STRUCTURAL APPRAISAL

VICTORIA PIER, COLWYN BAY

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SUMMARY

The report details the findings of the inspection of Victoria Pier carried out on a sample basis to allow an assessment of its condition to be made. The results of the assessment would provide information to allow a Cost Plan to be prepared.

The Pier structure was inspected from the beach using a mobile access platform and allowed at-hand inspection of most areas of the Pier sub-structure. Access to the deck was not possible and the inspection was therefore restricted to the steel and cast iron substructure.

The inspection revealed that the cast iron piles and columns were structurally sound. The bracing system and their fittings between the columns were in poor condition and would need to be replaced. The condition of the steel girders supporting the timber decking varied and the present detailing of the older components would lead to water entrapment and on-going corrosion problems.

Approximately 30% of the girders were inspected and it was found that, following an analysis of their load capacity given their condition, 60% would need to be replaced with new. A further 30% would need to have some structural repairs. All existing steelwork that was to remain would need to be sealed, cleaned and painted.

The inspection revealed that the area with the least corrosion was beneath the Pavilion although some replacement and repair work would be required here also. The practicality of repairing the Pier in-situ rather than dismantling and refurbishing off-site for re-erection is considered.

1.0 INTRODUCTION

In February 2010 Datrys was commissioned by Conwy County Borough Council (CCBC) to carry out a structural inspection and assessment of Victoria Pier, Colwyn Bay and to provide a report on the findings.

The purpose of the report was to;

- Gather information on the form and condition of the structure.
- Identify the extent of the repairs or replacement required.
- Provide information for a Cost Plan to be prepared.

Using this information it was intended that the report would:

- Provide sufficient information to allow CCBC to purchase the Pier with knowledge of the likely future repairs.
- Highlight any immediate dangers posed to the public by the Pier structure.

The report would also provide the basis for the consideration of:

- the works necessary for:
    - Making the Pier safe without public access.
    - Making the Pier safe and operable as a public boardwalk.
    - Full renovation.
- the ability of a refurbished Pier structure to support buildings on it and their potential forms.

This report follows on from the Report on Preliminary Structural Inspection prepared by Datrys in December 2009 which highlighted the need for more detailed information to allow a Cost Plan to be prepared.

2.0 BACKGROUND

Victoria Pier is situated in Colwyn Bay at grid reference SH853 792. The Pier extends out from the promenade to a point approximately 80m beyond mean low water.

The Pier is sheltered from the predominant winds from the west by Rhos Point but has a 165km long fetch to the north. The structure can be susceptible to wind generated waves from this direction with a potential significant wave height of 4m.

The Pier is a product of the early Edwardian era and was originally built in 1903. It is largely a steel, cast iron and timber structure.

Whilst the majority the original structure remains, incidents have occurred over the years which required the replacement of large parts of the Pier, namely the buildings and some of the supporting structure. The original building burnt down in the 1920's and was replaced by a replica. This too suffered the same fate in the 1930's and an art deco style building was erected which remains today. This building required additional steel members to transfer the loads to the pile locations.

Over time the Pier lost some of its original buildings that were not replaced, these being the theatre on the Pier head and the entrance booths. In the late 1960's a more modern structure was built on the Promenade end of the Pier. which remains today.

The modern-day Victoria Pier still supports the 1930's art deco building and the later 60's addition. The seaward end of the Pier was closed to the public in 1987 on safety grounds. The whole Pier was closed to the public in 2008.

The Pier structure itself is grade II listed.

The following list shows the significant events within the history of the Pier:

1899-1900	- Link and main Pier area built
1903	- Full extent of Pier built
1922	- Original Pier building burns down and is replaced by a replica.
1933	- Replica Pier building burns down and is replaced by the current art deco style building.
1968	- The present day building on the Promenade end is built.
1980	- The Pier Entrance is widened.
2008	- Pier is closed to the public.

2.1 Previous inspections and reports

A report on a preliminary structural inspection of the Pier was prepared by Datrys in November 2009. This inspection was a visual structural survey only and was carried out from beach level and the Pier deck. The purpose of the inspection was to determine the form and general condition of the Pier structure so that the scope of remedial works that might be required to bring the Pier to an acceptable condition for public use could be outlined.

The report begins by providing a detailed description of the Piers location and history. The format then progresses to describe the observations for each area surveyed, discusses these and provides conclusions concerning the condition and recommendations for further work.

The main conclusion of the report was that a more detailed, ‘at-hand’ inspection should be carried out of the supporting structure as this could not be readily inspected from the deck or beach level. Further to this conclusions were formed relating to the condition of the decking, handrails, and both building structures.

2.2 Structural form of Victoria Pier

The typical structural form of the Pier is illustrated on Datrys drawings GS1 and GS2 contained in Appendix 1. The form of the Pier is timber decking spanning between softwood timber joists. The joists span onto mild steel lattice girders which in turn span onto cast iron columns. The columns are braced between bays by solid bar sections.

The columns and their supporting cast iron piles are arranged in a regular grid pattern so that the spans of the girders are generally equal and are no more than 12m in length. Girders are bolted to each other at the column head and bolted down to the column bearing plate.

At certain locations, generally under the building footprint the there are supplementary girders. These span between the main girders and pick up load from the building above.

Resistance to lateral load, due to wind and wave action is provided by cross bracing between the columns and low level horizontal struts.

There are no movement joints at the column heads between girder spans so the whole of the Pier deck is rigid. There is also no bracing within the plane of the deck so horizontal loads applied rely upon either plate action, or the resistance of the girders under lateral bending.

The majority of the connections between structural members are by means of riveted gusset plates. Later elements are bolted and welded.

3.0 METHODOLOGY

It was recognised that a full inspection of the Pier structure was not feasible at this stage. The approach adopted therefore entailed the detailed inspection of sample areas. The information gathered was then used in the loading analysis to assess the load carrying capacity of the members. This information was then extrapolated to the Pier as a whole. How the work was carried out is described below.

3.1 Site Inspection

The first stage of the inspection entailed a visual survey of each bay of the Pier to record its form and to note any missing members. Each elevation was then drawn up showing the individual members and providing a current and correct record of the Pier structure. A detailed topographic survey was also carried out to give accurate information on the locations of the piles and hence the spans of the girders.

At-hand access to the superstructure was achieved using a Wumag 30 4x4 access platform. This allowed easy access up to the underside of the deck in most bays although access to the central bays beneath the Pavilion was restricted by the presence of cross-bracing and limitations of reach.

The bays for inspection were selected on a random basis within defined areas to provide a good coverage of the overall structure. The areas were defined from considerations of exposure, age and function making use of the historical information contained in the Report on Preliminary Structural Inspection and the visual inspection.

The steel components were found to be heavily encrusted with marine growth or corrosion necessitating their cleaning before they could inspected. The rust was hammered off sections of each member type which gave a clear

indication of their robustness. The remaining section dimensions and thicknesses were then measured.

For each girder all elements that were either missing, had corroded through or had failed were marked on the corresponding drawing along with the section sizes.

The inspection of the buildings and decking required access to the deck level. Unfortunately it was not possible to secure access to the deck during the period of the surveys and no at-hand information could be obtained. No additional information on the decking or the buildings could therefore be gathered to supplement that contained in the Preliminary Structural Inspection of December 2009.

3.2 Structural Assessment

Loading assessments was carried out on those girders that were considered to be salvageable from the visual inspection. The loading assessments were carried out in accordance with the recommendations and information contained in the "Historical Structural Steelwork Handbook", 1984, published by the British Construction Steelwork Association (BCSA). The detailed assumptions that were made and the values and parameters used are given below.

3.2.1 Loads

For the purposes of loadings reference was made to the following codes:

- Imposed live loads to BS 6399-1: 1996
- Wind loading to BS 6399-2:1997 incorporating amendment No. 1
- Environmental loads to BS 6349, 1989

The Pier dead load was derived from the dimensions of the surveyed elements.

The buildings were considered to be generally lightweight, framed steel structures with their steel columns directly above the Pier column locations. In the absence of a more detailed knowledge of the load paths of the buildings an allowance was made for their construction by an increased dead load of 1.0 kN/m^2.

The imposed live load applied to the decking and the floors of the buildings in all cases was 5.0 kN/m^2. This figure would correspond to crowd loading which is applicable to places of assembly without fixed seating. Whilst this value would be entirely appropriate for areas where people might congregate it might be considered to be high in areas where pedestrians are more widely dispersed. The adoption of a lower imposed load could be considered following an appropriate risk assessment.

3.2.2 Steel stresses

The Pier structure had been constructed at different times within the past century and would therefore contain materials of different ages and properties. The first elements of the Pier structure was built at the turn of the 20th century when steel quality was significantly inferior to modern day materials or even those available the 1920's when it is considered the first sections were replaced.

The Historical Structural Steelwork Handbook was used to source the applicable grade of steel used during the periods of construction along with the allowable safe working stresses in tension, compression and bending. There was found to be little difference between the steel grades of 1899 to 1903 so the lesser pre-1900 values were used in the analysis.

The safe working stresses used were:

Bending stress in compression & tension:	100.4 N/mm^2
Allowable tension	108.0 N/mm^2
Allowable compression	116.0 N/mm^2
Shear	93.00 N/mm^2

Some of the steelwork girders had been replaced and these were identifiable as their component elements had been fully welded rather than riveted. As welding practices in structural buildings were not widely used prior to the 2nd World War it was assumed the welded sections could be analysed using 1948 steel values with an allowable safe working stress in bending of 154 N/mm^2.

3.2.3 Analysis procedure

In accordance with the recommendation of the BCSA Handbook a working stress analysis was carried out using current methods but with reduced permissible stresses. Given its relatively recent widespread use and its long period of application the use of the working stress method contained in BS 449 was considered to be more appropriate that the limit state approach of BS 5950.

The member sizes and properties that were use were those applicable to the remaining effective steel cross-sections measured on site. These would necessarily be the minimum values and would therefore potentially give a slightly conservative outcome for more global effects.

The Pier does not contain any plan bracing. All lateral loads would therefore need to be transferred to the column head bracing by a combination of the lateral bending of the girders and the in-plane action of the timber decking. Given its role in transferring direct lateral loads the

decking was therefore also assumed to be capable of providing lateral restraint to the top boom of the girder in contrast to normal practice.

4.0 RESULTS

Section 4.1 explains how the results of both the visual inspections and the analyses were processed in order to obtain results. Section 4.2 details the results. The results are illustrated on the drawings contained in Appendix 2.

4.1 Data management

Of the inspected elements there were some that were deemed to be failed outright. These were members that had either total section loss due to corrosion or damage etc, members that possessed failed connections or members that were missing. Where these were observed, the sections were marked in red on the gridline elevations contained in Appendix 2 and no further analysis was undertaken. The column bracing provides an example of where this is the general case.

The gridline elevations were marked up for each bay surveyed. Any of the girders that were found to contain more than 50% of failed members were deemed to require replacement and therefore analysis was not carried out on these.

Those girders that appeared acceptable within the visual inspection and had 50% or less of failed members were analysed under full load application.

To highlight the results of both visual inspection and analysis, the gridline elevations were colour co-ordinated (see attached) where members shown red represent those that had either failed the visual inspection, the analysis or both and green members represent sections that had passed both inspection and analysis and would therefore be adequate subject to cleaning and repainting.

All members would require some attention be it only cleaning and repainting.

4.2 Detailed outcomes of inspection & analysis

Detailed below are the results for each of the elements that were inspected and assessed.

4.2.1 Piles

The piles were all of hollow core cast iron circular sections which protrude from the beach. The site inspection of the piles revealed that all remain in a good condition with little or no section loss apparent. Their alignment and that of the Pier in general were good suggesting their adequate performance. Typical wall thicknesses of 25mm were recorded.

4.2.2 Column Bracing

There were two different diameters of bars used for the bracing between columns – these being 50mm diameter solid bar and 30mm diameter solid bar. Inspection revealed that whilst the majority of members remained in place they had suffered from extensive corrosion. Many bars had failed, or had suffered connection failure and some were missing.

Each bar contained a turnbuckle with which the bar would have been tightened to ensure its effectiveness as a tie. The turnbuckles exhibited heavy corrosion with a similar loss of section as the main bar. The expansion of the corroded metal within the turnbuckle would bind the threads and render them unserviceable.

The horizontal strut above beach level comprised a heavy rail section which was heavily encrusted with marine growth. It was however in generally a sound condition with a significant thickness of base material remaining.

Of the bracing that remains, all fittings were loose and would allow lateral movement of the structure to some degree.

4.2.3 Columns

Of all columns inspected all but one were found to be in an acceptable condition with little or no section loss. The defective column, at grid point D11+ was found to have a vertical crack in its wall near the capping plate.

4.2.4 Steel supporting the deck

The more recently installed universal and castellated beams under the Promenade end (which are supplementary steel to form the Entrance widening) were found to be acceptable under both inspection and analysis.

The lattice girders generally comprised of a top and bottom boom of T or angle sections which the internal members were attached through a double gusset plate. The internal members were of angle sections for the verticals and flat plates for the diagonals.

A total of 71 girders were inspected out of total of 225. The following results are a summary of those obtained from the combined inspection and analysis.

Results of assessment

Girder element	Number of members	Failure by inspection	Failure by analysis	Total number failed, percentage of those surveyed
Top boom	71	4	42	46 (65%)
Bottom boom	71	23	3	26 (37%)
Vertical struts	256	154	18	172 (67%)
Diagonals	256	134	14	148 (58%)

4.2.5 Fixings and fittings

All bracing fastenings and clasps and all riveted connections are heavily corroded and are considered to be inadequate for their continued required function. There was a 90% failure by inspection.

5.0 DISCUSSION

The cast iron piles and columns did not exhibit any structurally significant defects and no signs of excessive corrosion were noted. The joints between the low level piles and upper columns were intact and appeared to be adequately sealed. In our opinion these members could be retained and refurbished.

The bottom rails (struts) extending between the piles did not exhibit structurally significant defects and no signs of excessive corrosion were noted. However, the majority of the end connections for these members had failed or were in poor condition, and would need to be replaced. The vertical cross bracing, running both transversely and longitudinally exhibited extensive corrosion and the turnbuckles had failed or were considered to be unserviceable. The bracing and clasp fixings should be completely removed and replaced with new suitably designed members. The replacement of the column bracing and clasp fittings could be carried out from beach level using mobile access platforms working within a tidal window.

The close at-hand inspections of the upper girder beams revealed an inherent problem where pairs of steel plates were overlapped and riveted. This type of detail would trap water and increase the rate of corrosion in the adjacent steel members. Where girders have been assessed and are considered suitable for refurbishment it would be necessary to remove the rivets and adequately seal all joints by welding.

The visual inspections and structural assessments of the upper steel girders also revealed the following findings:

- A review of the assessment results showed that a higher percentage of the top booms had failed by analysis than any of the others members primarily due to secondary bending effects.

- Several bottom boom members were noted to have corroded through due to the trapping of water and resulting corrosion in the overlapping steel members.

- The girders located beneath the buildings were generally not as corroded as the outer edge girder beams.

The replacement of the top and bottom boom members would require the propping of the overlying timber deck structure or its removal. The future detailed inspection of the decking may reveal that the decking will need to be replaced in any case. Given the nature and location of the structure it may be considered more practical to remove the defective girders and repair them off-site or even to replace them entirely.

The future maintenance requirements for the Pier structure are directly related to the quality of the work carried out and in particular the attention given to sealing, cleaning and painting. The environment of the site is such that when the structure is accessed from the beach the working hours will be restricted by the tide and allowance would need to be made for the work being regularly covered by seawater. These restrictions would have a direct affect on both quality and cost. Depending on the extent of the work required in a particular area it may prove to be more effective to take down the Pier structure, carry out the cleaning, painting and repair work off-site in a workshop and then re-deliver the prepared components for re-erection.

Due to problems with access on to the upper deck structure it was not possible to carry out further close at hand inspections of the following elements:

- Timber decking
- Timber joists
- Buildings superstructure
- Handrails

No further comments can therefore be made with respect to these items beyond those previously made in the Preliminary Structural Inspection of 2009.

6.0 CONCLUSIONS

The following may be concluded from the inspections and assessments.

1. The cast iron piles and columns are in good condition and only require to be cleaned and painted.
2. All column bracing clasps require to be replaced.
3. Low level horizontal bracing struts need to be cleaned and their connection fixings and fittings replaced.
4. All column bracing members including turnbuckles require replacing.
5. An allowance should be made for replacing 20% of the transverse column head bracings. The remainder should be cleaned and painted.
6. An allowance should be made for replacing at least 60% of the main girders with new. The only area where this would not apply would be below the pavilion building where a higher proportion of the girders might be repaired.
7. An allowance should be made for repairing at least 30% of the main girders. These girders would also need to be cleaned and painted and vulnerable areas sealed.
8. The remaining girders require cleaning and repainting and vulnerable areas sealed
9. All girders will need to have their head bolts replaced.

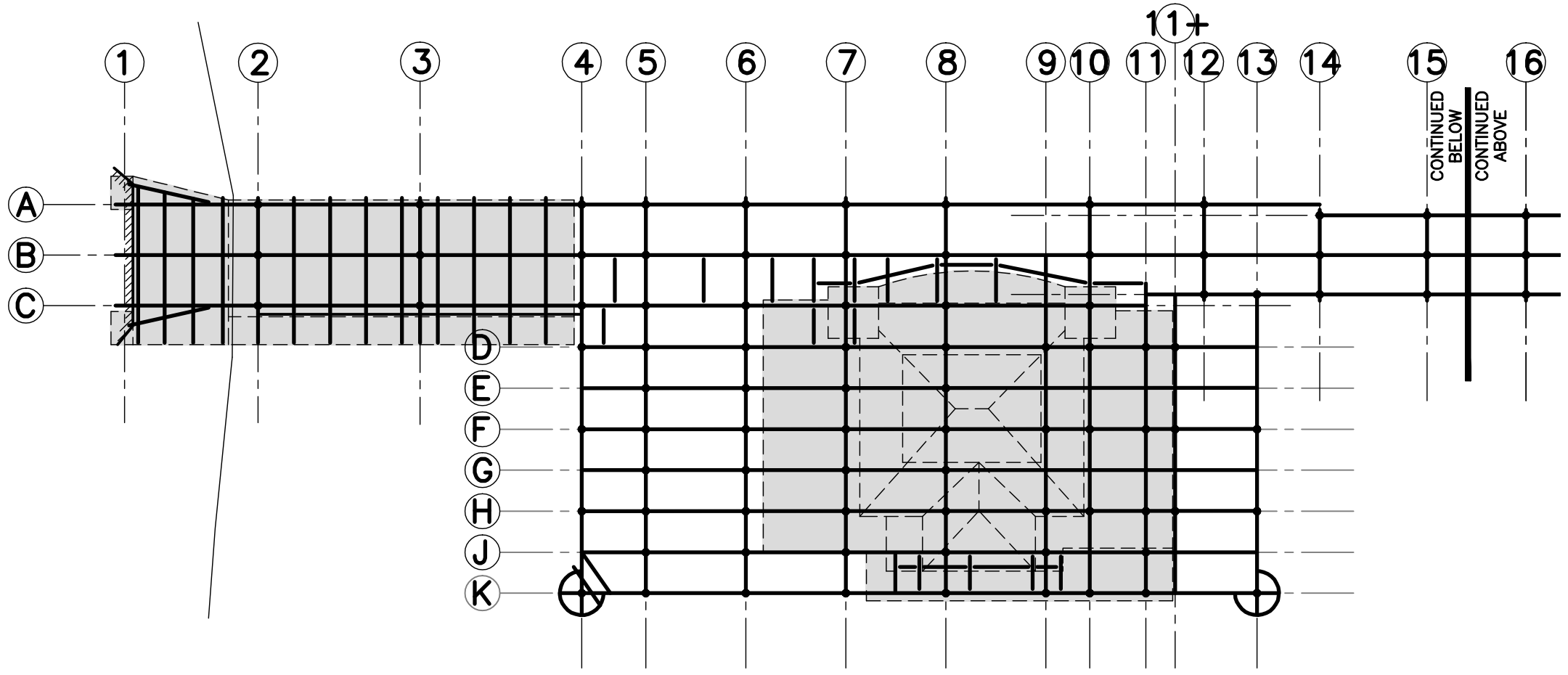
7.0 RECOMMENDATIONS

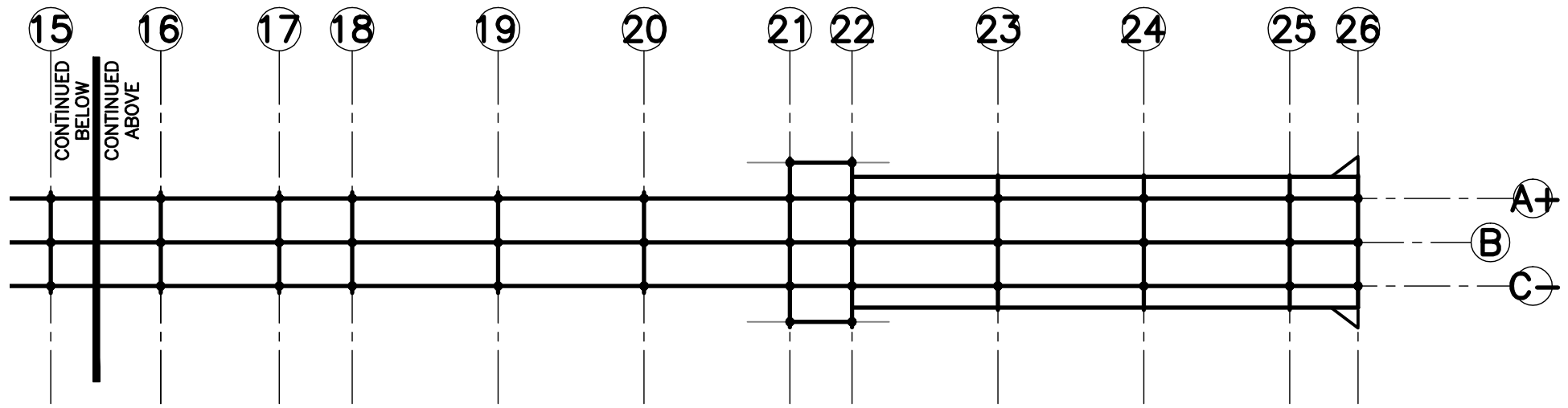
The recommendations from the assessment are as follows:

1. The structural survey should be completed, especially with regard to the pavilion structure.
2. A cost plan should be prepared based on the findings of the report to date.
3. Discussions should be opened with CADW and the conservation officer regarding the repairs and replacement works required and the requirements of the Listed Building Consent procedures followed.
4. The public should either be prohibited from walking under the Pier or at least warned of the dangerous nature of the structure.
5. The adequacy of the piles should be confirmed on a sample basis using such techniques as parallel seismic testing.
6. A full inspection of all elements of the Pier will be required to allow a full specification and schedule of works to be prepared.
7. If no action is to be taken in the short term a monitoring schedule should be established to identify the rate of deterioration of the structure using the information gather for this report as baseline.

APPENDICES

APPENDIX 1





TITLE

General Arrangment
Deck Level Steelwork

PROJECT

Colwyn Bay Pier

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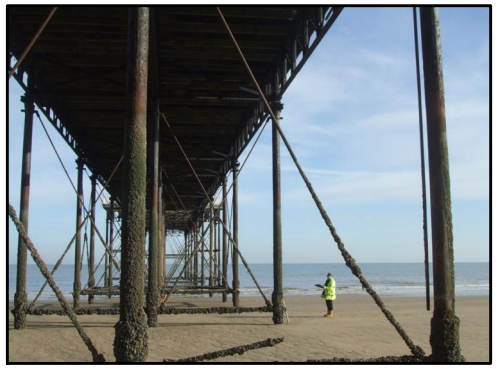

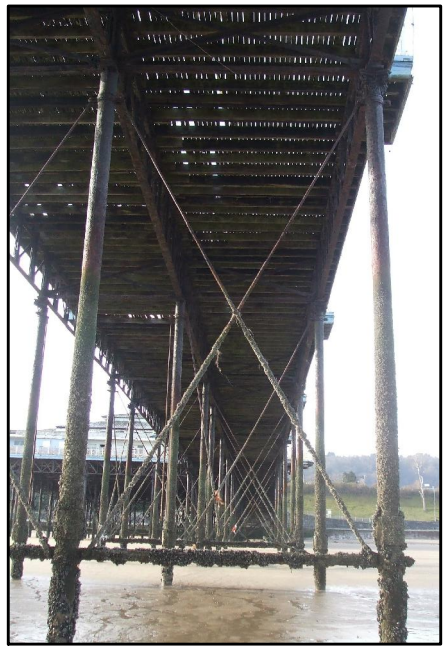

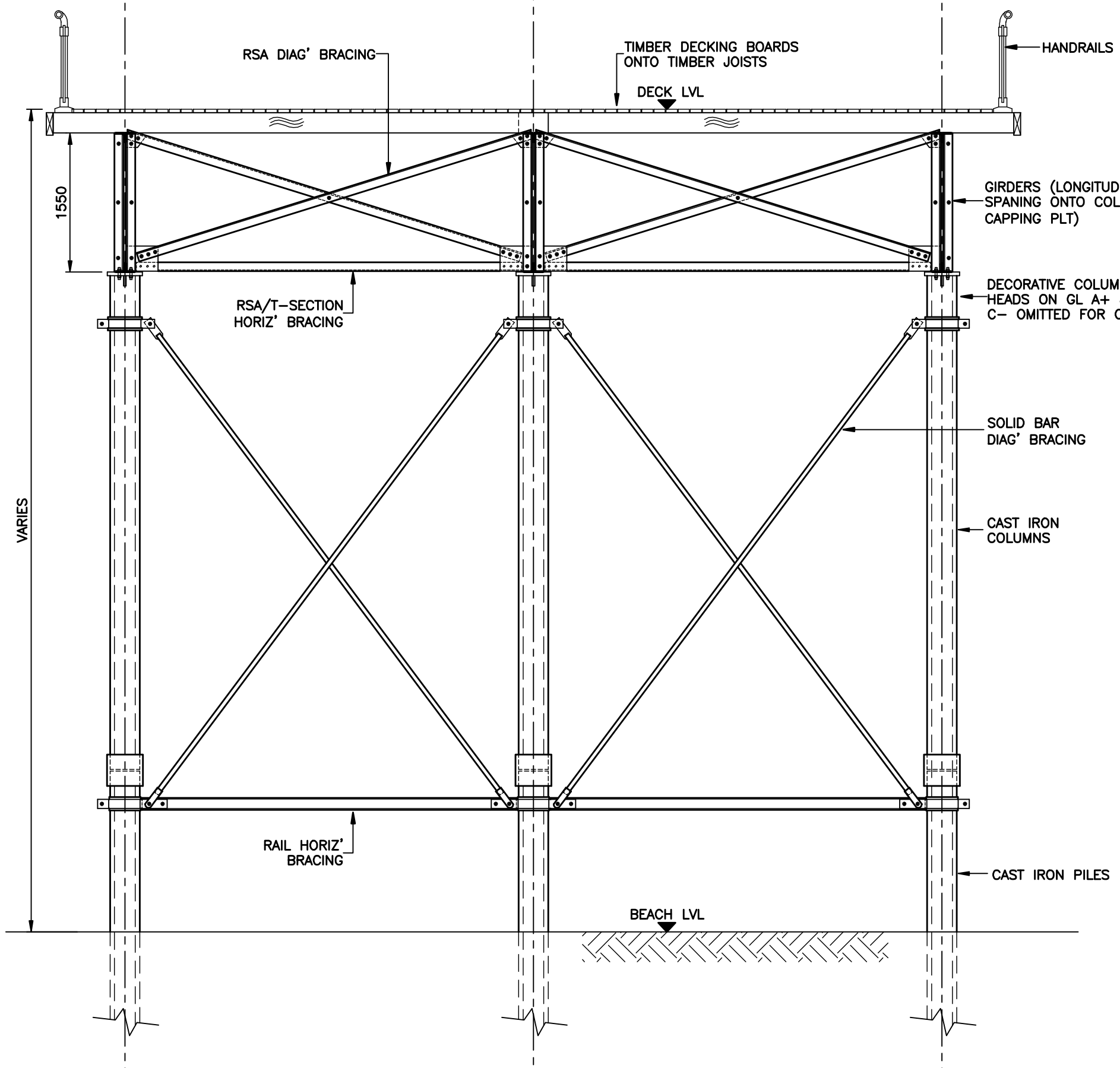

TITLE
Typical Transverse Section

PROJECT
Colwyn Bay Pier

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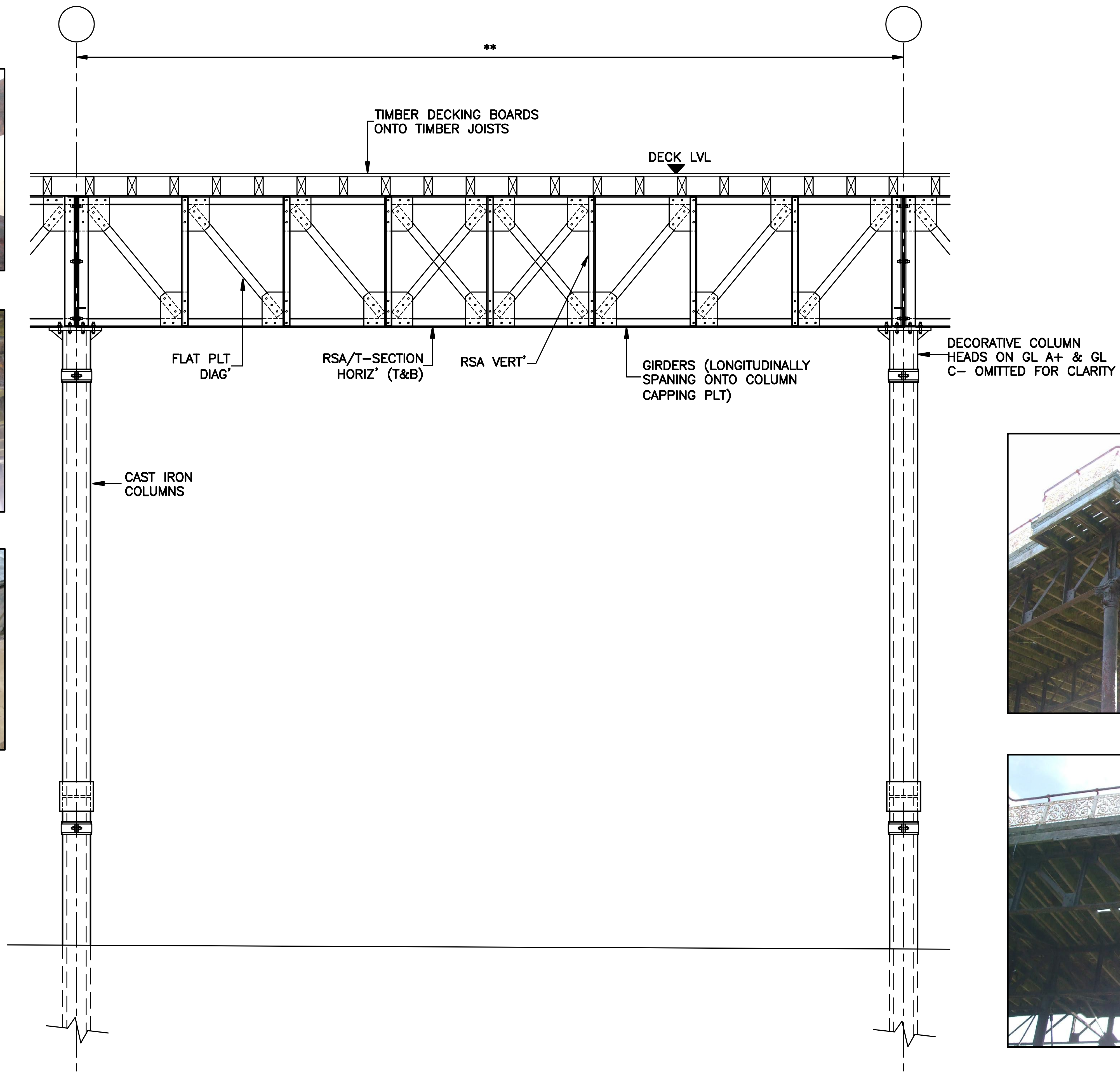
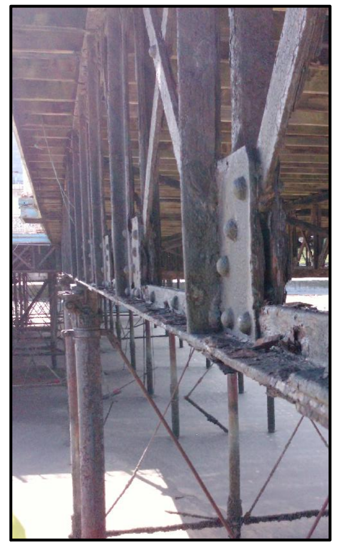
ACAD Ref. 09205/GS1	CHECKED JS	PASSED	
DRAWN CJ	DRG No. GS1		REV





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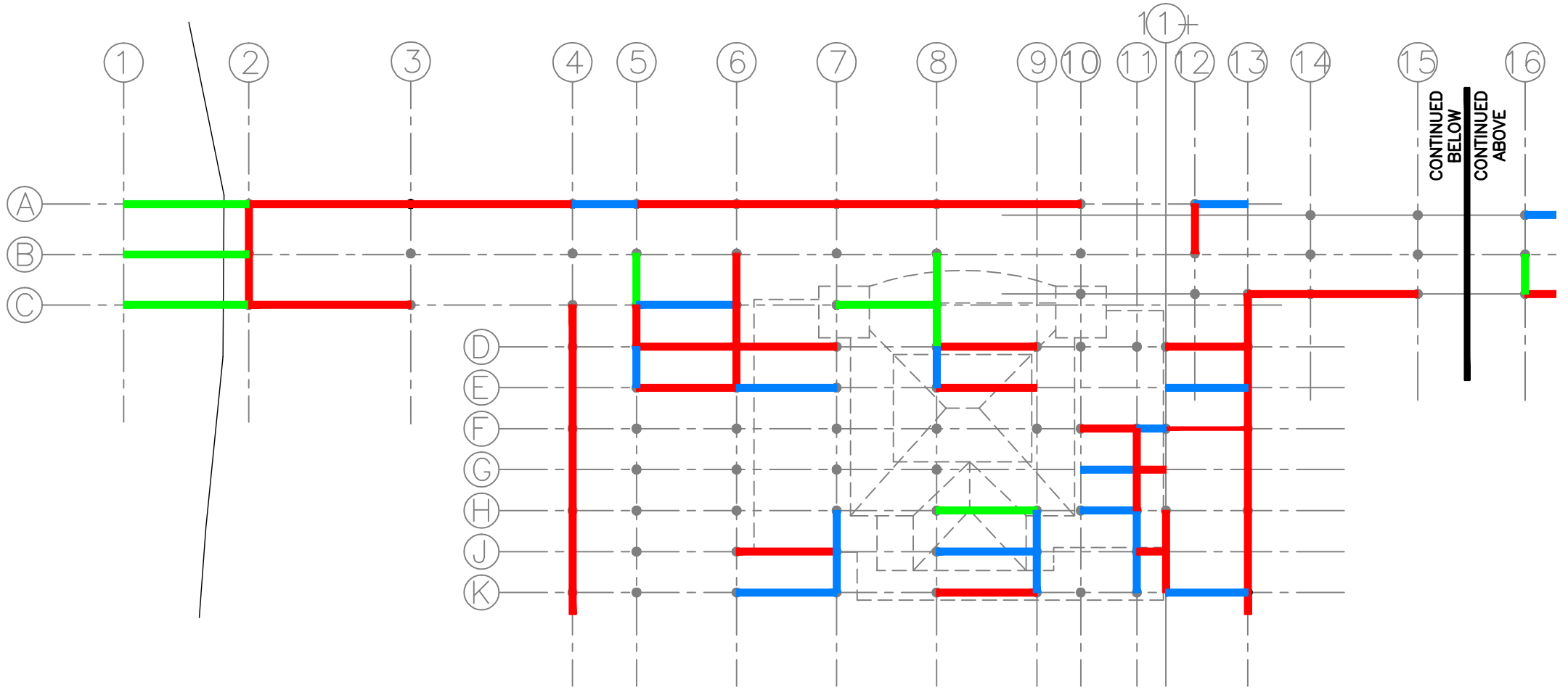
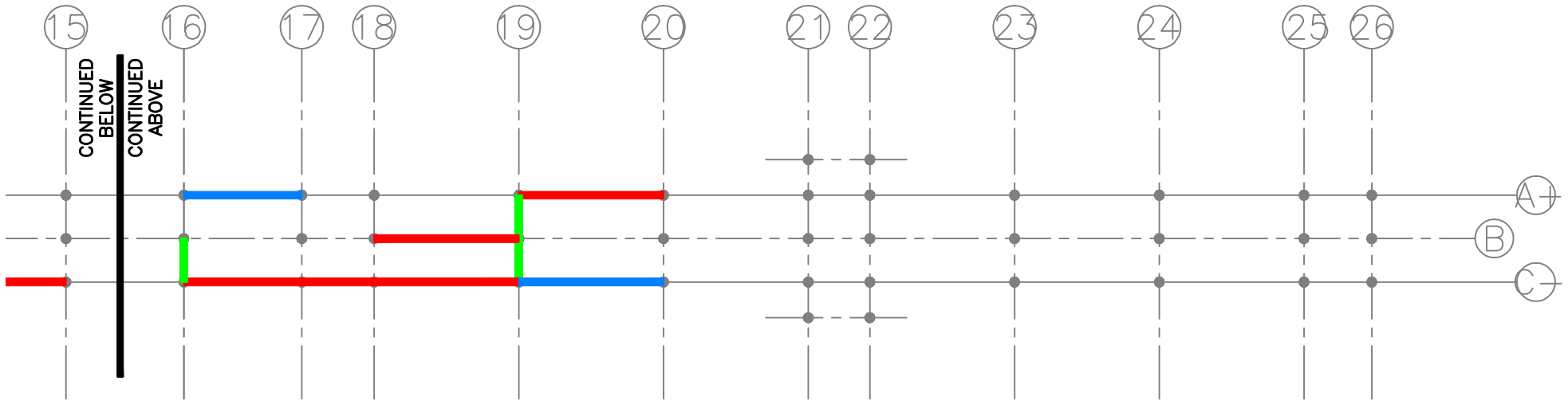
APPENDIX 2





KEY

RETAIN 100% & REFURBISH

RETAIN 50%, REPLACE 50% & REFURBISH

REPLACE 100%

TITLE

Girder Layout Plan showing outcome of Inspection/analysis

PROJECT

Colwyn Bay Pier

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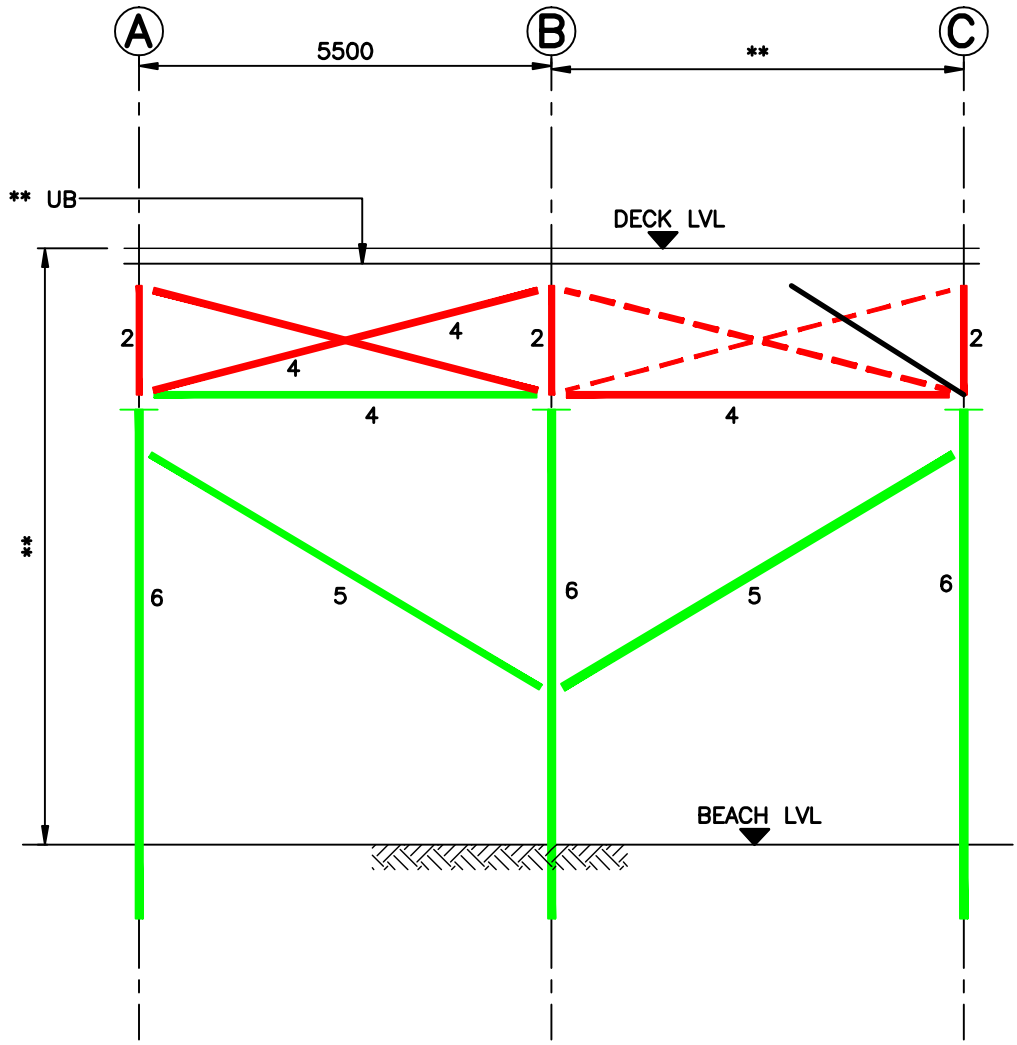
Job No. 09205	DATE 7.4.10	SCALE NTS
ACAD Ref. 09205/SURVEY1	CHECKED JS	PASSED
DRAWN CJ	DRG No. SURVEY1	REV

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
2	T SECTION	250x150mm	3	3	REPLACE
4	RSA	100x100mm	6	1	REPLACE
5	UC	203x203	2	0	BLAST & PAINT
6	CHS (COLUMN)	300x25mm	3	0	BLAST & PAINT

OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on Grid Line 2	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1;100
			DATE 07.04.10 / CHKD CJ
			DRG No. GL 2

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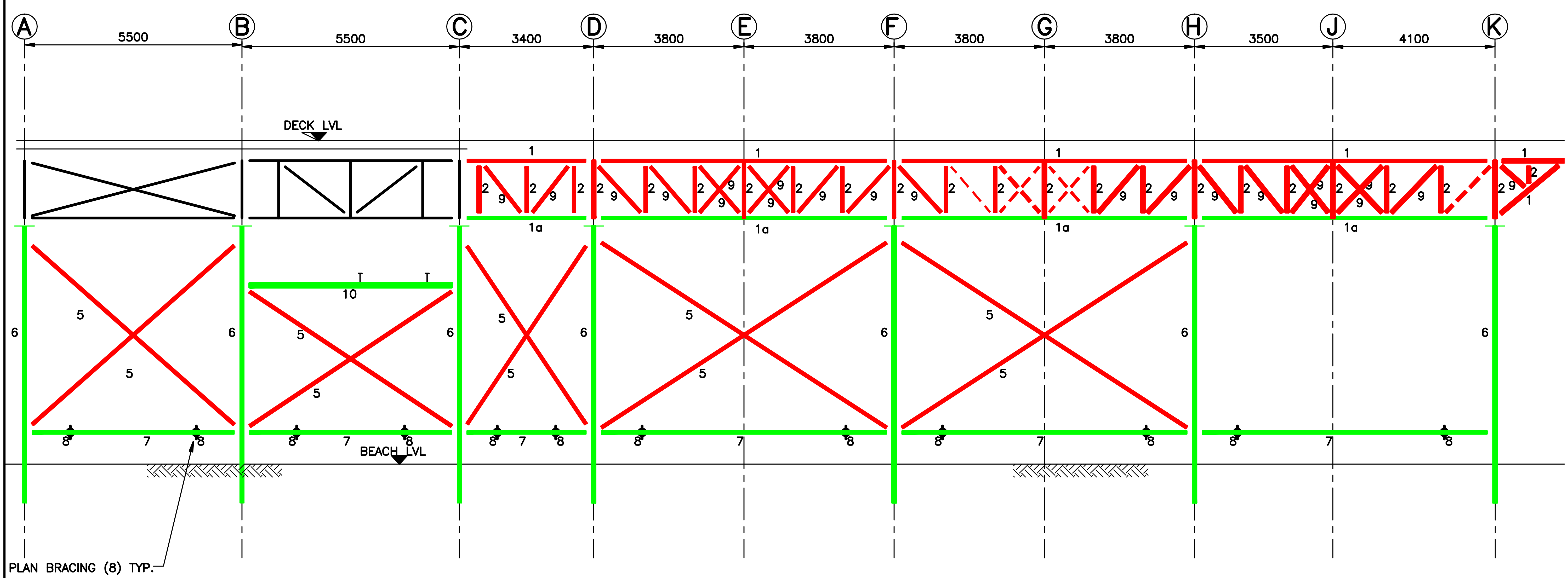
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



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1a	T SECTION	150x75x10mm	4	4	BLAST & PAINT
2	RSA (VERT')	75x75x10mm	23	23	REPLACE
5	BRACING	50mm ø	10	10	REPLACE
6	CHS (COLUMN)	300x25mm	7	7	BLAST & PAINT
7	RAIL	135x65mm	6	6	BLAST & PAINT
8	BAR	38x63mm	12	12	BLAST & PAINT
9	PLATES	75x10mm	27	27	REPLACE
10	UB	203x133	1	1	BLAST & PAINT

OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

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			DRAWN CJ	DRG No. GL 4	REV

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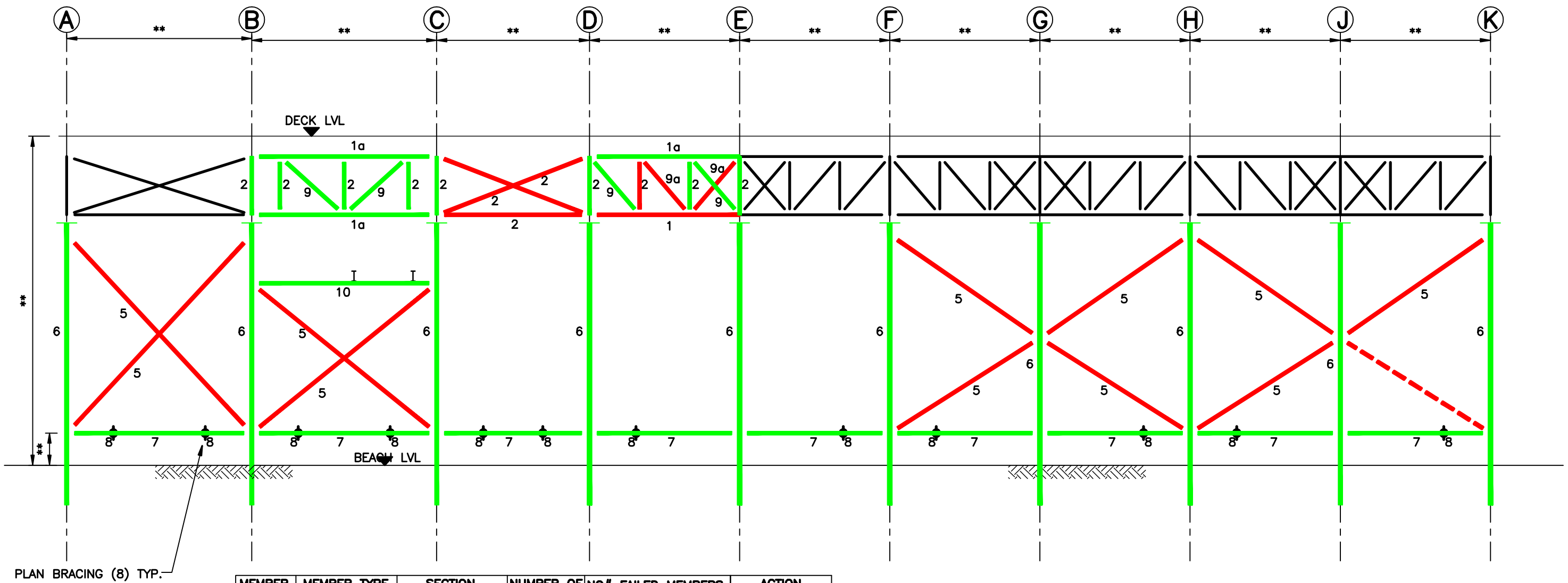
KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
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1a	T SECTION	155x50mm	3	3	BLAST & PAINT
2	RSA (VERT')	70x70x4mm	12	4	REPLACE
5	BAR	50mm ø	12	12	REPLACE
6	CHS (COLUMN)	300x25mm	10	0	BLAST & PAINT
7	RAIL	135x65mm	9	0	BLAST & PAINT
8	BAR	38x63mm	12	0	BLAST & PAINT
9	FLAT (DIAG')	75x10mm	4	0	BLAST & PAINT
9a	FLAT (DIAG')	75x10mm	2	2	REPLACE
10	UB	203x133	1	0	BLAST & PAINT

OVERALL VERDICT : KEEP GIRDER B–C, REPLACE GIRDER C–E
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on GL 5

PROJECT: Colwyn Bay Pier

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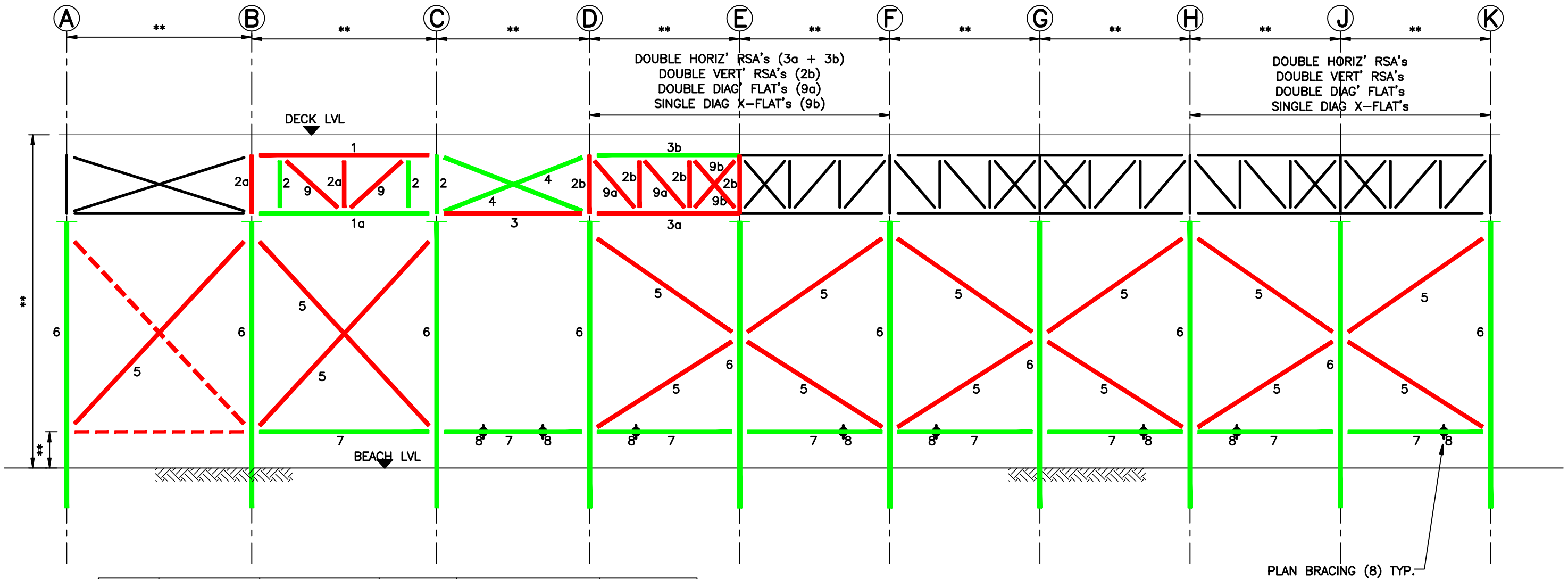
Job No. 09205	DATE 7.4.10	SCALE 1:100	
ACAD Ref. 09205/	CHECKED JS	PASSED	
DRAWN CJ	DRG No. GL 5		REV

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	165x60x4mm	1	1	REPLACE
1a	T SECTION	150x70x3mm	1	0	BLAST & PAINT
2	RSA (VERT')	75x75x6mm	3	0	BLAST & PAINT
2a	RSA (VERT')	75x75x6mm	2	2	REPLACE
2b	RSA (VERT')	2/ 75x75x7mm	4	4	REPLACE
3	RSA (HORIZ')	100x75mm	1	1	REPLACE
3a	RSA (HORIZ')	2/ 140x130x7mm	1	1	REPLACE
3b	RSA (HORIZ')	2/ 140x130x7mm	1	0	BLAST & PAINT
4	RSA (DIAG')	75x75mm	2	0	BLAST & PAINT
5	BRACING	50mm ø	16	16	REPLACE
6	CHS (COLUMN)	300x25mm	10	0	BLAST & PAINT
7	RAIL	135x65mm	9	0	BLAST & PAINT
8	BAR	38x63mm	8	0	BLAST & PAINT
9	PLATES	100x10mm	2	2	REPLACE
9a	PLATES	150x8mm	2	2	REPLACE
9b	PLATES	150x8mm	2	2	REPLACE

OVERALL VERDICT : REPLACE GIRDER B–C & D–E, REPAIR GIRDER C–D IN–SITU
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE
Steelwork GA
Elevation on GL 6

PROJECT
Colwyn Bay Pier

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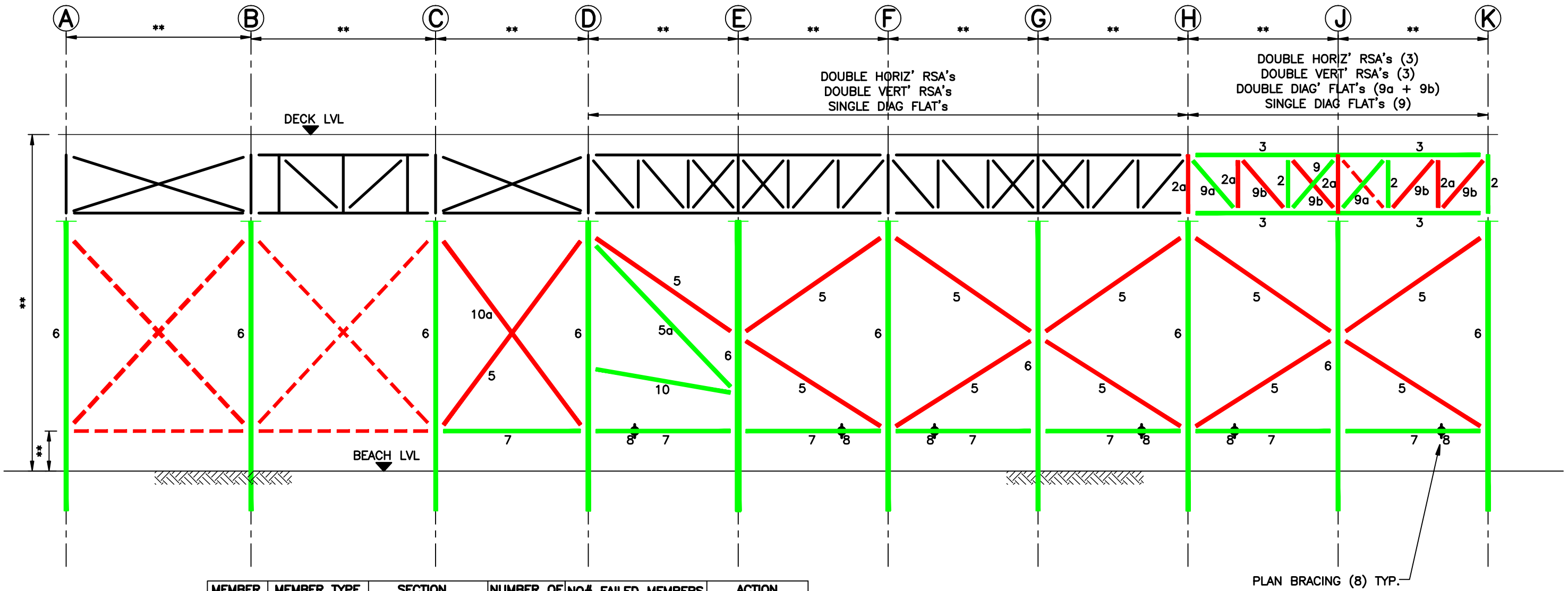
Job No. 09205	DATE 7.4.10	SCALE 1:100	
ACAD Ref.09205/	CHECKED JS	PASSED	
DRAWN CJ	DRG No. GL 6		REV

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
2	RSA (VERT')	2/ 75x75x10mm	3	0	BLAST & PAINT
2a	RSA (VERT')	2/ 75x75x10mm	4	4	REPLACE
3	RSA (HORIZ')	2/ 140x130x8mm	4	0	BLAST & PAINT
5	BRACING	50mm ø	16	16	REPLACE
5a	BRACING	50mm ø	1	0	BLAST & PAINT
6	CHS (COLUMN)	300x25mm	10	0	BLAST & PAINT
7	RAIL	135x65mm	7	0	BLAST & PAINT
8	BAR	38x63mm	6	0	BLAST & PAINT
9	FLAT (DIAG')	155x8mm	1	0	BLAST & PAINT
9a	FLAT (DIAG')	2/ 155x8mm	2	0	BLAST & PAINT
9b	FLAT (DIAG')	2/ 155x8mm	4	4	REPLACE
10	PFC	2/ 200x75mm	1	0	BLAST & PAINT
10a	PFC	2/ 200x75mm	1	1	REPLACE

OVERALL VERDICT : REPLACE GIRDER IN-SITU
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on GL 7

PROJECT: Colwyn Bay Pier

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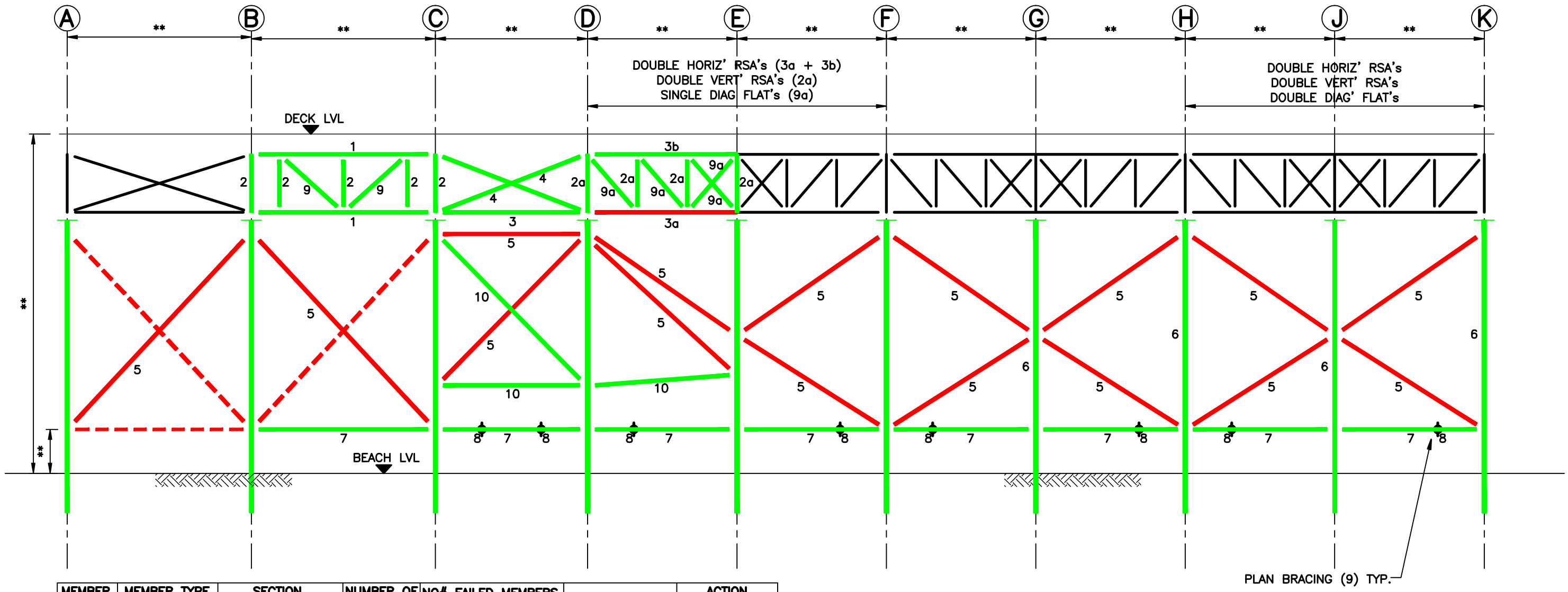
Job No. 09205	DATE 7.4.10	SCALE 1:100
ACAD Ref.09205/	CHECKED JS	PASSED
DRAWN CJ	DRG No. GL 7	REV

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS		ACTION
1	T SECTION	150x100x8mm	2	0		BLAST & PAINT
2	RSA (VERT')	75x75x10mm	5	0		BLAST & PAINT
2a	RSA (VERT')	2/ 75x75x6mm	4	0		BLAST & PAINT
3	RSA (HORIZ')	75x75x8mm	1	0		BLAST & PAINT
3a	RSA (HORIZ')	2/ 100x100x10mm	1	1		REPLACE
3b	RSA (HORIZ')	2/ 100x100x10mm	1	0		BLAST & PAINT
4	RSA (DIAG')	75x75x10mm	2	0		BLAST & PAINT
5	BAR	50mm ø	18	18		REPLACE
6	CHS (COLUMN)	300x25mm	10	0		BLAST & PAINT
7	RAIL	135x65mm	8	0		BLAST & PAINT
8	BAR	38x63mm	8	0		BLAST & PAINT
9	FLAT (DIAG')	100x10mm	2	0		BLAST & PAINT
9a	FLAT (DIAG')	155x12mm	4	0		BLAST & PAINT
10	PFC	2/ 200x75mm	3	0		BLAST & PAINT

OVERALL VERDICT : KEEP GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE
Steelwork GA
Elevation on GL 8

PROJECT
Colwyn Bay Pier

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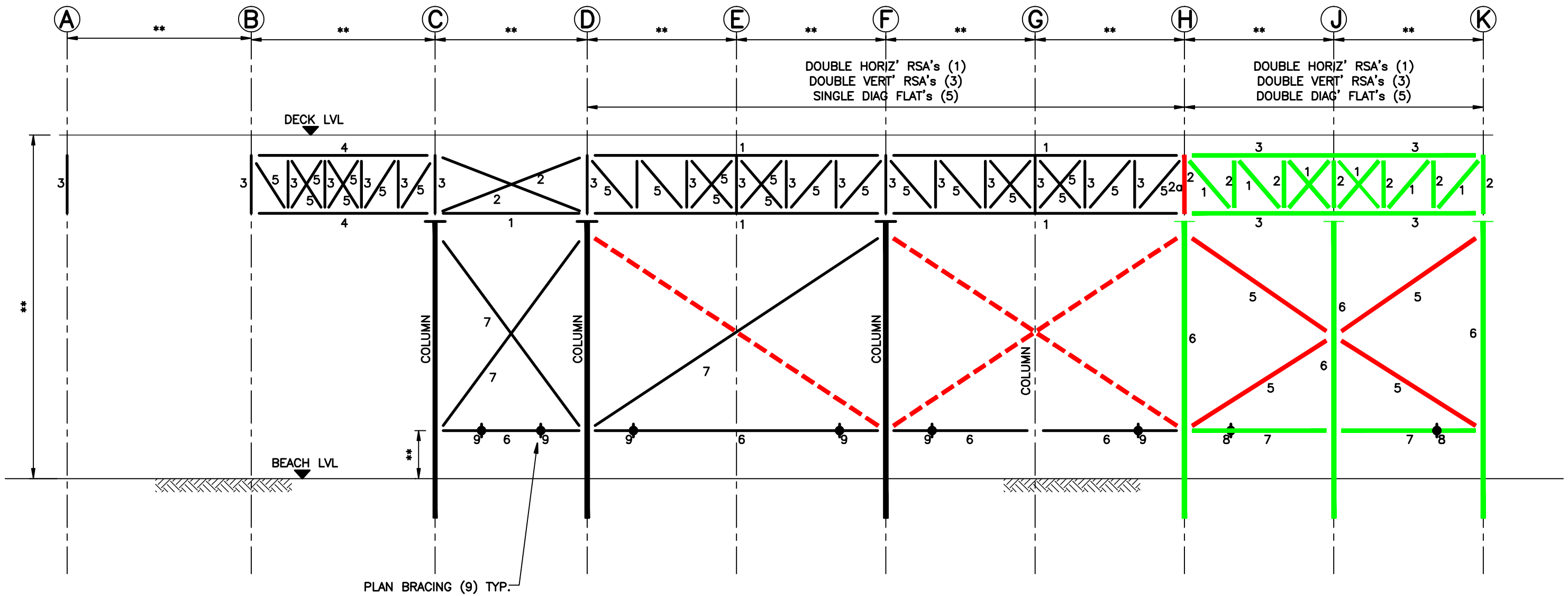
Job No. 09205	DATE 7.4.10	SCALE 1:100	
ACAD Ref. 09205/	CHECKED JS	PASSED	
DRAWN CJ	DRG No. GL 8		REV

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	150x75x10mm	8	0	BLAST & PAINT
2	RSA (2)	90x75mm	7	1	REPLACE
3	RSA (2)	100x125mm	4	0	BLAST & PAINT
5	BRACING	50mm ø	4	4	REPLACE
6	CHS (COLUMN)	300x25mm	3	0	BLAST & PAINT
7	RAIL	135x65mm	2	0	BLAST & PAINT
8	BAR	38x63mm	2	0	BLAST & PAINT

OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on GL 9

PROJECT: Colwyn Bay Pier

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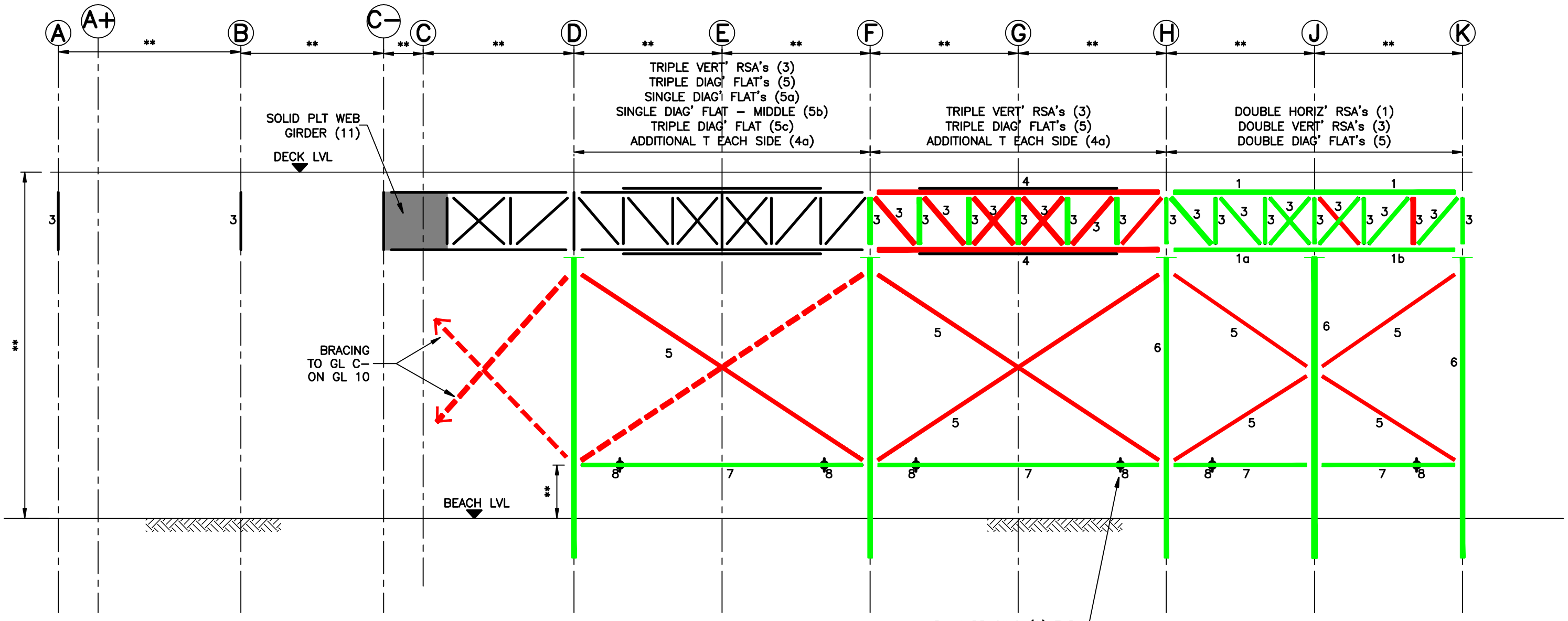
Job No. 09205	DATE 7.4.10	SCALE 1:100
ACAD Ref. 09205/	CHECKED JS	PASSED
DRAWN CJ	DRG No. GL 9	REV

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	RSA	100x100mm	1	0	BLAST & PAINT
1a	RSA	150x10mm	1	0	BLAST & PAINT
1b	RSA	125x75x10mm	1	0	BLAST & PAINT
3	RSA (2)	75x65x5mm	29	10	REPLACE
5	BRACING	50mm ø	4	4	REPLACE
6	CHS (COLUMN)	300x25mm	3	0	BLAST & PAINT
7	RAIL	135x65mm	2	2	REPLACE

OVERALL VERDICT : REPAIR GIRDER H–K, REPLACE GIRDER F–H
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on GL 11

PROJECT: Colwyn Bay Pier

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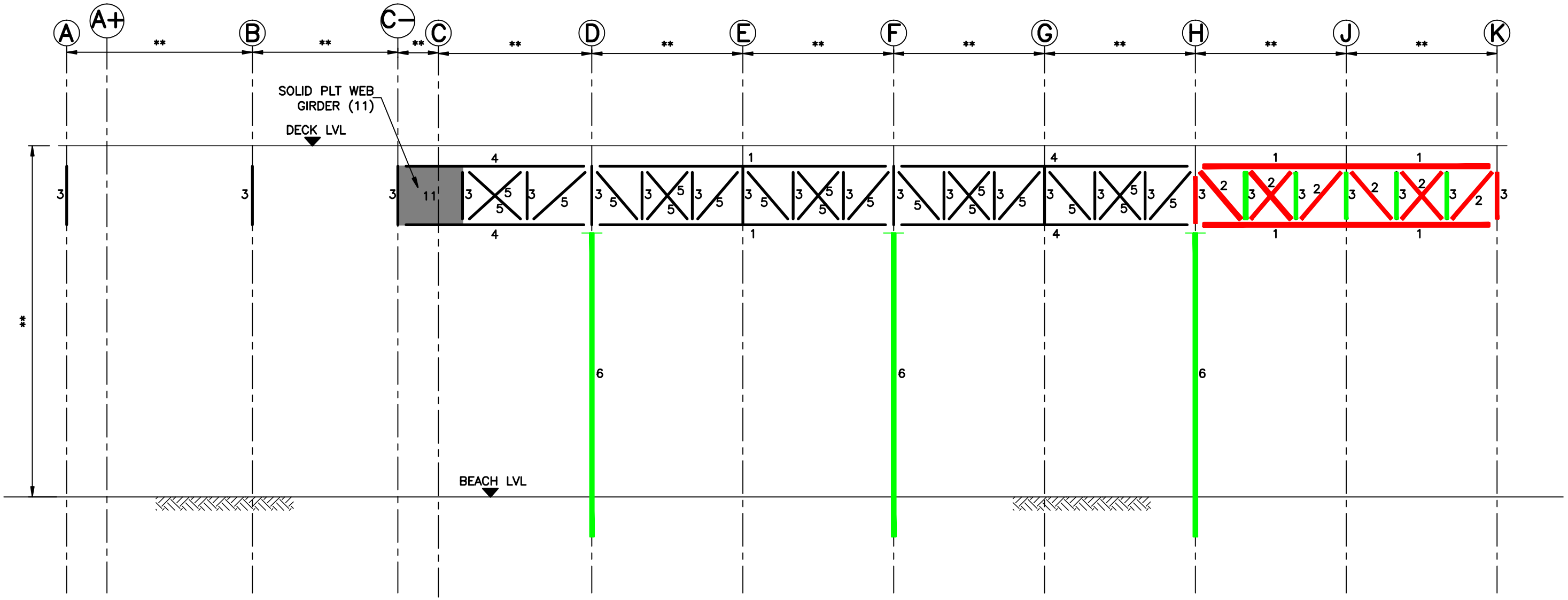
Job No. 09205	DATE 7.4.10	SCALE 1:100	
ACAD Ref.09205/	CHECKED JS	PASSED	
DRAWN CJ	DRG No. GL 11		REV

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	100x125mm	4	4	REPLACE
2	PLATES	75x10mm	8	8	REPLACE
3	RSA	75x65mm	7	2	REPLACE
5	BRACING	50mm ø	4	4	REPLACE
6	CHS (COLUMN)	300x25mm	3	0	BLAST & PAINT

OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on GL 11+

PROJECT: Colwyn Bay Pier

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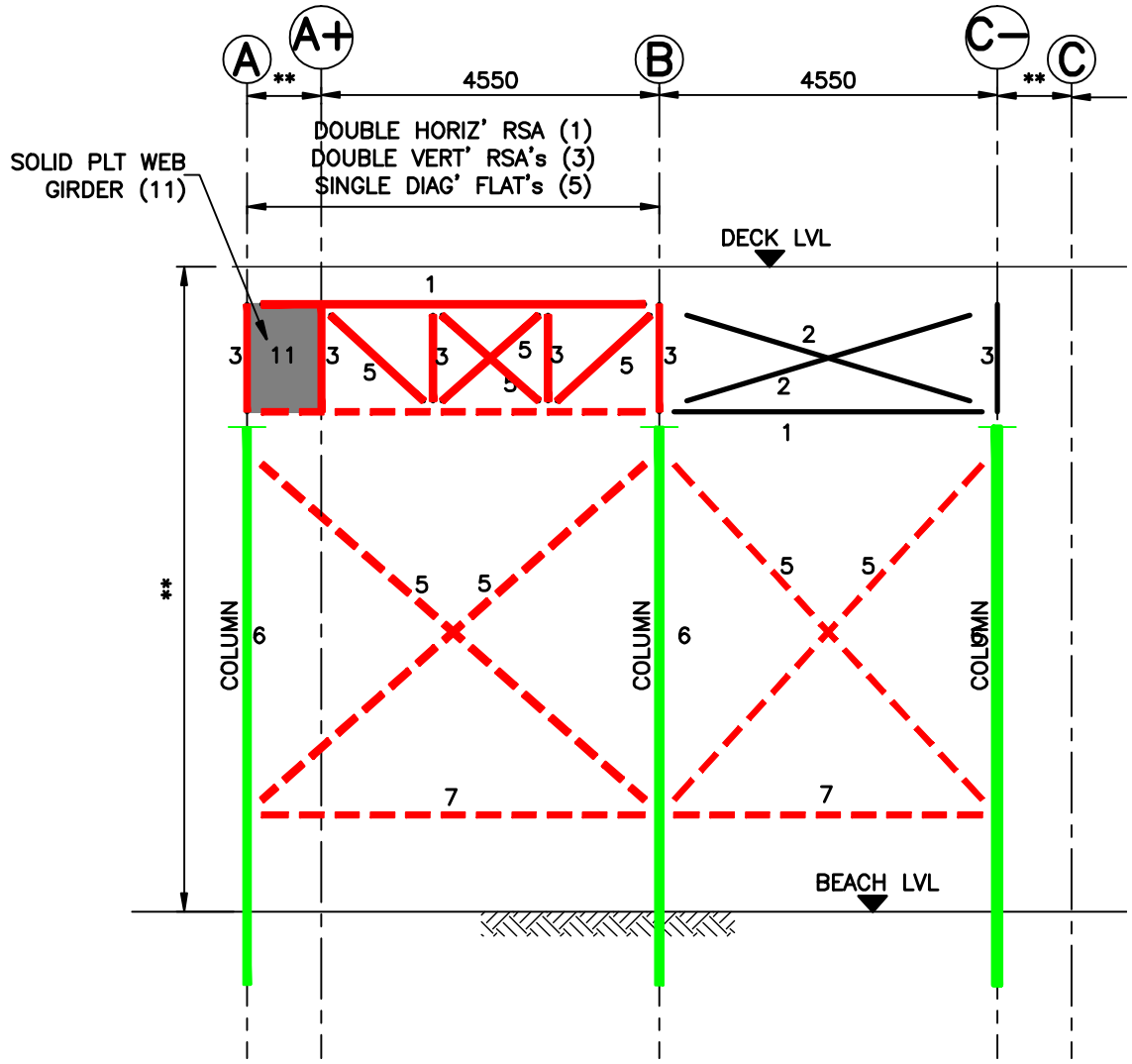
Job No. 09205	DATE 7.4.10	SCALE 1:100
ACAD Ref. 09205/	CHECKED JS	PASSED
DRAWN CJ	DRG No. GL 11+	REV

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



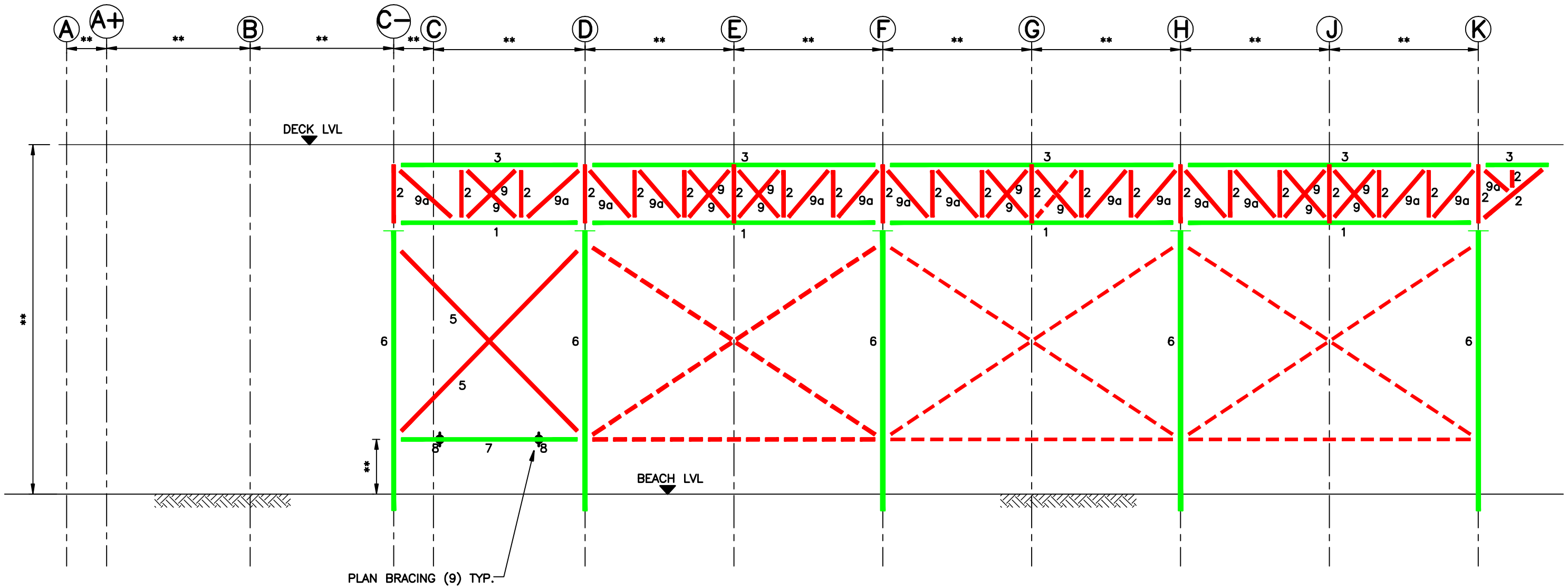
MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	RSA	90x90mm	1	0	BLAST & PAINT
2	RSA	100x100mm	2	0	BLAST & PAINT
3	RSA	75x65x10mm	5	5	REPLACE
5	BRACING	50mm ø	4	4	REPLACE
6	CHS (COLUMN)	300x25mm	3	0	BLAST & PAINT
7	RAIL	135x65mm	2	2	REPLACE

OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line 12	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1;100
			DATE 07.04.10 / CHKD CJ
			DRG No. GL 12

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
3	RSA (2)	90x90mm	5	0	BLAST & PAINT
9	PLATES	125x10mm	14	14	REPLACE
9a	PLATES	75x10mm	14	14	REPLACE
2	T SECTION	155x110mm	4	0	BLAST & PAINT
2a	RSA	75x65mm	23	23	REPLACE
5	BRACING	50mm ø	8	8	REPLACE
6	CHS (COLUMN)	300x25mm	5	0	BLAST & PAINT
7	RAIL	135x65mm	4	3	REPLACE

OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE
Steelwork GA
Elevation on GL 13

PROJECT
Colwyn Bay Pier

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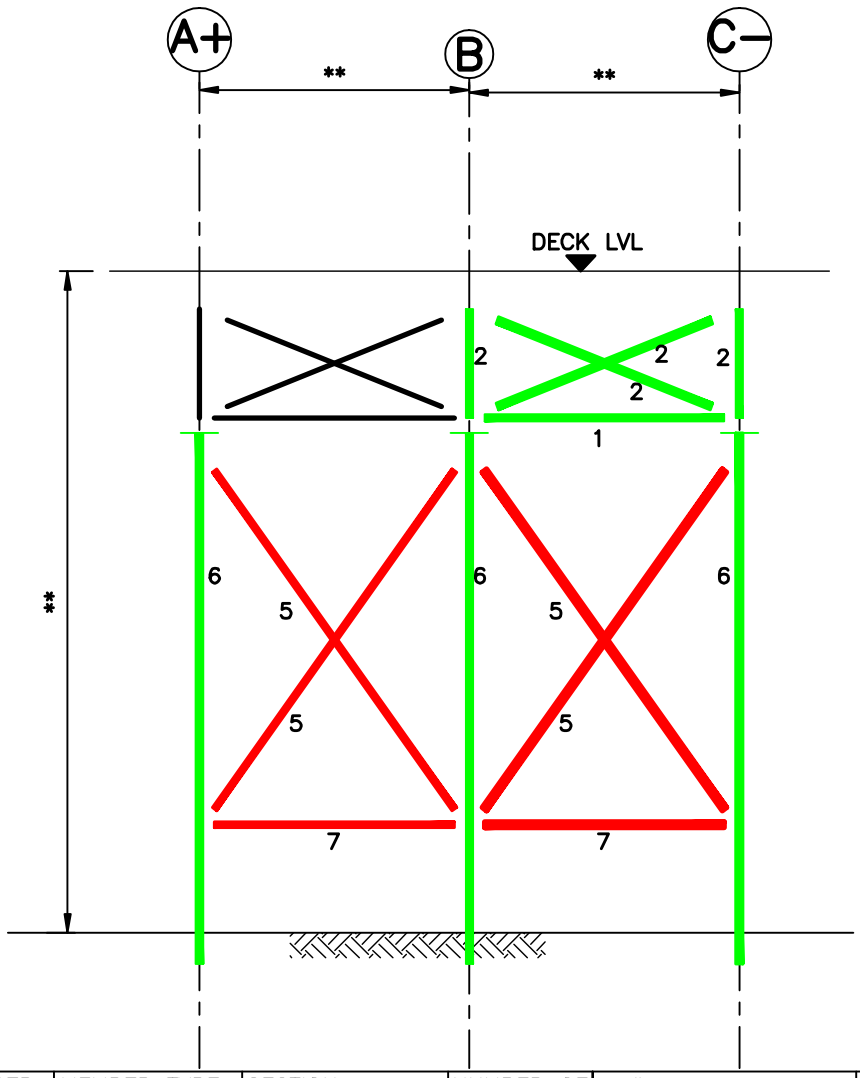
Job No. 09205	DATE 7.4.10	SCALE 1:100	
ACAD Ref. 09205/	CHECKED JS	PASSED	
DRAWN CJ	DRG No. GL 13		REV

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	RSA	90x90mm	1	0	BLAST & PAINT
2	RSA	100x100mm	2	0	BLAST & PAINT
5	BRACING	50mm ø	2	2	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT
7	RAIL	135x65mm	2	2	REPLACE

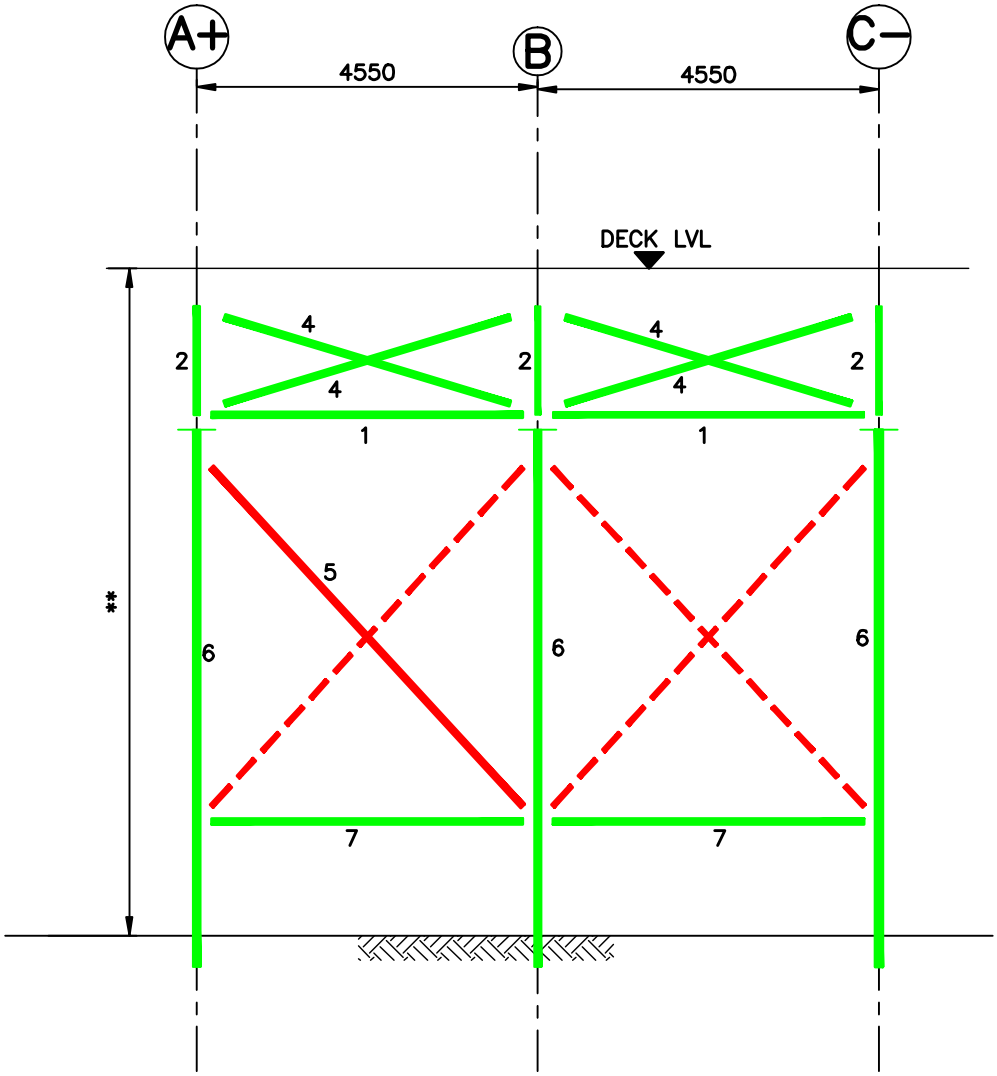
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line 16	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1;100
			DATE 07.04.10 / CHKD CJ
			DRG No. GL 16

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	INSPECTION RESULT	ANALYSIS RESULT	ACTION
1	T SECTION	100x100x6mm	2	ALL OK		BLAST & PAINT
2	RSA (VERT')	100x100mm	3	ALL OK		BLAST & PAINT
4	RSA (DIAG')	100x100x8mm	4	ALL OK		BLAST & PAINT
5	BAR	50mm ø	4	FAILED		REPLACE
6	CHS (COLUMN)	300x25mm	3	ALL OK		BLAST & PAINT
7	RAIL	135x65mm	2	OK		BLAST & PAINT

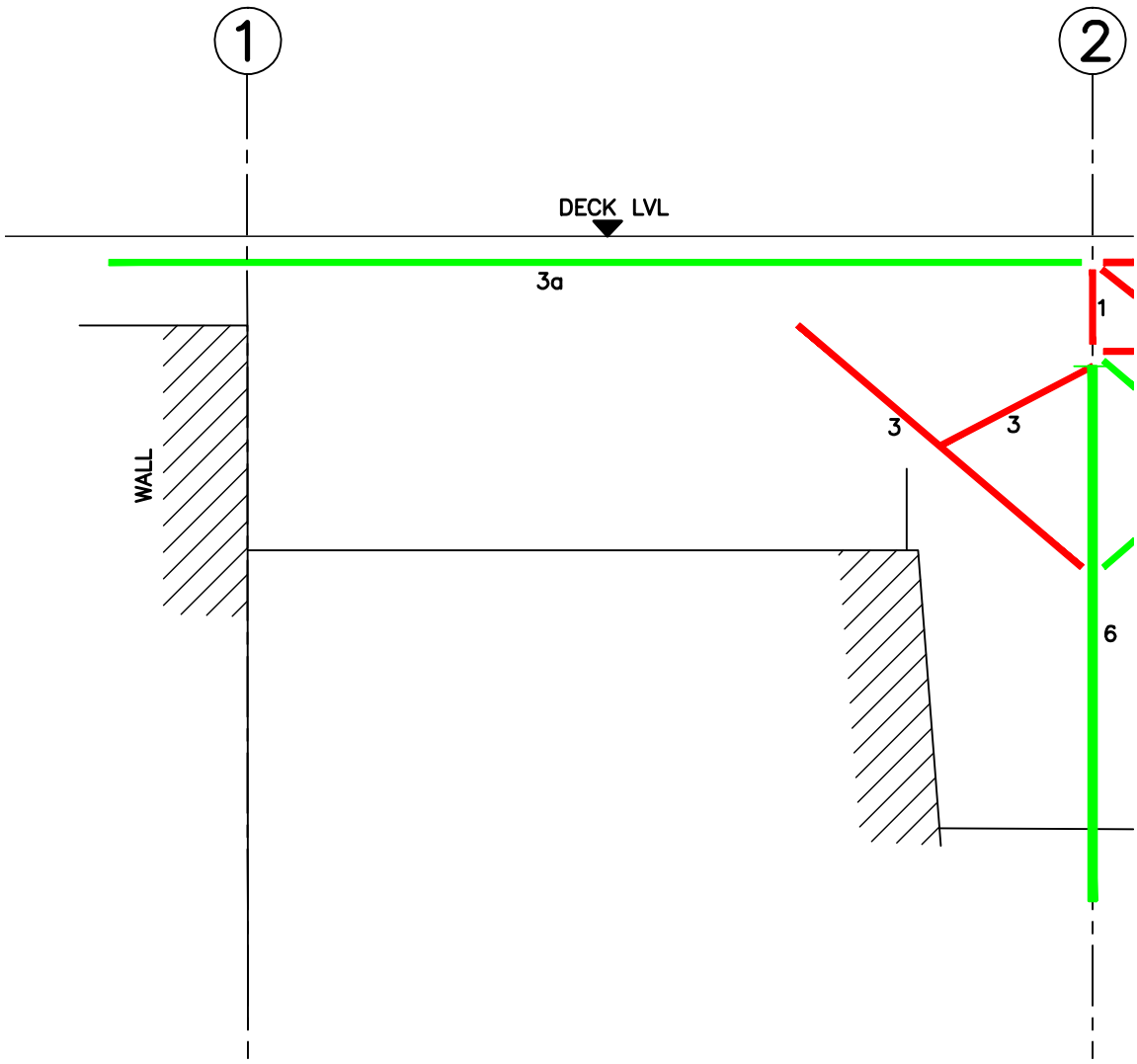
OVERALL VERDICT : REPAIR IN-SITU

TITLE: Steelwork GA Elevation on Grid Line 19	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1;100
			DATE 07.04.10 / CHKD CJ
			DRG No. GL 19

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
3	UB	152x152mm	2	2	REPLACE
3a	UB	456x191mm	1	0	BLAST & PAINT
6	CHS (COLUMN)	300x25mm	1	0	BLAST & PAINT

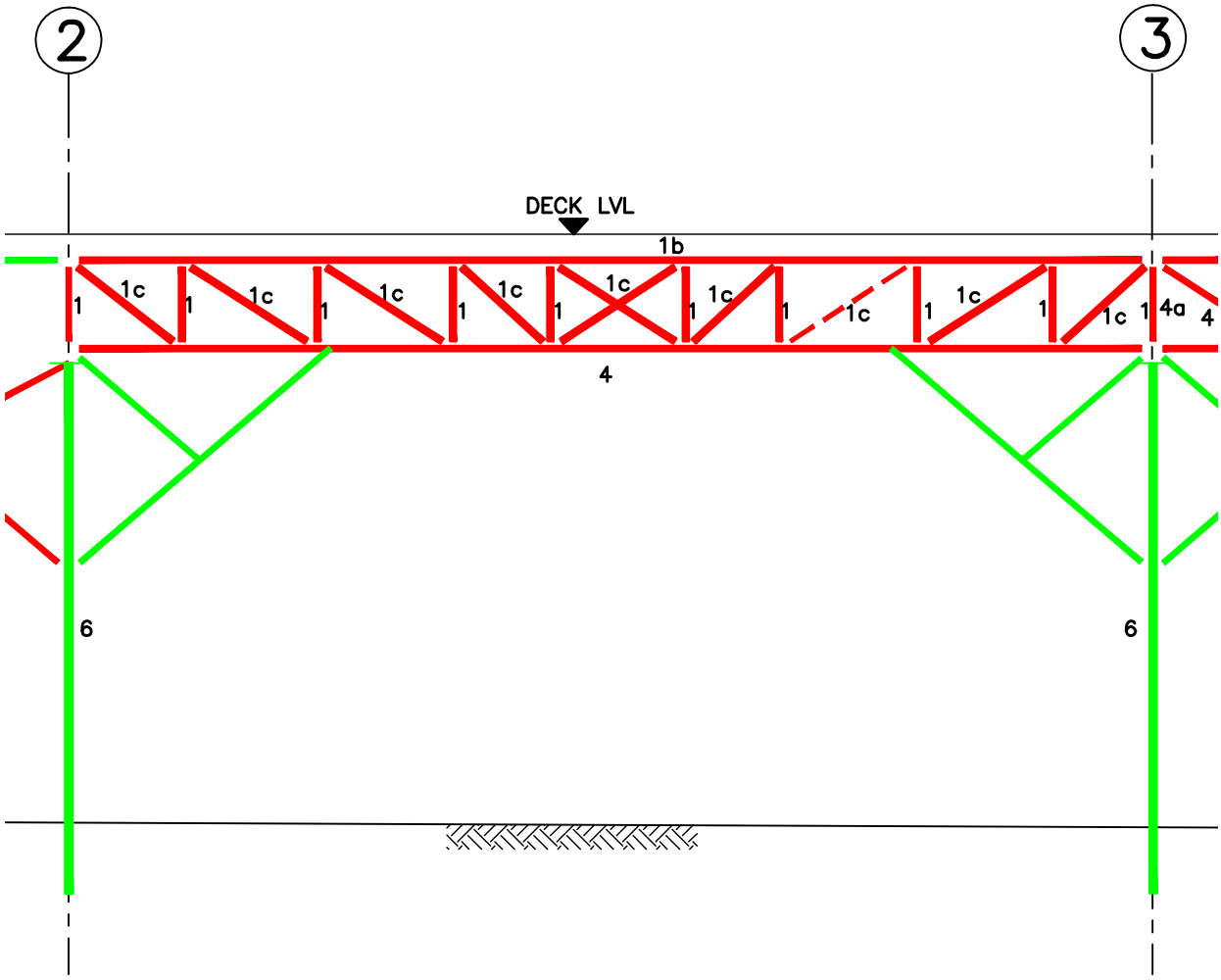
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line A	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No. GL A1–A2

09205

KEY:

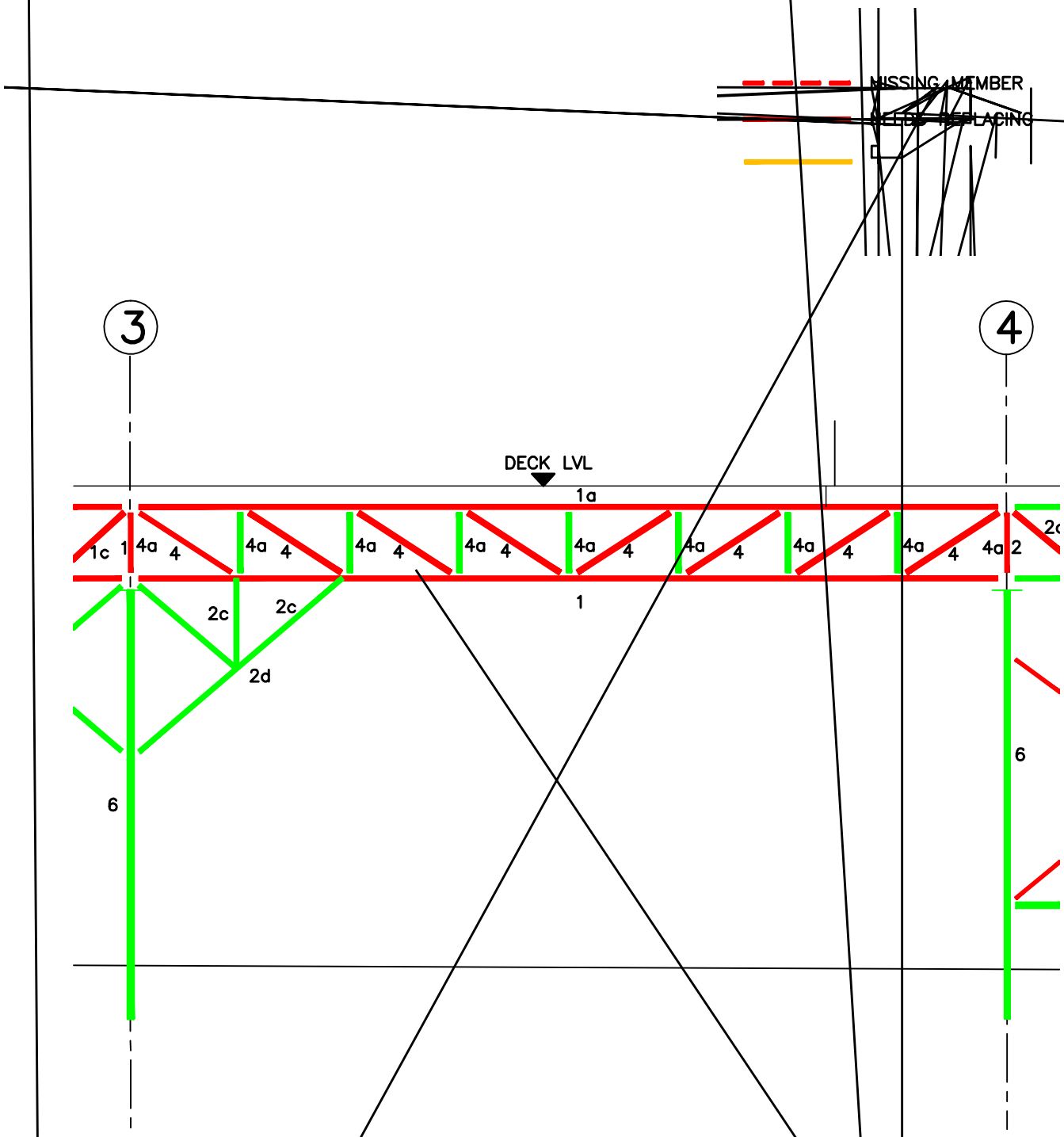
- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	100x60mm	1	1	REPLACE
1b	T SECTION	380x160mm	1	1	REPLACE
1c	T SECTION	100x80mm	10	10	REPLACE
4	RSA (DIAG')	180x90x10mm	1	1	REPLACE
6	CHS (COLUMN)	300x25mm	1	0	BLAST & PAINT

OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on Grid Line A	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No. GL A2–A3

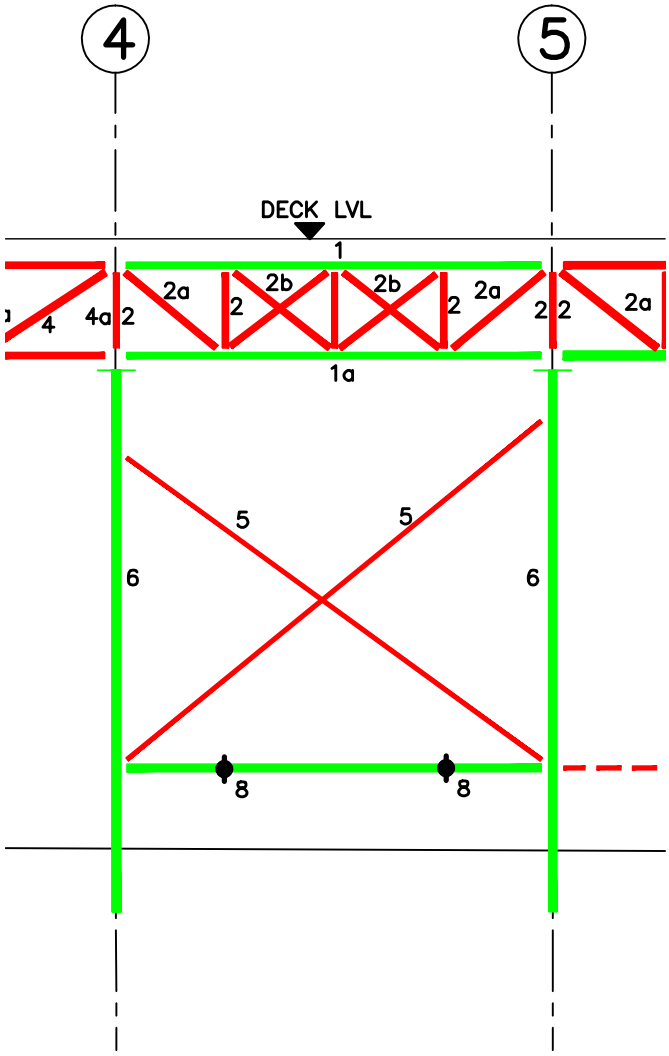


MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	210x100mm	1	1	REPLACE
1a	T SECTION	210x125mm	1	1	REPLACE
4	PLATES	100x80mm	8	8	REPLACE
4a	RSA	100x75mm	9	2	REPLACE
4b	RSA	80x80mm	2	0	BLAST & PAINT
4d	RSA	125x125mm	1	0	BLAST & PAINT

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	130x100mm	1	0	BLAST & PAINT
1a	T SECTION	100x100mm	1	0	BLAST & PAINT
2	RSA (2)	80x80mm	5	5	BLAST & PAINT
2a	PLATES	150x8mm	5	5	BLAST & PAINT
2b	PLATES	75x6mm	4	4	BLAST & PAINT
5	BRACING	50mm ø	2	2	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT
7	RAIL	135x65mm	1	0	BLAST & PAINT
8	BARS	38x63mm	2	0	BLAST & PAINT

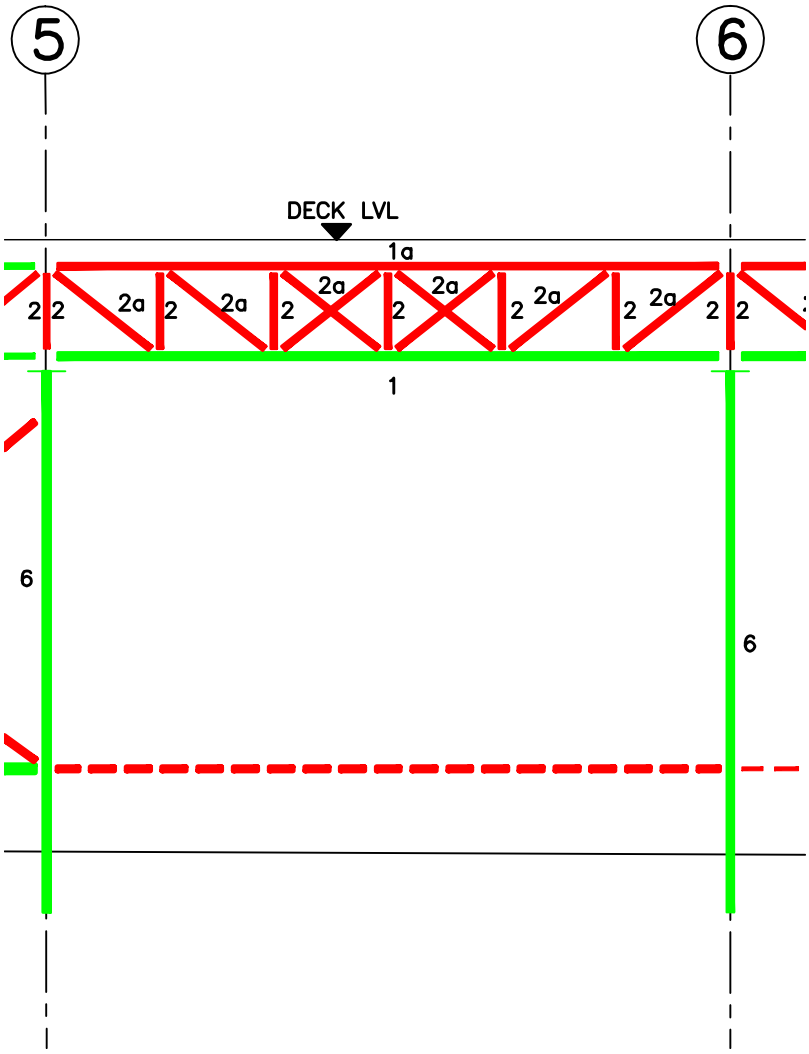
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line A	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100
			DATE 18.03.10 / CHKD CJ
			DRG No. GL A4–A5

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	100x100mm	1	0	BLAST & PAINT
1a	T SECTION	155x110mm	1	1	REPLACE
2	RSA (2)	75x50mm	7	7	REPLACE
2a	PLATES	75x6mm	8	8	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

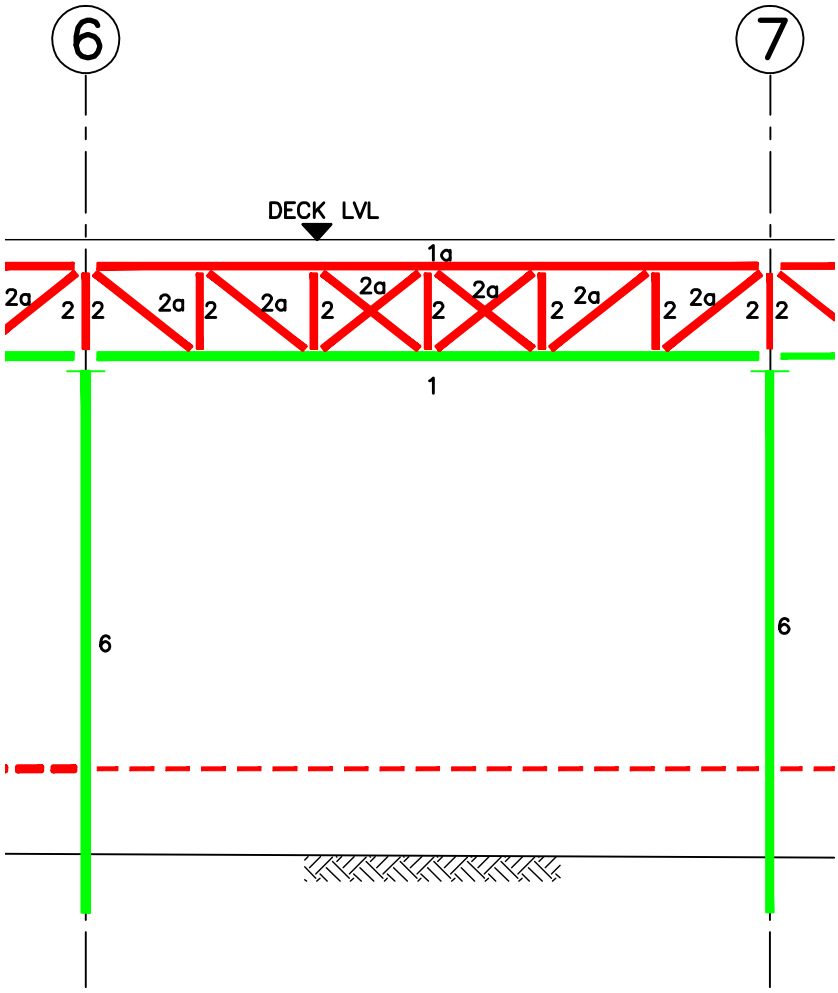
OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE	PROJECT		
Steelwork GA Elevation on Grid Line A	Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB · SCALE 1:100 · DATE 18.03.10 · CHKD CJ · DRG No. GL A5–A6

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	100x100mm	1	0	REPLACE
1a	T SECTION	155x110mm	1	1	REPLACE
2	RSA (2)	75x50mm	7	7	REPLACE
2a	PLATES	75x6mm	8	8	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

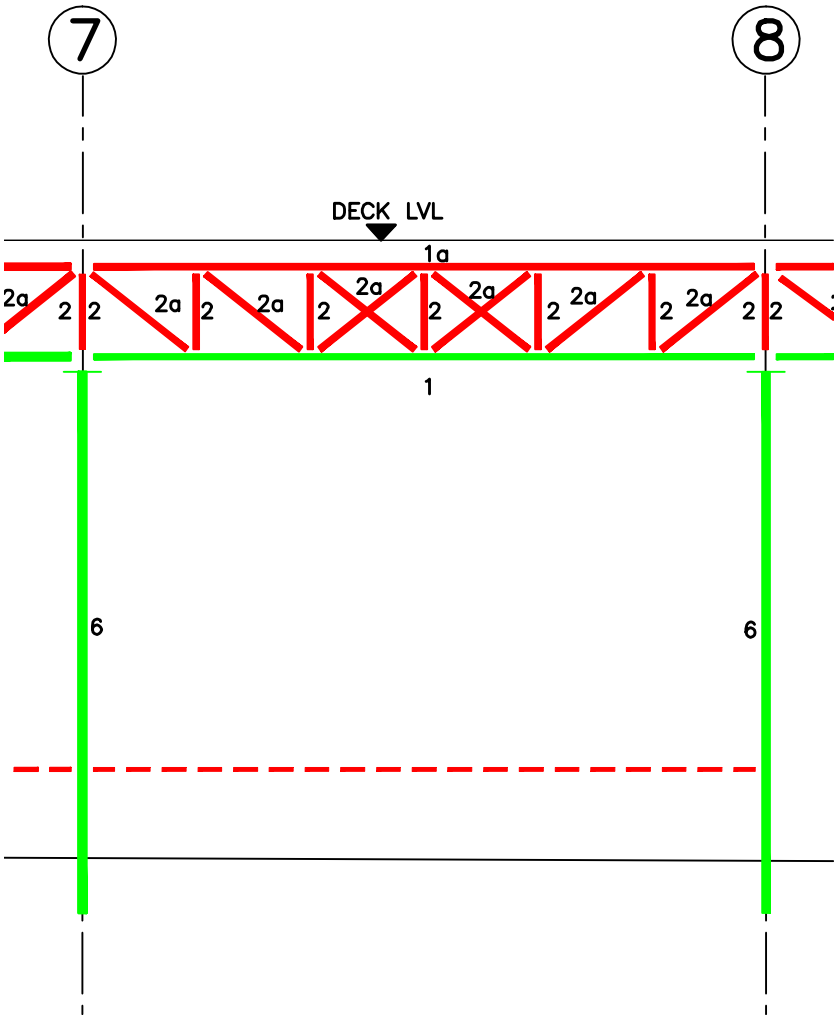
OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on Grid Line A	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No. GL A6–A7

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	310x125mm	1	0	REPLACE
1a	T SECTION	100x60mm	1	1	REPLACE
2	RSA (2)	80x80mm	7	7	REPLACE
2a	RSA	80x80mm	8	8	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

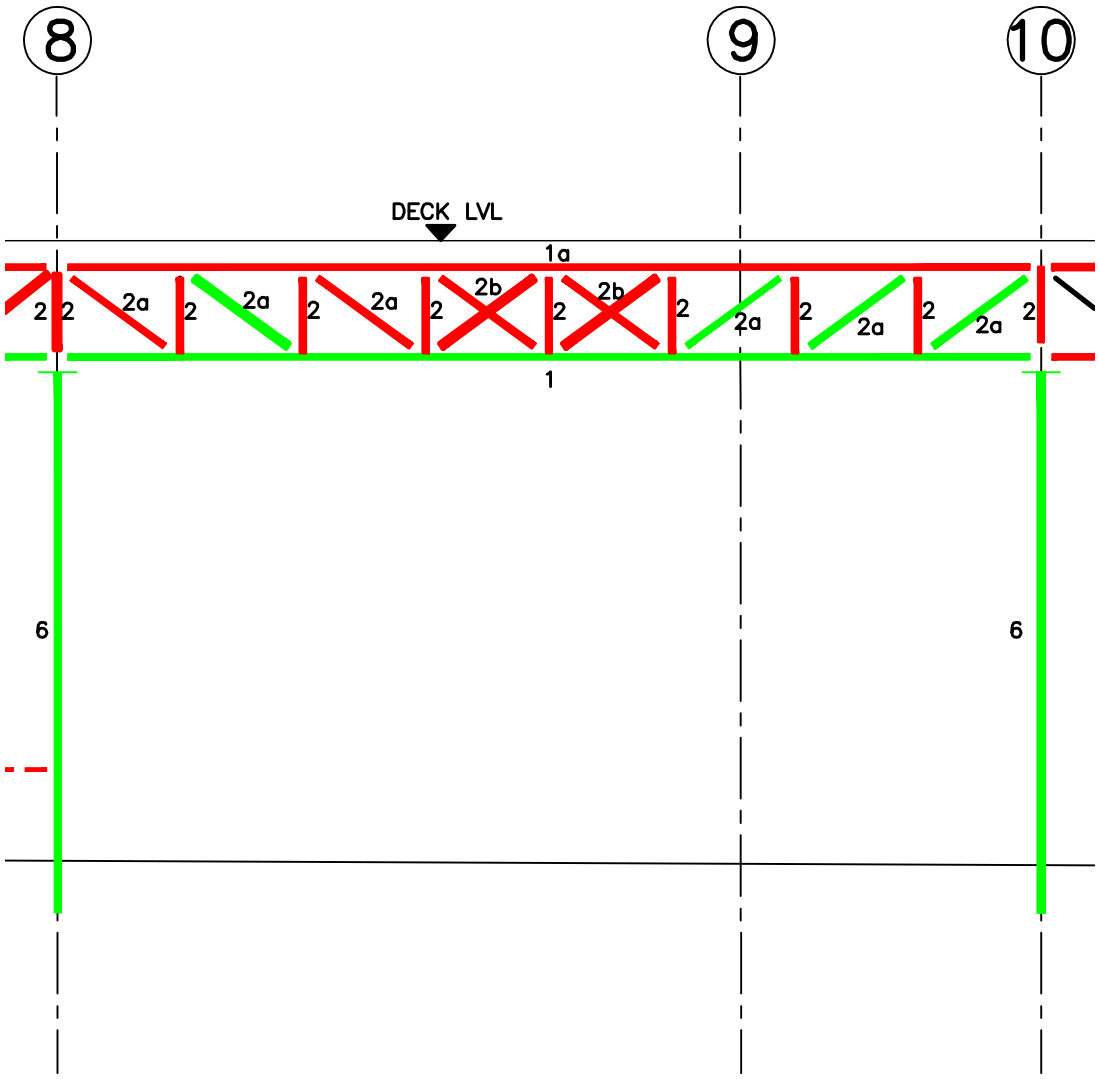
OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on Grid Line A	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No. GL A7–A8

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	RSA	90x75mm	1	0	BLAST & PAINT
1a	RSA	100x100mm	1	1	REPLACE
2	RSA	70x70mm	9	9	REPLACE
2a	PLATES	100x10mm	6	2	REPLACE
2b	PLATES	75x10mm	6	2	REPLACE
6	CHS (COLUMN)	300x25mm	4	4	REPLACE

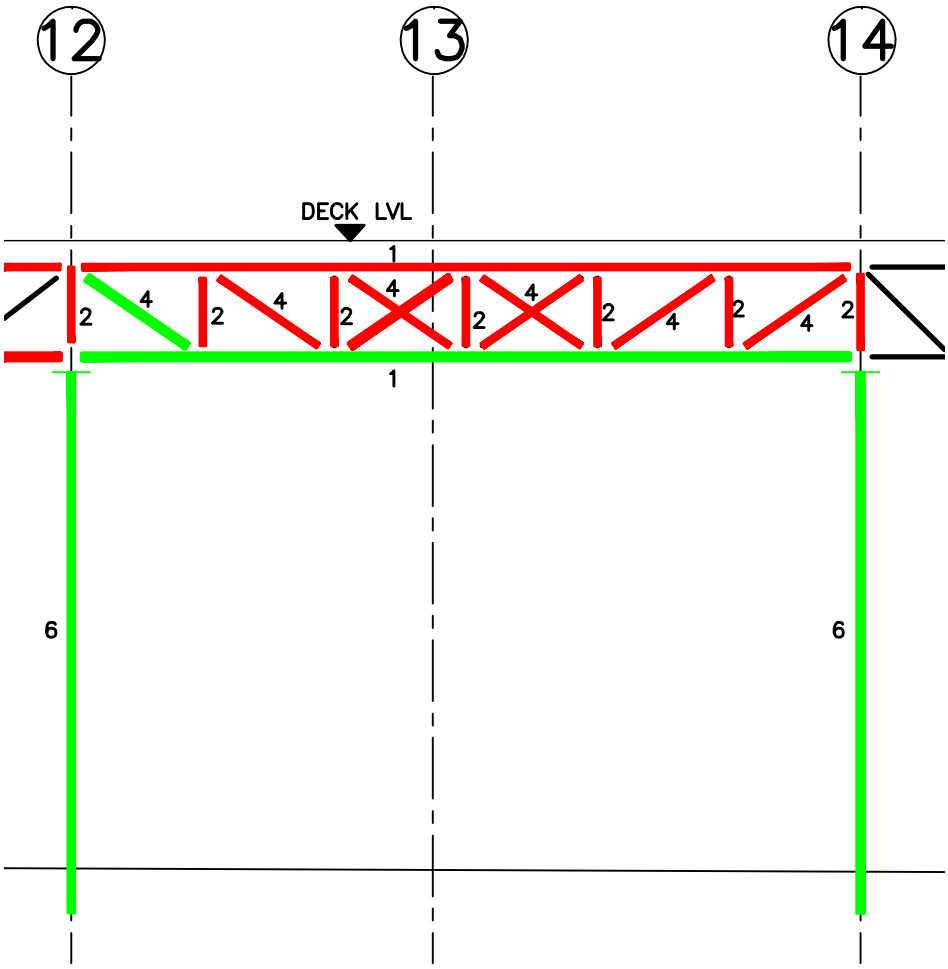
OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE	PROJECT			
Steelwork GA Elevation on Grid Line A	Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB	SCALE 1:100
			DATE 18.03.10	CHKD CJ
			DRG No. GL A8–A10	

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	RSA	140x130mm	2	1	REPLACE
2	RSA (2)	90x75mm	7	7	REPLACE
4	PLATES	75x10mm	8	7	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

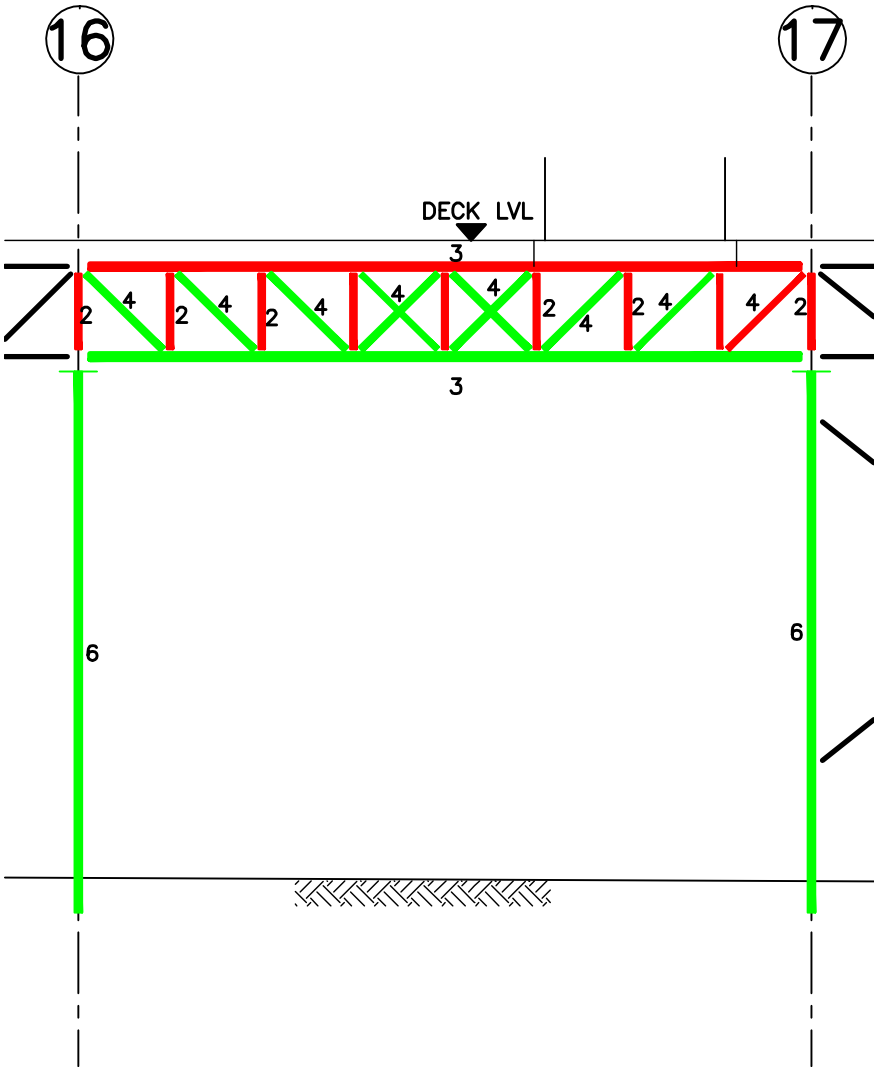
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line A	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100
			DATE 18.03.10 / CHKD CJ
			DRG No. GL A12–A14

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
3	RSA	152x152mm	2	1	REPLACE
2	RSA (VERT'S)	75x65x5mm	8	8	REPLACE
4	PLATES	100x15mm	10	1	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

TITLE
Steelwork GA Elevation on Grid Line A+

PROJECT
Colwyn Bay Pier

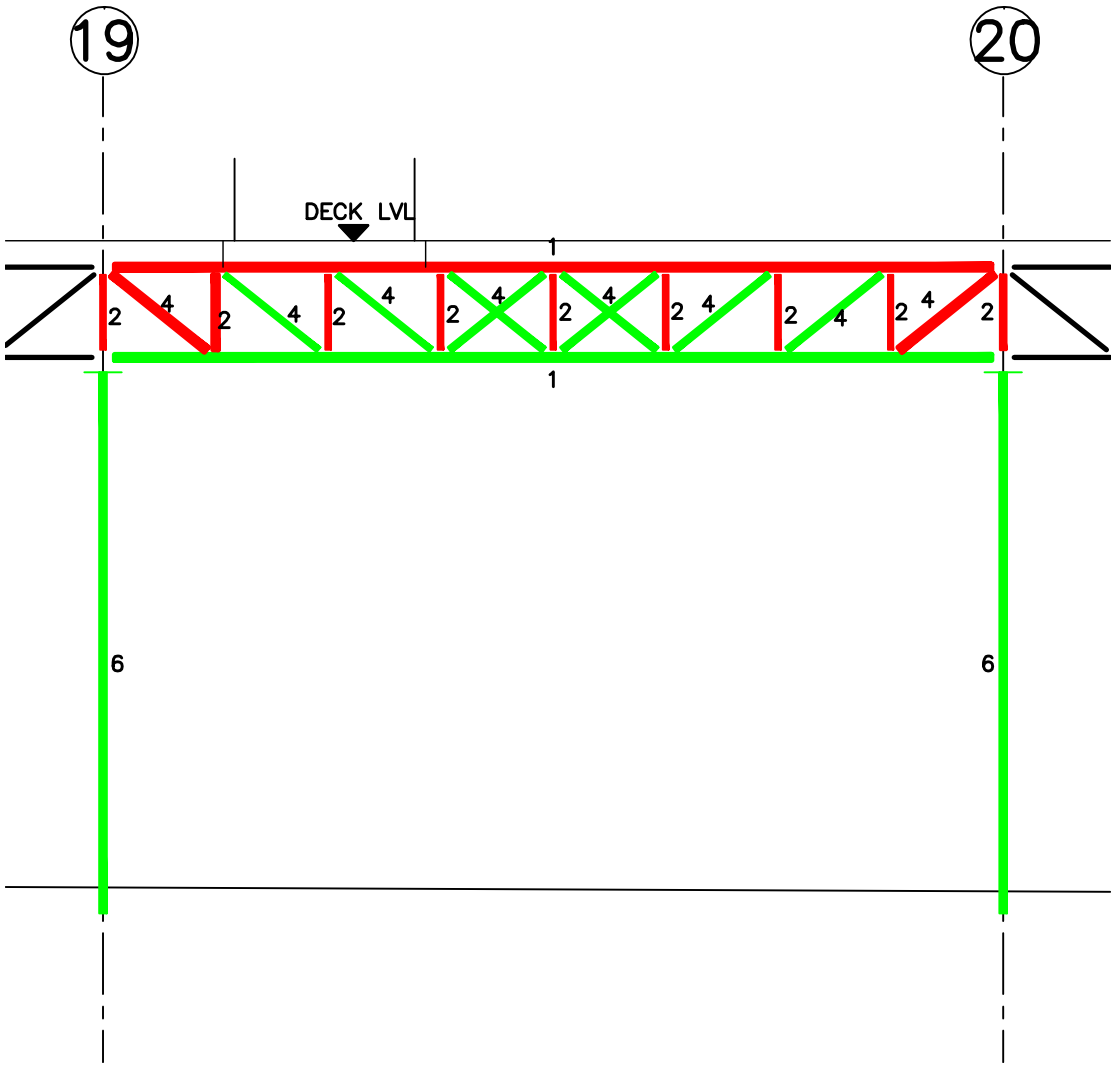
DATRYS
Peirianwyr Ymgynghorol
Consulting Engineers

DRAWN	OB	SCALE	1:100
DATE	18.03.10	CHKD	CJ
DRG No.	GL A+16–A+17		

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	RSA	100x100mm	2	1	REPLACE
2	RSA (VERT'S)	75x65x5mm	9	4	REPLACE
4	PLATES	75x10mm	10	2	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

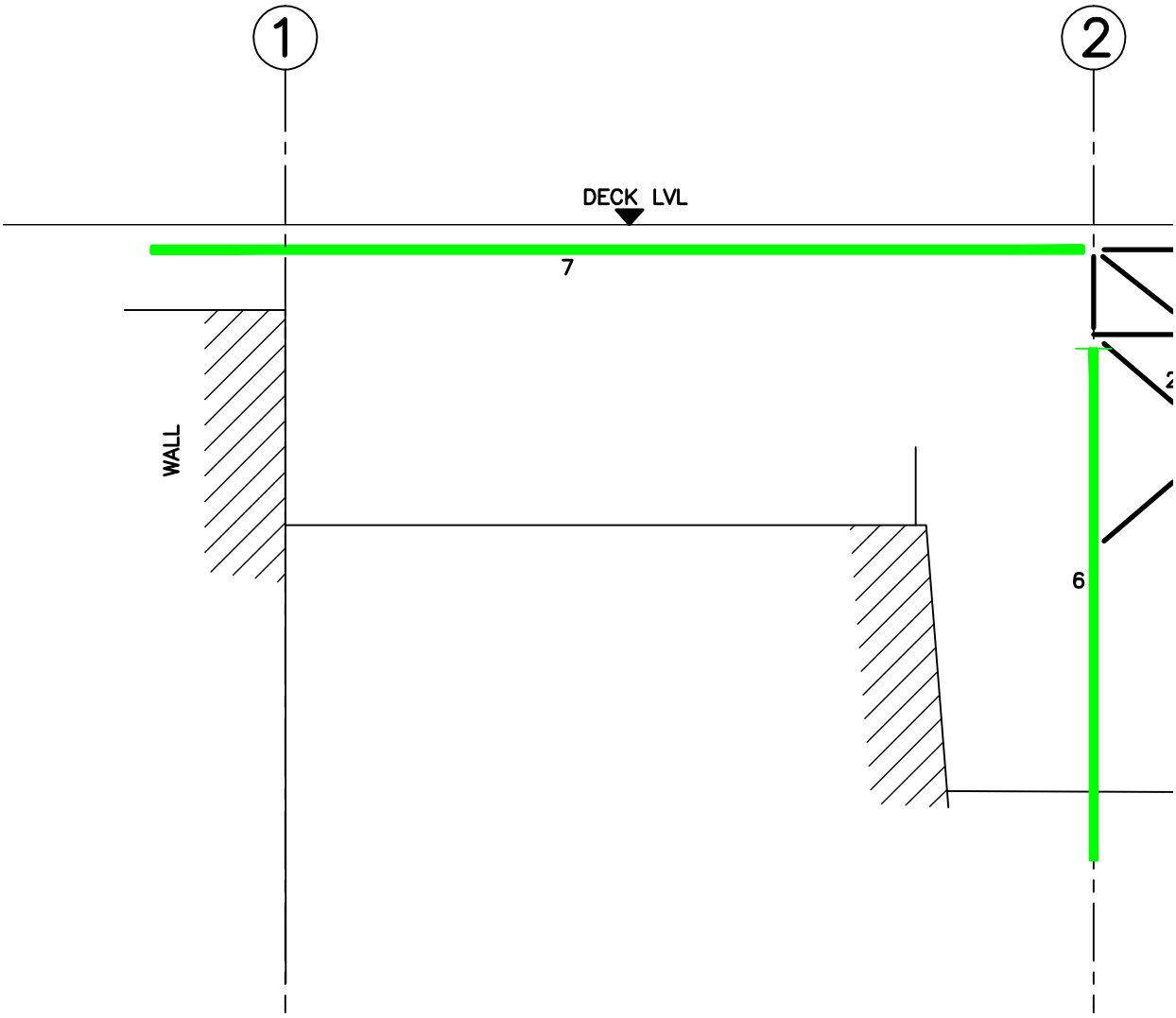
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line A+	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100
			DATE 18.03.10 / CHKD CJ
			DRG No. GL A+19–A+20

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
6	CHS (COLUMN)	300x25mm	1	0	BLAST & PAINT
7	CAST BEAM	930x225mm	1	1	REPLACE

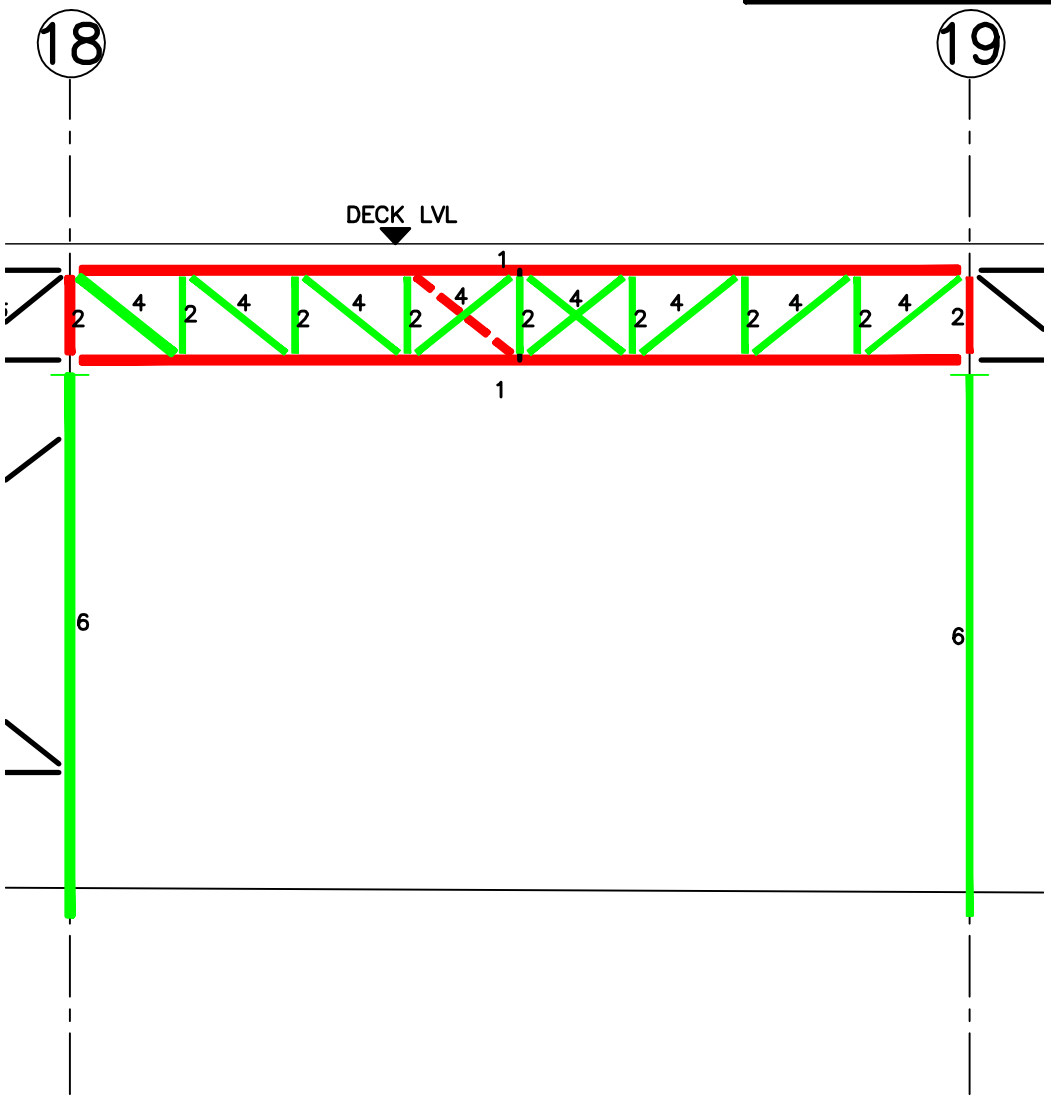
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line B	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No. GL B1–B2

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	RSA	150x100mm	2	2	REPLACE
2	RSA	75x65x5mm	9	2	REPLACE
4	PLATES	125x10mm	10	1	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

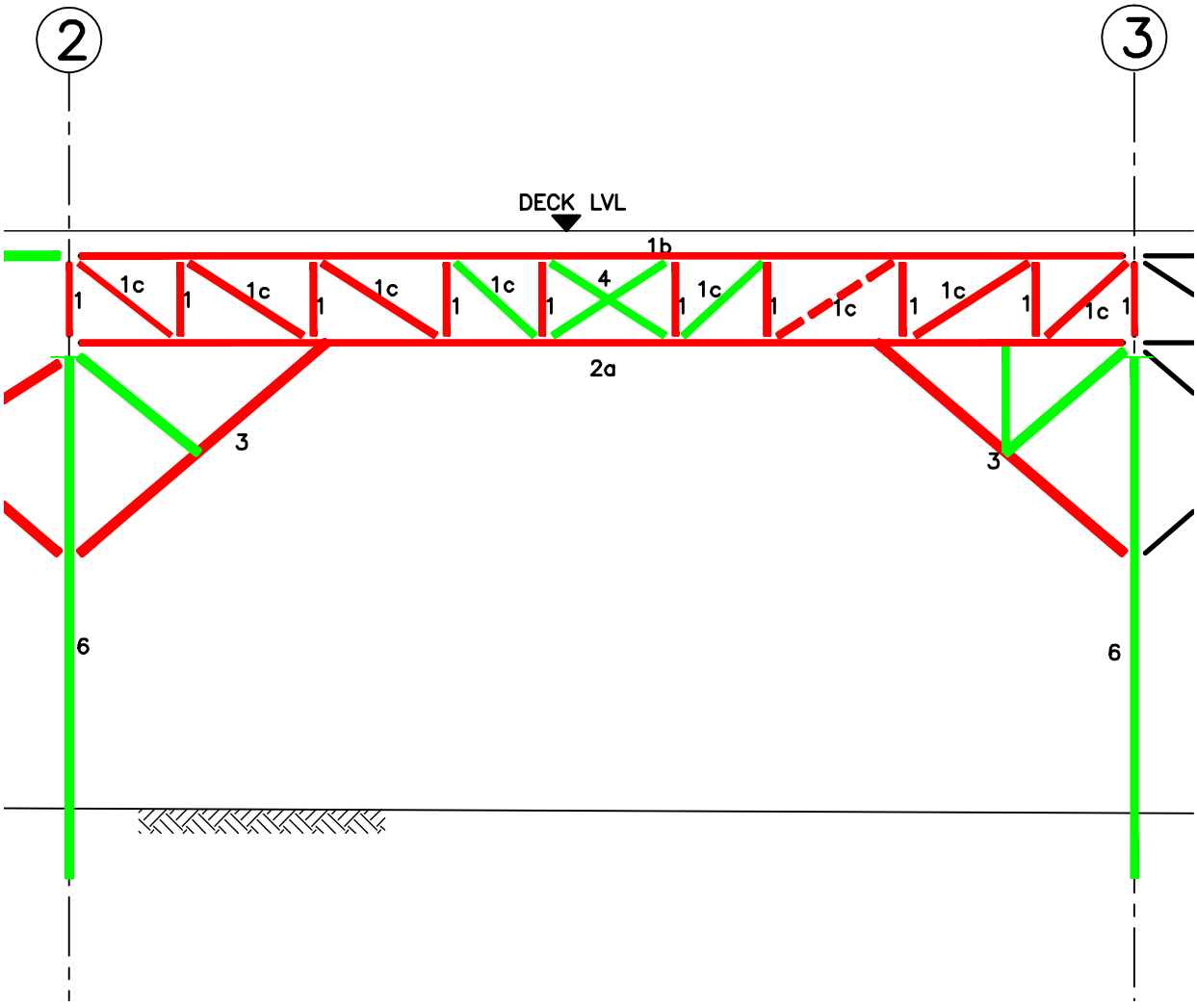
OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on Grid Line B	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No GL B18–B19

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
2	RSA SECTION	100x100mm	1	1	REPLACE
2a	RSA SECTION	90x75mm	1	1	REPLACE
2c	RSA SECTIONS	75x75x10mm	9	4	REPLACE
2d	PLATES	100x10mm	6	6	REPLACE
4	PLATES	75x10mm	4	0	BLAST & PAINT
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

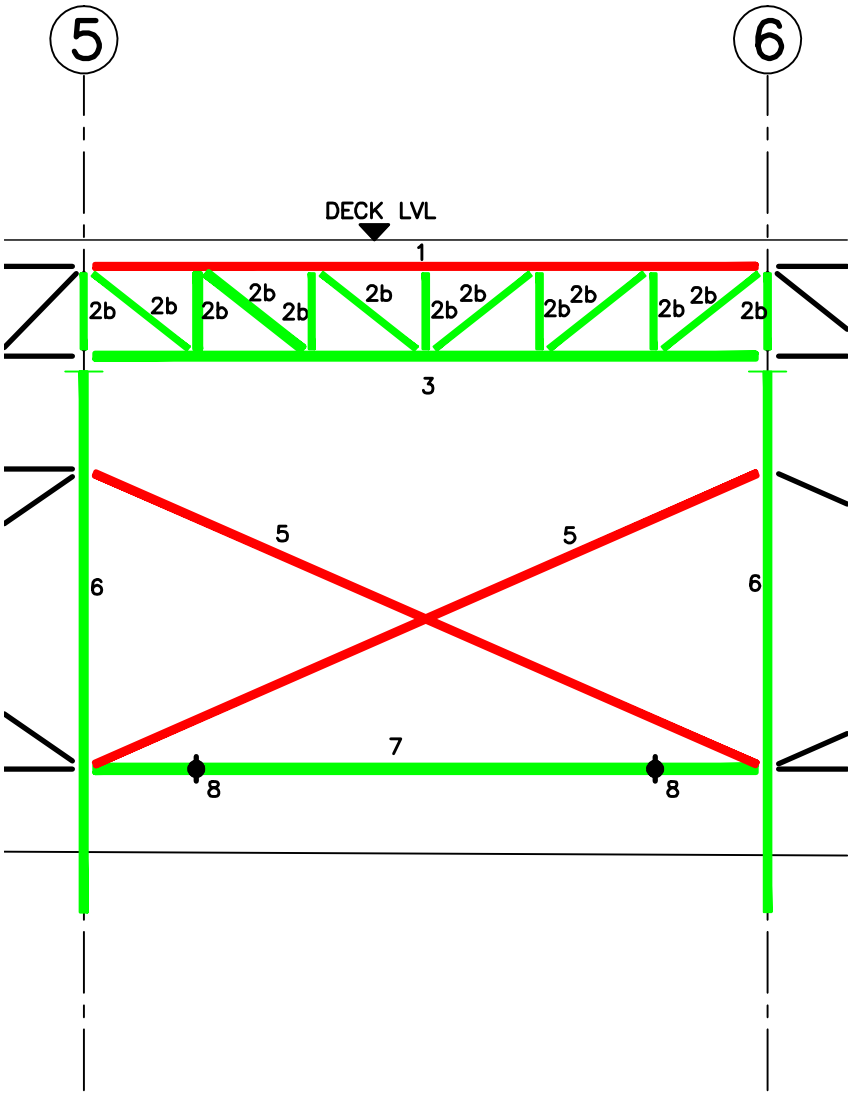
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line C	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100
			DATE 18.03.10 / CHKD CJ
			DRG No. GL C2–C3

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	310x160mm	1	1	REPLACE
2b	RSA SECTIONS	125x75x10mm	13	0	BLAST & PAINT
3	UB SECTIONS	152x152mm	1	0	BLAST & PAINT
5	BRACING	50mm ø	2	2	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT
7	RAIL	135x65mm	1	0	BLAST & PAINT
8	BARS	38x63mm	2	0	BLAST & PAINT

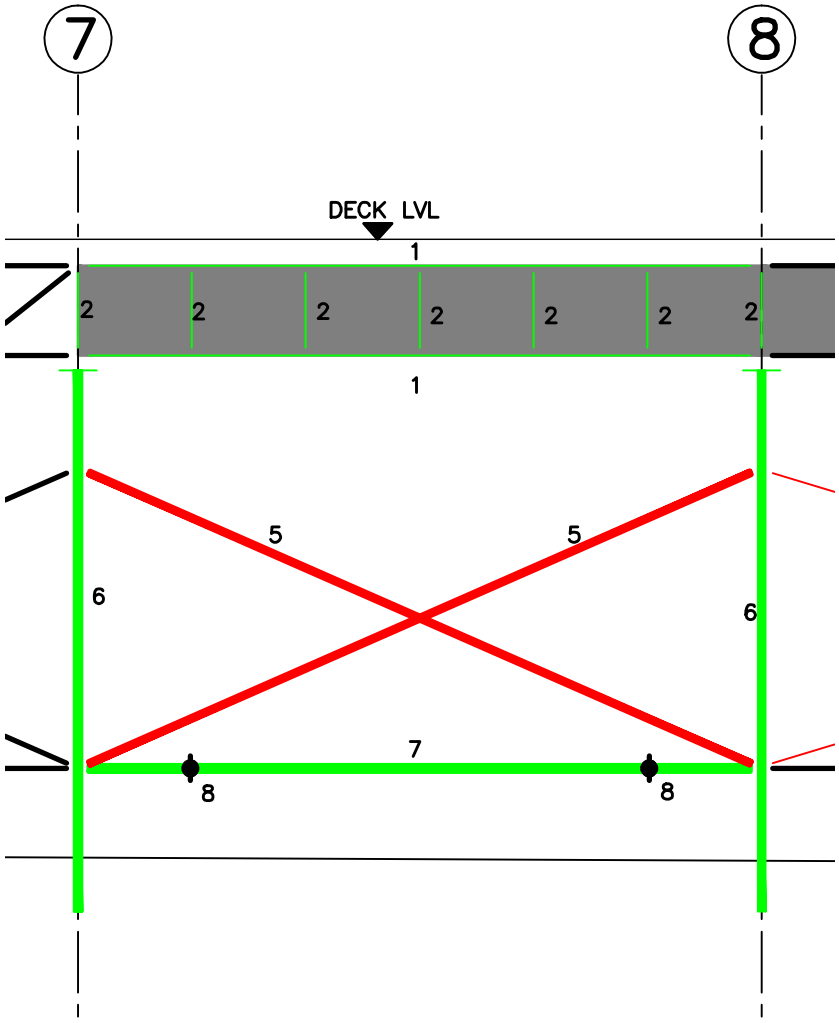
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line C	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100
			DATE 18.03.10 / CHKD CJ
			DRG No. GL C5–C6

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	RSA SECTION	130x90mm	2	0	BLAST & PAINT
2	RSA SECTIONS	90x75mm	7	0	BLAST & PAINT
5	BRACING	50mm ø	2	2	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT
7	RAIL	135x65mm	1	0	BLAST & PAINT
8	BARS	38x63mm	2	0	BLAST & PAINT

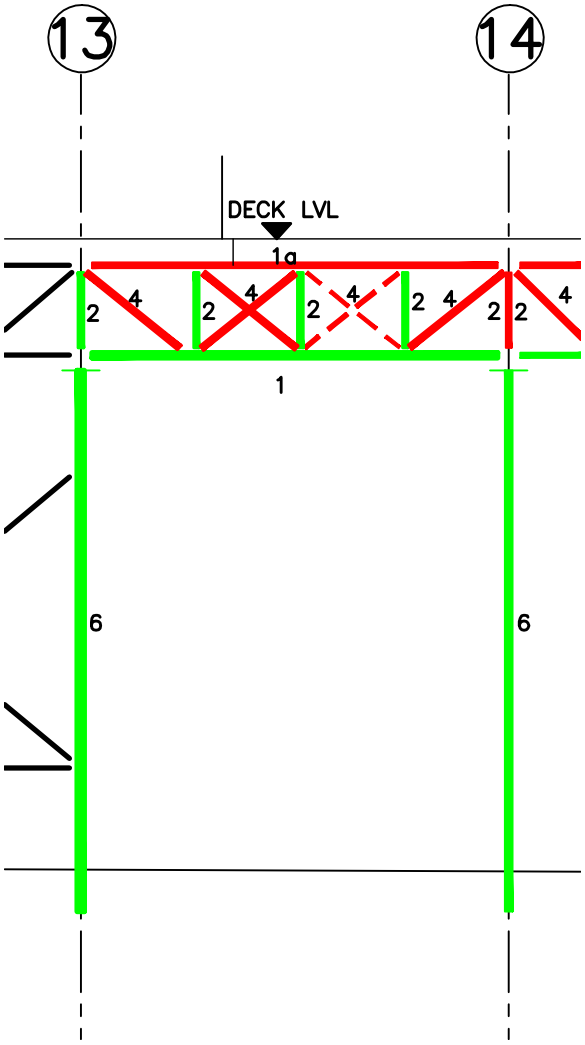
OVERALL VERDICT : RETAIN

TITLE: Steelwork GA Elevation on Grid Line C	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100
			DATE 18.03.10 / CHKD CJ
			DRG No. GL C7–C8

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTIONS	130x100mm	1	1	REPLACE
1a	T SECTIONS	100x100mm	1	0	BLAST & PAINT
2	RSA	75x65x10mm	5	4	REPLACE
4	PLATES	75x10mm	6	6	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

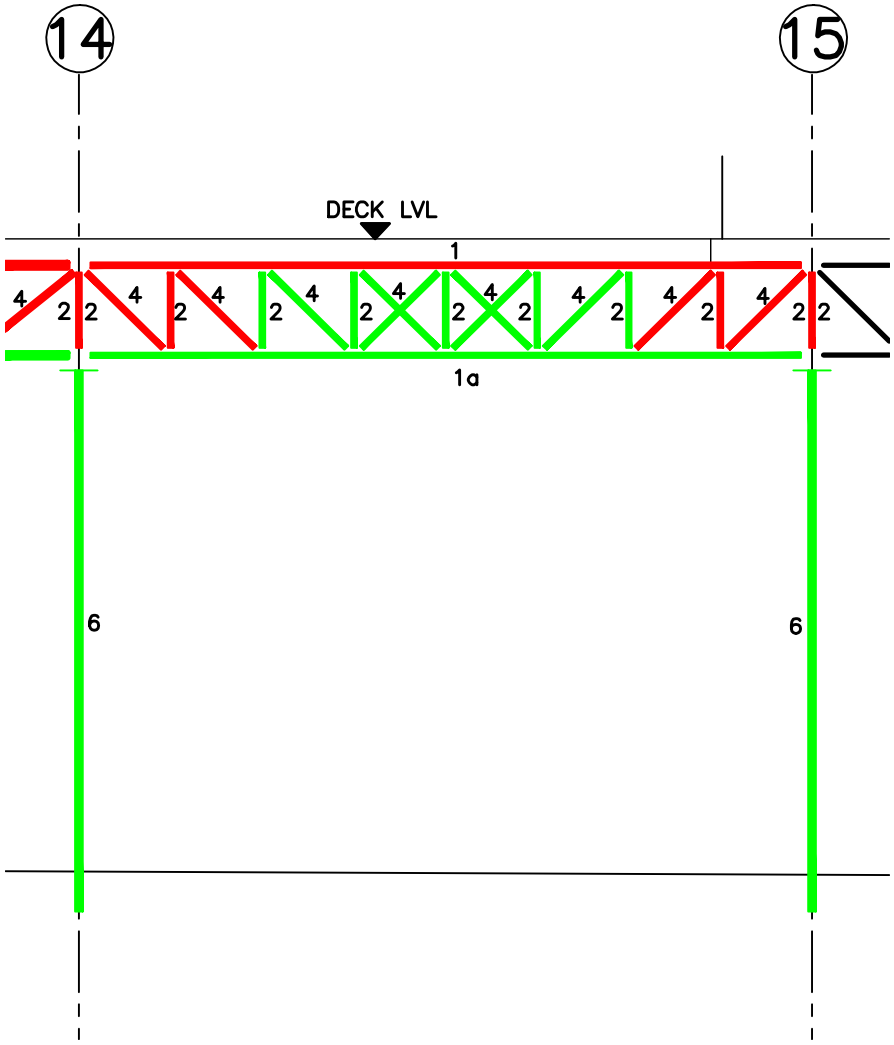
OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on Grid Line C–	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100
			DATE 18.03.10 / CHKD CJ
			DRG No.GL C–13–C–14

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	RSA	100x100mm	1	1	REPLACE
1a	RSA	90x75mm	1	0	REPLACE
2	RSA	75x65x10mm	9	4	REPLACE
4	PLATES	100x15mm	10	4	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

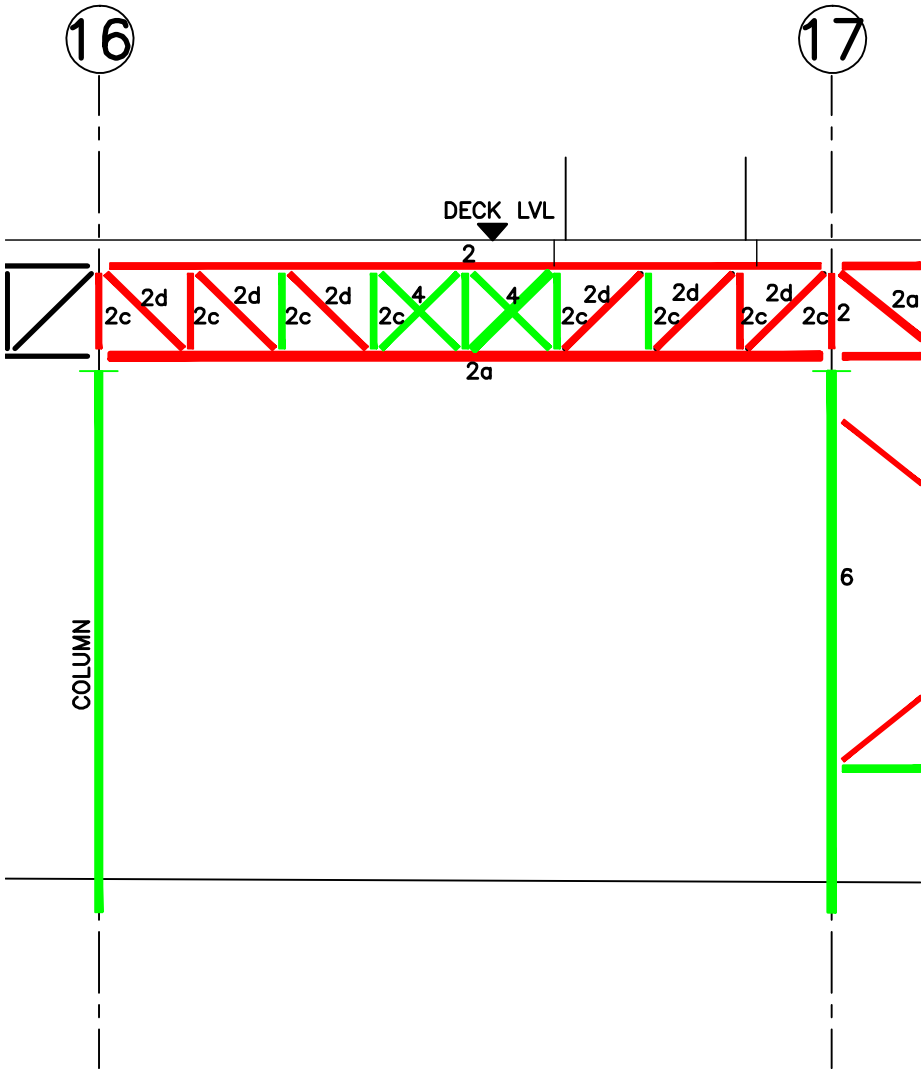
OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on Grid Line C–	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100
			DATE 18.03.10 / CHKD CJ
			DRG No. GL C–14–C–15

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
2	RSA SECTION	100x100mm	1	1	REPLACE
2a	RSA SECTION	90x75mm	1	1	REPLACE
2c	RSA SECTIONS	75x75x10mm	9	4	REPLACE
2d	PLATES	100x10mm	6	6	REPLACE
4	PLATES	75x10mm	4	0	BLAST & PAINT
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

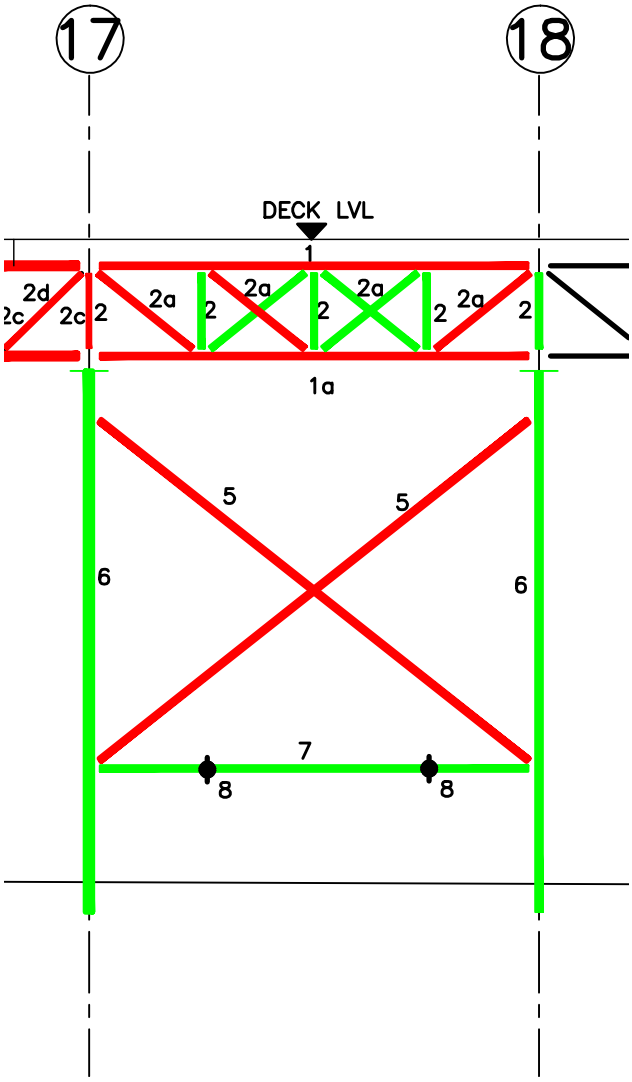
OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on Grid Line C–	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100
			DATE 18.03.10 / CHKD CJ
			DRG No. GL C–16–C–17

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	210x125mm	1	1	REPLACE
1a	T SECTION	100x100mm	13	0	BLAST & PAINT
2	RSA	75x75mm	5	1	BLAST & PAINT
2a	PLATES	75x6mm	6	3	BLAST & PAINT
5	BRACING	50mm ø	2	2	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT
7	RAIL	135x65mm	1	0	BLAST & PAINT
8	BARS	38x63mm	2	0	BLAST & PAINT

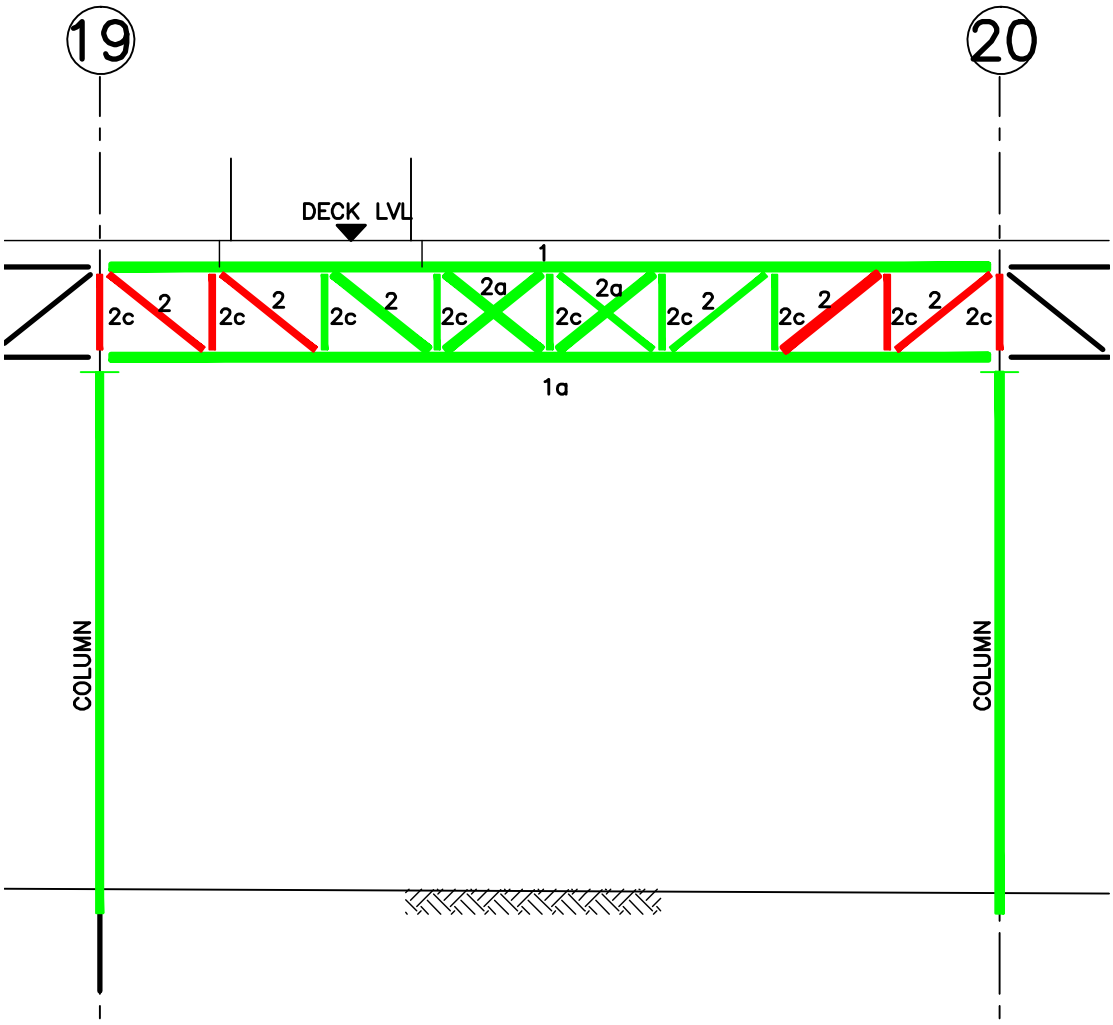
OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on Grid Line C –	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100
			DATE 18.03.10 / CHKD CJ
			DRG No. GL C–17–C–18

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	RSA SECTION	100x100mm	1	0	REPLACE
1a	RSA SECTION	90x75mm	1	0	REPLACE
2	PLATES	100x10mm	6	4	REPLACE
2a	PLATES	75x10mm	4	0	BLAST & PAINT
2c	RSA SECTIONS	75x75x10mm	9	4	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

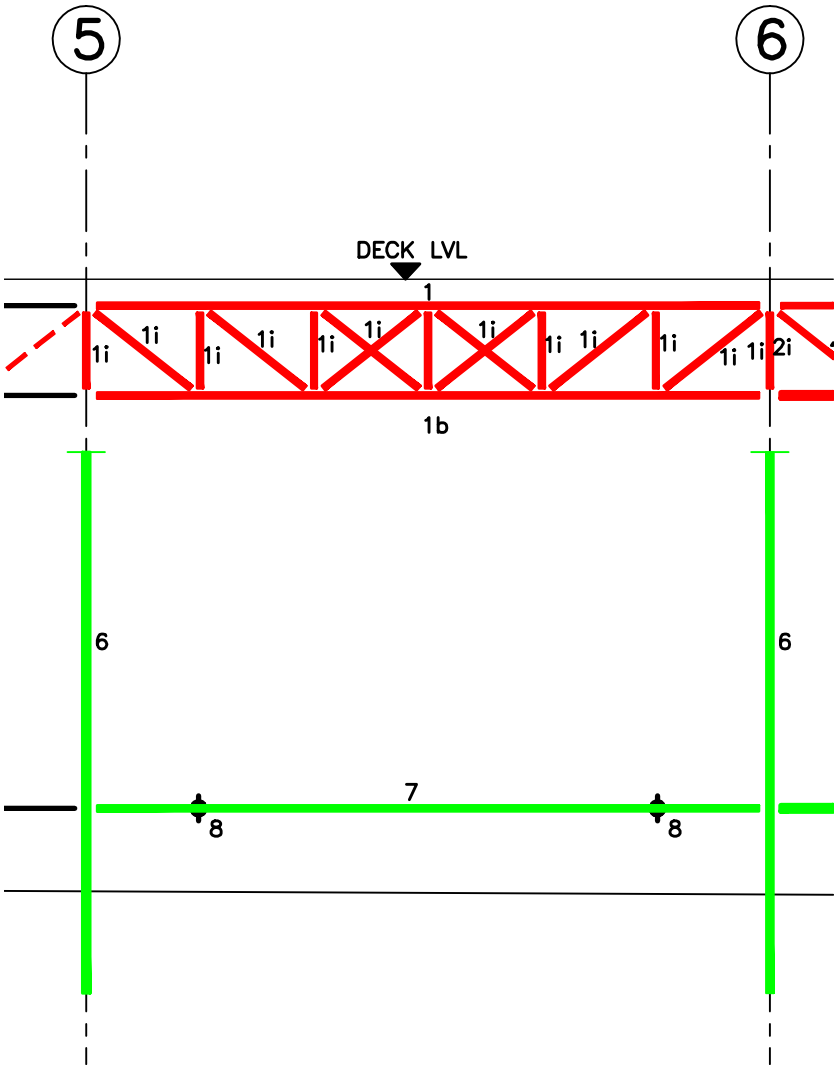
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line C–	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100
			DATE 18.03.10 / CHKD CJ
			DRG No. GL C–19–C–20

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
2f	RSA SECTIONS	100x100mm	2	2	REPLACE
2i	RSA (VERT'S)	90x90mm	7	5	REPLACE
4a	PLATES	125x10mm	6	6	REPLACE
4b	PLATES	75x10mm	2	0	BLAST & PAINT
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

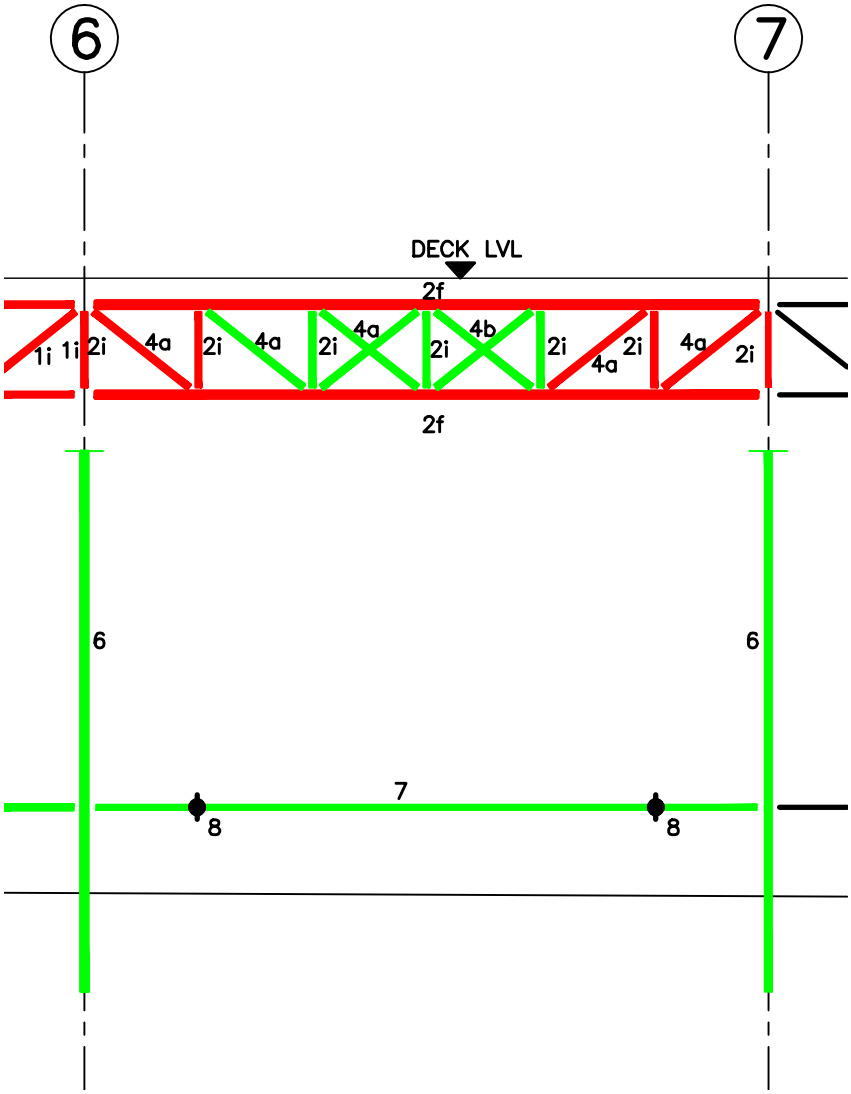
OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on Grid Line D	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No. GL D5–D6

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
2f	RSA SECTIONS	100x100mm	2	2	REPLACE
2i	RSA (VERT'S)	90x90mm	7	5	REPLACE
4a	PLATES	125x10mm	6	6	REPLACE
4b	PLATES	75x10mm	2	0	BLAST & PAINT
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT
7	RAIL	135x65mm	1	0	BLAST & PAINT
8	BARS	38x63mm	2	0	BLAST & PAINT

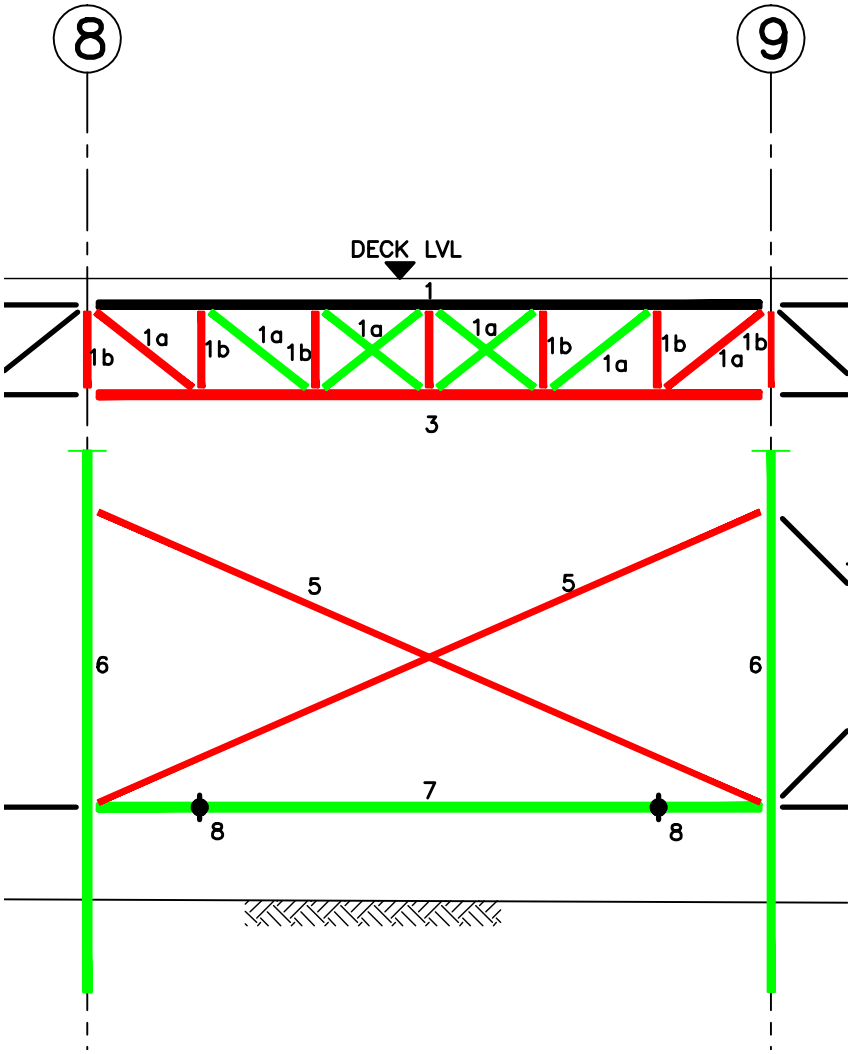
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line D	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No. GL D6–D7

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	310x160mm	1	1	REPLACE
1b	T SECTION	60x60mm	7	7	REPLACE
1a	T SECTION	78x60mm	8	2	REPLACE
5	BRACING	50mm ø	2	2	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT
7	RAIL	135x65mm	1	0	BLAST & PAINT
8	BARS	38x63mm	2	0	BLAST & PAINT

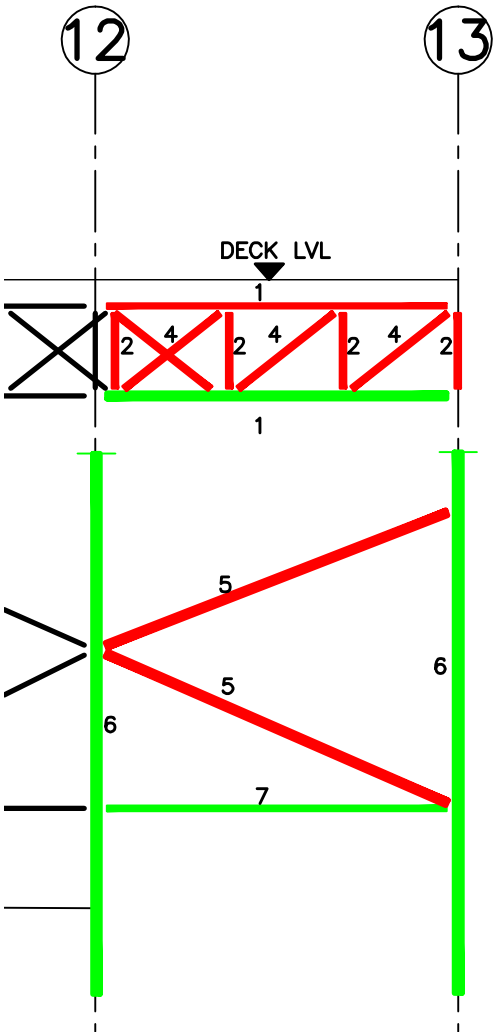
OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE	PROJECT		
Steelwork GA Elevation on Grid Line D	Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB · SCALE 1:100 · DATE 18.03.10 · CHKD CJ · DRG No. GL D8–D9

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	150x100mm	2	1	REPLACE
2	RSA	75x65x5mm	4	4	REPLACE
4	PLATES	75x10m	4	4	REPLACE
5	BRACING	50mm ø	2	2	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

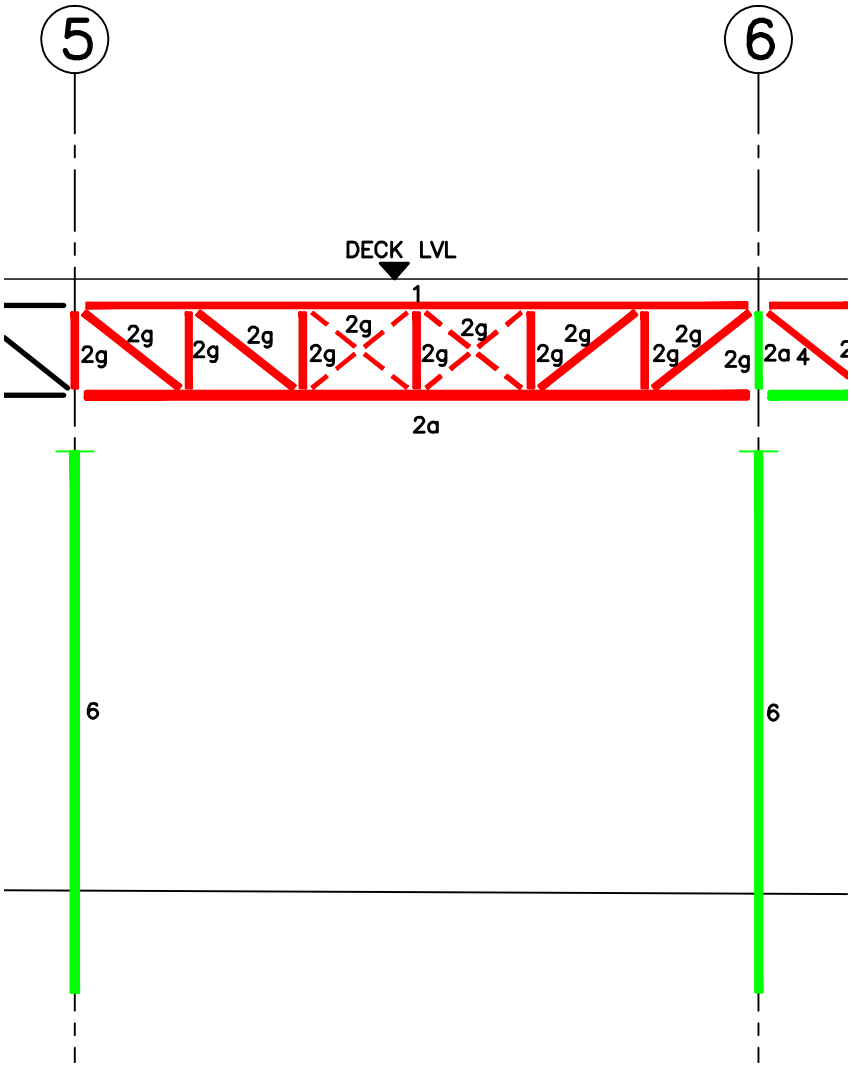
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line D	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100
			DATE 18.03.10 / CHKD CJ
			DRG No GL D12–D13

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	150x75mm	1	1	REPLACE
2	RSA	75x65x5mm	7	7	REPLACE
4c	PLATES	75x6m	2	2	REPLACE
4e	PLATES	100x10m	2	2	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

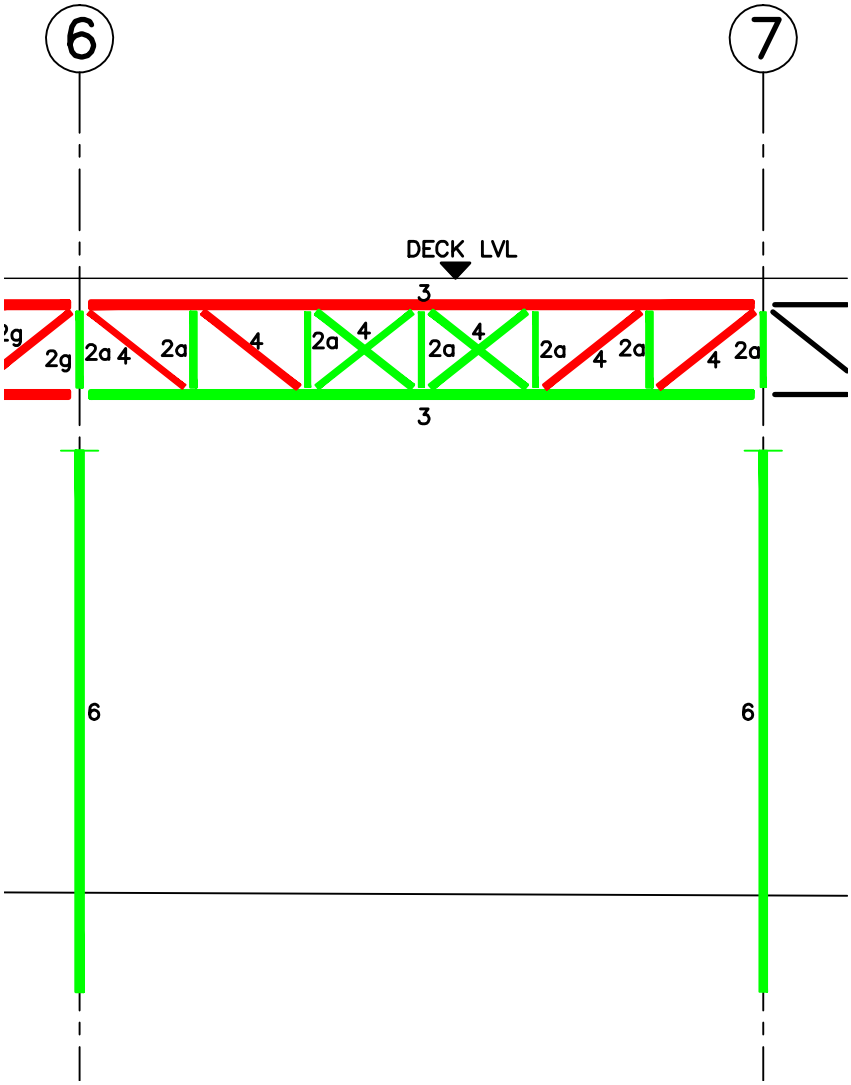
OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on Grid Line E	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100
			DATE 18.03.10 / CHKD CJ
			DRG No. GL E5–E6

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
3	UB	152x152mm	2	1	REPLACE
2a	RSA (VERT'S)	80x125x10mm	7	0	REPLACE
4	PLATES	100x15mm	8	4	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

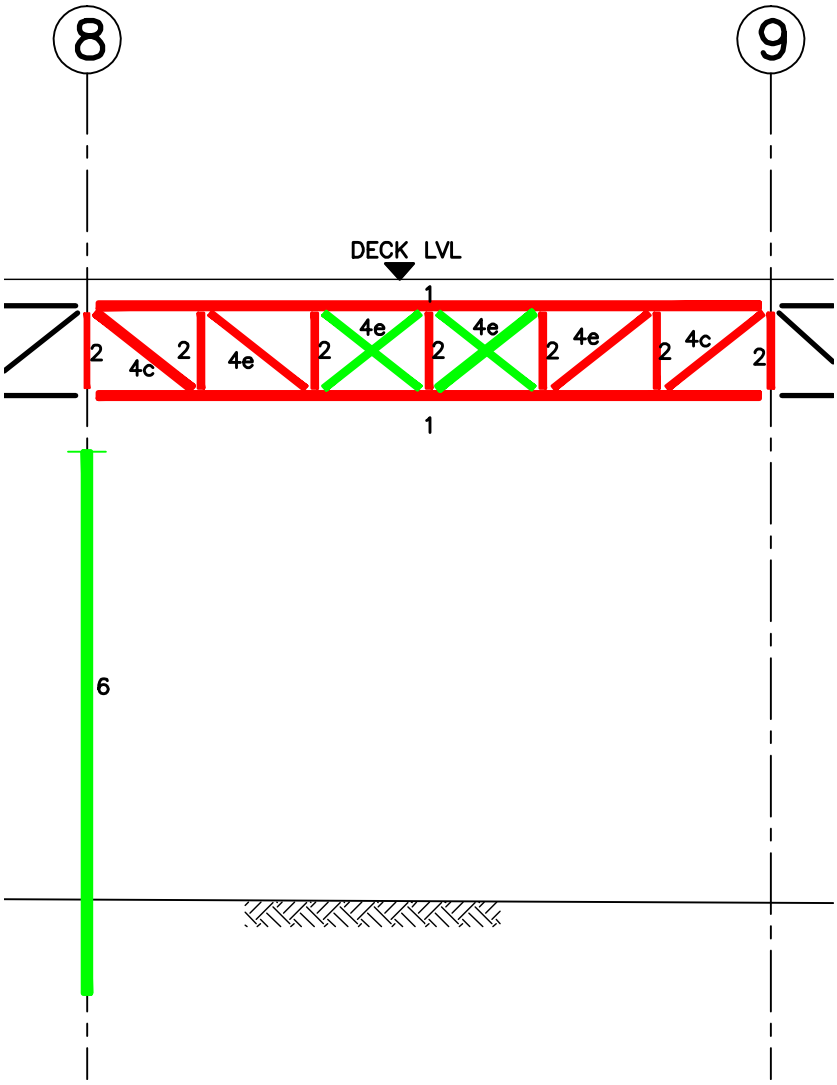
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line E	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100
			DATE 18.03.10 / CHKD CJ
			DRG No. GL E6–E7

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
2f	RSA SECTIONS	100x100mm	2	2	REPLACE
2i	RSA (VERT'S)	90x90mm	7	5	REPLACE
4a	PLATES	125x10mm	6	6	REPLACE
4b	PLATES	75x10mm	2	0	BLAST & PAINT
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

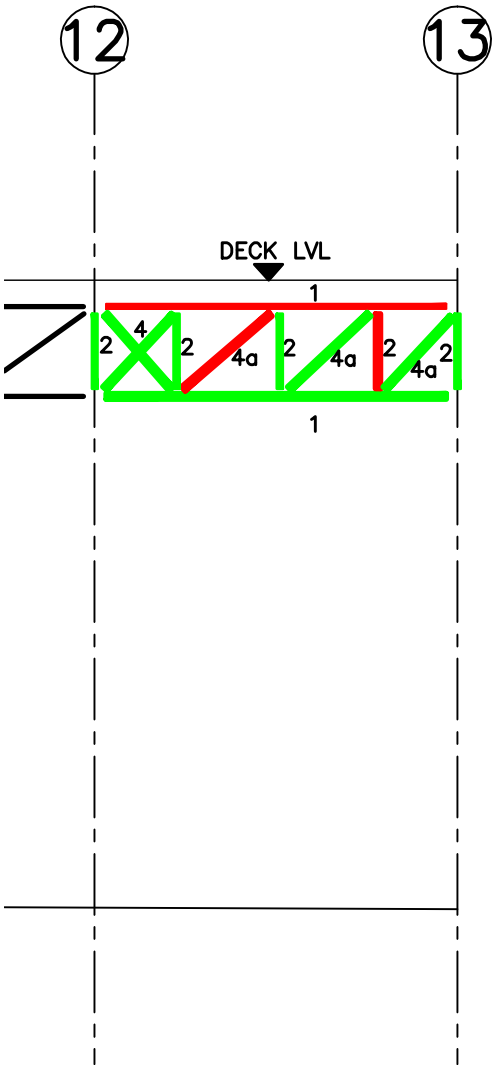
OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE	PROJECT		
Steelwork GA Elevation on Grid Line E	Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB · SCALE 1:100 · DATE 18.03.10 · CHKD CJ · DRG No. GL E8–E9

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	150x100mm	2	1	REPLACE
2	RSA (VERT'S)	75x65mm	5	0	BLAST & PAINT
4	PLATES	75x10mm	2	0	BLAST & PAINT
4a	PLATES	100x10mm	3	1	REPLACE

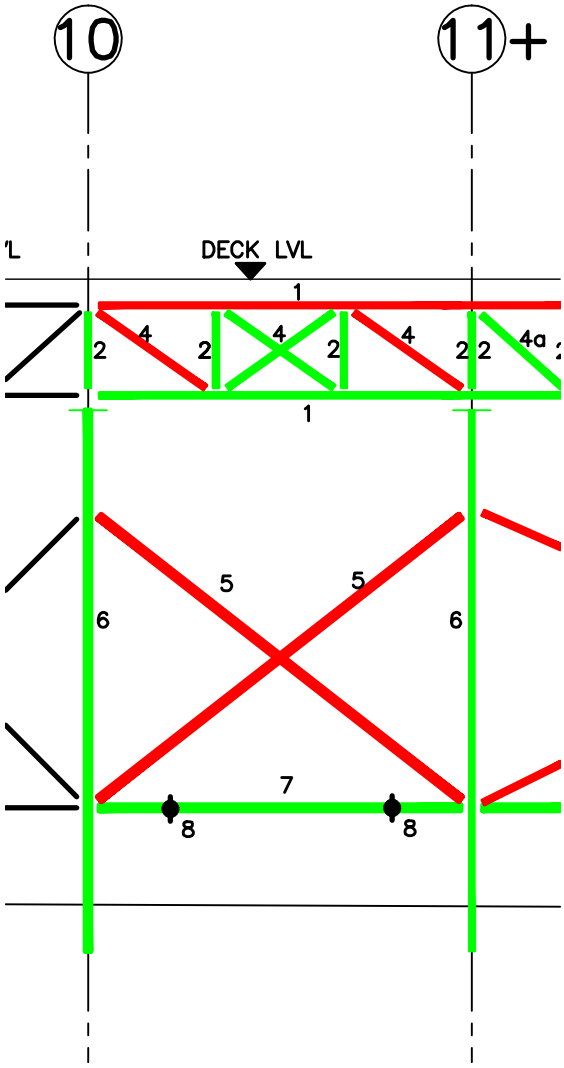
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line E	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No. GL E12–E13

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	150x100mm	2	1	REPLACE
2	RSA	75x65x5mm	4	0	BLAST & PAINT
4	PLATES	60x8mm	4	2	REPLACE
5	BRACING	50mm ø	2	2	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT
7	RAIL	135x65mm	1	0	BLAST & PAINT
8	BARS	38x63mm	2	0	BLAST & PAINT

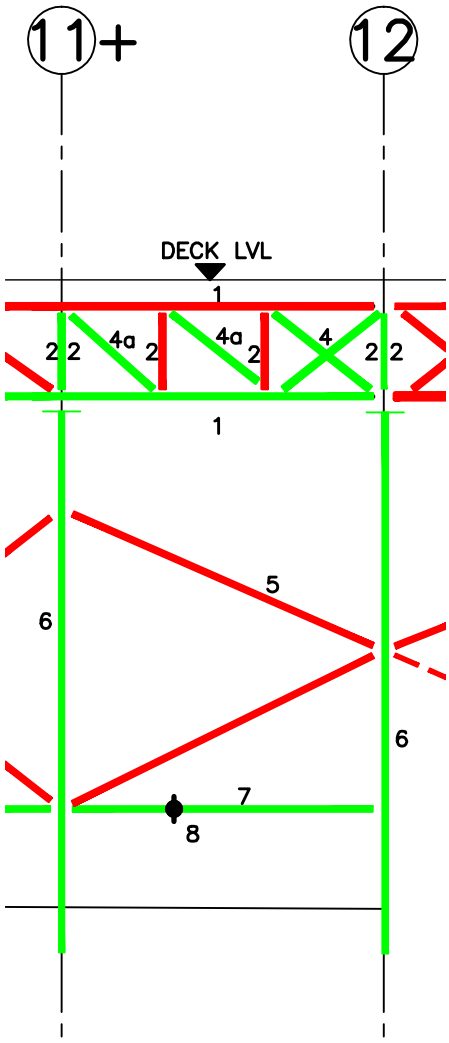
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line F	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No. GL F10–F11

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	150x100mm	2	1	REPLACE
2	RSA	75x65x5mm	4	2	BLAST & PAINT
4	PLATES	100x5mm	2	0	BLAST & PAINT
4a	PLATES	155x12mm	2	1	REPLACE
5	BRACING	50mm ø	2	2	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT
7	RAIL	135x65mm	1	0	BLAST & PAINT
8	BARS	38x63mm	1	0	BLAST & PAINT

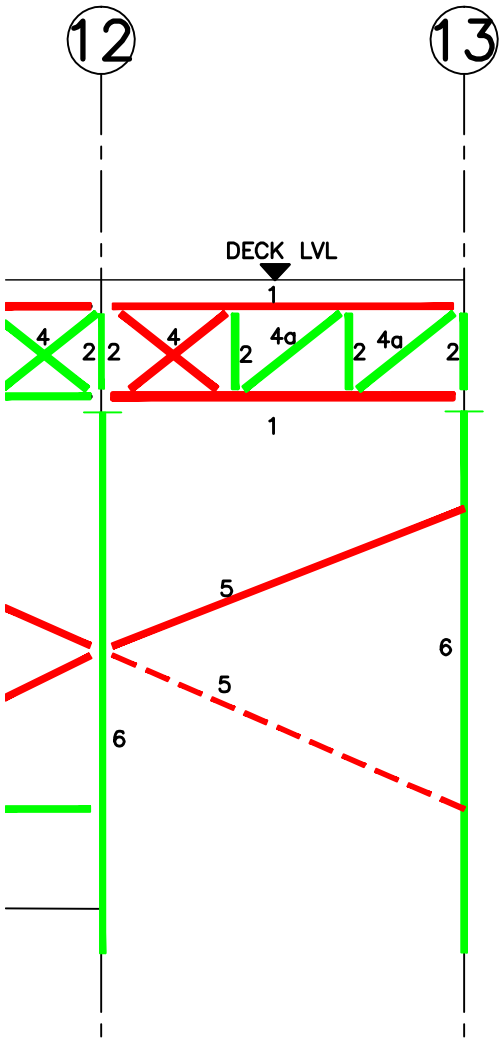
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line F	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No GL F11+–F12

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	150x100mm	2	2	REPLACE
2	RSA	75x65x5mm	4	0	BLAST & PAINT
4	PLATES	100x5mm	2	2	REPLACE
4a	PLATES	155x12mm	2	0	BLAST & PAINT
5	BRACING	50mm ø	2	2	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

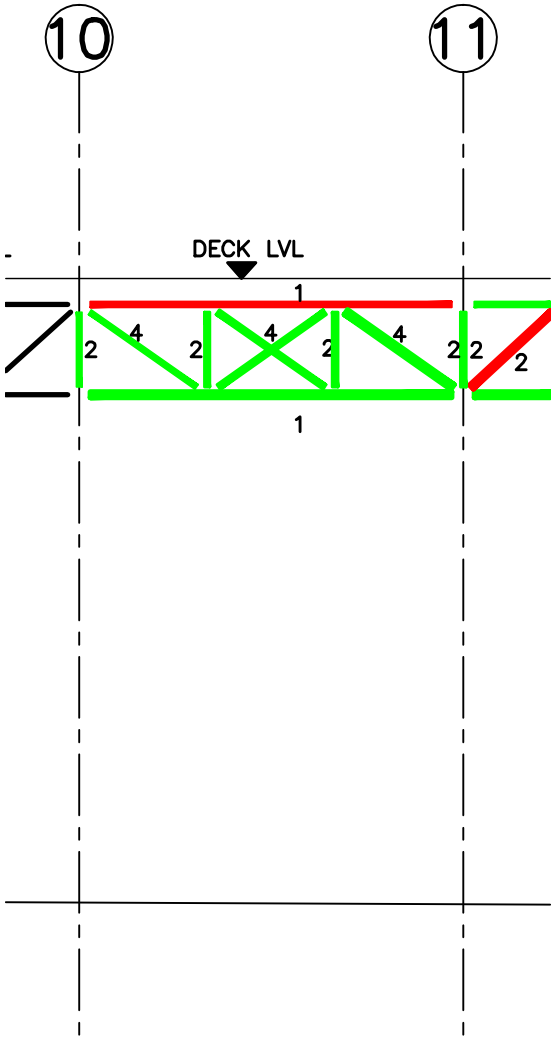
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line F	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No. GL F12–F13

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



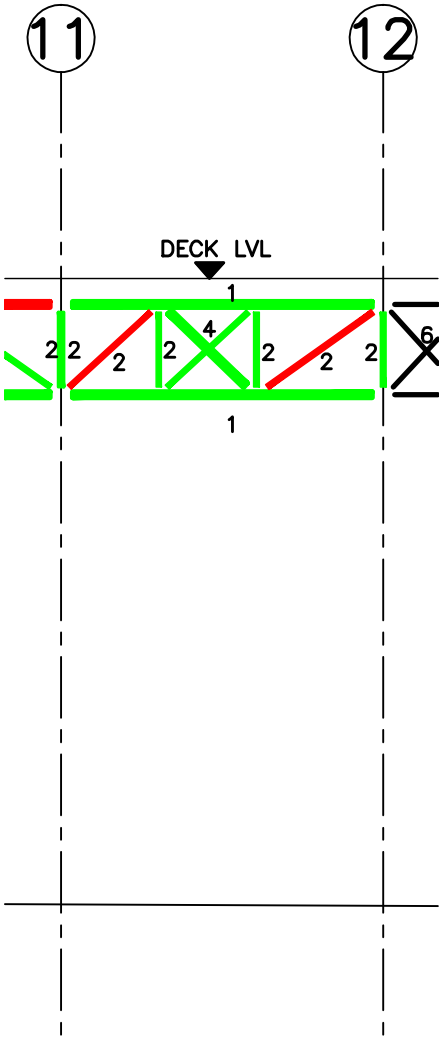
MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	150x100mm	2	0	BLAST & PAINT
2	RSA (VERT'S)	75x65mm	4	0	BLAST & PAINT
4	PLATES	60x8mm	4	0	BLAST & PAINT

TITLE	PROJECT		
Steelwork GA Elevation on Grid Line G	Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No. GL G10–G11

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	150x100mm	2	0	BLAST & PAINT
2	RSA (VERT'S)	75x65mm	6	2	REPLACE
4	PLATES	100x10mm	2	0	BLAST & PAINT

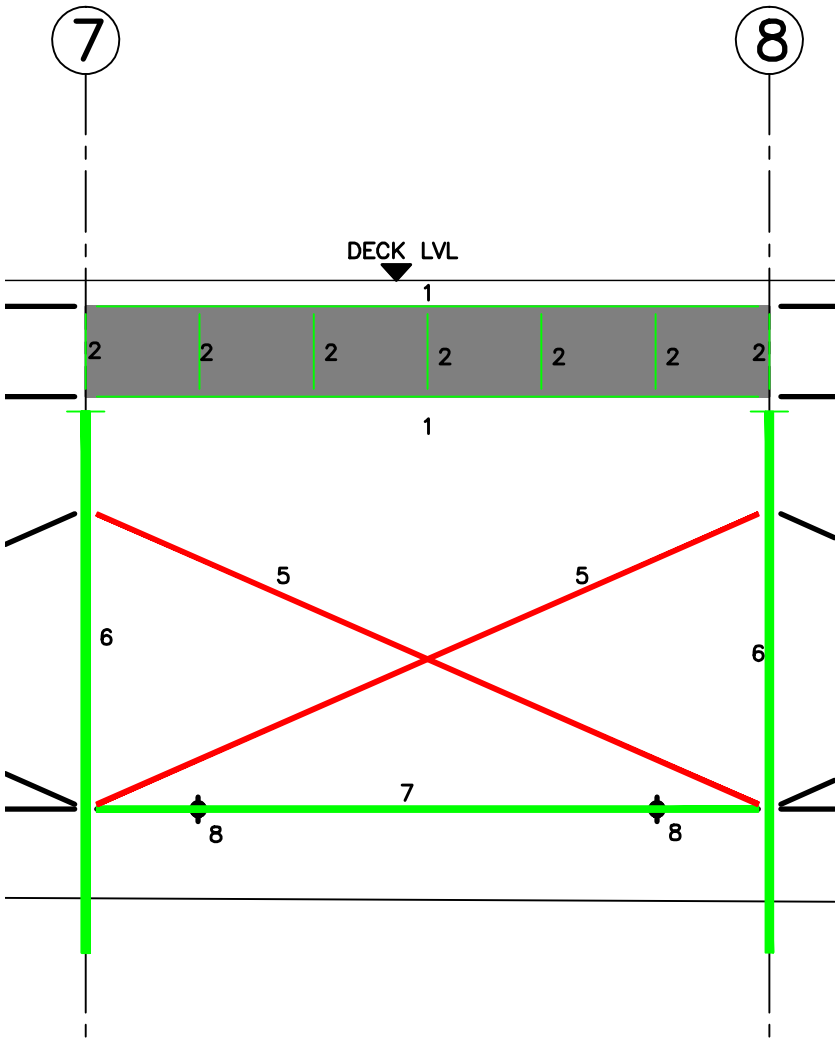
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line G	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No GL G11–G12

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	RSA SECTION	130x90mm	2	0	BLAST & PAINT
2	RSA SECTIONS	90x75mm	7	0	BLAST & PAINT
5	BRACING	50mm ø	2	2	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT
7	RAIL	135x65mm	1	0	BLAST & PAINT
8	BARS	38x63mm	2	0	BLAST & PAINT

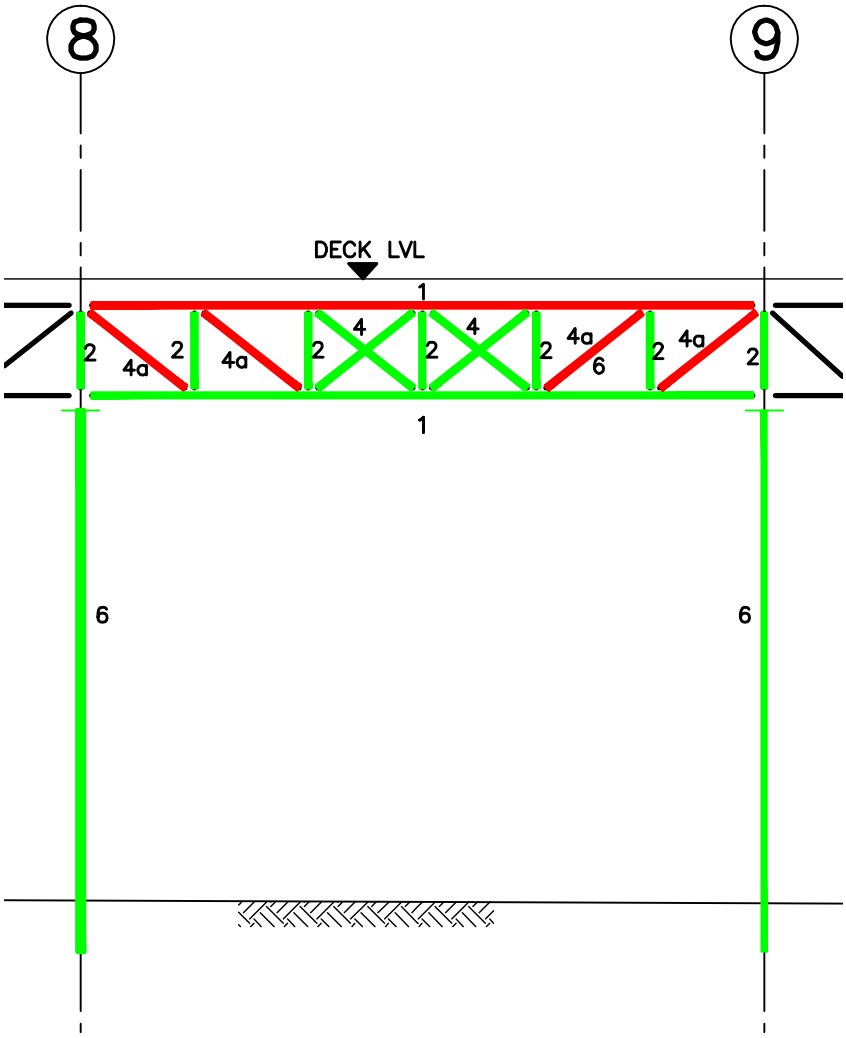
OVERALL VERDICT : RETAIN

TITLE	PROJECT			
Steelwork GA Elevation on Grid Line H	Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB	SCALE 1:100
			DATE 18.03.10	CHKD CJ
			DRG No. GL H7–H8	

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)

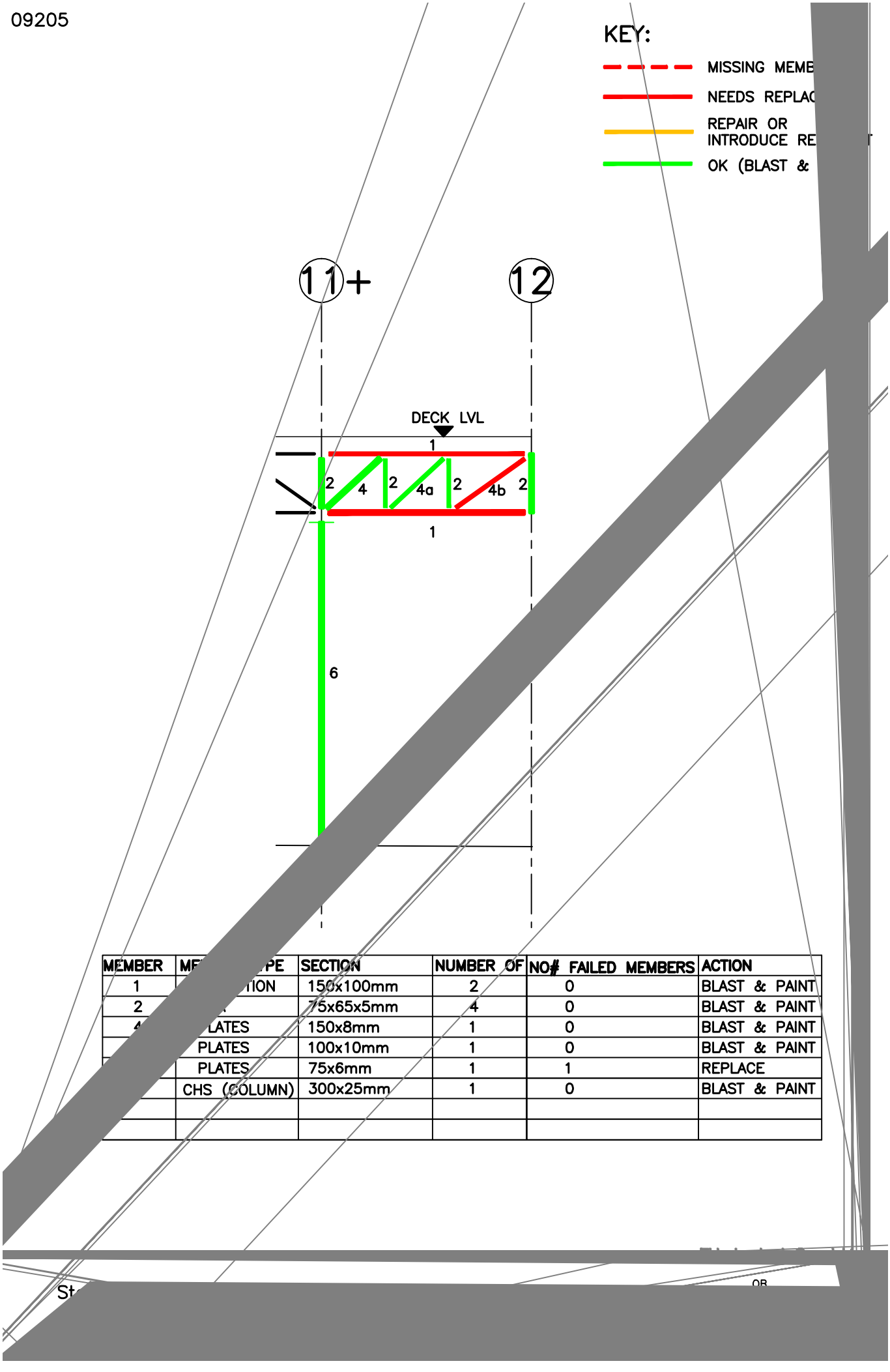


MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	150x100mm	2	1	REPLACE
2	RSA	75x65x5mm	7	0	BLAST & PAINT
4	PLATES	75x6mm	4	0	BLAST & PAINT
4a	PLATES	100x10mm	4	4	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

OVERALL VERDICT : REPLACE GIRDER
(FAILURE PREDOMINANTLY OBSERVED DURING VISUAL INSPECTION)

TITLE: Steelwork GA Elevation on Grid Line J	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100
			DATE 18.03.10 / CHKD CJ
			DRG No. GL J8–J9

09205

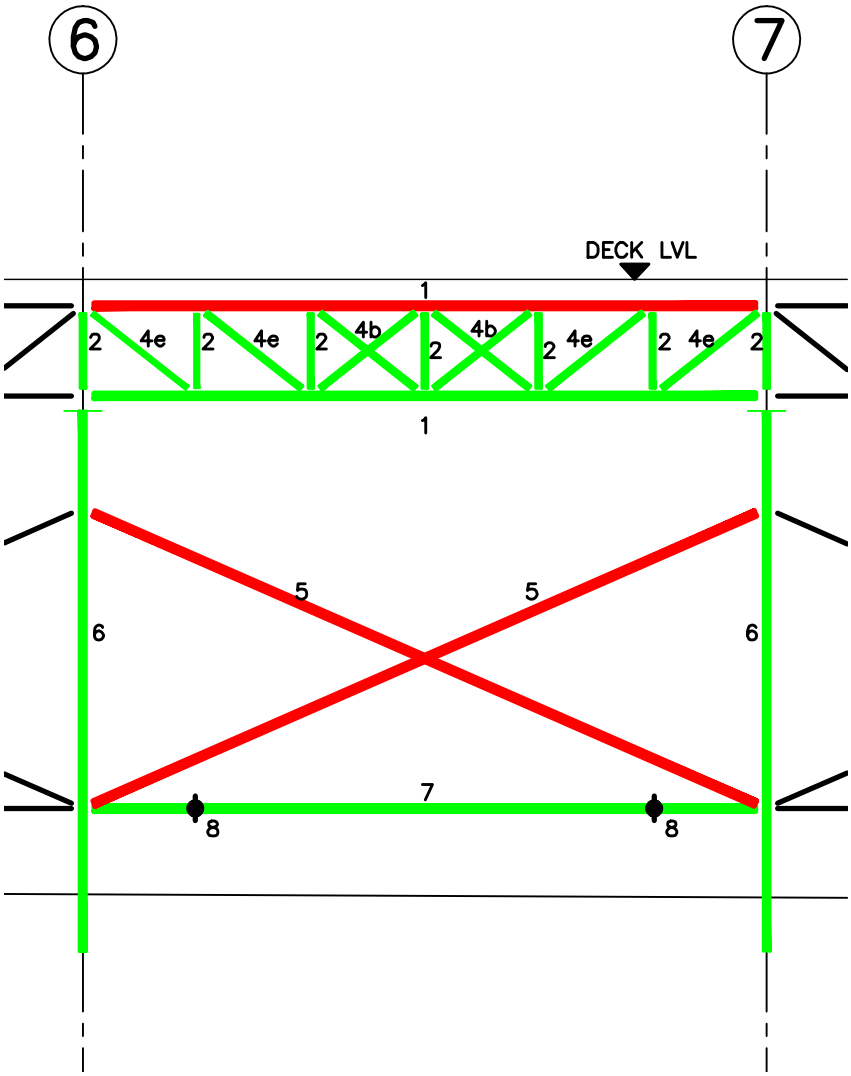


MEMBER	ME	PE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1		TION	150x100mm	2	0	BLAST & PAINT
2			75x65x5mm	4	0	BLAST & PAINT
4		LATES	150x8mm	1	0	BLAST & PAINT
		PLATES	100x10mm	1	0	BLAST & PAINT
		PLATES	75x6mm	1	1	REPLACE
		CHS (COLUMN)	300x25mm	1	0	BLAST & PAINT

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	155x110mm	2	1	REPLACE
2	RSA	75x65x5mm	7	0	REPLACE
4b	PLATES	75x10mm	4	0	REPLACE
4e	PLATES	100x10mm	4	0	REPLACE
5	BRACING	50mm ø	2	2	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT
7	RAIL	135x65mm	1	0	BLAST & PAINT
8	BARS	38x63mm	2	0	BLAST & PAINT

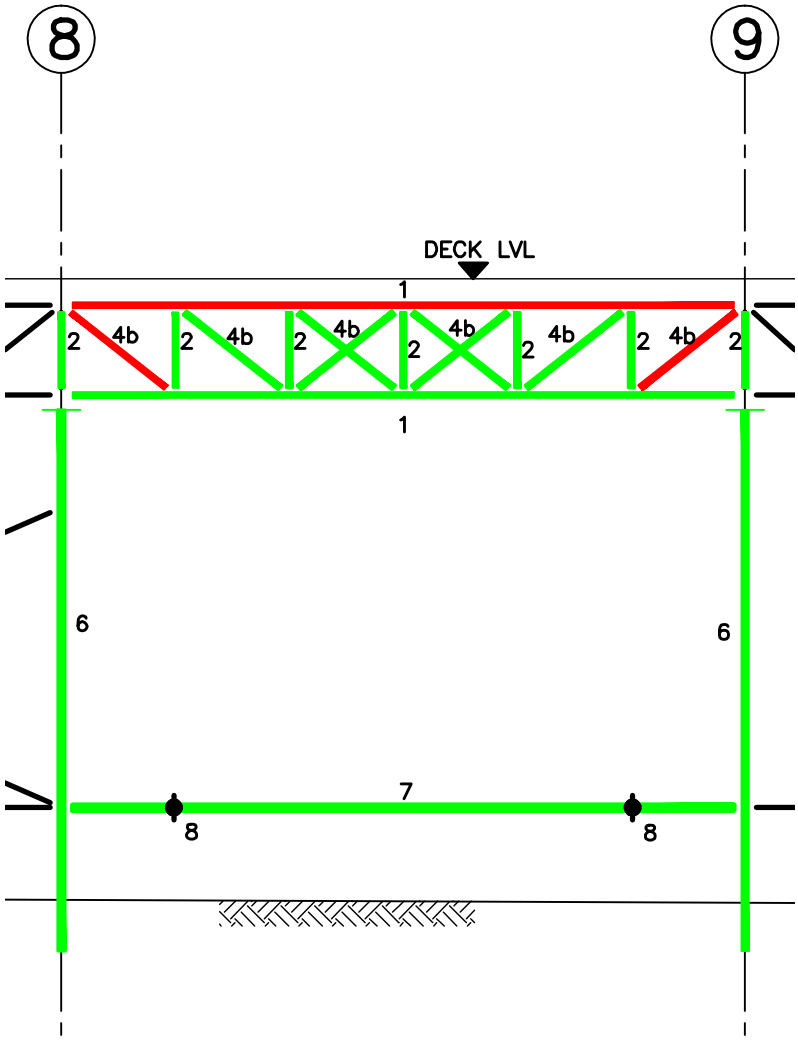
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line K	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No. GL K6–K7

09205

KEY:

- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	150x100mm	2	1	BLAST & PAINT
2	RSA	75x75x5mm	7	0	BLAST & PAINT
4	PLATES	75x10mm	8	2	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT
7	RAIL	135x65mm	1	0	BLAST & PAINT
8	BARS	38x63mm	2	0	BLAST & PAINT

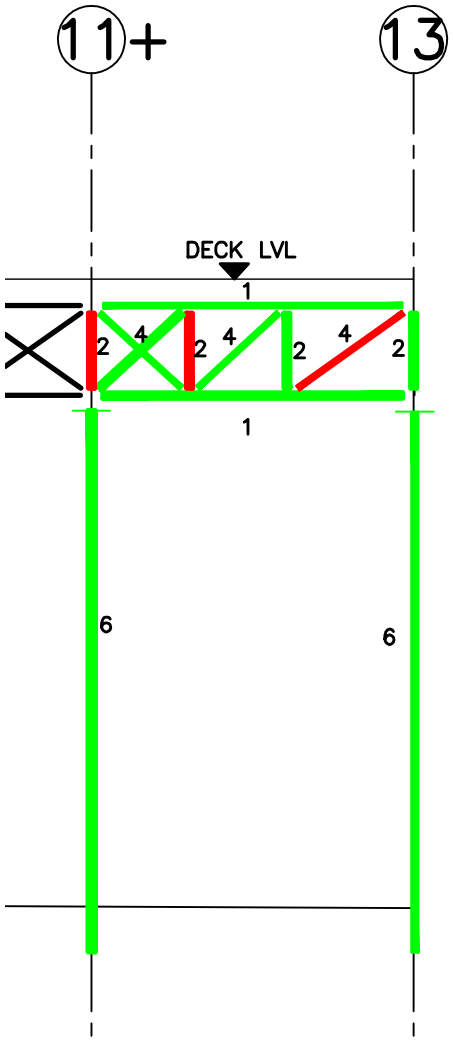
OVERALL VERDICT : REPLACE GIRDER
(MEMBERS GENERALLY IN TACT DURING VISUAL INSPECTION BUT FAILED DURING ANALYSIS)

TITLE: Steelwork GA Elevation on Grid Line K	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 DATE 18.03.10 / CHKD CJ DRG No. GL K8–K9

09205

KEY:

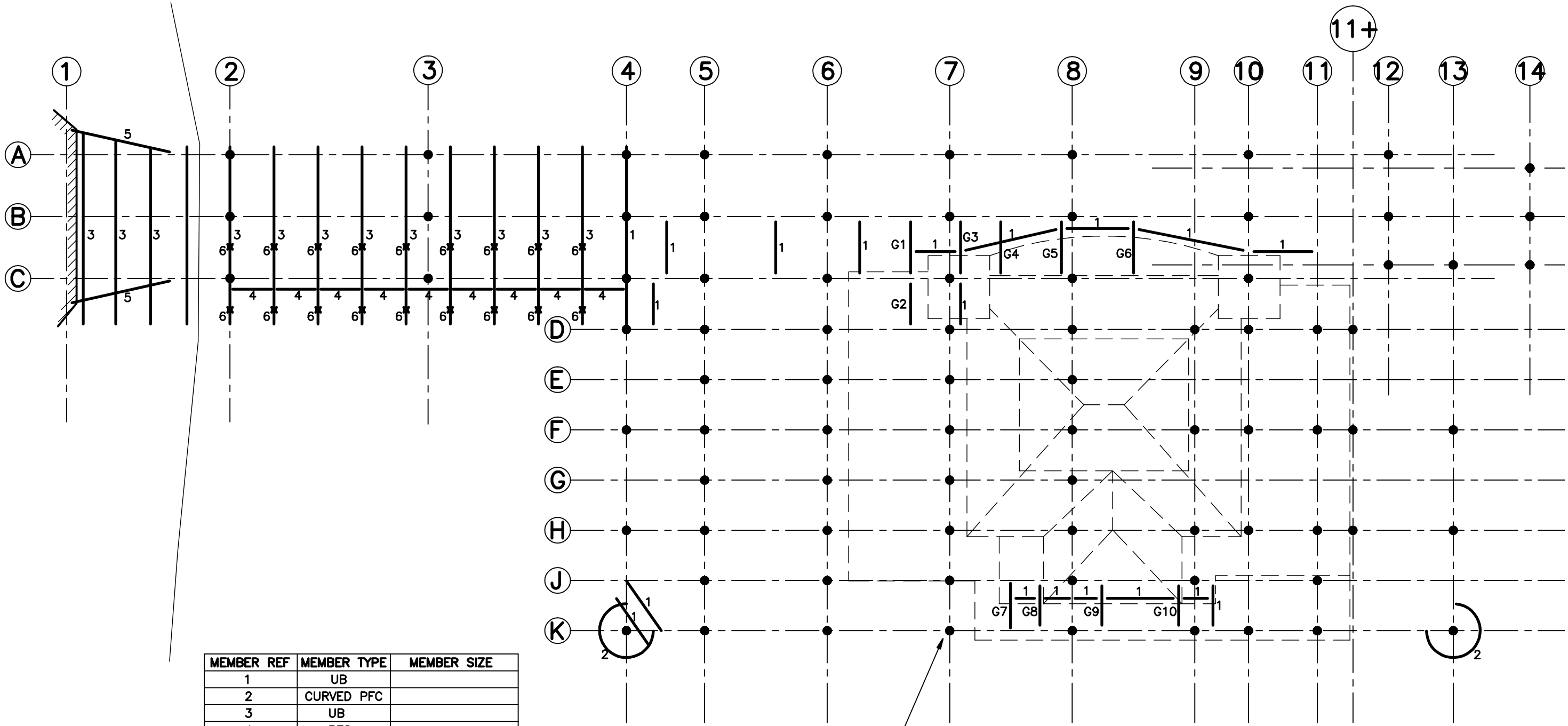
- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
1	T SECTION	150x100mm	2	0	BLAST & PAINT
2	RSA	75x65x5mm	4	2	REPLACE
4	PLATES	75x10mm	4	1	REPLACE
6	CHS (COLUMN)	300x25mm	2	0	BLAST & PAINT

OVERALL VERDICT: REPLACE TRUSS

TITLE: Steelwork GA Elevation on Grid Line K	PROJECT: Colwyn Bay Pier	DATRYS Peirianwyr Ymgynghorol Consulting Engineers	DRAWN OB / SCALE 1:100 / DATE 18.03.10 / CHKD CJ / DRG No. GL K11+–K13



MEMBER REF	MEMBER TYPE	MEMBER SIZE
1	UB	
2	CURVED PFC	
3	UB	
4	PFC	
5	UB	

TITLE
Additional Steelwork Layout Plan

PROJECT
Colwyn Bay Pier

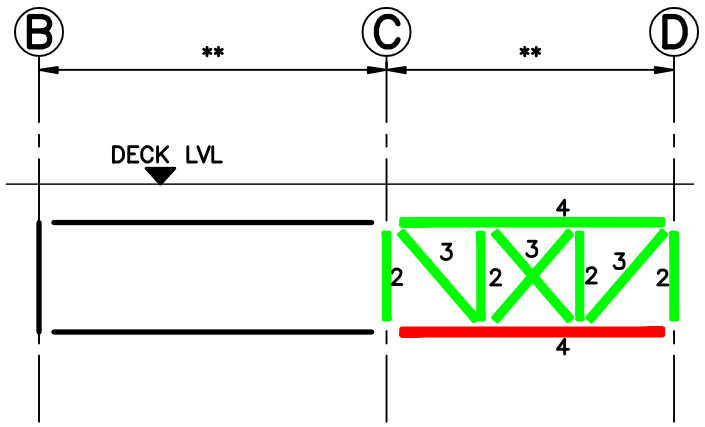
DATRYS
Peirianwyr Ymgynghorol Consulting Engineers
Yr Ashyd
3-5 Church Street
Caernarfon
01286 671027 Telephone
01286 674434 Fax
info@datrysconsulting.com E-mail
www.datrysconsulting.com Internet

Job No. 09205	DATE 18.3.10	SCALE NTS	
ACAD Ref. 09205/ADD1	CHECKED JS	PASSED	
DRAWN CJ	DRG No. ADD1		REV

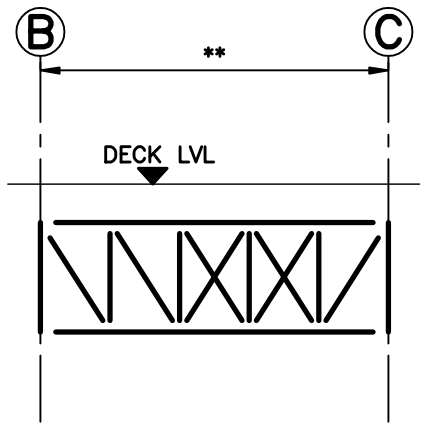
MEMBER	MEMBER TYPE	SECTION	NUMBER OF	NO# FAILED MEMBERS	ACTION
4	RSA	150x100mm	2	1	REPLACE
2	RSA (VERT')	75x75x5mm	4	0	BLAST & PAINT
3	PLATES	75x10mm	4	0	BLAST & PAINT

KEY:

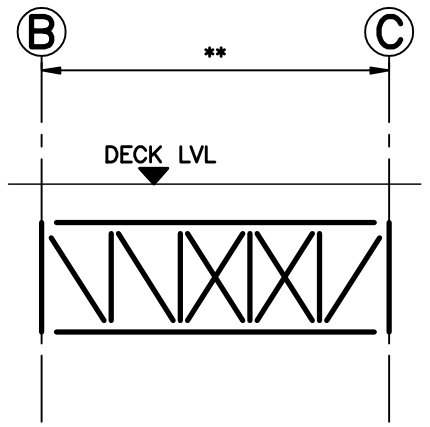
- MISSING MEMBER
- NEEDS REPLACING
- REPAIR OR INTRODUCE RESTRAINT
- OK (BLAST & PAINT)



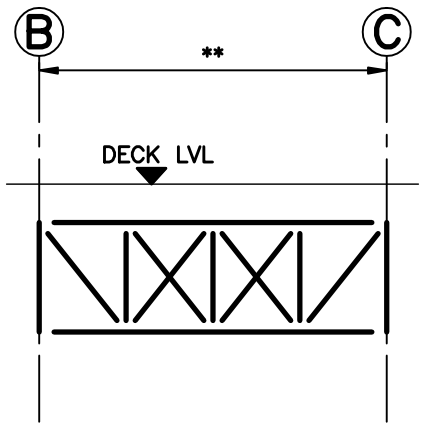
GIRDER G1+G2
1:100



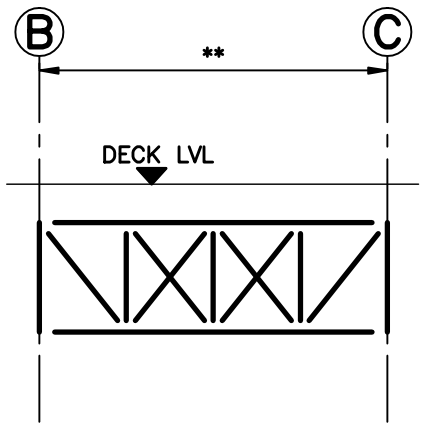
GIRDER G3
1:100



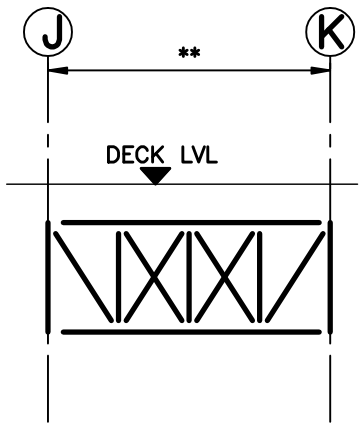
GIRDER G4
1:100



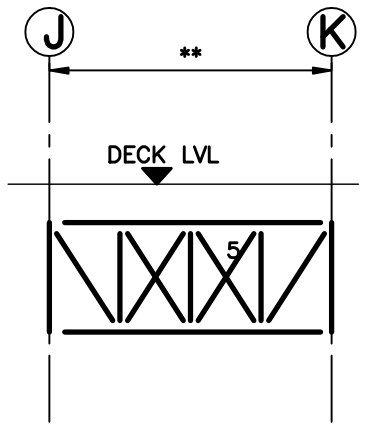
GIRDER G5
1:100



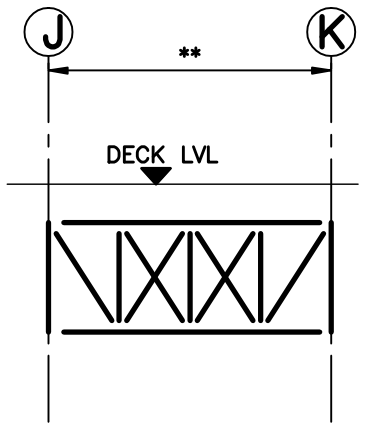
GIRDER G6
1:100



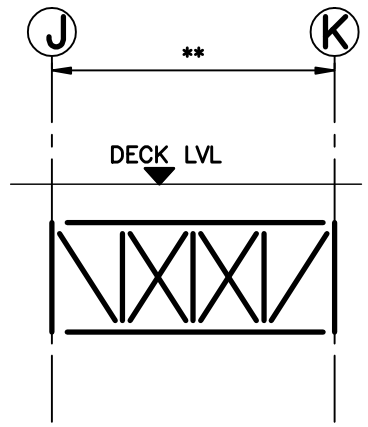
GIRDER G7
1:100



GIRDER G8
1:100



GIRDER G9
1:100



GIRDER G10
1:100

REF PLAN ON DRWG 09205/ADD1
FOR ADDITIONAL GIRDER LOCATION

TITLE
Steelwork GA
Additional Transverse Girders

PROJECT
Colwyn Bay Pier

DATRYS
Peirianwyr Ymgynghorol Consulting Engineers
Yr Aelwyd
3-5 Church Street
Caernarfon
01286 671027 Telephone
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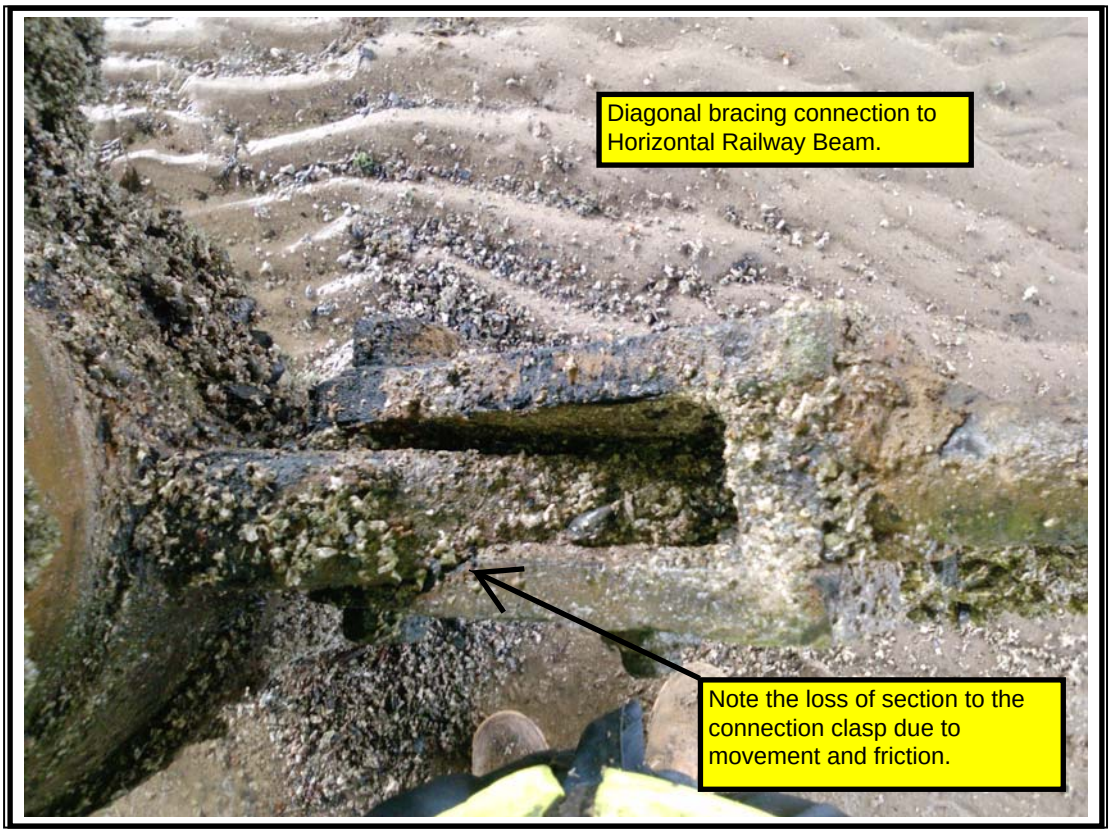
info@datrysconsulting.com E-mail
www.datrysconsulting.com Internet

Job No. 09205	DATE 7.4.10	SCALE 1:100	
ACAD Ref. 09205/	CHECKED JS	PASSED	
DRAWN CJ	DRG No. ADD 2		REV

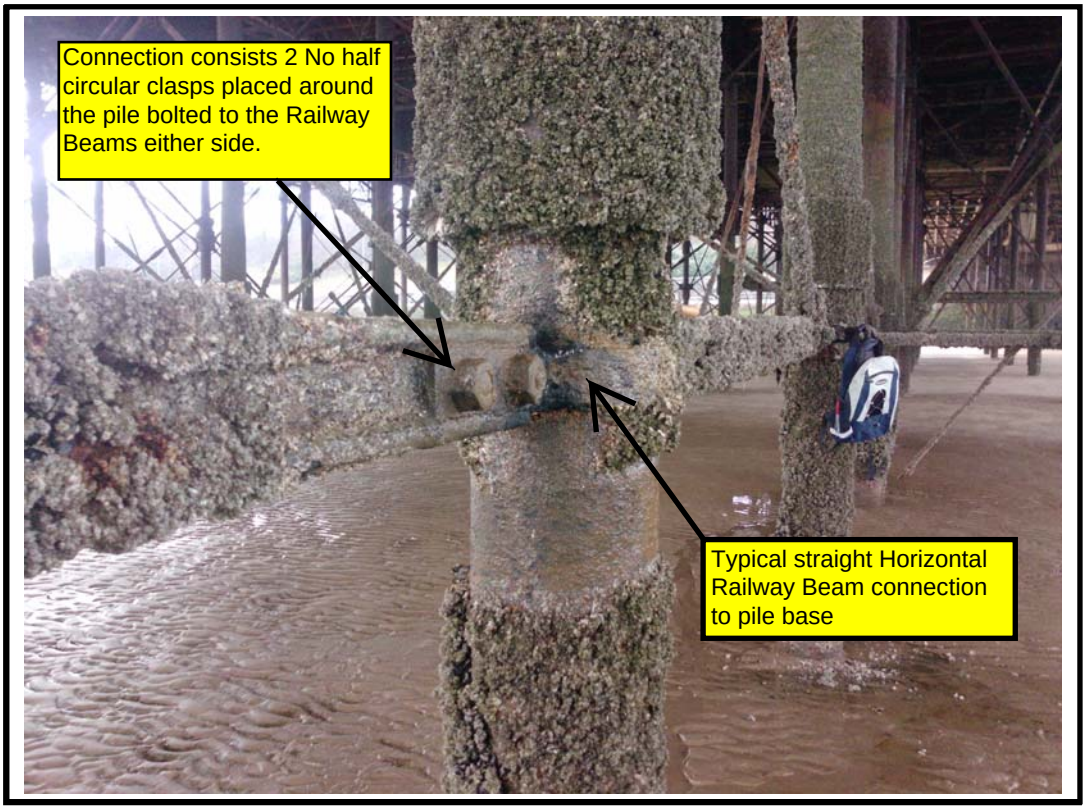
APPENDIX 3

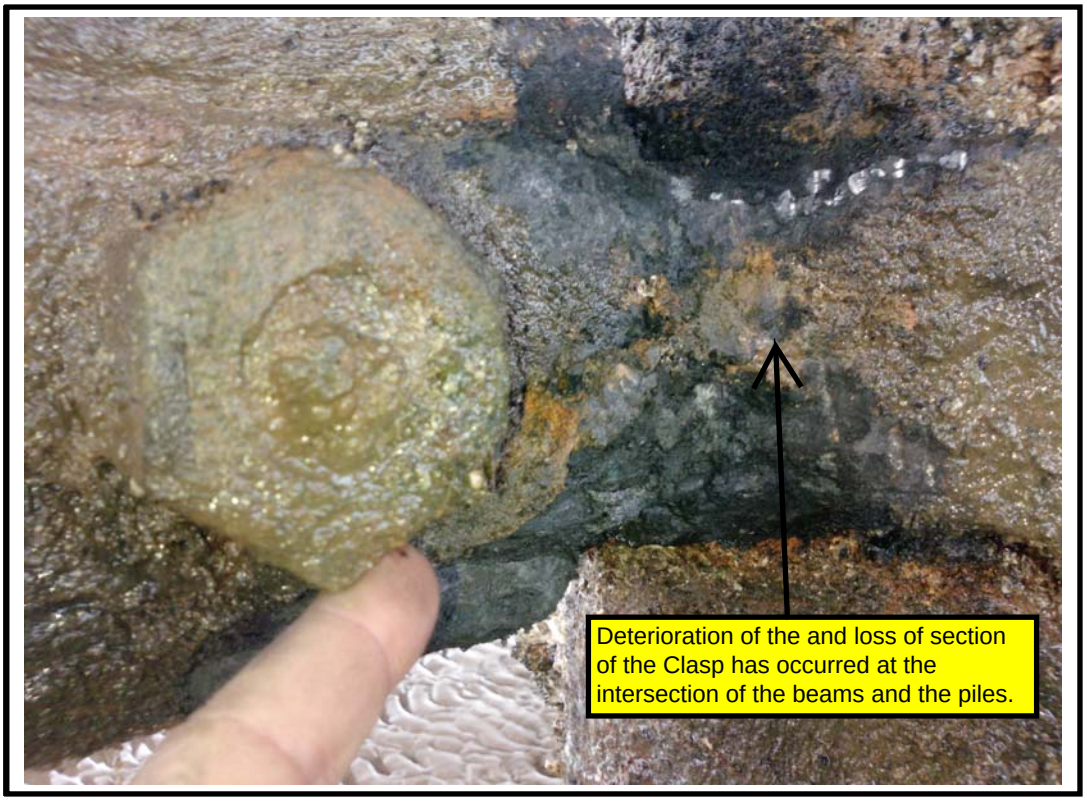
COLUMN D6


Typical Diagonal and Horizontal bracing connection to pile bases.


Diagonal bracing connection to Horizontal Railway Beam.
Note the loss of section to the connection clasp due to movement and friction.

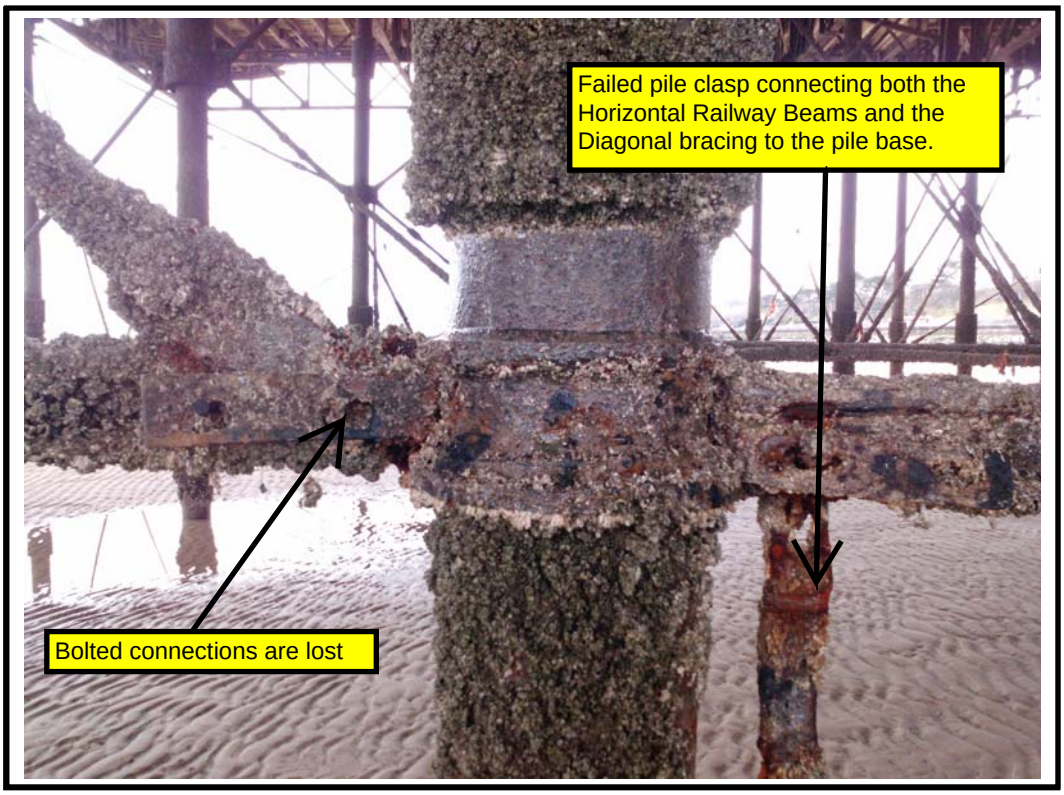
COLUMN D11


Connection consists 2 No half circular clasps placed around the pile bolted to the Railway Beams either side.
Typical straight Horizontal Railway Beam connection to pile base

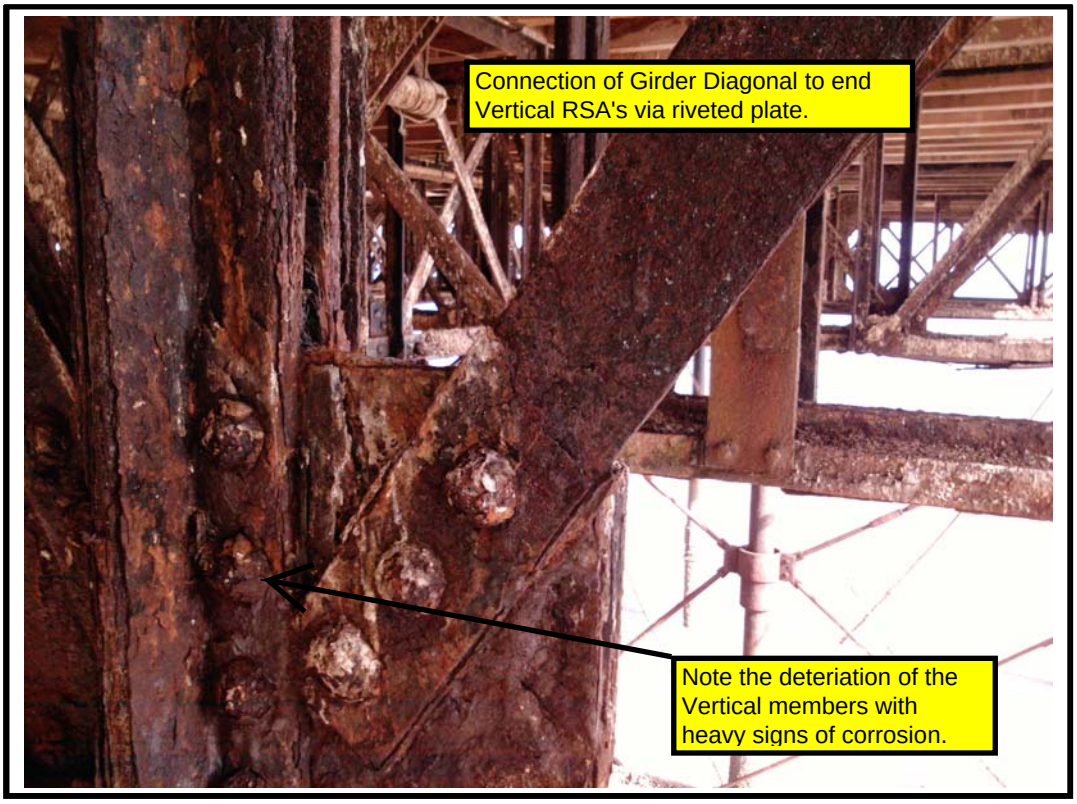

Deterioration of the and loss of section of the Clasp has occurred at the intersection of the beams and the piles.

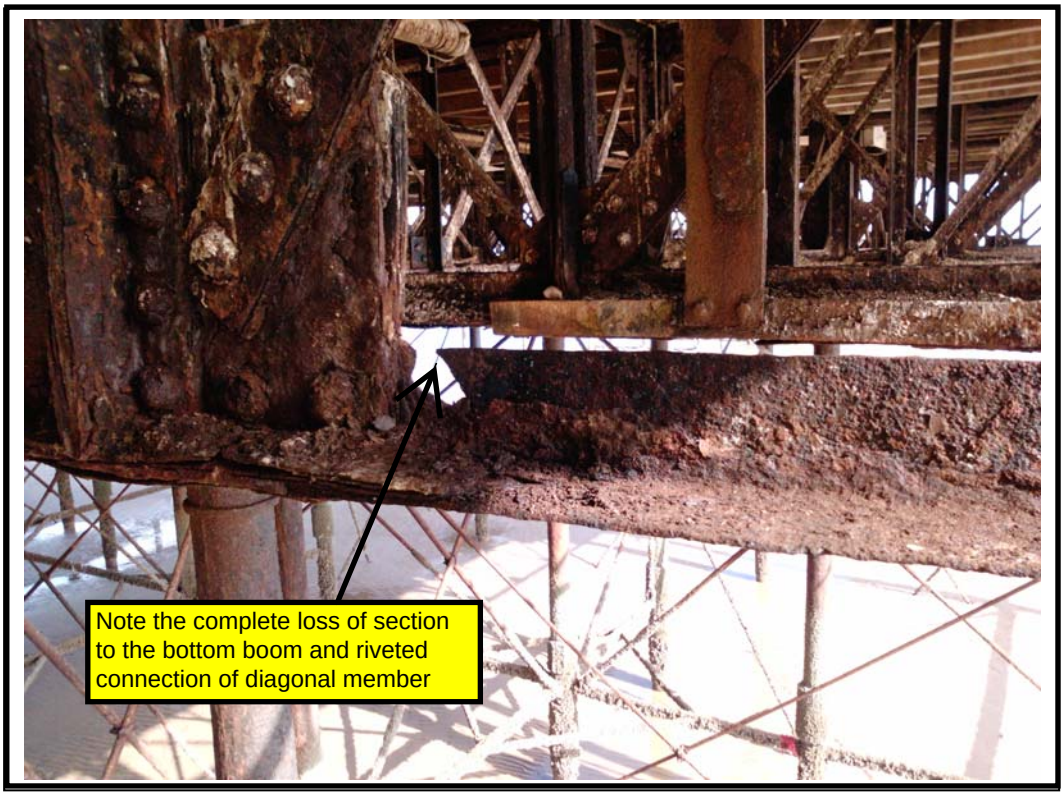
COLUMN F11


Typical bracing connection at base of pile as noted with Column D6 above.

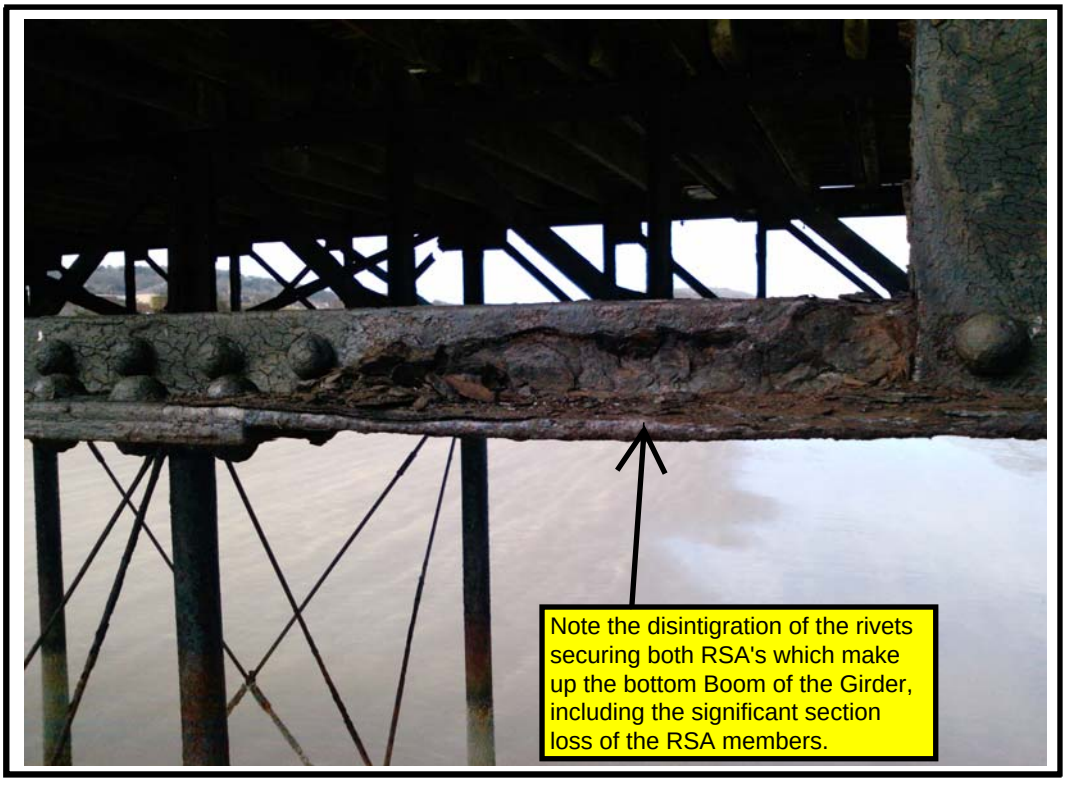

Failed pile clasp connecting both the Horizontal Railway Beams and the Diagonal bracing to the pile base.
Bolted connections are lost

GIRDER 9J – 9K

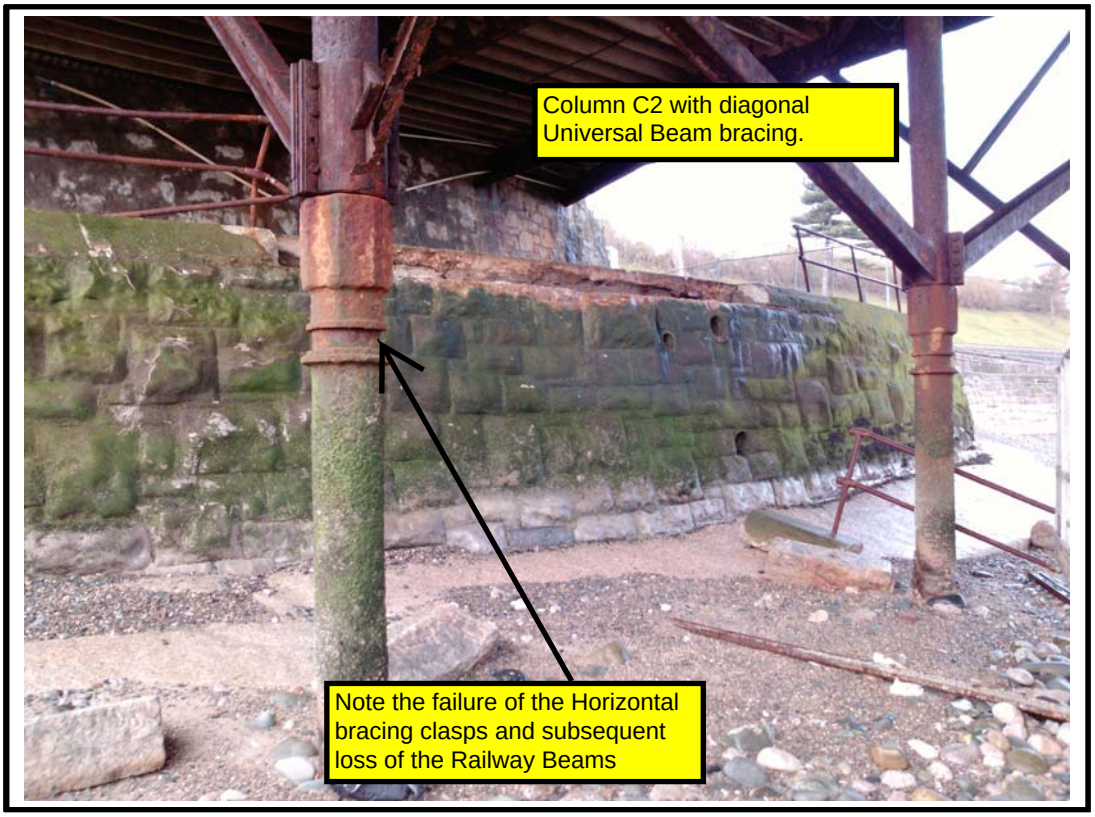

Connection of Girder Diagonal to end Vertical RSA's via riveted plate.
Note the deteriation of the Vertical members with heavy signs of corrosion.

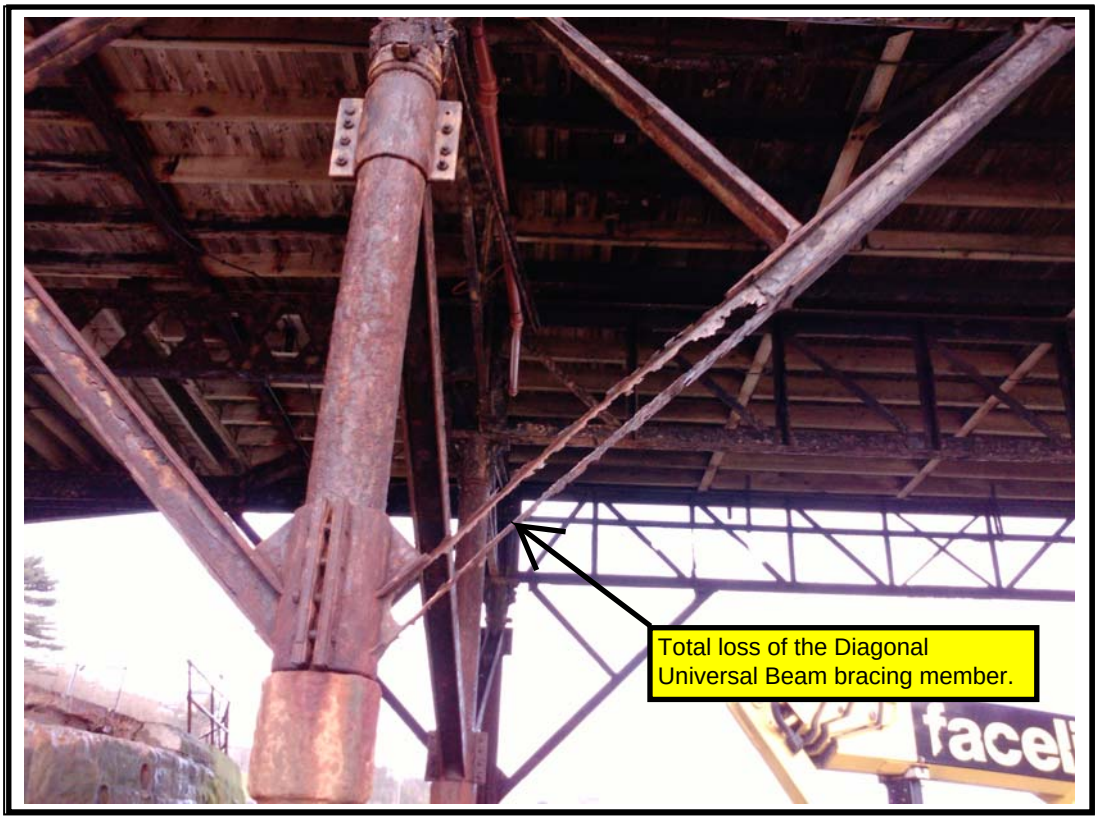

Note the complete loss of section to the bottom boom and riveted connection of diagonal member

GIRDER C18 – C19

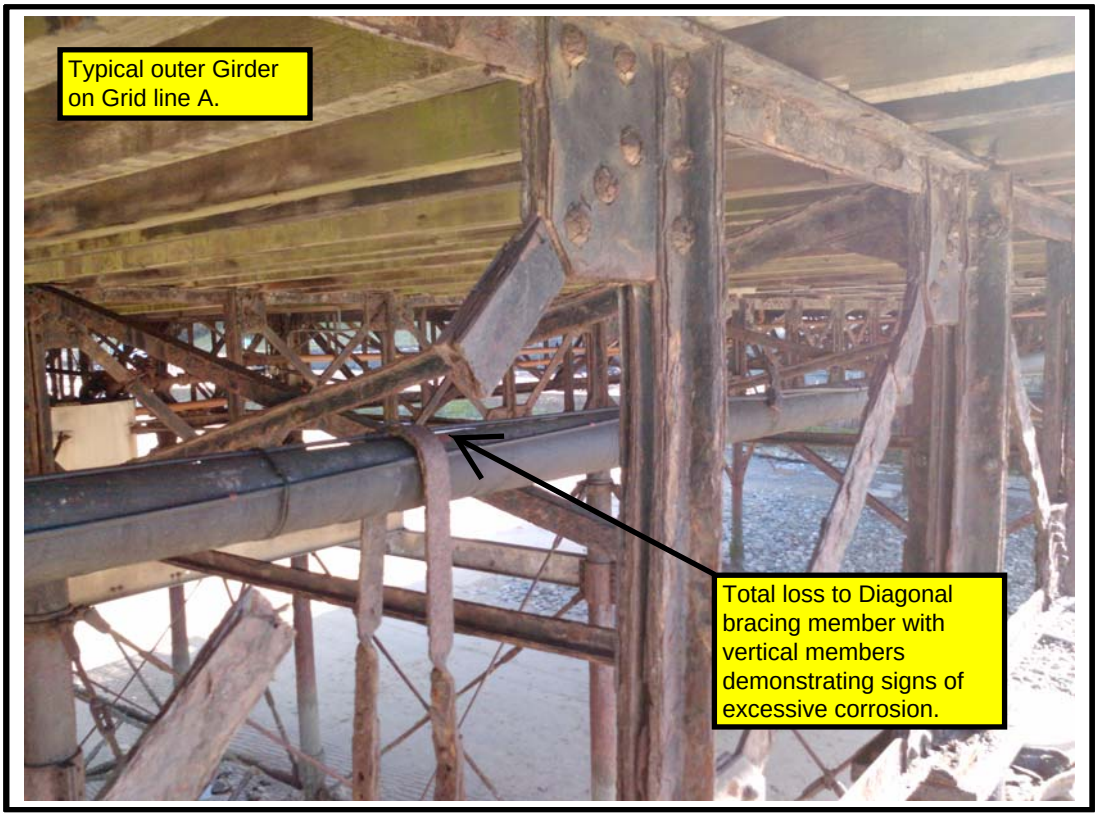


COLUMN C2


Column C2 with diagonal Universal Beam bracing.
Note the failure of the Horizontal bracing clasps and subsequent loss of the Railway Beams


Total loss of the Diagonal Universal Beam bracing member.

GIRDER A5 – A6


Typical outer Girder on Grid line A.
Total loss to Diagonal bracing member with vertical members demonstrating signs of excessive corrosion.


Loss of Diagonal bracing members and excessive corrosion of Vertical members.

GIRDER A7 – A8


Outer Girder of Grid Line A.
Total loss of Diagonal bracing members and Vertical RSA members


Diagonal bracing member lost.