

Brain Injury Awareness Made Possible by Protolabs' Manufacturing Grant

Tozuda brings visibility to an invisible injury with impact sensors for sports and recreation helmets

MINNEAPOLIS, MINN.—Feb. 5, 2020—Digital manufacturing leader [Protolabs](#) (NYSE: PRLB) has announced that [Tozuda](#) is its latest Cool Idea Award winner. Attached to sports helmets, the head impact sensors made by this Philadelphia-based company of the same name change color to bright red when they experience an impact potentially strong enough to cause a concussion.

Protolabs' Cool Idea Award provides in-kind manufacturing services to support development of life-changing products. Tozuda used Protolabs' on-demand molding services to produce components for the sensor. With the help of Protolabs' engineering team, Tozuda was able to finalize its design and identify the right manufacturing process.

“Knowing that we’ve helped a company whose invention can help identify the kind of dangerous impacts that could cause long-term brain injuries is a great example of why the Cool Idea Award program exists. We look to grant the award to inventors and entrepreneurs who not only want to build a profitable business model, but also affect the lives of others in a meaningful way.” said Brian Peters, Chief Marketing Officer at Protolabs. “Our on-demand manufacturing service is ideal for Tozuda’s merging of technical and design simplicity in a small footprint.”

Almost 4 million people will suffer from sports- and recreation- related concussions in the United States this year alone. In boys’ high school sports, for example, the vast majority of these happen during football games and practices. For girls, it’s soccer. Workers in industries that require protective headgear, such as construction, can benefit from Tozuda, too. The name, *tozuda* means “hard-headed” in Spanish.

“It was important to us that Tozuda be affordable,” said Jessie Garcia, CEO & founder. “Young athletes and professionals in dangerous work situations deserve to know if their head injuries require a physician’s attention.”

How Tozuda Works

Most of the currently available impact sensors are electronic, and can be costly. They also require external devices, such as smartphones with special apps, to read and interpret the data. Tozuda’s solution is mechanical, using a compressed spring and ball bearings that keep dye tucked away in reservoirs. When an impact is of sufficient force, the spring and bearings dislodge and dye spills into a chamber, causing the device to turn red. When the color changes, it indicates the possibility that a

concussion has occurred and the user should be evaluated for potential traumatic brain injury (TBI). Only a licensed medical professional can diagnose a concussion.

Tozuda's sensor is a first-step indicator of damaging impact. While brain concussions are considered traumatic brain injuries, initially some people may not experience any symptoms at all. Tozuda provides a warning that the individual should seek medical attention to avoid secondary impacts that could worsen the injury.

Manufacturing Tozuda

"Protolabs was so easy to work with," said Garcia. "We worked closely with the Protolabs team and received instant quotes. Most important was their ability to work with liquid silicone to make Tozuda in the exact color and material we wanted."

Protolabs used injection molding to manufacture three parts for Tozuda. The cover is made from transparent polycarbonate plastic that makes the detection system clearly visible. The base, where the device attaches to a helmet is rugged ABS plastic. Between the two are critical internal components made from flexible [liquid silicone rubber](#) (LSR). These hold the spring and ball bearings in place, ensuring that the dye doesn't leak unless jarred with a force that is sufficient to potentially cause a concussion. Tozuda's catchphrase, "If it's RED, check your head," is a nod to the simple system built into the device to detect linear and rotational force. It also reminds users that only a medical professional can diagnose a concussion.

While initial prototypes were produced in-house, the Tozuda team quickly realized that they could not produce their product in large enough quantities to meet expected demand. Protolabs was the natural choice for that next step.

The latest iteration of Tozuda will be available during 2020. The company is accepting orders for the device through its [online store](#). Pricing varies based on order quantity.

About Protolabs

Protolabs is a leading digital manufacturing source for rapid prototyping and on-demand production. The company produces custom parts and assemblies in as fast as one day with automated 3D printing, CNC machining, sheet metal fabrication, and injection molding processes. Its digital approach to manufacturing enables accelerated time to market, reduces development and production costs, and minimizes risk throughout the product life cycle. Visit [protolabs.com](#) for more information.

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