

CARVED ROCK WATERFALL

Cinnabar Florida, Inc. was awarded the contract to construct a waterfall that was to be installed as the "center point" exhibit in the Reception Area of an Art Museum. The dimensions of the finished project were 10'6" [3.20 m.] high by 40.0' [12.19 m.] wide curved to a radius of 92.0' [28.04 m] to give it depth and a realistic appearance.

The designer brought several sample pieces of the rock that he wanted "duplicated" in color and appearance in the full sized wall. A model was sculptured and decorated for approval and therein the first problem surfaced. The designer wanted a more "rough" or textured appearance, but Cinnabar had previously worked on many projects of this nature and if the designers mode were followed, the water cascading down the rock facing would splash at least 12.0' [3.66 m.] from the facing. After many estimates and modifications, the rock facing was modified to have the water splash only 3.0' [0.91 m.] in cascading down the rock wall.

Since the waterfall was to be curved to give it a more natural appearance, the first item to be done was draw the base with the specified 92.0 [28.04 m] on the floor of the mold room where it was to be erected, sculptured, fiber glassed and decorated. Following the plotting of the unit, a wall of finished dimensions and 2.0' [60.96 cm] in thickness of expanded polystyrene was erected to the contour drawn on the floor. Base and vertical supports were installed on the reverse side to hold the wall erect during the ensuing operations.

The sculpture's of Cinnabar were allowed to use their artistic skills to transform the EPS wall into one with the appearance of rock using the samples supplied by the designer. After the basic sculpturing was approved, the entire EPS wall was coated with an acrylic, water based exterior house paint. Following full cure of the coating three mist coats of PVA Mold Release were sprayed over the wall surface to ensure its "parting" and release from the final reinforced fiberglass structure to be coated over it.

Three laminates of Class 1, Fire Retardant Resin and E-Type Gun Roving each 0.100/0.110" [0.254/0.279 cm] thick (total - 0.300/0.330" [0.762/0.838 cm]) were sprayed over the entire surface. To insure good wetting and an environmentally safe procedure, an Internal Mix Equipment, with a 13:1 pump giving Non Atomized Spray through an Impingement Tip was used. The "chopper" was set to cut the gun roving in lengths of >2.0" [5.08 cm] to span the sculptured rock. Each laminate was hand-rolled to remove air entrapped and thoroughly sanded and ground with a Bodi right angle sander/polisher and a 36-grit wheel to "knock off" any extraneous "free fiberglass filaments". This was a tedious job that required excellent work on behalf of the laminators to make certain that the sprayed laminate was well rolled as the rock configuration was very difficult to insure complete contact of the chopped glass filaments in all areas. The resin had to have excellent wetting characteristics and also thixophory to hang on such difficult and "reverse" areas. Following careful surface

preparation using a "Dyna-Brade" palm sander and 3-M's - 36 grit, "Sticky-Back" paper, the rock waterfall was ready for the decorative coating.

The face side of the waterfall was sprayed with two [2] coats of a Manila colored, Class I, Fire retardant, ISO/NPG Gel Coat to a final film thickness of 0.030" [0.762 cm] and immediately coated with PVA to insure air inhibition to the surface and excellent cure. The Gel Coat was sprayed with Equipment employing an Internal Mix, with 20:1 Pump giving Non Atomized Spray with an Impingement Tip that is the latest environmental technology. The PVA was spray with a paint pressure pot. The "wax free" Fire Retardant Gel Coat cured perfectly by employing this method.

The Expanded Polystyrene rear structure was removed as this material does not pass the Fire Codes. Upon cleaning up the surfaces, both it and the Gel Coated facing were high pressure washed with a 10:1 ratio of water and Denatured Alcohol. All traces of the PVA mold release and the acrylic emulsion house paint were removed.

Using the Manila and a version of the Class 1, Fire Retardant Gel Coat with no prime pigments and Hi-Strength Universal Colorants that would be used by the manufacturer to shade and tint colors, Cinnabar's "crew of artists" descended on the project and in a single afternoon, made the desired colors and decorated the fiberglass rock wall with the catalyzed gel coat to give a realistic, natural appearance. The materials were applied by conventional air brush, "Preval" touch-up sprayer and brush. When completed, the entire facing was sprayed with PVA to inhibit air from reaching the wax-free gel coat and insure complete cure. The PVA was washed from the decorated wall in the same manner previous method.

Since the unit had to be transported to the site and the only entry door was 3.5' [1.07 m] wide and 7.0' [2.13 m] in height, the finished unit had to be cut vertically into sections that measured 6.5' [1.98 m] by the 10.0' [3.048 m] in height. This was done by partially cutting through the 0.300" [0.762 cm] thickness and masking off an 8.0" [20.32 cm] up the entire height of the wall. Partal Paste Wax was applied to one side and four [4] each 16.0" [40.64 cm] by 10.0' [3.048 m] laminates of #1815 Fab Mat were applied over the waxed surface and the adjacent non-waxed laminate. The remaining wall reinforcement was cut thus leaving a lap seam that would later butt together. The wax was thoroughly removed from the "joint" with Lacquer Thinner.

On "site" each of the panels were joined at the lap seam using a putty mixed with the Class I Fire Retardant Resin, 50-percent by volume of microspheres and 4-percent by weight of Clay thix agent and catalyzed with MEK-P. The putty was applied to the seamed "back surfaces" of the waterfall and used to fill the joint between the sections. Fasteners of No. 10, stainless steel machine screws were placed at 3.00" [7.62 cm] on center to further insure the joining of the sections. The artists redecorated the joint and when completed there was no indication that the sections were joined.

All units [without "plumbing"] were erected, joined, patched, decorated on site in one single day!

The Composite Waterfall, or any object that the architect or designer envisions, when constructed of Class 1 Composite materials, can be the focal point in the lobby of a

hotel or any commercial building that could use an esthetic focal point. Composites can be produced in any 3-dimensional form that one might dream of.

MATERIALS AND SUPPLIERS

1. EPS SCULPTURING FOAM.....	Dow Chemical
2. ACRYLIC LATEX HOUSE PAINT.....	Behr – Home Depot
3. BrUPE FIRE RETARDANT LAMINATING RESIN, CLASS 1, #752-4423.....	Hexion Resins
4. FIRE RETARDANT GEL COAT, CLASS 1 – LFS SERIES.....	HK Research
5. NOROX CATALYST – MEKP-9.....	Norac Inc.
6. HI-STRENGTH COLOR ADDITIVES – SHADING INORGANIC ROCK COLORS.....	HK Research
7. PREVAL SPRAYER.....	Bodi Company
8. SPRAY EQUIPMENT AND CHOPPER GUN – F/R GEL COAT & RESIN.....	Phoenix Equipment
9. FIBERGLASS GUN ROVING, #300, TYPE E-GLASS.....	Owens Corning
10. RIGHT ANGLE GRINDER & WHEELS.....	Bodi Company
11. PALM SANDER.....	Dyna-Brade
12. SANDING PAPER – “STICKY-BACK’.....	3-M
13. PARTALL PASTE WAX.....	Rexco
14. MICROSPHERES – 2,500 PSI B/S.....	3-M
15. THIXOTROPE ADDITIVE,.....	Southern Clay



Carved rock waterfall
Full Sail