

Commercialization of the Circular Wave Drive (CWD)

What We Aimed to Do:

Work with Dr. Yuan Zheng to expand and commercialize his design for the Circular Wave Drive. This requires further experimentation with the design in order to increase functionality. We identified the three main markets as agriculture, robotics, and food production. We would like to thank the State of Ohio and the Ohio Development Services Agency for making this project possible.

What We Did:

To start we created an additive manufactured prototype to confirm functionality. This revealed an issue with off-axis loading and tooth geometries resulting in CDME making several design changes and improvements increasing both the range and specificity of potential reduction ratios and increased manufacturability. Prototypes were machined out of aluminum and tested in different applications. This illustrated the versatility of the design as well as its viability. Mathematical models were created to quickly generate CWD gear profiles for applications such as gear boxes.

CWD as a Replacement for Harmonic Drives:

Current harmonic drives are expensive to machine due to their many small teeth. They have low load bearing capabilities and can be worn down quickly. The CWD is less expensive to machine as it has larger teeth. It also features a higher load bearing capability and does not wear out as fast because of its design.

What's Next:

The startup company Circular Wave Drive Inc. will continue to develop the gearing system and characterize its performance. Local manufacturers will be sought out to produce the device. They will also continue to expand its adoption in the fields of precision robotics, food processing, and agricultural/construction machinery.

To learn more about this project, contact Corinne Uskali (uskali.1@osu.edu)