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# **Self-Torquing Fasteners**

AzTE Case #M01-022

## Background

#### Inventor

Dr. Alvin M. Post

Associate Professor, Mechanical and Manufacturing Technology

# Intellectual Property Status:

US patent 6,688,828

#### Contact

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480.884.1996 main 480.884.1992 desk Email: bloux@azte.com Currently, fastening a bolt requires using either a classical wrench for small bolts or a hydraulic stretcher for heavy duty bolts such as those employed in large manufacturing applications (e.g. oil exploration/production). These existing methods are generally labor intensive and therefore expensive and time consuming. In addition, due to weight and size of the bolts, these methods can be extremely hazardous. Meanwhile, the equipment employed in these applications requires regular maintenance and calibration to operate effectively. Moreover, current technologies and methods often prove unable to perform properly in troublesome environments such as in the ocean or in space.

## **Invention Description**

Researchers at Arizona State University have developed a novel and unique self-torquing bolt comprised of a shape memory alloy that changes shape in response to the application of heat. The bolt will expand when heated until the desired compressive force is achieved in order to fasten it in place; the bolt will remain in this state even after it cools back to ambient temperature. Because this design utilizes a standard tapped hole and a standard nut there will be minimal need to adapt equipment to this new technology.

### **Potential Applications**

- Offshore oil exploration/production industry
- Applicable in structural assemblies in space
- Applicable in other challenging environments

### **Benefits and Advantages**

- Improves the safety of the torquing process
- Reduces the application time
- Reduces cost
- Reduces human intervention
- Can readily replace traditional bolts in all current applications