

ABSTRACT

Application of Gearbox Drivetrains for Commuting Bicycles

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People all over the world are beginning to ride their bicycles more often to destinations which include work, school, and local markets. Most bicycles being used for these activities have an external drivetrain exposed to the elements of the road including water, mud, dirt, and debris. External drivetrains are very fragile and when damaged, pedaling efficiency is greatly reduced and the overall riding experience diminishes.

One solution to this issue is a gearbox specifically designed for a bicycle frame. A gearbox has several mechanical mechanisms operating inside a protective housing. Since the housing is fully sealed, outside elements are not able to contaminate the drivetrain system. A gearbox is also much more robust and requires less maintenance compared to a traditional external drivetrain.

This project documents the designing and prototyping of a gearbox drivetrain for a bicycle using the manufacturing facilities in the Gene Haas Advanced Manufacturing Lab at Cal Poly. Software was used to create models and toolpaths for machining all of the parts. Computer numeric controlled machines were used to manufacture and inspect all of the metal parts that would then be assembled into a functioning gearbox.