

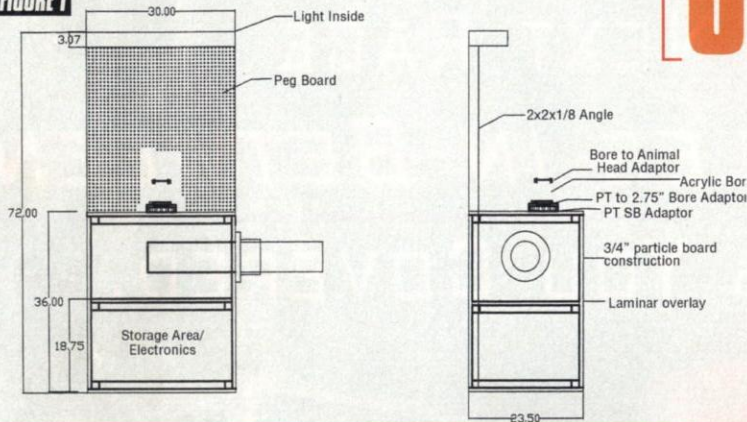
Karting has the advantage of being inexpensive, at least when compared to other forms of racing. In my observations, experience goes a lot farther than money when it comes to being competitive. This is proven by the fact that the guy getting into karting with an open checkbook just won't be competitive until he gains experience in both driving and setup. Those who have been in karting for years are able to be competitive while making any equipment work on a limited budget. Being at the grassroots of racing means that sometimes the money isn't always available to have the best equipment, especially on the engine builders' side where equipment can get really expensive. This forces builders to be creative and utilize the resources available to the fullest.

pressure, which is the pressure in the system by the component being flowed. This pressure is regulated so that as things change it is kept consistent so that flow can be compared to other data. Remember that a head flowed at 10" H2O flows less than that same head flowed at 28" H2O. This means that the test pressure must be kept stable for a test and recorded with the flow to give it a relative meaning. Twenty CFM of flow means nothing but 20 cfm at 10" H2O is something that we can work with. For reference: 27.68" H2O is equal to 1 psi; inches of water ("H2O) is just another unit of pressure.

The bench needed to fit certain criteria before it could be constructed. It needed to be reversible, which means that it could flow both the intake and exhaust in their proper direction (pressure for exhaust and vacuum for intake). It had

The Construction Of A Flowbench

FIGURE 1



A flowbench can be a huge investment. A stand alone model can easily cost upwards of \$8000. Even the bench-top models will set you back at least \$3000 by the time you include the fixturing, and some of these aren't even computerized. In this article we will discuss the steps involved in building a bench which can save you a lot of money if you have the time to dedicate to this project. Last month we looked at how a bench works, discussing the components it is made up of: a pressure source, a flow device, and a measurement component. We also discussed the fact that most benches utilize a sharp edge orifice to measure flow and we will also utilize this type of orifice on this bench build up.

To recap, the sharp edge orifice works by forcing air to flow through a thin plate with a hole in it. When the air flows through this restriction, a pressure is taken from one side of the plate to the other and this pressure differential becomes a measurement of the flow. Because it is so simple, and nothing can really change with the measurement device, it is very repeatable, accurate, and similar to most all other manufactured flow benches. We also talked a little bit about test

Left Side 33.5 x 24	Back 28.5 x 33.5	Bottom 28.5 x 22.5
Right Side 33.5 x 24		Middle Shelf 28.5 x 22.5

FIGURE 2

Top 28.5 x 22.5	Plenum Front 28.5 x 18	Cabinet Front 28.5 x 13.125
--------------------	---------------------------	--------------------------------



to be repeatable more so than accurate. Even though accuracy is important for comparison to other data, repeatability is what allows us to test for that last little bit of horsepower. It had to be upgradeable and able to flow anything from kart heads to full size automotive heads, this would leave the door open for making more money in the future by having the ability to move into other markets. It had to look professional, if it didn't, others may question the validity of your work. And, it is always good to be proud of the equipment in your shop. It also had to be computerized, reading manometers and writing down numbers was

FIGURE 3

Qty.	Part	Total Cost
2	Melamine Plywood	\$ 55.00
1	24" Florescent Light Base	\$ 7.97
1	24" Florescent Light Base	\$ 5.98
1	6x6x4" PVC Electrical Enclosure	\$ 12.49
1	11-17" TV Wall Mount	\$ 29.99
1	White Egg Crate	\$ 6.30
2	Easy on Hinge	\$ 8.00
1	Cabinet Knob	\$ 2.00
1	Cabinet Door Support Stop	\$ 2.00
3	6' sections of 1.5"x.125" angle iron, for light support	\$ 22.00
1	Quart of fiberglass resin	\$ 10.79
3	Generic paint brushes	\$ 3.00
2	3' sections of 1" aluminum angle, for trim	\$ 5.00
4	General 2" wheel casters	\$ 20.00
1	8ft 2x4	\$ 4.00
2	8ft 2x2's	\$ 5.00
	10ft 6" PVC	\$ 25.00
	6" PVC Flanges, McMaster Carr PN 4881-k221	\$ 60.00
	.125" Aluminum for oriface plate and bench top	\$ 40.00
	Miscellaneous PVC	\$ 15.00
	Miscellaneous electrical	\$ 40.00
	2" drywall screws	\$ 6.00
	Miscellaneous supplies, drill bits, silicone, saw blades	\$ 20.00
	Performance Trends Black Box and Software	\$ 899.00

Total Estimated Cost

\$ 1304.52



FIGURE 4

not an option; remember, we want something to be proud of and utilize today's technologies. Most importantly, it had to be affordable and a value for your shop. It would take a long time to get \$8000 out of a flow bench doing kart heads. Not that a good manufactured bench doesn't have many advantages, but this bench will be in the range where even a diehard hobbyist engine builder could afford it.

The basis of the bench stems from the electronics and for this I went to Performance Trends™. After looking around they ended up being the best bang for the buck using the above criteria. They have their Black Box which is set up to do exactly what we want and it reads directly to their Flow Analyzer software which is a very complete software package. Some of the other systems offered either good value or adaptability but not both. The Black Box comes fitted with three transducers; two for measuring the differential pressure across the orifice and one for measuring the test pressure. Once the software is installed and the bench is hooked up to your computer by a serial cable, you are ready to flow parts. Now we just need something to hook it up to.

**18,000 RPM...
Broken engine?**

Forget about it!

For the ultimate in synthetic pro racing lubricants for karting, ask for Elf!



- HTX 909 for 2-stroke engines
- HTX 3818 for 4-stroke engines
- HTX 740 Clutch Oil
- HTX 732 Gear Oil
- High-Performance Elf Chain Paste



For an authorized distributor, call: **(877) ELF-OILS** or visit: **www.ElfMoto.us**

PG Racing

WWW.PGRACING.COM



Exclusive North American Importer
Dealer Inquiries Welcome

800-752-2932

Wentzville, MO

FIGURE 5



After consulting with many text books and Kevin at Performance Trends™, the bench ended up having to have more than just PVC for ducting. A plenum or box below the test piece allows for a more stable flow measurement, and ultimately more accurate results. Not that a complete PVC bench isn't accurate, but one of the criteria is to have a highly repeatable bench. This led us to having a flow bench that looks similar to current benches on the market, which was also what we were looking for. Performance Trends™ suggested that because we may want to flow big car heads on the bench to go with 6" PVC to make sure that we don't run out of flow area when high volumes are needed. One concern of mine was that with running a 6" pipe to say a 1" orifice plate that the pressure differential signal would be very weak. This proved not to be the case and actually by design the turbulent flow of the bigger pipe is more like the designs of other benches and in the end worked out great. Six inch PVC is a little harder to find and more expensive, but it is cheaper to buy it up front than to have to change it later.

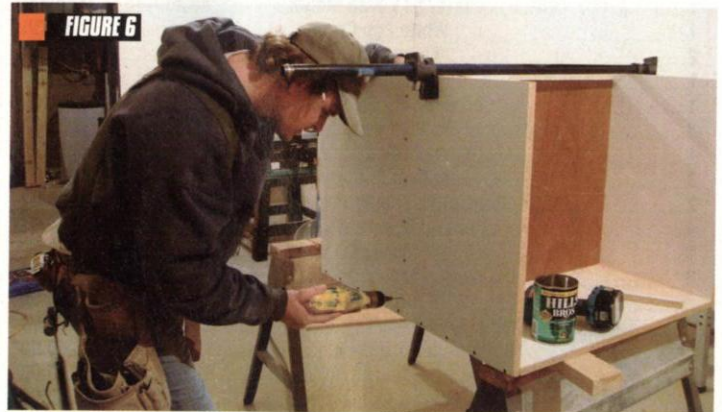
We have now established that we need a plenum and six inch PVC tubing. Figure #1 shows the initial design of the bench. It was laid out with a light bar and shelf on top with a peg board back, which is optional since it is not functional and also included a lower cabinet to keep the Black Box and flowing supplies in. The bench ended up being 30" wide x 23.5" deep x 72" high not including the PVC out the side. This gave a substantial plenum volume and also gives the operator some room to work on the top of the bench. The light bar and peg board gives an area to hang supplies and mount gauges. The plywood used for the construction was Miramax, or laminated particle board. This had two

advantages. First it didn't require painting on the outside to look good, and it helped seal the plenum from an air leak which is essential for accuracy. Wood by itself will leak air through its pores and that is something that we can't have. The light bar was made out of 1.5" angle iron that was bought at the local hardware store. The light bar did require a little expertise to construct since some welding was required.

Let's walk through the construction of the bench step-by-step.

STEP 1 Here is a general list of supplies needed for the bench but keep in mind that your bench may require more or less depending on how you lay it out. Remember, the bench design itself is not as critical as the components used. Feel free to be creative and change the size or features of the bench. See Figure 3 on page 51.

FIGURE 6



STEP 2 The main cabinet and plenum of the bench were constructed from laminated particle board called Melamine, it is available at any local lumber yard. Two 4 X 8 sheets are required for it, along with 16 feet of 2x2's for supports. Figure 2 shows how the bench is cut out of the plywood. The bench was

Big Spark. Small Engine.

MC-3 Pro Stock Digital Ignition

- Incredible spark energy and voltage
- Long multiple spark series produces quick throttle response
- Set a rpm limiter for overrev protection

CALL OR LOG ON FOR
YOUR APPLICATION

(888) 258-3835

FOR A FREE
CATALOG, CALL
(888) 603-7455



www.MSDPOWERSPORTS.com

**MSD
POWERSPORTS**

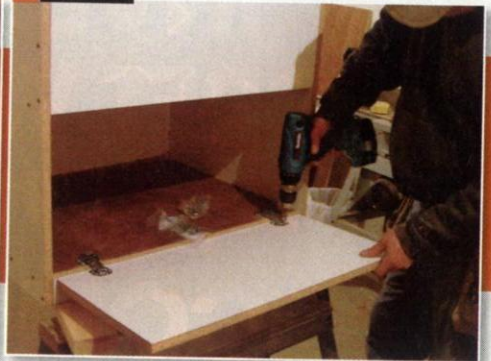
FIGURE 7



FIGURE 8



FIGURE 9



held together using 2" drywall screws. It is very important to utilize a special drilling countersink bit, like the one on page 50, so the screws hold securely and to keep the boards from breaking out.

STEP 3 The dimensions of the bench were laid out onto the plywood and it was cut using a straight edge secured to the plywood by C-clamps. (Figure 4) What this did was allow for a perfectly straight cut which is essential for getting the box to seal when assembled. Don't try to free hand this because the ability of the bench to seal air is essential for accuracy.

STEP 4 Once cut, the bench must be screwed together. It is very important that screws are placed generously in the plenum area of the box. Anything more than 3-4" between screws may allow air to escape the box and give artificial readings. The box was assembled by first drilling and screwing the side panels to the back of the box as shown in Figure 5. Make sure to use a good construction adhesive between all the joints, this helps stiffen the box and seal any leaks.

STEP 5 The center shelf was then installed at 17.25" to the center from the top edge. A bar clamp was used to hold it in place while the screws were installed. Notice how the board in the example isn't

laminated? This is what happens when you try to do the project with one sheet of Melamine; you run out and end up scrounging for scraps. Save your self an extra trip to the hardware store and get two right away.

FIGURE 10



STEP 6 Next the bottom is installed keeping it 1.5" from the bottom of the sides. This allows for 2x4's to be installed on the bottom to give support to the casters that will be installed later (Figures 7 and 8).

STEP 7 The front faces can now be installed. The lower face gets hinged to create the cabinet and the upper one is mounted solid to create the plenum. We used concealed hinges so they could not be seen to give a clean look to the bench (Figure 9).

STEP 8 The top is the most difficult to install because it was made to be removable. This required installing a 1x2" or 2x2" board around the edge 3/4" down to screw the top to. This also gave the box added support. Make sure to put glue behind the 1x2's to keep air from leaking behind them. The top can then be drilled for installation, but don't install it yet (Figure #10).

STEP 9 A TV wall mount was added to give a place for the laptop to sit. Because the bench will be ran off of the computer it is very import to construct your "cockpit" in a manner that will allow you to



19033 174th Avenue • Spring Lake, MI 49456
616-846-1730 Fax 616-846-5999

Find us on the Web!
www.aa-mfg.com • racing@aa-mfg.com

CALL TODAY FOR YOUR
CATALOG 1-800-473-1730



HAS CHASSIS
COMPONENTS FOR ALL
RACING NEEDS

PICK YOUR POWER

LEOPARD TAG
More Horsepower than Stock

YAMAHA Blueprinted

HPV Blueprinted Package

- Pipes
- Engine Mounts
- Horstman and L&T Clutches

WOLTJER
Racing Engines

online store WoltjerEngines.com Email info@woltjerengines.com Broken Arrow, OK 918-258-0598

comfortably and efficiently use it. The mount used was a standard 15" TV mount from a local hardware store (Figure #11).

STEP 10 Next a 6" hole is laid out on the right side of the bench. This hole is offset towards the bottom of the plenum to allow the air to settle out before it enters the measured piece located at the top and give an inaccurate reading. The hole is cut out using a jig saw. Make sure to use caution, big gaps around the pipe will invite air leaks (Figure #12).



FIGURE 11

STEP 11 Two 24" pieces of the 6" PVC can then be cut. One way or another the cuts must be made square at the ends, using a chop saw works good but if other methods are used make sure to sand the ends square. One of the 24" pieces can then get installed into the box with 4" sticking out, which allows room to install the flange at a later time. A chunk of 2x4 is installed at the end of the pipe in the box and screwed to the floor and then the pipe to hold it in place; a hole must be drilled through the bottom edge of the pipe to do this (Figure #13).

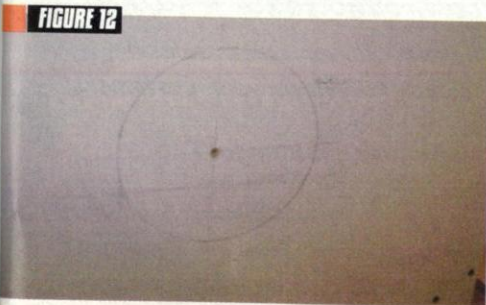


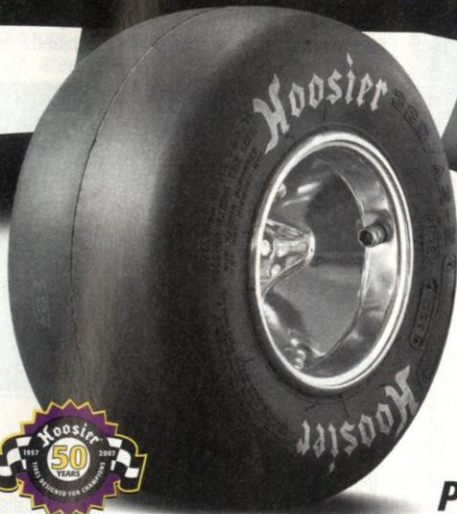
FIGURE 12



FIGURE 13

Hoosier[®]

RACING TIRE



**Hoosier
Sprint and
Super Kart Tires**
Get the Hoosier
Performance Advantage



Wanna Race? For more than 50 years, the Hoosier brand has been collecting wins on tracks around the globe. Select from a full range of sprint and super kart tires engineered for the specific needs of competitive kart racers. For more information about the growing list of successful drivers capturing checkered flags on Hoosier Tires, visit www.hoosiertire.com.

Race with the choice of champions! Contact your nearest Hoosier Distributor today for more information about Sprint and Super Kart tires.

COMPOUND & HARDNESS MEASURE

Hoosier Compound	Hardness Measure
R55	57
R60	62

All listed tires are of a slick tread design. All measurements are in inches. Note: tread width numbers are an exact measure and not an approximation. For more information, contact your nearest Hoosier Distributor.

SPRINT KART TIRES

Item Number	Tire Size	Tread Width	Approx. Dia	Approx. Circ	Recom. Rim	Measured Rim	Section Width	Compound	2007 MSRP
22150	4.5/10.0-5	4.25"	10.00"	32"	5.0-5.5"	5"	5.5"	R60	\$40.00
22250	6.0/11.0-5	6.0"	11.00"	34"	7.0-7.25"	7.00"	7.75"	R60	\$45.00
22350	7.1/11.0-5	6.75"	11.00"	34"	8.0-8.25"	8.25"	8.50"	R60	\$50.00

SUPER KART TIRES

Item Number	Tire Size	Tread Width	Approx. Dia	Approx. Circ	Recom. Rim	Measured Rim	Section Width	Compound	2007 MSRP
22650	4.5/10.5-6	4.5"	10.5"	34"	5"	5"	5.25	R55	\$42.00
22850	7.1/11.0-6	7.25"	11.00"	35"	8"	8"	8.25	R55	\$52.00

Hoosier
TIRE MIDWEST

Plymouth
2519 N. Michigan Street • Plymouth, IN 46563
Phone: (574) 936-8344 • Fax: (574) 936-1673
E-mail: hoosiertireply@netscape.net

Hoosier
TIRE MID-ATLANTIC

Baltimore
2931 Industrial Park Drive • Finksburg, MD 21048
Phone: (410) 833-2061 • Fax: (410) 833-5921
E-mail: hmta@hoosiermidatlantic.com

Hoosier
TIRE CANADA

117-119 Cushman Road
St. Catharines, Ontario, Canada L2M6S9
Phone: (905) 685-3184 • Fax: (800) 891-0521
E-mail: brp@cogeco.net

Hoosier
TIRE SOUTHWEST

103 Cross Road • Mesquite, TX 75149
Phone: (972) 289-RACE (7223)
Fax: (972) 289-8055
E-mail: jboyd@hoosiertiresouthwest.com

Hoosier
TIRE MIDWEST

Indianapolis
4155 North 1000 E., Suite A
Wally Parks Drive • Brownsburg, IN 46112
Phone: (317) 858-1234 • Fax: (317) 858-1307
E-mail: hoosiertireindy@yahoo.com

Hoosier
TIRE MID-ATLANTIC

Pittsburgh
205 West Water Street • Saxonburg, PA 16056
Phone: (724) 360-8000 • Fax: (724) 360-8044

Hoosier
TIRE CANADA-NY

1733 Maryland Avenue
Niagara Falls, New York 14305
Phone: (716) 285-7502 • Fax: (800) 285-1454
E-mail: usasales@bicknellracingproducts.com

Hoosier
TIRE SOUTHWEST

Wichita
3801 W. Pawnee, Suite 200 • Wichita, KS 67213
Phone: (316) 945-4000 • Fax: (316) 945-4003
E-mail: dlim@pcswichita.com

Hoosier
TIRE MIDWEST

3886 E. State Route 54 • Springfield, IL 62707
Phone: (217) 522-1955 • Fax: (217) 522-6097
1-800-365-1955 • E-mail: tari@racetires.com

Hoosier
TIRE EAST

56-H Loomis Street • Manchester, CT 06042
Phone: (860) 646-9646 • Fax: (860) 646-2054
E-mail: htrac@aol.com

Hoosier
TIRE NORTH

21601 John Deere Lane • Rogers, MN 55374
Phone: (763) 428-8780 • Fax: (800) 555-8577
E-mail: htrac@aol.com

Hoosier
TIRE WEST

2608 E. California • Fresno, CA 93721
Phone: (559) 485-4612 • Fax: (559) 485-4632
E-mail: racing@hoosiertirewest.com

Hoosier
TIRE SOUTH

Road & Drag • P.O. Box 290 • Louisville, TN 37777
Phone: (865) 984-3232 • Fax: (865) 681-0775
E-mail: racetire@compuserve.com

"TIRES DESIGNED FOR CHAMPIONS"®

65465 U.S. 31 • Lakeville, IN 46536 • (574) 784-3152 • Fax (574) 784-2385 • www.hoosiertire.com



STEP 12 At this point I took the time to place silicone on all of the joints of the box. Make sure to get around the tube and underneath the top board mounting supports! A general indoor/outdoor window sealant was used for this.

STEP 13 Next an egg crate was installed on the far end of each of the 24" PVC pipes. This can be bought at any hardware store under the lighting section, (it is used to go over florescent lights in drop ceilings). It is cut to the inside diameter of the pipe and then super glued in place at a couple spots. See figures 14 and 15. What this does is help straighten the air out going to the measurement orifice and make for a more accurate reading.

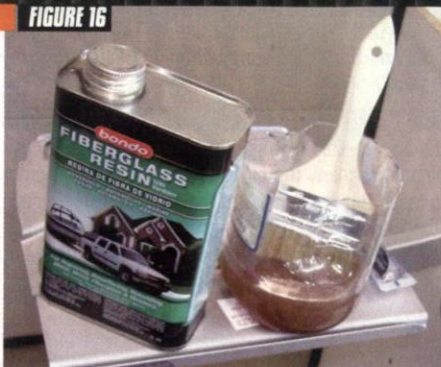
STEP 14 To make extra sure that the inside of the box is sealed it was coated with fiberglass resin. This step is a must for accurate testing results! The inside of the box and the bottom of the top were all

coated with at least one coat installed with a brush. The more coats the better because it will help eliminate any chance of leakage (Figure #16).

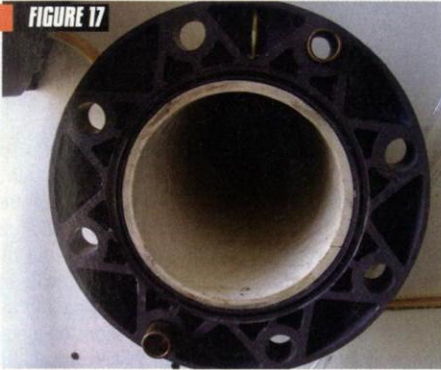
STEP 15 Next the flanges which hold the orifice plate can be installed. I machined mine to have a recess with an O-ring seal to make sure that it seals tight to the orifice plate, but, it is said that foam tape can also be used and the flanges left as received. The flanges were ordered from McMaster-Carr under part number 4881K221, which are 6" PVC flanges and two are required. Figure #17 gives an example of how they were machined.



STEP 16 When the flanges are done to your liking they can be glued to the 6" PVC, the one in the box, and the other that is not yet installed. What this does is give you the place in the pipe for the orifice plate to sit between when they are bolted together. Big 3/4" bolts are required to bolt these together so if you local hardware store doesn't have them it is then easiest to order the bolts when you order the flanges (Figure #18).



STEP 17 Notice how in Figure #18, two 1/8" brass tubes have been drilled into the flanges on each side of the orifice place. This will be where the Black Box actually picks up the signal to measure the pressure differential to obtain its flow reading. These tubes should be installed so they just fit through the hole you drill and so they are flush with the inside of the pipe within 1" of the measuring



S&M KART SUPPLY INC.

WHOLESALE DISTRIBUTOR



CALL or WRITE
for details on our
Wholesale Program

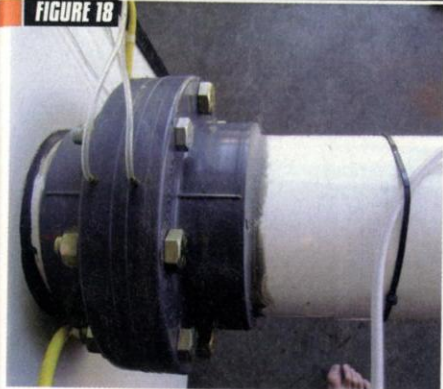
Kart Shops - Engine Builders
Do You Need Wholesale Pricing?
Do you have E-Bay or online sales?
We can ship direct to you or your customers

Dealer or Distributor for:

- ◇ FHS Oils
- ◇ Cool Power Oils
- ◇ Dunlop Tires
- ◇ Vega Oval Tires
- ◇ Burris Tires
- ◇ Maxis Tires
- ◇ Burris Products
- ◇ Douglas Wheels
- ◇ Williams Wheels
- ◇ Briggs & Stratton
- ◇ Longacre Products
- ◇ RLV Products
- ◇ Williams Sprockets
- ◇ Premier Sprockets
- ◇ My-Chron Gauges
- ◇ G-Man Plastics
- ◇ Martin Brakes
- ◇ Dyno Cams
- ◇ Robertson's Pipes
- ◇ Raytech Clutches
- ◇ Fel-Pro Gaskets
- ◇ ND Spark Plugs
- ◇ Coleman Products
- ◇ AND MUCH MORE

Phone 217 546-9120 Fax 217 546-9409
1126 W. Reynolds, Springfield, IL 62702
WWW.SMKART.COM

FIGURE 18



orifice, the closer the better. Make very sure that these seal to the inside of the pipe so you can get accurate pressure measurements of the inside of the pipe, this is very important. This bench had the tubes sealed with epoxy.

STEP 18 The test pressure tap is installed in the plenum of the bench in an area that is not disrupted by air flow. Somewhere away from the

measurement piece and the end of the PVC pipe is preferred. This one was installed on the right side at the top back corner. A 1/8" brass tube was installed through the box and sealed with silicone (Figure #19).

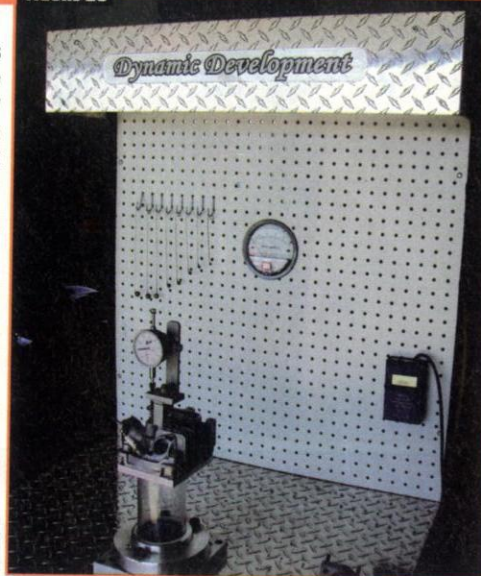
STEP 19

The top of the box can then be installed. The top for this bench was originally installed with foam tape so that it could be removed if something needed to be done to the inside of the box. It ultimately ended up getting siliconed down because of a couple residual air leaks that didn't want to seal. I would try the foam tape first to see if the leaks can be eliminated without gluing it down.

FIGURE 19



FIGURE 20



STEP 20

Now that the top has been installed, a hole should be cut to allow for the test piece to be installed. The kit that was ordered from Performance Trends™ included an adaptor for a small block Chevy and small block Ford bolt pattern. For this bench this adaptor was mounted to the top of the bench but biased a little towards the front so the test piece could be easily reached. A 4" hole was drilled under the adaptor into the plenum. The adaptor was mounted with 4" bolts.

STEP 21

The back of the bench had a 1.5" angle iron back installed with a top shelf to mount a light too. This was welded together and just screwed to the back of the bench. This can be whatever you want it for it has no function other than convenience. This one had polished diamond plating bent around the top for cosmetics and peg board installed on the back for hanging test devices off of. The total height of the back was 68" to the bottom of the bench (Figure #20 shows this design).

STEP 22

As can be seen by figure #20, diamond plating was also put on the top of the bench. Not only does this make it look better, but it also gives you a harder surface to work off of. Anything could be used for this, stainless, aluminum, steel, etc. but I recommend putting something on the top to protect the bench.

SIMPSON **IMPACT** **hans** **G-FORCE** **TRP**

AAR RACING GEAR

GO FAST. HAVE FUN. BE SAFE.

Large Selection of Simpson Kart Vudo Helmets in most sizes.

Alpinestars Tech 1-K shoes in most sizes and colors.

Large **IN STOCK** Inventory
Items Ship in 24 Hours (In Most Cases)
Friendly, Knowledgeable Staff

THE RACING GEAR SPECIALISTS FOR KIDS AND THE KIDS AT HEART.

www.aargear.com
800-699-9493

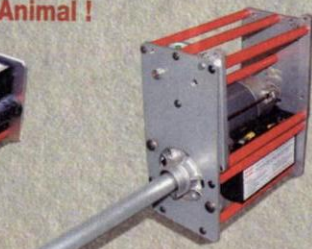
MYCUPON4 **RaceQuip** **sparco** **FINISH LINE** **ULTRA-SHIELD** And More...

CHOOSE FROM THE COMPLETE LINE OF STARTERS FOR ALL KART ENGINES AND APPLICATIONS.

Top Choice for Briggs Animal !



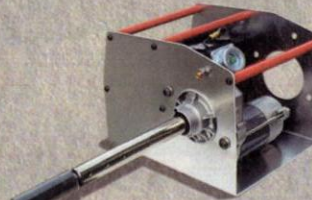
Super Mini



Compact



Auto Battery



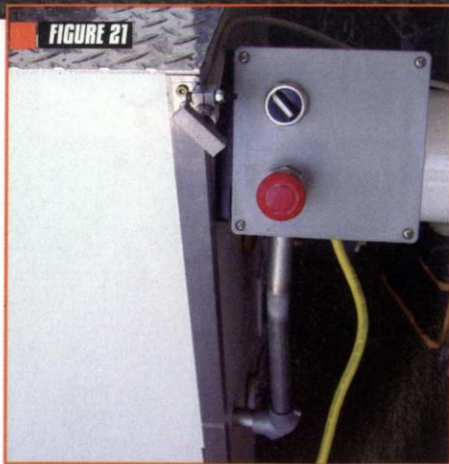
Conventional

Send for free catalog • Dealer inquiries invited

COLEMAN
Products

310.324-6805 • Fax 310.324-7024 • thebeststarters@yahoo.com

FIGURE 21



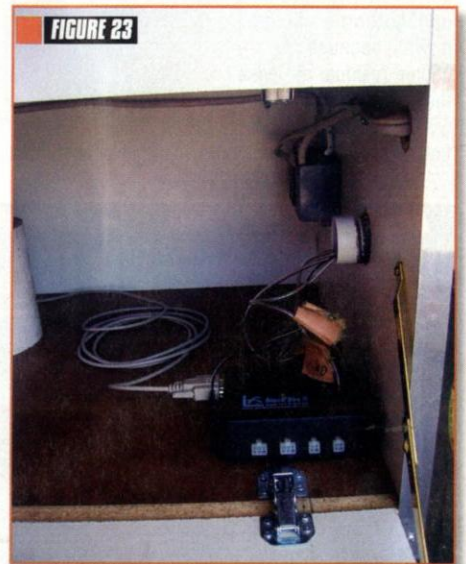
STEP 23 Now that the bench is pretty much complete it is just a matter of wiring it up. When it comes to wiring, especially 110 volt systems it is recommended that only a qualified technician do it. This bench was set up with an 8" plastic electrical box mounted to the sides and two industrial switches installed. One that would turn the bench on, this included the power for the laptop, the Black Box, and the light. The second switch was wired to an outlet that will be used for the pressure source (shop vac) to turn it on and off as needed. The switches were basically just wired to outlets that were mounted through the lower cabinet that could then be used to plug the different components into. Figures #21 and #22 help illustrate how this one was set up.

FIGURE 22



STEP 24 The final step to finishing the main part of the bench is the hook-up of the Black Box. The Black Box goes into the lower cabinet. A short piece of 2" PVC pipe mounted by drilling through the side of the box to get power and the pressure lines to the box. Basically the box is just a matter of hooking up the two pressure differential lines (one from each side of the orifice plate) and the test pressure which is taken from the tap we installed into the plenum. Figure #23 shows the lower cabinet with the Black Box installed. Performance Trends™ has a lot of information on the build up of the bench and how to hook everything up in the manual that comes with the purchase of the Black Box.

FIGURE 23



This should help you get started with the construction of a flowbench. Remember, this is not a set in stone design, this design fit the criteria laid out in the beginning of the article; your criteria may be different. What it does do is lay out some of the basic principles and designs that could be utilized to construct a bench. This design could be followed closely because in the end the design worked out very well.

In the near future we will take a look at what it takes to finish off the bench including hooking up the pressure source, coming up with a way to adjust the test pressure, and using it to flow a head. We will also talk about sizing the measurement orifice. Finally we will also see how repeatable the results are and look at some of the ways to utilize a bench for development. **NKN**

Source - Performance Trends

Bodywork • Steering Wheels • Air Boxes
Seats • Kart Covers • Steering Wheel Covers • Stands
Fuel Tanks • Radiators • Chassis • More

KG



Unico, Duo and 07 Evolution bodywork kits



New Rear Bumper Systems
(bumpers & brackets)
Colors: Black, Red & Pearl



Special Radiator



Gauge Bracket

www.kgkarting.it

email: kgusa@kgkarting.it

Phone: 408-272-1039