

# A CASE STUDY IN MOLTEN METAL TRANSFER



**MOLTEN METAL**  
EQUIPMENT INNOVATIONS

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## ARTICLE TAKEAWAYS:

- Manufacturing processes are in a continuous state of evolution
- Every process has “pain points” associated with it
- Focusing on the elimination of pain points is a good business model

Manufacturing processes are perpetually evolving. Much like the natural world, things that prove beneficial tend to stick around, while those things that are harmful or less useful are eliminated over time.

Generally, changes of this type in the natural world happen over very long periods of time and can be influenced by externalities that cause evolution to occur in a way that is only perceptible when measured over thousands of years. In our manufacturing world, we don't have the luxury of that much time, and thus the rate of change required to eliminate harmful “pain points” is much faster. We all live this every day, and case studies are a great way to document how pain points can be eliminated to benefit a process and provide lasting gains. Generally, the benefits are measured over short periods and produce improved performance in the important areas of safety, process efficiency and financial return. Our company, Molten Metal Equipment Innovations (MMEI), recently worked with a customer to eliminate a pain point and generate real benefits

that will persist over time.

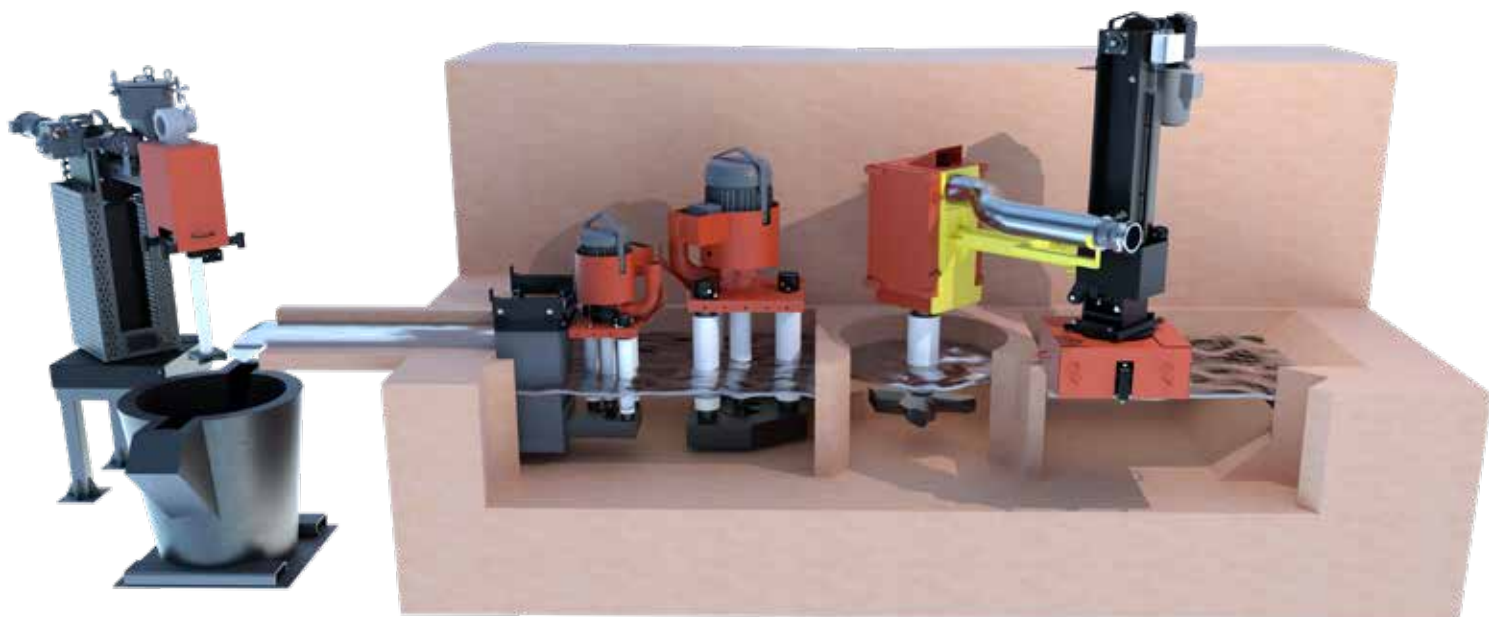
## WHERE DOES IT HURT

Companies can almost always tell you where the pain is, and generally remedies are focused on where there is the most pain, especially those areas creating unsafe working conditions and/or poor financial performance. In the case I would like to relate, the pain was concentrated in three primary areas: safety, operational efficiency, and excessive cost. The root cause of the pain is related to a very common problem in our industry, and that is the challenge associated with emptying molten metal from a stationary furnace. There are a number of factors that create this pain point and all of them need to be factored into developing an effective solution. First, molten metal is dangerous to humans. At temperatures in

excess of 700 degrees centigrade, it can do great harm very quickly should it come in contact with you. Second, and related to the first issue is that when spilled it creates a major safety hazard and a very expensive problem to clean up, often requiring significant down time and huge expense. Next, there is the issue of how to empty a furnace. Over time different technologies have been developed that include, gravity, mechanical pumps, hydraulics and pressure. All can work, all have pros and cons. After you decide how to get the metal out, you have to have a place to put it, and to keep it in the state desired (molten or solid) for your intended use. Lastly, all these things drive costs, and ideally you want to accomplish the task safely, quickly, and for as little money as possible.

## A CASE STUDY

In the case of our customer, all the factors above came into play. Normal operation would see molten aluminum alloy (A-380) transferred by a MMEI Mini Launder Transfer pump into ladles and then transported to the casting machines. The process was continuous and designed for high efficiency, and thus the metal level in the furnace was never allowed below 20 inches to keep the pump fully submerged. Periodically however, the furnace needed to be emptied to allow for routine maintenance, or to switch alloys. The existing process was to use gravity, tap out plugs and sow molds to manage the emptying process. This resulted in safety concerns for the operators as they were forced to be in the path of the



molten aluminum. It would take them several days to empty the remaining 20 inches of molten alloy from the 50,000 lb. furnace in their facility. It would halt production, and it required more than 50 sow molds to handle the volume to be drained from the furnace. More than they had on hand, and so they had to wait as metal cooled and solidified in the molds and could then be removed. Clearly a very painful situation.

They needed a way to get the remaining 20 inches of metal into ladles and into their production flow so that they could continue to make product and avoid the need to empty into sows altogether. This provided MMEI the opportunity with its new Raptor Transfer Pump, which is completely portable, quickly submersible, with a variable speed motor capable of moving 1,100 lbs./minute, to pump metal out of the furnace down to a level of 5 inches or lower, and to see all that metal go into production. The remaining 5 inches was then drained via gravity quickly and easily to leave the furnace completely empty and ready for the

maintenance process to begin. This solution resolved the safety issue, kept production at normal levels, significantly increased the efficiency of the furnace emptying process (from days to hours) and generated a strong financial return for our customer.

**RELIEVING PAIN IS  
GOOD BUSINESS**

As I get older, I have more and more opportunities to deal with “pain” and how to make it go away. I once worked for a good friend who told me that if you go to a surgeon, the recommendation will be for a surgical solution, if you go see a homeopath, you will be prescribed a natural remedy and if you see the chiropractor, it will be an adjustment. Those of us in the business of relieving pain, generally have a specialty, and while that can lead to a bias, our industry is fortunate to have “doctors” that invest substantial time and money in developing new ways to relieve, or even better yet prevent, pain. It is always good to have options, and the market will sort out those that are most beneficial in addressing the ailment. The case study above

is the result of having identified a common pain point in our target market, namely the need to safely, quickly, and efficiently empty stationary furnaces to facilitate maintenance or alloy changes. Many years ago we developed a product called the Speed Demon that was able to relieve a certain amount of pain. With those lessons learned we went back to our drawing board and developed the Raptor to better address situations with a higher pain threshold. It has been gratifying to see how our customers have benefitted from this new development in technology. In fact, we even heard our patient say “The Raptor pump performed very efficiently. The pump exceeded all expectations as we were able to continue to run production while draining the furnace. I would recommend the Raptor pump for other facilities. An outstanding product. Made my work easier.” I suspect we will be back at the drawing board again with new ideas in hopes of continuing to be effective pain specialists.



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