RapidMade
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Corrugated Coater Case Study

Introduction

RapidMade is a Portland, OR-based design firm, specializing in 3D, automation and machine design, and new technologies like additive manufacturing (3D printing).

Background

A client approached RapidMade for help solving a fundamental problem with a first-of-its-kind digital printing line. The printer ink being used required exposure to ultraviolet (UV) light in order to cure properly. Unfortunately, corrugated cardboard tended to absorb the ink and prevent a proper cure leading to an unusable end product. RapidMade was asked to design and support the manufacture of a machine that would apply a coating to the surface of the corrugated to prevent absorption.

Solution

In order to ensure success, the goals of any design project must be agreed upon beforehand. To that end, RapidMade worked closely with the client to determine initial requirements:

- Similar machines were evaluated
- Site visits were made to assess the problem
- Engineers analyzed the existing printer design to determine integration requirements

Beyond the technical specifications, any new machine requires testing to ensure it performs as desired, so RapidMade worked closely with the customer and several vendors to design the testing protocol.
From there, a specification document was created that all parties could reference throughout the project.
Once the client approved the specification and agreed on the path forward, the design work began in earnest.

- RapidMade sourced suppliers for the coating and drying portions of the machine, while electing to design the media handling and integration features in-house.
- 3D CAD files were shared amongst several other parties to avoid any compatibility issues when the various sub-systems were integrated.
- Technical calculations for motor sizing, dryer capacity, and power requirements (among many others) were performed and cross-checked by multiple parties

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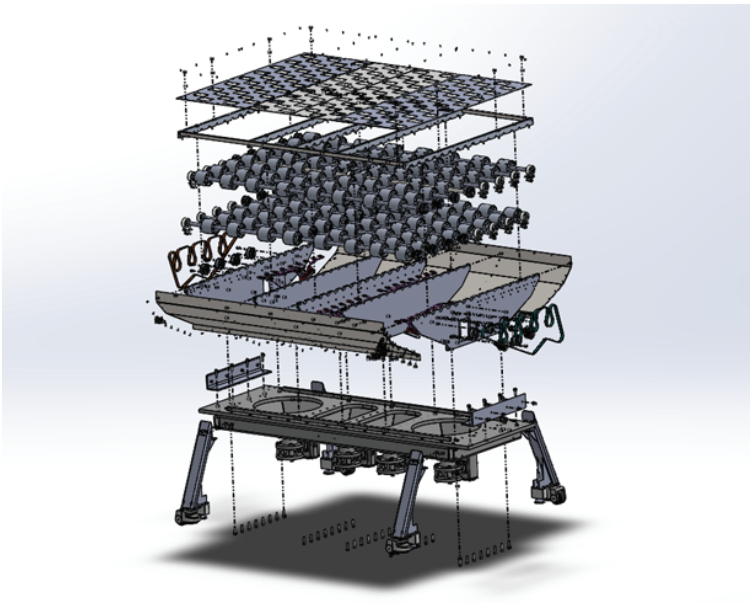

Figure 1: SolidWorks model for coater vacuum transfer table

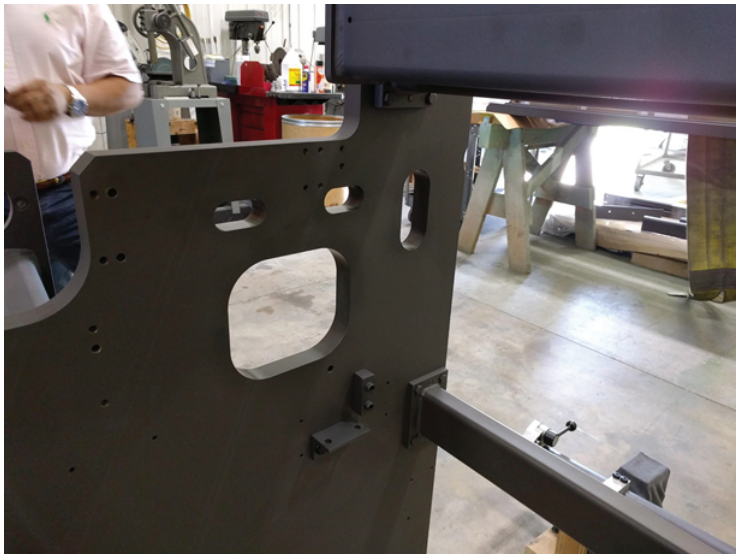

Figure 2: Coater frame assembly

Once the initial design was complete, RapidMade worked directly with the contract manufacturer to oversee assembly and testing. RapidMade service technicians and engineers remained on-site to answer any questions that arose and to make adjustments to the design as needed.

After the assembly had been completed, the machine was tested.

- The media handling tables and the IR dryer were run continuously
- The coating material was cycled through the machine
- Various media were run through the machine

These tests confirmed most of the design decisions made, but also showed several areas that required improvements. RapidMade worked to update the existing design and included all improvements in future iterations.

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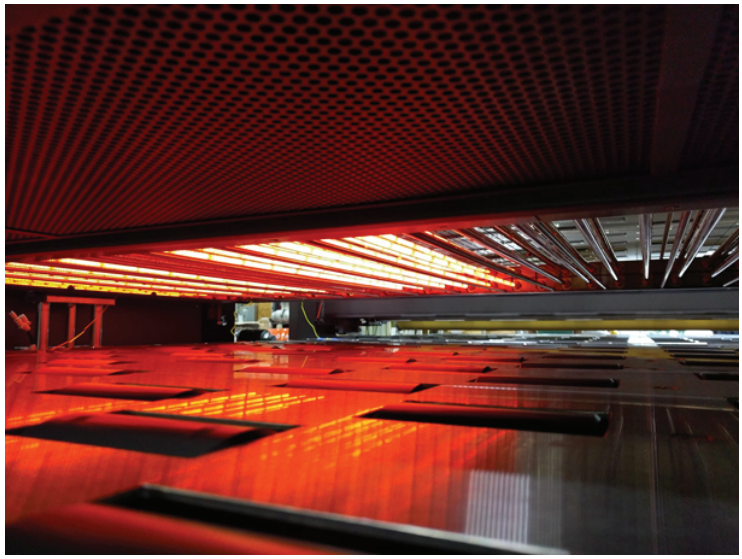

Figure 3: IR dryer testing

Once all testing was complete, the coater was disassembled and shipped internationally to the client's location. RapidMade provided site layout drawings, assembly instructions, user manuals, and on-site coordination for the installation.
Once installation was successfully completed, RapidMade worked to perform a technology transfer of all design data:

- 3D CAD
- 2D manufacturing drawings
- User documentation
- Off-the-shelf components

In the end, the client received a complete package of all relevant data for its future purchasing or design needs.