

TEKREX[®]

Case Studies

Custom Tooling – Fiber Mandrel

A recent collaboration between TekRex and Megladon resulted in a super compact fiber cassette for autonomous vehicle simulation. A mandrel system was designed to coil discrete lengths of fiber cable into the cassette, nesting them into one another. These separate coils could then be connected through switches to produce a variety of lengths. An artificial intelligence is then trained to “drive” and react to objects and obstacles represented by data travelling through the cassette. The “distance” of the obstacles in relation to the AI was simulated by the latency caused by traveling through different lengths of cable. The mandrel tool that made this work, like the rest of this product, had to be designed from the ground up to meet such a unique use case.



The mandrels are built as a cone with a flange, 3D printed at varying diameters to achieve the desired nesting. The diameters are chosen with the specifications of the glass in mind so that the fiber is not coiled past its stated bend radius. Striations created during filament-based printing can cause fiber coils to get caught, so the design team opted to leverage the DLP-powered, resin-based Carbon M2 printer for a smooth finish that the fiber coils can easily be removed from.

Once coiled, the lengths of fiber can be connected in parallel to a maximum length of nearly 460m of glass, or used individually down to a length of 3.19meters, with many other lengths possible through various combinations of fiber spools. With all the combinations of fiber lengths present, the device can reliably simulate hundreds of miles driven with a variety of obstacles in a matter of hours.