Poster: 3D printed CPE material properties

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ABSTRACT

fused deposition modeling (FDM), has been an attractive method for rapid prototyping and manufacturing. Poor mechanical properties of the 3D printed specimens, raised the interest to design various methods to improve the mechanical properties of these specimens. Using short fiber reinforcement to improve the mechanical properties of 3D printed parts is known as an attractive solution for the poor mechanical properties of 3D printed parts using pure thermoplastic materials. A brief description on the mechanical properties of the fiber reinforced composites are given. The preliminary results depicted promising results for the final mechanical properties of the 3D printed specimens. The SEM analysis of the fracture surfaces will be provided as the future work plan.

1 INTRODUCTION

In the recent years, machine learning has also being used in other domains [7–11] [1–6, 12–15] The methods and algorithms for optimizing the properties of the 3D printed materials are being enhanced day by day. on of these methods are the short fiber reinforcement.

The plastic pellets and short carbon fibers were purchased, then mixed thoroughly, and at the end were converted into a filament using an extruder. The filaments were then used to print the 3D printed specimens.

2 PRELIMINARY EVALUATION AND RESULTS

We are conducting a research on the effect of the percentage of short fibers in the 3D printed short fiber composite specimens. The experiments were conducted using short carbon fibers (10 mm), and plastic pellets. Our preliminary results show that, a specific percentage of short fibers results in different characteristics of the 3D printed specimens. I general, the lower short fiber percentage results in a higher strain and higher percentage acts in a more brittle manner.

Preliminary results are shown in Table **??**

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	5% wt	7.5 % wt	10% wt	15% wt
Max Strength(MPa)	43	43	33	35
Strain (%)	3.5	3.7	2.5	3.2
Modulus (GPa)	2.4	2.45	2.2	2.3

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