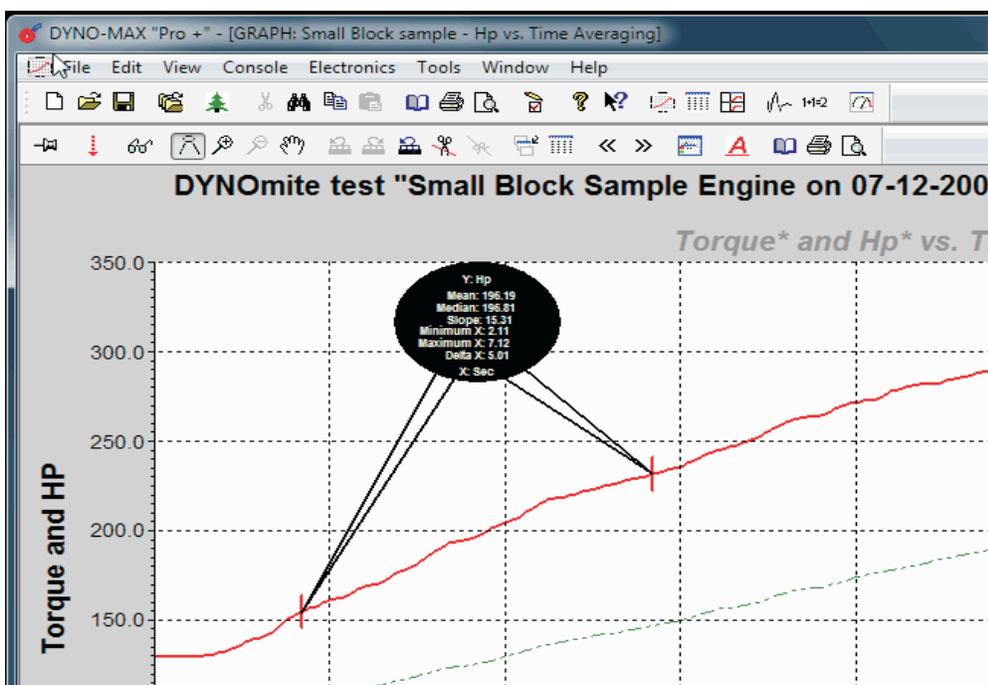


Summer 2009 – in this issue:

-  **Measure Line Tool 1**
-  **Auto-Overlying Runs 2**
-  **Tip of the Month! 2**
-  **Question of the Month...? . 3**
-  **Customer Spotlight 3**
-  **Contact Us. 4**
-  **Making Money. 4**
-  **DYNO-MAX 2010 Beta 4**



Measure-Line (Divider)Tool in DYNO-MAX 2010

While the powerful combination of DYNO-MAX's graphing tools, data points listing, and formula engine allows for almost any type of advanced data analysis – sometimes the new Measure-Line tool (divider toolbar icon) may be all you need. It displays an array of statistical characteristics for the selected line segment.

Listed items include:

Y (units) denotes what the Y-axis for your selected graph line represents (e.g. Hp – horsepower).

Mean shows you the mean average (Y-axis) value for all points in the designated line segment.

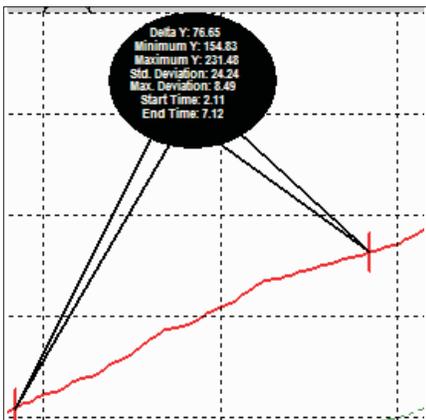
Median returns the median average (Y-axis) value for all the points in the designated line segment.

Slope returns the Y/X ratio for a straight line that connects the selected start and end points of the line segment.

Minimum-X value for the leftmost (horizontal X-axis) line point within the indicated region.

Maximum-X value for the rightmost (horizontal X-axis) line point within the indicated region.

Delta-X returns the total horizontal (X-axis) span of the designated line segment.



Delta-Y returns the total vertical (Y-axis) span of the the designated line segment.

X (units) denotes what the X-axis for this graph line represents (e.g. sec – time in seconds).

Minimum-Y value for the lowest (vertical Y-axis) line point within the indicated region.

Maximum-Y value for the highest (vertical Y-axis) line point within the indicated region.

Standard Deviation for the selected segment of the graph line.

Maximum Deviation reveals the peak deviation, from a straight line, connecting the start and end points of the selected segment.

Start Time is the X-axis time (in seconds) for the first point on the line segment – this is reported for where you clicked the first leg of the divider tool.

End Time is the X-axis time (in seconds) for the second point on the line segment – this is reported for where you clicked the last leg of the divider tool.

You can activate the Measure-Line tool either by right-clicking the mouse in the graph area (to open a tool menu) or by selecting the Measure-Line toolbar icon.

Once active, the mouse cursor turns into a divider tool with a pair of legs. The highlighted (white) leg is then used to pick the first (normally left) point on the desired graph line segment. Once this point is selected, a small vertical line marks it. Simultaneously the highlighting on the tool switches to the other leg.

During selection of the second (rightmost) point, the tool knows to lock your selection to the same line. Other Smart Pick™ features include the ability to toggle the active leg using the Alt and Shift keys. See the online help for more details on using the tool.

Auto-Overlaying Graph Runs

DYNO-MAX “Pro” users will often overlay one or more runs to compare performance between tests. However, some operators are not aware of all the “Smart Overlay™” features available to help them automate this process. In fact, the 2010 version’s tool set even accommodates two significantly different types of auto overlaying methods.

Overlaying method a)

Some users want to include the results of a particular, or multiple, prior run(s) on each subsequent run they take. The prior run may be a baseline test (e.g. before modifications) to monitor how each subsequent test stacks up to the original – especially useful if your customer is returning from a previous session. Or, it may be that the prior run represents a target goal – one of your historical best engines or even a curve imported from a competitor’s published dyno data.

To configure this, use Graph Set Up’s “Add Overlay...” button to insert overlay lines from one, or more, existing runs. If you do this before recording the new run, these overlay lines will appear on every subsequent run! Conversely, if you wait to add the overlay lines until after you have recorded the new run, those lines will only appear on that single test’s graphs.

Overlaying method b)

Some users like to use the first pull, from a new test session, as their graph’s baseline. They then want to have each subsequent test overlaid with it.

To configure this, open the Graph Set Up Editor, before recording the baseline run, and check the “Auto Overlay” box. After that, all subsequent runs appear on the same graph. Earlier runs will be available, as overlay lines, to manipulate with the additional tools explained below.

Other overlay related buttons, on the Graph Set Up Editor Screen, include *Replace Overlay...*, *Delete Overlay*, and a *Hide Overlays* checkbox. *Replace Overlay...* allows you to quickly change the source run for any set of overlays – without having to manually do it line by line. *Delete Overlay* allows you to select any overlay run in the list and remove all its lines with one click (to remove just a single line, use the *Delete Line* button). If you just put a check in the *Hide Overlays* box, display of the extra lines can be quickly toggled off – but can be shown again by simply unchecking.

The *Style* button allows selecting unique line widths and symbols to help you to identify which run is which – this is in addition to the automatic numeric line labeling. As it always has, DYNO-MAX still maintains a consistent color for all graph lines that are derived from the same formula (e.g. Torque).

Note: For a peek at the DYNO-MAX 2010 Graph Set Up Editor screen, showing the above-mentioned buttons, turn to page four.

Tip of the Month!



FINDING YOUR SETUP ERRORS

We have all heard (and said) this before: *“I didn’t change anything, but now ‘it’ is behaving all wrong – and I checked everything!”*

The expert’s response is usually a look that means: *“Yeah, right – I don’t believe you!”*

You know that the expert wins here, because things only change for a reason. The correct problem description should have been: *“I didn’t change anything I know of to make it behave all wrong – and I checked everything that I know might cause it.”*

Keep the above in mind when troubleshooting sudden changes in dynamometer results. *For example, you mysteriously begin getting data showing 200 Hp from a 20 Hp engine. There is always a reason, and you may have caused it!* Try comparing your current New Run settings (for items below) to a, pre-problem, run’s.

Atmospheric entries (Weather tab)

Inertial entries (Inertia tab)

Gear Ratio entries (Dyno tab)

Drive Ratio entries (Dyno tab)

RPM source settings (Dyno tab)

Torque source settings (Dyno tab)

Dyno Loss entries (Dyno tab)

Driveline Loss entries (Dyno tab)

RPM pulse settings (Calibrate DYNomite

Channels for engine or absorber)

Torque calibration (Calibrate DYNomite

Channels – Torque tab’s Gain or Multiplier entries)

Graph Averaging settings (Graph Set Up)

Graph Clipping should usually not be active (Graph Set Up)

Hardware failure is always a possibility, but we still suggest analyzing recorded data – before tearing into wires and sensors. Unlike being stuck roadside with a mysteriously dead auto, and no diagnostic tools, most dynamometer mysteries include plenty of computer data for tracking what has gone wrong.

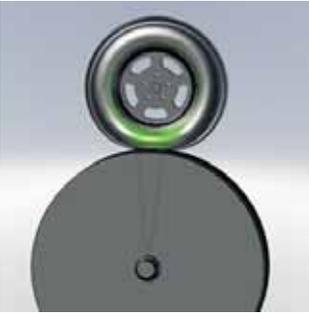
Question of the Month...?

“Why do some chassis dynamometers use huge four-foot diameter rolls if others can get by with tiny eight-inch ones?”

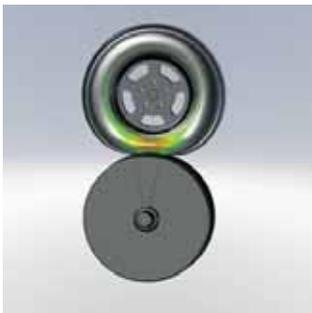
Dyno roll diameter is a fundamental component in determining the maximum safe operating speed and tire to roll torque transfer limits. As the roll diameter is decreased, the critical contact patch area between the roll’s surface and the tire’s tread is unfortunately reduced as well.

Worse still, as this contact radius is decreased the tire’s belting and sidewalls must then wrap (deform) further and further around the contour of the roll – to support the weight of the vehicle. This tire deformation is not a static event. As the tire rotates, the deformation works its way around the circumference, over-flexing almost every cubic inch of the tire.

Keep in mind that automotive tires are designed to run on near-flat pavement – please allow us to call the earth’s large “roll diameter” near flat. Yet, as you can will see in the image at right, Finite Element Analysis of a tire on a 44" diameter roll shows that relatively little added deformation is required to replicate flat-earth contact. This is one advantage (there are others) for rolls in this diameter range. This is why all tire manufactures insist that only large diameter rolls be used for high-power or high-speed testing on chassis dynamometers.



Fortunately, as long as the roll at least equals the tires’s diameter, full contact can be attained with reasonable strap-down deflection forces. See the FEA image for the same tire on a 24" diameter roll below. *Note: The green color zones represent minimal stress areas, yellow moderate, and red excessive.*



Now look at the deflection necessary to attain a full contact patch using a typical pair of (unlinked) 8½" rolls (see image at below right). It is quite alarming! Notice that, under higher loads, the forces drive the tire into the forward roll – that rear roll adds no effective support. Even if rear-biased strapping is used, that unlinked roll provides zero extra torque transfer.

All this excessive flexing stresses and heats the tire surface and sidewalls – which eats up measured power! It can also permanently damage the tire’s structural integrity. Even if strapping forces are reduced, to help lessen the sidewall damage and recover some lost power, traction suffers – and so tire slippage kills repeatability.

For more information see:



www.land-and-sea.com/dyno-tech-talk/roll_diameter.htm

Customer Spotlight

Salenbien Performance



Located in Maybee, Michigan, Salenbien Performance and its founders are well known (across the entire country) for their racing tractors. That is what led them to construct a new 14,720-square-foot facility in 2007.

It incorporates a very complete dynamometer test cell, a full machine shop, plus an engine building room with a separate, tear-down area.



The company is run as a full-service performance diesel dyno and tuning center. As the pictures show, it specializes in pulling tractors – many outputting 3,000 horsepower! Says President Ryan Salenbien, “I became interested in dynamometers when we visited a shop in New York. It was where we used to test our own pulling tractor. With no one in our area offering this type of a service, we decided to purchase a dyno and build a new business. Researching via the Internet, I came across Land & Sea and was impressed with their product line – especially their DYNO-MAX software. It’s easy to use and gives very repetitive results.

“With the help of the Land & Sea Dynamometer, we achieved two back-to-back Bowling Green, Ohio, Ring Championships and a Louisville Farm Machinery Show Championship for our ‘Never Satisfied’ Super Farm pulling tractor. Dynoing is the only way to get the maximum output for a high performance engine – hands down! We have become very well known for our services and the successful results they give to so many of our customers!”





Contact Us...

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(603) 226-DYNO

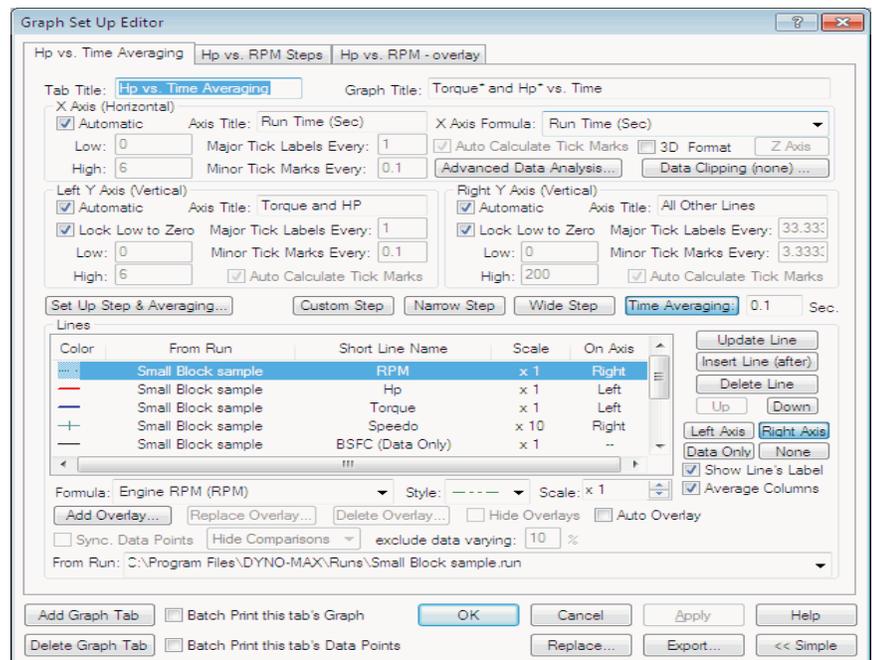
www.land-and-sea.com

sales@land-and-sea.com

or visit your

DYNOmite Users' Forum

www.land-and-sea.com/forums



Making Money...

is easier if you display “before & after” graph results (from repair problems solved for other customers) at your service desk. Or, include Dyno Test Reports for “performance packages” at your parts counter. For those service customers, the graphs allow them to see that your shop has handled, and solved, problems similar to their own before. Similarly, for the racing enthusiasts, test results get them thinking about the benefits of combinations you already know will satisfy “out of the box.”

This is a dirt cheap promotion that requires nothing but space for a small and inexpensive binder. It is really important for shop layouts that do not allow installing a window into the test cell area. That binder should include a nice cover picture of your dynamometer equipment and work area. Include some “packaged prices” in the binder and it can work like adding a good counter salesperson!



DYNO-MAX 2010 Beta is Now Available to non-“Pro” Users!

Even if you are running DYNO-MAX 2000 standard, the beta release of DYNO-MAX 2010 (version 9.6) is open to you. Here is a chance to check out many of the new features before the final 10.0 release – in the late Fall of 2009.

Most of the planned new features are already present in this beta release. The 9.6 beta version is primarily missing only some final on-line Help text, mostly documentation for the more advanced new enchantments, and updates to the included tutorials.

Provided you are currently under a Priority Support Plan, simply contact sales to arrange to have a (free) 9.6-beta CD mailed to your company. Once the official (non-beta) 10.0 version is released, you will automatically be sent a copy.