



Embodied Carbon Action Plan 2024 SE 2050

EHLERT BRYAN
consulting structural engineers





Introduction

Ehlert Bryan is a 40-person structural engineering consulting firm with offices in Tysons, VA, Washington, DC, and Orlando, FL. As one of the leading firms in the Washington metropolitan region, we support **SE2050**'s vision for a future with net zero embodied carbon in the built environment. We are committed to playing our part in reaching this goal.

As of 2024, we have joined the **SE2050** movement and have committed to providing **SE2050** with Life Cycle Assessment data from two of our projects in 2024. Ehlert Bryan encourages our clients to consider sustainable designs for our buildings. Our aim is to reduce the embodied carbon and global warming potential of structural building materials on our projects. We intend to do this by:

- Fully optimizing structural systems
- Specifying low cement concrete whenever practical
- Working with building owners and architects to develop embodied carbon reduction plans in the early stages of our projects
- Collaborating with architects to optimize column layouts, reduce transfer beams and slabs, and minimize structure required for non-structural features
- Encouraging owners and contractors to use locally-sourced structural building materials
- Adjusting our standard specifications and notes to specify reduced carbon alternatives to structural building materials where there is little impact on cost or performance

Part 1: Education

Our firm's Embodied Carbon Champions will be **Chris Heckmann, PE** and **Brian McSweeney, PE, SE, FBRSE**. In September 2023, they presented a 90-minute introduction to embodied carbon and how to reduce it in our projects to the entire firm. In addition, a recorded webinar on embodied carbon in concrete was presented to the firm earlier in the year. We will continue presenting a minimum of two embodied carbon-focused training sessions to our staff annually. One of our upcoming 2024 seminars will cover the document, "How to measure and report embodied carbon."

Chris co-manages our internal engineer training program and Revit training program and will ensure that a combination of internal seminars and national/global webinars are presented to the engineering staff. In September 2023, Chris attended a 16-hour training course on **Life Cycle Analysis (LCA)** by One Click LCA Academy. While One Click LCA software will not be used in our office, he has presented how to use **Tally** in Revit in a training session.

We have also amassed a large technical library of embodied carbon-focused research papers, presentations, and technical guidelines. This library and **SE2050's** carbon reduction strategies have been shared with all staff as of January 2024.

Chris Heckmann, PE is a member of the **Structural Engineers Association - Metropolitan Washington (SEA-MW) Sustainable Design Committee**. He attends monthly meetings and the committee holds two workshops every year. He will also attend **Carbon Leadership Forum (CLF)** meetings quarterly.

Brian McSweeney, PE, SE, FBRSE is a member of the national **Structural Engineering Institute (SEI) Sustainability Committee** and attends monthly meetings on ongoing code development related to sustainability.

Embodied Carbon Champions



Chris P. Heckmann, PE



Brian M. McSweeney, PE, SE, FBRSE

Part 2: Reporting

Ehlert Bryan's main office is located in Tysons, VA with two smaller satellite offices in Washington, DC and Orlando, FL. For the purposes of reporting, we consider our smaller offices to be part of our headquarters.

We plan to use the Tally plugin for Revit to perform our LCAs, which creates comprehensive reports automatically. We will create an embodied carbon database in our office to track and compare embodied carbon performance by project. We intend to model elements accurately in Revit as follows:

- **Concrete:** all concrete elements (including deep foundations, small curbs, slab folds, etc.) will be modeled.
- **Concrete Reinforcing:** reinforcement quantities will be provided to Tally manually for floors, walls, beams, columns, and foundations. Miscellaneous concrete will typically use a preset "medium" reinforcing percentage.
- **Steel Framing:** all primary structural steel framing members will be modeled.
- **Secondary Steel:** estimates will be made in the software for steel connections, kickers, and other additional supplementary steel not specifically modeled.
- **Mass Timber Framing:** all primary mass timber framing members, including beams, columns, floor panels, etc. will be modeled. Estimates will be made for wood connectors and other fastening members.
- **Light Wood Construction:** structural walls and floors from the architectural model will be assigned properties in Revit and those properties will be used to estimate the volume of wood.
- **Masonry:** all structural concrete masonry units (CMUs) will be explicitly modeled and actual reinforcing put into the software. Brick cladding will not be included in our structural LCA.

Once the LCAs are completed, the results of our two in-office LCAs will be presented to the entire engineering staff with a step-by-step guide on how they were performed and reported. We intend to ascertain project sustainability goals from the architect on both 2024 projects we are submitting to the database.

Part 3: Embodied Carbon Reduction Strategies

Ehlert Bryan intends to reduce the embodied carbon in the two projects we report to **SE2050** by 20 percent from the benchmark Global Warming Potential (GWP). This benchmark is based on the schematic design of each project, which is determined based on past experience and preliminary analysis and will not include fly ash or slag in concrete.

An LCA will be run in each project's design development phase once the schematic design is modeled to establish the benchmark. We will then be able to optimize the material and structural design to reduce the GWP by at least 20 percent.

We plan on creating project-specific Embodied Carbon Reduction Plans for our two reported projects. Since this will be our initial report, the format has yet to be determined. We will correspond with other local firms for examples of successful reduction plans they have used in the past.

In 2023, we updated our concrete specifications to a performance-based concrete mix design with GWP targets. In 2024, we plan to collaborate with a concrete supplier to obtain a mix design that reduces embodied carbon on the project beyond the requirements of our new specifications.

Also in 2024, we will identify embodied carbon mitigation strategies that we can incorporate into our standard General Notes and specifications and plan to include these strategies on at least two projects.



Part 4: Advocacy

Ehlert Bryan proudly announced our commitment to **SE2050** on our website in February 2024. We intend to collaborate with our clients and design teams to reduce embodied carbon in our projects. We will incorporate a sustainability meeting in the early design phases of all our projects, involving the building owner, architect, and all other engineering disciplines. We believe this will sufficiently educate owners and architects who may not be as informed on embodied carbon and reduction techniques.

We plan on including our pledge to **SE2050** on relevant project proposals, stressing to our clients that we care and are dedicated to sustainability.

We will work with the building owner and architect on at least one project to require that concrete, steel, or wood comes from a facility with product-specific Environmental Product Declarations (EPDs). We will share education opportunities we come across that may be useful to owners and architects.

Reducing carbon in the built environment is one of the most important issues facing our industry. As a firm, we believe it is imperative that the buildings we design take every measure possible to reduce embodied carbon. **SE2050** is a commitment we made along with hundreds of other structural engineering firms in the United States to achieve net zero embodied carbon in our projects by the year 2050. We cannot do this without you! We look forward to working with you to achieve this goal and make the built environment more sustainable for future generations.



Ehlert Bryan Consulting Structural Engineers was founded in 1981 on the belief that structural engineers should go beyond designing columns and beams and should be involved from project conception to project completion as a cohesive and creative part of the building process. Since then, we have continued to provide specialized structural engineering services for federal agencies, local governments, building owners, architects, and contractors throughout the Washington, DC metro area as well as in 37 states, Canada, and overseas.

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