



What makes a pool “fast”?

This question has been asked and debated for decades now. The high-profile successes achieved in meets at the IUPUI Natatorium in Indianapolis have fueled this discussion. This magnificent facility was built for the 1987 Pan American Games hosted in Indianapolis. To this date it continues to be one of the fastest pools in the world and can claim more World and American records than any other venue. That is not to say this is the only “world class” facility in the USA. We have quite a few University facilities, club pools, and some municipal pools that fit into the “super fast pool” category. In August of 2008 the Beijing pool hit the front pages. Reporters and commentators from around the globe speculated as to why this particular venue was so “fast”. So, in an effort to explain “fast pools” in a non-technical way, we will address this issue in the following paragraphs.

The 4 rules of fast pools:

- Fast swimmers
- Proper gutter size and design
- Best possible lane lanes
- Water between 6’7” and 9’8” deep

FAST SWIMMERS: Listening to and reading dialogue from the 2008 USA Olympic Trials and then a few weeks later from the 2008 Olympics, “fast swimmers” were mentioned but then everyone made a beeline for the pool issue. Point #1 is truly the most important. Rowdy Gaines – our favorite TV commentator for swimming -summed it up well when he said “Records often fall at the Olympics because athletes spend four years preparing and their performances often peak at the games. “

Most of the coaches and athletes expected the attack on world records going into the Olympics. Since Swimming does not get allot of press coverage during the 46 months prior to the games, the general public was shocked by the level of performances and improvements. Australia's Libby Trickett, gold medalist in the women's 100-meter butterfly said “There was so much hard work, so much preparation and so much history behind each person, each gold, silver and bronze. Everyone is giving their best,”

And we also must give some credit to the new suits which enhance body compression and facilitate drag reduction. Additional credit must go to increasing global competitiveness, better biomechanics, more sophisticated training methods, and the ever-improving art and science of coaching.

GUTTER DESIGN:

The gutter is the trench you do not see that surrounds the outer top rim of the pool. It has 2 purposes:

1. To return surface water to the filter system so it can be filtered and recirculated.
2. To grab waves created by the swimmers and make them disappear.

The term “Fast Pool” alludes to engineering and design principles that are easily built into most pools, but we somehow “mystify” the process. Wave action created by athletes in the pool is called dynamic

surge. Waves are linear in direction. They will travel in the direction they first started until they are removed or hit a solid object and bounce back. Water that makes its way to the gutter must be swept away into it or rebound back to the pool. This being said, width of lanes, lane lines, and the ability to add lane lines at the side walls (Lane 1 and 8 or 10) are important.

In “fast pools” the end-wall design and placement of touch pads can have a substantial effect on performance. As an example in the FINA World Championships and the Olympic Games, the touch-pads are set high on the wall (for manufacturers name visibility) covering the end wall gutters thus acting as a barrier to the gutter in the place that is most affected by dynamic surge - the turning and finish walls. So many times, even the deepest most well-designed gutters cannot be effective since they are blocked by the automatic timing touchpads. In most swim meets conducted in USA pools we do not have this problem because our touchpads hang from the gutters which stop at the level of the water. It is just a difference in pool design that has evolved in different countries.

There are different types and sizes of gutters but the effect of a professionally designed and properly sized gutter is that waves go in and don't come out. If the trough floods due to poor sizing, then the water will bounce out and not be captured. It's important to reinforce that dynamic surge at the end walls is the primary culprit not the side walls since little in the way of dynamic surge gets to the side wall gutter past the outside lane wall lane lines.

Wide Lanes and best possible lane lines

Lane width needs to be mentioned here. There are competition pools with 7' lanes, 8' lanes, and 9' lanes. Some pools are designed with full size outside lanes that are left vacant during competition to act as a buffer zone between occupied lanes and the side gutters. There are other pools with only an 18" buffer zone then an additional outside lane line is added. The goal here is to knock down the waves and keep the water as quiet as possible. One must keep in mind that the wider the lane the more opportunity for an athlete to swim crooked which basically means swim farther which translates to swim slower. The bigger the athlete the larger the lane should be. 9' wide lanes have been around for years now, so this also is not new design.

The lane ropes – lane lines – that separate lanes from each other play a very important role in quelling the waves created by the swimmer. In a 50-meter long pool with 9' wide lanes, the most advanced design of lane line is necessary. The smoother the surface of the pool is, the less resistance an athlete has to confront. Also, it is important to note that lane lines help more with sideways moving waves within the lane and not as much with the end to end directional wave created by a swimmer's turn or finish. This is where the gutters play a huge role.

Water between 6'7" and 9'8" deep.

We know it can get confusing but things that drive so called “fast design” are often expensive and not really needed. A relatively deep pool (on average 4' shallow end and 6' starting block end) with proper gutter sizing and plumbing and filtration size will usually meet the bill and allows the pool owner to conduct community programs other than competitive swimming.

Specialty competition pools are usually constant depth (maybe a slight bottom slope for circulation and bottom cleaning) and can range from 2 meters (~6'7") to 3 meters (~9'8") deep.

The U.S. Navy did a study (un-published since it was the defense department) concerning water depth and rebound waves. They discovered there was no discernable difference after 4 foot of water depth in water bounce affecting the floating object. Now they did not study a 6'7" 210 lb. swimmer. But even for the highest level of competition, 2 meters to 3-meter water depth should be ideal. Is 3 meters faster than 2 meters? To our knowledge, no scientific study has been published verifying a measurable difference in these depths. Many upper level coaches believe there is a slight advantage to the athletes when swimming in deeper water. If the coach and athletes believe this is better, then it is already an advantage. There are many 7 to 9-foot-deep competition pools in this country so we have had this luxury in all levels of competitions for many years now. This is not a new concept or an engineering feat.

Other things

Another consideration is water quality and water supply to the pool from the filters through water inlets. There are different configurations for these supply lines e.g. bottom supply inlets, inlets through the side walls or through the gutter angled down to the bottom. Every pool designer thinks their configuration is the best. The point is to alleviate a possible current being developed in the pool at the surface. We don't personally think this happens if properly designed in any of the configurations.

Air and water quality are very important. It is impossible for an athlete to swim fast if they cannot breathe comfortably. Proper air flow and distribution, proper dehumidification, and Ultraviolet treatment of the water all play an important role for the fast venue. Also lighting, acoustics, deck space for both athletes and volunteers must be considered.

SO

The fastest pool in the world is – Ta Da -

The pool that has the fastest swimmers in it, with great gutters and lane lines, and depth that allows for quiet water. In July that pool was at the Qwest Center in Omaha, and in August 2012 that pool was in Beijing China and next January it will probably be somewhere else. It is not only the pool that is super – it is the swimmers.

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