MotoMan

"The Scientifical ~ Mystical One"

Power News Magazine

Presents:

Intake Porting Secret

Part 2:

HomeWork

(How To Make Your Own Power ... at Home !!!)

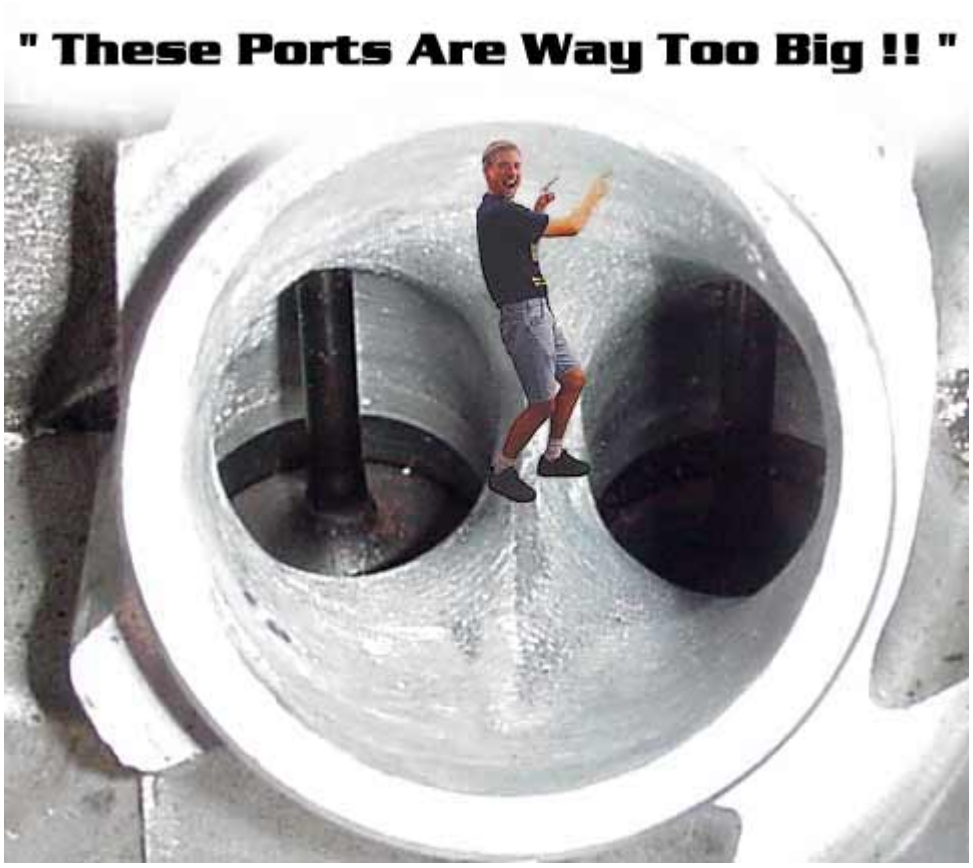
In the last issue of Power News, we learned that:

1: When an intake port is too big to provide the velocity necessary to prevent blowback duri
Charging phase, the result is a loss of power at all RPM's. The secret to more power
is to make the ports smaller.

2: The intake ports in most modern motorcycles are **still**
waay too big as they come from the factory !! ...Even for Roadracing use !!

3: Thousands of motorcycles are losing horsepower this winter,
as many tuners will make their intake ports even bigger !!

If this is your first issue of Power News, I recommend that you read last month's edition f
http://www.mototuneusa.com/think_fast.htm



Here's a Honda F3 th professionally Flow Bench Port (enlarged) to the MAX !!

This bike was really, r slow !!

The head measures we Flow Bench, but the e actually produced *Less* with this ported head tha with the original stock h

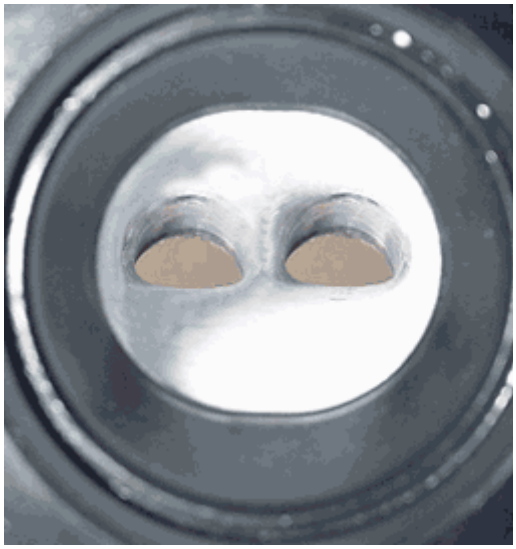
What Do High Velocity Intake Ports Look Like ??

These never before seen photos show the remarkable size difference between stock and High Velocity Ports:

Before:

Stock Yamaha R6 Intake Port

After:



30 Percent Reduced High Velocit Yamaha R6 Intake Port

High Velocity Intake Porting

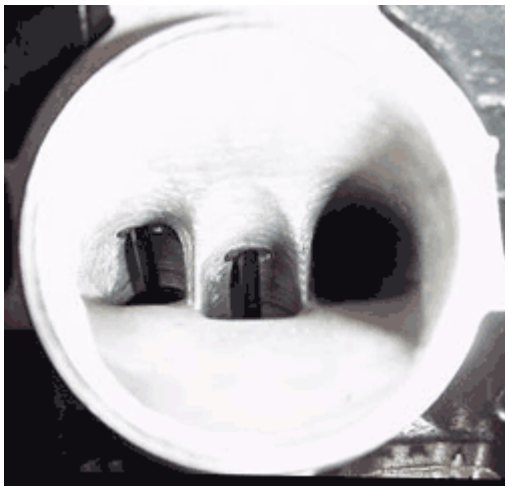
On 5 Valve Heads:

Yamaha YZF 400's, R7 and R1, FZR 1000 & 750

Before:

Stock Yamaha R1 Intake Port

After:



30 Percent Reduced High Velocit
Yamaha R1 Intake Port

The Secret to Making Ports Smaller ??

JB Weld Epoxy

Epoxy !!

Epoxy is much easier to work with than w
and it offers insulation for the incoming f
mixture. (Cooler mixture = denser char

This product does the best job of expan
contracting with the engine heat without c
or coming loose.

Other products that work well are Loctite
Set" (available in Europe) and Bondo auto
body filler.

I recommend the JB Weld because it se
slowly, which can be a real plus when you
learning this porting technique.

Ready To Do It Yourself ??
Here's How:

Recommended Too

1) Dremel Tool

2) Tool Bits
(Sanding Roll, Stone, Aluminum Cutter

3) 60 Grit Coarse Sanding R

4) Caliper For Measuring Port I

5) JB Weld (24 Hour Type

6) Plastecine Modeling Cla

7) Dremel Extension Cabl

8) Safety Goggles
(Keep Your Eyes !!)

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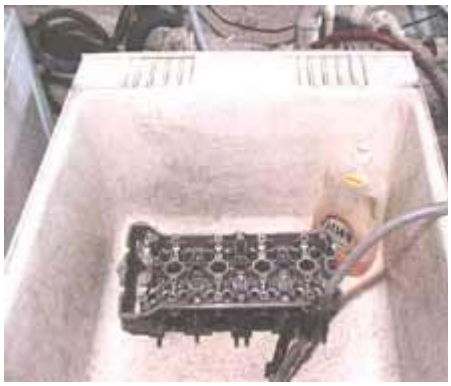
.

Clean Up First (?)

That's right !! Any traces of oil will ruin the sanding rolls, and make the head an oily mess to work on !!

So the first step is to wash out all the oil with dishwashing detergent and hot water.

Use compressed air or a blow drier to prevent rust.



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Secure The Head on The Workbench

It's critical that the head is secur stable. It's very easy to ruin a valve the head suddenly shifts while the tool is turning at 24,000 RPM

Use a 2X4 board to "wheelie" the h the proper position.

The clamp-on type light illuminat ports from the combustion chambe

.

Get Centered

The end of this sanding mandrel center. The result will be inefficient action and chatter marks on the surface.

Uneven wear on the sanding roll ca it to unravel at high speed and pc damage the cylinder head.

Here, I'm using a marker to find ou way the mandrel is bent. By lightly t it with the marker while it's spinni ink will only show on the "high"

Careful ...

By pressing the "inked" side it against the bench, I'm bending the mandrel back slightly to perfectly re-center it.

This takes a bit of practice, because it's easy to bend the mandrel too much.

If you have to bend it more than 3 times, throw it out and start over with a new one. They get weak from being bent, and can suddenly bend out 90 degrees while spinning 24,000 RPM !!

Ready To Port !!

Here's the best way to hold the to the dremel motor hang over my shoulder, and hold onto the drive with both hands.

The bottom of my hands are pus slightly against the bench to help the tool.

Also, notice that I've anchored my hand with my little finger. This giv best combination of power and co With some practice, you can really sanding roll "torque" into the metal losing control.

Use a griding stone to grind the steel valve guide. Many newer models' valve guides are already flush, so you get to skip this step.

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Once most of the steel guide is g down, use sanding rolls to make aluminum boss & valve guide flush port roof.

Then, finish the entire port surface grit sanding rolls.

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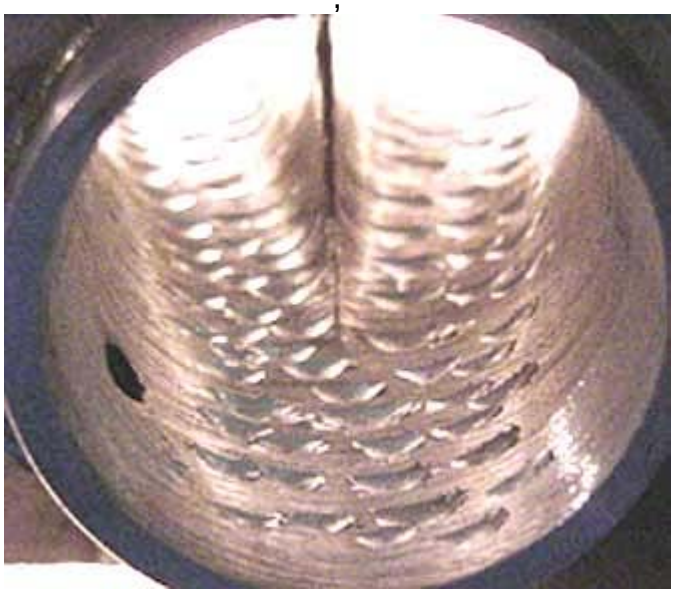


60 Grit (Coarse) Sanding Roll

Use it to remove the fuel residue, and create a rough port surface.

Aluminum

Use it to score th to secure the

.

Rough Finish /Grooved Floor

Why Not Polish The Ports ??

Doesn't Air Flow Better on a Smooth Surface ???

Remember that the ultimate goal isn't "flow" ... it's POWER !!

The intake port is going to flow both fuel and air. The problem with fuel is that, since it weighs more, it's difficult to keep it evenly mixed with the air as it follows the contours of the port.

Boundary Layer

The next time you drive a car in the rain, notice that when the car is going 60 MPH, the rain drops go up the hood of the car at walking speed. That's because the smooth surface of the car creates what's known as a boundary layer, and the portion of that layer of air that's nearest to the surface is almost still.

The same thing happens inside an intake port. Except instead of raindrops, it's fuel droplets that will run down the port wall slower than the air. That causes a serious change in the fuel air mixture by the time it reaches the cylinder, ruining much of the engine's potential power.
Polishing the port walls will ensure that this happens.

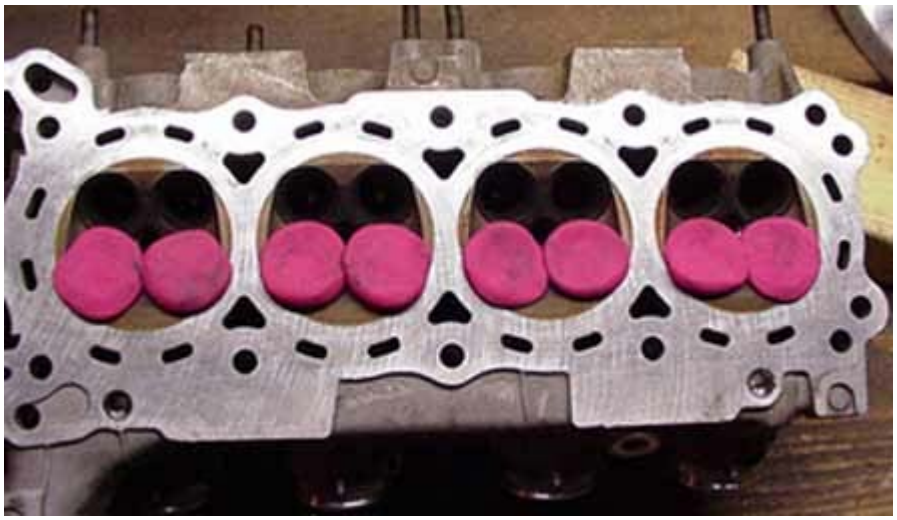
The phrase "Port & Polish" always makes me laugh ... I think the idea came from 70's Hot Rod magazines or something. Anyways, the last thing you want to do is polish your ports !!!

Instead, by making a series of rough 60 grit lines that purposely go **against** the flow, the "boundary layer area" will be turbulent, and the fuel will stay suspended in the air.

Remember: Rough is Good !!

**Okay: now that the 1st part of the process is complete,
it's time to prep the head for epoxy - ing.**

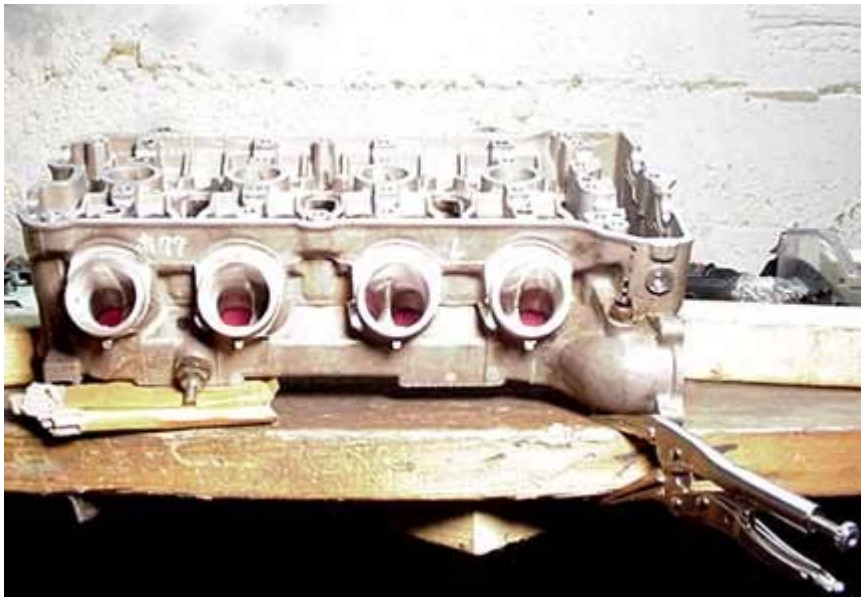
First: Wash & Dry The Head Again !!
To remove all the sanding dust and aluminum chips...



Here's what the clay is used

It keeps the liquid epoxy
flowing out and onto the valv

Next, set the head up so th
floors of all 4 ports are le



On most heads with downdra
the head will have to be "wh
as shown here.

Epoxy Mess Avoidance !!

The hardest part about the next process is not getting yourself covered with epoxy !!
My advice is to wear old clothes, and keep a fresh roll of paper towels on hand !

Here's a few more tricks I can share with you:

Cold epoxy is super hard to squeeze out
small cap end of the tube !!

So, to get it all out as easily as possible,
the JB Weld tubes backwards. Using a ra
cut open the bottom...

Then, I use a vise-grip pliers to squeeze out all the goo onto a sheet of cardboard.

You'll use about 1 package of 2 tubes each (steel & hardener) per port.

Mix up one at a time.

Ying & Yang

Mix It Up !!

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.

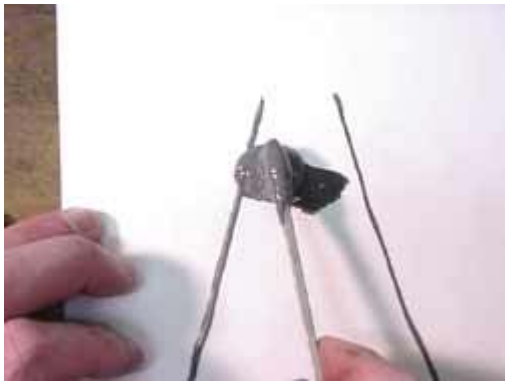
Clean the screwdriver completely, then tw
blob as in the photo on the left.

Keep rotating that screwdriver !!!

Remember: The minute you stop, the blob will dro

Application

The idea is to add the epoxy to the deepe
first and then back up. I add the epoxy in
The first row will flow down onto the clay



It was impossible to get a clear photo as
epoxy into the port, so I'm demonstrating
on paper.

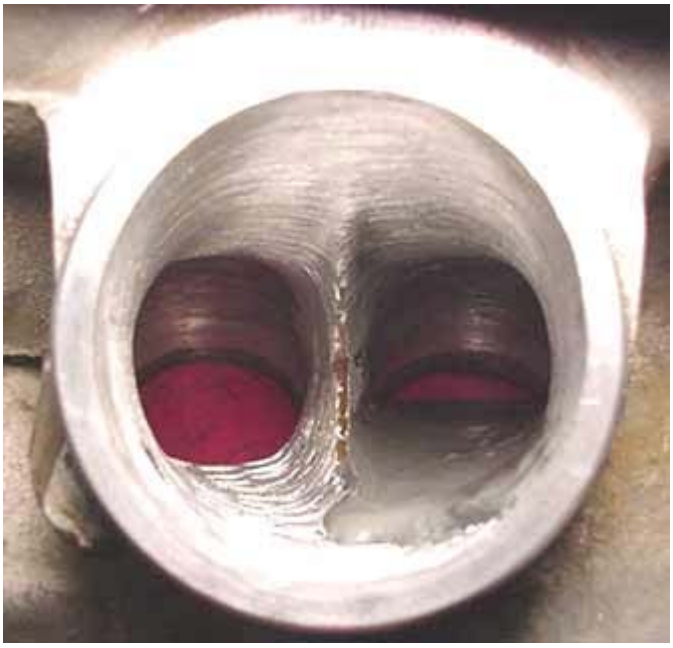
To avoid bubbles, start on the left side
rotate the screwdriver as you "lay down
epoxy.

Be sure to make the epoxy a little thicker
sides.

Then when the right side is reached, tw
screwdriver as you back it away. That ke

last strand of epoxy from getting out of c

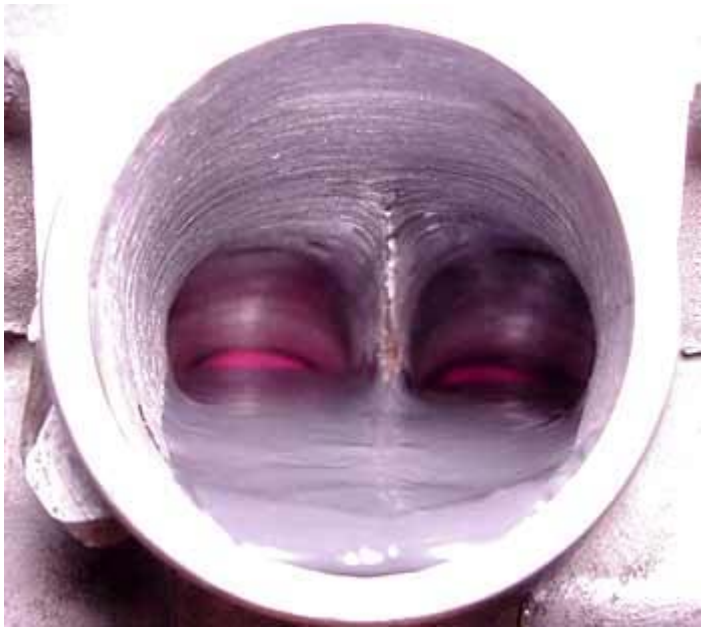
Here's What it Should Look Like So Far:



Preview: The Finished Port.

Now as almost all of the epoxy is added, you can really see the size difference !!

Notice that the epoxy is slightly higher where it meets the side walls, to avoid air bubbles.



Don't Miss The Next Issue:
Finishing The Ports !!

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