



July 1999

By Haydn Woolley

7/1/1999

Speed is an advantage that we all know you gain merely by donning a wetsuit. But do we all understand the factors that explain why this happens? This article provides information that can help you understand wetsuit technology in greater depth ... and make you a more discerning consumer.

1. Materials & Buoyancy

Speed primarily comes from a wetsuit due to the buoyancy created by the materials utilised by wetsuit companies today. As we know, all rubber (or neoprene) has a buoyancy effect, which allows you to ride higher in the water. Basically this means that if your wetsuit has been made from neoprene (it sure has) then you are going to benefit from merely wearing it whenever you train and race.

2. Material Thickness & Buoyancy

The materials used in construction affect your speed in various ways. The thickness of the rubber used on each specific wetsuit panel generally differs and there are good reasons why. As you increase the thickness of a rubber you will similarly increase the buoyancy of that particular panel. This is why most wetsuits have a thick panel on the stomach resulting in the swimmer riding higher in the water. No wonder the ITU have a restriction on the thickness of wetsuit panels, (5mm) which will provide more or less upward lift.

3. Material Thickness & Body Position

All swimmers know that when their body sits higher in the water (especially their legs - because most of us tend to drag them) you will be in a more hydrodynamic and streamlined position. This is exactly what happens when we slip that suit on and plunge into the ocean. This is great news for many of us, but less so for gifted swimmers (better swimmers already tend to have an effective swimming position and therefore do not benefit to the same degree).

4. Materials: Thickness & Flexibility

The thickness of your wetsuit's material adds another dimension which affects wetsuit design. When you increase the thickness of your neoprene you lose flexibility from that panel. This is why most manufacturers aim to construct the main "moving" panels with a thinner neoprene allowing you a greater freedom of movement. A more flexible panel in this area (underarm



swim@futuredreams.co.nz

www.futuredreams.co.nz

[021-2888715](tel:021-2888715)

stretch panel) also gives us a better shot at holding that swimming technique we've been working on so laboriously (as an innovation by Orca in 1995 this underarm stretch panel has now become the industry norm).

Needless to say, most of us have been through the uncomfortable situation of hitting the half-way mark in the swim and tying up suddenly, like a Mack truck was dropped on us. This is the result of our suit's flexibility affecting our performance. Some companies recognise this and use very expensive, flexible materials on this part of the suit - but some still continue to skimp in this area. A good product and a bad one are quite easy to tell apart though, if you have a sample of both to stretch-test. **5. Material Buoyancy & Stretch** There is an interesting and widely unknown relationship between the two characteristics, buoyancy & stretch, which have further implications for wetsuit design ...

"The degree of buoyancy for the same neoprene is inversely proportional to the degree of stretch it exhibits"

...that is, the same piece of wetsuit neoprene will not exhibit both high levels of buoyancy and stretch - you have to choose between one extreme or the other. The implications that stem from this relationship lie with identifying the locations where each of these 2 characteristics will have the greatest positive effects and then choose the appropriate material for that area. It should also be noted here that a faster suit will be created by using more than one material, not just one.

Now there are a few key areas that will result in performance gains given the right material in that area. The front panel is the first of these areas. Ideally you want the most overall buoyancy possible from your suit. The panel that affects your overall buoyancy the greatest is the front panel so we should choose a thick, highly buoyant material in this area. As we now know a thick buoyant panel here will be quite an inflexible one due to the trade off, but this is not an area we require that characteristic in so that's OK.

The next main area is the arms, divided into the main arm panel and the underarm panel. We definitely require a flexible material under the arms otherwise we will feel the effects as our stroke grinds to an inglorious halt soon after we leave the beach. On the other hand the buoyancy factor would also be beneficial on the main arm panel due to the positive impact on our arm entry and technique this has. The best choice for the main arms is 3mm (not 2 or 5mm) of a primarily buoyant material. The underarms however do not require any buoyancy level because they hardly penetrate the water but if this area is tight you can say goodbye to your technique - a flexible material of about 2mm is perfect for this region.

6. Surface Coating

Another factor influencing wetsuit speed is whether or not the wetsuit has a slippery coating on the outside of the suit. On many suits now, manufacturer utilise materials coated with "silicon" on the surface. This desirably reduces



swim@futuredreams.co.nz

www.futuredreams.co.nz

[021-2888715](tel:021-2888715)

the drag coefficient that your body's profile presents to the water as you move through it - meaning a faster swim for the same energy output. Most people will see this as a desirable factor unless you are buying a suit for rougher conditions because suits coated with this silicon layer are more prone to 'nicks', those annoying little finger nail marks that pop up from time to time. **7. Design & Fit**

Apart from the obvious superficial qualities (of how good you look in that slick rubber suit) the design of a wetsuit will determine whether or not your suit "fits" correctly (design encompasses choice of materials, panel construction and sizing). If you are fitted into a suit that has a few bulges you may notice excess water leaking in while swimming. Fortunately for those in this situation, a little excess water in your suit does NOT affect your speed to a great extent as popularly thought.

On the other hand, it is commonly believed that the tighter the suit is, the faster you will swim – due to less water entry. This may be true to a certain degree for powerful swimmers but much less so for those weaker amongst us. There definitely is a trade-off with a tighter suit and flexibility around your arms, which is the primary problem area in a suit. My suggestion is to rate the comfort factor above tightness.

8. Type of Material

Obviously, some materials are a higher quality, being more durable, aesthetically appealing or having special properties that distinguish them from others. This brings with it a difference in price with the more elaborate qualities costing extra. Be aware that not all neoprene properties used in triathlon suits today have an effect. Some of them claim various qualities but close examination can prove them superficial.

SO WHAT DOES ALL THIS MEAN?

With all the possible factors influencing wetsuit construction there exists a large number of potential designs and combinations that manufacturers can decide on. It is therefore up to you to choose with wisdom, and probably according to a budget, what is going to be best for you. You need to identify what is most important to you.

My Recommendation: I would look to combine these factors - the most buoyant wetsuit on the market that fits well, lets a minimum of water in but is still comfortable and has a good degree of flexibility in the underarm area. It should have a thick front panel of a buoyant material (5mm), thinner arms (3mm) and some kind of super stretch material under the arms (non buoyant).

A silicon coating over the suit will definitely help but if you find arm panels with design properties that are designed to catch more water I would probably ignore them. You can probably do the same thing with some sandpaper.



swim@futuredreams.co.nz

www.futuredreams.co.nz

[021-2888715](tel:021-2888715)

I strongly advise you to physically try on a few different brands and compare them. Be sure to assess all suits IN a pool or the sea if the opportunity arises. Evaluation of a suit on dry land is a poor indicator of how it will feel in a race and in this way you will discover how the manufacturer's claims pan out in relation.

Finally, I recommend having a checklist. If you satisfy what is on that list, and are thoughtful about what you have read here, I am sure you will make the right decision and be happy with your choice. All you need to do now is get out there and bang out some k's with some good old fashioned training. Enjoy!

Signing off,
Haydn



swim@futuredreams.co.nz

www.futuredreams.co.nz

021-2888715