
A Fin for All Reasons?

Commercial hype about the ideal fin

Many companies claim that there is a single “best” diving fin — theirs. Don’t you believe it. While one diver may need powerful fins for strong currents, another may want fins that are more efficient, to maximize bottom time. There is no single best fin for both situations.

To support their claims of design superiority, some fin marketers test their fins using tethered swimming and/or underwater swimming courses. They measure total time, then ask the divers to rate fin performance. While these tests may accurately show differences in performance, the divers’ ratings are usually more subjective.

In the more rigorous tests, divers are tethered to weighted or pressurized ergometers. Advanced tests use a swim flume, in which

divers are able to move freely and remain at their normal position of neutral buoyancy while the water moves by at the desired rates. Quantifiable measures — heart rate, oxygen consumption, etc. — allow the results to be confirmed or disputed by later investigations. However, when a company does not publish the methodology of its tests, as sometimes happens, the scientific community cannot confirm the results.

One of the earliest diving fin investigations in a swim flume used only one set of diving fins — Churchills — and three Navy divers who were considered equally fit. These tests, conducted to determine fin efficiency, also revealed differences between the divers’ peak finning speeds. Thus, this study provided the first evidence of performance differences attributable not to the fins

but to differences in skill or anatomy among the divers.

Two other investigations using a flume have also reported similar findings. The first showed that the optimal fins for male and female divers were different. The second found differences attributable to both gender and experience. These results are probably related not specifically to gender, but to anatomy and physiology.

Investigations using tethering or thrust measuring devices have had similar findings. In one of the more comprehensive, Glen Egstrom determined that each of the nine fins tested was ranked somewhere in the top three by at least one of the divers.

He also found a relationship between leg length and fin efficiency. Divers with the longest legs used the fins at a lower energy level than did those with shorter legs.

Egstrom also found that divers who were less experienced or less conditioned tended to favor the more flexible fins. Thus, divers with less muscular ability for finning selected fins with less resistance — a finding consistent with fundamental human performance.

In a similar investigation, I. B. Mekjavic found larger fins to be more efficient than smaller fins on the subjects tested. He suggested that there might be an optimal size fin for each diver, depending upon his or her size, shape, and level of aerobic fitness. In a later investigation, Mekjavic found that neither fin vents nor

The Dead Zone

The once-teeming ocean waters near San Diego have turned into a dead zone, says John McGowan of the Scripps Institution of Oceanography at La Jolla. Since 1951 the water temperature off

San Diego has increased by 2–3°F and the population of zooplankton, the main diet for sardines, anchovy, hake, jack mackerel, and Pacific mackerel, has declined by 80 percent. The water temperature increase robs surface waters of nutrients, such as nitrates and phosphates, that plant plankton need to survive. The zooplankton that feed on the phytoplankton then decline as well.

“It’s pretty dead out there,” he told *Science* magazine. The scientist said he remembers an abundance of fish and bird life on scientific cruises in the 1960s, and that on a recent cruise “I was flabbergasted at the difference.”

Dick Veit, a University of Washington zoologist, said many studies have shown stunning losses of fish and seabird populations from Southern California to Washington state.

“We don’t know if this warming of the ocean is man-caused or part of a natural cycle,” said McGowan. “If we can pin it down to the greenhouse effect, then we’ve really got something to worry about.”

stabilizers had an effect on performance.

My research at Purdue University found that no fins or fin properties were consistently superior. I had a heterogeneous sample of divers swim underwater with each set of fins at very low and somewhat high intensities and one atypical (very high) intensity. I used nine different fins of different sizes and different flexibilities.

I found that overall performance was related to neither size nor flexibility; thus there is no single best fin. Yet it does matter which fin a person uses, because each individual has different physical characteristics and different needs.

Physical considerations: muscular strength and endurance levels, aerobic capacity, and leg length.

Diving considerations: location, plan, and diving conditions.

Some general principles:

At low intensities, larger fins appear to be more efficient, in terms of propulsion gained for effort expended, than smaller fins.

Larger fins may be more efficient at high intensities if one has the muscular ability to use the fins effectively.

There is probably an optimum flexibility for every fin size. Fins that are either very stiff or very flexible are generally less suited to most divers.

To sort out the differences, fin marketers could help by explaining how their fins meet different needs and physical characteristics. But that may be too much to expect. To maximize sales, they prefer to promote a single fin as the best for everyone.

Of course, that's not true — but when has advertising ever been the truth?

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professor of kinesiology at Christopher Newport University, Virginia. A version of this article first appeared in the March-April issue of Sources, a bimonthly publication of NAUI. ■



LET THE SWIMMER BEWARE. A *Consumer Reports* reader strapped on his new “water resistant to 100 feet” watch, then dived into a pool. He wasn’t worried about the watch, but he should have been — its display quickly went blank. Then he looked at the warranty, which said: “This warranty does not cover any failure to function properly due to misuse such as water immersion.” The packaging for the watch shows a surfer.

DO NOT! DO TOO! While researching a story for *Men’s Journal*, *In Depth* subscriber Ken Smith noticed that Rodale’s 1994 equipment issue listed TUSA Liberator fins as positively buoyant, but in 1995 they were listed as negative. Thinking that a floating fin might not be a bad idea for inexperienced snorkelers — if they fumbled it, they could always retrieve it — he called TUSA. The first person he spoke with insisted that their fins had never floated and the chart was wrong. A sales manager told him the same thing. After all, she said, “it would not be good if a diver’s fin floated up while he was trying to stay down.” So Smith borrowed a pair of Lib-

erators from a dive shop and a pair from a friend. All four of the fins floated in fresh water and seawater.

ARTIFICIAL REEF REPLACEMENT. The natural reef of Manchones, between Cancun and Isla Mujeres, Mexico, was virtually destroyed by a hurricane in 1988. In an effort to revive the reef community, the Atlantis Submarines Company has created an artificial reef park in this national marine sanctuary.

The new artificial reef, using products like Reef Balls [*Editor’s note: See Urchin Award, page 7. Didn’t I point out that this was an ecologically correct product?*], a sunken ship, concrete caverns, and steel-spiked urchins, have already attracted more than 24 marine species to the new 6,500-square-foot Atlantis Park.

IT’S A GIRL. *New Scientist* magazine reports that men who work as divers are more likely to produce girl, rather than boy, babies. To those of you who still think diving is a macho sport, I give you Galton James, a British scientist, who theorizes that testosterone promotes the conception of boys. Case rested.