

## *A general training model for the road cyclist*

BY CHARLES HOWE

The training model presented here is based on the [concepts and methods](#) of New Zealand Olympic running coach Arthur Lydiard (1917-2004). With slight modifications, these can be summarized as follows:

1. Performance in any endurance activity (i.e., longer than 3 minutes) is largely determined by the available rate of aerobic energy production, and this common basis allowed Lydiard to successfully use the same training program for all his runners, from 800 meters through the marathon, until their period of specialization. Aerobic development is essentially unlimited; the only constraints are training opportunities (available time, environmental conditions), training capacity, motivation, and resistance to injury/illness. “The wider and deeper the base, the higher and more sustained the peak.”
2. Aerobic capacity is developed through at least 10-12 weeks of mainly steady-state [tempo/threshold runs](#) of ~2 hours long, totaling ~8-12 hours per week. The goal of this is [increased energy production at lactate threshold](#) (“endurance” or “metabolic fitness”) by inducing peripheral adaptations (i.e., within the working muscles), including increased capillary density (allowing greater removal of waste metabolites), increased mitochondrial mass (which improves muscle respiratory capacity), and interconversion of slow-twitch muscle fibers (which improves cycling economy). Aerobic power may be ‘peaked’ toward the end of this period with once-a-week, intermediate-intensity interval workouts (e.g., 5 × 5 minutes).
3. The distribution of energy expended during aerobic workouts should be governed by the [interaction of intensity and perceived exertion](#), such that there is a greater second-half output in each session, leaving the athlete exhausted only at the very end, feeling “pleasantly tired” shortly afterward, and thus able to sustain a gradually progressive training load almost indefinitely; workouts may be somewhat challenging to complete, but not a struggle, with something always left in reserve. “You must exhaust the body systematically and sensibly. Not go ahead and kill yourself,” Lydiard summed up in a 1964 interview, and his frequent refrain of “**Train, don’t strain**,” is now justifiably famous. Recently, a client captured this perfectly another way: “Work, don’t suffer.”
4. Since the metabolic strain of sprint training is limited, speed can and should be developed throughout the year with short, intense efforts of no more than 15 seconds, with emphasis on technique and form.
5. When aerobic conditioning has proceeded as far as possible, ~7 weeks are devoted to anaerobic capacity training (4 weeks lower-intensity hill workouts, 3 weeks high-intensity repetitions) during which aerobic fitness is maintained. The reason for this sequencing is not so much that aerobic training is needed to prepare for anaerobic workouts, rather, the latter interferes with and limits the former, and so should be forestalled until aerobic fitness is as complete as possible, then be applied in a concentrated manner, as a kind of “icing on the cake.”
6. This is followed by a 4-week ‘coordination period’ of over-and under-distance training races and/or other specific workouts meant to simulate the neuromuscular demands and variable pace of competition.
7. Finally, 7-10 days of ‘sharpening and freshening’ leaves the athlete rested and in peak form for a period of competition and recovery.

This approach can be applied to cycling in a quantitative manner with the [power-based training levels](#) laid out by exercise physiologist Andrew Coggan, Ph.D., as well as the analytical tools he has created: Training Stress Score (TSS), Chronic and Acute Training Load (CTL and ATL), and Training Stress Balance (TSB). All of these are incorporated in the [Training Peaks WKO+ Performance Manager](#).

Perhaps because they feel threatened by them, some coaches are quick to condemn and dismiss training models as “cookie cutter” or “pre-fab” in nature, and insist that all training must be individualized. The question is, individualized from what? Preparation for any given event arises from known demands and is governed by established underlying principles, so a logically-constructed model can provide, at the very least, a useful starting point for most any runner or cyclist (savvier coaches take advantage of this by offering power- and pace-based [training plans](#) designed for specific goals). It is certainly true that different athletes can respond in significantly varying degrees to a particular workout, or have varying training load capacities as well as recovery needs, yet this is akin to the exception that proves the rule: most responses fall within a predictable range.

Thus, no model program should be applied rigidly, but must be adapted to the athlete for whom it is intended. In addition to physical constitution, other factors that shape the training prescription include competitive priorities/preferences (which races you want to do well in, which you want to use for training, and which you enjoy the most, since motivation determines how diligently you train), role within a team, age, training status/history, individual characteristics (strengths and weaknesses), weather, training opportunities (e.g., local availability of roads/trails, terrain, traffic), work schedule and other responsibilities, etc. A coach can provide valuable aid in offering objective advice as well as customizing and adjusting the training plan.

## PHASE I: PRE-SEASON PREPARATION

### *Aerobic Conditioning*

Period 1 ("Base"): aerobic endurance and lactate threshold (at least 8-10 weeks)

- ▶ OFF or Level 1 (30-60 min.) – Monday
- ▶ 1 Level 4 functional threshold power, or FTP, test (40-50 min.) per week – Tuesday
- ▶ 3-5 Level 2-3 rides (1.5-4 hr.) per week; primarily steady-state, with one **controlled** variable-pace (e.g., group/rolling terrain) ride per week
- ▶ 1 Level 7 workout per week, prior to a Level 2 ride, with each effort no longer than 15 seconds (to limit metabolic stress), and complete recovery (5 minutes) in between each effort
- ▶ Build CTL by 3-6 pts. per week (20-35 TSS pts.), or (less preferably) volume by 25-45 min.; use last ride of the week to reach weekly target. Use TSB in relation to perception of fatigue to evaluate and adjust load and rate of overload progression.

Period 2 ("Build"): lactate threshold and maximal aerobic power (5 weeks)

- ▶ OFF or 30-60 min. Level 1 – Monday
- ▶ 1 Level 5 workout (5-6 x 5 min. @ ~110% FTP) per week, on appropriate terrain – Tuesday
- ▶ 1 FTP test (40-50 min.) every other week – Wednesday
- ▶ 3-4 Level 2-3 rides (1.5-4 hr.) per week; primarily steady-state, with one or two **controlled** variable-pace (e.g., group/hilly terrain) ride each week
- ▶ CTL rate of increase slows or is maintained at sustainable plateau; repeating a week occasionally as needed, when higher CTL levels are reached, can help to assimilate (consolidate) training. Professional/elite riders should generally aim for a CTL of at least 110 by the end of Phase 2.

## PHASE IA

### *Anaerobic Capacity/Aerobic Maintenance*

Period 3: interval training (3 weeks)

- ▶ OFF or Level 1 (30-60 min.) – Monday
- ▶ 2-3 Level 6 workouts per week (e.g., 8-12 x 1 min. @ ~150% FTP) on appropriate terrain, alternated with . . .
- ▶ 2-3 Level 2 rides per week; no FTP test
- ▶ CTL maintained or allowed to fall slightly

## PHASE II: COMPETITION

### *Long (>30 min.), Flat TT Emphasis*

Specificity/taper (7 days)

- ▶ 2 practice TTs of similar duration, using TT bike and all equipment
- ▶ 2 Level 2 rides (1.5-2 hr.)
- ▶ 2 days OFF or Level 1 (30-60 min.)
- ▶ TSB should be positive or nearly neutral the day before the event

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Criterium emphasis    TT emphasis (2)    Road race emphasis

## PHASE IB

### *Criterion Emphasis*

Period 4: race specificity/taper (2-3 weeks)

- ▶ 1-2 criterium training races, motorpacing, or microinterval workouts per week
- ▶ 2-3 Level 2 rides (~2 hr.) per week
- ▶ 2 days OFF and/or Level 1 rides (30-45 min.) per week
- ▶ TSB should be +10 to +15 at end of period

## PHASE IB

### *Road Race Emphasis*

Period 4: race specificity/taper (2-3 weeks)

- ▶ 1-2 training races and/or 'spirited' group rides per week
- ▶ 2-3 Level 2 rides (~2 hr.) per week
- ▶ 2 days OFF and/or Level 1 rides (30-45 min.) per week
- ▶ TSB should be +10 to +15 at end of period

## PHASE II: COMPETITION

### *Short (<25 min.) TT Emphasis*

Period 4: specificity/taper (10 days)

- ▶ 1 FTP test (30-40 min.)
- ▶ 2 practice TTs of similar terrain/duration, using TT bike and all equipment
- ▶ 4 Level 2 rides of up to 1.5-2 hr.
- ▶ 4 days OFF or 30-45 min. Level 1
- ▶ TSB should be +10 to +15 at end of period

### *Long (>30 min.), Hilly TT Emphasis*

Period 4: specificity/taper (10 days)

- ▶ 1 FTP test (40-50 min.)
- ▶ 2 practice TTs of similar terrain/duration, using TT bike and all equipment
- ▶ 4 Level 2 rides of up to 1.5-2 hr.
- ▶ 4 days OFF or 30-45 min. Level 1
- ▶ TSB should be +10 or so at end of period

## PHASE II: COMPETITION

Period 5: racing and recovery (up to 6 weeks)

- ▶ 1 midweek and 1-2 weekend races interspersed with Level 1, and occasional Level 2 rides, depending on time between races

Period 6: recover and rebuild (4-5 weeks)

- ▶ after an initial week of low volume and intensity, endurance/threshold are rebuilt with Level 2/3 rides
- ▶ increases in training load from week-to-week (the 'ramp rate') are higher than in Period 1
- ▶ Level 6/5/4 "combination" workouts are used to "refresh" anaerobic capacity and maximal aerobic power in last 2 weeks

Period 7: racing and recovery (5 weeks)

- ▶ 1 midweek and 1-2 weekend races interspersed with Level 1, and occasional Level 2/3 rides, depending on time between races

## PHASE III: OFF-SEASON

Period 8: stabilization and maintenance (14-18 weeks)

After a 1-2 week hiatus, cycling continued at up to ~50% the previous season's peak weekly load (including maintenance of each energy system), supplemented with aerobic activities such as skating or x-c skiing, plus some strength training. Muscles, tendons, and joints are allowed to recover and rebuild through "active recuperation," rather than rest alone. Adjustments to bicycle fit and any lingering medical issues should also be addressed at this time.