

NDE PATENTS

Compiled by Dr. Shyamsunder Mandayam

After a break of nearly 3 years, we are restarting this feature in the Journal. In today's world of fast paced technology innovations, Patents are an important facet and provide different types of information and value addition to Academia, Industry, Research or Business. Keeping oneself updated with the latest patents in their respective domains can help gain some great insights and perspectives into what are the technologists around the world working on and in addition help to trigger ideas and solutions!

Through this feature every quarter, we intend to provide you a snapshot of some latest and important patents in the world of NDE. We also intend to use this feature to encourage the Indian NDE community to file more patents based on your innovations by providing guidance and assistance in different ways – Answering queries, Conducting Tutorials and webinars, One-on-one discussions, Networking with Intellectual property experts, etc.

Need help understanding, what are Patents? Why Patent? When to Patent? What is the Patenting Process? Please feel free to reach out to me by email at mandayam.shyamsunder@gmail.com

Here we list below a few interesting patents related to *NDE and Inspection for Additive Manufacturing*.

United States Patent 11,027,332

System and method for in-situ characterization and inspection of additive manufacturing deposits using transient infrared thermography

Inventors: Zalamed Joseph N, Burke Eric R, Hafley Robert A, Domack Christopher S

Assignee: UNITED STATES OF AMERICA AS REPRESENTED BY THE ADMINISTRATOR OF NASA (Washington, DC)

Systems and methods are provided for the real time inspection of additive manufacturing deposits using infrared thermography. Various embodiments may enable the measurement of material properties and the detection of defects during the additive manufacturing process. Various embodiments may enable the characterization of deposition quality, as well as the detection of deposition defects, such as voids, cracks, disbands, etc., as a structure is manufactured layer by layer in an additive manufacturing process. Various embodiments may enable quantitative inspection images to be archived and associated with the manufactured structure to document the manufactured structure's structural integrity.

United States Patent 11,105,754

Multi-parameter inspection apparatus for monitoring of manufacturing parts

Inventors: Yacoubian Araz

Additive manufacturing, such as laser sintering or melting of additive layers, can produce parts rapidly at small volume and in a factory setting. To ensure the additive manufactured parts are of high quality, a real-time non-destructive evaluation (NDE) technique is required to detect defects while they are being manufactured. The present invention describes an in-situ (real-time) inspection unit that can be added to an existing additive manufacturing (AM) tool, such as an FDM (fused deposition modeling) machine, or a direct metal laser sintering (DMLS) machine, providing real-time information about the part quality, and detecting flaws as they occur. The information provided by this unit is used to a) qualify the part as it is being made, and b) to provide feedback to the AM tool for correction, or to stop the process if the part will not meet the quality, thus saving time, energy and reduce material loss

United States Patent 10,926,328

System and method for in-situ inspection of additive manufacturing materials and builds

Inventors: Ralls John W, Soghomonian Zareh, Hebert Daniel John, Wade Kyle A

Assignee: Huntington Ingalls Incorporated

An inspection system for in situ evaluation of an additive manufacturing (AM) build part is provided. The inspection system comprises a build plane induction coil sensor configured and positionable so that during construction of the build part, the sensor's magnetization and sensor coils surround at least the last-produced layer of the AM build part in the build plane. The inspection system further comprises an energization circuit and a central processing system. The central processing system comprises a communication processor configured for sending command signals to the energization circuit and receiving impedance data from the build plane induction coil sensor, and energization controller configured for determining energization commands for transmission to the energization circuit, and an induction data analyzer configured for processing build part impedance data using complex impedance plane analysis and for identifying anomalies in the AM build part.

United States Patent 10,919,285

Method and system for x-ray backscatter inspection of additive manufactured parts

Inventors: DehghanNiri Ehsan, Kottilingam Srikanth Chandrudu, Going Jr. Claude Leonard

Assignee: General Electric Company (Schenectady, NY)

A method for inspection of additive manufactured parts and monitoring operational performance of

an additive manufacturing apparatus is provided. The method includes a step of obtaining, in real-time during an additively manufactured build process, a backscatter x-ray scan of an area of a build platform. The build platform is configured for supporting at least one part during the build process. An evaluating step evaluates, by a processor, the backscatter x-ray scan. A determining step determines, based on the evaluating, whether an operational flaw with the additive manufacturing apparatus has occurred or a defect in the at least one part has occurred. A backscatter x-ray system has an emitter that emits x-rays and a detector that receives backscattered x-rays. The emitter and detector are located on a movable support located above the build platform, and the movable support raises and lowers the emitter and detector with respect to the build platform.

United States Patent 10,773,458

Terahertz inspection for additively manufactured materials

Inventors: Lou Taisia Tsukruk, Palmer Jr. Donald Duane, Smith Nathan Rylan, Dorrell Shayne Andrew

Assignee: The Boeing Company (Chicago, IL)

Apparatuses and systems comprising an *additive* manufacturing device and an associated terahertz *inspection* device for inspecting additively deposited layers in real time during or immediately following material deposition and parts made and inspected by the apparatuses and systems and their associated methods are disclosed herein.