
**Overview:**

Students are to investigate split cycle technology, where the typical four stroke combustion process is broken into two paired cylinders each performing two of the conventional four strokes in a diesel combustion process. The split cycle to be studied in detail is a liquid nitrogen cycle that includes nitrogen generation and storage, iso-thermal compression, and exhaust heat recovery. Students, through simulation and if possible experimentation, are to explore this split cycle and report on its feasibility and efficiency in a truck application.

**Objectives:**

Provide a two cylinder split cycle model in GT Power utilizing liquid nitrogen injector. Provide results of model and comparison to baseline 13 L engine. Report on results and feasibility of split cycle design.

**Approach:**

- Look at existing models/ideas of split cycle engines
- Talk with Volvo to acquire all deliverables they are looking for project to fulfil
- Begin hand calculations to gain perspective of proposed idea
- Learn the capabilities and different aspects of GT Power
- Understand baseline model from Volvo and figure out what will need to be changed when reducing it to our two cylinder model
- Begin setting up our model and running simulations
- Optimize model to gain best results and fulfill customer needs
- Compare simulation results with hand calculations
- Confirm that model is an accurate representation of hand calculations
- Report on feasibility of proposed split cycle design and report on the results that were found from simulation and hand calculations

**Outcomes:**

- Our model showed an increase of about 10% in Brake Thermal Efficiency over Volvo’s baseline model
- Achieved isothermal compression
- Results encourages further investigation into the split cycle design
- Hand calculations show the optimal variables to achieve best results