ISMAEL IBRAHIM BURO HAPPOLD

Pedestrian Bridges

OCT. 22, 2021

ARE 320K → 12pm

[Pedestrian Bridges]

> offer unique set opportunities to be creative.

> can serve as a gateway or be a destination itself.

> The user should be put at the forefront
- is it a pleasant experience
- good viewpoints / enough lighting?
> SMALLEST DETAIL CAN MATTER!

Purpose → who is it for?
↓ ↘ ICONIC?
WHO ARE THE USERS

what is the structure crossing over? spanning under
> water, road, etc.
> above or belowdeck

ALL LINKED TO FORM

TYPES OF BRIDGES:

- Arch
- Truss
- Suspension
- Cantilever
- Cable-stayed
- Beam (000)

SUSTAINABILITY & ENVIRONMENTAL CONSTRAINTS:

> Preservation Areas
> Trees
> Animals

Site specific constraints (wind, ground, etc).
> earthquake zone
> Rock faults

FORM AND FUNCTION

> form of bridge is primarily driven by constraints.
> Chose suitable form & let constraints tell story of design
> Know structural load path
> Bridges structure is very unique — generally exposed.

BRIDGES:

→ North Bank BRIDGE, BOSTON (2003)

- Architect: Hakes Associates
- Proj. value: $15 million
- client: Massachusetts Hwys depts.
- BH's first bridge in the US.

→ Ponte de la musica; Rome Italy (2002)

- Architect: Powell - Williams
- value. € 10.5 million
- BH's first bridge outside the UK

→ Sackler crossing, Kew Gardens

- London U.K. (2006)
- seems like it's floating on water
- client: Royal Botanic Gardens
- John Powsons Architect.
- Provided access to some less visited areas.

→ Hike Bridge, London (2019)

- Architect: Stuppard Robson
- Client: LDC
- Perforations follow stress distribution
- BH involved w/ original masterplan & legacy transformations of site

→ Lille Langebro, Copenhagen Denmark (2019)

- Arch: Wilkinson Eyre
- Client: Realdania
- Opens up for ships down below
- multi award winner
- Swing bridge w/ mechanical moment (centre)

→ Providence River Pedestrian Bridge

- Rhode Island (US) - 2019
- Used to be a highway (same foundation used for bridge (I-95)

New Era of Sustainable Design

context:

- going vegan will reduce your carbon footprint by over 2 tons per year

- A typical structural engineer is responsible for ~ 40,000 sq ft of structure (approx = 2000 tons of carbon per year)

- Every 1% saving made by a structural engineer is saving 5 times more than going vegan and 10 times more than flying from London to New York.

- A typical high-rise in London can easily have 100,000 tons of embodied carbon.

Pedestrian bridge loading

→ In the US, as per AASHTO, pedestrian loading is 90 lb/ft²

→ for strength combinations, this is factored up to 75% to 157.5 lb/ft²

(these need to be challenged).

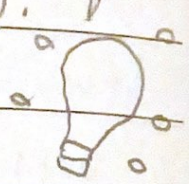
Embodied Carbon

→ means all the CO_2 emitted in producing materials

→ not just materials you use

- where you get it, how you use it

(It's life cycle — Assessment).



"The most sustainable structure is one that people love"

↓ social value is important.

↓ Prolonged life (by users)

Steel → requires more energy (lighter) → more Adaptable

(But has slight advantage over concrete)

But concrete is simpler → & ability to cast concrete anywhere is easier

Closing Remarks

- Be creative... push the boat out!
  - our designs wont really be built right now (go crazy). Less constraints //
- YOU have the power
- Design decisions at the beginning have much bigger impact on overall project... so choose a sustainable one.
- challenge codes
- Be proud of your expertise & profession

Ismael Ibrahim

ismael.ibrahim@bnoha ppold.com

- LinkedIn!

bnoha ppold.com