# Reading Assignment #2

Due October 7 , 2020

Answer the following questions on Nathan Bradbury’s thesis, pages 33-62, as well as the questions pertaining to general snowmobile knowledge. The best way to get answers for the general knowledge questions is to ask an older member!

## Bradbury Questions:

1. Like Table 7, create a table of our current engine with each of the characteristics listed in the thesis. Include units if necessary.

|  |  |
| --- | --- |
| Engine Type |  |
| Number of Cylinders |  |
| Bore |  |
| Stroke |  |
| Displacement |  |
| Compression Ratio |  |
| Intake Type |  |
| Scavenging Type |  |
| Rated Power |  |

1. Why were the E-TEC injectors selected for the UICSC snowmobile? What modifications do you think needed to be made to adapt to the new E-TEC system (the second question is conceptual and not covered explicitly in the text).
2. What is the water hammer effect? What in our sled takes advantage of the water hammer effect?
3. Describe some of the difficulties in combustion chamber design that Bradbury had. Discuss things like trapped compression ratio, injector location, and sparkplug location.
4. Why did the GDI system require more power than a traditional carbureted two-stroke? What were some of the ideas to generate the power? What do we use on our snowmobile to generate the needed power?
5. How is the power from the engine transmitted to the track? Draw a schematic with the labelled names of each components. Is it possible to figure out the gear ratio of the CVT at any given engine speed? What information would you need to calculate it?
6. How does the engine know how much fuel to inject at certain loads and RPMS (What device is telling it the numbers)? Is this still how our engine is controlled? How do we determine the values within the various tables, or maps, for the engine?

## General Snowmobile Knowledge:

1. Where is the SmERF? What do we do there? What are some important rules about it?
2. What is the HEV? What do we do there? What are some important rules about it?
3. What are the biggest events at the snowmobile competition (points wise)? What are the goals of the 2018 team in these major events?
4. Explain engine speed and load in layman terms, how does an everyday rider increase engine speed? What situations cause low/high load?
5. In Bradbury’s thesis, he often says that we run a naturally aspirated engine. What does that mean? What are the alternatives? Would there be any benefit for the team to change?
6. Define these acronyms:
* SAE:
* NPS:
* EPA
* CSC:
* HP:
* BSFC:
* BMEP:
* CR:
* AFR:
* DI:
* SDI:
* HPDI:
* HCCI:
* SCT:
* SI:
* CI:
* ZE:
* EMM and ECU: