

Architectural Freedom of TPS



All photos: Fred J. Fuhrmeister/Time Frame Images.

Total precast/prestressed structures are a ubiquitous part of the Denver, Colorado skyline. Denver, famed for being the first location to produce a prestressed double tee, has evolved and matured the precast market from glorified double tee warehouses to sophisticated core and shell architectural masterpieces. Stresscon Corporation has continued to improve the performance of building envelopes, while enhancing the exterior features of Total Precast Structures.

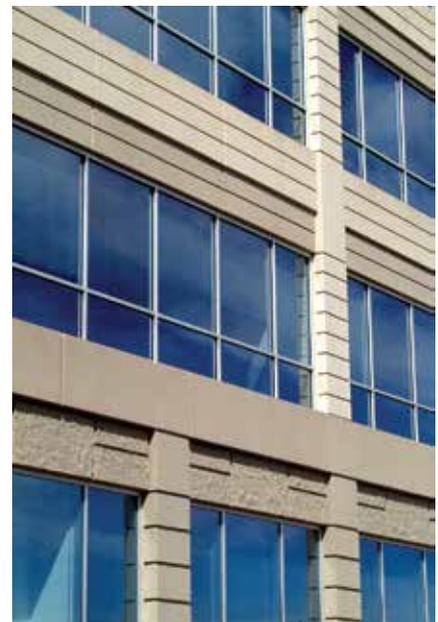
The term Total Precast Structure (TPS) describes a system that includes interior framing, floor systems, vertical stair and elevator shafts, roof framing, and perimeter load bearing elements; all of which are plant manufactured precast prestressed concrete. There are many inherent advantages of a system with this number of inter-related parts, the most significant being the coordination of all components expertly managed under one subcontracted trade. Stresscon engineers and seals its own delegated design for the building system and each of the prestressed precast components, completes the manufacturing in their 70 acre facility,

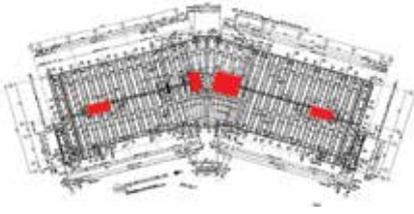
and is responsible for the final installation and finishing of all of their precast prestressed components that make up the superstructure. These structures reduce trade coordination, shorten construction schedules, and minimize risk for all parties involved.

Paramount to supplying all the necessary structural components of a TPS, Stresscon's Architectural Production Facility has the capacity to support multiple projects with varying architectural detail, color, finish, and structural requirements. Architectural precast concrete applications offer numerous advantages, and maximum freedom from a design standpoint. Architectural options can be used in conjunction with structural precast concrete to enhance aesthetic options and building design economy, with a wide variety of possibilities for expression and detail. Architectural precast concrete provides sculptural freedom and versatility, and it is adaptable to any building configuration. Because precast concrete is available in a broad range of architectural styles, shapes, sizes and colors, it has unlimited design potential and can be integrated into any project type to de-

fine architectural expression.

The primary structural systems of a TPS are the Lateral System, Gravity System, and Enclosure System. Prestressed precast products serve as critical elements in each of these systems. The Lateral System is comprised of stair and elevator shafts made up of in-





dividual wall panels, with either strong or ductile connections between members. These vertical shafts are grouted and connected in such a way that they resist lateral forces induced from seismic or wind events. The Collection System of TPS includes floors and a roof diaphragm. Typically designed as rigid diaphragms, these members ensure compatibility and movement of the vertical elements, collect either wind or seismic force, funneling these forces to the vertical shafts. The Gravity System is comprised of interior framing members, double tees, beams, and columns, as well as the vertical shafts for the stairs and cores. In an effort to limit the number of tension connections in a lateral element, Stresscon designs the structure to force the shafts to support as much dead load as possible. This also limits doubling up on systems. The final component of the Gravity System in a TPS is the Enclosure System. In this system, the exterior architectural elements serve a number of purposes. Acting as perimeter spandrels and columns, they create the first line of defense against wind and rain, acting as air and vapor barriers, and creating the architectural expression of the enclosure. The Enclosure System also acts as a portion of the Gravity System, eliminating redundancy in spandrels and columns typically used in a clad-type structure.

Images in this editorial are from the North West Business Park, an example of a TPS, located in Broomfield, Colorado. The kinked floor plate is typical for a Class 5-A story structure. The total gross area is 340,000 sq. ft., with about 68,000 sq. ft. per floor. The pre-cast floor and roof components include double tees and prestressed beams. The lateral system is made up of four shafts (shown in red) with cast in place topping on the floor double tees serving as the diaphragm. At the roof level, the double tees are connected to act as a diaphragm without topping. The enclosure, highly accented in architectural precast, serves as the exterior perimeter gravity system.

This complex building enclosure is made up of architectural precast manufactured to PCI MNL 117 specifications, and a glass curtain wall system. The architectural precast contains two integral colors, stone liner, and multiple lines of reveal work. There are two primary spandrel profiles, with the lower spandrel utilizing the system's darker tan stone liner, with an acid etch finish. The second, third, and roof line spandrels are two-tone, with darker tan and lighter buff concrete. These panels also show dramatic relief with multiple reveals. In this structure, Stresscon manufactured the column elements in only one color, creating a column break just above the first elevated level at the column's color transition. The single color columns feature multiple horizontal reveals that return to the window elements, and are finely finished with an acid etch.

Attention to detail is critical to a successful project, allowing companies like Stresscon to convey the highest level of professionalism and standards in their



design and detailing. Here, the Stresscon production department applied their skilled expertise, for these monolithic one piece columns. Produced with the light buff color concrete and an acid etch finish, the member is exposed on all four sides, along with a four sided reveal wrap to the windows. The building's facade is striking and dramatic, with mixed two-tone architectural precast, colored glazing, and aluminum shade screens. There are sections of the project where the perimeter support structure has been recessed to allow the use of a unique light blue spandrel panel. This detail is repeated on multiple elevations, and on multiple levels. It is this level of intricate detail that designers can rely on from Stresscon Corporation.

Stresscon tailors efficient, durable and versatile architectural total precast systems to be artistically appealing and to provide the highest performance characteristics. These pieces create a wide range of design and flexibility functions that can be incorporated into any design environment, and that allow designers to create and realize the full potential for a building solution. Stresscon manages these TPS designs from start to finish, and has proven success in all stages from manufacturing through final installation. 



For more information, call 1-(719) 390-5041 or visit www.stresscon.com