



# THE BENEFITS OF LAP TIMING

## Sectors, splits and timing systems explained...

I still remember my first track day like it was yesterday. The trepidation and nervous anticipation seemed overwhelming while I gridded up for my first lap around a race track. It's an experience I'll never forget. And, as I look back while considering material for this article, I find myself reminiscing over fond memories as I follow the timeline of my experiences from race-track-newbie to track day junky and beyond.

But, if I'm going to be honest, I don't think it would have been half as much fun without my friends who were there with me to share the experience as we pushed each other to go faster and faster, knocking a second off here and a point off there. Chasing that new 'personal best' time is what kept us going back again and again. And, if you think about it, your best time around a circuit or through a tarmac stage, really is an integral part of the reason why racing is so addictive.

Whether you're into bikes or on a bike, I think you'd have to agree that a day racing on a

closed circuit is nothing short of exhilarating! It's an experience that simply cannot be duplicated on a public road. But once the buzz wears off, the next question you may find yourself asking is, "How fast can I go?" or even more consuming, "Who can I go faster than?"

If you're a track day junky like me, chasing the fastest time you can, or you've taken the next step and entered the world of competitive racing, at some point you'll find that there's a little magic number out there that will sometimes have you smiling and sometimes lamenting, often on the same day. In this article I'll attempt to help you understand how to improve this number through the use of live lap timing and post session analysis of lap timing data with a GPS lap timing system.

My position at Roost Industries along with a short stint coaching superbikes at Phillip Island a few moons back, has given me a unique insight into the psychology behind improving lap times in riders/riders via the use of live timing

equipment, as well as benefits of lap timing with GPS timing systems.

But first I'd like to point out that, like many things that go into posting a fast lap, just knowing your lap time is not the whole answer. Getting around a racetrack quickly is generally the culmination of good rider skills, track knowledge, motorcycle knowledge and a level head... a good lap time is just the result. But if we already know this, how can we use lap timing information to help? The answer lies in the human psyche.

Most people like to learn their own lessons, racers are even worse. Some people who are, let's say "spirited road riders", often think they already know how to ride a bike fast. When they come to the track for the first time they can bring with them a plethora of habits that can be very hard to break!

Why? Because, through their own experiences, they have been conditioned to think a certain way for such a long time that

it can be a real job for an instructor to break those habits. There is a myriad of information that can be taught to a new rider to help them improve their lap times such as getting early on the throttle and late apexing but unless they see the results of these lessons themselves, they can have hard time absorbing the information.

Let's have a look at the common new rider habit of rushing corners and see how having a live lap timer can help the rider understand the benefits of slowing down their corner entries so that they can get early on the throttle right.

### EARLY ON THE THROTTLE

If you ride a bike fast it feels scary right? So it stands to reason that the faster you ride the scarier it will feel? Not necessarily true... If you've ever heard a faster rider or instructor talk about being smooth then they are talking about a fast lap. You may have even heard them say something like, "Slow in fast out."

Rushing or diving quickly into corners and destabilising the motorcycle on corner entry is a common newbie trait. It feels quick because the motorcycle feels loose and on the edge, which in turn feels fast but is not necessarily the case. The problem with this kind of riding is that it has a cumulative knock on effect corner to corner, that ultimately adds up to a slower lap time. Let me explain.

If you rush a corner entry, you'll put yourself and the motorcycle in a position that makes it difficult for you to hit your apex, you will also find it much harder to get on the gas early as you'll need to bring the motorcycle back to a point where it's stable enough to start applying more throttle.

This means that you'll be late getting back on gas which in turn gives you less straight line speed to the next corner. Now, you might be thinking, "So what? Whatever I lose in straight line speed I'll make up for by rushing the next corner." Not true!

This kind of rationalisation is a false economy. To know why it helps to think of an imaginary racetrack broken up into three sections...

### BRAKING POINT

When approaching a corner, this is the point on the track that you begin to apply the brakes. The distance from the brake point to the turn in point accounts for approximately 15 per cent of the total racetrack.

### TURN IN POINT

This is the point on the track that you first apply a steering input to the motorcycle or initiate the turn. The distance from the turn in point to the apex accounts for approximately 10 per cent of the total racetrack.

### APEX

The apex is the point in the track where your motorcycle is closest to the inside of the corner or ripple strip. It is also (in many situations) the point on the track where you will begin to start to apply more throttle. The distance from

the apex to the next brake point accounts for approximately 75 per cent of the total track.

Ok, so now we've established that the largest percentage of the racetrack is made up of our third section, apex to brake point, it seems obvious that this is the part of the circuit we should be focusing on improving, as it's where we will make the most gains. For example, a faster/rushed approach into the brake point and the turn in point (25 per cent of the track) will generally result in late application of the throttle and a slower time exiting the apex to next brake point (75 per cent of the track) and in turn a slower total lap time all up.

Alternatively, a more controlled/less rushed approach to the brake point and the turn in point will result in earlier application of the throttle from the apex to the next brake point and in turn a faster total lap time.

You may now be wondering what all of this information has to do with lap timing itself? Well, this is where the psychology comes in to the equation. I've often found when looking at a racetrack in the above way, the answer to the question, "How can I improve my lap times?" seems very clear. I should focus on increasing my speed through the part of the circuit that covers the largest percentage – apex to brake point.

However, as I mentioned before, people like to learn their own lessons, racers can be stubborn and there's only so much information you can tell someone before they start to tune out and revert to old habits. This is where a good timing system can really help. If you give someone the information they need to drive a motorcycle faster they may listen but until they see results it can be difficult for them to reject the old misconception that "Scary is fast".

A good lap timing system really is the only way to see the benefits of lessons such as the

one described above. If you have a live lap timer on your motorcycle you can see instantly if the lap you just did was faster or slower and you can capitalise on that information immediately.

Let's say you're at Phillip Island Circuit and look down at your timer and see a personal best time and think, "What did I just do to achieve that time? Ok, I remember that I entered turn 12 slightly slower but I think I got on the gas earlier. Wow that didn't feel that fast but I've just busted my best time!"

It's this kind of instant feedback that allows you to make significant gains and realisations that you would not normally make if you were simply checking your times after each session and thinking, "Oh, that was a good lap, what the hell did I do to achieve that time?"

If you have done 10 laps and are trying to recall which one was the faster one, you may even fall into the trap of thinking it was the one that felt scary and loose when in reality that was probably one of your slower laps. Without a live timer on the motorcycle you may never know.

The situation described above is only one of many where having access to reliable live lap timing data is a huge benefit in helping to improve your lap times. A quality GPS timing system will display live sector times with a plus/minus or green/red indicator to show you whether your last sector was better or worse than previous sectors. This is a very handy tool for setting a qualifying time as it allows you to make a judgement on whether you are on a good lap or not when you are only half way through that lap. If you see a lot of red sectors popping up you will know you are on a bad lap and you can back off, save your tyres and push harder on the next lap. Alternatively if you see a lot of green sectors then you'll know that you are on a hot lap and should keep pushing for good time. ■





Yet another example is in post session reviewing of logged data. Many GPS based lap timing systems will allow you to review information such as speed and position at any point on the circuit.

Some of the better systems allow you to run comparison analysis between two laps. So, let's say you would like to compare one of your slower laps to one of your faster laps. Or even better, you have a friend who is riding a similar motorcycle and is consistently a second or two a lap quicker than you and has generously offered to let you use his lap timing data.

You can overlay these two laps and see why he is faster than you. Looking at this kind of post session data, you can compare his speed to yours at any point around the circuit and it becomes glaringly obvious what he is doing to make the gains. To take it even further, some units such will even allow you log engine information such as revs, throttle position, oil temp etc.

So, not only can you compare speed and position to a faster rider but you can also see their throttle position and revs at any point around the circuit. This kind of information is invaluable if you want to discover how another rider in a similar motorcycle is achieving lap times faster than yours. Just make sure you buy them a beer or two for the privilege!

Let's have look at a few different types of personal lap timing systems and the pros vs cons of these systems.

#### TRANSPONDER TYPE:

Transponder type systems use a transmitter that

is placed trackside and connected to a bike battery or other 12v source. The transmitter sends out an infrared beam that is picked up by a small receiver that is mounted on the motorcycle. The lap time is recorded when the motorcycle rides past the beam and trips the receiver. Accuracy +/- .001 secs

**Pros:** These are generally the cheapest lap timers to purchase.

**Cons:** They will only record lap times, no other data is recorded. Beacon transmitters can run batteries down quickly so often a 12v battery is required to power them.

#### MAGNETIC STRIP TYPE:

Magnetic strip lap timers have a small magnetic pickup that is mounted on the motorcycle and connected back to the lap timer. When the magnet travels over a magnetic strip in the track the timer records the lap. These timers are popular with kart racing because they are very accurate especially on smaller circuits. Accuracy +/- .0001 secs

**Pros:** Fairly cheap and simple to run. Extremely accurate.

**Cons:** Can only be used on a track that has magnetic strips installed. They will only record lap times, no other data is recorded.

#### GPS LAP TIMERS

GPS lap timers use a Global Positioning System to record the motorcycles position in time and space. From this information many things such as lap times, 1/4 mile times and 0 – 100 times can be deduced.

**Pros:** Will delivery much more useful information than transponder or magnetic



type. Do not require external "pick up" source. Can display live split times. Accuracy +/- .01 secs

**Cons:** These are generally the most expensive lap timing systems.

I'm sure you've realised by now that GPS based timing systems really are the choice for ultimate lap analysis. The ability of a GPS based lap timer to log lap information at all points around the circuit gives the user far more usable information than any of the other above mentioned systems. However, when purchasing a GPS timing system there are a few things you should look out for.

### EASE OF USE

If you can, try to have a play with the unit first. GPS lap timers generally have options out the wazoo which can mean a difficult learning curve while you become familiar with all the functions. A good timer should be intuitive to use with comprehensive, easy to understand instructions. There's no point buying the best system in the world if it's too difficult to use.

Many systems require you to create or set up each track by riding around the circuit and inputting start lines, splits etc. Some systems come with a pre-loaded track library so all you have to do is select the track and away you go. This is definitely a plus as it means you're not wasting time setting up new tracks.

### PC ANALYSIS SOFTWARE

All good systems come with PC analysis software. Again, this software can have a difficult learning curve and you don't want to have to go back to school just to learn how to analyse your timing data.

### FUNCTIONALITY

Make sure the system is capable of recording data for all the situations you plan to use it for. There's no point buying a timer that only logs circuit data if you plan to use it for rally stages. Most good timers will have their functions listed on the box or website.

### ACCURACY

The accuracy of GPS timing systems is determined by GPS signal strength. Some lap timers have a built in GPS receiver and others have a separate receiver. A separate receiver is more desirable as it can be placed where it can receive the best satellite reception. Metal surfaces can interfere with GPS reception, plastic and glass will not. If you have a display screen with a built in receiver you'll need to place it at the front of the dash, under the glass, for best reception. This may not be practical or even race legal.

### 5HZ VS 10HZ

Some systems will promote 10Hz functionality as

a benefit over 5Hz. This means that the receiver logs 10-bits of information per second which will increase resolution of speed graphs but not accuracy. In my opinion, 10Hz makes very little difference over 5Hz for circuit racing and rally stages. As there is no increase in accuracy and the increase in resolution is not generally visible.

10Hz really only makes a difference in situations such as 1/4mile and 0-100 performance tests where small distances are more relevant.

### PORTABILITY

A portable system is a bonus as it allows the user to easily swap the timer between motorcycles.

This is a definite advantage if you are riding different bikes or even if you'd like to log some data from another rider for some lap comparison.

### DURABILITY

A quality GPS timing system needs to be durable. Race conditions can sometimes expose equipment to extremes in heat, shock and vibration.

### SUPPORT

Make sure the manufacturer provides contact support. A good support structure is key to resolving any issues you may have. **RB**



### THANKS TO

Special thanks to Jake Haddad from RaceChrono. You can check out their GPS lap timers and other products at [racechrono.com.au](http://racechrono.com.au).