FIRST Foundry Industry Recycling Starts Today

CASE STUDY: Foundry Sand in Residential Home Construction

Eureka Foundry Company

Chattanooga, Tennessee

Eureka Foundry is a family-owned iron foundry that has been in operation since 1902. They handle both long and short production runs, service a variety of industries, and can pour castings of up to 20,000 pounds. Beginning in June of 1996, Eureka started making its co-product foundry sand available to local contractors and haulers for beneficial reuse projects.

Tennessee's Beneficial Use of Nontoxic Spent Foundry Sand policy allows Eureka's sand to be used as structural fill as long as the sand meets certain standards and is documented with the Tennessee Department of Environment and Conservation (TDEC). The sand must meet maximum concentration limits, which are generally ten times the drinking water standards, for eleven potentially toxic substances. Eureka samples and tests the sand every two to three years. The initial test results from when the program was first implemented are documented with TDEC, and as long as the sand does not change, it can be applied in beneficial reuse projects requiring up to 200 tons of sand without having to obtain individual state approval for each project. It should be noted that testing does not place any additional burden on Eureka Foundry, as it must periodically test its sand for the same substances in order to landfill it.

The sand itself may be either air-set or green sand from various parts of the foundry. Eureka removes the sand from stages of the casting process where core butts and metal fragments are not a concern. It is then screened, with the sand that gets screened out used for beneficial reuse projects while the remaining sand is reused within the foundry's casting process. Eureka does not charge for the sand itself, but transportation arrangements must generally be made for each project. The nature and cost of these arrangements vary, so the foundry generally negotiates them on a per-project basis in order to ensure that the beneficial use of the sand is not cost-prohibitive to any potential end users.

Contractors typically use the sand as foundation fill for individual home construction projects where it is placed within cinder block walls and capped with concrete. The projects vary quite widely in size, but are all within about an hour's drive of the foundry. About four to five projects are completed with the sand each year, and they generally use a significant portion, about one-third, of Eureka's co-product sand. The sand that is not applied in beneficial reuse projects must be deposited in a landfill.

Photo 1: A view of one of the homes that used Eureka's sand as foundation fill. The building site was excavated down to stable ground, and then the foundry sand was used as fill to get the foundation back up to the necessary grade.

This program was developed in order to pursue several benefits. The foundry itself avoids both transportation costs of about $14 per ton and disposal fees of about $12 per ton that are associated with landfilling the sand. For project owners and contractors, the sand is usually less expensive than locally available aggregates, which can run up to $9.75 per ton plus delivery for crusher rock or $12 per ton plus delivery for gravel. Note that as alluded to before, end users usually only need to pay

for transport of the sand. In fact, it is common that they must only pay a portion of the transport cost, as Eureka is often willing to assume some of the transport costs in order to make the project work. Additionally, according to the rules established by TDEC regarding use of the sand, there are no individual project permitting costs associated with this particular application.

Despite these benefits, Eureka's program faces two challenges. First, while some contractors love to use the sand, others are more skeptical about incorporating it into their projects. Skeptics believe the sand does not compact as well as gravel or that it may place undue pressure on poorly designed walls. However, those contractors who regularly use the sand register no such complaints with Eureka. The second challenge is that Eureka has no on-site storage capacity for their foundry sand, making it difficult to service larger projects.

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Personnel	**Foundry and Marketer:** Eureka Foundry Company **End Users:** Various contractors and home owners **Regulatory Agency:** Tennessee Department of Environment and Conservation
Site	**Location:** Chattanooga, Tennessee **Site Description:** Eureka sells its co-product foundry sand to various contractors in the Chattanooga area who use it for individual residential home construction.
Materials Utilized	Between 200 and 300 tons of foundry sand annually, split between roughly four or five projects per year.
Project Costs and Benefits	**Costs Include:** • Transportation costs are negotiated and divided up between the foundry and the end users on a per-project basis. **Benefits Include:** • Homeowners and contractors save money over locally available construction aggregates. • Eureka avoids both the disposal fee ($12 per ton) and the transportation costs ($14 per ton) for depositing its sand in a landfill. • No individual project permitting costs are required for this application according to TDEC rules. • The projects use a significant portion, about one-third, of Eureka's co-product sand.