#### 2.2.9 Cables

#### (17) Damages in cable

#### (a) General description and damage characteristics

This subject is defined as the damage occurring in the cables and the anchorages of the cables of cable stayed bridges.

#### (b) Relation to the other damages

- It is difficult to inspect corrosion on the cables directly so that it shall be evaluated by means of the damage on the cable sheathing, the leaking rust stain from the anchorage, etc..
- The concrete damages at the anchorage shall be evaluated in the subjects of cracking, water leakage, free lime, rebar exposure, etc..

## (c) Inspection area

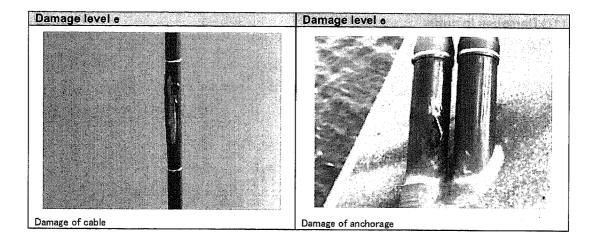
The damages in the cables such as deterioration of cable sheathing, deflection, twist, fracture, etc. and those in the cable anchorages such as deterioration of waterstop cover, missing bolts, corrosion, deterioration and missing of sealing material, etc. are inspected approaching closely or using binocular.

## (d) Classification of damages

The inspected results shall be evaluated with the following classification:

Evaluation criteria	Classification
No damage .	а
Damaged	6

# (Examples)



## 3. Inspection records

The inspection results shall be recorded for each span according to the followings. Spans are numbered as 1, 2... from the beginning point numbering members for each span according to the following procedure.

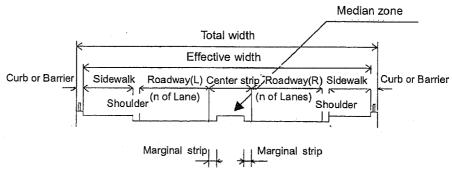
## 3.1 Recording guide for the inspection results

#### (1) Bridge data

The following data should be filled:

- a) Recording date
- b) Identification data (bridge name, route name, jurisdiction, location, etc.)
- c) Data regarding service condition (date in service, live load, applied specification, etc)
- d) Basic components of whole bridge (bridge length/number of total spans/structural type)
- e) Traffic condition (year of traffic survey/heavy vehicle ratio/traffic/load restriction)
- f) Width of road

The items shown in the following figure are provided to cover the different road width type. The inapplicable items need not be filled.



## g) Data regarding bridge location

These are provided for the following purpose:

- Distance from the coast: Information for chloride damage
- Designation for emergency transportation road:

The road designated in the disaster prevention plan for the wide range countermeasures such as evacuation, rescue, material supply, facility restoration, etc.. Information for the judgement of the repair priority.

- Priority route:

Especially important stretch among the emergency transportation roads, which combines the main disaster prevention bases and the cities. Information for the judgement of the repair priority.

- Condition under bridge: crossing condition under the bridge (river, road, etc.)
- h) Overall view of bridge and general view for each span

## (2) Site photo

The photos show the outline of the bridge site (overall, under the bridge, on the bridge) should be attached for each span.

a) Recording date: The date when the form is recorded after the inspection

b) Photo No. : Corresponding number to the photo (from left to right No.1, 2, 3 --)

c) Span No. : Corresponding span No. to the photo

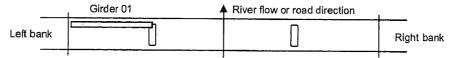
d) Description : Photo target such as side, road surface, under the bridge, etc.

e) Inspection date : The date when the photos are taken

f) Note : Supplementary explanation for the photos

#### (3) Member numbering scheme

Member shall be numbered from left bank and downstream in principle.



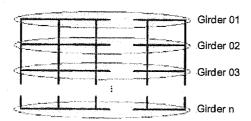
In case of special bridge type in which it is difficult to record according to the following procedure, the members shall be appropriately devided and numbered.

Member No. according to the following numbering rules shall be illustrated for each span.

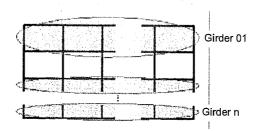
## 1) Girder and stringer

In principle these shall be defined in each girder.

#### i) Steel plate girder, concrete T-shaped girder



#### ii) Box girder etc.

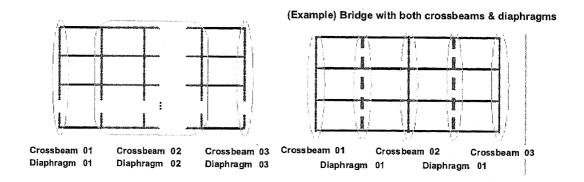


The bridges can not be devided in each girder such as a slab bridge shall be defined as "Girder 01" as a whole.

## 2) Crossbeam and diaphragm

These shall be devided into "end part" and "intermediate part".

In case a bridge has both crossbeams and diaphragms the end parts shall be considered as 01 and the intermediate parts as 02 respectively (refer to the right figure below).

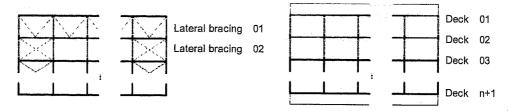


In case of a box girder the crossbeam and diaphragm on the same line may not be considered independently.

## 3) Lateral bracing and deck

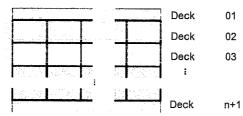
These shall be defined in each line between the girders.

## i) Steel plate girder, concrete T-shaped girder



For prestressed concrete T-shaped girders, only CIP-slab parts shall be defined as a deck in principle. For reinforced concrete T-shaped girders the parts except haunches shall be defined as a deck and the upper flanges and haunches are defined as a girder.

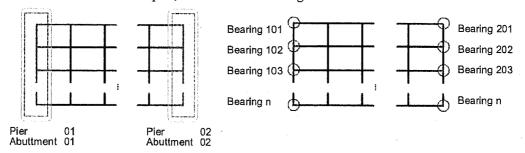
## ii) Box girder etc.



For slab bridges etc. only the cantilevered deck and the CIP-slab parts shall be defined as a deck and the other parts as a girder.

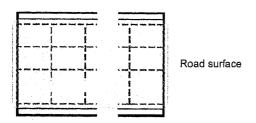
## 4) Substructures(pier, abuttment) and bearings

These shall be defined in each pier, abutment and bearing.



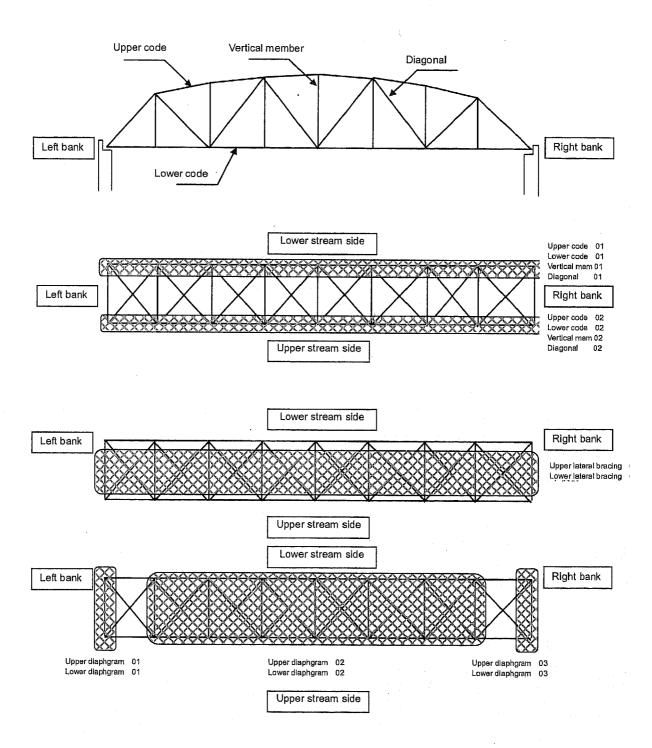
## 5) Road surface

This shall be defined in a span.



## 6) Truss member

In principle the same numbering rules shall be applied for the members of truss bridges as above from 1) to 5), however, the specific members for truss bridges shall be numbered as follows:



## (4) Inspection result (1)

The classification of the inspected damages shall be recorded in the form for each span.

#### (5) Inspection result (2)

Damage location map and damage photo shall be recorded in the form for each span.

#### 1) Damage location map

"Member No.", "damage type" and "photo No." of the inspected damages shall be recorded in the damage location map.

#### 2) Damage photo

Corresponding photos to the inspected damages shall be attached.

a) Photo No. : Corresponding No. to the photo (from left to right No.1, 2, 3 --)

b) Span No. : Corresponding span No. to the photo c) Inspection date : The date when the photos are taken

d) Member No. : Girder 01, Bearing 01, etc.

e) Damage : Type of damage / Cracking, rebar exposure, etc.

f) Damage level : Classification of damage / a - e

g) Note : Supplementary explanation for the photos

The following damages need to be described besides damage and damage level in the note:

#### • Missing bolts

Potential influence upon the third person shall be described.

• Cracking, water leakage and free lime (common to super- and substructures)

In case of Classification of damage "c":

Distinction of "Crack width w = 0.2mm or not" and "Remarkably influential cracks upon structures or not"

## • Deck cracking

In case of Classification of damage "a":

Distinction of "Cracked or not"

• Damages in pavements

In case of Classification of damage "a":

Distinction of "Cracked or not"

3.2 Recording forms and recorded examples

[Recording Forms]

Bridge Da	ita			in the state of th	V		20 <b>427</b> -			Record	ing Date			
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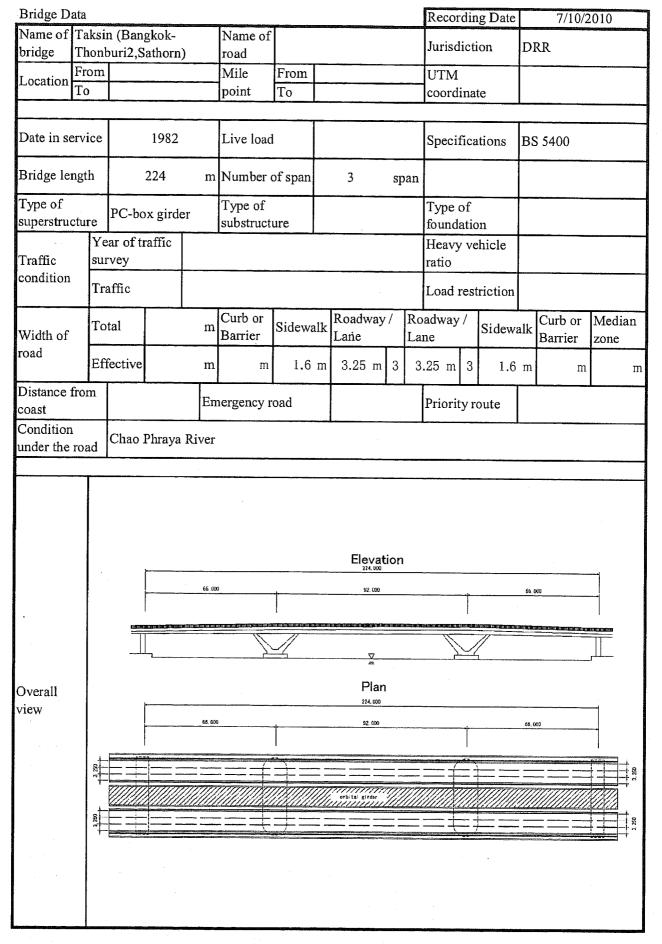
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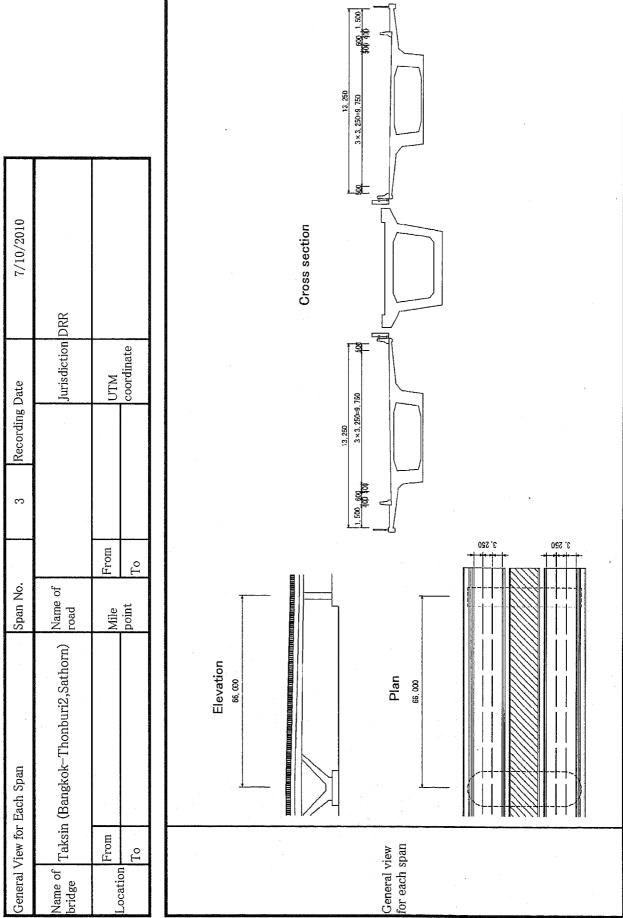
Note: For "No Note: For "No." is that of remarkably influential cracks defined in the inspection & evaluation manual.

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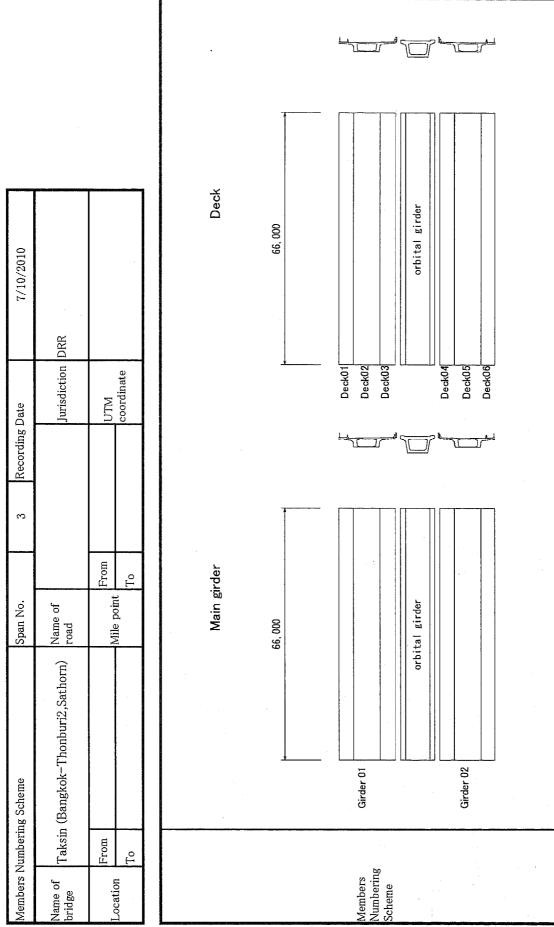
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[Recorded Examples]





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		Corrosion	Cracking	Missing bolts	Fracture	Deformation and loss	Cracking, Water leakage, Free lime	No.	Rebar exposure	Pop-outs	Deck cracking	Damages at anchorage of PC tender	Level difference of road surface	Functional damage of bearings	Damages in substructures	Damages in pavemnents	Damages in barriers	Damages in expansion joints	Damages in cable	Remarks
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Note: For "No." is that of remarkably influential cracks defined in the inspection & evaluation manual.

			Girder 01,02∶Poor drain, Photo 10 Bearings 101 ≺04∶Corrosion,	Deck 01,03,04,06: Cracking and Free lime, Photo 1 Pier 02: Cracking, Photo 8		A)	. 1	Pier 02: Bird harm, Photo 9
7/10/2010	DRR		φ -	Deck 01,				Pier 02:B
3 Recording Date	Jurisdiction DRR	UTM coordinate	Damages on the exterior girder surface  Power transmission pipe: Corrosion, Photo 3,4  66, 000	Girder 01: Free lime, Photo 7 Girder 01: Cracking, Photo 5,6		orbital girder	0	
ce(1Span No.	Name of road	Mile point To	Dar	Girder 01:	0	o	0	
Inspection Result(2): Damages on the exterior girder surface(1Span No.	Taksin (Bangkok-Thonburi2,Sathorn)		Down stream	Up stream				
Inspection Result(2	Name of Taksin bridge	Location To		75	Damage Location Map			

Inspectio	n Result(2) : 1	Damages on the	Inspection Result(2): Damages on the exterior girder surface(2) Span No.	e(2)   Span I	۷٥.	3	Recording Date	g Date		7/10/2010			
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7/10/2010	)RR			urface		Railing 02:	
Date	Jurisdiction DRR	UTM	coordinate	Damages on the road surface		66, 000  Rement: Hole, Photo 1  Barrier 01: Cracking of base concrete, Photo 3	
Recording Date				)amages or		66, 000  Pavement: Hole, Photo 1  Barrier 01: Cracking o  Photo 3	
3						Barrier 0	
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Span No.	Name of road	Mile point	ivine pour			<u> </u>	Control of the section of
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n Result(2)	Taksin	From	To	3		Location	
Inspectio	Name of bridge	1	Location			Damage Location Map	

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			Inspection date	Note			Inspection date	Note		
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Recording Date	Jurisdiction	UTM coordinate	Photo No.	Member name	Damage		Photo No.	Member name	Damage	
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Inspection	Name of bridge	Location			-7.1	<u>o</u>		<u>- 1</u>	<u>,-1</u>	