

Open Road

Measures

PRECISE STANDARDS FOR measurements of all types have been a serious concern ever since the Egyptians first began building pyramids. The Cubit is said to be the first official unit, probably the length from a pharaoh's elbow to the tip of his middle finger (450mm or 17.7").

Tradesmen in earlier times would calculate dimensions off their bodies: The cubit was divided into seven "palms" of four "digits." The width of outstretched fingers was a "span" (equal to 1/2 cubit). Small weights could be measured with a balance beam and a quantity of something like tiny carob seeds (the original "carat," a term still used for measuring gems). It's hard to miss the potential for inaccuracy in such systems, but you do have to admit they were handy.

All the great civilizations of antiquity developed their own measuring systems, and even when the names of units agreed, like the cubit, they didn't agree side-by-side.

A serious effort to unify all the competing systems on the planet didn't get much attention until 1668, but it took more than 100 years for the idea to reach fruition. Given the go-ahead by King Louis XVI of France (shortly before losing his head in the Revolution), the "Metre" became the universal unit of length and the basis of the Metric System, adopted in 1793.

In 1870, a permanent International Bureau of Weights and Measures was established in Sèvres, France, and is still home to a bar made of 90% platinum and 10% iridium engraved with the official Metre, certified accurate at the melting point of ice.

Still not satisfied with its precision, the International Prototype Metre bar was superseded in 1960 by a new definition: a distance equal to 1,650,763.73 wavelengths of the orange-red emission line in the electromagnetic spectrum of the krypton-86 atom in a vacuum. It was redefined again in 1985 as the distance covered by light in a vacuum in 1/299,792,458 of a second.

Such efforts for exact uniformity might seem almost absurd until you consider that comparisons of every kind are meaningless without precise reference points.

And despite the fact that the US, together with Myanmar and Liberia, are the last nations on the planet still refusing to accept the metric system as their primary or sole system of measurement, the SI (*Système International d'unités*) is used to define our own measuring units by the National Institute of Standards and Technology.

With its clear decimal relationships, the metric system eases conversions from one unit to the next, and its seven basic units—Metre for length, Kilogram for mass,



Second for time, Ampere for current, Kelvin for temperature, Candela for luminous intensity, and Mole for the amount of a substance—can provide equivalents for every unit of measure in use around the world. The list of these equivalents is an interesting cultural history lesson in itself. How many hogsheads, furlongs, roods, jiggers, firkins, or mickeys is that? SI has the answer.

Alas, one of motorcycling's most important measuring systems is not nearly so accurate. Mark Dobeck, the founder of Dynojet, conceived his first dynamometer primarily as a rolling road that could be used to keep a running machine stationary while attached to a gas analyzer so that it could be tuned to perfection. Dobeck, a veteran foreign car and motorcycle mechanic, was not an engineer, but his father was a skilled fabricator and inventor. Together they created the inertial roller dyno that was to change the face of motorcycling. Dobeck then asked engineers if they could assign horsepower numbers based on the dyno's response to acceleration. Although a single roller weight is not truly representative of machines of various sizes, they felt they should be able to come close. Now used by more motorcycle shops around the world than any other, Dynojet hp numbers provide a convenient and reasonably repeatable basis for performance comparisons, including MCN's.

With a showman's instincts, Dobeck chose the then-new 1198cc Yamaha V-Max as his dyno's first test subject. Billed as the most powerful production machine yet built, the V-Max was brochure-certified to make 145 hp at the crankshaft.

Cycle magazine, at the time America's most authoritative motorcycle publication, had recently tested the new V-Max. Using a very accurate Schenk water-brake dyno, the test machine pumped out a mind-warping 119.08 hp. A legend was born.

Dobeck obtained a new V-Max fresh off the showroom floor, hooked it up to his dyno and saw numbers around 90 hp. This discrepancy was a shock. His engineers assured him of the dyno's accuracy, but Dobeck understood that if its results were so far below what *Cycle* had reported, all his hard work might be discredited. So he told his engineers to adjust the software to make the stock V-Max show 120 hp. They were aghast, but did as they were told. The die was cast.

Cycle magazine had a reputation for totally disassembling test bikes to catch cheaters, and some of the more flagrant examples of this time-honored chicanery are favorite bench-racing tales among journalists. It certainly wouldn't be the first time that a hot-rodded machine had been passed off as stock to ensure rave reviews, and it wouldn't be the last, but *Cycle*'s V-Max managed to escape a teardown.

When Dobeck later found that his revised calibration scheme appeared unrealistically optimistic on other stock bikes, the software's scales may have been quietly detuned, but not so much that the Dynojet's hp numbers would regularly agree with the lower hp results of brake-type dynos.

The formula for hp is actually quite simple with a brake dyno: the torque required to resist acceleration times rpm divided by 5252. Even with the current SAE correction factors applied, the Dynojet will typically inflate power by a factor ranging from 5% on engines of 50 hp to as much as 10% or more on engines of 150 hp. As a result, some dyno manufacturers have resorted to inflated software of their own to create Dynojet-matching numbers, while others must continually struggle to explain that truthful numbers accompanied by real-world results are what really count.

Okay, that dirty little secret is out of the bag. But until the Federal Trade Commission or the SAE demands greater accuracy, and everyone must comply with the change, we all have to live with this unfortunate fudge factor.

It's as if we just crowned a new king and his "foot" was only 10" long!

DAVE SEARLE

—Dave Searle
Editor