Patent awarded for novel use of water jets to create high tensile strength alloy parts

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A patent was awarded today to the late Ernest Geskin, PhD, of Florham Park, an expert in water jet technology and a mechanical engineering professor at NJIT for more than 25 years. Sharing the patent with him is Krzysztof Kluz, PhD, his former student and now a senior mechanical engineer for Marotta Controls, Montville.

US Patent Number 8,459,078 entitled "System and Method for Forming of Tubular Parts" discloses a method for using propellant driven water. It teaches a method in which a combustion chamber generates a gas to drive water through a tubular part with sufficient force to mold the part into the form provided by the die surrounding the high tensile strength alloy work piece.

This process results in a seamless tubular part of uniform thickness that might be round at one end and oval at the other with perhaps a geometric indentation, or a symmetrical bump in the tube. The process overcomes the deficiencies of hydroforming, which can result in unpredictable wall thinning; and explosive forming, which cannot be used to produce small and precise repeatable parts.

Beginning in 1987 until his untimely death in 2012, Geskin directed the Water Jet Machining Laboratory at NJIT. His innovations included multiples techniques for using water jets to perform precision machining and cleaning procedures.

One mechanism applied water jet technology for the cleaning operations

used in the electronics industry, replacing chlorofluorocarbons (CFC) for the precision cleaning required to ensure operation of sensitive electronic devices. Other applications included a chemical-free method for precision cleaning of metals and ceramics as well as a cleaning system for pharmaceutical reactors.

His work received support from federal agencies including several grants from the National Science Foundation to develop "green" water-based machining technology. Manufactured items were "finished" by removing extraneous material with ultra, high-speed water slugs, delivered through a nozzle. The process requires only minimal water consumption and generates little debris and almost no emissions. Other applications that employed his water jet nozzle technology included a method for extinguishing fires by removing oxygen, high speed drilling through underground concrete barriers, and an improved method for building demolition.

Geskin was the author or co-author of more than 50 book chapters. His research interests included non-equilibrium thermodynamics, the information and application of high speed projectile, combustion and steelmaking. He received his doctorate from Moscow Institute of Steel and Alloys and his master's degree from the Dnepropetrovsk Institute of Metallurgy.

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