Metalworking

Calibration Services Done Right: Hiring a Pro vs. Handling It in House

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Even the best, most expensive metrology equipment is unreliable if it's not calibrated correctly.

Getting the tools and staff to do that in-house, however, is beyond the budget of many smaller machine shops—and not necessarily the best choice even for larger ones.

Whether it's better than hiring an outside company to handle ***calibration*** "really depends on the company, the skill level of their quality control people, the number and types of measuring tools they use, and how often they have to get them calibrated," says Jim Salsbury, senior vice president of quality and services at Mitutoyo America Corp. in Chicago.

In a recent interview with Better MRO, he discussed developments in metrology during 25 years with the company, the trends shaping the field's future and what businesses need to do to ensure their metrology tools are accurately evaluating whether machined workpieces meet client specifications.

Better MRO: When I started in manufacturing, the inspector would come around once a year and grab your micrometers and other hand tools, then bring everything back a couple of hours later with a calibration sticker on them. How is that responsibility handled by most of your customers today?

Salsbury: It's really a mix. We train a lot of people here on everything they need to calibrate in-house, but at the same time, we provide a broad array of ***calibration services***. It really depends on the company, the skill level of their quality control people, the number and types of measuring tools they use, and how often they have to get them calibrated.

Better MRO: Let's say you own a small machine shop. Give us some examples of what you would tackle on your own.

Salsbury: As a general rule, it's what you said a moment ago—micrometers, calipers and so on. Calibrating those in-house is pretty easy. You don't need a special facility and you don't need very

expensive equipment: A set of high-quality, traceable gage blocks will take care of most of it. When you move into height gages and indicators, though, you start getting into more expensive equipment and tighter temperature controls. For instance, you could spend $10,000 for a good indicator tester, and if you want to check your pin and plug gages in-house, about the same amount of money for a laser-scan micrometer. Some of these might not make financial sense until the shop reaches a certain size.

Gage Block Calibration

Better MRO: Let's flip the question around. What types of measuring equipment should a smaller shop avoid calibrating on its own?

Salsbury: By all means, the gage blocks mentioned earlier should almost always be sent to an accredited laboratory. So should any calibration artifacts, such as the master spheres used to calibrate your coordinate measuring machine probing system. All of that is super-specialized, and a company could be looking at a couple hundred thousand dollars for the necessary tools, an environmentally controlled room and some fairly extensive training for its people.

Better MRO: We haven't discussed coordinate measuring machines, or CMMs. They can't be sent outside for calibration. Also, aren't more and more shops putting them on the production floor? It seems like this could become an expensive problem.

Salsbury: We are definitely seeing greater use of CMMs, vision machines and the like across the industry. And you're right, you can't very well ship one across town or to another state for calibration. You need specialized equipment and training, which is why our field service team offers on-site calibration, accredited by the A2LA [American Association for Laboratory Accreditation], for these precision measuring instruments, as do other metrology providers.

Better MRO: Many shops will say, "We're too busy making parts. Why not just hire someone to take care of our equipment calibration, whether it's you or another specialist?" Thoughts?

Salsbury: Many organizations have hired a third-party laboratory to come on-site and manage all that for them. Mitutoyo doesn't offer that service, but some of our distributors do. There are also a handful of nationally accredited firms that are more than happy to visit your facility and address these needs. This approach might make sense for a manufacturer, or it might not; it all depends on the scenario and their unique needs.

Doing Due Diligence on Calibration Providers

Better MRO: You keep talking about accreditation. Please explain.

Salsbury: When I refer to accreditation, I'm talking about *ISO/IEC 17025:2017*, or general requirements for the competence of testing and calibration laboratories. There are probably tens of thousands of accredited labs around the world, covering everything from police forensics to testing for illegal drug use in the Olympics. For this discussion, though, I'm referring to dimensional calibration labs. Assuming that your shop chooses to use one of these, it's crucial that you find one that adheres to industry-recognized best practices and that they do what they say they're going to do.

Better MRO: What do you mean by "Do what they say they're going to do?" Isn't that guaranteed if they are accredited?

Salsbury: Maybe, but then again, maybe not. I'll give you an example. One of our customers bought a linear height gage that is roughly 10 times more accurate than competing products. They sent it out to a third-party lab, which declined to certify it. Why? Because the tools they were using to calibrate the

gage were less accurate than the gage itself. Unfortunately, this kind of situation is becoming more common, which is why manufacturers must verify in advance that their calibration partner can meet their requirements—and in the worst case, make sure that any reported measurement uncertainty is smaller than the tolerance that's being checked.

Better MRO: If a shop's calibration provider needs accreditation, doesn't the shop itself? And if so, what's involved?

Salsbury: Maybe not yet, but I think it's coming. We're starting to see some organizations requiring in-house labs to be accredited, although they still seem to be on the fringe. It's definitely something to keep an eye out for since I can tell you that getting accredited would be a heavy lift for a smaller company. We'll just have to wait and see. For now, the only thing that's changed over recent years is that—generally speaking—whatever third-party calibration lab you use must be accredited.

How does your shop handle metrology equipment calibration? Tell us in the comments below.