Accepted Manuscript

Title: Nondestructive ultrasonic evaluation of additively manufactured AlSi10Mg samples

Authors: T. Sol, S. Hayun, D. Noiman, E. Tiferet, O. Yeheskel, O. Tevet

 PII:
 S2214-8604(18)30048-4

 DOI:
 https://doi.org/10.1016/j.addma.2018.06.016

 Reference:
 ADDMA 430



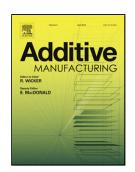
 Received date:
 24-1-2018

 Revised date:
 18-6-2018

 Accepted date:
 20-6-2018

Please cite this article as: Sol T, Hayun S, Noiman D, Tiferet E, Yeheskel O, Tevet O, Nondestructive ultrasonic evaluation of additively manufactured AlSi10Mg samples, *Additive Manufacturing* (2018), https://doi.org/10.1016/j.addma.2018.06.016

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



ACCEPTED MANUSCRIPT

Nondestructive ultrasonic evaluation of additively manufactured AlSi10Mg samples.

T. Sol^a, S. Hayun^{a, ‡}, D. Noiman^b, E. Tiferet^{b,c}, O. Yeheskel^b, O. Tevet^b

^a Department of Material Engineering, Ben-Gurion University of the Negev, Beer-Sheva, 84005, Israel
 ^b Department of Materials, Nuclear Research Center Negev, Beer-Sheva, 84190, Israel
 ^cAM Center, Rotem Industries, Mishor Yamin, Israel

ABSTRACT

Pulse-echo ultrasonic method was carried out to investigate possible anisotropy in selective laser melting additively manufactured (AM) AlSi10Mg samples. Three types of ultrasonic analyses were employed: time of flight (TOF) sound velocity measurement, frequency depended attenuation and exponential fitted attenuation. Analysis of the transverse waves TOF sound velocity as a function the oscillation angle relative to the build direction reveals that the AM AlSi10Mg material has anisotropy in both transverse wave velocity and attenuation with respect to the build direction. Such an anisotropy is with symmetry around the build direction. Three transverse wave velocity zones were identified, low-velocity zone, where the transverse oscillation direction parallel to the build direction and a transition zone. This behavior held even after heat treatments. The transverse velocity and the frequency depended attenuation seems to be sensitive tools that enable detection of subtle changes in AM products.

Keywords: Ultrasonic, Time of flight, Attenuation, Additive manufacturing, Al alloy, Anisotropy.

[‡] Corresponding author. Email: hayuns@bgu.ac.il

Download English Version:

https://daneshyari.com/en/article/7205804

Download Persian Version:

https://daneshyari.com/article/7205804

Daneshyari.com