

Development of ceramics

Member Company North American Stainless
Category investment in new processes and products

Challenge

NAS generates large quantities of slag as part of the steel making process, and will continue to produce this waste stream. The slag, once treated by Phoenix Services to remove the steel, is known as aggregate and has been approved by Kentucky Division of Waste Management to be used for multiple purposes, such as concrete production. Unfortunately, while it was approved for concrete production, local concrete producers did not want the aggregate as it slows the cure time of concrete.

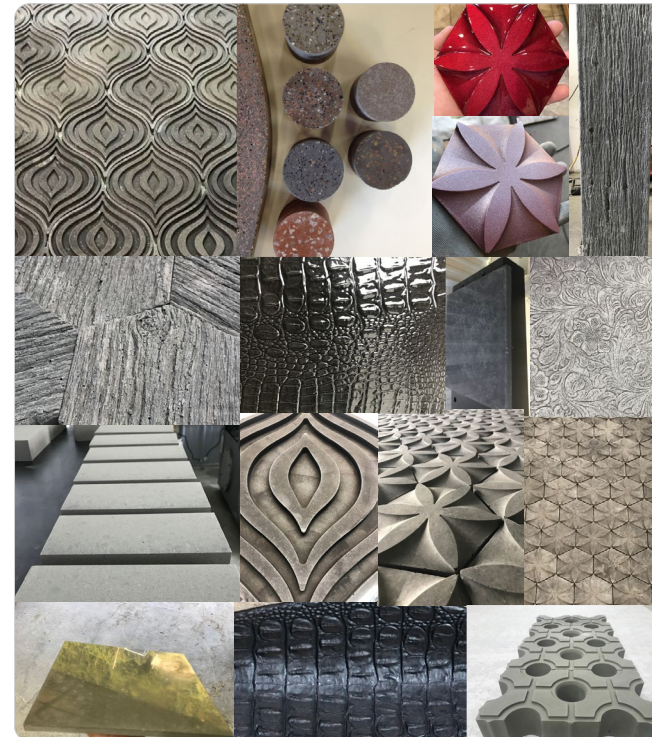
Action

NAS has been working with a company, Truce Global, to develop products that can be manufactured using aggregate for its cementitious properties. During 2019, NAS has diverted 12,000 tons of aggregate to Truce Global to develop architectural products. The aggregate is used as an alternative raw-material to sand-based Portland Cement. Geo-polymers are used to physically and chemically encapsulate the aggregate to make a comparable if not more resilient building product. The final products are various tiles and outdoor pavers as seen from the picture.

Outcome

The aggregate will be able to be used to manufacture valuable commodities. Because this aggregate-based cold ceramic relies on steel waste as the primary raw material rather than Portland cement, this cementitious material does not contribute to air pollutants such as NO₂, SO₂, and CO because it does not rely on energy intensive kilns or other firing processes. Similarly, environmental and social impacts of sand extraction are avoided altogether. Along with the lower

ambient air pollution, these products have an 80% lower carbon footprint compared to traditional cement production methods. All products exceed product-based ASTM standards. While finishing this research and development phase, a production facility near NAS is being constructed so that these architectural products can be manufactured using NAS aggregate and be economically competitive with traditional Portland-cement products.



Final products. Picture courtesy of Truce Global