

## Accepted Manuscript

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PII: S0167-577X(18)31181-9

DOI: <https://doi.org/10.1016/j.matlet.2018.07.139>

Reference: MLBLUE 24705

To appear in: *Materials Letters*

Received Date: 29 December 2017

Revised Date: 26 July 2018

Accepted Date: 29 July 2018



Please cite this article as: O.A. Mohamed, S.H. Masood, J. Lal Bhowmik, Analysis of wear behavior of additively manufactured PC-ABS parts, *Materials Letters* (2018), doi: <https://doi.org/10.1016/j.matlet.2018.07.139>

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## Analysis of wear behavior of additively manufactured PC-ABS parts

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### Abstract

With the development of additive manufacturing techniques and a range of newer materials, there is a real demand for manufacturing functional products with improved mechanical properties. This study investigates the effects of the fabrication parameters on the microstructure and wear performance of parts processed by FDM. This study also provides insights into the relationships between process parameters and the wear mechanism and adds to the current knowledge base for the field of FDM process by providing a critical examination of wear behavior and part microstructure for the academic and industrial researcher for real world applications.

Keywords: FDM; wear rate; mechanical properties, process parameters

### 1. Introduction

FDM is becoming a more and more prevalent additive manufacturing process which produces functional products in a layer by layer fashion directly from a digital file allowing for increased design freedom without tooling requirement [1]. As the companies scale up their use of FDM for end-use part manufacturing, various industries are seeking for acceleration of the process robustness and continuous improvement. Wear is a dynamical process of continuous removal of material through the interactions between surfaces moving relative to each other. The worn surface becomes loose wear debris [2]. Wear in various manufactured components is the progressive loss of material which cannot be totally eliminated but can be reduced significantly by selecting appropriate manufacturing process parameters. Study of loss of material by the dynamic interaction between two sliding surfaces with respect to each other is important for the manufactured products by FDM processes because the material removed from the manufactured part results in poor reliability and durability of the manufactured component. Hence, the loss of the product dimensions requires regular replacement of the manufactured products. Several studies [3-8] have been made on the investigation of the influence of FDM manufacturing parameters on different properties.

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