EDITORIAL

Getting Lucky?

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Of course, I mean this in a technical sense. You are setting up a new, or updating an old, shock/vibration/acoustics laboratory. Your management (which may be you) has authorized you to spend a lot of money on shakers, noise generation, vibration control, and/or measurement equipment. Getting that authorization may have been tough, but that's actually the easy part. Now you have to decide what to buy.

I have spent most of my career either buying or building/selling major laboratory equipment. Most of it has been in the data acquisition arena, but I have participated in the selecting/purchasing of the other facilities mentioned above. I claim that most of these have been successful acquisitions but there have been a few disasters. The objective here is to help you avoid the bad outcomes.

Let's face it, in most companies you will have to live with the equipment you buy for at least 10 and maybe 20 years. With this in mind, I suggest that you put as much effort into selecting equipment as you do in choosing your spouse. You will probably be spending comparable amounts of time with each. It can be a pleasure – or not.

It all boils down to doing your homework. And the sad part is that you probably will not get any financial support to do it. Some of the effort has to be done before you are authorized to start. Otherwise, how will you know how much money you need? This effort will almost certainly have to be a hobby project. Spend the time, and it will be worth it in the long run.

The first thing you have to face is a chicken/egg problem. Depending on your experience, you may have a good idea of both what you need and what is available. This column is not meant for those who really know what they are doing. (In any case, I doubt their existence). It is for engineers that don't have that much experience/equipment knowledge or, more important, the engineers who think they have a clue but want to learn what the unknown options and trade-offs might be. That should be most of us.

First, we need to establish a few basic system requirements. We have some idea of what we need, right? (Note: NEED, not want). However, don't restrict yourself much at this stage. Generic items might include:

- Frequency range (0.1 Hz-10 kHz?)
- Specimen weight (27 lb?)
- Specimen dimensions (bigger than a breadbox?)
- Specimen complexity (how many channels?)

Don't worry. If you are asking too much, the folks you talk to in the next step will tell you so.

Next, we do a quick industry survey. Who do we contact? An easy (and good) start is to review the advertisers in this illustrious magazine.What you will quickly find is that the vendors have two distinct methods of selling things to you.

Most big companies have a "direct-sales" staff that sells that organization's products. Often the products include multiple components of laboratory systems. For example, a single company might offer shakers, control systems, and data acquisition systems. Their staff should have a very good understanding of their products and have the capability to connect you with a specialist if necessary.

Smaller companies use "technical" representatives (tech reps), which are organizations that hawk the products of several vendors. The represented companies offer a variety of products/services that normally don't compete with each other. Their offerings might include shakers, control systems, and data acquisition systems from different vendors. A tech rep's staff should have the capability to describe the appropriate vendor's products and be able to refer you to experts at that company to handle high-tech questions.

So, pull out the copy of *S&V* that hopefully has ads of the equipment that you want. *S&V* would like you to use their www.SandVinfo.com Reader Service web site. With the appropriate issue of the magazine and your browser set to this web site, you have a very efficient way of getting the advertised information almost instantly. However, I am always in a rush so I call the company after looking at their web site. When you first talk to someone, tell them that you are following up on an ad in S&V so that they get the appropriate credit and the vendor hopefully will continue to advertise.

The next step is to find a marketer with a clue. This should be pretty straightforward in the case of direct-sales organizations. Their staff is selected and trained to have an excellent understanding of the company's products. These products are limited in scope/variety and probably don't change very fast, so real expertise should be readily available. The folks you will talk to are usually on salary (with appropriate bonuses) so their next meal is not dependent on them selling something today. They *should* have a long-term view.

It is not as simple for the tech-rep organizations. These companies might represent 10 or 20 vendors, and they may change often. It is a volatile business. The rep company and its staff are normally paid a commission by the equipment manufacturer when a sale is made.

There are significant differences between the two approaches. The skill/support levels of the direct-sales organizations are uniformly good. The comparable levels in tech reps range from abysmal to the best. There are reps that are only capable of handing out literature. The really good ones offer excellent advice/support and get (relatively) rich doing it.

The tech rep's task is to determine whether one of the companies represented can provide the capability requested. If there is a good match, the rep will get you in touch with the appropriate people at the supplier. If *you* find that there is a good match, a visit should be arranged. If they are local, you should go to the supplier and look them over. Otherwise, a visit during the vendor's next marketing trip should be arranged.

Of course, there are excellent vendors that don't advertise. They are usually either new companies or small specialty houses that serve a niche in the community, and they survive on word-of-mouth and their tech reps. Here *Google* is your friend. For example:

- "Vibration shaker controller" brought up the usual suspects and a handful of options that I had never heard of.
- "Wind turbine data acquisition" brought up a few known general sources (that were smart enough to put the right buzz words in their page) and a pile of vendors and other appropriate (or not) resources.
- "Wind tunnel data acquisition" brought up an entirely different set.

It takes about a minute to evaluate the hits and decide whether further investigation is needed. They may also lead you to a tech rep who is a specialist in that area and can produce other ideas.

On *LinkedIn* I have found the following groups to have useful discussions.

- Vibration & Shock Test
- Mechanical Engineers Network
- Sound and Vibration
- Modal Analysis
- Go to technical meetings

It is perfectly reasonable to post a question about your requirements or potential options. With any luck, you will get responses from both vendors and users.

Don't Trust Anybody. Anyone who has taken any of my short courses will remember this slogan. I can't emphasize it enough here. Remember that the salesperson's objective is to sell you something and make his/her commission. So, how do you tell what is the good stuff:

The bottom line is that you have to test the candidate systems yourself. I proved this again a few years ago when a client asked me to evaluate a data acquisition system

for a low-frequency vibration application. The vendor was located near me, so I made arrangements to visit and perform some evaluation tests. The bottom line was that the system worked fine at low input frequencies (satisfying my client), but it failed the out-of-band energy test.* If it were used in a shock test (which the advertisement certainly implied), it would have yielded completely erroneous data.

A year or so later, I was getting things together to write an article on vibration/shock data acquisition systems for *S&V*. I called the same vendor to ask whether we could do a bunch of tests to demonstrate the test procedures I was recommending. I would use the data acquired in the article and give them appropriate credit. I was politely refused! Conclusion: they did not want their system tested for characteristics that I think are necessary for vibration applications. *And*, they apparently did not think their system would pass. (My take on it was that the problem discovered earlier had not been fixed).

You can't make this stuff up!

(**Side Issue**. If there are any brave data acquisition vendors out there that are willing to subject their system to some basic tests that will support their claim that their system is good for vibration and shock applications, please contact me. I would like to write the article but need solid results to present. I already have enough bad examples.)

Remember that the salesperson is representing a company or client. Basically his/her only onus to support you is to make a sale. The smarter and more talented ones will also be priming you for their next sale. If they sell you a bad product, you won't come back. If the salesman uses long-term thinking, the product will be a good match and work well.

There are several layers to the bottom line:

- For most vibration/acoustics applications, several vendors may offer solutions – they will not all be as good for your application, and there may, or may not, be a good correlation with price.
- It is essential that you test the candidate product in your own environment. Don't take anyone's word for it.
- Don't trust anybody! SV

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*Acquiring and Analyzing Pyrotechnic Test Data – The Right Way!, *Sound & Vibration* magazine, October 2008.