It is important to use special types of sand for certain types of castings, including the many different kinds of metals and alloys. In this example, Humtown uses a chromite sand from Africa, which causes the casting to chill faster in the mold.

Foundries Find In-House Core Shops No Longer a "Core Necessity"

Many foundries outsource cores to gain significant benefits that far outweigh those of producing cores in-house

The sand core shop is an almost universal facility that can be found in foundries around the world. At one time considered a vital part of the foundry for constructing complex molds - particularly those with passages and cavities – the foundry core shop may now be fading into the past due to higher costs, overall core quality and production issues.

Although many foundries still maintain the classic in-house core shop, others are finding conclusive evidence that core making is no longer a core necessity central to their success, and is best outsourced from core specialists.

"For many foundries, in-house core production has been a sort of necessary evil that for several reasons is no longer practical," says Dick Holden, an industrial consultant with Advanced Sales Dynamics, Cranberry Township, PA. "I think it's fair to say that in-house core production is often a deterrent to productivity and profitability, and could be the source of considerable waste."

Lowering core costs

Given that foundries are in the business of making and finishing castings, for them to have core shops often creates a hidden source of overhead, Holden says. For example, the core shop consumes energy, compressed air, air scrubbers, floor space and other resources, yet often times labor is the only cost considered by the foundry, when calculating core making costs.

"If you want to learn the true costs of cores, you can get those from an outside core making specialist," Holden adds. "Not only do they track overhead completely and accurately, but they also help to keep the outsourcing of cores competitive and affordable. Just considering the foundry's unidentified overhead, it is highly possible for them to lower core costs by going outside to a core specialist."

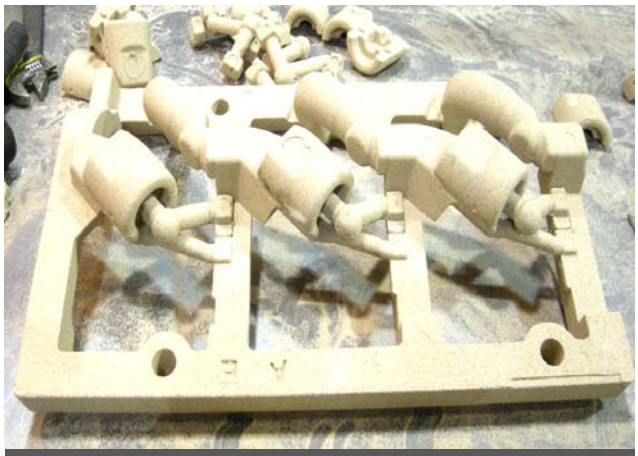
Improved, consistent quality

While many in-house core makers are skilled craftsmen, their capabilities are sometimes thwarted by foundry policies that inadvertently compromise casting quality.

For example, sourcing the optimum sand or silica used to make cores may be unfamiliar or overlooked.

Holden says core specialists such as Humtown Products (Columbiana, OH) use all virgin sand that is consistent in quality and composition.

"Many foundries recycle sand for use in making cores," he



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explains. “So, there might be a mixture of fine and coarse materials in it, or it might be coarse this time and fine the next. Without consistency your core results, and possibly casting results, will vary all over the place.”

Holden adds that it is important to use special types of sand for certain types of castings, including the many different kinds of iron and steel, steel alloys, copper, brass, zinc. For example, for manganese steel a certain pH property is required, such as olivine sand from Green Mountain, South Carolina.

“If you want the casting to chill faster in the mold, you should use a chromite sand, which comes from Africa,” advises Don Covert, Humtown’s Technical Sales Representative. “Zircon sand is more for steel castings, and much of that material comes from Florida. Not only do the sand types and quality make a difference, but also the types of powder additives. If you want to capture nitrogen out of a certain kind of steel, you should add the black iron oxide, spherox, or an appropriate powder additive to the sand and blend,” says Covert.

Reducing waste and machine time

Sand cores that are used to make passages are often very intricate. For example, oil pump passages for jet engines have very fine and small passages throughout the casting. If the core is not prepared properly, such as with an incorrect sand mix, flaws such as “burn in” can result.

“It can be very challenging to correct that kind of problem,” Covert says. “The effect of burn-in is like metal spikes protruding into the casting passages. These will restrict the flow of the pump, and when they do a flow test on the casting, it will fail the test. Or, if you get something with too high of a resin, you can have gas pockets in the casting, which can result in leakage. If you have those types of defects in an internal passage, it can be difficult to remedy them.”

Holden adds that many cores produce castings with excessive stock that require unnecessary machine time. On the other hand, cores that produce castings with too little clean-up stock for machining usually end up wasting valuable machine time and the castings ultimately have to be re-melted.

“If those castings are tested after machining and the flaws are undetected, then both the machine time and testing are wasted, plus delivery may be thrown off schedule,” Holden says.

Covert mentions that at Humtown core quality is checked very carefully, and because the firm also has longtime pattern design and fabrication capabilities, worn or out-of- spec tooling can be quickly and accurately corrected, a significant value-added service to foundry and OEM customers.

Leveraging capacity

One of the main reasons foundries are outsourcing their cores is faster turnaround time. While foundries are used to outsourcing cores with difficult configurations, in many instances they inadvertently hold back production by making simpler cores in-house.

“Some foundries struggle to make 10 sets of cores per day,” Covert says, “where an outside core specialist like Humtown can produce 100 sets of those same cores every hour.” He adds that turnaround time for the outside core specialist may be a matter of days to two or three weeks, compared to several weeks or even months for the in-house core shop.

When it comes to large volumes of cores, the capabilities of the outside specialists are not lost on many foundries. But Holden says there are many instances when the foundry should not be in the core business even for smaller volumes because the real estate occupied by a core shop can be put to more profitable use, whether making castings or for providing space for finishing equipment.

Avoiding compliance issues

Like outside core specialists, foundry core shops are subject to EPA requirements, some of which are very stringent. Core shops have to scrub all of the air within the department or building because of the hazardous catalyst used to cure the cores. In the case of outside core shops, the entire building must be sealed and air scrubbed before it can be recycled. Foundries are held to even stricter standards. Because the building cannot be sealed, air scrubbers are required for every core-making machine – at very substantial cost. Even with this equipment, cores continue to off-gas for periods up to 24 hours, exposing the area to the catalyst, and subjecting the core facility to EPA compliance issues.

“Foundries already have enough air quality issues to deal with,” says Holden. “When you consider the capital investment required for air scrubbing equipment, the many months it takes to get those systems installed, approved and permitted, plus the tasks of dealing with continual monitoring, the already marginal benefits of having an in-house core production facility become all the more problematic.”

For more information, contact Humtown Products, 44708 Columbiana-Waterford Rd., Columbiana, OH; Phone 330-482-5555; Fax: 330-482-9307; Email sheri@humtown.com; Humtown Products delivers quality cores to the 48 Continental United States and Canada. Visit the web site www.humtown.com