

More Than You Ever Wanted to Know About Timing at Swim Meets

by Cliff Reyda, February 23, 2018

Your child gets a best time at a swim meet, 25.83 seconds, and you know for certain that he/she improved from the old time of 26.01, by 0.18 seconds. So exciting! Time for a celebration! Well, maybe not. Maybe they really were slower. How can that be? Well, you need to understand how that time was determined.

Lots of things can affect a swim time. Are touch pads being used, push buttons, or manual watches. Which timing system was used. Was a backup time used (the swimmer missed the pad and so the button times were used, or the timing system failed and stop watch times were used). How far was your swimmer from the starting speaker. Is your child hard of hearing and they started off a strobe. They have to have an advantage over those starting by sound, right? No!

Touch pads are the gold standard. Everything is precise. The clock starts running for all swimmers at the same time and stops as soon as each hits the pad. You can't get better than that. Well, maybe that is true at the Olympics and maybe not at your local meet. Do you have speakers under each starting block or are they at the sides of the pool. It takes 0.035 seconds for the sound to get from the side of the pool to the middle lanes. If you don't have a speaker at each side of the pool, that swimmer in the farthest lane won't hear the start for 0.07 seconds. But, we are high tech and have strobe lights on each starting block. Do you know that the physical path from the eye to the brain is slower than from the ear to the brain? So much slower that you would have to be 30 yards or more away from a strobe/speaker before your body would react to light faster than it would react to sound.

Of course, touch pads don't work well at C/B/A+ meets. The swimmer hits the top of the pad on the gutter or the touch is so light that the pad does not trigger and so now you use the backup time from the buttons, or maybe buttons are your primary timing system. How accurate are the buttons?

In a semiautomatic timing system the clock starts instantly for each swimmer, but there is delay from when the swimmer touches the end of the pool until the timer pushes the button. In 1975 Joe E. Killpatrick published a paper in which he did a statistical analysis of that delay. His answer, 0.15 seconds.

The Colorado 5 and 6 timing systems compensate for that delay by subtracting 0.15 seconds from the time they record. That is built into their hardware. Omega, Daktronics, and SST do not subtract that time; and so the swimmer's time will be slower by 0.15 seconds when using buttons at a meet with those timing systems. Actually, an option in SST allows you to apply the 0.15 second correction, but their setup options specifically say that is illegal in FINA and USA-S regulations.

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But what if the timing system fails and I need to use a stop watch. Up until about three years ago, USA Swimming used to make us calculate the average differential between the button times and the stop watches across all the other lanes. If the timing system failed for all lanes, then you would calculate that differential using another race that was valid. That differential would then be added to the watch time and typically was 0.07 seconds for a Colorado timing system. Realize that watches have a delay at the start which is typically longer than at the finish because the timers cannot anticipate the start like they can the finish. This shortens the race compared to using buttons. Because Omega, Daktronics, and SST did not subtract out the 0.15 delay, their differential is typically 0.22 seconds ($0.07+0.15$). In Pacific Swimming we used to just calculate the differential once in the morning and again in the afternoon for a race to account for a different shift of timers and to make it easier to adjust watch times when used. Hmm? But, timers often change every 2 hours.

In 2011 the USA Swimming Rules and Regulations Committee reviewed the process for adjusting times by this differential. They studied the times that resulted by computing a differential from all the other lanes and they looked at doing a differential for all the races at a given lane and decided that neither method consistently gave a better time than just using the backup time. They dropped having a differential calculated. They also said the computer software should apply the 0.15 second correction. Not long after, a notice came out that if you were using the latest level of Hy-Tek meet management software which did the 0.15 second correction, you should back it out to an older level that did not. In fact, the newer Hy-Tek versions have the 0.15 option, but say that it is illegal to use per FINA and USA-S regulations.

So, we are left with using watch backup times with no differentials applied. We also are left with the times being 0.15 seconds faster if you use a Colorado timing system. And, we are left with backup watch times that are either 0.07 or 0.22 seconds faster than the button times.

But, wait! We could make the Colorado timing system times the same as for the other systems. There is a separate plug on the timing cable that does not apply the 0.15 second correction. It is meant for manually starting races with a button when you don't have an electronic starter. The intent is that the manual start delay negates the manual finish delay. If the electronic starter were plugged into that plug, then each race would be 0.15 seconds slower just like for Omega, Daktronics, and SST. But, there has been no direction given on what to do, and so many of your Colorado operators run with the 0.15 second correction even though they should not.

Now I haven't even gotten into the fact that there are three people pushing buttons for each lane, all with different reaction times. It used to be that officials were taught to compare the times for more than a 0.30 time difference. The middle button was the time unless an outside time was off by more than 0.30 seconds. If so, you throw away that outside time and average

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the other two times if they are within 0.30 seconds of each other. If not, then the time is just the middle time. So, the accuracy of the swim time was felt to be + or - 0.30 seconds. However, some Administrative Officials (AO) did not automatically do that. If tossing a time and averaging the other two times only made a difference of 0.05 seconds, the middle time was just used because our timing systems are not that accurate to justify a change.

There has been a subtle modification in the USA Swimming rule book. It no longer says to look for a greater than 0.30 second difference in the times. It just says that unless you have other information to indicate that a button or watch is wrong, you use the middle time (or average if only two times, or the time of a single watch or button). The only place you use the 0.30 second time difference in determining a malfunction is in comparing the primary and backup timing systems.

The AO reviews all the times and makes a determination as to whether any adjustment is needed. The AO looks at lots of information. The deck referee may say the swimmers finished in a different order than the times show. A coach or parent may come in and say the times don't seem right. A timer may have written a note beside the watch time telling you a button was pressed early or late. The deck referee may make a note that the timers pushed the buttons late, or were still sitting in their chairs.

So, in conclusion pretend you are recording these swim times for a physics class in college and diligently putting them down to the one hundredths of a second. Those of you who took college physics know what would happen, right? The professor would lower your grade for recording information far more accurately than you can measure it. At best you should be recording it to one tenth of a second with a deviation of 0.3 seconds. But, that is not what we do; and if we did, all the boys in the fast heat of the 50 yard freestyle would have the same time. But, my child is trying to make the cut for Far Westerns and so a difference of 0.01 seconds could be very significant. Yes. :O) Have a good day!

Disclaimer: This article is the interpretation of the author and has not been approved by anyone else. He will be happy to update it if shown documentation that says other than what was written. In addition, the speed of sound varies depending on humidity and wind. Many AO's still follow the old teachings and new AO's are being taught by the old AO's. So, determination of the swim times is not always consistent and remains a judgment call.