Researchers at the University of South Florida have developed a method to use glass as a material for construction structural piling foundations.

Pile foundations have been used as load carrying and load transferring systems for many years. A pile is a slender structural member made of steel, concrete or wood that transfers the structures load to deeper soil or rock. Piles are generally driven, drilled or jacked into the ground depending on the type of soil, pile material, and load transmitting characteristics. However, piles made of steel, concrete or wood are expensive, on a strength per cost basis. Hence, there is a need for a pile foundation that uses a different pile material that could provide greater strength at lower cost and ease the process.

Researchers at USF have developed a novel method that creates stronger piles by creating glass using high amperage and low voltage with graphite electrodes. The invention details a device with several actuators that can be lowered into a steel-cased bore hole. Soil from the bore hole can then be mixed with sodium carbonate and other fluxing agents. The fluxing agents reduce the melting point of the sand mixture, allowing for more economical glass piles. Due to the large compressive strength of glass the required thickness can be significantly reduced. This reduces handling costs, boring costs, and manufacturing costs of the piles. Glass compressive strengths up to 36 ksi (concrete is typically 4 ksi) have already been realized from preliminary testing using sandy soils mixed with sodium carbonate. A 36 ksi strength glass results in a pile that has up to a 40% material cost saving over traditional foundations.

**Advantages:**
- Increased strength (up to 36 ksi)
- More cost effective (up to 40% savings)
- Smaller required boreholes

**Glass Produced by the Arc Melting Process**