
FAILURE

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Detecting and Mitigating Against Printing Defects in Fused Deposition Modelling

Chad Sinclair (466) & Daan Maijer (467)

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TRENDS 2017

3D PRINTING MARKET IS MATURING

+72%
expect their spendings on additive manufacturing to increase for 2018

+47%
saw a greater Return on Investment than last year

+49%
of respondents increased their expenses in 3D Printing this year

+90%
consider 3D Printing as a **competitive advantage** in their strategy

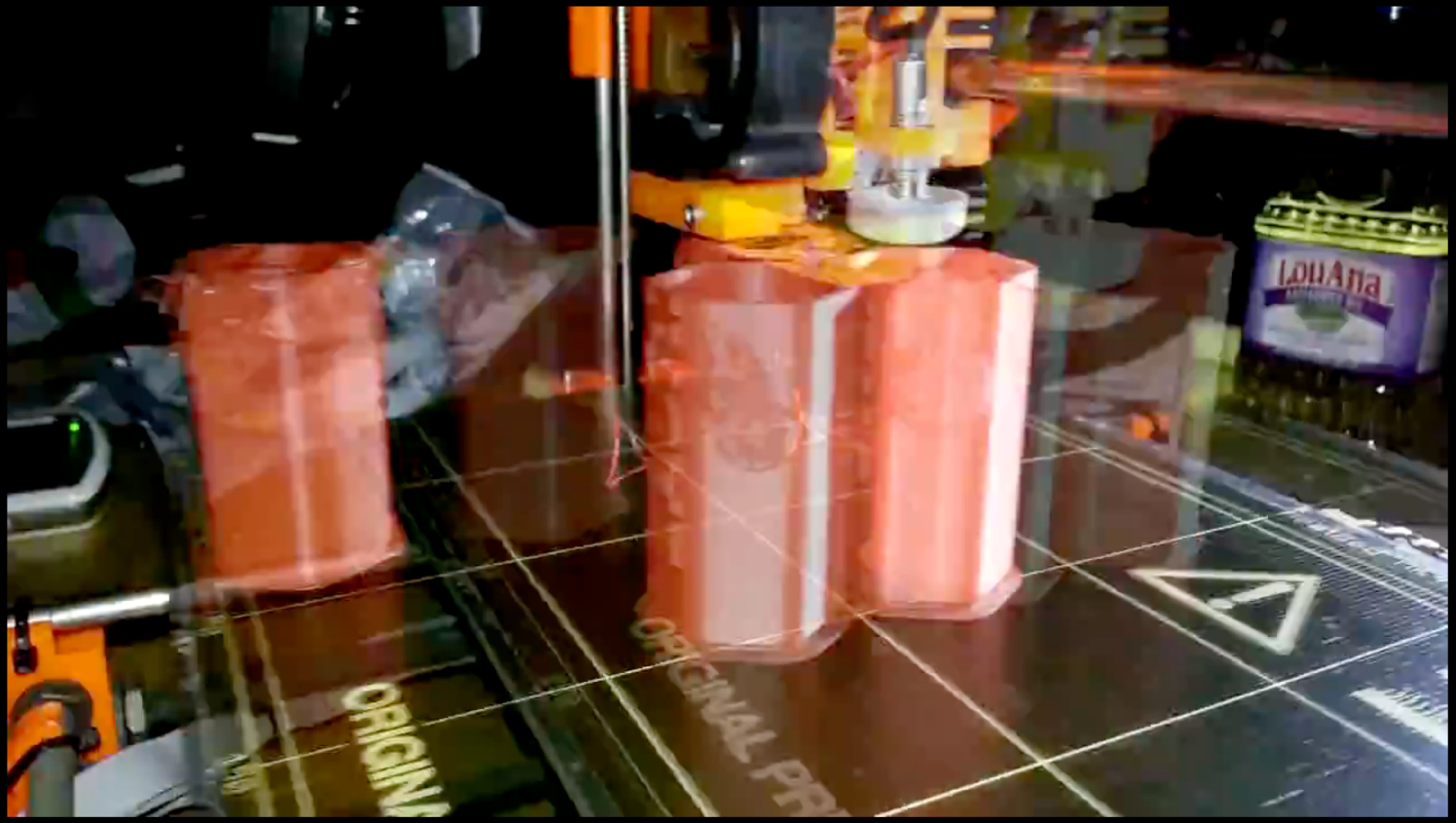
$9,504
is the average budget for 2017 compared to $6,132 in 2016

Additive manufacturing is still ramping up. 49% of our respondents increased their expenses in 3D Printing this year. And this trend is here to stay: 72% of them expect their spendings to increase again next year. Last year, almost the same amount of respondents had the same expectation (77%).

Additive manufacturing is showing positive results. Indeed, 47% of the respondents saw a greater return on investment than last year. Moreover, 90% of them consider 3D Printing as a competitive advantage in their strategy.

These elements show that the respondents are loyal to additive manufacturing and that they consider this technology as a real partner for their activity. As a result, we can say that the market is becoming more stable and mature.

17.4% growth in worldwide revenues in 2016 - less than in 2015 (25.9%)
Let's Make Additive-Manufacturing Great Again (MAGA)!



Processes like FDM have lots of potential… to create ‘crap’.

Problems:

1. Material Fusion/Sintering

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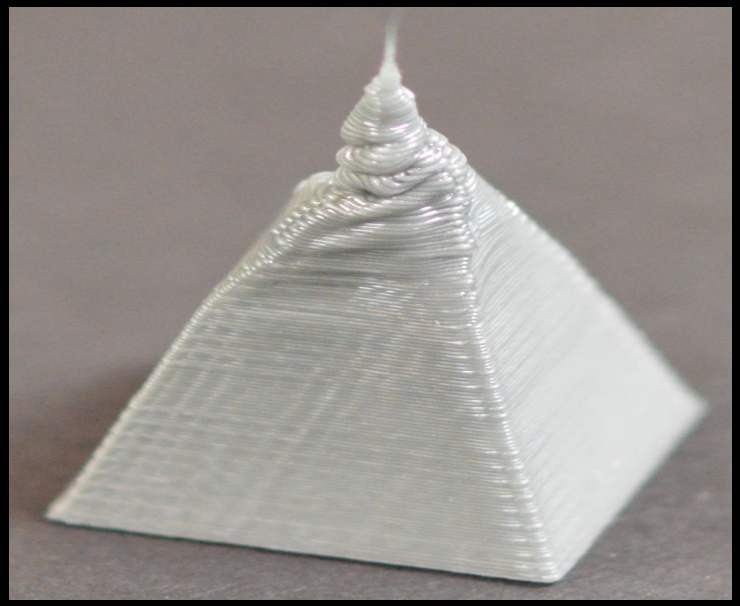
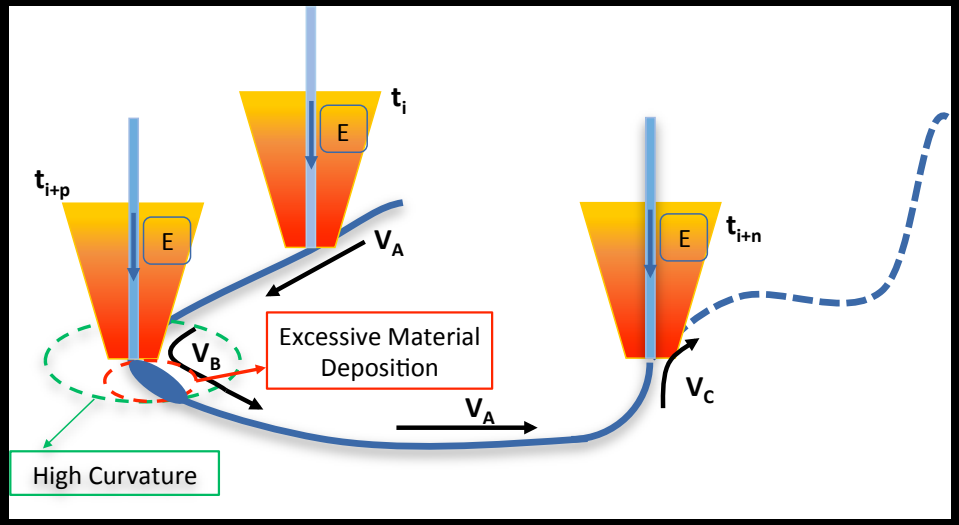
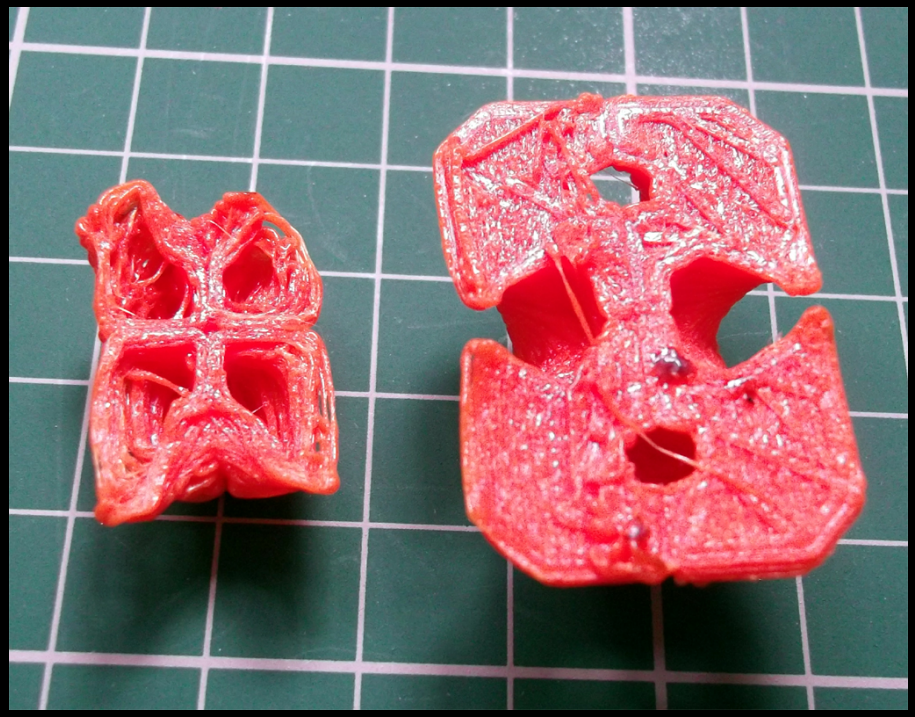
2. Material Feeding Rate (temperature)





Problems:

1. Material Fusion/Sintering
2. Material Feeding Rate (temperature)
3. Overheating



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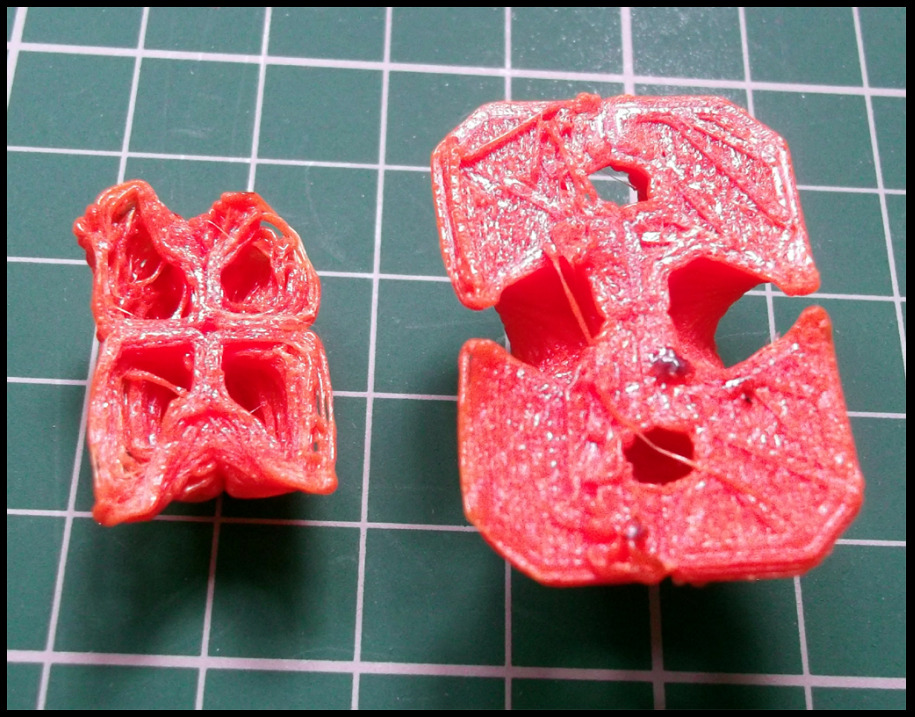

How do we develop methods that can detect defect formation and either 1) stop the machine or 2) adjust to avoid failure

Project Goals

Term 1

1. Identify non-contact methods to look for dimensional defects (particularly out of plane)
2. Identify and develop one method that would be cost competitive
3. Focus on FDM (right)
4. Show proof of concept

Term 2

1. Develop proof of concept into working prototype and/or
2. Develop working detection algorithm and
3. Couple technique to machine with working detection algorithm

MAGA!