

HURST PLAYS THE NUMBERS GAME

*Two Toros in a Four-Four-Two make
Hurst's Hairy Olds the odds-on winner*

BY ALEX WALORDY

HURST PERFORMANCE PRODUCTS can always be trusted to come up with a wild exhibition machine. But this time Jack "Shifty Doctor" Watson has really outdone himself producing an encore for the ultra-successful *Hemi Under Glass* of last season. Watson followed up with the wildest 442 Olds ever built. The project took eight weeks of solid work, and was completed under a cloud of secrecy that rivals prototype new-car building at the Big Three. Presiding over the construction with Watson were Dave Landrith and race mechanics Paul Phelps, Ray Sissner, and Bob Riggle. Two blown, fuel-injected 425 Toronado engines power the 442. The power-to-weight ratio works out to about 1980 pounds per engine since the car weighs 3980 pounds. This is good enough to make top showings. Complete four-wheel drive with fully-independent suspension makes this 442 drag racing's most unique project to date. Apart from being a wild, slick-smoking machine and a crowd-pleaser, the new Hurst machine represents some interesting breakthroughs in maximum traction design, as well as new approaches to safety at funny car speeds. A conventional car builder wants a favorable static weight distribution, with most of the weight at the driving wheels. He raises the center of gravity as high as possible to increase the load transfer from front to rear. The result, of course, is wheelies.

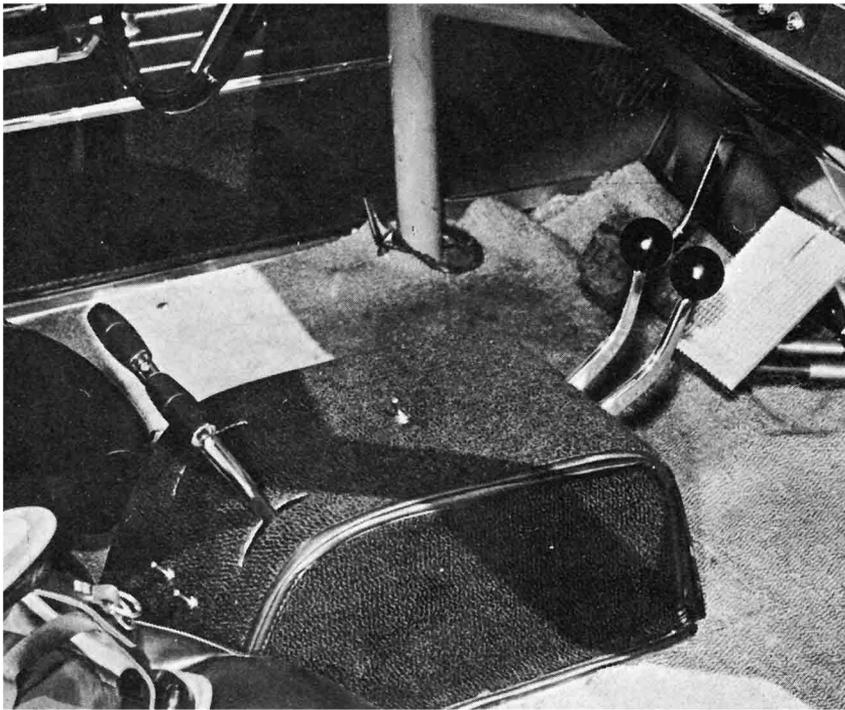
Hurst's *Hairy Oldsmobile*, with its four-wheel drive, is a different approach. Here, weight distribution under full acceleration is nearly 50/50, front and rear, allowing equal traction at the slicks. Static weight distribution favors the front, with figures of around 56/44. Weight transfer under acceleration just brings the ratio back to the optimum 50/50 for traction. A car with more weight at the front will offer stable top-end handling and tends to stay in a straight line. Since weight transfer can be kept at a minimum, the Hurst *Hairy Olds* is lower than most machines in its class. It leaves the gate with all four wheels on the ground and remains controllable at all times. ▶



One-off Olds boasts dual blown Rockets, each with its own Toronado drive train. Note stock Toro wheels.

Two Toronado drive trains with dragsterized mills plus a 442 body equal one very hairy Olds

Complex console holds controls for the dual Turbo Hydros, kill switches, and fuel shutoff valves. Converter pitch can be changed at will.

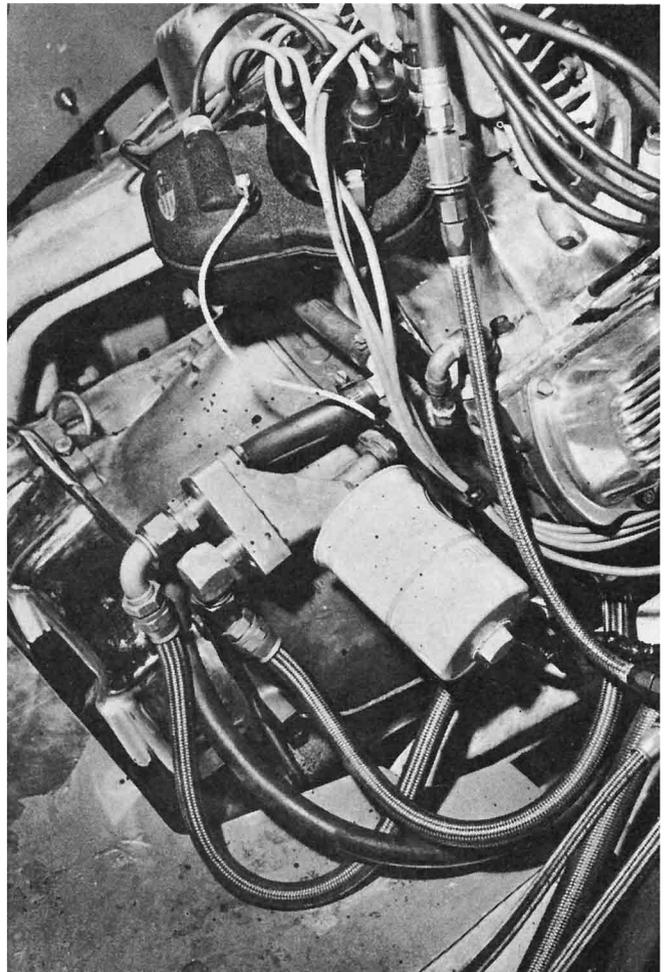
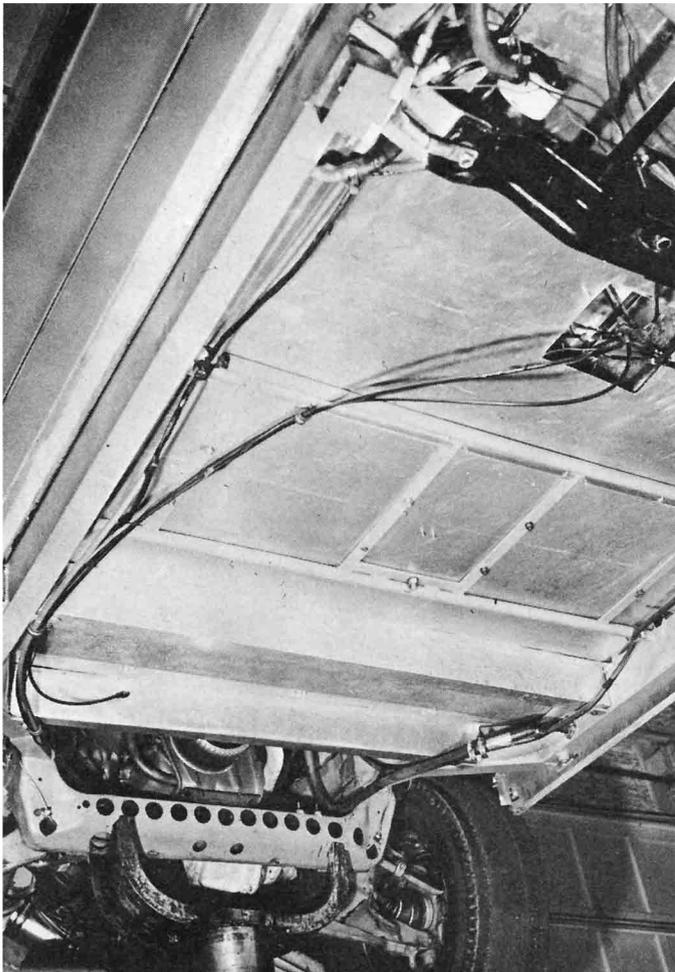


The mechanical design of the new Hurst special can best be described as two complete Toronado drive trains with a 442 Olds in between. Chain drives, Turbo-hydramatics, the new Olds planetary differentials, ball-spline driveshafts; everything has a front and rear mirror image. The front and rear suspensions are both from the front of a Toronado. Tie rods at the front wheels are controlled by a '60 Chevy manual steering gear, while the tie rods at the rear connect to fixed frame brackets so the rear wheels will point straight ahead. The location of the inboard pivots, incidentally, is critical, and must be designed so that the rear wheels will not steer because of suspension travel.

Toronado springs were replaced by a set of torsion bars. Originally, the Hurst boys worked with six cylinder Barracuda bars but replaced them with higher rate bars out of a V8 Dart. This prevents squat at the rear due to weight transfer. The Oldsmobile torsion bars, like the Mopars, end in a hex section. Since the Oldsmobile bars are bigger, a spacer was made up out of flat stock to fit between the Mopar bar and the Oldsmobile socket. Final height trim is handled by Delco air shocks at the front and rear.

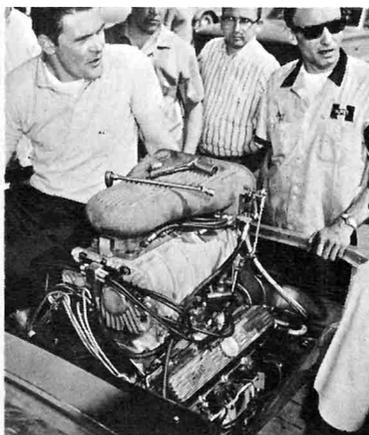
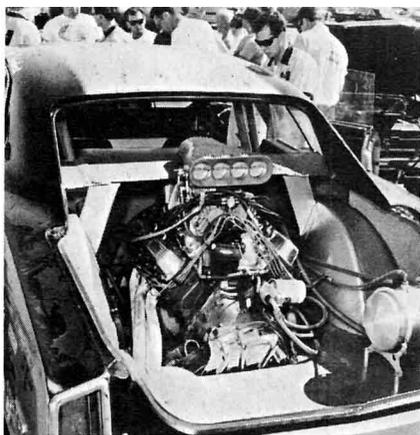
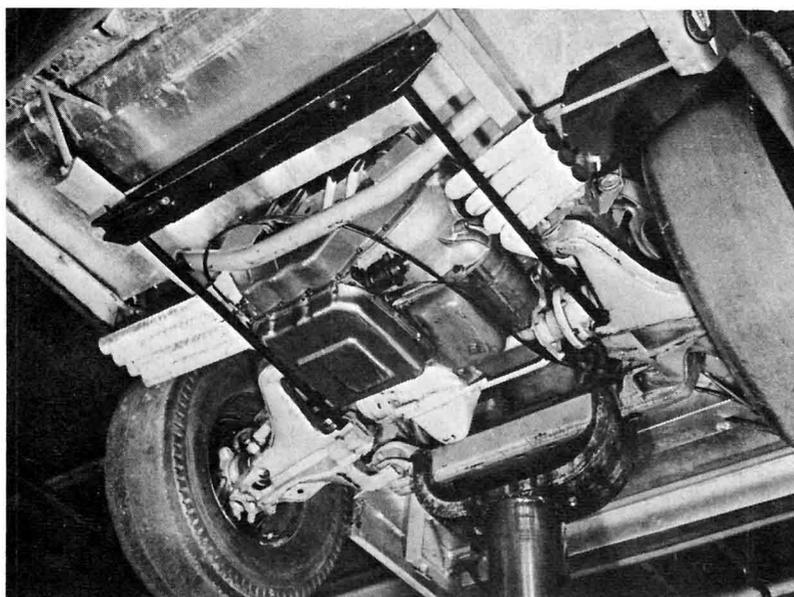
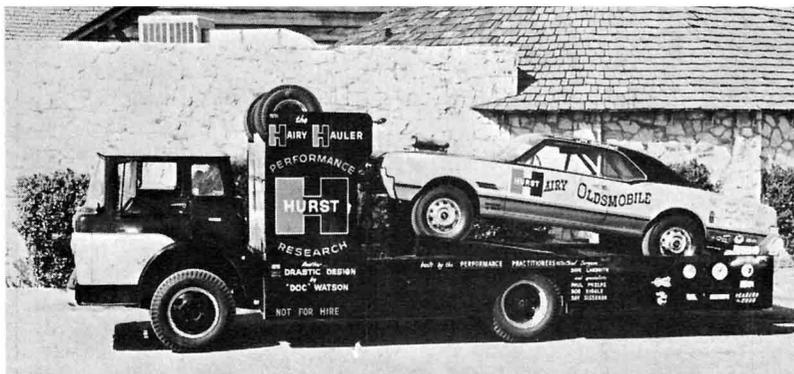
Torque reactions in a conventional rear axle unload the right rear and cause traction problems. Where the differential is mounted on the frame, as with the fully independent Toronado design, all torque reactions are taken up right within the body, and equal traction is delivered to the right and left side wheels. Another benefit is that the chassis doesn't need wedging. The car travels straighter down the course.

Adding a pair of Toronado power train assemblies imposed quite a weight penalty, and the Hurst boys tried to slim the car down to below 4,000 pounds. To help them they enlisted the aid of Proto Products, of Utica, Michigan. Proto replaced many of the steel shapes with aluminum panels, including floor pan, hood, trunk deck and rear wheel housings. Dave did not use fiberglass because aluminum panels can be produced faster and be made lighter at the same time. Aluminum eliminates the problem of making molds. Proto Products uses special rolling equipment to shape the panels, and while they make it look easy there is a lot of art and skill connected with the process. ▶



Top left, frame doubles as a coolant container, holding 6.5 gallons of water. Right, to cut down on valve guide wear "Doc" Watson installed M/T roller bearing rockers. Head bolts are of Allen head design. Above left, aluminum flooring, deck panels and bumpers keep weight down. Right, remote adapter brings AC oil filter out in the open for trackside servicing. Both 425-cube engines employ Tornado chain drive assemblies.

the "Shifty Doctor" strikes again with an ultra-radical exhibitionist that looks like a stocker and smokes like a fueler



Top, Hairy Hauler carries car, slicks, engine goodies and lots of fuel. Center, MoPar torsion bars and crossmembers replace conventional Olds components. Above left, injection inlets face to the rear on the trunk-mounted engine to protect the driver and to avoid the lowpressure. build-up inside the car. Right, Sharp Engineering manifolds with GMC-Hilborn setups are used fore and aft.

Further lightening was achieved by using an outside starting battery, carried in the tow truck. To operate the electrical gadgetry, the Hurst machine is fitted with a small, bantam weight, 9 pound battery which receives an occasional outside charge.

Crank journals are cut down to provide main bearing clearances from .0025 to .003 inches. The journals are Tuftrided and the mains are grooved. Mickey Thompson rods and pistons are used, together with a Mickey Thompson MM ring that acts as a heat shield. Piston clearances are snug, just .007 to .008 inches, which cuts down on piston rock and helps the rings stay square with the bore. Compression was brought down to 7.76 so that the engine accepts a 23-percent blower overdrive. The engines are set up for low-end torque, allowing the slicks to produce crowd-pleasing smoke. Nitro percentages were upped for the same reason.

A blown engine needs a large exhaust valve size, but can get by with smaller intake valves since intakes operate at boost pressure. The Hurst crew re-vamped valve sizes accordingly. Late Olds heads have two pairs of adjacent intake manifold ports separated by thin webs. For production reasons, the casting is purposely made up so that these webs will not come up to the finished machined surface. The Hurst team built up and ground the webs even with the surface to match the manifold. This allows the intake manifold ports to form part of the total ram length and improves the low-end performance. Cylinder head gasket problems were eliminated by switching from the stock bolts to high tensile strength Allen bolts and hardened steel washers.

Converting from stock rocker arms to the Mickey Thompson version brought several benefits such as increases in stiffness and a roller tip contact between the rocker and the valve stem. This considerably reduces valve guide wear. But, the conversion was not without difficulties. The stock rocker arm studs were replaced with threaded ones from a 289 Ford high-

(Continued on page 75)

higher with the special internal modifications allowed under AHRA rules. We could say these same things about the late Pontiac 389 engines (in the dozens of versions available) and this new 273 Dart-Valiant power packed engine. Conservative rating is the key.

Keep in mind here that you can find some very economical drag racing in these lower stock classes. Older models have just as much potential as the new ones. You can buy a good '56 Chev and build up the 265 V-8 engine to '56 Corvette specs (225 hp) for less than \$500. Or this is true of many other Chev and Pontiac models of the late '50s and early '60s. There are dozens of possibilities; do a little studying.

If you want to go even farther down in the NHRA stock classes there are many possibilities in M, N and O/S. These classes take in the older, pre-1955 cars with really low HP ratings. But you still have to select your models carefully here. It is true that the Detroit companies used to rate their engines more honestly in those days; however now it's a problem selecting the basic design that can be tuned to give as much as possible above the advertised rating.

The most popular models in this area are the Olds 88 Rockets of the early '50s (around 150 hp), the early Studebaker OHV V-8's of the '50-'52 period with the 120-hp rating, and the famous '52-'54 Hudson Hornets with dual carburetion. These engines can be easily made to far exceed their advertised HP with a little sharp tuning. There were other "modern" short-stroke OHV V-8 engines available during the period-Chrysler, Cadillac, Buick, DeSoto, etc., but the three engines above are the ones most conservatively rated in terms of what can actually be gotten out of them.

The cost of racing in these bottom classes is rock bottom, too. Cars this old sell at junk prices, usually under \$75, and the major cost comes in rebuilding the engine and bringing the chassis up to snuff-(plus the cost of special gears, exhaust headers, tires, etc.). Over all, you should be able to get running for a little less than you could in the middle classes from E/S to L/S. It can cost as much to set up a '52 engine as a '57, and the difference of maybe \$50 in the first cost of the two cars would be relatively insignificant. If you're after the highest possible acceleration performance for the least money, you're better off in the middle stock classes. The bottom classes are for the guys, who enjoy racing the oddball stuff, and facing the challenge of making an old engine

design go like a modern engine. To some buffs, this is all the fun.

That's the story, gang. There's a lot of fun to be had dragging in the lower stock classes. And, if present trends continue, there's going to be more interest and prestige in these classes in the next three years. No telling where the whole game will go. You might be smart to get in on the ground floor.

HURST 442 continued

performance mill. To install these studs perfectly straight, the corresponding holes were drilled and tapped on a Bridgeport mill, rather than by hand. As a further precaution the threaded portion of the studs are coated with Loctite to prevent them from working loose.

In a stock Olds, each pair of rocker arm barrel pivots is aligned by a steel stamping. With the rocker arms guided, no provision needs to be made in the cylinder heads for guiding the pushrods. Here, the pushrods are guided by notched steel plates which are retained by the hex head on the Ford studs. As a final precaution, the rocker arm adjustment is locked by a recessed Allen screw that threads into the adjustment nut and bears against the stud.

Mating the 6-71 blower to the Oldsmobile engine involved a special Gragar drive and a manifold designed by Sharp Engineering. Both engines use 4-port Hilborn bug catcher injections together with port needles. The front bug catcher faces forward in a conventional fashion while the rear one is turned around to protect the driver against spit backs and also to get the air inlet out of a low pressure area inside the car. Separate fuel tanks are used at the front and rear, with a Milodon shut-off valve at each location.

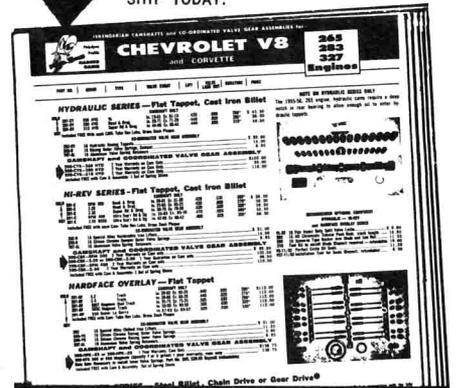
To save weight, the "Doc" discarded the idea of using stock radiators. He could have added some conventional coolant tanks, but went one step further and converted the two by four-inch main frame rail sections into a pair of 6 1/2 gallon water tanks. Stock water pumps were replaced by a pair of Jabsco units, saving more weight.

The engine installation details include a host of small but essential items. Doug Headers made up an impressive set of exhaust stacks of 1 3/4 inch diameter and 32 inch length, which are aimed to clear smoke away from the slicks. Adapters hogged out of aluminum blocks allow remote mountings for the AC oil filters. Ignition includes a Schiefer mag, Auto-



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lite wiring and Champion spark plugs. Even the engine mounts involved changes: the front engine ones are stock while the rear ones consist of pairs of Chevy biscuits mounted on box shaped sections that are fabricated from flat stock.

Controlling two engines is a task. Hurst handled it by using two Moon hydraulic throttle controls together with a pair of accelerator pedals that are placed side by side. This makes it possible to clear each engine separately and listen to them before take-off, and also to control the engines together during the actual driving. Dave Landrith is thinking in terms of some more sophisticated control systems, such as an electrical speed synchronizing system that would automatically control the throttles of each engine and prevent either one of the engines from racing away with the tires broken loose.

Both transmissions seem to shift fairly close to each other, and are controlled manually. Throttle vacuum response controls have been omitted. Control of both transmissions so that they work absolutely in unison can be effected by using a single common governor and valve body. This has not been needed to date.

A switch within easy reach of the driver controls the stator pitch in both torque converters. Starts are made with a torque converter at a high angle, giving maximum torque multiplication. Thus it is possible to break the tires loose quickly and avoid breaking the axle stubs. With the vanes at the high angle, the engine receives the benefit of maximum stall speed. As soon as the car gets out of the hole, the switch is flipped and the torque converters shift back to the low angle pitch and stay there for the remainder of the run.

Retaining the Oldsmobile suspension and drive line offers the benefits of independent four-wheel suspension minimizes load transfers from side to side. There is also a safety advantage, since each wheel is mounted on a full floating hub. If a stub does break, the car can still continue to roll.

There is a scarcity of gear ratios for the unique Toronado differential. One solution Dave Landrith and Jack Watson proposed was to make up different sprockets for the chain drive between the engine and the transmission. To carry all this power to the ground, the Hurst boys picked a set of M & H race master 8.50-15 slicks with 260 compound. Tire pressures are kept at 40 psi in the rear and 35 up front, indicative of the load transfer that is to take place on acceleration.

Kelsey Hayes disc brakes are fitted at the front (is it a preview of things to come?), while the rear brakes are stock. A bar allocates the pedal pressure to the two master cylinders in the proper ratio to tailor the front to rear brake action. Making room for the disc brakes entailed a different offset at the wheels.

The Hurst Hairy Olds is completed in a true Hurst tradition, perfect down to the last detail. The car is topped by an impeccable gold and black paint job. It is carried by a vehicle that is no less imposing than the car itself. Appropriately dubbed the "Hairy Hauler", the unit incorporates just about every modern feature that a drag racer would want in his own truck, including ramps, a power winch, storage chests and a rack for the slicks: a Hurst extravaganza!

CLUTCHING continued

later an owner decides on an engine conversion and is then faced with setting up new clutch linkage. The simplest method is to make up a new bracket on the engine side of the clutch equalizer bar and make up the correct length rod to the throwout-fork. Don't get rid of the cross-over or equalizer bar; it can roll with the engine without transmitting any motion to the linkage and eliminates a major source of clutch chatter. If you're having problems in getting a clutch to release fully, and suspect that the problem is due to linkage, have someone work the clutch from inside the car while checking for linkage deflection and motion at the throw-out fork.

Hydraulic clutch operation offers the major benefit of getting rid of linkage and of eliminating the effect of engine rock on clutch operation. A number of units are available, such as the one used on Ford trucks. Most troubles with hydraulic clutch operation stem from deflections which soak up release travel.

Some car owners run into mystery failures in clutch after clutch. Stop trusting the alignment of stock parts and start checking with a dial indicator or with a homemade rig. Check for runout at the flywheel and for runout at the flywheel flange. Next, make up a bracket that bolts on the flywheel and sticks through the bell housing. A dial indicator mounted at this location checks the runout on the bore in the bell housing. Since this bore also pilots the transmission, misalignment can cause no end of problems. Finally, check the back face of the bell housing. If that back face is out, the transmission and clutch (Continued on page 78)

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