
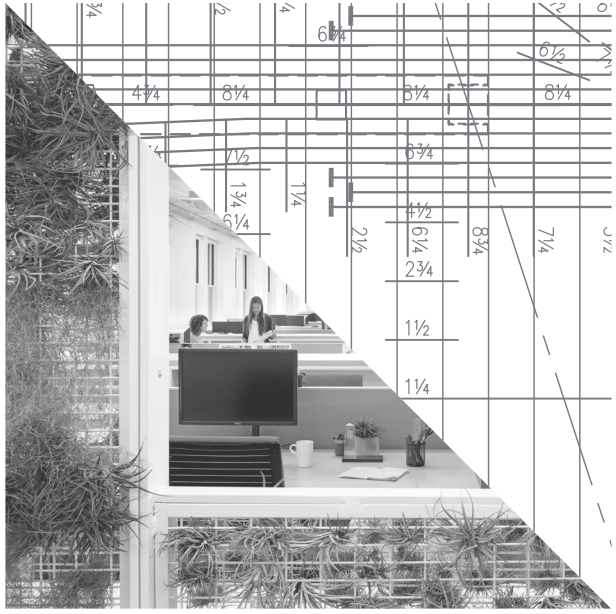


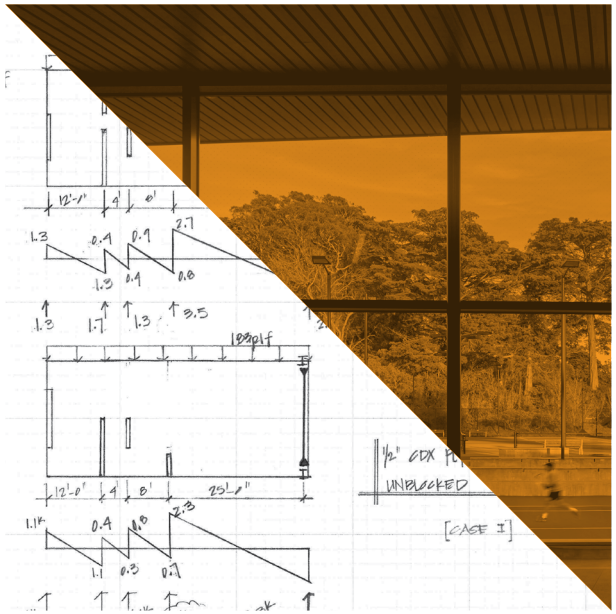


Holmes

Embodied Carbon Action Plan

2021

We are compelled by engineering possibilities.

We are open to new ideas and not bound by the rote application of rules.

We strive to bring our inquisitiveness to each project for the benefit of our clients.

Holmes is an international design firm with employees around the Pacific Rim and beyond.

We believe projects become great by what you put into them. With inspired practicality, we reconcile the complex, competing interests and constraints, providing not just engineering but optimal solutions. In this way, we create more meaningful, integrated designs as a collaborative process in the vital pursuit of building great things.

US OFFICE LOCATIONS
Boulder, Los Angeles, Portland,
San Francisco, Seattle

WEBSITE
holmes.us

SAY HELLO
Structural Engineering:
Megan Stringer / megan.stringer@holmes.us

Fire Engineering:
Parisa Nassiri / parisa.nassiri@holmes.us

Product Testing & Development:
Harriet Ingham /
harriet.ingham@holmessolutions.com

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1.0 Introduction

Committing to Net Zero

At Holmes, we take accountability for our role in shaping the built environment. Across locations and experience levels, we see ourselves as stewards of environmental resources and design. This philosophy is rooted in each of our disciplines: structural engineering, fire engineering, as well as product testing and development.

We work with like-minded clients to achieve sustainability goals alongside performance objectives. We bring a keen eye for eliminating excessive materials and systems—increasingly through design for fabrication optimization and truly integrated project team delivery. Our portfolio covers pioneering mass timber and low-carbon concrete, alongside deep expertise in adaptive reuse and historic preservation. We engage in broader industry research and development, code writing, and professional organizations to absorb the latest in green engineering tactics. In turn, we educate our staff, architects, contractors, developers, and owners on how we can reduce total carbon through our solutions.

With Holmes as a signatory of SE 2050, we are committed to doing our part to get to net zero structures by 2050.

Microsoft Silicon Valley: Holmes and team completed a mass timber campus targeting LEED Platinum, Net Zero Water, and WELL Building certification.

2.0 Education

Sparking Awareness

To ignite urgency and excitement around SE 2050, Holmes will provide our employees with the education and resources to track and reduce embodied carbon on our projects.

Our educational approach includes a series of Tech Sessions (company-wide technical presentations). A group with knowledge from professional committee involvement will present a four-part series that will:

1. Introduce embodied carbon within Structural Engineering.
2. Review the SE 2050 initiative and how to pitch the program to clients and project teams.
3. Guide engineers through a case study on reporting Structural Material Quantities (SMQs) and Global Warming Potential (GWP) through a Life Cycle Analysis (LCA).
4. Provide an overview of resources available through SEI and SE 2050.

Holmes will ensure that all staff have the opportunity to improve their embodied carbon literacy. We will establish a digital library with technical resources, articles, presentations, and design guides in one location. In addition, we will create an open online forum for ongoing discussions around sustainability, new technologies, and project-specific feedback.

"We need to see our profession face embodied carbon reduction before someone else does it for us. We have an opportunity to be really proactive and drive decisions around the building structures we design. It's an exciting time to be a structural engineer. We just need to take on the challenge."

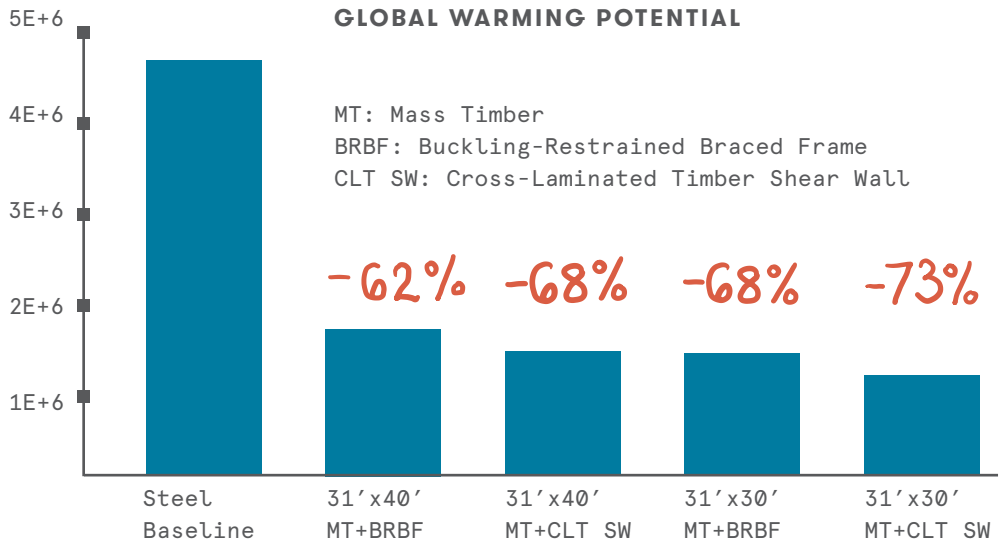
—Megan Stringer, Associate Principal

3.0 Reporting

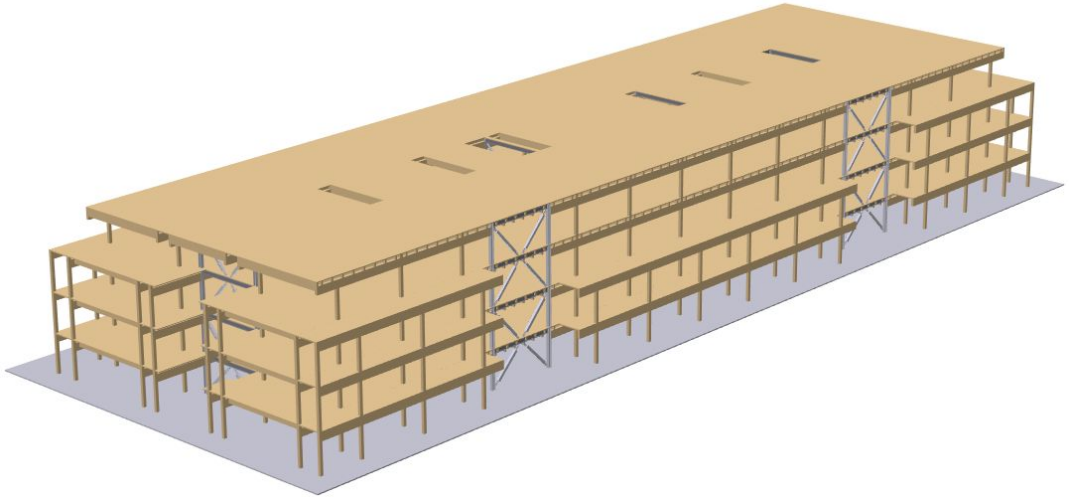
Quantifying Impact

Holmes is in the early stages of reporting our embodied carbon. We're in the process of establishing how we measure SMQs in our everyday workflow. Holmes predominantly uses Environmental Product Declarations (EPDs) in tandem with the Athena Impact Estimator. We're working with our Building Information Modeling (BIM) team to determine the best ways to extract SMQs from our 3D models. We are also looking into other LCA tools that may facilitate more seamless integration with our modeling software.

Holmes will create a database of our projects' SMQs and corresponding GWP. This database will serve as the foundation for our embodied carbon tracking of all projects across design phases. It will inform us of where our designs stand and allow us to chart our progress towards net zero. We will plug this information into the larger SE 2050 database.



Holmes assessed the GWP of four alternate structural systems for a project, taking into account their gravity, lateral, and foundation components.



The client selected a mass timber alternate, given its major GWP savings compared to the steel baseline.

"As we get into more complex Life Cycle Analyses, we begin framing impacts within a total carbon conversation. It's important to take this holistic, building-life view, rather than solely focusing on operational energy."

—Erik Kneer, Principal

4.0 Reduction

When Less Is More

Holmes purposefully reduces embodied carbon on our projects through a variety of strategies. These range from material specifications to disaster resilience advocacy and proprietary optimization tools. We pride ourselves on realizing efficient designs that meet project requirements. We educate our clients on how structural design decisions affect the project's embodied carbon. We utilize LCAs to quantify and reduce these impacts. We advocate for repurposing existing structures where possible, as well as utilizing mass timber and low carbon concrete.

ACTIONS WE ARE TAKING

Holmes' embodied carbon reduction strategies include:

- Updating specifications and general notes regarding:
  - Cement replacement
  - EPDs
  - Certified lumber
  - Recycled content of steel
- Utilizing technology to quantify our SMQs.
- Performing LCAs at all design phases.
- Developing in-house parametric tools to optimize structural designs.
- Harnessing the inherent strength of existing buildings through performance-based engineering.
- Using lower embodied carbon materials like mass timber as a sustainable alternate to concrete and steel.
- Coordinating low carbon concrete mixes on projects.
- Partnering with fire engineers to eliminate excessive materials through Structural Fire Engineering (SFE).

Intuit Marine Way Building: Holmes reduced the concrete structure's embodied carbon by 32% through collaboration with the contractor and supplier.

5.0 Advocacy

Speaking Up for Sustainability

We push to be a part of sustainability discussions—with our project teams and wider communities. Holmes commits to openly sharing our efforts and learnings to help us achieve net zero embodied carbon structural systems together. We will relay best practices and strategies for our peers to incorporate into designs.

We recently helped develop the first Low Carbon Concrete Code (LCCC) in the United States. Our team conducted research within the SEAONC Sustainable Design Committee to help the LCCC become published and adopted in Marin County. We also participated in a pilot project for the LCCC, implementing high cement replacement concrete to meet GWP limits per the LCCC. We look forward to sharing a narrative summary of this headway.

In an effort to build the momentum surrounding SE 2050, Holmes will regularly provide updates, insights, and milestones with our network as we implement reduction strategies and track project impacts. We will publish news to the SE 2050 website as well as via holmes.us, our social media channels, email blasts, and client-facing presentations. We will leverage our connections with professional committees to create platforms for discussion. We will also encourage inter-firm collaboration as we navigate this exciting new challenge together.

To keep up with our progress, follow us on social media:
linkedin.com/company/holmes-us
instagram.com/holmes.us

CODE & DESIGN DEVELOPMENT

We're collaborating with regulators and developers to advance greener buildings through our contributions to:

- LCCC
- Mass Timber Vibration and Diaphragm Design Guides
- Nail-Laminated Timber Design & Construction Guides - US & Canada

PROFESSIONAL COMMITTEES

We participate in local and national organizations to stay up to date on the latest sustainable practices:

- Carbon Leadership Forum
- NCSEA Sustainable Design Committee
- SEI Sustainability Committee
- SEI SE 2050 Committee
- SEAOC Sustainable Design Committee
- SEAONC Sustainable Design Committee
- SEAOSC Sustainable Design Committee
- SEAW Sustainable Design Committee
- USGBC - California Council of Experts & Los Angeles Chapter

INDUSTRY EVENTS

Our leadership regularly engages in speaking opportunities such as:

- AIA Los Angeles: Research and Resources for Implementing Mass Timber
- AIA San Francisco: A Discussion on Low Carbon Construction
- Greenbuild International Conference & Expo
- Mass Timber Conference
- NCSEA Structural Engineering Summit & Webinars
- SEAOC Convention
- SEI Structures Congress
- Swinerton's Lumber & Libations
- Texas Wood Solutions Fair

COVERAGE

Our sustainability work has garnered media coverage in outlets including:

- The Business Journals
- The Registry
- Structural Engineering Podcast
- STRUCTURE Magazine
- Technology Art + Design Journal

6.0 Glossary

We Know—Lots of Acronyms!

AIA: American Institute of Architects

BIM: Building Information Modeling

EPD: Environmental Product Declaration

GWP: Global Warming Potential

LCA: Life Cycle Analysis

LCCC: Low Carbon Concrete Code

NCSEA: National Council of Structural Engineers Associations

SE 2050: Structural Engineers 2050 Commitment Program

SEI: Structural Engineering Institute

SEAOC: Structural Engineers Association of California

SEAONC: Structural Engineers Association of Northern California

SEAOSC: Structural Engineers Association of Southern California

SEAW: Structural Engineers Association of Washington

SFE: Structural Fire Engineering

SMQ: Structural Material Quantity

USGBC: US Green Building Council

We’re All in on Net Zero.