**Project Scope:**

This project involved information collection and development of recommendations for the sustainable production of concrete ties. Research spanned sustainability, CXT company practices and supply chain, concrete tie production techniques, life cycle analyses, tie disposal through recycling and reuse, and process modeling. The main objectives of the project were to:

- Create a model that tracks the sustainability of CXT Concrete Ties
- Identify applicable and practical performance metrics that can serve as benchmarks
- Calculate the carbon footprint for Spokane, WA CXT production facility
- Compare the sustainability of concrete and wood ties
- Define what sustainability should be for CXT

**Definition of Sustainability:**

Sustainability is meeting current economic needs while promoting social qualities and environmental practice as much as possible from the extraction of materials before production to when the product is discarded after final use. For CXT this means the efficient allocation of material resources to create a quality product, while providing a safe workplace for employees and having an active presence in the community.

**Project Results:**

Through research and numerous meetings with industry sponsors, CN and CXT, and university professors, we were able to define sustainability in respect to CXT’s manufacturing processes and develop models to track CXT’s sustainability over time. Our final deliverables were:

- Model that tracks CXT’s production emissions based on fuel consumption, as well as energy and material usage
- Model that evaluates CXT’s social sustainability based on employee satisfaction, demographics, and safety, as well as benefits provided to employees and the community
- Model to evaluate various tie disposal options, both by emissions and potential profit
- Literature review comparing lifetime CO2 emissions of concrete and wood ties
- Definition of sustainability as applied to CXT

**Clients:**

- As the widest reaching railroad in North America, CN is committed to protecting the environment and ensuring the health and safety of their employees and the public.
- As the largest supplier of concrete ties in North America, CXT strives to produce a high performance, high value product that is also environmentally responsible.

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**Transportation Enterprise**

- Work with Industry Partners on Real Challenges
- Looking for Industry Sponsors and Project Ideas
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- Contact: George Dewey at gdewey@mtu.edu