



# Bottom End + Oil System!

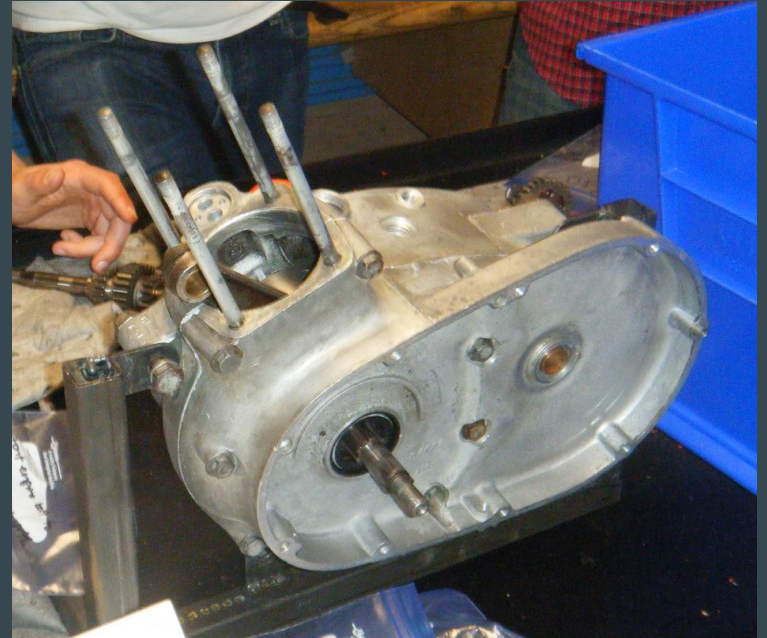
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Brought to you by Jamie O'Leary & Oscar Holmes

# What is the bottom end?

- Part of the engine
- Consists of:
  - Crankcase
  - Crankshaft
    - Flywheel (2 parts)
    - Connecting Rod
  - Camshaft

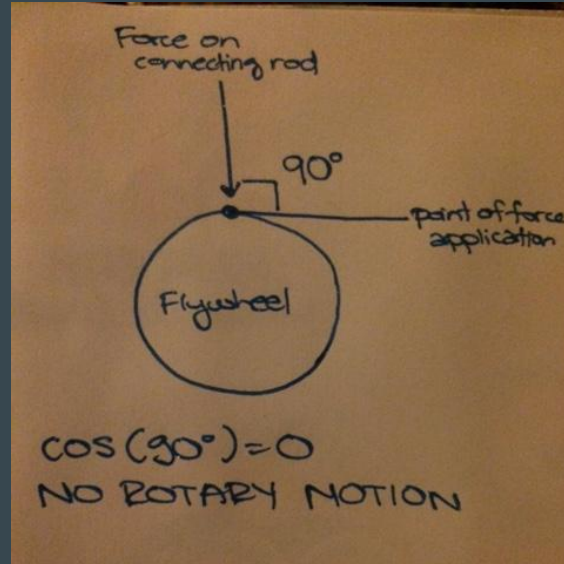
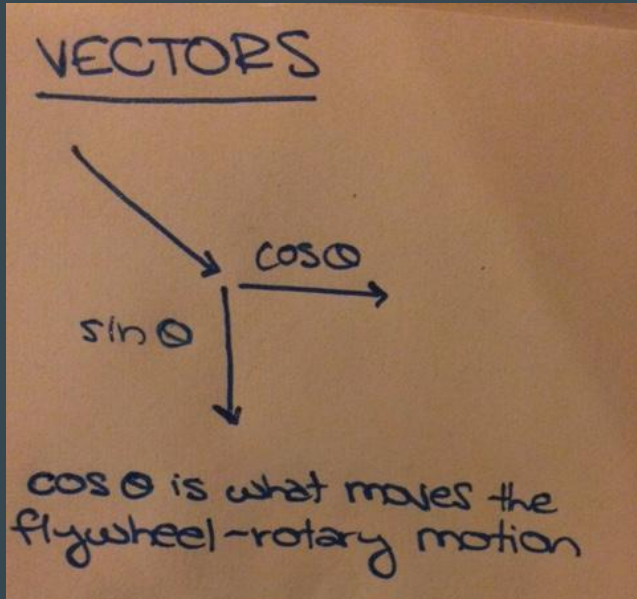


# How does the flywheel work?

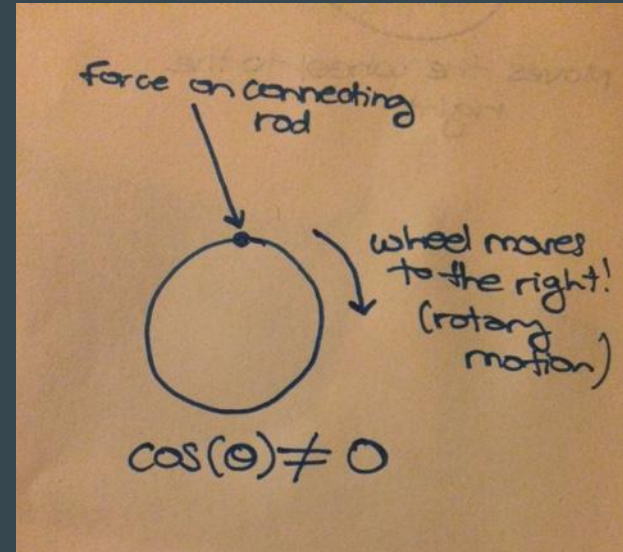
- Converts vertical motion of the piston into rotary motion - transmission transfers that to the back wheel
- Piston pushes down connecting rod which rotates flywheel
- 4 stroke engine = 2 full flywheel rotations
  - Intake (vacuum - pulls up connecting rod)
  - Compression (bottom to top)
  - Power (**only stroke that adds energy to flywheel**)
  - Exhaust



# Why the connecting rod must be set at an angle (PHYSICS!)



90 degree angle



Non-90 degree angle

# Camshaft

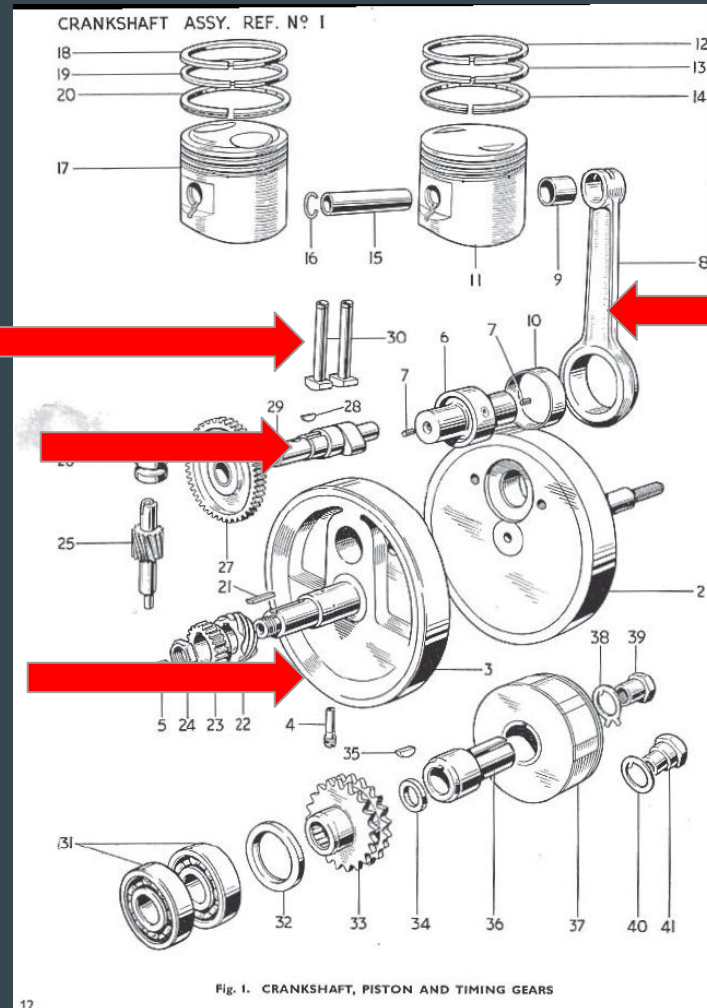
- Cam helps to open the valves which make the strokes possible
  - Cam → tappets → push rods (top end) → rocker arms → OPEN VALVES
  - Everything is connected!

Tappets

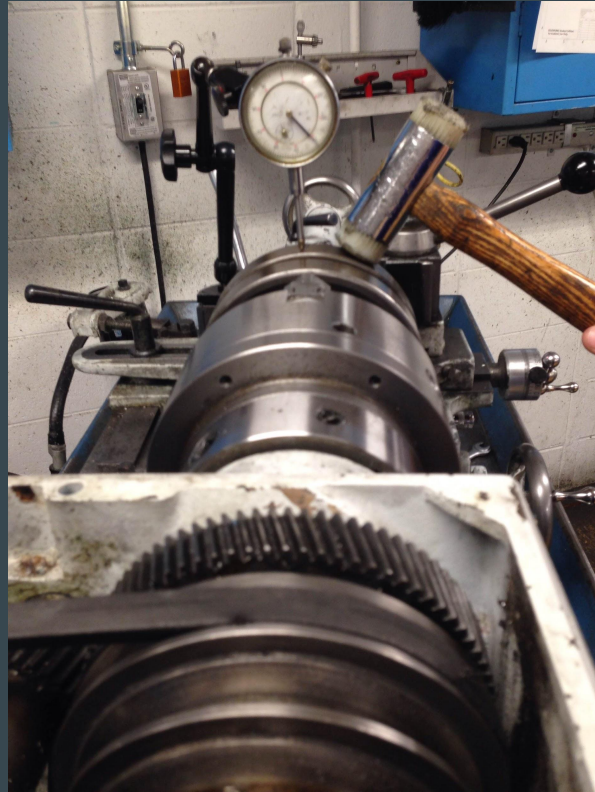
Camshaft

Flywheel

Connecting Rod



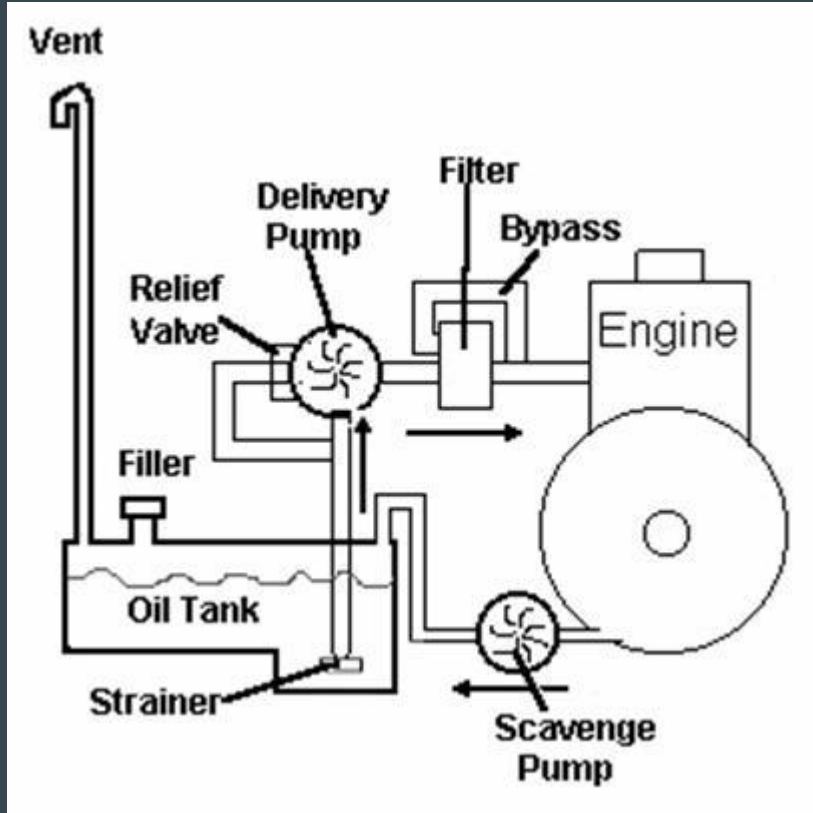
# Aligning the flywheel



# Oil system

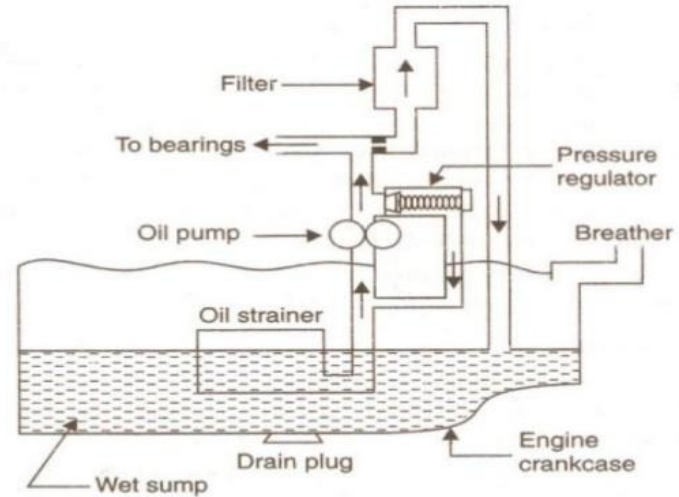
- Dry sump Vs. Wet sump
  - Oil pump
- What oils what and where gets oil?

## DRY SUMP



## WET SUMP

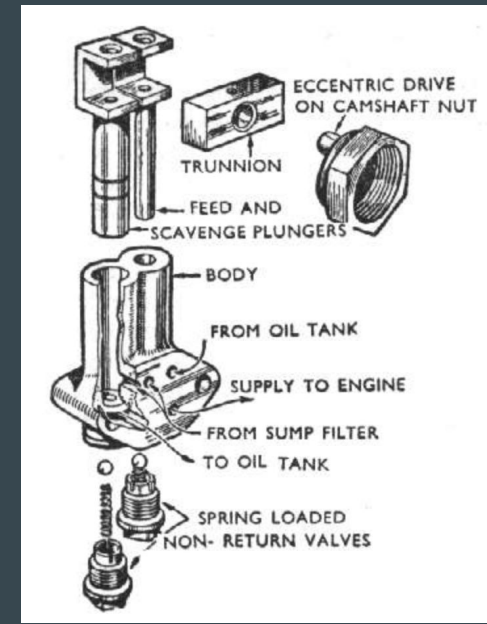
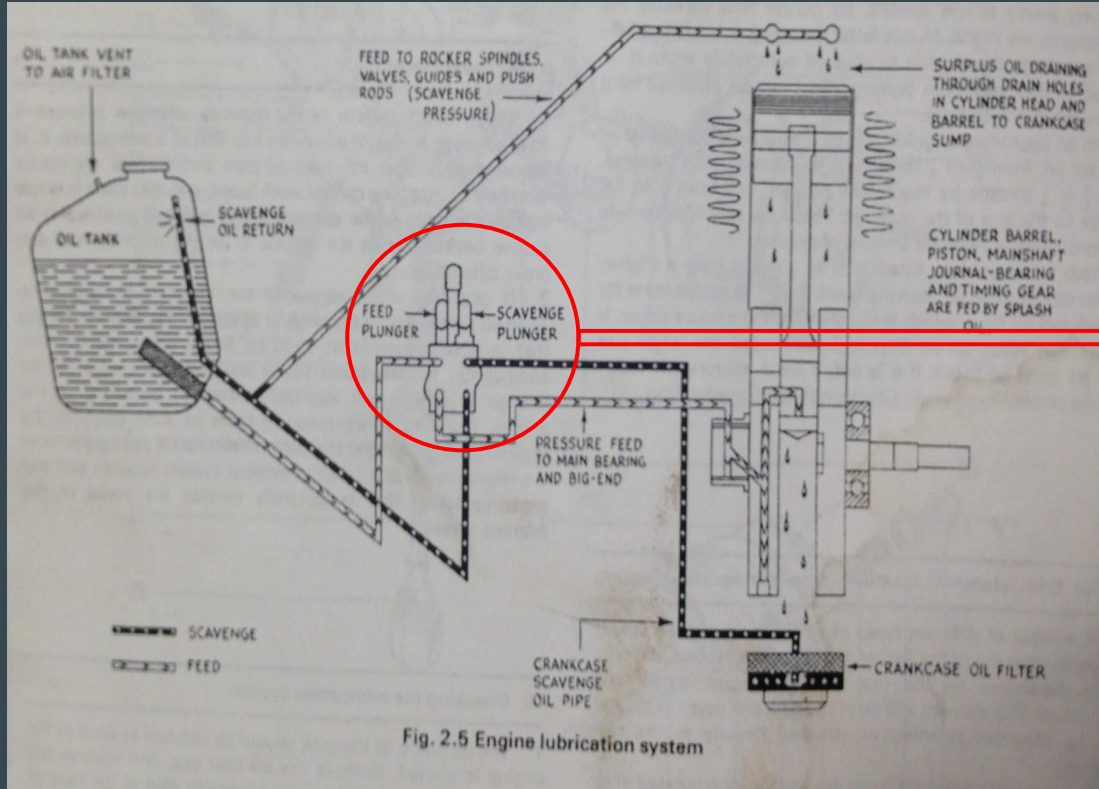
### Lubrication System – Wet Sump





DRY SUMP	WET SUMP
<p style="text-align: center;"><b>ADVANTAGES</b></p>	<p style="text-align: center;"><b>ADVANTAGES</b></p>
<ul style="list-style-type: none"> <li>➤ Increased oil capacity</li> <li>➤ Helps lower the center of gravity</li> <li>➤ Better weight distribution</li> <li>➤ Better cooling</li> <li>➤ Better oil pressure maintained</li> <li>➤ Easier to maintain and replace</li> </ul>	<ul style="list-style-type: none"> <li>➤ Simple design</li> </ul>
<p style="text-align: center;"><b>DISADVANTAGES</b></p>	<p style="text-align: center;"><b>DISADVANTAGES</b></p>
<ul style="list-style-type: none"> <li>➤ Cost</li> <li>➤ Complexity</li> <li>➤ Weight</li> <li>➤ Can negatively affect day to day drivability (System is too efficient)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Starves racing cars of oil (Not a problem in motorcycles)</li> </ul>

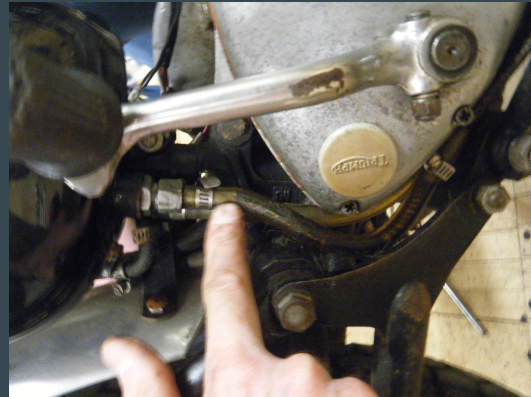
# Components to the Dry Sump



# OIL FAQ'S

- Where does the oil go in?
  - Oil tank, Chaincase oil (Filler plug), Gearbox oil (Gearbox plug)
  
- What type of oil should I use?
  - Chaincase - 20 SAE Gearbox - 30
  
- How often should I change my oil?
  - Every 1000 miles with intermediate 250 and 500 oil changes also.

# Getting to the Bottom end / oil system



# Taking it apart

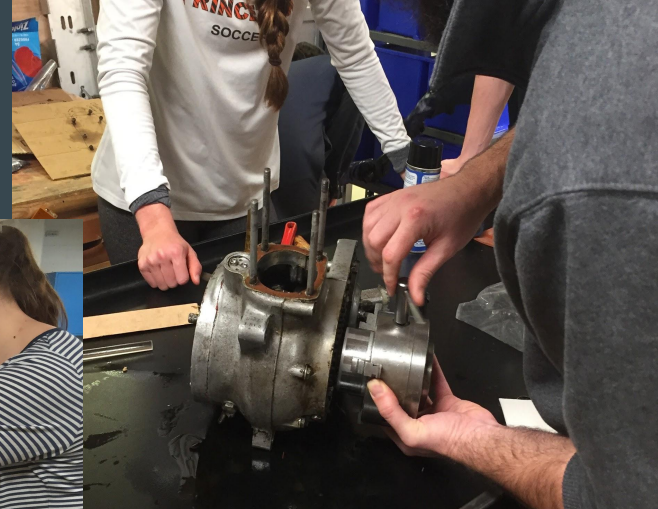
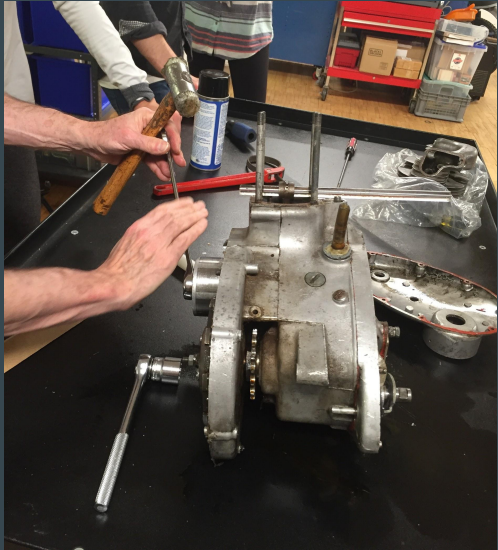


Collaboration with Clutch / Top End

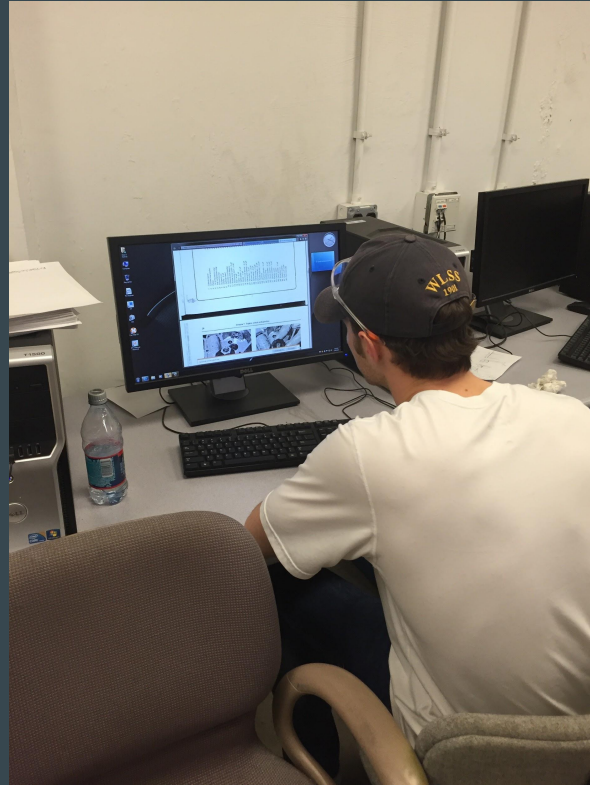
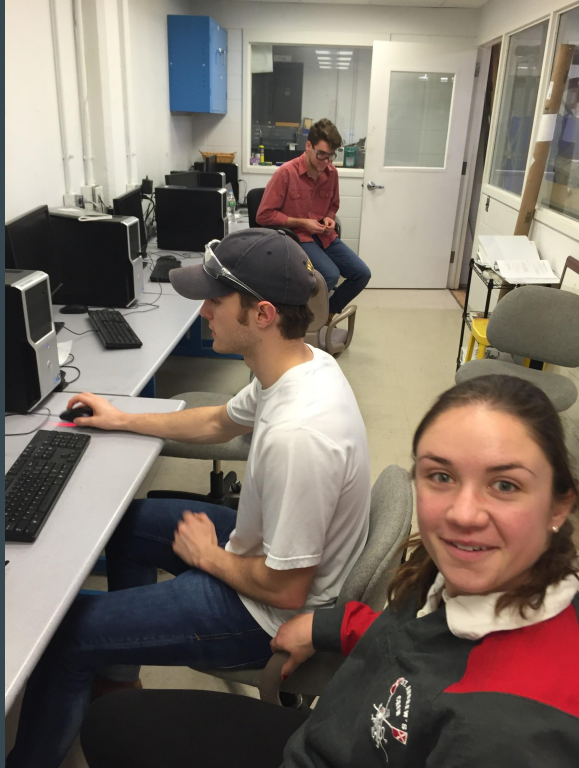


Splitting the case

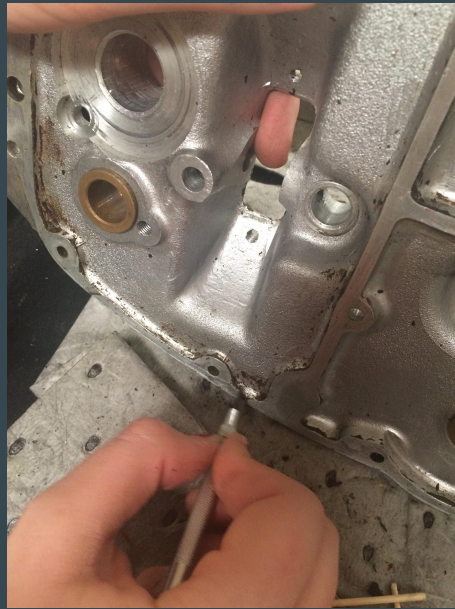
# Challenges!



# Understanding what we took apart:



# Cleaning



“This is the best-cleaned crankcase I have ever seen!”

- John Prevost



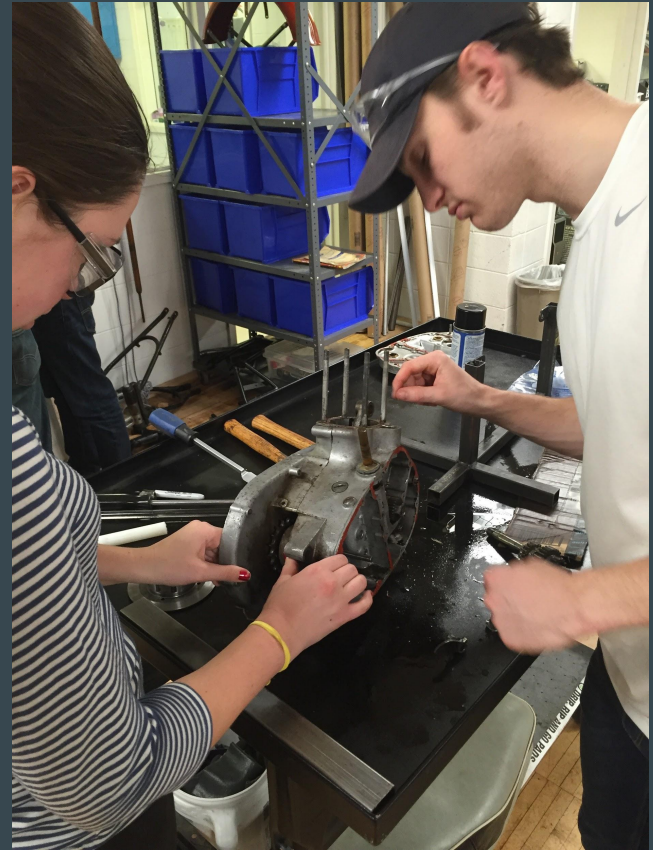
# A brief break



“This is so useful!”

- Professor Littman

# Putting it back together



# Finished!

Thanks for such a fantastic semester - we learned so much!



## What we learnt

- Technical knowledge of the bottom end / oil system
- Understand what you are working with before you begin to work with it. This helps to get things done faster. Prevents things getting lost.
- Label everything!
- If one strategy doesn't work, try something else. You'll figure it out!