Combining Additive Manufacturing with CNC Machining

Photo courtesy of Hybrid Manufacturing Technologies

Hybrid Additive Manufacturing

Hybrid manufacturing produces objects by employing both additive and subtractive technologies. Because of this dual nature, hybrid machines can begin producing a part by using either of the two processes. However, beginning production using additive manufacturing can be more efficient than milling alone and typically offers broader design freedom.

Benefits of Hybrid Manufacturing:

- Ability to add and/or clad materials to parts, and either perform dimensional restoration at the end of the process or periodically as the material addition progresses
- Relatively low and localized heat input when compared to other metal material adding processes
- No limit on deposition thickness
- Multiple heads for fine features or heavy deposition
- 1000 watt laser for added capability and extreme duty
- In-situ sensing and control to ensure thermal stability and reliable operation
- Multiple metal materials (non-reactive at this time)

The hybrid directed energy deposition AM machine in a Haas VF 11 multi-axis machine tool.

Specialized Equipment

The AMBIT™ multi-task system, developed by Hybrid Manufacturing Technologies, is an award winning patented series of deposition heads and docking systems that allows virtually any CNC machine (or robotic platform) to use non-traditional processing heads in the spindle and conveniently change between them. Changeover is completely automated and only takes seconds. The equipment utilizes a combination of a laser as the energy source and deposited metal powder to build up material onto the desired substrate.

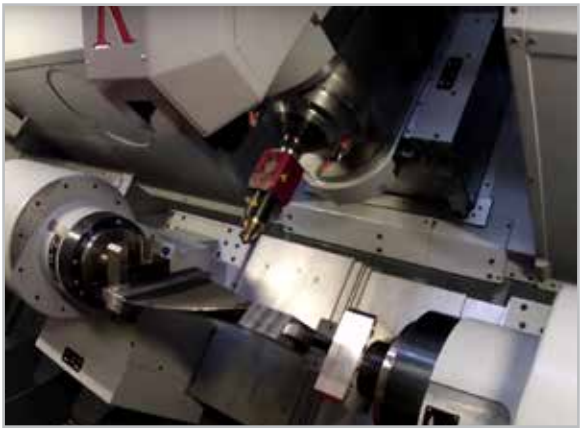
Specifications

- 120” x 40” x 30” mill/build chamber, 5 axis
- 1000W IR Fiber laser
- In process melt pool monitoring/adjustment
- Fine and medium cladding heads
- Combines additive and subtractive
- Materials: Stainless Steel, Tool Steel, Cobalt-Chromium, Inconel, more..

(continued)

AM Part Repairs

Using hybrid additive manufacturing, CTC is capable of repairing damaged or worn parts and surfaces. To undertake repair operations, we use our hybrid machine to employ a cladding process and build new geometry before switching to a milling operation to finish the part. While hybrid repair is a significant benefit to manufacturers, adding geometry or features to an existing part can also yield significant cost savings if applied correctly.



At CTC, The AMBIT™ system is paired with a HAAS VF-11 five axis milling machine. Working envelope is approximately 120" x 40" x 30" for large part repair or feature addition.

Why Concurrent Technologies Corporation?

Concurrent Technologies Corporation is an all-encompassing service provider for Additive Manufacturing solutions. We offer complete process execution including reverse engineering, development of process parameters, powder and substrate characterization, surface profile preparation, material application, finish machining and inspection. We also provide services to evaluate, validate and qualify the repair through mechanical and physical property characterization. All processes are controlled in-house to ensure quality results.

CTC's quality management systems are certified to the ISO 9001:2015 (Quality) and 14001:2015 (Environmental) standards, and to AS9100D:2016 (Quality-Aerospace-Related Products).

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