

# ISU professor helps design new Speedo swimsuit that's breaking world records

August 20 2007

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Speedo's new Fastskin FS-PRO swimsuit, modeled by six-time Olympic gold-medallist Michael Phelps. Photo courtesy of Speedo

Rick Sharp was once a competitive swimmer and still swims daily. And so the professor of exercise physiology in Iowa State University's Kinesiology Department is getting great satisfaction out of being part of a design team that created Speedo's new Fastskin FS-Pro swimsuit, which is being credited with helping world class swimmers break dozens of national and international records in the six months since its release.

In February, Michael Phelps wore the suit for the first time and set a world record in the 200-meter butterfly, even though he hadn't shaved for the meet. Kate Ziegler tried out the suit in June and broke swimming's oldest record -- the 1988 mark set by Janet Evans in

1,500-meter freestyle -- by almost 10 seconds. Others had similar success at the recent national championships in Indianapolis.

Expect Speedo's recent design to be all the rage among swimmers at next summer's Beijing Olympic Games -- now just a year away.

## **Speedo comes calling two years ago**

The director of ISU's Kinesiology laboratories, Sharp was first contacted around two years ago by Speedo officials to assist in the design and evaluation of the new suit.

"They called me up to ask me to help out with the R&D (research and development) aspect of the suit," said Sharp, who serves as physiology consultant to Speedo International and participates in numerous swimming coach education programs in the U.S. and abroad.

"They contacted me because I had done some research over the last 10 years on suit design and swimming performance. It actually started with a study we did on shaving down -- tapering -- on whether shaving down made a measurable physical improvement in performance. I also did a study on the early version of the whole body suits to see if there was a similar effect in performance with those. That's how Speedo knew me and they came up with the idea of helping to design a suit that might work as intended."

The Fastskin FS-Pro swimsuit features a new, water-repellent fabric made through weaving a combination of spandex and nylon yarn. The fabric feels like a windbreaker when dry and is patented and dubbed LZR Pulse. It weighs 70 percent less than other swimsuits, but has 15 percent better compression -- an important feature to maintaining the pace of world class swimmers. It retains almost no water and needs only 45 minutes to dry after being in water for one hour.

Sharp reports that Speedo officials had already identified the fabric with the right low-drag characteristics by the time they first contacted him. But they had to fit that fabric into a design, which is where he came in.

"We talked about aspects of design that are important," he said. "Once they put together prototypes, they had several testing sites around the world for different aspects of the testing. We'd collect all the information from the testing and feed that back to the group as a whole and come up with ideas for the next prototype -- what we would tighten up, loosen up, etc.

"We have an outfit in New Zealand to do flume testing on a water treadmill -- putting swimmers in there to perform at different speeds to measure energy costs at the various speeds that a swimmer maintains," he continued. "That was my chief role as a physiologist -- to assess the energy cost in a specific design. I looked for something that would lower the energy cost as much as possible, and yet maintain these race paces that they have to keep in competition."

## **Shaping the swimsuit**

He analyzed the physiological data that came in from testing all over the world and make suggestions on improving performance.

"My perspective is that you have a nice fabric -- a low-drag fabric that is as slippery as possible -- but you need to shape the body and prevent the skin from flapping around in the water, since that creates a lot of drag," he said. "We wanted to make something super tight and hold everything in -- something that wouldn't restrict breathing or movement -- that would allow real freedom at the same time. So the question became 'How tight can we afford to get the suit before restricting motion or breathing?'"

The design team used data gained from body scanning hundreds of international swimmers to successfully answer that question and devise the groundbreaking suit. According to Sharp, that suit is being marketed specifically for competitive swimmers, as well as Master swimmers "who also want to go fast."

Sharp hasn't worn one of the new suits when he swims. He doesn't even have one in his Forker Hall office. But he doesn't care if he ever gets to try out the suit. He gets plenty of satisfaction from just seeing it work.

"It's really gratifying to see your efforts pay off and have an impact on things like this," he said. "It certainly wasn't without frustrations. This is not something that took an afternoon to think up. There were plenty of failures and frustrations along the way. But to work as part of team from a lot of different professional backgrounds -- and have everyone put their professional input into this sort of thing and meld it all together into this product -- was challenging and rewarding at the same time."

Source: Iowa State University

Citation: ISU professor helps design new Speedo swimsuit that's breaking world records (2007, August 20) retrieved 24 April 2024 from <https://phys.org/news/2007-08-isu-professor-speedo-swimsuit-world.html>

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