
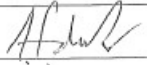
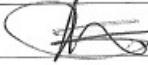
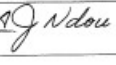


 Eskom	Matimba ACC General Maintenance Contract SOW	Doc. no. NA
		Rev. 1
		Total pages 1 of 30
Matimba Power Station		Reference Document: NA

Outage type	MO/GO/IR	Outage start date	As Per Outage Philosophy
Department	Engineering	System	Air Cooled Condenser

Details	SCOPE CONCURRENCE			
	Compiler	Verified	SCOPE ACCEPTANCE	Supported
	System Engineer	Engineering Specialist	Outage Coordinator	Engineering Line Manager
Name & Surname	Francois Nel	Francois Du Preez	Daniel Mashego	Alusani Ndou
Signature				
Date	2021/05/20	2021/05/20	2021/05/24	2021/06/01

	<b>Matimba ACC General Maintenance Contract SOW</b>	<b>Doc. no. NA</b>
		<b>Rev. 1</b>
		<b>Total pages 1 of 30</b>
<b>Matimba Power Station</b>		<b>Reference Document: NA</b>

<b>Outage type</b>	MO/GO/IR	<b>Outage start date</b>	As Per Outage Philosophy
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<b>Signature</b>				
<b>Date</b>	2021/05/20			

**1. GOAL**

The goal for this outage scope of work is to ensure that the contractor is well informed of each task and the necessary Health, Safety and quality aspects required to effectively and efficiently execute the applicable outage (MO/GO/IR) scope of work. Non-compliance to this scope of work and other Eskom Quality, Health and Safety standards will result in the issuing of NCR's unless other disciplinary action is decided.

**2. SUMMARY OF THE SCOPE**

This scope contains the detailed scope of work for the Air Cooled Condenser for execution during MO's, GO's and IR's. The outage commencement date and duration will be according to the outage philosophy.

**3. NORMATIVE REFERENCES**

- [1] ISO 9001 Quality Management Systems
- [2] OHS Act 85 of 1993

**4. INFORMATIVE REFERENCES**

- [3] **376-MAT-AABB-D00139-16** Basic Design Matimba ACC Fan Blade Replacement

**5. DEFINITIONS**

	DEFENITION	DESCRIPTION
1.	Fan ring	The metal ring/bel nose/cowling at the fan to guide the air into the fan and increase fan efficiency
2.	ACC gearbox	The mechanical drive rotating the fan which in turn is driven by the electric motor
3.	Oil level stand pipe	A pipe attached to the gearbox to allow undisturbed oil level measurements to be taken with a reed type oil level switch
4.	Fan deck	Metal sheet/platform around the fans to walk on to gain entry to the fans
5.	ACCCT	Air Cooled Condenser Collecting Tank
6.	IR	Interim Repair – 3 Yearly
7.	GO	General Overhaul – 6 Yearly
8.	MO	Major overhaul – 12 Yearly

**6. ABBREVIATIONS**

	ABBREVIATION	DESCRIPTION
1.	ACC	Air Cooled Condenser
2.	NDT	Non Destructive Testing
3.	PQP	Process Quality Procedure
4.	QCP	Quality Control Plan/Procedure
5.	ACCCT	Air Cooled Condenser Collecting Tank
6.	IR	Interim Repair
7.	GO	General Overhaul
8.	MO	Major overhaul

**7. GENERAL CONSIDERATIONS**

ACTIVITIES	SPECIFICATIONS
<b>PRE-REQUISITES / PRE-CONDITIONS</b>	
Ensure vacuum is released before any work on the ducting commences	

A Gas test must first be done before the workers can enter the confined space areas	Occupational Health and Safety Act 85 of 1993
All workers names must be entered on a Worker's Register.	Occupational Health and Safety Act 85 of 1993
<b>SAFETY</b>	
Matimba Power Station SHE specifications for principal contractors and other related requirements specific to the plant.	PA/270/003: Contractor health and safety requirements.
Ensure permit to work is released before any work commences.	
<b>ENVIRONMENT</b>	
Matimba Power Station Waste Management procedure and other related requirements specific to the plant	PS/244/001 PG/244/001
<b>QUALITY</b>	
Supplier Contract Quality Requirements Specification	QM-58
<b>Process Quality Process/Procedure (PQP/QCP)</b> All work done on the ACC will be done in accordance to the agreed and signed QCP which must be submitted to the system engineers at least 3 weeks before the outage commence. The QCP shall be signed and agreed on before the permit is issued. The QCP shall be signed off before the contractor closes the permit Where defects have been identified on the ACC components, photos are to be taken and it should be reported to the system engineer.	<b>PA/237/005:</b> Quality control of contractor's workmanship.
<b>Hold and witness points</b> Hold and witness points will form part of the QCP that will be submitted by Outage Management and approved by Engineering prior to the start of an outage.	Outage Management coordinator to hold the contractor to a policy of, "No QCP, No Work)
<b>Check Sheets</b> Inspections to be carried out in accordance with check sheets as attached in master quality plan (QCP).	Check sheets referenced in this document.
<b>Experience of staff</b> All supervisors, riggers, fitters, boiler makers and welders must have a minimum of three years work experience post trade test.	Prove of qualifications and work history to be submitted and Verified by the outage Coordinator and System Engineer
<b>General Requirements</b>	
The contractor will: Give regular feedback to the system engineer daily or at least every second day in the form of documented report with pictures signed off by the QC and site supervisor. This will include working progress, delays, problem areas etc	
The contractor will: Report all issues to the outage coordinator as well as the system engineer pertaining to the outage work.	
The site supervisor will: Go to the plant at least once per day and inform the outage coordinator and system engineer when the expected plant walk is should either decide to join the inspection.	
The site supervisor and QC will join the system engineer and or outage coordinator during final QC on different tasks.	

<b>Qualifications</b>	
The site supervisor will have at least a N3 and trade certificate with 3 years' experience and at least 2 years working as a supervisor	
The QC inspector shall have at least a N3 and trade certificate with 3 years' experience and supply a reference letter where he worked as a QC inspector for at least 1 year.	
All fitters and technicians shall have at least a N3 and trade certificate with 2 years' experience.	
<b>EXISTING DEFECTS</b>	
Make a list of the known defects left from the previous outage or identified during operations	Not applicable for the master scope of work
Maintenance defects shall be tracked by Works Management and does not have to form part of this list	

8. ADDITIONAL

- A plant walk shall be done before the commencement of any work. This plant walk shall be with the contractors site supervisor and relevant QC personnel, outage coordinator and system engineer.
- Where working on or close to electrical components with water, consult with the outage coordinator to ensure electrical isolations.
- Ensure all fans are electrically isolated and on permit before any persons enters the fans.
- The system engineer and outage coordinator is not responsible to constantly go to the plant to verify if the work is completed or not It is the contractors responsibility to know this. If the contractor accepts that the work is completed, an inspection will be done. If the work is not adequate as per this SOW, a written notification will be submitted to the contractor. Thereafter the contractor will make the necessary correction if possible, if not, an NCR will be issued. Once the corrections have been made, the contractor will inform the outage coordinator that the work/task is completed. If the work is again found inadequate as per this SOW, the first NCR will be issued and so forth.
- If at any time an employee/contractor is found inside the fan area (on the fan grating) not being connected to a lifeline, it will be reported as a violation of Eskoms life saving rules.
- The contractor shall not make use of the scaffolding access ladders to gain access to the inside of the fan area. The contractor must have their own appropriate ladders to gain access to the fan area. It is advised that the contractor has at least three such ladders.
- Communication to be shared that the lift doors are to be adequately closed to prevent the lift from going into an “Out of service” mode. See picture below.
- Where there are any hold and witness points requiring intervention from the outage coordinator and or engineer, a formal notification shall be given at least 24h in advance with a final notification at least 12-6 h before the time. Should these times not be respected, the employer shall not be accountable for lost time should inspections not be done due to unavailability.
- During cleaning, one fan unit will first be cleaned and will first be QCD by the outage coordinator, engineer together with the site supervisor and relevant QC personnel. All shortcomings will then be identified and that fan unit will be used as a reference for the expected quality of work on the remaining fans.



9. MIN TOOLS AND EQUIPMENT

The following tools are considered to be the minimum requirements and as such, will be verified by outage and engineering before the outages commences.

- At least 3 x access ladders as per Task 6 to gain entry to the fan. Scaffolding ladders will not be permitted.
  - Ladder shall have a stabilizing bar.
  - Ladders shall be clearly marked as the property of the Contractor.
- At least 2 x portable hot water high pressure pump cleaners to be used on the structural components for cleaning. The pumps shall conform to the following:
  - 220VAC or 380VAC or Fuel (Diesel/petrol). With IP 65 plugs on the cables.
  - Must be able to inject soap/degreaser for application to surfaces.
  - Min P: 6 Mpa.
  - Max P: 12 Mpa.
  - Min temperature: 60°C.
  - Max temperature: 85°C.
  - Min flowrate: 6 L/s .
  - Max Input power: 40kW.
  - If the cleaning pump is wider than 500mm then the pump will need to be moved using a chain block (3T chain block is available) Contractor will need to use their own rigging eq and personnel.
- At least 2 x 100m long power supply cables will be required.
- 24 x 5kg cleaning rag bags for manual cleaning. (Could be more).
- 48 x Hard bristle hand scrubs for manual cleaning. (Could be more).
- 8 x Tube and pipe cleaners to clean the ACC gearbox oil level stand pipes. (Could be more).
- SABS approved safety harnesses with double lanyard for each person working inside the ACC fans.
- Retractable steel wire fall arresters for each person working inside the fan.
- At least 12 x 10L cleaning buckets with steel handles to use for manual cleaning.
- Ropes to secure buckets etc should it be necessary.
- Headlamps for all workers working in areas with limited illumination (Estimated 12 workers).
  - To be at least 400 Lumens.
  - lithium-ion battery
  - Adjustable Headstrap
  - Tiltable
  - Battery life – At least 8h on 50%
  - Optical lens, zoom in/out available
- At least 12 x Hard bristle industrial brooms to be used to scrub and sweep the fan rings, fan deck and ACC walkways.

10. BILL OF MATERIALS (SUPPLIED BY THE EMPLOYER)

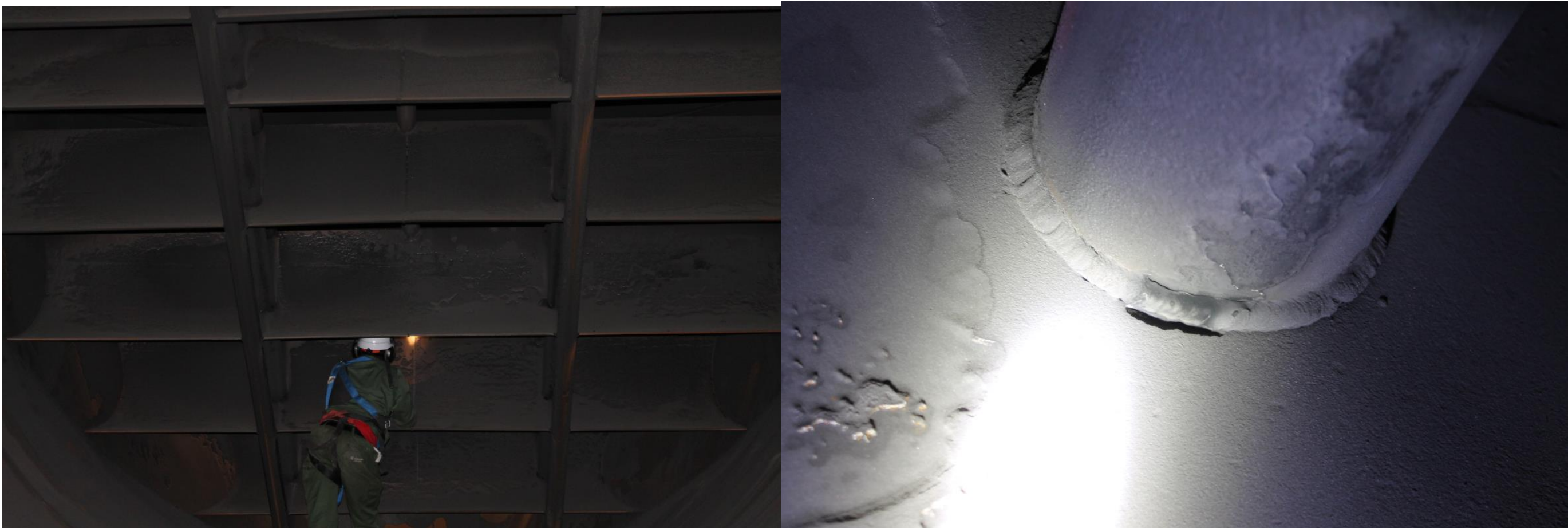
Nº	COMPONENT FLOC (KKS CODE)	COMPONENT DESCRIPTION	COMPONENT / MATERIAL SPECIFICATION	CRITICALITY CRITICAL/NON CRITICAL	Drawing No.	Group Number	Position Number	STOCK NUMBER	DESIGN QUANTITY	Required Quantity	Unit of measure
1	MAG11/12BR010	Manhole gasket LP exhaust steam ducts	3mm gasket	High				197972	2	2	#
2	MAG20BP001/2 MAG30BP001/2	Rupture disc manhole gasket	4 rupture discs and 2 manholes	Very High				197972	10	10	#
3	MAG21/22/23/24BR010 MAG31/32/33/34BR010	Manhole Gasket		High				197972	8	8	#
		Epoxy paint (Ivory wear cote)		High					100	100	Kg
		25mm paint brushes		High				137635	100	100	#
4	MAJ20/30AA501/2	Gaskets		High				219593	2	2	#
6	MAJ20/30BN001/2	Holding ejector steam nozzle		High					4	4	#
		Gaskets		High				219593	2	2	#
5	MAJ11/12BN001	Hogger ejector steam nozzle		Low					2	2	#
6	MAG00	Cleaning soap	BH38	High				157593	1300	1300	Litres
7		Liquid cleaning	SAFHeavy	High				159784	2200	2200	Litres

## Task 1

This work is done every 6 years during GO's and MO's and not during IR's

Activity No	Activity Type	Steps	Outcomes	Min workers tools	Responsibility	Intervention/Eng Expectation	Recommended personnel	Total Task Duration (h) – Excludes reports
1.1	Inspection of LP exhaust steam ducts	Erect scaffolding at 0m level below the LP exhaust steam ducts manhole cover	Allow workers to safely open, gain access into the ducts and close the manhole covers	NA	Outage Coordinator	NA	NA	NA
		Open manhole covers at 6m level. Remove old gasket and clean gasket seats with a scraper	Access gained to exhaust steam ducts. New gasket must be able to seal adequately	NA	Outage Coordinator	NA	NA	NA
		Do gas test	Occupational Health and Safety Act 85 of 1993		Outage Coordinator	Gas test to form part of contractors QCP – Hold point for contractor	Eskom	3
		Inspect ducting – use torch to identify any indentations which could weaken the structure. Shine torch parallel to the ducting walls	Check that there is no excessive active corrosion on the ducts. Check for any silver/white marks which indicates active corrosion	Sufficient illumination – adequate torches must be used	Contractor	Report with photographs to be submitted	X2 SAIW welding inspector	1
		Check the condition of the hot-well grid, drains and condition of hot-well itself	Check that hot-well drain is free from any foreign materials.	Sufficient illumination – adequate torches must be used	Contractor	Report with photographs to be submitted	X2 Artisans	1
			Check the condition of the hot well grid. If grid is severely corroded, it should be replaced during the next outage and the contractor must indicate as such.					
			Ensure that the hotwells and drains are all drained and that there is not an accumulation of water which is not draining					
		Inspect guide vanes at front and back – Inspect each vane at the welds. Identify any critical areas using a white spray paint. Note them and inform system the engineer	Ensure that the guide vanes are all firmly secured. Ensure there is no severe active corrosion on the welds as well as the vanes	Sufficient illumination – adequate torches must be used	Contractor	Report with photographs to be submitted	X2 SAIW welding inspector	2
		Inspect LB bypass distribution ducts – Identify all active corrosion.	Ensure bypass distribution duct has no foreign objects inside.	Sufficient illumination – adequate torches must be used	Contractor	Report with photographs to be submitted	X2 SAIW welding inspector	0.5
		Inspect bypass support, hinges and retainer pins – Identify active corrosion; inspect all welds for corrosion as well as cracks. Ensure retainer pins are not lose or missing.	Ensure that the bypass support does not fail during operation	Sufficient illumination – adequate torches must be used	Contractor	Report with photographs to be submitted	X2 SAIW welding inspector	1
			Be sure to thoroughly inspect the bottom support welds for cracks. Replace all damaged/missing pins – Inform system engineer prior to replacement					
		Check for any loose objects in the duct. Inform system engineer of all suspicious items	This work must be done at the start so as to do the necessary repair work if required				X2 Artisans	0.5
		Clean ducts after LP casing/inspection manhole covers has been closed	Remove all foreign objects such as wire, sand etc. after LP turbine manhole covers are closed	Brooms and Sufficient illumination – adequate torches must be used	Contractor	The contractor is to liaise with Rotek just before the LP ducts are closed so that the ducts can be cleaned	X2 Semi-skilled	1
		Inspect pressure measurement taping points	Ensure that the holes are free from any foreign objects and or scaling accumulation if any. It is critical that these lines are not blocked as this will result in inaccurate pressure measurements	Sufficient illumination – adequate torches must be used	Contractor		X2 Artisans	0.5
		Remove hotwell drain flanges at .05m level and remove any foreign objects. Clean drain pipe. Close flange covers with new gaskets. (x4 Flanges)	Ensure hotwell drain pipe is thoroughly cleaned so as to prevent any blockages in sampling lines	Sufficient illumination – adequate torches must be used	Contractor	Report with photographs to be submitted	X2 Artisans	2







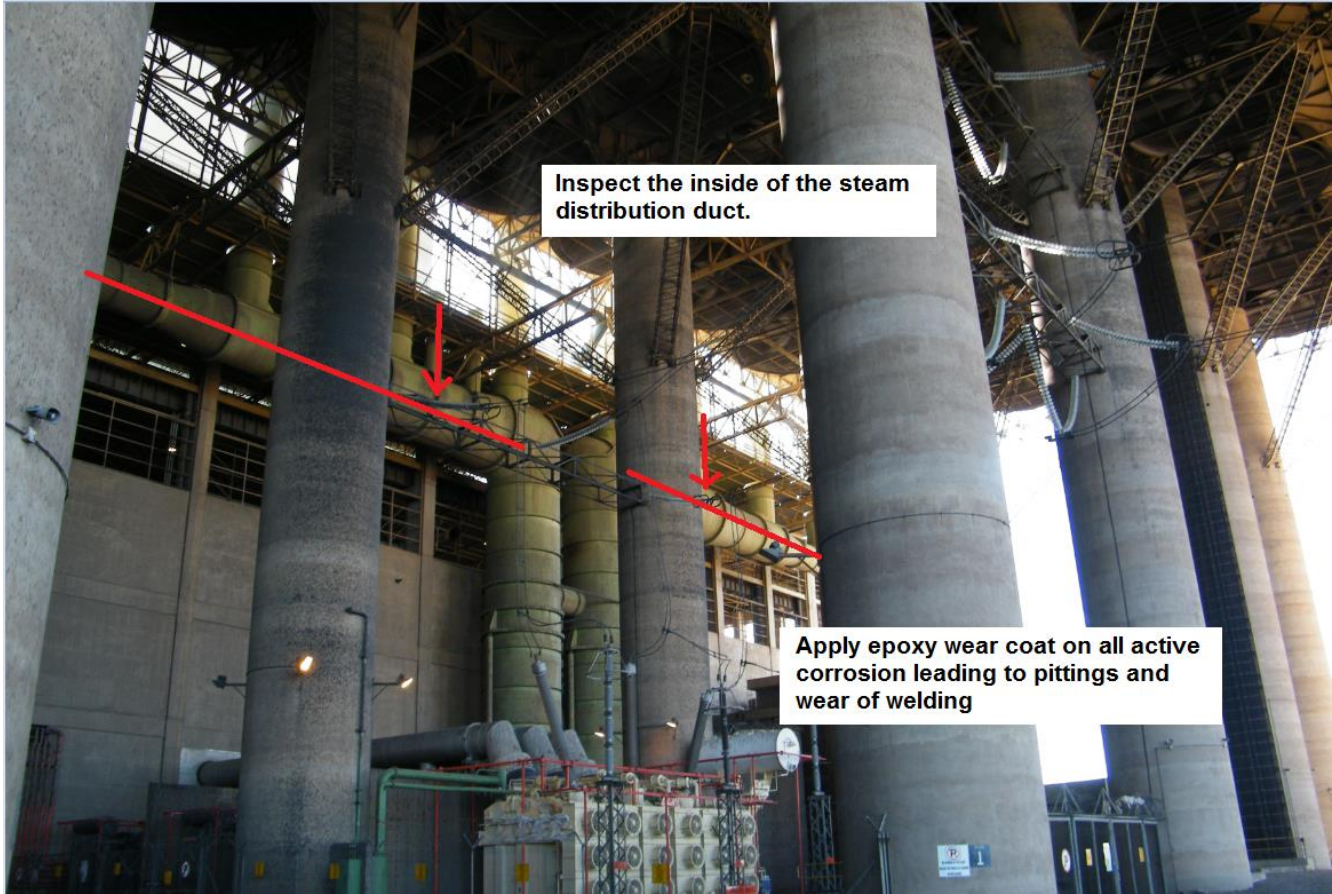
Task 2

This work is done every 6 years during GO`s and MO`s and not during IR`s

Activity No	Activity Type	Steps	Outcomes	Workers tools	Responsibility	Intervention/Eng Expectation	Recommended personnel	Total Task Duration (h) – Excludes reports
2.1	Inspection of distribution duct	Open manhole covers at 35m level	Open manhole covers to gain access to the distribution duct	Wrenches, hammer	Contractor		X2 Artisans	3
		Do gas test	Occupational Health and Safety Act 85 of 1993		Outage Coordinator	Gas test to form part of contractors QCP – Hold point for contractor. Must be arranged in advance	Eskom	3
		If ladder is damaged due to FAC, repair damaged ladder. If ladder becomes unsafe, report to system engineer	Ensure ladder is safe to use and will not come loose during operation. No welding may be done on the ducts without approval of the system engineer	Safety harness and Sufficient illumination – adequate torches must be used	Contractor	Report with photographs to be submitted	X2 SAIW welding inspector	1
		Inspect distribution duct ladders and guide vanes. Report any active corrosion as well as cracks on the welds. Inspect all welds on the guide vanes.	Ensure that all guide vanes are secure and not suffering from localised corrosion.	Sufficient illumination – adequate torches must be used	Contractor	Report with photographs to be submitted	X2 SAIW welding inspector	2
		Scrape off any debris left behind from the gaskets. Use sand paper to ensure a fully cleaned surface	Mating faces must be cleaned and there may not be any high spots on the flanges	Scraper, 100 fine sand paper	Contractor		X2 Semi-skilled	2



		Replace manhole gaskets and cover	Gasket must not leak during operation	Wrenches, hammer – Contractor to make own arrangements to cut the gaskets	Contractor		X2 Artisans	3
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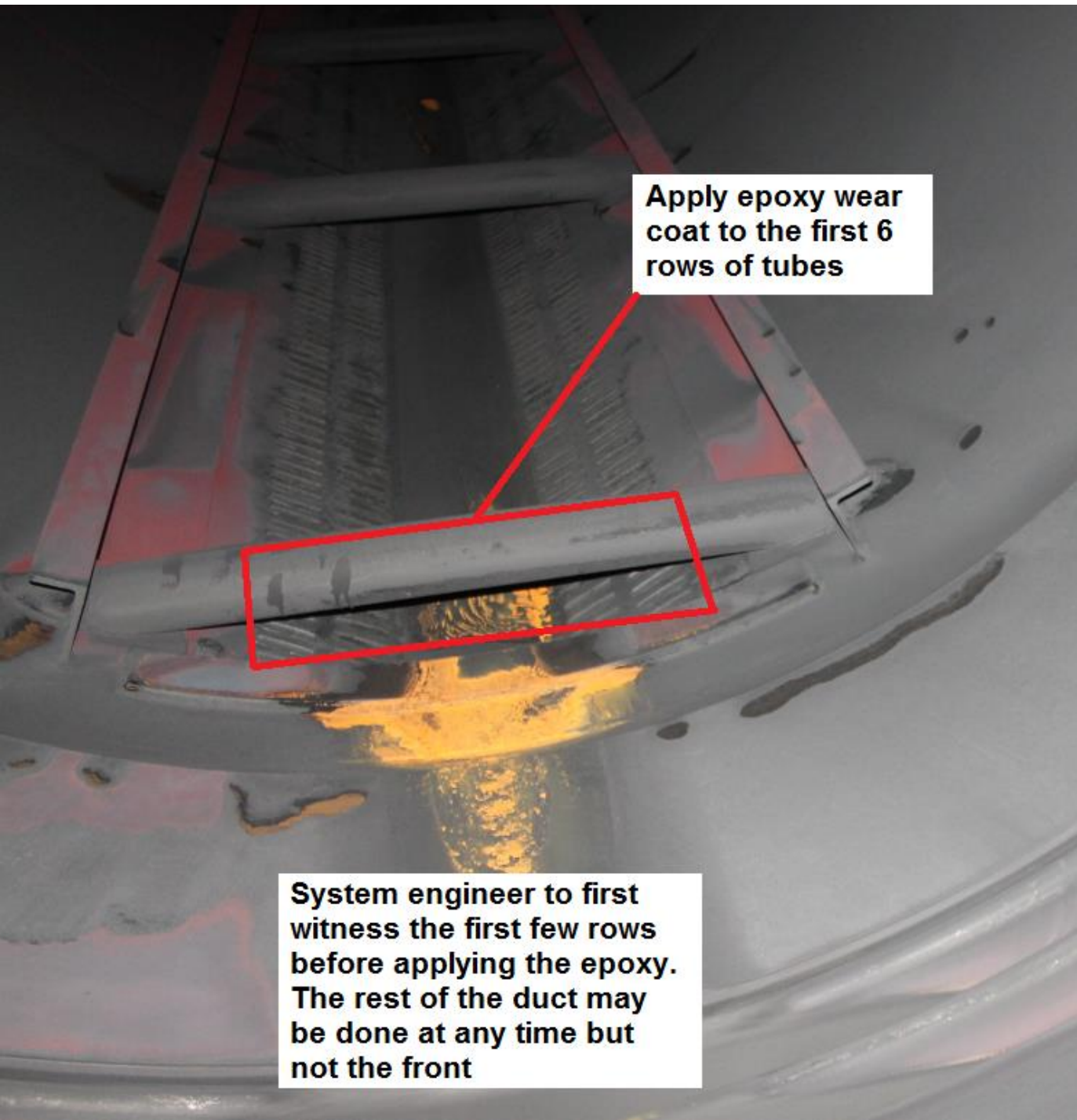




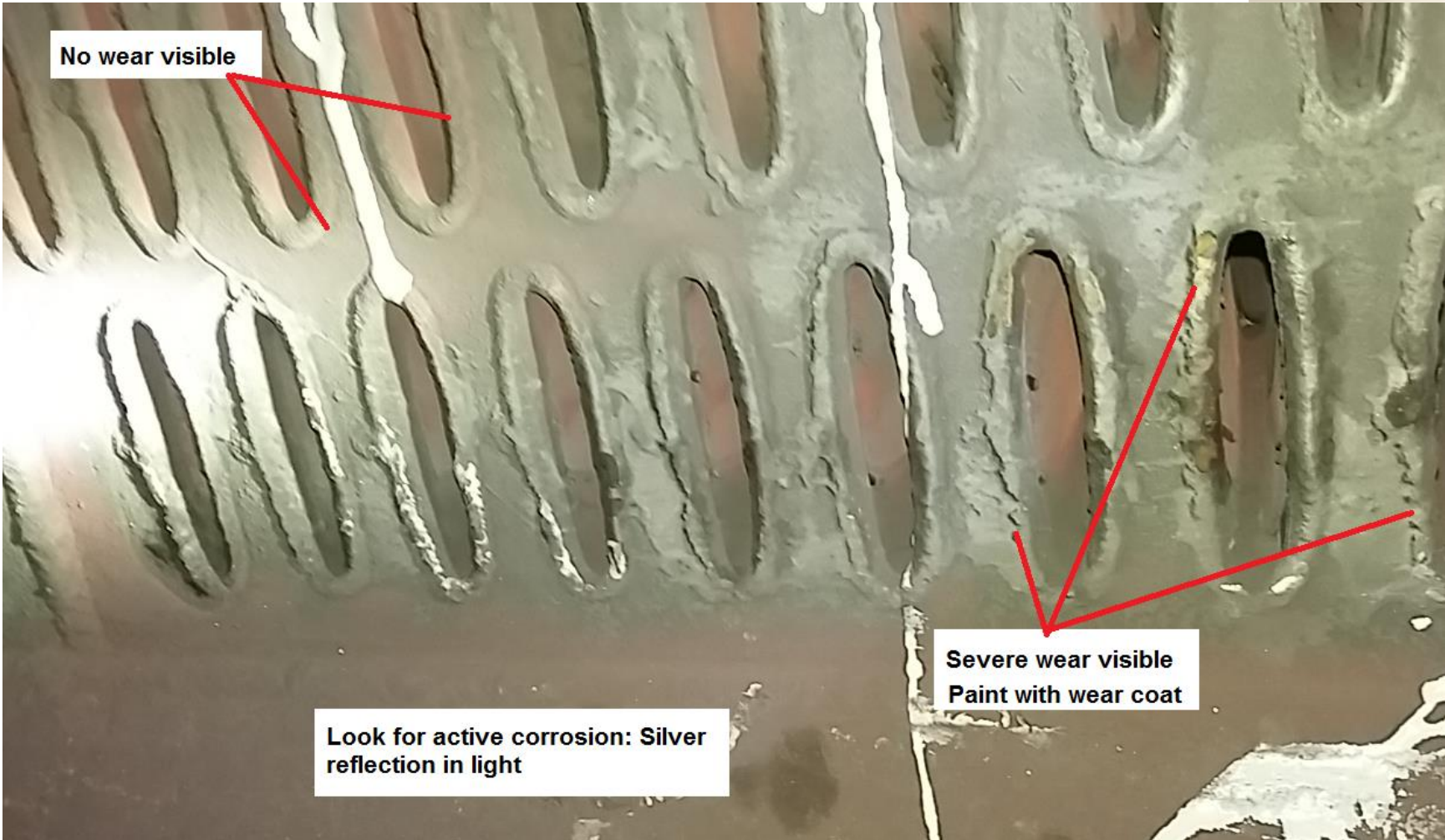
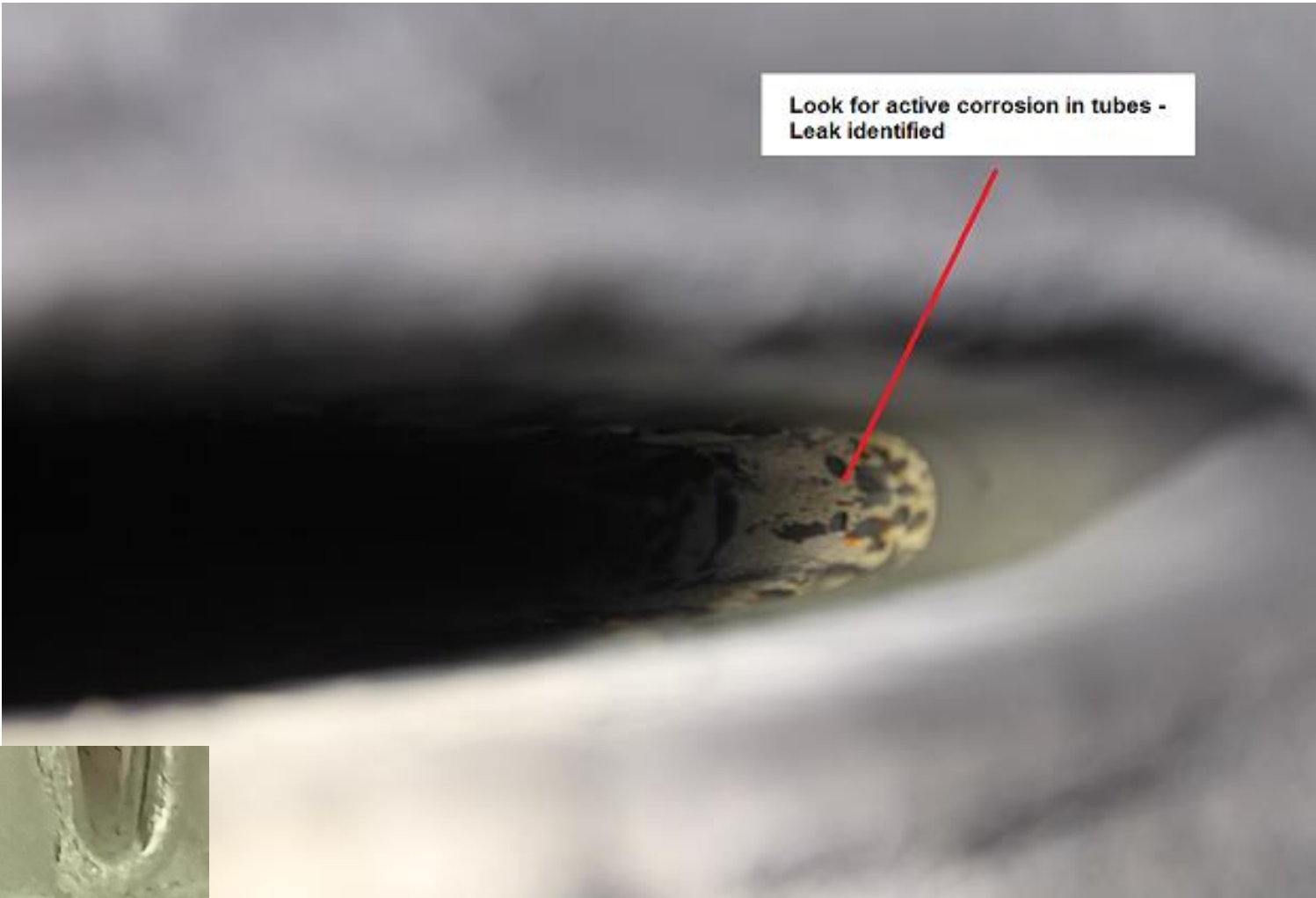
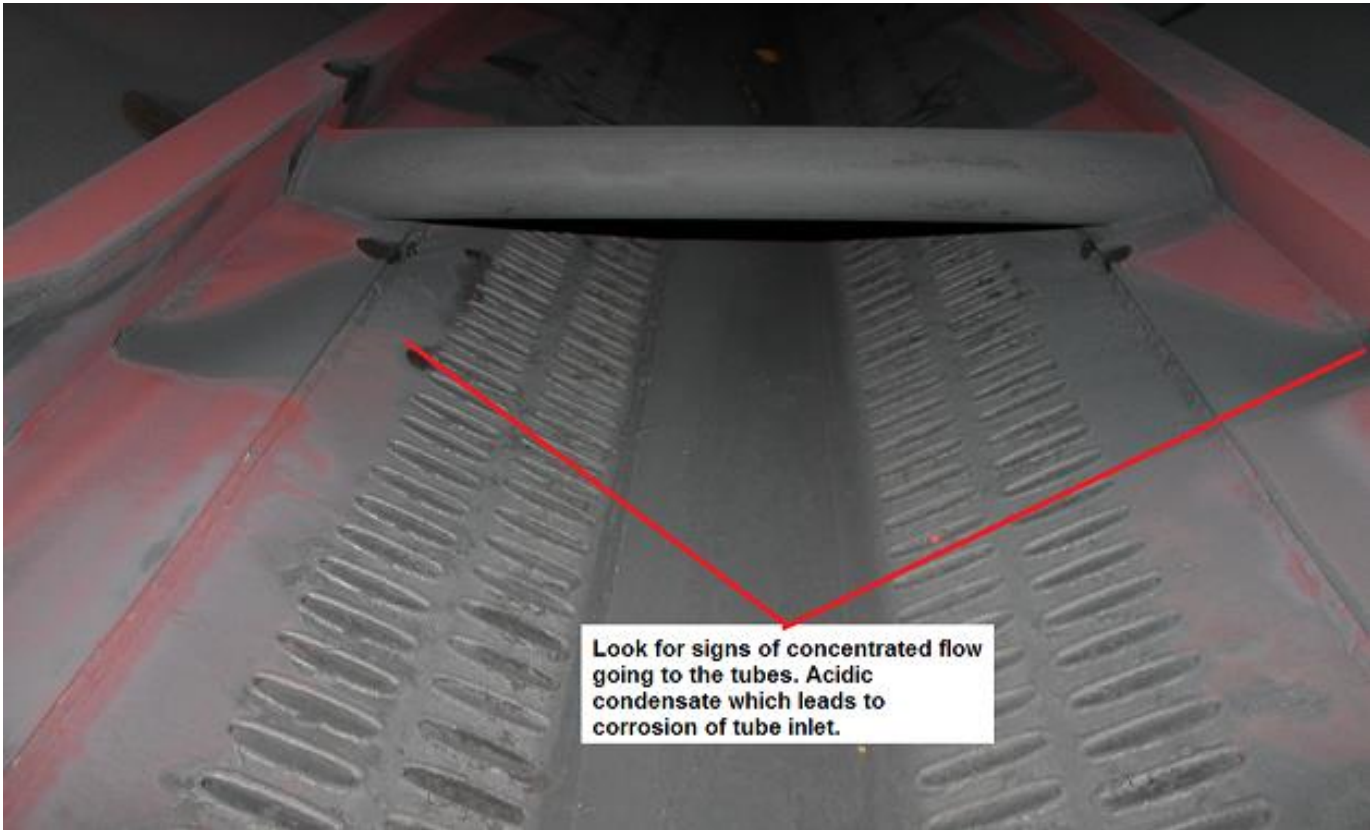
## Task 3

This work is done every 3 years during IR`s, GO`s and MO`s

Activity No	Activity Type	Steps	Outcomes	Workers tools	Responsibility	Intervention/Eng Expectation	Recommended personnel	Total Task Duration (h) – Excludes reports
3.1	Inspect and repair damages to ACC distribution ducts	Erect scaffolding at 42m level on each one of the ACC distribution ducts (8 rows)	Allow workers to safely open, gain access into the ducts and close the manhole covers	NA	Outage Coordinator	NA	NA	NA
		Open manhole covers at 50m level above the dephlagmator fans	Gain access	Wrenches, hammer	Contractor		X2 Artisans	8
		In the presence of the system engineer, use a 200mm x 200mm x 5mm plate and paint one side surface with the epoxy as per the correct ratio. With a thick layer +-0.5mm thick and give to the SE for verification once cured within 24h.	To verify that the contractor mixes the epoxy paint to the correct specification	Paint brushes	Contractor	No painting inside the ducts will be allowed unless the sample plate has been accepted by the system engineer	All people that will be painting including the site manager and relevant QC personnel	1
		Inspect distribution duct guide vanes in the front of each row (8 Rows). Report any active corrosion as well as cracks on the welds. Inspect all welds on the guide vanes.	Ensure that all guide vanes are secure and not suffering from localised corrosion.	Sufficient illumination – adequate torches must be used Employees must be kept hydrated and no person is allowed to work alone inside the ducts	Contractor	Report with photographs to be submitted	X2 Artisans	8
		After ducts have been opened, the system engineer is to inspect the frontal tubes of each row for corrosion. This area must be painted only after the system engineer has signed this section off	There are often leaks on the first few tubes. If painted, the paint could cover the hole.		Contractor and System engineer		System engineer with QCP personnel from contractor	3
		Take note of previous point. Hold point. Paint all areas of active corrosion, white or silver marks. Use epoxy paint and ensure the whole area is covered	Ensure epoxy is mixed to correct ratio. Use a good torch to identify all the areas with corrosion. Be sure to inspect underneath each support brace as well as runoff that drains into tubes (Request system engineer to indicate all the possible areas which should be considered )	Sufficient illumination – adequate torches must be used Employees must be kept hydrated and no person is allowed to work alone inside the ducts	Contractor	Report with photographs to be submitted. Paint only 1 duct and then the SE must verify and review. It is the responsibility of the contractors QC to ensure that the work is done adequately. It is not the work of the system engineer to indicate shortcomings.	X4 Artisans/general labourers	35
		Remove any foreign material such as plastic, wires etc inside the ducts as well as at the walkways.	Foreign material reduce the streamflow	Sufficient illumination – adequate torches must be used Employees must be kept hydrated and no person is allowed to work alone inside the ducts	Contractor	Contractor will sign off that the ducts are all cleaned and can be closed	X2 Semi-skilled	4
		Scrape off any debris left behind from the gaskets on the manhole flanges. Use sand paper to ensure a fully cleaned surface	Mating faces must be cleaned and there may not be any high spots on the flanges		Contractor		X2 Semi-skilled	4
		Replace manhole gaskets and cover – Ensure gaskets are not too large to damage the rupture disc when tightening the bolts.	If the gaskets do not seal, the system will suffer load losses due to leaks. Intervention point for the QC personnel to verify all bolts	Wrenches, hammer	Contractor	QC to sign that all bolts were checked to be tight.	X2 Artisans	16











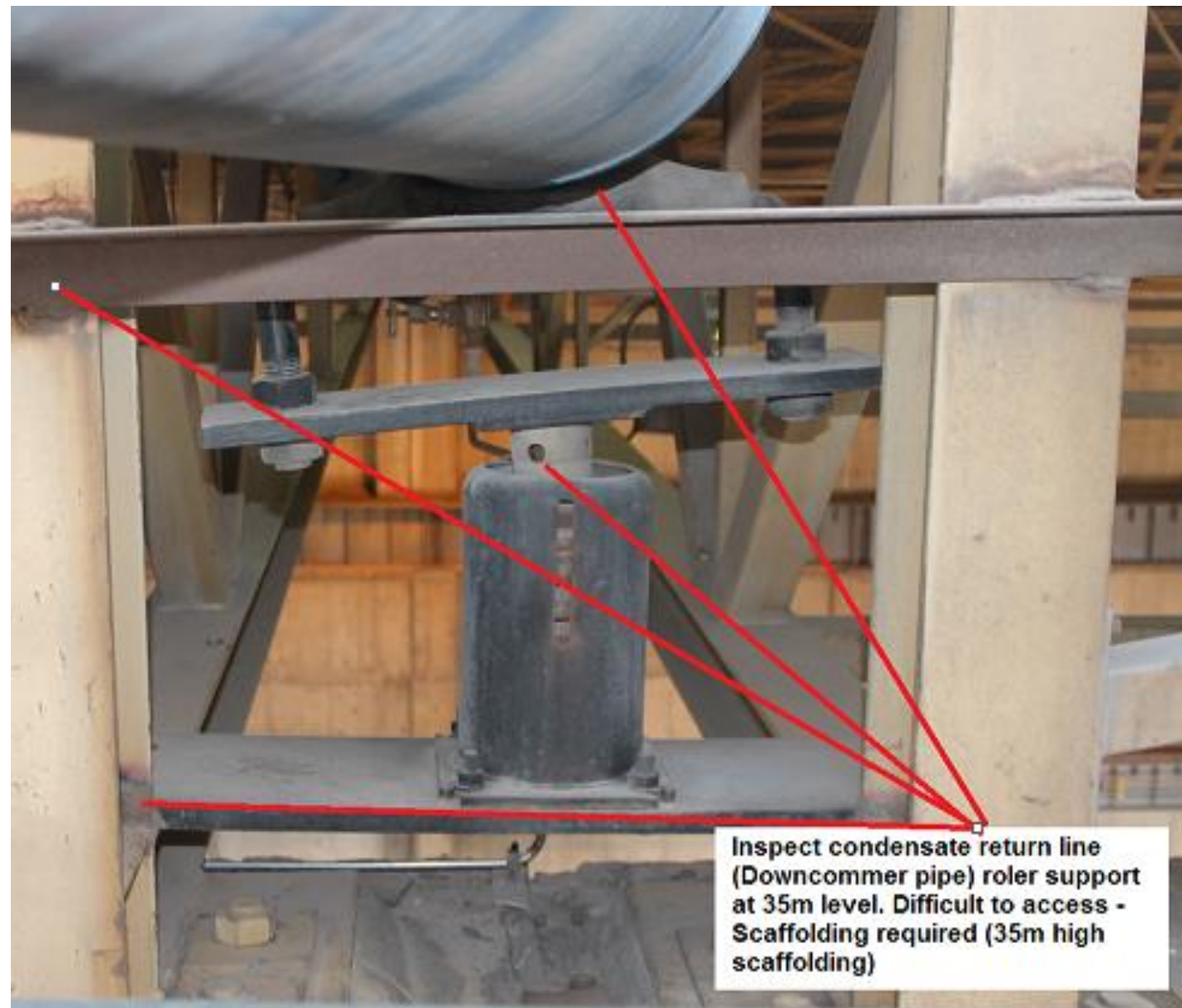
Task 4

This work is done every 3 years during IR`s, GO`s and MO`s

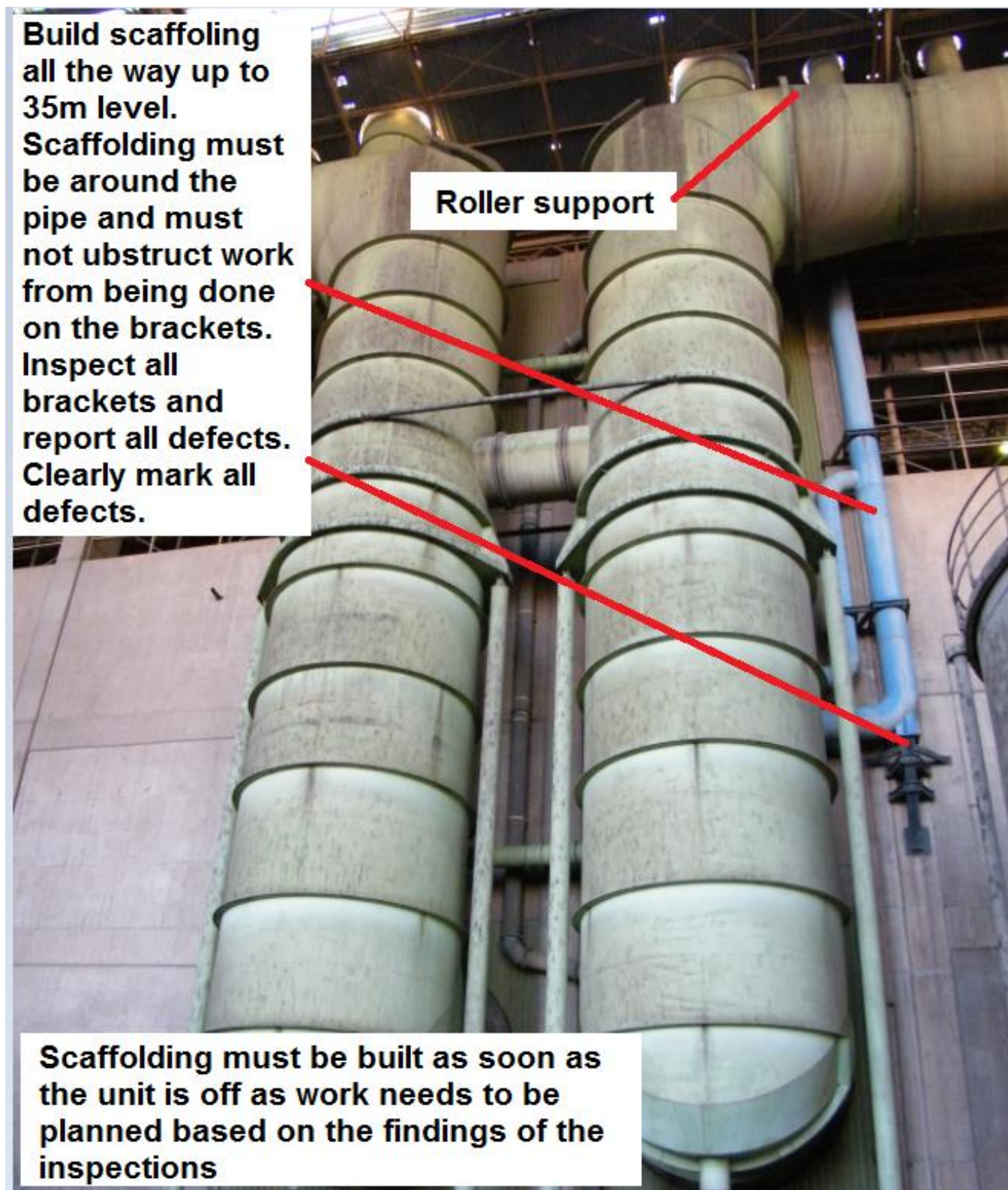
Activity No	Activity Type	Steps	Outcomes	Workers tools	Responsibility	Intervention/Eng Expectation	Recommended personnel	Total Task Duration (h) – Excludes reports
4.1	Inspect and do repairs (if needed) on condensate drain line	Scaffolding contractor to build scaffolding as soon as the unit comes off or prior to the unit shutdown. Scaffolding to be built from 0m to 35m level to allow access to upper support bracket. Scaffolding should be built so as to allow complete access to support brackets. Scaffolding should not obstruct work to be done on the brackets if needed. The contractor should ensure that the scaffolding will not prevent any repair of the brackets if needed	If scaffolding is built too late and repairs are necessary, sufficient time is required to do the repairs. Physical repair work can take up to 1 week depending on the damage. If scaffolding is built in such a manner that obstructs work to be done on the brackets if needed, scaffolding will have to be modified afterwards, increasing the repair duration.	NA	Outage Coordinator	Outage Coordinator and Contractor is to ensure the scaffolding is as per the needs of the contractor to execute the work	NA	This scaffolding generally takes 4 days to built
		Using a pressure cleaner, soap and a cloth /brush to clean the pipe and all supporting brackets to inspect the pipe for defects.	Cracks at the wear plates have been identified. Wear plates are subject to impact loading and must be cleaned to allow adequate inspections	Pressure cleaner, soap and rags/brushes, safety harness	Contractor	The contractor will clean the pipe as soon as possible to allow for inspections and repair work if necessary.	X4 Semi-skilled	8
		Thoroughly inspect for visual cracks around wear plates and brackets. Report any defects to the system engineer	If the brackets are defective, the supports will need to be repaired	NA	Outage Coordinator to arrange for NDT	NA	NA	NA







**Build scaffolding all the way up to 35m level. Scaffolding must be around the pipe and must not obstruct work from being done on the brackets. Inspect all brackets and report all defects. Clearly mark all defects.**

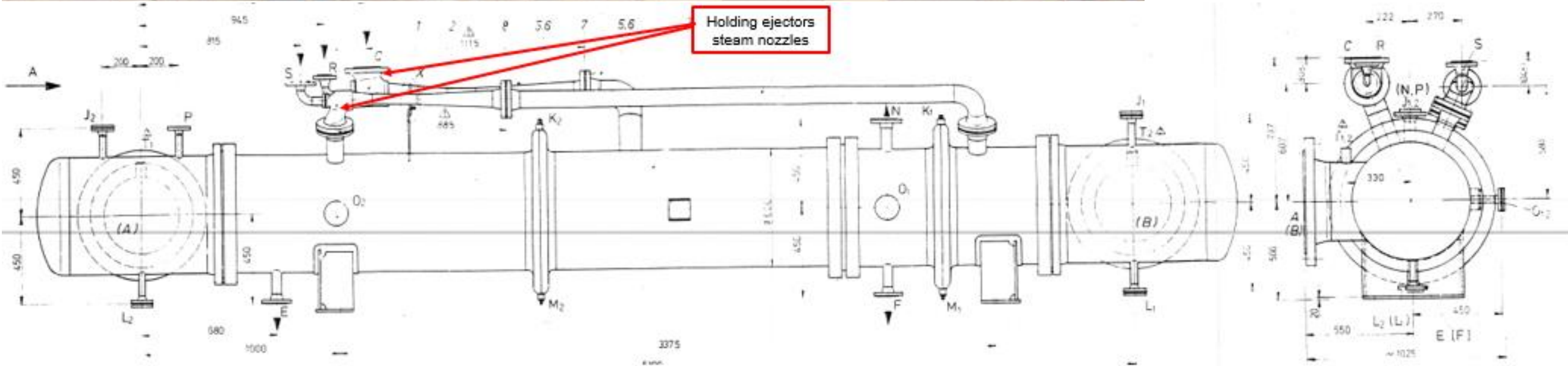


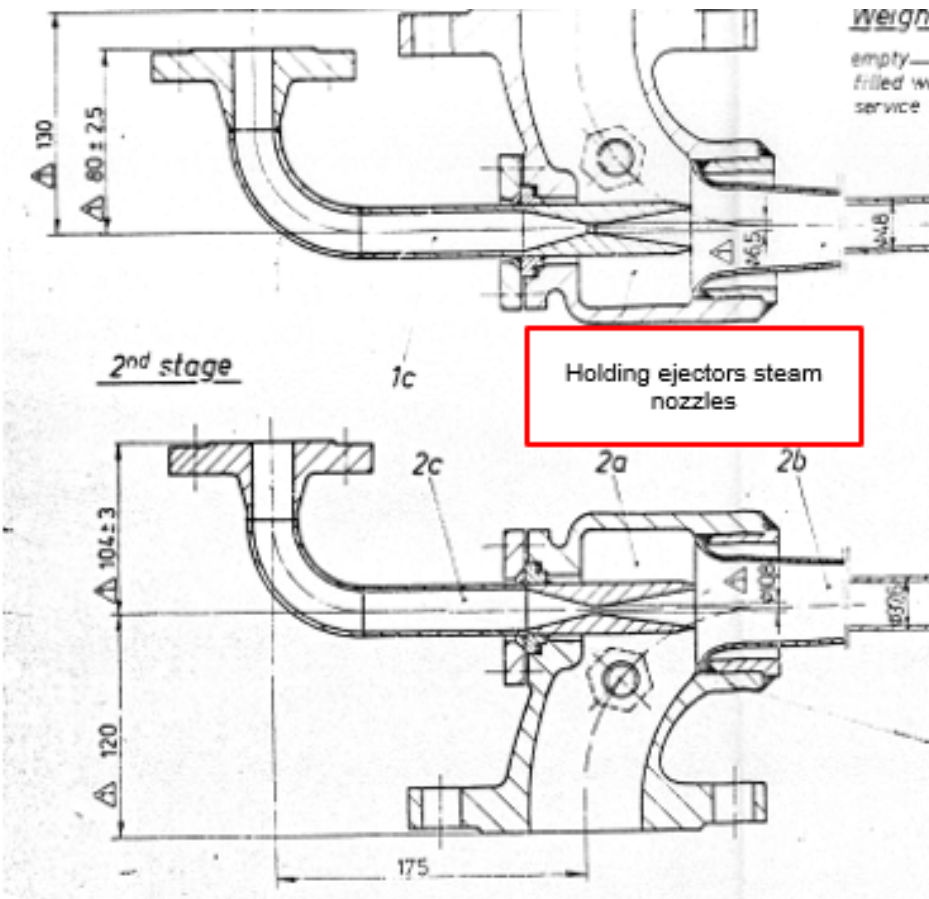
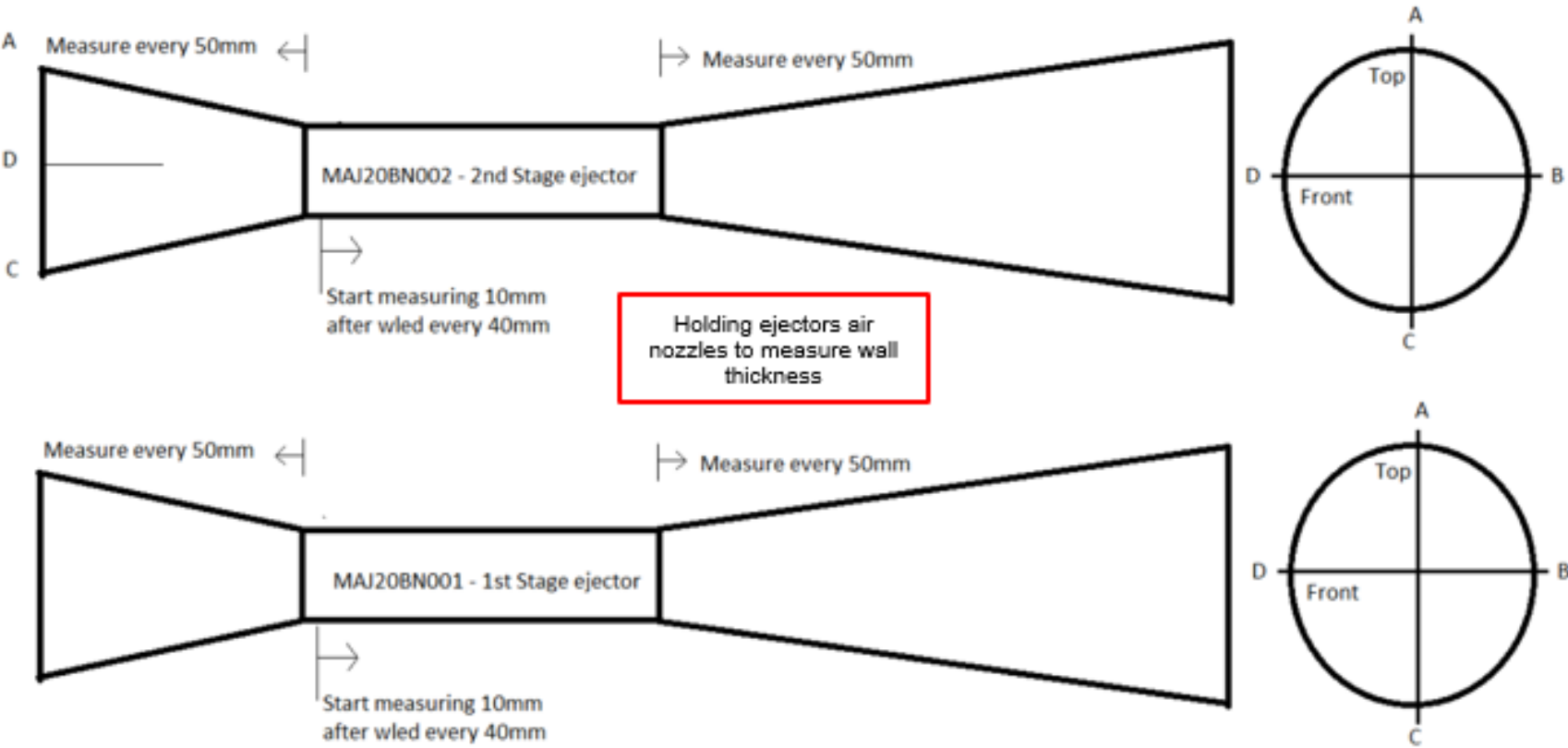
## Task 5

This work is done every 6 years during GO's and MO's and not during IR's

Activity No	Activity Type	Steps	Outcomes	Workers tools	Responsibility	Intervention/Eng Expectation	Recommended personnel	Total Task Duration (h) – Excludes reports
5.1	Inspect and replace if necessary the holding ejectors	Remove lagging on both first and second stage holding ejectors A and B	Defective nozzles result in poor performance of ejectors	NA	Outage coordinator	NA	NA	NA
		Open both the first and second stage holding ejectors A and B and inspect for wear. To be witnessed by Eskom – hold point. If defective/Worn replace steam nozzle		Spanners	Contractor	Report with photographs to be submitted.	X2 Artisans	4
		Measure throat diameter using a No-Go gauge. If steam nozzle does not pass the test, report to system engineer and replace steam nozzle – Maximum acceptance criteria for 1 <sup>st</sup> stage = 6.955mm and for the 2 <sup>nd</sup> stage = 11.556mm Ejectors must be taken to the mechanical workshop		Telescopic snap gauge and vernier		Eng to witness	X1 Artisan	2
		Measure wall thickness on both stages air nozzle on one of the selected ejectors to be specified by engineering		NA	Outage coordinator to arrange for NDT	NA	NA	Can take about 3 days to finalise
		Replace all ejector gaskets before re-assembly			Contractor		X2 Artisans	4
5.2	Inspect hogger ejectors	Remove lagging on hogger ejectors A and B	Defective nozzles result in poor performance of ejectors		Outage coordinator	NA	NA	NA
		Open both hogger ejectors A and B and inspect for wear. To be witnessed by Eskom – hold point.		Spanners	Contractor	Report with photographs to be submitted.	X2 Artisans	8
		Remove nozzle and take it to the mechanical workshop and measure throat diameter using a telescoping snap gauge. Max throat diameter is 69.5mm		Telescopic snap gauge and vernier		Eng to witness	X1 Artisan	2
		Replace both hogger ejector gaskets before re-assembly					X2 Artisans	4
		Loosen the Hogger shell drain pipe. Pour water into the pipe and verify at the drain that water flows out freely and that the drain is not blocked.	If the drain is blocked, the hogger shells fills with water and the hogger performance is reduced	Spanners		Eng to witness	X2 Artisans	4









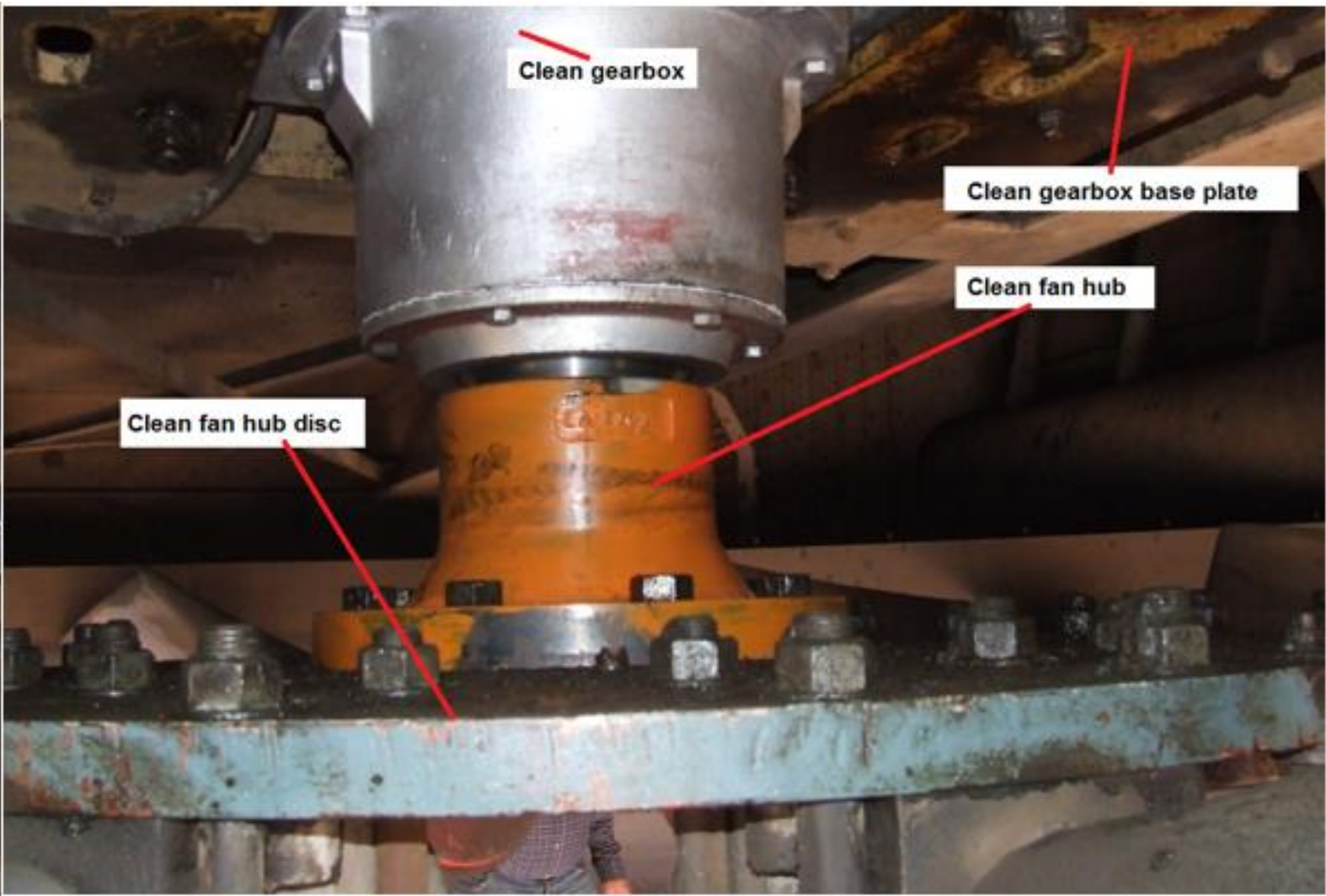
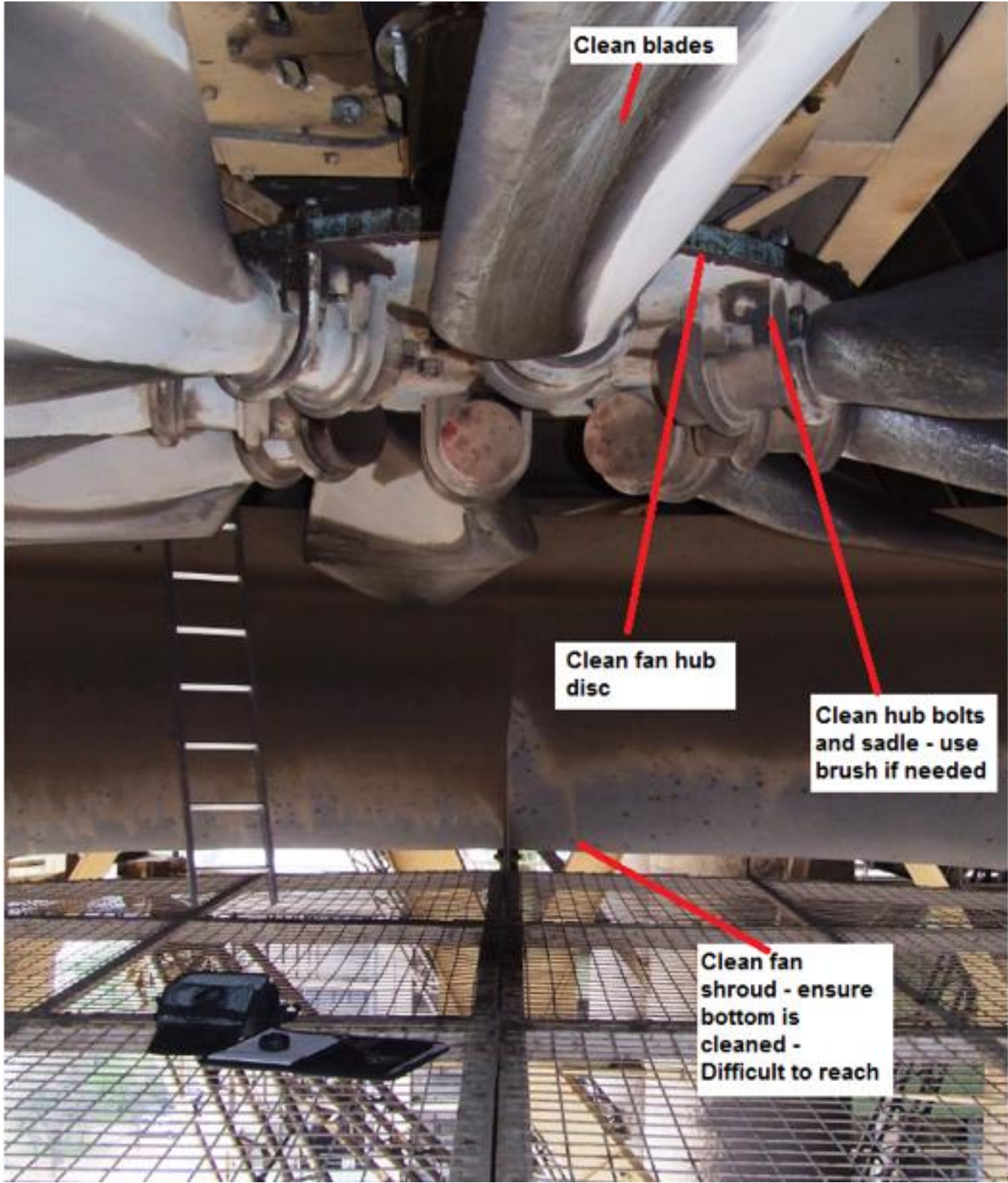
## Task 6

This work is done every 3 years during IR`s, GO`s and MO`s

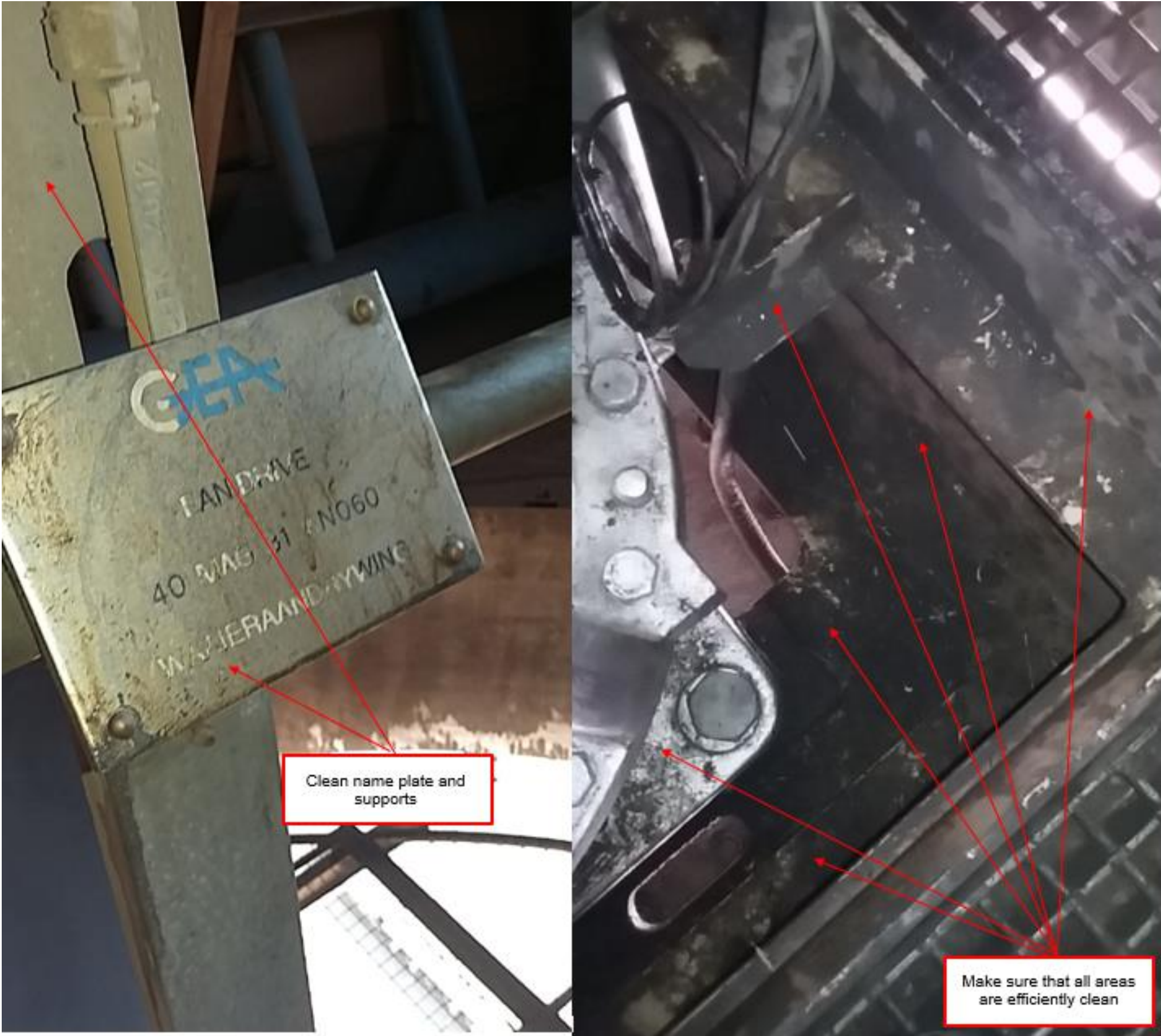
Activity No	Activity Type	Steps	Outcomes	Min workers tools	Responsibility	Intervention/Eng Expectation	Min Recommended personnel	Total Task Duration using recommended personnel (h) – Excludes reports		
6.1	ACC Cleaning – ACC Platform within plenum	Clean fan deck and blue condensate pipe using high pressure hot water hose. Clean badly fouled areas using soapy water.	This area can also be cleaned after the deck has dried. This area can be cleaned using brooms and pressure lances	<ul style="list-style-type: none"><li>• Safheavy/BH38 degreaser</li><li>• Appropriate ladders</li><li>• Safety harness</li><li>• Fall arresters</li><li>• Plastic suits due to lots of water and dirt</li><li>• High pressure hot water cleaners with the ability to inject/apply soap/degreaser</li><li>• Cloths/rags</li><li>• Cleaning brushes</li><li>• Adequate head lights</li></ul> <p>No person shall be allowed to work on the fan grid without the correct PPE and always being hooked up to the lifeline. Any person found not adhering to this will be reported immediately.</p>	Contractor	QC report with photos and plant inspection once completed	X4 general cleaners	96		
6.2	ACC Cleaning – ACC fan units	Clean all ACC gearboxes using high pressure jet – Entire gearbox including its cubicle should be cleaned	Apply degreaser on the gearboxes as well as the base plates and the fan unit structure. (Area where the gearbox sits)				X4 general cleaners	36		
			Take care when using the high pressure jet at the top of the gearbox as there could be water ingress at the motor opening and or oil breather filters. The area at the motor flange should be cleaned using soapy water and a cloth/brush							
			Due care should be taken to first inspect the gearbox for any openings. The Flender XSBN output shaft cover lid has a bolt which often comes out or is missing. Ensure there is not an opening							
		Clean ACC gearbox base plate using high pressure jet ensuing all dirt is removed	The entire base plate must be cleaned as well as the vertical walls in the cubicle where the gearbox is mounted				X4 general cleaners	36		
		Clean ACC fan blades on both sides using degreaser and high pressure jet and brush if necessary	The entire blade must be cleaned including the U-bolts				X4 general cleaners	96		
		Clean ACC fan hub base unit – Ensure the entire hub is cleaned using degreaser and a high pressure jet.	Clean both sides of the hub. This includes the U-bolts and output shaft coupling				X4 general cleaners	36		
		Clean ACC fan cowling using degreaser and high pressure jet with brushes					X4 general cleaners	96		
6.3	ACC Cleaning – ACC rails and bridge	Clean all rails, name plates, electrical boxes (Ensure electrical isolation) and door handles using degreaser and water using a brush and rags						X4 general cleaners	48	
6.4	Clean ACC flood lights	Use a safe ladder and using the 2 man ladder rule, clean the flood lights using soap and cloths. Be careful not to get water into the light electrical box – Ensure that the lights are electrically isolated						X4 general cleaners	16	
6.5	ACC Cleaning – ACC Walkways	After clearing the permits, walk ACC and remove all general waste. Clean ACC walkway using high pressure hose on areas contaminated with oil– Be careful not to drop any objects such as metal, wire, bottles etc – 3 walkways to be cleaned each 85m long. 2x at 45m level and 1 x at 35m level.	Walkway should be left clean and there should be no objects left that could fall off at any time and no oil on the floor or rails. The walkways can be cleaned using high pressure water when the outage starts and then just litter etc can be cleaned after the permits have been cleared.						X4 general cleaners	16



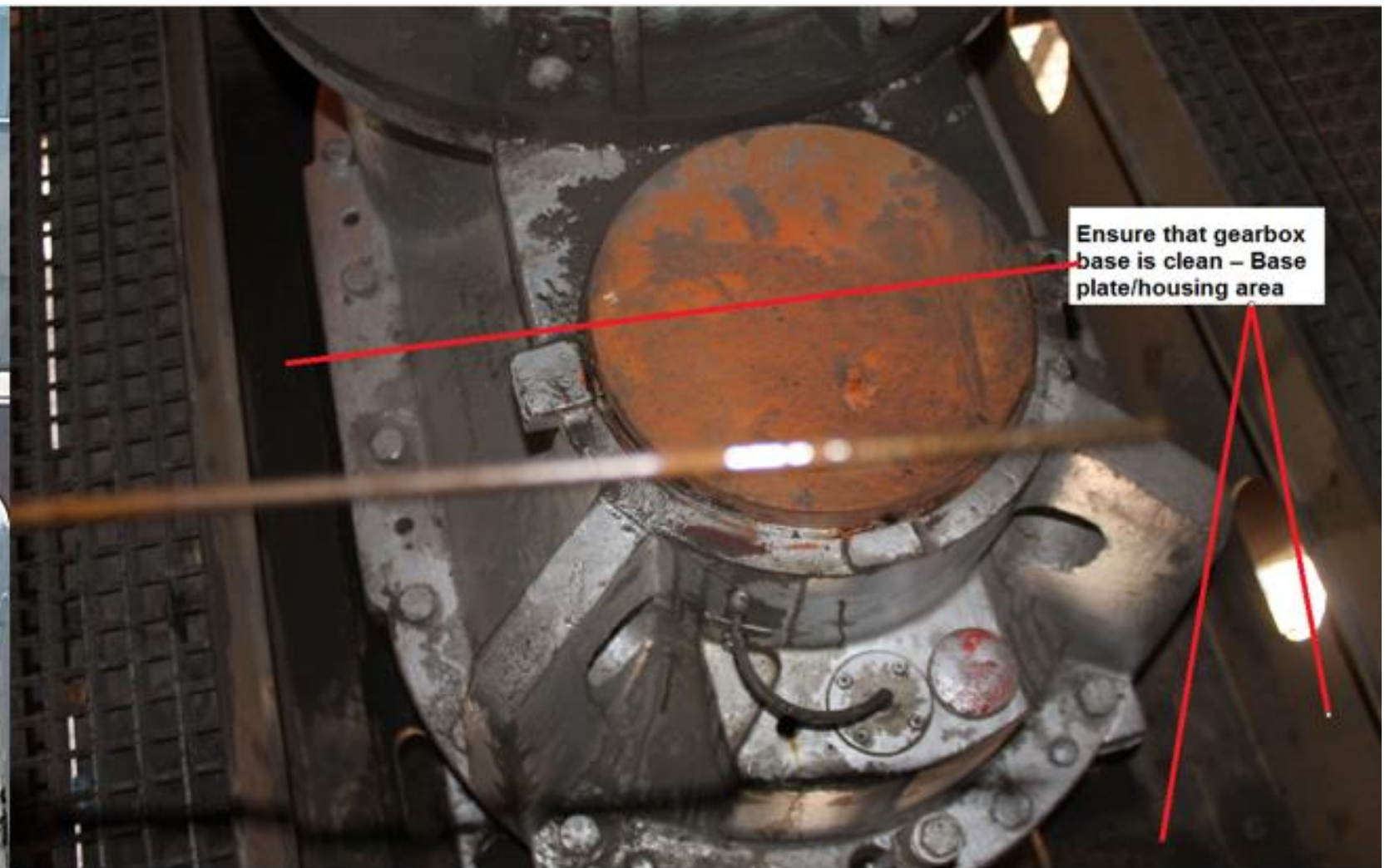
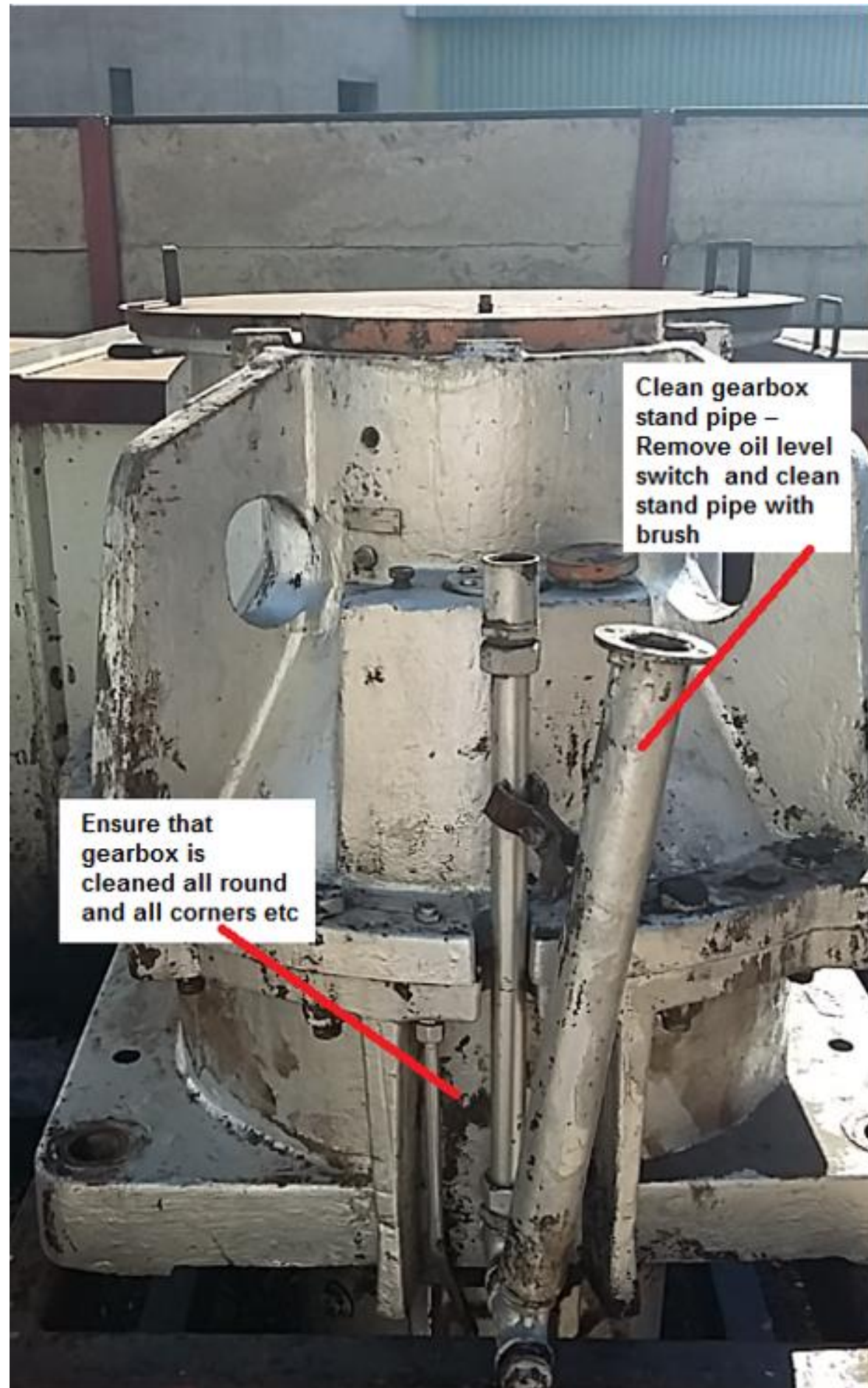




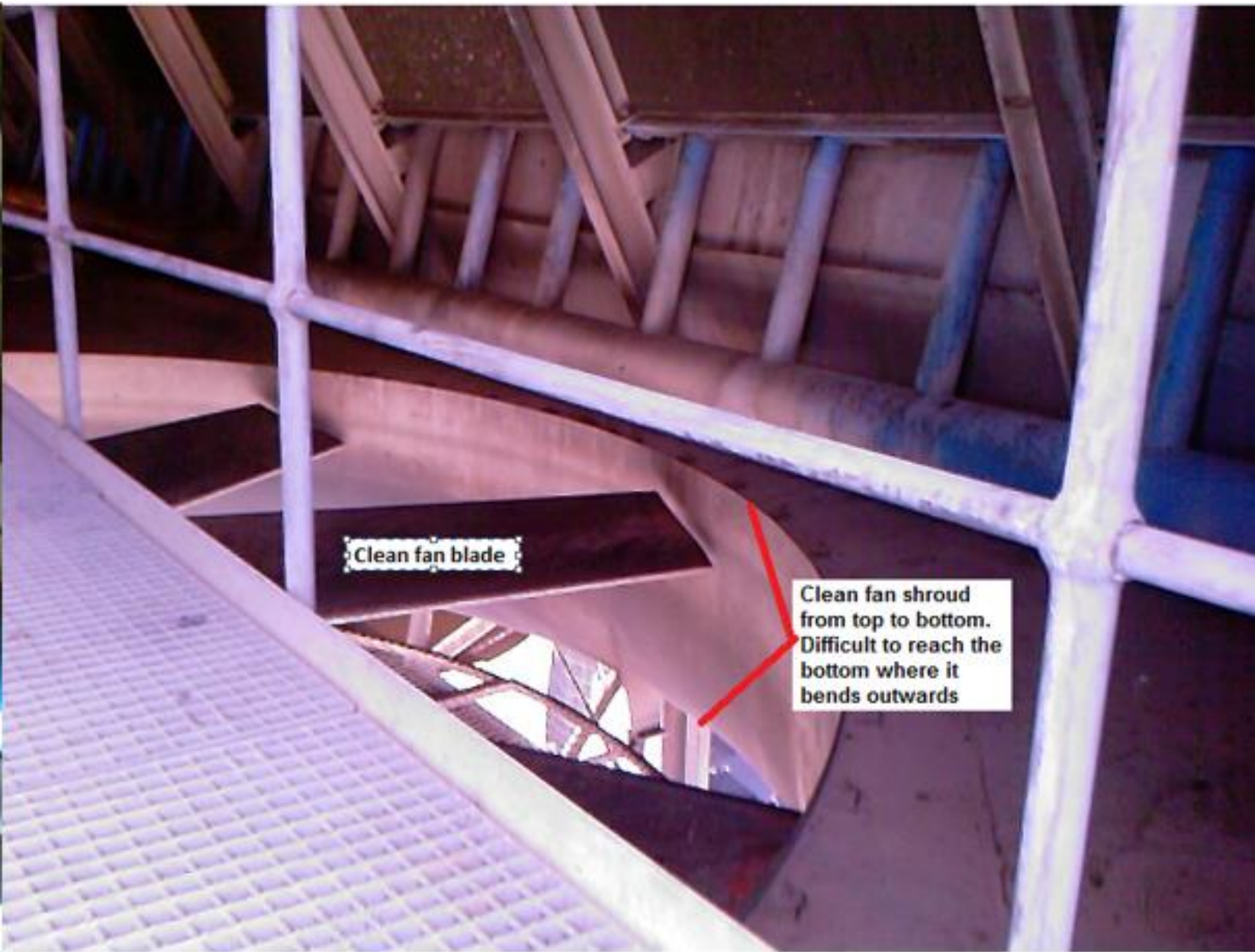




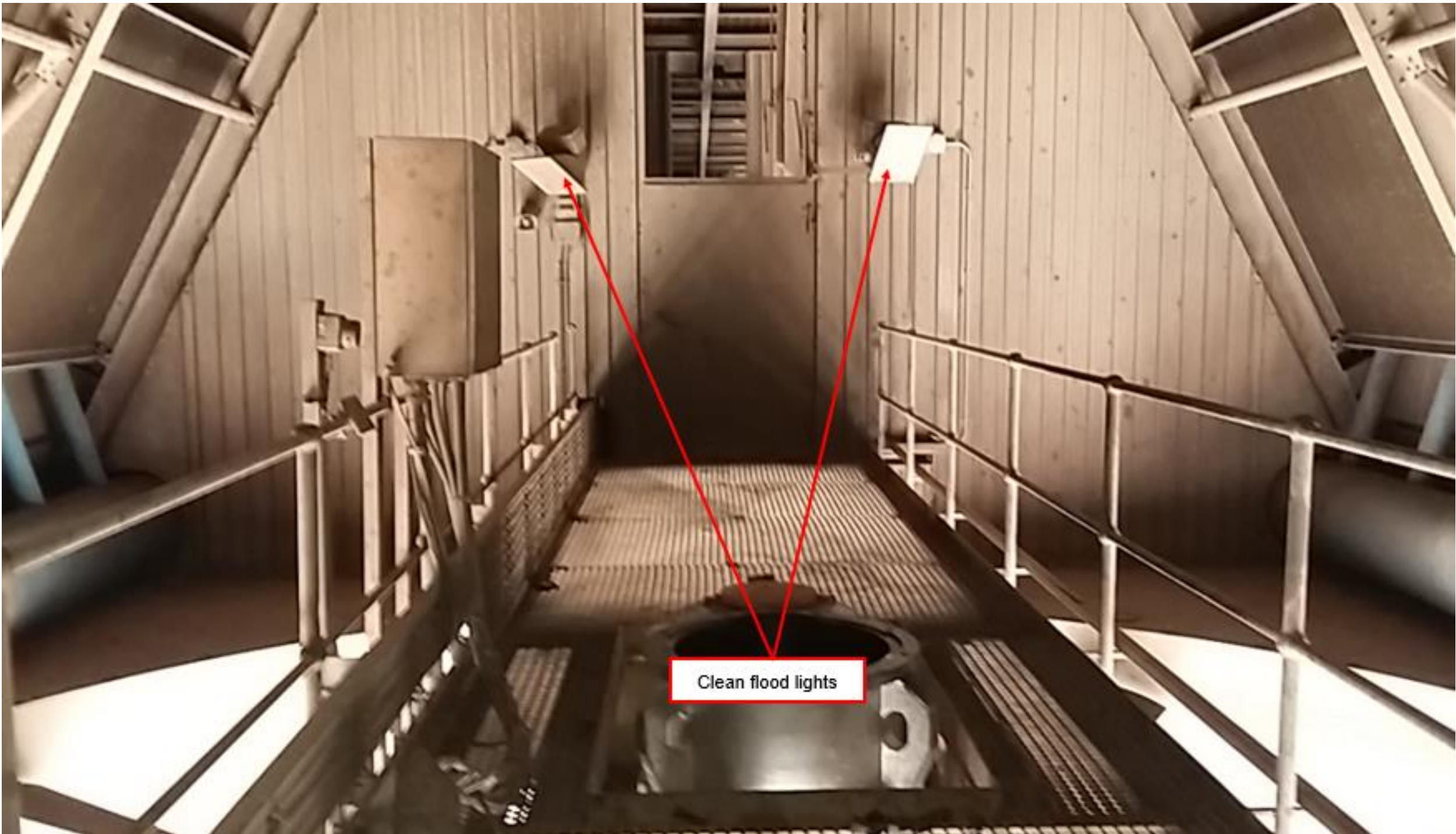














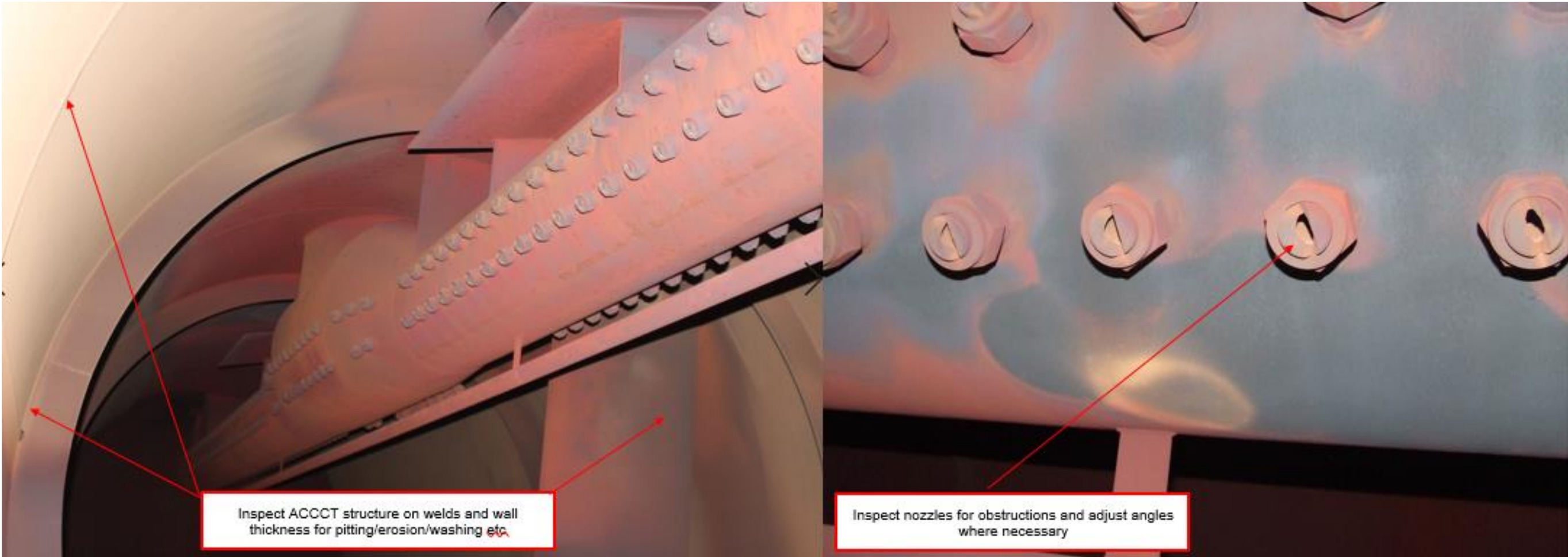




Task 7

This work is done every 6 years during GO's and MO's and not during IR's

Activity No	Activity Type	Steps	Outcomes	Workers tools	Responsibility	Intervention/Eng Expectation	Recommended personnel	Total Task Duration (h) – Excludes reports
7.1	Build scaffolding at ACCCT	Built scaffolding to get access to the manhole cover	Gain access		Outage coordinator	NA	NA	NA
	Inspect ACCCT	Open ACCCT	Scaffolding will need to be built to access the manhole	Spanners, hammer	Contractor Contractor	Report with photographs to be submitted.	X2 Artisans	1
		Inspect tank structural condition –Check for active corrosion/ pitting/washing inside the tank		Sufficient illumination – adequate torches must be used			X2 SAIW welding inspector	2
		Inspect the header nozzles for blockages and unblock if necessary		Sufficient illumination – adequate torches must be used and spanners			X2 Artisans	1
		Adjust nozzles as required	Nozzles must be oriented correctly				X2 Artisans	2
		Scrape off any debris left from the gasket	Surface area must be smooth with no material remaining	Scrapers and 100 grid sand paper			X1 Semi-skilled	0.5
		Cut, install gaskets and close the manhole					X2 Artisans	1



Task 8

This work is done every 3 years during IR`s, GO`s and MO`s and there are only about 3 doors that needs repairs

Activity No	Activity Type	Steps	Outcomes	Workers tools	Responsibility	Intervention/Eng Expectation	Recommended personnel	Total Task Duration (h) – Excludes reports
8.1	Inspect, refurbish and close all ACC doors	Function test and close all doors manually. This task must be done early in the outage to allow time for repair/replacement.	All doors must be functional and safe and should not fail with the fans on. All doors must be closed  Report all defective doors to the outage coordinator. Scaffolding will need to be built		Contractor	Report with photographs to be submitted.	X2 Semi-skilled	4
		Any door defective must be removed and refurbished or a new door made – This task is based on engineering instruction after the report has been submitted to engineering – Estimated 3 doors defective that will need to be removed per unit during an outage. Missing doors must also be replaced. Contractor to use their own rigging equipment to remove the doors.	The doors must be refurbished, re-installed and closed	As required	Contractor	QC report	X2 Semi-skilled X2 Riggers	3h to remove or install

