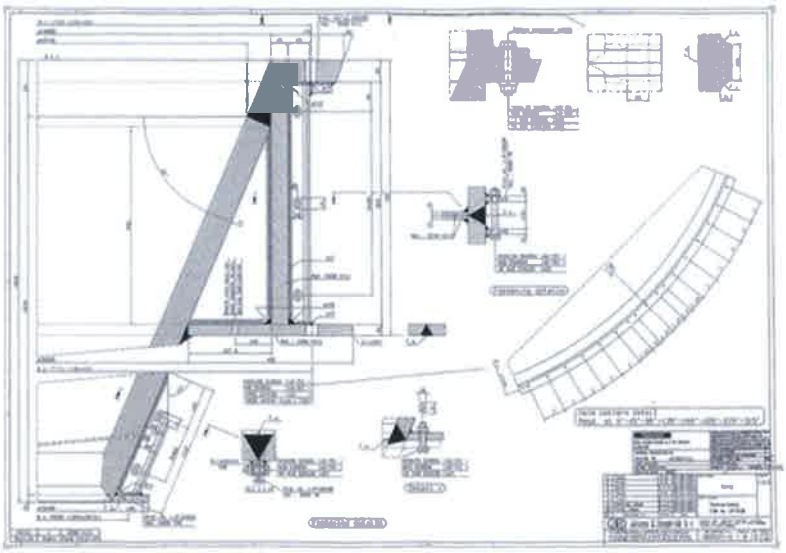

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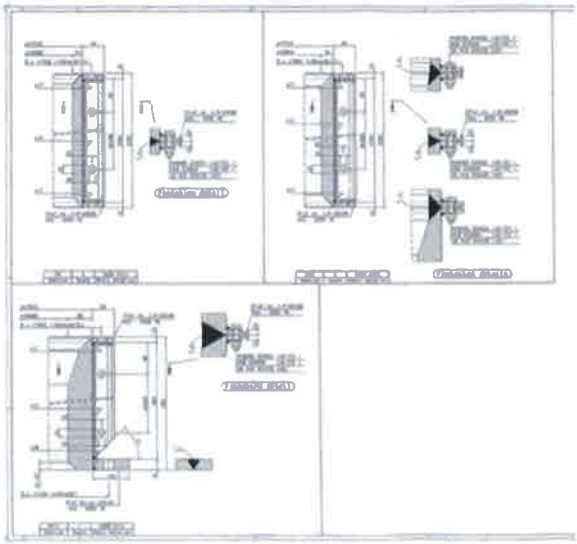
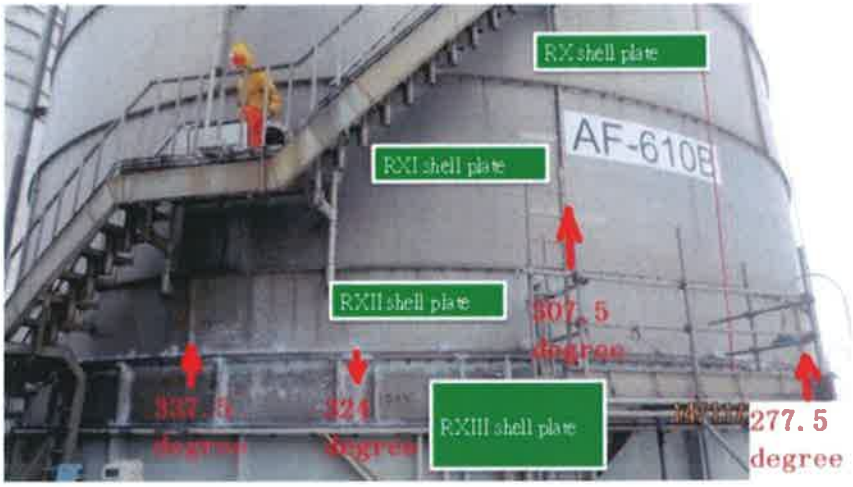


AF610B PTA product Silo Inspection



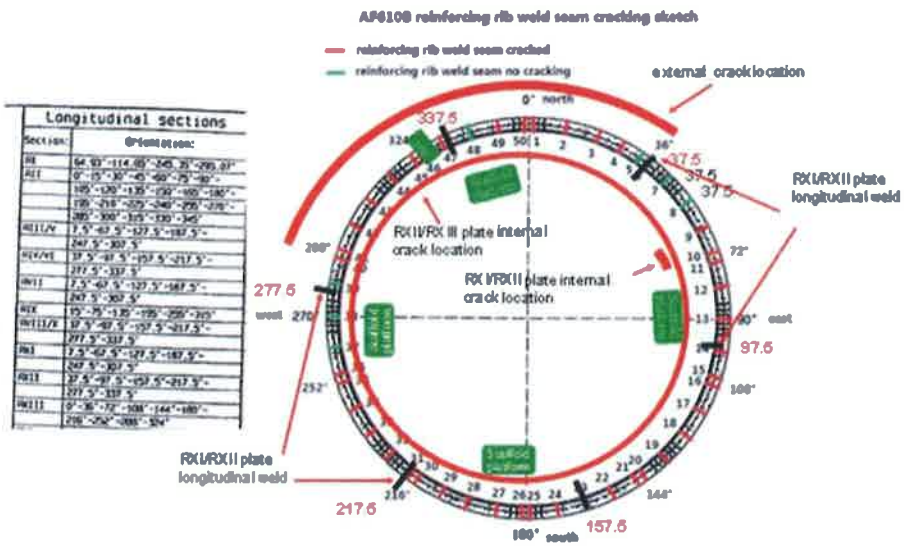
AF610B PTA product Silo Inspection

Inspection topic 2
PT result and summary

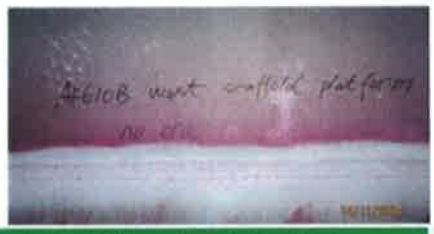
AF610B PTA product Silo Inspection

Shell plate thickness is in normal condition

AF610B PTA product Silo Inspection



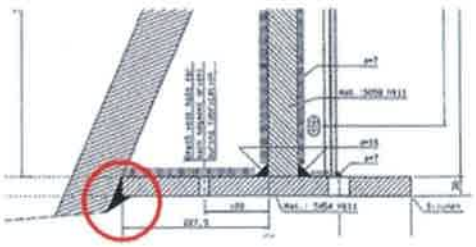
AF610B PTA product Silo Inspection



RX/RXI shell plate joint circumferential weld were checked by PT, No cracks and other defect were found by random check , 4 *2000mm,4 scaffold platform, 4 directions, east/south/west/north,90/180/270/350 degree.

AF610B PTA product Silo Inspection

RXIII cone plate support circumferential weld were checked by PT, No cracks and other defect were found .



AF610B PTA product Silo internal Inspection

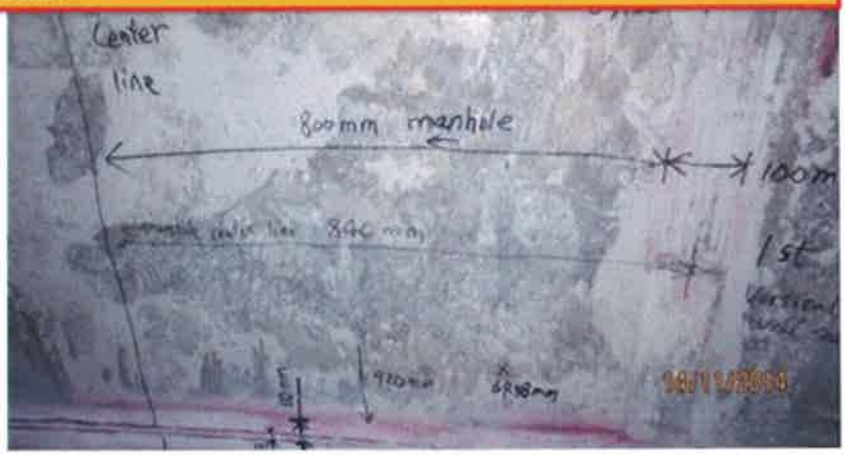
Crack length: RXII/RXIII shell plate joint circumferential weld were checked , The whole circle has cracks ,Ø17000*3.14=53,389mm length.

AF610B PTA product Silo internal inspection

Crack width/depth: RXII/RXIII shell plate joint circumferential weld were checked , biggest depth is 38mm by feeler gauge , width is about 1~2mm.

AF610B PTA product Silo internal inspection

Condition of the 1st longitudinal weld(RXII/RXIII) section : no cracks were found in vertical weld, but circumferential weld is in whole section cracks.



AF610B PTA product Silo internal inspection

Condition of the 1st longitudinal weld(RXII/RXIII) section : no cracks were found in vertical weld, but circumferential weld is in whole section cracks.

AF610B PTA product Silo internal inspection

Condition of the 2nd longitudinal weld(RXII/RXIII) section : no cracks were found in vertical weld, but circumferential weld is in whole section cracks.

AF610B PTA product Silo internal inspection

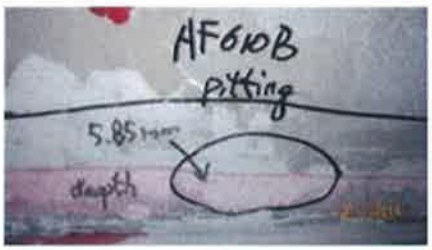
Condition of middle of the 2nd/3rd longitudinal weld(RXI/RXII) section : no cracks were found in vertical weld, but 200mm length cracks were found in circumferential weld, up in AL skirt weld, the only cracks in RXI/RXII circumferential section

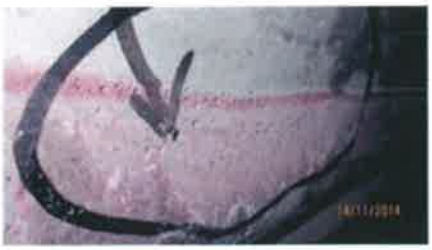
AF610B PTA product Silo internal inspection

Condition of the 3rd longitudinal weld(RXII/RXIII) section : no cracks were found in vertical weld, but circumferential weld is in whole section cracks.

AF610B PTA product Silo internal inspection

Condition of the 3rd longitudinal weld(RXII/RXIII) section : many pitting were found in circumferential weld toe, the biggest depth is about 5.85mm,length is about 300mm, width is about 60mm.





AF610B PTA product Silo internal inspection

Condition of the 4th longitudinal weld(RXII/RXIII) section : no cracks were found in vertical weld, but circumferential weld is in whole section cracks, many pitting were found both in up and down circumferential weld, length is about 650mm,biggest depth is about 4mm,width is about 60mm.

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Condition of the middle of 4/5 longitudinal weld(RXII/RXIII) section : circumferential weld is in whole section cracks, many pitting were found in upper circumferential weld, length is about 1400mm,biggest depth is about 2mm,width is about 50mm.

AF610B PTA product Silo internal inspection

Condition of the 5th longitudinal weld(RXII/RXIII) section : no cracks were found in vertical weld, but circumferential weld is in whole section cracks. The cracks was complex and 2 or 3 layer cracks may be seen.

AF610B PTA product Silo internal inspection

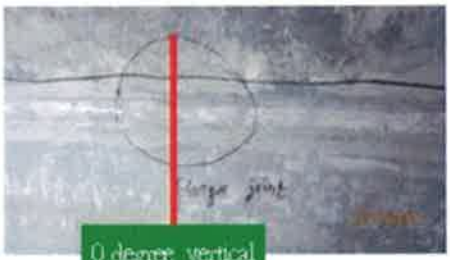
Condition of the 6th longitudinal weld(RXII/RXIII) section : no cracks were found in vertical weld, but circumferential weld is in whole section cracks.

AF610B PTA product Silo Inspection

Calculate and identify the internal location of flange

AF610B PTA product Silo Inspection

Other finding: flange joint is not plain and smooth, but big curve



AF610B PTA product Silo Inspection

Other finding: flange vertical level is not in the same line and big curve

AF610B PTA product Silo Inspection

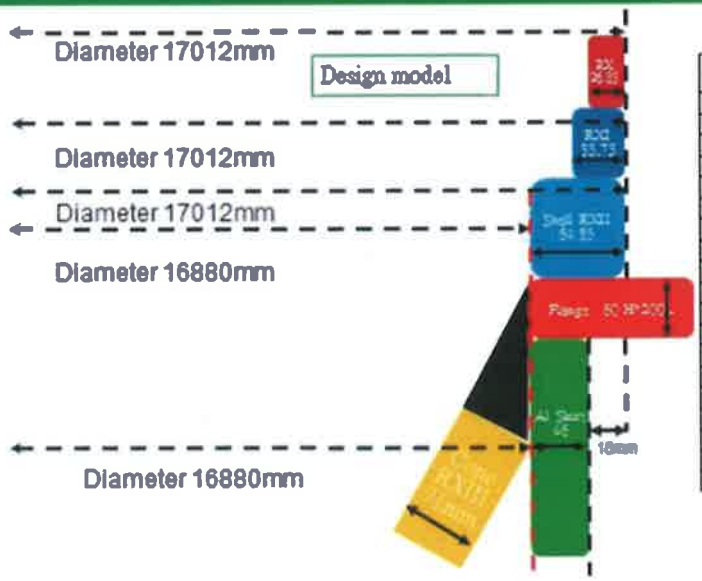


plate	shell thickness (mm)
NO 4	9.90
NO 5	12.98
NO 6	16.00
NO 7	17.91
NO 8	20.90
NO 9	22.82
NO 10	26.83
NO 11	33.73
NO 12	64.83
NO 13 A	46.07
NO 13 B	71.07
NO 14	42.10
NO 15	33.80
NO 16	26.80
NO 17	21.80
NO 18	17.90
NO 19	13.10
NO 20	10.90
NO 21	7.70

AF610B PTA product Silo Inspection

parts	shell thickness (mm)
NO 4	9.90
NO 5	12.98
NO 6	18.00
NO 7	17.81
NO 8	20.80
NO 9	22.82
NO 10	26.83
NO 11	33.78
NO 12	64.83
NO 13 A	46.07
NO 13 B	71.07
NO 14	42.30
NO 15	33.80
NO 16	28.80
NO 17	23.80
NO 18	17.90
NO 19	13.30
NO 20	10.90
NO 21	7.70

AF610B PTA product Silo Inspection

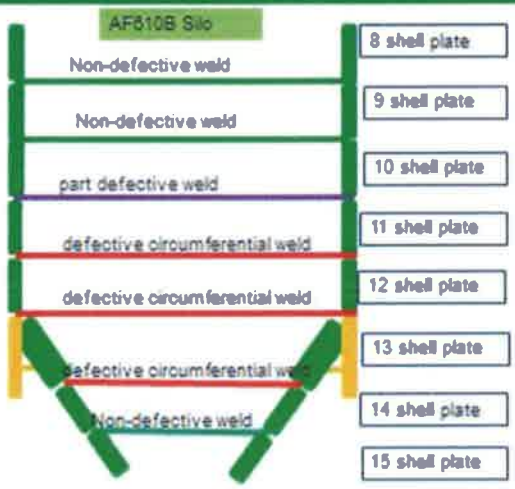
PT Summary:

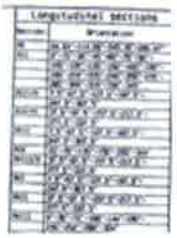
1. Shell plate thickness is in normal condition.
2. RXI/RXII shell plate joint circumferential weld were checked by PT, No cracks and other defect were found by random check, 4*2000mm, 4 scaffold platform service, 4 directions, east/south/west/north, in 90/180/270/350 degree.
3. RXII/RXIII shell plate joint circumferential weld were checked by PT, focus on "T" weld, The only 200mm length crack was found on north-eastern direction, about 67.5 degree. Many patting were also found in circumferential weld, which is 650mm and 1400mm length in the circle of 157.5 degree and 187.5 degree.
4. RXII/RXIII shell plate joint circumferential weld were checked visually, the whole circle has obviously cracks, Ø17000*3.14=53,389mm length, biggest width is 2mm, biggest depth is 38mm. The condition should be seriously reposed immediately. Many patting were found in circumferential weld 97.5 and 157.5 degree, the biggest depth is about 5.85mm, length is about 300/650mm, width is about 60mm.
5. Other finding: flange vertical level is not in the same line and big curve. Flange joint is not plain and smooth, but big curve.

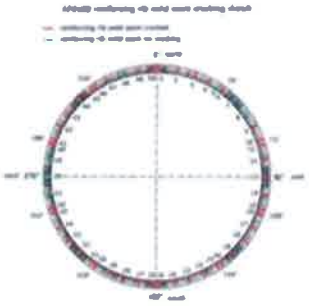
AF610B PTA product Silo Inspection

Inspection topic 3
UT result and summary

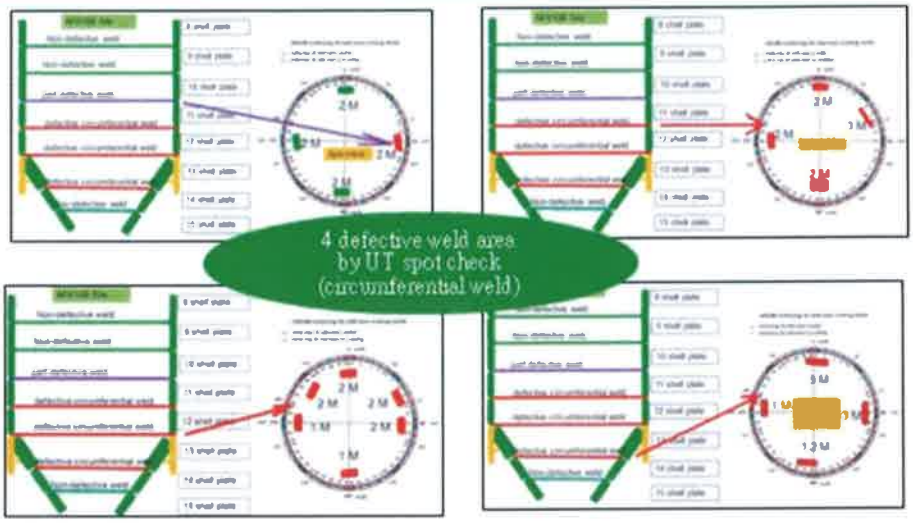
AF610B PTA product Silo Inspection



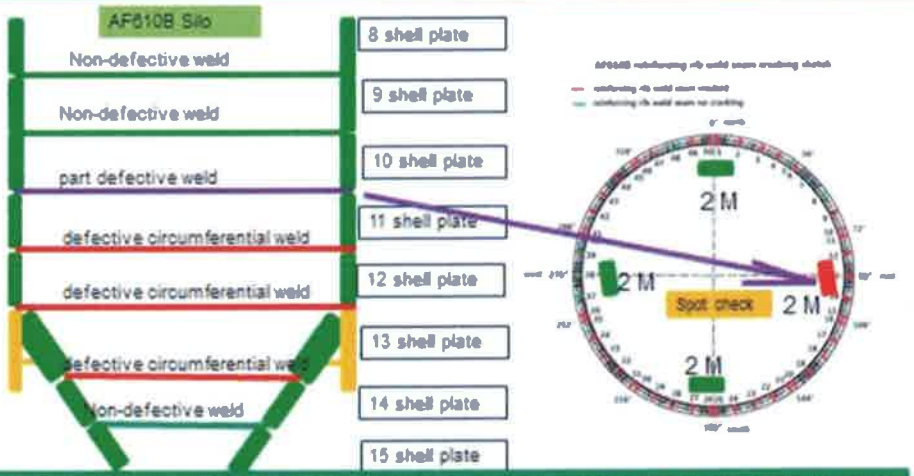




AF610B PTA product Silo Inspection

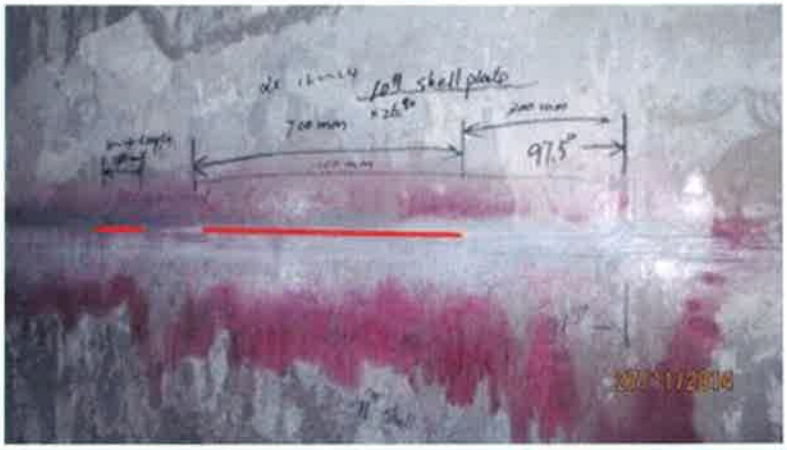


AF610B PTA product Silo Inspection



RX/RXI 10/11 section Spot check 2*4=8 meters by UT test, as marked in red location Complex defect of crack were found in 90 degree direction. The depth is about 16—24mm from internal surface, defect is near upper fusion line, continuing length is 190/140/700mm. 4 scaffold platforms service, the other 3 platforms no defect found, defect only in eastern scaffold platform.

AF610B PTA product Silo Inspection

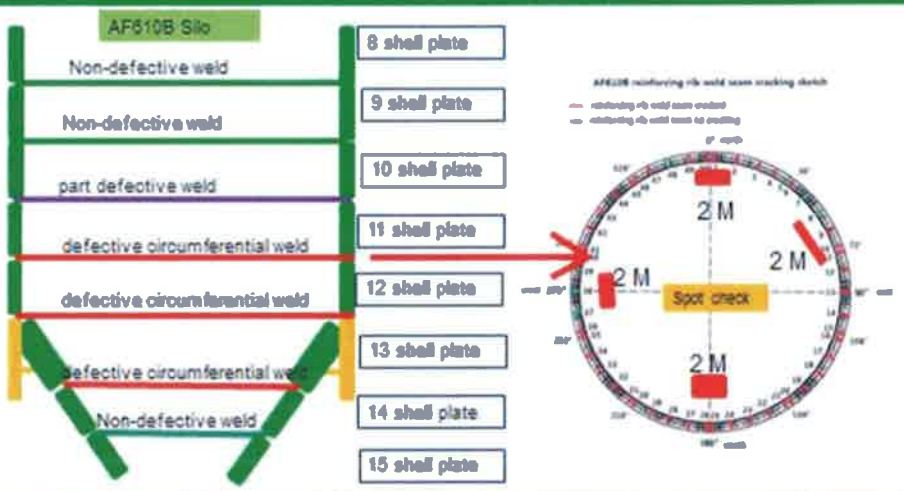


RX/RXI 10/11 section : many continuing cracks were found in 2 meters length by UT test, 97.5 degree direction, east of the silo. The depth is about 16—24mm from internal surface, defect is near upper fusion line, continuing length is 190/140/700mm. 4 scaffold platforms service, the other 3 platforms no defect found, defect only in eastern scaffold platform.

AF610B PTA product Silo Inspection

RX/RXI 10/11 section :There is a pipe support outside the shell in the same 97.5 degree.

AF610B PTA product Silo Inspection

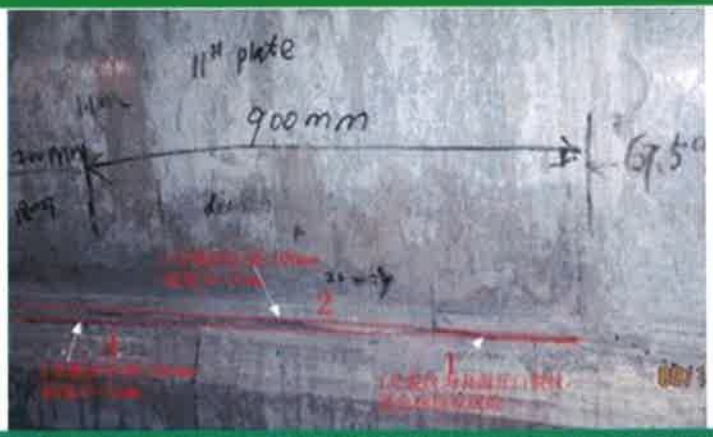


RXI/RXII 11/12 section : Spot check 2*4=8 meters by UT test, as marked in red location. Complex defect of crack were found in each direction. The depth is about 17—24mm and 28—32mm from internal surface, defect is near down fusion line, continuing defective length is 170/200/160/400/200/1300/170/100/2000mm.

AF610B PTA product Silo Inspection

RXI/RXII 11/12 section : discontinuing cracks were found by UT test, from 350—360—7.5 degree direction, north of the silo. The depth is about 17—24m from internal surface, defect is near down fusion line, continuing defective length is 400/160/200/170mm as marked. No1—4 in upper picture, location is 10mm from lower fusion line. No 5—7 is very short.

AF610B PTA product Silo Inspection



RX/RXII 11/12 section : continuing cracks were found by UT test, from 60—67.5 degree direction, north-eastern of the silo. One surface defect was found by PT, depth is about 0--29mm from internal surface by UT, defect location is 10mm from lower fusion line, continuing length is 200mm as marked No1.No 2 defect is continuing 1100mm from 60—67.5 degree ,depth is 18—27mm, defect location is 10mm from lower fusion line. No3 defect is continuing 1300mm from 60—67.5 degree ,depth is 26—32mm, defect location is near down fusion line

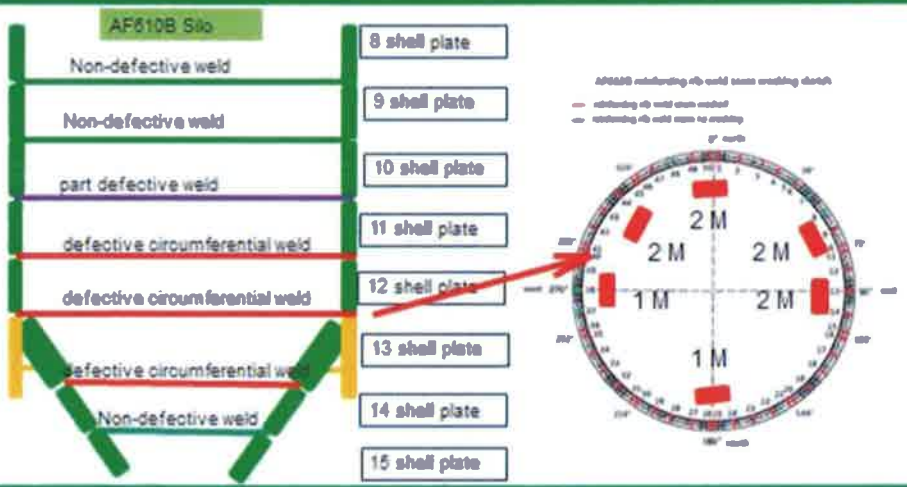
AF610B PTA product Silo Inspection

RX/RXII 11/12 section : continuing cracks were found by UT test, from 180—187.5 degree direction, south of the silo. No1 defect is continuing 170 and depth is 26-32mm, near down fusion line. No2 defect is continuing 100mm and depth is 26—32mm, defect is near down fusion line.No3/No4/No5 is shorter defect

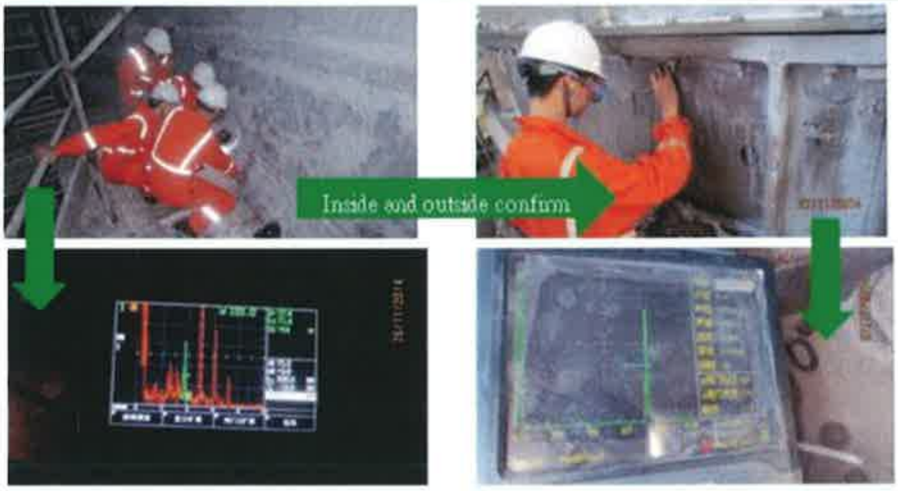
AF610B PTA product Silo Inspection

RXI/RXII 11/12 section 2 cracks were found by UT test, from 265—277.5 degree direction, west of the silo. No1 defect is discontinuing 2000mm length, depth is 18--24mm, location is 10mm from lower fusion line. No2 defect is continuing 2000mm length and depth is 24—31mm, location is near the lower fusion line.

AF610B PTA product Silo Inspection

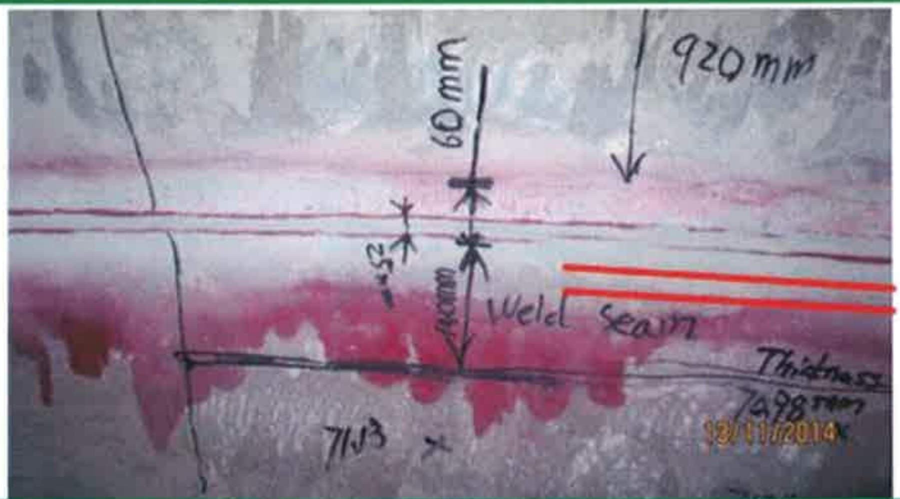


AF610B PTA product Silo Inspection



RXII/RXIII 12/13 section: the whole circle weld seam has obviously cracks by eye. Ø17000*3.14≈53.38mm length, biggest width is 2mm. Spot check 10M. Double check of inside and outside by UT on 0/67.5/97.5/180/277.5/337.5 degree, the crack was confirmed thorough penetrating through outside to inside.

AF610B PTA product Silo Inspection



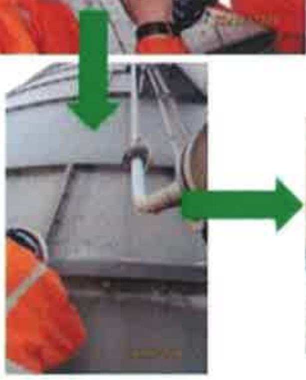
RXII/RXIII 12/13 section: the whole circle weld seam has obviously cracks by eye. Ø17000*3.14≈53.38mm length, biggest width is 2mm. Spot check 10M. Double check of inside and outside by UT on 0/67.5/97.5/180/277.5/337.5 degree, the crack was confirmed thorough penetrating through outside to inside.

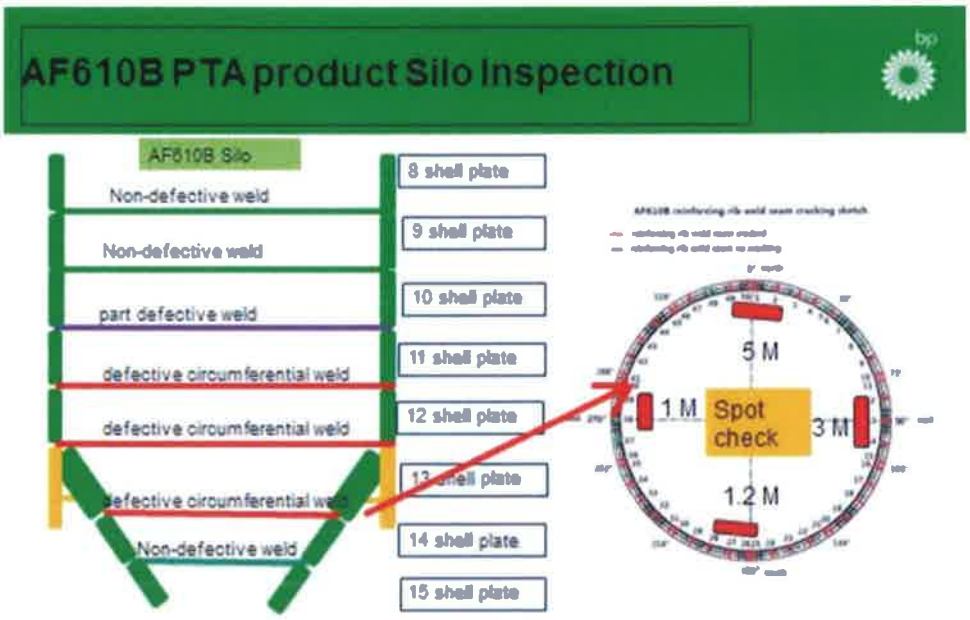
AF610B PTA product Silo Inspection

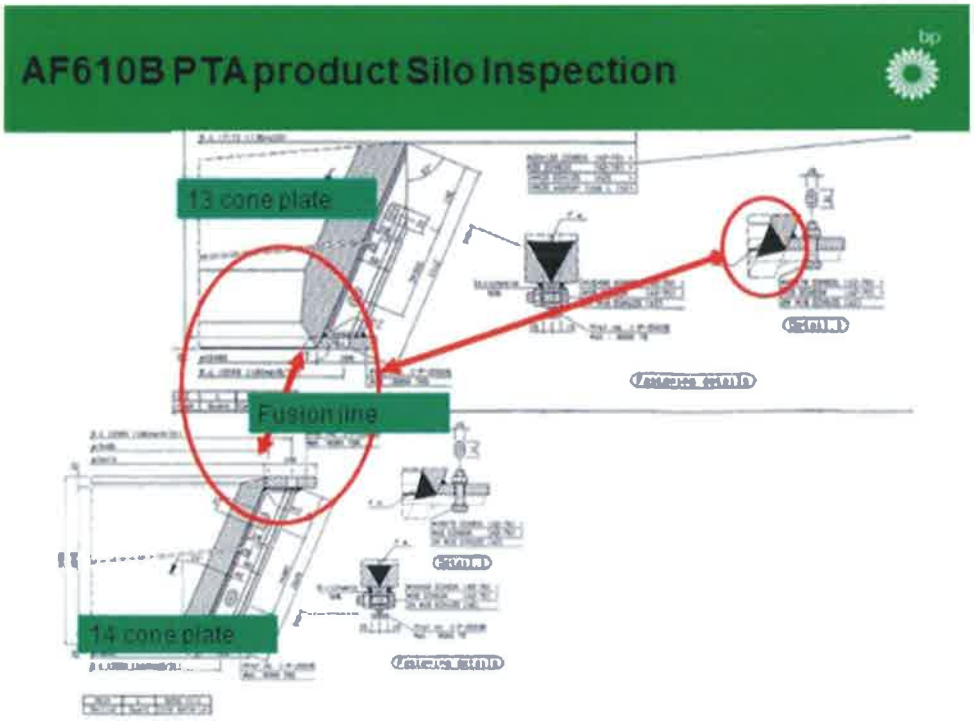
RXII/RXIII 12/13 section: the whole circle weld seam has obviously cracks: [illegible] 389mm length, biggest width is 2mm. Double check of inside and outside by UT on 0/67.5/97.5/180/277.5/337.5 degree, the crack was confirmed thorough penetrating through outside to inside

AF610B PTA product Silo Inspection

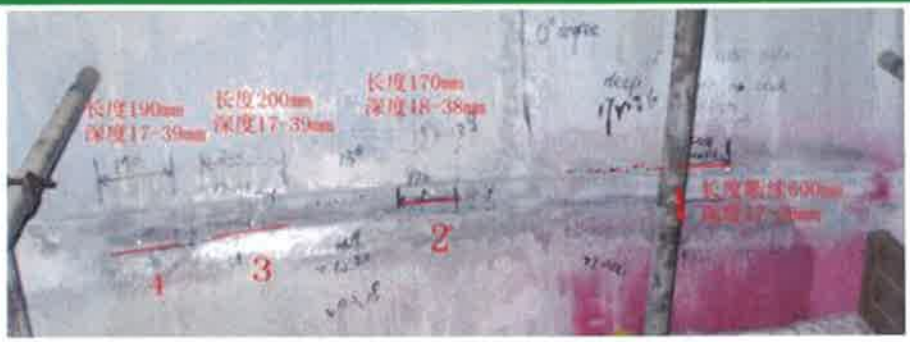
RXII/RXIII 12/13 section, the whole circle weld seam has obviously cracks by eye. [illegible] 389mm length, biggest width is 2mm. Spot check 10M. Double check of inside and outside by UT on 0/67.5/97.5/180/277.5/337.5 degree, the crack was confirmed thorough penetrating through outside to inside




AF610B PTA product Silo Inspection
AF610B Silo
Non-defective weld
Non-defective weld
part defective weld
defective circumferential weld
defective circumferential weld
defective circumferential weld
Non-defective weld
8 shell plate
9 shell plate
10 shell plate
11 shell plate
12 shell plate
13 shell plate
14 shell plate
15 shell plate
5 M
1 M
Spot check
3 M
1.2 M


AF610B PTA product Silo Inspection
13 cone plate
Fusion line
14 cone plate

AF610B PTA product Silo Inspection

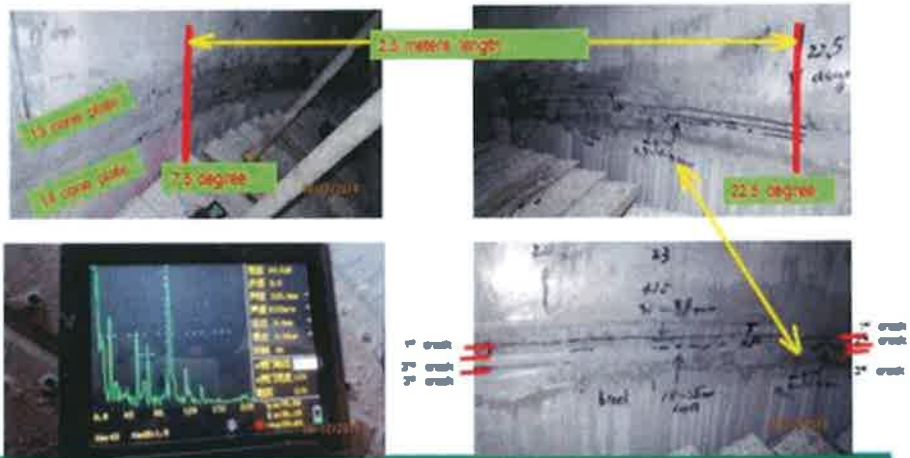


RXIII/RXIV 13/14 section : discontinuing cracks were found by UT test as marked in red location, from 350--360--7.5 degree direction, north of the silo. The depth is about 17—39mm from internal surface, defect is near upper fusion line, continuing length is 600/170/200/190mm

AF610B PTA product Silo Inspection

RXIII/RXIV 13/14 section : continuing cracks were found by UT test as marked in red location, from 7.5--22.5 degree direction, north of the silo. The depth is about 18—26mm and 30—39mm from internal surface, defect is near upper and lower fusion line, continuing length is 2000mm,it is severe crack

AF610B UT Inspection

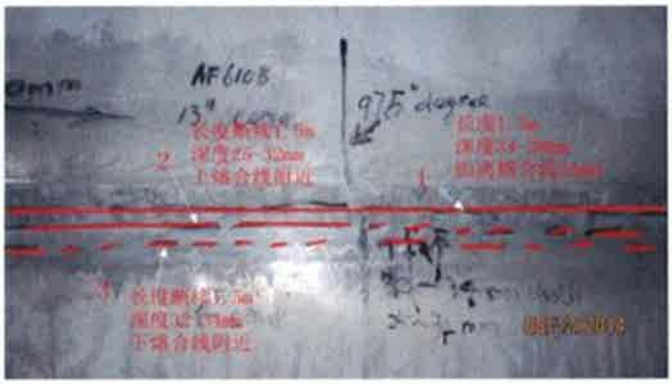


[illegible] 13/14 section, many complex cracks were found in 2000mm length by UT test, from 7.5 to 22.5 degree direction, north of the silo. Total have 3 layer cracks. 1st crack layer continuing length is 2000mm, depth is about 10—39mm. 2nd crack layer is breaking, depth is 25—33mm from the internal surface, the length is continuing 750mm/breaking 300/discontinuous 500mm/continuing 440mm. The 3rd crack layer is breaking and discontinuing 2000mm, depth is 33—35mm. The most serious cracks depth is in 34mm area.

AF610B UT Inspection

R(X)/R(XI) 13/14 section, many complex cracks were found in 1500mm length by UT test, from 90—97.5—105 degree direction, east of the silo. The depth is about 25—35mm from internal surface, defect is near upper fusion line, continuing length is abut 1500mm

AF610B UT Inspection



RX/RXI 13/14 section many complex cracks were found in 1500mm length by UT test, from 90—97.5—105 degree direction east of the silo. The depth is about 25—38mm from internal surface, defect is near upper fusion line, continuing length is abut 1500mm.

AF610B UT Inspection

RXIII/RXIV 13/14 section many complex cracks were found in 2000mm length by UT test from 90—97.5—105 degree direction east of the silo. Similar with 7.5 degree defect, total have 3 layer cracks, 1st crack layer is continuing, depth is about 30—39mm; 2nd crack layer is breaking, depth is 32—37mm from the internal surface; The 3rd crack layer is breaking and discontinuing, depth is 24—32mm.

AF610B PTA product Silo Inspection

RXIII/RXIV 13/14 section 2 complex cracks were found in 1200mm length by UT test from 170 to 180 degree direction, south of the silo. Similar with 7.5 degree defect, total have 2 layer cracks. 1st crack layer is continuing, depth is about 28—35mm, length is 1200mm. 2nd crack layer is breaking and discontinuing, depth is 20—26mm from the internal surface, location is near the upper fusion line, length is 1200mm.

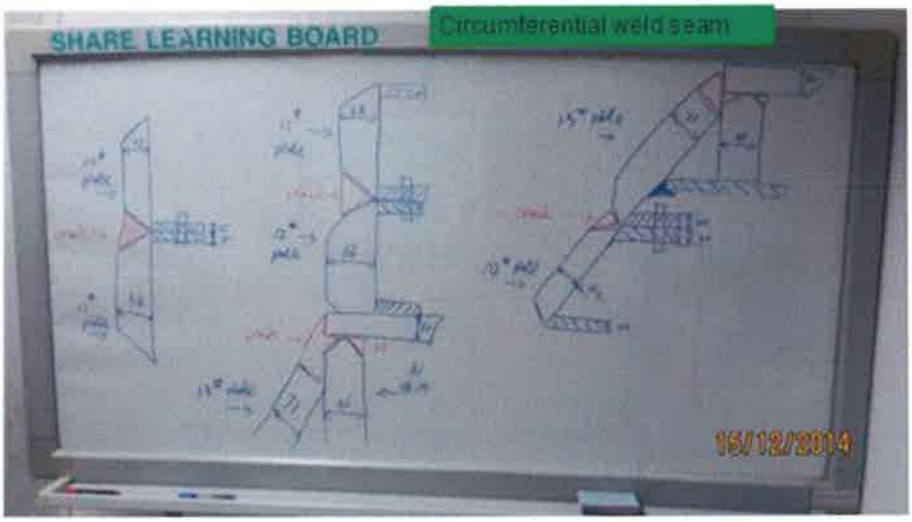
AF610B PTA product Silo Inspection

RXIII/RXIV 13/14 section 3 complex cracks were found in 1000mm length by UT test from 270—277.5—280 degree direction, west of the silo. Similar with 7.5 degree defect, total have 3 layer cracks. 1st crack layer is continuing, depth is about 30—38mm, length is 1000mm. 2nd crack layer is breaking and discontinuing, depth is 18—25mm from the internal surface, length is 1000mm. 3rd crack layer is breaking and discontinuing, depth is 25—32mm from the internal surface.

AF610B PTA product Silo Inspection

RXIV/RXX 14-20 section : NO defect finding .

AF610B PTA product Silo Inspection



AF610B PTA Produce Silo Inspection

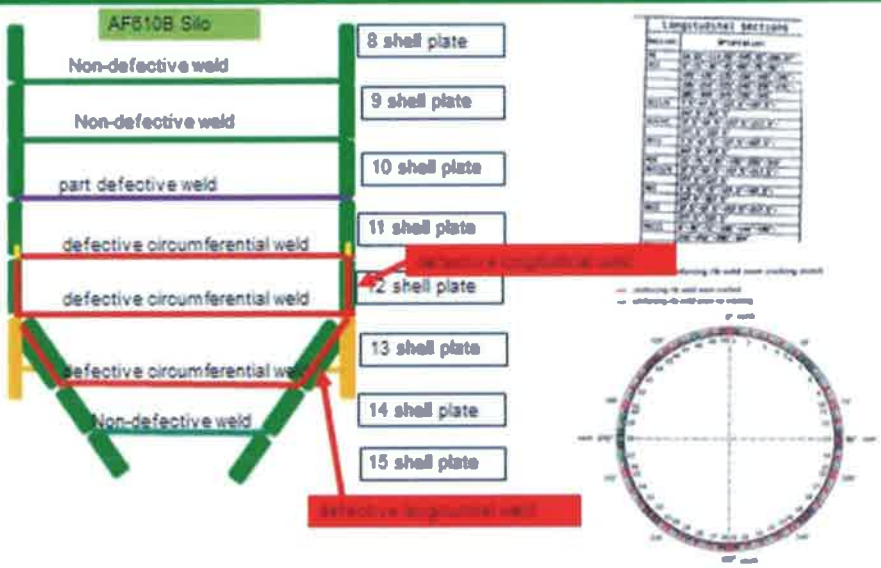
UT inspection summary:

1. 4 circumferential weld seam crack were found. The location is in the weld seam of 10/11 and 11/12 shell plate and 12 shell plate/13 cone plate and 13/14 cone plate.
2. RX/RXI 10/11 section: spot check 8 meters and continuing crack length is 1.3 meters, only in 90 degree direction, depth is 16-24 mm.
3. RXI/RXII 11/12 section : Spot check 8 meters and continuing crack is 4.7M. Complex defect of crack were found in each direction. depth is about 17—24mm and 26—32mm from internal surface, defect is near down fusion line, it is buried defect except 200mm surface crack by PT.
4. RXII/RXIII 12/13 section : the whole circle weld seam has obviously complex cracks ,53M length, biggest width is 2mm. Double check of inside and outside, the crack was confirmed penetrating through from outside to inside.
5. RXIII/RXIV 13/14 section : Spot check 10.2 meters and defective length is 8.36meters. Complex defect of crack were found in each direction. The depth is about 17–39mm and 33–39mm, it is buried defect and near fusion line.
6. No finding in other section.

AF610B PTA product Silo Inspection

Inspection topic 4
Longitudinal weld spot check

AF610B PTA product Silo Inspection



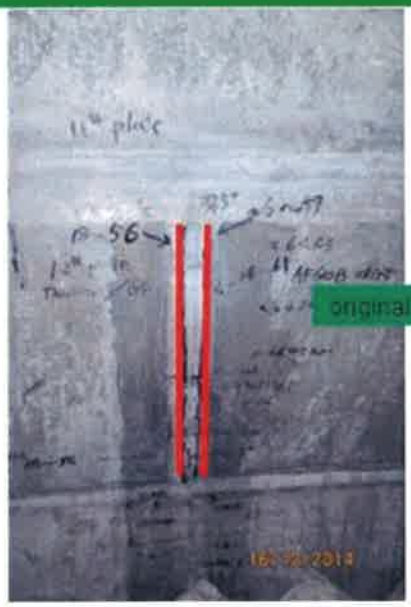
AF610B PTA product Silo Inspection

original thickness 34mm

NO 11 shell plate, total 8 longitudinal weld. Spot check 7.5/127.5/187.5/247.5/307 degree, original thickness is 34mm, only 0.5 M length was checked.

In 187.5 degree, the crack was doubted, depth is 16—29mm from the internal surface, continuing length is 450mm, not sure if it was crack out.It was confirmed a defect. In 7.5/127.5 degree the defect was slight.

AF610B PTA product Silo Inspection



original thickness 64mm

NO 12 shell plate total 6 longitudinal weld Spot check 37 5/97 5/157 5 degree the crack was found and the depth is 18—58mm from the internal surface, original thickness is 64mm, the crack is continuing or breaking, length 900mm

AF610B PTA product Silo Inspection

NO 12 shell plate total 6 longitudinal weld Spot check 37 5/97 5/157 5 degree the crack was found and the depth is 18—58mm from the internal surface, original thickness is 64mm, the crack is continuing or breaking, length 900mm

AF610B PTA product Silo Inspection

NO 12 shell plate total 6 longitudinal weld Spot check 37.5/97.5/157.5 degree, the crack was found and the depth is 18—58mm from the internal surface, original thickness is 64mm, the crack is continuing or breaking, length 900mm

AF610B PTA product Silo Inspection

NO 13 cone plate total 10 longitudinal weld Spot check 0/36/180 degree, original thickness is 71mm,the crack was found and the depth is 19—64mm from the internal surface, continuing length is 2000mm

AF610B PTA product Silo Inspection

NO 8 shell plate: only 1 longitudinal weld can be checked in 97.5 degree, no defect was found.

NO 17 cone plate: only 1 longitudinal weld can be checked in 187.5 degree, no defect was found.

The other shell plate was not checked because of limited scaffold platform.

AF610B PTA product Silo Inspection

Longitudinal weld spot check summary:

1. NO 11 shell plate: total 6 longitudinal weld. Spot check 7.5/127.5/187.5/247.5/307 degree, In 187.5 degree, the crack was doubted, depth is 16—29mm from the internal surface, continuing length is 450mm, not sure if it was crack but it was confirmed a defect.
2. NO 12 shell plate: total 6 longitudinal weld. Spot check 37.5/97.5/157.5 degree, the crack was found and the depth is 18—58mm from the internal surface, original thickness is 64mm, the crack is continuing or breaking, length 900mm.
3. NO 13 cone plate: total 10 longitudinal weld. Spot check 0/36/180 degree, original thickness is 71mm, the crack was found and the depth is 19—64mm from the internal surface, continuing length is 2000mm.
4. NO 8 shell plate: only 1 longitudinal weld can be checked, no defect was found.
5. NO 17 cone plate: only 1 longitudinal weld can be checked, no defect was found
6. The other shell plate was not checked because of limited scaffold platform.

附錄三　工程興建期間之環境保護計畫

新建備用成品儲槽設計規劃將依原環評的成品儲槽規範來設置，工程興建期間之環境保護計畫如下：

甲、 空氣品質

- 設置工地標示牌。標示牌內容載明營建工程空氣污染防制費徵收管制編號、工地負責人姓名、電話及當地環保機關公害檢舉電話號碼。
- 於營建工地周界設置定著地面之全阻隔式甲種圍籬及防溢座。
- 水泥地坪切割敲除，開挖與植樁時，每日施工前先撒水，施工期間定時灑水避免揚塵。
- 土壤改良 PC 樁施工時，會注水輔助加快施工，避免粉塵。
- 地基與基座支撐結構，使用滑模與預拌混泥土車灌注，不會有粉塵產生。
- 每日灑水基座養護並減少粉塵。
- 土壤回填期間每日施工前先撒水，施工期間定時灑水避免揚塵。
- 工程車除開挖階段外,大部分車行於水泥地坪，且車行圍籬出入口設置加壓沖洗設備清洗車體及輪胎，其表面不得附著污泥才予放行，並妥善處理洗車廢水。
- 廠區出入口設有攝影監視系統，監控出入施工車輛、機具，確保車輛出廠前車體及輪胎沒有附著污泥。
- 選用狀況良好之施工機具及運輸車輛，作好定期、不定期保養維護工作，並避免於不正常之狀況下操作，以減少排放廢氣之污染濃度。

乙、 廢棄物

施工期間可能產生的廢棄物，主要可分為工程廢棄土、施工人員生活廢棄物及廢建材三大類。

(1) 棄土及工程廢棄物

- 本計劃之土壤改良整地工程，所需土石在廠內挖、填可達平衡，無土石區外運送問題。營建廢土將回填於基座與廠區內不會運出廠外，對環境影響輕微。
- 開挖土方在不影響後續工種作業情況下，以堆置於工地內為原則。工地無法堆置之開挖待回填土，暫時存放於中美和廠區南側廢土堆置區。土方運輸時，必須全程覆蓋，避免塵土飛揚污染。
- 堆置於工地之開挖土必須時常灑水，必要時應以黑紗網覆蓋，避免塵土飛揚。
- 工地堆置開挖土高度以不超過 1.5 公尺為原則避免坍塌，堆置土方週圍必須警示避免危險。
- 植樁產生之廢水泥漿，放置於現場，等凝固後再運到廢棄混凝土堆置區破碎棄置。
- 廢棄混凝土運至廠區南側廢棄混凝土堆置區，將混凝土破碎後將混凝土與鋼筋分離，鋼筋移至中美和廢棄物堆置場依規定位置棄置。
- 工程結束後由廠商帶料之施工材料(如鋼筋、水泥…)，將由施工廠商負責清運帶離廠區。

(2) 施工人員生活廢棄物

- 工地施工人員產生之廢棄物以便當餐飲之包裝材料及衛浴廢棄物等一般垃圾為主，施工期間平日工作人員平均約 30 人/日，尖峰期間可達 60 位工作人員，若以每人每日垃圾產生量 1.0 公斤估計，預估施工期間每日產生的生活廢棄物約 0.03 公噸，最大產生量約 0.06 公噸。整體而言，施工人員生活廢棄物產生量不

大，其性質與一般生活廢棄物相似，將依應回收廢棄物相關規定先予以分類資源回收；對於無法回收的部分，則以有蓋容器收集後，再委託當地代清除處理機構定期清理，同時注意維護工區周圍環境衛生清潔，避免蚊蠅滋生污染。

(3) 廢建材

■ 金屬、玻璃、塑膠、木材、竹料、紙類、瀝青等廢建材，將妥善貯存，先依應回收廢棄物相關規定，予以分類回收，其餘工程廢棄物則要求承包商依「廢棄物清理法」規定，委託經主管機關許可清除、處理該類廢棄物之公民營廢棄物清除處理機構清除、處理，且其委託種類未逾主管機關許可內容。此外，亦將要求承包商於開工前備妥代清除處理機構之合約等文件；於興建期間，取得受託人開具之該事業廢棄物妥善處理紀錄文件，以確實掌握廢棄物清理途徑及處置場之適切性與合法性。

由於興建計畫於施工期間可能衍生的生活廢棄物及廢建材等廢棄物量不多，各項廢棄物又均配合資源回收、正確的清理途徑及處置地點等追蹤管制措施，因此，施工期間之廢棄物可能引起的環境影響輕微。

丙、 廢水

■ 施工人員生活污水除部分使用既有衛浴設備收集外，另於公區內設置臨時廁所收集，並配合水肥車定期清運。

■ 工地之廢水導流至廠區廢水處理廠，經處理合格後排放，對承受水體影響有限。

丁、 噪音

■ 工區施工機具車輛依「營建工程噪音管制標準」規定辦理。

■ 本工程因為沒有採用打擊式樁，而採用植入式基樁，故不會產生

高噪音，而其他工種之施工與平時維修之工作項目相同，故工地噪音不會有特殊變化，不用特別管制。

戊、 安全

- 藉由本廠安全衛生管理制度的實施並透過稽核管理加以落實，加上完整的安全防護、偵測警報及消防系統，將可確保施工期間之安全。
- 施工計畫中設有緊急應變組織並訂有事故通報及緊急應變措施。