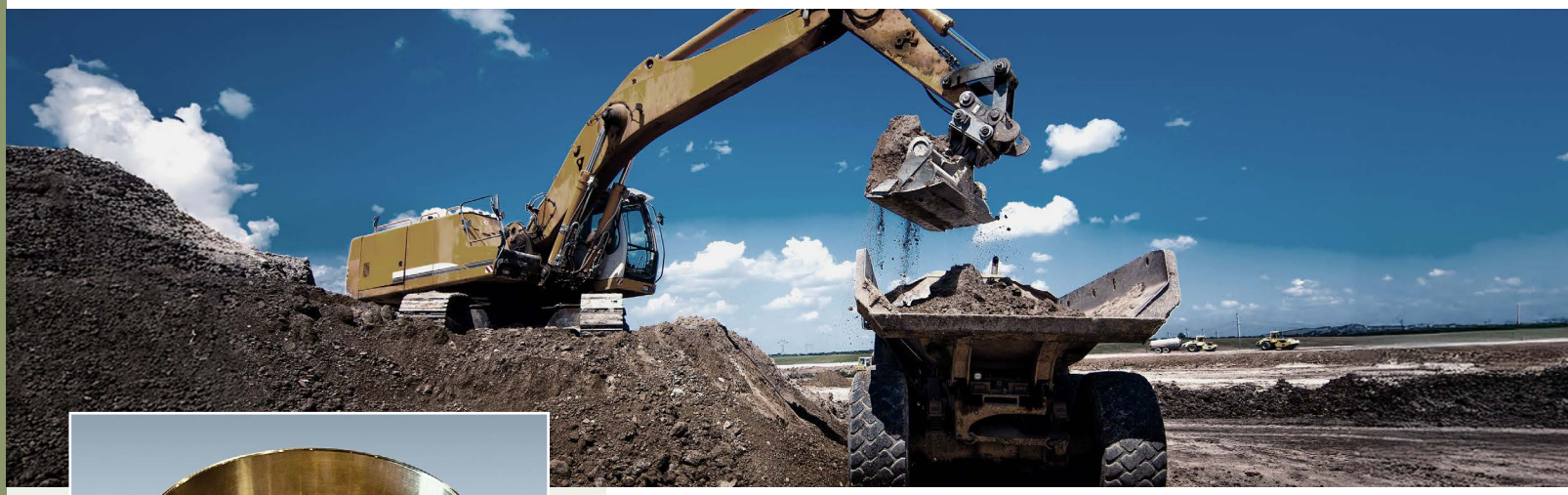


Heavy Equipment Bushing

Producing emergency replacement parts on-site to keep equipment moving.

Value Summary

Downtime can be very costly for heavy equipment awaiting long lead time components after wear, damage, or unexpected failure. SPEE3D's Cold Spray additive manufacturing can produce nickel aluminum bronze bushings as needed, on-site, in as little as 24 hours.

Production Method	Production Time
CNC Machining (from billet)	3 weeks
SPEE3D CSAM	21 hours

Background
A heavy equipment crane operating at a remote location is essential for the progress of the entire operation. A routine inspection identified excessive wear on a radial load bushing, resulting in the equipment being deemed unsafe to operate until a replacement bushing is procured.

The Challenge
The production of large diameter bushings requires a very large raw stock billet of nickel aluminum bronze with a long lead time. Additionally, it requires a long time to machine since 90% of the material is removed from the billet as the bushing is machined into form. This challenge is compounded for remote equipment needs where transit and delivery to the point of need can take days and add significant costs.

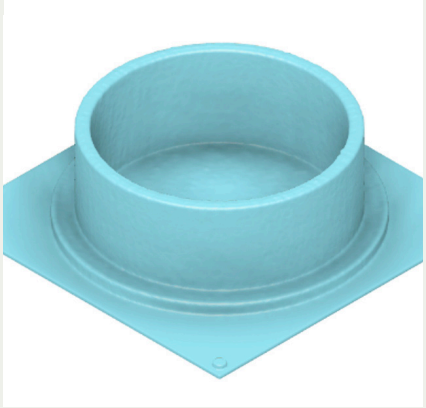
The Solution
SPEE3D's CSAM (Cold Spray Additive Manufacturing) technology can 3D print nickel aluminum bronze bushings and other critical to function wear components from design to deployment in as little as 1 day.

The Value
Keeping equipment running is essential in critical enviorments for any industry. Whether it's a tank on a battlefield, a piece of mining equipment in a remote area, or a valve on an oil rig in the ocean, without the correct spare parts equipment can sit idle and unable to be used or produce value. Often the cost of the replacement parts is not the issue, it's the time it takes to receive them. With CSAM technology customers can reduce the wait time for critical spare parts from weeks to less than a day.

Design to deployment in less than a day

Print: 2 hours

Nickel Aluminum Bronze,
6.9kgs of material



Cook: 17 hours

Heat treated in a standard
air furnace

Cut: 2 hours

Critical surfaces machined
on CNC

About The Equipment

Radial load bushings are commonly made from NAB for its strength, corrosion, and wear resistance. The proposed bushing is representative of an item who's wear and/or failure could render a piece of (expensive, critical) heavy equipment fully inoperable. The cost of such failed components can equate to tens of thousands of dollars per hour or complete mission failure for time sensitive endeavors. A 12 inch diameter bar stock to produce (machine) with traditional means may be very difficult to source rapidly in remote locations but can be produced in less than 24 hours with just over 10kgs of powder.

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