PA&E: Explosive Metal Forming

March 2017
PA&E Bonded Metals Division:

2249 Diamond Point Road
Sequim Washington
Bonded Metals Division

Who we are:

PA&E Bonded Metals Division
- In operation since 1970
- Formally known as Northwest Technical Industries

What we do:

We use explosives to weld or bond dissimilar metals together and to explosively form metals into exotic shapes that are difficult or impossible to do by conventional methods. Explosives are also used to compact or consolidate metal powders into near net shapes.
The Explosive Metal Forming Process

This technique uses the energy generated by an explosive detonation to form the metal work piece. This process can deliver a great deal of flexibility in the metal-forming process.
Why Explosive Forming?

• It can simulate a variety of other conventional metal forming techniques such as stamp- or press-forming and spin-forming in a single operation
• It can offer significant cost savings on short-run parts because a one-sided tooling die is generally all that’s required
• Explosive hydro-forming can efficiently form large parts – up to 14’ square or 10’ in diameter
The Explosive Metal Forming Process

Preparation

A PA&E Employee Matches Material To Die and Applies an Explosive Charge
The Explosive Metal Forming Process

Detonation

Material is Lowered into Blasting Pond and the Explosive is Detonated
The Explosive Metal Forming Process

Post Detonation

Explosively Formed Sheet
The Explosive Metal Forming Process

Other Examples of Explosively Formed Sheets

- Missile Components
- Boiler Products
- Aircraft Radar Shields
The Explosive Metal Forming Process

Examples of Explosively Formed Cones

Rocket Engine
Nozzles

Space Shuttle Cone and After Explosive Forming
The Explosive Metal Forming Process

Turbine Components

Hastelloy® Tubes

Explosive Forming Die

Finished Parts
The Explosive Metal Forming Process

Learn More

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Or Visit: