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## OLSON ALUMINUM: LESSONS FROM A 15-YEAR NO-BAKE EXPANSION



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### ARTICLE TAKEAWAYS:

- Enhancing a 15-year-old installation with modern technologies
- Understanding a scalable & flexible no-bake line
- Managing labor shortages & optimizing crew sizes

In 2011, Olson Aluminum, a green sand foundry, completed an expansion of its no-bake (air set) operations with the goals of significantly increasing total production using the existing labor force and enabling more complex casting designs. While experienced in the no-bake process, this expansion would allow Olson Aluminum to attract a broader range of part sizes, offering greater detail and deeper draws.

As hindsight is 20/20, we thought to take the unusual step, to revisit this installation—fifteen years later. Like many foundry expansions, the Olson expansion was announced with great fanfare and excitement. Our effort here was to understand what really happened and identify the lessons learned. In revisiting the no-bake installation, we wanted to understand how it ultimately performed—and, more importantly, how the system has adapted over time. To that end, we asked Tad Olson, President of Olson Aluminum; Zac Utsinger, Vice President of Engineering; and Shane Pulgarin, Director of Human Resources, to address the following questions:

- Did the new no-bake facility achieve productivity goals projected in 2011?
- Was the system flexible as production quantities and sizes changed?
- Was the system scalable through production increases or decreases?
- How did the labor situation affect the system?
- What technological enhancements have taken place since the original installation?
- Overall, what were the lessons learned and the long-term impact of this system?
- What does the future hold for this system?

### BACKGROUND

Olson originally operated as a green sand foundry, with molding equipment ranging from jolt squeeze machines up to 32 × 56 cope-and-drag flasks. By 2006–2007, the company was receiving increasing requests for castings that exceeded its existing flask sizes and were better suited for no-bake production. During the 2008–2009 downturn, Olson took advantage of the slower period to plan the addition of a no-bake foundry designed to accommodate a wider range of box sizes. To identify the optimum system, the team visited several no-bake foundries and developed a clear plan for the capabilities they wanted.

In 2010, the decision was made to move forward with a no-bake operation for increased flexibility and to produce larger and more complex parts. After a review of many other no-bake installations, Olson Aluminum selected the Palmer system. Olson Vice President of Engineering Zac Utsinger worked closely with the Palmer Engineers and the building architect to design the building and equipment layout.

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# SIMPLE SOLUTIONS **THAT WORK!**

## **The key equipment for this expansion included:**

- 600 LB M-Series Palmer Mixer
- Vibrating filling table
- 22' carousel turn table
- Rebuild of an existing flop style rollover
- Two track mold transporter system
- Two parallel closing lines w/small & large scissors cope roll/mold closers
- Pouring lines with overhead cranes

Construction of the new 16,000 sq. ft. building and installation of the new no-bake line were completed by the end of 2011.

## **EARLY CHALLENGES**

Olson Aluminum initially faced a challenge in fully testing the new no-bake line due to insufficient workload. Operating at a fraction of its design capacity was difficult to manage, and the underutilization continued to varying degrees into 2015. Labor shortages, including productivity challenges among mixer operators, further limited the system's ability to reach full capacity. As Tad Olson explained, "Even with these challenges, we focused on optimizing the system so it could perform at full potential once workload and staffing aligned."

Once the floor was fully engaged with work, productivity issues were resolved through the right leadership and a production-focused crew. As a result, production rates soared, exceeding all initial goals.



## **SCALING THE OPERATION**

By 2024-2025, production returned to more normal levels and lead times stabilized, which reduced the volume of work for the new no-bake line. Staffing adjustments allowed the crew size to be reduced by 50% without affecting productivity e.g., molds-per-crew-member output. According to Olson, "This capability allows us to scale far more easily by adjusting crew size to match demand."

## **LESSONS LEARNED**

**There were many lessons learned throughout the process:**

- Completing the building and line installation took months longer than anticipated.
- Getting the system up and running to the expected productivity levels took more time than estimated.
- Never underestimate the value of motivated and trained operators working with an experienced team for getting a system fully operational to desired goals.
- Having a better sales backlog of jobs just for the new no-bake line would have assisted greatly in testing and working with the system at start up.
- Increasing productivity is a difficult task and requires constant attention, motivation, and training.
- Originally the system was designed for up to a 48" x 60" mold box, and estimated that it would run anything from about 24" square up to that maximum size.

However, two things were quickly discovered:

1. Work came in that was significantly larger than what the system was designed to accommodate. Therefore, the team got creative and pushed the system to sizes as wide as 54" and as long as 90".

2. Mixing small work with large size jobs on the same table proved to be more logistically challenging than anticipated. In hindsight, it would be better to have a smaller table for the small to medium size jobs, and a bigger mixer and possibly different handling system for the larger jobs. The differences in box fill times and mold cure times made the shared system less efficient than if all boxes were closer to a similar size.

- Longer cooling lines would have been better, allowing more time for molds to cool before shakeout.
- Most long tubing runs from the resin tanks to the mixer are now hard piped, with tubing at the ends.
- Early on, there was discussion as to whether a turntable or loop style would be more efficient. While this is still heavily debated, it is noted, that there is only a very small amount of down time in the mixer due to the rotation of the table.



## SYSTEM CHANGES

Since the original installation, there have been several system changes:

- Because of the operators' familiarity with larger mold boxes there is a tendency to put the cope and the drag both on one sled for the smaller boxes.
- Very long or very large boxes are put on the floor, when necessary, due to weight limitations on the flop mold rolover machine.
- Another 12,000 sq. ft. building expansion in 2019 was added for no-bake tooling storage.
- Adding a Gudgeon Thermfire was a great cost savings measure. According to Zac Utsinger, "The addition of the Gudgeon thermal reclamation system significantly reduced new sand purchases from seven truckloads per week to three per month—and in hindsight, wished the system had been installed earlier."

## SYSTEM FLEXIBILITY

While not understood initially; this system had built-in flexibility that proved helpful during high peak periods.

During the busiest times, not only was the no-bake area swamped with work, but the middle floor green sand molding (25" square flask size) also was booked beyond capacity. Olson was able to temporarily add a second small no-bake loop to the no-bake area and exclusively produced two jobs there. One operator was able to mold about 40% of a day's production per day in comparison to the 2-person green sand line. The flexibility of the sand supply system and ease of equipment installation helped immensely in meeting the peak demands.

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# SIMPLE SOLUTIONS **THAT WORK!**

## SYSTEM BOTTLENECKS

The production surge in 2022–2023 highlighted additional bottlenecks, particularly in heat treat. In response, the company recently expanded its T6 heat-treat capacity by 50%, and also doubled its aging capacity. Olson Aluminum is also in the process of adding metal processing capabilities, including additional furnace and degassing capacity, to support larger mold volumes. A major office remodel in 2024 also freed up the space needed to accommodate these expansions.

## TECHNOLOGY PLAN

Looking back, Olson notes it is remarkable how much technology has entered the foundry floor since 2011. While staying competitive has required adopting many new advancements, the core of the no-bake expansion line has remained largely unchanged, with new technologies serving to enhance its performance. Current initiatives continue to focus on supporting the system while improving efficiency and capacity.

### Current initiatives include:

- AI: Olson Aluminum uses AI to create 90-second safety videos that are viewed at plant meetings.
- 3D: Tooling, full-size models and prototypes are made in the 3D printing lab.
- ERP: The company is transitioning from a foundrybased ERP system to Epicor, a more comprehensive ERP platform.

***Special thanks to Tad Olson, President of Olson Aluminum, and his team for sharing their insights and experiences, which informed the lessons and solutions highlighted in this article.***



## LABOR & LEADERSHIP

To address the current labor shortage, Olson Aluminum's Director of Human Resources, Shane Pulgarin, created two programs: one for interns and one for newly hired engineers. Both programs are instrumental in preparing participants for success and play a key role in knowledge transfer and the company's continued growth. Shane Pulgarin explained, "These programs are a strong recruiting tool and help ensure we maintain a pipeline of capable leaders—from working supervisors to upper management."

## 15 YEARS LATER: A LASTING IMPACT

Fifteen years after installing the Palmer no-bake system, there have been very few changes to the core platform. Its long-term positive impact has exceeded the original productivity goals, proving the system to be both more scalable and flexible than initially imagined. Over the years, Olson Aluminum has expanded the system with a thermal reclaimer, additional mold closers, another overhead pouring crane to handle large two-up molds and significantly expanded the building exclusively for no-bake tooling storage. Olson emphasized, "This system design has served us exceptionally well and remains our lead production line as we plan for the future. While we embrace new automation and technology, it complements and supports our current line rather than replacing it."



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