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AUBURN UNIVERSITY

Improved Plasma Blasting With Reusable Probe and Specialized Fluid

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Reference: Plasma Blasting

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Licensing Opportunities

- This technology is available for exclusive or non-exclusive licensing
- Joint development opportunities include funded research, field testing

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Overview

Auburn University is seeking a licensee or development partner for a new system for blasting. This design improves the efficiency of plasma blasting, which is known to have several advantages over conventional blasting but has previously been too expensive. By redesigning the blasting probe and with the introduction of a specialized blasting fluid, the costs of plasma blasting can be significantly reduced. This method has the potential to improve blasting in mining, construction, space, or other applications necessary for rock removal or demolition.

Advantages

- Minimizes vibrations, noise and flying debris, resulting in a safer work environment and increasing control allowing for application in more locations (e.g. in populated sites)
- Reusable and adjustable probe, reducing both materials cost and inventory
- More volume of rock breakage for a given energy input, lowering operating costs compared to traditional plasma blasting
- Inert and environmentally friendly, making it applicable where chemical explosives are prohibited and eliminating transport restrictions

Description

In a plasma blasting system, electrical energy is deposited into a fluid which then creates acoustic, pressure and shock waves that break apart a solid material. Traditionally, plasma blasting has proven too expensive for practical use due to large required energy inputs and single-use equipment. By redesigning the blasting probe and the introduction of a specialized blasting fluid, the costs of plasma blasting can be significantly reduced, making it comparable to traditional blasting methods that have significant drawbacks by comparison.

This two-part invention first consists of a specialized fluid that surrounds the probe. This fluid better seals the bore hole to hold the probe in place, and also better transmits the blast energy. This allows for a reduction in energy requirements. The second part consists of a redesigned blasting probe that allows for better control of energy input, further reducing energy requirements. With these lowered requirements, the probe size can be reduced, which lowers the cost. Additionally, the life of the probe is increased. Without having to replace the probe with every use, materials costs are further lowered. With these reductions in expenses, plasma blasting may now become cost competitive with conventional blasting techniques. This would allow users to realize the advantages of plasma blasting, including reduced vibrations, relatively low noise, minimized flying debris ("fly rock") and chemical inertness.

Status

- A patent application has been filed
- The probe and fluid have been demonstrated on concrete and a 4-foot diameter, 1-ton granite boulder (see pictures above) | [View video](#) of blast demonstrations
- Next steps include further scale-up and field testing

