

After being injured in a motorcycle crash and then seeing another rider hurt in a motocross wreck, John Deagan set to work designing a system to help rescue workers remove helmets from crash victims.



PRODUCTS FOR THE LOCAL RACER

Racing is never an inexpensive undertaking, but affordable and innovative tools are available—thanks to enterprising people like those profiled here Text and photography by JERRY F. BOONE

It has been more than a decade since John Deagan discovered what a life-threatening injury feels like from inside a crash helmet.

"I broke my neck in a motorcycle accident," he explains. "The accident was bad, but pulling the helmet off just made it worse."

So Deagan decided to do something about it.

His piece of self-described "table-top technology" was among the homegrown inventions racers brought to the 2006 Performance Racing Industry Trade Show in Orlando. They were tucked into tiny booths, sandwiched between expensive and consumer-honed displays of pistons, wheels, racing wear, and machinery.

The homegrown products show that smart minds with good ideas

don't always need to rely on focus groups, market researchers, and a cadre of engineers to make an impact on racing. Sometimes it can be accomplished by simply recognizing a problem and then taking a common-sense approach to solving it.

The products—we picked five—are designed to be economical and make the sport less dangerous. You could buy them all for about the price of a set of wheels and tires. Some of the stories behind them are as interesting as the invention itself.

HATS OFF

Deagan says he spent a few years mulling ideas about how to remove a race helmet without further injuring a driver or rider.

"I knew firsthand that just undoing

the chinstrap and tugging it off was a bad idea," he says. "I talked to rescue workers at a variety of different tracks, and they all agreed with me."

It wasn't until Deagan was at a motocross track and saw a young rider take a hard fall—one that left him with a severe head injury—that he got serious.

His invention consists of a thin plastic bag that is folded into a square, measuring about 2 inches, and mounted between the helmet liner and helmet shell. A thin rubber tube extends from the folded bag to the base of the helmet, where it is attached. The tube is not much larger than most helmet microphone cords.

Helmets with the system are marked with a decal, so medics recognize right away that they can use the airbag.

When a driver is injured, medics need only unhook the chinstrap and squeeze a rubber air pump to inflate the bag. The pressure lifts the helmet away from the head without the medics having to struggle to lift it off the victim.

"It puts no pressure on the neck," he says.

While each driver has to have a helmet bag, a track's rescue crew needs only one hand pump. The helmet bag costs \$45, and the pump—there needs to be only one on each rescue rig—is \$25.

Deagan's invention has been endorsed by the Snell Foundation and is required in helmets worn by drivers in the Indy Racing League. He supplies the bags to Bell, which installs them in the helmets before they are shipped to IRL drivers.

Beginning this season, the bags will be required in helmets worn by riders in the American Motorcycle Association's motocross and supercross series.

"We've tried to talk to NASCAR," he says, "but I never seem to be able to get to the right person."

UNIQUE FIRE STOP

Mike Tobias says there is a reason few people in racing use the term "fire-wall" anymore.

"Most everyone calls it a bulkhead because they know it won't stop a fire," he says.

Tobias makes his living as a cable installer, working mostly in industrial buildings where fire inspectors have an almost-religious fervor about sealing each room from the next to prevent fire from traveling through walls.

"Then my son began racing. When he hit the wall with his Modified, there was a huge fire," Tobias says. "I got to thinking about how bad a job most people do on race cars to prevent fire from getting to the driver."

Flames routinely travel through holes cut in the bulkhead for things such as wires, lines to gauges, the steering shaft, and the transmission shift lever.

To assemble and create a package he says will keep the flames away from drivers, Tobias adapted some of the technology he uses on his day job. He figures both bulkheads on most cars can be sealed for about \$250.

Pieces include three sizes of metal split sleeves to surround cables and lines as they pass through firewalls. The void around the wires and lines is then filled with a fireproof expanding foam to seal one side from the other.

"This isn't the foam insulation you buy at Home Depot," he says. "This is material that simply doesn't burn."

Material includes pieces of fireproof foam that can be wrapped around steering shafts and then cut and formed to fit below a shifter boot.

Tobias says he won't sell the package to anyone who hasn't completed his free online training course, which explains how to install the parts and pieces to be sure they work as designed.

"There's no sense doing this unless you do it right," he says.

CATCHIT CAM

David and Chris Boggs say they went through five years of development and destroyed more than 100 video recorders before perfecting their on-board recording system.

How good is it? Good enough that ESPN television production crews for NASCAR races use it to monitor and broadcast suspension movement.

David Boggs says he got tired of spending money on video recorders that couldn't hold up to the environment in his race car: "So I looked around and saw this son [Chris] that I helped put through college and figured it was time I got a return on my investment."

The heart of the system is a camera that is about the size of a tube of lipstick. It can be mounted almost anywhere, so it can be used to monitor suspension movement or simply record what the driver sees during a race. The basic \$600 kit comes with a camera, mount, wiring harness, battery holder, and a shock-proof bag that holds a driver-supplied video recorder.

"Any recorder with video and audio inputs will do," says Chris Boggs. "So far we've had the best success with Sony. The cameras today are so cheap and are available everywhere new and used."

David Boggs says the camera can be a valuable tool for suspension tuning



▲ The basic Catchit cam consists of a camera and mount, battery holder, wires, and a shock-proof bag to hold a video recorder. The system produces broadcast-quality images for about \$600.

because it depicts what a driver feels behind the wheel.

"Sometimes a driver will know the car is different, but maybe can't tell exactly what the difference is," Chris says. "This will show how a change looks on the track, where no one can see."

The system can be upgraded in modules, so a driver on a budget can replace the battery holder with a battery pack and charger or expand to a multicamera system that can record up to four images at once and play them back in real time. That allows a driver to look out the window at the track, watch his steering input, and see how the suspension reacts all at the same time.

"The system lets a driver know what needs to be fixed, instead of spending thousands of dollars buying new parts and hoping you finally buy the right one," says David.

TRACK FRESH

A good driver can see danger coming on a racetrack. The best drivers avoid it.

But what about the danger he or she can't see?

Carbon monoxide poisoning has emerged in recent years as one of the previously unknown dangers in auto racing. Depending on where and how you race, it may be a minor or major health concern.

It is a colorless, odorless gas that infiltrates your bloodstream, slows your reaction time, and—in large, sustained quantities—causes permanent injury to a driver.

Mike Zilinek, a mechanical engineer who helped design CO filters for Nextel Cup teams more than a decade ago,

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has begun producing a smaller, lighter, affordable version for short track racers.

"One of my real concerns is with kids who are beginning to race at a very early age," he says. "They will be exposed to carbon monoxide for a very long time."

Zilinek says that in most people, CO is gradually purged from the body.

"But if you race on a regular basis, by the time the CO has been purged, you are back in a car again getting another shot of it," he says.

Symptoms of mild CO poisoning include headache, lethargy, disorientation, or symptoms similar to the flu. The gas replaces oxygen in the bloodstream and robs the brain, heart, and other organs of what they need to function.

Zilinek's Track Fresh 1 filter is simple, effective, and costs just over \$200. It uses a small fan (like those normally used for brake cooling) to draw air through a catalytic filter designed to work at very low temperatures. It filters about 60 percent of the carbon monoxide and nearly 100 percent of airborne pollutants, he says.

Zilinek designed the system to let the driver add to the components as he or she progresses to a larger system, and a cooler can be added to reduce the heat in his or her helmet.

"Even if drivers don't use it for the safety aspect," he says, "they should be using it because it allows them to stay up on the wheel at the end of a race, when their competition is beginning to get fuzzy. Having clean air in the helmet means a driver can make better decisions at the end of the race, when they really count.

"I think a lot of what we need to do is educate drivers about the danger of carbon monoxide," he says. "I don't think drivers realize what bad things can happen and that sometimes the damage can't be reversed."

NUTSLINGER PIT GUN

Andy Weyenberg can build a \$1,400 airgun for you that will be the match of anything used by a Nextel Cup team. He does it all the time.

But if you race on a short track or in a development series, he can also build a \$349 gun that will do everything you need.



▲ Andy Weyenberg began designing a low-cost airgun after other racers complained about the price of the Nextel Cup-quality guns on the market.



▲ Mike Zilinek used his knowledge from designing carbon monoxide filters for Nextel Cup teams to create a basic version that is affordable for short track drivers on a budget.

What's the difference?

"About \$1,000," he says with a smile.

Weyenberg is an amateur racer who knows how to get by on a budget. He never had the money to buy the best equipment on the market, so he often made his own stuff.

Weyenberg is Miller Electric's manager of motorsports and serves as the company's liaison between the manufacturer and race teams. He also is in charge of the Miller-sponsored stock car that the company brings to shows for fan pit stop competitions.

"I built the airguns for the pit stops and people kept asking me where they could get one just like it," he says. But when he told them about the \$1,400 price tag, a lot of potential customers just walked away.

"It is just too much for a weekend racer," he says.

Much of the high price was in the airgun used as the foundation for the race version.

So Weyenberg found an overseas foundry that would cast housings for him at a reasonable price, and he began building his own version of the over-the-wall tool in his shop in Charlotte.

"A lot of the tools being sold today by American companies begin as castings from overseas," he says.

Weyenberg polishes and ports the tool to meet the demanding needs of racers and adds his own innards and special synthetic lubrication.

"It's probably just a bit too slow for a Nextel Cup team," he says. "Those guys have such speed and hand-eye coordination, they need the fastest guns on the market. But for anyone

else, they'll probably never be quick enough to be faster than my gun.

"If they buy one for \$1,400, they are spending about \$1,000 on speed they'll never use."

THE MARKETPLACE

Airbags to airguns.

The innovations reflect the genius of racers, crews, and fans who use their creativity to solve problems and make racing safer, more competitive, and more affordable.

The problem solving on a short track team is the same as that of a Nextel Cup crew, but the only real difference is the level of technology.

Often, the difference between someone who simply solves a problem and someone who markets their solution is the courage to take the same chance in the marketplace that they take charging into Turn 1.

Jerry F. Boone can be reached at jfboone@aol.com.

SOURCES

CATCHIT CAM
803/328-1394
catchitcam.com

HATS OFF
847/438-7142
hatsoffusa.com

NUTSLINGER PIT GUN
nutslinger.com

TRACK FRESH
203/278-6400
trackfresh.com

UNIQUE FIRE STOP
251/960-5018
uniquefirestop.com