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Example Maintenance Procedure in ACE 3T SOP Format and with an Inspection and Test Plan (ITP)

Here is the best example we have yet seen in industry of a maintenance procedure using an Accuracy Controlled Enterprise (ACE) 3T standard operating procedure (SOP) format. To make it better would need photos and/or videos included for critical tasks. 3T stands for Target-Tolerance-Test, which are the minimum criteria needed to specify maintenance task quality and prove compliance. The 3T's are a simple maintenance work quality assurance technique we invented to maximise the chance of doing outstandingly high quality maintenance work that brings you outstanding plant and equipment reliability.

Maintenance work on machinery and equipment involves complicated, non-routine tasks. These types of activities have a ten percent failure rate if left to the discretion of trained and experienced people. Meaning for every ten times such tasks are done by qualified and competent persons they will get it right nine times and wrong once. Yet even with a 90% success rate, if a maintenance job has 20 complicated, non-routine tasks, the 10% error rate per task means only 12% of all those jobs will be done totally correctly over the years. In the other 88% of times the job was done there would be one or more work quality defects put into the equipment. The ACE 3T maintenance SOP was developed to help knowledgeable, skilled, qualified, competent craftsmen and tradespeople do the best quality work they have ever done. Go ahead and read the example ACE 3T maintenance procedure below and consider what an ACE maintenance SOP format with 3T content can do for maintenance work quality and resulting reliability of your plant and equipment.

You will discover the power of an ACE 3T maintenance procedure as you read the following example maintenance SOP. In it is exactly how to do the job to both minimum acceptable work quality standards and to the world class work quality standards that cause world class reliability. In the SOP is recorded the equipment manufacturer's recommendations, plus all the experiences, tips and know-how of the maintenance crew members from across their careers. You can include all your special corporate knowledge and engineering 'secrets' so your people do a job exactly as you want it done. ACE 3T maintenance procedures are 'live' documents continually improved by their users. Check the feedback received from the maintainers to improve the maintenance procedure noted on the last two pages of this example ACE 3T format maintenance SOP.

You will find an Inspection and Test Plan included as part of this sample maintenance procedure. In this case, due to space limitations on an A4 sheet, the record of maintenance workmanship quality is made in the ITP and not directly in the ACE 3T maintenance procedure. You can overcome any concerns with limited space by using electronic documents to record the task work quality outcomes. If you are constrained to using printed records you can either use a separate ITP, as in this example maintenance SOP, or you can change to A3 size paper to format your maintenance procedures, and include space to put the work quality records directly in the SOP.

If you've questions on the above, or want to know more about ACE 3T maintenance procedures, please email me.

All the best to you,

Mike Sondalini
LRS Consultants Global
www.lifetime-reliability.com

Procedure CCW-PGA Motor Replacement

Operational Maintenance Procedure
Procedure No. PGA 4250

This Procedure is best practice for 16 CCW motor replacements in units MM1PGA and MM2PGA.

Maintenance Period
As needed bases/Condition monitoring

Personal Safety/Equipment Precautions
1. Plant Isolated
2. All PTW and site safety rules to be adhered to.
3. Remove and replace motor as specified - Rigger and Crane driver needed.
4. Remove replace drive belt.
5. Laser align motor pulley to hub pulley.
6. Manual handling.
7. Return PTW.

Tools/Equipment
Tooling Needed

Allen keys IMP/hand set	Verniers	Copper dolley	Belt spring loader
Allen keys Metric/hand set	Ring spanner 3/4"x2	Socket 1/2" 30mm	Laser aligner belt
Screw driver large	Ring spanner 36mm	Soft hammer small	Torque wrench 250ft lbs
Pinch bar medium	Ring spanner 30mm	Steel scriber	Medium ball pain hammer
Pinch bar small	Steel ruler 150mm x 2	Adjustable square	Rattle gun 1/2" battery

Consumables Needed

Anti Seize x2	Paint marker pen	Scourer pad	Information tag x 2
Super release spray x 2	Wire brush x2	Sand paper 320G	
Rags x2	Scraper Paint	Buckets x 1	
Rope 10mm x 4 metre	Tag line	Barricade tape	

				Tolerance Bands					
Step	Task Description	Mat'l - Tools	Test	Good	Better	Best	Reading / Result	Action if Out of Tolerance	Sign off
1	Pick up PTW/Verify isolation	Isolation list	Check lock is locked/Isolator in off position/Correct plant isolated.	Tech verifies isolation	Tech/OIC verifies isolations.	Tech/OIC verifies isolations with isolation list and signs each point on isolation tag.	✓	No work to start until PTW verified, picked up and signed onto. If isolations not correct return to OPS PTW officer to rectify	
2	Tooling and parts to work areas X 2. Barricade crane lifting zone @ CCW.	All tooling and parts listed in work pack @ LOC WTP wheel barrow AUX in store and tooling and parts for work shop are in LOC W1 Under gantry crane.	Check against work pack list	All equipment accounted for before task starts.	All tooling and parts accounted for by Planner before task starts and located in work shop.	All tooling and parts accounted for by planner and ready for task. Tooling and parts in LOC WTP wheel barrow AUX in store. Tooling and parts for work shop area in workshop work area W1 under gantry crane. Barricade crane lifting zone @ CCW.	✓	If any tooling missing, action with stores and leave feed back on issues information page.	

3	Work pack JHA review sign on / Complete take 5	Work pack, JHA and PTW.	Check work pack is correct and complete for task with all tooling and parts accounted for.	Tech/OIC reviews	Tech/OIC reviews with some of work party	Tech/OIC reviews with all work party and reads through/signs on.	✓	If work pack not fully complete or wrong inform supervisor so can be corrected before work starts. Leave fed back for Planner/Scheduler on what was wrong.	
4	Electrically disconnect motor	MOC basic electrian's bag	Check motor has no current. All tooling is in good working condition and calibration dates.			Electrician checks no current before any disconnection happens. Remove wiring from power box using MOC electrical bagging on removal for cable protection from environment. Roll conduit down flat on floor for ease of Motor removal.	✓	No disconnection until motor is tested for no current. If current found all work stops and OIC and Operations to be contacted with issue. If any equipment not in calibration date return to store .	
5	Remove motor pulley cover	2x3/4" Ring spanners, Super release spray	Spray lube bolts before undoing		Undo bolts.	Lube bolts before undoing. Hold head of bolt when undoing nut.	✓	If bolts damaged not free and easy to undo replace.	

6	Tie off fan blade	Rope 10mm x 4 metre	Measure rope is minimum of 10mm before use.	Rope of fan.	Use a rope that looks close to 10mm or bigger.	Do not use any rope less than 10mm in thickness once measured.	✓	If rope is not 10mm go to store and get a minimum rope of 10mm.	
7	Clean, lube and loosen belt tensioning nuts.	Wire brush,36mm spanner and anti-seize	Tools in good condition. Lube threads before removing nuts with anti seize.		Wire brush threads on tensioning studs until visually clean before removing nuts and back off.	Wire brush threads on tensioning studs until visually clean and install anti-seize on threads before backing nuts all the way off.	✓	If nuts tight to remove replace before re-installation.	
8	Remove anti rotation loc 2 peace.	Allen keys 8mm,4mm,1/4"and pinch bar medium.	Tools in good visual condition.			Remove 2 piece anti rotation loc. Use 1/4" allen key and 4mm allen key to remove first piece of anti rotation LOC. Then use 8mm allen key to remove 2nd part of anti rotation LOC using pinch bar to slide up off shaft.	✓	If any tooling is not the write size record on information sheet in work pack.	

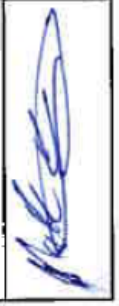
9	Remove belt from pulley.		Belt is loose enough to remove from pulley.	Remove belt.	Make sure belt is loose before removing.	Make sure belt tensioning nuts are backed all the way off to give maximum belt looseness before removing belt.		If belt still tight check tensioning nuts are backed all the way off. If belt tensioning nuts are backed all the way off the belt will come off pulley without rotation.	
10	Remove motor pulley - Morse taper	Allen key 8mm and large screw driver	Tools in good visual condition.			Undo grub screws x 2 with 8mm allen key and insert one grub screw in Morse tapper release grub screw hole and tension until morse tapper parts between centre and pulley. Install large screw driver in expansion split of Morse tapper in centre until centre is free and remove.		If grub screws damaged replace before re-installation	
11	Tap hole in Motor shaft and install lifting eye.	M20 tap ,M20 lifting eye and super realise spray.	Tooling in good visual condition.		Tap motor shaft lifting eye point before installing lifting eye.	Use M20 Tap to clean threads in motor shaft lifting eye point lubing with super realise spray before tapping. Install lifting eye in motor shaft.		Lifting eye should screw in smooth and easy after tapping. If not re-tap threads in motor.	

12	Clean parts/measure pulley	Sand paper, Scourer pad, Super realise spray, rags, wire brush, scrapper and verniers.	Have all parts cleaned together before commencing. Check verniers are in calibration test date.	Motor pulley tolerance of less than .5mm is not serviceable and pulley must be replaced.	All parts clean. Motor pulley tolerance of .5mm face value of rib is a serviceable value or replace.	All parts to be clean and free of any contaminents.Motor pulley tolerance of 1mm face value of rib is best serviceable value or replace.		If Motor pulley doesn't meet a greater value than .5mm replace pulley. If verniers are not in test date replace with another set from store.	
13	Set up rigging to remove Motor.	1x.5 metre 2T and 2X1metre 2T slings, 1T short drop chain block x1,800kg coma-long, 4x 3.2T shackles	All rigging gear visually checked for damage and have current test tags .			Rigger only to install rigging gear on Motor. Connect the 1metre sling from the crane hook and with 3.2T shackle in other end install the coma-long and with another 3.2T shackle install coma-long to the motor lifting eye bolt. Off the crane hook install the .5 metre sling and install the chain block with shackle to other end. Place 1 metre sling around bottom of Motor against motor feet and hook to chain block with shackle.		Rigger only to set up rigging. If rigging gear out off test date take to store and get indate equipment.	

14	Remove Motor with crane	Franna crane and tag line	Franna crane to have daily check list filled out and signed.			Rigger only to conduct lift with crane driver. Install Franna hook centre of Motor eye. With rigging on hook of crane do not take load with crane but use coma-long to take weight of Motor. When Motor weight taken slide Motor of tensioning studs. Use the chain block to roll Motor so feet are facing down to sit Motor down on. Install tag line and lift Motor down into the vehicle in the barricaded area to take back to work shop.	↓	If Franna crane check list not filled out do so before lifting load. Rigger only to conduct lift with crane.	
15	Take Motor back to work shop		Motor sitting on feet.			Follow all site rules and speed signs when driving on site.	↓		
16	Lift Motor onto work station/Gantry crane	Motor rigging gear from removal.	All rigging straight and untangled.		Clean work station. Using fork lift with crane attachment lift motor onto the work station.	Work station to be clean and tidy. Use workshop gantry crane to lift Motor with same rigging gear and set up as from removal from CCW onto work area.	↓	No dirt or dust on work area. Rigger only to do crane lift.	

17	Scribe Motor position on locating plate/ Measure feet position.	Steel scriber, Adjustable square and Steel ruler 150mm.	Scriber sharp visually and square and 150mm ruler in good working condition not bent.			Scribe feet on motor locating plate . Measure with 150mm steel ruler distance to the edge of the locating plate making sure the measuring position is square with the square. Do this while hold down bolts are tight. Record final Motor position measurements on data sheet.			
18	Undo 4 Motor holding bolts of location plate.	Rattle gun 1/2" Battery, 30mm socket and 30mm ring spanner. Super realise spray lubricant.	Visually inspect tooling before use. Fully charged battery for Rattle gun.	Undo 4x Motor holding bolts.	Undo 4x Motor bolts using spanner to hold head of bolt rattle nut of with battery rattle gun and socket.	Undo 4x Motor bolts using spanner to hold head of bolt rattle nut of with battery rattle gun and socket once lubed with super release.		Replace bolts with new bolts and nuts supplied.	
19	Lift old Motor onto store pallet	Motor rigging gear from removal. Store pallet.	All rigging straight and untangled. Store pallet to be sturdy to hold motor.			Rigger only to use gantry crane to lift old motor of locating plate and put onto store pallet. Store pallets located in designated SE corner of work shop.		If no pallets in designated SE corner of work shop see stores.	

20	Set rigging up on new Motor.	Motor rigging gear that is removed from old Motor.	Rigging gear in good condition and no damage has occurred in previous lifts.			Rigger only to remove rigging gear from old Motor and re-instate on new Motor.		Adjust rigging to new Motor.	
21	Lift new Motor and locate on Motor location plate.	Gantry crane, Motor rigging gear. Ajustable square and 150mm steel ruler.	Motor level to lift.		Rigger only to lift new Motor. Using scribe lines and measurements taken on removal of motor re-line Motor on Motor location plate.	Rigger only to lift new Motor. Using scribe lines and measurements taken on removal of motor re-line Motor with steel ruler and adjustable square on Motor location plate as square and close to centre as possible. Record final measurements on data sheet in work pack.		Keep Motor square and as close to centre as possible.	

22	Do up Motor hold down bolts. Torque setting 250ft/b.	Torque wrench and 30mm ring spanner and 30mm socket.	Torque wrench to be in calibration test date. Tooling in good condition.	Torque up Motor bolts to 250ft/b.	With torque wrench set at 200 ft/b torque bolts starting with left hand side of Motor near fan and then diagonally do the Motor pulley end and then horizontally do the other Motor pulley end bolt before finishing on the last bolt near Motor fan. Repeat as above with torque wrench set on 250ft/b to finish bolt tensions.	With in calibration torque wrench set at 200 ft/b torque bolts starting with left hand side of Motor near fan and then diagonally do the Motor pulley end and then horizontally do the other Motor pulley end bolt before finishing on the last bolt near Motor fan. Repeat as above with torque wrench set on 250ft/b to finish bolt tensions.	✓	If torque wrench out of calibration date take to store and replace with in date torque wrench.	
23	Rotation test old Motor and new Motor. Confirm direction	Electrical Motor rotation tester. MOC basic electrian's bag.	Check rotation tester is in calibration test date			With in calibration rotation tester test each Motor for direction. Record on data sheets and wire new Motor to suit.	✓	If rotation tester is out of calibration date take to store and replace with in date rotation tester.	

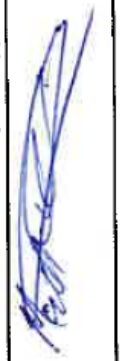
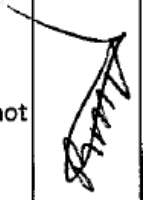
24	Take Motor back to CCW		Motor sitting on feet.			Follow all site rules and speed signs when driving on site.			
25	Crane Motor back and Install on tensioning bolts	Keeping same rigging gear as was used in removal. Crane	All rigging gear visually checked for damage and have current test tags .			Rigger only to conduct lift with crane driver. Use the chain block to roll Motor back so feet are vertical. Install tag line and lift up to position. When Motor level with tensioning studs slide back on as far as possible and install nuts and washers on all 4 studs. Use Coma-Long for fine adjustment. Remove rigging gear.		Any damaged lifting gear to be replaced before lift.	

26	Install motor pulley - Morse taper	Allen key 8mm and large screw driver	Tools in good visual condition.	Put pulley over Motor shaft. Install large screw driver in expansion split in centre of Morse tapper and slide on anti seized motor shaft 33mm from top of shaft. Bring pulley up to morse tapper and install anti seized grub screws back in to pulley and morse tapper until firm by hand no extensions applied.	Put pulley over Motor shaft. Install large screw driver in expansion split in centre of Morse tapper and slide on anti seized motor shaft 34mm from top of shaft. Bring pulley up to morse tapper and install anti seized grub screws back in to pulley and morse tapper until firm by hand no extensions applied to allen key.	Put pulley over Motor shaft. Install large screw driver in expansion split in centre of Morse tapper and slide on anti seized motor shaft 35mm from top of shaft. Bring pulley up to morse tapper and install anti seized grub screws back in to pulley and morse tapper until firm by hand no extensions applied to allen key.		All parts to be anti seized prior to assembly and pulley meets minimum service requirement.	

27	Place belt on Motor pulley and firm.	36mm spanner and anti seize and wire brush if needed.	Tools in good condition. Lube threads before tensioning nuts with anti seize.	With Motor in closest position to fan install belt on pulley. On free of dirt and anti seized studs wind out Motor until belt is firm with no more than 25 mm deflection from fan cowling is capable with belt spring loader. Measure with steel ruler the deflection.	With Motor in closest position to fan install belt on pulley. On free of dirt and anti seized studs wind out Motor until belt is firm with no more than 23 mm deflection from fan cowling is capable with belt spring loader. Measure with steel ruler the deflection.	With Motor in closest position to fan install belt on pulley. On free of dirt and anti seized studs wind out Motor until belt is firm with no more than 20 mm deflection from fan cowling is capable with belt spring loader. Measure with steel ruler the deflection.	✓	If over tensioned release until with in tolerances.	

28	Laser align motor pulley to fan pulley/complete tension.	Laser Aligner Belt, torque wrench,belt spring loader, 36mm spanner,8mm allen key, copper dolly and Medium ball pain hammer.	Laser Aligner Belt, spring loader and torque wrench in current calibration and all tooling in good visual condition.		Install laser head on Motor pulley and on fan pulley. Align to -.5 and +.5 on both laser heads by moving the Motor pulley down to position on shaft and moving Motor tensioning nuts in and out . If pulley needs to be moved down loosen grub screws x 2 half way out and tap copper doley down on morse tapper until level and do grub screws back up. Once alignment acheived torque grub screws to beetween 195ft lbs and 200ft lbs and tension belt with belt spring loader positioned on left hand side of motor were belt is closest to cowling to 25mm .	Install laser head on Motor pulley and on fan pulley. Align to 0 and 0 on both laser heads by moving the Motor pulley down to position on shaft and moving Motor tensioning nuts in and out . If pulley needs to be moved down loosen grub screws x 2 half way out and tap copper doley down on morse tapper until level and do grub screws back up. Once alignment achieved torque grub screws to 200ft lbs and tension belt with belt spring loader positioned on left hand side of motor were belt is closest to cowling to 25mm of travel. Record measurements in work pack for Laser belt aligner/belt tension.		If calibration out of date return to store and get in date Laser Aligner Belt,torque wrench and belt spring loader. If unfimilar with equipment contact superviser.	

29	Install anti rotation lock 2 piece.	Allen keys 8mm,4mm and 1/4".	Tools in good visual condition.			Install 2 piece anti rotation loc . Use 8mm allen key to install bottom half of anti rotation loc. and 4mm and 1/4" allen key to install top peace of anti rotation loc. keeping level and grub screws tight no extensions to be used on allen keys. Check rotation of anti rotation device before installing . Must be clockwise. All grub screws to be anti seized before installation.		If not visually level loosen and re-level.	
30	Check fan rotation					Remove rope and check fan rotation is clockwise.		If rotation clockwise not achievable reverse anti rotation lock .	
31	install Motor pulley cover	2x3/4" Ring spanners, Super release spray	Spray lube bolts before retensioning.		Undo bolts.	With super release spray bolts before retensioning. Hold head of bolt when retensioning nut. Tension until tight no extensions to be used.		Use replacement bolts if required.	

32	Electrically reconnect motor	MOC basic electrian's bag	All tooling is in good working condition and calibration date.		Reconnect Motor electrically checking for electrical faults.	Reconnect Motor electrically. Check earth continuity by megaring between each phase to check and record results. Check insulation break down if under 1 Meg on inform OIC and supervisor and record result. Check phase winding continuity and record value.	✓	If electrical checks fail on Motor inform OIC and Supervisor for further action. If any equipment not in calibration date return to store.	
33	Clean up work area CCW	Account for all tooling listed in work pack.	All tooling returned to store. Area clean and free of all other equipment and rubbish.		Return tooling to store. Any rubbish is removed and area left clean and tidy.	Return all tooling and equipment to store. Any rubbish is removed to bins and area left clean and tidy.		Oic to do final walk around area of task. If any foreign materials are found work group to be informed and removed.	
34	Return PTW	PTW/Work Pack	OIC/work party signed of and OPS signed as accepted.			OIC and work party signed off/confirmed by OPS signature. OIC finalise feed back and any issues in work pack for task.		OIC to do final check of PTW and insures no one signed on and PTW is all together. OPS not to accept any PTW that is not complete and signed off.	

35	Clean up work area at work shop/Return any unused spares.	Account for all tooling listed in work pack.	All tooling returned to store. Area clean and free of all other equipment and rubbish. Any unused spares returned to store.		Return tooling to store. Any rubbish is removed and area left clean and tidy.	Return all tooling and equipment to store. Any rubbish is removed to bins and area left clean and tidy.		OIC to do final walk around area of task. If any foreign materials are found work group to be informed and removed.	

ITP

Remove Replace CCW Motor

ITP ORIGINATOR - H Commens

W/O-598116

	Operation or stage of work		Requirement/Standard/Specification	Acceptance Criteria	Verification by		
Ref	Description	Test			Employee	Date	Peer
1	Work station preparation @ work shop	Visual	Work station and areas directly around to be clean/tidy free of dust.	Clean work station tidy tooling with no dust.		8-10-14	
2	Check parts and materials	Visual	Check P/N on replacement motor match parts list. Check motor identification plates match. Check motor pulley P/N match parts list.	P/N match and identification plate match new parts.		8-10-14	
3	Lubrication	Visual	All bolts to be silver grade anti-seized	Follow consumables list in work pack		8-10-14	
4	Bolt torques	Visual measure/record	Calibrated 250ft lbs torque wrench in date. All values to be recorded. Bolts to only be torqued to procedure values.	Clear label showing calibration in date. Values to be recorded on data sheet provide. Use only torque values provided in procedure.		8.10.14	
5	Alignment tolerances	Visual measure /record	In date calibrated Belt laser aligner only to be used for alignment.	Belt laser aligner with clear calibration label showing in date to be used. Use only the tolerances provided in the procedure for alignment and record values on data sheet supplied.		8-10-14	

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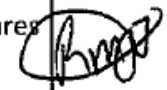
6	Crane lifting and rigging for Motor removal and replacement.	Visual / Qualified	Qualified and trained Crane driver and Rigger	Qualified crane driver and rigger only to do motor replacement lifting and rigging. Rigging equipment must have clear current test tag showing test date. Crane log book and check list to be completed before any lifts take place.		8-10-14	
7	Electrically disconnect and reconnect motor	Electrically Check	Multi meter with current calibration tag. Electrically test for no current. Check wiring condition	Motor with no current only to be worked on. Follow MOC site procedure for wiring condition and faults/replace as necessary. Current calibration tag on multi meter clearly showing calibration in date. Record any items replaced.		08/10/2014	
8	Remove/Replace motor pulley cover	Visual	Motor pulley cover in good condition not rusted or dented. Check bolts in good condition.	Motor pulley cover no rust or dented. Repaint, repair and replace. Replace bolts if binding or rusted.		8-10-14	
9	Loosen belt tensioning nuts. Remove anti rotation loc 2 piece.Remove belt from pulley and remove pulley/Morse taper.	Visual	Use tooling as specified in procedure.	Procedure to be followed for removal in order. Any bolts tight or rusted to be replaced.		8-10-14	
10	Tap hole in motor shaft	Visual	M20mm tap to be used lubing before tapping.	Tap in good condition not rusted or damaged.		8-10-14	

11	Clean parts/measure pulley	Visual/measure and record	Calibrated verniers in date. Clean parts free of dirt. Record data collected.	Calibrated verniers in date with clear label showing calibration in date. Pulley must meet minimum thickness as specified in procedure or replace. Only use values supplied in procedure and record data on data sheets supplied in work pack.		8-10-14	
12	Scribe motor position on locating plate/Measure feet position	Visual/measure and record	Measure with 150mm ruler and record data collected. Use stainless scriber.	Measure with 150mm stainless ruler and record data collected on data sheet supplied in work pack. Use sharp stainless scriber.		8-10-14	
13	Locate motor on motor location plate	Visual/measure and record	Place motor as close to centre as possible using scribed lines as a starting guide. Record motor location data.	Motor to be in centre of locating plate using 150mm stainless steel ruler and adjustable square. Record final motor location on data sheets in work pack. Follow procedure.		8-10-14	
14	Do up motor hold down bolts	Measure and record	Calibrated torque wrench in date. Record final torque values.	Torque wrench with clear label showing calibration in date. Final torque setting to be 250ft lbs. Use only torque values supplied in procedure and follow procedure. Record final torque values on data sheet supplied.		8-10-14	

15	Rotation test old and new motor	Record	With calibrated electrical motor rotation tester check direction of motors for wiring replacement and record	Digital rotation tester with clear label showing in date calibration test tag. Record old and new motor direction and if wiring to be adjusted on data sheet supplied.		8/10/2014	
16	Laser align motor pulley to fan pulley/complete tension	Visual/measure and record	Calibrated laser aligner belt and torque wrench. Align pulleys to values specified in procedure only. Tension belt to value specified in procedure only.	Clear label showing calibration in date. Values to be recorded on data sheet provided. Use only torque values and pulley alignment values specified in procedure.		8-10-14	
17	Check fan rotation remove belt	Visual	Fan turns in clockwise rotation and locks in anti clockwise rotation.	If fan not turning clockwise anti rotation lock is on upside down and must be removed and replaced as per procedure so clockwise rotation only achieved.		8-10-14	
18	Clean up work areas at CCW and at work shop/Return any unused or refurbishable spares.	Visual	No rubbish all tooling/spares back in store.	No rubbish clean and tidy with all tooling back in store. Unused or refurbishable spares must be returned to stores.		8-10-14	

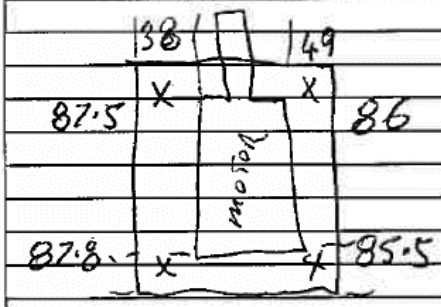
Data Record Sheets / Issues To Raise

MOTOR PULLEY REPLACED UNDER MINIMUM VALUE.

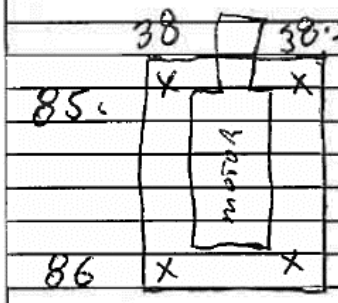
MOTOR POSITION

30. MINS CONTINGENCY USED APPRENTICE TRAINING.

BEFORE.



AFTER



BELT ALIGNMENT

MOTOR PULLEY +.2 ⇒ FAN PULLEY -0

FINAL BELT TENSION @ 25mm TRAVEL

* ALL TORQUE SETTINGS. COMPLETE. AS. BEST PRACTICE.

SMALL SOFT HAMMER COULD BE ADDED TO TOOLLIST (WORKSHOP)

TASK COMPLETED TO SCHEDULE.

R. WEIR

Data Record Sheets / Issues To Raise

* Check phase / winding rotation of old motor while still in coupled condition (motor rotation is clockwise looking at motor shaft)

* Check phase / winding rotation of new motor while in coupled condition

* Re-connect wiring so as motor will run in correct rotation

Insulation Test Results (MEGGAR)

Red phase to Earth = ∝ MΩ
White phase to Earth = ∝ MΩ
Blue phase to Earth = ∝ MΩ

Red phase to White phase = ∝ MΩ
White phase to Blue phase = ∝ MΩ
Blue phase to Red phase = ∝ MΩ

Earth continuity = 0.1 Ω

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