The Modern Art Museum of Fort Worth
Tadao Ando
The New Modern

Six international architects were invited to submit design proposals for the Modern Art Museum’s new building.\(^1\)

The design by Tadao Ando, a renowned Japanese architect, was chosen in 1997.\(^1\)
The New Modern

Ando’s vision was to protect the art and yet maintain a connection to the outside. To protect the art, he enclosed it in a concrete box, but to maintain the connection to the outside, he placed the concrete box within a glass box, creating a space he referred to as the ‘engawa’, a traditional Japanese element consisting of an enclosed space that connects inside to outside.
Main Structural System

The main structural system consists of cast in place load bearing concrete walls and columns with a ‘Y’ shaped accent column supporting a cantilever on one side.

These elements support a slab/plate hybrid which acts as a plate over the majority of the building, but becomes a two-way slab-like system to cantilever past the ‘Y’ shaped column.
Components

Shear Walls

Columns

‘Y’ Columns

Slab/Plate
Slab/Plate Roof System
Connections

The connections for most of the structure are rigid cast in place connections.

The ‘Y’ column is made of 4 pre-cast components which are bolted together.

The connection between the slab/plate and the ‘Y’ column creates a triangular shaped truss-like element in the ‘V’ of the ‘Y’, producing tension in the span between the top points and compression in the two top elements of the ‘Y’.
‘Y’ Column Installation
‘Y’ Column Internal Forces
Lateral Resistance

To resist lateral loads the roof slab in this system acts as a diaphragm, transferring the loads to the cast in place concrete shear walls.

The rectilinear layout of the walls provides lateral bracing in both directions with asymmetrical fenestration in the walls causing a small amount of twist in the structure under lateral loading.
Lateral Resisting Systems
Vertical Load Transfers

The uniformly distributed load created by the plate section of the roof is transferred to the interior concrete columns and the load bearing concrete shear walls.

The two-way slab-like section of the roof cantilevers out about 16’ from the concrete ‘Y’ columns.

The slab in the two-way system carries the loads to the beams which concentrate the loads into two point loads, one on each of the top portions of the ‘Y’ column.

The two loads are then collected by a single vertical element transferring the load into the ground.
Distributed Roof Load
Cantilever Shear and Moment
Two-Way Slab-Like Roof
‘Y’ Column Load Tracing\textsuperscript{1}
Works Cited

