

Segmental Steel Lattice Frame System

The Guggenheim Museum project in Bilbao, Spain, required a unique structural engineering solution along with the utilization and sharing of computer generated information among architects, engineers, steel detailers, and fabricators during all phases of the project from design through shop drawings and into construction. The design for the building is highly stylized and geometric with an interplay of compound curvilinear forms. The three-dimensional structural steel system for the curved exterior surfaces was conceived as a universal system that could be applied regardless of geometric arrangement. Instead of a traditional steel framed curtain wall, a series of stacked trusses that closely followed the curvature of the wall was constructed. The curvature and interconnectivity of the trusses was used as a stiffening device against lateral wind loads and individual column buckling. This system effectively decreased the amount of steel and the overall thickness of the gallery wall. The fabrication/erection concept for the three-dimensional frames assumed that the trusses were to be prefabricated in approximately three meter heights. These were shop connected so that the truss lengths could be stacked vertically and spliced horizontally in the field. This system resulted in a unit price for steel comparable to a standard steel framed building project and led to the project being constructed on time and within budget. The system is universally applicable to all free form building surfaces.

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