theDELTAadvantage

DESIGN TOPICS FOR PRECASTERS

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Precast Noise Walls – A "Sound" Alternative II

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The following article is a continuation from our previous issue:

Wind load magnitude is a function of wind velocity, which varies by region, and exposure condition. The AASHTO Guide Specification provides detailed charts and tables to aid the designer in selecting the appropriate wind load. Seismic coefficients are also displayed by region. Exposure conditions relate to the number of buildings and other obstructions that tend to shelter the noise wall resulting in slightly lower design wind loads. The height of the wall is also considered when determining the design wind load.

Precast is an excellent choice for most noise wall applications based on economy, speed of construction, and visual appeal

Precast noise walls are typically constructed by anchoring the vertical post members to a foundation then sliding panels into the post flanges. The post is either precast concrete or steel "H" section. Foundations for ground-mounted walls are either drilled shaft or spread footings. It should be noted here that noise walls constructed on bridges, retaining walls or traffic barriers are considered structure-mounted. Posts may be anchored to drilled shafts either by embedment or mechanical anchors. Structure mounted posts and posts on spread footings typically use some form of mechanical anchor. The use of a base plate and anchor bolts for securing a precast post to a foundation may be considered proprietary and protected by a U.S. Patent.

There are a couple of articulated wall systems available that require no footing other than a leveling pad at grade. However, these systems are somewhat limited in height and require more right-of-way for construction.

The type of foundation to be used with a ground-mounted system is based on a project subsurface investigation or geotechnical report. Factors to consider include soil type, ground water, rock layers, right-of-way limits and site topography.

Post spacing can vary anywhere from 12' to 24' but should be kept uniform throughout a project except where obstructions may occur. Keep in mind that the greater the spacing, the more load that must be transferred from the wall panels to the post and down to the foundation.

Precast wall panels can remain reasonably thin (say 4" – 5") for most wind load applications. Soil loads may result in significantly thicker walls, however. Handling and erection stresses often exceed those from service loads and should always be considered in the structural analysis. A layer of sound absorptive material may be laminated to the precast panel in the casting process to enhance the sound attenuating properties of the wall. Form liners, embossers and/or pigments may be used to create any number of architectural treatments. Finishes that protrude from the wall such as stone, block or rake should not be considered as contributing to the structural capacity of the wall.

Precast is an excellent choice for most noise wall applications based on economy, speed of construction, and visual appeal. To assure a successful project, the wall must be approached as an engineered system and not simply the supply of a product. There are a vast number of details to be considered in the structural design, manufacturing, handling and erection of the various wall components. These details require a determined coordination effort among the precaster, contractor, owner's representative, and precast specialty engineer.

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Featured Project

NY Rte 415 Bridge over McNut Run
Owner: New York State Department of Transportation
Produced by: Kistner Concrete Products, Lockport, NY
Specialty Design and Reinforcing Drawings- Delta Engineers

Send us your project photos to be featured here, if selected we will send you a Delta Engineers T-Shirt

This 3-sided frame unit has a 39.5' span and an 8' rise. NYSDOT now requires a 1% pitch on flat top units such as this to facilitate drainage. Units were cast with 7000 psi concrete containing a corrosion inhibitor admixture. Units were then coated with Hydrozo penetrating sealer to further ensure the long term durability of the structure.