

~> First week 03/10/2019

First session

Instructor: John Kinsella

~> Engine number: ER750JE 151489

~> Aims for session:

- Introduction into workshop, including SAFETY RULES; machinery and HEALTH & SAFETY.
- Start strip a motorcycle engine and gearbox
- Study and analyze parts to understand how engine works
- PPE: Steel toe capped boots and overalls

Safety First!

Professional mechanics are trained in safe working procedures. However enthusiastic you may be about getting on with the job at hand, take the time to ensure that your safety is not put at risk.

A moment's lack of attention can result in an accident, as can failure to observe simple precautions.

There will always be new ways of having accidents, and it is important to encourage a safe approach to all work you carry out on the engine.

Step 1:

To be able to work on the engine we decided first remove the oil pan. By removing the oil pan we could leave the engine in a good position to disassemble the rest of the engine.

• Items Removed

- 1x Valve relief
- 16x Bolt - Flanged 6x25 mm
- 1x Pan oil
- 1x Gasket 12x22x3 mm
- 1x Filter oil

• Tool used

- Caliper (measure BOLTS)
- Batchet
- Socket 8mm
- Socket 12mm

Step 2:

Disassemble the Top of engine.

• Items Removed

- 4x Ignition spark plug
- 6x Bolt Head cover
- 6x O-ring
- 1x Cover Head
- 1x Gasket
- 4x Spark plug gasket

* Advice: Sometimes the Head cover is stuck, so use a nylon Hammer. What you shouldn't DO is HIT the cover with the steel Hammer or stick, or flat screwdriver to remove it *

Step 2:

Remove camshaft.

To remove the Intake/Exhaust camshaft, the first needs removal:

- 1x Chain Tensioner
- 2x BOLT 6x25mm
- 2x Camshaft covers
- 4x BOLT 6x45mm
- 16x BOLT 6x40mm
- 1x Intake camshaft
- 1x Exhaust camshaft

* Advice: Stick the screwdriver through the camchain. This will avoid the chain falling inside of the engine *

- Tool used
Allen 5
Socket 10mm
Ratchet

Set up procedure 1, 2, 3.

NOTE: Place clean rags over the spark plug holes and the cam gear teeth holes to prevent any component from dropping into the engine on removal.

- Remove the valve covers
- Unscrew the timing inspection cover from the right-hand crankcase cover. Discard the wire O-ring as a new one must be used.
- To remove the front cylinder head camshaft, turn the engine until the "T2" mark on timing plate aligns with the static timing mark on the crankcase cover, and the index lines on the right-hand end of the camshafts are facing away from the head and aligning with the index mark on the camshaft holders. The no. 4 (Front right) cylinder is at TDC on the compression stroke.

- To remove the rear cylinder head cam shafts, turn the engine until the 'T1' mark on the timing plate aligns with the static timing mark on the crankcase cover, and the index lines on the right-hand end of the camshafts are facing away from the head and aligning with the index mark on the camshaft holders, the no. 1 (rear left) cylinder is at TDC on the compression stroke.

- Undo the camshaft holder bolts for the camshaft being worked on and all the bolts securing the central oil pipe and plate assembly, evenly and a little at a time in a criss cross pattern until they are all loose. To separate the camshaft from the holders, align the cam lobe with the lobe-shaped hole in the holder, then remove the camshaft.

Extra note:

The front cylinder head is marked FR IN and the exhaust camshaft is marked FR EX. The rear cylinder head is marked RR IN and the exhaust camshaft is marked RR EX.

Achievements:

- Overcome Technical limitations of sample preparation and detection methods
- Critically review the analytical outcome.

Machine shop

07/11/2019

FIRST session

Instructor: David Cooper

Aims for session

- Introduction session with a brief overview of the machine shop
- Start practical work on machines.

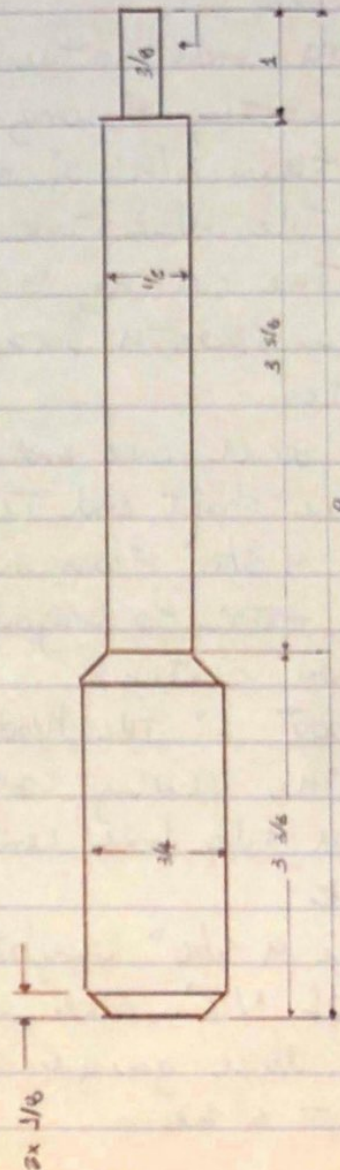
Machine shop safety rules

1. Wear proper clothing for the type of work being done.
2. Remove all jewelry
3. Safety glasses
4. Hair. Pull back long hair in a band and tuck it under your shirt collar
5. Food and drink are NOT permitted
6. DO NOT leave a machine running unattended.
7. Open-toed shoes are prohibited
8. Cell phones and other personal electronic devices must be NOT used when

- Working at my machine
- a) Short pants and skirts are prohibited.

Specific safety procedures and practices that are required use in the machine shop, not only because it makes good sense, also the uni requires it. Most importantly, failure to observe safety rules and regulations can endanger those around of the machine shop. In short, the machine shop can be dangerous place. The importance of knowing and following good safety practices cannot be over-emphasized, because this is the only way the dangerous situations can be avoided.

SHAFT



Procedure

- Cut $\phi 1\frac{1}{2}$ " inches of $\frac{3}{4}$ " hot rolled round steel.
- Face both ends on the lathe until length is exactly ϕ " long. No more than $\frac{3}{4}$ " of material extending through the headstock. Ensure the cutting bit centered so you get a smooth face with no dimples or 'outies'.
- Center drill one end. Choose the side where shaft and tenon will be made.
- Measure $4\frac{5}{8}$ " from one end and mark the metal to layout the shaft and tenon locations.
- Hold about 1" the headstock and support the newly center drilled end with the live center in the tailstock.
- Turn the $4\frac{5}{8}$ " length to a diameter of $1\frac{1}{2}$ ". Use calipers and the $1\frac{1}{2}$ " drill gauge hole to ensure the correct size.

- Measure 1" from the end to create the tenon.
- Turn tenon diameter down to $\frac{5}{8}$ ". Use the calipers and $\frac{5}{8}$ " hole on the drill gauge to ensure correct measurements.
- * ADVISE NP DO NOT make it smaller than $\frac{5}{8}$ ". *
- Flip material around tenon/skim off the dirty scale from the grip.

Achievements:

- Learning metal work lathe machine tool operation.

Guest Lecture

Date: 4/12/2019

Room: 101

Guest Lecturer: Chris Bull

Topic: F1 Aerodynamics.

Chris Bull, principal Aerodynamicist at Renault F1 Team shared insight of working alongside Formula 1 Teams.

Chris ~~has~~ has been working on several F1 Teams, including Honda F1, Brawn GP, Mercedes Petronas.

He started his career as SERP engineer in magotech. After a year he got the opportunity to join an F1 Team as Aerodynamic Design Engineer. He was part of a small team that designed wheel components for a 40% wheel off model using the CATIA software.

Chris said the daily technical challenges and opportunities to learn something new continues to inspire his passion for engineering and Aerodynamics.

Chris was one of the Aerodynamicists who worked on the double diffuser on the 2009 championship.

A radical aerodynamic overhaul led to completely redesigned cars for the 09 season.

JD Definitely the biggest name we've had the chance to hear so far.

The presentation full of technical details with a hint of advice on "How to get there".