

# Zero Cost Engineering

This is the latest in a series of rants from Slim Volume, recovering ex-engineer.

One of my old acquaintances from my days at HP is now running his own little company here in Corvallis and contacted me recently about doing some engineering work for him on an hourly basis.

He's losing a significant amount of his factory output to yield losses in his facility and is struggling to find some way to figure out what's going wrong and fix it so he does not have keep throwing that stuff into the trash, week after week.

After discussing his situation with him for a bit, it became apparent that he can't really afford to pay an engineer for having furnished the yield improvement until after he has accrued the financial benefits of the yield improvement. So he's in a classic "gotcha" spot. Can't afford to throw away the scrap, but can't afford to hire someone to do anything about it.

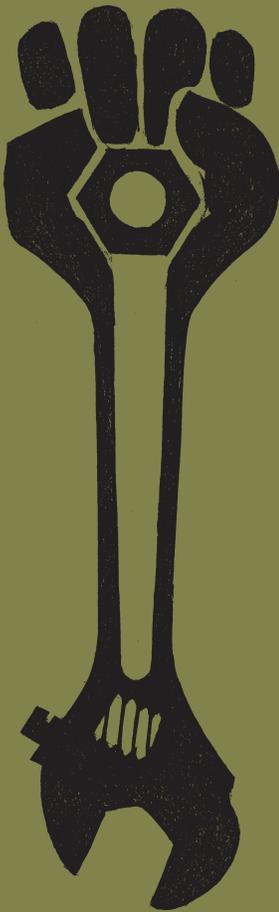
In addition, the facility he is located in was once the storage area of a now-defunct department store and has no running water- neither hot nor cold- and no sink, no drains, no vacuum, no compressed air, and no duct work suitable for connecting to a fume hood for scavenging solder smoke and the like.

So... I'm doing some engineering work for him on an "off-the-clock" basis, in the interests of getting him set up with (at the very least) some sort of microscopic inspection device so he or one of his partners can get a close enough look at the situation to start guessing intelligently at the root cause. And it's going to be in the utility room of my house, since at this time of year it's far too cold in my garage to do any sort of demanding, close-up work.

Now a real inspection microscope, in working condition, that is designed for this purpose and has all the accessories required, will cost about a thousand bucks-used. So that's obviously out. And the digital cameras that people carry around do not focus closely enough to get the required magnifications, so they are out of the running, too.

But in my junk pile I have a child's toy- a hand-held video camera in the shape of a great big plastic eyeball on a handle- that puts out a composite color NTSC video signal that can be fed straight into a TV set. When focused on a dime, the mint date is bigger than the image area- so it has plenty of magnification. And all for \$2 at the annual Vina Moses community garage sale last July!

Furthermore, I have a friend who gave me a very nice and big old heavy-as-hell genuine analog Sony TV set to plug this thing into. So I started hacking the video camera and installing a new light fixture and fume hood in a corner of the utility room, across from the washing machine and the laundry sink. I finished this up last night at about 2 AM and went to bed, feeling like I had accomplished something significant.



Later, it began to dawn on me (by the dawn's early light...) that what I had built was in reality a pile of junk. A pile of junk whose most salient feature was its near-zero cost. Just a big pile of junk, which one could in principle finesse into some semblance of functionality and maybe- just maybe- use to solve a difficult and subtle engineering problem without having to buy thousands of dollars' worth of machine and technician time on a real inspection tool. In fact, without having to buy ANYTHING.

Or not. Who knows whether or not I would be able to accomplish anything of value using this crude, home-made kludge of a device?? Why did it have to cost zero point nothing? Why wasn't my time worth ANYTHING? And what the hell was this big pile of junk doing in my utility room? What in the world had I been thinking during the unbroken eight-hour marathon MacGyver session in which I designed, built, and then installed this thing in my own house?

But... but... but... it has to perform a difficult and exacting task. And it CAN'T COST ANYTHING. So OK, so it had to be done using materials at hand, only what was in my garage- with NO trips to the hardware store or Home Depot or Craigslist or E-bay, oh no no no. Because that would COST MONEY.

Why did I do it this way? Because the guy who needs it is a friend, and he can't afford what it would cost to do the job right. So it has to cost almost nothing and do almost everything.

But behind this all- burned into my memory cells as if by a 140 watt soldering iron, in fact a black bakelite dual heat Weller industrial soldering gun that weighs more than a real Colt .45- is something I learned from my Dad, who died almost two years ago at age 96:

Friendship is DEFINED by whether or not you will go that extra mile. If you are not willing to help your friends, you will have none.

And that's why I do it.

That's Slim's story for a Sunday night, and he's sticking to it.