



# Document details

< Back to results | 1 of 1

↗ Export ↴ Download 🖨 Print ✉ E-mail 💾 Save to PDF ☆ Add to List More... >

View at Publisher

2020 Advances in Science and Engineering Technology International Conferences, ASET 2020  
February 2020, Article number 9118198

2020 Advances in Science and Engineering Technology International Conferences, ASET 2020;  
Dubai; United Arab Emirates; 4 February 2020 through 9 April 2020; Category  
numberCFP20ASG-ART; Code 161213

## A design consideration of heated bed's rapid levelling tool based on von misses stress using FEA simulation (Conference Paper)

Arief, R.K.<sup>a</sup> ✉, Adesta, E.Y.T.<sup>b</sup> ✉, Abdullah Hannaf, R.A.<sup>b</sup> ✉, Hilmy, I.<sup>c</sup> ✉

<sup>a</sup>Universitas Muhammadiyah Sumatera Barat, Department of Mechanical Engineering, Bukittinggi, Indonesia

<sup>b</sup>International Islamic University Malaysia, Department of Materials and Manufacture Engineering, Gombak, Malaysia

<sup>c</sup>Faculty of Mechanical Engineering, Higher Colleges of Technology, Fujairah, United Arab Emirates

### Abstract

↕ View references (14)

Currently, heated bed levelling method used in low cost FDM 3D printer is using spring and screw adjustment system that requires more effort and time. This is a part of ongoing research to design a novel leveling system for FDM 3D by introducing a new system to replace the screw system. Previous research has introduced a new concept design to quick and easy levelling of FDM 3D printer's heated bed using staggered pin design. This paper is to analyze the staggered pin system by simulating various dimensions and materials using Finite Element Analysis (FEA) simulation software. Best configuration was analyzed by comparing the VMS value obtained from the simulation. Using FEA, 18 design configurations have been simulated and analyzed. All configurations are strong and safe to apply and can be carried on for further research but Polyethylene (PE) material obtained lowest VMS value and suggested to be chosen. PE material also good for mass production because it can be manufactured by using plastic injection molding and can be sold in relatively lower price. © 2020 IEEE.

### SciVal Topic Prominence ⓘ

Topic: Fused Deposition Modeling | Frequency Division Multiplexing | 3D Printers

Prominence percentile: 99.878



### Author keywords

3D printer FDM FEA Leveling tool VSM

### Indexed keywords

Engineering  
controlled terms:

Computer software Finite element method Injection molding Plastics industry  
Printing presses Screws

Engineering  
uncontrolled terms

Concept designs Design configurations Design considerations FEA simulation  
Mass production Plastic injection molding Simulation software Von Misses stress

Engineering main  
heading:

3D printers

Metrics ⓘ View all metrics >



PlumX Metrics



Usage, Captures, Mentions,  
Social Media and Citations  
beyond Scopus.

Cited by 0 documents

Inform me when this document  
is cited in Scopus:

Set citation alert >

Set citation feed >

### Related documents

Hardware improvement of FDM  
3D printer: Issue of bed leveling  
failures

Arief, R.K. , Adesta, E.Y.T. , Hilmy,  
I.

(2019) *International Journal of  
Innovative Technology and  
Exploring Engineering*

Vibrational analysis of single-  
point cutting tool for different  
tool material and nose radius  
using design of experiment

Choudhari, C.M. , Bhisti, I.A. ,  
Choudhary, M.G.

(2019) *Lecture Notes in  
Mechanical Engineering*

Engineering method based on  
static strength theory for  
Random vibration

Guo, W. , Wu, Q. , Liu, H.  
(2012) *Jixie Qiangdu/Journal of  
Mechanical Strength*

View all related documents based  
on references

Find more related documents in  
Scopus based on:

Authors > Keywords >

## Funding details

Funding sponsor	Funding number	Acronym
International Islamic University Malaysia		IIUM

### Funding text

This research was conducted in collaboration between Innovation Lab of International Islamic University Malaysia, 3D Printing Lab of Higher Colleges of Technology, Fujairah, UAE and 3D Modeling Lab of Muhammadiyah University, Sumatera Barat, Indonesia.

**ISBN:** 978-172814640-9

**Source Type:** Conference Proceeding

**Original language:** English

**DOI:** 10.1109/ASET48392.2020.9118198

**Document Type:** Conference Paper

**Publisher:** Institute of Electrical and Electronics Engineers Inc.

## References (14)

[View in search results format >](#)

☐ All ☐ Export ☐ Print ☐ E-mail ☐ Save to PDF ☐ Create bibliography

- ☐ 1 Deshmukh, S.P., Shewale, M.S., Suryawanshi, V., Manwani, A., Singh, V.K., Vhora, R., Velapure, M.  
Design and development of XYZ scanner for 3D printing

(2017) *2017 International Conference on Nascent Technologies in Engineering, ICNTE 2017 - Proceedings*, art. no. 7947905. Cited 2 times.

ISBN: 978-150902794-1

doi: 10.1109/ICNTE.2017.7947905

[View at Publisher](#)

- ☐ 2 Fang, E., Kumar, S.  
The trends and challenges of 3D printing  
(2018) *Encyclopedia of Information Science and Technology*, pp. 4382-4388. Cited 2 times.  
Fourth Edition, 4th ed. August, M. Khosrow, Ed. PA: IGI Global

- ☐ 3 Schmitt, B.M., Zirbes, C.F., Bonin, C., Lohmann, D., Lencina, D.C., Da Costa Sabino Netto, A.  
A comparative study of cartesian and delta 3d printers on producing PLA parts  
([Open Access](#))

(2017) *Materials Research*, 20, pp. 883-886. Cited 8 times.

<http://www.scielo.br/pdf/mr/v20s2/1516-1439-mr-1980-5373-MR-2016-1039.pdf>

doi: 10.1590/1980-5373-mr-2016-1039

[View at Publisher](#)

- ☐ 4 Jerez-Mesa, R., Travieso-Rodriguez, J.A., Corbella, X., Busqué, R., Gomez-Gras, G.  
Finite element analysis of the thermal behavior of a RepRap 3D printer liquefier

(2016) *Mechatronics*, 36, pp. 119-126. Cited 22 times.

<https://www-journals-elsevier-com.ezproxy.um.edu.my/mechatronics>

doi: 10.1016/j.mechatronics.2016.04.007

[View at Publisher](#)