

THE IMPORTANCE OF COORDINATION: A CASE STUDY OF THE SEPRACOR BRIDGE



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As seen in *Banker & Tradesman Commercial Real Estate Monthly*

It's a brisk fall day in Massachusetts and a crew of two dozen steel erectors is systematically raising a huge piece of steel onto a pier that stands 30 feet high and five feet wide. They're shouting back and forth – each command dictating the direction to move this enormous structure to ensure it will fit into its small window of space. There are four steel pieces in total and when these erectors are finished after two days of intense labor, a 182 foot, free-standing connector bridge will span wetlands to link two buildings together.

Anatomy of a Bridge

In 2000, Sepracor, Inc. – a research-based pharmaceutical company located in Marlborough, Massachusetts – hired Erland Construction as the design/build contractor for its new 196,000sf worldwide headquarters. Flash forward to 2007 – Sepracor had outgrown the original facility and needed to add space to facilitate its growing business. They once again turned to Erland for their construction needs. Sepracor considered including a connector bridge that would join the new 1,430,000sf building with the original building, but because it was only a possibility, the new building was not sited or designed to facilitate a connection.

In the fall of 2008, while construction of the new building was well under way, Erland began to physically erect the bridge after months of planning, preparing, coordinating, and calculating for different challenges that presented themselves along the way.

Team

Once it was determined that the project would include construction of a bridge, Erland had to assemble a team. Each discipline with its own expertise, the team consisted of:

Erland Team – Erland convened a separate project team for the bridge. In addition to a superintendent, two field engineers, and a project manager, a dedicated member of Erland's Coordination department was also involved. With so many different parties involved in the process – each with its own set of priorities – the Erland Coordinator was responsible for bringing them all together to make sure everything would fit in the end and the bridge would be structurally sound.

Structural Engineer – before anything else could be done, the Structural Engineer was responsible for designing the concrete and structural steel bridge.

Civil Engineer – reviewed the Structural Engineer's design to determine how it could be supported in the ground, a particularly difficult challenge for this project because the bridge spanned over 180 feet of wetlands.

Geotechnical Consultant – determined which trees could be cut down and which could not; where equipment could be placed to ensure the wetlands were protected; and how best to protect ground below from slag dropping caused by welding the bridge together once it was erected.



Erland

Steel Contractor – acted as a general contractor for all steel subcontractors; hired, organized, and managed all the steel work on and offsite.

Steel Fabricator – took design from Structural Engineer and actually calculated all of the dimensions/specifications to create construction drawings. Once all calculations were made, all the necessary pieces were fabricated offsite to ensure all the calculations were correct and would fit together.

Steel Erector – responsible for physically erecting the bridge into place and building the bridge onsite.

Major Challenges

With the team established, Erland's Coordination Department organized an initial meeting to discuss priorities, critical dates, and upcoming challenges. Each group came in with their own concerns and priorities, but in the end the team collectively determined the major challenges that they would have to tackle together:

Alignment – the two buildings (new and existing) were not aligned – they were both built on an angle. These angles required the bridge's steel pieces to be angled, meaning they were not even cuts. Everything had to be built with funky angles to account for the discrepancy.

Elevation – there is also a seven-foot elevation change from the original building to the new one. This wasn't a huge issue for the steel fabricators, but did become an issue when pouring concrete because the crew had to follow strict ADA/handicap guidelines. The slope on the ramp had to be exact – with a flat spot for every 30 feet of pitch and a length of 20 feet to elevate the pitch one foot – in order to get approval. This

process was further complicated by the Owner's preferred design, which lacked a handrail, making the requirements that much more stringent.

Wetlands – the bridge spanned wetlands between Buildings 1 and 2. Because the area was protected, many components of the bridge were affected, including:

The design – only three piers could be used to support the bridge to limit the disturbance to the ground below
Actual construction – the wetlands limited the amount of space the construction crew could use to set the bridge in place

Welding – once the steel pieces were placed, the steel fabricator had to weld the connections; however, it was critical that slag/sparks from the welding did not affect the wetlands below. To ensure protection of the ground, the crew installed sprinklers to negate the sparks and special blankets to cover any exposed space.

Fabrication – the bridge could not be fabricated completely offsite and then simply raised into place because each piece was so heavy that cumulatively they would have exceeded weight and size requirements for shipping. The pieces were fabricated offsite, cut into transportable segments, and reassembled into four sections in the parking lots onsite.

Size and Scope – because the bridge is freestanding and so large, it needed to be steadily secured. Three support piers were built and augured 75 feet into the ground to ensure the bridge was sufficiently anchored.

Importance of Coordination

So with all of these challenging components and multiple team members, it was critical that one person or group take charge and organize all the pieces together. Erland's Coordination Department took the lead on the Sepracor bridge



project by communicating with all the trades, owner, architect, engineers, and consultants to ensure that in the end, the bridge would not only get built, but get built correctly.

Facilitating the various elements of this project required meticulous organizational skills, attention to detail, in-depth knowledge of all the components of the bridge, and – most of all – lots of patience. The coordinator was responsible for reviewing all the drawings from every trade to determine/ check that every element was accurate and the structural steel team (engineer, contractor, fabricator, erector), mechanical team (HVAC, tel-data, electrical), glass for curtain wall, geotechnical consultant for the wetlands, and the ADA-compliant rep, were working in concert.

So what?

A Coordination Department will help to organize all the trades together, but what's their real value? Can they actually help an owner or benefit a project in a positive way? Absolutely. The work done by a diligent and talented coordinator saves time, money, and headaches on construction projects of all sizes and scopes. At Erland, we don't just rubber stamp drawings and assume all the pieces will fit; we dig into the specifications and cross-reference them with other elements of the project to ensure compatibility. This preplanning and preparation saves time by red flagging potential problems before any work is done in the field. Ultimately, this reduces change orders and saves valuable time on the schedule – thereby saving the owner by avoiding expensive snafus that would occur without that extra set of eyes.

Construction of a bridge in and of itself may not a noteworthy accomplishment. Construction of a bridge that unites two buildings with a seven-foot height discrepancy – complicating the ADA-compatibility requirements – can be fairly standard. Construction of a bridge that connects two buildings that are not aligned with each other – both built at an angle so the facades are not flush with each other, thus forcing the bridge to be built with hundreds of angled pieces in order to fit – is a little more interesting, but still not out of the ordinary. Working in and around wetlands is not an unfamiliar or supremely difficult challenge for construction projects. Using steel pieces so large that they needed to be shipped separately and fabricated and assembled onsite is routine. But, the combination of all these elements on the construction of one bridge creates a very challenging project – one that requires the expertise and organizational skills of a Coordination Department.

