

University of Wales Trinity Saint David

Wales Institute of Science and Art



Prifysgol Cymru
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University of Wales
Trinity Saint David

Workshop And Practice

ACHA4011

Michael Charity

2100477

23/04/2023

		Engine Workshop Session 1 Logbook Entry		
Student Name	Michael Charity•A4:P36AA4:P34		PPE Required	Tasks Performed
Session Date	04/10/2022		Steel toe cap boots/Dust coat Nitrile gloves	The process for removing each cylinder heads is identical and is as follows -Remove the rocket covers using a 6mm allen key. -Check the timing of the engine so the piston is either at top dead centre on the compression stroke or both cam lobes are not pushing on the valve buckets. -Remove the spark plugs from the cylinder head. -Remove the cam chain tensioner with the two 5mm allen head cap bolts -Crack off each of the 10mm bolts holding the cam carrier down before removing fully as to not damage the carrier -With the carrier removed the intake and exhaust cams can be removed. -To check for wear the bearing surface in the cylinder should be visually checked as well as the opposing surface on the cam shaft. The cam lobes can also be visually checked, with wear typically appearing on the leading face of the lobe. If the cam is worn through past the case hardening it should not be re used. -There are two points of measurement in regards to the cams, firstly the lobe height is measured with a micrometre from the lowest point to the highest. The service limit for the intake cam is 35.76mm and the exhaust is 34.38mm. -Secondly the oil clearance is checked using plasti-gauge, where a small piece of plasticine of a controlled diameter is inserted between the cam and carrier, the carriers are bolted down to the correct torque – 11Nm, and then removed again. The width of the plasticine is then measured which can then be compared to the provided chart, giving the clearance measurement. The specification for the oil clearance is 0.15mm.
Session Time	13:00			
Session Location	UW/TSD IQ 020A			
Staff	Mark Fall			
Aims of Session				
Continue Teardown of Olethros SV700 Engine, Remove cylinder heads and dis assamble				
Equipment Used				
Allen keys, Socket set, rubber mallet plasti-gauge, micrometer				
Observations & Feedback				
Cam oil clearance FR In 0.12mm, FR Ex 0.11mm, RR In 0.11mm, RR Ex 0.11mm Cam lobe height FR In 35.9mm, FR Ex 34.63mm, RR In 35.99mm, RR Ex 34.71mm				

Engine Workshop Session 2 Logbook Entry			
Student Name	Michael Charity	PPE Required	Tasks Performed
Session Date	11/10/2022	Steel toe cap boots Dust coat Nitrile gloves	The process for removing each cylinder heads is identical and is as follows
Session Time	13:00		1. Using a 14mm socket, remove the four head bolts securing the cylinder head to the engine block. Then, using a 10mm socket, remove the two bolts that connect the cylinder head to the cam chain cover.
Session Location	UWTSD IQ 020A		2. Carefully lift the cylinder head off the engine block, taking care not to damage any components.
Staff	Mark Fall		3. Remove the valves and valve springs from the cylinder head by compressing the springs with a valve spring compressor and removing the keepers with a magnet or pick.
Aims of Session			4. Measuring the spring free length with a suitable tool, such as a vernier calliper, and compare it to the service manual specification of 39.8mm +/-0.7mm. If springs fall outside this measurement, they should be replaced. This is done for both the inner and outer spring.
Continue head Removal and disassembly			5. The spring force should also be measured by using spring tester, where the spring is compressed by a set distance in mm and the force is measured, the specification for this is 4.1-4.7Kgf/29.9mm for the inner spring and 16.6-19.2Kgf/33.4mm.
Equipment Used			6. Check the valve diameter and length using a micrometre and compare it to the service manual specification. Replace any valves that are out of tolerance or show signs of wear.
Socket set, valve spring compressor, straight edge, feeler gauges			7. Check the cylinder head for flatness and damage using a straightedge and feeler gauges. If the cylinder head is warped or damaged, it will need to be repaired or replaced.
Observations & Feedback			
Significant damage to head from impacts from piston. Damage to all valves including bent and broken valves Spring free length from front Intake 1 outer to Rear exhaust inner 39.61mm, 39.63mm, 39.65mm, 39.68mm, 39.7mm, 39.73mm, 39.75mm, 39.78mm, 39.8mm, 39.83mm, 39.85mm, 39.88mm, 39.9mm, 39.93mm, 39.95mm, 39.98mm.			

Engine Workshop Session 3 Logbook Entry			
Student Name	Michael Charity	PPE Required	Tasks Performed 1. With the head removed the final 10mm nuts can be removed from the outside of the barrels 2. Then the barrel can be removed from the crankcase, making sure not to damage the piston rings. 3. Removed the circlip from the top of the piston using circlip pliers. 4. Then the removed the gudgeon pin from the piston. 5. Measure the bore diameter of the cylinder using a bore gauge, taking measurements at several points along the length of the cylinder. The specification for the bore diameter is 81mm-81.15mm, with a maximum taper of 0.05mm. 6. Check the top cylinder for distortion using a straight edge, which should be placed diagonally across the bore. The service limit for cylinder distortion is 0.1mm. 7. Visually inspect the cylinder bore for any signs of wear or damage, such as scoring, scratches, or pitting. If the bore is excessively worn or damaged, it may need to be re-bored or replaced. 8. It is important to measure the diameter of the piston using a micrometer, taking the measurement at 20mm from the skirt. The specification for the piston diameter is 80.88mm. 9. To check the piston pin diameter, which should be 19.98mm a micrometre is used 10. A bore gauge should then be used to measure the piston pin bore diameter, which should be 20.15mm.
Session Date	Not in class	Boots, nitrile gloves	
Session Time	n/a		
Session Location	n/a		
Staff	Mark Fall		
Aims of Session			
Remove cylinders and barrels, measure components			
Equipment Used			
10mm spanner. Bore gauge, micrometer straight edge, feeler gauges			
Observations & Feedback			
Catch up session on 19/10/22 as session missed due to racing commitments. No salvagable components			

Machine Workshop Session 1 Logbook Entry			
Student Name	Michael Chrity	PPE Required	Tasks Performed 2. To remove the clutch the clutch cover must first be removed. On the SV650 this is split into two separate covers. For just a clutch removal only the outer cover needs to be removed however as the entire engine is to be dis-assembled then both covers were removed at this point. 3. By removing the 8mm M6 bolts the two clutch covers were removed, special care was taken to not damage the two dowels that ensure proper alignment of the clutch cover. 4. The water pump is removed with the clutch cover as they are part of the same assembly, this will be stripped, checked and rebuilt at a later date. 5. To dis-assemble the clutch the 5 10mm M6 bolts that preload the clutch springs must be removed. Care must be taken to remove these in an even manner as to not damage the pressure plate or clutch basket. 6. The pressure plate and clutch plates can be removed. Most of the clutch plates are identical however the last friction plate is different so this must be noted for re-assembly. It is also good practice to install them in the same order as they are removed. 7. There are two checks for the clutch plates. Firstly the thickness of the both friction and steel plates are measured using a micrometer, the specified minimum thickness for the steel plates is 2.35mm and the thickness of the friction plates is 2.9mm. They must also be checked for warpage, the easiest way to do this is to place them on a clean surface plate or engineering table and feeling for any rocking motion or using a torch and checking for light passing through between the plate and the surface. If they are in specification they can be reused (or in this case they have been put into storage and recorded on our spare parts inventory). 8. The clutch basket is held on by one central nut. This can be rather tight so a breaker bar must be used and typically (although not in this instance) a clutch holding tool may be required. 9. With the nut removed the clutch basket can be removed, taking care to remove the spacer on the input shaft. The clutch basket is checked for damage and fatigue and wear from the teeth on the friction plates.
Session Date	25/10/2022	Steel toe cap boots Dust coat Nitrile gloves	
Session Time	13:00		
Session Location	UWTSD IQ 020A		
Staff	Mark Fall		
Aims of Session			
Remove clutch and clutch assembly			
Equipment Used			
Socket set Breaker bar Impact driver			
Observations & Feedback			
Oil had not been fully drained, however with the pump not being removable for future tear-downs a designated stand with catch tray may be beneficial. Nitrile gloves (provided) were also required due to the amount of oil and should be considered as a health and safety issue as the MSD sheet for the oil used specified a risk of contact dermatitis when exposed for prolonged periods of time.			

Session 1 Logbook Entry			
Student Name	Michael Charity	PPE Required	Tasks Performed
Session Date	04/10/2022	Steel toe cap boots Dust coat Nitrile gloves	1. The Primary drive gear is held on with one 14mm M12 bolt. typically a method of holding the crank is required however as the engine was seized the bolt was able to simply be loosened. The gear is then removed from the crank shaft along with the woodruff key which prevents the gear from spinning in the shaft. 2. The gear for the oil pump is retained by a single circlip. ones removed the gear can be removed along with the pin which passes through the shaft on the pump. 3. The gear selector mechanism is attached with a circlip. the gear selector is spring loaded so care must be taken when removing the circlip. 4. There is a circlip on the reverse side of the gear selector shaft which must be removed. 5. due to the positioning of the selector shaft it is common for a buildup of corrosion and dirt to be found on the reverse side of the shaft. it is best for this to be cleaned before removal. this way no damage is caused when pulled through the engine cases upon removal. 6. once the clips and dirt has been removed the selector shaft can be removed the return spring can be removed as well as the indexing lever. 7. in order to split the cases the 5mm M6 allen head bolt must be removed along with the detent. 8. On the Left side of the engine a blanking plate must be removed to gain access to two of the crankcase bolts. 9. the crankcases are now ready to be split.
Session Time	13:00		
Session Location	UWTSD IQ 020A		
Staff	Mark Fall		
Aims of Session			
Continue Teardown of Olethros SV700 Engine Remove primary drive, gear selector and oil pump drive gear and prep for crankcases to be split.			
Equipment Used			
Socket set Braker bar Impact driver Circlip pliers screwdrivers (assorted)			
Observations & Feedback			
Engine is seized which made removal of the primary drive gear bolt relatively easy. Oil pump was not removed as to reuse would be to high risk due to the nature of the failure.			

Student Name

Assignment Title or Module

Student Number

Machine Workshop Session 1 Logbook Entry			
Student Name	Michael Charity	PPE Required	Tasks Performed 1. The first session was an overview of the equipment to be used as well as a demonstration of basic operating procedures. 2. For both machines there were commonalities such as emergency stops in addition to the regular motor controls, safety interlocks fitted to the guards. The DRO Functionality was the same however with the addition of a third readout on the milling machine as well as some of the health and safety practices in place, such as eye protection. 3. A short demonstration was given on each of the machines
Session Date	06/03/2023	Boots, Eye protection	
Session Time	09:00		
Session Location	IQ0021A		
Staff	Adrian Dix		
Aims of Session			
Review Health and safety			
Equipment Used			
N/a			
Observations & Feedback			
N/A			

Machine Workshop Session 1 Logbook Entry			
Student Name	Michael Charity	PPE Required	Tasks Performed 1. The first part is a cylinder of various diameters. To achieve the final part a variety of turning operations will be carried out. 2. Before work is carried out the machine is inspected for condition, the screws holding the chuck in place are tightened, tool is checked for sharpness and installed. As well as ensuring the tool is centered, by use of the center in the tailstock, using packers under the tool to raise or lower the tool. And finally the speed is set to the correct setting for the application. 3. Firstly the bar stock is placed into the lathe with approximately 55mm of stick out from the chuck, this is to allow the first two diameters to be turned with clearance to the chuck. 4. The first cut of 0.5mm is taken, as the surface of the stock is not a machined surface it is not concentric or even across the bar. Therefore after the first cut the surface was not fully cleaned up. 5. Another 0.5mm cut was taken, this time leaving a clean surface around the part in which a measurement could be taken. As a measurement was not taken the x-axis measurement was noted, the tool brought back from the work on this axis, brought back to the start position on the z axis and then the tool brought back to the same x axis measurement. A measurement of the bar was then taken and this inserted into the DRO on the x-axis. 6. A further series of 0.5mm cuts were then taken until the part neared the final maximum OD of 46mm. On the final cut the x axis was brought back in the same way as before in order to ensure an accurate measurement was taken. The Measured OD was not exactly the same as the DRO measurement, the reason for checking on one of the final cuts. The updated measurement was put into the DRO and the final cut was taken bringing the part into size. This was double checked, the recorded measurement being 46.01mm 7. The part was then faced off with two 0.5mm cuts, the z-axis was then set to 0 and a bump stop set to 30mm. A series of cuts of 0.5mm was then taken until the DRO reading was just over 36mm, the second diameter. 8. At the final cut the same procedure of measuring and resetting the DRO was then used to obtain the final measurement. The final cut was taken bringing the measured diameter to 35.98mm 9. The tool was then changed to a chamfer tool, again using the center to level the tool. As well as the tool post being squared to the cross slide and cross slide to the lathe bed. The first chamfer was cut at 45 degrees at a depth of 2mm, or 4mm on the DRO. The chamfer was also used to de-bur the other edge.
Session Date	13/03/2023	Boots, Eye protection	
Session Time	03:00		
Session Location	IQ0021A		
Staff	Adrian Dix		
Aims of Session			
Part 1			
Equipment Used			
Lathe, Micrometer, height gage			
Observations & Feedback			
When retracting the tool do not go as far as this is not required			

Machine Workshop Session 1 Logbook Entry			
Student Name	Michael Charity	PPE Required	Tasks Performed 1. After the start up checks the next task was to remove the part and flip the part in the chuck, using the flat machined surface against the jaws of the chuck and face off the rough edge. This took 3 0.5mm cuts. On the final cut the z axis was untouched once taken. 2. Once the face was clean the part was then measured with the height gauge, this measure 2.9mm oversize. The z axis was then set to 0 and the part placed back into the chuck using the machined surface against the chuck as a reference as before. the part was taken to near final size before in the same process as before rechecking the measurement and resetting the DRO, this time with the z axis. 3. With the length to final size the center was removed from the tail stock, a center drill was instead used to drill a center hole in the end in the part, before replacing the drill for the center and setting this into the part to offer rigidity to the setup. 4. The next three diameters were then turned in the Exact same method as the first two diameters. 5. Finally the chamfer tool was re-inserted using the same packing pieces for tool height and the same chamfer repeated on the other side. The remaining edges were then de-bur'd. 6. The part was then taken and measurements double checked against the specification.
Session Date	20/03/2023	Boots, Eye protection	
Session Time	09:00		
Session Location	IQ0021A		
Staff	Adrian Dix		
Aims of Session			
Finish Part 1			
Equipment Used			
Lathe, chamfer tool, micrometer, height gauge.			
Finish Part 1			
tolerance on the center dimeter was noted but was aolced at all stages. Final diameters, 35.98mm, 46.01mm 41.005mm, 30.012mm, 24.99mm			

Engine Workshop Session 4 Logbook Entry			
Student Name	Michael Charity	PPE Required	Tasks Performed
Session Date	27/03/2023	Boots, Eye protection	1. Firstly the part was marked off. Using the corner as a reference and a combination of an engineers square and height gauge to mark out the cut lines and hole enters. The 45 degree chamfer the part had to be turned and the gauge set to 0 at each edge and taken to -10mm to mark the edge of the chamfer and a line scribed between these two points.
Session Time	09:00		2. The next step was to center punch the hole centers before drilling the first hole to tapping size of M6x1, which is 5mm others to final size.
Session Location	IQ0021A		3. The edges were de-bured and an m6 tap was used to thread the hole to M6.
Staff	Adrian Dix		4. With a hacksaw the two steps were roughed out.
Aims of Session			5. The part was then taken to the mill, placed into the vise, ensuring the vice is clean. The tool was touched off on the first vertical face with the height slightly higher than the first horizontal face. Two 0.3mm cut was taken to clean the edge.
Part 2			6. The measurement of the first face was then taken and recorded using the height gauge. The Part was re-installed in the vise, the face touched off gently and the X- axis set to 0 on the DRO.
Equipment Used			7. A further set of 0.3mm cuts were taken until the part was to final size when the DRO read the difference between the previously measured distance and the desired distance.
Hack saw, File, Mill, Pilar drill and drill bits, tap and handle.			8. The next step was to touch off on the highest point of the first horizontal face. Before taking a set of 0.3mm cuts until the face was clean, at which point the part was measured, and replaced in the vise and gently touching off setting the z axis.
Observations & Feedback			9. Another series of cuts were taken to bring the part to size.
completed in the one session.			10. The part was then placed on a parallel in the vise to raise it to a better height. Ensuring to lightly tap the part down ensuring contact with the parallel.
			11. Using the same method, the second step was machined
			12. Using a file the chamfer and radius was completed and all edges de-bured

Student Name

Assignment Title or Module

Student Number

Guest Lecture Logbook Entry		
Student Name	Michael Charity	Guest Lecturer Name & Company
Session Date	23/11/2022	Ian Cooper, TWI Industries
Session Time	13:00	
Session Location	IQ002	
Overview of the lecture		
This lecture was based on the work carried out by TWI Industries and their non destructive testing method, TWI list over 15 methods of NDT. The scope of industries in which TWI work with, including power generation, both conventional and nuclear, to transport and medical.		
Any interesting points		
The range of systems used from Scanning electron microscopy to optical systems and the use of gasses in testing. The magnification from electron microscopes being 50000x. The use of ultrasound to detect imperfections in composites.		
Main information gained		
Marked		