



▲ Microscopic view of needles in TiBor Skin composite structure.

TiBor Skin™ is a two-part technology that enables creation and fabrication of toughened and corrosion- and wear-resistant composite structures. First, it provides a family of coatings or surface materials for application on metals plus methods of applying these materials. Second, it provides methods of interjoining the applied coatings with their substrates to form composite structures, the surfaces of which wear and corrode at rates much lower than those currently experienced in the industry.

Features

- Coatings are applied to substrates as a sheet, tape, slurry or paste.
- Coatings react with substrates to form composite structures rather than mechanical bonds; heating may be applied in the presence of an oxidation preventative until the reinforcing material interjoins with the substrate.

Benefits

- Integral — does not distort substrate geometry, reduce surface smoothness or allow for delamination
- Versatile — may be applied either to raw materials prior to manufacturing or to parts after manufacturing
- Nonrestrictive — does not interfere with welding process
- Thorough — replaces need for other coating techniques such as plasma spraying, sputtering and plating
- Broad — can also be used to aid in bonding of dissimilar metals

Applications

- Aircraft propeller blades
- Compressor turbine blades
- Food processor blades
- Chain saw chains
- Cutting tools
- Lawnmower blades
- Saw blades
- Drill bits
- Bearings, pistons and similar wear parts

Patents & Awards

- U.S. Patent No. 8,691,343
- Technology Ventures Corporation–featured technology, 2012

Inventors

Roland D. Seals, Edward B. Ripley and Russell L. Hallman Jr.

Technology Readiness Level (1–9)



Basic technological components are integrated to establish that the pieces all work together.

Partnering Opportunities

Y-12 is seeking an industry partner to fully commercialize this technology.

**If you would like more information, please contact the
Office of Technology Commercialization and Partnerships:**

OTCP@y12.doe.gov

(865) 241-5981

<http://www.y12.doe.gov/technologies>