FORTH ROAD BRIDGE

North West Main tower. Expansion Joints Main-span

Removal of

And Reinstatement of plate MW 3.

FORTH ROAD BRIDGE

Pre - Post Inspection Information.

North West main Tower Expansion Joint.

Main-span plate MW 3.

FORTH ROAD BRIDGE

North West Main Tower expansion joint . Removal and re-instatement of plate Main-span west No. 3.

On Sunday the 12th of October 2014, a programme of works operational procedure was carried out, the objective, to inspect and report the current status of the North main tower expansion joint plate MW 3. and to carry out any requested repairs or remedial works if required before being reinstated back into position.
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Pre- removal . : Prior to the removal of the north west main tower expansion joint plate Mw.3. Bridge inspector carried out the required dimensional checks. All required information recorded.

Engineers removed required plates rocker & tongue plate bolts & springs. Prior to removal bridge inspector recorded measurement of tensioning on springs to ensure exact tensioning restored following reinstatement of plate. In conjunction with this, the emergency failsafe system connection plates and associated fixings attached to underside of Rocker & sliding plates were removed. Bridge inspector carried out a spring measurement on both Tongue & Rocker plates. It was agreed prior to commencement of works that both rocker and tongue plate springs would be replaced regardless of condition of existing springs. Therefore it was found that there was no requirement to record in situ spring dimensional diameter checks and supply survey sheets. Although it should be recorded that sizes were taken on spring lengths only. Condition was satisfactory, no visible cracks. corrosion evident through breakdown of the protective coating.
Pre – removal photographs.



Rocker Plate spring. Tongue plate springs (East & West)

Post – removal photographs.



Rocker plate spring Tongue plate springs (East & West)

Positioning of lifting equipment & crane usage : Crane positioned on site .

Tongue plate removal.

Tongue plate on MW3. lifted and laid down as specified as per Drawings. Note. : During lifting it was found that plate movement combined with the build up of corrosion scale, detritus on the edges of the plate created resistance. This was located in the north west corner of the plate. This was overcome by applying impact by means of a heavy hammer. This combined with the continual lifting force being applied by the crane was enough to free up and release the plate to allow removal .

Rocker & shuttle plates on MW3. lifted and laid down as specified as Per drawings. No problems were encountered during removal . Post removal , plates, radius arm girders and underdeck steelwork were pressure washed so that dimensional checks could be carried out. This would incorporate bush & pin wear on the rocker / sliding plate, wear-down depths on the radius arm girders & the visual inspection of all welds on the plates bearing pads. Following the completion of removal and lay – down of plates , employees from consultants Atkins attended the site. It should be recorded that no guarantee of complete 100% accuracy with regards to bush thicknesses can be given. Some bush wear has receded back into the pin location making it difficult to obtain an exact measurement. The pin internal bore in itself has areas of corrosion, detritus.

On completion of their inspection, it was agreed that plate MW3 could be reinstated. Whilst carrying out pre removal dimensional survey the mismatch recorded between the tongue plate and bitumen plate would require 5mm packer plates to be welded to the existing bearing pads. This was completed . Prior to the reinstatement of the tongue plate, all faces of the plate were cleaned by engineer using a grinder to remove all corrosive material to ensure no problems occurred with the refitting.

Packer plates welded to existing tongue plate bearing pads.

Following completion rocker, shuttle & tongue plates were reinstated without any problems. Emergency failsafe system connection plates and associated fixings attached to underside of sliding plate.

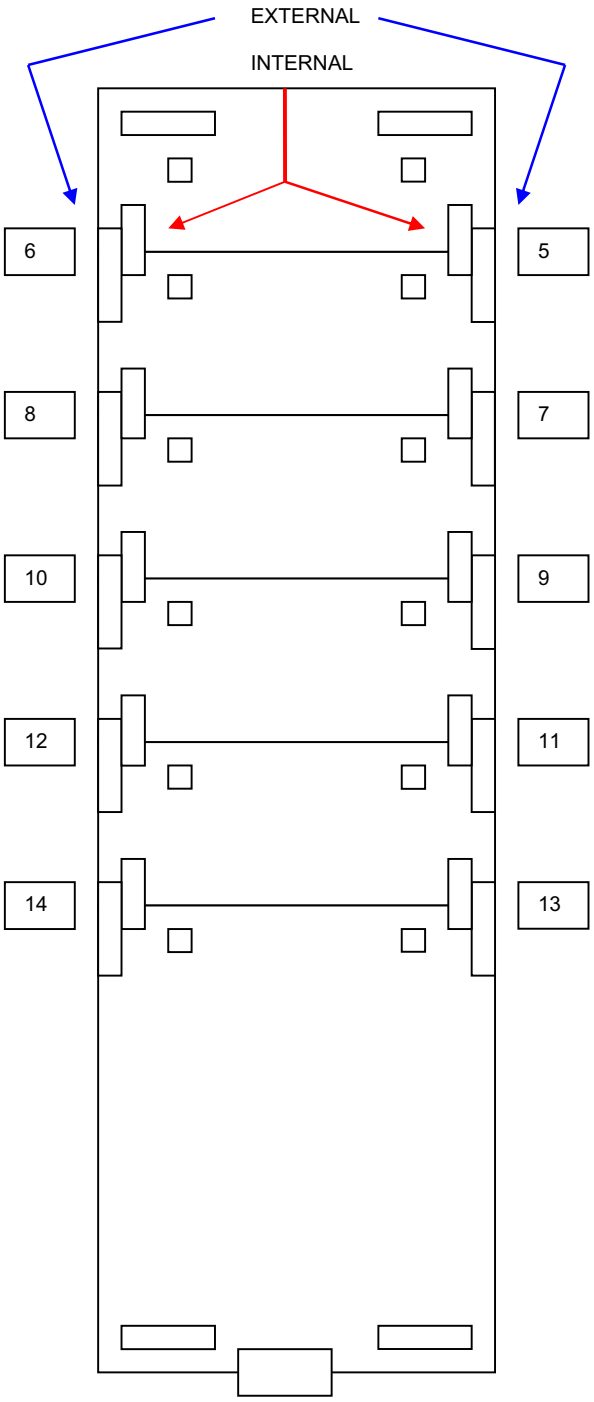
Bridge post removal dimensional checks completed on plate MW3 following reinstatement.

Bridge Inspector. :

Note.:
It should be recorded that following completion of works, tarmac removed defective area of surfacing as instructed from bitumen plate No1.west.Previous repairs had been carried out previously by FRB using cold laid material. Reinstatement was carried out using mastic asphalt.

FORTH ROAD BRIDGE

INSPECTION DEPARTMENT
Demag dimensional. . North west Mainspan plate. MW.3. . Pins & bushes. .
DATE. 2014.10.12.



PIN No.	EXTERNAL	INTERNAL
5	39mm	39mm
Bush thickness		
Top	4 mm	4 mm
Bottom	4 mm	4 mm
North	4 mm	4 mm
South	4mm	4 mm
6	39mm	39mm
Bush thickness		
Top	4 mm	3 mm
Bottom	4 mm	3 mm
North	4 mm	3 mm
South	4 mm	3 mm
7	39mm	39mm
Bush thickness		
Top	2 mm	3 mm
Bottom	2 mm	3 mm
North	2 mm	3 mm
South	2 mm	3 mm
8	39mm	39mm
Bush thickness		
Top	4 mm	3 mm
Bottom	3 mm	3 mm
North	4 mm	3 mm
South	3 mm	3 mm
9	39mm	39mm
Bush thickness		
Top	2 mm	2 mm
Bottom	2 mm	2 mm
North	2mm	1mm
South	1 mm	2 mm
10	39mm	39mm
Bush thickness		
Top	2 mm	2 mm
Bottom	0 mm	2 mm
North	2 mm	1 mm
South	1 mm	2 mm

FORTH ROAD BRIDGE

INSPECTION DEPARTMENT
North main tower expansion joint . MW.3.
DATE: 21014.10.12.

◀Inspection Record Sheet:- Mainspan . 2014.10.12.. PLATE MW3.		
Subject :- Demag plate set removal	Location. North west main tower. MW 3.	
Pre & Post removal Dimensional Checks		
Pre-removal Checks		
Task	Yes	No
* Record top side clearance gaps as identified on survey sht 2 of 4	✓	
* Mismatch between adjacent plates, rocker MW 2 – N. 4 mm S. 4 mm	✓	
rocker MW 4 - N. 3 mm. S. 0 mm	✓	
Slide plate No. 1 MW 2 - 3 mm Centre	✓	
Slide plate No.1 MW 4 - 3 mm Centre	✓	
Tongue plate MW 2 – N 11 mm .S.8mm	✓	
Tongue plate MW 4 – N 10 mm S.8 mm	✓	
* Spring lengths:- rocker plate:- 150mm	✓	
* Spring lengths:- tongue plate:- east. 82 mm West. 82mm	✓	
Mismatch between adjacent plates Main span end trimmer & rocker plate:- east.12 mm west. 8mm	✓	
Post Removal Checks		
Task	Yes	No
Slide plate cam radius:- As per drawing		✓
* Bush wall thickness: (5) mm (6) mm (7) mm (8) mm		
(9) mm (10) mm (11) mm (12) mm (13) mm (14) mm . Refer to page 3		
*Radius girder wear plate thickness:- As per drawing.		✓
* Tongue plate radius length:- As per drawing.		✓
* Tongue plate end thickness:- Worn to nothing	✓	
Remedial & Completion Checks		
Task	Yes	No
* Top side clearance gaps (complete sheet 3 of 4)	✓	
* Pins and bushes replaced:- No pins or bushes replaced .		✓
*Springs and pins replaced:- Yes. Tongue springs & Rocker spring..	✓	
* Spring lengths:- rocker plate:- 150 mm		
*Spring lengths:- tongue plate:- East. 82 mm West. 82 mm		
* Complete comment sheet 4 of 4 (if required)		
Inspected by: G.Elliott .	Date: 2014.10.12.	

Note. :

Spring sizes. Rocker 150 mm. Tongue plate E & W 82mm
Pre- removal. : Rocker plate spring. = 139 mm. Tongue plate springs (E) 71mm (W) 71mm
Post - removal. : Rocker plate spring. = 139 mm. Tongue plate springs (E) 71mm (W) 71mm
Springs compressed by required 11 mm. on replacement of plates.

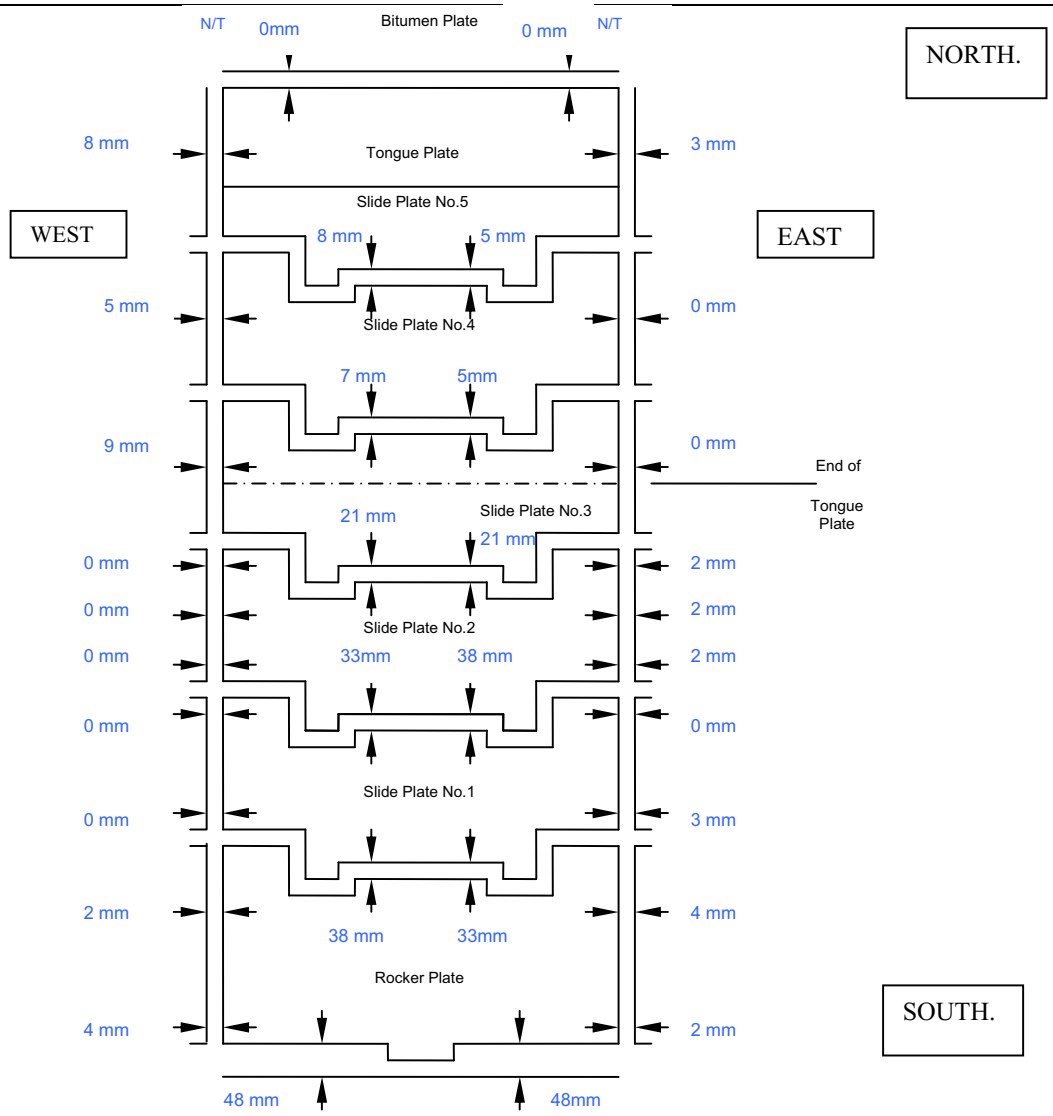
Post removal slide plate cam radius bush wall thickness. **Please refer to sheet No 3. For all sizes.**

*** Slide plate cam radius recorded n/ shift 2009.01.16. as **3.785 Metres*****

FORTH ROAD BRIDGE

INSPECTION DEPARTMENT
North main tower expansion joint . MW.3.
DATE: 21014.10.12.

Inspection Record Sheet:-	
Subject :- Demag plate set removal Pre-removal Dimensional Checks	Location: North main tower expansion joint . MW.3.



Inspected by:	G. Elliott.
Date:	2014.10.12..

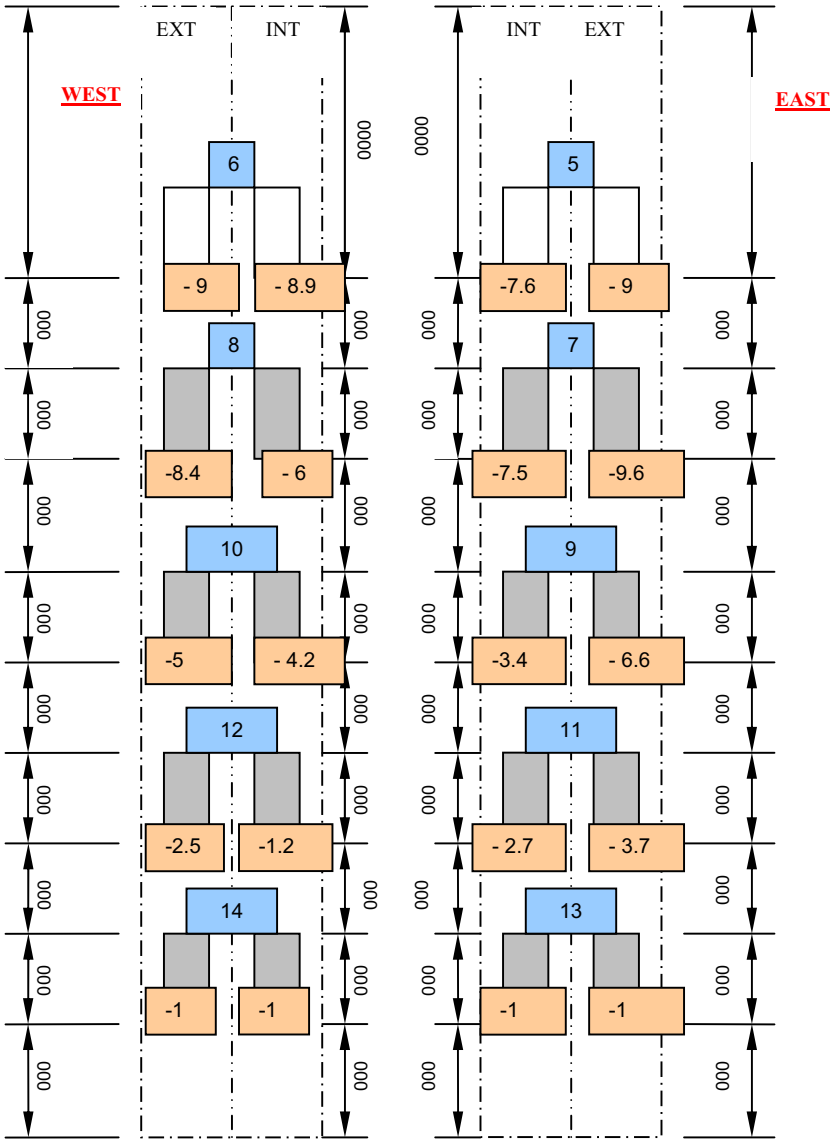
FORTH ROAD BRIDGE

INSPECTION DEPARTMENT
North main tower expansion joint . MW.3.
DATE: 21014.10.12.

Inspection Record Sheet:- Main span NW. 2014.10.12.. PLATE MW 3.	
Subject:- Demag Plate Set Removal	Location:- North west main tower. Mw.3.

Pin No.		Internal Dia.	External Dia.
5		39mm	39mm
Bush Thkns	Top	4mm	4mm
	Bottom	4mm	4mm
	North	4mm	4mm
	South	4mm	4mm
Pin No.		Internal Dia.	External Dia.
6		39mm	39mm
Bush Thkns	Top	3mm	4mm
	Bottom	3mm	4mm
	North	3mm	4mm
	South	mm	4mm
Pin No.		Internal Dia.	External Dia.
7		39mm	39mm
Bush Thkns	Top	3mm	2mm
	Bottom	3mm	2mm
	North	3mm	2mm
	South	3mm	2mm
Pin No.		Internal Dia.	External Dia.
8		39mm	39mm
Bush Thkns	Top	3mm	4mm
	Bottom	3mm	3mm
	North	3mm	4mm
	South	3mm	3mm
~~Pin No.~~		~~Internal Dia.~~	~~*External Dia.*~~
9		39mm	*39mm*
Bush Thkns	Top	2mm	*2mm*
	Bottom	2mm	*2mm*
	North	1mm	*2mm*
	South	2mm	*1mm*
Pin No.		Internal Dia.	*External Dia.*
10		39mm	*39mm*
Bush Thkns	Top	2mm	*2mm*
	Bottom	2mm	*0mm*
	North	1mm	*2mm*
	South	2mm	*1mm*
Pin No.		Internal Dia.	*External Dia.*
11		39mm	*39mm*
Bush Thkns	Top	2mm	*1mm*
	Bottom	2mm	*2mm*
	North	0mm	*2mm*
	South	N//T	*0mm*
Pin No.		Internal Dia.	*External Dia.*
12		39mm	*39mm*
Bush Thkns	Top	0mm	*2mm*
	Bottom	2mm	*0mm*
	North	0mm	*0mm*
	South	2mm	*0mm*

Pin No.		Internal Dia.	External Dia.
13		39mm	39mm
Bush Thkns	Top	1mm	0mm
	Bottom	1mm	0mm
	North	0mm	0mm
	South	1mm	0mm
Pin No.		Internal Dia.	External Dia.
14		39mm	39mm
Bush Thkns	Top	1mm	0mm
	Bottom	1mm	1mm
	North	0mm	1mm
	South	1mm	0mm



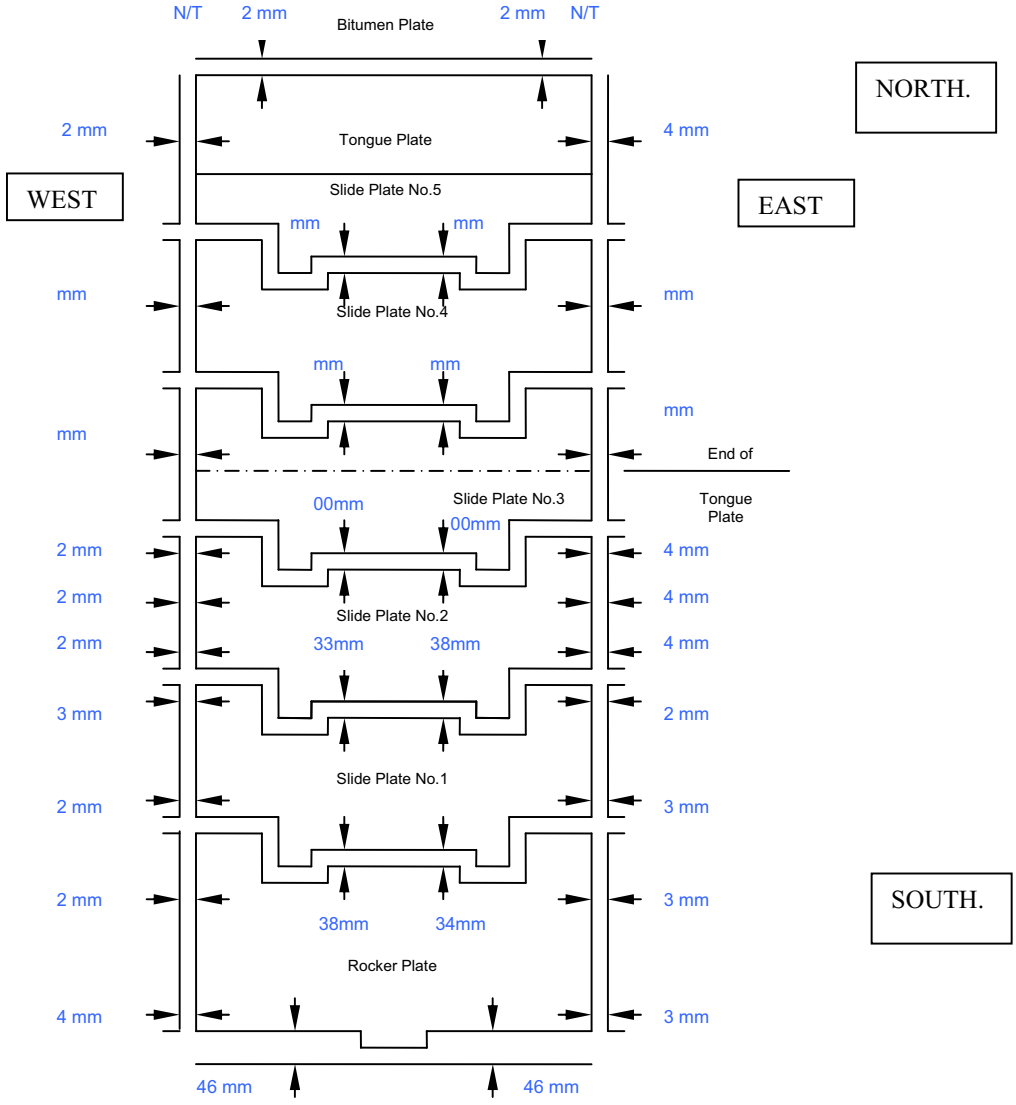
Radius girder wear down locations and Depression sizes are shown in mm.

DENOTES DEPTH OF WEAR

FORTH ROAD BRIDGE

INSPECTION DEPARTMENT
North main tower expansion joint . MW.3.
DATE: 21014.10.12.

Inspection Record Sheet:-	
Subject :- Demag plate set removal Post Inspection Dimensional Checks	Location: North main tower expansion joint . MW 3.



Inspected by:	G. Elliott.
Date:	2014.10.12.

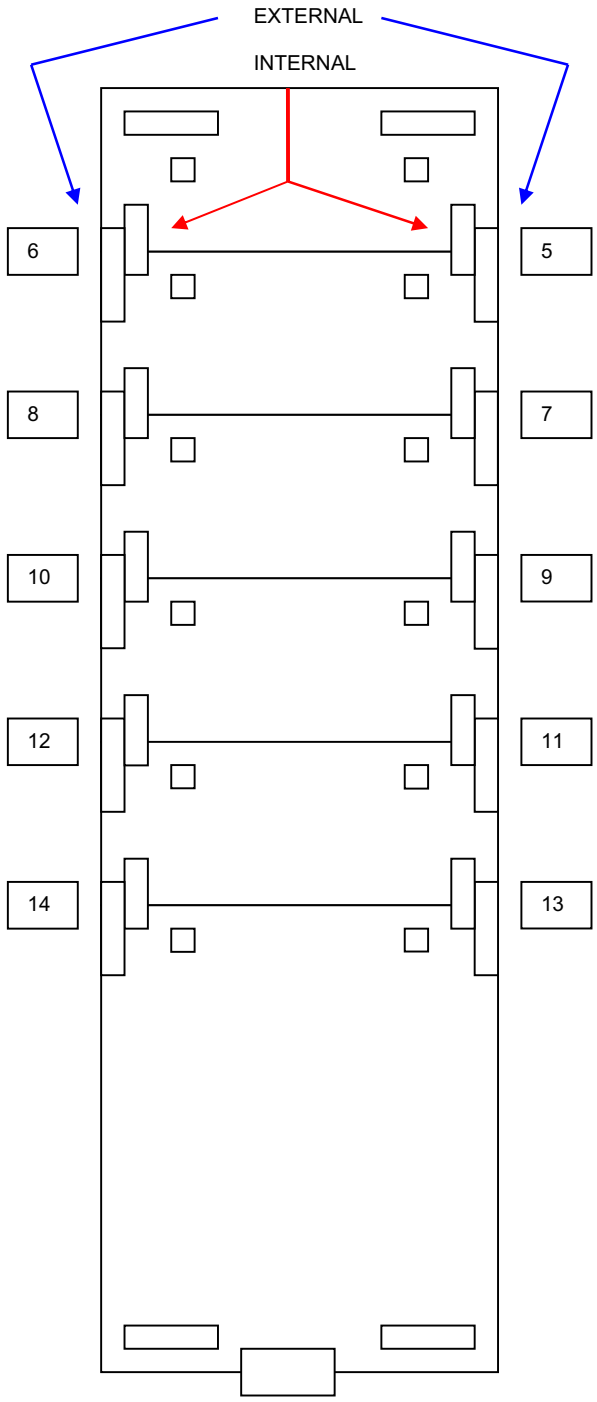
Note. : Radius arm wear-down measurements on plate MW 3. Recorded by Mr. Steven Jones. Of Atkins , consultants.

Bridge Inspector G.Elliott.

Bridge Inspector G.Elliott.

FORTH ROAD BRIDGE

INSPECTION DEPARTMENT
Demag dimensional. . North west Mainspan plate. MW.3. . Pins & bushes. .
DATE. 2014.10.12.



PIN No.	EXTERNAL	INTERNAL
11	39 mm	39mm
Bush thickness		
Top	1 mm	2 mm
Bottom	2 mm	2 mm
North	2 mm	0 mm
South	0 mm	N/T
12	39 mm	39mm
Bush thickness		
Top	2 mm	0 mm
Bottom	0 mm	2 mm
North	0 mm	0 mm
South	0 mm	2 mm
13	39 mm	39mm
Bush thickness		
Top	0 mm	1 mm
Bottom	0 mm	1 mm
North	0 mm	0 mm
South	0 mm	1 mm
14	39mm	39mm
Bush thickness		
Top	0 mm	1 mm
Bottom	1 mm	1 mm
North	1 mm	0 mm
South	0 mm	1 mm

Note. :

It should be recorded that no guarantee of complete 100% accuracy with regards to bush thicknesses can be given.

Some bush wear has receded back into the pin location making it difficult to obtain an exact measurement.

The pin internal bore in itself has areas of corrosion, detritus.

Bridge inspector . : G.Elliott.

FORTH ROAD BRIDGE

INSPECTION DEPARTMENT
Demag dimensional. . North west Mainspan plate. MW.3. . Pins & bushes. .
DATE. 2014.10.12.

FORTH ROAD BRIDGE

Weld Inspection Information.

North West main Tower Expansion Joint.

Main-span plate. MW 3.

FORTH ROAD BRIDGE

FORTH ESTUARY TRANSPORT AUTHORITY

VISUAL WELD INSPECTION REPORT		
Technician: G. ELLIOTT Signature:	Inspection Qualification: **P.C.N. LEVEL 2**	Date. : 2014.10.12.
Work Pack No. N/A	Drg No. **N/A**	Inspection Part: **. MW 3.** Rocker & Tongue plate bearing blocks.
Inspection Document Conforming To BSEN 13018:2001		
Direct Visual Test:	Aided	Unaided
If Aided:	Equipment:	
Remote Visual Test:	Endoscope	Fibre Optics
Test Location:	Workshop.	On site.
Illumination:	Natural	Auxiliary
Area Examined:	Welds & Heat Affected Zone	
Surface Condition:	As Welded	Dressed
Surface Preparation:	Dry & Free of all Dirt, Grease, Scale, Spatter, Oil etc.	
Fabrication Stage:	Fabrication Complete.	
Purpose of Test:	To find any surface breaking defects or indications.	

Name of Welder.: **N/A**	I.D. N/A	Results:
Comments: It should be recorded that all Rocker & tongue plate bearing block fillet welds were **v**isually inspected only. All welds remain in a satisfactory condition.		Accept: Reject: