Ship Collision Repair & Rehabilitation of a Cable Stayed Bridge

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KURINO, Sumitaka
CHODAI CO., LTD
Japan
Binh Bridge: Vietnam, Hai Phong

Opening on March 13, 2005

17 span continuous composite girder

Bridge length: 1,280 m
On River: 100 + 260 + 100 m

Road width 22.5 m (4 car lane + 2 pedestrian)

Edge steel girder:
H = 1.75 m (Center)
Distance = 20.5 m
RC slab thickness = 260 mm

Repair - Rehabilitation Work
FD - DDTA - CS: Chodai Co., Ltd

Construction: IHI Infrastructure Asia
Ship collision

July 17, 2010
Typhoon Conson
Ship collision

- Damaged cables: 23B, 24B
- Damaged slab & handrails
- Damaged girder: L = 23m
Detail Design: 3-D model
Girder repair procedure

1. 

2. 

3. 

4. 

5. 

6.
Temporary Bypass Truss Method

Repaired girder

Length L = 22.5 m

Lower FL

Thickness t = 50 mm

Web thickness t = 16-20 mm

SM 570 TM C

Section A-A
Girder: Girder:
Repair
Cable: Replace
Temporary hanger
Roller-parts
Guide rope
Removal
Winch
Internal Inspection of a damaged cable

Cover-taping: 4 days after the collision

Water intrusion

1.5m from socket: Poly-Butadiene rubber

Cable 24B

Inside cable inspection

561cm

15cm

760cm

Damaged area

Cable 24B

L = 10.5m

Cable

Dia = 115mm

Ø7mm@163

Black HDPE Cover
Cable Inspection

Top of cable (A-line) 0-30 cm

60-80 cm Close-up
Cable Inspection

Corrosion map

Damaged cable >> Urgent waterproofing

Socket  Steel Sheeve

A(Top)  B  C  D

Spots of brown (red) rust

0  20  40  60  80  100  120  140 cm

HDPE Pipe

Ø150mm

Ø7mm Galvanized Wire

White rust covering

White rust appeared

New
Conclusion

- **Ship Collision** – Binh Cable Stayed Bridge
- Damage: Girder buckling, Cable Cover
- FSD, DD: Repair girder, Replace cables
- Girder repair: **Temporary By-Pass Truss**
- Cable replacement: **Temporary Hanger System**
- Cable internal inspection: Water
Thank you for your kind attention.

The works had completed in 2012-13 and Defect Liability Period has completed in 2014.
Cable Replacement

Setting of Cable Hanger System & Major Equipment Arrangement

Cable (100tonf)  
Crane (25tonf+)
Scaffolding (Girder side)
Cable Unreeler
Ram Chair & Jack
Scaffolding (Tower side)
Gondola
Turn Sheve
Concrete Anchor
Winch
Cable Supported Part
(Comet Span)
(Side Span)