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Installation & Maintenance Manual for the Full RDS Grillage Range to Suit GSM-R Monopoles & REB Cabin

Prepared for: Network Rail

Document No: 2010/41

DOCUMENT ISSUE RECORD

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01	25/05/10	WH & RS		T. Burden

Summary

FLI Structures (FLI) have designed a range of grillages to suit the GSM-R antenna supporting structures and REB cabin. This includes the Light RDS grillages, which comprise two separate foldable frames to suit the monopole and REB cabin, as well as the 15m RDS and 20m Flexi RDS. Together these form an adaptable range of grillages that can support both a monopole or a lattice tower and REB cabin in a variety of arrangements. The grillages provide an intermediate support between the superstructure and screw piles or pre-cast foundation blocks. There may be cases where base stools are used in between the grillage and pile cap due to sloping sites. Should the base stools be deployed, the grillage boots will rest on top of the base stools and be secured via studding. Note that different base stools exist to suit different slopes. This document contains the information required for the safe installation and maintenance of the full range of the FLI designed RDS grillages.

The range of grillages is illustrated on the following pages and is separated into the following categories.

- 15m Standard and Narrow RDS Grillages
- Light RDS Grillages
- 20m Kentledge RDS Grillage
- 20m Flexi RDS Grillages (including Standard, Narrow, and Space Saver options)

Standard and Narrow RDS Grillage to suit Monopole and REB Cabin

The pictures below are the isometric views of the Standard and Narrow width RDS grillage to suit the monopole and REB cabin in folded and unfolded form. A similar arrangement is used for both 15m and 20m structures and the models differ only in details. Refer to Appendix A for the general assembly drawings and details.

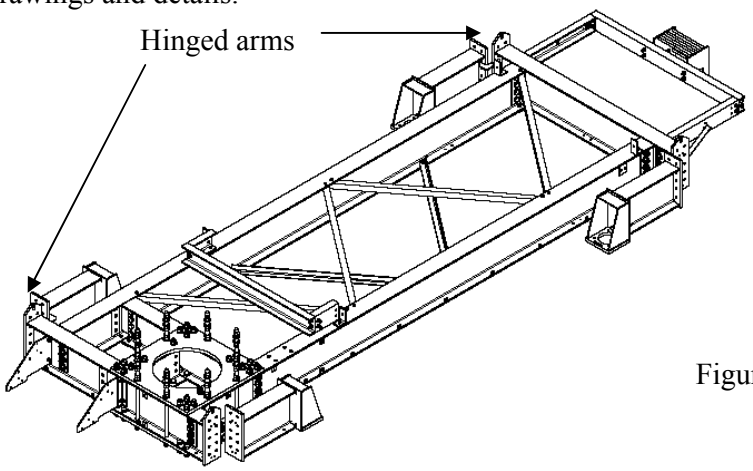

Figure 1 – Standard Frame folded for transit

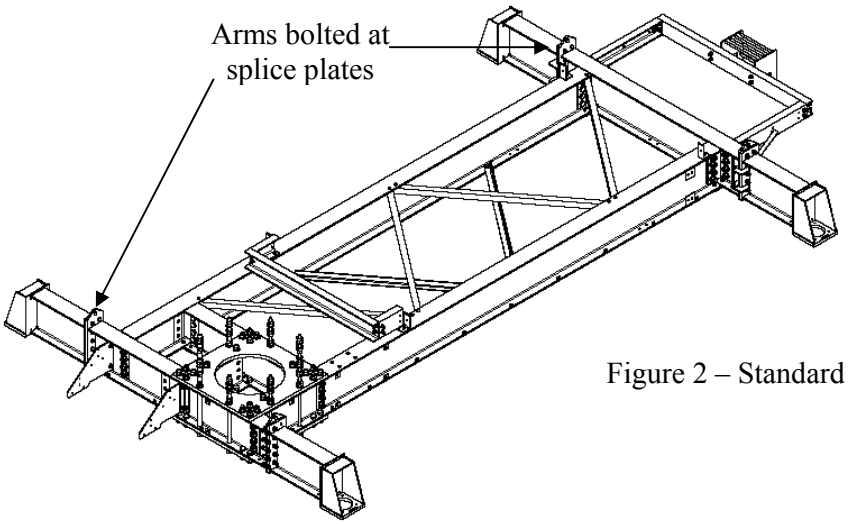

Figure 2 – Standard Frame opened and fully assembled

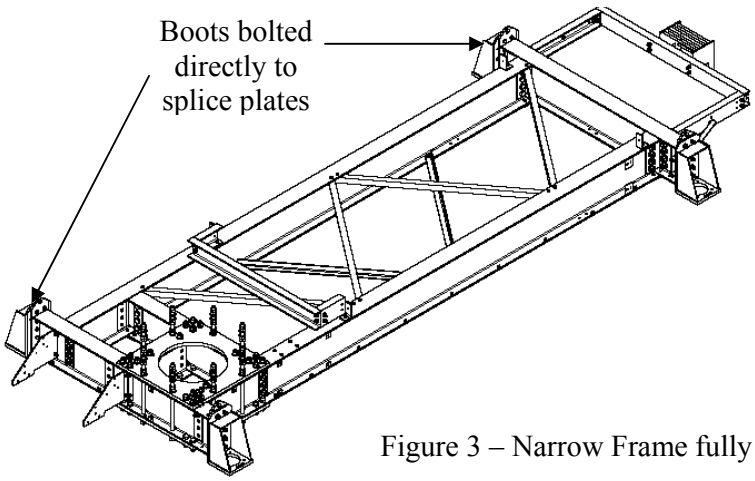

Figure 3 – Narrow Frame fully assembled for transit and installation

Light RDS Grillage to suit Monopoles

The pictures below are the isometric views of the grillage to suit the monopoles in folded and unfolded form. This concept is used in a number of different designs to suit various models of monopole. Refer to Appendix A for the general assembly drawings and details.

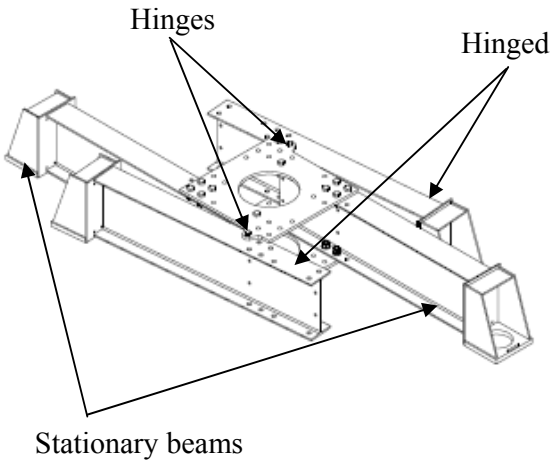

Figure 4 – Frame folded for transit.

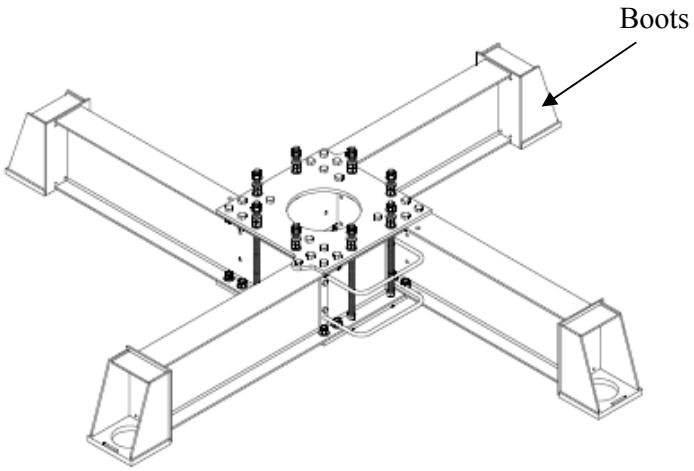

Figure 5 – Frame opened and fully assembled.

Light RDS Grillage to suit REB Cabin

The pictures below are the plan views of the grillage to suit the REB cabin in folded and unfolded form. Refer to Appendix A for the general assembly drawings and details.

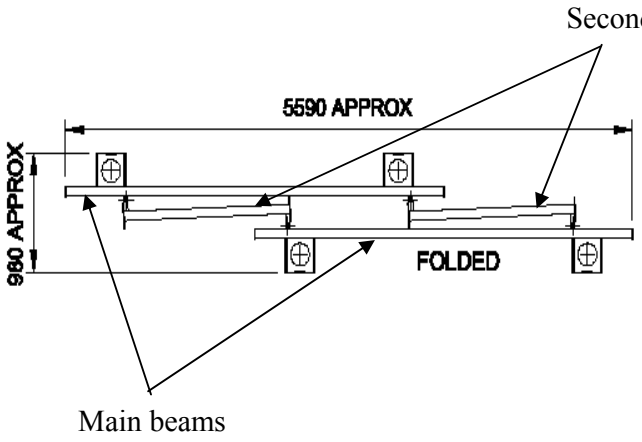

Figure 6 – Frame folded for transit.

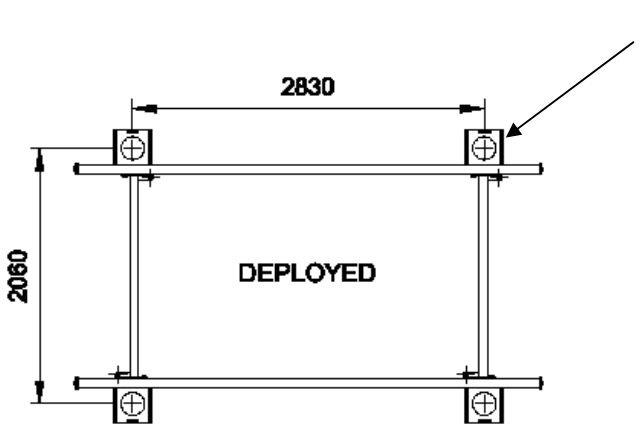

Figure 7 – Frame opened and fully assembled.

Kentledge RDS Grillage to suit Monopole and REB Cabin

The pictures below are the isometric views of the Kentledge RDS grillage to suit the monopole and REB cabin in folded and unfolded form. Refer to Appendix A for the general assembly drawings and details.

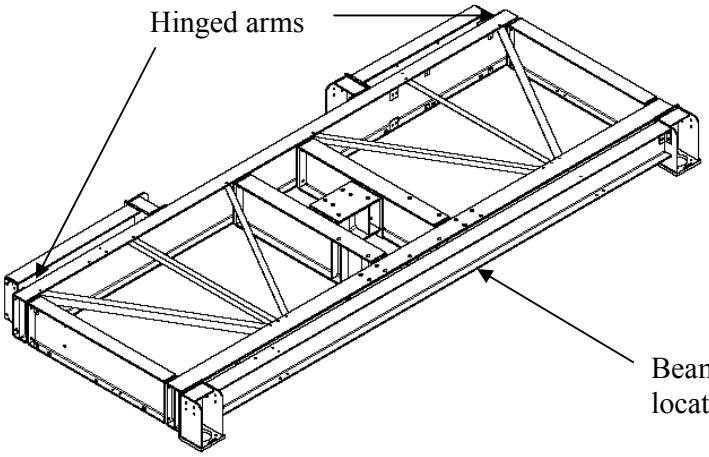

Figure 8 – Frame folded for transit

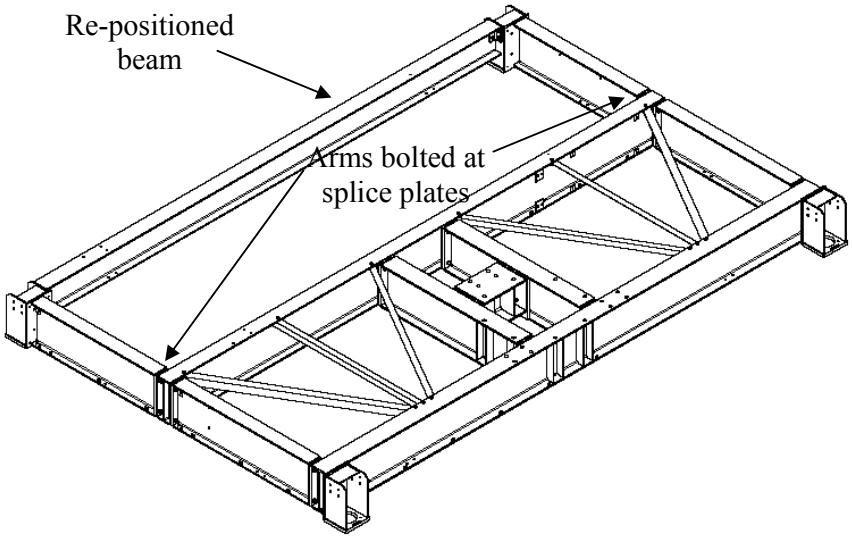

Figure 9 – Frame opened and fully assembled

20m Flexi RDS Grillage - Space Saver Option to suit Monopole and REB Cabin

The picture below is an isometric view of the Space Saver RDS grillage to suit the monopole and REB cabin in fully assembled form. Refer to Appendix A for the general assembly drawings and details.

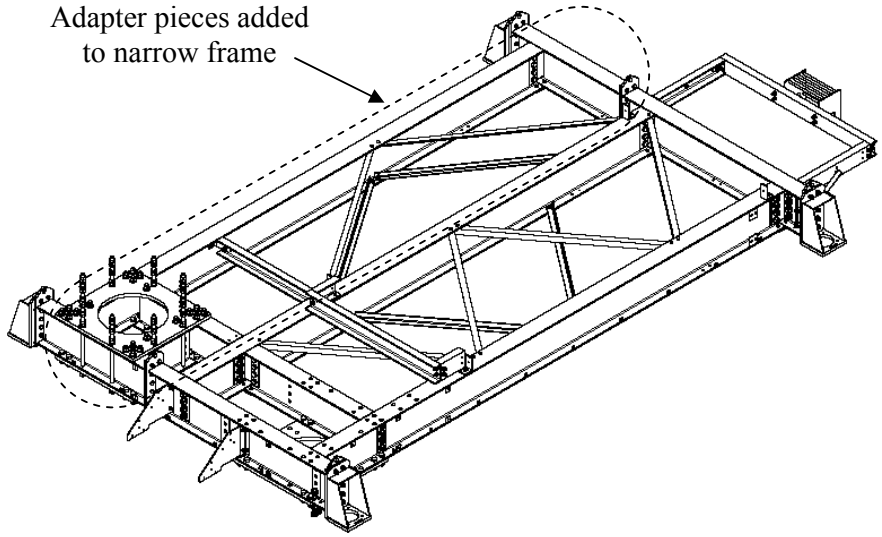

Figure 10 – Frame fully assembled for installation

Contents

1. Introduction

This document contains information required for the safe installation and maintenance of the suite of grillages to suit the monopoles and REB cabin supplied to Network Rail for the GSM-R project. This document includes a summary of the designer's residual hazards, maintenance statement and lifting information including grillage weights.

The 15m RDS grillage was initially developed based upon an existing design, adapted to better suit FLI's manufacturing processes. Subsequent variations and adapter kits have been developed in order to accommodate different structures and layouts. Narrow type frames are supplied fully assembled, while standard width frames are supplied with hinged arms that are folded in towards the main body for transport.

The 20m Flexi RDS grillage is a further development of this principle. As well as the Narrow and Standard types, the Space Saver configuration has been designed, which allows the hinged monopole to be laid down alongside the REB cabin, thereby allowing it to be used at sites where the space is restricted. This is supplied to site as a Narrow frame along with additional parts for site assembly.

The 20m Kentledge RDS frame is based upon a similar general design philosophy as the Flexi but is an entirely separate design. It has been developed to carry a centrally mounted monopole in order to minimise support reactions and allow kentledge block foundations to be efficiently utilised. For ease of transport it is supplied with two arms folded in towards the main body and a temporarily attached beam that must be relocated on site.

The Light RDS grillages have been designed to reduce costs, improve buildability and to be deployed at confined sites. The grillages designed to suit the monopoles are folded via hinges located on the profiled cover plates and the grillages designed to suit the REB cabin are folded via hinges located between the main and secondary beams. Both types of grillage are supplied as a folded assembly to ease transit to site.

A variety of adapter plates have also been developed to allow alternative models of monopoles, and in some cases lattice towers, to be mounted on the RDS Frames.

All grillages are fabricated from galvanised steel plates and universal beams. Once the grillages are opened and fully assembled, the boots will rest on top of the pile caps or pre-cast concrete blocks and be secured via studding. There may be a case where base stools are used in between the grillage and pile cap due to sloping sites. Should the base stools be deployed, the grillage boots will rest on top of the base stools and be secured via studding. Note that different base stools exist to suit different slopes.

It is essential that the grillage be installed using approved method statements by competent Contractors. The statement of Designers Residual Hazards addresses specific issues regarding the installation, maintenance and dismantling of the structures.

Included within this document is a maintenance statement outlining the recommended frequency of grillage inspections and a section titled installation guidance, which covers specific points for the installation of grillages.

All grillages are supplied free issue via the NR procurement team. 15m Standard and 20m Kentledge RDS grillages are supplied complete with studding, thrust washers, 'D' plates and all necessary nuts and washers. For all other grillages it is the responsibility of the installation contractor to arrange the supply of these items.

Asset tags shall be positioned as per NTPO drawings NTPO-SITE-SD-163 (for 20m Kentledge RDS grillage) and NTPO-SITE-SD-164 (for 20m RDS frame). The asset tags are to be affixed using a suitable waterproof adhesive (a 2 part epoxy or similar adhesive). Asset tags shall be hand stamped before fixing with site ID (format – 1234/5) in the "structure" box as shown below.

2. Designers Statement of Residual Hazards for the Thru-life of all RDS Grillages

Design Residual Hazard	Description	Activity
Tripping	It is likely there will be trip hazards in the form of uneven ground, piles and grillage protruding from the surface.	Installation Maintenance Dismantling
Handling heavy individual pieces	Grillage is generally supplied as a folded assembly unless otherwise stated. The weights of individual elements are shown on the general assembly drawings.	Installation Dismantling
Use of inappropriate lifting equipment	Grillage is generally supplied as a folded assembly unless otherwise specified. The weights of individual elements and the frame as a whole are shown on the general assembly drawings.	Installation Dismantling
Entrapment by hinged parts	Body parts (fingers, arms, legs) can become trapped between the parts of the frame as the beams are folded into position.	Installation Dismantling
Separation of hinged beams during lifting	The hinged beams can separate during lifting. It is important that the hinged beams are secured to the fixed beams at the boot end using an appropriate strop. Refer to installation guidance in FLI Doc. No. FLI/HP/06 or FLI/HP/07.	Installation Dismantling
Injury from Plant Movements	Plant will be moving around the site. For each operation measures need to be taken to prevent injury.	Installation Dismantling
Use of under strength bolts	The structural bolts used on the foldable grillage are grade 8.8 bolts. Substitute bolts from other sources shall not be used on this grillage for both structural and maintenance reasons.	Installation Maintenance
Use of hazardous material – zinc rich paint	Damage to the galvanised coating can be repaired as detailed in section 3.1. This requires the use of zinc rich paint/spray. Appropriate measures should be taken when using such paints. COSHH data sheet for zinc rich paint is included in the Appendix.	Installation Maintenance
Bolt removal by vandalism	In areas where vandalism is considered to be a problem, anti-tamper bolts can replace exposed bolts on the pile frame. These prevent bolts being undone once installed and protect the monopole and pile frame from damage.	Installation Maintenance

A full risk assessment for each of these identified hazards needs to be completed by the installer.

3. Maintenance Statement

The grillage should be inspected at least once every two years in conjunction with the monopole inspection.

The items to be examined are as follows:

Item	Description
Ground Works	The ground around the foundation shall be checked to ensure there is no visible movement, erosion or subsidence. Any drainage or surface water problems in the vicinity of the grillage should be noted as these can affect the stability of the foundations.
Grillage	Members and connections shall be inspected for corrosion and any form of distress, e.g. bent or fractured members. A 10% representative sample of all structural bolts shall be tested for tightness, and if there are any problems, check another 10% of remaining sample. If further problems are encountered all bolts in similar locations must be checked and tightened. A 10% representative sample of all ancillary bolts (i.e. hand railing etc.) shall be tested for tightness, and if there are any problems, check another 10% of remaining sample. If further problems are encountered all bolts in similar locations must be checked and tightened.
Galvanising and Painting	Members shall also be checked for signs of any damage to the galvanised surface. Any damaged surface shall be identified and remedial measures proposed. Refer to page section 3.1 for guidance.

3.1 Galvanising Coating Repair

Repair Materials

- Zinc rich primer paint (Manor Coating Systems or equivalent).
- Zinc sheen aerosol spray.
- Paint brushes.
- Protective gloves.
- Wire brushes.
- Sheets of emery paper.
- PPE as identified by task Risk Assessments shall also be used.

Repair Procedure

- Visually inspect all galvanising components to identify areas of coating damage.
- Wire brush any damaged areas to remove loose coating material, signs of staining and corrosion products.
- Exposed steel and the edges of any mechanically damaged areas are to be abraded with emery paper and the edges ‘feathered’ to provide a keying surface.

- Clean area of damage with a clean cloth removing all dust/dirt from damaged area.
- Observe good painting practice and do not apply paint in wet or damp conditions, or when the air temperature is below 5°C.
- Apply 2 coats of zinc rich primer paint to the repair area (Touch dry approximately 1 hour).
- When dry, the painted area should be over sprayed with a zinc sheen spray to give a similar appearance to the galvanise coating. Note that when first applied, zinc sheen spray may appear bright but will fade quite quickly to match the galvanise surface.

Notes:

a) Superficial marks such as band staining and footmarks should be wiped clean and sprayed with zinc sheen.

b) White rusting rarely progresses past the superficial stage and will generally was off in normal weather. No remedial treatment is required for light white rusting.

c) White rusting, which has progresses past the superficial stage is characterised by a noticeable darkening and apparent etching of the galvanised coating. In such cases less than 5% of the galvanised coating has been removed and repair may be limited to removal of the white rust by wire brushing and over spray of the affected area with zinc sheen.

d) Severe white rust is characterised by heavy oxide deposits, with the area underneath almost black and showing signs of red rust.

Appendix A:

Installation Guidance

For 15m & 20m Standard and Narrow RDS Grillages

to suit Monopole & REB Cabin

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Installation Guidance

For 15m & 20m Standard & Narrow RDS Grillage to suit GSM-R Monopole & REB Cabin

Doc Nr : FLI/MS/HP/10

Issue: 02

Date: May 2010

Prepared by: Will Hayward & Richard Steel

Reviewed and Approved by:

General

This guidance note covers both the 15 and 20m RDS variants. The RDS grillage is used to provide an intermediate support between a GSM-R antenna carrying structure and associated REB cabin, and screw piles.

Each standard grillage is supplied folded for site assembly and each narrow grillage is supplied preassembled as shown in Figures 1 to 3 in FLI document number 2010/41.

Grillages are manufactured from galvanised steel plates and universal beams. Steel elements are assembled together with bolts. The standard grillage is folded via hinges located on the main beams.

Once the grillage is opened and fully assembled as shown in Figure 2, the boots will rest on top of the pile caps and be secured via the pile studding.

This pile frame is designed for a generic REB cabin and FLI Monopole (or lattice tower). There are two different models for each, designed for a 15m structure and a 20m structure and shown in generic GA drawings NTPO-SITE-SD-110 and 180 respectively. These will give details of the overall dimensions, bolts, pile positions and weights. Although the frames are slightly different in the details of fabrication, the installation methods are similar.

The flexi frame can be adjusted with additional modules added and/or existing frame members being relocated to create a mounting solution for SLP lattice towers or a "Space Saver" frame. Preferably these configuration changes will already be carried out at the fabrication facility before the frame goes to site. However if for whatever reason this is not possible and configuration changes must be carried out on site then the method described in the relevant installation guidance document must be followed.

If a SLP3 or 4 lattice tower is to be erected on the 15m RDS grillage then the supplied adaptor stubs, flange stiffeners and web stiffeners must be installed as described in FLI Doc. GN/SLP/Adaptor Kit. When mounting a SLP3 or SLP4 tower some Hard Lock nuts will be required to be removed so to allow the repositioning of the frame beam, refer to the relevant drawing for details.

Relevant NTPO Drawings

15m RDS:

NTPO Drg No.	FLI Drg No.	Description
		15m STANDARD & NARROW RDS GRILLAGES
NTPO-SITE-SD-100	3900-282	Site Layout for Standard Frame
NTPO-SITE-SD-110	3900-283	Frame Details Indicating Holes for Sloping Sites Greater Than 1:5
NTPO-SITE-EL-100	3900-284	Lightning Protection for Std Frames
NTPO-SITE-SD-114	3900-285	RDS Frame Connection to Foundation Detail (Std & Narrow)
NTPO-SITE-SD-119	3900-286	Cable Ladder Fixing Details for Std & Narrow Frames
NTPO-SITE-SD-120	3900-287	Stub Details for Sloping Sites
NTPO-SITE-SD-170	3900-288	Notes for RDS Frames
NTPO-SITE-SD-171	3900-289	Sloping Sites Guidance Drawing for Std & Narrow Sites
NTPO-SITE-SD-123	3900-290	RDS Frame Adaptor Kit for SLP4 Towers

Refer to Network Rail to confirm latest revision status.

20m RDS:

NTPO Drg No.	FLI Drg No.	Description
		20m FLEXI RDS GRILLAGES (STANDARD, NARROW & SPACE SAVER)
NTPO-SITE-SD-105	3900-364	20m RDS Frame - Site Layout
NTPO-SITE-SD-180	3900-365	20m RDS Frame - GA on Steelwork
NTPO-SITE-SD-185	3900-366	RDS Frame Adaptor Kit for SLP3 Towers
NTPO-SITE-SD-186	3900-367	RDS Frame Adaptor Kit for SLP4 towers
NTPO-SITE-SD-187	3900-368	20m RDS Frame C/W L-Hand Extension for Restricted Laydown Sites
NTPO-SITE-SD-182	3900-369	RDS Frame Connection to Foundation Detail (Std & Narrow)
NTPO-SITE-SD-183	3900-370	Cable Ladder Fixing Details for Std & Narrow Frames
NTPO-SITE-SD-184	3900-371	Stub Details for Sloping Sites

Refer to Network Rail to confirm latest revision status.

Grillage Lifting and Installation

1. This guidance covers foldable grillages installed by using a crane, hiab, RRV or other similar plant.
2. The team leader shall check off all parts against the packing list supplied. Any anomalies will be noted and reported to the FLI's project manager immediately.
3. The grillages will generally arrive in a single piece as shown in Figures 1 to 3, with the arms folded for the standard grillage in to the main body of the frame. These arms can separate during lifting because they are connected to the main body via hinges. It is important that the beams are secured together at points A to D as shown in Figure 1. Frames are generally supplied with the arms held in place with steel banding. If for any reason this is not the case, strops must be used to secure the arms. **Always check that the beams are held in place before lifting.**

   Ancillary elements, such as hand railing and flooring, are supplied within the frame and should be separated from the main frame and put to one side.
4. The grillage should be lifted with suitable sling, at the lifting lugs as shown in Figure 1 & 2. **Slings must not be attached to any part of the hinged beam.**
5. Any chips to the galvanised finish of the grillage should be touched up with 2 coats of zinc rich epoxy primer after feathering the edges and cleaning the area with a wire brush, thinners, clean water and rag. Finally the area should be sprayed with a zinc sheen paint, such as 'Metatec' or similar.
6. The grillage shall be assembled in the sequence described below:

- Secure the lifting slings to the lifting lugs as shown in Figure 1.
- Off load the grillage and position in a clear and safe area. Land the grillage on timber supports and remove the steel banding or strops.
- If an extended REB cabin is to be used, assemble the additional parts in accordance with guidance note GN/xx/xx.
- If an SLP3 or SLP4 Lattice tower is to be installed on the grillage instead of a monopole then refer to FLI Doc. GN/SLP/Adaptor Kit for guidance on installation.
- Check that installed height of the underside of the grillage to the finished site ground level is 150mm clear. This should be confirmed on the site specific drawings.

- Unfold the hinged arms (for standard grillage only) and fully assemble the frame, referring to the GA drawings. Tighten the bolt on the splice plates in the main arms. Torque settings for tightening standard nuts and bolts are not given. Nuts are to be tightened with a standard podger spanner until the nut can be tightened no further. The fully assembled frame with attached lifting slings is shown in Figure 2
- Lift the fully assembled frame into position and land on pile caps / kentledge blocks. Once the grillage is resting on the supports, fit the top nuts and washers to secure grillage boots to studding.
- Use spirit level to check that grillage is levelled and that all boots are in contact with the pile caps / kentledge blocks. Any anomalies must be noted and reported to the FLI's project manager immediately.
- Where kentledge blocks are used (for the 15m grillage), install lightning protection according to Drawing No. NTPO-SITE-EL-100, ensuring that earth tape is connected at the holes provided to the bottom flange of each arm.
- Wait a minimum period of one hour from the intial bolt tightening before fitting the PAL nuts. The standard nut on each assembly should first be checked for tightness, tightening if necessary. Fit the PAL nut onto the assembly and tighten using an open-ended spanner, until tight plus one half turn. One half turn of the PAL nut is best confirmed by match marking the nut and PAL nut on opposite faces and tightening until the lines are coincident.

7. Installation of ancillary elements (hand railing and floor panels) should be carried out in accordance with the relevant assembly drawing. Replacement floor panels are supplied with the SLP3/4 adaptor kit to accommodate for the change in beam configuration (refer to GN/SLP/Adaptor Kit).
8. The site will then be cleaned and tidied prior to installation team leaving the site. Any damage to this or adjacent sites will be reported by the installation team leader to the project manager.

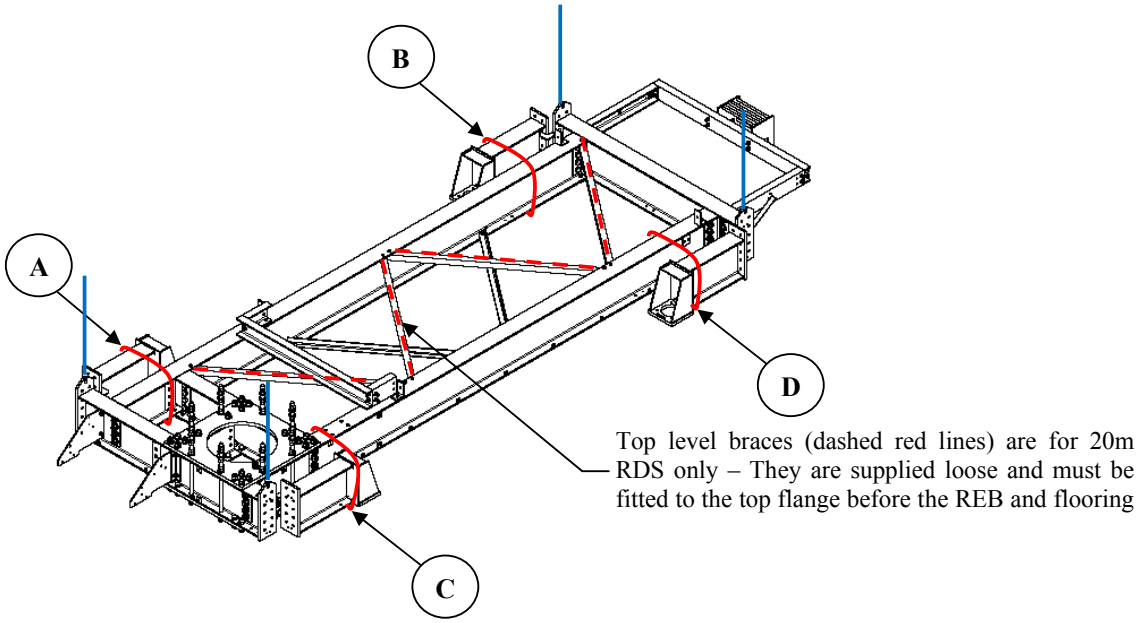

Figure 1 – Standard Frame – Steel banding / strops (solid red lines) securing hinged arms to main frame. Slings (solid blue lines) attached to lifting lugs for lifting.

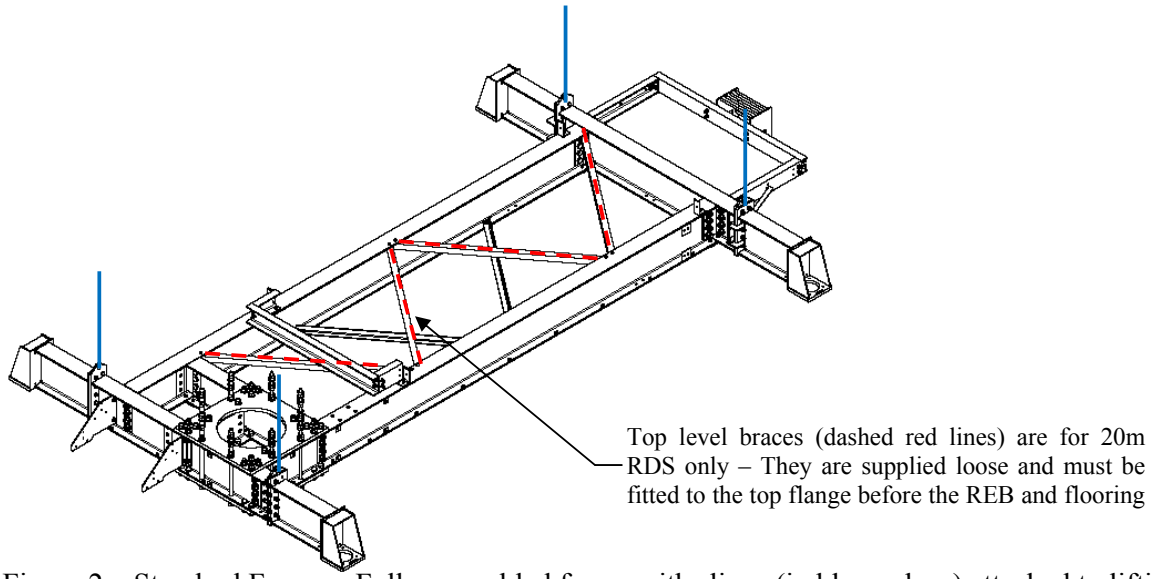

Figure 2 – Standard Frame – Fully assembled frame with slings (in blue colour) attached to lifting lugs for lifting.

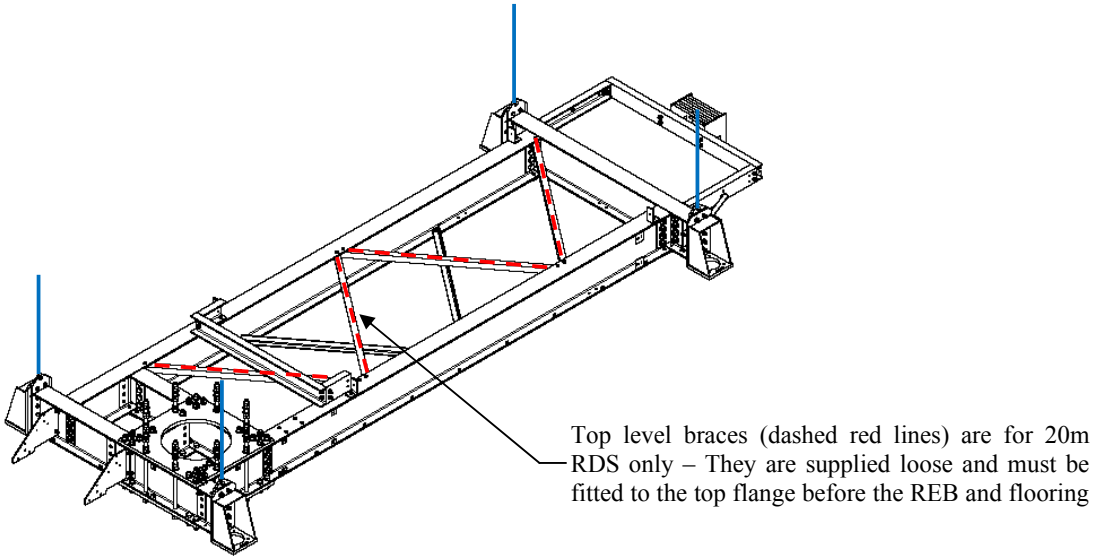

Figure 3 – Narrow Frame – Fully assembled frame with slings (in blue colour) attached to lifting lugs for lifting.

Appendix B:
Installation Guidance
for Light RDS Grillage
to suit Monopole

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Installation Guidance

for Foldable Grillage to suit GSM-R Monopoles

Doc Nr : FLI/MS /HP/08

Issue: 02

Date: May 2010

Prepared by: Chih Ern Liong & Richard Steel

Reviewed and Approved by: Trevor Burden

General

The foldable grillages are used to provide an intermediate support between GSM-R monopoles and helical piles.

Each grillage is supplied folded for site assembly as shown in Figure 1.

Grillages are manufactured from galvanised steel plates and universal beams. Steel elements are assembled together with bolts. The grillage is folded via hinges located on the profiled cover plates.

Once the grillage is opened and fully assembled as shown in Figure 2, the boots will rest on top of the pile caps and secured via the pile studding. The pile studding should be supplied by the piling contractor and locked in place.

Because this pile frame is designed for a specific monopole it is essential that reference be made to the site specific drawings during assembly. This will give details of the overall dimensions, bolts, pile PCD and weights.

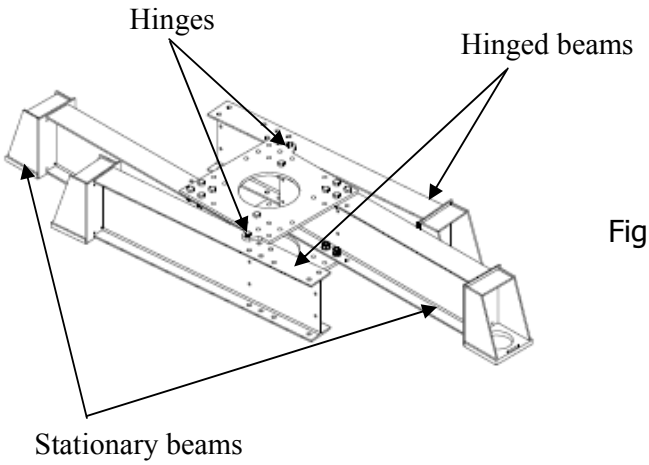

Figure 1 – Frame folded for transit.

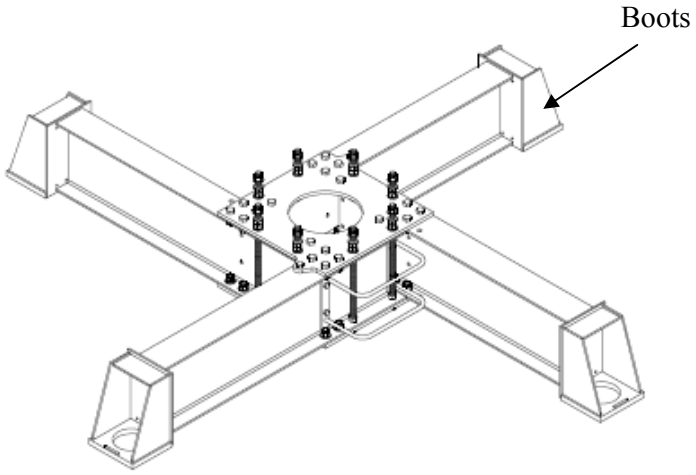

Figure 2 – Frame opened and fully assembled.

Relevant NTPO Drawings

NTPO Drg No.	FLI Drg No.	Description
		15m & 20m LIGHT RDS GRILLAGES
NTPO-SITE-EL-101	3900-116	FLI Light Lightning Protection Details
NTPO-SITE-SD-102	3900-115	FLI Light Site Layout Details
NTPO-SITE-SD-140	3900-129	FLI Light Foldable Grillage For 15m & 10m Monopoles (HPF17) 800 PCD
NTPO-SITE-SD-141	3900-108	REB Cabin (3710 x 2510) Foldable Frame (HPF13)
NTPO-SITE-SD-142	3900-177	REB Cabin (3710 x 2510) Foldable Frame (HPF23)
NTPO-SITE-SD-143	3900-126	FLI Light Cable Ladder Fixing Details
NTPO-SITE-SD-144	3900-189	REB Cabin (3710 x 2510) Extended Frame For Sloping Sites (HPF25)
NTPO-SITE-SD-145	3900-146	FLI Light Foldable Grillage For 20m Monopoles (HPF21) 970 PCD
NTPO-SITE-SD-146	3900-200	FLI Light Grillage For 20m - 27m/s Monopole (HPF19) 840 PCD
NTPO-SITE-SD-161	3900-125	FLI Light Signage Position Drawing
NTPO-SITE-SD-173	3900-127	FLI Light Notes
NTPO-SITE-SD-174	3900-128	FLI Light Stool Solution For Sloping Sites
NTPO-SITE-SD-147	SK1787	FLI Light Boot Detail

Refer to Network Rail to confirm latest revision status.

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1. This guidance covers foldable grillages installed by using a crane, hiab, RRV or other similar plant.

2. The team leader shall check off all parts against the packing list supplied. Any anomalies will be noted and reported to the FLI's project manager immediately.

3. The grillage will generally arrive in a single folded piece as shown in Figure 1. The hinged beams can separate during lifting. It is important that the hinged beams are secured to the stationary beams at the boot end using appropriate strops as shown in Figure 3. **Always check that the hinged beams are held in place by strops before lifting.**

4. The grillage should be lifted with suitable sling(s), by forming a choke knot around the stationary beams and near the profiled cover plates as shown in Figure 3. **Slings must not be attached to any part of the hinged beam.**

5. Any chips to the galvanised finish of the grillage should be touched up with 2 coats of zinc rich epoxy primer after feathering the edges and cleaning the area with a wire brush, thinners, clean water and rag. Finally the area should be sprayed with a zinc sheen paint, such as 'Metatec' or similar.

6. The grillage shall be assembled in the sequence described below:

- Secure the lifting slings around the stationary beams as shown in Figure 3.

- Off load the grillage and position in a clear and safe area. Land the grillage on timbers at a suitable height above the ground to allow the hinged arms to rotate and

the bolts to be fitted. Lift or tilt the grillage to allow the hinged beams to swing open and fix bolts to the underside of the frame.

- Open and fully assemble the frame as shown in Figure 2, referring to the GA drawings. All flange bolts should be fitted with the heads uppermost. Ensure that all nuts and palnuts are fitted to the studding especially those between the flanges. It is best not to fully tighten the nuts at this stage.

- Check that installed height of the underside of the grillage to the finished site ground level is 150mm clear. This should be confirmed on the site specific drawings.

- Lift the fully assembled frame into position and land on pile caps. Once the grillage is resting on the pile caps, fit the top nuts and washers to secure grillage boots to pile studding.

- Use spirit level to check that grillage is levelled and that all boots are in contact with the pile caps. Any anomalies must be noted and reported to the FLI's project manager immediately.

- Tighten all standard nuts. Torque settings for tightening standard nuts and bolts are not given. Nuts are to be tightened with a standard podger spanner until the nut can be tightened no further.

- Wait a minimum period of one hour from the initial bolt tightening before tightening the PAL nuts. The standard nut on each assembly should first be checked for tightness, and if found loose must be tightened. Fit the PAL nut onto the assembly and tighten using an open-ended spanner, until tight plus one half turn. One half turn of the Pal nut is best confirmed by match marking the nut and Pal nut on opposite faces and tightening until the lines are coincident.

7. The site will then be cleaned and tidied prior to installation team leaving the site. Any damage to this or adjacent sites will be reported by the installation team leader to the project manager.

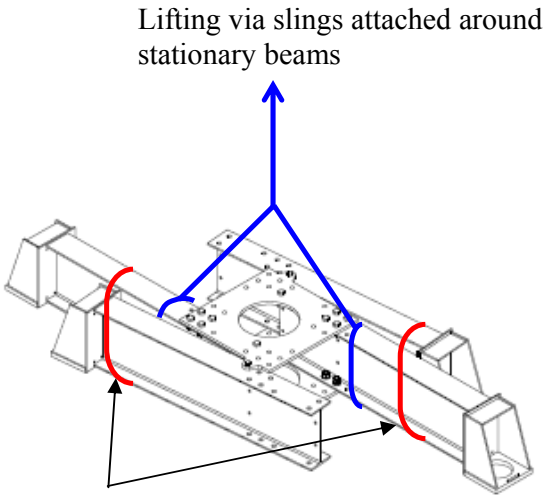

Figure 3 – Strops (in red colour) securing hinged beams to stationary beam at boot end. Slings (in blue colour) attached on stationary beams for lifting.

Appendix C:
Installation Guidance
for Light RDS Grillage
to suit REB Cabin

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Installation Guidance

for Foldable Grillage to suit GSM-R REB Cabin

Doc Nr : FLI/HP/09

Issue: 02

Date: May 2009

Prepared by: Chih Ern Liong

Reviewed and Approved by: Peter Verso

General

The foldable grillages are used to provide an intermediate support between GSM-R REB cabin and helical piles.

Each grillage is generally supplied folded for site assembly as shown in Figure 1.

Grillages are manufactured from galvanised steel plates and universal beams. Steel elements are assembled together with bolts. The grillage is folded via hinges located between the main and secondary beams.

Once the grillage is opened and fully assembled as shown in Figure 3, the boots will rest on top of the pile caps and secured via the pile studding.

This pile frame is designed for a generic REB cabin as shown in the generic GA drawings, NTPO\SITE\SD 141 & 142. These show two variations on the folded frame and give details of the overall dimensions, bolts, pile positions and weights. Also included is a third type of frame designed for sloping sites, drawing No. NTPO\SITE\SD\144. This is supplied to site fully assembled and the references to unfolding in the method below do not apply.

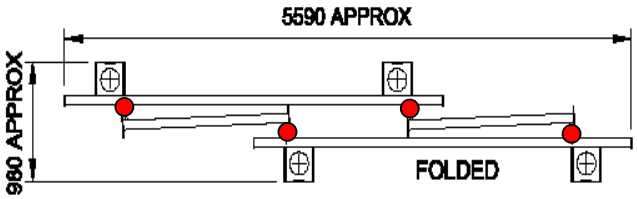

Figure 1 – Plan view of frame folded for transit. Position of hinges in red colour.

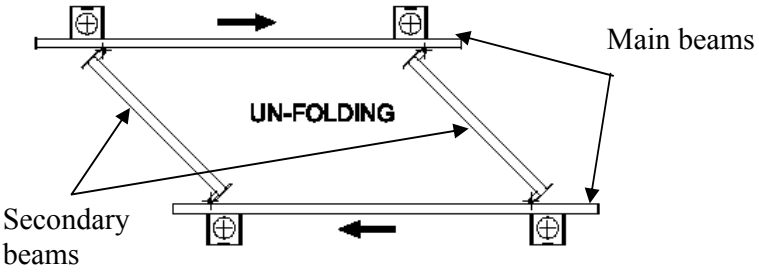

Figure 2 – Unfolding the grillage.

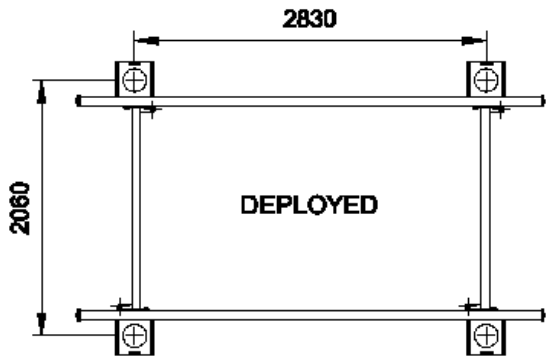

Figure 3 – Frame opened and fully assembled.

Relevant NTPO Drawings

NTPO Drg No.	FLI Drg No.	Description
		15m & 20m LIGHT RDS GRILLAGES
NTPO-SITE-EL-101	3900-116	FLI Light Lightning Protection Details
NTPO-SITE-SD-102	3900-115	FLI Light Site Layout Details
NTPO-SITE-SD-140	3900-129	FLI Light Foldable Grillage For 15m & 10m Monopoles (HPF17) 800 PCD
NTPO-SITE-SD-141	3900-108	REB Cabin (3710 x 2510) Foldable Frame (HPF13)
NTPO-SITE-SD-142	3900-177	REB Cabin (3710 x 2510) Foldable Frame (HPF23)
NTPO-SITE-SD-143	3900-126	FLI Light Cable Ladder Fixing Details
NTPO-SITE-SD-144	3900-189	REB Cabin (3710 x 2510) Extended Frame For Sloping Sites (HPF25)
NTPO-SITE-SD-145	3900-146	FLI Light Foldable Grillage For 20m Monopoles (HPF21) 970 PCD
NTPO-SITE-SD-146	3900-200	FLI Light Grillage For 20m - 27m/s Monopole (HPF19) 840 PCD
NTPO-SITE-SD-161	3900-125	FLI Light Signage Position Drawing
NTPO-SITE-SD-173	3900-127	FLI Light Notes
NTPO-SITE-SD-174	3900-128	FLI Light Stool Solution For Sloping Sites
NTPO-SITE-SD-147	SK1787	FLI Light Boot Detail

Refer to Network Rail to confirm latest revision status.

Grillage Lifting and Installation

1. This guidance covers foldable grillages installed by using a crane, hiab, RRV or other similar plant.

2. The team leader shall check off all parts against the packing list supplied. Any anomalies will be noted and reported to the FLI's project manager immediately.

3. The grillage will generally arrive in a single folded piece as shown in Figure 1. The beams can separate during lifting because the main and secondary beams are connected via hinges. It is important that the beams are secured together using appropriate strops at point A and B as shown in Figure 4. **Always check that the beams are held in place by strops before lifting.**

4. The grillage should be lifted with suitable sling(s), by forming a choke knot around the main beams and near point A and B as shown in Figure 4. **Slings must not be attached to any part of the hinged beam.**

5. Any chips to the galvanised finish of the grillage should be touched up with 2 coats of zinc rich epoxy primer after feathering the edges and cleaning the area with a wire brush, thinners, clean water and rag. Finally the area should be sprayed with a zinc sheen paint, such as 'Metatec' or similar.

6. The grillage shall be assembled in the sequence described below:

- Secure the lifting slings around the main beams at point A and B as shown in Figure 4.

- Off load the grillage and position in a clear and safe area. Land the grillage on timber supports and remove the strops and lifting slings.

- Re-attach the lifting slings at one end of the main beam to unfold the frame as shown in Figure 5.

- Open and fully assemble the frame, referring to the GA drawings. Tighten the bolt on the connection plates at each end of the secondary beams to the main beams. For the HPF23 frame, the pile boots should be attached at this stage.

- Check that installed height of the underside of the grillage to the finished site ground level is 150mm clear. This should be confirmed on the site specific drawings.

- Lift the fully assembled frame into position and land on pile caps. Once the grillage is resting on the pile caps, fit the top nuts and washers to secure grillage boots to pile studding.

- Use spirit level to check that grillage is levelled and that all boots are in contact with the pile caps. Any anomalies must be noted and reported to the FLI's project manager immediately.

- Tighten all standard nuts. Torque settings for tightening standard nuts and bolts are not given. Nuts are to be tightened with a standard podger spanner until the nut can be tightened no further.

- Wait a minimum period of one hour from the initial bolt tightening before tightening the PAL nuts. The standard nut on each assembly should first be checked for tightness, and if found loose must be tightened. Fit the PAL nut onto the assembly and tighten using an open-ended spanner, until tight plus one half turn. One half turn of the Pal nut is best confirmed by match marking the nut and Pal nut on opposite faces and tightening until the lines are coincident.

7. The site will then be cleaned and tidied prior to installation team leaving the site. Any damage to this or adjacent sites will be reported by the installation team leader to the project manager.

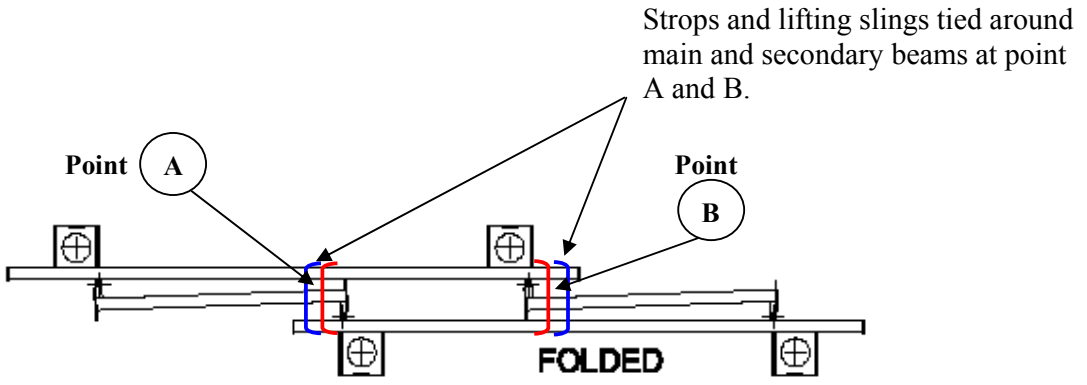

Figure 4 – Strops (in red colour) securing main and secondary beams together. Slings (in blue colour) attached around main and secondary beams, near point A and B for lifting.

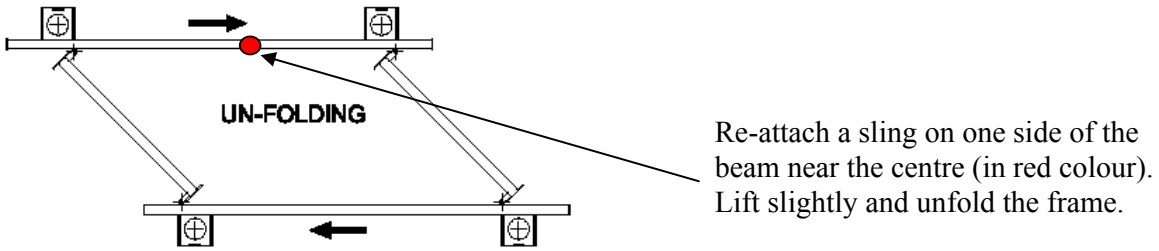

Figure 5 – Slings to be re-attached at the main beam to unfold the frame.

Appendix D:
Installation Guidance
for 20m Kentledge RDS Grillage
to suit Monopole & REB Cabin

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Installation Guidance

for RDS Kentledge Grillage to suit

GSM-R Monopole & REB Cabin

Doc Nr : FLI/MS/HP/13

Issue: 02

Date: May 2010

Prepared by: Will Hayward & Richard Steel

Reviewed and Approved by:

General

The RDS grillage is used to provide an intermediate support between a GSM-R antenna carrying structure and associated REB cabin, and kentledge blocks.

Each grillage is supplied folded for site assembly as shown in Figure 1.

Grillages are manufactured from galvanised steel plates and universal beams. Steel elements are assembled together with bolts. The grillage is folded via hinges located on two of the main beams.

Once the grillage is opened and fully assembled as shown in Figure 2, the boots will rest on top of the kentledge blocks and be secured via studding.

This frame is designed for a generic REB cabin and FLI Monopole (or lattice tower) as shown in generic GA drawing NTPO-SITE-SD-150. These will give details of the overall dimensions, bolts, boot positions and weights.

Relevant NTPO Drawings

NTPO Drg No.	FLI Drg No.	Description
		20m KENTLEDGE RDS GRILLAGE
NTPO-SITE-SD-104	3900-292	Site Layout for 20m Kentledge RDS Grillage
NTPO-SITE-SD-150	3900-293	GA on Steelwork for 20m Kentledge RDS Grillage
NTPO-SITE-SD-151	3900-294	Adaptor Kit for SLP3 Tower Installed on 20m Kentledge RDS Grillage
NTPO-SITE-SD-152	3900-295	Adaptor Kit for SLP4 Tower Installed on 20m Kentledge RDS Grillage
NTPO-SITE-SD-153	3900-296	20m Kentledge RDS Grillage, Holes for Sloping Sites Greater Than 1:5
NTPO-SITE-SD-154	3900-297	Grillage to Foundation Connection Detail for 20m Kentledge RDS Grillage
NTPO-SITE-SD-155	3900-298	Cable Ladder Fixing Detail for Monopoles, SLP3 & SLP4 On 20m Kentledege RDS Grillage
NTPO-SITE-SD-157	3900-291	Handrail Assembly Detail for 20m Kentledge RDS Grillage
NTPO-SITE-SD-158	3900-301	Stub Support Details for 20m Kentledge RDS Grillage
NTPO-SITE-SD-175	3900-300	Notes for 20m Kentledge RDS Grillage
NTPO-SITE-SD-163	3900-336	Signage Positioning Drawing for 20m Kentledge RDS Grillage
NTPO-SITE-EL-103	3900-337	Lightning Protection Plan for 20m Kentledge RDS Grillage

Refer to Network Rail to confirm latest revision status.

Grillage Lifting and Installation

1. This guidance covers foldable grillages installed by using a crane, hiab, RRV or other similar plant.
2. The team leader shall check off all parts against the packing list supplied. Any anomalies will be noted and reported to the FLI's project manager immediately.
3. The grillage will generally arrive in a single piece as shown in Figure 1, with two arms folded in to the main body of the frame. The beam labelled A is temporarily secured at this position and is to be relocated during site assembly. The hinged arms can separate during lifting because they are connected to the main body via hinges. It is important that the beams are secured together at points B and C as shown in Figure 1. Frames are generally supplied with the arms held in place with steel banding. If for any reason this is not the case, strops must be used to secure the arms. **Always check that the beams are held in place before lifting.**
4. The grillage should be lifted with suitable sling(s), by forming a choke knot around the main beams and near points D to G as shown in Figure 4. **Slings must not be attached to any part of the hinged beam.**
5. Any chips to the galvanised finish of the grillage should be touched up with 2 coats of zinc rich epoxy primer after feathering the edges and cleaning the area with a wire brush, thinners, clean water and rag. Finally the area should be sprayed with a zinc sheen paint, such as 'Metatec' or similar.
6. The grillage shall be assembled in the sequence described below:

- Secure the lifting slings around the main beams at point D to G as shown in Figure 1.
- Off load the grillage and position in a clear and safe area. Land the grillage on timber supports and remove the steel banding / strops and lifting slings.
- Unfold the hinged arms, detach beam A and fully assemble the frame, referring to the GA drawings. Tighten the bolt on the splice plates in the main arms. Torque settings for tightening standard nuts and bolts are not given. Nuts are to be tightened with a standard podger spanner until the nut can be tightened no further.
- If an SLP3 or SLP4 Lattice tower is to be installed on the grillage instead of a monopole then adjust the frame and assemble the additional parts in accordance with the appropriate drawings (see Appendix F).
- Secure the lifting slings around the main beams at point H to K as shown in Figure 2.
- Check that installed height of the underside of the grillage to the finished site ground level is 150mm clear. This should be confirmed on the site specific drawings.
- Lift the fully assembled frame into position and land on kentledge blocks. Once the grillage is resting on the kentledge blocks, fit the top nuts and washers to secure grillage boots to studding.
- Use spirit level to check that grillage is levelled and that all boots are in contact with the kentledge blocks. Any anomalies must be noted and reported to the FLI's project manager immediately.
- Install lightning protection according to Drawing No. NTPO-SITE-EL-103, ensuring that earth tape is connected at the specified points.

- Wait a minimum period of one hour from the intial bolt tightening before fitting the PAL nuts. The standard nut on each assembly should first be checked for tightness, tightening if necessary. Fit the PAL nut onto the assembly and tighten using an open-ended spanner, until tight plus one half turn. One half turn of the PAL nut is best confirmed by match marking the nut and PAL nut on opposite faces and tightening until the lines are coincident.

7. Installation of ancillary elements (hand railing and floor panels) should be carried out in accordance with NTPO drawing NTPO-SITE-SD-157.
8. The site will then be cleaned and tidied prior to installation team leaving the site. Any damage to this or adjacent sites will be reported by the installation team leader to the project manager.

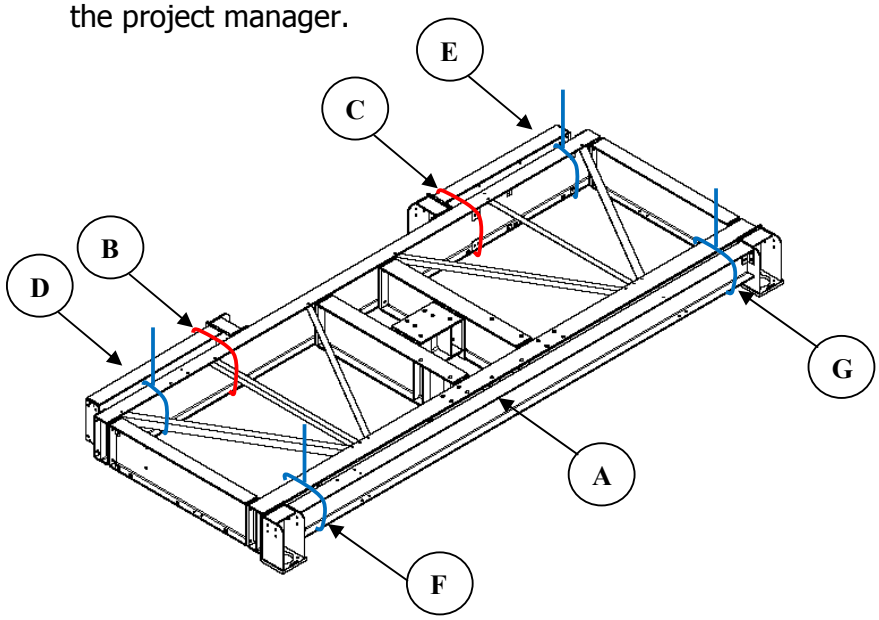

Figure 1 – Steel banding / strops (in red colour) securing hinged arms to main frame. Slings (in blue colour) attached to main beams for lifting.

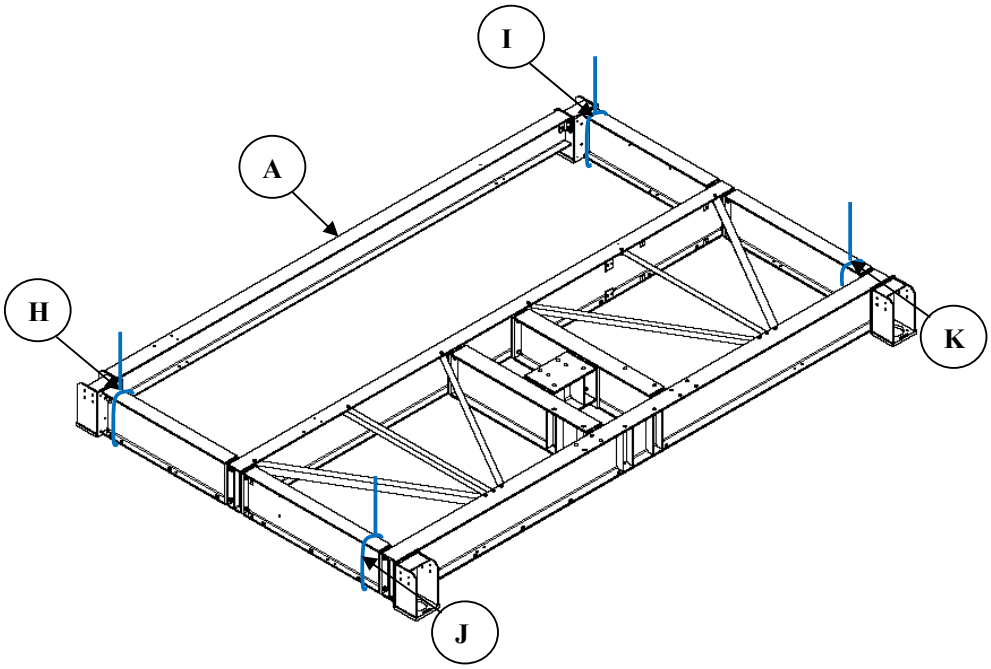

Figure 2 – Fully assembled frame with slings (in blue colour) attached to main beams for lifting.

Appendix E:

Installation Guidance

for 20m Flexi RDS Grillage – Space Saver Option

to suit Monopole & REB Cabin

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Installation Guidance

for RDS Space Saver Grillage to suit

GSM-R Monopole & REB Cabin

Doc Nr : FLI/MS/HP/12

Issue: 02

Date: May 2010

Prepared by: Will Hayward & Richard Steel

Reviewed and Approved by:

General

The RDS grillage is used to provide an intermediate support between a GSM-R monopole and associated REB cabin, and screw piles.

Each grillage is supplied for site assembly as a narrow frame as shown in Figure 1 along with additional individual pieces as an adapter kit.

Grillages are manufactured from galvanised steel plates and universal beams. Steel elements are assembled together with bolts. The grillage is folded via hinges located on the main beams.

Once the grillage is fully assembled as shown in Figure 3, the boots will rest on top of the pile caps and be secured via the pile studding.

This pile frame is designed for a generic REB cabin and 20m FLI Monopole (or lattice tower) as shown in generic GA drawing NTPO-SITE-SD-187. This will give details of the overall dimensions, bolts, pile positions and weights.

For the space saver configuration, Hard Lock nuts will be required to be removed and reinstalled. **If, after retightening to the desired torque, the concave and convex parts of the Hard Lock nuts do not have a gap (a gap of one screw pitch is required) between them, then the Hard Lock nuts must be replaced.** Additional Hard Lock nuts should be present with the rest of the parts.

Relevant NTPO Drawings

NTPO Drg No.	FLI Drg No.	Description
		20m FLEXI RDS GRILLAGES (STANDARD, NARROW & SPACE SAVER)
NTPO-SITE-SD-105	3900-364	20m RDS Frame - Site Layout
NTPO-SITE-SD-180	3900-365	20m RDS Frame - GA on Steelwork
NTPO-SITE-SD-185	3900-366	RDS Frame Adaptor Kit for SLP3 Towers
NTPO-SITE-SD-186	3900-367	RDS Frame Adaptor Kit for SLP4 towers
NTPO-SITE-SD-187	3900-368	20m RDS Frame C/W L-Hand Extension for Restricted Laydown Sites
NTPO-SITE-SD-182	3900-369	RDS Frame Connection to Foundation Detail (Std & Narrow)
NTPO-SITE-SD-183	3900-370	Cable Ladder Fixing Details for Std & Narrow Frames
NTPO-SITE-SD-184	3900-371	Stub Details for Sloping Sites
NTPO-SITE-SD-178	3900-372	Notes for 20m RDS Frames
NTPO-SITE-EL-104	3900-373	Lightning Protection for RDS Frame
NTPO-SITE-SD-164	3900-374	Signage Positioning for 20m RDS Frame
NTPO-SITE-SD-181	3900-375	Kentledge Frame Indicating Holes for Sloping Sites Greater Than 1:5

Refer to Network Rail to confirm latest revision status.

Grillage Lifting and Installation

1. This guidance covers foldable grillages installed by using a crane, hiab, RRV or other similar plant.
2. The team leader shall check off all parts against the packing list supplied. Any anomalies will be noted and reported to the FLI's project manager immediately.
3. The grillage will generally arrive in several pieces for site assembly, including a core module as shown in Figure 1, and a number of additional pieces used to convert it into the Space Saver configuration.

4. The core module and, once completed, the fully assembled frame should be lifted with suitable slings, via the lifting lugs on the support arms as shown in Figure 1 and 2.
5. Any chips to the galvanised finish of the grillage should be touched up with 2 coats of zinc rich epoxy primer after feathering the edges and cleaning the area with a wire brush, thinners, clean water and rag. Finally the area should be sprayed with a zinc sheen paint, such as 'Metatec' or similar.
6. The grillage shall be assembled in the sequence described below:

- Secure the lifting slings to the lifting lugs on the core module as shown in Figure 1.
- Off load the core module and position in a clear and safe area. Land the grillage on timber supports and remove lifting slings.
- Secure lifting slings around the bundle of additional parts, and off load adjacent to the core module.
- If the space saver frame configuration has already been assembled then skip to next step. If this is not so then the following must be done.

  Referring to Figure 2, loosen relevant bolts and remove top cover plate labelled A, short beam labelled B and boots labelled C & D from core module.

  Fully assemble the frame, referring to the GA drawings. The main beams and boots should be assembled first, followed by the bracing, and finally the cover plates. Torque settings for tightening standard nuts and bolts are not given. Nuts are to be tightened with a standard podger spanner until the nut can be tightened no further. Hard Lock nuts are to be reinstalled and tightened to the specified torque. **If, after tightening, the concave and convex parts of the Hard Lock nuts do not have a gap of approximately one screw pitch between them, then the hard Lock nuts must be replaced.** Additional Hard Lock nuts should be present with the rest of the parts.
- Secure the lifting slings to the lifting lugs as shown in Figure 3.
- Check that installed height of the underside of the grillage to the finished site ground level is 150mm clear. This should be confirmed on the site specific drawings.
- Lift the fully assembled frame into position and land on pile caps. Once the grillage is resting on the pile caps, fit the top nuts and washers to secure grillage boots to pile studding.
- Use spirit level to check that grillage is levelled and that all boots are in contact with the pile caps. Any anomalies must be noted and reported to the FLI's project manager immediately.
- Wait a minimum period of one hour from the intial bolt tightening before fitting the PAL nuts. The standard nut on each assembly should first be checked for tightness, tightening if necessary. Fit the PAL nut onto the assembly and tighten using an open-ended spanner, until tight plus one half turn. One half turn of the PAL nut is best confirmed by match marking the nut and PAL nut on opposite faces and tightening until the lines are coincident.

7. Installation of ancillary elements (hand railing and floor panels) should be carried out in accordance with the relevant assembly drawing.
8. The site will then be cleaned and tidied prior to installation team leaving the site. Any damage to this or adjacent sites will be reported by the installation team leader to the project manager.

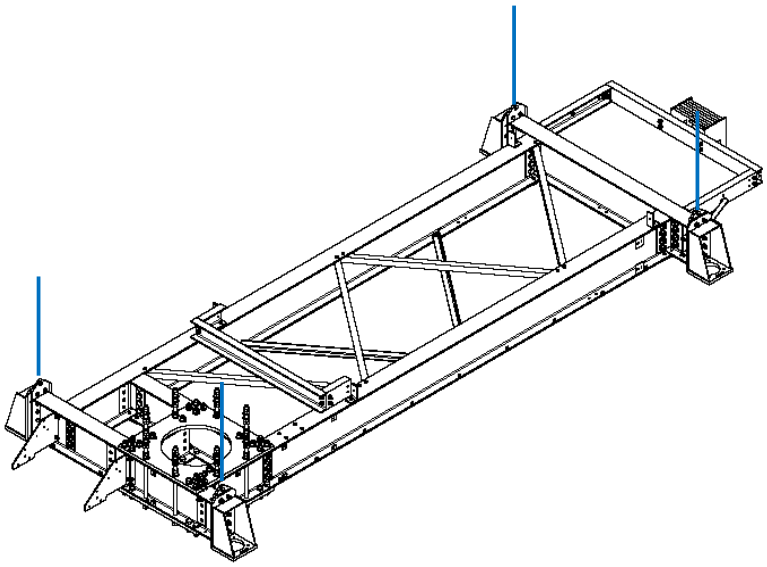

Figure 1 – Core module with slings (in blue colour) attached to lifting lugs for lifting.

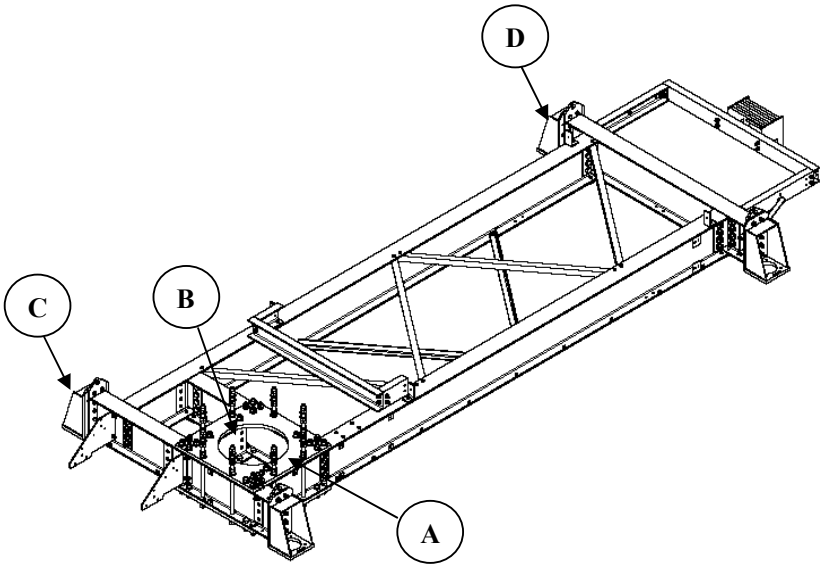

Figure 2 – Core module frame indicating parts to be removed for conversion to Space Saver

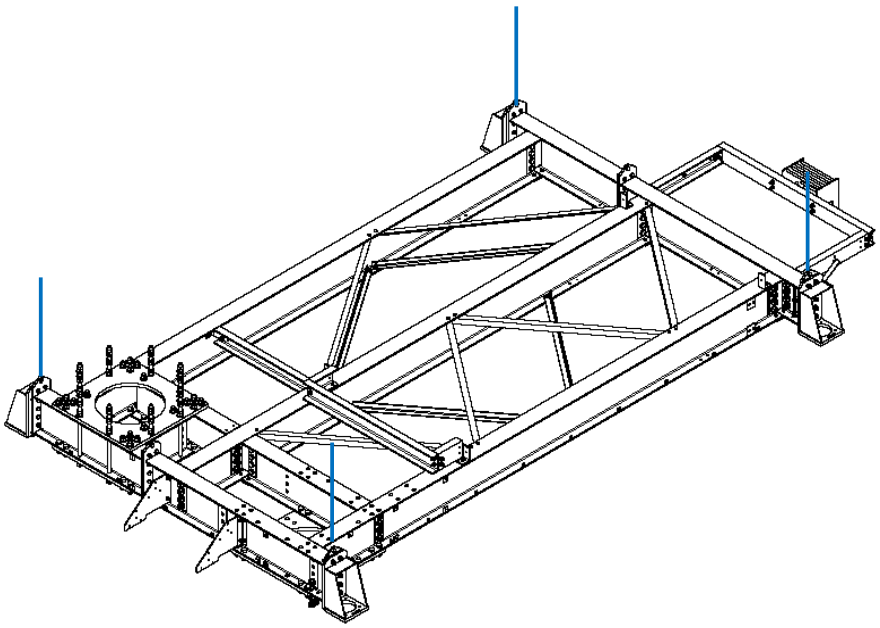

Figure 3 – Fully assembled Space Saver frame with slings (in blue colour) attached to lifting lugs for lifting.

Appendix F:

Installation Guidance for

SLP3/4 Adaptor Kit for RDS Grillages

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Installation Guidance

for SLP3/4 Adaptor Kit for RDS grillages

Doc Nr: GN/SLP/ADAPTOR KIT

Issue: 01

Date: May 2010

Prepared by: Richard Steel

Reviewed and Approved by:

General

The SLP3/4 Adaptor Kit is used to facilitate the mounting of a SLP3 or 4 lattice tower onto a RDS Grillage. The kit contains adaptor stubs, web and flange stiffeners (for 15m SLP3 or 15m SLP4 tower on 15m Flexi frame only), replacement platform panels and all necessary nuts, bolts and washers. These additional parts shall be assembled as detailed below and in accordance with the NTPO and FLI assembly drawings listed in the below relevant drawing tables.

Relevant NTPO Drawings

NTPO Drg No.	FLI Drg No.	Description
		SLP3/4 Adaptor Kit
NTPO-SITE-SD-123	3900-290	RDS Frame Adaptor Kit for SLP4 Towers
NTPO-SITE-SD-185	3900-366	Adaptor Kit for SLP3 Tower Installed on 20m Standard & Narrow Grillages
NTPO-SITE-SD-186	3900-367	Adaptor Kit for SLP4 Tower Installed on 20m Standard & Narrow Grillages

Refer to Network Rail to confirm latest revision status.

Relevant FLI Assembly Drawings

FLI Drg No.	Description
	SLP3/4 Adaptor Kit
4500-142	Ex-works Assembly for Standard 20m RDS Flexi Frame – RDS83
4500-143	Ex-works Assembly for Narrow 20m RDS Flexi Frame – RDS83
4500-90	Ex-works Assembly Details for RDS Std Flexi Frame – RDS109
4500-91	Ex-works Assembly Details for RDS Std Flexi Frame – RDS110
4500-193	Installation Kit RDS155 for SLP4 (Module 4) to 20m Flexi Frame
4500-110	Adaptor Kit for RDS 15m Flexi to Suit SLP3 15m Tower (Module 5B – TS663)
4500-215	Adaptor Kit for RDS 15m Flexi to Suit SLP3 10m Tower (Module 4B – TS664)

Refer to FLI to confirm latest revision status.

Adaptor Kit Installation

10m SLP3 on 15m RDS Frame or 20m SLP3/4 on 20m RDS Frame:

1. The short beam (RDS115 for 15m RDS, RDS69 for 20m RDS) supplied with the RDS frame is to be unbolted from the cover plates, with PAL nuts removed and discarded, and repositioned using the angle cleats provided, as detailed in NTPO & FLI drawings stated in the above relevant drawing list, and figures 1 & 2 below for detail.
2. Bolt all three adaptor stubs to the RDS frame, ensuring that the included packer plate for "Stub A" is installed, as detailed in FLI and NTPO drawings in the above relevant drawing list.

   Torque settings for tightening nuts and bolts are not given. Nuts to be tightened with a standard podger spanner until the nut can be tightened no further.

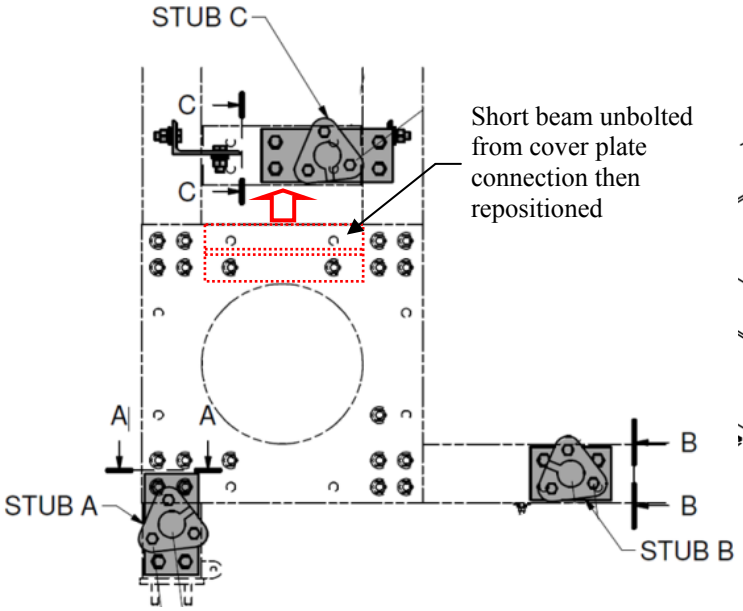


Figure 1: Plan View of Stub Layout
(grillage shown is a 15m RDS Flexi, but installation principle is the same for 20m RDS Flexi)

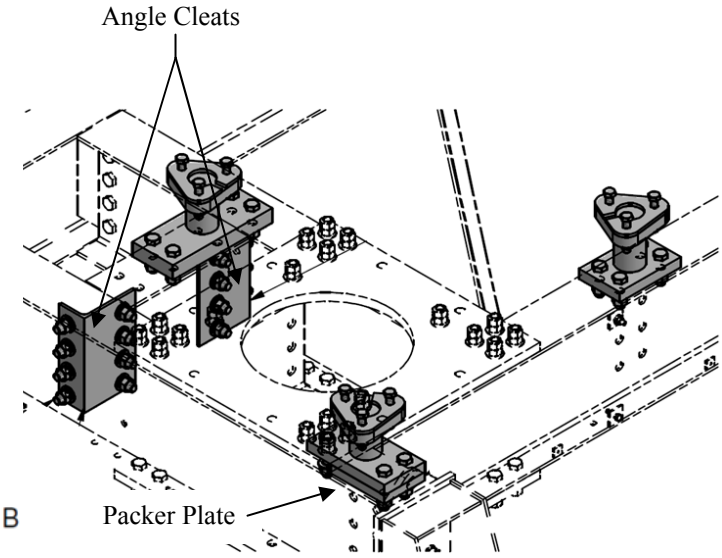


Figure 2: 3D View of Stub and Angle Cleat Layout

15m SLP3/4 on 15m RDS Frame:

1. The short beam (RDS115) supplied with the RDS frame is to be unbolted from the cover plates, with PAL nuts removed and discarded, and repositioned using the angle cleats provided, as detailed in NTPO & FLI drawings stated in the above relevant drawing list, and figures 1 & 3 for detail.
2. Bolt all web stiffeners to the RDS frame as detailed in NTPO & FLI drawings in the above relevant drawing list and Figure 3 below.
3. Bolt all three adaptor stubs to the RDS frame, ensuring that the included packer plate for Stub A (see figure 1) and flange stiffeners are installed, as detailed in FLI and NTPO drawings in the above relevant drawing list and figure 3.

Torque settings for tightening nuts and bolts are not given. Nuts to be tightened with a standard podger spanner until the nut can be tightened no further.

Note: ALL web and flange stiffeners MUST be installed in the correct locations shown on the above mentioned drawings prior to erecting the lattice tower on the RDS frame.

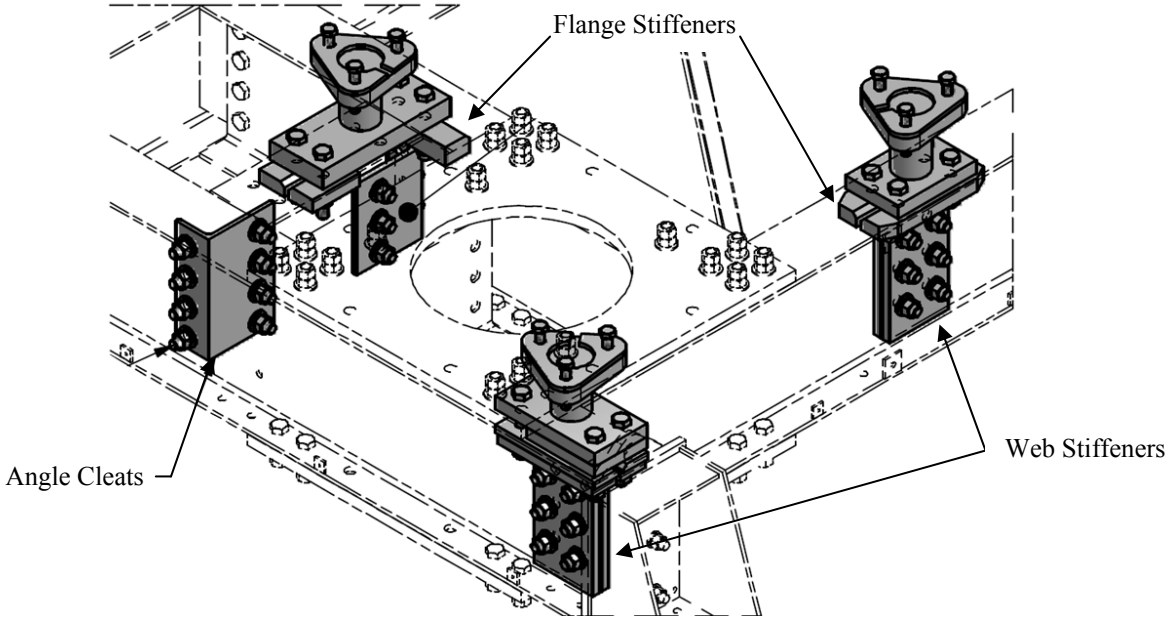


Figure 3: 3D View of Stub, Angle Cleat and Stiffener Layout

Replacement Platform Panels:

Platform panels that came with standard RDS grillage should be removed and discarded with replacement platform floor panels installed in their place as per NTPO drawing NTPO-SITE-SD-185 and figure 4.

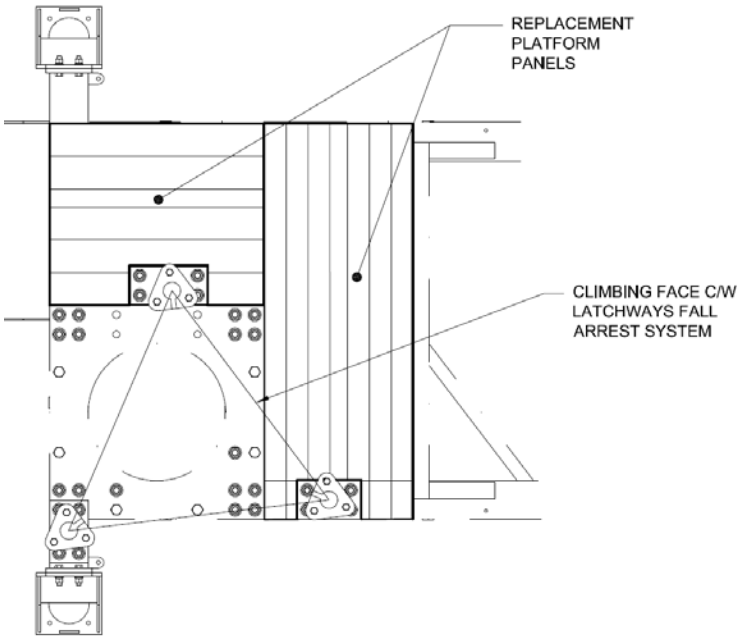
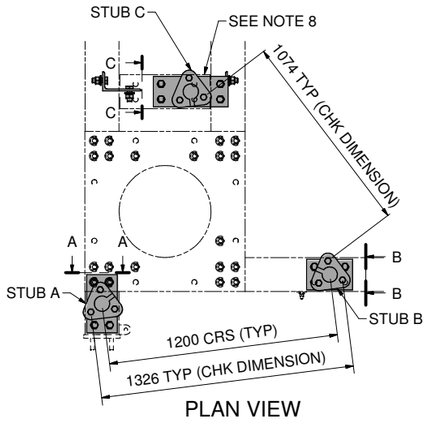
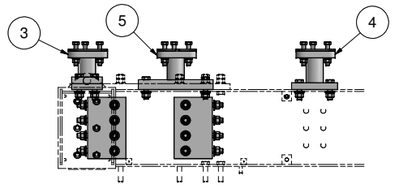


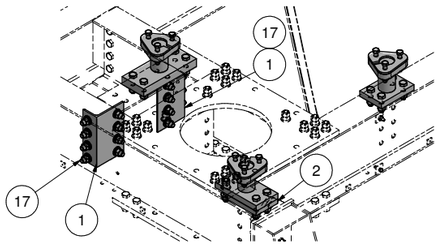
Figure 4: Plan View of Replacement Platform Panel Layout
(taken from NTPO drawing NTPO-SITE-SD-185)



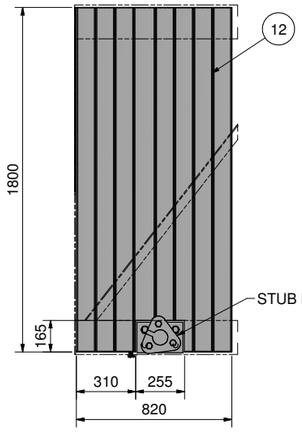
PLAN VIEW
(STUB & STIFFENER FIXING)



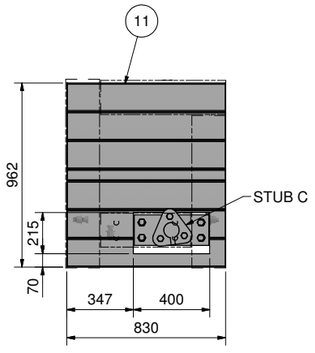
ELEVATION
(STUB & STIFFENER FIXING)



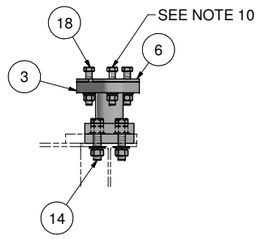
3D VIEW
(STUB & STIFFENER FIXING)



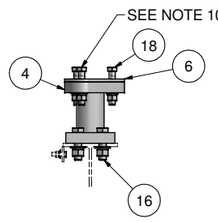
FLOORING DETAILS AT STUB B
(SHOWING CUT OUT DETAILS)
(SEE NOTES 5 & 6)



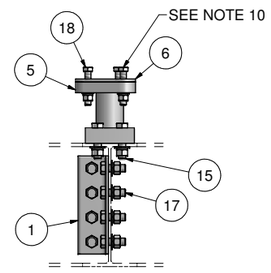
FLOORING DETAILS AT STUB C
(SHOWING CUT OUT DETAILS)
(SEE NOTES 5 & 6)



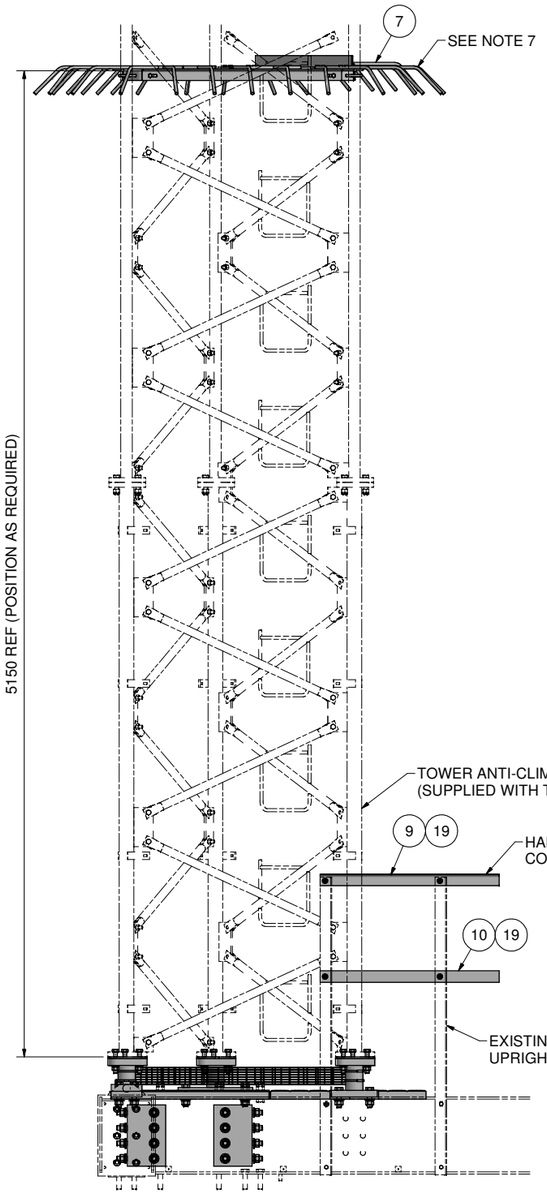
SECTION A-A
(STUB A)



SECTION B-B
(STUB B)



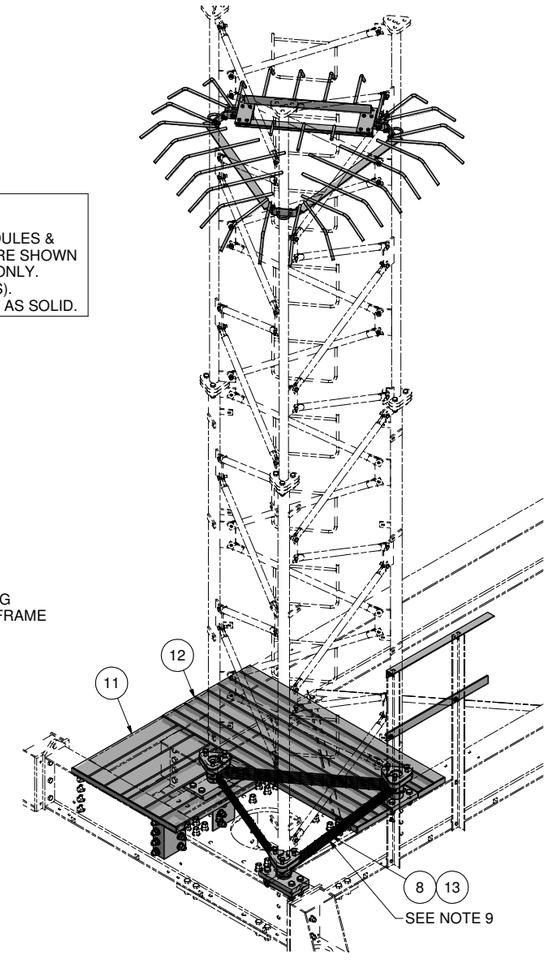
SECTION C-C
(STUB C)



SIDE ELEVATION
SHOWING HANDRAILS & ANTI-CLIMB

NOTE:

FRAME, TOWER MODULES &
HANDRAIL UPRIGHTS ARE SHOWN
FOR REFERENCE ONLY.
(DASHED LINES).
ALL NEW ITEMS SHOWN AS SOLID.



3D VIEW OF ADAPTOR ASSEMBLY

ADAPTOR KIT SO SUIT RDS 15m FLEXI & 10m SLP3 TOWER (ASSY No. RDS159)					
ITEM	Drg No.	PART No.	DESCRIPTION	Wt (kg)	QTY
1	4500-39	RDS39	LARGE CLEAT - 200x100x10 RSA	7.4	2
2	4500-101	RDS120	PACKER PLATE (30 THK)	8.0	1
3	4500-209	RDS156	SLP ADAPTOR STUB	26.3	1
4	4500-210	RDS157	SLP ADAPTOR STUB	25.0	1
5	4500-211	RDS158	SLP ADAPTOR STUB	38.7	1
6	3800-94	DF45	DRAINAGE FLANGE (10 THK)	1.7	3
7	3800-93	ACD242	ANTI-CLIMB ASSEMBLY (SLP3 - Ø60.3 CHS)	70.4	1
8	4500-123	ACP124	MESH PANEL	0.6	3
9	4500-111	HR1080	HANDRAIL (60x60x5 RSA)	4.5	1
10	4500-112	HR1081	KNEE RAIL (60x10 FLAT)	4.6	1
11	J35174-001	------	PcP FLOORING PANEL c/w FIXINGS	25.0	1
12	J35174-001	------	PcP FLOORING PANEL c/w FIXINGS	51.8	1
13	------	------	JUBILEE CLIP TO SUIT Ø95	0.1	6
14	------	------	M24x120 LG B-N-SP'W-FW	0.5	4
15	------	------	M24x100 LG B-N-SP'W-FW	0.5	4
16	------	------	M24x90 LG B-N-SP'W-FW	0.4	4
17	------	------	M24x65 LG B-N-SP'W-FW	0.4	16
18	------	------	M20x110 LG B-N-PAL NUT	0.3	9
19	------	------	M12x40 LG B-N-SP'W-FW	0.1	4
20	------	SPARES	M24x120 LG B-N-SP'W-FW	0.5	2
21	------	SPARES	M24x100 LG B-N-SP'W-FW	0.5	2
22	------	SPARES	M24x90 LG B-N-SP'W-FW	0.4	2
23	------	SPARES	M24x65 LG B-N-SP'W-FW	0.4	2
24	------	SPARES	M20x110 LG B-N-PAL NUT	0.3	2
25	------	SPARES	M12x40 LG B-N-SP'W-FW	0.1	2

DO NOT SCALE
IF IN DOUBT ASK

UNLESS OTHERWISE STATED>
MATERIAL>: GRADE 43 PER FLI FORM 11G
FINISH>: GALVANISED TO BS EN ISO 1461
DIMENSIONS>: MILLIMETRES (mm)
TOLERANCES>: AS PER FLI QA MANUAL
WELDING>: AS PER BOSS (5th EDITION)- ANNEX"B"

NOTES:-

1. ALL DRAWING NOTES ARE FOR GUIDANCE ONLY. FOR INSTALLATION INSTRUCTIONS REFER TO THE RELEVANT METHOD STATEMENT.

2. UNLESS OTHERWISE STATED TIGHTEN BOLTS UNTIL SPRING WASHER IS COMPLETELY FLAT THEN GIVE AN ADDITIONAL HALF TURN.

3. THIS ADAPTOR KIT IS ONLY SUITABLE FOR SLP3 MODULE TS664. FOR OTHER STRUCTURES SEEK ADVICE.

4. FINAL POSITION & ORIENTATION OF ALL STEELWORK IS TO BE DETERMINED BY CONTRACTOR ON SITE.

5. REPLACEMENT FLOORING PANELS ARE SUPPLIED WITH THIS ASSEMBLY. EXISTING PANELS ARE TO BE REMOVED & REPLACED WITH THOSE SUPPLIED. PANELS ARE TO BE FITTED PRIOR TO INSTALLING TOWER.
(SEE PCP DRAWING J33500-001 FOR PANEL O/ALL DETAILS)

6. REPLACEMENT PANELS ARE TO HAVE A GAP ALL AROUND STUB TO ALLOW EASE OF INSTALLATION.

7. ANTI-CLIMB IS TO FIT ON MODULE 3 (TS659) AS SHOWN.

8. RDS115 BEAM SUPPLIED WITH EXISTING FRAME IS TO BE REMOVED & REPOSITIONED AS SHOWN. (WEIGHT = 26.2 Kg)

9. MESH PANELS & JUBILEE CLIPS (ITEMS 8 & 13) ARE TO BE FITTED TO STUBS FOLLOWING COMPLETION OF ASSEMBLY (AVOIDING ALL BOLTS). ENSURE BARREL OF JUBILEE CLIPS ARE ON INSIDE OF TOWER & CRUSHED FOLLOWING INSTALLATION TO PREVENT UNAUTHORISED REMOVAL.

10. M20x110 LG BOLTS (ITEM 18) ARE SUPPLIED TO REPLACE BOLTS SUPPLIED WITH MODULE 4B (TS664) FOR FIXING OF TOWER TO STUBS.

ISSUE	DATE	MODIFICATION	DATE
A	31.01.13	FIRST ISSUE	AM

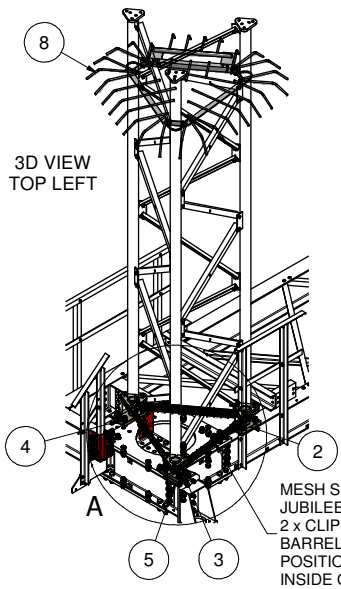
FLI structures
FRANCIS & LEWIS INTERNATIONAL LTD
TEL: +44 (0)1452 730300 WEB: www.fli.co.uk

DATE:	13/04/2010	SCALE:	NTS	FLI Ref:	N/A
DRAWN: AM		CHECK: SG		APP'D: RS	
CUSTOMER:	GSMR				
ORDER No.	N/A				
TITLE:	ADAPTOR KIT FOR RDS 15m FLEXI TO SUIT SLP3 10m TOWER (MODULE 4B - TS664)				

TOTAL WEIGHT 302.0 kg | DRG No. 4500-215 | ISS. A

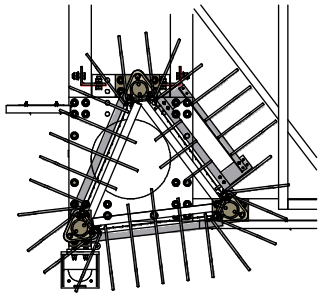
A1

SLP4 - MODULE 4 ADAPTOR KIT - RDS155					
ITEM	Drg No.	PART No.	DESCRIPTION	Wt (kg)	QTY
1	4500-130	RDS70	LARGE CLEAT - MAIN	13.0	2
2	4500-189	RDS152	STUB TYPE 1	35.7	1
3	4500-190	RDS153	STUB TYPE 2	33.8	1
4	4500-191	RDS154	STUB TYPE 3	39.5	1
5	4500-147	RDS148	PACKER PLT	9.2	1
6	4500-188	ACP123	MESH PANEL	0.7	3
7	4500-192	DF41	DRAINAGE FLANGE	2.7	3
8	4200-53	ACD236	ANTI-CLIMB ASSEMBLY	69.8	1
9	----------	----------	JUBILEE CLIP TO SUIT Ø95	0.0	6
10	----------	----------	M30x80 B-N-FW-SP'W	1.0	16
11	----------	----------	M30x100 B-N-FW-SP'W	1.2	20
12	----------	----------	M30x140 B-N-FW-SP'W	1.4	4
13	----------	----------	M24x110 B-N-PALNUT	0.7	9
14	J34837-001	----------	REPLACEMENT FLOORING	70.3	1
15	----------	SPARE	M30x80 B-N-FW-SP'W	1.0	2
16	----------	SPARE	M30x100 B-N-FW-SP'W	1.2	2
17	----------	SPARE	M30x140 B-N-FW-SP'W	1.4	2
18	----------	SPARE	M24x110 B-N-FW-PALNUT	0.7	2



3D VIEW
TOP LEFT

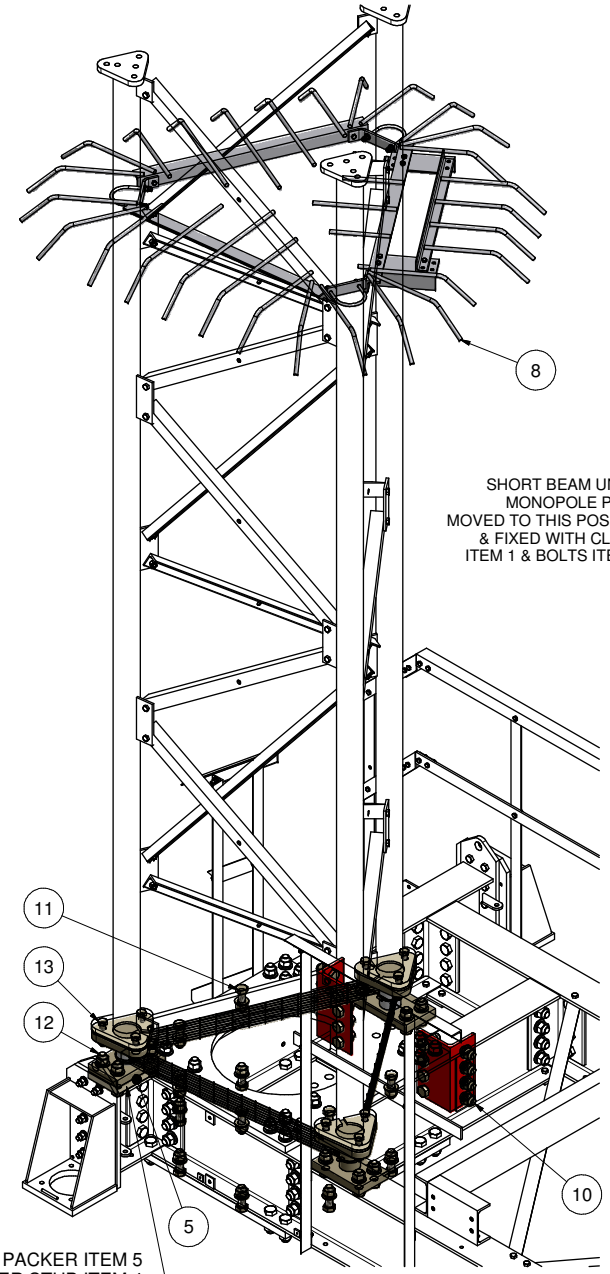
MESH SECURED WITH JUBILEE CLIPS PROVIDED 2 x CLIPS EACH END BARREL OF CLIPS TO BE POSITIONED ON THE INSIDE OF TOWER



PLAN VIEW

TOWER ANTI CLIMB MESH DOOR & LADDER REMOVED IN ALL VIEWS FOR CLARITY

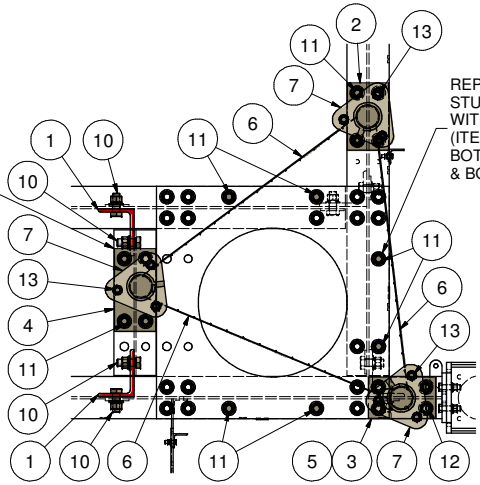
REPLACE FRONT FLOORING PANELS WITH THE NEW ONES SUPPLIED WITH CUT OUTS FOR THE STUB FEET



PACKER ITEM 5 UNDER STUB ITEM 4 THIS POSITION ONLY

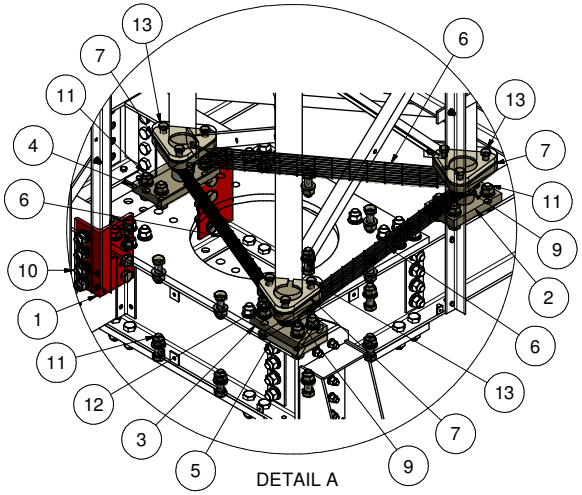
3D VIEW
TOP RIGHT

SHORT BEAM UNDER MONOPOLE PLATE MOVED TO THIS POSITION & FIXED WITH CLEATS ITEM 1 & BOLTS ITEM 10

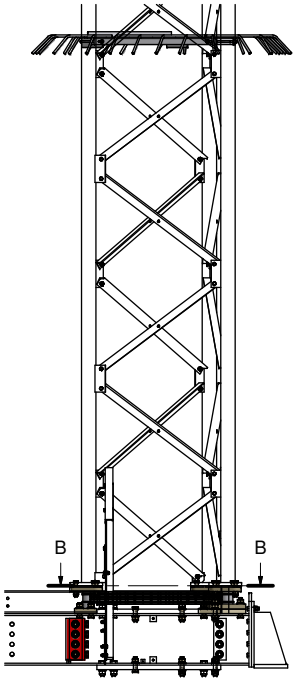


REPLACE STUDDING WITH BOLTS (ITEM 11) BOTH TOP & BOTTOM

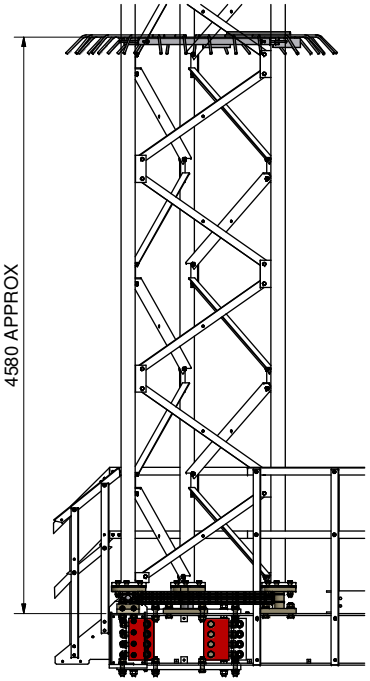
SECTION B-B
TOP VIEW OF STUBS
NOTE POSITION & ORIENTATION



DETAIL A



FRONT VIEW



SIDE VIEW

DO NOT SCALE
IF IN DOUBT ASK

UNLESS OTHERWISE STATED:-
MATERIAL:- GRADE AS PER FLI FORM 11G
FINISH:- GALVANISED TO BS EN ISO 1461
DIMENSIONS:- MILLIMETRES (mm)
TOLERANCES:- AS PER FLI QA MANUAL
WELD INSP:- AS PER NSSS (5th EDITION)- ANNEX 'B'

NOTES:-

1. ALL DRAWING NOTES ARE FOR GUIDANCE ONLY. FOR INSTALLATION INSTRUCTIONS REFER TO THE RELEVANT METHOD STATEMENT.

2. UNLESS OTHERWISE STATED TIGHTEN BOLTS UNTIL SPRING WASHER IS COMPLETELY FLAT THEN GIVE AN ADDITIONAL HALF TURN.

ISSUE	DATE	MODIFICATION	CHK'D
B	04-05-10	FLAT WASHER REMOVED FROM ITEM No. 13	BP
A	09/04/10	FIRST ISSUE	RC

FLI structures
FRANCIS & LEWIS INTERNATIONAL LTD
TEL: +44 (0)1452 726500 WEB: www.fli.co.uk

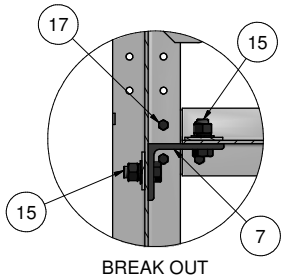
DATE:	30/03/2010	SCALE:	NTS	FLI Ref:	
DRWN/ ASSESSED	BD	DRG CHECK	RC	ENG. APP'D	DR

CUSTOMER: NETWORK RAIL
ORDER No.:

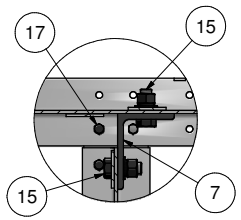
TITLE: INSTALLATION KIT RDS155 FOR SLP4 (MODULE 4) TO 20m FLEXI FRAME

TOTAL WEIGHT: 356.8 kg | DRG.No. 4500-193 | Rev. B

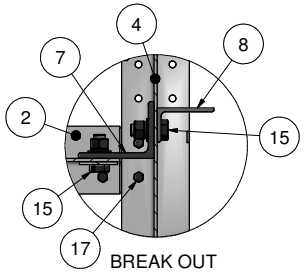
A2



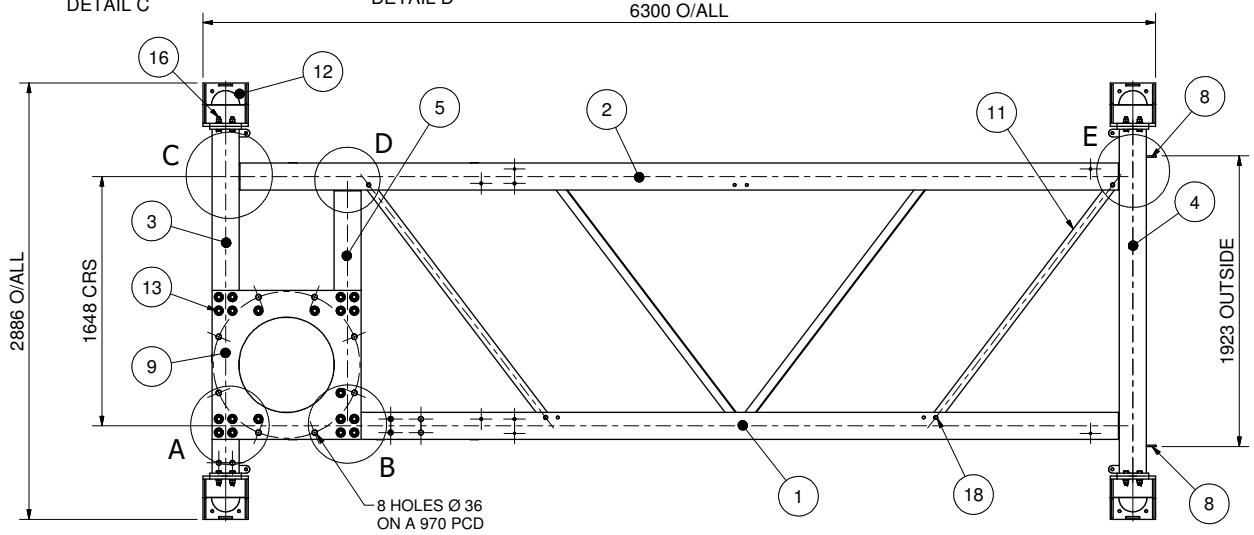
BREAK OUT
DETAIL C



BREAK OUT
DETAIL D

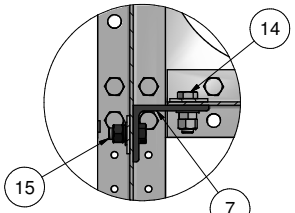


BREAK OUT
DETAIL E

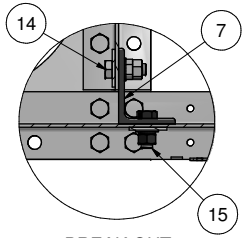


WORKSHOP ASSEMBLY OF 20m NARROW RDS FRAME - RDS83					
ITEM	Drg No.	PART No.	DESCRIPTION	Wt	QTY
1	4500-124	RDS64	BEAM 'A'	418.6 kg	1
2	4500-125	RDS65	BEAM 'B'	425.6 kg	1
3	4500-126	RDS66	BEAM 'C'	203.9 kg	1
4	4500-127	RDS67	BEAM 'D'	200.2 kg	1
5	4500-128	RDS68	BEAM 'E'	107.4 kg	1
6	4500-129	RDS69	BEAM 'F'	42.3 kg	1
7	4500-130	RDS70	LARGE CLEAT - MAIN	13.0 kg	6
8	4500-131	RDS71	LARGE CLEAT - REAR	6.6 kg	2
9	4500-132	RDS72	MONOPOLE PLATE	184.4 kg	2
10	4500-133	RDS73	CONNECTION PLATE	3.6 kg	4
11	4500-134	RDS74	LONG BRACE	9.6 kg	4
12	4500-135	RDS75	NARROW BOOT	50.8 kg	4
13	----------	----------	M30x100 B-HARDLOCK NUT-FW	1.4 kg	40
14	----------	----------	M30x90 B-HARDLOCK NUT-FW	1.3 kg	8
15	----------	----------	M30x80 B-N-FW-SP'W	1.1 kg	40
16	----------	----------	M20x80 B-N-FW-SP'W	0.4 kg	40
17	----------	----------	M16x60 B-N-FW-SP'W	0.1 kg	16
18	----------	----------	M16x50 B-N-FW-SP'W	0.1 kg	8

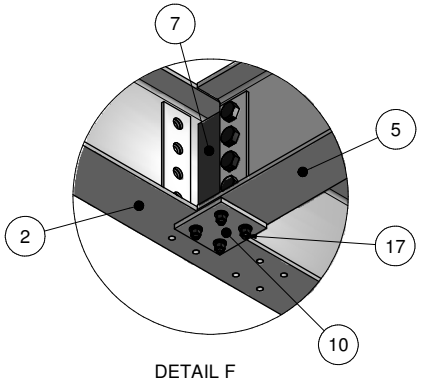
ALL BOLTED JOINTS TO HAVE ACCESS TO THE NUTS FROM THE OUTSIDE OF THE FRAME FOR MAINTAINANCE WHERE POSSIBLE, EXCEPT FOR THE BRACING WHICH ARE TO HAVE THE NUTS ON THE INSIDE OF THE FRAME.



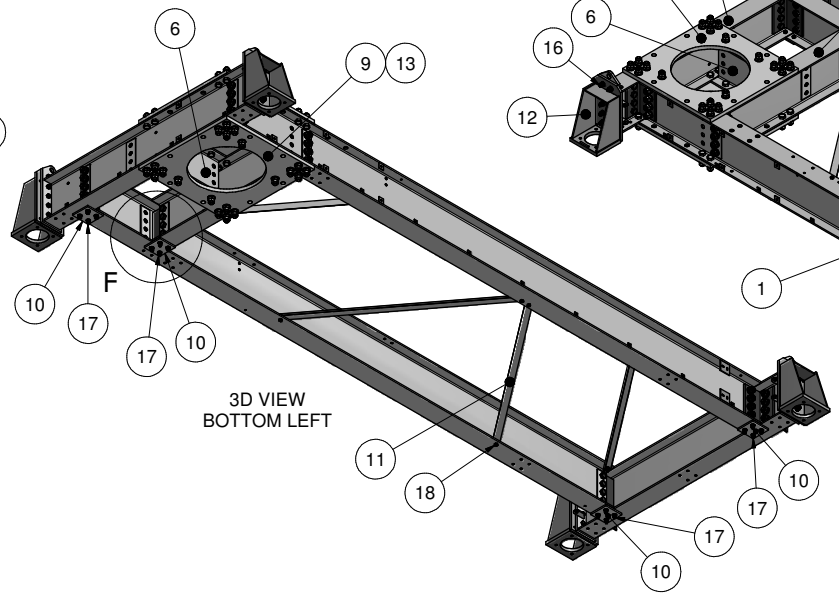
BREAK OUT
DETAIL A



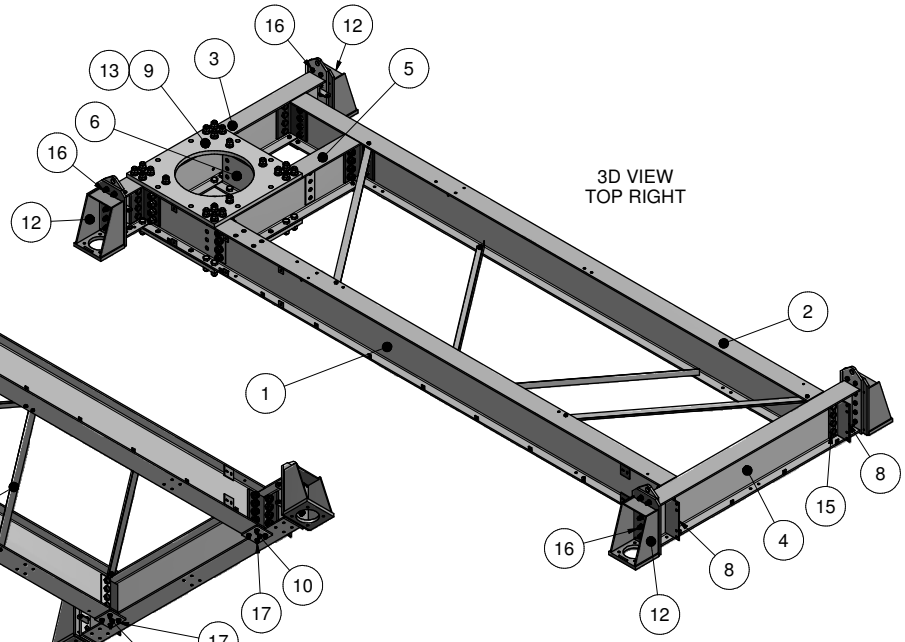
BREAK OUT
DETAIL B



DETAIL F



3D VIEW
BOTTOM LEFT



3D VIEW
TOP RIGHT

1. ALL DRAWING NOTES ARE FOR GUIDANCE ONLY. FOR INSTALLATION INSTRUCTIONS REFER TO THE RELEVANT METHOD STATEMENT.

2. UNLESS OTHERWISE STATED TIGHTEN BOLTS UNTIL SPRING WASHER IS COMPLETELY FLAT THEN GIVE AND ADDITIONAL HALF TURN.

3. ENSURE THAT M30 STUDDING RUNS FREELY THROUGH TOP AND BOTTOM MONOPOLE PLATES ONCE THE ASSEMBLY IS COMPLETED.

4. ENSURE THAT THE TOP FACE OF THE FRAME IS FLAT ACROSS ALL BEAM JOINTS AND THAT THE REAR PLATFORM BRACKETS (ITEM 8) ARE ALIGNED SQUARE TO THE TOP FACE TO THE OUTSIDE DIMENSION GIVEN.

5. FOR REFERENCE TO THE PARTS FITTED ON SITE i.e. REAR PLATFORM, HANDRAILS, FLOORING ETC., SEE RELEVANT SITE DRAWING.

6. THERE IS NO ALLOWANCE FOR SPARE BOLTS IN THE B.O.M. AS THIS PART OF THE FRAME IS DELIVERED TO SITE ASSEMBLIED. (USE SPARE BOLTS FROM FLI STOCK IF REQUIRED)

7. ALL HARDLOCK NUTS (ITEMS 13&14) ARE TO BE TIGHTENED AS PER FLI HARDLOCK TIGHTENING PROCEDURE (FLI 363)

DO NOT SCALE
IF IN DOUBT ASK

UNLESS OTHERWISE STATED:-
MATERIALS GRADE AS PER FLI FORM 11G
FINISH:- GALVANISED TO BS EN ISO 1461
DIMENSIONS:- MILLIMETRES (mm)
TOLERANCES:- AS PER FLI QA MANUAL
WELD INSP:- AS PER NSS (5th EDITION)- ANNEX 'B'

ISSUE	DATE	MODIFICATION	CHK'D
C	14-04-10	2 OFF BRACES REMOVED (ITEM No. 11)	AM
B	29/03/10	HARDLOCK NUTS ADDED (ITEMS 13 & 14)	B D
A	23/02/10	FIRST ISSUE	BD

FLI structures
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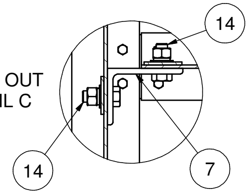
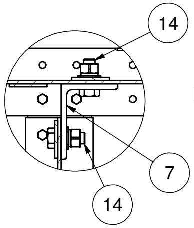
DATE:	23/02/2010	SCALE:	NTS	FLI Ref:	
DRAWN / MODELLED	BD	DRG CHECK	SG	ENG APP'D	DR
CUSTOMER	NETWORK RAIL				
ORDER No.					
TITLE	EX-WORKS ASSEMBLY FOR NARROW 20m RDS FLEXI FRAME - RDS83				
TOTAL GALV WEIGHT	2242.7 kg	DRG.No.	4500-143	Rev.	C

A2

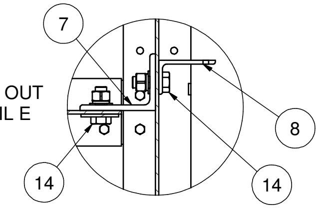
BREAK OUT DETAIL C

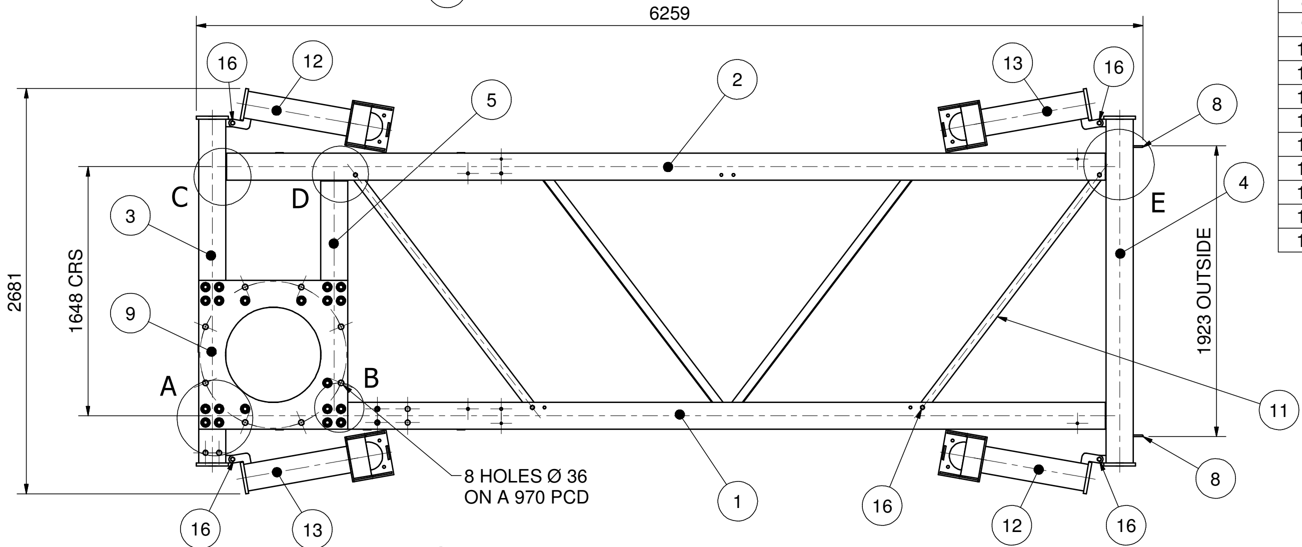


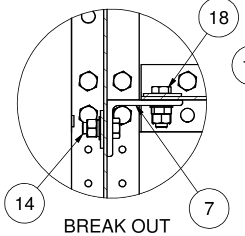


BREAK OUT DETAIL D

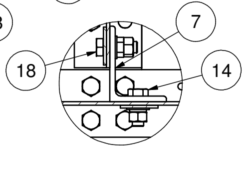
BREAK OUT DETAIL E



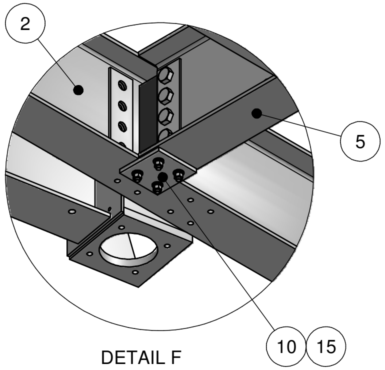




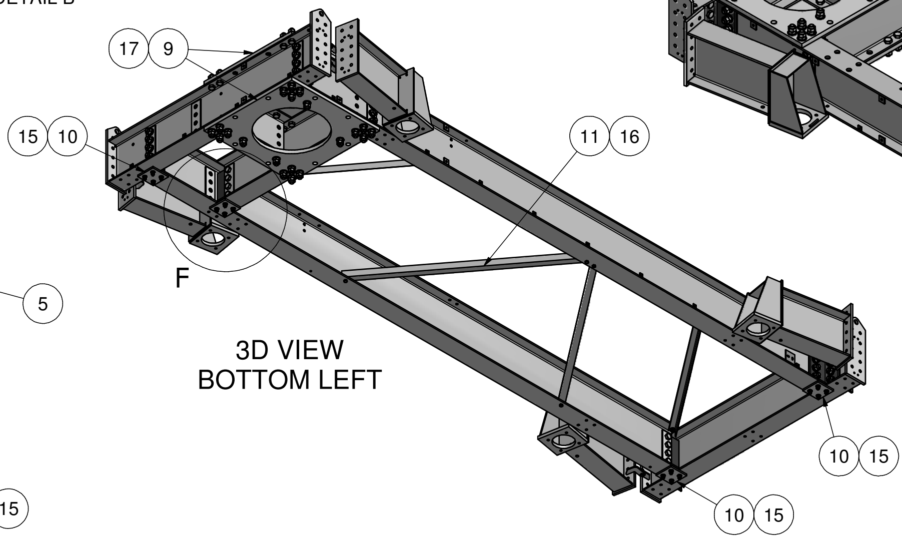
BREAK OUT DETAIL A



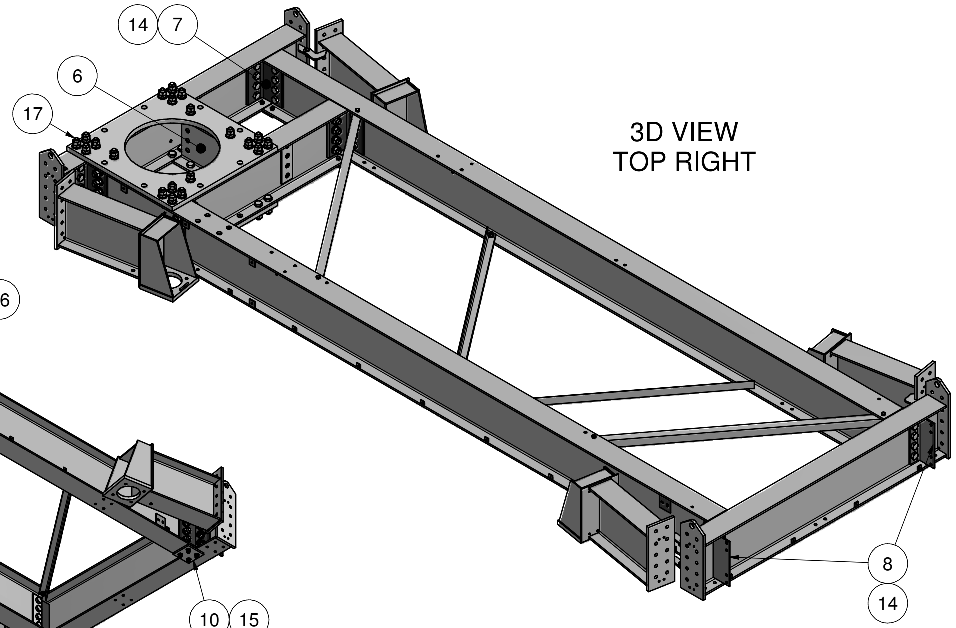
BREAK OUT DETAIL B



DETAIL F



3D VIEW
BOTTOM LEFT



3D VIEW
TOP RIGHT

WORKSHOP ASSEMBLY OF 20m STANDARD RDS FRAME - RDS82

ITEM	Drg No.	PART No.	DESCRIPTION	Wt	QTY
1	4500-124	RDS64	BEAM 'A'	418.6 kg	1
2	4500-125	RDS65	BEAM 'B'	425.6 kg	1
3	4500-126	RDS66	BEAM 'C'	203.9 kg	1
4	4500-127	RDS67	BEAM 'D'	200.2 kg	1
5	4500-128	RDS68	BEAM 'E'	107.4 kg	1
6	4500-129	RDS69	BEAM 'F'	42.3 kg	1
7	4500-130	RDS70	LARGE CLEAT - MAIN	13.0 kg	6
8	4500-131	RDS71	LARGE CLEAT - REAR	6.6 kg	2
9	4500-132	RDS72	MONOPOLE PLATE	184.4 kg	2
10	4500-133	RDS73	CONNECTION PLATE	3.6 kg	4
11	4500-134	RDS74	LONG BRACE	9.6 kg	4
12	4500-136	RDS76	STD BOOT - Rt Hd	107.3 kg	2
13	4500-137	RDS77	STD BOOT - Lt Hd	107.3 kg	2
14	----------	----------	M30x80 B-N-FW-SP'W	1.1 kg	40
15	----------	----------	M16x60 B-N-FW-SP'W	0.1 kg	16
16	----------	----------	M16x50 B-N-FW-SP'W	0.1 kg	16
17	----------	----------	M30x100 B-HARDLOCK NUT-FW	1.4 kg	40
18	----------	----------	M30x90 B-HARDLOCK NUT-FW	1.3 kg	8

ALL BOLTED JOINTS TO HAVE ACCESS TO THE NUTS FROM THE OUTSIDE OF THE FRAME FOR MAINTAINANCE WHERE POSSIBLE, EXCEPT FOR THE BRACING WHICH ARE TO HAVE THE NUTS ON THE INSIDE OF THE FRAME

DO NOT SCALE
IF IN DOUBT ASK

UNLESS OTHERWISE STATED:-
MATERIAL:- GRADE AS PER FLI FORM 11G
FINISH:- GALVANISED TO BS EN ISO 1461
DIMENSIONS:- MILLIMETRES (mm)
TOLERANCES:- AS PER FLI QA MANUAL
WELD INSP:- AS PER NSSS (5th EDITION)- ANNEX 'B'

NOTES:-

1. ALL DRAWING NOTES ARE FOR GUIDANCE ONLY. FOR INSTALLATION INSTRUCTIONS REFER TO THE RELEVANT METHOD STATEMENT.

2. UNLESS OTHERWISE STATED TIGHTEN BOLTS UNTIL SPRING WASHER IS COMPLETELY FLAT THEN GIVE AND ADDITIONAL HALF TURN.

3. ENSURE THAT M30 STUDDING RUNS FREELY THROUGH TOP AND BOTTOM MONOPOLE PLATE ONCE THE ASSEMBLY IS COMPLETED.

4. ENSURE THAT THE TOP FACE OF THE FRAME IS FLAT ACROSS ALL THE BEAM JOINTS AND THAT THE REAR PLATFORM BRACKETS (ITEM 8) ARE ALIGNED SQUARE TO THE TOP FACE TO THE OUTSIDE DIMENSION GIVEN.

5. FOR REFERENCE TO PARTS FITTED ON SITE i.e. REAR PLATFORM, HANDRAILS, FLOORING ETC., SEE RELEVANT SITE ASSEMBLY DRAWING.

6. THERE IS NO ALLOWANCE FOR SPARE BOLTS IN THE B.O.M. AS THIS PART OF THE FRAME WILL BE DELIVERED TO SITE ASSEMBLIED. (USE SPARE BOLTS FROM FLI STOCK IF REQUIRED)

7. HARDLOCK NUTS (ITEMS 17&18) ARE TO BE TIGHTENED AS PER FLI HARDLOCK TIGHTENING PROCEDURE (FLI 363)

ISSUE	DATE	MODIFICATION	CHK'D
B	14-04-10	2 OFF BRACES REMOVED (ITEM No. 11)	AM
A	29/01/10	FIRST ISSUE	SG

FLI structures
FRANCIS & LEWIS INTERNATIONAL LTD
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DATE: 28/01/2010	SCALE: NTS	FLI Ref:
DRAWN / MODELLED BD	DRG. CHECK SG	ENG. APP'D DR

CUSTOMER NETWORK RAIL

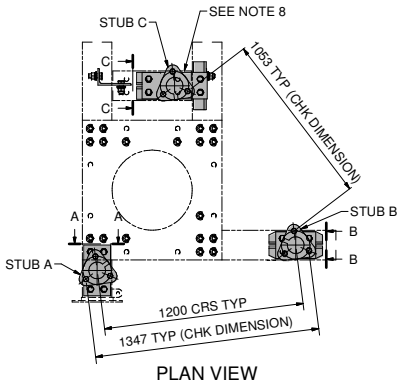
ORDER No.

TITLE EX-WORKS ASSEMBLY FOR STANDARD 20m RDS FLEXI FRAME -RDS82

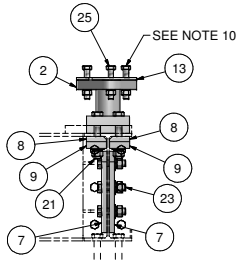
TOTAL WEIGHT 2454.6 kg

DRG.No. 4500-142 Rev. B

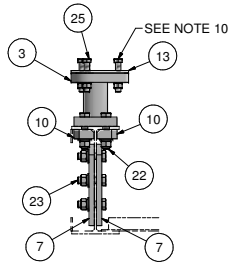
A2



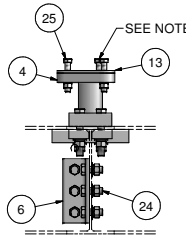
PLAN VIEW
(STUB & STIFFENER FIXING)



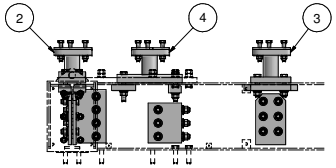
SECTION A-A
(STUB A)



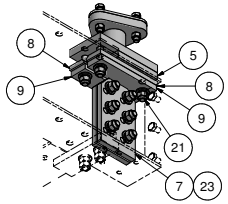
SECTION B-B
(STUB B)



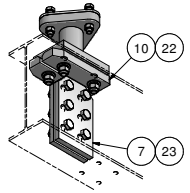
SECTION C-C
(STUB C)



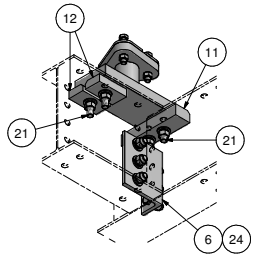
ELEVATION
(STUB & STIFFENER FIXING)



3D VIEW
(STUB A)



3D VIEW
(STUB B)



3D VIEW
(STUB C)

ADAPTOR KIT TO SUIT RDS 15m FLEXI & 15m SLP3 TOWER (ASSY No. RDS130)					
ITEM	Drg No.	PART No.	DESCRIPTION	Wt	QTY
1	4500-39	RDS39	LARGE CLEAT - 200x100x10 RSA	7.4 kg	1
2	4500-98	RDS117	SLP ADAPTOR STUB	27.9 kg	1
3	4500-99	RDS118	SLP ADAPTOR STUB	26.5 kg	1
4	4500-100	RDS119	SLP ADAPTOR STUB	40.2 kg	1
5	4500-101	RDS120	PACKER PLATE (30 THK)	8.0 kg	1
6	4500-103	RDS123	ANGLE CLEAT (200x100x15 RSA)	8.2 kg	1
7	4500-104	RDS124	WEB STIFFENER PLATE (305x180x20)	8.3 kg	4
8	4500-105	RDS125	FLANGE STIFFENER PLATE (304x75x20)	3.4 kg	2
9	4500-106	RDS126	FLANGE STIFFENER PLATE (290x75x25)	4.3 kg	2
10	4500-107	RDS127	FLANGE STIFFENER PLATE (320x75x35)	6.3 kg	2
11	4500-108	RDS128	FLANGE STIFFENER PLATE (288x75x50)	8.4 kg	1
12	4500-109	RDS129	FLANGE STIFFENER PLATE (144x75x35)	2.9 kg	2
13	3800-79	DF40	DRAINAGE FLANGE	1.9 kg	3
14	4500-111	HR1080	HANDRAIL (60x60x5 RSA)	4.5 kg	1
15	4500-112	HR1081	KNEE RAIL (60x10 FLAT)	4.6 kg	1
16	3800-84	ACD240	ANTI-CLIMB ASSEMBLY	70.5 kg	1
17	4500-123	ACP124	MESH PANEL	0.6 kg	3
18	J35174-001	------	PcP FLOORING PANEL c/w FIXINGS	25.0 kg	1
19	J35174-001	------	PcP FLOORING PANEL c/w FIXINGS	51.8 kg	1
20	------	------	JUBILEE CLIP TO SUIT Ø95	0.1 kg	6
21	------	------	M24x160 LG B-N-SP'W-FW	0.7 kg	8
22	------	------	M24x120 LG B-N-SP'W-FW	0.5 kg	4
23	------	------	M24x90 LG B-N-SP'W-FW	0.4 kg	12
24	------	------	M24x65 LG B-N-SP'W-FW	0.4 kg	14
25	------	------	M20x110 LG B-N-PAL NUT	0.3 kg	9
26	------	------	M12x40 LG B-N-SP'W-FW	0.1 kg	4
27	------	SPARES	M24x160 LG B-N-SP'W-FW	0.7 kg	2
28	------	SPARES	M24x120 LG B-N-SP'W-FW	0.5 kg	2
29	------	SPARES	M24x90 LG B-N-SP'W-FW	0.4 kg	2
30	------	SPARES	M24x65 LG B-N-SP'W-FW	0.4 kg	2
31	------	SPARES	M20x110 LG B-N-PAL NUT	0.3 kg	2
32	------	SPARES	M12x40 LG B-N-SP'W-FW	0.1 kg	2

DO NOT SCALE IF IN DOUBT ASK

UNLESS OTHERWISE STATED:-
MATERIAL:-GRADE AS PER FLI FORM 116
FINISH:-GALVANISED TO BS EN ISO 1461
DIMENSIONS:-MILLIMETRES (mm)
TOLERANCES:-AS PER FLI QA MANUAL
WELDING:-AS PER ISO 3834 EDITION:- ANNEX B

NOTES:

1. ALL DRAWING NOTES ARE FOR GUIDANCE ONLY. FOR INSTALLATION INSTRUCTIONS REFER TO THE RELEVANT METHOD STATEMENT.

2. UNLESS OTHERWISE STATED TIGHTEN BOLTS UNTIL SPRING WASHER IS COMPLETELY FLAT THEN GIVE AN ADDITIONAL HALF TURN.

3. THIS ADAPTOR KIT IS ONLY SUITABLE FOR SLP3 MODULE TS663. FOR OTHER STRUCTURES SEEK ADVICE.

4. FINAL POSITION & ORIENTATION OF ALL STEELWORK IS TO BE DETERMINED BY CONTRACTOR ON SITE.

5. REPLACEMENT FLOORING PANELS ARE SUPPLIED WITH THIS ASSEMBLY. EXISTING PANELS ARE TO BE REMOVED & REPLACED WITH THOSE SUPPLIED. PANELS ARE TO BE FITTED PRIOR TO INSTALLING TOWER. (SEE PCP DRAWING J33500-001 FOR PANEL O/ALL DETAILS)

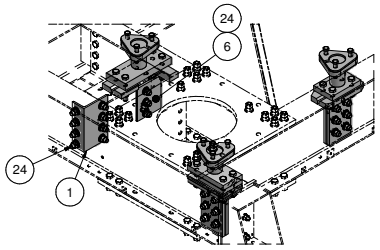
6. REPLACEMENT PANELS ARE TO HAVE A GAP ALL AROUND STUB TO ALLOW EASE OF INSTALLATION.

7. ANTI-CLIMB IS TO FIT ON MODULE 4 (TS658) AS SHOWN.

8. RDS115 BEAM SUPPLIED WITH EXISTING FRAME IS TO BE REMOVED & REPOSITIONED AS SHOWN. (WEIGHT = 26.2 Kg)

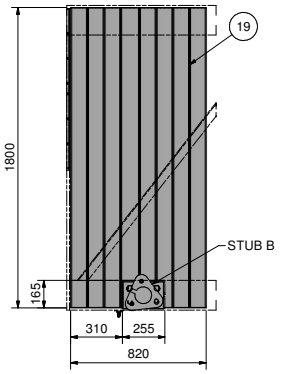
9. MESH PANELS & JUBILEE CLIPS (ITEMS 17 & 20) ARE TO BE FITTED TO STUBS FOLLOWING COMPLETION OF ASSEMBLY (AVOIDING ALL BOLTS). ENSURE BARREL OF JUBILEE CLIPS ARE ON INSIDE OF TOWER & CRUSHED FOLLOWING INSTALLATION TO PREVENT UNAUTHORISED REMOVAL.

10. M20x110 LG BOLTS (ITEM 25) ARE SUPPLIED TO REPLACE BOLTS SUPPLIED WITH MODULE 5B (TS663) FOR FIXING OF TOWER TO STUBS.

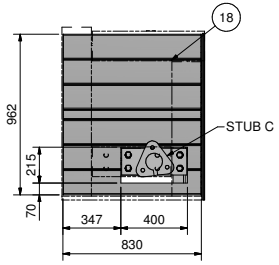


3D VIEW
(STUB & STIFFENER FIXING)

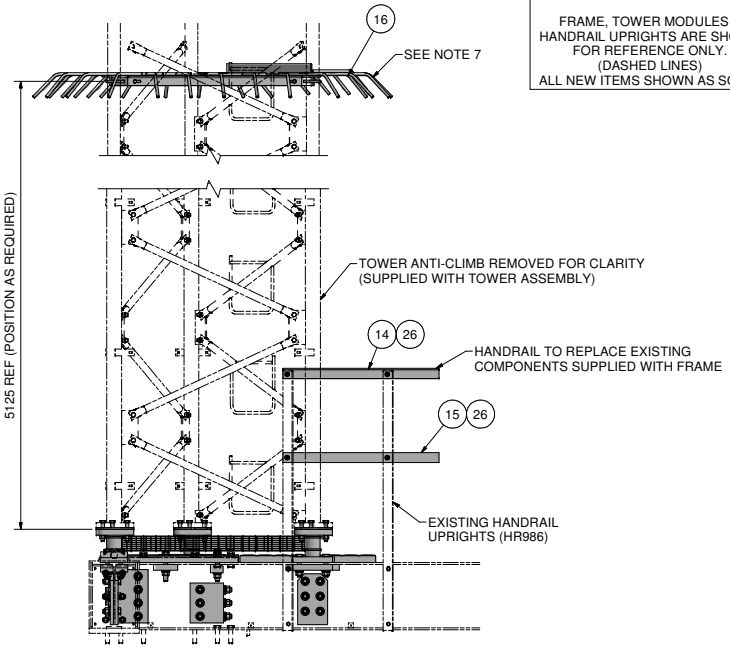
NOTE:
THIS ASSEMBLY IS ONLY TO BE USED IF A SITE SPECIFIC FORM B HAS BEEN APPROVED.



FLOORING DETAILS AT STUB B
(SHOWING CUT OUT DETAILS)
(SEE NOTES 5 & 6)



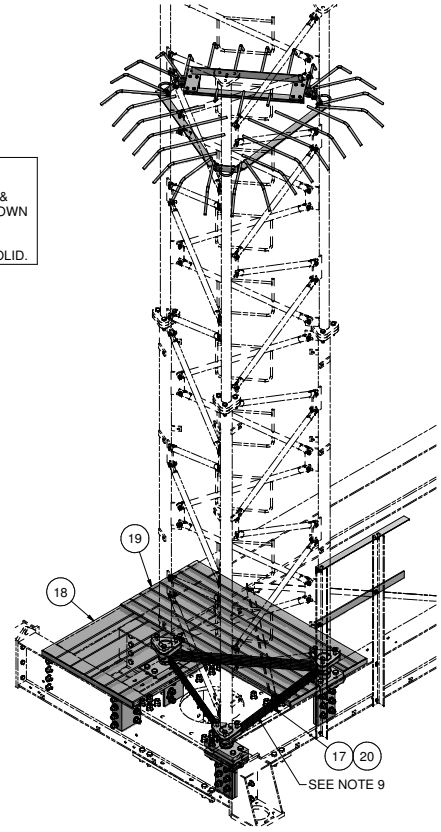
FLOORING DETAILS AT STUB C
(SHOWING CUT OUT DETAILS)
(SEE NOTES 5 & 6)



SIDE ELEVATION
SHOWING HANDRAILS & ANTI-CLIMB

NOTE:

FRAME, TOWER MODULES & HANDRAIL UPRIGHTS ARE SHOWN FOR REFERENCE ONLY. (DASHED LINES) ALL NEW ITEMS SHOWN AS SOLID.



3D VIEW OF ADAPTOR ASSEMBLY

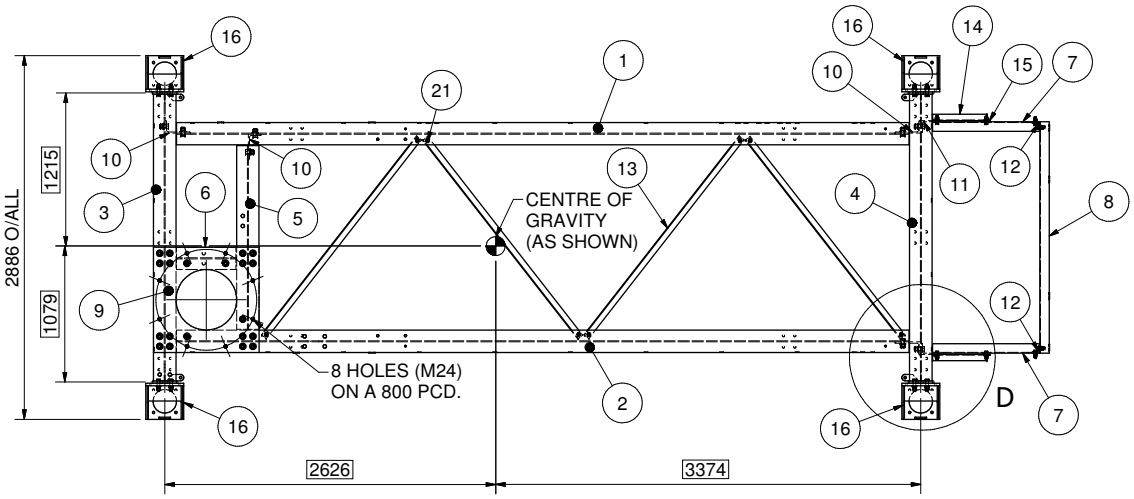
FLI structures
FRANCIS ALLEMBI INTERNATIONAL LTD
TEL: +44 (0)1455 556566 WEB: www.fli.co.uk

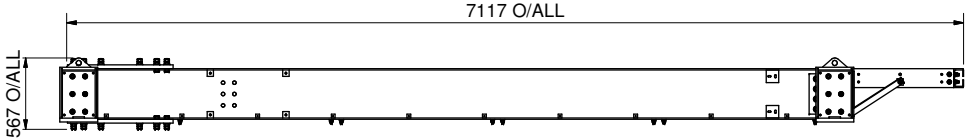
DATE: 22/02/2016	SCALE: NTS	Fix Ref: N/A	
DRAWN: AM	CHKD: SG	APPD: RS	
CUSTOMER: GSMR			
ORDER No.: N/A			

TITLE: ADAPTOR KIT FOR RDS 15m FLEXI TO SUIT SLP3 15m TOWER (MODULE 5B - TS663)

TOTAL WEIGHT: 392.2 kg | DRG No.: 4500-110 | A

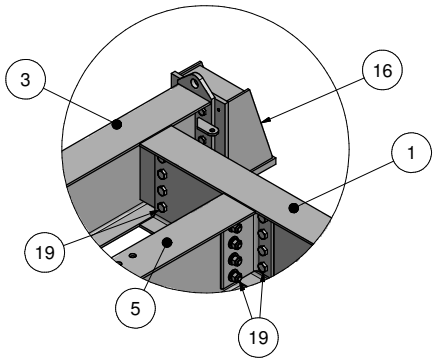
A1



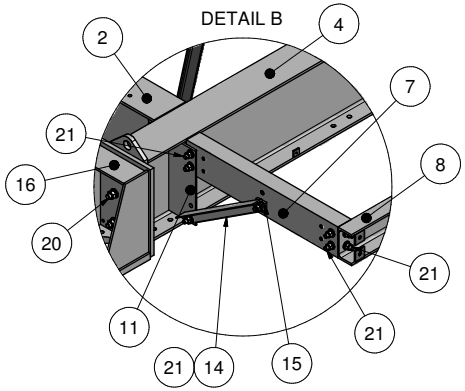


RDS FLEXI NARROW 800 PCD FRAME - WORKSHOP ASSEMBLY - RDS110					
ITEM	Drg No.	PART No.	DESCRIPTION	Wt	QTY
1	4500/29	RDS29	BEAM "A" - Lt. Hd. SIDE	338.3 kg	1
2	4500-92	RDS111	BEAM "B" - Rt. Hd. SIDE	333.7 kg	1
3	4500-93	RDS112	BEAM "C" - FRONT	159.0 kg	1
4	4500-94	RDS113	BEAM "D" - REAR	160.5 kg	1
5	4500-95	RDS114	BEAM "E" - CROSS BRACE	82.6 kg	1
6	4500-96	RDS115	BEAM "F" - SHORT	26.2 kg	1
7	4500/35	RDS35	PFC 'G' - 150x75x18 PFC	16.0 kg	2
8	4500/36	RDS36	PFC "H" - 150x75x18 PFC	35.6 kg	1
9	4500/42	RDS42	MONOPOLE PLATE - 30mm PLATE	125.7 kg	2
10	4500-39	RDS39	LARGE CLEAT - 200x100x10 RSA	7.4 kg	4
11	4500/40	RDS40	REAR CLEAT - 150x90x10 RSA	6.7 kg	2
12	4500/41	RDS41	SMALL CLEAT - 60x60x8 RSA	0.7 kg	2
13	4500/37	RDS37	LONG BRACE - 50x50x5 RSA	8.0 kg	4
14	4500/38	RDS38	SHORT BRACE - 50x50x5 RSA	2.0 kg	2
15	4500/43	RDS43	SPACER - 50x10 FLAT	0.2 kg	2
16	4500-04	RDS4	RDS NARROW PILE BOOT	48.9 kg	4
17	------	------	M24x90 LG B-H/LOCK NUT-FW	0.4 kg	40
18	------	------	M24x65 LG B-N-SP'W-FW	0.4 kg	8
19	------	------	M24x55 LG B-N-SP'W-FW	0.3 kg	24
20	------	------	M20x80 LG B-N-SP'W-FW	0.3 kg	24
21	------	------	M16x50 LG B-N-SP'W-FW	0.1 kg	24

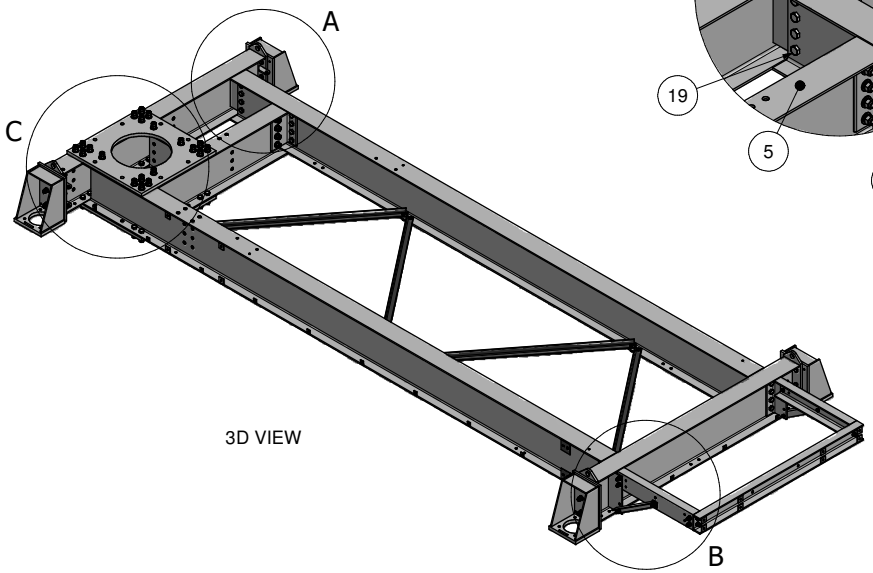
DETAIL A



DETAIL B

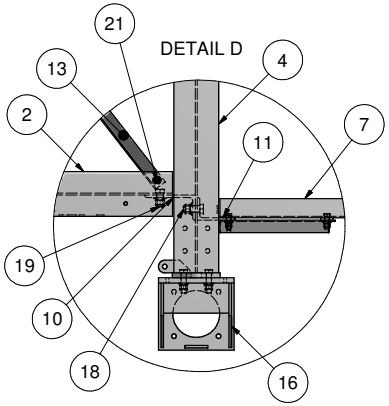


NOTE:
ALL BOLTS TO BE POSITIONED WITH THE NUTS ON THE OUTSIDE OF THE FRAME.

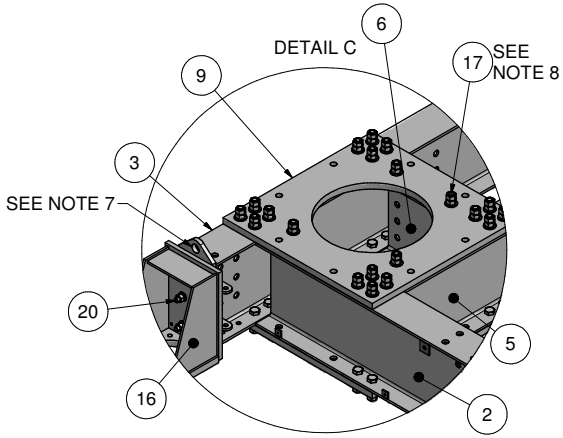


3D VIEW

DETAIL D



DETAIL C



DO NOT SCALE
IF IN DOUBT ASK

UNLESS OTHERWISE STATED:-
MATERIALS:-GRADE AS PER FLI FORM 11G
FINISH:- GALVANISED TO BS EN ISO 1461
DIMENTIONS:- MILLIMETRES (mm)
TOLERANCES:- AS PER FLI QA MANUAL
WELDING:- AS PER NSS (5th EDITION)- ANNEX 'B'

NOTES:-

1. ALL DRAWING NOTES ARE FOR GUIDANCE ONLY. FOR INSTALLATION INSTRUCTIONS REFER TO THE RELEVANT METHOD STATEMENT.

2. UNLESS OTHERWISE STATED TIGHTEN BOLTS UNTIL SPRING WASHER IS COMPLETELY FLAT THEN GIVEN AN ADDITIONAL HALF TURN.

3. ENSURE M24 MONOPOLE STUDDING RUNS FREELY THROUGH TOP PLATE, FRAME AND BOTTOM PLATE ONCE THE ASSEMBLY IS COMPLETE.

4. ENSURE THAT THE TOP FACE OF THE FRAME IS FLAT ACROSS ALL JOINTS AND THE REAR PLATFORM IS LEVEL WITH THE MAIN FRAME ONCE ASSEMBLY IS COMPLETE.

5. FOR REFERENCE TO PARTS FITTED ON SITE, i.e. HANDRAILS, FLOORING etc. SEE RELEVANT SITE ASSEMBLY DRAWING.

6. THERE IS NO ALLOWANCE FOR SPARE BOLTS IN THE B.O.M. AS THE FRAME WILL BE DELIVERED TO SITE ASSEMBLED. (USE SPARE BOLTS FROM FLI STOCK IF REQUIRED)

7. LIFTING HOLES ARE PROVIDED IN 4 POSITIONS ON ASSEMBLY (Ø40). ALL CENTRE OF GRAVITY DIMENSIONS ARE TO THE CENTRE OF THESE LIFTING POINTS.

8. HARD LOCK NUTS (ITEM No. 17) ARE TO BE TIGHTENED AS PER FLI HARD LOCK TIGHTENING PROCEDURE (TO BE FOUND IN FLI 363).

ISSUE	DATE	MODIFICATION	CHK'D
A	26/01/10	FIRST ISSUE	AM

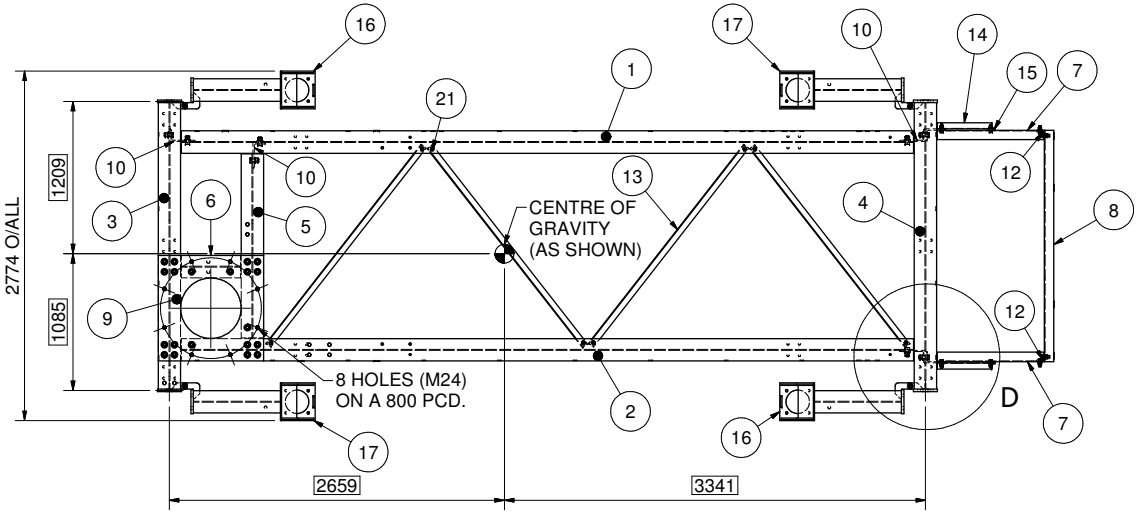
FLI structures
FRANCIS & LEWIS INTERNATIONAL LTD
TEL: +44 (0)1452 720200 WEB: www.fli.co.uk

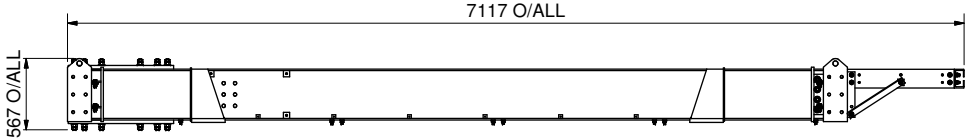
DATE: 26/01/2010	SCALE: NTS	FLI Ref:	
DRAWN / MODELLED: AM	DRG. CHECK: SG	ENG. APP'D: RS	
CUSTOMER: GSMR			
ORDER No.: N/A			

TITLE: EX-WORKS ASSEMBLY DETAILS FOR RDS NARROW FLEXI FRAME- RDS110

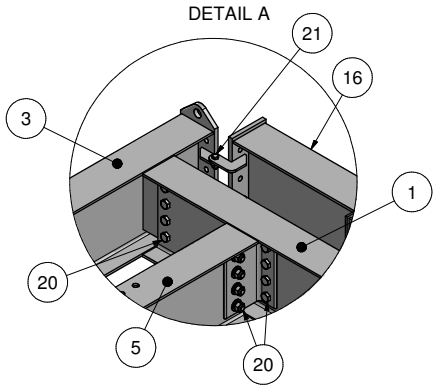
TOTAL WEIGHT	1755.4 kg	DRG.No.	4500-91	Rev.	A

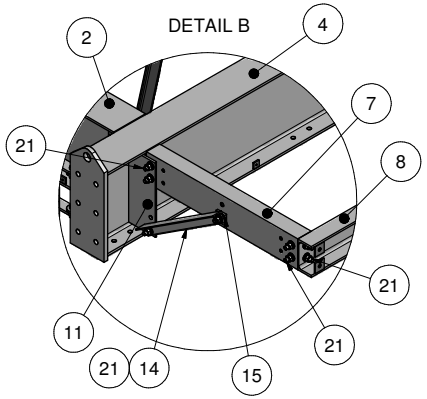
A2



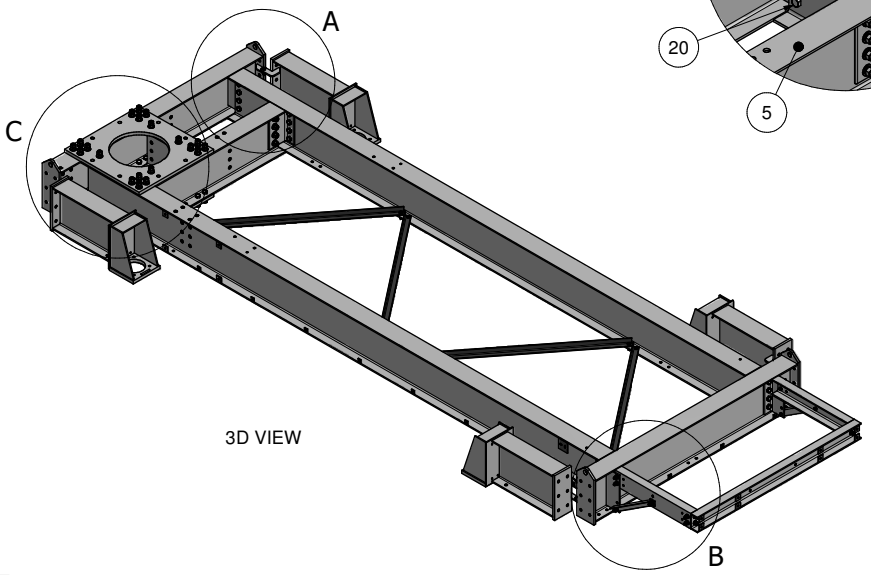


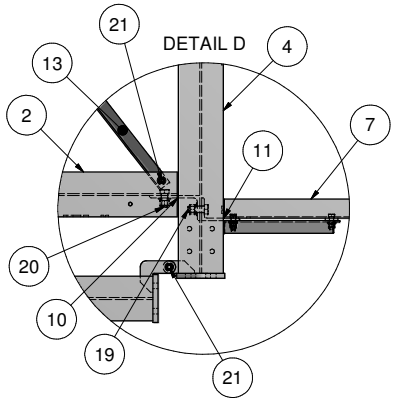
RDS FLEXI STANDARD 800 PCD FRAME - WORKSHOP ASSEMBLY - RDS109					
ITEM	Drg No.	PART No.	DESCRIPTION	Wt	QTY
1	4500/29	RDS29	BEAM "A" - Lt. Hd. SIDE	338.3 kg	1
2	4500-92	RDS111	BEAM "B" - Rt. Hd. SIDE	333.7 kg	1
3	4500-93	RDS112	BEAM "C" - FRONT	159.0 kg	1
4	4500-94	RDS113	BEAM "D" - REAR	160.5 kg	1
5	4500-95	RDS114	BEAM "E" - CROSS BRACE	82.6 kg	1
6	4500-96	RDS115	BEAM "F" - SHORT	26.2 kg	1
7	4500/35	RDS35	PFC 'G' - 150x75x18 PFC	16.0 kg	2
8	4500/36	RDS36	PFC "H" - 150x75x18 PFC	35.6 kg	1
9	4500/42	RDS42	MONOPOLE PLATE - 30mm PLATE	125.7 kg	2
10	4500-39	RDS39	LARGE CLEAT - 200x100x10 RSA	7.4 kg	4
11	4500/40	RDS40	REAR CLEAT - 150x90x10 RSA	6.7 kg	2
12	4500/41	RDS41	SMALL CLEAT - 60x60x8 RSA	0.7 kg	2
13	4500/37	RDS37	LONG BRACE - 50x50x5 RSA	8.0 kg	4
14	4500/38	RDS38	SHORT BRACE - 50x50x5 RSA	2.0 kg	2
15	4500/43	RDS43	SPACER - 50x10 FLAT	0.2 kg	2
16	4500/12	RDS12	RDS FRAME BEAM "J" - Rt. Hd.	93.2 kg	2
17	4500/12	RDS13	RDS FRAME BEAM "J" - Lt. Hd.	93.2 kg	2
18	------	------	M24x90 LG B-H/LOCK NUT-FW	0.4 kg	40
19	------	------	M24x65 LG B-N-SP'W-FW	0.4 kg	8
20	------	------	M24x55 LG B-N-SP'W-FW	0.3 kg	24
21	------	------	M16x50 LG B-N-SP'W-FW	0.1 kg	32

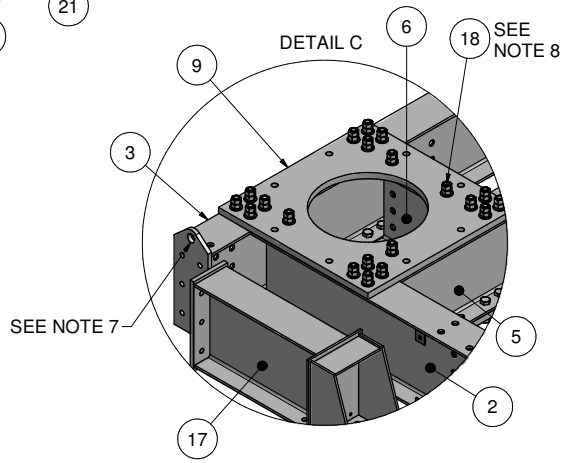




NOTE:
ALL BOLTS TO BE POSITIONED WITH THE NUTS ON THE OUTSIDE OF THE FRAME.







DO NOT SCALE
IF IN DOUBT ASK

UNLESS OTHERWISE STATED:-
MATERIALS:- GRADE AS PER FLI FORM 11G
FINISH:- GALVANISED TO BS EN ISO 1461
DIMENSIONS:- MILLIMETRES (mm)
TOLERANCES:- AS PER FLI QA MANUAL
WELDING:- AS PER NSS5 (5th EDITION)- ANNEX 'B'

NOTES:-

1. ALL DRAWING NOTES ARE FOR GUIDANCE ONLY. FOR INSTALLATION INSTRUCTIONS REFER TO THE RELEVANT METHOD STATEMENT.

2. UNLESS OTHERWISE STATED TIGHTEN BOLTS UNTIL SPRING WASHER IS COMPLETELY FLAT THEN GIVEN AN ADDITIONAL HALF TURN.

3. ENSURE M24 MONOPOLE STUDDING RUNS FREELY THROUGH TOP PLATE, FRAME AND BOTTOM PLATE ONCE THE ASSEMBLY IS COMPLETE.

4. ENSURE THAT THE TOP FACE OF THE FRAME IS FLAT ACROSS ALL JOINTS AND THE REAR PLATFORM IS LEVEL WITH THE MAIN FRAME ONCE ASSEMBLY IS COMPLETE.

5. FOR REFERENCE TO PARTS FITTED ON SITE, i.e. HANDRAILS, FLOORING etc. SEE RELEVANT SITE ASSEMBLY DRAWING.

6. THERE IS NO ALLOWANCE FOR SPARE BOLTS IN THE B.O.M. AS THE FRAME WILL BE DELIVERED TO SITE ASSEMBLED. (USE SPARE BOLTS FROM FLI STOCK IF REQUIRED).

7. LIFTING HOLES ARE PROVIDED IN 4 POSITIONS ON ASSEMBLY (Ø40). ALL CENTRE OF GRAVITY DIMENSIONS ARE TO THE CENTRE OF THESE LIFTING POINTS.

8. HARD LOCK NUTS (ITEM No. 18) ARE TO BE TIGHTENED AS PER FLI HARD LOCK TIGHTENING PROCEDURE (TO BE FOUND IN FLI 363).

ISSUE	DATE	MODIFICATION	CHK'D
A	25/01/10	FIRST ISSUE	AM

FLI structures
FRANCIS & LEWIS INTERNATIONAL LTD
TEL: +44 (0) 1452 720200 WEB: www.fli.co.uk

DATE:	25/01/2010	SCALE:	NTS	FLI Ref:	
DRAWN / MODELLED	AM	DRG. CHECK	SG	ENG. APP'D	RS
CUSTOMER	GSMR				
ORDER No.	N/A				

TITLE: EX-WORKS ASSEMBLY DETAILS FOR RDS STD FLEXI FRAME- RDS109

TOTAL WEIGHT	1924.8 kg	DRG.No.	4500-90	Rev.	A

A2

Appendix G:

Installation Guidance for Extended Frame to Suit 7.3m REB Cabin on RDS 15m Flexi grillages

Francis & Lewis International Ltd : Waterwells Drive, Waterwells Business Park, Gloucester, GL2 2AA, England
Tel: +44 (0)1452 722200 Fax: +44 (0)1452 722244 E-mail: postmaster@fli.co.uk Web: www.fli.co.uk

Installation Guidance

for Extended Frame to Suit 7.3m REB Cabin on RDS

15m Flexi grillages

Doc Nr: GN/RDS/EXTENDED-REB

Issue: 01

Date: May 2010

Prepared by: Richard Steel

Reviewed and Approved by:

General

The extension steelwork is used to facilitate the mounting of an extended 7.3m REB Cabin onto a RDS 15m Flexi Grillage. The kit contains additional main frame beams, a boot beam, pile boots, bracing, connection cleats and all necessary nuts, bolts and washers. These additional parts shall be assembled as detailed below and in accordance with the NTPO and FLI assembly drawings listed in the below relevant drawing tables.

Relevant NTPO Drawings

NTPO Drg No.	FLI Drg No.	Description
		Extended REB
NTPO-SITE-SD-		

Refer to Network Rail to confirm latest revision status.

Relevant FLI Assembly Drawings

FLI Drg No.	Description
	Extended REB
4500-266	Frame Extension Steelwork to Suit RDS109
4500-267	Frame Extension Steelwork to Suit RDS110
4500-88	Assembly Details For RDS STD Lean Extended Frame – RDS62

Refer to FLI to confirm latest revision status.

Extension Steelwork Lifting and Installation

1. This guidance covers extension steelwork installed by using a crane, hiab, RRV or other similar plant.
2. The team leader shall check off all parts against the packing list supplied. Any anomalies will be noted and reported to the FLI's project manager immediately.
3. The extension steelwork will generally arrive in several pieces for site assembly.
4. Any chips to the galvanised finish of the steelwork should be touched up with 2 coats of zinc rich epoxy primer after feathering the edges and cleaning the area with a wire brush, thinners, clean water and rag. Finally the area should be sprayed with a zinc sheen paint, such as 'Metatec' or similar.
5. The extension steelwork shall be assembled in the sequence described below:

- Remove the fixings from the angle cleats (RDS39) connecting the boot beam to the main grillage beams, as shown in figure 1. Be sure to only remove the fixings shown.

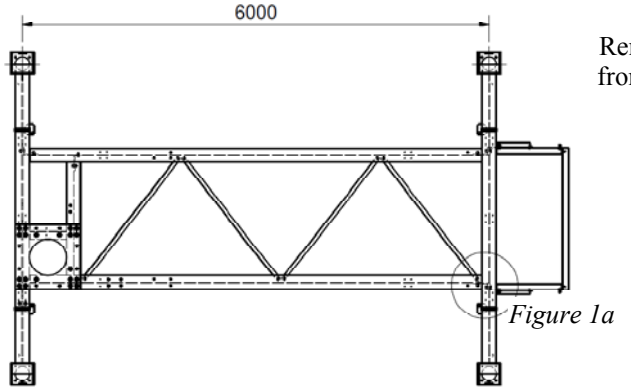


Figure 1: Existing frame as assembled

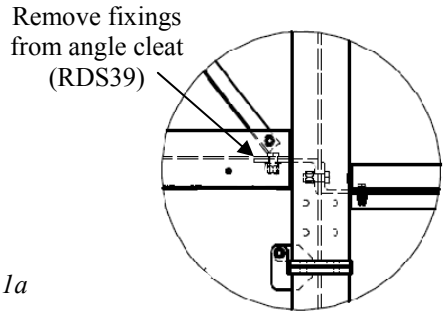


Figure 1a: Fixing removal detail

- Secure the lifting slings to the lifting lugs on the separated boot beam and position as shown in figure 2.

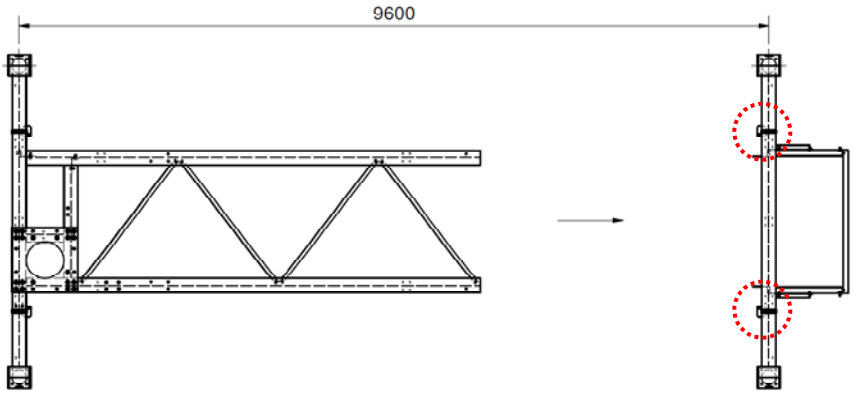


Figure 2: Break details of existing frame, with lifting lugs circled

- Once the broken up parts of the existing frame are correctly repositioned, secure lifting slings around the bundle of additional extension parts, and off load adjacent to the core module.
- Fully assemble the extension steelwork, the main beams and boots should be assembled first, followed by the bracing, as shown in figure 4 and detailed in the NTPO & FLI drawings stated in the above relevant drawing list.

- Torque settings for tightening standard nuts and bolts are not given. Nuts are to be tightened with a standard podger spanner until the nut can be tightened no further. All bolts to be positioned with the nuts on the outside of the frame.

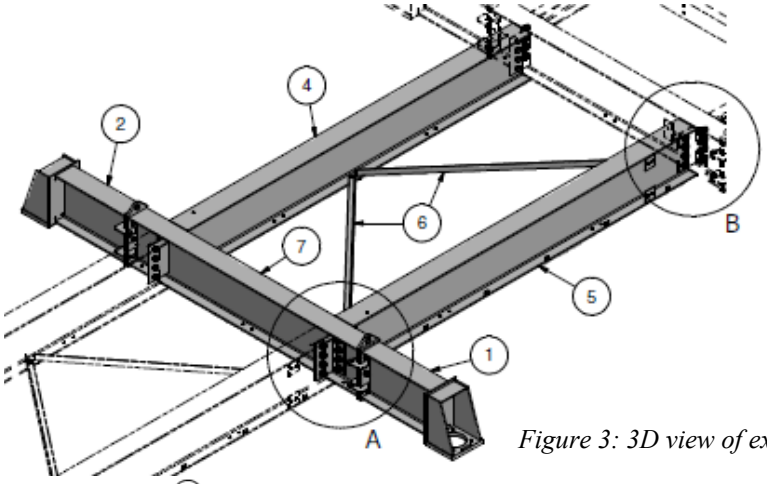
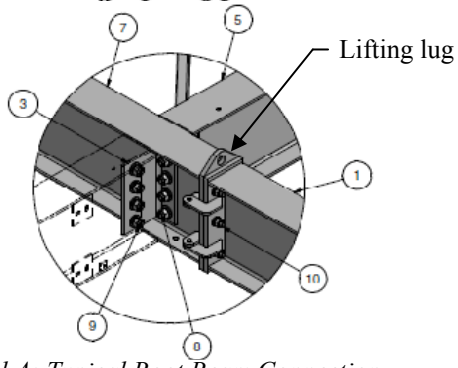
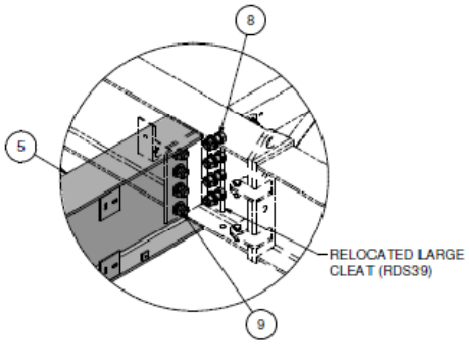


Figure 3: 3D view of extension steelwork



Detail A: Typical Boot Beam Connection



Detail B: Typical Beam Connection

- Secure the lifting slings to the lifting lugs shown in Figure 4.
- Lift the fully assembled frame into position and land on pile caps. Once the grillage is resting on the pile caps, fit the top nuts and washers to secure grillage boots to pile studding.
- Use spirit level to check that grillage is levelled and that all boots are in contact with the pile caps. Any anomalies must be noted and reported to the FLI's project manager immediately.
- Wait a minimum period of one hour from the intial bolt tightening before fitting the PAL nuts. The standard nut on each assembly should first be checked for tightness, tightening if necessary. Fit the PAL nut onto the assembly and tighten using an open-ended spanner,

until tight plus one half turn. One half turn of the PAL nut is best confirmed by match marking the nut and PAL nut on opposite faces and tightening until the lines are coincident.

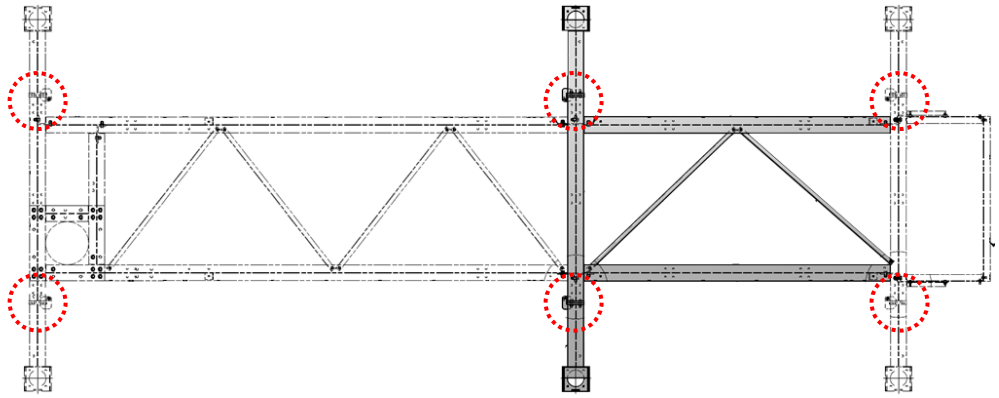
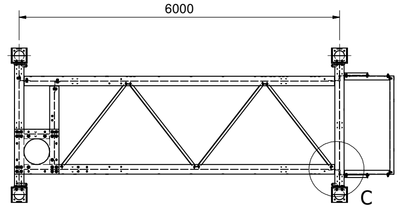


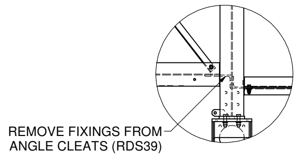
Figure 4: Plan view of extended REB grillage, with lifting lugs circled.

6. Installation of ancillary elements (hand railing and floor panels) should be carried out in accordance with the relevant assembly drawing.
7. The site will then be cleaned and tidied prior to installation team leaving the site. Any damage to this or adjacent sites will be reported by the installation team leader to the project manager.

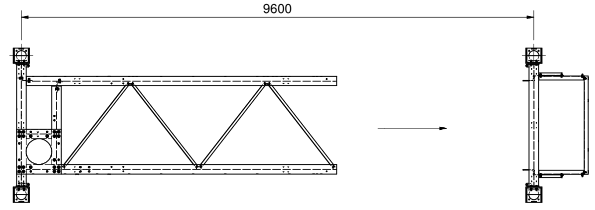
Appendix H:
Installation Guidance for Hard Lock Bolts
(for Space Saver and SLP3/4 conversions)
– Extract from Guidance Note FLI 363



EXISTING FRAME (RDS110)
AS ASSEMBLED



DETAIL C



BREAK DETAILS OF EXISTING FRAME

RDS 15m FLEXI FRAME EXTENSION STEELWORK (RDS161)					
ITEM	Drg No.	PART No.	DESCRIPTION	Wt (kg)	QTY
1	4500-04	RDS4	RDS NARROW PILE BOOT	48.9	2
2	4500-39	RDS39	LARGE CLEAT - 200x100x10 RSA	7.4	4
3	4500-85	RDS59	BEAM "K" - Lt. Hd. SIDE	196.4	1
4	4500-86	RDS60	BEAM "L" - Rt. Hd. SIDE	196.4	1
5	4500-87	RDS61	LONG BRACE - 50x50x5 RSA	9.1	2
6	4500-94	RDS113	BEAM "D" - REAR	160.5	1
7	------	------	M24x65 LG B-N-SP'W-FW	0.4	16
8	------	------	M24x55 LG B-N-SP'W-FW	0.3	24
9	------	------	M20x80 LG B-N-SP'W-FW	0.3	12
10	------	------	M16x50 LG B-N-SP'W-FW	0.1	4
11	------	SPARE	M24x65 LG B-N-SP'W-FW	0.4	2
12	------	SPARE	M24x55 LG B-N-SP'W-FW	0.3	2
13	------	SPARE	M20x80 LG B-N-SP'W-FW	0.3	2
14	------	SPARE	M16x50 LG B-N-SP'W-FW	0.1	8

DO NOT SCALE
IF IN DOUBT ASK

UNLESS OTHERWISE STATED:-
MATERIAL:- GRADE AS PER FLI FORM 11G
FINISH:- GALVANISED TO BS EN ISO 1461
DIMENSIONS:- MILLIMETRES (mm)
TOLERANCES:- AS PER FLI QA MANUAL
WELD INSP:- AS PER NSSS (5th EDITION)- ANNEX 'B'

NOTES:-

1. ALL DRAWING NOTES ARE FOR GUIDANCE ONLY. FOR INSTALLATION INSTRUCTIONS REFER TO THE RELEVANT METHOD STATEMENT.

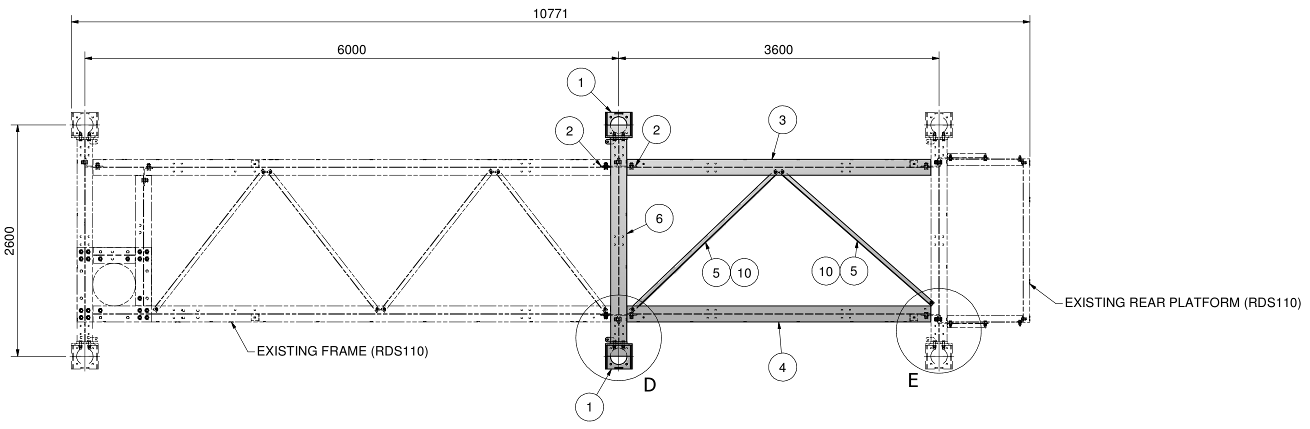
2. UNLESS OTHERWISE STATED TIGHTEN BOLTS UNTIL SPRING WASHER IS COMPLETELY FLAT THEN GIVE AN ADDITIONAL HALF TURN.

3. ENSURE THAT THE TOP FACE OF THE FRAME IS FLAT ACROSS ALL JOINTS AND THE REAR PLATFORM IS LEVEL WITH THE MAIN FRAME ONCE THE ASSEMBLY IS COMPLETE.

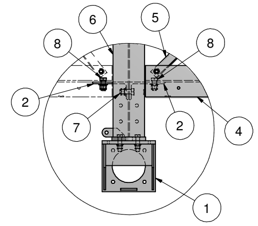
4. FOR REFERENCE TO PARTS FITTED ON SITE REFER TO THE RELEVANT SITE ASSEMBLY DRAWING.

5. ADDITIONAL SPARE M16x50 BOLTS HAVE BEEN PROVIDED (ITEM 15). THESE ARE TO BE UTILISED IF THE REMOVAL OF ANY REAR PLATFORM STEELWORK IS REQUIRED.

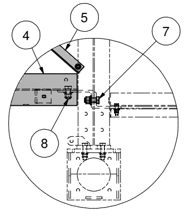
NOTE:
ALL BOLTS TO BE POSITIONED WITH THE NUTS ON THE OUTSIDE OF THE FRAME.



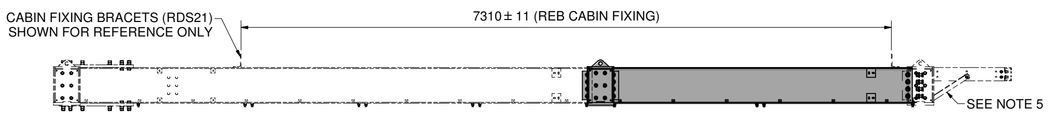
PLAN VIEW



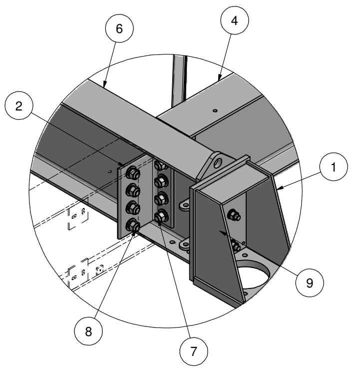
DETAIL D



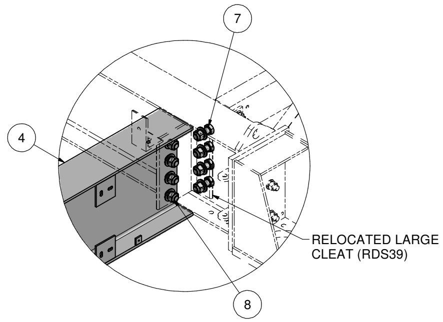
DETAIL E



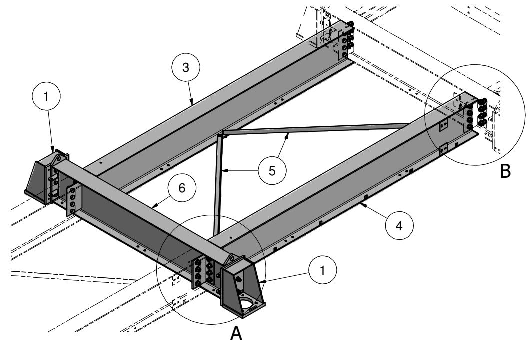
SIDE ELEVATION



DETAIL A
TYPICAL BOOT BEAM CONNECTION



DETAIL B
TYPICAL BEAM CONNECTION



3D VIEW
(NEW ITEMS)

ISSUE	DATE	MODIFICATION	CHK'D
A	16/04/10	FIRST ISSUE	AM

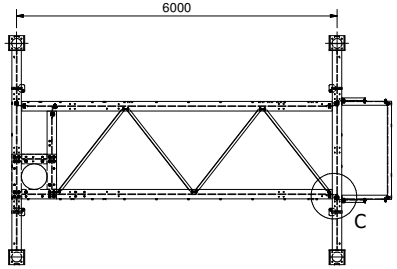
FLI structures
FRANCIS & LEWIS INTERNATIONAL LTD
TEL: +44 (0)1452 722200 WEB: www.fli.co.uk

DATE:	16/04/2010	SCALE:	NTS	FLI Ref:	N/A
DRAWN / MODELLED	AM	DRG. CHECK	SG	ENG. APP'D	DR

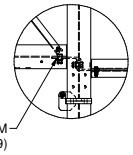
CUSTOMER: GSMR
ORDER No.: N/A
TITLE: FRAME EXTENSION STEELWORK TO SUIT RDS110

TOTAL WEIGHT: 728.4 kg
DRG.No. 4500-267 Rev. A

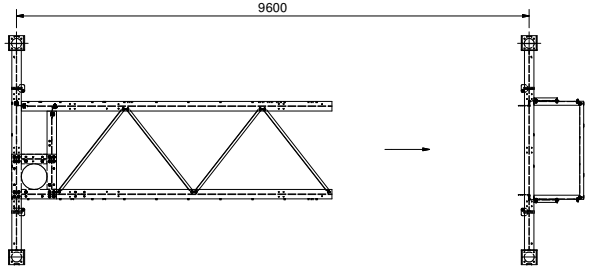
A1



EXISTING FRAME (RDS109)
AS ASSEMBLED



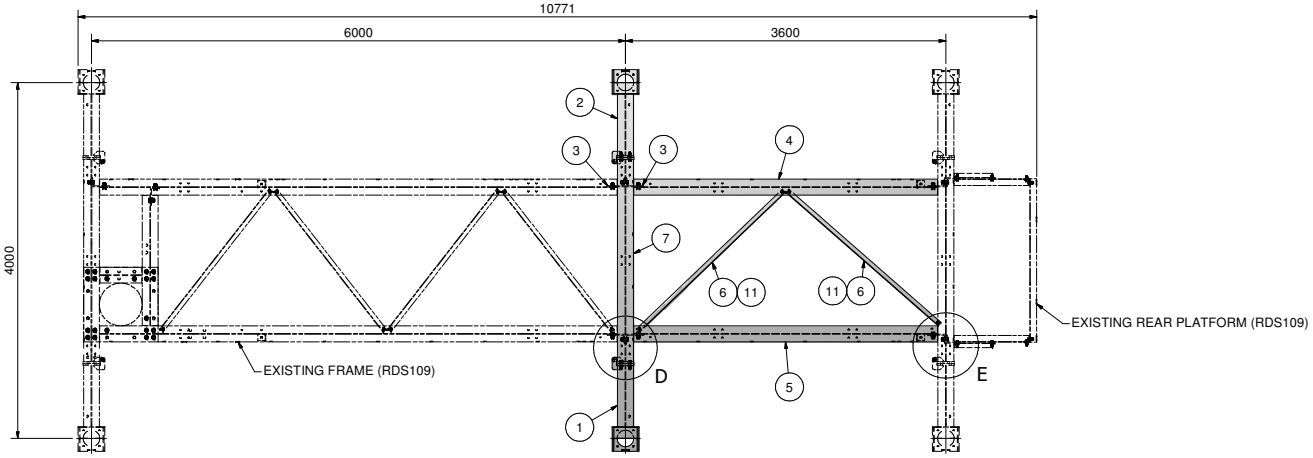
DETAIL C



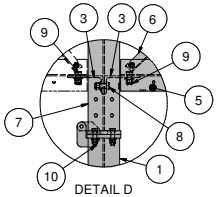
BREAK DETAILS OF EXISTING FRAME

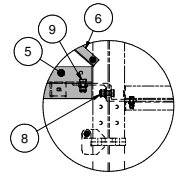
RDS 15m FLEXI FRAME EXTENSION STEELWORK (RDS160)					
ITEM	Drg No.	PART No.	DESCRIPTION	Wt (kg)	QTY
1	4500-12	RDS12	RDS FRAME BEAM "J" - Rt. Hd.	93.2	1
2	4500-12	RDS13	RDS FRAME BEAM "J" - Lt. Hd.	93.2	1
3	4500-39	RDS39	LARGE CLEAT - 200x100x10 RSA	7.4	4
4	4500-85	RDS59	BEAM "K" - Lt. Hd. SIDE	196.4	1
5	4500-86	RDS60	BEAM "L" - Rt. Hd. SIDE	196.4	1
6	4500-87	RDS61	LONG BRACE - 50x50x5 RSA	9.1	2
7	4500-94	RDS113	BEAM "D" - REAR	160.5	1
8	------	------	M24x65 LG B-N-SP'W-FW	0.4	16
9	------	------	M24x55 LG B-N-SP'W-FW	0.3	24
10	------	------	M20x80 LG B-N-SP'W-FW	0.3	12
11	------	------	M16x50 LG B-N-SP'W-FW	0.1	4
12	------	SPARE	M24x65 LG B-N-SP'W-FW	0.4	2
13	------	SPARE	M24x55 LG B-N-SP'W-FW	0.3	2
14	------	SPARE	M20x80 LG B-N-SP'W-FW	0.3	2
15	------	SPARE	M16x50 LG B-N-SP'W-FW	0.1	8

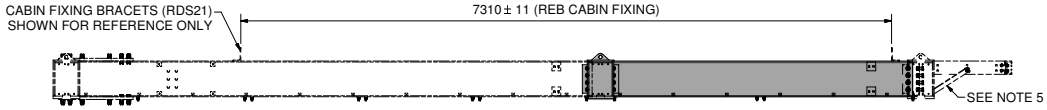
NOTE:
ALL BOLTS TO BE POSITIONED WITH THE NUTS ON THE OUTSIDE OF THE FRAME.



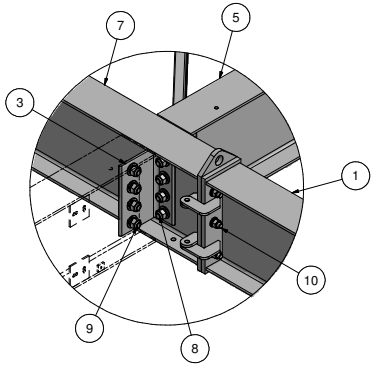
PLAN VIEW

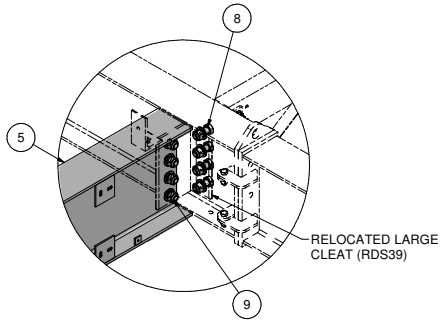


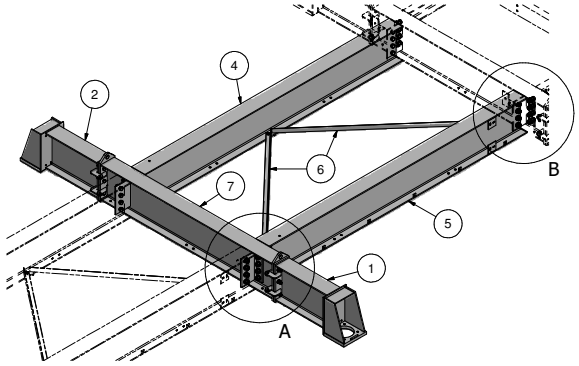




SIDE ELEVATION







DO NOT SCALE
IF IN DOUBT ASK

UNLESS OTHERWISE STATED:-
MATERIAL:- GRADE AS PER FLI FORM 116
FINISH:- GALVANISED TO BS EN ISO 1461
DIMENSIONS:- IN MILLIMETRES (MM)
TOLERANCES:- AS PER FLI QA MANUAL
WELDING:- AS PER BS EN ISO 3834 EDITION:- ANNEX B

NOTES:

1. ALL DRAWING NOTES ARE FOR GUIDANCE ONLY. FOR INSTALLATION INSTRUCTIONS REFER TO THE RELEVANT METHOD STATEMENT.

2. UNLESS OTHERWISE STATED TIGHTEN BOLTS UNTIL SPRING WASHER IS COMPLETELY FLAT THEN GIVE AN ADDITIONAL HALF TURN.

3. ENSURE THAT THE TOP FACE OF THE FRAME IS FLAT ACROSS ALL JOINTS AND THE REAR PLATFORM IS LEVEL WITH THE MAIN FRAME ONCE THE ASSEMBLY IS COMPLETE.

4. FOR REFERENCE TO PARTS FITTED ON SITE REFER TO THE RELEVANT SITE ASSEMBLY DRAWING.

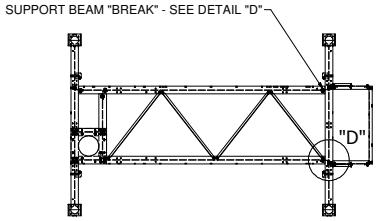
5. ADDITIONAL SPARE M16x50 BOLTS HAVE BEEN PROVIDED (ITEM 15). THESE ARE TO BE UTILISED IF THE REMOVAL OF ANY REAR PLATFORM STEELWORK IS REQUIRED.

ISSUE	DATE	MODIFICATION	BY
A	07/14	FIRST ISSUE	AM

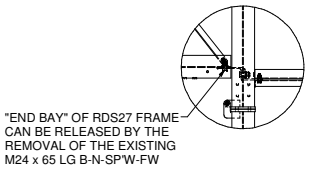
FLI structures
FRANCIS ALLENBY INTERNATIONAL LTD
TEL: +44 (0) 1455 556565 WEB: www.fli.co.uk

DATE:	15/04/2015	SCALE:	N.T.S
DRAWN: AM	CHKD: SG	APPD: DR	
CUSTOMER:	GSMR		
ORDER No.:	N/A		
TITLE:	FRAME EXTENSION STEELWORK TO SUIT RDS109		
TOTAL WEIGHT:	816.9 kg	DRG No.	4500-266
			A

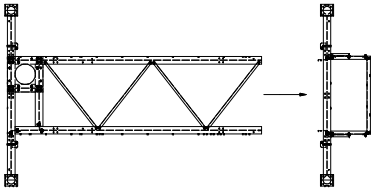
A1



EXISTING STANDARD LEAN FRAME (RDS27) - PHASE 1

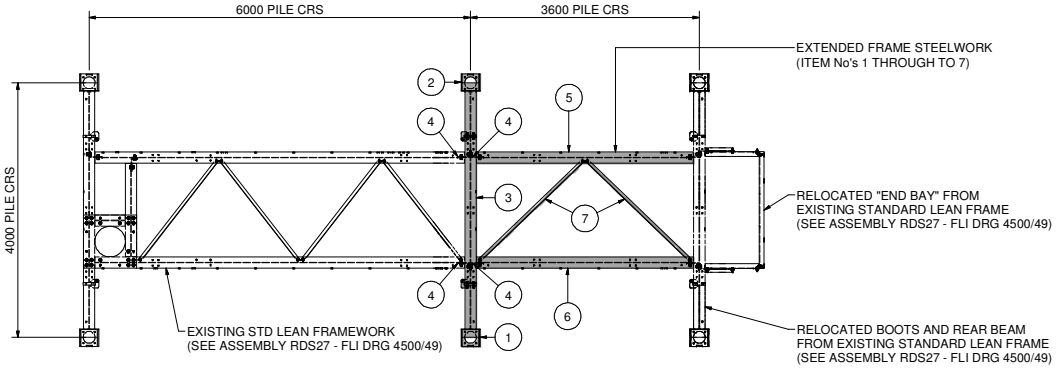


SUPPORT BEAM "BREAK" DETAIL "D"

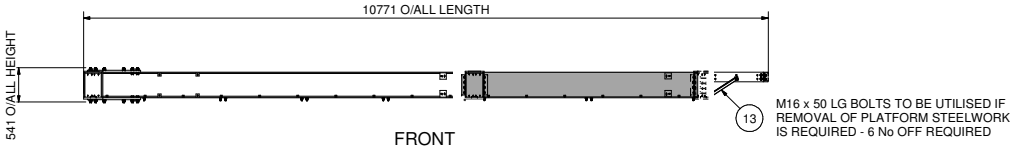


PROPOSED BREAK OF EXISTING FRAME (RDS27) - PHASE 2

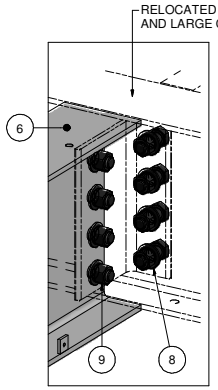
RDS STD LEAN EXTENDED FRAME STEELWORK - PART No RDS62					
ITEM	Drg No.	PART No.	DESCRIPTION	Wt	QTY
1	4500/12	RDS12	RDS FRAME BEAM "J" - Rt. Hd.	87.9 kg	1
2	4500/12	RDS13	RDS FRAME BEAM "J" - Lt. Hd.	87.9 kg	1
3	4500/32	RDS32	BEAM "D" - REAR	149.6 kg	1
4	4500/39	RDS39	LARGE CLEAT - 200x100x10 RSA	7.0 kg	4
5	4500/85	RDS59	BEAM "K" - Lt. Hd. SIDE	185.6 kg	1
6	4500/86	RDS60	BEAM "L" - Rt. Hd. SIDE	185.6 kg	1
7	4500/87	RDS61	LONG BRACE - 50x50x5 RSA	8.6 kg	2
8	----	----	M24 x 65 LG B-N-SP'W-FW	0.4 kg	16
9	----	----	M24 x 55 LG B-N-SP'W-FW	0.3 kg	24
10	----	----	M20 x 80 LG B-N-SP'W-FW	0.3 kg	12
11	----	----	M16 x 50 LG B-N-SP'W-FW	0.1 kg	4
12	----	SPARE	M24 x 65 LG B-N-SP'W-FW	0.4 kg	2
13	----	SPARE	M24 x 55 LG B-N-SP'W-FW	0.3 kg	2
14	----	SPARE	M20 x 80 LG B-N-SP'W-FW	0.1 kg	2
15	----	SPARE	M16 x 50 LG B-N-SP'W-FW	0.1 kg	8



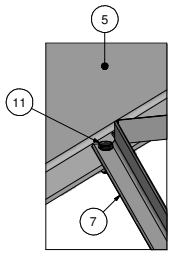
PLAN



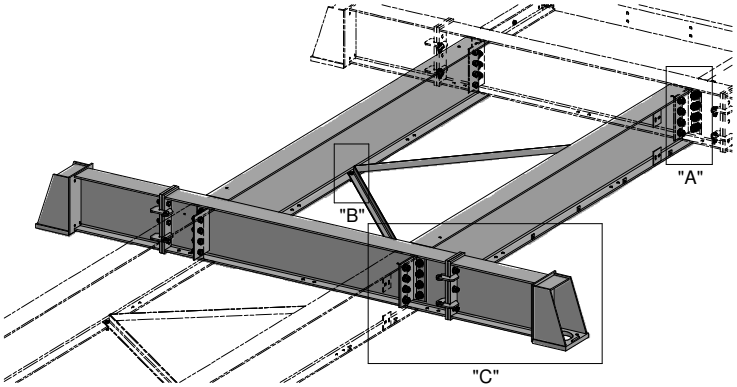
FRONT



BEAM CONNECTION DETAIL "A"



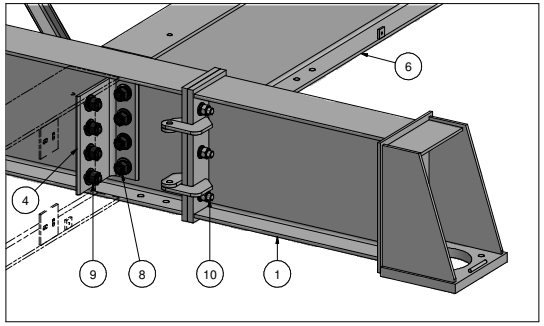
BRACE CONNECTION DETAIL "B"



3D VIEW

NOTE:

ALL BOLTS ARE TO BE POSITIONED WITH THE NUTS ON THE OUTSIDE OF THE FRAME.



BOOT BEAM CONNECTION DETAIL "C"

DO NOT SCALE
IF IN DOUBT ASK

UNLESS OTHERWISE STATED:-
MATERIAL:- GRADE 43 PER FLI FORM 11G
FINISH:- GALVANIZED TO BS EN ISO 1461
DIMENSIONS:- MILLIMETRES (mm)
TOLERANCES:- AS PER FLI QA MANUAL
WELD 350P - AS PER NSSS (5th EDITION)- ANNEX 'B'

NOTES:-

1. ALL DRAWING NOTES ARE FOR GUIDANCE ONLY. FOR INSTALLATION INSTRUCTIONS REFER TO THE RELEVANT METHOD STATEMENT.

2. UNLESS OTHERWISE STATED TIGHTEN ALL BOLTS UNTIL SPRING WASHER IS COMPLETELY FLAT THEN GIVE AND ADDITIONAL HALF TURN.

3. ENSURE M24 MONOPOLE STUDDING RUNS FREELY THROUGH THE TOP PLATE, FRAME AND BOTTOM PLATE ONCE THE ASSEMBLY IS COMPLETE.

4. ENSURE THAT THE TOP FACE OF THE FRAME IS FLAT ACROSS ALL JOINTS AND THE REAR PLATFORM IS LEVEL WITH THE MAIN FRAME ONCE THE ASSEMBLY IS COMPLETE.

5. FOR REFERENCE TO PARTS FITTED ON SITE i.e. HANDRAILS, FLOORING ETC; SEE RELEVANT SITE ASSEMBLY DRAWING.

6. THERE IS NO ALLOWANCE FOR SPARE BOLTS IN THE B.O.M. AS THE FRAME WILL BE DELIVERED TO SITE ASSEMBLED. (USE SPARE BOLTS FROM FLI STOCK IF REQUIRED)

A	02/10/2009	FIRST ISSUE
ISSUE	DATE	MODIFICATION

FLI structures
FINANCE & LEASING INTERNATIONAL LTD
TEL: +44 (0) 1453 733000 WEB: www.fli.co.uk

DATE: 02/10/2009	SCALE: NTS	SIZE: A1	
DRAWN: ShaunG	CHK'D: BD	APP'D: WH	
CUSTOMER: GSMR			
ORDER No:			

TITLE: ASSEMBLY DETAILS FOR RDS STD LEAN EXTENDED FRAME - RDS62

TOTAL WEIGHT: 803.9 kg | DRG.No. 4500/88 | A

A1

3: Bolt Tightening

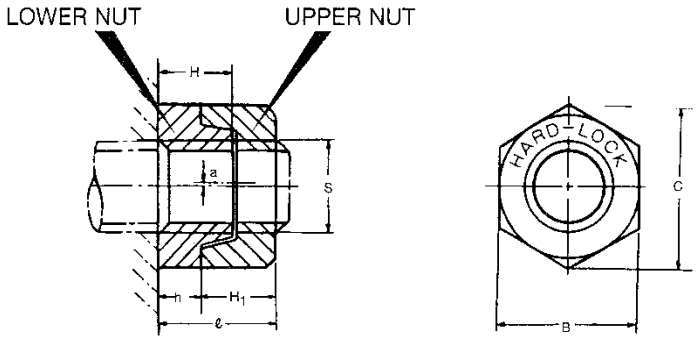
Hardlock nuts require specific installation methods to be followed.

A final 100% bolt tightness check was requested prior to the introduction of Hardlock nuts into the structure. Providing the installation notes for the installation of these nuts are followed, there is no requirement for a final check on the structural bolt positions. This is because the methods of installation specified in this document require tightness checks to be completed during the installation process.

3a: Hardlock Nut Assemblies – Installation and Tightening

Hardlock nuts consist of two separate nuts which when tightened correctly provide an effective locking to any structural fastener.

The nuts are supplied loose and each assembly consists of two separate items. The lower nut has an eccentric cone, which is proud of one of the faces of the nut. The upper nut has a concentric recess machined in one of its faces.



Whilst the tower modules are on the ground, fit the bolt through the parts to be connected and then fit a standard flat washer and the Hard Lock lower nut. (There is no need to fit a spring washer with the hard lock assembly). It is essential that the lower nut be fitted with the smooth face flush to the washer and fully tightened.

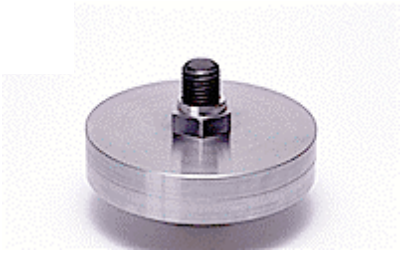
Once the tower has been lifted into position the lower nut should be checked for tightness, tightening if necessary. Fit the upper nut on the assembly ensuring that the recess in the upper nut will fit over the cone in the lower nut. Using a torque wrench tighten the upper nut to at least the minimum seating torque shown in Table 1.

Pre assembled tower modules will not have the upper nut fitted when delivered to site. These should be fitted once the tower has been lifted into position and the lower nuts have been checked as above.

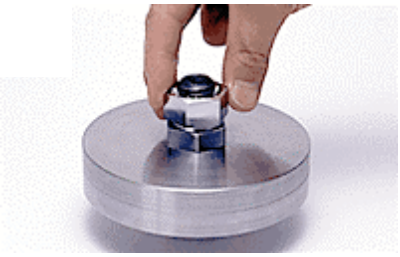
Note: Providing the torque settings have been achieved, there is no need tighten until the gap between upper and lower nuts is fully closed or to make the flat faces of the nuts to coincide.

Pass the bolt through the materials to be attached and screw the lower (convex) nut onto the bolt.

Fully tighten using open-ended or ring spanner

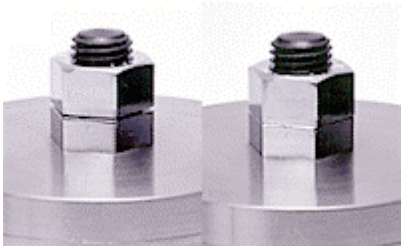


At this point, the lower nut has exactly the same strength as a general-purpose nut.



Next, screw the upper (concave) nut onto the bolt by hand.

After tightening the upper nut by hand, use a torque wrench to tighten to at least the minimum torque setting given in the Table overleaf



There may be gaps between the upper and lower nuts at this time and nut faces may not coincide.

Size	Upper Nut – NM Min Seating Torque	Upper Nut – NM Max Seating Torque
M12	27	39
M16	70	100
M20	120	200
M24	160	300

Table 1: Seating Torques (This Table is for SS400 grade nuts only).

Appendix I:

COSHH Data Sheets

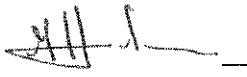
FRANCIS & LEWIS INTERNATIONAL

Substance Identification Record (COSHH) and Assessment Record

Substance: Galv Tech Zinc Sheen		**Record No:** 44	
Manufacture; Galv Tech		**Manufactures Health & Safety** Identification **Number:** 7043 GT	
Process: . Zinc Spray Touch-Up for Galvanised Steel		**Process Location:** Workshop and Site	
Ingredients		**Occupation Exposure Limit**	**Date**
-Zinc Powder		None Stated	
-Aluminium Powder		None stated	
-Xylene	5-10%	100 ppm (TLV)	03/01/08
-Solvent Naphtha	4-7%	None Stated	
-Mineral Spirit	2-5%	None Stated	
-Dimethyl Ether	30-32%	1000ppm (TLV)	03/01/08
Physical Properties		**Suppliers**	
-Colour – Silver -Aerosol -Odour – Solvent -Flash Point 25°C -Not Soluble in Water -Specific Gravity 1.69-1.85 g/cm^3 -Vapour Heavier than Air		Precedent Industrial Products UK Ltd PO Box 2668 Poole BH15 3ZB Tel:01202 673339	
Frequency & Duration of Exposure		**Hazard Identification**	
Intermittent (10 minutes) over a maximum period of 3 hours.		-Extremely Flammable -Pressurised Container -Can cause Dizziness and Headaches -Can cause Breathing Difficulty	
Assessment of Exposure: The level of exposure is acceptable providing work is undertaken in a well ventilated area.			
Exposure Controls: -Use only in well ventilated areas -Store away from heat and out of direct sunlight -No eating or drinking. -Do not spray on sources of heat.		**Personal Protection:** - Wear overalls, gloves and eye protection.	
Approved for Use: Providing exposure controls and personal protection requirements are followed. **Safety Officers Signature:** _____ **Date:** ____20/01/09_____			

FRANCIS & LEWIS INTERNATIONAL

Substance Identification Record (COSHH) and Assessment Record

Substance: Paint-Zinc Rich Primer (Manor Product)	**Record No:** 54	
Manufacture: Shipley Paint Limited	**Manufactures Health & Safety Identification Number:** UN 1263	
Process: Repair/ touch-up of damaged hot dip galvanised steel.	**Process Location:** Workshop and Site.	
Ingredients	**Occupation Exposure Limit**	**Date**
Xylene (mixed isomers) Ethylbenzene	100ppm 8hr TWA 100ppm 8hr TWA	03/01/08 03/01/08
Physical Properties	**Suppliers**	
Liquid Aromatic Odour Boiling Point 138-185°C Vapour heavier than air Auto-flammability 490°C	Shipley Paint Ltd Otley Road Shipley West Yorkshire BD17 7DP Tel No: 01274 587351	
Frequency & Duration of Exposure	**Hazard Identification**	
Intermittent, (as required for repairs), Maximum duration 3 hours.	- Highly Flammable - Harmful by inhalation - Harmful in contact with skin - Irritating to skin	
Assessment of Exposure: The level of exposure is considered acceptable providing this Product is applied in a well-ventilated area.		
Exposure Controls: -Use only in well-ventilated areas. -Keep container sealed when not in use. -Store in cool dry place	**Personal Protection:** -Wear eye protection, gloves and overalls. -Do not smoke when using this product. -If insufficient ventilation wear suitable respiratory protection.	
Approved for Use: Providing controls and personal protection requirements are followed. **Safety Officers Signature :**____  _____ **Date :**____ 20/01/09		

FRANCIS & LEWIS INTERNATIONAL

Substance Identification Record (COSHH) and Assessment Record

Substance: Icosit PUR Accelerator	**Record No:** 65	
Manufacture: Sika Limited	**Manufactures Health & Safety Identification Number:** ICPURA	
Process: Accelerator for 2 component Polyurethane Sika paints.	**Process Location:** Workshop (Occasional on site)	
Ingredients	**Occupation Exposure Limit**	**Date**
Xylene Ethyl Benzene Dibutyilin Diaurate 2.5-10% Concetration	100ppm – 8HrTWA 100ppm – 8HrTWA None stated	03/01/08 03/01/08 03/01/08
Physical Properties	**Suppliers**	
-Colourless Liquid -Flash point 23°C -Immiscible in water -880 kg/m^3 at 20°C -Mobile liquid at ambient temp	Sika Limited Watchmead Welwyn Garden City Hertfordshire AL7 1BQ Tel: 01707 329128	
Frequency & Duration of Exposure	**Hazard Identification**	
Duration of exposure is controlled by the size and quantity of the objects to be painted. Maximum painting duration 4 hours	Flammable Harmful by Inhalation Harmful in contact with skin Irritating to skin	
Assessment of Exposure: As painting is infrequent the level of exposure is considered acceptable providing the area for painting is well ventilated.		
Exposure Controls: - As controls detailed in Risk Assessment No 81. - Keep away from sources of ignition - Store in a cool dry place.	**Personal Protection:** - Wear eye protection, impervious gloves and disposable overalls. - Wear respiratory facemask. (Type 3M 4251) - Use Barrier cream.	
Approved for Use: Icosit PUR Accelerator is approved for use providing exposure controls are in place and personal protection requirements are followed. **Safety Officers Signature:** _____ **Date:** _____20/01/09		

FRANCIS & LEWIS INTERNATIONAL

Substance Identification Record (COSHH) and Assessment Record

Substance: Icosit EG120 Part A	**Record No:** 66	
Manufacture: Sika Limited	**Manufactures Health & Safety Identification Number:** ICEG12A	
Process: 2-component polyurethane protective paint coating for galvanised steel. Brush applied.	**Process Location:** Workshop (Occasional on site)	
Ingredients	**Occupation Exposure Limit**	**Date**
Xylene Butyl Acetate Ethyl Acetate Ethyl Benzene	100ppm – 8HrTWA 150ppm – 8HrTWA 200ppm – 8HrTWA 100ppm – 8HrTWA	03/01/08 03/01/08 03/01/08 03/01/08
Physical Properties	**Suppliers**	
-Coloured Liquid -Flash point 32°C -Immiscible in water -1380 kg/m^3 at 20°C -Characteristic odour	Sika Limited Watchmead Welwyn Garden City Hertfordshire AL7 1BQ Tel: 01707 329128	
Frequency & Duration of Exposure	**Hazard Identification**	
Frequency is occasional. Duration is dependant on size and quantity of objects to be painted. Maximum painting duration 4 hours.	Flammable	
Assessment of Exposure: As painting is infrequent the level of exposure is considered acceptable providing the area for painting is well ventilated.		
Exposure Controls: - As controls detailed in Risk Assessment No 81. - Store in cool dry place	**Personal Protection:** - Wear eye protection, impervious gloves and disposable overalls. - Wear respiratory face mask (Type 3M 4251) - Use Barrier cream	
Approved for Use: Icosit EG120, Part A, is approved for use providing exposure controls are in place and personal protection requirements are followed. **Safety Officers Signature:** ___ _____ **Date:** 20/01/09		

FRANCIS & LEWIS INTERNATIONAL

Substance Identification Record (COSHH) and Assessment Record

Substance: Icosit EG120 Part B	**Record No:** 67	
Manufacture: Sika Limited	**Manufactures Health & Safety Identification Number:** ICEG12A	
Process: 2-component polyurethane protective paint coating for galvanised steel. Brush applied.	**Process Location:** Workshop (Occasional on site)	
Ingredients	**Occupation Exposure Limit**	**Date**
Xylene Ethyl Benzene 2-Methoxy-1-Methylethyl Acetate Hexamethylen-1.8-Disocyanate	100ppm – 8HrTWA 100ppm – 8HrTWA 50ppm - 8HrTWA 0.02mg/$m^3$8HrTWA	03/01/08 03/01/08 03/01/08 03/01/08
Physical Properties	**Suppliers**	
-Light YellowLiquid -Flash point 38°C -Insoluble in water -1070 kg/m^3 at 20°C (approx) -Characteristic odour	Sika Limited Watchmead Welwyn Garden City Hertfordshire AL7 1BQ Tel: 01707 329128	
Frequency & Duration of Exposure	**Hazard Identification**	
Frequency is occasional. Duration is dependant on size and quantity of objects to be painted. Maximum painting duration 4 hours.	Flammable Harmful by inhalation Harmful in contact with skin May cause sensitisation by skin contact	
Assessment of Exposure: As painting is infrequent the level of exposure is considered acceptable providing the area for painting is well ventilated.		
Exposure Controls: - As controls detailed in Risk Assessment No 81. - Do not smoke when using this Product. - Store in cool dry place	**Personal Protection:** - Wear eye protection, impervious gloves and disposable overalls. - Wear respiratory face mask (Type 3M 4251) - Use Barrier cream	
Approved for Use: Icosit EG120, Part B, is approved for use providing exposure controls are in place and personal protection requirements are followed. **Safety Officers Signature:** _____ **Date:** _20/01/09_____		

FRANCIS & LEWIS INTERNATIONAL

Substance Identification Record (COSHH) and Assessment Record

Substance: Icosit 6630	**Record No:** 69	
Manufacture: Sika Limited.	**Manufactures Health & Safety Identification Number:** IC 663	
Process: Single component polyurethane Paint coating for steel and galvanised Structures.	**Process Location:** Workshop (Occasional on site)	
Ingredients	**Occupation Exposure Limit**	**Date**
Xylene 1 methoxy-2propyl acetate 2- Methylpropan-1-ol	50ppm – 8HrTWA 50ppm – 8HrTWA 100ppm-8Hr TWA	03/01/08 03/01/08 03/01/08
Physical Properties	**Suppliers**	
-Coloured Liquid -Flash point 34°C -Characteristic Odour -Immiscible in Water -Density 1400 at 20°C	Sika Limited Watchmead Welwyn Garden City Hertfordshire AL7 1BQ Tel: 01707 329128	
Frequency & Duration of Exposure	**Hazard Identification**	
Frequency is occasional. Duration dependant on size and quantity of objects to be painted. Maximum painting duration 4 hours.	-Flammable. -Toxic to Aquatic Organisms. (May cause long-term adverse effects in the aquatic environment).	
Assessment of Exposure: As painting is infrequent the level of exposure is considered acceptable, providing the area for painting is well ventilated.		
Exposure Controls: -As controls detailed in Risk Assessment Number 81. -Store in sealed container in a cool dry place. -Dispose of as 'Special Waste'.	**Personal Protection:** -Wear eye protection. -Wear impervious gloves the insides of which must be kept scrupulously clean. -Wear overalls. -Wear respiratory facemask.	
Approved for Use: Icosit 6630 is approved for use providing exposure controls are in place and personal protection requirements are followed. Do not let this product get into the drains or water table. Unused material must be disposed of as 'Special Waste' **Safety Officers Signature:** _____ **Date:** _____20/01/09		