3D Printing
An Introduction and Overview

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My Story

Involved in Model Railroading as teenager

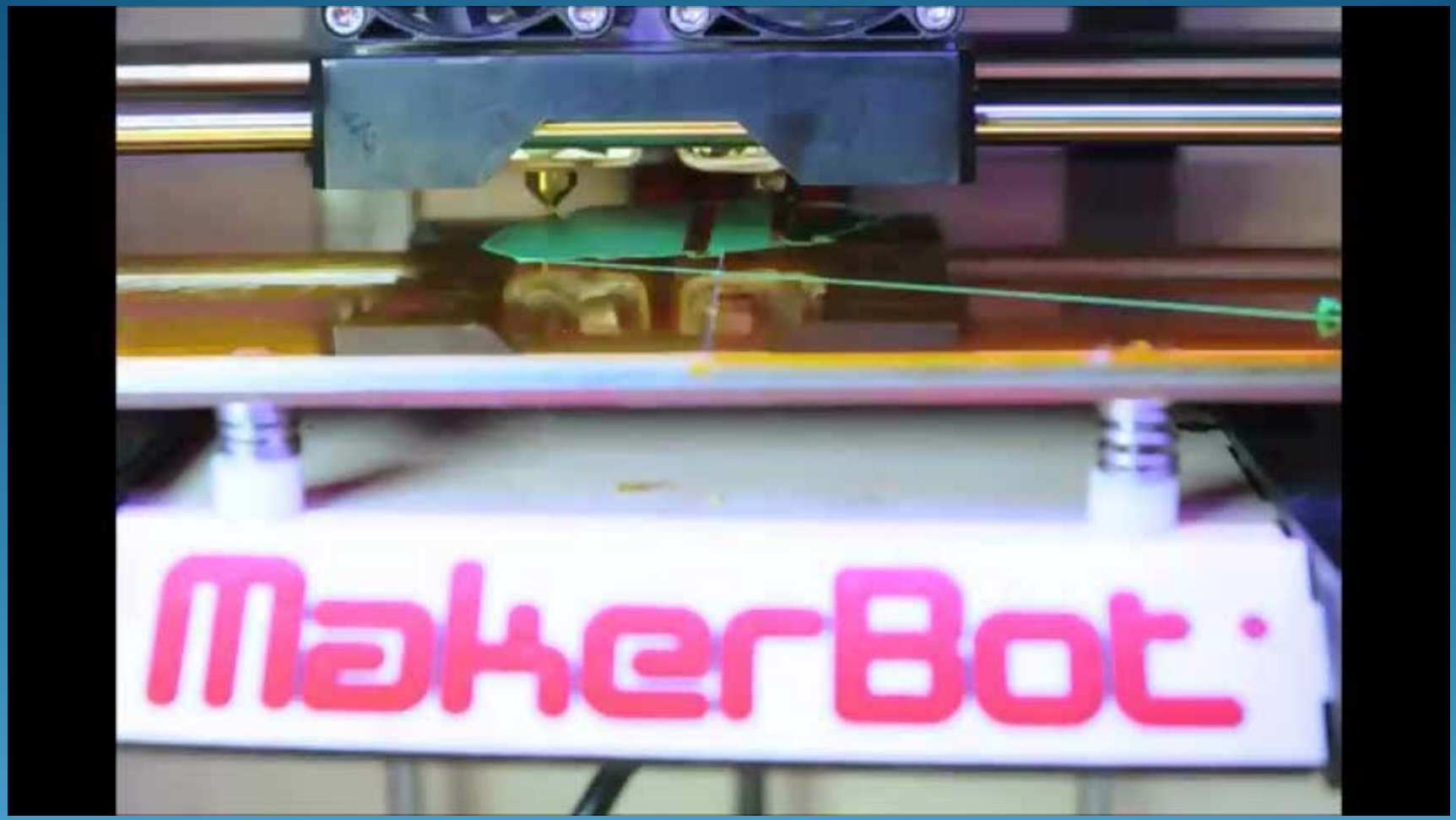
Returned to Hobby last summer

Wanted interior details for some buildings

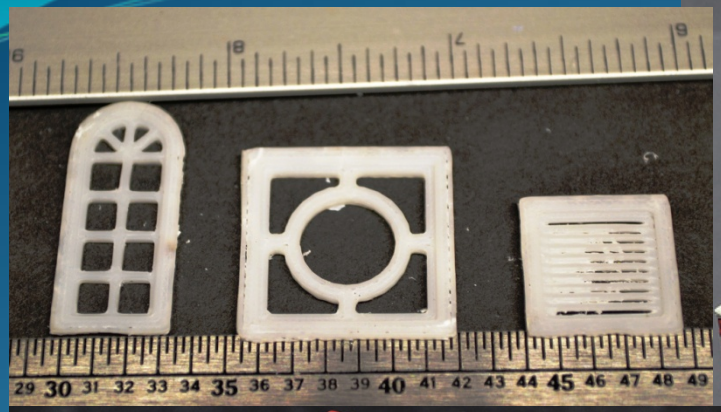
Lack of details at reasonable prices and limited selection

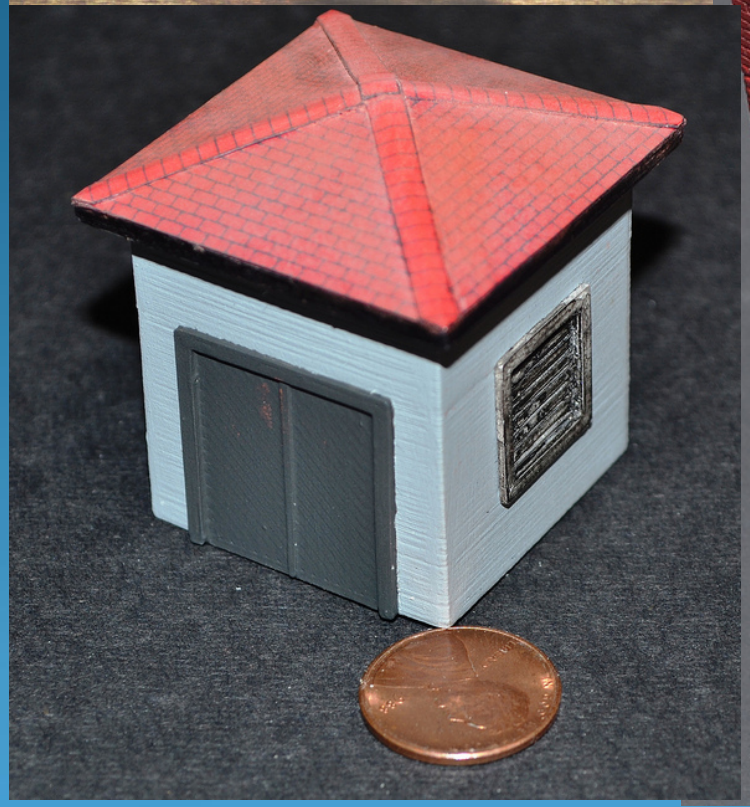
Computer background- interest in 3D printing

What is 3D printing?



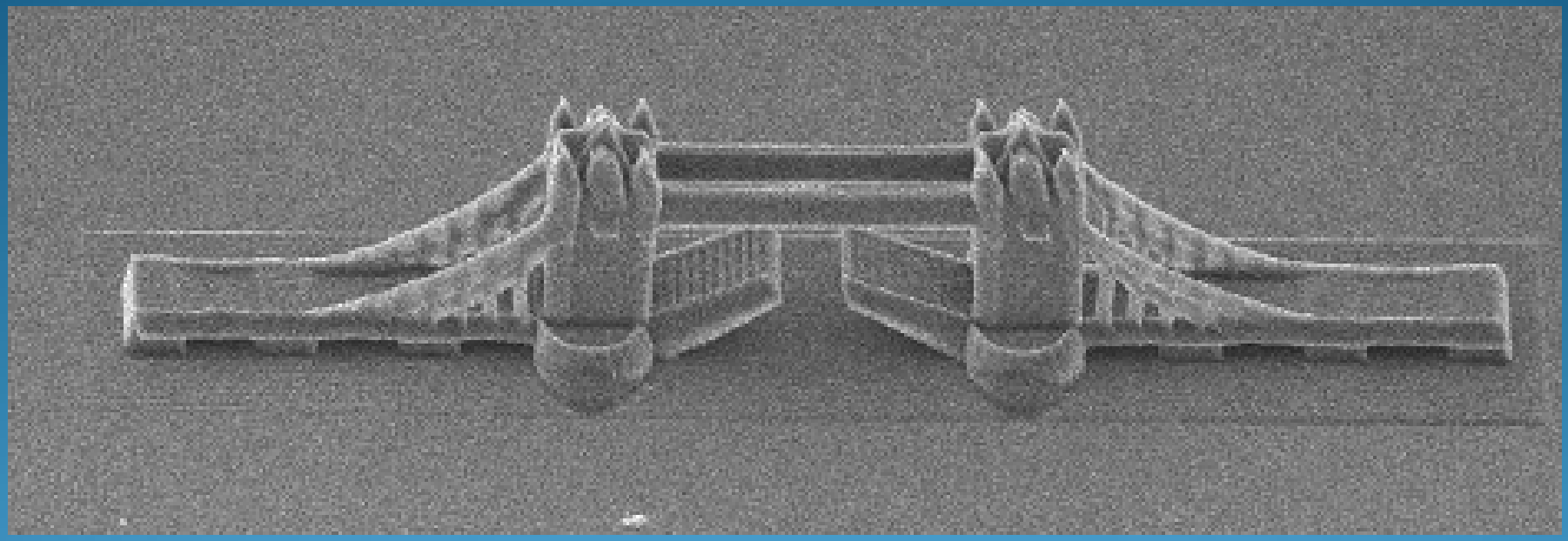
Examples of what a “cheap” Printer can do:





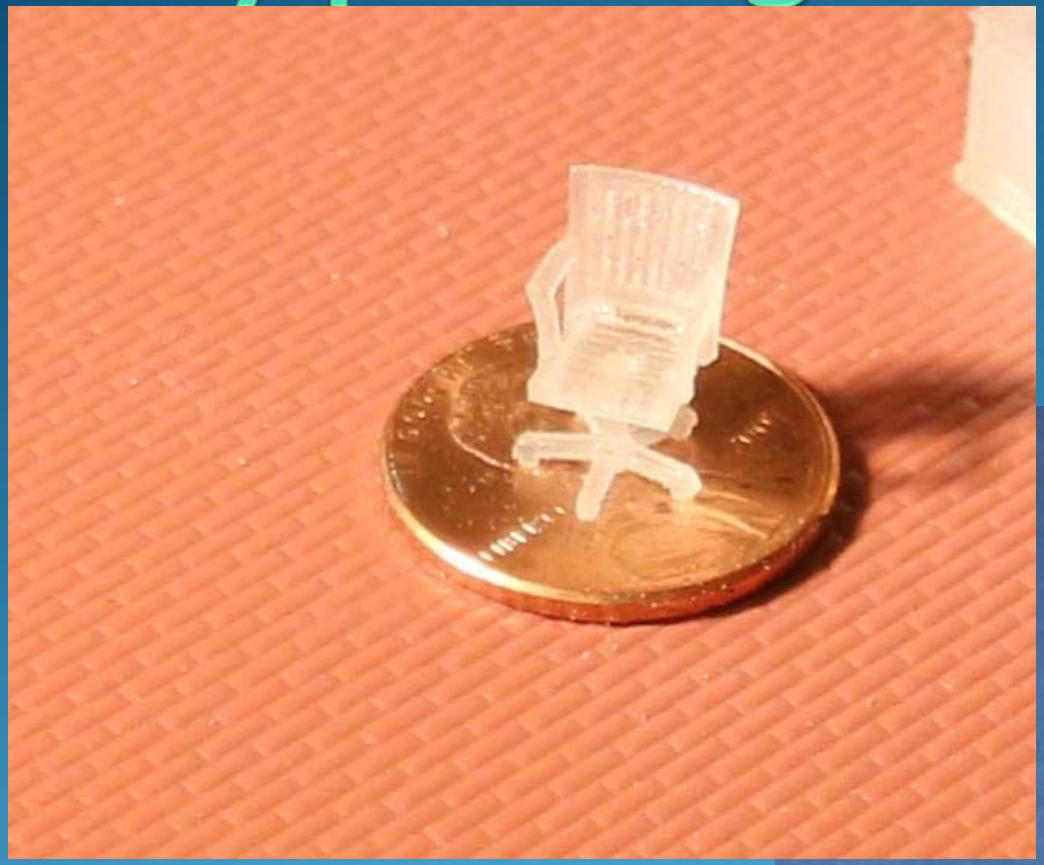
Other Printing Methods:

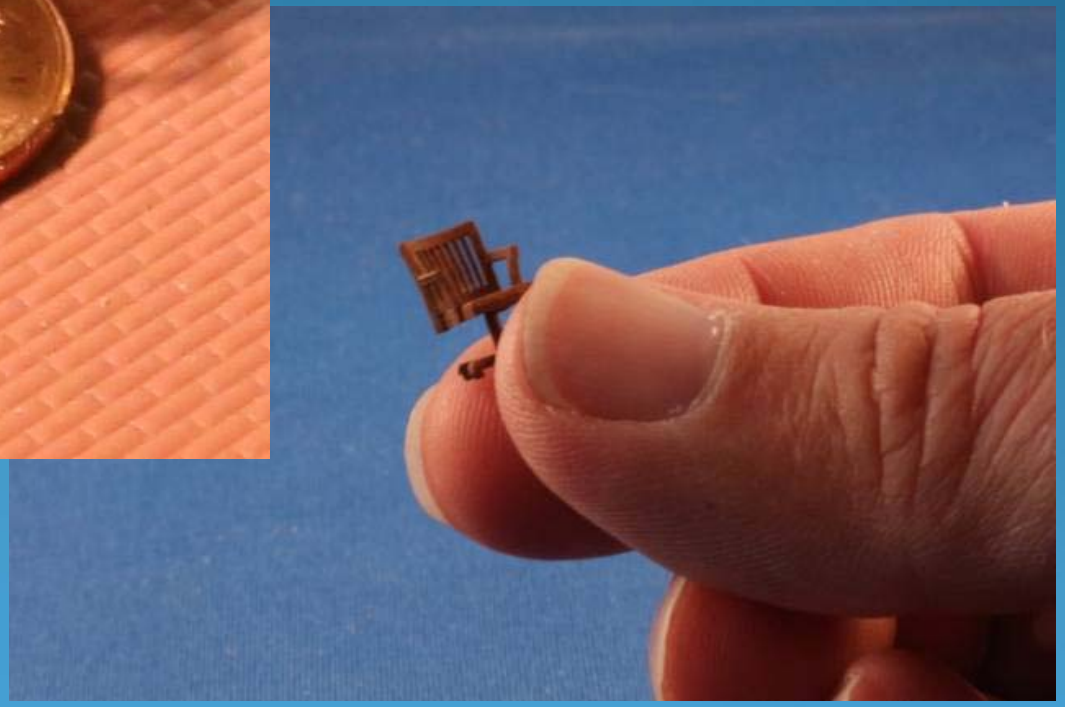
Nano Technology:



Distance between towers= One human hair

My printing





Shapeways

Dutch Company- Print facility in New York

Uses Industrial Printers- These can cost over $100,000 each

- Home printers are under $1000 now, but it is a different method of printing.

Materials include nylon, plastic, UV cured resin, and metals.

- Some metals are direct printed
- Other metal is cast from a master that is 3d printed

My Design Process

Sketchup- Easier than others I tried

Demo

Materials I use

White Strong and Flexible- WSF

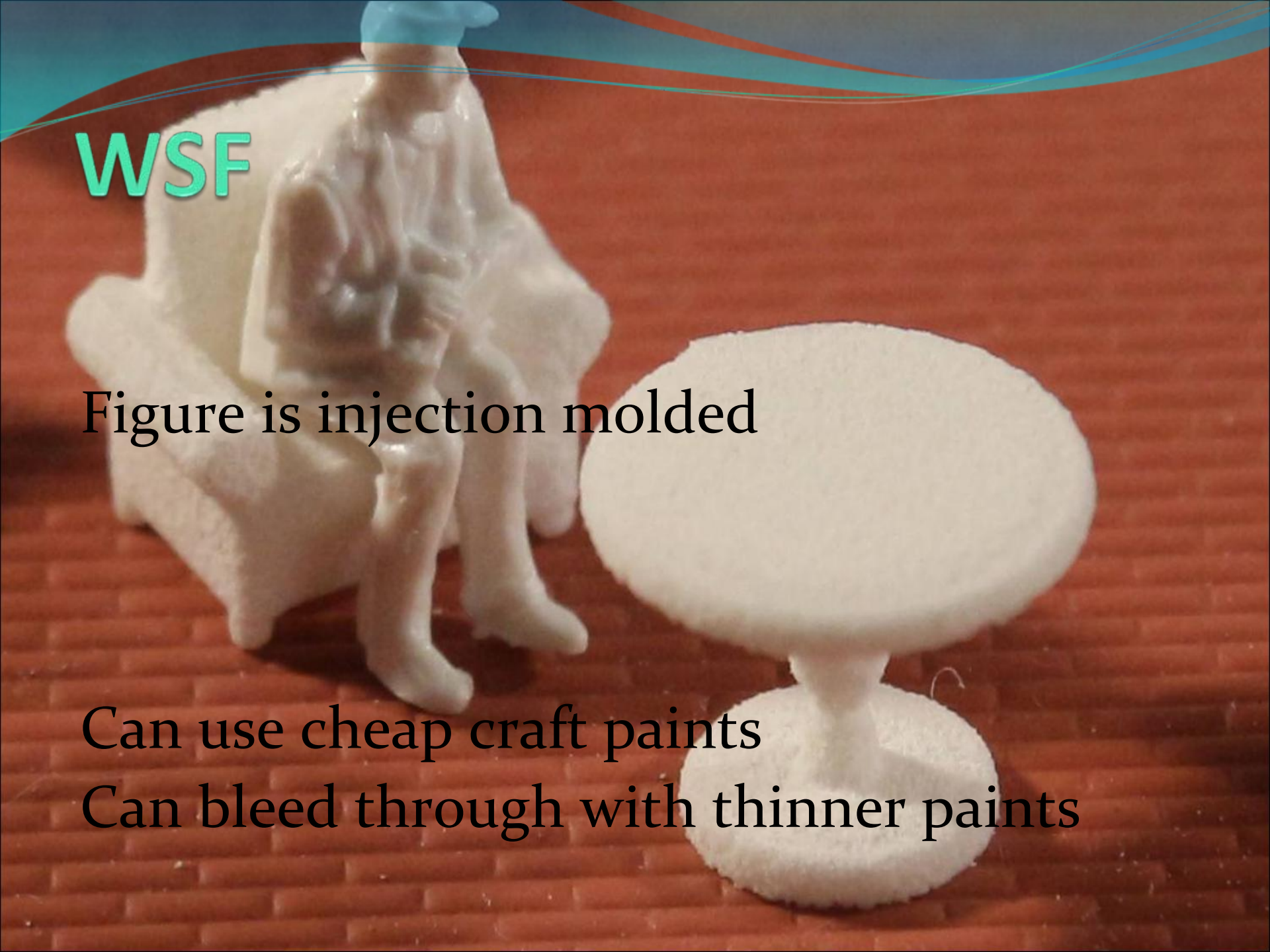
Less Expensive

Nylon material fused by a laser

Layer by layer

Lower resolution

Rough texture


WSF
Figure is injection molded
Can use cheap craft paints
Can bleed through with thinner paints

Frosted Ultra Detail- FUD

UV Cured Resin

Arrives slightly oily, has to be cleaned

Acetone- can ruin model if left too long- 20 minutes

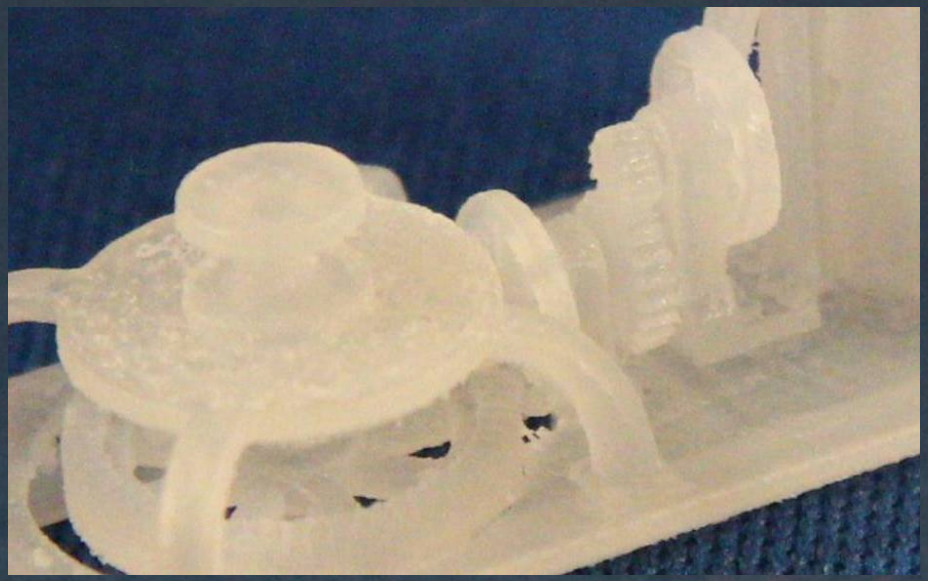
Warnings

Ultrasonic with vinegar and dish water detergent

Some paints can attack resin

FUD

Much higher detail- Ruler shows inches



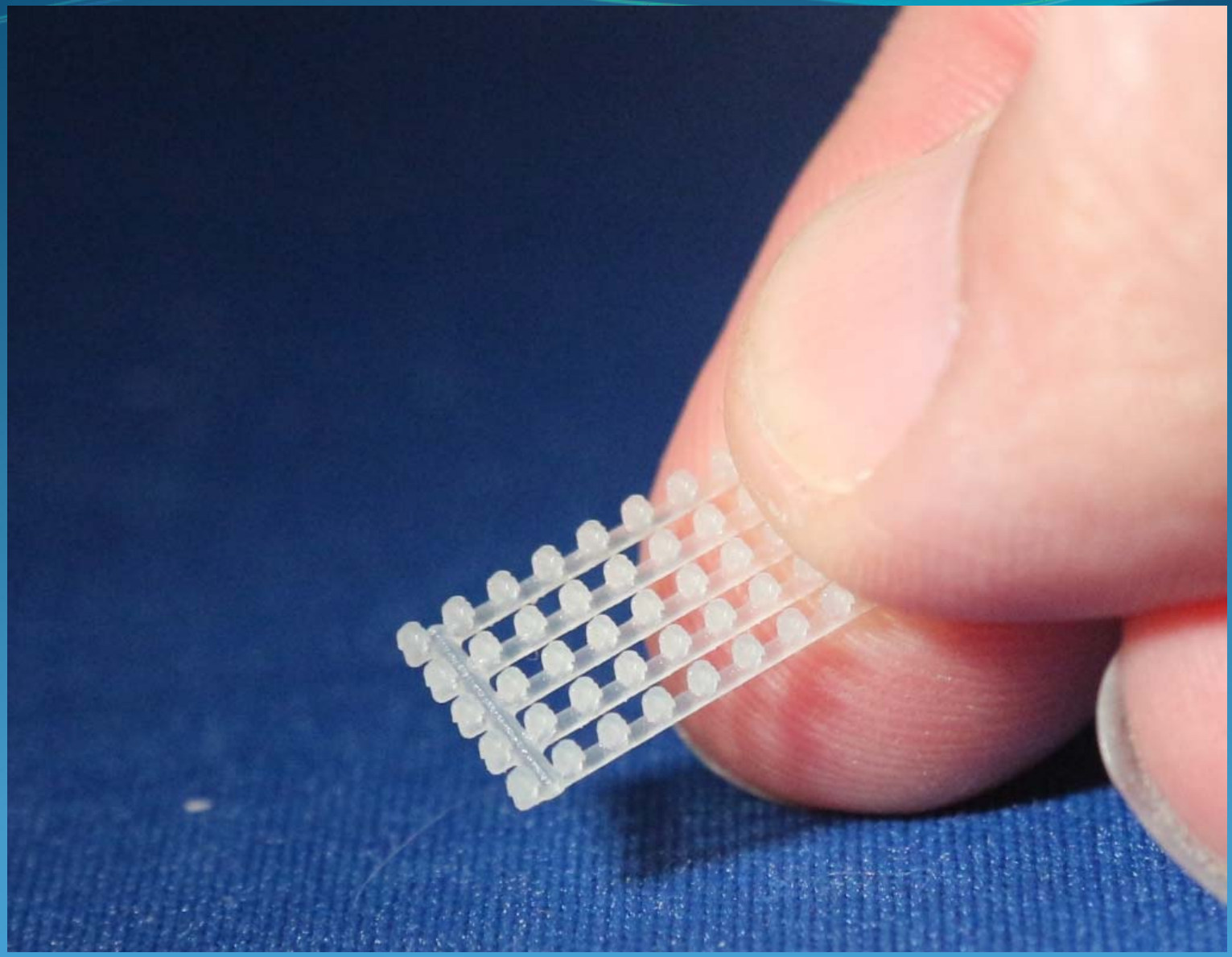
Small gear is .1 inches and shows teeth

Still needs some cleaning

FUD v SWF

	WSF			FUD		
	Actual mm	Actual in	ho in	Actual mm	Actual in	ho in
Wall	0.7	0.03	2.40	0.6	0.02	2.06
Wall Supported	0.7	0.03	2.40	0.3	0.01	1.03
Detail-embossed	0.2	0.01	0.69	0.1	0.005	0.34
Detail-engraved	0.2	0.01	0.69	0.1	0.005	0.34
wire supported	0.8	0.03	2.74	0.6	0.02	2.06
wire unsupported	1	0.04	3.43	0.8	0.03	2.74
Clearance	0.5	0.02	1.71	0.05	0.00	0.17

How low can you go?



Other Materials

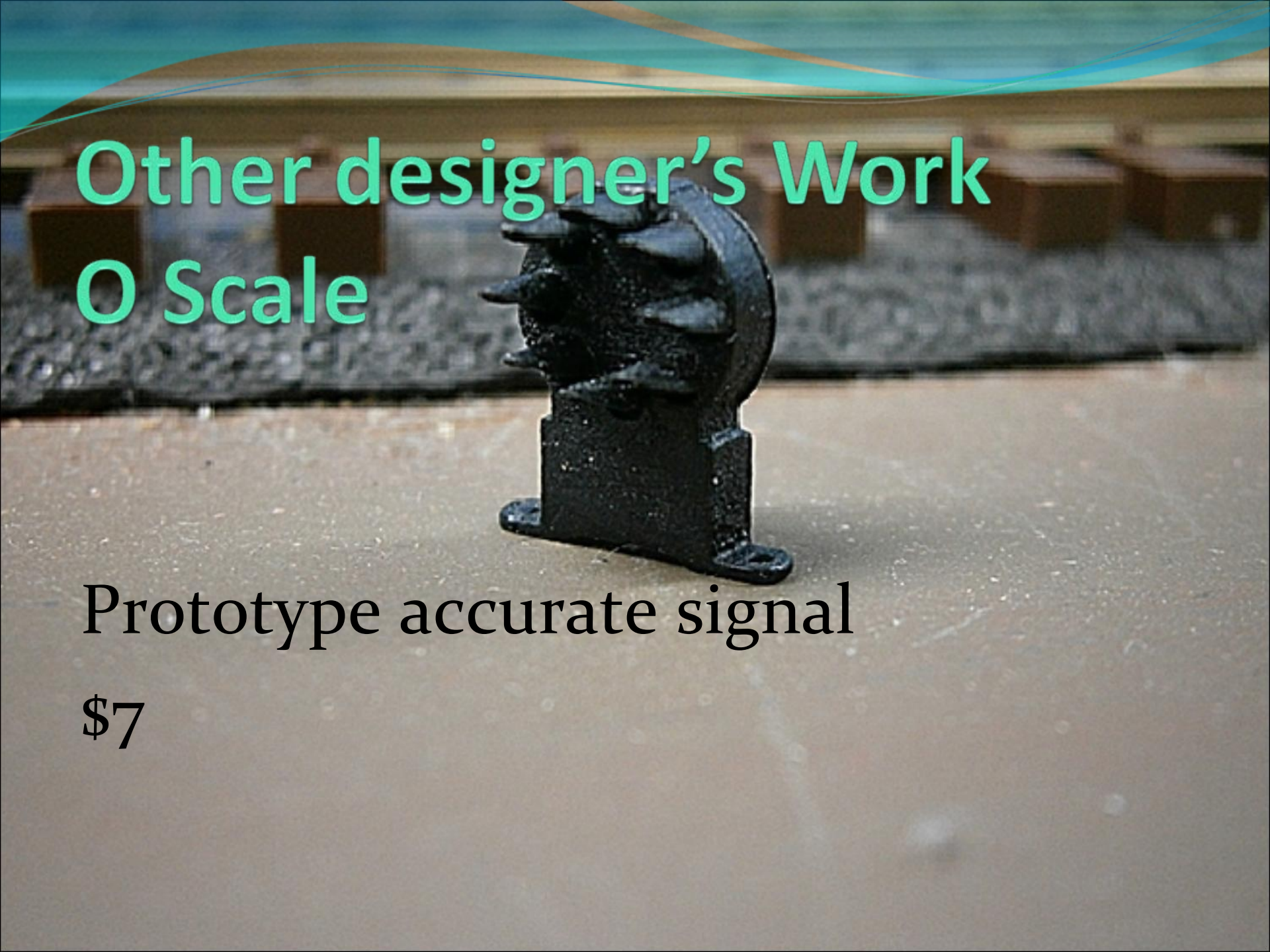
Full Color Printing

This is how model was delivered

Color applied in computer at design step

Not very cost effective yet- $16 single sided, $30 double sided- less detail

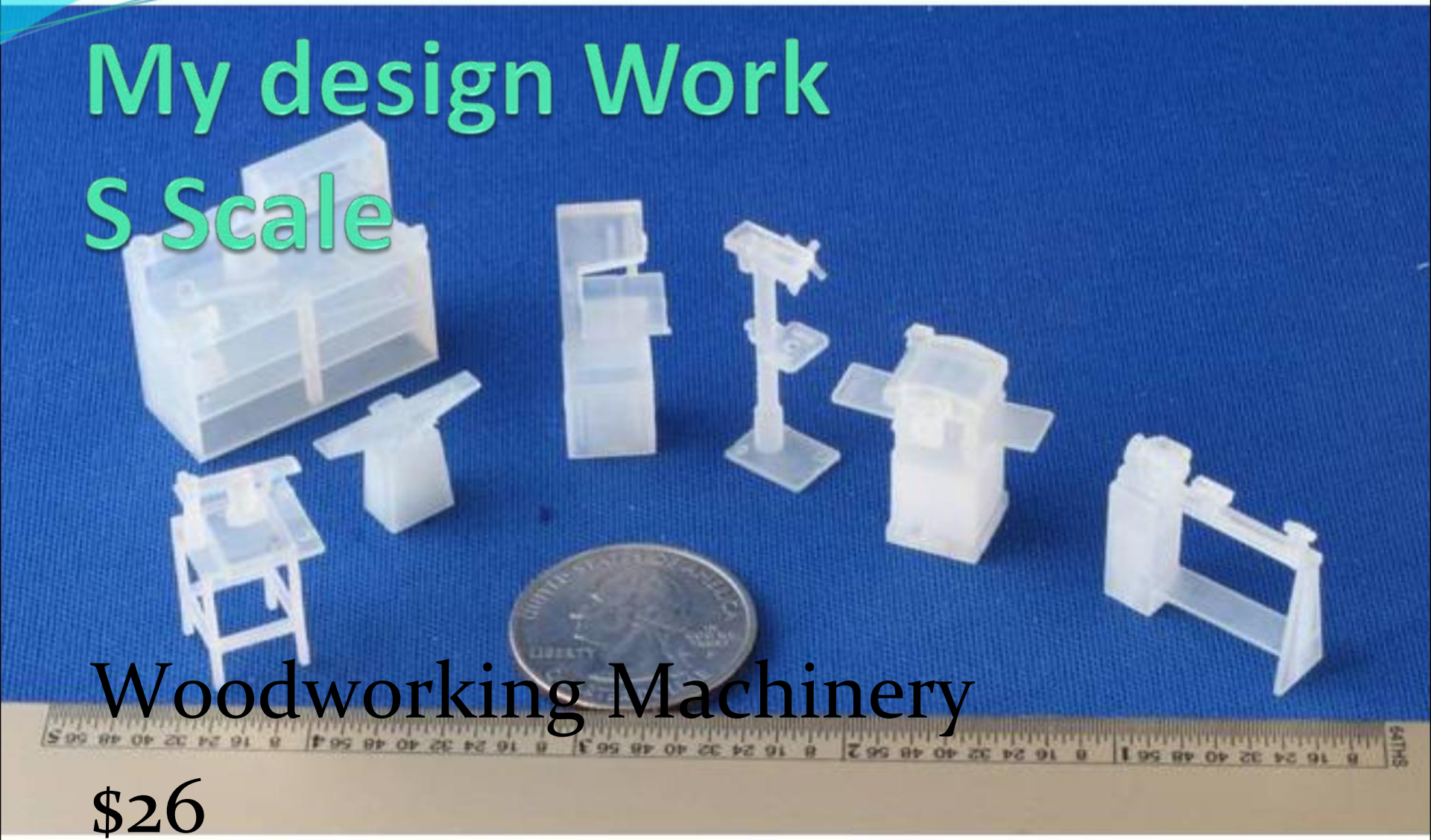
Other designer's Work
O Scale



Prototype accurate signal

$7

My design Work
S Scale



Woodworking Machinery

$26

Other designer's Work HO Scale

Fowler Engine (Some wire required


HO Scale
Loader
$35
Painted and assembled model

Other designer's Work

N Scale

Pre 1900 Passenger Car

$28 less wheels

Other designer's Work N Scale

Pigeons $9 for 121 birds

Other designer's Work
Z Scale

Excavator $22

Other designer's Work

Z Scale

MOW equipment $9

The Future

Zero inventory

- Hurts the local hobby shop

Infinite customization

- Locomotive shells custom printed as ordered installed on a common mechanism

Low demand items- small production runs

- Injection molding has high setup, low production costs
  3D printing has low start up, high production costs
- Allows true hobbyists to become part of industry
  - Removes need for higher profit

THE BEGINNING (not the end)

Questions

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