RATING OUR RIDES

Many ride grading systems use a series of descriptors such as Hard, Medium, Easy to allocate a grade to a ride. In most cases these are simply statements of how the leader feels after completing the ride. If he was whacked it was graded **Hard**; if he coasted home it was graded **Easy**. Or sometimes, it was simply a PR statement: "If we rate it Hard no one will come, so lets make it Medium". Or based on flattery: "We only do hard rides!".

We decided some years ago that this was no good. What's easy for you is hard for me. We now rate our rides using an objective, evidence-based system based on research into the power demanded of a cyclist together with studies by NASA into the endurance of cyclists when producing that power.

The research demonstrated that, for example, a good rider can sustain an output of about 175 watts for 100 minutes but only about 125 watts for 200 minutes. So we developed a system that graded rides based on the endurance they demanded.

Our Ride Grading System.

> **Level Rides**
> **Ride grade is the distance divided by 10.**
> **Level Ride Speed is 15+Grade (km/h).**

So a 60 km level ride is Grade 6.

Toss in a few hills and it gets more complex because climbing hills calls for different power outputs.

> **Hills**
> Calculate all the different powers demanded by a ride (hills and flats) at a specific speed, and then work out how long a **level** ride would need to be to demand the same endurance.
>
> **Ride grade is Equivalent Level Ride distance divided by 10**
> **Level Ride Speed is 15+Grade (km/h).**

Want more detail?

Power is determined using a formula that takes into account Wind Resistance, Rolling Resistance, Internal Resistance such as chain drag and Slope Resistance

$$P = V[R_A V^2 + Mg(C_R + s) + (91 + 8.7V)10^{-3}]/E_C$$

while Endurance is determined using a formula derived from NASA studies

$$E_m = m[(27400/(T + 97)) + 34]$$

It is important to note that the result is not linear and that the commonly used engineering equation (another favourite with the bike clubs), which equates the work done to the product of *Power* and *Time,* does not work. (Despite external appearance, we are not steam locomotives!) The problem is that the ability to complete a ride (i.e. do the work) depends on the rate at which it is done. That explains is why speed is part of our ride grading system.

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The most difficult part of the system is calculating the miriad of power demands and then finding the best fitting curve. Our computer program uses an iterative process to come up with the solution in a microsecond. Mere mortals can use the attached graph to get a close approximation.

For those wanting more detail still (!!!) we have a 19 page documentation of the process. But be warned – its fairly mathematical!