Document details

‹ Back to results | 1 of 1

International Journal of Recent Technology and Engineering Open Access
Volume 7, Issue 6, March 2019, Pages 170-174

Influence of internal fill pattern, polishing time and Z-Axis orientation on the tensile strength of the 3D printed part (Article)

Seprianto, D.[a], Iskandar[a], Wilza, R.[a], Adesta, E.Y.T.[b]

[a]Mechanical Engineering Department, Polytechnic State of Sriwijaya, Indonesia
[b]Kulliyyah Of Engineering, International Islamic University Malaysia, Malaysia

Abstract

View references (12)

This fourth-generation industrial revolution is characterized by the existence of supercomputers, smart robots, drivers less vehicles, genetic editing and the development of neurotechnology, currently the manufacturing process is entering mass customization era that is how to make more high variety product with low price or known as build to order principle, customized product, but can be mass produced. One method that can answer the challenge is additive manufacturing using three-dimensional printing (3DP). In this research, making an object using 3DP use CAD data which then transformed into G-Code with FlashPrint© v.3.23.1 software. This study aims to determine the effect of the internal shape of the pattern fill, polishing time and z-axis orientation, to the tensile strength of test specimens made using Flashforge® Dreamer 3D Printer type Fused Deposition Modeling (FDM) with Polymaker PolySmooth™ material and refers to ASTM D-638 for the Type I. Factors investigated were Polishing Time, Internal Fill Pattern and Z axis Orientation with tensile strength response from test specimen. The test results data were analyzed using ANOVA with design type 2 factorial level and design 3 factorial interactions (3FI) modeled by Design-Expert® software. The result of the analysis revealed that the main factor that most influences to the tensile strength of the test specimens was the polishing time factor with the contribution percentage of 35%, while the interaction between internal fill pattern and z-axis orientation contributed 52%. © BEIESP.

SciVal Topic Prominence

Topic: Additives | Printing | Build time

Prominence percentile: 99.862

Author keywords

2 level factorial design | ANOVA | Tensile strength | Three-dimensional printing

Funding details

Funding sponsor	Funding number	Acronym
Kementerian Riset, Teknologi dan Pendidikan Tinggi	040/SP2H/LT/DRPM/2018	

Funding text #1
The authors acknowledge funding support from the Directorate of Research and Community Service of the

Funding text #2
Ministry of Research, Technology and Higher Education of the Republic of Indonesia through a National Strategic Research grant (Institution), with contract number 040/SP2H/LT/DRPM/2018. The authors also regard thanks to all civitas academic State Polytechnic of Sriwijaya for motivation and help.

ISSN: 22773878
Source Type: Journal
Original language: English
Document Type: Article
Publisher: Blue Eyes Intelligence Engineering and Sciences Publication

References (12)

View in search results format >

1 Douglas, S.T., Stanley, W.G.
(2014) *Costs and Cost-Effectiveness of Additive Manufacturing*. Cited 131 times.
National Institute of Standards and Technology U.S. Department of Commerce

2 Divyathej, M.V., Varun, M., Rajeev, P.
Analysis of mechanical behavior of 3D printed ABS parts by experiments
(2016) *Int. J. of Scientific & Engineering Research*, 7 (6), pp. 116-124. Cited 10 times.

3 Ana, L.A., Imnaculada, M.Z., Klaus, P.
(2015) *The Impact of 3D Printing on Trade and FDI*. Cited 2 times.
center for European, governance and economic development research No 262 Georg August Universität Gottingen

4 (2014) *Technology Insight Report 2014*. Cited 2 times.
Gridlogics Tech

5 Kang, H.-W., Lee, S.J., Ko, I.K., Kengla, C., Yoo, J.J., Atala, A.
A 3D bioprinting system to produce human-scale tissue constructs with structural integrity

(2016) *Nature Biotechnology*, 34 (3), pp. 312-319. Cited 791 times.
http://www.nature.com.ezproxy.um.edu.my/nbt/index.html
doi: 10.1038/nbt.3413

View at Publisher

6 Tanikella, Nagendra, G.
Mechanical Testing of Fused Filament 3-D Printed Components for Distributed Manufacturing
(2016) *Open Access Master's Thesis Michigan Technological University*

7 Tahseen, F.A.
Effect of Infill Parameter on Compression Property in FDM Process
(2017) *Int. J. of Engineering Research and Application*, 7 (6), pp. 16-19. Cited 2 times.

8 Md Raf, E.U.S.
Effect of Building Orientation & Post Processing Material on Mechanical Properties of 3D Printed Parts
(2016) *Int. Conf. on Mechanical Industrial and Energy Engineering, Khulna, Bangladesh*