

ASK THE COACH

Pete writes; "Hi. I have now been told by 2 different bicycle mechanics (2 different bike shops) that ceramic bearing upgrades (everything - wheels, bottom bracket & derailleurs) will give the average rider like me (62 years old, B- rider, 200 pounds (91kg), ride 100-120 miles per week, average speed 16-18 mph) a 2-3 mph increase. I don't believe it, but if they're even 50% right (heck, even 25%), then I'm going to start saving now for an upgrade. How much increase in performance can I expect?"

So, I replied to Pete. For calculations, let's assume Pete's FTP is 184.

One other point, if you rebuilt all bearings using a high-quality low friction grease like SBG-32, this would save you another 2-3W total. This additional savings is not used within the calculations.

I did some research a few years ago and pieced together a WATT SAVINGS table below for Pete.

Watts Saved - Researching bicycle components and wheel manufacturer's websites and their corresponding technical reports, here is a summary of their combined findings comparing watts saved using Chinese hybrid ceramic bearings vs. Chinese conventional steel bearings. Also included are drivetrain components to help save watts.

WHEELS	FRONT WHEEL (Left Side)	FRONT WHEEL (Right Side)	REAR WHEEL (Left Side)	REAR WHEEL (Right Side)	TOTAL
Ceramic Bearings					
Minimum Savings	1W	1W	1W	1W	4W
6802 Bearing Cost	\$35	\$35	\$35	\$35	\$140

JOCKEY WHEELS	REAR DERAILLEUR PULLEY 1	REAR DERAILLEUR PULLEY 2	TOTAL
Ceramic Bearings			
Minimum Savings	0.5W	0.5W	1W
Pricing			\$75

OR

OVERSIZE PULLEY WHEEL SYSTEM	OVERSIZE PULLEY SYSTEM INCLUDING CERAMIC BEARINGS	TOTAL
Minimum Savings	3W	3W
Pricing	\$500	\$500

BOTTOM BRACKET	LEFT SIDE	RIGHT SIDE	TOTAL
Minimum Savings	2W	2W	4W
6806 Ceramic Bearings Pricing			\$200

CHAIN - CERAMIC SPEED	CHAIN	TOTAL
Minimum Savings	5W	5W
Pricing		\$150

TOTAL WATT SAVINGS (from above)	14W to 16W
TOTAL COST TO ACHIEVE WATT SAVINGS	\$565 to \$990
\$/W (\$565/14W to \$990/16W)	\$40.36 to \$61.88

Note 1: 250-500 miles required to break in most bearings.

Note 2: A special lightweight grease (TPS SGB-32) is required for max watts saved.

Note 3: All numbers are estimates since different manuf. bearings & wheels will behave differently.

Note 4: Average pricing shown. Ex. 6802 from Wheels MFG = \$35 each, Ceramic Speed = \$169 each

Note 5: Full ceramics save even more watts.

The following table shows different solutions to ‘adding’ watts along with a corresponding \$ value.

BASELINE	
Power-to-weight ratio: 184W FTP, 91kg (200 lbs.)	2.02W/kg = Untrained Non-Racer
EFFICIENT BEARINGS & DRIVETRAIN (from tables above)	
184W FTP +16W = 200W FTP, 91kg	2.20W/kg = Mid Untrained Non-Racer
COST →	\$565 to \$990
WEIGHT LOSS – \$0 (by yourself) -to- \$200/mo. (with nutritionist)	
Lose 10 lbs. (2 mo.) (86.2kg): 184W FTP	2.13W/kg = Mid Untrained Non-Racer
Lose 20 lbs. (4 mo.) (81.6kg): 184W FTP	2.25W/kg = Mid Untrained Non-Racer
Lose 40 lbs. (6 mo.) (72.6kg): 184W FTP	2.53W/kg = High Untrained Non-Racer/Low Cat 5
COST →	\$0 to \$1,200
COACHING - Weight Loss (above) + 6 months @ \$200/mo.	
Basic Training: Lost 40 lbs. (72.6kg): 230W FTP	3.17W/kg = High Cat 5/Low Cat 4 Racer
COST →	\$0 to \$1,200 + \$1,200 = \$1,200 to \$2,400
Serious Training: Lost 40 lbs. (72.6kg): 260W FTP	3.58W/kg = High Cat 4/Low Cat 3 Racer
COST →	\$0 to \$1,200 + \$1,200 = \$1,200 to \$2,400
COACHING (Weight Loss + 6 months @ \$200/mo.) + EFFICIENT BEARINGS/DRIVETRAIN	
Basic Training: 230W FTP + 16W = 246W FTP	3.39W/kg = Mid Cat 4
Serious Training: 260W FTP + 16W = 276W FTP	3.80W/kg = Mid Cat 3
COST →	\$0 to \$1,200 + \$1,200 + \$565 to \$990 = \$1,200 to \$3,390

*Calculations above use Andy Coggan’s & Hunter Allen’s Power Profile chart (below)

NUMBER CRUNCHING:

Pete, there are a lot of variables. The table above identifies many options for you ... from making the drivetrain more efficient to weight loss & serious coaching/training. The more of these that you do, the more fit and faster you will be. It’s up to you how far you wish to take this. Some cyclists like tinkering with cool new ceramic bearings, others prefer coaching and serious training. You can do a little, you can do a lot or you can do something in-between...it’s up to you.

OPTIMIZED BEARINGS & DRIVETRAIN (bearings, pulley system, chain). You can expect to save a total of 14W to 16W at a cost of \$565 to \$990. These prices are dependent upon whose bearings you decide to purchase. In the example above, assuming you are buying low to medium quality Chinese ceramic bearings, you should expect to pay \$40.36/Watt – and gain a maximum of 14W. Upgrading to the high-end Ceramic Speed oversize pulley wheel system and high-end bearings you can expect to gain an additional 2W.

With everything else being equal, using Andy Coggan’s/Hunter Allen’s Power Profile chart, \$990 will move you from an Untrained Racer to a MID-LEVEL Untrained Racer.



WEIGHT LOSS – Losing weight can be an individual experience or, through the use of a licensed nutritionist.

Losing 10-20 pounds bumps you up slightly in the MID-LEVEL Untrained Racer. It's not until you lose 40 pounds that you bump yourself into a Cat 5 racer category.

COACHING + WEIGHT LOSS – General training with a USAC coach can raise your FTP from 184W to 230W. If you train seriously, you can expect to raise your FTP from 184W to 260W. If you couple this with your 40-lb. weight loss, you can expect to be as strong as a mid/high level Cat 4 (and possibly a low Cat 3).

ALL THE ABOVE – If you choose the best from everything above, you can expect to be as strong as a mid-level Cat 3!

I hope this *quick analysis* makes sense and provides you with some options that will help you decide which route you wish to take.

Sincerely,
Rick Schultz
Bike Fitness Coaching.com

		Maximal power output (in W/kg)							
		Men				Women			
		5 s	1 min	5 min	FT	5 s	1 min	5 min	FT
World class	}	24.04	11.50	7.60	6.40	19.42	9.29	6.61	5.69
		23.77	11.39	7.50	6.31	19.20	9.20	6.52	5.61
		23.50	11.27	7.39	6.22	18.99	9.11	6.42	5.53
		23.22	11.16	7.29	6.13	18.77	9.02	6.33	5.44
		22.95	11.04	7.19	6.04	18.56	8.93	6.24	5.36
		22.68	10.93	7.08	5.96	18.34	8.84	6.15	5.28
		22.41	10.81	6.98	5.87	18.13	8.75	6.05	5.20
		22.14	10.70	6.88	5.78	17.91	8.66	5.96	5.12
Exceptional (domestic pro)	}	21.86	10.58	6.77	5.69	17.70	8.56	5.87	5.03
		21.59	10.47	6.67	5.60	17.48	8.47	5.78	4.95
		21.32	10.35	6.57	5.51	17.26	8.38	5.68	4.87
		21.05	10.24	6.46	5.42	17.05	8.29	5.59	4.79
		20.78	10.12	6.36	5.33	16.83	8.20	5.50	4.70
		20.51	10.01	6.26	5.24	16.62	8.11	5.41	4.62
		20.23	9.89	6.15	5.15	16.40	8.02	5.31	4.54
		19.96	9.78	6.05	5.07	16.19	7.93	5.22	4.46
Excellent (e.g., cat. 1)	}	19.69	9.66	5.95	4.98	15.97	7.84	5.13	4.38
		19.42	9.55	5.84	4.89	15.76	7.75	5.04	4.29
		19.15	9.43	5.74	4.80	15.54	7.66	4.94	4.21
		18.87	9.32	5.64	4.71	15.32	7.57	4.85	4.13
		18.60	9.20	5.53	4.62	15.11	7.48	4.76	4.05
		18.33	9.09	5.43	4.53	14.89	7.39	4.67	3.97
		18.06	8.97	5.33	4.44	14.68	7.30	4.57	3.88
		17.79	8.86	5.22	4.35	14.46	7.21	4.48	3.80
Very good (e.g., cat. 2)	}	17.51	8.74	5.12	4.27	14.25	7.11	4.39	3.72
		17.24	8.63	5.01	4.18	14.03	7.02	4.30	3.64
		16.97	8.51	4.91	4.09	13.82	6.93	4.20	3.55
		16.70	8.40	4.81	4.00	13.60	6.84	4.11	3.47
		16.43	8.28	4.70	3.91	13.39	6.75	4.02	3.39
		16.15	8.17	4.60	3.82	13.17	6.66	3.93	3.31
		15.88	8.05	4.50	3.73	12.95	6.57	3.83	3.23
		15.61	7.94	4.39	3.64	12.74	6.48	3.74	3.14
Good (e.g., cat. 3)	}	15.34	7.82	4.29	3.55	12.52	6.39	3.65	3.06
		15.07	7.71	4.19	3.47	12.31	6.30	3.56	2.98
		14.79	7.59	4.08	3.38	12.09	6.21	3.46	2.90
		14.52	7.48	3.98	3.29	11.88	6.12	3.37	2.82
		14.25	7.36	3.88	3.20	11.66	6.03	3.28	2.73
		13.98	7.25	3.77	3.11	11.45	5.94	3.19	2.65
		13.71	7.13	3.67	3.02	11.23	5.85	3.09	2.57
		13.44	7.02	3.57	2.93	11.01	5.76	3.00	2.49
Fair (e.g., cat. 5)	}	13.16	6.90	3.46	2.84	10.80	5.66	2.91	2.40
		12.89	6.79	3.36	2.75	10.58	5.57	2.82	2.32
		12.62	6.67	3.26	2.66	10.37	5.48	2.72	2.24
		12.35	6.56	3.15	2.58	10.15	5.39	2.63	2.16
		12.08	6.44	3.05	2.49	9.94	5.30	2.54	2.08
		11.80	6.33	2.95	2.40	9.72	5.21	2.45	1.99
		11.53	6.21	2.84	2.31	9.51	5.12	2.35	1.91
		11.26	6.10	2.74	2.22	9.29	5.03	2.26	1.83
Untrained (e.g., non-racer)	}	10.99	5.99	2.64	2.13	9.07	4.94	2.17	1.75
		10.72	5.87	2.53	2.04	8.86	4.85	2.07	1.67
		10.44	5.76	2.43	1.95	8.64	4.76	1.98	1.58
		10.17	5.64	2.33	1.86	8.43	4.67	1.89	1.50



Training for a Gran Fondo event.

I am a USA Cycling coach and I have clients that range from those that haven't ridden a bicycle in 40 years to elite athletes that podium at Nationals. From those of us that are somewhere in-between, this is the coaching question that I get asked most often, "**what should I do to train for an upcoming XYZ event?**" In this article, we will discuss a Gran Fondo-type event (GF).

Unlike a typical group ride, a GF is meant to be a **very challenging cycling event**, usually between 100 and 125 miles (161km – 201km). What makes it so challenging is not the longer miles, but the typical 10,000 to 13,000 feet (3,048 – 3,963 meters) of climbing on some of the more difficult GF's. If you are located in Southern California, other GF-type events include the Belgian Waffle Ride (just around the corner - 4/15/2018), which, for 2017 is 146 miles (235km) long, 40+ miles (64.5km) of dirt and 13,000 feet (3,963m) of climbing. Yes, Gran Fondos are supposed to be 'super-hard.'

With any of these super hard rides, the top finishers are usually (ex-)professional riders who know how to train for different events. So, what about the rest of us? How do we train so that we can at least finish? Organizers know that most of us regular cyclists would like to (a) start off with something a little more do-able and (b) that a lot of us work and don't have the time to commit to training 300 miles (483km)/week. This is why most Gran Fondos have 'mini-Fondos'. These 'mini-Fondos' offer less mileage, typically 35 (56km), 65 (105km), etc. For most of us, this is the best place to start. But, again, what if you signed up for the full event?

One of the difficulties in coaching is that athletes sometimes wait until well past the last minute to even start thinking about training. In reality, training should start many months prior.

TYPICAL SCENARIO

So, how do coaches put together a training plan for a cyclist that works full time, has kids that need help with homework, whose kids play soccer on the weekends, who wants to spend time with their spouse and who wants to start training with only 3 weeks remaining before a GF? But, in reality, there is only about 2-1/2 weeks of actual training when you include rest days.

LET'S START WITH THE BIKE

I recently put an in-depth article together discussing gearing. <<<[LINK TO ARTICLE HERE](#)>>> Over the past 2 years, I have been practicing many different cadence drills for more efficient pedaling. My cadence has gone from a typical cyclist average of 80 rpm to a racers average of 102rpm (60-80rpm is typical for most recreational riders). This allows me to quickly spin up when there is an acceleration, AND this is also VERY USEFUL FOR CLIMBING – something you will be doing a lot of during a Gran Fondo.

The problem with low rpm climbing is that you build up lactic acid in your legs and, after a while, they don't want to move anymore. Spinning offers two huge benefits; (a) lactic acid doesn't build up as fast since you are not pushing as hard on the pedals, and (b) any lactic acid that does get built up gets flushed out faster. What about power output? The power formula is $Power=Force*Velocity$ or $P=F*V$ for short. By spinning, you increase the velocity (cadence) and don't need as much force (Newtons) to output the same power. So, practice spinning.

What gears should you use? Personally, for the road, I believe the best overall chainring combination is a 52/34. What about the cassette? Your bike will probably have an 11-28. This won't cut it, especially for a typical



10,000 – 13,000 feet (3,048 – 3,963 meters) of climbing. Halfway through the ride your legs will either feel like noodles or will be cramping so bad you won't want to continue. The next range is 11-32. Now we're getting somewhere. The next larger option is 11-34. But, for this cassette, you will need a new rear derailleur with an even longer cage (Shimano Ultegra R8000-GS). You will also need a new chain with several more links. I recommend larger still. In fact, I highly recommend the 11-36...SRAM makes several. The solution is the WOLF TOOTH RoadLink. [Again, please read the article here.](#)

With a 34 chainring and a 36-cassette cog, you will make easy work out of the steepest Gran Fondo climb.

TRAINING PLAN

Since GF-type events are both distance and climbing, you will need to train both. I will usually sit down with my clients and ask what type of riding they have been doing up until now so I can determine what kind of shape they are in and ultimately where they should start their workouts.

Generally speaking, if you are going to ride 146 miles and climb 13,000 feet in one day, your body should have been recently stressed to both of these.

THE 3 BIG AREAS

Training an accelerated schedule. The 3 big areas of training for a GF are

1. **Spinning (S)**
2. **Climbing (C)**
3. **Long Distances (LD)**

Since this is an accelerated schedule, I recommend the following workouts. You will note that several are doubled up due to limited time remaining before the event. For example, since the client works full-time, on **LD** days, I recommend a ride before work, at lunch and after work. Not ideal, but this workout is intended for those that have limited time to train as well as to accomplish certain event goals. For **C** and **S** days, the client might want to do spinning before work and climbing after work. [Again, this is an accelerated schedule.](#)

You will also note that we accounted for the bare minimum of rest days as well as spending time with the kids.

SPINNING (S)

In my opinion, the best workout for your overall foundational fitness is spinning. Most cyclists have too low of a cadence and end up dumping lactic acid into their legs which leads to premature fatiguing and cramping. Spinning taxes the cardiovascular system not the muscular system and learning to spin at 95+ rpm will allow you to ride longer without muscle fatigue.

So how do you spin at 95-105 rpm? The short answer is that **it takes time**. Most cyclists will start at 65-70 rpm. The recommended workouts are 2 sets x 20 minutes at 80 rpm (or 5-10rpm over your current cadence). For the next spinning workout, the body will just about be used to 75-80 rpm so the next workout will be at 85 rpm. The following workout 90 rpm, then 95, then 100, 105, etc. If you can get to 120 rpm for 2 sets of 20 minutes **without bouncing**, you will eventually feel comfortable at a cadence of 100+ for an entire 2-hour ride. For these workouts, keep bumping up the rpms each workout, and NO bouncing.

LONG DISTANCE MILEAGE (LD)

LD days are done separately since they take up a lot of time. But, it is important to remember that you are not training for time, but rather miles. If you are like most people and work full time, as a working cyclist you have



only a limited amount of time to train, therefore, you need to train smart and maximize the remaining time you have before the event. Remember, for a GF you are training to be able to complete up to 146 miles in a single day. If you look at the schedule below, the time intensive workouts are mainly left for the weekends. But what about doing a LD on a Mon or Thurs? Install a set of lights on the bike and go out for a 5am ride, trying to get 40 or so miles in. At lunch another 20 and after work another 50. That will get you 110 for the day. During the second and third weeks you might even want to add more miles on your trainer. Keep increasing your miles so that you can kick out a 150 miler on a Saturday.

CLIMBING (C)

Training for climbing is a mix of the above two workouts. Most cyclists who would sign up for a GF should be able to do 4,000 feet on a single ride so I recommend starting there. Again, since time is limited, you should add 1,000 feet of climbing to each climbing workout.

TAPER

Several days before the GF, take an easy ride on the trainer to keep the legs fresh for the event then rest the next day.

4-WEEK TRAINING SCHEDULE

When you have selected your Gran Fondo to accomplish, write down the miles as well as the elevation. I have listed %'s for each of these for what you should complete during each training session. For example, if your GF is 120 miles (193km) and 10,000 ft. (3,048 m) climbing and the schedule lists **LD 90%**, then you should complete 108 miles (174 km) during that training session. As stated earlier, you are training in order to ensure that you can complete this epic event. That means that you will want to have several workouts at greater than 100%. So, for example, the workout states **C 110%**, then you should complete 11,000 ft. (3,353 m) of climbing during that workout.

The workout below is meant to build your distances and climbing by adding 10% at a time. If you can complete 65%, after a couple days off, you will be able to complete 75%, and so on. For the week of the event, there are several planned tapering days allowing you to recover without losing too much fitness.

SUN	MON	TUES	WED	THURS	FRI	SAT
Note: Accelerated Schedule						
LD 65%	C, S 65%	S	LD 75%	C, S 75%	REST DAY	LD 75%
C 85%	LD 85%	S	REST DAY	LD 90%	C 90%	LD 100%
C 110%	LD 110%	S	REST DAY	LD 90%	C 120%	LD 120%
C 100%	LD 100%	C 75%	LD 50%	C 50%	REST DAY	EVENT!

LOCAL TRAINING ROUTES

Several readers sent in their training routes and asked to share them with those that are getting ready for a Gran Fondo. These are great for training as you can do the whole route or partial routes. Download the GXP file into your GPS head unit and away you go! Easiest to hardest;

1. <http://ocgranfondo.com/gran-fondo/> or <https://www.strava.com/routes/3005334>



Orange County Gran Fondo. 100 miles/5,528 feet elevation. Start in Irvine through Newport Beach to Corona via river trail back to Rancho Santa Margarita via dirt trails and Santiago Canyon Road finishing back up in Irvine.

2. <http://www.philsfondo.com/route-profiles-1#double-fudge>

117.6 mile/12,456 feet elevation gain from Eastern Malibu to Calif State University Channel Islands

3. <https://www.strava.com/routes/4429640>

BWR as described above, 146.15 miles/12,959 feet elevation. San Diego county. Rancho Penasquitos, San Marcos, and Ramona.

SUMMARY

This is only a quick overview that is meant to help those who only have a short time remaining before their scheduled GF. Following the above schedule, you should have enough miles and climbing to complete the event.

Make sure that you use a roller on your legs after each workout. Also add a stretching regimen as well. This will help reduce soreness and cramping.

Learning to spin will not only make the legs last longer but will really help in the hills. Make sure to add spinning to your overall workout plan even after the GF. Spinning will help you become a better overall cyclist.

And most importantly, Good Luck and Have Fun!!

Coach Rick Schultz is an avid cyclist who trains, races and coaches in Southern California. Rick is an engineer by trade, and in addition to being a USA Cycling (USAC) Level 2 coach, he's a bike fitter and prolific product reviewer. As a USAC Certified Power Based Trainer, Rick specializes in helping the athlete achieve their goals via training with power. As a USAC Certified Skills Instructor, Rick helps athletes ride safer and race better via his bicycle handling skills clinics. Rick also teaches the local Beginner Racer Program (BRP) for USA Cycling. He's the author of [Bike Fit 101: Your Toolset for a Great Bike Fit](#) as well as [Stretching & Core Strengthening for the Cyclist and Triathlete](#). Check his product reviews website, www.biketestreviews.com, and his coaching site, www.bikefitnesscoaching.com. Rick is also the bike fitter for [Cycles Veloce \(Team Simple Green\)](#) and [Monster Media Racing](#).

