

Considering shimming the slide needles on your Honda DOHC inline-four or CBX?

Where do I start.

I can cover the entire subject with three words: gimme a break.

Yes, there are those who report good results—and who thereafter evangelize the practice as a cure-all.

But for every success there are countless failures, which we know because of the sheer numbers of carbs that arrive here having been abandoned long ago as hopeless. When we see shims, we roll our eyes and say, “Ahaa...”

First, some basics.

Rule #1 is that the needle needs some free play in the holder. The short answer as to why, which I'll elaborate upon in a moment, is side-loading by the passing airstream. Proper free play is accomplished by VERY close tolerance design: when you screw the aluminum holder insert down, it comes to a hard stop just before it contacts the head of the needle. A little wiggle room for the needle, free of the side itself.

If the designers left too much free play the needle would jump up and down enough to change fueling characteristic, which is bad for obvious reasons.

But zero free play is equally perilous.

With a shim installed, the holder insert will now come to a hard stop on the needle head and lock it into place. The needle is now for all intents and purposes part of the slide.

Any side-loading force exerted on the needle is thus transferred to the entire slide. Here where it get's tricky: the slide barrel is under maximum exposure when it's down—but with the throttle closed, there's no force present to press the slide sideways and cause binding.

As air volume increases the slide rises, at which time it SHOULD come under proportionally decreasing loading force owing to less of its surface being the airstream.

The trouble is that as the slide moves *out* of the airstream, more of the needle is not only *in* the airstream but is exposed to the steadily increasing loading force—which is precisely where it NEEDS to have that wiggle room.

This is a very easy phenomenon to replicate: hold a slide in your hand and direct compressed air at the needle.

Skeptical as to the degree of force we're talking about? Consider this (you'll have to trust the math—it's derived by a known formula): A 1000cc displacement (Um...a CBX!) engine running with the throttle wide open will take in roughly 715 cubic feet per minute, which works out to a little over 119 CFM per venturi. I'd wager that this is more than your shop compressor.

Not to mention which, these numbers represent gross overall volume and don't account for the fact that side loading force is applied not steadily like your compressor but in pulses. Very-high force, zero

force, very-high force, zero force—umpteen times per second at mid-throttle.

Is it a coincidence that when we encounter shimmed needles the slides generally have more side scoring than normal?

Plus, shims' presence also alerts us to probable damage to the needle and insert. If the owner is lucky the bike fell on its face immediately, but if he's been riding around for any length of time it's a safe bet that the needle has been rubbing in the guide. It'll be ground to a characteristic oval with corresponding wear in the guide. Why? Of all the other issues to contend with, a locked needle is rarely in a *perfectly* straight line with the slide.

Over time, emphasis on *time*, the bike will go progressively rich such that it bogs out under throttle.

Now tell me that you don't get why this is important.

Of course in those same places where you'll see folks raving about shims you'll see instructions on how to re-introduce free play.

This is all well and good—as far as it goes. For this I refer back to the danger of too much wiggle, which in real life manifests as surging, hanging throttle, and other anomalous behaviors that can be suggestive of anything *but* loose needles. Those in search of cures are told to look for “air leaks” or the old standby, “your slow jets are clogged.” Any or all might be true, but still.

It only takes a very small difference between one needle and another to upset the balance, which variance is virtually inevitable given the shade-tree nature of the “fixes.”

Some instruct you to “pocket” the holder insert with a twist drill. Yikes. Talk about precise!

My personal favorite is the guy who tells you to dribble loctite into the needle holder, screw down the insert and then back it out by a half turn or so. Let it dry overnight and voila!

Loctite? *Really?* What if a later mechanic wants to put things right? Hint: replacement OEM stock parts, in particular 30+ year-old needles, are EXPENSIVE. Just ask those customers of ours who have learned this lesson the hard way.

I am by no means stating categorically that shimming cannot be accomplished, period. Bottom line is that if you're having trouble, it needs to be addressed at the source.

This means performing sound, stepwise, and thorough diagnostics instead of reaching for the snake oil.

Let me conclude with an anecdote taken from real life. It's not directly related to needle shims but it goes to the larger idea.

In a certain online forum a guy reported that he had stubborn idle problems, which prevailing “group-think” blamed on air leaks at the choke shafts.

He devised a torturously complex rig of orings, washers, and compression springs on the exposed parts of the choke shafts to seal them.

Of course he had to split them and he makes only the most passing of references to bench-synching during assembly—he being, in my view anyway, rather myopic about the choke shafts to the exclusion of all else.

Many followers to the thread were hanging on to the edges of their seats for results, which were for him seemingly miraculous—and which he (and everyone else) attributed to his own admittedly rube goldberq-esque setup. So it *was* the choke shafts! “Dude, you need to make up a kit...”

But *we* know don't we?

In all probability the only thing wrong from the start was that the synch was off-kilter, which he unwittingly “fixed” in the process of diddling with the choke shafts. Fact is, choke shafts were never intended to be airtight. Um...they have to move freely? And, hanging idle is almost always a result of the synch being out of whack.

This isn't to knock the guy's mechanical abilities or his (considerable) can-do inventiveness, but rather to underscore that we all suffer to one degree or another from the tendency to leap to conclusions based on incomplete understanding. It's like when Einstein wryly observed that *to the uninitiated, technology is indistinguishable from magic*.

Customer: “My bike is bogging. I need major engine work. Try to keep it under 1500.00.”

Repairman: “Your brakes were dragging. Twenty bucks.”

Seriously, that was me—no, not the all knowing repairman but me, as in customer.

Hey, we were all in diapers once...