

Race Stats Every Coach Can Use Everyday For Every Athlete



Presented By:
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Since August 2007, Coach Scott Colby has been a Sport Performance Consultant for USA Swimming. Prior to that, Scott coached in Ohio, Louisiana (Bengal-Tiger Aquatic Club), Texas (Fort Worth Area Swim Team), served as an assistant at Dynamo Swim Club in Atlanta and coached for 5 years at a YMCA on Long Island. His Louisiana team placed top ten at Nationals.

His swimmers finalled at Olympic Trials, won 2 National titles and 7 Junior National titles including all four strokes, set three National Age Group Records, and won the National Meet Bob Kiputh High Point award. Scott has also produced numerous Top 16 athletes. He holds a Masters degree in Physical Education and is an ASCA Level 5 coach.



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PRESENTATIONS FOR COACHES:

- Using Race Analysis to Swim Faster
- Effective Use of Video Capture
- Recovery and Nutrition
- Season Planning
- Lactate Testing
- DartFish training
- Latest stroke technique from the National Team (Back, Breast, Starts)
- Setting up dry-land training systems
- Progressions to the USA Swimming National Team

PRESENTATIONS FOR ATHLETES:

- Understanding Race Analysis
- Recovery and Nutrition
- Lactate Testing
- Goal setting
- Latest stroke technique from the National Team (Back, Breast, Starts)
- Progressions to the USA Swimming National Team





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Today's Outline

- Terminology
- Case Study: Katie Hoff becomes World Class
- How Do I Get My Swimmers Faster?
- Great Ideas You Can Use Everyday for all swimmers
Senior AND Age Group
- Questions

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What is this?

$$a^2 + b^2 = c^2$$

Pythagorean
Theorem

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What is this?

$$E = mc^2$$

Einstein's Theory
of Relativity

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What is this?

$$A = \pi r^2$$

Area of a Circle

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What is this?

$$ST = (UT + TT) + (CC \times SR)$$

The “Swimming
Equation”

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What does it Mean?

$$ST = (UT + TT) + (CC \times SR)$$

ST = Swim Time
UT = Underwater Time
TT = Turn Time
CC = Cycle Count
SR = Stroke Rate

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$$ST = (UT + TT) + (CC \times SR)$$

Swim Time – Amount of time it takes to swim a race
Underwater Time = Total amount of time spent underwater during the course of a race
Turn Time = Total amount of time spent turning during the course of a race
Cycle Count = Total amount of stroke cycles taken during the course of a race
Stroke Rate = How fast the strokes are taken over the course of a race (cycles/minute or seconds/cycle)

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What does it Mean?

Cycle = One complete stroke

(For free/back a cycle includes one left-arm plus one right-arm stroke)

DPC = Distance Per Cycle

Free Swimming Time/Distance =
Actual Swimming Time/Distance


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2007 World Championships Katie Hoff - 400 IM Finals (100 Breast)



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How Do I GET



SWIMMERS FASTER?

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How Do I GET SWIMMERS FASTER? PLAN A


INCREASE TEMPO

(Faster Cycles)

55 strokes x 1.33 sec = 1:13.15
55 strokes x **1.23** sec = 1:07.65

Can your swimmers do this?
Maybe?

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How Do I GET SWIMMERS FASTER?
PLAN B

INCREASE DPC
(Take fewer strokes)

55 strokes x 1.33 sec = 1:13.15
53 strokes x 1.33 sec = 1:10.49

Can your swimmers do this?
Maybe?

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How Do I GET SWIMMERS FASTER?
STILL PLAN B

**HOW MUCH LONGER DO I HAVE TO
MAKE EACH PULL TO DROP ONE
CYCLE?**

- Free swimming distance= 90 meters
- Number of strokes = 60
- DPC = 90 meters / 60 strokes = 1.50 meters/stroke
- Number of strokes = 59
- DPC = 1.53
- Difference of .03 meters per cycle = **1.18 inches (Fr/Bk = 0.59 in.)**
- If Stroke Rate = 1.3 sec/cycle
- Save 1 cycle = Save 1.3 seconds

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**How Do I GET SWIMMERS FASTER?
PLAN C**

DO BOTH:
(INCREASE DPC & INCREASE TEMPO)

55 strokes x 1.33 sec = 1:13.15
53 strokes x 1.23 sec = 1:05.19

**Can your swimmers do this?
Probably not this week!**

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**How Do I GET SWIMMERS FASTER?
PLAN D**

REALITY = TRADEOFFS:
(Longer strokes usually results in slower tempo)
(Faster strokes usually results in shorter strokes)

55 strokes x 1.33 sec = 1:13.15
53 strokes x 1.36 sec = 1:12.08

**Can your swimmers do this?
Definitely, with Practice!**


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HOW DID KATIE HOFF GET FASTER?




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Turn Time (TT)

- The turn represents less than 2% of the total race time (400 IM).
- In Katie Hoff's 100 breast split she swam the distance in 1:18.20 seconds and took 1.25 seconds to do the turn.
- If she drops the TT 0.30 sec., she will have reached maximum improvement for that factor.
- Does this mean she shouldn't work on turns?

Of course she should!



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How did she Improve?

	2004	2007	Result
Underwater Time	6.46 sec.	6.47 sec.	No Change
Turn Time	1.25 seconds	1.06 seconds	0.19 Faster
Free Swimming Time	1:10.49	1:08.05	2.44 Faster
Cycles	59	51	8 Fewer
Stroke Rate	1.19 sec/cycle	1.33 sec/cycle	.14 Slower
Distance Per Cycle	1.5 m/cycle	1.74 m/cycle	.24 Further
Total Time	1:18.20	1:15.58	Faster

A slower SR with an increase in DPC resulted in a 2.62 second drop in time.


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Before 2007 World Championships

Date	Average Tempo	Average DPC	Time
3/28/2006	1.21	1.53	1:18.95
5/19/2006	1.25	1.59	1:18.57
8/1/2006	1.27	1.61	1:17.91
8/17/2006	1.30	1.67	1:18.13
11/30/2006	1.34	1.69	1:18.81
3/25/2007	1.31	1.74	1:15.58


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Before 2007 World Championships

Date	Actual Distance Swam	Free Swim Time	Average Velocity	Cycle Count
3/28/2006	88.5 m	1:11.29 sec	1.24 m/sec	57
5/19/2006	88.75 m	1:11.19 sec	1.25 m/sec	56
8/1/2006	88.5 m	1:10.37 sec	1.26 m/sec	55
8/17/2006	88.75 m	1:10.86 sec	1.25 m/sec	53
11/30/2006	88.5 m	1:11.24 sec	1.24 m/sec	52
3/25/2007	88.75 m	1:08.05 sec	1.30 m/sec	51

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Hoff Lifetime Best
4:32.89
SPLITS
37.40 & 38.18 =
1:15.58
(1:18.16 here)

Hoff Lifetime Best
4:32.89
CYCLES
25 AND 28

Hoff Lifetime Best
4:32.89
TEMPO
1.28 AND 1.32

Hoff Lifetime Best
4:32.89
DPC
AVG 1.75 AND
1.72 BY 50'S

Name: Katie Hoff		Meet: 2008 Ohio State Grand Prix		Meet Start: 4/3/2008								
Time: 4:34.49	Country:	Event: 400	Individual Medley	Heat: Finals								
Dist	Brkout	Brk Dist	Time	Dropoff	Cycles	Split	Tempo	Tempo 2	Tempo 3	DPC	Velocity	Turn Time
50	4.28	10.75*	30.00	N/A	23	30.00	55.0 (1.09)	54.4 (1.10)	53.0 (1.13)	1.71	1.53	0.98
100	3.72	8.25*	1:03.37	3.37	25	33.37	53.5 (1.12)	52.7 (1.14)	51.3 (1.17)	1.67	1.46	0.92
150	2.80	6*	1:38.88	2.14	18.5	35.51	37.5 (1.60)	37.4 (1.60)	37.5 (1.60)	2.38	1.43	1.37
200	2.89	6*	2:13.52	-0.87	20	34.64	37.6 (1.60)	37.5 (1.60)	37.2 (1.61)	2.20	1.39	0.95
250	3.36	5.75*	2:52.28	4.12	27	38.76	47.0 (1.28)	46.5 (1.29)	46.3 (1.30)	1.64	1.28	1.01
300	3.20	5.5*	3:31.68	0.64	27	39.40	46.7 (1.28)	46.9 (1.28)	45.8 (1.31)	1.65	1.26	1.04
350	1.76	4.5*	4:03.33	-7.75	21	31.65	45.0 (1.33)	44.7 (1.34)	44.7 (1.34)	2.17	1.62	1.12
400	1.92	4.75*	4:34.49	-0.49	21.5	31.16	45.3 (1.32)	44.6 (1.35)	44.1 (1.36)	2.10	1.55	0.00
Totals:		23.93	51.5		183	4:34.49						7.39
15M Vel:		2.09	15M Start:	7.17	7.5M Vel:	0	7.5M Finish:	0	Free Swimming Time:		4:03.17	

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Hoff Split Comparison (OSU)

- Her time was 1.60 seconds slower than her best
- Her tempo remained approximately the same
- Her turns and underwater were about the same
- Her breaststroke split was **2.58 slower**
- **Her Distance Per Cycle was shorter, therefore She took 3 more strokes at Ohio State**
- She improved .98 seconds other places

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Why Was She Slower?

- Heavy training that week?
(especially breaststroke?)
- Not enough breaststroke training lately?
- Over-trying to race “hard”?
- Timing was “off”?
- Others?

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Future of “Race Stats”



- Based more on actual number of strokes taken, providing More Accurate Information
- Race Stats is BETTER than the previous software because we can stand behind the accuracy of the cycle counts and tempos. (Previously, there were extrapolations and calculations in cycle counts and tempos, resulting in inaccuracies.)
- Additional data can be added on an individual basis: breakout time, breakout distance, intermediate splits, # of breaths, # of dolphin kicks, reaction time
- Simpler to read and understand

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Race Stats Sample



200 LCM Breaststroke Final

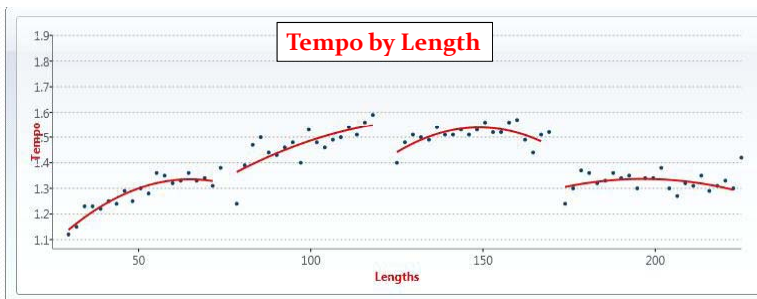
Rebecca Soni

2010 Mare Nostrum - Barcelona 6/9/2010

length	time	50 split	100 split	cycles	tempo
50	32.02	32.02		21	1.28
100	1:07.85	35.83	1:07.85	20	1.47
150	1:44.75	36.90		21	1.51
200	2:21.41	36.66	1:13.56	24	1.32

Total **2:21.41** **86**

Race Notes:



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Suggestions: Season Plan (Senior Athletes)

- Start season with maximum DPC, then shoot for optimum
- Start season working on tempo and DPC separately, then bring them together with:
 - “Race Simulation Sets” must have both components (i.e. lactate sets, broken swims, etc)
 - Focus on race pace and DPC/CC
 - “SWOLF” Swimming/Golf
- Move from shorter distance repeats to longer distances
- Use RS when setting goals!

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Suggestions: Season Plan (Age Group Athletes)

- Age groupers' primary focus should be on DPC!
- Age groupers' primary focus should be on DPC!
- Age groupers' primary focus should be on DPC!
- Age groupers' primary focus should be on DPC!

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Suggestions: At Practice (Senior Athletes)

- Control warm-up with DPC (prescribed # strokes)
- Have swimmers time each other's tempo
- Approximately 7%* faster than race tempo can develop speed (*Maglischco)
 - Speed assisted (tubing, fins, Power Tower)
 - Just do it – go “too fast” (Tempo Trainer, spin drills)

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Suggestions: At Practice (Senior Athletes)

- Rehearse 1st length of a race with CC AND Tempo AND Pace
- “Olympic 25's” (DPC, Tempo, Time)



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World Class



National and World Class Ranges for Tempo and Cycles (1980-1995 approx)					
DIST	STROKE	WOMEN		MEN	
		TEMPO	CYCLES*	TEMPO	CYCLES*
50	Free	.92-1.00		.90-1.07	
100	Free	1.07-1.13	23-24	1.07-1.20	20-21
200	Free	1.11-1.25	22-23	1.18-1.40	19-20
400/500	Free	1.33-1.43	24-25	1.30-1.58	18-19
800/1000	Free	1.11-1.36		-	-
1650/1500	Free	-	24-25	1.40-1.54	19-20
100	Back	1.07-1.20	22-23	1.13-1.25	20-21
200	Back	1.43-1.50	20-22	1.36-1.43	19-20
100	Breast	1.13-1.28	25-26	1.09-1.15	23-24
200	Breast	1.33-1.76	24-25	1.43-1.58	20-21
100	Fly	1.07-1.15	25-27	1.07-1.15	21-22
200	Fly	1.11-1.33	25-26	1.11-1.25	22-23

*Cycles are approximate and for 50 meter pools

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Suggestions: At Practice (Age Group Athletes)



- Age groupers' primary focus should be on DPC
- Start with the warm-up
- 25's with a certain number of "allowable" number of strokes, then switch to another stroke or Kick in
- "Distance" swims
 - How far in 20, 50, 100 strokes?
 - Swim with 17 or less until 'failure'
- Relays where strokes count!
- 20/20, 19/19, 18/18. etc.

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Suggestions: At Meets (Senior Athletes)



- Before race, ask athletes, "What choices are you going to make to 'pick it up' the last 50 of this race?"
- See what competitors are doing – especially in distance events
- Get swimmers on deck to count cycles while you time tempos
- Tempos always drop off from beginning of length to end of length.
The least drop off usually wins!

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Suggestions: At Meets (Senior Athletes)



- Film the races and analyze later (have the swimmers film)
- Give the athletes ownership – Teach them to analyze their own races!
- Time Tempo on 1st 25 ('odds'), count DPC on 2nd ('evens')
- Use RS during race debriefing




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Sample Split Sheet

Free	Back	Breast	Fly IM	50	100	200	400	500
Name:			Best:	Heat:				
			Goal:	Lane:				
Cum	Lap	SR	DPC	Comments				
50								
100								
150								
200								
250								
300								
350								
400								
450								
500								


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Sample Split Sheet

Free	Back	Breast	Fly IM	50	100	200	400	500
Name: <i>Sally</i>			Best: <i>1:23.33</i>	Heat: <i>12</i>				
			Goal: <i>1:19.99</i>	Lane: <i>7</i>				
Cum	Lap	SR	DPC	Comments				
13.2	<i>13.2</i>		<i>10</i>	<i>Too many strokes on 1st 25!</i>				
28.7	<i>15.5</i>		<i>11</i>	<i>We practiced 9 to go</i>				
45.8	<i>17.1</i>		<i>12</i>	<i>9,11,11,11!</i>				
1:0	<i>19.2</i>		<i>15</i>					


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Sample Split Sheet

Free	Back	Breast	Fly IM	50	100	200	400	500
Name: <i>Sally</i>			Best: <i>2:19.64</i>			Heat: <i>12</i>		
			Goal: <i>2:16.99</i>			Lane: <i>7</i>		
Cum	Lap	SR	DPC	Comments				
<i>13.2</i>			<i>10</i>					
<i>28.7</i>	<i>28.7</i>		<i>11</i>					
		<i>1.4</i>						
<i>1:05.00</i>	<i>36.3</i>	<i>1.6</i>		<i>Too slow tempo!</i>				
<i>1:46.4</i>	<i>41.4</i>		<i>11</i>					
			<i>13</i>					
<i>2:17.23</i>	<i>30.8</i>							

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Conclusions

- Analyze what athletes are doing before you begin planning what they could/should do
- Plan in increments, not leaps. It may take several seasons to get there!

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Conclusions

- Cycle Count and Stroke Rate exist in a balance
- Optimum is different at different speeds/distances
- Find the optimum balance for each athlete's event
- Maximize DPC while minimizing the impact on Stroke Rate

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Final Thought

KNOW WHAT THE BEST DO

Top 1 Performances, 200 Freestyle LCM, Michael F Phelps, All Dates

Name: Michael Phelps		Meet: Beijing Olympic Games		Meet Start: 8/9/2008								
Time: 1:42.96		Country:		Event: 200 Freestyle								
		Heat: Finals										
Dist	Brkout	Brk Dist	Time	Dropoff	Cycles	Split	Tempo	Tempo 2	Tempo 3	DPC	Velocity	Turn Time
50	4.70	13"	24.31	N/A	12"	24.31	40.0	38.7	N/A	3.14	2.00	1.31
100	4.97	13.25'	50.29	1.67	12.5	25.98	37.9	37.2	39.0	2.97	1.84	1.35
150	4.08	10.75'	1:16.84	0.57	13.5	26.55	38.3	38.1	37.7	2.95	1.84	1.39
200	4.66	12.25'	1:42.96	-0.43	14'	26.12	38.9	40.4	N/A	2.67	1.76	0.00
Totals:		18.41	49.25		52	1:42.96						4.05
15M Vel: 2.6		15M Start: 5.77		7.5M Vel: 0		7.5M Finish: 0		Free Swimming Time: 1:20.50				

AND HELP YOUR ATHLETES DO BETTER

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Thank You!

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