

What the Heck Happened to the Magnet Industry?

By Walter T. Benecki

Thirty years ago, the US permanent magnet industry was flourishing and full of excitement. A new exciting magnet material had just been announced and everyone was energized with anticipated growth opportunities for the industry. Some magnet producers were lining up to pay millions of dollars for the rights to manufacture sintered NdFeB magnets! Dozens of magnet producers and distributors were enjoying a vibrant and profitable business environment. But today's permanent magnet industry has changed remarkably.

China's Massive NdFeB Over-Capacity Remains a Big Issue. Over the past twenty years, the North American magnet industry has faced more than a dozen plant closures as the emergence of China's dominance quickly became a reality. Today, most observers believe the Chinese investment in rare earth magnets has been excessive.

China's current NdFeB production capacity utilization is estimated to be less than 50%, while they enjoy a global market share in excess of 70%. That means hundreds of hungry, almost desperate magnet suppliers, all chasing the same business with one primary lever....price. In addition, the Chinese government's recent moves to manipulate their currency have certainly affected the overall complexity and uneasiness within the magnet industry.

Magnet buyers relish the thought of a more competitive marketplace and lower magnet prices, and there is no doubt that the abundance of magnet producers will keep market prices in check. The aggressive buyers, eager to take advantage of alternate suppliers offering attractive cost reductions will try to take advantage of every opportunity. Some buyers will be successful. However, some will be disappointed, finding their new "low cost" supplier unable to consistently meet their quality or service requirements.

The Pain of 2011 Continues in Everyone's Memory. The magnet industry, as well as most magnet buyers, still remembers the pain of 2011, when rare earth prices spiked to unprecedented levels. Magnet suppliers had the unpleasant task of requesting massive price increases from their customers. Today, magnet users continue to be concerned about a potential repeat performance. Many maintain alternate technologies in their back pocket, prepared to move quickly to avoid being stung a second time.

During the past 3-4 years, everyone has been encouraged about the prospect of rare earth oxides being mined in the US (Molycorp) and Australia (Lynas). However, Molycorp filed for bankruptcy in June, 2015 and each company's long-term viability remains in question. In fact, Molycorp announced the transition of its Mountain Pass operation to a 'Care and Maintenance' mode in late August.

Chinese government shifting policies regarding rare earth mining, tariffs and other export regulations have not left the magnet community with a feeling of comfort or security. In addition, as long as China remains the dominant rare earth producer, unpredictable political rifts between governments always loom as a triggering event. The result is an ongoing concern about future prices of rare earth magnets....and in the worst case, the possibility of raw material shortages which could once again ripple through the magnet industry. Recently, rare earth prices have experienced steady downward

pressure, clearly suggesting “No supply problem today!” But who knows what the price trend will be 12-24 months from now?

It Takes Forever to Resolve Patent Disputes! Since Hitachi Metals launched its legal assault with the US International Trade Commission in 2012, the permanent magnet community (producers, distributors and users) have been facing an extended period of uncertainty. The current phase of this international legal battle involves a consortium of Chinese companies who are challenging certain Hitachi patents.

Although the US Patent Office claims to have a “Streamlined” process for resolving such disputes, this contest is now entering its third year with no resolution. At stake for Hitachi are millions of dollars of royalty income from their stable of licensees. Many in the magnet industry are concerned that a Hitachi loss would result in an period of confusion and chaos, as more than 200 Chinese NdFeB producers would be free to descend on the global marketplace.

This concern is valid. Since 2013, when Hitachi increased their Chinese license list by three additional manufacturers, the three new Chinese licensees have been pursuing market share penetration with the primary tool they feel is available to them – attractive (low) prices.

So the unknowns behind the current patent dispute are significant. Some observers anticipate an initial legal determination before year-end. But what responses, negotiations or appeals might occur afterward is difficult to predict. Who knows how long this cloud of uncertainty will continue to cloak the magnet industry? And what is in store for our us once the dispute is resolved? All we can say is: “Stay tuned”.

The Global Permanent Magnet Industry is Not Really That Big. Outsiders to the permanent magnet industry are often attracted to the lure and technology surrounding the permanent magnet industry. In fact, the global permanent magnet industry is estimated to be in the range of \$20 billion. In the grand scheme of things, this is small.

Keep in mind that, during the typical Christmas holiday period, US consumers spend over \$600 billion! US consumers also spend over \$50 billion each year for cosmetics and about \$60 billion a year on weight loss products each year! So a \$20 billion global spend on permanent magnets is really not very large.

Then add in the fact that, worldwide, there are over 1,500 magnet producers, distributors and magnetic assembly fabricators. The average “sales per company” calculates out to about \$13 million per participant. The median magnet industry player is estimated to be well below \$10 million! On any basis you choose, the permanent magnet industry is really “small potatoes”!

A High Percentage of Magnet Purchases Involve High Volume and Competitive Prices. Ah....the lure of large production volumes! This is the primary attraction when selling magnets for most computer, automotive, appliance and wind turbine applications. Unfortunately, the buyers in these industries do everything within their power to leverage their attractive volumes to achieve the lowest possible prices.

A quality or service glitch can be extremely dangerous, both for the magnet seller as well as the purchasing agent attempting to explain to upper management why their production lines are shut down. Certainly, one of the current high-volume opportunities is the wind turbine industry. If direct-drive wind turbine production were to accelerate (and most producers prefer the direct-drive design), the overall

demand for NdFeB magnets would jump....and magnet manufacturers would all be scrambling to participate.

One word of caution...the battlefield of the permanent magnet industry is littered with companies who staked their business model on “high volume....low margins”. Atlas Magnetics, General Magnetics, Crucible Magnetics and Kane Magnetics are just four examples of companies who, at one time, strategically elected to focus on disk drive, speaker or automotive applications. Unfortunately these companies do not exist today.

The Continuing Claim That “Magnets are Commodities” is Bogus. I’ve occasionally heard buyers argue that magnets as “commodities”. Don’t buy this assertion for one minute! Quite often, especially for the ultra-high volume applications, initial magnet selection is often determined to meet the application’s specific magnetic circuit requirements. Sometime, a custom magnet composition is actually developed! There are simply too many variations in specifications and magnet types for permanent magnets to qualify as a commodity. They are really *engineered products*.

We have seen many cases where “standard grade” magnets purchased from two different magnet manufacturers were tested under identical test conditions. Often, such magnet comparisons can produce very different magnetic characteristics. So much for being commodities!

Any magnet buyer who has been stung with a serious magnet quality or delivery problem is unlikely to re-assert the “commodity strategy”. But make no mistake -- magnet sellers will continue to be confronted with this claim. Just remember, it’s a purchasing strategy, not a fact!

A Fledgling Sub-Industry May or May Not Survive. In-house recycling of NdFeB and SmCo magnet scrap has been successfully pursued by most of the major rare earth magnet producers for over 15 years. Reprocessing magnet scrap within the manufacturing process is economical and common within the magnet industry.

But independent recycling of NdFeB magnets, from either a fabricator’s scrap or magnets recovered from end products like motors or disk drives, has recently been taken on by a few start-up recyclers.

This writer has reservations regarding the ultimate economic feasibility of recycling magnets from end products. Certainly, this has plenty of “sex appeal” tied to “green initiatives” and has attracted many to give it a go. But once much of the “low hanging fruit” has been recovered, there is a real question whether these magnet recyclers will achieve a sufficient return on their investment. Obviously, a main factor will be the future market prices for rare earths. Given that it’s impossible to predict future raw material price levels, we suspect the jury is still out on this one!

The Search for the “Holy Grail” Hasn’t Yet Been Successful. For the past 20+ years, magnet industry leaders, governments and university laboratories have spent millions of dollars in search of the “Holy Grail” – a permanent magnet with overall properties equivalent to, or exceeding those of NdFeB magnets, *that do not contain Neodymium or Dysprosium*.

Efforts continue in a number of areas – Iron Nitride, Samarium Iron Nitride, a variety of Cerium and Manganese-based compositions, magnetic nanoparticles and Iron Lithium Nitride are just a few of the research areas that have pursued over the past few decades. US government funding for some of these initiatives has been scaled back and today, a much smaller number of the U.S. Department of Energy’s ARPA-E magnet program initiatives are being pursued. Unfortunately, we do not anticipate a major breakthrough that will fundamentally change the permanent magnet industry, at least not in the foreseeable future.

Finally, The Financial Investor/Owner is a Reality. Aside from the fact that the US magnet industry has witnessed more than a dozen acquisitions and plant closures over the past few decades, thirty years ago, the thought that major industry players like Vacuumschmelze, Arnold and Dexter would all be owned by financial buyers or private equity investors would have never entered anyone's mind. Today, this ownership shift is a reality.

It may take an extended period of time to evaluate the impact of this significant change. Financial owners often tend to have a shorter-term focus and target to resell their investments within a 4-7 year window. On the other hand, these investors have the financial clout to make major financial commitments, including strategic acquisitions. This ownership trend represents a significant change within the permanent magnet industry.

Summary: Thirty years ago, life in the magnet industry was much simpler. We were riding the early wave of a new NdFeB technology and Chinese competition was not on anyone's radar screen. In fact, in 1990, very few anticipated any meaningful transfer of any magnet production to China. And nobody could have predicted that, in 2015, there would be hundreds of NdFeB producers in China! But it occurred, pretty much in the blink of an eye. In addition, we have now transitioned from manufacturing and promoting rare earth magnets to trying to recycle or find substitutes for them!

Today, we are faced with challenges and uncertainty that seems to make the overall business equation in permanent magnets far more daunting and uncertain. The good news is that the overall market demand for permanent magnets continues to grow between 5-8%. Those industry participants who are well-managed and can articulate and implement a sound business strategy will certainly excel. Unfortunately, some may fall by the wayside.

A lot has changed over the past few decades.....some of the change has been good, and some has been less than good. Quite often, it depends on your perspective.

About the Author - *Walter T. Benecki was president of Arnold Engineering (now Arnold Magnetic Technologies) from 1989-2001 and served as president of the Magnetic Materials Producers Association from 1994-1997. In 2001, Walt established his consultancy serving the global magnetics industry. He is author of "The Global Permanent Magnet Industry" published in 2014. Walt has been a principle or strategic advisor for more than fifteen successful acquisitions, dispositions or joint ventures within the global magnetics industry. For additional information, visit: www.waltbenecki.com.*



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