

Architectural Finishes for Retaining Walls

by Marcus H. von der Hofen

What kind of architectural finishes are possible with shotcrete? From the most basic natural gun finish to exotic carved sculptures, from the gray color of regular portland cement concrete to custom-colored and stained mixtures, shotcrete can take on many different types of finished appearance. Today's designers are continually challenged to provide quality finishes that fit the surroundings; and in many applications, shotcrete can fill these needs.

Cut and Finish Methods

Achievement of an architectural finish starts with the establishment of the final surface plane. Perimeter forms and guide wires are used to

establish the face of the plane to which the shotcrete is to be cut or rodded. After this surface has been established, the guide wires are removed and the surface can be finished using a variety of different types of tools to create the desired texture. Wood, rubber, and magnesium floats, steel trowels, tines, brooms, and stamps are just some of the tools that can be used to finish a shotcrete surface. Joints may be tooled as the wall is being constructed or saw-cut after the wall has achieved its final set. Figure 1 shows a good example of a shotcrete wall with a wood float finish with tooled joints and an applied pigmented sealer.

It is important to have realistic expectations for the appearance of these types of finishes. Some finishes are not good choices in certain situations. For instance, large sections of smooth steel-troweled surfaces exposed to natural lighting may show imperfections that might not be seen if the same wall was placed in a fluorescent or nonnatural lighting situation. Careful application of pigmented sealers can also make the difference between a good-looking wall and a great one. Figure 2 shows an example of a finished wall with a vertical broom texture and tooled joints. This type of finish typically provides a more uniform surface appearance than a smooth steel-troweled finish.

Construction methods imposed by design can also limit the quality or the types of finishes available. For example, full-thickness, top-down construction methods with a rubber-float finish will not look the same as a shotcrete wall with the same finish but constructed full height. It is important to consider all of the parameters that will contribute to the final finished look. Figure 3 shows an example of a nonpigmented, rubber-float finish with top-down construction. Note the characteristically



Figure 1: Wood float with pigmented sealer.



Figure 2: Vertical broom finish with pigmented sealer.



Figure 3: Nonpigmented rubber float finish with top-down construction.



Figure 4: Fractured fin on a radius.

more blotchy surface appearance with this type of finish. If a more uniform surface appearance was required, an application of a pigmented surface sealer could have been used.

Textured Back Forming

Shooting against forms with an impregnated surface can produce another type of architectural finish. This formed surface then becomes the exposed face of the retaining wall. Various form liners designed for cast-in-place concrete construction can easily be used in this type of application with amazing results.

The one-sided form system can be jumped around on a site to create repetitive patterns that would be very difficult if not impossible to do by hand finishing. Unfortunately, this method is only available when there is access to the backside of the wall during construction. Figure 4 shows an example of a curved shotcrete wall with a fractured fin appearance, constructed using a textured back form that was subsequently removed.

In summary, a wide range of architectural finishes for shotcrete retaining walls are possible depending on the needs and desires of the owner and architect. Consult with your shotcrete contractor for details on how best to achieve the desired architectural treatment.

Artistic shotcrete finishes have become both a popular and economically feasible solution for structural retaining walls in highway and road construction. Using techniques developed in the construction of zoo exhibits and water features, designers now have new options for meeting the demands of their clients. Once considered an expensive option, these textures are now being combined with structural shotcrete retaining systems at price points that are very competitive with traditional systems. These designs soften the visual impact of a tall retaining wall and can be tooled to look so realistic that the public is amazed to discover a “new” rock formation right in their neighborhood!



Figure 5: Fractured fin forms.





Initial construction cost is only one element of the value formula. Another important element is the maintenance expense. Natural-looking, geologically correct formations actually improve aesthetically over time as weathering takes its effect. Two increasing problems in both the public and private market are graffiti and vandalism. For whatever reason, these natural finishes have not attracted these problems to the extent that other flat or fractured fin-type surfaces have.

An often-overlooked value is the community's enthusiasm for these natural finishes. Preserving the most natural appearance of the landscape and providing functionality are part of the challenge designers face today. I have recently completed several of these projects and have received a great number

of compliments and gratifying remarks from the owners, neighbors, and surrounding communities.

Conclusion

Investigate and discuss the advantages of many different types of finishes possible before making a choice. Shotcrete contractors with experience in constructing architectural retaining walls will have an extensive list of previous jobs to provide real-world examples of the value of using architectural shotcrete designs. These projects will provide an idea of what a completed job will look like in service. And remember, not all finishes are necessarily right for all applications. Use your shotcrete contractor as a consultant to help assure that your project is a winner both in appearance and function.