

NdFeB: The First 30 Years and the Next 30 Years

I would like to begin this article with a tip of the hat to Shuk Rashidi as he retires from the permanent magnet industry this past June. Over 40 years ago, Shuk began his career as a graduate student at the University of Dayton, working for Dr. Karl J. Strnat. He worked for several permanent magnet producers, ending with Tridus. The introduction of SmCo and NdFeB magnets took place under his watch. If you have been in this industry a while, it is almost inevitable that you have encountered Shuk at a conference, as a supplier, as a co-worker or as a competitor. Shuk's enthusiasm for taking good care of his customers throughout his career benefited all of us. So let me salute him as he makes a graceful exit.

This year is auspicious as we mark the 30th anniversary of NdFeB magnets. Some of us had the good fortune to be around at the start of this technology and have been able to nurture it, as it developed and deployed. For me it began at the Magnetism and Magnetic Materials Conference in Pittsburgh in November of 1983. Over time, we have seen NdFeB magnets applied to ear buds, disc drives, MRI's and micromotors, just to name a few applications. Today we see several new and promising applications on the horizon: wind turbines and hybrid/electric vehicles being two of them.

We have also had some difficult times, too. Discovering after their introduction in the marketplace that NdFeB magnets had a significant problem with corrosion was a major blow. In addition, much of the industry has moved away from the US and Europe and now resides in China and

elsewhere in Asia, as manufacturers chased lower labor rates and other economic advantages. More recently the rare earth price spike reminds us of a phenomena MBA's call demand destruction, consumers will shun products when their price skyrockets. Beyond the characteristics unique to our industry, we have the regular business cycles, with a major crash in 2001 due to computers and the financial crash of 2008. Yet in spite of these setbacks, we have generally moved forward as an industry. One driver that every magnet designer knows has always pushed us in the right direction: we need to find the minimum amount of material to do the job at hand. People who have mastered this skill have done well, even while others have suffered. It is a fundamental truth.

We should also use this opportunity to think about the future and I would like to use a frequently asked question from many of the early conferences: What is holding back this industry? I think there are two issues.

The first is the lack of long term thinking. Port Wheeler had his famous slide that contained only one word "VISION." The message that companies should have a strategic plan has been around for a long time. Unfortunately I have no advice to give on this topic because ignoring the future in favor of the present is endemic in all businesses today, not just ours. This seems unlikely to change until all industries get away from obsessing about the current fiscal quarter.

The second is what I call a lack of a holistic view, and I do have quite a bit to say on this

subject. If you write down all the processing steps from the rare earth mine to a final product containing a magnet, like a disc drive, you would easily have well over 20 processing steps. Today there is no single company that does all the steps. Our industry is fragmented, with each plant performing a few of the processing steps. This is where the trouble begins, since most people have limited or no understanding of the processing steps done by their suppliers or customers. This leads to difficulties in communicating needs and expectations up and down the supply chain. If I could change just one thing in our industry it would be to have miners and processors understand the applications and vice versa. I would also want researchers to appreciate the realities of a production environment and customer needs, all the way through the supply chain. I would outlaw the use of the word “presumably” when discussing supply chains and replace it with firsthand knowledge, not guessing, educated or otherwise. We need some openness to do this, something that is not popular in the magnet industry. But it would have a handsome payoff, if we are brave enough to open up.

This is a tall order, I will admit, but I think is one that we as an industry could handle. It would benefit and nurture us and our special materials for the next thirty years.

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