LSR BIKE RACER AND PSYCHOLOGY PROFESSOR:

269 MPH LORING RECORD ON A TURBO HAYABUSA

AN INTERVIEW WITH DEAN SABATINELLI PhD

By Bill Hoddinott

Your scribe recently completed a comprehensive interview with 'Land Speed Larry' Forstall about his lifetime of sit-on bike racing and many records at Bonneville, ECTA and Loring.
A recent addition to Larry's team of riders is Dean Sabatinelli, who is a professor in the Psychology Department at the University of Georgia. His web page at UGA describes his specialty.

Dean has about 25 years of sit-on bike racing behind him, and plenty of records in the book at ECTA, Bonneville, Loring and El Mirage. I was intrigued to learn of Dean's combination of professional work and his love for LSR, and asked Larry to put me in touch with Dean.

When I reached him, he was a little hesitant to agree that his achievements on the track justified an article for the News, of which he is a long-time reader, but THEY DO, so he agreed to tell readers his story.

I must say Dean is an excellent interviewee: enthusiastic about the sport, an encyclopedic knowledge of it, and a quick mind to articulate answers. As with most of my interviewees, every phone chat session with Dean left my head spinning!

Dean is like your scribe in having a surname that is hard for people to pronounce or spell, so let's get that out of the way before going any further. Mine is "Hod-not" and his is "Suh-BAT-in-elly". There, that's not so hard, is it!

Bill: Dean, thank you for agreeing to an interview for the Bonneville Racing News. You have set a lot of records at ECTA, Bonneville and Loring, such as 269 mph on a turbo Hayabusa at Loring, plus you have that professional background as a university professor. I see from our chats you have already had a world of fun, travel, and adventure from two-wheel sport and have set a very fine example for our readers!

Dean: Thank you for saying so, Bill. I'm not sure about that last bit but proceed.

Bill: Tell us about your early life that took you to the professorship at the University of Georgia.

Dean: I was born in Maine, and my Dad was an engineer for Mobil Oil, so we moved around a bit for his job. I graduated from high school in McLean, Virginia, and went to college at Virginia Polytechnic Institute in Blacksburg, Virginia, where I eventually majored in Psychology.

Bill: A Virginian myself, I gather that VPI and the University of Virginia are considered the two top universities here.

Dean: I applied to both schools, and UVA politely declined. After a lousy first year I took a psychology course with an enthusiastic professor and ended up working in her lab. From there I went to the University of Florida in 1995 and became interested in the biological aspects of psychology, especially in the study of

attention and emotion. Around this time, MRI scanners were being adapted to track brain activity as well as structure, and this changed the field of psychology quite a bit. We don't know all that much about how the brain works, so there's plenty to study. I stayed on at Florida after I finished my graduate degree in 2001, and eventually moved to Georgia in 2008 after they opened a bioimaging center. Studying the human brain is sort of like trying to understand how an engine runs without taking it apart, it's a big challenge.

Bill: I had a bulging spinal disc years ago and the neurologist took an MRI of it, which he showed me. I was impressed that it looked like a very clear black-and-white photograph. Far better than the vague images on an x-ray. I know x-rays involve radiation which the body can only handle in small doses. Does the same thing apply to the MRI?

Dean: The beauty of the MRI, Bill, is that it has no harmful effect on tissue whatsoever. You could have an MRI every day for the rest of your life and it would not harm you in the least.

Bill: What about the domestic side, always an important part of the life of a man?

Dean: My wife Leslie and I have two boys, Ben, who's 11, and Cole William, who's 8. We gave Cole his middle name in memory of the late Bill Warner. Bill and I met at ECTA Maxton in 2007 when he was running his V-Max, his first LSR bike. He was trying to get it to run 200 at Maxton, and amazingly, did. As you know, Bill's determination and skill led him to dominate asphalt LSR and eventually become the fastest sit-on rider at 311 mph at Loring. Bill was an extraordinary man, and we were friends until the end of his life. I miss him.

Bill: How did you get into racing motorcycles?

Dean: There is a lot of drag racing in Florida, much of it at Gainesville Raceway which is owned by NHRA and hosts national Pro events. There was also a great South Eastern Motorcycle Drag Racing Assn that was run by Jackie (wife of Pro Stock George) Bryce & Doug Frierson that met 5-6 times a year. My brother Art and I rode trail bikes in Maine as kids, and we raced motocross for a few years in Virginia, but I had never tried drag racing. Right after grad school I bought a Kawasaki ZRX 1100, which was essentially a Kawasaki ZX-11 that the factory had converted into a second Eddie Lawson Replica, with water cooling and 4 valves. I took it to a test-n-tune night at Gainesville raceway and was hooked. I didn't have a lot of money, but there were parts out there for the ZX-11, so over the next few years it transformed to a street/strip bike that went 9.23 normally aspirated, 8.77 on nitrous, and 8.17 turbo, at 64" wheelbase with a street tire & no wheelie bar. The ZRX was carbureted, and I didn't use an intercooler, just a bunch of lead mixed in with C-16 and lots of ignition retard. Muzzy was running a ZRX in Prostar's Streetbike Shootout class at the time, and they kindly provided me with a turbo header and dry sump oil pan at cost. Kevin Cadby and I spent MANY nights after-hours tuning the ZRX at a bike shop in Jacksonville, Stock-Mild-to-Wild.

I raced this bike for a few years in SEMDRA and Prostar, up until 2007. It was a lot of fun, and I tried hard to break into the 7s, and finally decided to try nitrous injection on top of the turbo. It worked on the dyno, but at the dragstrip I lost not one, but TWO cylinder heads in two tries down the track. I gave up and parted out what was left of the bike and started planning for a new project.

Bill: What exactly happened to the cylinder heads?

Dean: I don't know precisely, I think the engine was making so much heat, or maybe some kind of uneven nitrous distribution was happening, but 1 or 2 cylinders showed melted holes between the two exhaust valve seats, right into the water jacket, it made me cringe to see.

Bill: Wow, that is the FIRST time I ever heard of that particular failure! On a four-valve chamber, the metal between the two exhaust valve seat inserts is an obvious hot spot, but the water-cooling is supposed to keep it from overheating. I have heard that with air-cooled four-valve engines, the area between the two exhaust valve seats is a limiting factor for how much power can be pulled out of the engine.

Bill Hoddinott: Dean, tell us about your first adventures in LSR sit-on bike racing.

Dean Sabatinelli: I remember telling my wife Leslie that I would take a year or so off from racing, but that lasted 6 weeks. I found a crashed 2006 Kawasaki ZX10R and started building it into a land speed bike. Started in unfaired "naked" classes, mostly because the bodywork is expensive. This new generation of ZX-10 1000cc four-valve four-cylinder water-cooled sport bikes started in 2004 and were much lighter and more powerful than ever. Kawasaki has been very successful with them in the World Superbike Championship against stiff competition from BMW, Honda and Suzuki. It's basically a production road bike and many have been sold, but the factory has done just about everything possible for performance while meeting emission laws and so forth. This leaves little for the racer to do to convert them, except to add compression, cams, port work and exhaust to try to get 10-15% more power. It is noteworthy that the ZX-10, and later the ZX-14 (both are still in production for '23) were the first Japanese four-cylinder bikes to make the cylinder block in one piece with the upper crankcase casting. This made a more rigid engine structure, but it also made it more difficult for LSR racers to increase bore and stroke. Larry Forstall can tell you more about this than I can, but the Suzuki Hayabusa always had a separate cylinder block, from the first production for '99, up to today's '23 bikes. The Hayabusa thus could be bored and stroked to 1800+ cc from the original 1299 (and subsequent production stroker 1350). The aftermarket has made both solid and water-cooled big-bore blocks for the Hayabusa. But for turbo use, most people stayed with the original 1300 or 1350 cc for the Hayabusa, for more structural strength, since with a high boost and methanol, 700+ horsepower can be pulled out of them with reasonable reliability. As I understand it, this was how Bill Warner developed his bike when he went 296 in the standing mile and 311 mph in 1.5 miles at Loring.

I was hoping to go 200 naked at Maxton with the ECTA, and made a rookie mistake with my first bike, running it on C-16 and "dry" nitrous, using a single nitrous nozzle into the airbox. This is fine for short bursts on the street or even the ¼ mile, but not for the standing mile. The result of this was poor distribution of nitrous, and one piston ring land melted.

Bill: You were using the stock airbox?

Dean: Yes, minus the filter. The bike has a ram-air system built into it to duct air from the front of the bike and give a little free supercharging at high speed. Just an example of how the factory designed this bike for high performance and easy conversion into serious racing. I realized my first nitrous design was faulty and replaced it a few years later with a four-port dry nitrous system. This eventually gave me 203 mph in the mile naked, and 217 mph with a fairing at Maxton.

Bill: It has always been said that nitrous is touchy and will melt pistons in a heartbeat if there is a leanout.

Dean: Exactly. The electronics I had for the engine had to control the fuel injection very precisely to give the power with the nitrous and keep the chamber temps in the safe range. I was using a Dynojet Power Commander in combination with the factory electronics and Brian Livengood tuned it at his shop, Livengood Motorsports, in Lawrenceville, GA.

But before that, I ran the ZX10 normally aspirated for a season, going as fast as 186 without a fairing at Maxton. Then in 2008 I found a great fabricator and converted the ZX-10 to use a turbo. At the start it had no intercooler, but after lots of practice at Maxton, it got up to 200 naked at 7psi boost. I was REALLY happy about this, and immediately replaced the wastegate spring and went 209 on the next pass. Later that season it got up to 217 naked, and 226 with a small fairing. I took that bike to World of Speed that year and was told that the salt was excellent. I was lucky to run 208 in MBG-1000, and earn my red Bonneville 200 Club hat. Many thanks to all the wonderful folks at the ECTA for providing me with a place to learn and get most of my rookie mistakes worked out before heading out to Bonneville!

Over the next few years I ran my ZX-10 turbo, adding an icewater intercooler built into the intake plenum. This is critical at higher boost, because the compressor heats the air as it compresses it, and it is important to take some of the heat out of it.

Cooler intake air is denser and reduces the tendency to detonation in the chamber. There are a lot of factors to balance in any racing engine, you are always looking to maximize reliable power while keeping chamber heat down. The small cylinders of a four-cylinder engine have a natural advantage in reducing the tendency to heat and detonation and allowing high compression and high manifold pressure with a turbo, while still retaining reliability.

But you recall the lesson I learned with my ZX-11 drag bike with the turbo and nitrous, it only took a couple of seconds to build up enough heat to melt holes in the cylinder head between the two exhaust valves, right through into the water jacket! At Bonneville you have to run for miles to get your records, so that makes tuning and heat management very important.

I took my ZX-10 turbo to Loring in ’09 and ran it 220 naked and 245 faired, the fastest the bike had been. My too-soft road race tires didn't survive, though, and I was able to ride Greg Williams’ turbo ZX-14 to a 234 record, which felt like a Cadillac compared to my ZX10.

Bill: In 2010 you got some support from Scott Guthrie when you returned to Bonneville with your turbo ZX10 to reset your naked M/BG record to 215 mph. That record is still in the 2022 SCTA Rules and Records book. Tell us about that.

Dean: Scott and I met at ECTA and Loring events, and of course he has a long and successful history at Bonneville. He knew I intended to return to Bonneville and offered me a healthy contingency for any record I might set if I added his name to the entry. This sounded fine to me, as I was going in any case, and the travel expenses from Georgia to Utah are significant. This worked out well for both of us, and it led the next year to Scott offering one of his "milder" turbo Hayabusas to me to ride at Maxton. This went fine, and later in 2010 I rode his "full strength" turbo Hayabusa at Maxton without a fairing to try to set some records at a few different displacements (with the same engine, which is legal at ECTA events). This specific bike was built by the late Dave Owen for Charlie Anstaett, who went 259 on the bike at Maxton

before selling it to Scott. We set several records, going as fast 239 naked, and Scott paid me contingency for each record. This seemed like a great way for me to spend a weekend!

At this time, Scott had teamed with Todd and Debbie Dross to manage his pavement LSR efforts. Todd was a careful mechanic and tuner who saw to the preparation and maintenance of the bikes, and was always focused on safety first, which I appreciated. Debbie handled operations and the considerable paperwork of the entries for the bikes, since an entry fee had to be paid for almost every pass the bike made. Scott liked to run the bike and change classes to support the ECTA with entry fees and set as many records for his team as possible. I know he had LOTS of records in the ECTA Maxton book when it was closed at the time ECTA had to move to Ohio. The ECTA always had a good relationship with the Maxton Airport Commission, but the time finally came when the Commission wanted to do some development on the part of the airport runway area ECTA was using, so their lease was lost. ECTA Maxton ended in '10, there were no ECTA meets in '11 during the search for a new home, and in '12 ECTA started up again at an airport in Ohio.

Bill: Scott was a real blessing to the ECTA at Maxton for many years, Dean. He was entrusted with running the whole bike side, which he did very ably. He also liked to ride his own bikes there and set many records; for which he paid entry fees just like everyone else. I recall he had his professional career for many years as a licensed expert witness for court cases involving motorcycle accidents. This was very responsible work involving traveling all over the country and working with lawyers representing insurance companies or individuals hurt in motorcycle accidents. His role was to get at the facts and the truth about the accidents and who was responsible for them. As an expert witness he had to appear in court and present the facts to a judge, jury and opposing lawyers. We can imagine those scenes. The work was probably well compensated and should have been, for the professional responsibility and all the efforts, expenses and inconveniences of travel and lodging. Evidently it enabled Scott to afford the finest racing motorcycles which he rode in LSR for years, and to sponsor other riders such as yourself, right up to the present.

Before we move on, Dean, there is a LOT to talk about from the rider's perspective about running the fast turbo bikes at Maxton's standing mile, and you are one of the folks who can tell us!

I ran my Ardun roadster there from '99 to '05 so I know after the finish line there was a slight dogleg to the right, and 5/8 of a mile in which to stop the car or bike. On the left side of the course after the finish line there was a wooded area where the trees had been cut but the stumps remained. This area had, unfortunately, been the scene of the deaths of one or two racers over the years who for whatever reason, went off the course into it.

So, I'm thinking: this 700 lb projectile you're on crosses the finish at 239 mph, there's the dogleg, and all the braking has to be done with the front brakes through a front tire contact patch about the size of my palm. Not only that, but you were riding the bike in naked, no-fairing form, so there was that hurricane of what the Brits called "judgment-spoiling" wind on you. How does the rider handle all this?

Dean: (chuckling) It sounds bad, Bill, but it's not really as hard as it seems. The Hayabusa dual disc front brakes were tremendously powerful, quite capable of locking the front wheel anytime (but of course this is a thing the rider NEVER wanted to do!).

Bear in mind that Bill Warner set a 272 record at Maxton in '09 with his turbo Hayabusa, and got the bike stopped on its tires. This was the all-time Maxton standing mile record, by the way.

Anyway, as far as the wind, you recall that I had years of experience riding my naked drag bikes up to 180 or so. The wind makes you tuck in as tightly as possible, "under the paint" as they say, and you get used to it. So naked bikes at even higher speeds didn't seem too different to me. I will say racing partial-streamlined bikes DOES make a big difference in comfort for the rider. The first time I rode with a fairing I thought the engine might be hurt, it felt so slow.

Bill: Let me interject an old saying here, Dean, "It's all what you're used to…"

Dean: That is so right. Okay, I'm crossing the finish line at 239 mph at full throttle, and the first thing I do is roll gently off the throttle and let the chassis stabilize from the great chain pull making the front-end light. Next thing is to bank a little to the right to line up for the dogleg. Then I'd sit up a little, point the bike dead ahead, and squeeze the front brake progressively to scrub off speed. You cannot jerk the lever or the front tire might lock. The rear brake is mostly useless in this scenario because of the great weight-transfer to the front, and it will easily lock if you try to use it.

On concrete you do have a lot of traction for the front tire, so you can brake hard even with the inertia of 700 pounds of weight at 239 mph. The net result is the bike slows down quickly and 5/8 of a mile gives plenty of margin of safety. So, it was not a scary situation. If you want to see this done really well, check out Bill Warner's on-board videos from the Texas Mile. They have a short shutdown there and Bill would barely make it at his speeds. He didn't make it once, after some of the asphalt had been resealed, and injured himself pretty seriously.

Bill: That is very illuminating, Dean! One last point, I know tire pressure affects the contact patch of the tire against the surface. Less pressure, more contact. How much pressure did you have in the tires of Scott's turbo Hayabusa?

Dean: We used 40 psi in the front for reduced rolling resistance and more speed. I think Todd went with 25-30 in the rear for best traction. You are right that less pressure in the front tire meant less grip for braking, but we had plenty of braking power as it was so we were able to use the higher pressure safely.

Bill: That is a good example of the subtleties and nuances that go into the preparation of a really successful LSR bike, Dean. Concrete airport courses are one thing to deal with, and Bonneville and El Mirage would be another.

This is a good break point for Part 2, and in the next Part we'll talk about the rides you had for Scott at Loring in 2010.

Bill Hoddinott: Okay, Dean, besides doing so many ECTA meets in 2010, you also went to Loring that year to ride Scott's turbo Hayabusa. Tell us about that.

Dean Sabatinelli: We had quite a time at Loring that year. Scott wanted to set as many records as possible, both naked and faired. Todd and Debbie set up the bike and the entry paperwork so we could make a pass, and if it beat the existing record, ride to impound, get checked out, hand in the class change form, and ride right to the staging lanes. They would peel off a strip of masking tape to reveal the new class,

cool the engine with fans and look at the data from the logger and tweak as needed. We made 10 passes and set eight records, with the fastest naked pass on Saturday at 244, and the fastest faired record 269 mph -twice- on Sunday, the second day of the meet. I wanted very badly to break 270 with it, but after two consecutive record 269s, time ran out and the meet closed at 5PM. I love building, tuning, and riding my own bike, but that event with Scott and his team was a huge amount of fun.

Bill: Tell us more about the way Scott's 1300 turbo Hayabusa was set up.

Dean: It had a 5" extended swingarm but otherwise the frame was stock, no added fork rake on this one. It had a big water-intercooled turbo and ran on C16 gasoline.

A lot of drag and LSR Japanese bikes use the extended rear fork. The purpose of it is to reduce wheel-standing in the first few gears since it puts more weight on the front wheel. On the other hand, it reduces the bike weight on the rear wheel, which reduces traction. So there is a trade-off here when there is no wheelie-bar on the back, and five inches is a good tradeoff point.

The electronics for the turbo control the waste gate so that boost is limited in the lower gears, or there would be either wheelspin, or lifting the front wheel too much. In first gear the turbo makes only 5-6 lbs of boost, and by third gear, 18-22 psi. By fifth and sixth gear you get max boost of 30 psi or so. You can imagine how hard the bike accelerates with this kind of boost, it just keeps pulling!

Bill: Wow! We can imagine the thrill of riding a missile like this! I'm curious about the stability of the bike at super-high speeds.

Dean: Suzuki engineers designed the bike for stability up to 200 mph or so, and they did a wonderful job. It continues to be stable up to around 260, despite the extra weight of the turbo and so forth, but from there up to 269, it often shows a sort of low-frequency oscillation which can be scary. We couldn't find the source, it was just an oscillation of the whole bike. The scary part for the rider is that it's hard to know if the oscillation is stable, or if it will suddenly get worse as the bike hits different parts of the course. We checked over everything twice but couldn't find anything off.

Bill: Was there any crosswind on the day which could have been involved?

Dean: We were lucky, the wind was pretty calm all during that meet. The bike didn't have an enclosed tail fairing. Those make the bikes more sensitive to crosswinds.

Bill: What kind of steering damper did it have?

Dean: A Scotts Racing adjustable damper. These have concentric damping, no telescopic unit on it. They are the state of the art today.

Bill: The stability of the sit-on LSR bikes at the high speeds, over 250, is quite a subject. Our friend Larry Forstall feels that they are unpredictable over 250. In other words, they are going so far over the original engineers' design intentions, their stability can't be assured, for the rider's safety. Gusts of crosswinds can have sudden effects on them. And yet, Bill Warner did 311 on his turbo Hayabusa which had a tail fairing, and Ralph Hudson and Al Lamb ran their turbo 1000cc Suzuki and Honda with tails right up to 300 mph at the Bolivia FIM meet a few years ago.

There is a lot to talk about here. Larry and I discussed this, and I asked him why the 1000cc turbo bikes of Ralph and Al seemed stable near and over 300 mph, but the Hayabusa turbo bikes seemed to be less so. Larry said he thought the difference was the size and weight of the two classes of bikes. The 1000s were only 2/3 the size and weight of the 'Busas. He also pointed out that at Bolivia, Ralph did hit a mile marker during one pass, evidently from a gust of crosswind.

No question that Ralph Hudson was one of the greatest LSR sit-on bike builders and racers of all time. The mysterious crash at Bonneville a couple of years ago that took his life was a great loss to LSR.

Dean: I think we have very little data on how these bikes perform at these speeds, and there are so many interacting variables, it's hard to know how it might be resolved. I'm not an engineer.

While I was riding Scott's bike, Bill, I also took my own turbo ZX-10 along to the meets and rode it as well. It set a 245 record standing mile at Maxton, but at the end of 2011 I retired it. I was shooting for 250 in the mile, running it on ethanol with 32 psi manifold pressure on a 10-1 compression ratio. It made great power on the dyno, but would hurt pistons on the track, ovaling-out the wrist pin bores. I think the pistons were just not up to the stresses of the 12-13K rpm I was running. They didn't downright fail, but the pin bores loosened up in a disturbing fashion.

Bill: Why were you using ethanol (drinking alcohol) in your ZX-10 instead of methanol?

Dean: The injectors I had on it did not quite have the volume capacity for methanol, but it was okay for ethanol. The two fuels are very similar and give almost the same power. Methanol is much cheaper, but also more corrosive.

Bill: What was next, Dean?

Dean: For '12 I decided to try building a newer ZX-10 for Production Class. For that class you can do anything inside the engine as long as it looks stock and is within the cc size. I installed 14.5:1 pistons, had the head beautifully ported by Jim Gilnack at Competition CNC, and put a straight pipe through the OEM catalytic converter box. We tuned it on a chassis dyno and it made 197 horsepower on ERC 110 octane SCTA spec gas.

This bike turned out to be a disappointment, though. I found out Production class is a lot harder than it looks!

I took the bike out to the new ECTA Ohio meet in 2012 and ran it to 193 mph, but a BMW there ran 198 in the almost the same class. I suspect that the stock fairing of the ZX-10 did not have the best aerodynamics and that may have been what was holding it back.

Bill Hoddinott: Okay Dean, what was next?

Dean Sabatinelli: In early 2012, I got a call from a good friend Karl Gunter, who had built and set several records with a gorgeous 1635cc NA Hayabusa. He accomplished what he wanted and made me a great offer for his bike. I said yes on the spot and parted out the production ZX10.

Karl had always run the bike with a fairing, so first I just took the fairing off and ran it in the naked 1650 gas class at the Ohio ECTA track to a 212 mile record. Then I got a notion to take it to Bonneville and converted the rear coil-over suspension to a hard tail with a strut. That is, rigid rear frame. This would allow me to mount a water tank on the swingarm in its place (that I got from Larry Forstall) and remove the radiator, saving drag.

The next thing that happened was that our great friend Bill Warner, whom we all rooted for in his hope to break 300 in the standing mile, crashed and died at Loring on July 14, 2013. He had hoped to check off this last box, and then retire. Everyone who knew, admired and respected Bill was CRUSHED. Including me. So much so I didn't feel like riding in LSR asphalt events again for quite a while.

Bill: Right, when I recently interviewed our mutual friend Larry Forstall, who was one of Bill's sponsors at the time, he told me he is still haunted by that memory today, nine years later. Larry said he thinks the sit-on bikes can't be made safe enough for speeds over 250, since there are so many unknowns about the physics controlling them, and the ever-present possibility of gusty crosswinds with unpredictable effects. I tend to agree with that. There are innumerable class records under 250 mph for LSR bike racers to try for with much less risk.

Dean: I'm inclined to take that view as well, Bill.

Eventually I decided to go back to Bonneville with the naked 1635 Hayabusa. I got rained out in 2014, but wanted to try out the hard tail and took it to Loring in 2015. The first pass I made the bike was so rough over the pavement joints that I could barely see! This was not going to work, so I went back to the pits and borrowed a shock from the always helpful Daly family and went back to a stock suspension and radiator. In this set up it went 212 for the mile and 217 in the 1.5. But an oil gauge line came loose on the return road, and I was terrified that I had just destroyed this super expensive engine. I parted out the bike again, missing the cheap power of turbos. So, in 2016 I decided to go in a whole new direction and stay away from the paved tracks.

Bill: Oh? That would be a major change from what you had been doing, with the 269 at Loring on Scott Guthrie's bike and all the rest of it.

Dean: Yes, I decided to go back to my tried-and-true naked ZX10 platform and to set a goal of getting in the El Mirage 200 MPH Club, which would be a big task, but keep me at lower speeds and off asphalt.

Bill: Wow, that would be a lofty goal indeed!

Dean: Yes, it would be challenging to build a ZX10 that could do 200+ in 1.3 miles on dirt. I didn't realize at first just how tough it would be to make this quest a reality, though!

Racing at El Mirage is not really designed for people outside California. To set a record, you need to first be a member of a club. The current SCTA is made up of twelve traditional clubs, and to my knowledge only two of them will consider folks from outside the area as Associate Members. The El Mirage events are run by SCTA clubs as a volunteer effort, with all the many duties distributed across the clubs. As an Associate Member, I pay a little extra in dues, but am excused from these duties unless I am at an event. For me this happens at most twice a year, so I am grateful and honored to be part of the Gear Grinders club (the champion club in 2021 by the way!).

To become a member, you need to show up at an event and introduce yourself, and hopefully find a current member to support your application at the next club meeting. If you are accepted, you can enter an event as a rookie. You cannot set a record as a rookie. If your rookie meet goes well, you can try for a record at your next event.

Bill: Wow again, Dean, I did not know about all these restrictions, but I can understand the reasons for them. SCTA doesn't want 'just anybody' piling into their meets, they want what was called "The right crowd, and no crowding…" at the old Brooklands oval paved track in England between the two World Wars. SCTA officials can't handle but so many entries to the EM meets, so these restrictions make sense.

Describe exactly what you had to do to qualify.

Dean: In 2016 I flew out to California and met with the Gear Grinders club. In '17 Dave Consalvo very kindly offered to let me ride his SCTA-legal Hayabusa for my rookie El Mirage meet. The SCTA folks were welcoming and professional, and all went well.

I ran into some delays with my bike, so John Noonan kindly offered to let me ride his street Hayabusa in November 2018, which also went well, and I was able to bump the record in the newly-opened Modified chassis class, MPS-G 1350, at 190 mph. Fun stuff.

Then I finally finished up the ZX10 for the naked M-F 1000cc class. I had experience using E85 and nitrous, and this was a lot easier and less expensive than a turbo. In November '20 I was ready and planned to run the bike on gasoline (no nitrous) to get some seat time, and maybe set a record if I got lucky. At El Mirage, your starting order is determined by your success at previous meets, so if I could set a record, I'd have a better chance for a good racing surface at the NEXT meet in May '21, when I would hope to spray it and maybe get a new hat. This worked out as I hoped, with the bike going 180 on gas, and bumping the record.

Back at home, the bike checked out fine (though dusty) and I did some final tuning before heading back out to El Mirage in May '21. The conditions were perfect, and after a few years of effort, the bike ran 200.3 mph in M-F 1000, and I got my El Mirage 200 MPH Club Hat! Thanks to all of the wonderful land speed community for making it possible.

Bill: Congratulations, Dean! I see it listed in the 2022 SCTA Rules and Records book. You also sent me a fine photo John Noonan took of the bike and yourself. We can see the bike is heavily modified on a stock-frame Kawasaki ZX10, which is the meaning of M class, and there is much of interest here. That photo of the naked ZX10 makes a fascinating case study of just how you modified it for the class and to get this much speed in a standing 1.3 mile course on dirt, so I'd like us to go over the WHOLE bike for the benefit of readers who would like to try to build one like it.

Dean Sabatinelli: Fire away, Bill, I'll be glad to describe every part of the build inside and out.

Bill: The M-F class you set the record in requires a stock frame, but modifications to the bike are allowed. I am impressed with the basic design of the frame, how the aluminum top members curve down from the steering head to the rear fork pivot area, to give great strength and rigidity to the whole bike. Which is greatly INCREASED by the fact that the extremely strong and rigid power unit is bolted to it top front and

rear bottom to make the complete combination of frame and power unit one piece which is almost completely free of any flex. This speaks volumes about why Kawasaki has been so successful for years in World Superbike racing and the Isle of Man T.T. with these ZX10s! And what's more, they have been made and sold to the enthusiast public for affordable prices world-wide to spread everyday riding enjoyment throughout the motorcycle movement!

Dean: I couldn't agree more, we are living in a time when the best sport bikes ever made are available to the public for prices people can afford. Currently something like $15K for the ZX10 (I paid $3K for mine from a salvage yard years ago). The ZX14 at 1400cc is even bigger and faster, and not much more money.

Bill: I love the idea that the ZX10 of today largely follows the design of the 1946 Vincent 1000cc Twin with the power unit bolted rigidly to the main frame member to avoid the well-known faults of the older traditional tubular steel frames in terms of flex and vibration. Some motorcycle manufacturers have persisted right up to modern times with the ancient tubular steel frame designs, but at least they have rubber-mounted their power units to minimize the vibration reaching the rider.

Dean: That's a good point about the Vincent frame comparison, Bill. I admire your friend Alp Sungurtekin's achievements with his vintage '48 Vincent special at Bonneville and El Mirage.

Bill: Okay, looking at the photo, we see the red fuel tank on top, the battery box behind, then the rider's perch, and behind the rider at the rear is the white nitrous bottle. I can see for land speed racing the original large-capacity steel fuel tank is superfluous, as well as bulky and unwanted weight. Hence you have your own tank which has sufficient capacity for El Mirage or Bonneville. What is the fuel capacity?

Dean: The tank is a bit over 5 liters, and I bought it off eBay. It happens to fit perfectly where I need it. It holds a Walbro fuel pump inside the stock pump assembly, which made for easy packaging and plumbing.

Bill: Next we see a carefully designed battery box. I know it has to be made to minimum size and safe so that it will not come adrift during a pass, but the battery can easily be serviced. We can see the whole bike is so tightly packaged that it's challenging to find space for all the essential components, while bearing in mind the rider has to be able to tuck down as much as possible to minimize air drag on a naked class bike.

Dean: I wanted to use a Hayabusa battery which is a little bigger than the original ZX10 battery. The original charging system remains in place so there will be plenty of voltage in the system to support the electronics plus the nitrous system. The engine, by the way, runs on VP C85 (ethanol) with wet nitrous in top gear. This puts me in the Fuel class. Hitting the button is worth around 75 hp, which I needed to get to 200 mph at El Mirage. But nitrous introduces its own complexities and challenges.

Bill: Okay, behind the rider we see the white nitrous bottle, I gather there was no other better place to put it on the bike.

Dean: That's right, as you noted above, everything on the bike is packaged tightly for the best possible naked bike entry.

Bill: Are those the original wheels and brakes?

Dean: No, I happened to have a set of Suzuki GSXR wheels, and I'm "frugal", so I went to a lot of trouble to use those wheels on the ZX10 chassis I had. The GSXR wheels are lighter and their axles and bearings are a little bigger. I mounted a Hayabusa fork which will accept the GSXR front wheel and holds an aero front fender. The Suzuki brakes and Kawasaki chassis took a little convincing to work together, but it works.

Bill: I see Bridgestone sportbike tires on there, they have a little tread pattern on them, but are basically slicks.

Dean: That's right, they worked fine for the 200 mph record, but SCTA Rules required me to replace them with genuine racing tires since the bike went 200, and I did so, for running the bike this year at the May '22 El Mirage meet. These are race slicks with no tread at all. They take some getting used to on the dirt.

Bill: Readers will naturally wonder how these extremely fast bikes handle on the hard-clay-pan surface at El Mirage. 100% of a motorcycle's stability depends on the grip of its two tires on the surface it runs over. Dirt or salt can't give the same grip as pavement, can it?

Dean: No, it can't. But the grip the tires do have is sufficient for stability as well demonstrated for many years with fast bikes at Bonneville and El Mirage. But if the course gets torn up by the powerful cars, the stability and feel of the bikes is a little worse. You will find that a suspended bike generally feels safe going down the course at El Mirage or Bonneville.

Bill: Results always count the most, Dean. When Les Leggitt took my wife Jerry and myself out to look at El Mirage on a visit in '13, I saw a geological surface I had never seen before! A hard flat smooth clay pan almost like good concrete paving. And this extended for miles in all directions, like the salt course does at Bonneville, which I saw in '89. Both of these are truly fabulous landscapes that occur very few places on our planet.

What front and rear tire pressures were you using on the 200 mph record pass?

Dean: I was around 40 psi in front and 30 in the rear.

Bill: We see a big chunk of what looks like lead bolted to the rear fork, obviously for ballast. Tell us about that.

Dean: Yes, there is a 30 lb piece of lead bolted to each side of the rear fork, to help with traction. I was worried the sudden hit of nitrous would break loose the traction, but it wasn't an issue.

Bill: With the rider in place and everything ready to go at the Start line, can you give us the total weight and its percentage distribution front and rear?

Dean: Altogether around 650 lbs going down the track, 46% front, 54% rear.

Bill: We see that the original rear swingarm is massively strong and rigid, but it strikes me that extra lead weight would interfere to a degree with the operation of the rear suspension.

Dean: I use a Hayabusa rear shock, Bill, which is stiffer both in springing and in damping, and an easy adaptation to the ZX10 mountings. It is true that the unsprung weight is increased with this arrangement

of the ballast, but there is not much in the way of bumps on the course at El Mirage, so the suspension isn't too taxed. I see lots of hard-tail bikes that work well on the dirt, and salt too. There aren't many places to mount ballast on a bike, especially low, so the swingarm is a popular choice.

Bill: Tell us about the gearbox and clutch.

Dean: Both are OEM units, but the clutch has stronger springs to handle the extra power of the nitrous hit. The six-speed gearbox has fairly close ratios and is designed for the stresses of road-racing. No modification to the engaging dogs is necessary, as it would be for a drag-racing application where you want instant gear changing with an air shifter.

Bill: So, no air shifter here.

Dean: No, it's not necessary, the factory made an excellent gear change and gear selector system to serious road-racing standards and I can change gear instantly and reliably with the original gear pedal. It might be nice, but there is no need for the extra expense and equipment of an air shifter. As noted before, there's nothing on the bike that isn't essential, and packaging is very tight.

THE ENGINE

Bill: Let's look at the source of power now, Dean. I see it's a four-cylinder, four-valve, water-cooled, dohc design and well-proven in the crucible of international racing competition. What mods does it have from the original standard?

Dean: It's got off-the-shelf 76 mm Wiseco pistons set up at about 14-1 compression on stock factory rods and crank. I matched the weight of each piston and rod assembly to 1/2 gram. The factory conrods and crank have been proven with years of racing success so there's no need to go to aftermarket parts at these power levels. I fit the main and rod bearings a little looser than stock, .003" on the mains and .002" on the rods to give plenty of oil clearance. You only have a minute or so to warm up the engine and oil at the start line which means the oil is going to be thick.

Bill: This is an interesting subject, Dean, what viscosity oil do you use?

Dean: I have used anything from 10w-30 to 20w-50 over the years with my ZX10s and these loose bearing clearances, and the original wet-sump system and oil pump. The viscosity doesn't seem to make any difference, I've never had any trouble with any of them. The oil pressure relief valve works at about 80 psi so I know since there's no chance to warm up the oil, a lot of it is going out the relief valve but whatever goes into the crankshaft has always given adequate lubrication, as proven on tear-down. The gearbox lubrication has always been good, no issues.

I don't pull the engine down after every meet, but I do a leakdown test on it to verify condition. The engine is still sealed from its inspection at El Mirage in May '21, and there's been no need to disturb it. Partly this comes from the fact the unit is built by the factory for racing use in the first place, compared with street-focused bikes.

Bill: The compression ratio seems very high considering you are putting nitrous on top of it, has there been any issue with detonation?

Dean: No, the combination has not shown any sign of detonation, so evidently the engine is happy like this. The ethanol helps heat, and I retard the ignition timing 4 degrees on the button. I do have 24 volts going to the original 12 volt starter, to handle the extra compression. This doesn't hurt the starter for just a brief spin. The engine starts right up.

I bought a factory race intake cam they used to sell for only $150 each. This is a bargain compared with some other factories that want $1K for them! Might mention that this is a cam over bucket engine (04-10), not the latest cam over finger-followers type. For this application, I don't think it makes any real difference. I red-line it at 13,200 revs and at El Mirage, it crossed the timing lights at 12,800 at 200 mph.

Bill: I recall my '88 Kawasaki 250 Ninja twin had finger-type followers, so they are nothing new. I assume they might have less reciprocating weight than a bucket-type cam follower.

Tell us about the electronic injection and ignition.

Dean: The original electronic timed fuel injection is in place controlled by the original computer. On top of this I plumbed in a wet nitrous system from NX in Texas, a very sharp nitrous equipment maker. This meant drilling and tapping the original throttle bodies for nozzles that take hard lines that bring in the combination of fuel and nitrous that gives you the boost but keeps the fuel mixture correct. Using wet nitrous allows me to hit the button when I choose, and not having to worry about matching the onset of extra fuel from the engine's injectors. But I use fuel from the engine pump (43 psi) for the nozzle, so the pill sizes had to be chosen carefully. The installation of the hard lines to the throttle bodies without kinking them was a job I hope NEVER to have to do again. After it was all set up, I took Bob "Stainless" Steele's advice and tested the flow of the whole setup to make sure everything matched across the 4 holes.

Brian Livengood again helped me tune the nitrous injection and the engine, he does excellent, careful work. Meant to mention that I replaced the original radiator with a smaller, flatter one which drags less air, and is adequate for El Mirage or Bonneville. It retains the original pressure cap cooling system.

Bill: Is there metering of the nitrous-fuel injection to match the engine rpms?

Dean: No, that is not necessary. My approach is to run up through the gears quickly and when you get into top gear, and reach 8000 revs, get comfy, hit the nitrous button and HOLD ON! If the traction holds, tuck in and PRAY to the gods of metallurgy until it gets through the lights.

Bill: What kind of rear wheel horsepower figures did you and Brian see on the dyno?

Dean: Without the nitrous, 185. With the nitrous with modest jets, 230. When I ran the 200 mph run, it was with bigger jets, probably around 250 horsepower at the rear wheel.

Bill: That is VERY impressive and shows the efficiency of the ZX10 design, Dean. 1000 cc equals 61 cubic inches, so if my junior high school math is right, this means 3.03 HP per cubic inch no nitrous, 3.77 HP per cubic inch with first stage nitrous, and a full 4.09 HP per cubic inch with the bigger jet you used for the 200 mph record. Terrific for an unblown engine running on E85 and nitrous. Considering the losses through the gearbox, primary drive and chain, the actual horsepower at the crankshaft would have been 10-15% more.

Why did you use E85 instead of methanol?

Dean: The stock Kawasaki injectors were oversized for this engine and have the capacity to flow enough E85 in the correct fuel/air ratios, but not quite enough to use methanol. Another advantage of E85 is that it is not as corrosive as methanol, which makes my life easier. E85 is well known for a pump fuel for cars and trucks in parts of our country. 85% ethanol and 15% gasoline. It needs the 15% gasoline for easy starting in cold weather, and to keep people from drinking it.

Bill: This reminds me that in the good old days of the early and mid-20th Century, in the UK and cold parts of the world, 80-10-10 fuel was used for racing. Methanol 80% and 10% each of gasoline and benzole. The gas and benzole were there to give easy starting on cold race mornings, since methanol by itself will not vaporize and burn below about 55 degrees F. Now all these years later E85 comes along as pump fuel in America.

At El Mirage, using E85, did you bring along your own E85 from a service station pump, or did you need some kind of special E85?

Dean: I don't use pump E85, it varies a lot from pump to pump. I bring pails of VP C-85, which is their equivalent.

Bill: What about the ignition and spark lead on the engine?

Dean: I used the standard computer-controlled Kawasaki ignition, with spark plugs one step colder to cover the high compression and nitrous. Good question about the spark lead, we didn't know and couldn't tell! It was whatever Kawasaki put into its ECU. Retarding the standard spark lead 4 degrees is just extra insurance for a land speed application. Until I need every single HP, I'll play it safe. But if I really needed it, I'd put the 4 degrees back, I think it would live.

Bill: This reminds me of the tale told about the MV Augusta racing air-cooled four-cylinder dohc two-valve 500cc engines back in the 1950s. They were world champions in GP racing for years. The story is that in the race shop, the rebuilt or new engine would be tested on the dyno by an experienced tuner, who would stand by running it about 10,000 rpm with a tremendous racket from the four pipes and megaphones, and turn the Lucas racing magneto by hand until both the power numbers on the dyno went up to the max, and the sound of the engine seemed "right" to him. Tighten the mag mounting down and take the engine out to the race, and usually win.

What about the exhaust, I see it peeking discreetly out down by the right side under the engine?

Dean: It's an Akropovic 4 into 2 into 1. I think the design of it smooths out the torque curve of the engine a bit, but with this nitrous setup, I doubt the exhaust setup matters much as long as it's open.

Bill: Okay, I think we've covered about everything, have you had the bike out since May '21?

Dean: I took it back to El Mirage in May '22 with a small race upper fairing, to go after the MPS-F class record. It did just barely clip the record at 193, but it's certainly got more in it, I need to take it back out there again for another try. Hopefully May '23.

Bill: Dean, thank you very much for taking the time to give us this story about your racing successes, and best of luck as you continue into the future!

Dean: I enjoyed it, Bill, and my thanks to you for your interest.


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