PROJECT Lucie-Bréard Footbridge

YEAR
2024

LOCATION
Saint Denis, Ile-de-France, France

USE
Bridge

CONSTRUCTION
Deconstruction of Existing Structure for Reuse

ARCHITECT
Explorations Architecture (bridge), August (landscape)

ENGINEER
schlaich bergermann partner

DEVELOPER
Plaine Commune

BUILDER
Eiffage Métal (steel), Razel-Bec (general)

SUPPLIER
NA

SPECIALISTS
NA

GROSS AREA
14,750 sq-ft

MEAN ROOF HEIGHT
18ft

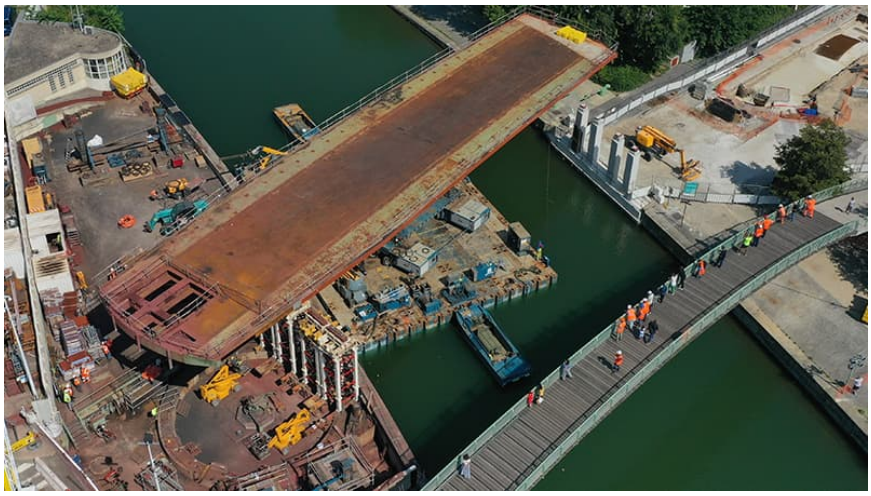
STORIES ABOVE GRADE
1

STORIES BELOW GRADE
0

RISK CATEGORY
II (all buildings and other structures)

COST INFORMATION
Unavailable

LCA INFORMATION
Partially available



Credit: Eiffage Metal

MATERIALS		Steel	Steel
SYSTEMS		Beams, Foundations	Beams
SCALE		Whole-structure	Whole-structure
	DfD *Design for Disassembly*	**SCR** **Structural Component Reuse**	**DECON** **Deconstruction**

SUMMARY

A new pedestrian and bicycle footbridge to cross the Canal Saint Denis was constructed for the Paris 2024 Olympics using deconstructed steelwork from an existing non-functioning moveable vehicular bridge.

SUSTAINABILITY GOALS

The Paris 2024 Olympics pledged to reduce the overall carbon emissions by 50% compared to London 2012 and Rio 2016. The Olympics largely eschewed new construction; where new construction was necessary, biobased materials and circular economy principles were favored.

CIRCULAR ECONOMY STRATEGIES

The circular economy strategy focused on the deconstruction and reuse of an existing non-functioning vehicle bridge steel deck that already crossed the canal at ground level. This deck was inspected in situ before refabrication work took place in a temporary construction tent also in situ.

The existing pedestrian walkway, railings and edge cladding were removed, and small extensions were added at each end of the bridge deck along with stiffening and bearing plates were included to allow for a change in support locations. The deck was then lifted, rotated and permanently supported on new piers to elevate it above the waterway to allow clear passage. New material was used to construct the approach ramps and staircases to access the elevated main span. Additionally, the existing foundations at one side of the bridge were reused.

The name coined for the strategy of reusing structural materials on the same site as the deconstruction project, but in a different configuration, is 'prope in situ'.

KEY FINDINGS, RECOMMENDATIONS, AND LESSONS LEARNT

The success of the reuse of the steel bridge deck was partly based on the continuity of material ownership by the same client - with the existing bridge that was being deconstructed and reused owned by the local municipality. This meant that the documentation and records for the existing bridge were readily-available and complete, and also that the potential financial benefits could be realized of reusing existing steel assets instead of paying for disposal and then purchase of new material. The primary incentive for the client was the potential for schedule savings through minimizing supply chain steps and parties. The reuse of the existing 13m wide bridge deck as opposed to constructing a new 5m wide bridge deck avoided an estimated 140 metric tonnes of embodied carbon emissions, while providing a larger functional area. The whole life embodied carbon per unit are of the project - including the approaches and main span - would meet a SCORBS rating of A.

A number of challenges remained on the project, primarily related to discrepancies between the interpretation of historic as-built documentation and the real situation on site. The existing moving vehicular bridge included a counterweight within the steel bridge deck, and this needed to be removed to best utilize the deck in its new configuration. The counterweight was noted as a granular material which would be easily removed, however it was found to be cast-in-place concrete between the bridge stiffeners. The necessary removal of the counterweight led to a schedule extension and the requirement to replace a portion of the deck surface.

The second challenge related to corroded steel areas which had not been visible during initial surveys of the existing bridge. The corrosion was calculated to be structurally irrelevant, however the surface of the bridge required additional leveling to meet service requirements. Future prope in situ construction should ensure sufficiently detailed surveys are completed to confirm the condition meets the available historic documentation.

FURTHER INFORMATION AND RESOURCES

https://www.sbp.de/en/project/francs-moisins-bruecke/

https://www.eiffagemetal.com/lucie-breard-footbridge-renovation

IABSE Congress Ghent 2025 proceedigngs (https://iabse.org/Sys/Store/Products/400790)

AVAILABLE QUANTITATIVE DATA

Reused bridge deck weight: 280 metric tonnes

ABOUT THE DATABASE

This case study has been prepared by the Structural Engineering Institute Sustainability Committee Circular Economy Work Group with the goal of sharing and promoting the excellent circular economy work that project teams are working on throughout North America and the world. Often it is hard to find information on how circular economy principles are implemented in practice; these circular economy case studies aim to better share information amongst the industry.

Some case studies have been prepared directly by a project team member, while others have been prepared based on available texts and publications. In the second case, the text descriptions are a summary of information available from other sources. These sources are referenced in the *Further information and* resources section.

While reasonable efforts have been made to ensure the information is representative and accurate, we cannot guarantee there are no errors. Please contact the case study team to provide additional information, suggest updates and amendments, or with any other questions. To submit a new case study to the database, please use this submission form. Thank you!