Innovative GFRP deck for road bridges (example)

Pultruded GFRP Deck for Road Bridges

- Benefits

**Light Weight**
- Much lighter than concrete deck
- Reduce self-weight
- Enhance resistance against earthquake

**High Strength**
- 10 times of concrete strength
- 1.5 times of steel strength
- Enhance structural safety

**High Durability**
- Low Life Cycle Cost (LCC)
- Reduce maintenance cost
- Longer service life

**Rapid Installation**
- Reduce construction time and cost
- Minimize traffic interference

**Slender Substructure**
- Girders and piers can be slender
- Save construction costs

**Efficient Bridge Expansion**
- No extra strengthening needed
- Most economical and fast solution for walkway/bikeway expansion

- Promising alternative in bridge decks → New, expansion and rehabilitation of bridges
Pultruded GFRP Deck for Road Bridges

- Section Design

- Orthotropic plate behavior of pultruded GFRP decks due to shape orthotropy and material orthotropy.
  → Significant differences in flexural characteristics between strong- and weak-axis bending

- A GFRP deck can be built by assembling modularized deck tubes
  → Section geometry of deck tube should be designed considering the local deformation, deck-to-girder connection and effect on weak-axis bending behavior
  → Joining details between the deck tubes
  → Behaviors of adhesive joints are essentially caused by weak-axis bending

Pultruded GFRP Deck for Road Bridges

- Section Geometry

- Pultruded GFRP bridge decks with various modularized sections
- Each sections show different flexural characteristics, especially in weak-axis flexural stiffness

- Rectangular section (Strongwell)
- Triangular section (ASSET)
- Trapezoidal section - 2 cells (Duraspan)
- Hexagonal section (Superdeck)
- Trapezoidal section - 3 cells (Delta Deck TG200)