



Race Engine Optimization



Objective

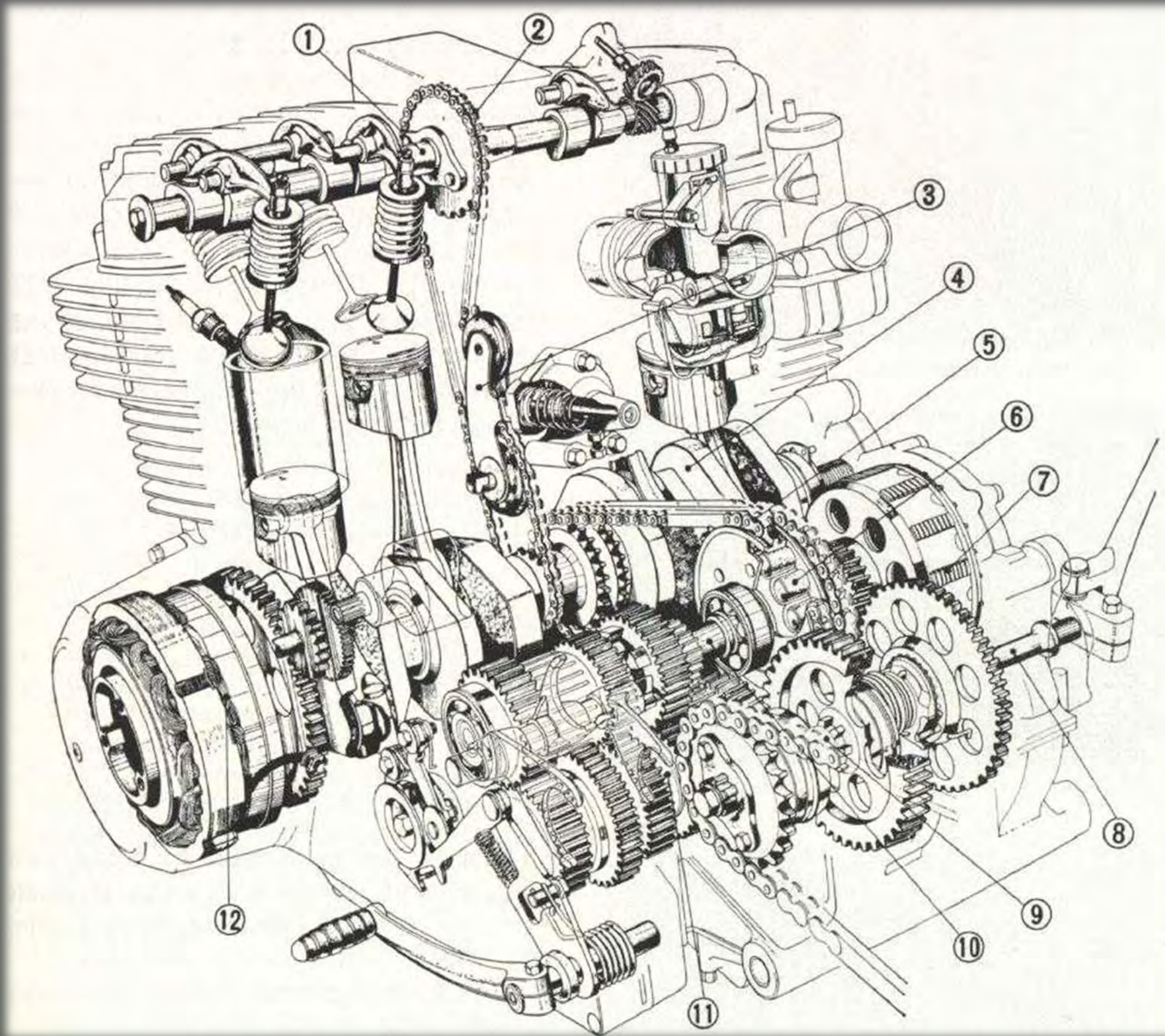
- Optimize a Honda motorcycle engine (CB 550) to work at peak performance while following the guidelines of the Formula SAE competition.

Proposed Design

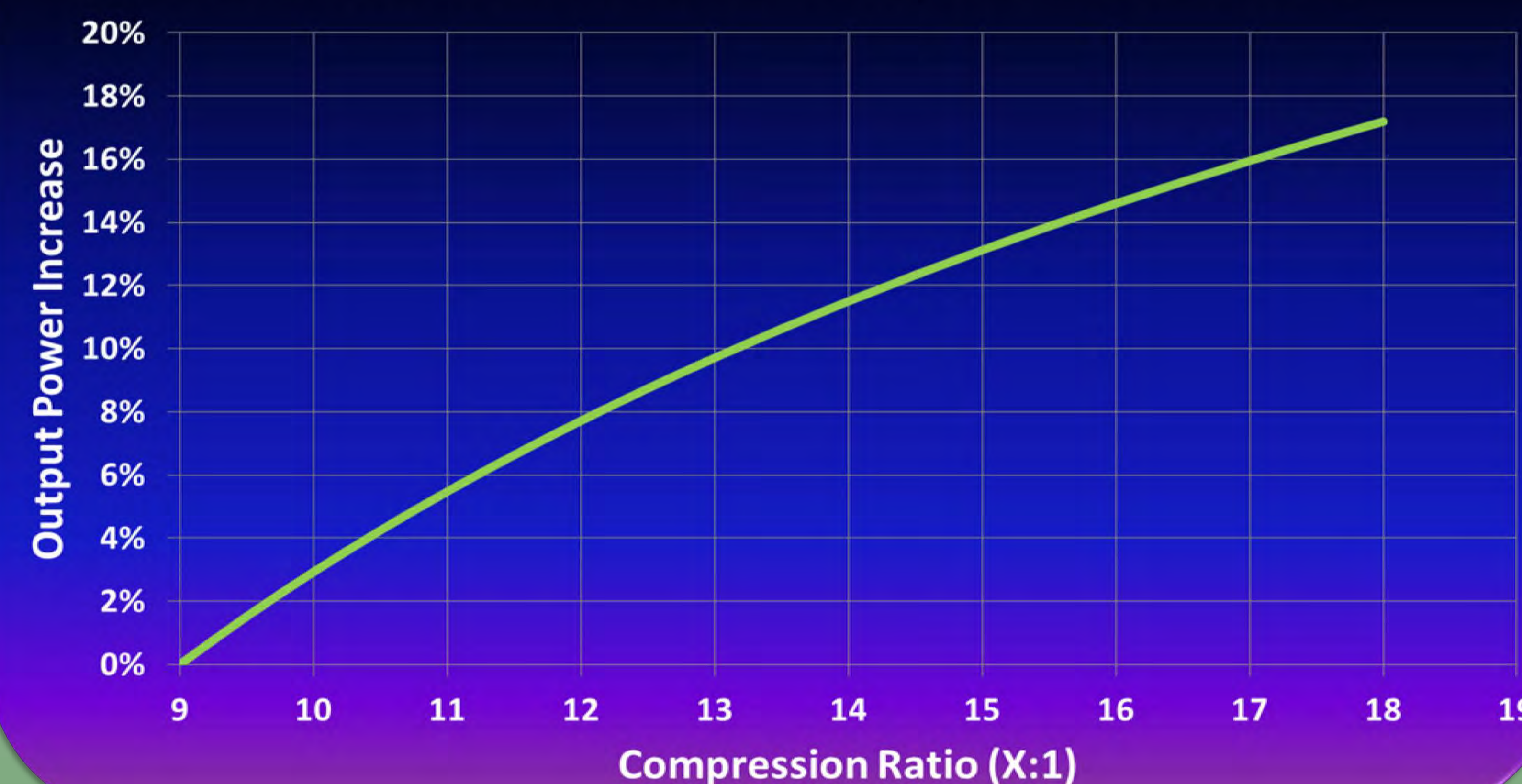
- Modify Honda CB 550 engine
- Increase stroke & displacement
- Maximize compression ratio for increased power and efficiency
- Compensate for loss of effective compression caused by restrictor

Development Process

- Research
- Optimization method selection
- Platform Selection
- Baseline Testing
- Modeling & Analysis
- Computation of target specifications
- Simulation
- Design
- Modification & Assembly
- Final Testing



Power Increase vs Compression Ratio



Constraints

- 610cc displacement limit
- 20mm intake restrictor
- 100 octane (AKI) fuel

Timeline



- Gain Power and Efficiency by Optimizing Compression Ratio
- Increase Compression From 9.0 to 13.5:1
- ~10% Power Output Increase
- +5.3 Horsepower
- ~6% Increase in Thermodynamic Efficiency

Team Members



David Ducassi Alex George Felipe Guajardo
Advisor: Prof. Andrés Tremante