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Laser-assisted Micromachining Systems for Contouring Complex Features

A novel laser-assisted micro milling system employs flexible beam positioning to thermally soften difficult-to-machine materials, yielding higher removal rates, extended tool life, and improved surface quality.

Many advanced materials, such as ceramics, composites, and high temperature alloys, are difficult to machine. Some solutions to address this issue employ a laser-assisted method; however, currently used laser-assisted micromachining techniques do not provide flexible beam positioning methods with a requisite low incidence angle. Therefore, these methods are limited to machining only simple features. Also, laser machining, ultrasonic machining, precision grinding, and other micro milling solutions in use yield very limited material removal rates.

Researchers at Purdue University have developed a new technology for laser-assisted micro milling of difficult to machine materials. This system is capable of micro milling these materials with higher material removal rates than existing systems by using a novel, flexible beam delivery mechanism. The laser's positioning thermally softens the material, resulting in lower cutting forces, longer tool life, and improved machined surface quality. This system allows for more advanced machining options including pocketing, contouring, deep slot milling.

Advantages:

-Extends the life of the machining tool

-Increases precision in machining process

-Increases material removal rates

-Advanced machining options

Potential Applications:

-Parts manufacturers

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Category

Robotics & Automation/Automation & Control

Chemicals & Advanced Materials/Materials Processing & Manufacturing Technologies

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-Materials industry

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