ADDITIVE MANUFACTURING FOR MARINE AND OFFSHORE INDUSTRIES

ADDITIVE MANUFACTURING TECHNOLOGY

Additive manufacturing (AM), also known as 3D printing, encompasses processes that build parts layer by layer, replacing or augmenting traditional methods such as casting, forging and subtractive machining. AM can streamline supply chains and reduce lead times for specialized parts, driving efficiencies through design innovation, faster production and improved availability.

The three most common methods using AM are powder bed fusion, directed energy deposition for producing metallic parts and binder jetting for producing nonmetallic parts.

AM parts are widely used in aerospace and medical industries to reduce weight, simplify assemblies, enhance design functionality and create specialized components. These parts are small to medium sizes, such as fuel injectors and implants. Advances in AM technologies will enable the manufacture of larger structural and machinery parts applicable to the marine and offshore markets.

In addition to rapid production, AM's capacity to fabricate complex and unique parts allows for improvements in design. One example is producing parts with features such as internal cooling channels that lead to cost and efficiency savings over the life of the part.

With these benefits, why are AM technologies not used more frequently? AM processes can have many quality-affecting variables acting simultaneously, which can cause uncertainty and variability in the final part properties and lead to unnecessary risk. Certification requires an understanding of the relationship among the part design, material properties and processing parameters for each AM part and process.

Process definition is key to repeatability and confidence in AM parts.

BENEFITS

- Reduces supply chain lead times
- Enhances flexibility in end-use part design
- Enables small-batch production
- Complements traditional manufacturing methods

ABS SUPPORT, RULES AND GUIDANCE

The ABS *Requirements for Additive Manufacturing* define a procedure for qualifying AM parts, as well as the processes and systems used to create them.

These requirements provide a standardized approach to qualifying AM parts and processes for marine and offshore applications.

The methodology emphasizes process definition, enabling designers and manufacturers to achieve repeatable and reliable results. In developing these requirements, ABS recognized the importance of flexibility in AM, and outlined a process that allows for swift changes and alterations without affecting the ultimate quality.

For additional information or assistance, please contact **additivemanufacturing@eagle.org**.

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