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2023 VOLUME 28 NO. 1

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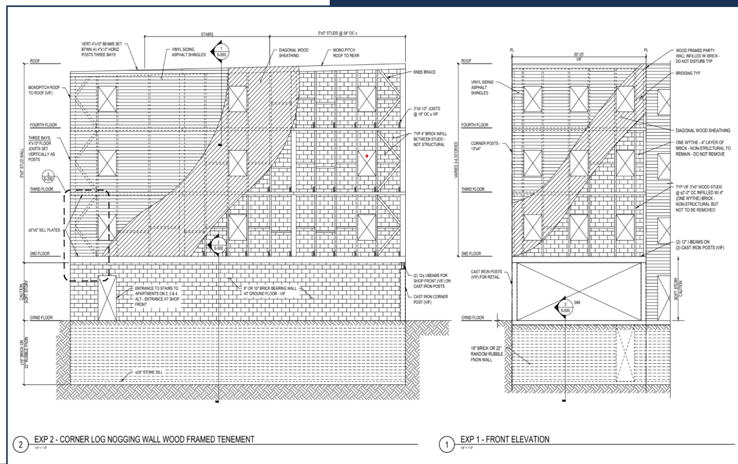

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RESOURCES FOR THE ASSESSMENT AND RENOVATION OF NEW YORK CITY EXISTING BUILDINGS

BY ANDREA SHEAR, PE
ASSOCIATE PRINCIPAL, WJE ENGINEERS AND ARCHITECTS

INTRODUCTION

Over the past 10 years, SEAoNY's Code Advisory Committee (CAC) has gathered information on a wide variety of topics relevant to construction. The committee's most recent focus has been on the existing built environment, encompassing the following topics specific to New York City:

- Historic code requirements for building construction
- Typical construction methods specific to New York City
- Mechanical properties and structural behavior of historic materials and archaic systems found in existing buildings
- Requirements for protection of adjacent properties during construction, and
- New New York City Building Code provisions.

Data was gathered through research by CAC members and refined through collaborative discussion during monthly meetings. In addition to research, CAC members also drew upon their own professional experiences as designers. Some documents are available to active SEAoNY members in the "Members Only Library" portion of the SEAoNY website (https://www.seaony.org/page-7745) which can be accessed by a link on the CAC homepage. The library currently includes a reference sheet on cast iron as well as 1855, 1860, 1899, 1906, 1916, and 1938 code documents. One of the committee's goals for upcoming years is to expand the technical content available to SEAoNY members through the website. While this is a brief summary representing just some of the CAC's research and curated information, the CAC's intention is to publish more detailed articles for each topic.

NEW YORK CITY HISTORIC CODES

In 1898, the City of New York was expanded to include Manhattan, Brooklyn, the Bronx, Richmond (now Staten Island), and Western Queens County (Eastern Queens County is now Nassau County). Prior to this expansion, individual cities, counties, and towns outside of the island of Manhattan (what was then New York City) were independent municipalities with their own laws. Most construction was prescriptive in nature and the municipal requirements focused on fire prevention. With the assistance of the New York City Department of Buildings, the CAC has gathered and reviewed historic prescriptive requirements for building construction dating back to 1813. There were significant provisions regarding fire districts, wall construction materials and thicknesses, and excavations. This information can be especially useful in understanding the elements of a building built under historic code requirements as well as anticipating how recent code requirements may affect these structures.

NEW YORK CITY CONSTRUCTION TYPES

There are numerous typical building types constructed to prescriptive standards that are unique to New York City. The most common are residential tenement buildings and townhouses. The Tenement House Act of 1867, which dictates construction requirements for tenements, defines a tenement as *"any house, building, or portion thereof, which is rented, leased, let or hired out to be occupied or is occupied, as the home or residence of more than three families living independently of one another and doing their own cooking upon the premises, or by more than two families upon a floor, so living and cooking and having a common right in the halls, stairways, yards, water-closets, or privies, or some of them."*

Subsequent updates to the Tenement House Act followed in 1879, 1901, and 1919. The legal modifications typically focused on improvement of quality of life, such as minimum light, ventilation, and area requirements for dwellings. Tenements constructed under the 1879 provisions are referred to as Old Law Tenements and typically have the "dumbbell" floor plan shape to provide the required light and ventilation in areas set back from the lot line. New Law Tenements, which typically have courtyards and are commonly located on corner lots or multiple lots, were constructed after modifications to the legislation in 1901. The Multiple Dwelling Law was enacted in 1929 and multiple dwellings subsequently became more commonly known as apartment houses. The structural framing of both old law and new law tenement buildings generally consist of wood floor joists supported on steel or iron elements at the interior and mass brick masonry walls at the exterior. Unlike tenement buildings which are typically standalone structures, townhouses often share walls with adjacent properties, adding legal and structural challenges when repairing or modifying these structures. The townhouse is defined in Chapter 2 of the 2022 New York City Building Code as *"a single-family dwelling constructed in a group*

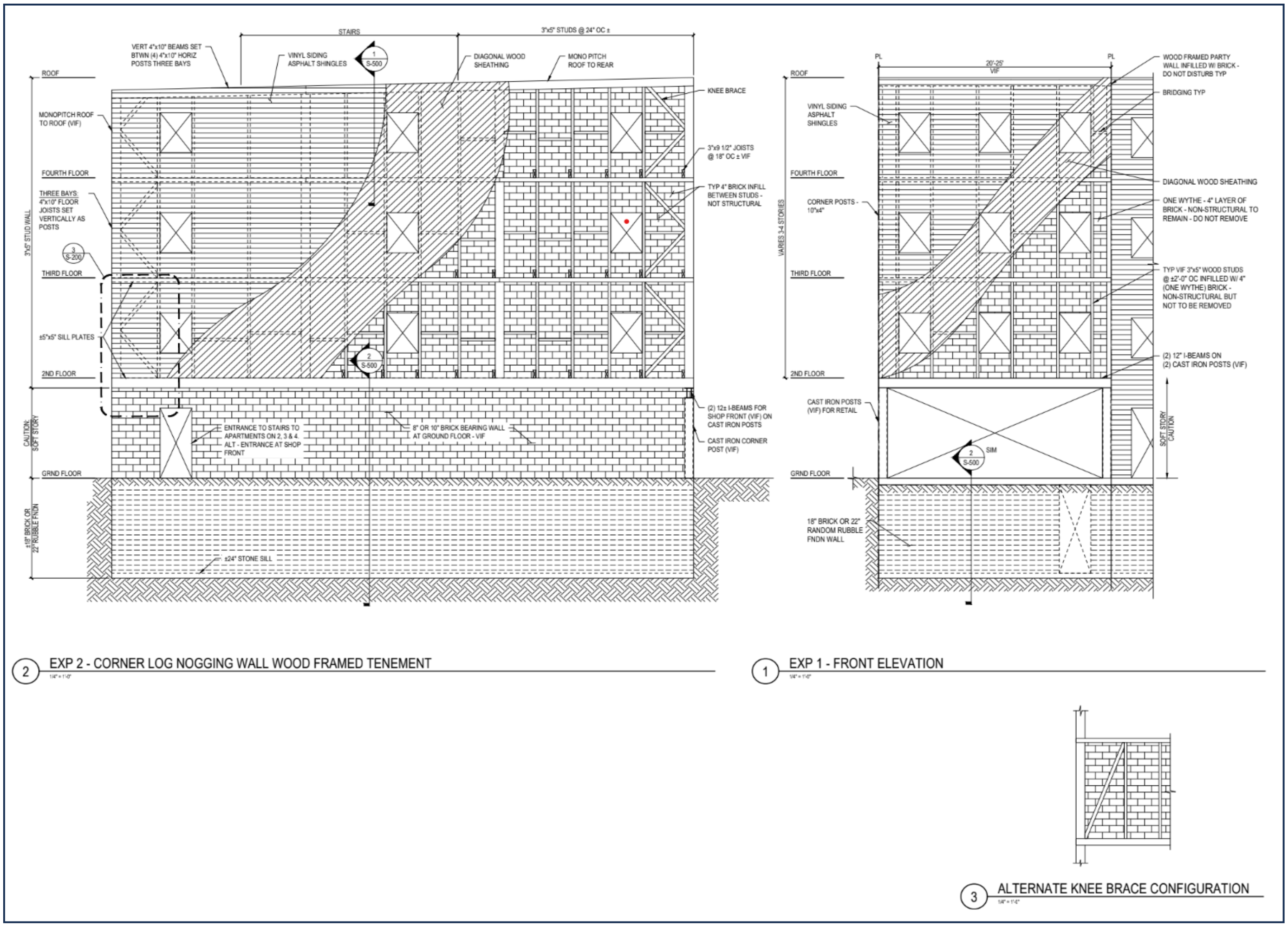

Figure 2: Typical townhouse with nogging wall construction

of three or more attached units in which each unit extends from the foundation to roof and with open space on at least two sides". These buildings were originally constructed in blocks which provided stability for the entire building group. However, because each building unit is frequently an individual property under independent ownership, conflicts often arise between legal and structural requirements. Renovations to individual townhouses can raise questions regarding stability and reinforcement that do not have a straightforward answer within existing code provisions. It is important to understand the original construction, load paths, and potential weaknesses of these structures to appropriately implement modern renovations. Common proposed modifications include:

- increasing light at the interior, which often results in the expansion of opening sizes in the exterior walls, decreasing their stiffness,
- increasing floor-to-floor height, which decreases or modifies the wall bracing or can undermine foundations,
- and removal of interior partition walls, which often function as relieving walls.

For example, renovations often focus on increasing light. This may be proposed by increasing the size of wall openings, thereby decreasing stiffness of exterior walls. They might include increasing floor height, resulting in a decreased or modified wall bracing, or undermining of foundations. Removal of interior partition walls which often function as relieving walls may be proposed. It is important to establish a knowledge base and standard of care for renovation of these buildings to ensure that the

Figure 1: Nogging wall construction at townhouse under renovation in Brooklyn

engineering community promotes resilient and sustainable modifications to existing structures. A white paper is currently in development by CAC defining common repair methodologies that consider typical structural issues encountered in the renovation of townhouses.

While Manhattan townhouses were typically constructed with multi-wythe solid brick masonry walls, the outer boroughs permitted and utilized hybrid wood and masonry walls in townhouse construction, known as nogging walls (also sometimes referred to as noggin walls). Figures 1 and 2 illustrate typical nogging wall townhouse construction. Understanding municipal requirements and the progression of fire districts provides valuable clues regarding the construction type of exterior walls concealed beneath vinyl siding, stone or brick cladding. This in turn can help develop informed structural assessments, repairs, and retrofits for these structures.

HISTORIC MATERIALS AND ARCHAIC SYSTEMS

As construction in New York City progressed from having prescriptive design requirements to more unique structures designed to meet customized criteria, there was a corresponding advancement in the development and understanding of material properties and structural systems. Historic codes can provide a useful reference for minimum design criteria in place at the time of original construction as well as context on how construction and design methods evolved over time. It is also important for modern day engineers to be aware that at certain times in history, there were unconservative provisions. Examples include

- a lack of consideration for snow drift prior to the 1980s
- allowable timber tensile stresses prior to 1968 and 1977 that were higher before the National Design Standard (NDS) values were lowered to more accurately account for the effect of knots and distorted grain in tension elements
- Less restrictive requirements for shear in concrete prior to the 1963 ACI code

CAC research focused on historic properties of materials including concrete, masonry, steel, iron, and wood. Additionally, the CAC has collected information on archaic floor systems, particularly tile arch floor construction, commonly used in early 1900s construction in New York City. These floor systems were typically proprietary and validated by testing; a variety of historic resources are available for the assessment of these systems.

ADJACENT CONSTRUCTION AND TPPN 10/88

Due to the congested urban environment, excavation for new construction in New York City occurs very close to existing buildings. If proper precautions are not taken, routine construction activities can result in dangerous and unstable conditions for both new and existing buildings affected. Unsafe conditions are often the result of construction vibrations, undermining of adjacent foundations, or inadequate excavation support or dewatering procedures resulting in water table changes or subsidence.

The provisions for monitoring and protection of historic buildings, originally issued by the New York City Department of Buildings as Technical Planning and Procedure Note 10 of 1988 (TPPN 10/88), are generally more restrictive than for a modern structure. The 2022 New York City Building Code has increased the requirements for pre-construction planning and documentation as well as inspections conducted before and during construction for all buildings; however, significant judgment is still left up to the developer. Engineers are faced with conveying to stakeholders that while minimizing the adjacent construction assessment and monitoring program can initially appear to save money, reduction of these costs often results in higher costs of repairs, delays and claims as well as potential safety risks to workers and the public.

NEW YORK CITY CODES AND CHANGES

As New York City's building stock evolves, codes must keep up with new methodologies while simultaneously allowing for the repair, renovation and adaptive reuse of the existing 1 million structures that make up New York City's urban environment. The CAC aims to provide the resources needed by structural engineers to interpret the requirements for existing and new buildings, recommendations for the Department of Buildings to improve the existing built environment through improved regulation of both new and existing construction, and to issue proposals for improvement of both local and national codes.

CLOSING

SEAoNY's CAC has provided a forum for the discussion and sharing of information and experience related to the subjects above and others, and aims to make this information more accessible to the engineering community. If you are interested in contributing to this effort, please contact Andrea Shear (ashear@wje.com) or attend an upcoming CAC meeting.

ACKNOWLEDGEMENTS

A number of individuals other than the author have contributed their time, resources, and knowledge to these efforts over the years and deserve acknowledgement and thanks in the development of this article, most notably:

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THE ABC'S OF SUSTAINABILITY

BY MEL CHAFART, EIT
CARBON LEADERSHIP FORUM

BY STEVE RYS, PE
BUILDING SOLUTIONS SPECIALIST, NUCOR STEEL

INTRODUCTION

LCAs, EPDs, GWP…many engineers attempt to dive into the world of sustainability and find themselves swimming in a sea of acronyms. While a designer might wish or need to incorporate sustainability into projects, the lack of concise background information can leave someone new to sustainability feeling quite intimidated. Rest assured that integrating carbon reduction into designs can be as simple as adding a couple of rows or columns to existing design spreadsheets or hand calculations!

The carbon emissions such as CO_2 and other greenhouse gasses ("GHG") directly associated with the building and construction sectors are responsible for about 40% of the annual emissions generated globally[1]. Current legislation such as New York City's recently enacted Local Law 97 (2019) focuses on the emissions generated during the operational or in-use phase of a building's life cycle. However, the ratio of operational carbon to carbon associated with building materials and construction (upfront or embodied carbon) can approach 1:1. Indeed, a building's structural systems can contribute up to 80% of a building's embodied carbon[2]. Therefore, it will not be long until embodied carbon becomes a target for future legislation. Several state and local governments are exploring law, such as the Buy Clean California Act (BCCA) to impose carbon limits on building products. It is imperative for structural engineers to become familiar with sustainable design procedures and strive to reduce embodied carbon on their projects.

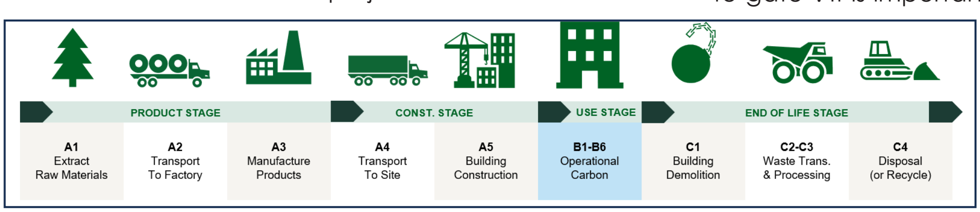


Figure 1: Life Cycle Stages of a Building. Courtesy: Nucor Corp.

WHAT IS EMBODIED CARBON?

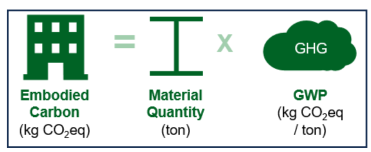
For structural engineers, the primary focus in the realm of sustainability is on embodied carbon. Embodied carbon is the measure of greenhouse gasses emitted into the atmosphere that can be attributed to a building's materials and its construction. Activities in this category include the extraction of raw materials, manufacturing and refinement of materials, transportation of those refined products, construction of the building, and the deconstruction and disposal of materials at the end of a building's life cycle (Figure 1).

MEASURING EMBODIED CARBON

There are many complexities in the world of sustainability; thankfully, the measurement of embodied carbon is not complex at all:

Embodied Carbon = Material Quantity x Carbon Factor

This calculation is performed for each building material to be used (steel, concrete, rebar, etc.) and then summed to attain a total embodied carbon value for the design.

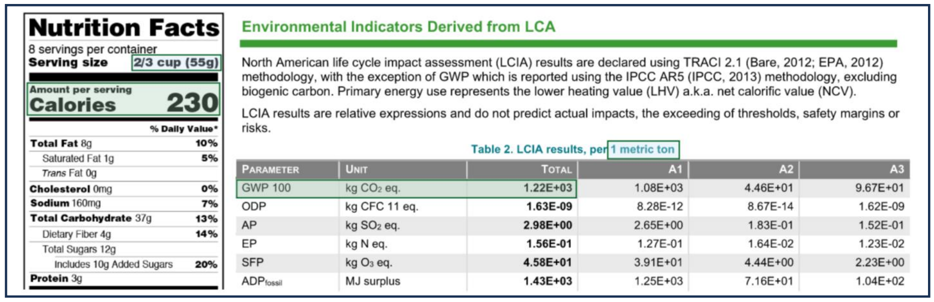


Structural engineers determine material quantities for their buildings (i.e. yd^3 of concrete or tons of steel) through typical design procedures. The carbon factor, often referred to as carbon intensity or emission intensity, is a multiplier providing the carbon emissions produced per unit of material quantity to measure the potential impact on the environment. Global Warming Potential (GWP) is the metric typically used to measure a product's carbon footprint and is quantified in units of kilograms of CO_2 equivalent (kg CO_2eq).

ENVIRONMENTAL PRODUCT DECLARATIONS

GWP values are found in Environmental Product Declarations (EPDs). EPDs are third-party verified and registered reports that transparently document the environmental impact of a building product over its life cycle. The EPDs must conform to a set of accounting rules known as Product Category Rules (PCR) and ISO standards. EPDs typically cover impacts from the product stage (A1-A3 per Figure 1) which are referred to as "cradle-to-gate". It is important to understand the boundaries or stages covered by each EPD as it can vary, such as the difference between EPDs for "fabricated" versus "unfabricated" steel products. An EPD documents various environmental impact categories such as Ozone

Depletion Potential (ODP) or Acidification Potential (AP) as well as energy consumption and wastes. In simpler terms, the EPD is analogous to a nutrition label, and documents the product's impact to the environment instead of a food to one's body. The material quantity parallels the serving size and the GWP corresponds to calories per serving. The additional impact categories can be thought of as the various macronutrients. [See Figure 2]



Nutrition Facts

8 servings per container
Serving size 2/3 cup (55g)

Amount per serving
Calories 230

	% Daily Value*
Total Fat 8g	10%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 160mg	7%
Total Carbohydrate 37g	13%
Dietary Fiber 4g	14%
Total Sugars 12g	
Includes 10g Added Sugars	20%
Protein 3g	

Environmental Indicators Derived from LCA

North American life cycle impact assessment (LCIA) results are declared using TRACI 2.1 (Bare, 2012; EPA, 2012) methodology, with the exception of GWP which is reported using the IPCC AR5 (IPCC, 2013) methodology, excluding biogenic carbon. Primary energy use represents the lower heating value (LHV) a.k.a. net calorific value (NCV).

LCIA results are relative expressions and do not predict actual impacts, the exceeding of thresholds, safety margins or risks.

Table 2. LCIA results, per 1 metric ton

Parameter	Unit	Total	A1	A2	A3
GWP 100	kg CO_2 eq.	**1.22E+03**	1.08E+03	4.46E+01	9.67E+01
ODP	kg CFC 11 eq.	**1.63E-09**	8.28E-12	8.67E-14	1.62E-09
AP	kg SO_2 eq.	**2.98E+00**	2.65E+00	1.83E-01	1.52E-01
EP	kg N eq.	**1.56E-01**	1.27E-01	1.64E-02	1.23E-02
SFP	kg O_3 eq.	**4.58E+01**	3.91E+01	4.44E+00	2.23E+00
ADP_{fossil}	MJ surplus	**1.43E+03**	1.25E+03	7.16E+01	1.04E+02

Figure 2: EPD and Nutritional Label Comparison. Courtesy: FDA, AISC

There are two primary types of EPDs: generic or industry-wide EPDs (IW-EPDs) and manufacturer EPDs. Generic EPDs are produced by industry organizations such as AISC or NRMCA that provide GWP values representing a weighted average over a representative sample of suppliers for a given type of product. Manufacturer EPDs are produced by an individual supplier for a specific product. These EPDs should indicate the GWP values for a given product based on data from the actual facility from which it is manufactured.

SUSTAINABLE STRUCTURAL DESIGN CONSIDERATIONS

CARBON FACTORS AND MATERIAL SELECTION

The first step of integrating carbon reduction into structural design is to choose the most appropriate material or product for the given project or application. There is no single material or product considered to be the most sustainable. Thus, multiple material options and hybrid solutions should be considered. Engineers should calculate embodied carbon using each respective material quantity and associated GWP for the designs being considered. It is recommended that engineers use industry-wide GWP values in the early phases of design, because it is unknown from where the product will be sourced until a project's procurement team purchases the material. The lightest design or product with the lowest GWP is not always the most sustainable option. Consider embodied carbon when designing for sustainability, not just material quantity or GWP!

CONCRETE CONSIDERATIONS

Concrete is a versatile material, and the bedrock of construction for the last few centuries. Its ubiquity is not without consequences, as concrete production is responsible for 8% of all carbon emissions[3]. The main culprit of its carbon intensity is Portland cement, which is the binding agent between the coarse aggregate, fine aggregate, and water that comprise concrete. Portland cement is created by heating ground limestone and clay in a kiln. Here, Portland cement creates two streams of carbon emissions: first, heating materials to that temperature requires vast amounts of energy, which are typically supplied using fossil fuels; second, the heating of limestone creates lime and carbon dioxide. Each of these processes results in approximately one ton of carbon emissions per one ton of cement production. For this reason, reduction strategies for embodied carbon in concrete should involve reducing the amount of cement in the concrete mixes.

EAF	METRIC	BOF
29%	**Global Production Share**	71%
70%	**Domestic Production Share**	30%
99+	**Max Recycled Content %**	30
24	**Energy Demand** (GJ / mt steel)	10
2.32	**Carbon Factor** (mt CO_2e / mt Steel)	0.67

Figure 3: 2021 EAF & BOF Steel Production Metrics. Courtesy: The World Steel Association

STEEL CONSIDERATIONS

Structural steel manufacturing can be subdivided into two principal processes: "extractive" blast furnace-basic oxygen furnace (BF-BOF) production and "circular" electric arc furnace (EAF) production. BOF mills extract and use raw materials (primarily iron ore, coal & limestone) and up to 30% recycled scrap metal to produce new, virgin steel. They are also powered by coal and fossil fuels.

By contrast, EAF mills use electricity to melt down and recycle scrap metal (up to 99+% recycled content) and direct-reduced iron (DRI) to repurpose old metals. EAF steel is a much more efficient and sustainable means of producing steel (see Figure 3). Per the World Steel Association, every ton of steel produced in a BOF facility versus an EAF facility emits an average of 3.5 times the amount of carbon into the atmosphere[4]. Therefore, any project striving for sustainability should prioritize the use of EAF produced steel.

Product	IW-GWP
Decking	2.32
HSS	1.99
Plate	1.73
WF Beam	1.22
Rebar	0.854

Figure 4: GWP (mt CO2eq / mt) for Steel Products, per IW-EPDs. Courtesy: AISC, CRSI

It is important to note that different steel products have different ranges of GWP values. This is closely related to the percentage of recycled content of which the product is composed. Thinner steels such as sheet mill products, including hollow structural sections and metal deck, require more raw iron and alloys relative to scrap metal in order to maintain surface quality during the rolling process. Products with reduced surface quality concerns such as rebar can have nearly 100% recycled content.

DID YOU KNOW?

All wide flange sections produced in the US are made in EAF mills and only five W sections in the AISC steel manual are not currently rolled domestically. Avoid specifying W14x873 and W36x723-925.

DESIGN OPTIMIZATION

Sustainability can be further achieved by optimizing designs through the exploration of new technologies and use of high-strength materials. There are both established and emerging sustainably focused structural technologies in the marketplace that can facilitate a sustainable project. Reach out to suppliers directly to inquire about availability and applicability to your project. It also may be surprising to find that many contractors are open to using them. Here are just a few examples of readily available innovations:

- Grade 65 Wide Flange Sections (ASTM A913): Grade 65 structural steel should be the new normal for strength-controlled elements such as columns and truss chords. A 10-25% tonnage reduction can be expected for only a slight premium from the mill and no difference in lead time compared to traditional A992. In addition, there is an increased weldability not previously available for shapes of the same toughness and strength. Also inquire about Grade 70 and 80 availability.
- Grade 80 Rebar (ASTM A615 or A706): Explore replacing typical Grade 60 rebar in vertical or direct tension elements (columns, shear walls, etc.) for larger diameter bars (typically #10-#11). In addition to tonnage reductions of over 5-15%, horizontal tie requirements and congestion can be reduced from those of Grade 60.
- Voided Floor Slabs: While not popular in NYC, numerous voided systems are commercially available and meet IBC and ACI 318 requirements. Average dead load reductions on the order of 25-30% compared to traditional slab composition are common.
- Portland Cement Reduction Products:
    - Portland limestone (Type 1L) cement (PLC): PLC can save up to 10% of carbon emissions produced by Portland cement, has its own ASTM standard, and is readily available.
    - Supplementary cementitious materials (SCMs): Fly ash and slag are the most common and widely available SCMs that act as bonding agents thanks to their pozzolanic nature. Slag is a byproduct of steel production, and fly ash is the byproduct of the burning of coal. These materials may have additional benefits for strength and durability.
    - Ground Glass Pozzolans (GGP): Made from recycled glass, this SCM has the added benefit of not being a byproduct of carbon intensive processes.
- Specification of Lengthened Cure Times: Structural engineers typically require achievement of compressive strength at 28 days, but there can be significant advantages to lengthening specified cure times. Less cement can be used to reach the same compressive strength if 56 day test results are used in lieu of 28 day results. Additionally, SCMs typically take longer to cure, and therefore require more time to reach the desired compressive strength.

Carbon Sequestration Technologies: though in their nascent form, these technologies purport to reduce carbon in two ways. First, carbon dioxide can be injected back into the cement during its creation process, which reduces the amount of "new" cement needed to reach a specified compressive strength. Second, artificial aggregate created from carbon dioxide can be used in lieu of traditional aggregate, which would allow the concrete to act as a carbon sink.

SPECIFICATION UPDATES AND SELECTIVE PROCUREMENT

Designers can implement the use of sustainable materials on a project by updating and expanding project specifications. As early as possible in a project, collaborative sessions involving the entire design, construction and procurement teams should be held to make sure the goals of the respective teams are aligned to reduce embodied carbon. Selectively procuring more sustainable materials is another layer of embodied carbon refinement. Below are recommended changes to project specifications that can increase the sustainable qualities of a project:

- If any new materials or proprietary technologies are used in design, they must be added to the specifications and general notes drawings as allowable or required materials.
- The submission of manufacturer EPDs can be mandated for appropriate building products. This will allow the procurement teams to review GWP information.
- Establishing GWP limits is both the most important and difficult part of this process. These GWP benchmarks will all govern the selection of product suppliers. For more information on setting the GWP baselines, it is recommended to review the Carbon Leadership Forum's "Material Baseline Report v2"[5].
- Many specifications currently indicate minimum recycled content percentages. These requirements are generally quite conservative and not overly impactful. Specification writers may require the submission of recycled content letters, but should ultimately allow the GWP requirements to govern procurement decisions.
- Concrete suppliers are the most knowledgeable parties in the concrete making process and should be given the opportunity to provide the most efficient design mix. Therefore, it is recommended to move to performance-based specifications for concrete mix designs, which allow the engineer

to specify the required strength, durability, and embodied carbon limits while allowing concrete suppliers the freedom to achieve it however they can.

SUSTAINABLE DESIGN EXAMPLE

A transfer truss is initially designed to capacity using A992 GR-50 wide flange elements (Figure 5):
Material Quantity = (500 plf x 60 ft x 2) + (605 plf x 21.25 ft x 4) = 111,425 lbs [50.5 metric tons]
GWP = 1220 kg CO2eq / mt [per AISC "Fabricated Hot-Rolled Structural Steel Sections" IW-EPD]
Embodied Carbon = 50.5 mt x 1220 kg CO2eq / mt = 61,610 kg CO2eq

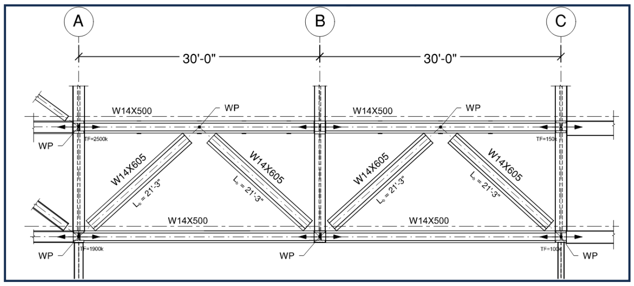


Figure 5: Truss Elevation, Original Design (A992 GR-50). Courtesy: Nucor Corp.

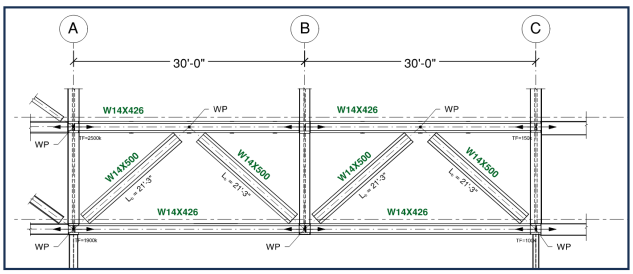


Figure 6: Truss Elevation, Optimized Design (A913 GR-65). Courtesy: Nucor Corp.

The truss is optimized under the same criteria using higher-strength A913 GR-65 wide flange elements (Figure 6):

Material Quantity = (426 plf x 60 ft x 2) + (500 plf x 21.25 ft x 4) = 93,620 lbs [42.5 metric tons] {16% reduction in material quantity}
GWP = 1220 kg CO2eq / mt [per AISC "Fabricated Hot-Rolled Structural Steel Sections" IW-EPD]
Embodied Carbon = 42.5 mt x 1220 kg CO2eq / mt = 51,850 kg CO2eq {16% reduction in embodied carbon}
During the selective procurement process, the contractor purchases the wide-flange steel from Nucor's Yamato Steel facility in Blytheville, Arkansas due to its low GWP values:

Material Quantity = 93,620 lbs [42.5 metric tons]
GWP = 996 kg CO2eq / mt [per Nucor's "Fabricated Hot-Rolled Structural Steel Sections" EPD] {18% reduction in GWP relative to industry average}
Embodied Carbon = 42.5 mt x 1220 kg CO2eq / mt = 42,330 kg CO2eq {31% total reduction in embodied carbon relative to the initial design}

LIFE CYCLE ASSESSMENTS

Life cycle assessments take simple embodied carbon calculations to the next level. Thankfully there are many tools at an engineer's disposal to measure the impacts of building materials on the environment. Tools such as those shown in Figure 7 below all can calculate embodied carbon as well as provide detailed reports on various life cycle stages.

It should be noted that other environmental impacts can be important in the calculation of LEED points and other sustainability frameworks and should be monitored in conjunction with GWP. Products such as mass timber may have high eutrophication potential due to their end-of-life assumptions, which may cause calculation headaches in the future. Be mindful of other potential impact categories throughout the design process to ensure that the building is holistically reducing its impact on the environment.

	A1-A3: Cradle to Gate	Full Life-Cycle Assessment	Industry Average EPDs	Product Specific EPDs	Generic Materials from LCI and EPD data	GWP only	All Metric	Revit
ECOM	x		x			x		
EC3	x		x	x		x		
BEACON	x		x	?			x	x
Athena IE4B		x			x		x	
Tally		x			x		x	x
BHoM	x	x	x	x			x	x

Figure 7: LCA Toolkit Comparison. Courtesy: Buro Happold

CONCLUSION

Structural engineers have the opportunity to make a dramatic difference on the GWP of a given building. In the not-so-distant future, due to legislation and the impending climate crisis, designers will consider embodied carbon to be as important as cost and constructability. Armed with the aforementioned approaches such as optimized material selection, sustainability-focused specifications and selective procurement, structural engineers will be able to effectively reduce the carbon footprint of their buildings.

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CHANGES TO SEE AWARDS

BY LEAH PEKER, PE

BY CANDICE OGANDO, PE

The structural engineering industry is constantly growing and evolving. As such, the way we consider awards must also grow and evolve along with it. The most important challenge facing our industry today is our response to climate change.

Buildings generate 40% of annual global greenhouse gasses and11% of those annual greenhouse gas emissions are due to the embodied carbon of buildings. The role of structural engineers in preventing emissions is vital and it is our hope to motivate this goal in the structural engineering community.

Considering the increasing urgency and importance of climate action, SEAoNY has restructured the criteria for the SEE awards to highlight the impact and importance of sustainable design. When you review the call for submissions, you will find a new criteria called, "Sustainability of structure and implementation of sustainable design methodology," which is equally weighted with the other 4 top criteria.

The goal of the sustainable design criteria is to encourage engineers to focus more intently on the sustainable design actions we are taking, and increase conversations around tools and methods to analyze sustainability in our designs. Over the coming years, we anticipate that the way we quantify and describe a project's climate impact will evolve.

Talking points to consider in your application include, but are not limited to: considerations around your SE2050 embodied carbon action plan; how sustainability studies have affected the development of your project; material decisions based on embodied carbon impact; consideration of renewable and/or recycled resources; and lessons learned through the process of incorporating sustainable design analyses and methods.

We hope you're just as excited as we are about the new award criteria!

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