Engineering through DFM to meet your needs

OBJECTIVE

The existing metal retainer needed a tube and hammer for installation, often damaging the resin soil plate and failing to provide adequate retention on the wooden stake. Additionally, there were inconsistencies in the concentricity of features and material properties, such as hardness. Arbor Stakes sought a solution that would allow for tool-free installation of the metal retainer, enabling it to slide down the wooden stake and securely lock onto the resin soil plate. The new design should firmly hold the resin soil plate in place, preventing any movement.

METHODOLOGY

After completing the initial design iteration, Micro Forms performed a finite element analysis to estimate the retention force of each retention tooth.

Physical prototypes were built to verify their fit, form, and function.

Based on the results from the prototypes and the analysis, only a minor adjustment to the tooth angle was necessary to achieve the desired retention force.

The progressive tool was designed with adjustable inserts for the retention teeth, allowing for any needed angular adjustments without the need for additional prototypes.

SOLUTION

The Micro Forms engineering team collaborated with Arbor Stakes to redesign the part, incorporating push tabs for easier hand installation.

Our team increased the length and angle of the retaining teeth that engage the stake, which reduced the force needed for installation while maintaining strong retention.

Arbor Stakes agreed that the austemper heat treating process would ensure the most consistency.

At a Glance

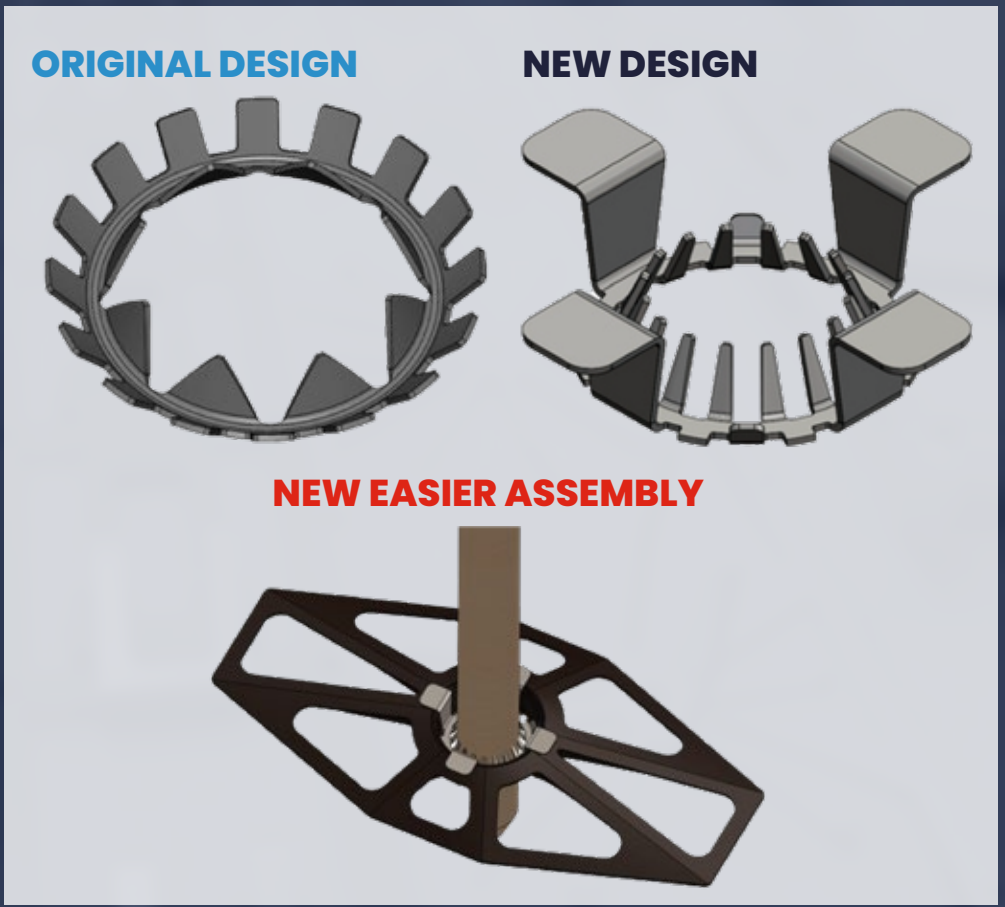
- **Challenge**
  - -Eliminate installation tools
  - -Reduce installation damage
  - -Improve retention
  - -Reduce cost
- **Benefits**
  - -Improved installation process
  - -Reduced logistics
  - -Cost savings
  - -Consistent quality

RESULTS

The redesigned retainer eliminated the need for tools that were required with the previous version, resulting in lower costs and simplified logistics.

The tool-less installation prevents damage to the resin soil plate, further reducing expenses.

Improvements in dimensional consistency and material properties have minimized rejections and sorting costs, enhancing installation ease and increasing end-user satisfaction.



Micro Forms, Inc.

Precision Metal Stamping

- We specialize in precision metal stamping for complex, small parts across diverse industries.
- Design for Manufacturing (DFM) approach for cost-effective solutions.
- Deliverables in reel-to-reel, individual parts, or tape and reel format.
- Over 55 years of experience.
- Expertise in high-volume production.
- In-house tooling design and build.