

HOW MUCH IS TOO MUCH?

Evaluating the Impact of Swimming Innovations

by Margaret Schauer

Watching Michael Phelps break the world record in the 200 IM during the 2006 Pan-Pacific Games officially inspired you. For the rest of the summer and most of the fall, you stepped up your training to at least five times a week, readying yourself for the chance to break your own record at the next big meet. You set aside your normal racing gear—a suit from the discount rack, a cap not too badly weathered from swim practice and a pair

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of minimally dry-rotted goggles—for a new full-length bodysuit, new

goggles and a cap with a manufacturer's promise to reduce turbulence. Now, standing on the starting block, psyched at the way your new suit streamlines certain parts of your anatomy, you're confident that you're about to drop at least 10 seconds from your previous 200 IM time.

Will it happen?

Barring any mishaps during the race, most folks would be inclined to think so. After all, consider the rapid increase in new world records set in recent years. It seems fairly obvious that evolutionary innovations in swimming technology do result in faster times for swimmers. By the same token, there's more to a fast swim



than just the equipment itself—there's the mental aspect of wearing something new and the more traditional matter of hard training. Although viewed by many athletes as exciting and fresh, technological developments in the past 20 years or so have raised a few cautionary eyebrows: How much is too much? And what impact do these advances have on the sport?

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traced to Adolph Kiefer, a 1936 U.S. Olympic swimming champion, founder of aquatics company Adolph Kiefer & Associates and owner of 12 patents. Considered a pioneer in the industry, Kiefer, 88, firmly believes swimming has improved through the years because of innovation.

“Originally, swimming pools were all fill-and-draw,” he explains. “No filters. They did use chlorine, but that was about it. They would fill the

pool and drain it like every week or every month. But then came filtration with clear water, pure water, sanitized water, and that was a big boost. I think one of the biggest boosts that gave swimming a real go-ahead was the Salk vaccine. We always attributed polio, years ago, to water. That was in the minds of everybody. But when we had Salk polio vaccine for every boy and girl, swimming was more viable for everyone.”



Many key developments in swimming technology can be traced to Adolph Kiefer, a 1936 U.S. Olympic swimming champion, founder of aquatics company Adolph Kiefer & Associates and owner of 12 patents. Kiefer helped develop goggles and invented the first nylon racing suit in 1948. During that same era, he also developed the first nonturbulent lane line.

Far left: The **2000 OLYMPIC TRIALS** at I.U.P.U.I. Natatorium featured Kiefer lane lines, as did seven of the last 10 Olympic games. Near left: **ADOLPH KIEFER** (kneeling) and New Trier High School Coach **DAVE ROBERTSON** inspecting a Kiefer Non-Turb Racing Lane float in 1966.

Through the years, Kiefer had a hand in major improvements in swimming and equipment. In the 1930s, he tried out swimming fins first developed by Owen Churchill in the 1920s. During World War II, Kiefer was in charge of the Navy's swimming program, wrote books on the subjects of swimming and survival and also conducted a survey of every man in the world ever shipwrecked, to show the need for more swim training.

After the war, Kiefer went into business for himself, helped develop goggles and invented the first nylon racing suit in 1948. During that same era, he also developed the first nonturbulent lane line. The lane line has had three improvements since then, he notes, with the latest design released just this fall.

"It gives little kids the chance to break world records," Kiefer says of the new lane line. "Whether you're in lane three

or in the outside lanes, which you normally associate as the slower lanes, you're breaking world records in every lane, partially because the lane [line] separates the swimmers and their abilities. There's no backwash, supposedly, which keeps down the turbulence. Therefore, it's you, the swimmer, swimming at your own ability, breaking that record or winning that race."

Craig Brommers, Speedo USA's vice president of

marketing, believes innovations not only help athletes achieve their goals but also draw fresh interest in the sport.

"Speedo always starts any project with the athlete in mind," Brommers says. "We feel that the advances that Speedo has made in the sport of swimming has helped the athlete unleash their potential—whether it was the move from wool to mosquito netting in the 1920s, the introduction of the board shorts in the 1940s, the racing brief in the 1950s, Lycra in the 1970s, or the current Fastskin full bodysuits. People have a myriad of exercise options today. These swim technologies help layer the cool factor over swimming, which ultimately makes it attractive to a wider audience."

Eliciting a "wow" response

with its 2000 introduction, Speedo's Fastskin and the second-generation FSII in 2004 employed fabric principles modeled after sharkskin. In 2005, Speedo rolled out the XD skin suit that wicks water and is quick drying. The technology behind every Speedo fabric is formulated to minimize drag by retaining less water.

Brommers emphasizes that new innovations in swimming technology are useful for athletes at every level, no matter their speed.

"At Speedo, we try to be very democratic in our technological advancements," he explains. "We use the most advanced materials and designs to allow everyone—from Olympic gold winners to children learning to swim—to reach their goals with speed, agility and pleasure."

Roque Santos, a 1992 U.S. Olympian, current Masters swimmer and director of Nike Team Business, points out that advances in swimming tech-

nology have assisted swimming in various ways, including helping swimmers believe in themselves more.

"The biggest thing in swimming is the mind," he says. "The mental area is the most untapped part of competitive swimming...absolutely the suits help because they help out mentally." How swimmers look or believe themselves to look in their high-tech suits, though difficult to quantify, can make a difference in performance.

Like Brommers, Santos believes that technology developments increase sport participation. "A change helps people get excited about the sport...I think those advancements keep the sport exciting and fresh," he says.

One example is Nike's Swift suit, which has very low drag and uses zoned tension to provide a tight fit. It was developed by "people who have been involved in swimming and also not involved in swimming,"

which, he explains, creates thinking "outside the box."

Santos does express a desire for more independent testing of manufacturers' products, such as swimwear. "You have the scientific proof that backs up the claims that all the manufacturers make," he says. "Of course it's paid-for scientific proof...I'd like to challenge USA Swimming to prove or disprove the beliefs and claims of these companies. There are all of these claims, but they're claimed by the companies, not by someone who is independent. Isn't that where the answer would be?"

Santos also urges a line be drawn to protect the integrity of records set years before recent advancements in swimming technology.

"As a former elite swimmer in competitive swimming, I'd want my times to be compared to someone not wearing, let's say, a wetsuit or a type of wetsuit," he says. "Because it's obvious they'd have an advantage over me."

Santos believes it takes a fair playing field in setting regulations. "It would be my hope that FINA would be pure and true, not just to the swimmers now, but the swimmers in the past, and keep the pools [a certain way], the suits in a certain type of guidelines. There should be a level of consistency that holds true over a generation."

Matt Zimmer, director of promotions at TYR Sport Inc., believes it's not even a question anymore of whether or not innovations have helped make

swimmers faster: the proof is in the decreasing times.

"The debate," he says, "has actually started to turn into a question of have we done too much to help them go faster? Is this now too much of an aid, in a sense cheating, much like steroids would be cheating or putting on a pair of paddles during a race? It's ironic that we produced something so good that we'd even have that conversation."

One of TYR's innovations is the patented Aqua Shift suit, which has a long development history. "Every time we go through a quadrennial development cycle, we learn something," Zimmer says. "We learned something when we had the old paper suits and we were developing new fibers to be a little bit softer, a little more forming. We learned something when we developed suits that were essentially full-body suits and how the body responded to that—where the different areas for compression paneling were required as well as different characteristics of coating the material, so it could reduce the amount of water absorption."

When the company developed Aqua Shift, introduced to the market in 2004, the leap forward was dramatic, according to Zimmer. The TYR R&D process entailed "sophisticated science to produce a suit that actually changes the flow of water around it. And for the first time, as far as we know, this is a patented process that nobody else in the world can duplicate."

At times, a product's design can clash with the sport's regulations. An example is the speed bump TYR's Aqua Shift technology experienced in 2004 with FINA's rules regarding suit innovations, highlighting communication confusion between the swimming industry and the sport's governing body.

"We produced armbands that we certainly thought were legal under the rules and, to be blunt," Zimmer explains, "they



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were banned. We weren't sure what [FINA] thought, but either way, they're not legal anymore."

Zimmer says there are some basic standards to decide if a suit is legal, such as whether or not the suit is buoyant, or if the suit can trap air, thus creating an air bubble and leading to flotation, which is prohibited. On the whole, he suggests that better dialogue is needed between the industry and FINA. "There are a litany of things that need to be resolved within FINA so all of us really know what's appropriate going forward," he says.

Phil Whitten, a Masters swimmer as well as the head of the College Swim Coaches Association and the former editor of *Swimming World* and *SWIM* magazines, is a bit skeptical regarding the strides made in equipment improvement.

"Undoubtedly, it's made the sport faster and it's made the athletes faster and the records continue to fall at a record pace," he says. "But whether that constitutes an advance is a philosophical issue. On the negative side, what it does is unfairly contrast today's swimmers with the swimmers of the past. Take a guy like

Johnny Weissmuller, whose world record was 58 seconds for the 100 freestyle and now the record is around a 47. You'd think, 'Wow, today's swimmers are so much faster.' But if you put in nonturbulent lane lines and a gutter system that reduces or eliminates backwash, make the water deeper, teach people how to do flip turns instead of open turns, put them in a modern bodysuit, give them goggles and have them train four or five times as much as Weissmuller, I think you'd get a guy who, under those conditions, could go 47 seconds or even 46."

Perhaps less subject to debate is the modernization of swimming pools. "Making the pools less wavy, I think swimmers think that's great. Compared to people who swam 50 or 60 years ago, we're pretty spoiled nowadays," Whitten says.

He does question where technological innovations may lead the sport, even in light of FINA's ban on fabrics with properties that allow the suit to float, and he also wonders how far people might go in order to gain more speed.

"One discussion we had

When TYR developed the patented Aqua Shift suit (above), introduced to the market in 2004, the leap forward was dramatic. The TYR R&D process entailed "sophisticated science to produce a suit that actually changes the flow of water around it."

sounds absurd," Whitten says, "but what if someone had hip implants, the effect of which is to make that person more buoyant in the water?"

What he hears from other Masters swimmers is mostly positive feedback about the way technological innovations impact the sport.

"If your best time was a minute for 100-meter freestyle when you were 20 years old and now you're 45 or 50 and you can still come close to your time, as so many people can do, that's a tremendous psychological boost." He notes that technological innovations are "inevitable, so in most cases I think it's a battle not worth fighting. The only caveat I'd add to that is that [it's acceptable] as long as the innovation keeps the sport within the rules. If it's outside

the rules," he says, "then the rules need to acknowledge that change."

Of course, a factor not to be overlooked in record-breaking swims is the value of bedrock training. Whether you're wearing a Speedo Fastskin FSII, TYR Aqua Shift, Nike Swift Swim or any other new bodysuit in your next meet, Zimmer offers this piece of advice: "The thing we at TYR like to promote to our athletes, just as much as any coach would want to promote to his team, is that the suit doesn't make you—you make the suit. It's always going to be the case. You still have to swim that fast, you still have to do the work to put yourself in a position to go that fast. We're just going to take away as much of the drag as possible and let you go as fast as you should be capable." <<<