

Attachment 5
(Present condition)

No.6 Emculu Bridge

Middle

LC-7

Middle

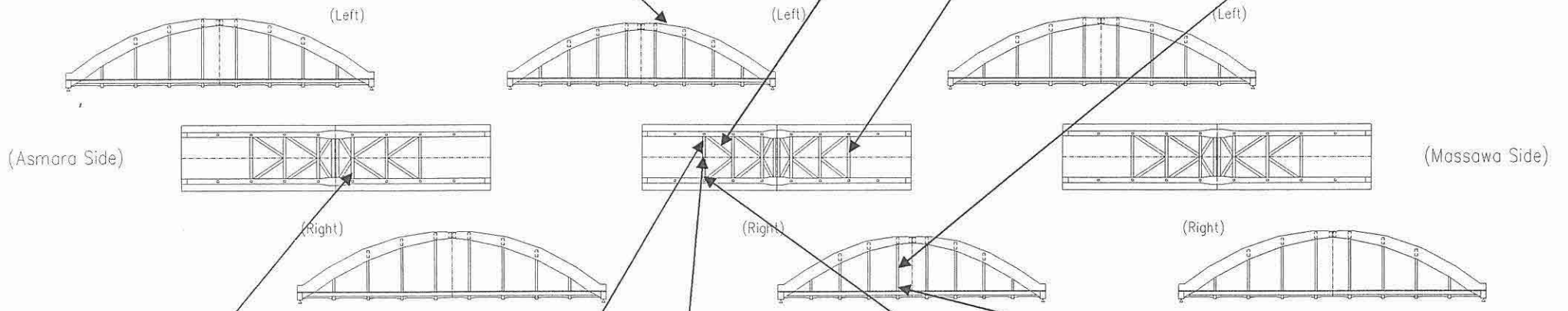
CF-1

Middle

UCB-8

Middle

RV-4



Asmara side

UCB-6

Middle

UCB-1

Middle

UCB-1

Middle

UCB-1

Middle

RV-4

No.6 Emculu Bridge

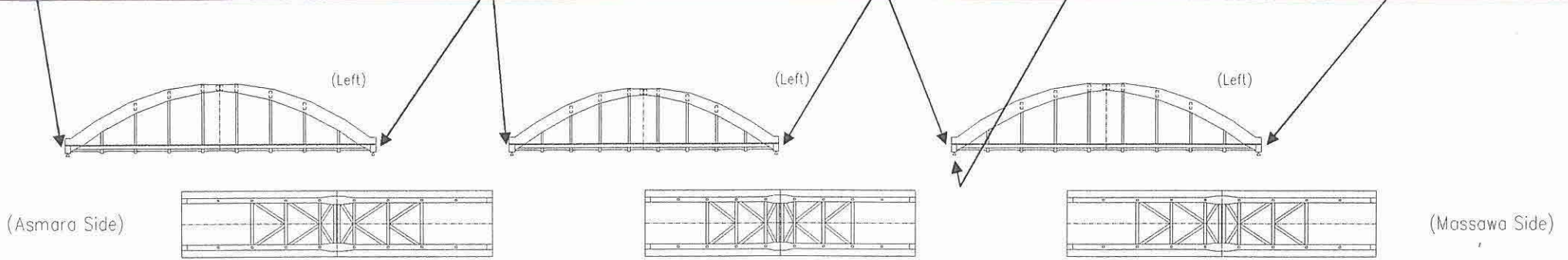
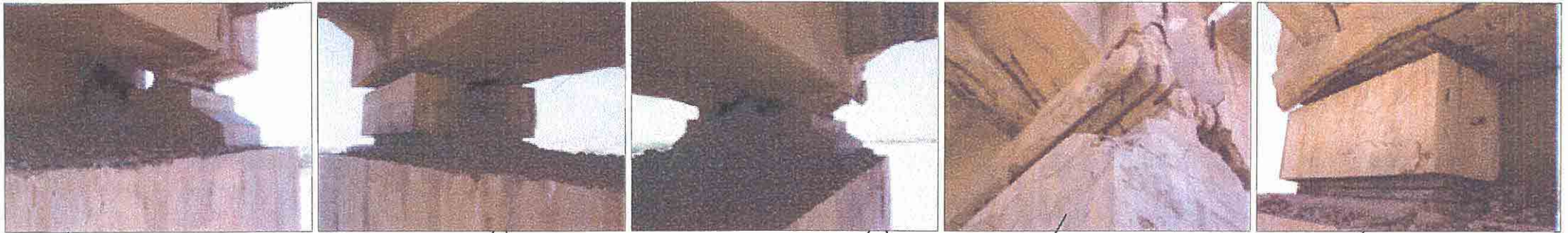
A1-Left

P1-Left

P2-Left

P2-Left

A2-Left



Handwritten signature or mark.

(Right)

(Right)

(Right)



A1-Right

P1-Right

P1

P2-Right

A2-Right

(3 alternatives on repair works of portal member and evaluation of 3 alternatives)

Handwritten signature or initials in black ink, appearing to be 'J A'.

	Alternative	Structural aspect	Construction aspect	Cost	Evaluation								
A		<p>RC structure(exising steel are driill out and these steel are to be connected new one. Though stiffness around support is depend upon existing steel's condition, degree of deterrioration semms to be not progress as existing steel is apparently sound. Though clearance at shouder is not suffucient(less than 5.00m),passing of vehicle has not specific problem.</p>	<p>New and existing bars are to be joinded with lapping or welding after blushing surface of old bars drilled out from deteriorated concrete. This RC structure has not any specific problem while repairing.</p>	<table border="0"> <tr> <td>RC member.</td> <td>3.36 m3</td> </tr> <tr> <td>Welding</td> <td>20 kot</td> </tr> </table>	RC member.	3.36 m3	Welding	20 kot	<p>⊙</p> <p>Recommendable</p>				
RC member.	3.36 m3												
Welding	20 kot												
B		<p>SRC structure(steel plates are installed around arch girder with high tension bolts, and H shaped steel is connected through splice plates. Stiffness at support can be secured as expected, but hitensin bolts and steel plate will be checked periodically.</p>	<p>Arch surface is to be cleaned with plaster mortal. After painting and applying cohesion agent,steel plates will be contacted with high tension bolts. After combining with arch member and steel plates,H shape steel is joined and concrete is embedded to form SRC structure. Construction period is longest.</p>	<table border="0"> <tr> <td>Steel plate</td> <td>1.75 t</td> </tr> <tr> <td>Hightension bolt</td> <td>22 kot</td> </tr> <tr> <td>Concrete</td> <td>1.70 m3</td> </tr> </table>	Steel plate	1.75 t	Hightension bolt	22 kot	Concrete	1.70 m3	<p>○</p>		
Steel plate	1.75 t												
Hightension bolt	22 kot												
Concrete	1.70 m3												
C		<p>SRC structure(Arch is to be drilled to insert steel bars to the horizontal direction. Inserted steel bars form connection with H shaped steel through splice plates. Though arch member patially injured,bridge is undertaken only dead load without live load,So Consultant beleive that any other problem will not arrise while repairing.</p>	<p>After hole to be inserted by bars is installed with concrete cutter, SRC structure is formed with H shaped steel plate. It is concened about injuring of existing bars in the arch member, so it needs careful works.</p>	<table border="0"> <tr> <td>Drilling</td> <td>9.60 m</td> </tr> <tr> <td>Steel plate</td> <td>0.92 t</td> </tr> <tr> <td>Hightensin bolt</td> <td>12 kot</td> </tr> <tr> <td>Concrete</td> <td>1.70 m3</td> </tr> </table>	Drilling	9.60 m	Steel plate	0.92 t	Hightensin bolt	12 kot	Concrete	1.70 m3	<p>○</p>
Drilling	9.60 m												
Steel plate	0.92 t												
Hightensin bolt	12 kot												
Concrete	1.70 m3												

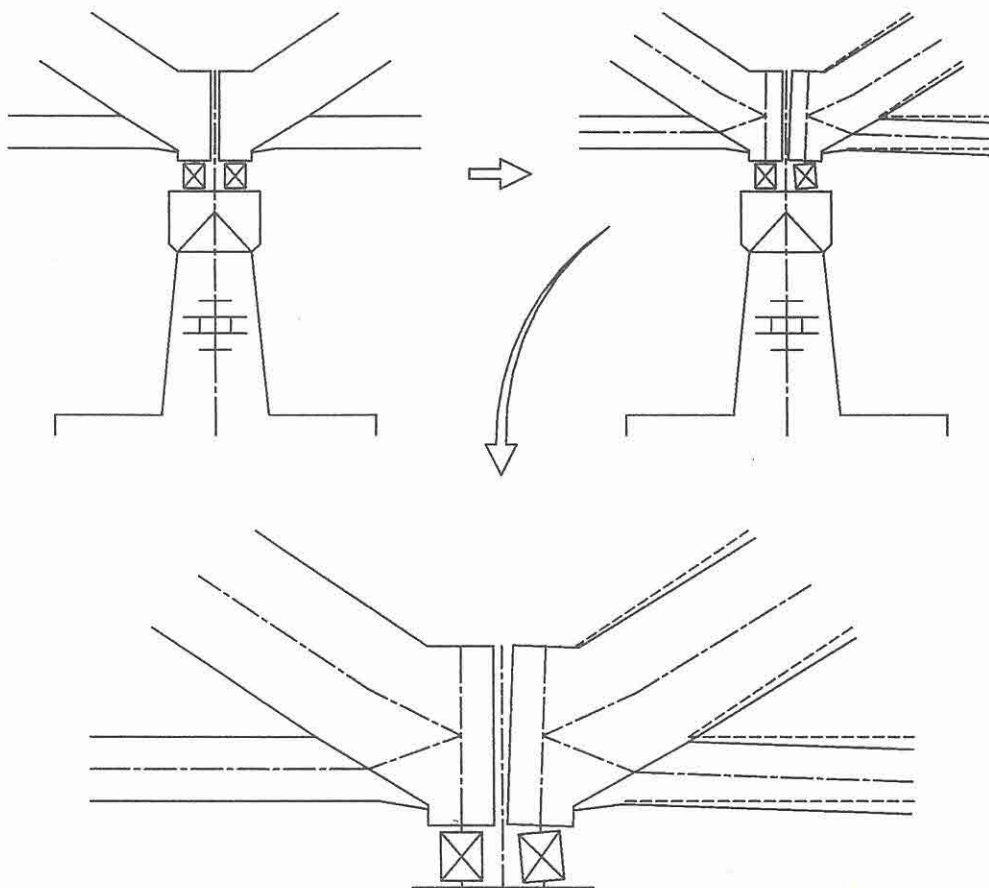
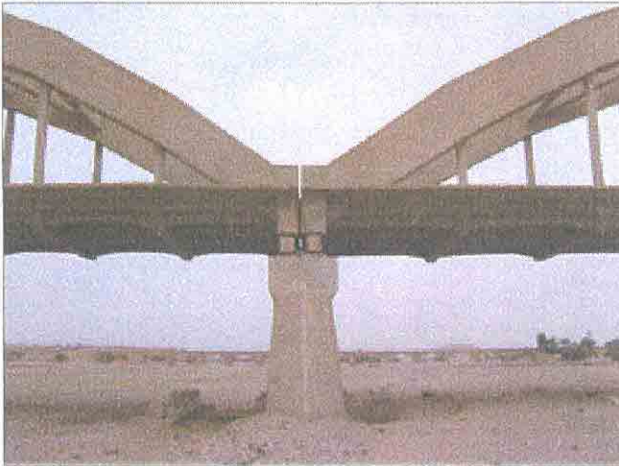
(Observation Results of Movable Bearing Emculu Bridge / Dogali 1 Bridge)

Handwritten signature or initials, possibly 'F N'.

No.4 Dogali 1 Bridge / P1(Mov)



No.6 Emculu Bridge / P1(Mov)



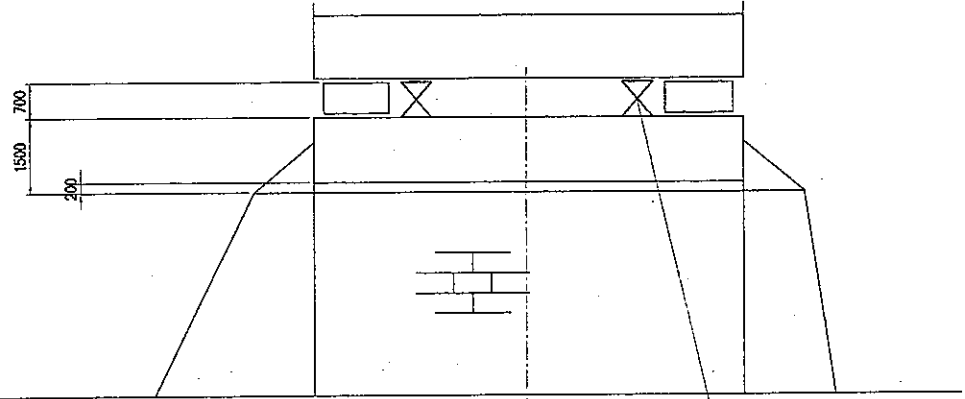
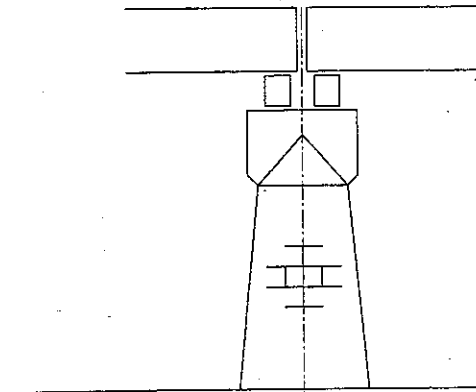
Handwritten signature or initials in blue ink.

Attachment 5-3-2
(Repair work plan on bearing)

Handwritten initials or signature

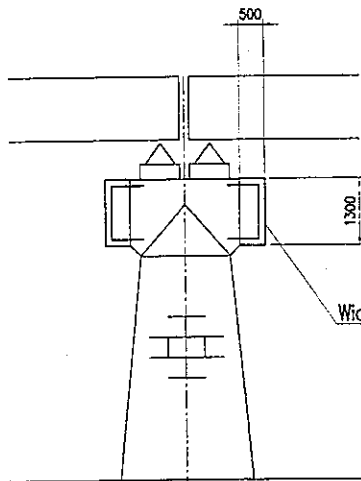
No.6 Emculu Bridge

Mov / (P1),(A2)

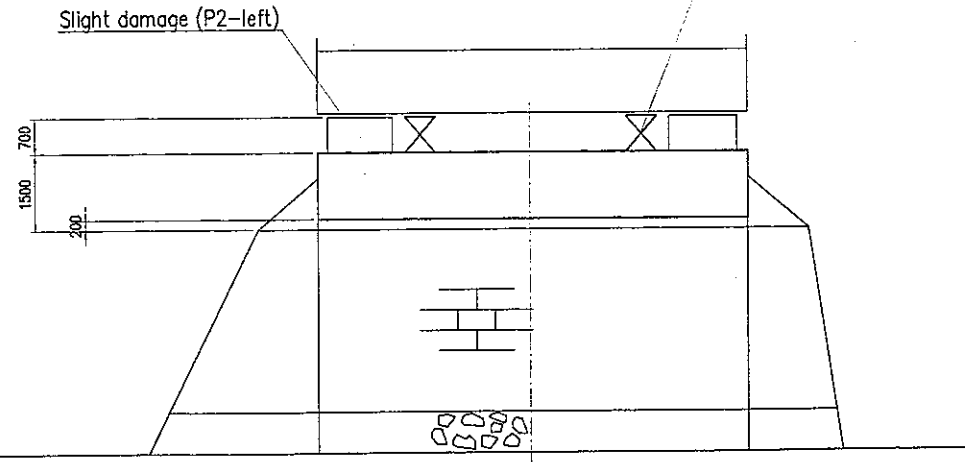


Prevention of bump

Fix / (A1),(P2)



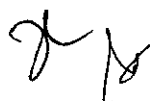
Widen the bridge seat



Slight damage (P2-left)

Handwritten initials or signature.

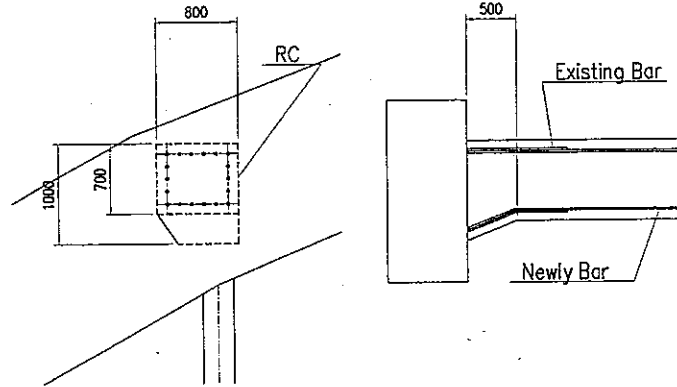
Attachment 5-4
(Repair work plan on main members)



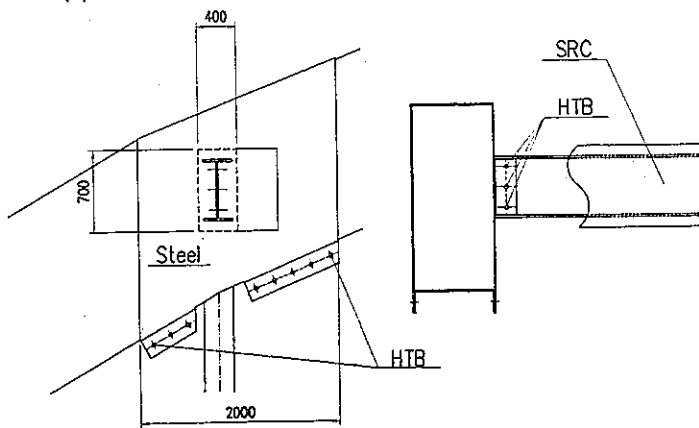
No.6 Emculu Bridge

Mid UCB-1

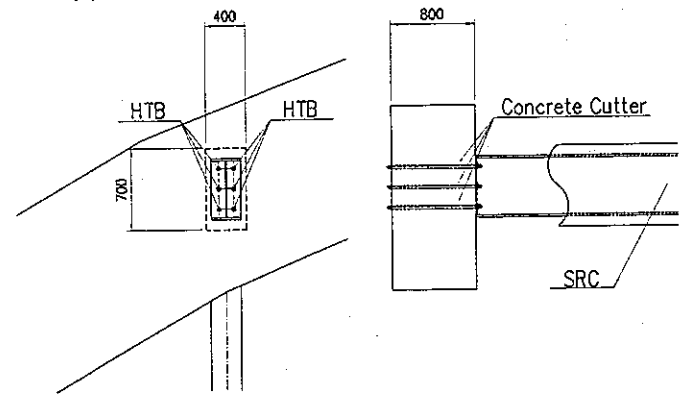
(A)



(B)



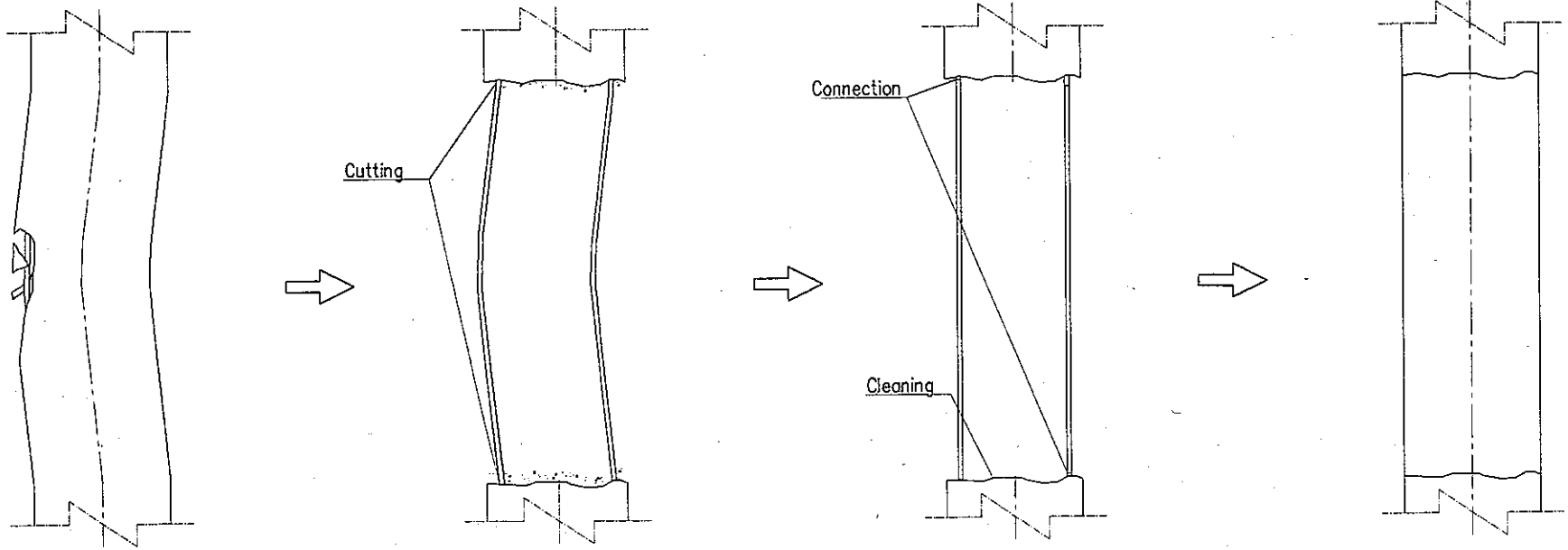
(C)



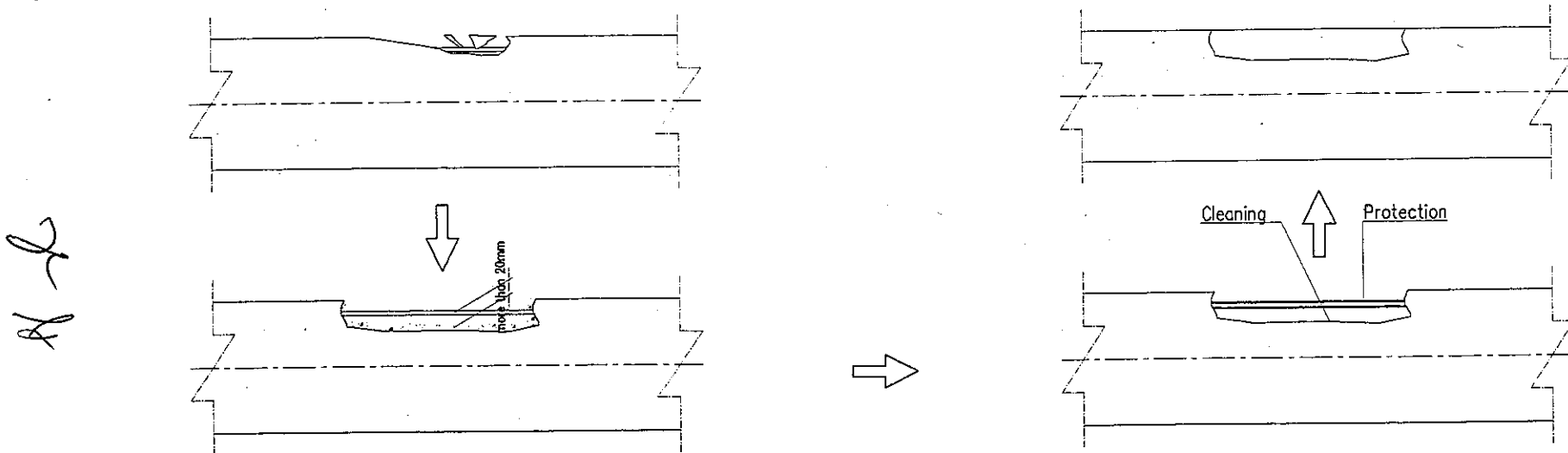
AL

No.6 Emculu Bridge

Terrible damage (Mid RV-4)

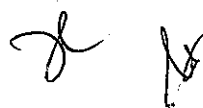


Slight damage (Asm side UCB-6/Mid LC-7,CF-1,UCB-8)



Al

Attachment 6
(Present condition and repair work plan)

Handwritten initials or signature in black ink, consisting of a stylized 'J' followed by a vertical line and a horizontal stroke.

No.4 Dogali 1 Bridge

Asmara side

LV-5

Asmara side

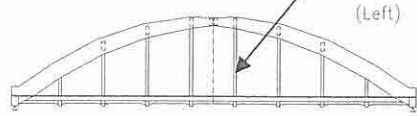
S-1

Massawa side

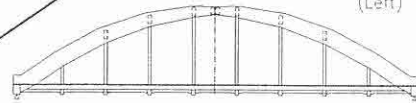
LV-4

Massawa side

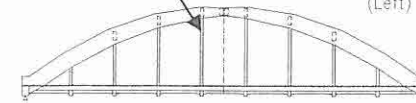
RC-10



(Left)

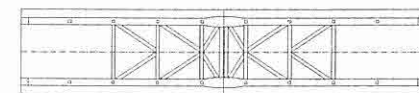
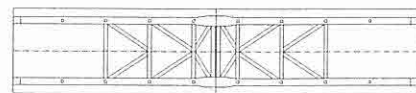
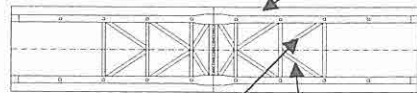


(Left)

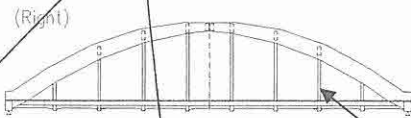


(Left)

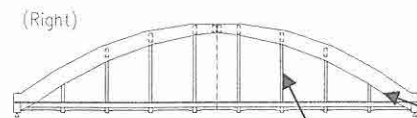
(Asmara Side)



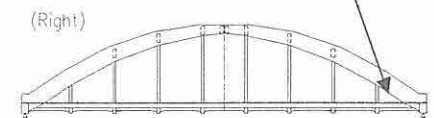
(Massawa Side)



(Right)



(Right)



(Right)



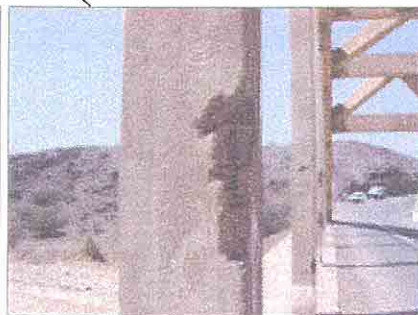
Asmara side

CF-11



Asmara side

CF-12



Asmara side

RV-7



Middle

RV-6



Middle

RC-10

No.4 Dogali 1 Bridge

A1-Left



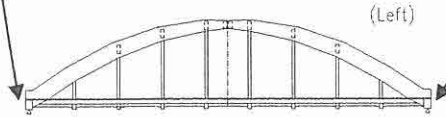
P1-Left



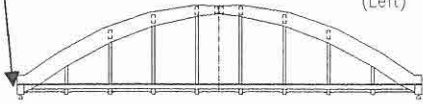
P2-Left



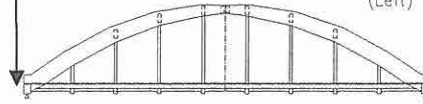
A2-Left



(Left)

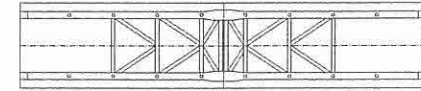
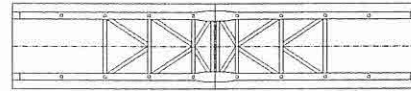
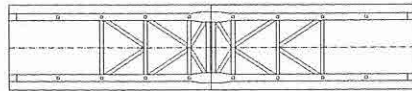


(Left)

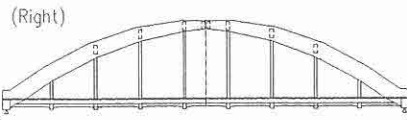


(Left)

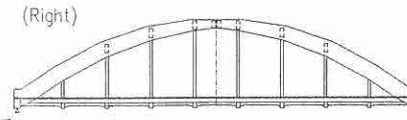
(Asmara Side)



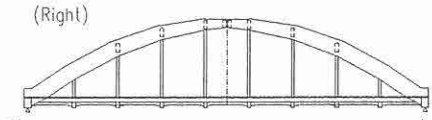
(Massawa Side)



(Right)



(Right)



(Right)



A1-Right



P1-Right



P2-Right

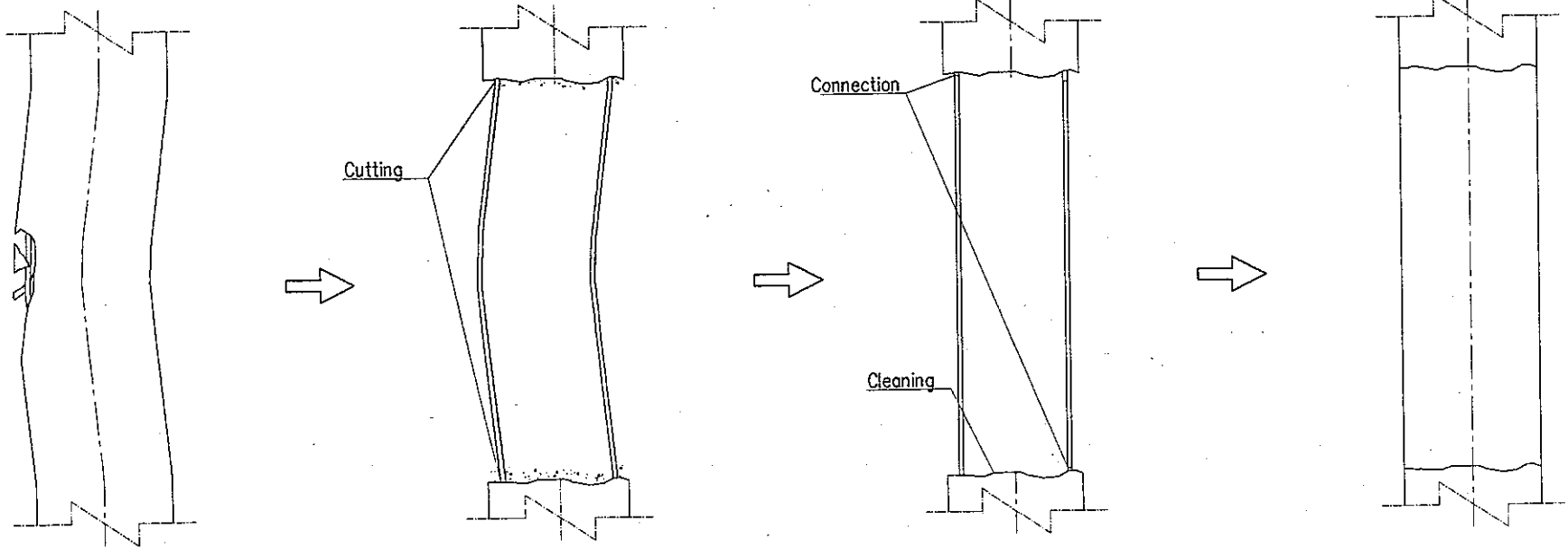


A2-Right

Handwritten signature or mark.

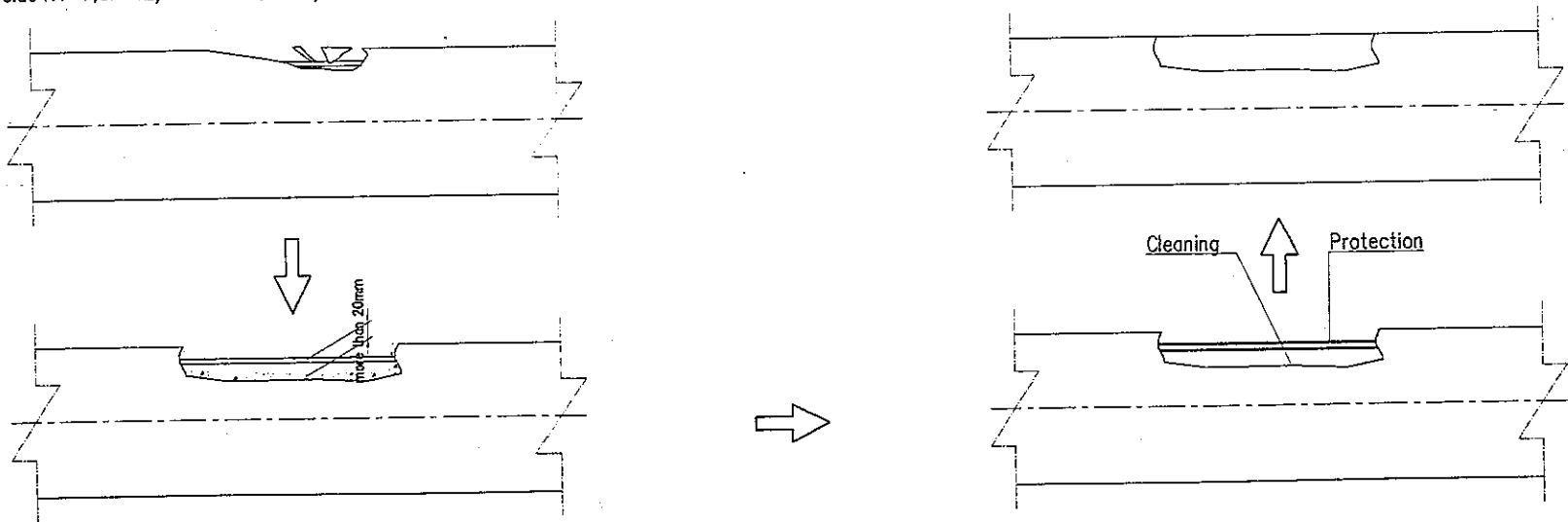
No.4 Dogali 1 Bridge

Terrible damage (Asm side LV-5,S-1,CF-11)



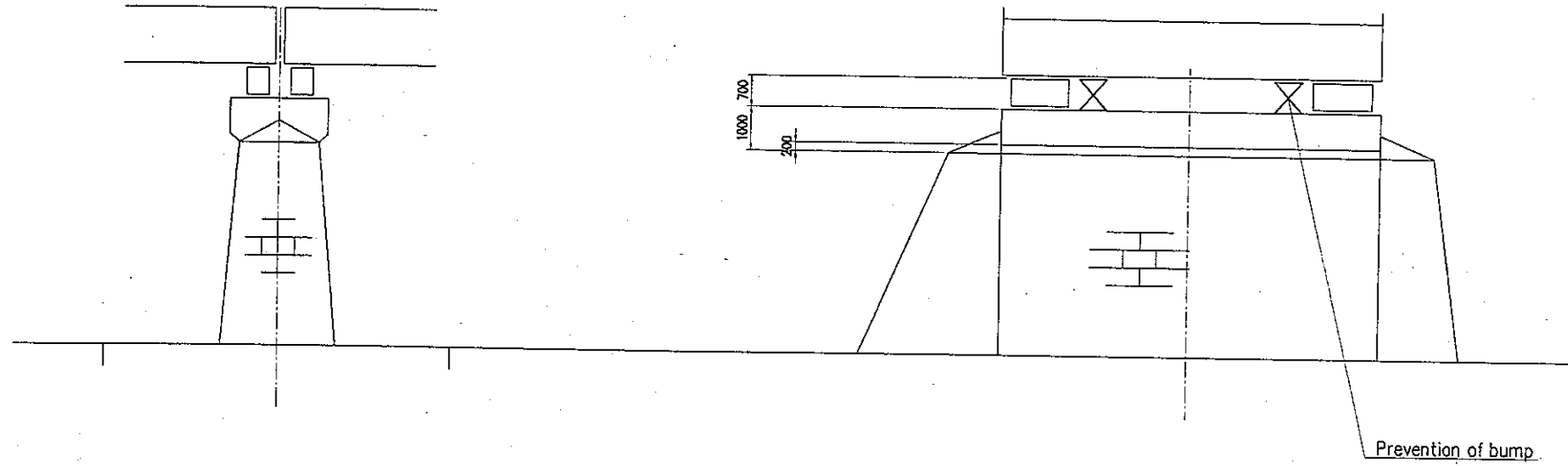
Slight damage (Asm side RV-7,CF-12/Mid RC-10,RV-6/Msw side RC-10,LV-4)

AL



No.4 Dogali 1 Bridge

All Sub-structure



AB