3-D PRINTING IS HERE!
AND THERE! AND OVER THERE!

Jack Mc Guinn, Senior Editor

Necessity is the Mother of Invention, goes the bromide, but this 3-D printing thing is taking manufacturing to an entirely different — yes — *dimension*.

I mean, you've read the bordering-on-science-fiction articles, attended the seminars, sat through the webinars. And to cite the legendarily titled, unfinished, unreleased Orson Welles film—*It's All True*. (Allowing of course for obligatory flak-speak).

3-D print technology—and this is a most-basic explanation—fashions parts, modules, etc., from a "blank page" by pan-caking thin layers of materials on top of each other — as specified (designed) by blueprints via computer display. Acknowledged advantages thus far for this nascent technology include faster production, increased flexibility, i.e.—the ability to create components in shapes impossible to accomplish through standard methods—and, one of 3-D printing's most attractive capabilities for the power transmission game — rapid prototyping of complex, expensive parts (tools, gears, etc.).

Easily the shiniest, newest thing for most of us to ponder who follow manufacturing, 3-D printing gains more attention – and investment capital — in real time as one after another of its manufacturing wonders is unveiled in the trade press.

For example, a recent *Bloomberg News* report, that likens Sandvik's 3-D gambit to Siemens AG in exploring 3-D printing, states that, "Sandvik AB is boosting research spending on 3-D printing as the world's largest maker of metal-cutting tools expands capabilities in a market set to grow nine-fold — to $21 billion in a decade." That's a lot of folding money for a technology that some continue to treat like a redheaded stepchild. (In fairness, the whiz-bang technology process is not manufacturing-extensive; there are limitations having to do with cost effectiveness and repeatability issues, to name just two.) What's more, the report adds, the toolmaker is adding staff expertise to operate a new 3-D printing research and development center in Sandviken, Sweden. There they will "unify 3-D initiatives across the business and examine how the technology can be used in its production of everything from mining drill rigs to fuel tubes for nuclear power plants."

Another wonder of 3-D printing — or additive manufacturing, as it is interchangeably known — is how it can work with extruded plastic to create solid objects that can include moving parts — even though they are first created as a single/solid component. One such wonder is this 3-D-printed peristaltic pump (shown) — the brainchild of a blogger. What makes it truly wondrous is that this thing was printed from a 3-D-printed *planetary gear bearing*.

Pump people know peristaltic pumps are designed to apply constant, steady pressure on fluid-filled tubing that is coursed through the interior perimeter of a planetary gear. Meanwhile, intermediate gears directly apply pressure as they are tracking. These pumps are used in medical devices, clean rooms and many other environments and in equipment where controlled fluids delivery is critical. They also have a place in the sizeable home & garden market, where they are used in gardens, fountains, ponds, etc.

Not to party-poop, but shiny and new can get old and in the way in a hurry. What's the application-specific service life for a piece of 3-D-printed equipment such as this? Its blogger maker says it is wear-and-tear-resistant, but what does *that* mean, exactly? So in this case expectations are key and certainly more testing is/would be needed — dependent upon what those expectations — or mandated requirements — actually might be.

That aside, you have to admit that the fact that one can ***print*** a set of *working, moving,* parts is like taking the "fi" out of "sci" — like *Iron Man 2*, for instance, writ true-to-life. And you can bet your stock portfolio there will be other applications dovetailing with the rotary functions of 3-D print-friendly planetary gears and other iterations.

Like, the aerospace industry is at the forefront of 3-D printing in the manufacturing industry (peristaltic pumps for example?), according to *Bloomberg,* reporting that "General Electric has said that from 2016, its new Leap aircraft engine will include 19 3-D-printed fuel nozzles, designed to last five times longer than traditionally made components (see service life comments above); and "Siemens uses additive manufacturing to repair gas turbine burners that's accelerated the repair time from 44 to four weeks, and the process has also hastened the time taken to prototype new metal components to as little as 48 hours."

And did we mention they are already 3-D-printing replacement parts up at the ISS (International Space Station)?

Saddle up folks. Mars, Hoooooooooooooo! **PTE**