



665 Rodi Road, Suite 305
Pittsburgh, PA 15235

www.HMAmembers.org
www.HardwoodInfo.com

p 412.244.0440
f 412.244.9090

The Future of U.S. Manufacturing

By Art Raymond

We have real reason to be optimistic! Newfangled manufacturing tools are finding their way into industries across our economy. Combined with other technologies, these tools are heralding the beginnings of a new chapter in a continuing industrial revolution.

Since the 19th century, the world of manufacturing has moved from single craftsmen building items by hand on a bench, to the advent of interchangeable parts, assembly lines, and finally to lean production in the late 20th century. Over that time, these developments have driven a quantum increase in human productivity – the real key to improved standard of living. With the global economy presently faltering, a new spark is needed to regain the momentum required to achieve prosperity for all.

That catalyst is found in the realm of **digital manufacturing technology**. Its application is being aimed at two important objectives: (1) streamlining new product development and (2) enabling the efficient manufacture of customized products for the customers of tomorrow. Engineers using digital tools are creating and testing new products in a virtual world that by-passes slow, labor intensive prototyping. Once a product's design is finalized, other software drives its fabrication using automated machine tools, robots, and vision/sensor systems.

The latest gadgets in this high tech arsenal are **3D printers** and their close cousins. These devices create objects by laying down successive ultra-fine layers of material, under computer control, until the required three-dimensional item is completed. Unlike traditional subtractive techniques that cut, mill, grind, and stamp products from a block of material, 'printed' items are built from the bottom up, virtually out of thin air. Hence the new process is called **additive manufacturing**.

At this stage in adoption, most 3D printers are employed in rapid prototyping. One such application is *sand printing*, where intricate casting molds are built by binding thousands of layers of sand. At automaker Ford,

this method replaces expensive, more traditional mold making processes in developing engine components. New parts can effectively be refined and fabricated for the cost of sand and binding agents. More importantly, savings in time gets new products to market much faster.

Other 3D printing technologies include such gee-whiz methods as *direct metal laser sintering* (DMLS) and *electron beam melting* (EBM). Jet engine maker Pratt & Whitney employs these methods to prototype complex, hollow components in the same material that will be used in full production. This attribute enables more rigorous physical testing of prototypes, a must when your end products are used in aircraft.

The speed of 3D equipment is currently preventing its adoption, by the likes of Ford, in high-volume parts production. Savvy companies, however, are integrating additive and subtractive processes to create hybrid factories whose real value is mass customization: the profitable production of what a customer wants in low volumes when needed at an affordable cost. Think Rolls Royce and Ferrari.

Additive fabrication technology is only one cornerstone in the potential revival of U.S. manufacturing. Two other elements are:

- *Stable Energy Supply* - Advances in extraction and fracking technology are driving the transformation of our energy supply. Growing supplies of North American oil and natural gas are reducing our dependency on foreign supplies and absorbing the external shocks that have traditionally led to higher costs. North America added 1.8 million barrels of daily oil production in the past two years. Experts predict a further 3.9 million barrels of output by 2018.
- *New Materials* – Ceramic, plastics, carbon fiber, non-woven and other innovative materials are finding thousands of uses that answer heretofore unsolvable problems. Nanomaterials developed by manipulating molecules and atoms will soon be employed in high-efficiency solar cells, batteries, and medical applications.

What, you ask, do these high-tech gizmos have to do with your lumber business?

Revolutionary technology rarely has an immediate impact in the average business. Think, however, of the tools described above as a catalyst that ignites improved competitiveness and motivates smart capital investment. Remember the positive impacts of inventions like the steam engine and the personal computer on the U.S. economy: rising productivity and standard of living. Well-employed workers mean more demand for housing, cabinets, furniture, millwork, and flooring. The future could be now...