New Railway Viaduct System for the 21st century

Ladder Railway Viaduct System

Ladder Track

Rigid to Light Frame

RC Girder-Type Viaduct

PC Girder-Type Viaduct

Steel Girder-Type Viaduct
Ladder Railway Viaduct System ensures cost effective railway viaduct by fully utilizing the advantages of floating ladder track, i.e. low vibration, low noise, light weight track and low maintenance cost.

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<th>Rigid Frame Structure</th>
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* Ratio against existing viaduct system

Ladder Railway Viaduct System ensures cost efficiency, rapid construction and earthquake-resistance in conjunction with the choice of RC, PC and Steel girder structure for the required span length.

Sophisticated Structure System and Construction Method

- Cost efficiency
- Rapid construction
- Earthquake-resistance

- Low vibration, Low Noise
- Light weight track, Low maintenance cost
1. **Frame structure with 1 girder for 1 track**
   - RC hollow girder is placed underneath each floating ladder track and the allocation of center maintenance walkway minimizes the total width of viaduct structure.

2. **1 pile for 1 column foundation**
   - Omission of in-ground beam enables cost reduction and rapid construction.

3. **Special joint connection**
   - Application of socket joint (between pile and CFT column) and Junction plate (between CFT column and RC hollow girder) enables rapid construction.

4. **Lift-up Method**
   - Reduction of work at height and lifting operation increases safety, especially for work beside running rail.

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1. **Frame structure with 3 girder for 2 track**
   - Adoption of through girder bridge enables to lower rail level and structure height.

2. **Noise and derailment**
   - Concrete through girder performs as a part of noise barrier wall and contributes to the safety for derailment.

3. **Sheet pile foundation**
   - Adoption of retaining sheet pile as a part of permanent foundation enables cost reduction and rapid construction for relatively shallow bearing strata.

4. **Minimum Maintenance**
   - Adoption of concrete superstructure enables cost reduction of maintenance fee.

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1. **Frame structure with 1 girder for 1 track**
   - Steel box girder is placed underneath each floating ladder track and the allocation of center maintenance walkway minimizes the total width of viaduct structure.

2. **Low noise**
   - Application of floating ladder reduces noise and vibration of steel girder.

3. **Special joint connection**
   - Application of socket joint (between pile and CFT column) and Fixing plate (between CFT column and steel box girder) enables rapid construction.

4. **Rapid construction**
   - Installation of pre-fabricated steel box girder enables rapid construction.
Technology

Screw Steel Pipe Pile with Toe Wing

- [Tsubasa pile]
- [GEO-WING PILE]

- Enlarged Pile/Head Type
- Normal Pile Type

Socket Type Joint Connection

- CFT column
- Steel pipe pile
- End plate
- Filled Concrete

Sheet Pile Foundation

- Footing
- Sheet pile

Lift-up Method

- Drive Steel pipe pile
- Insert tube column
- Construct Superstructure
- Install noise barrier and ladder track

- Install temporary pedestal and jack
- Lift up superstructure
- Fill concrete into the pile

- Remove jack and pedestal
- Fix and adjust ladder track
Ladder Track

Measurement of acceleration during train running

Association for Ladder Railway Viaduct System

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