
Editorial

Buyer or Seller?

Many editorials relate to or about advances in technology, real or imagined, or about the interplay of the economic world and the world of materials research, engineering, and, ultimately, performance. I'd like to step back a bit and look at the interplay of research, engineering, and performance as seen from the "seller" vs. the "buyer" point of view. My students in certain courses, such as those dealing with high temperature properties, special high performance materials, and similar applied courses, are warned by me about the importance of noting one's position in the research – development – production chain. In other words, are you the buyer or the seller? I have applied the same philosophy to my colleagues in industry!



Matt Donachie

A huge defect in engineering has been the "seller" mentality, which has long influenced selection of research projects and funding of projects. We need to take a long hard look at the ethics of the "seller." In my 45 years of working and teaching since I left school, I have tended to look at the practical, not the romantic, aspects of metallurgical invention.

In the worst case, money is spent without the slightest aspect of real return on investment except for the "seller" who stands to be able to investigate, to her/his heart's content, a subject with no likelihood of payoff, publish papers, and attend conferences, etc. This is not to say that impractical studies should never be funded. However, they should be funded after an *ethical* presentation of the pros and cons, debits and credits, of the project. The "seller" is always the optimist, sometimes, unfortunately, the con man, the purveyor of ideas the likes of which might give River City (in "The Music Man") a study in crass commercialism, with the "seller" the beneficiary. Let me mention two cases from my career that come to mind.

An alloy system we will designate DS-E was studied by a research laboratory and reported to have exceptional high temperature strength capabilities. Work was transferred to an applied laboratory group and a concerted effort mounted to make the alloy a commercial success (for a specific component). There was a parallel contract funded by a government agency, which required the generation of the properties of DS-E. The project was assigned to my group.

After some study, it was obvious that the claims for DS-E were exaggerated. The director of the laboratory called me up one day and asked me my feelings. My answer was that this alloy, sold as being +150° F in strength over the nearest competitor alloy, was faced with an unattainable goal. I suggested that +100° might be possible in the lab (at some specific condition), but only about +50° F would result on the production line. The alloy made +47° in the casting shop and was abandoned.

The government contract continued, but in our lab we could not get the +150° promised by the research lab. At that lab one day, we confronted the "inventor of the alloy" with the fact that any component or even a rod made of DS-E would be perfect for an inch or so and then imperfect for a bit, then perfect in structure again. We wondered how the "inventor" ever achieved, with such poor material, the properties that were quoted in his government contract report and which were used to interest my company in DS-E production.

The answer was simple! The inventor cut out the small pieces of good material and tested it. He ignored the bad material! Hence, he reported outstanding but unattainable properties. What was done may not have been illegal but it was unethical. There is a common trait among sellers to present the best results and ignore the real results. Sometimes this is misguided enthusiasm, sometimes deliberate falsification. "Here are the typical properties for our material" is a common line. The "buyer" ought to understand that this often means, "Here are the best properties we have ever gotten for this stuff!" A skeptical "buyer" can go a long way towards inducing more realistic or ethical (or both) presentation of information directed to creating new materials applications.

Another illustration. A cast alloy was converted to a wrought alloy by special processing techniques. After a period of development, a series of tests was run on the developed product, which we'll PM-A. Every now and then, low results (notch failures) were reported in creep-rupture tests. As the person designated to provide the design curves for PM-A, I was directed to ignore the low results since the test engineers reported them as being false readings – in effect, low data were withheld from me. PM-A went into

production and virtually every other component in the first production run failed its specification creep-rupture test at levels consistent with the withheld data! Was the decision to proceed with production an ethical failure or the result of optimistic vision?

Later this same alloy name was transferred to another alloy without mentioning to an appropriate external regulating body that the “alloy” was no longer quite the same in chemistry and processing. Ethical? No. Legal? I do not know. Common type of situation? More often than you would like to think, I suspect!

What I have been trying to do throughout my career is to train the “buyer” to be a bit skeptical, to ask at least the necessary questions. Don’t take statements at face value. Look for proof. Challenge the status quo, which goes with the crowd mentality. Of course, this is not the way to advancement for most folks. However, I would like to think that living with oneself as an ethical and honest person is a far better life achievement than being the “promoter,” the “seller,” the purveyor of somewhat uncertain goods.

I close with a quotation that might well be the Donachie family motto. It was for our father Scotti, and is for my brother Steve and me.

“How happy is he born and taught
That serveth not another’s will
Whose armour is his honest thought
And simple truth his utmost skill!”

— Sir H. Wotton in *The Golden Treasury*, F.T. Palgrave, 1861

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