June 26, 2026

CASE STUDY:

Lambert Airfield Maintenance Complex: The Head Building

The Head Building, located on the new Lambert Airfield Maintenance Complex, will replace an existing facility that is nearing the end of its usable life due to age and associated deterioration. The building is divided into two areas: one features workshops and a high-bay maintenance space equipped with a double girder bridge crane, while the other consists of a partial two-story structure that includes second-floor offices and conference rooms, and a first-floor warehouse with self-supported high-density shelving.

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Project Data

Location	St. Louis, MO, United States
Primary Building Use Type	Industrial
New building or Renovation project:	New Construction
Construction Year (or Anticipated):	2027
Gross Square Footage (sq ft):	112624
Mean Roof Height (ft):	38
Number of Stories Above Grade:	2
Number of Stories Below Grade:	0
Expected Building Life (years):	60

Project Team	Developer: St. Louis Lambert International Airport (City of St. Louis) Architect: Jacobs Engineer: Jacobs Builder: Wright Construction Services
Suppliers	Steel Fabricator: Atlas Iron Works, Concrete Subcontractor: Vee-Jay, Ready Mix Supplier: Kienstra
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Structural System Data

Primary Horizontal Gravity System	Steel: Frame + Concrete on Metal Deck
Primary Vertical Gravity System	Steel: Columns
Primary Lateral System	Steel: Braced Frames
Foundation Type	Shallow Foundations
Structural System Description	The Head Building's superstructure consists of steel framing, including joists, beams, columns, and braced frames. The substructure consists of shallow concrete foundations, as well as a concrete retaining wall on one side of the structure.

Case Study Narratives

Project Sustainability Goals	The project is currently pursuing LEED v4 BD+C New Construction certification at the "Silver" level.

Embodied Carbon Calculation Methodology and Material Assumptions	
GWP Intensity, including biogenic carbon [kgCO2e/m^2]	N/A
GWP Intensity, excluding biogenic carbon [kgCO2e/m^2]	536
LCA Stages Included, for GWP intensity values above	A1-A3
LCA Tool Used	Tally

Design & Procurement Embodied Carbon Reduction Strategies	A concrete takeoff was performed in the structural model to quantify the volume of concrete by strength category. Through outreach to local concrete ready-mix suppliers, (2) lower GWP concrete mixes were acquired and compared to benchmark values for the project region from "ACI 323-24: Low Carbon Concrete" in an embodied carbon assessment. As a result, the capability of reaching a 30% reduction in concrete-related GWP in the project region was verified. As opposed to utilizing a traditional, prescriptive-based concrete specification to achieve the targeted reduction in GWP, the concrete specifications were edited to be performance-based. Rather than dictating maximum water-cement ratios, SCM limits, and minimum cement content per each concrete strength class, the concrete specifications only specify mix ingredient limits where required by ACI 318-19 based on concrete exposure class. This approach provides the mix designer the ability to substitute additional SCMs for cement and/or utilize innovative technologies. It is recommended to have a conversation with the client during design to confirm their comfort with this approach, particularly in regions where higher-SCM mixes have not been used widely in practice. It is important that concrete specifications also include clear language to indicate that mixes with higher SCM content may require longer set times and curing periods to achieve sufficient strength for subsequent construction operations. These potential impacts should be proactively discussed with the client/contractor to ensure alignment on schedule and sequencing associated with lower-carbon concrete mixes. Furthermore, instead of specifying upper GWP limits for each unique mix, an overall project carbon budget, or total maximum GWP limit, was established for the Head Building. This provides extra flexibility to the contractor, allowing GWP limits of individual concrete mixes to be averaged out in a way that satisfies the total project budgeted goal.
Key Findings, Recommendations, and Lessons Learned	One of the early and critical steps in an embodied carbon assessment is evaluating the availability of EPDs for concrete mixes in the St. Louis region. At the time of the project, only a limited number of published EPDs were available locally. Thus, before establishing GWP thresholds for concrete mixes, it is essential to verify that local suppliers have the capacity to meet those targets. In this case, the structural team coordinated with the St. Louis Concrete Council to identify local ready-mix producers and capabilities in the St. Louis region. Local ready-mix producers confirmed that lower-GWP mixes - typically achieved by reducing cement content - were not only feasible but could also result in cost neutrality or even modest cost savings, given cement's significant impact on concrete pricing. Implementing a new and emerging performance-based concrete specification method required an in-depth study of the latest resources such as NRMCA's "Guide to Improving Specifications" and "ACI 323-24: Low Carbon Concrete" code. In addition, participation in several webinars hosted by NRMCA and SEI provided valuable insights into how similar strategies have been applied on other projects. This process highlighted the importance of early education, local industry engagement, and staying current with evolving standards when adopting innovative specification methods.