

Project Profile

# Expressway Renewal Project

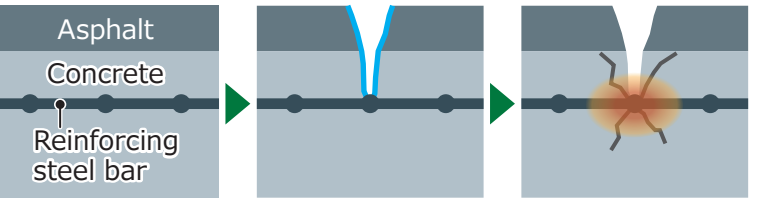
Type of project: Tomei expressway renewal work  
(section between Tokyo IC and Tomei Kawasaki IC: Tomei Tamagawa Bridge)

### For improved safety and driver comfort

We will conduct a deck slab replacement project to remove old cast-in-place concrete slabs on the bridge. Precast concrete deck slabs are manufactured at a factory and installed at the worksite to reduce the construction time and improve the quality of the final product. During the construction, we will employ the multiple-section\* deck slab construction method to secure the number of available lanes for the traffic. It will minimize the project's impact on drivers who cross the Tomei Tamagawa Bridge when traffic restriction becomes necessary.



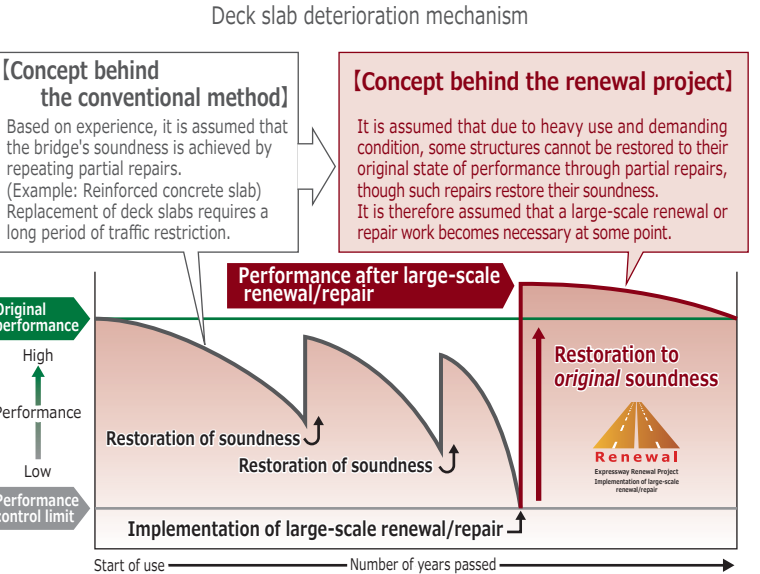
\* Conceptual image of multiple-section deck slab replacement at Tomei Tamagawa Bridge



Rainwater and antifreeze agents have seeped into cracks of the pavement, rusting the reinforcing bar inside the concrete deck slab and deteriorating the deck slab.

### Damage to the Tomei Tamagawa Bridge

The Tomei Tamagawa Bridge is in the section of the Tomei expressway that opened in 1968. A large number of heavy vehicles travel over the bridge daily, accelerating the deterioration of the bridge. Although partial repairs and reinforcements have been made over the years, structural damage has progressed, and we have confirmed concrete spalling at the bottom of the deck slabs that resulted in rebar exposure and corrosion. Addressing such a problem requires drastic countermeasures, such as replacing deck slabs.



### Deterioration and damage

●Concrete spalling

●Rebar exposure

●Void behind concrete at the bottom of deck slab

●Concrete deterioration on the contact surface of deck slab steel plate

●Concrete spalling on exterior of parapet foundation

●Deterioration of area around the expansion joint due to water leakage

# Pilot Project on Tomei Expressway's Six-Lane Segment in the Greater Tokyo Area

### Information on traffic conditions and constructions

[Overview and progress of construction, safety awareness for drivers, and other information]

#### ■Tomei Renewal Project (Tomei Tamagawa Bridge) website

[https://restriction.c-nexco.co.jp/ttrn\\_21a2/](https://restriction.c-nexco.co.jp/ttrn_21a2/)

※You can access the construction website by entering the keyword shown below into a search engine.

Search example

[NEXCO Central scheduled traffic restrictions]

#### ■Notice on major construction restrictions

〈Major Construction Restrictions Portal Site〉

<https://restriction.c-nexco.co.jp/>

#### ■Notice on construction restrictions

〈Traffic Control Plan Map〉

<https://construction.c-nexco.co.jp/>

[Realtime traffic information]

#### ■iHighway NEXCO Central website

<https://www.c-ihighway.jp/>

#### ■Japan Road Traffic Information Center

TEL.050-3369-6666 (Fast dial #8011)

Website: Road Traffic Information Now !!

<https://www.jarttc.or.jp/>

### Inquiries

[Inquiries about the Tomei Renewal Project]

#### ■NEXCO Central Customer Service (24 hours)

TEL.0120-922-229 (toll-free)

TEL.052-223-0333 (with charge; for those who cannot call the toll-free number)

※Please notify police at 110 in case of a traffic accident.

### Owner

Central Nippon Expressway Company Limited (NEXCO Central),  
Tokyo Regional Head Office  
Section in charge: Yokohama Maintenance/Service Center,  
Tokyo Regional Head Office  
〒226-0026 5509 Nagatsuda-cho, Midori-ku, Yokohama, Kanagawa  
TEL.045-922-1141

### Contractor

Obayashi Corporation, Obayashi Road Corporation  
Tomei Renewal Project (Tomei Tamagawa Bridge)  
〒214-0022 Under the Tomei Expressway, 1-13 Seki, Tama-ku, Kawasaki, Kanagawa  
TEL.044-322-0957



## The Tomei Renewal Project

## Tomei Tamagawa Bridge Deck Slab Replacement Project

Project Profile

# Tomei Renewal Project (Tomei Tamagawa Bridge)

### Project profile

Tomei Tamagawa deck slab replacement project is one of the renewal projects for the section between Tokyo IC and Tomei Kawasaki IC, of the Tomei Expressway. The section is one of the most heavily trafficked sections - in Tokyo, with 100,000 regular vehicles passing each day. Since it has a large impact on society, the deck slabs will be replaced in six construction steps in order to secure six lanes without reducing the number of lanes as much as possible during the construction period.

### Main Project Details

Existing deck slab removal work	15,500㎡
Deck slab installation work	15,500㎡
Noise barrier replacement	700m
Road lighting replacement	All

### Overview of traffic restrictions

The Tomei Renewal Project (Tomei Tamagawa Bridge) will take place over a three-year period from late November 2021 to late November 2024. To replace the bridge's old concrete deck slabs with new deck slabs, traffic restrictions will be implemented in the form of lane shifts and lane width reductions, with lanes also to be separated for some periods.

### Area of construction



### Problems faced on the site

1

Volume of traffic=56,000 vehicles/day (one side)  
Project occupies heavy traffic section

Minimize number of restricted lanes and period of construction-related traffic restrictions

2

Adjacent bridges (Tokyo Viaduct and Kawasaki Viaduct) are close to dense residential areas

Avoid prolonged schedule and impact on neighborhood by carrying out construction without widening Tamagawa Bridge and adjacent bridges

3

Maintenance and repair work are difficult after opening the bridge to the public

Facilitate maintenance by creating high quality and high durability structure

### Construction plan

1

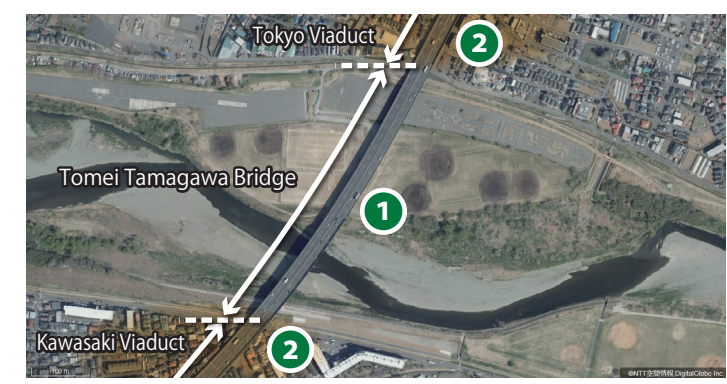
Minimize number of restricted lanes and period of construction-related traffic restrictions

2

Avoid prolonged schedule and impact on the neighborhood

Adopt multiple-section deck slab construction which shortens the number of restricted days as much as possible without widening Tamagawa Bridge and adjacent bridges

Bridge name	Bridge length	Width	Deck slab replacement area
Tomei Tamagawa Bridge	495m	31m	15,490㎡





①Technology that saves labor on site by minimizing the work process

### Slim-Fastener

- Features of Slim-Fastener
  - Connection width is reduced (50% of conventional method)
  - On-site arrangement of reinforcement is unnecessary, and amount of cement poured is reduced.
- Shorter work process (i.e., shorter traffic diversion period)
- Slim-Crete has high strength and durability
- Joints do not become structural weak points
- Maintenance-free structure

Multiple shear keys  
Slim-Fastener Method

Rebar anchorage length  $\phi 5$   
Slim-Fastener Method  
Joint width 21cm

### Slim top deck slab

- Wheel load running test (Demonstration test conducted prior to construction work)
- Adopted at Tohoku Expressway Miyagi Shiraisigawa Bridge (Fall 2020)
- Provides fatigue durability and water impermeability equal to or greater than that of existing PCA deck slabs

Slim top deck slab  
Slim-Crete (2 to 5 cm)  
PCA concrete slab

Asphalt pavement  
Slim-Crete filling  
Rebar

### Multiple shear key

PCa slab Bonding agent

Frictional resistance

Improved shear force and adhesive strength

### [Slim-Crete]

Slim-Crete

UFC (ultra high strength fiber reinforced concrete)  
Offers ultra-high strength (180N/mm<sup>2</sup>) and high durability

Ultra high strength mortar + Ultra-high strength steel fiber

Other UFCs  
Slim-Crete

### Joint connection work is incorporated into the deck slab removal and installation cycle

Joint connection work is incorporated into the deck slab removal and installation cycle

②Technology that allows traffic restrictions to be lifted after deck slab replacement is conducted while one lane is restricted at nighttime

### Slim Neo-Plate

- Installation procedure

1 Fixing of main girders and deck slabs

2 Installation of Slim Neo-Plate

3 Paving of joints

4 Open to traffic

5 Filling at the bottom of plate

1 Fixing of main girders and deck slabs  
2 Installation of Slim Neo-Plate  
3 Paving of joints  
4 Open to traffic  
5 Filling at the bottom of plate

### Nighttime

1 New PCA deck slab  
Fill with non-shrinkage mortar  
2 Install Slim Neo-Plate  
Inject acrylic adhesive  
3 Pave the joint

### Daytime

4 New PCA deck slab  
Main girder  
5 Pump and fill with Slim-Crete

Tomei Expressway

Tomei Tamagawa Bridge

Construction Schedule (plan)

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