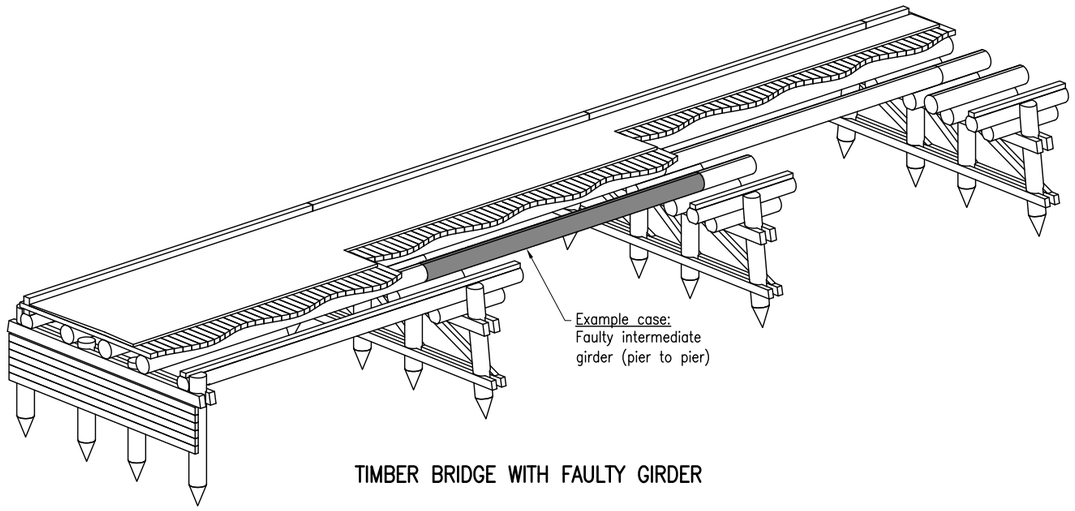
FIBRE REINFORCED POLYMER COMPOSITE GIRDERS FOR TIMBER BRIDGE REHABILITATION

* This procedure is to be used in conjunction with Standard Drawing 2285 – FRPC Girders for Timber Bridge Rehabilitation (WCFT–S1, S2 & S3 Installation Details). Any Variation to this procedure must be approved by an RPEQ.



TIMBER BRIDGE WITH FAULTY GIRDER

PROCEDURE SEQUENCE *

PROCEDURE STEPS	ACTIVITY SEQUENCE	SHEET	REMARKS
1	1a. Remove DWS above faulty girder across full span. 1b. Cut deck holes for webbed sling 1c. Measure required girder length, determine end dimension E1 & E2 to establish locations of HWS and RBA (Refer SD 2285 sheet 17)		
2	2a. Cut girder to length 2b. install HWS 2c. Place new girder in correct orientation 2d. Attach webbed sling in preparation for lifting	2	Girder orientation, lifting procedure and details to be approved by TMR Structures prior to installation
3	3a. Install jacks. 3b. Pre load and check jacks, hoses and equipment.	2	Jacking arrangement and detail to be approved by an RPEQ Engineer
4	4a. Lift new girder (FRPC) into place adjacent to the one to be removed and place on blocks to the same height as corbel with girder secured in place. Carpet may be used to prevent damage to protective coating from sliding along headstock. 4b. Drift/Remove girder/corbel/headstock bolts and temporarily secure faulty girder. 4c. For replacement of inner girders, loosen bolts through outside kerb/girders/corbel/headstocks to allow raising of the deck.	2	
5	5a. Raise the deck on either side of faulty girder to clear the deck from faulty girder. 5b. Install temporary shims/packing between deck and headstock where necessary.	2	
6	6a. Winch/pull out faulty girder, swing out of alignment and lower to ground – dispose to waste stockpile.	2	Girder removal to be approved by an RPEQ Engineer
7	7a. Install Jack.	3	
8	8a. Jack new girder (FRPC) into position under bridge with temporary jacking plate (JP)	3	Jacking procedure to be approved by an RPEQ Engineer
9	9a. Install new bottom packer and shims if required.	3	
10	10a. Lower jacks. 10b. Drill new holes on deck flat bar (DF) and install DF on top of deck aligned with new girder (FRPC) centreline. 10c. Drill new bolt holes and install bolts with saddle washer (SW).	3	
11	11a. Remove jacks.	3	
12	12a. Apply epoxy when required. 12b. Inspect contact between girder and deck. If significant gap exists, install formwork, inlet and outlet tubes and pour epoxy.	3	
13	13a. Repair DWS as necessary. 13b. To install RBA, temporarily clamp each component in position. Adjust accordingly to ensure RBU, RBM and RBL are in correct alignment. 13c. Tighten all bolts through outside Kerb/Girders/Corbel/Headstock.	3	

ACTIVITY CONTROLS:

The following controls are specific to the type of work being performed and must be implemented. In addition a site assessment must be performed to identify any additional controls required for the job. This works procedure must be used in conjunction with Work Method Statements

QUALITY

- Ensure restoration standard is achieved as per the Timber Bridge Maintenance Manual

ENVIRONMENT

- Implement controls as per the EMP
- Ensure waste is handled and tracked in accordance with Regulated Waste Procedure
- Implement control measures from Environmental Management Plan (EMP) prevent contamination of surrounds
- Dispose of wastes in accordance with EMP
- Return surplus material to designated area

SAFETY

- Clear surrounding area of potential trip hazards and clearly identify batter slopes or uneven ground
- Clear overgrown vegetation from around work area and identify any possible insect hives / nests
- Ensure task rotation and adequate breaks are given
- Training
- Ensure tools are in safe working order
- Exclusion Zones
- Ensure correct tool is chosen for task
- Regular servicing and maintenance of equipment
- Inspection prior to use

ASSUMPTIONS:

- The following details are for individual girder replacement only using WCFT–S1, S2 OR S3 (maximum one fibre reinforced polymer girder replacement per span).
- The scope of the FRPC girder replacement for timber bridges standard drawings is to define situations where approved FRPC girders may be used for timber girder replacements in the refurbishment of existing timber bridges
- All dimensions to be confirmed on site prior to construction

ACRONYMS

DF	Deck Flat Bar
RBA	Restraint Bracket Assembly
RBU	Restraint Bracket Upper assembly
RBM	Restraint Bracket Middle assembly
RBL	Restraint Bracket Lower assembly
FRPC	Fibre Reinforced Polymer Composite
JP	Jacking Plate
SW	Saddle Washer
HWS	Hardwood Web Stiffener

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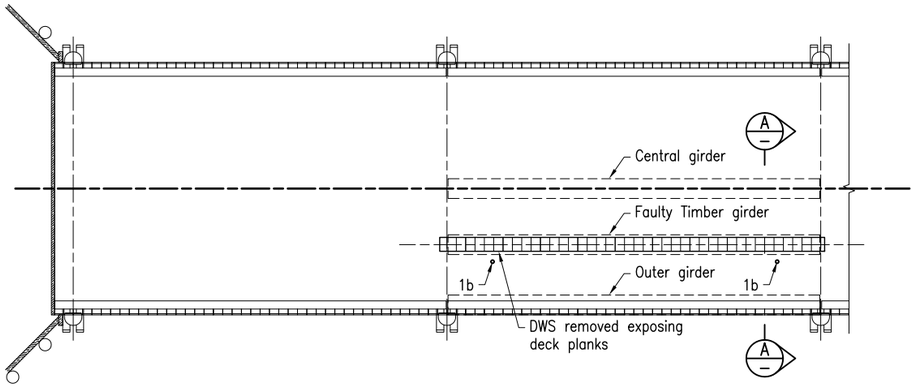
FRP COMPOSITE GIRDERS FOR TIMBER BRIDGE REHABILITATION

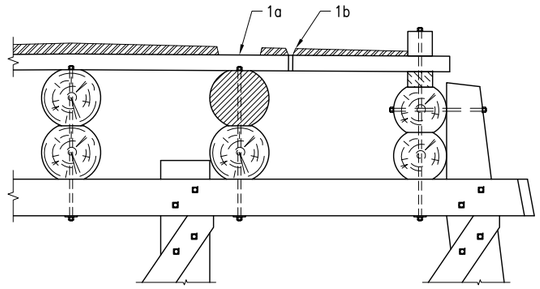
WCFT–S1, S2 & S3
INSTALLATION PROCEDURE
SHEET 1 of 3

Queensland Government

A3 | Not to Scale | Standard Drawing No 2286 | Date 7/15 | A

STEP 1 – PREPARATIONS

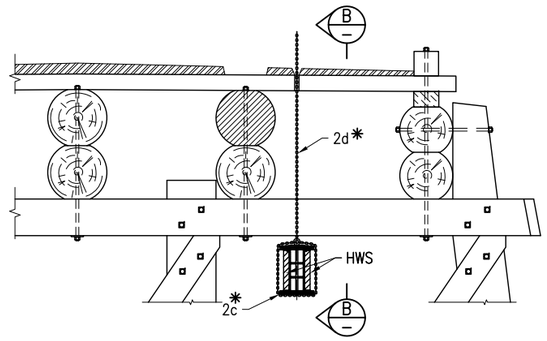




SECTION A

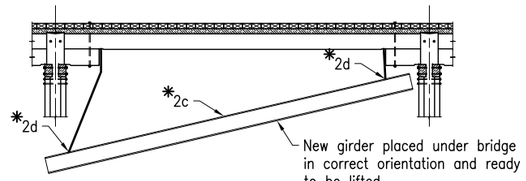
1a. Remove DWS above faulty girder across full span.
1b. Cut deck holes for webbed sling
1c. Measure required girder length, determine end dimension E1 & E2 to establish locations of HWS and RBA (Refer SD 2285 sheet 17)

STEP 2 – GIRDER ORINTATION



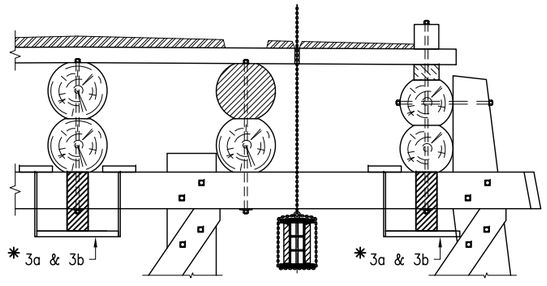
2a. Cut girder to length
2b. install HWS
2c. Place new girder in correct orientation
2d. Attach webbed sling in preparation for lifting

* Girder orientation, lifting procedure and details to be approved by TMR Structures prior to installation



SECTION B

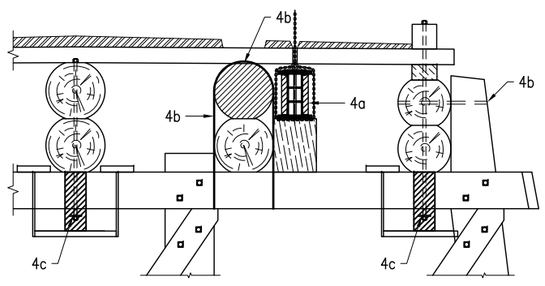
STEP 3 – INSTALL JACKS



3a. Install jacks.
3b. Pre load and check jacks, hoses and equipment.

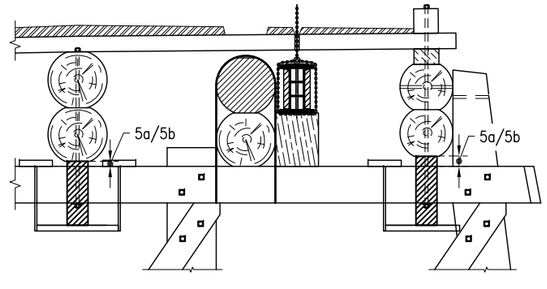
* Jacking arrangement and details to be approved by an RPEQ

STEP 4 – LIFTING NEW GIRDERS



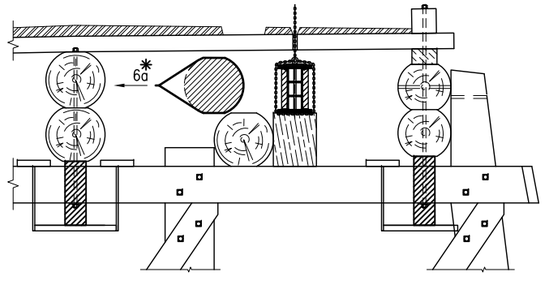
4a. Lift new girder (FRPC) into place adjacent to the one to be removed and place on blocks to the same height as corbel with girder secured in place. Carpet may be used to prevent damage to protective coating from sliding along headstock.
4b. Drift/Remove girder/corbel/headstock bolts and temporarily secure faulty girder.
4c. For replacement of inner girders, loosen bolts through outside kerb/girders/corbel/headstocks to allow raising of the deck.

STEP 5 – BRIDGE JACKING



5a. Raise the deck on either side of faulty girder to clear the deck from faulty girder.
5b. Install temporary shims/packing between deck and headstock where necessary.

STEP 6 – FAULTY GIRDER REMOVAL



6a. Winch/pull out faulty girder, swing out of alignment and lower to ground – dispose to waste stockpile.

* Girder removal approved by an RPEQ

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FRP COMPOSITE GIRDERS FOR TIMBER BRIDGE REHABILITATION

WCFT–S1, S2 & S3
INSTALLATION PROCEDURE
SHEET 2 of 3

Queensland Government

A3
Not to Scale

Standard Drawing No
2286
Date 7/15

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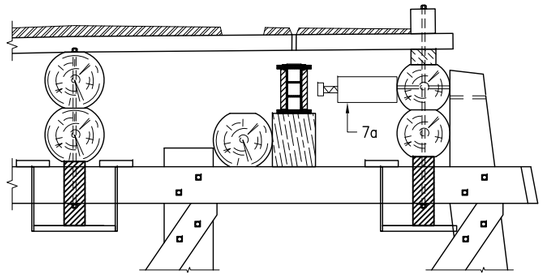
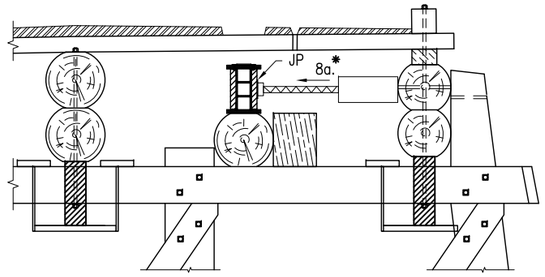
STEP 7 – PREPARATION JACKING NEW GIRDER



7a. Install Jack.

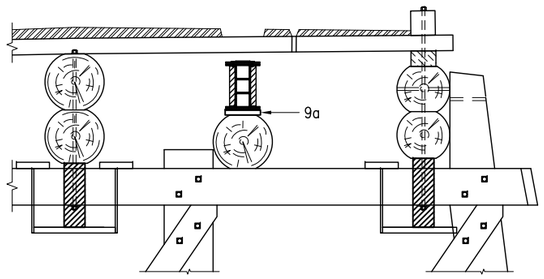
STEP 8 – JACKING NEW GIRDER IN PLACE



8a. Jack new girder (FRPC) into position under bridge with temporary jacking plate (JP)

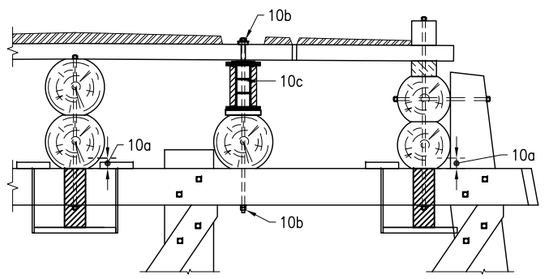
* Jacking procedure and details to be approved by an RPEQ

STEP 9 – INSTALL BOTTOM PACKER



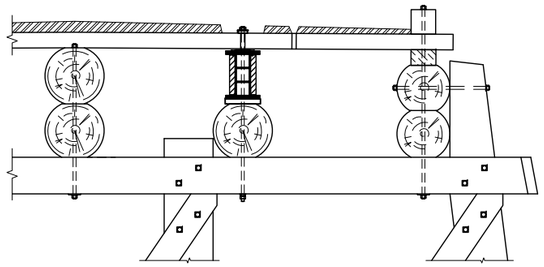
9a. Install new bottom packer and shims if required.

STEP 10 – LOWER THE DECK, REPAIR DWS



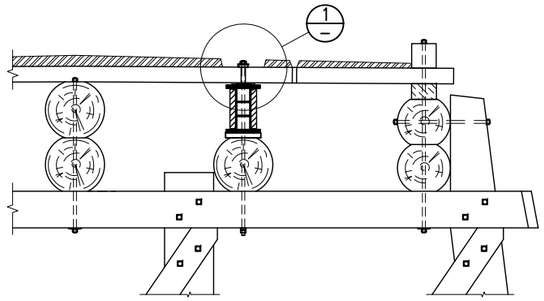
10a. Lower jacks.
10b. Drill new holes on Deck Flat Bar (DF) and install DF on top of deck aligned with new girder (FRPC) centreline.
10c. Drill new bolt holes and install bolts with saddle washer (SW).

STEP 11 – REMOVE JACKS



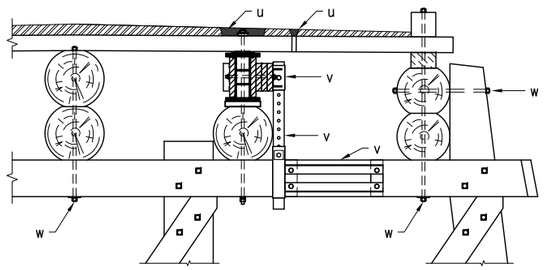
11a. Remove jacks.

STEP 12 – APPLY EPOXY (IF REQUIRED)

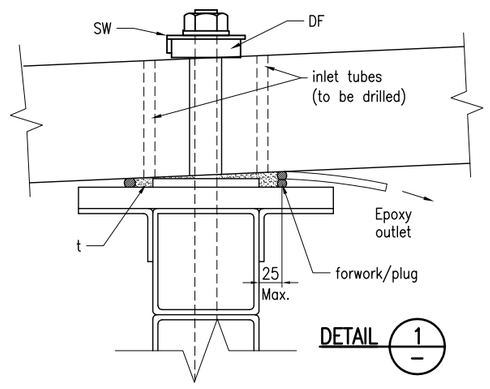


12a. Apply epoxy when required.
12b. Inspect contact between girder and deck. If significant gap exists, install formwork, inlet and outlet tubes and pour epoxy.

STEP 13 – INSTALL STEEL BRACKETS



13a. Repair DWS as necessary.
13b. To install RBA, temporarily clamp each component in position. Adjust accordingly to ensure RBU, RBM and RBL are in correct alignment.
13c. Tighten all bolts through outside Kerb/Girders/Corbel/Headstock.



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FRP COMPOSITE GIRDERS FOR TIMBER BRIDGE REHABILITATION

WCFT–S1, S2 & S3
INSTALLATION PROCEDURE
SHEET 3 of 3

Queensland Government

A3
Not to Scale

Standard Drawing No
2286
Date 7/15

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