A GUIDE TO ANAEROBIC TRAINING
‘SPECIFICITY OF TRAINING ‘RACE MODELS’, SPEEDCHARTS AND RACE ANALYSIS DATA’

OVERVIEW

Specificity is an important concept in training methodology. While all training should have a specific purpose, truly specific training exactly simulates one or more elements of racing within a training session.

Much of the training you do can and should be specific. It need not necessarily be specific in speed, but could be specific in the number of kicks off the wall, the breakout distance, breathing patterns, stroke rate or count, technique motor patterns, etc.

Athletes should know, from a young age, their target splits, stroke rates, counts, number of kicks, where and when to breathe, and other race parameters for their main events. They should be mindful of this information and apply it in training whenever appropriate – particularly in speed-specific training.

A ‘Race Model’ for 100m events can be developed from two primary sources. The British Swimming SpeedCharts can be used as a starting point to identify how an athlete should split a race, while previous Race Analysis Data is used to identify current strengths and weaknesses and further refine the model.

SPEEDCHARTS

The British Swimming SpeedCharts were developed to provide specific information to assist in objectifying and evaluating speed-specific swimming training sessions. The charts have been developed using real data from thousands of swims, and therefore represent the ‘average’ way in which each event is swum.

SpeedChart Versions
- SpeedCharts are currently available for all 100m events.
- Long-course and short-course versions of the SpeedCharts are available.
- ‘Club’ and ‘Elite’ versions are available. The club versions cover a greater range of times, but have larger time increments (1 second increments for the 100m Charts).

Timing
Accuracy and consistency in timing is important when using the SpeedCharts, as the charts are based on electronic timing. Correction factors are provided to account for different timing methods, and it’s important that these are applied to ensure that correct interpretations are made from the charts.

Short-Course SpeedCharts
The short-course SpeedCharts are designed to assist athletes and coaches who train in 25m pools to prepare for longcourse competition. The times highlighted blue represent the equivalent longcourse time, whilst all other splits are shortcourse times. Because these charts include a conversion factor, care should be taken in their use. Athletes who are very good shortcourse swimmers (e.g. have better than average turns) will have a greater differential between longcourse and shortcourse times, and therefore should aim to swim slightly faster than the times on the chart, while athletes who are bad shortcourse swimmers will have a smaller differential between longcourse and shortcourse times (and should work on improving their turns!).

© British Swimming, January 2006 (Revised 2020)
As with all the SpeedCharts, the shortcourse versions should be used as a guide only, and interpreted with care!

Common Used of the SpeedCharts

1. To Develop Race Models

The SpeedCharts can be used in conjunction with other Race Analysis information, in developing a race model. Keep in mind that the information in the SpeedCharts represents the average way in which a race is swum.

Allowances should be made to account for swimmers natural strengths and weaknesses. For example a swimmer who is naturally a stronger front-end swimmer should aim to be slightly faster than the SpeedCharts indicate for splits up to 50m. Or a swimmer who has a slower than average start will need to compensate for this in the rest of the race – so there back-end pace work will probably have to be somewhat faster than the chart suggests.

2. To Set Targets for Training Efforts

The SpeedCharts can be used to set goal times for training efforts of any distance. For example a male freestyler with a goal time of 50.0s for the 100m freestyle, should be aiming to swim 35m repetitions at 100m pace or faster – i.e., 16.19s.

The front page of the charts contain splits useful for ‘Front-End’ training (Speed Development and Lactate Production Training), while the back page of the charts contains information pertinent to back-end training (Lactate Tolerance and Pace Work).

The shorter the distance, the faster the swimmer should be able to go relative to projected time. Most swimmers should be able to achieve target times (or very close to) up to about 60% of race distance, though some swimmers (particularly male sprinters) may not be able to achieve true race speeds in training.

See the ‘Speed Development’, ‘Lactate Production’ and ‘Lactate Tolerance’ documents for guideline on these types of sessions.

3. To Check Projected Speed of Efforts Swum in Training

Conversely, the SpeedCharts can be used to evaluate the speed specificity of individual efforts performed within a training set.

Example

A 100m freestyler with a goal time of 50.0s is performing a Lactate Tolerance Session with 35m, 40m and 50m push efforts, and achieving the times indicated by the red circles. This swimmer is able to hold specific speeds up to 40m, but falls off the pace over 50m. In this case it would be advisable to keep the swimmer working over mainly 30m – 40m efforts, perhaps with a few 50m efforts. The flexibility to adapt a set to the individual requirements of athletes (sometimes mid-set) is very important when executing lactate tolerance sets. See the guide to ‘Lactate Production’ for more details on how to structure Lactate Production training sets.

Using the SpeedCharts in this way is particularly useful in evaluating the speed-specificity of Speed Development, Lactate Production and Lactate Tolerance training sets.
HOW FAST IS FAST ENOUGH?

There are many variables that determine how fast an athlete is able to swim in training on any given day. In general, the placement of sessions that require race-speed-specific swimming should be carefully considered by the coach to ensure that the athletes are physically in a state where they are able to swim fast. The athletes also have a responsibility to prepare themselves physically and mentally to swim fast in these sessions.

In general;

- There is much individual variation in athletes’ abilities to achieve race-specific-speeds in training
- There is much day-to-day variation in an athlete’s ability to achieve race-specific-speeds in training
- Often this day-to-day variation will be attributable to training fatigue BUT sometimes there will be no apparent reason
- Women are more likely to be able to achieve race-specific-speeds in training than men
- Distance swimmers are more likely to achieve race-specific-speeds in training than ‘sprinters’
- Younger swimmers may be more likely to achieve race-specific-speeds in training than senior swimmers.

*SpeedCharts* can be used as a powerful motivational tool – but can also work against athletes who are not able to achieve race speeds – care is required by coaches to get the most value from the charts whilst avoiding the potential negative effects.

- Effective speed-specific training requires the consideration of all of these factors, plus thorough planning, and flexibility and adaptability in the execution of the sessions.

RACE ANALYSIS DATA

The *SpeedCharts* can provide a lot of information to help ensure speed specificity, but it is important that many other elements of swimming are trained specifically. If available, Race Analysis data can provide valuable information for planning training and ensuring training specificity.

Some of the parameters measured in Race Analysis that can be applied in training include;

- Splits
- Stroke Rates
- Stroke Counts
- Start, Turn and Finish Times
- Start and Turn Breakouts (distance, time, kicks of wall)
- Breathing Patterns

The following extract from a Race Analysis Report highlights information that can be applied to ensure training specificity.

Ensure Front-End speed work is done at Stroke Rates specific to the 1st 50m of the race. When doing ‘Easy-Speed’ work, use the 1st 50m Stroke Count as a target. Similarly, Back-End pace work should be done at stroke rates and counts specific to the 2nd 50m of the race.

<table>
<thead>
<tr>
<th>LAPS</th>
<th>SEGMENT</th>
<th>TIME</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 - 50 m</td>
<td>00:24:07</td>
<td>46.4</td>
</tr>
<tr>
<td></td>
<td>50 - 100 m</td>
<td>00:27:77</td>
<td>53.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BLOCK</th>
<th>15 m</th>
<th>BREAK</th>
<th>BREAK</th>
<th>KICKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.64</td>
<td>5.94</td>
<td>4.74</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TURN</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.97</td>
<td>10.62</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FREE SWIM</th>
<th>TIME</th>
<th>DPS (m)</th>
<th>SR (str/min)</th>
<th>SPEED (m/s)</th>
<th>COUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 - 25 m</td>
<td>5.12</td>
<td>1.89</td>
<td>61.6</td>
<td>1.55</td>
<td></td>
</tr>
<tr>
<td>25 - 50 m</td>
<td>13.01</td>
<td>1.98</td>
<td>59.4</td>
<td>1.83</td>
<td>19</td>
</tr>
<tr>
<td>50 - 75 m</td>
<td>5.50</td>
<td>1.92</td>
<td>59.9</td>
<td>1.82</td>
<td>19</td>
</tr>
<tr>
<td>75 - 100 m</td>
<td>14.40</td>
<td>1.85</td>
<td>56.8</td>
<td>1.72</td>
<td>19</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>1.89</td>
<td>59.0</td>
<td>1.86</td>
<td>19</td>
<td>38</td>
</tr>
</tbody>
</table>

| TOTAL     | 38.03| 38      |            |             | 38    |

Start times and splits can be used to ensure speed-synchronicity of training. Use both the SpeedCharts and Skill Charts for more detailed splits.

Use information about the turns to monitor and improve turn performance. Other race information such as number of kicks off the wall can also be used to build the race model.
Race Analysis Information - Planning Training

An athlete’s strengths and weaknesses can be identified from Race Analysis reports, and used to plan race-specific training.

In Individual Race Analysis Reports, Start Time and Average Turn Time can be identified and compared to standards taken from British Swimming’s Skills Charts.

Many other weaknesses or errors in race execution can be identified from the individual race analysis reports. Some common errors include:
- Over-rating, or spinning in the first 25m of a race
- Too much variation in velocity or stroke-rate throughout a race
- Too little variation in velocity throughout a race
- Too many breaths in a 50m race
- Excessive ‘shortening’ of stroke in closing stages of the race
- Too long or too short underwater phases of start and turns

Race Analysis Comparison Reports

Race Analysis Comparison Reports can also be used to provide more information to aim in improving the specificity of training. There are two main types of comparison report:

- **Self-Comparisons** – compare a number of swims of the same event from a single swimmer
  
  This type of comparison provides information to assist in assessing effective race strategies for a swimmer on how execution of the race indicate more effective strategies for a swimmer.

- **Comparisons with Other Athletes** – often with ‘World Leaders’ in the event
  
  Comparing with competitors or world leaders in the event allows the identification of weaknesses, providing information for long-term development. It also helps an athlete know what to expect when racing opponents.

Race Models

This document focused largely on using SpeedCharts, Skills Charts and Race Analysis to build Race Models for 100m events. The Skills Charts and Race Analysis data should be used by coaches to build Race Models for all events and distances.

The SpeedCharts should be used to improve the 100m speed of all swimmers regardless of the distance of their main event.