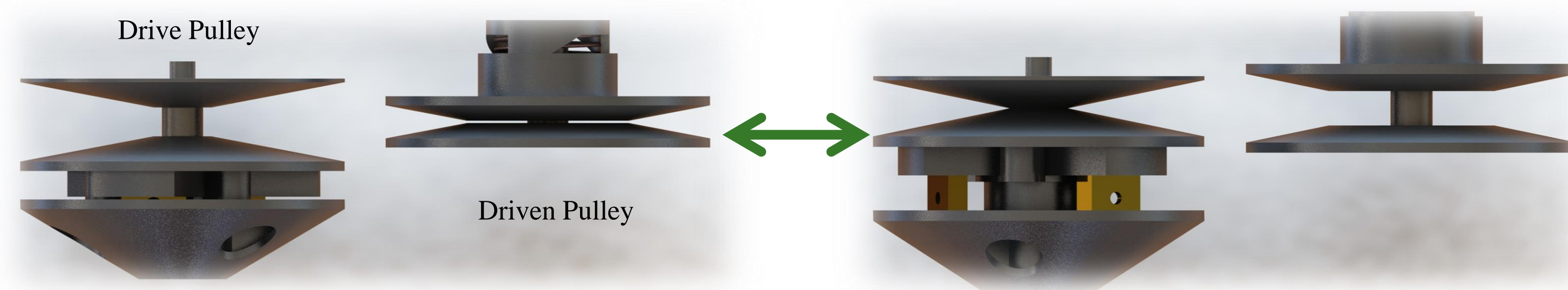
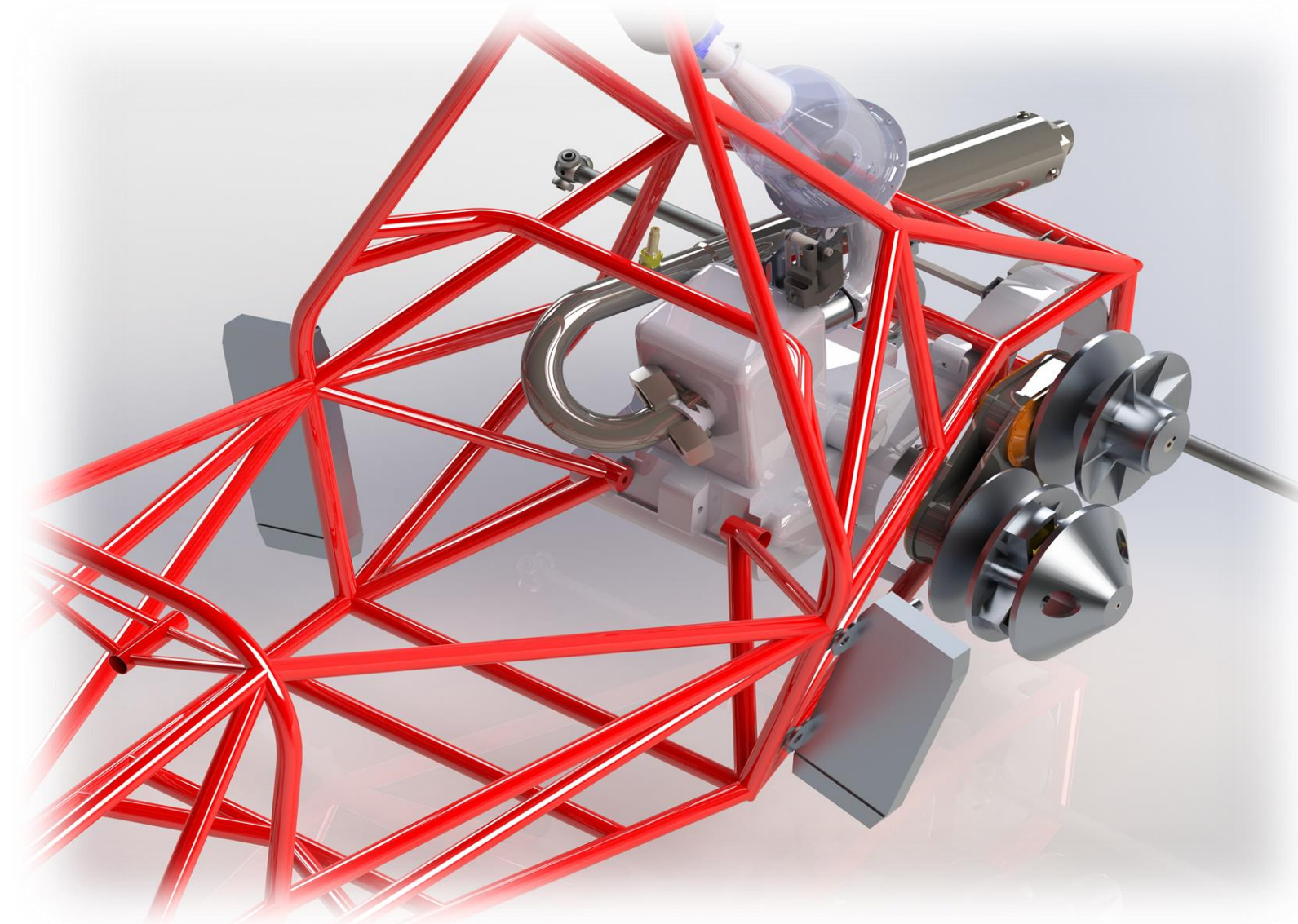


Design Objective

Optimize engine power transmission for acceleration through implementation of a CVT.

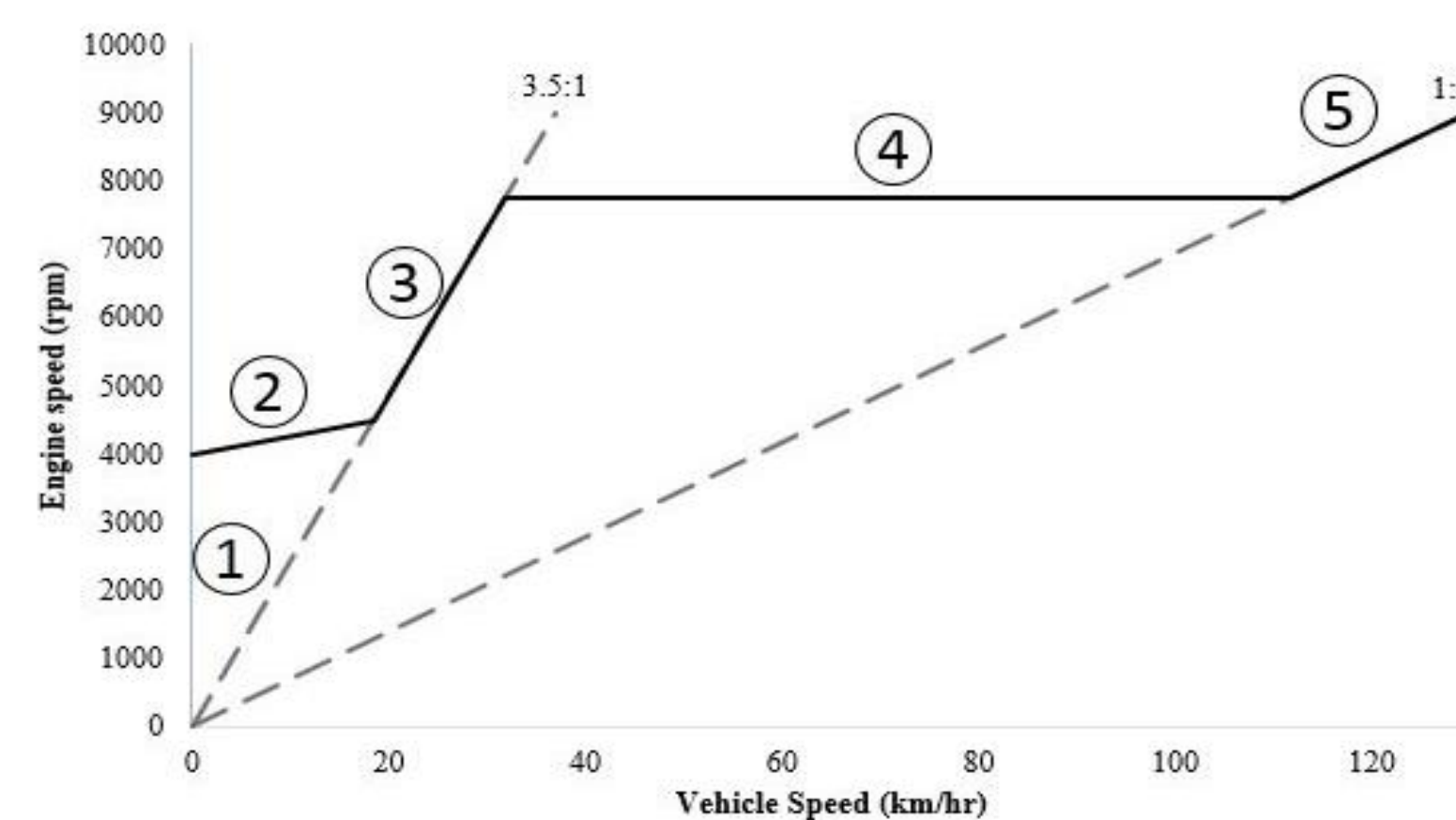
How it Works

CVT transmissions use continuous gear ratios to allow a vehicle to seamlessly transition between gear ratios to allow continuous, optimized power transmission from the engine to the wheels. The two pulleys, often referred to as the drive pulley and driven pulley, consist of a fixed and moveable sheave. As the moveable sheaves slide in and out the effective diameter of the pulley is changed. The result is in an infinite set of possible gear ratios.



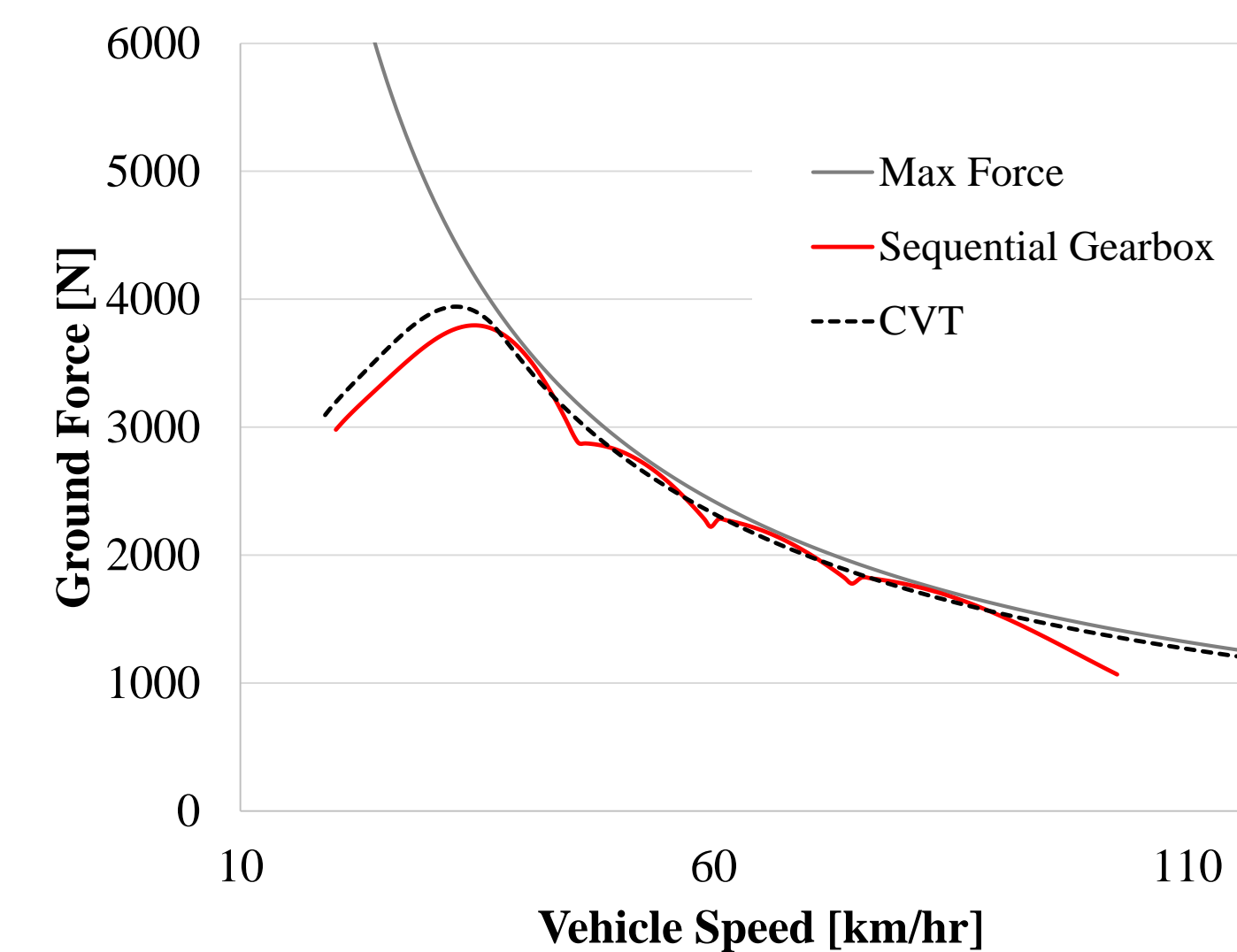
Shifting

1. Neutral, no belt engagement
2. Engagement, transmission and engine synchronize speeds
3. Low gear acceleration
4. Transmission Shifting at peak engine power
5. High gear acceleration (aka Shift Out)



Performance Analysis

The key characteristic for evaluating a transmissions performance is a ground force vs. vehicle speed comparison. The ground force output of the transmission to the road directly correlates to the vehicle acceleration. In theory, the ideal transmission allows the engine to operate at the speed where it produces the maximum power.

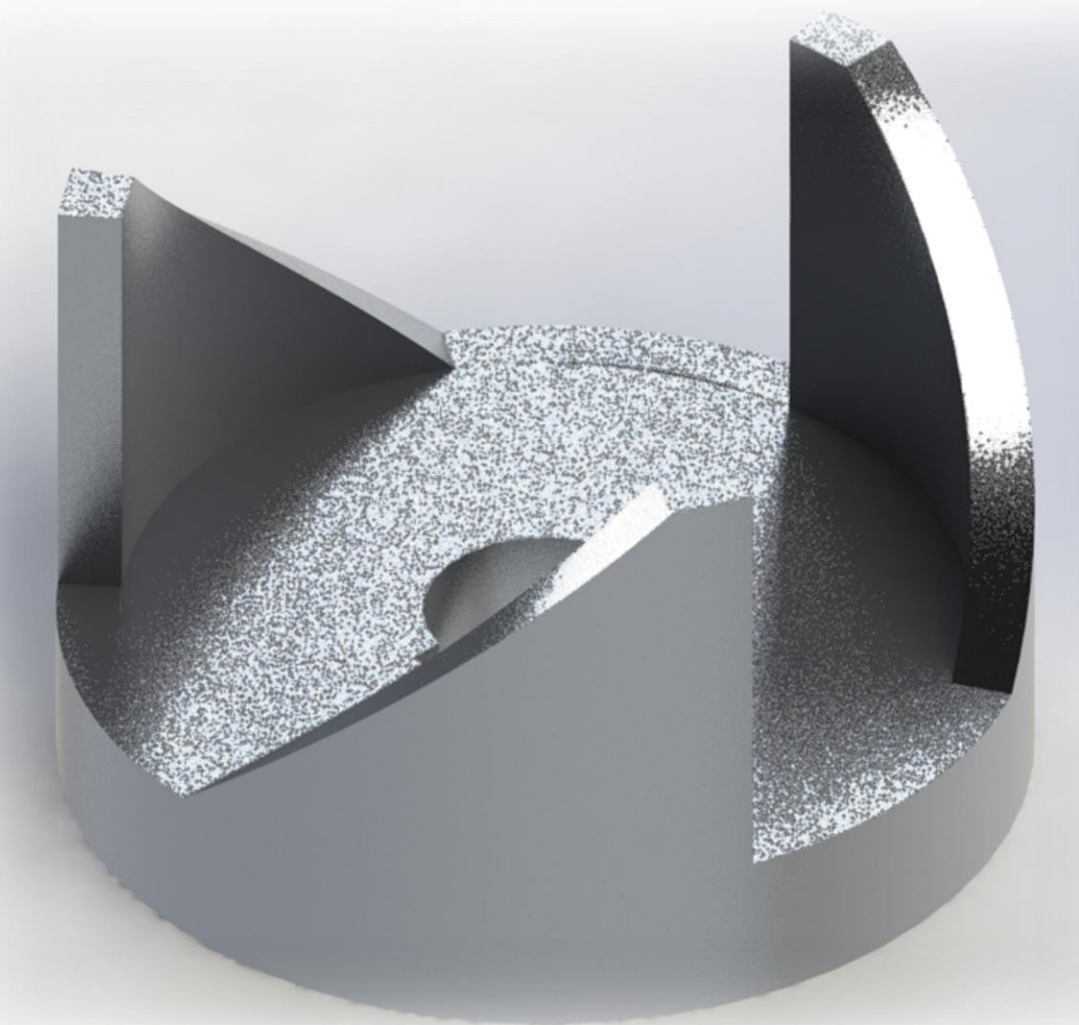


A sequential gearbox is severely limited by the fixed gears. During operation the engine is only at peak power for a short period of time in each gear. An effectively designed CVT allows the vehicle to shift continuously while holding the engine rpm at the maximum power output for long periods of time.

Key Features

TORQUE SENSING CAM

The most complex feature of this design is the torque sensing cam or helix. The helix is installed on the driven pulley. When a torque is applied to the system, the helix spirals cause an axial force to squeeze the belt.



FLYWEIGHTS

The drive pulley is outfitted with a set of flyweights. When the drive pulley is spun by the engine the weights generate a centrifugal force that is translated into an axial force to clamp the belt.

COMPRESSION SPRINGS

Compression Springs in the pulleys assist in maintaining a constant clamping force on the belt and ensure the correct shifting behavior is achieved