ARM 2012 Product of the Year: A Case Study

Ball Sanitizing Machine Housing

“Do You Even Know How That Thing Works?”

Here You Go, Rick!

Not Your Typical Roto Job

1. Daunting engineering challenges at start-up and beyond

2. Action-movie suspense over our ability to hit a hard and very visible deadline: the 2012 Olympic Games in London

Not Your Typical Roto Job

3. Thrill of success, international glory, etc.

4. Back to reality

5. Tremendous team effort to overcome new and unexpected challenges

Beginnings

- Doctor in CA was disgusted at the dirty bin that his daughter's volleyball team used for storing balls
- Contacted our customer to run with his idea of creating a unit that would use UV light to remove infectious bacteria
- We met customer at a trade show in April 2011
- Original design was fabricated sheet metal; they had very preliminary drawings and were considering roto and twin-sheet thermoforming
- "This guy in California has an idea"

Getting (Kind of) Serious

- Contacted us again in February 2012, ready to talk about production parts
- Customer's designer had never designed for rotational molding, more comfortable working with twin-sheet
- Much effort by sales/engineering devoted to boosting customer's comfort level with using a new process for such a critical job

Key Selling Points for Rotomolding

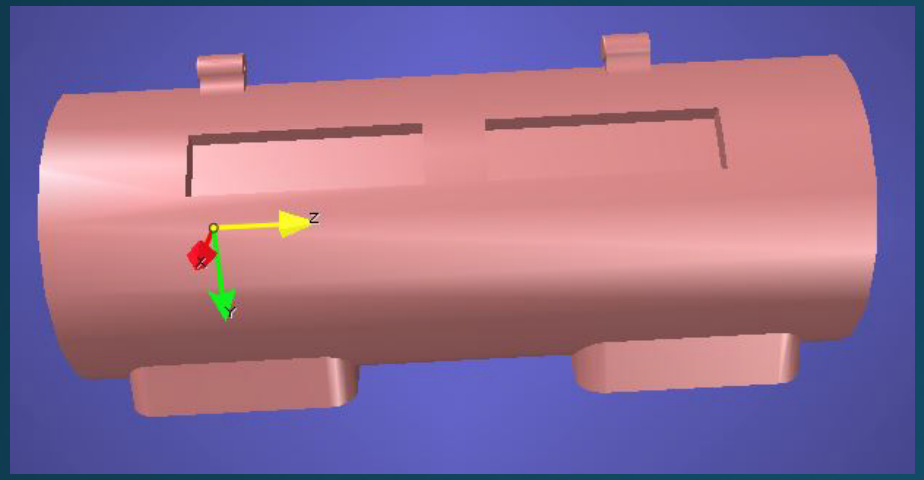
- Opportunity to leverage molded-in features for cost savings
  - Knuckle hinge vs. piano-style steel hinge assembly
  - Molded-in pockets for sanitizing wipes and cleaning fluid
  - Travel path of ball into, through, and out of unit created without any secondary operations needed
- Availability of colorful molded-in logos and instructions
- Ability to experiment with different color combinations
- Ability to experiment with wall thickness

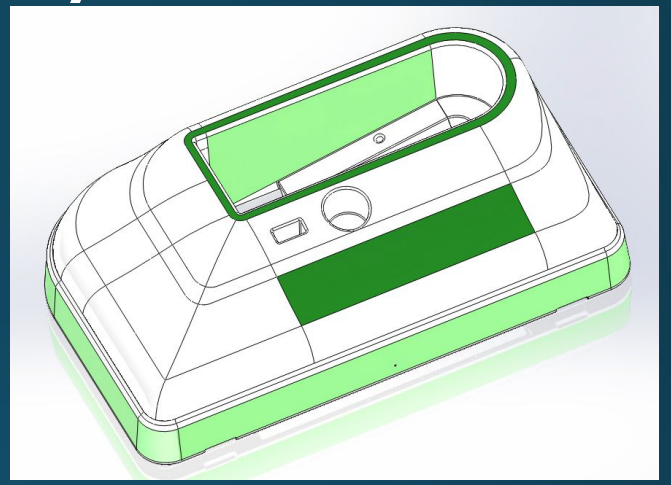
- Comfort level with FP engineering, production, and sales teams

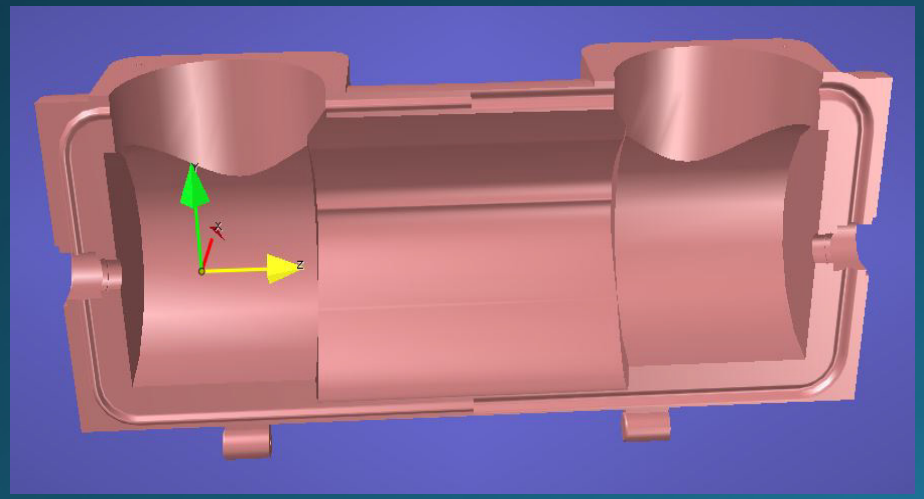
The Big Challenge

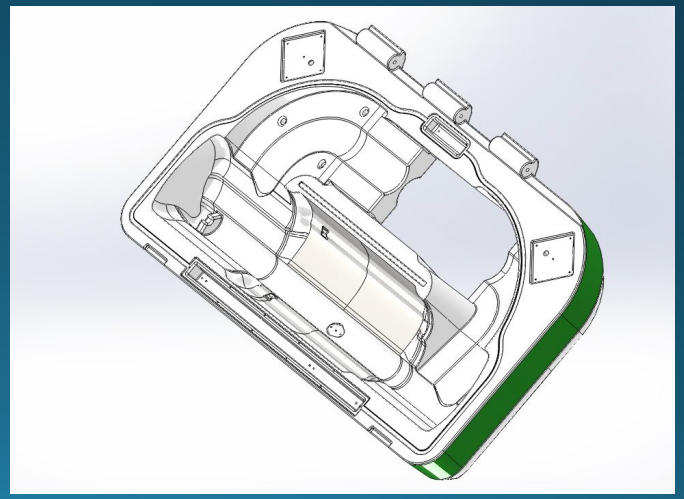
- Customer's idea: Use same mold for the top and bottom halves of the unit, cutting tooling costs in half!
- Great idea, but lack of roto experience on customer's end left us with most of the heavy lifting
- So, how'd we do it?

From Concept to Reality: A Painstaking Technical Analysis



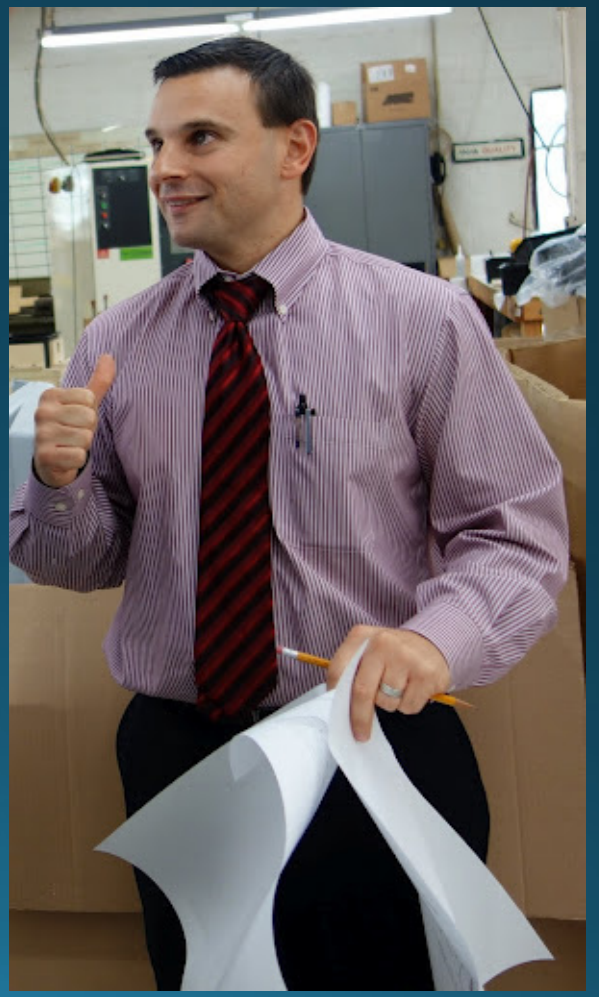






On Second Thought…

- Look at the time! I better just stick to the molding.
- Ask Steve Zamprelli for the details – he's the one who made it all happen.



Good News: We Got The Job!
Bad News: We Got the Job.

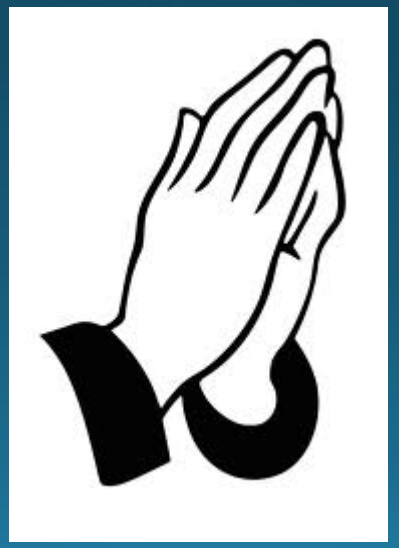
- Tool PO placed on May 12.
- Parts due at US volleyball practice facility in California: July 2.
- Parts due in London at on-site practice facility: July 24.
- Moldmaker: Midwest Pattern – our first time working with them. They were only shop willing to commit to meeting our deadlines.

Lucky or Good?

Friday:
Mold arrives at Formed Plastics

Saturday:
First parts are run

Sunday-Monday:
Sampling, testing, troubleshooting, building fixtures, praying



Tuesday:
London-bound finished parts are picked up

Olympic Glory for FP

- Units made it to London in time for the Olympics – and they worked!

- Impressive look and performance of rotomolded housing inspired US Women's team to a surprising silver medal finish

The Honeymoon is Over…

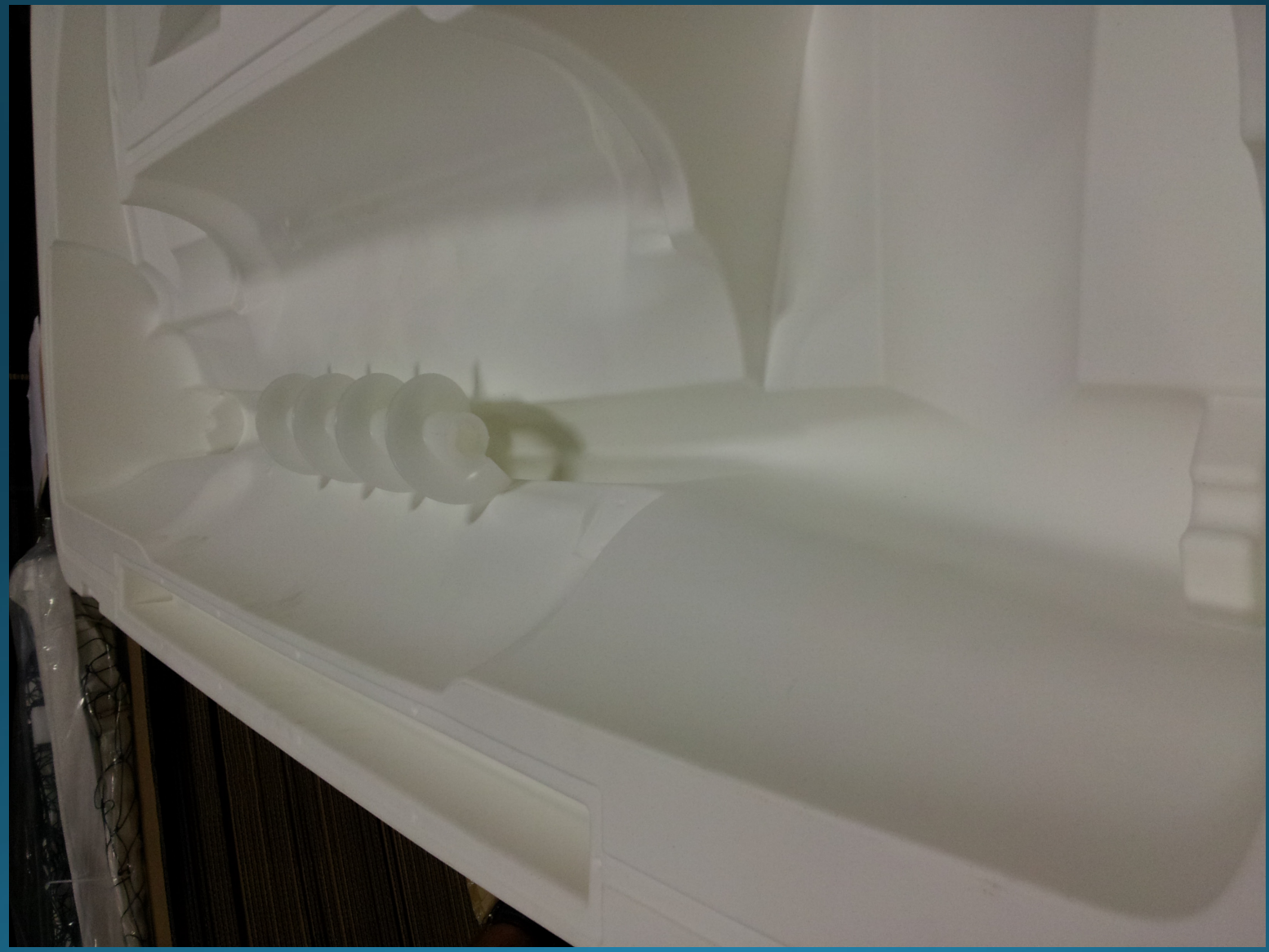
- Customer request: reduce weight by 10%. Resulting loss of wall thickness triggers problems in several key areas
- Warpage on flat faces where two halves meet caused the corners to bow open; unit would not close properly
- Key molded features not aligning properly from part to part
- Top half of part collapsing backwards when left open due to insufficient strength in hinge area
- Visible background on MIG deemed unacceptable
- Molded-in barcode not readable

THEY HAVE PROBLEMS, WE HAVE SOLUTIONS

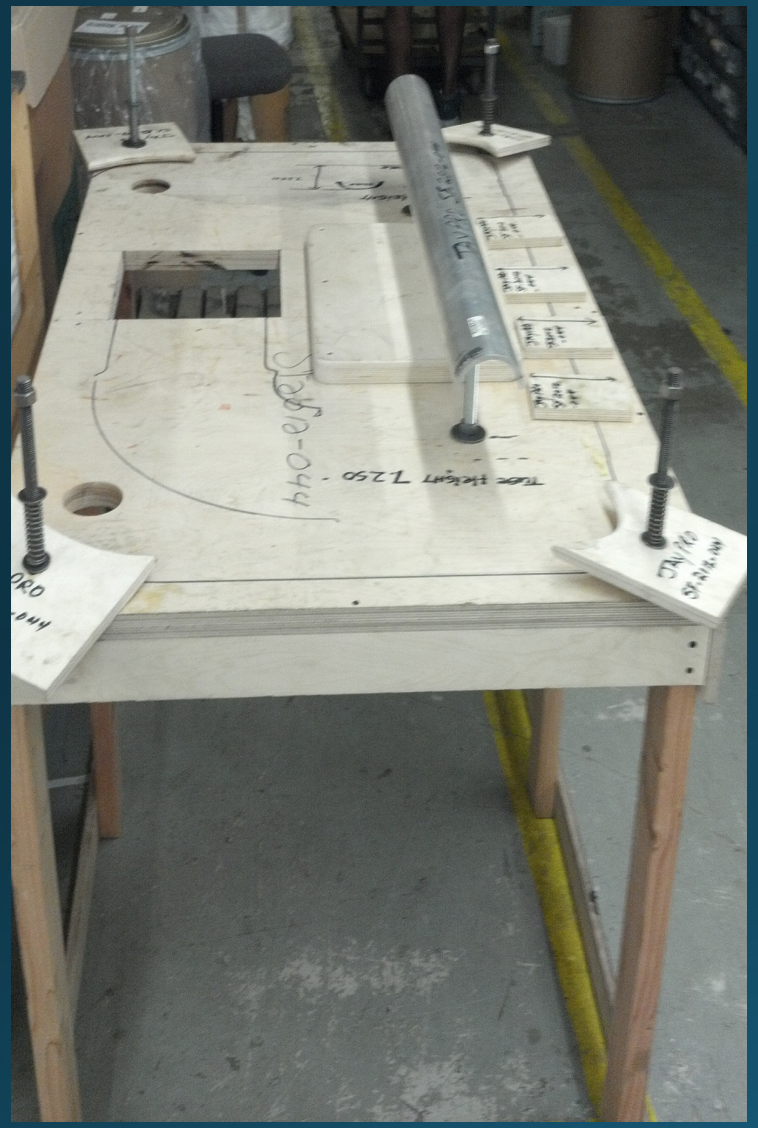
Loss of Wall Thickness Weakens Part

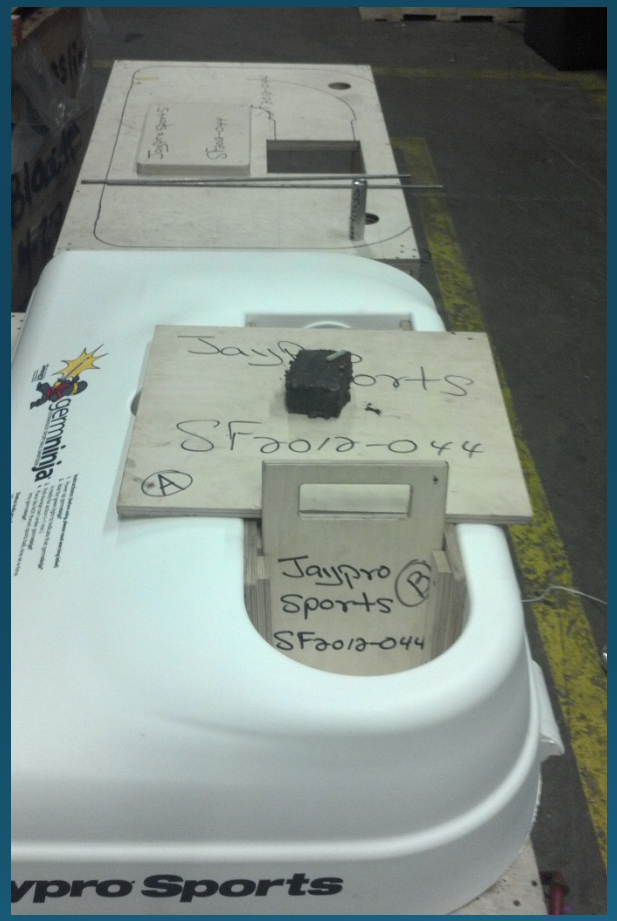
Before…

- Walls in auger trough deformed
- Auger does not fit



Solution





- Extensive shrink fixturing.

- Part pulled hot from mold and filled with air to maintain structure while it cools.

After

- Good fit for auger
- Wood shipping fixtures maintain integrity of other key areas during transit

Warpage Prevents Unit from Closing Properly

Before…

- Corners are especially problematic.

Solution

- Spring-loaded clamping system pushes down unit onto flat surface as part cools.

After


germninja
ULTRAVIOLET SPORT BALL SANITIZER
Go USA Volleyball
MIKASA
MIKASA

Poor Alignment of Molded Features

Before…

- Recesses in front of unit misaligned.

- Oversized gap between hinge knuckles in back of unit.

Solution

- Metal spacers between knuckles ensured part-to-part dimensional stability
- Shrink fixturing from earlier photos ensured proper alignment in front of part

After

- Correct spacing between hinges resolved several alignment issues.

Top Half Collapses

Solution

- Increased strength of critical hinge area by shielding mold in all other areas

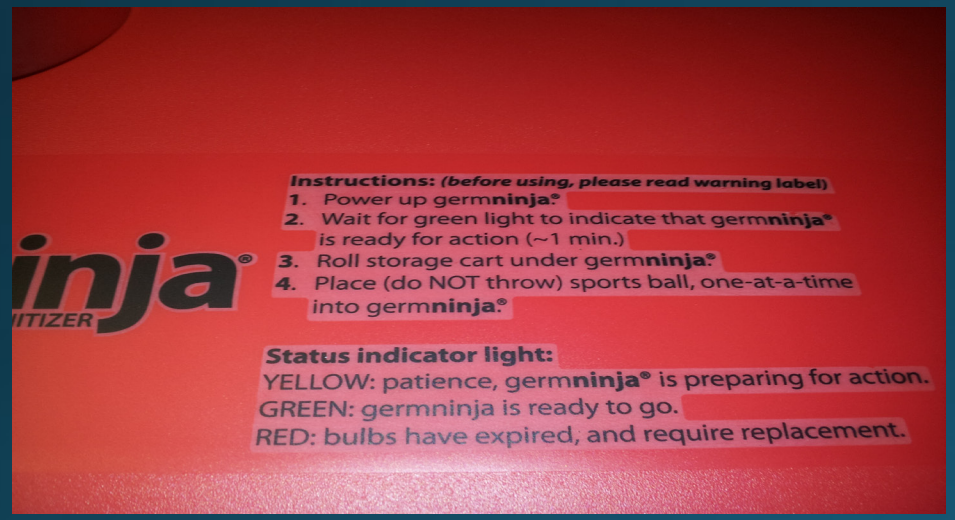
- Vectors direct air to hinge areas

After

- Unit strong enough to stay open until 2016 Olympics.

Graphics Behaving Badly

- Background film visible in molded part



- Barcode not reading properly

- 100+ emails with Clark Boyce, visit from John Schreiner… Success!

Smooth Sailing!

Why We Were Successful

- Tenacious approach to problem-solving – FP's greatest strength
- Always courteous collaboration between engineering and production

Why We Were Successful

- Sales personnel cultivated strong relationships with customer.
- Good relationship facilitated excellent communication of customer's needs, expectations, and (occasional) disappointments to our shop floor

Why We Were Successful (The Truth)

Pat Long rigged the vote.
Again.

Thanks for Your Attention!

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David Long, Executive VP
d.long@formedplastics.com