

The Jetcreter – The First Continuous-Feed, Dry-Mix Gun

By Ted Sofis

During the summer of 1970, on my 18th birthday, my father woke me up and told me they needed me on a job. I drove out that morning in July to the Crucible Specialty Steel plant in Midland, PA. It was my first experience working on a Gunite job. We were gunning refractory in a vessel, and I was throwing 100 lb (46 kg) bags of pre-packaged refractory into a paddle mixer to pre-dampen the material. We emptied the paddle mixer on sheets of plywood and shoveled the pre-dampened refractory material into the dry-mix shotcrete gun's hopper. The Jetcreter was a continuous-feed gun, and it was tough for us to keep up with it. It was a very long day for me because it took 15 hours to complete the gunning. I left the house that morning in the dark and returned home in the dark. That was my introduction to "Gunite" (now referred to as dry-mix shotcrete).

The Jetcreter was the very first continuous-feed gunite machine. It was manufactured by Engineered Equipment, Inc. in Waterloo, IA. It had a rotor with round pockets and worked on the rotating air-lock principle, which was a completely new idea. The material could be continuously added as needed without interruption. As the rotor turned, the pockets filled and then discharged material. With the sealing plates above and below the rotor, it worked much like a revolver: as each chamber came over the gooseneck opening, it discharged the material in a continuous flow through the gooseneck and through the gunning delivery hose to the nozzle.

The 240 Jetcreter had a gasoline-powered Ford engine and a four-speed transmission to turn the rotor. It had a "four on the floor" gear shift, just like you would have in a Ford pick-up truck of the day. The 240 model also had a built-in, dual-piston high-pressure water booster pump. We had two Jetcreters: a gas-powered unit, which we used on most projects, and another with an electric motor to drive the gun for industrial projects where it was necessary to set up indoors. We typically used a 600 CFM (17 m³/min) compressor with each model.

Prior to the introduction of the Jetcreter, gunite machines were either batch-type or double-chamber guns. With the batch-type gun, one batch would be introduced and fully discharged before another batch could be loaded. The double-chamber guns, like the Allentown N Gun (Fig. 1), work in a coordinated, two-step process. Material is loaded into the upper chamber while the sealed-off lower chamber is discharging material into the delivery line; after it is emptied, the material in the upper chamber is dropped into the lower and the procedure is repeated. When I started in the early 1970s, our double-chamber guns were already sitting discarded on the hillside behind our shop. It was just faster and easier to perform our work with rotary guns.



Fig. 1: A current photo of an electric powered Jetcreter.

The model 240 Jetcreter with the Ford engine and the four-speed transmission was a beast. When it was in 3rd or 4th gear, it was difficult to keep up with. In the summers of 1973 and 1974, I worked on the 31st Street Bridge in Pittsburgh, PA, repairing the bridge piers with dry-mix shotcrete. We mixed sand and cement in a paddle mixer, shoveled the mix into one ft³ (0.03 m³) boxes for precise measurement, and dumped the boxes of material into the Jetcreter.

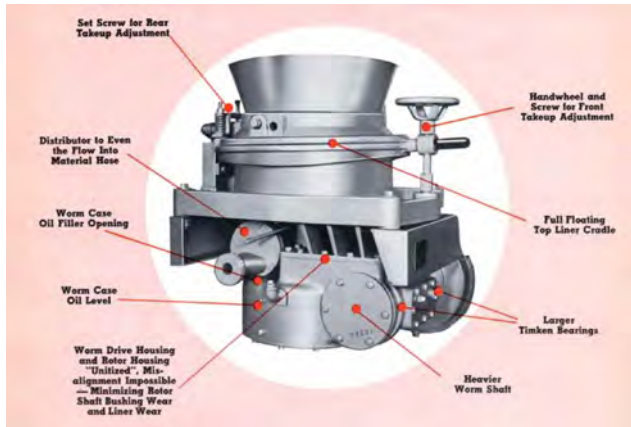


Fig. 2: The original Jetcreter with the Ford gas-powered engine. Originally published in Shotcrete magazine Summer 2009 from the library of Chris Zynda.

In 1974, we needed more machines, and we purchased several Reed “bowl-type” rotary guns (Fig. 2). They were affordable, smaller machines easier to stage in multiple steel mill locations for gunning refractory in the steel ladles. As time went on, we began to use bowl-type guns on all our projects. In the early 1980s, we sold our Jetcreters to a contractor in Milwaukee who performed decorative rock work in zoos. Although they were only used occasionally, I was still sad to see them go.

The Piccola and Aliva guns in use today, with a rotor and a straight-drop feed, are continuous-feed guns based on the original design of the Jetcreter. Reed introduced the first bowl-type rotary gun. Both types of rotary guns are commonly used in a variety of dry-mix shotcrete applications.



Ted Sofis recently retired as owner of Sofis Company Inc. with 47 years of experience in the shotcrete industry. He is an ACI Nozzleman Examiner and has served on the ASA Executive Board of Directors, the ASA Board, and 11 years as the Chair of ASA Publications Committee, as well as being a member on several other committees. Ted

began performing shotcrete work during summers while in college from 1971 to 1974. After graduating from Muskingum College in 1975, he began full time as a nozzleman and gun operator gunning refractory in ladles and blast furnace troughs in the steel industry. Ted has worked in the shotcrete industry performing work in the power generation and steel industries, and on bridges, tunnels, dams, spillways, slope-protection, and a variety of other installations over the years.