



Find the Best Solution: How Bedford Technology Redesigned the SR-415 Bridge Fender System to Lower Cost and Increase Longevity

The St. John's River in northeastern Florida is the longest river in the state. It contains over 200 miles of navigable stream and empties into the ocean near Jacksonville, FL. There are over major 25 bridges built along this river, the first dating back to the early 1900's. The principle building material for all of these bridges was traditional wood, and over time wood breaks down and deteriorates. In 2013, one of these bridges, along State Road 415 (SR-415), was in desperate need of reconstruction due to degradation. Not only did the bridge need repairs, the bridge protection system located in the waterway underneath the bridge was completely degraded and broken down. A new, durable solution was needed for the bridge reconstruction.

CHALLENGE:

The biggest challenge in this project was finding a replacement to traditional wood. Since the original building material deteriorated, replacing the fender system with wood was out of the question. The Florida Department of Transportation (FDOT), who was in charge of the design, considered alternatives like concrete and plastic lumber. After data analysis of each of these materials, the original design included a combination of 244 pre-compressed concrete piles and additional plastic lumber whales for support. This solution was more durable and long-lasting than traditional wood, and could absorb the energy from vessel impact.

SOLUTION:

United Infrastructure Group decided to partner with Bedford Technology for the plastic lumber portion of the project. As the only manufacturer of marine-grade structural recycled plastic lumber (SeaPile® and SeaTimber® by Bedford Technology), these Bedford Technology products were the best solution to meet the building material and timeline specifications: a high level of energy absorption, extreme durability and moisture resistance.

The design was then given to the in-house engineering team at Bedford Technology. After understanding the new fender system design and project requirements, our team saw an opportunity for better performance. Pushing the limits of the original design, our team reassessed the project elements and offered a new and improved solution. This included replacing all of the pre-compressed concrete piles with recycled plastic lumber. The idea behind this redesign was that much less material could be utilized, saving installation cost and time for the entire project, while still meeting (or exceeding) all of the material requirements.

The new design replaced 244 pre-compressed concrete piles with 52 recycled plastic lumber piles, greatly reducing the amount of material and installation cost, while exceeding the energy absorption requirements. The new design was then reviewed and accepted by the FDOT and the project construction began.

RESULTS:

Innovation was at the heart of this project, and from it a better, more cost-effective and long-term solution was found. This is just one example of how Bedford Technology constantly pushes limits and boundaries to find the best solution for projects. The new concept included many benefits for both the contractor and the customer; the installation cost was greatly reduced, the project schedule became shorter, and the FDOT received a better energy absorbing fender system that offered enhanced longevity due to the building material. The structural recycled plastic lumber, engineered by Bedford Technology, exceeded the energy absorption requirements and had much better performance characteristics than the pre-compressed concrete piles in regards to the climate and weather conditions. Plastic lumber doesn't rot, mold and is impervious to marine borers, and unlike concrete, plastic lumber won't crack and break down when exposed to consistent moisture.

Since the project was completed, the new bridge fender protection system is fully intact and has not needed any replacement.



Project Date:
2013

Customer Overview:

United Infrastructure Group (UIG) is one of the leading contracting firms in the infrastructure industry and specialize in markets including engineering, construction, environmental and many more. For this project, UIG was the primary contractor. UIG has over 85 years of experience in providing companies with technical experience in the transportation and safety arenas and have completed over 250 bridge construction projects.

United Infrastructure Group was involved in the project through The Florida Department of Transportation. This executive agency's primary responsibility is to plan and develop safe, viable and balanced state transportation systems for the entire state of Florida, and because of UIG's proven success in bridge construction projects, the match was meant to be. The FDOT was in charge of the design, planning and implementation for the SR-415 project, and they looked to UIG to find a building material that was sustainable and long-lasting.

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