A Most Glorious Archway

Producing a #8 mirror finish on such a large stainless steel Structure proved to be a formidable challenge.

By Joe F. Merritt
Buff Polish & Grind Industrial Supply Co., Inc.

The project called for six pairs of massive arches, which were made of 316 stainless steel. Each unit has a span of 165 feet.

When visitors drive through the upscale Galleria mall area in Houston, they are greeted by six pairs of massive arches. The #8 mirror arches span across Post Oak Road, which is an area of Houston known for its many high-end designer fashion shops. As the photographs show, the magnitude of this project is breathtaking

Project Statistics

The arches are placed approximately 700 feet apart, and the span between the base legs of each on is 165 feet. All total, the towering arches are made of over 12,000 square feet of 3/8 inch thick 316 stainless steel plate. The flat stainless steel plate was rolled to 24 inch diameter pipe in 40 foot long pieces. Each pipe piece, weighing 5,000 pounds, was then heat induction bent on a 85 foot radius. The 48 pieces of arches were fabricated, polished, and buffed prior to being taken to the job site for final assembly and placement.

The project, called the Uptown Houston Streetscape, also included 200 #8 mirror street light poles. The lamp fixtures were laser cut of stainless steel sheet.

There are 50 traffic signal poles which, like the arches and the street light poles, were also constructed of 316 stainless steel and had to be polished and buffed to the #8 mirror specification prior to installation.

A Little Background

My involvement in this project began two weeks before Thanksgiving 1993. Robert Dillard, president of the Offenhauser Company of Houston called late on a Friday afternoon. He informed me that his company would be bidding the major portion of the Uptown Houston Streetscape project. In my opinion, there are several reasons why the

Offenhauser Company was awarded the contract. The Offenhauser Company is more than 60 years old. The majority of their projects are located in the United States, but they have completed work in a few foreign countries. Plus, the company is known for its ability to fabricate complicated metal forms with a high degree of excellence in all grades of stainless steel and all exotic alloys. This fabricator has a facility which occupies 120,000 square feet under one roof. In addition to architectural products, their manufacturing facility can accommodate pressure vessels up to 150,000 pounds in weight, 13 feet in diameter, and 150 feet in length.

With all of the above experience and expertise you might wonder why Robert Dillard was calling me, and what did he hope I could provide for him and his company? At his request, I flew to Houston on November 18 for a consultation with all the department heads of Offenhauser who would be involved in the project.

My company, Buff Polish & Grind Industrial Supply Co., Inc. (BPG®), is highly specialized in the area of mechanical finishing technology. I am told by vendors that our facility is unique in the industry.

Project Overview

Offenhauser's bid had originally provided for outside vendors to do the polishing and buffing of the arches. Robert wanted to know if made more sense for his company to the work in-house. The original plan called for polishing the arch pieces using portable hand held air and electric tools. Let me remind you that each arch piece looks like a giant banana and weighs 5,000 pounds. Most of us know what happens if you use too small of a brush to paint your garage door. You will see a line every time you pick up and put down the small brush.

Also, when polishing and buffing, the skill level of each employee is directly related to the finish quality that can be achieved. For this reason, I told Robert that in my best judgment, the arch pieces could not be polished with portable tools. Could portable tools have been used? I will give you the answer later in the story.

Offenhauser decided to purchase the necessary equipment to polish and buff the arch pieces in-house using an automated system. In addition, this special machine could possibly do the light poles and other items originally scheduled for outside vendors. In order to help establish what method could be used, Offenhauser fabricated a test part with the exact specifications, except this piece was only 20 feet long. At my request, two 6 inch wide pieces were cut from one

end. Each of these 24 inch diameter circles were cut into four pieces. These pieces were shipped to my research facility near Argyle, Texas. I polished and buffed the sample pieces to varying degrees and drove back to Houston for another conference.

I had developed the exact four steps of polishing (abrasive belt) and two steps of buffing (cloth buffs and compound) which would be necessary to produce the needed #8 mirror finish. Now, the hard part was to find a vendor who could build a machine to emulate the method which I had developed.

We had another enormous problem to overcome. Offenhauser was supposed to start delivering arch pieces about 16 weeks from the start of the contract. Most of my vendors were eliminated due to either the magnitude of the task or the time constraint. Some special machines can take up to 12 months to design and manufacture. I knew of a manufacturer on the West Coast who for over 30 years had provided special machines to the buffing and polishing industry and who had come highly recommended to me.

I made the initial contact for Robert and the project was off and running. Blueprints and all the data from my research facility were forwarded to the manufacturer. A special machine, later to be nicknamed the "Dinosaur", was conceived and a price quoted. On December 19, 1993, Robert and I arrived on the West Coast to visit the vendor's facility. We would try to determine if the machine could really work and if the price was justifiable. The vendor demonstrated the machine on his state-of-the-art CAD system. There on the computer was the Dinosaur performing its duties of polishing and buffing, rising and falling, and traversing each arch piece at the projected travel rate necessary to finish the Offenhauser project on time and on budget.

The vendor's plant was bustling with business, and it was even hard to walk through because there was so much work in progress. Robert and I concluded our inspection and went to the airport for our return trip to Texas. We had time to sit and talk and reflect on what we had seen. Robert asked if I thought the machine would work. We had been very impressed by the computer presentation and had no indication that the vendor could not build such a machine. I told Robert that because of my six step process, basically "**all the machine has to do is contact the part**" and the arch pieces would be finished. And so, Offenhauser purchased the machine, and it was scheduled to arrive in Houston in 12 weeks.

I was in constant contact with Robert as we prepared for the machine's arrival. I purchased all the perishable supplies, which would be consumed in the polishing and buffing process, and tried to coordinate their arrival with the delivery of the special machine.

Meanwhile, Robert asked me to fly to Houston to help with the polishing and buffing procedure for the prototype laser cut street lamp fixture. I flew to Houston on March 29 and spent over nine hours in the Offenhauser plant. The final step of the process was achieved with a portable tool using an inflatable wheel and a CLEO™ wool BUFF-BELT®. This was the first production use of a 100 percent virgin lambs wool belt capable of producing a perfect #8 mirror finish without leaving lap lines. Each CLEO™ wool belt completed 200 square feet of stainless before it was worn out. By the way, this

is not the answer to the portable tool question on polishing the arch pieces — that is still to come!

Now, there was little else left to do on my part other than await the arrival of the special machine and start worrying. By the end of March there was still no machine; the end of April came and STILL no machine. Even by mid-May there was no machine. Finally, during the week of May 27, the machine and installers arrived in Houston. I was supposed to go down to Houston that day for start-up, but it was postponed again until Tuesday, May 31. Remember the CAD system that designed the Dinosaur? Well, someone forgot to check if the guy imputing the data on the computer might have been related to Murphy of MURPHY'S LAW fame. **YOU GOT IT — THE DINOSAUR NEVER WORKED!!!**

It would take a dozen of these articles to explain all the things wrong with the Dinosaur. After many modifications to the machine, which were performed both on the West Coast and in the Offenhauser plant, it was decided that we would have to go with "Plan B".

Plan B Swings Into Action

I was still convinced that the arch pieces could not be polished with portable tools. However, because of being behind the eight ball, Offenhauser decided to send out one complete arch for polishing and buffing. The finished arch had a beautiful (top finish) but the polishing (grinding/sanding) process had left such deep uneven marks that it looked like someone had tried to put a waffle pattern on it. After several weeks of giving it their best, the vendor gave up and Offenhauser rejected the finish. Unfortunately for Offenhauser, I was right about the portable tool question.

While the arch was out being polished and buffed, Plan B was underway. By this time, hindsight was getting better, and we knew we couldn't automate the project or handle it in a conventional manner. It was proposed and I agreed that the job could possibly be accomplished using swing frame polishers and buffers. These are counter balanced abrasive belt heads and buff heads which are suspended from above and operated by manpower from the floor. The units were mounted on air ride balancers due to their weight. Since the Dinosaur would not work, my original polishing and buffing method had to be modified.

The final method used to polish and buff each arch piece was a combination of all we had learned up to this point. The swing frame units performed the abrasive belt steps and some of the buffing. The final top finish (color buff) was achieved by crews using

portable tools. The balance of the project went a little more smoothly although Murphy's Law stayed in full effect until the last minute.

I would at this time like to thank Robert Dillard for allowing me to be a part of such a fantastic project and would encourage all who read this story to visit the Galleria and the Uptown Houston Streetscape on your next visit to Houston. □

Buff Polish & Grind joined NOMMA in 1995. For questions, call (940) 455-2269.