

PANORAMIC WATERFRONT VIEWS WITH STRUCTURAL INTEGRITY



LYNN ENGINEERING

Case Study

OVERVIEW:

Rohe Builders partnered with Lynn Engineering to build a beautiful custom home on the coast in Seadrift, Texas with a wall of large windows that produce beautiful panoramic views of the waterfront without compromising the structural integrity of the home.

PRACTICE: Windstorm Engineering, Structural Engineering

SERVICES: Foundation, Framing, WPI-8, TDI, TWIA

EQUIPMENT: Clips, Straps, Hold-Downs, Components, Cladding, Exterior Mechanical Equipment, Wind Borne Debris Protection,

LOCATION: Seadrift, Texas

GOALS:

- Design and build a beautiful custom home on the Texas Gulf Coast with panoramic waterfront views.
- Achieve these views through use of large windows without compromising the structural integrity of the home.
- Deliver a beautiful and sturdy custom home on time and within budget restraints.

THE CHALLENGE:

The homeowners desired walls with large windows that provide a breathtaking panoramic waterfront view without compromising the structural integrity of the home.

This home site is located right on the water in a high-risk build site in Exposure Category D as defined by the ASCE 7 Design Manual – the highest exposure category allowed for construction. On the coast, engineers must design for uplift and lateral forces, as well as for gravity.

As high winds pull on the structure, it wants to collapse like a deck of cards. This is typically compensated for with sheeting such as plywood and wall board. But in the case of this custom home, the gable end wall of the home contained a lot of glazing (glass, windows) which does not allow for a lot of lateral load resistance.

THE SOLUTION:

The team suggested a steel moment frame to compensate for the lack of area for structural plywood bracing. We partnered with them to develop an integrated steel beam and column design that transverses the house in two directions providing lateral support as well as uplift resistance. On one gable end the steel structure spans the entire width and is two stories tall with an intermediate I-beam to increase lateral strength. The design ties in a perpendicular beam and column assemblies to further enhance rigidity. Impact-resistant windows allow for the panoramic views while still keeping the home and its contents safe and dry.

THE RESULTS:

Because the team of Rohe Builders and Lynn Engineering were willing to think outside of the box and utilize alternative methods the homeowner was able to achieve the aesthetic beauty and architectural detailing they so desired. The home is well-designed and able to withstand the elements that come along with living on the coast, while at the same time offering custom features and the waterfront views that make coastal living so desirable.

HIGHLIGHTS:

- Engineers understand construction in wood, steel, and concrete
- Clear and concise plans, solution-oriented and adaptable
- Solving problems with attention to detail