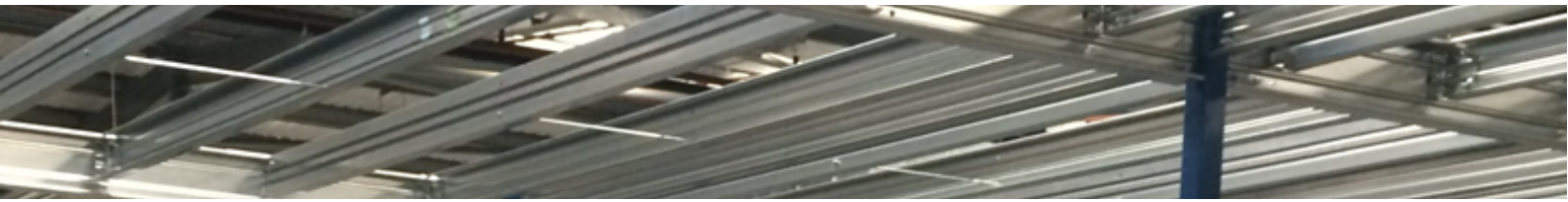




Ayrshire Metals Limited
Leading Manufacturer of cold rolled steel

Mezzanine Floor Installation Guide



**LIGHT STEEL FRAME
ASSOCIATION**
MANUFACTURING MEMBER



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Ayrshire Metals Ltd is a leading manufacturer of light gauge cold rolled sections.

The Ayrshire Group can trace its roots back to 1819 when it was largely a manufacturer of ships on the Ayrshire coast. The Company has come a long way since then and now produces cold rolled sections from its site in Daventry, Northamptonshire.

Ayrshire Metals Ltd has an experienced in-house team of Engineers and Detailers who deliver projects specific to customer needs and time scales. Ayrshire provides a full range of design services, from initial feasibility studies to full structural calculations and detailed drawings for all the cold rolled elements required for the project.

Ayrshire's bespoke design and detailing software, AyrSuite, can be used to design and detail our products easily. This software is available to external users such as engineers, architects and installers, to help design and detail our products. This can be particularly useful for determining section sizes during the initial stages of the project. The software is continuously updated to include new features, section sizes and functionality.

If you would like a copy of our latest AyrSuite software please contact our Customer Services Department using the details provided at the end of this guide.

We have a dedicated external Sales Team covering the UK and abroad. The team liaise directly with Architects and Engineers at the early stages of projects to understand the requirements and ensure the most optimal products are specified. We also organise CPD seminars for Architects and Engineers, please contact us if you would like to arrange for one of our representatives to visit your office.

Ayrshire manufactures a full range of cold rolled products for all areas of the construction sector.

This includes;

- ❖ Purlins / Rails
- ❖ Mezzanine Floor System
- ❖ Infill & Load-bearing SFS

We continually develop our products to achieve maximum efficiency and our range include several patented section profiles exclusively for Ayrshire.

This installation guide provides general information and recommended standard details for our mezzanine floor products and systems: The drawings in this document are meant to serve as a guide only. The exact detailing arrangement, including type and number of fixings, will be project specific and should always follow the intention of the project design engineer.

All the information contained in this guide, be it text or drawings are solely the property of Ayrshire Metals Ltd and should neither be copied nor passed to anybody else without prior confirmation from Ayrshire Metals Ltd. While every possible care has been taken to make sure that this guide contains all the basic information required, Ayrshire Metals Ltd will not accept any liability for any omissions or errors. Ayrshire Metals Ltd reserve the right to alter this guide at any time without prior notice.

SwageBeam™ Section

This is a profiled C-Section which was designed by, and is exclusive to, Ayrshire Metal Ltd. It benefits from the addition of stiffeners in the web and is particularly well suited to longer spans / heavier loading.



CJ Section

This is a traditional plain C-Section which is suited to shorter spans / lighter loads.



The SwageBeam™ and CJ ranges typically used for mezzanine floors are listed below. Occasionally there are different requirements, please contact our engineering team to discuss.

SwageBeam™ Product Range

Section	Depth (mm)	Thickness (mm)	Flange (mm)	Lip (mm)	Return Lip (mm)	Weight (kg/m)
SB22012	220	1.2	65	18	12	3.67
SB22015	220	1.5	65	18	12	4.59
SB22018	220	1.8	65	18	12	5.51
SB22020	220	2.0	65	18	12	6.09
SB22024	220	2.4	65	18	12	7.32
SB22030	220	3.0	65	18	12	9.18
SB22032	220	3.2	65	18	12	9.79
SB25015	250	1.5	65	18	12	4.94
SB25018	250	1.8	65	18	12	5.93
SB25020	250	2.0	65	18	12	6.56
SB25024	250	2.4	65	18	12	7.88
SB25030	250	3.0	65	18	12	9.90
SB30015	300	1.5	65	18	12	5.51
SB30018	300	1.8	65	18	12	6.63
SB30020	300	2.0	65	18	12	7.34
SB30024	300	2.4	65	18	12	8.82
SB30027	300	2.7	65	18	12	9.95
SB30030	300	3.0	65	18	12	11.04
SB30032	300	3.2	65	18	12	11.79

CJ Product Range

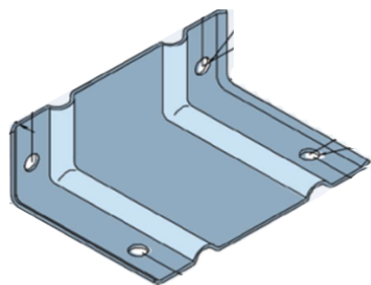
Section	Depth (mm)	Thickness (mm)	Flange (mm)	Lip (mm)	Weight (kg/m)
CJ10016	100	1.6	65	15	3.08
CJ10020	100	2.0	65	15	3.85
CJ12016	120	1.6	65	15	3.31
CJ12715	127	1.5	65	15	3.21
CJ12716	127	1.6	65	15	3.42
CJ12718	127	1.8	65	15	3.85
CJ12720	127	2.0	65	15	4.28
CJ14015	140	1.5	65	15	3.36
CJ14016	140	1.6	65	15	3.58
CJ14018	140	1.8	65	15	4.03
CJ15016	150	1.6	65	15	3.71
CJ15020	150	2.0	65	15	4.64
CJ15515	155	1.5	65	15	3.53
CJ15516	155	1.6	65	15	3.76
CJ15518	155	1.8	65	15	4.23
CJ16515	165	1.5	65	15	3.63
CJ16516	165	1.6	65	15	3.87
CJ16518	165	1.8	65	15	4.36
CJ16520	165	2.0	65	15	4.84
CJ17015	170	1.5	65	15	3.71
CJ17016	170	1.6	65	15	3.96
CJ17018	170	1.8	65	15	4.46
CJ18016	180	1.6	65	15	4.06
CJ18018	180	1.8	65	15	4.57
CJ18020	180	2.0	65	15	5.08
CJ18515	185	1.5	65	15	3.89
CJ18516	185	1.6	65	15	4.15
CJ18518	185	1.8	65	15	4.67
CJ18520	185	2.0	65	15	5.19
CJ20015	200	1.5	65	15	4.08
CJ20016	200	1.6	65	15	4.35
CJ20018	200	1.8	65	15	4.9
CJ20020	200	2.0	65	15	5.44
CJ22015	220	1.5	65	15	4.3
CJ22016	220	1.6	65	15	4.59
CJ22018	220	1.8	65	15	5.16
CJ22020	220	2.0	65	15	5.74
CJ24020	240	2.0	65	15	6.05

SwageBeam™ System

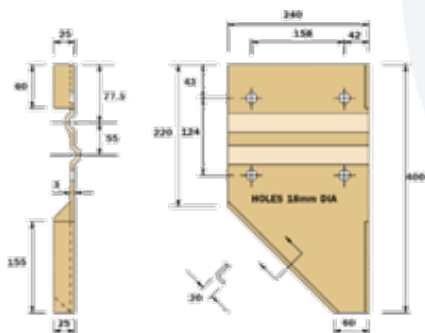
SwageBeam™ Section
(220mm, 250mm, 300mm deep)



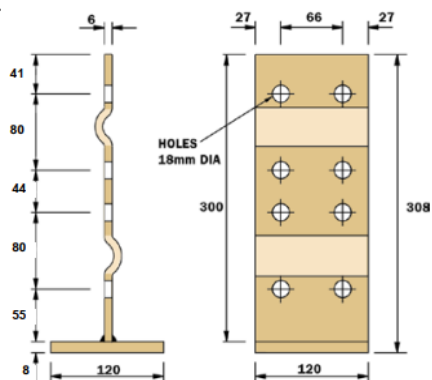
LC / SC Cleats
(LC - 2mm thick,
SC - 3.2mm thick)



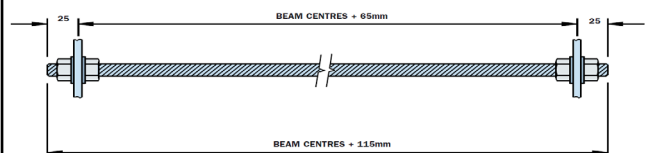
CB220 Bracket



CTB300 Bracket



Tie Rods (10mm diameter)

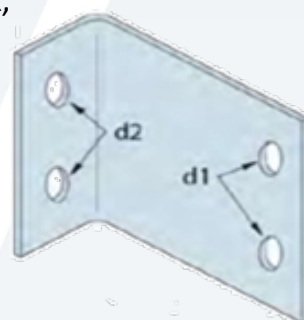


CJ System

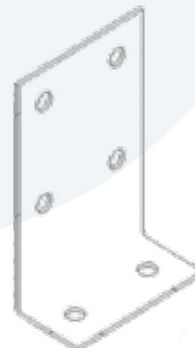
CJ Section
(100mm to 240mm deep)



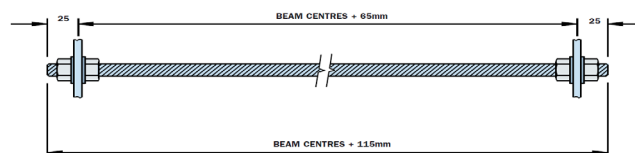
Inset Cleats
(I1, I2 & I5 - 3mm thick,
I3, I4 & I6 - 4mm thick)



Oversail Cleats
(Types C, E, G, J & K)



Tie Rods (10mm diameter)



A full set of guidelines for Ayrshire's' cold rolled steel systems can be downloaded from our website www.ayrshire.co.uk



SAFETY

REFERENCE SHOULD BE MADE TO THE WORK AT HEIGHT REGULATIONS WHEN INSTALLING MEZZANINE FLOORS.

WHERE SAFETY NETS ARE USED AS A MEANS OF ARRESTING FALLS FROM THE ROOF, THEY CAN BE SECURED TO THE SWAGEBEAM™ FRAME USING TIE ROPES AT THE PURLIN/RAFTER CLEAT CONNECTIONS. THE ROPES CAN BE THREADED THROUGH THE GAP BETWEEN THE RAFTER FLANGES AND THE PURLIN CLEAT AND SECURED IN AN APPROPRIATE MANNER. SAFETY NETS ARE TO BE INSTALLED BY SUITABLY EXPERIENCED AND QUALIFIED OPERATIVES, AND COMPLY WITH THE REQUIREMENTS OF BS EN 1263-1 & BE ERECTED IN ACCORDANCE WITH BS EN 1263-2 & GUIDANCE GIVEN IN BS 8411.

REFERENCE TO THE FOLLOWING PUBLICATIONS IS ALSO RECOMMENDED:

- HSE PUBLICATION HS(G) 150 "HEALTH & SAFETY IN CONSTRUCTION".
- BCSA PUBLICATION 48/09 "HEALTH & SAFETY ON STEEL CONSTRUCTION SITES: GUIDE FOR EMPLOYEES"

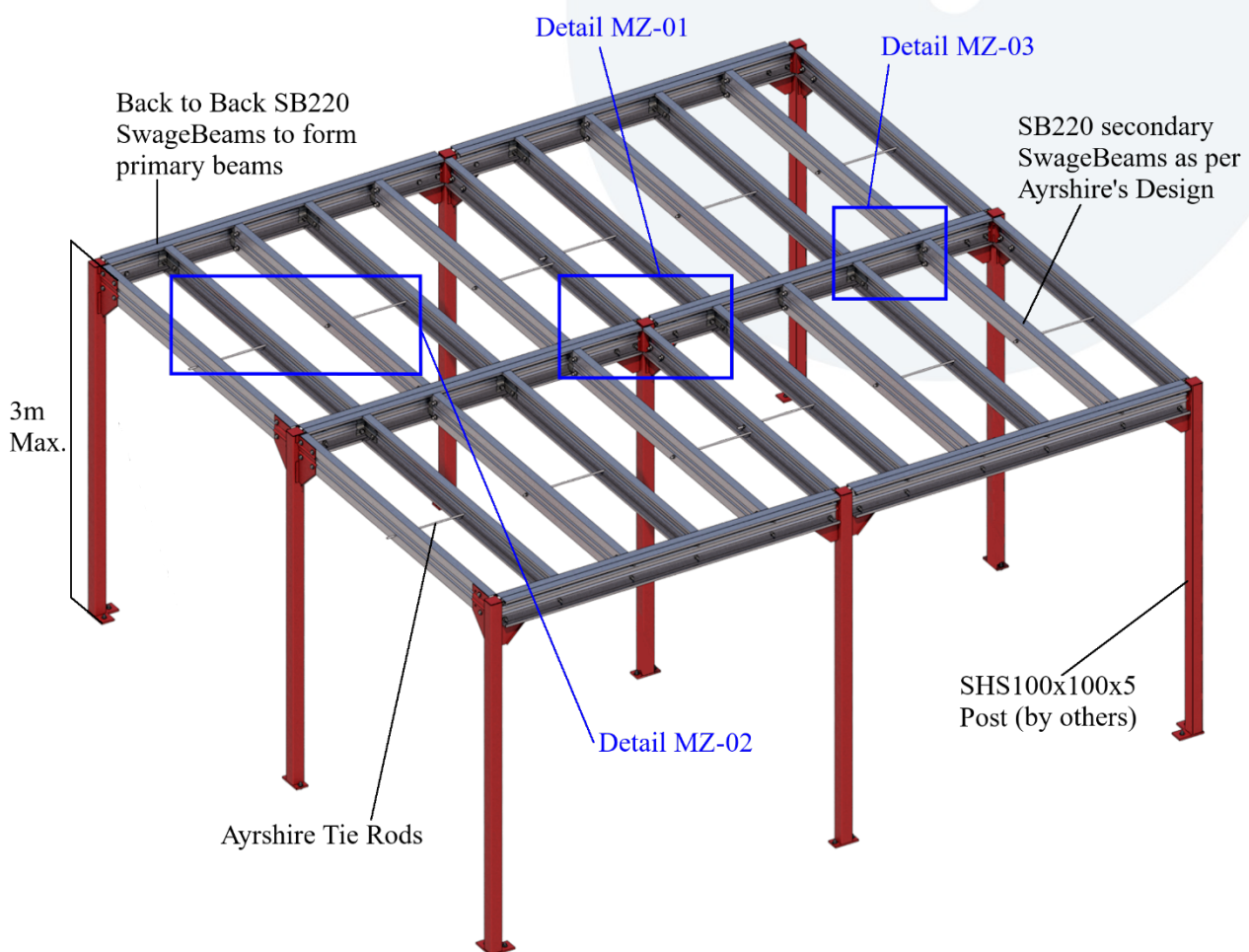
Where Primary Beams have already been designed in hot rolled steel, then we can provide Secondary SwageBeams to span between. However, Ayrshire can also form mezzanine floors without the requirement of the hot rolled primary beams by providing both the Primary & Secondaries using our SwageBeam™ sections.

Full SwageBeam™ System

- Available in 220mm deep Primary & Secondary SwageBeams.
- Available in 300mm deep Primary & Secondary SwageBeams.
- Slimline system available with 300mm deep Primary & 220mm deep Secondary SwageBeams.
- Hot rolled SHS Posts to be provided by others.
- Overall stability of the floor provided by Ayrshire.

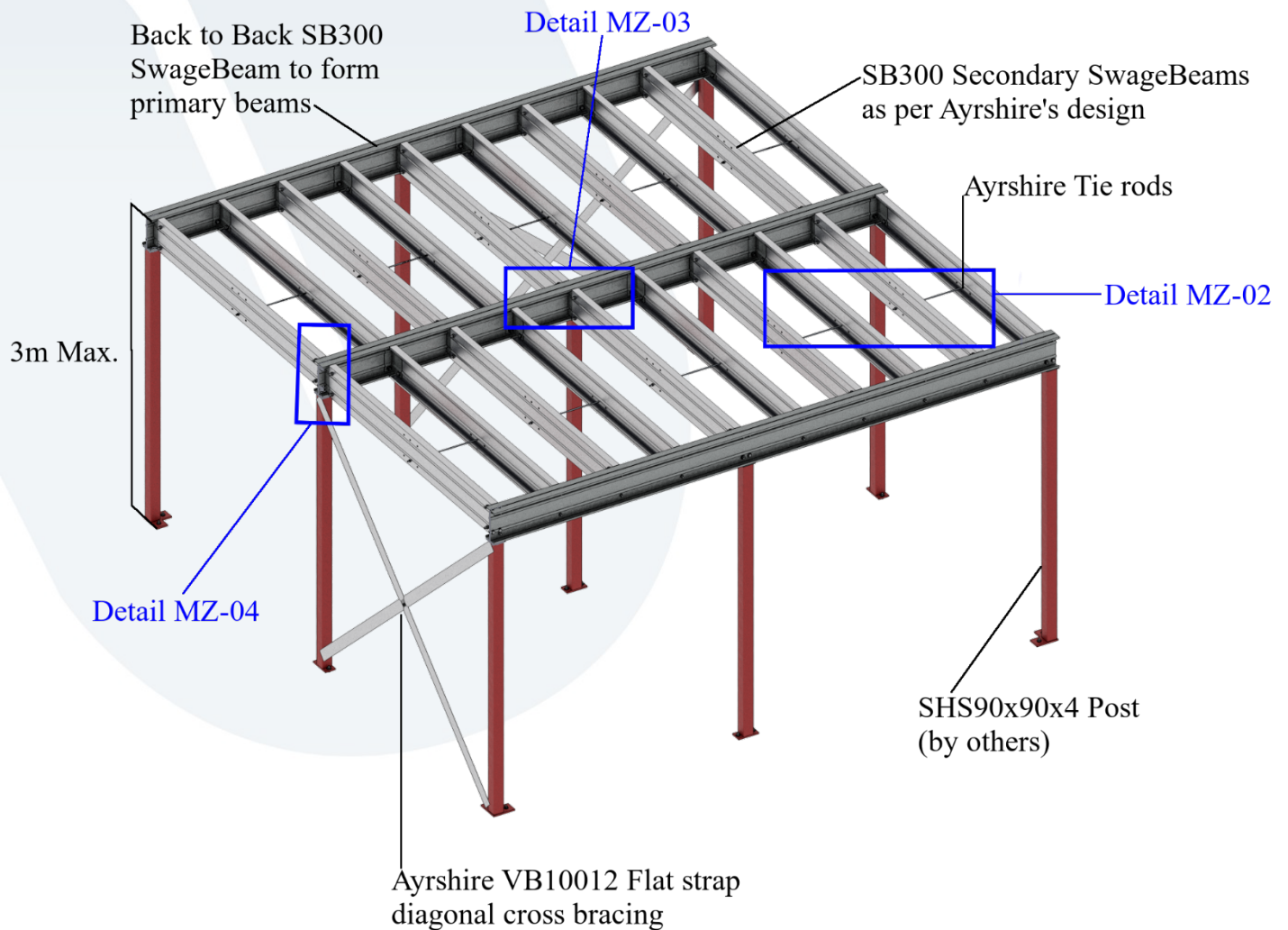
220mm deep Full SwageBeam™ System

- No vertical cross bracing required between the columns.



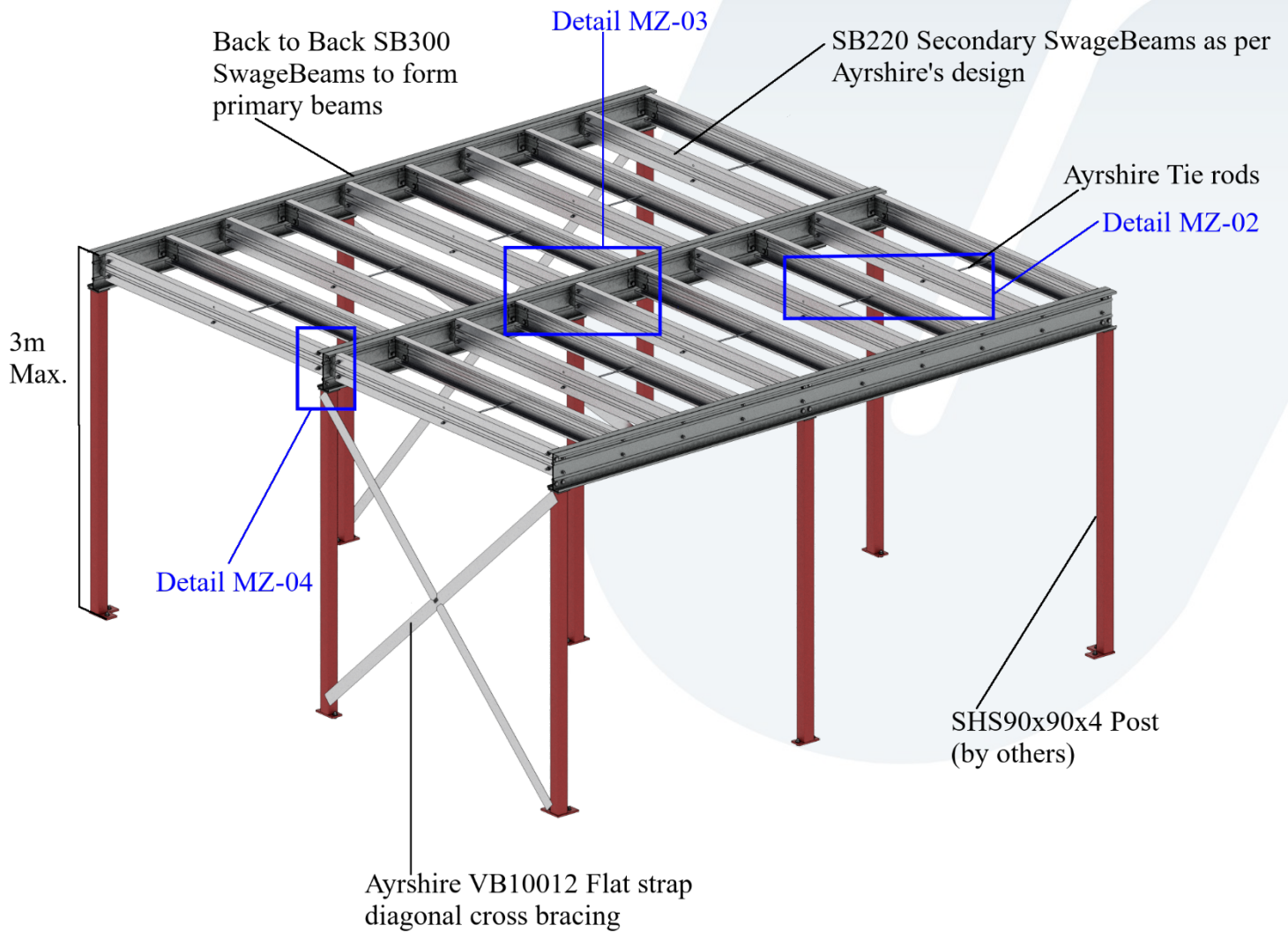
300mm deep Full SwageBeam™ System

- Vertical cross bracing required between posts as specified in the design.



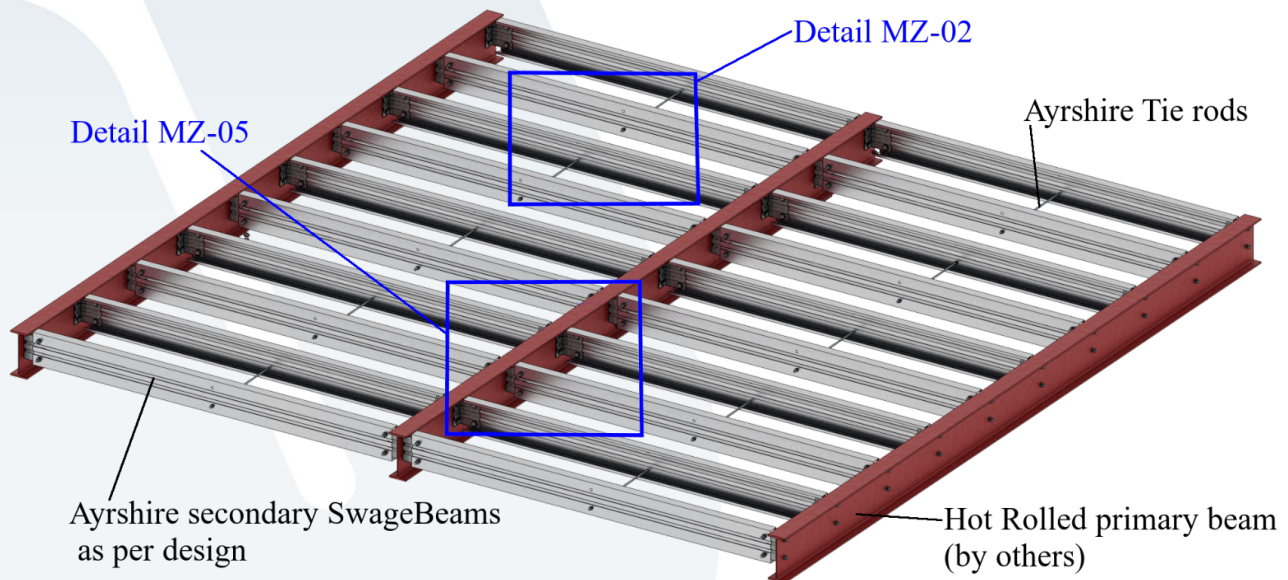
Slimline Full SwageBeam™ System

- Vertical cross bracing required between the columns as per the design.



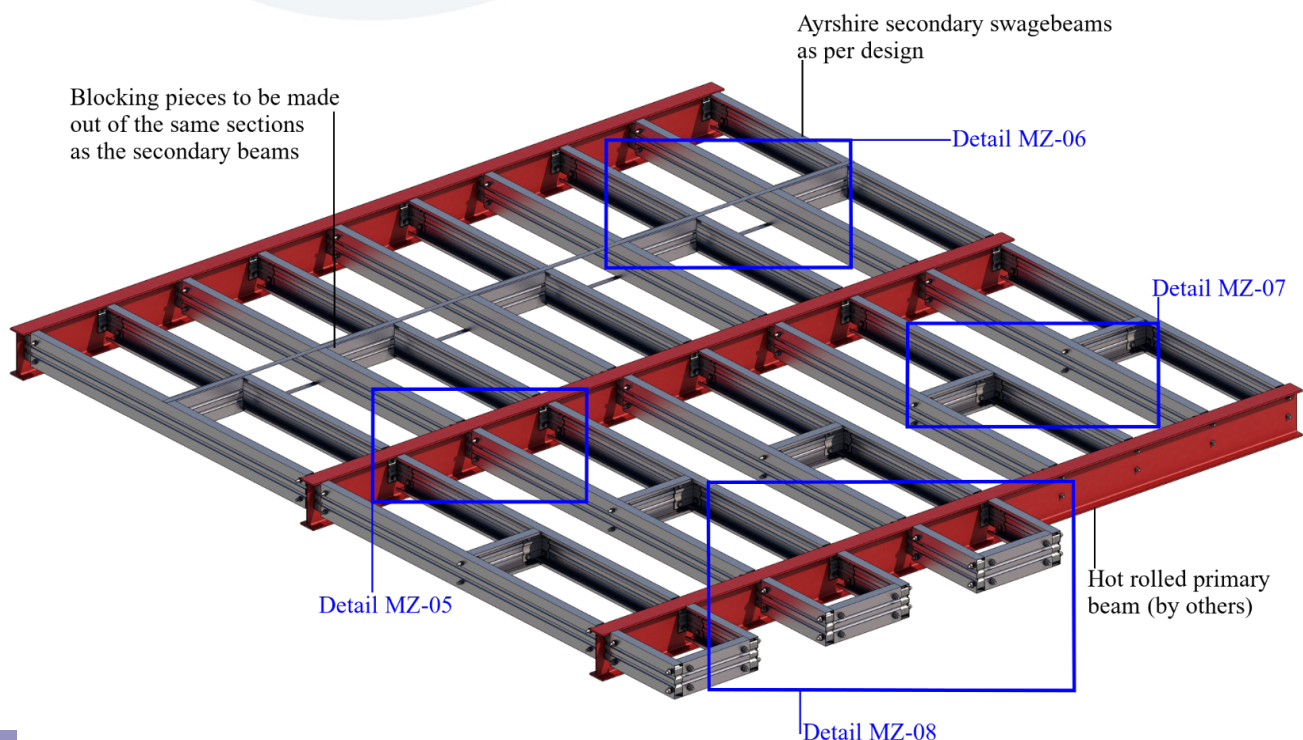
Secondary Only SwageBeam™ system

- Available in 220mm, 250mm & 300mm deep Secondary SwageBeams.
- Hot rolled Primary beams to be designed and provided by others.
- Overall stability of the floor to be designed & provided by others.

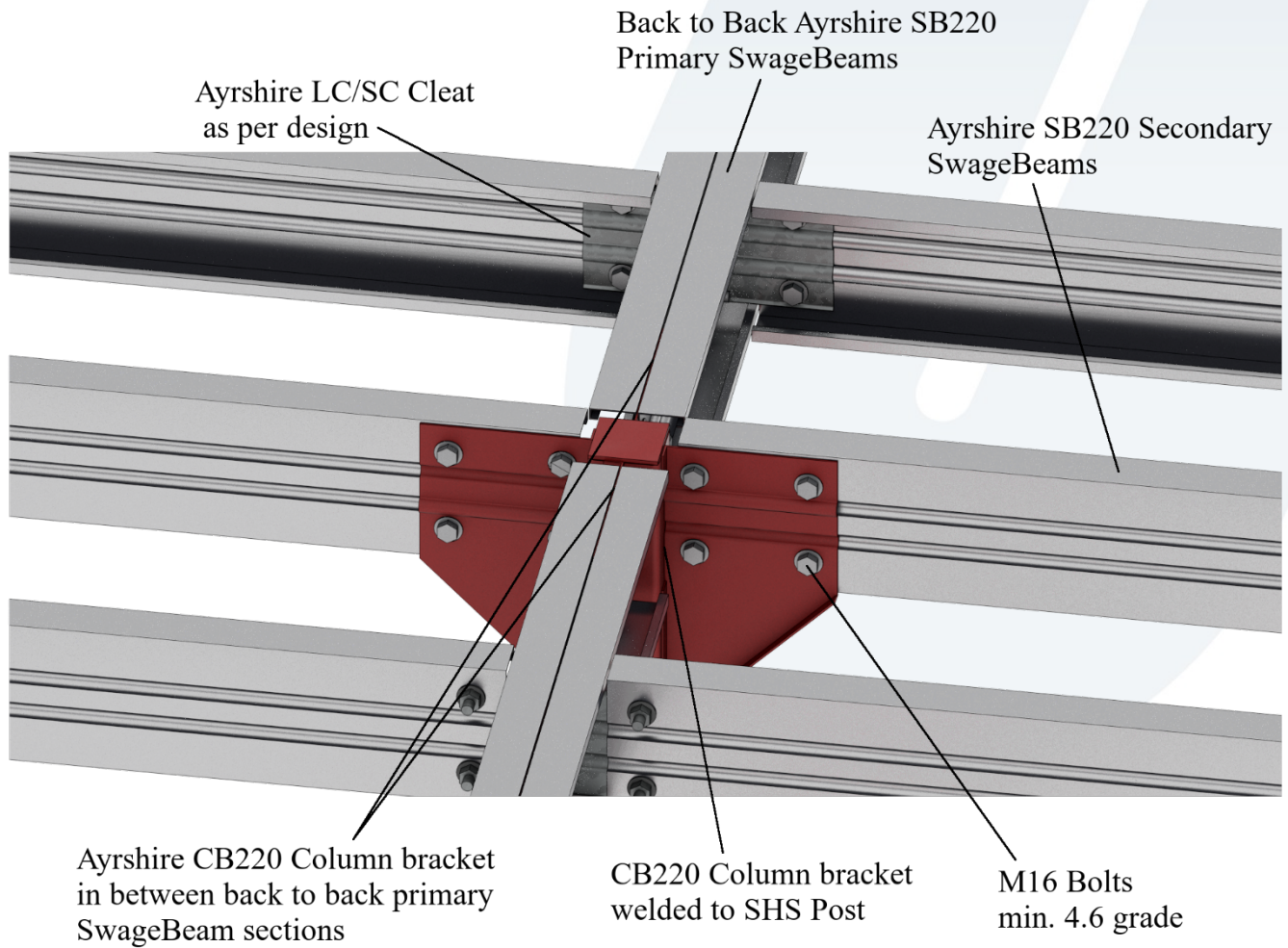


Laterally Unrestrained Secondary SwageBeam™ system

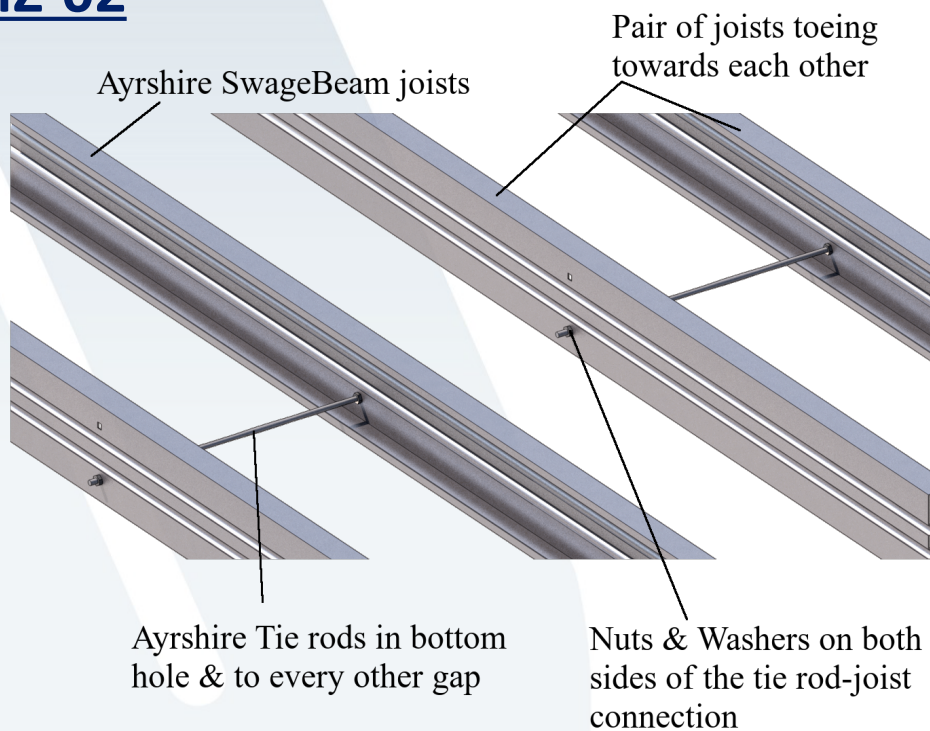
- Usually, suitable restraints need to be provided
- The restraints can either be in the form of conventional blocking & bracing or blocking pieces connected using standard SwageBeam™ cleats.



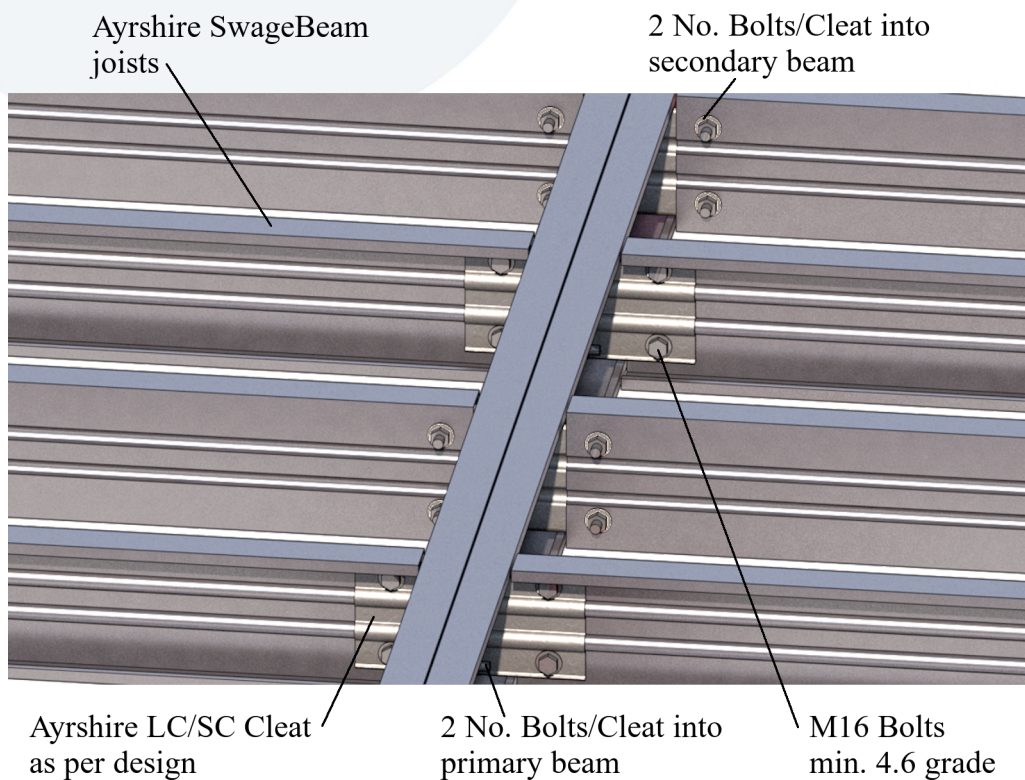
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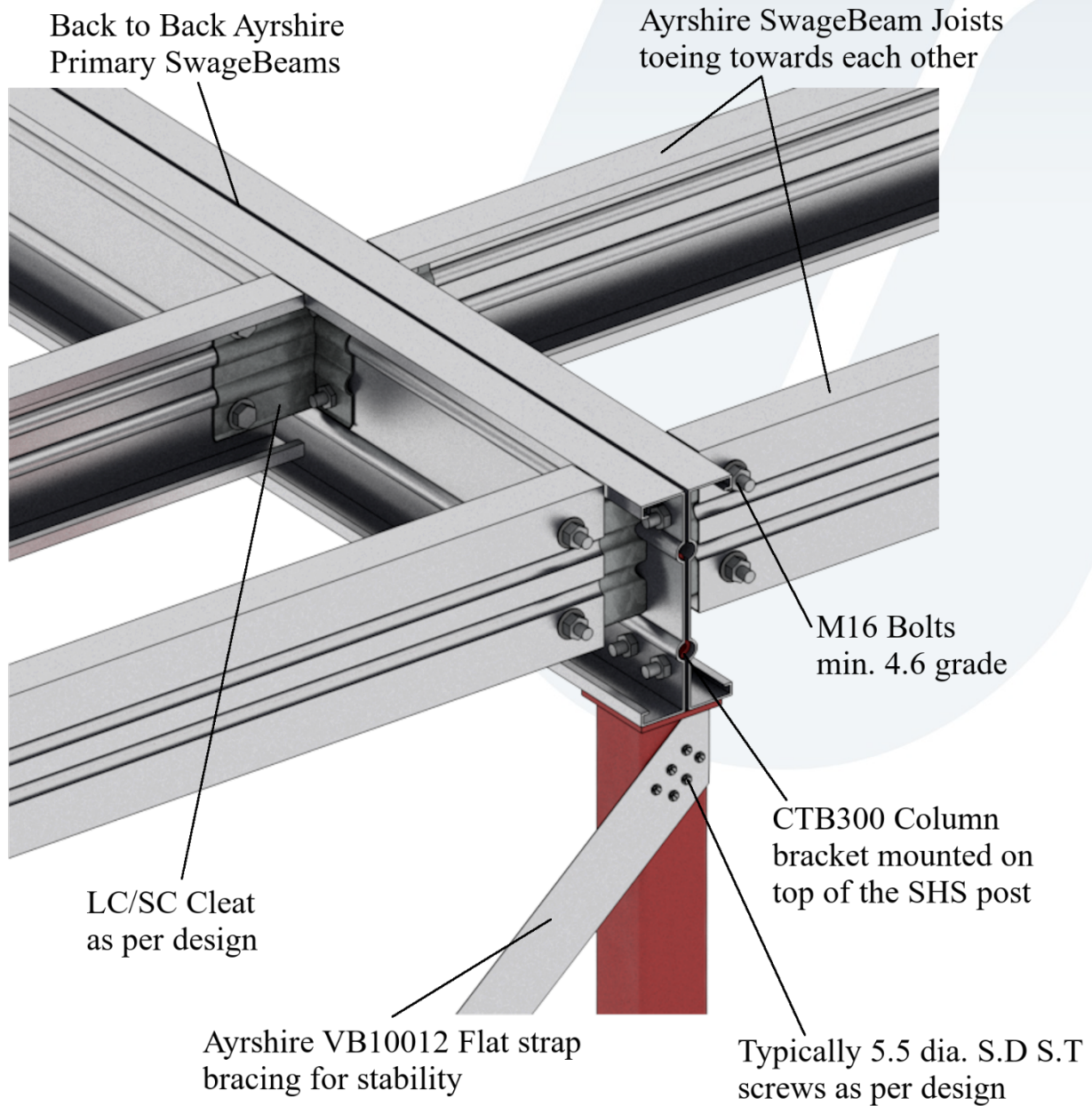
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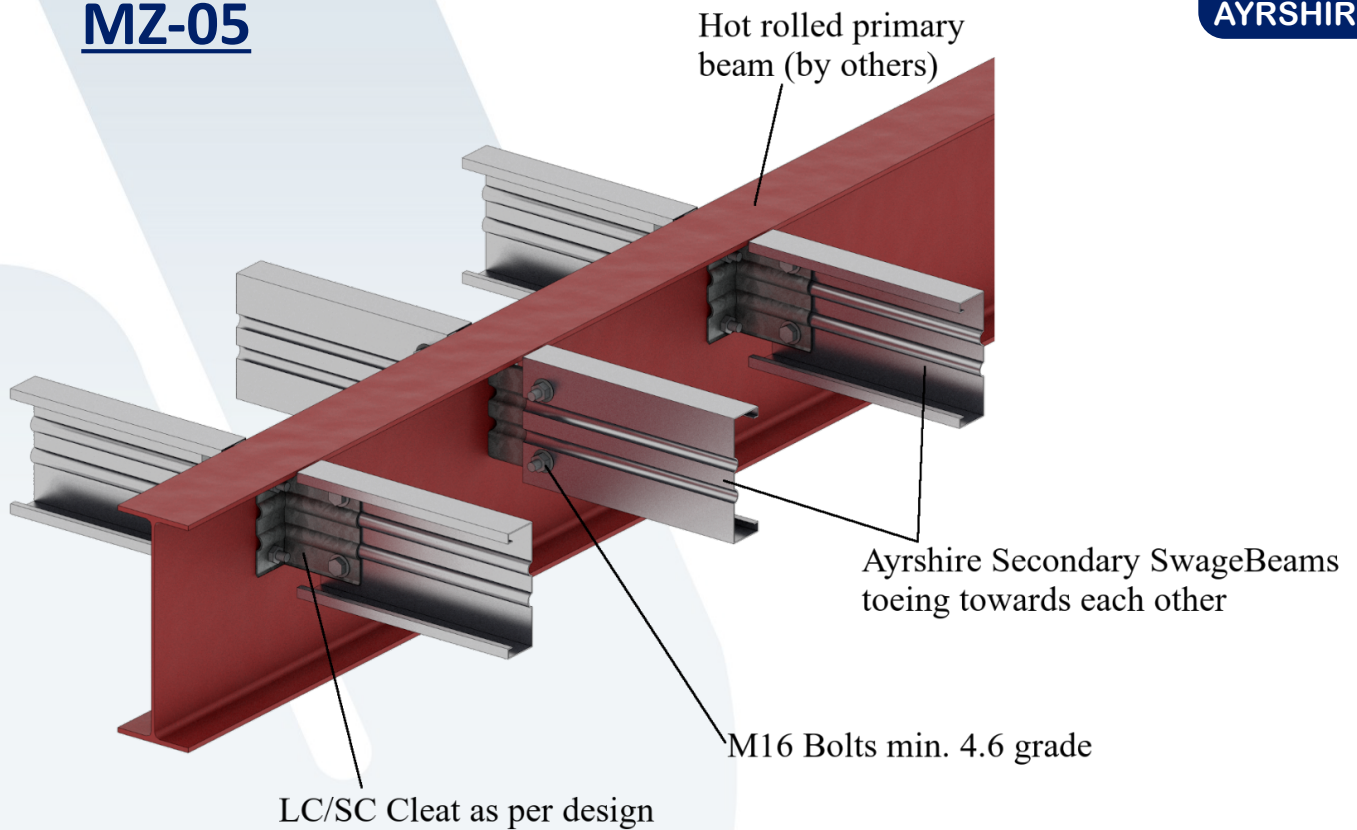
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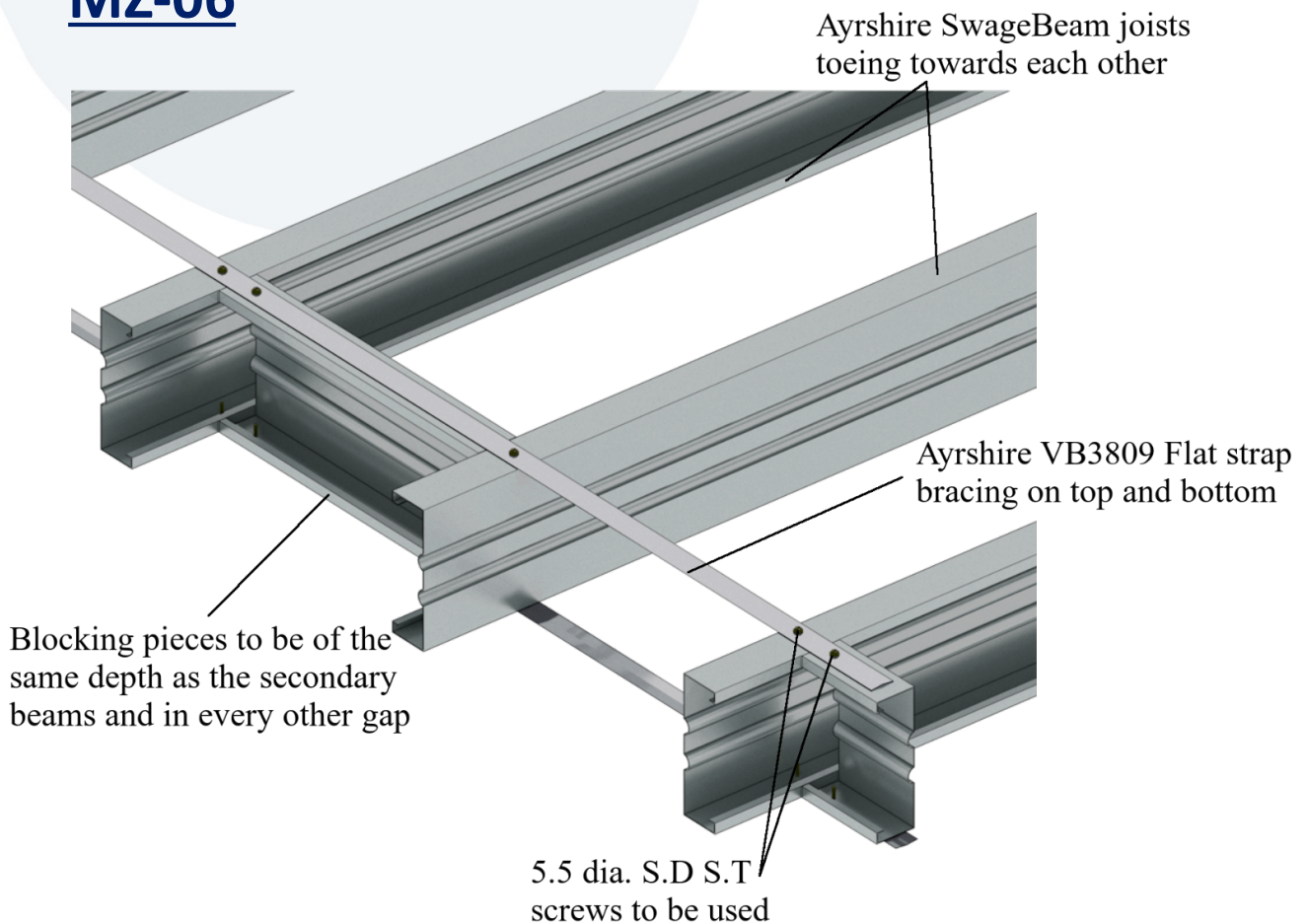
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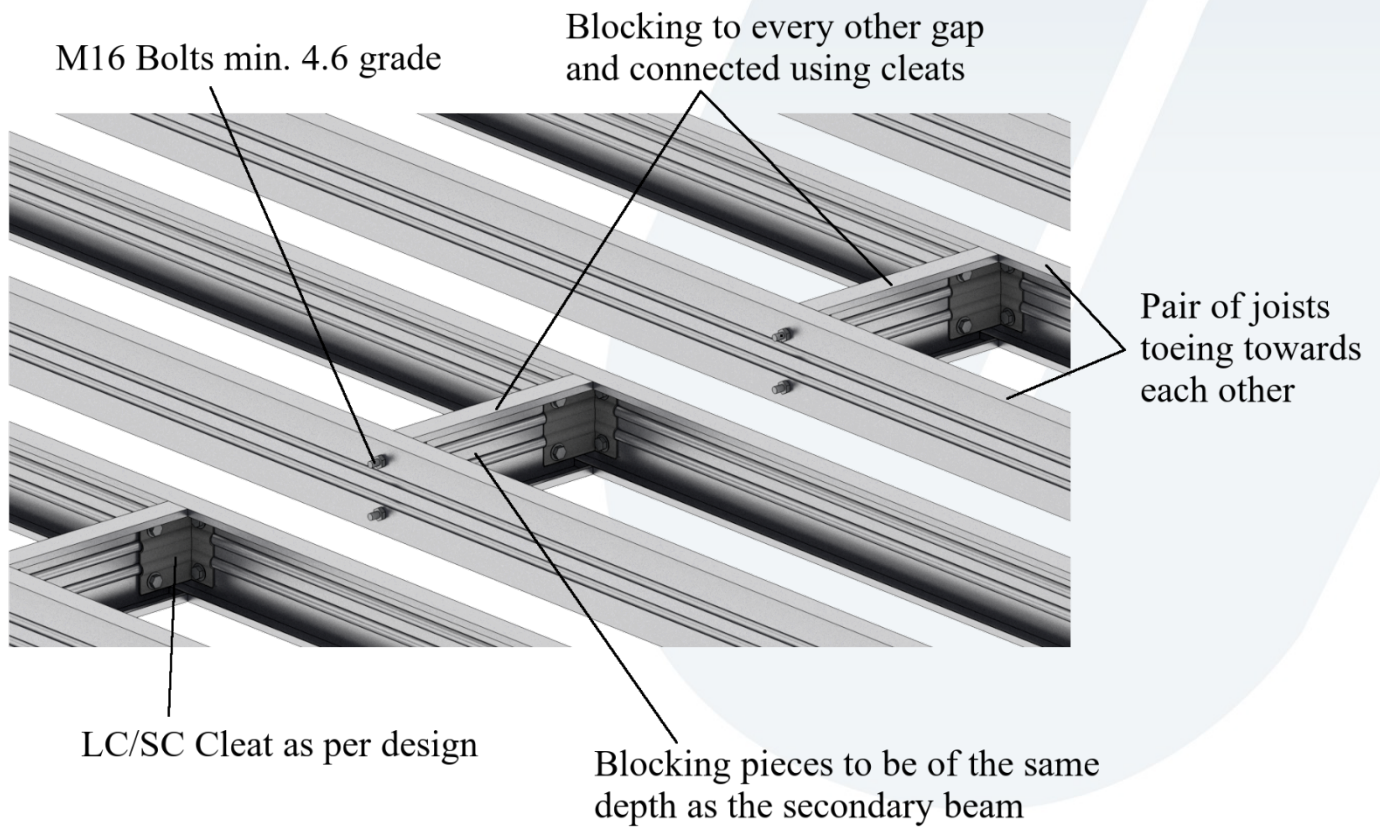
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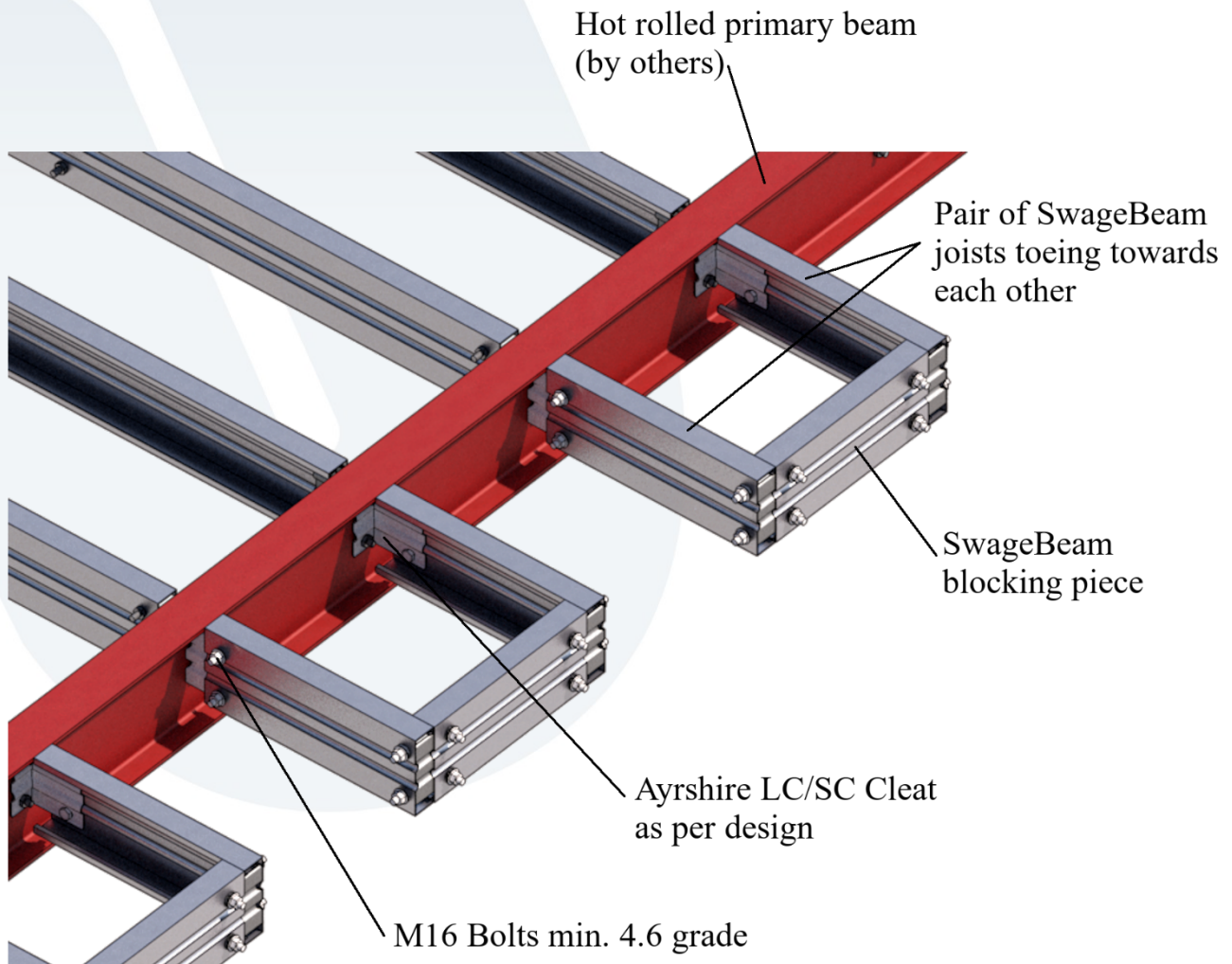
MZ-06



MZ-07



MZ-08



CJ Mezzanine Floors

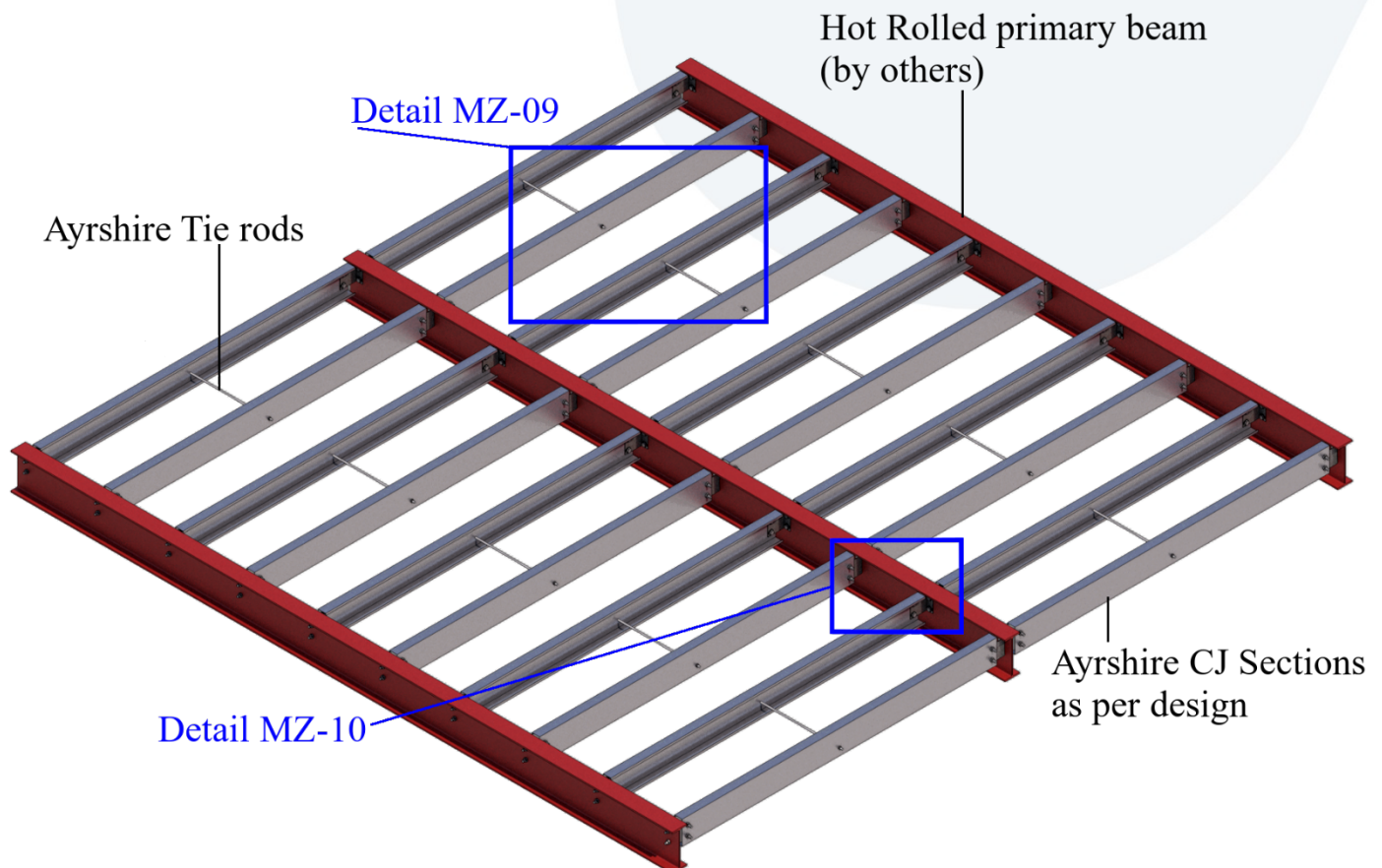
- CJ sections are used as secondary beams; hot rolled primary beams to be designed & provided by others.
- CJ sections are available in various thickness and in depths ranging from 127mm deep to 240mm deep.
- Overall stability of the floor to be designed & provided by others.

CJ System Types

- Inset System
- Single Span Oversail No Cleats
- Double Span Oversail No Cleats
- Single Span Oversail + Cleats
- Double Span Oversail + Cleats

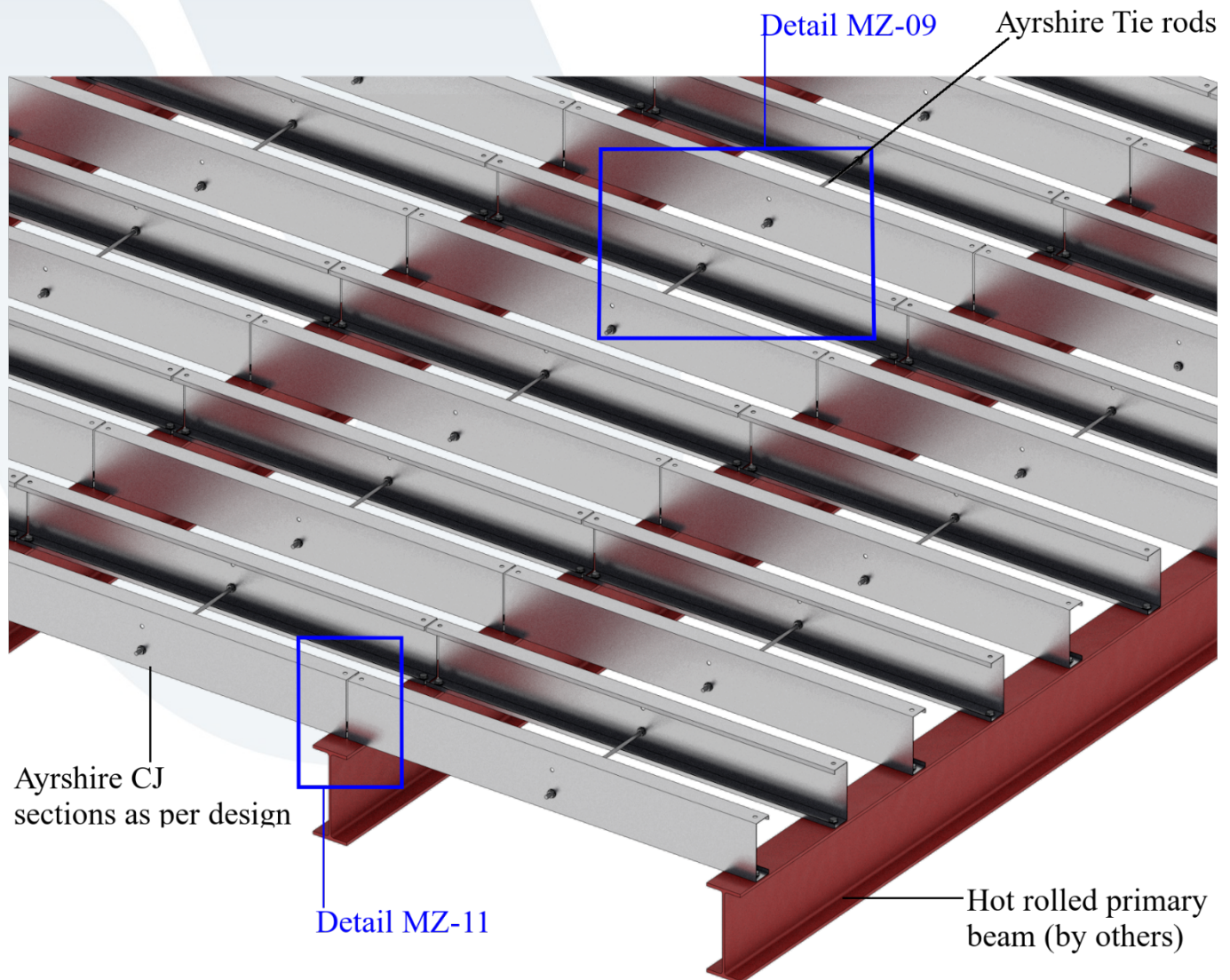
Inset System

- Cleats required at each end of each beam to connect to primary hot rolled beams.



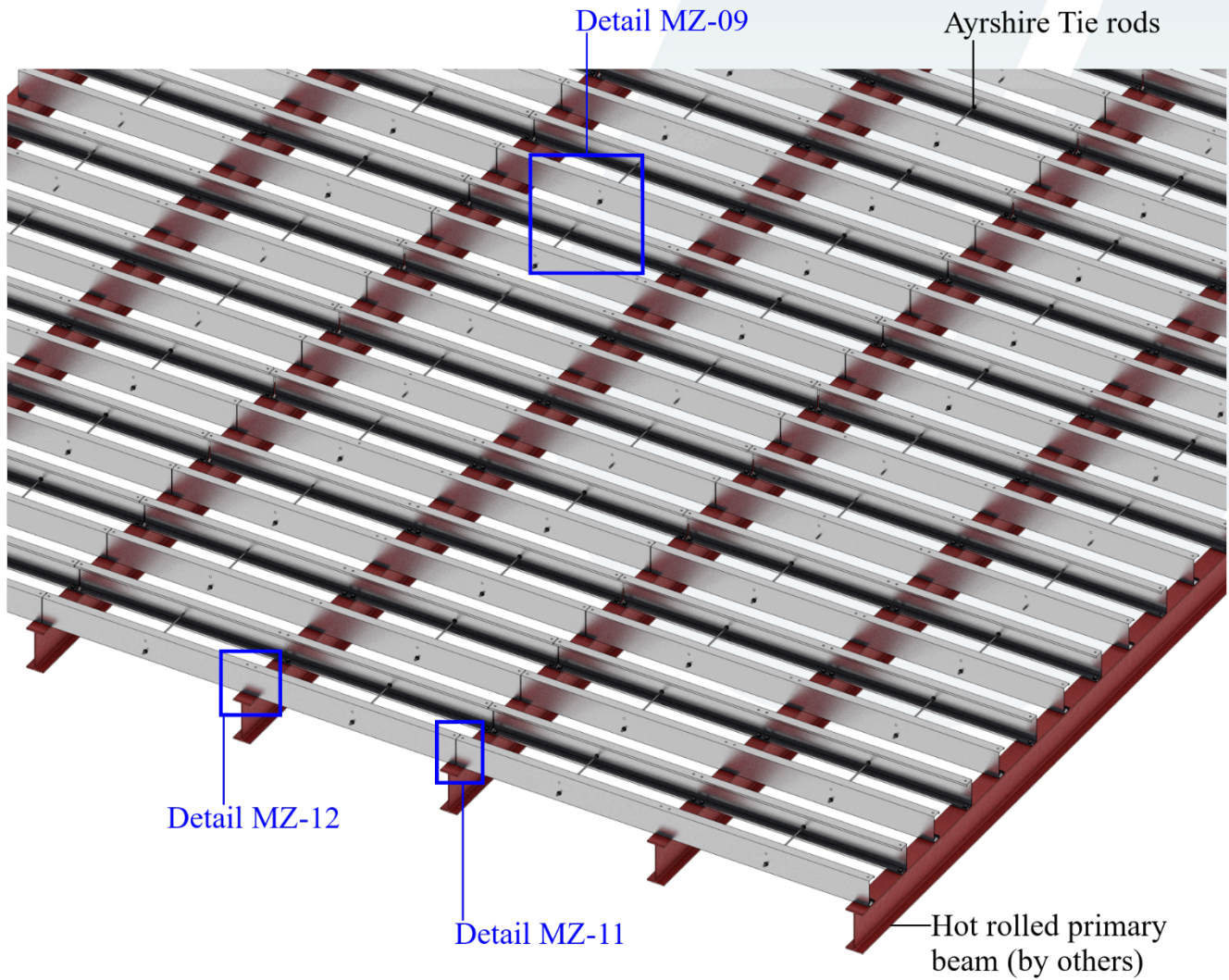
Single Span Oversail No Cleats System

- CJ secondary beams sit on top of the primary hot rolled beams at each end.
- No cleats are required.



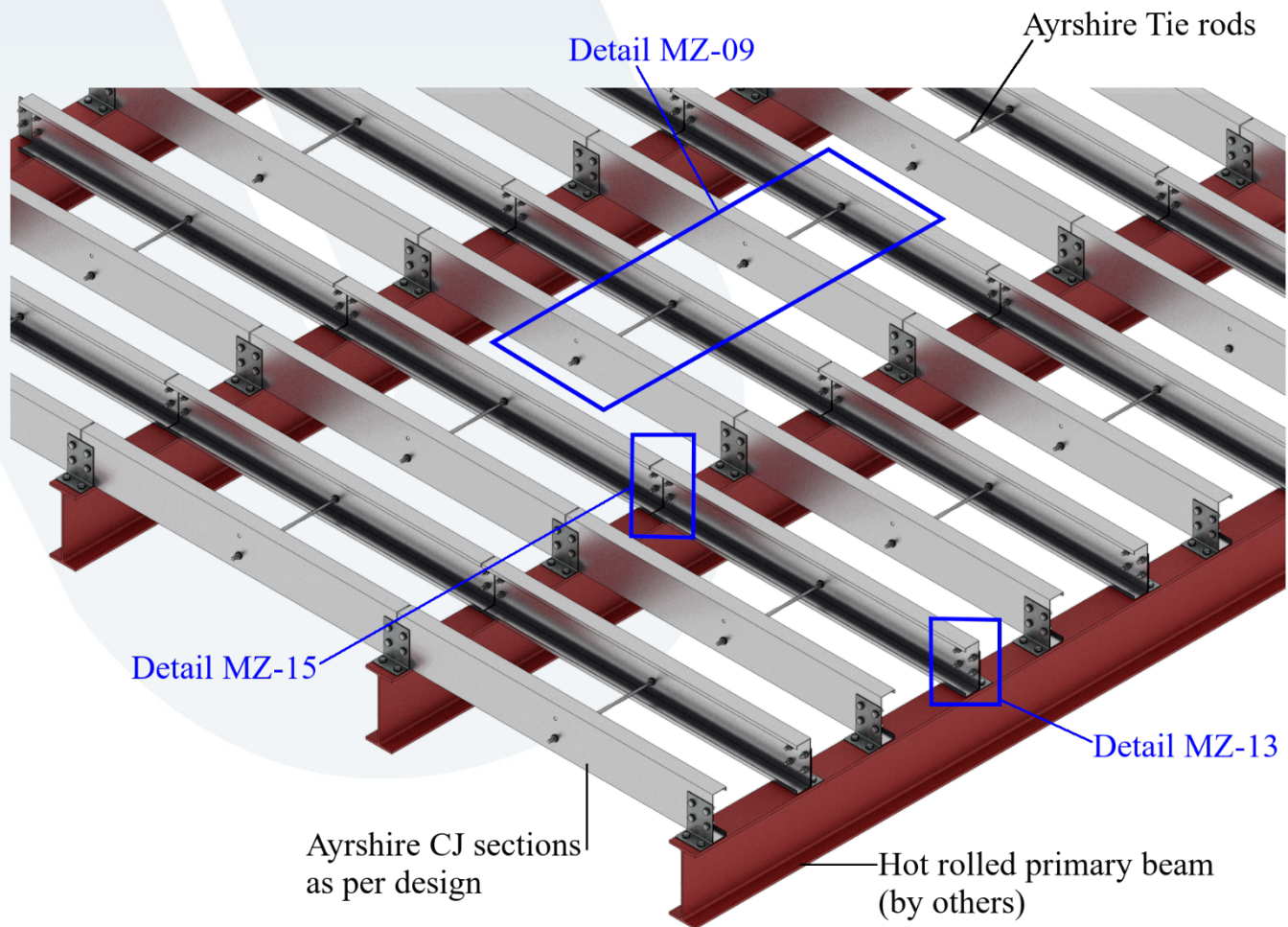
Double Span Oversail No Cleats System

- CJ secondary beams sit on top of the primary hot rolled beams at each end and at the intermediate location.
- **No cleats are required.**



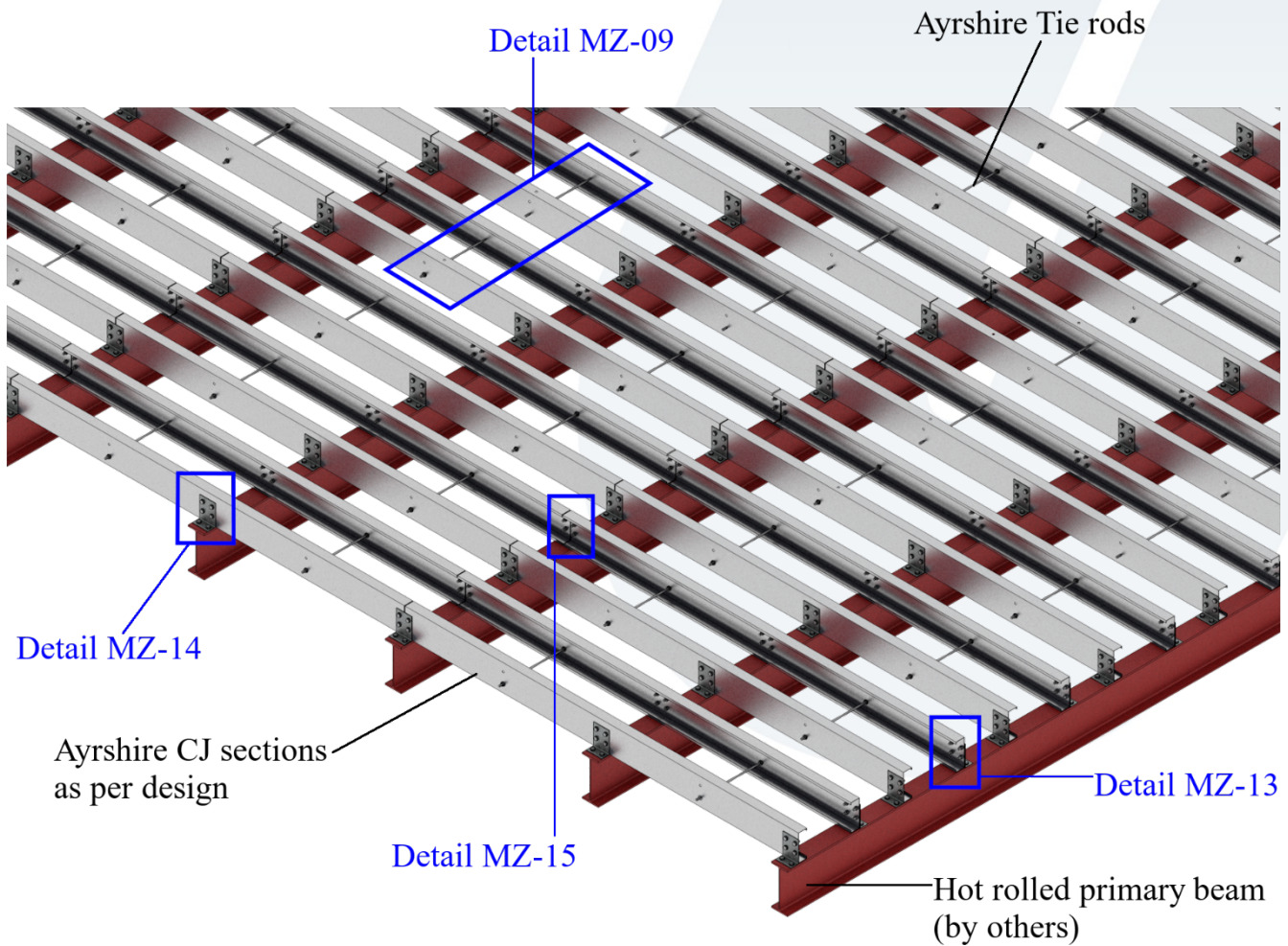
Single Span Oversail + Cleats System

- CJ secondary beams sit on top of the primary hot rolled beams at each end.
- Cleats required at each end of each beam to connect to primary hot rolled beams.



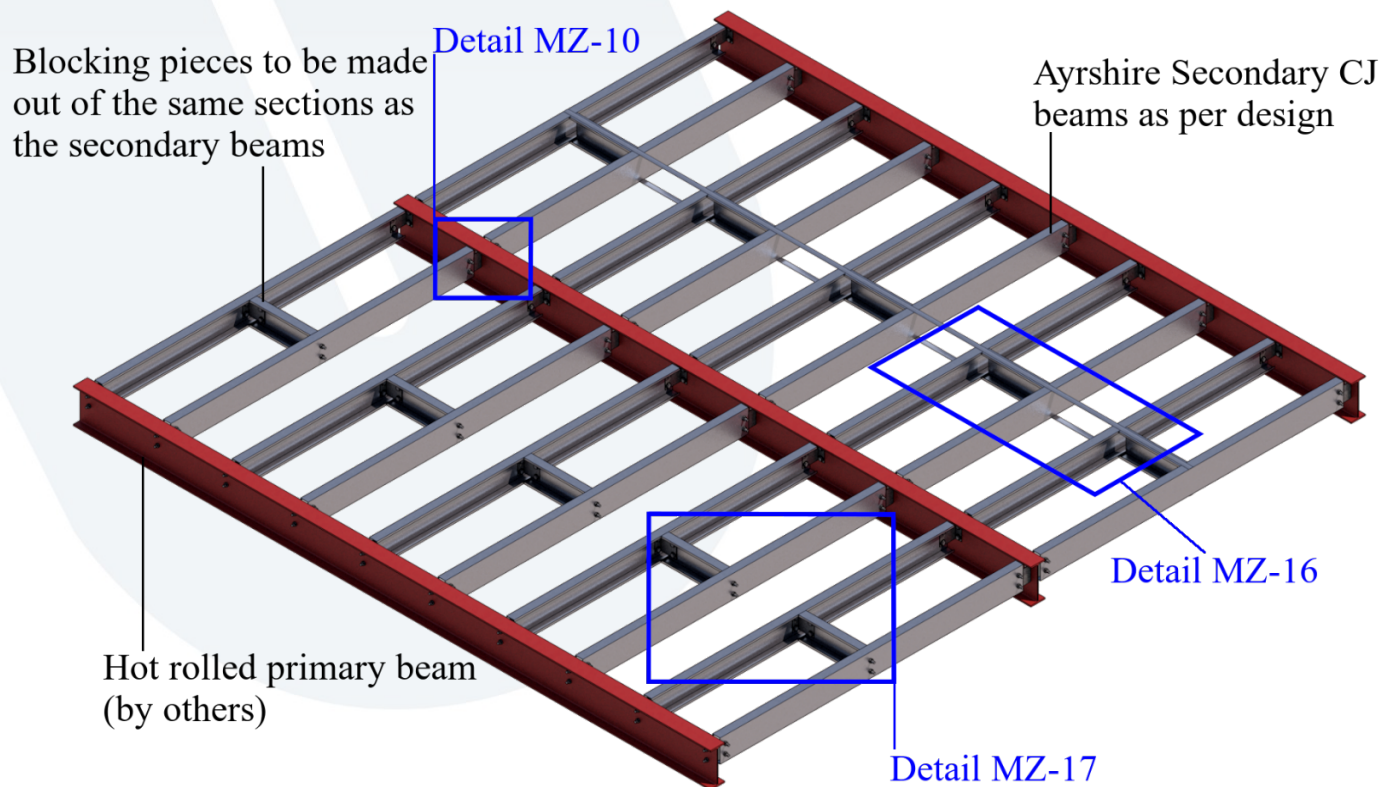
Double Span Oversail + Cleats System

- CJ secondary beams sit on top of the primary hot rolled beams at each end and at the intermediate location.
- **Cleats required at each end of each beam and at intermediate locations to connect to primary hot rolled beams.**

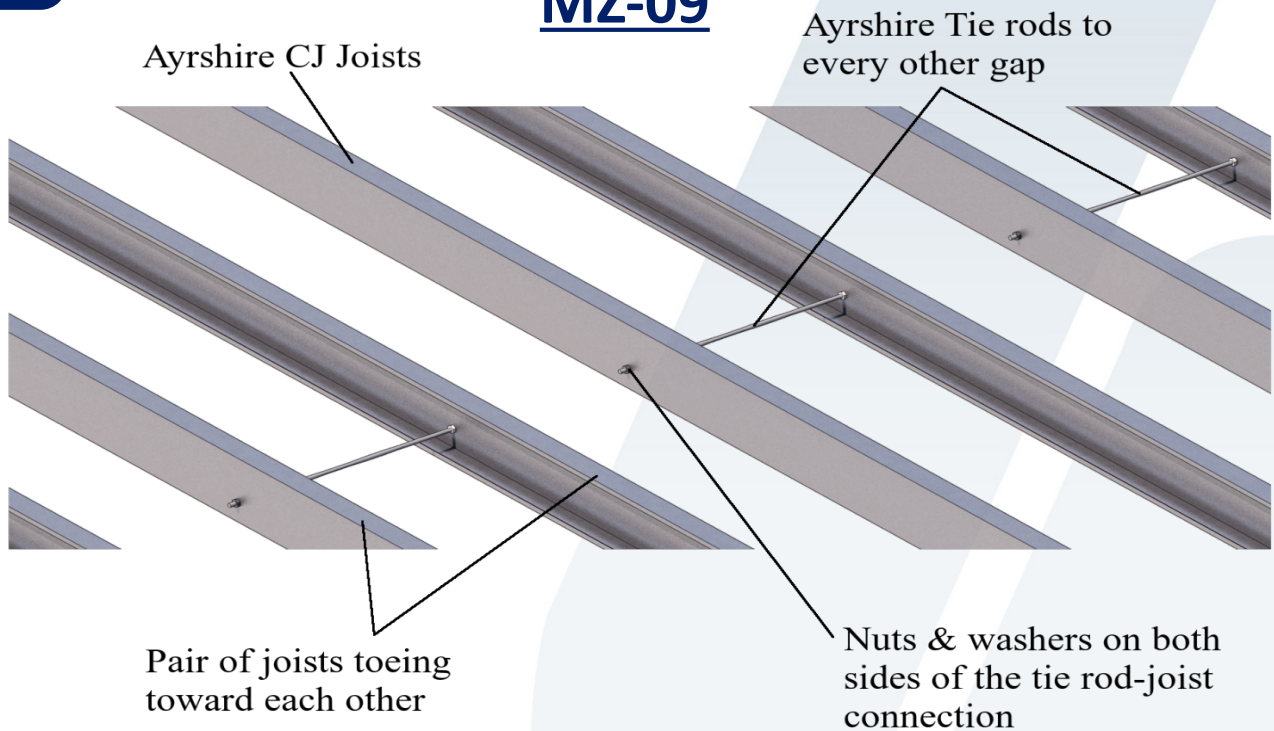


Laterally Unrestrained CJ System

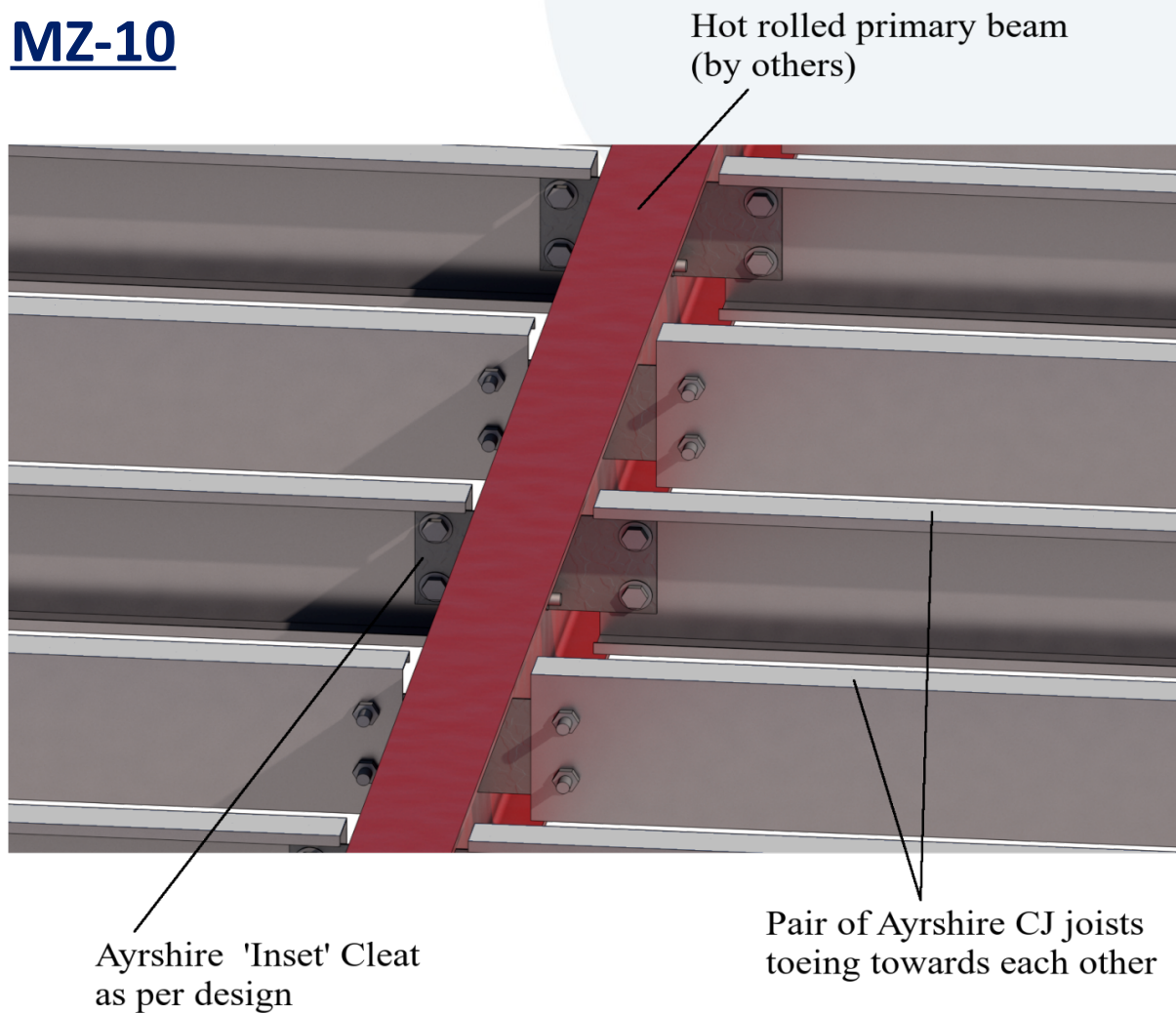
- Usually, suitable restraints need to be provided
- The restraints can either be in the form of conventional blocking & bracing or blocking pieces connected using standard cleats.



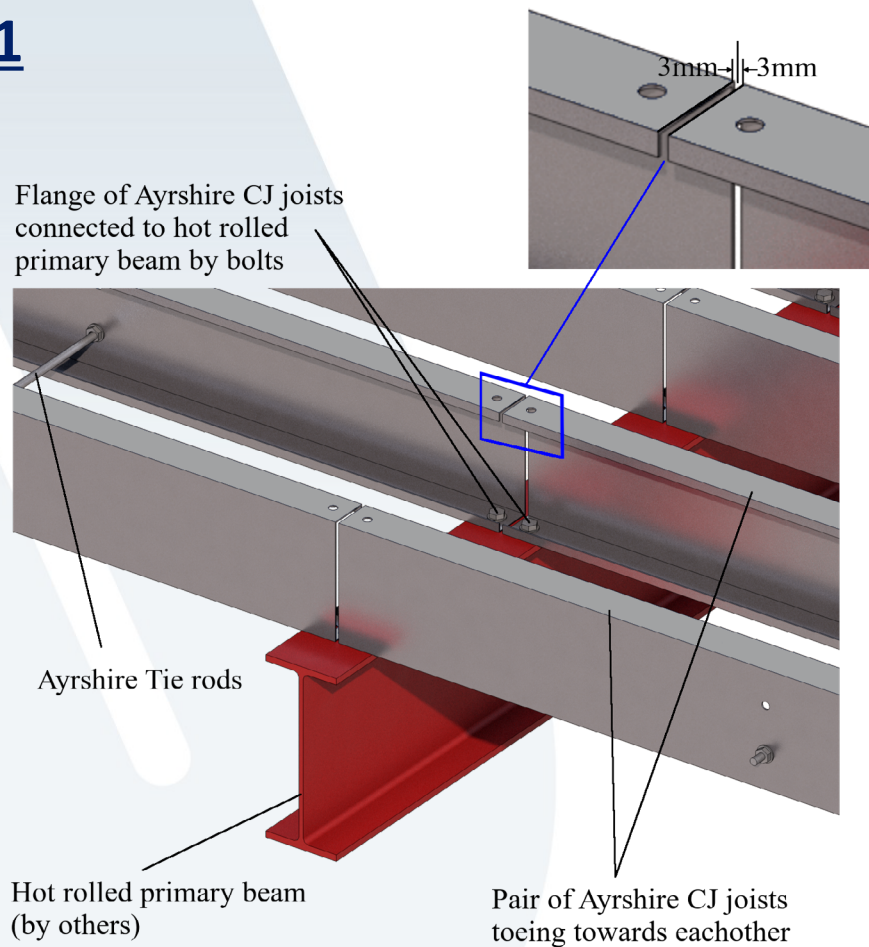
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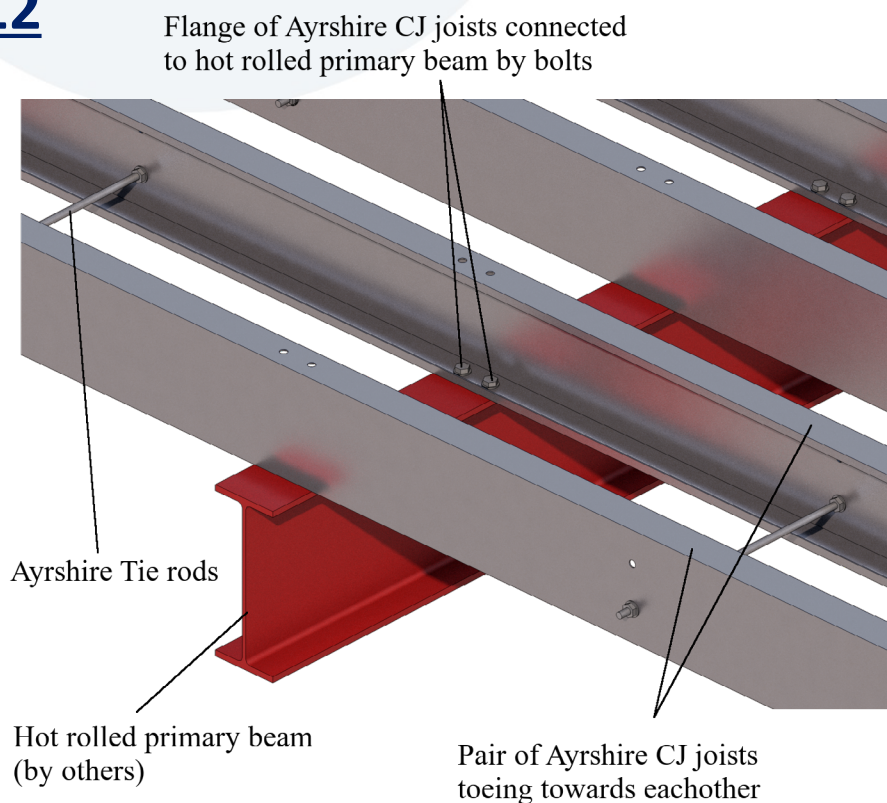
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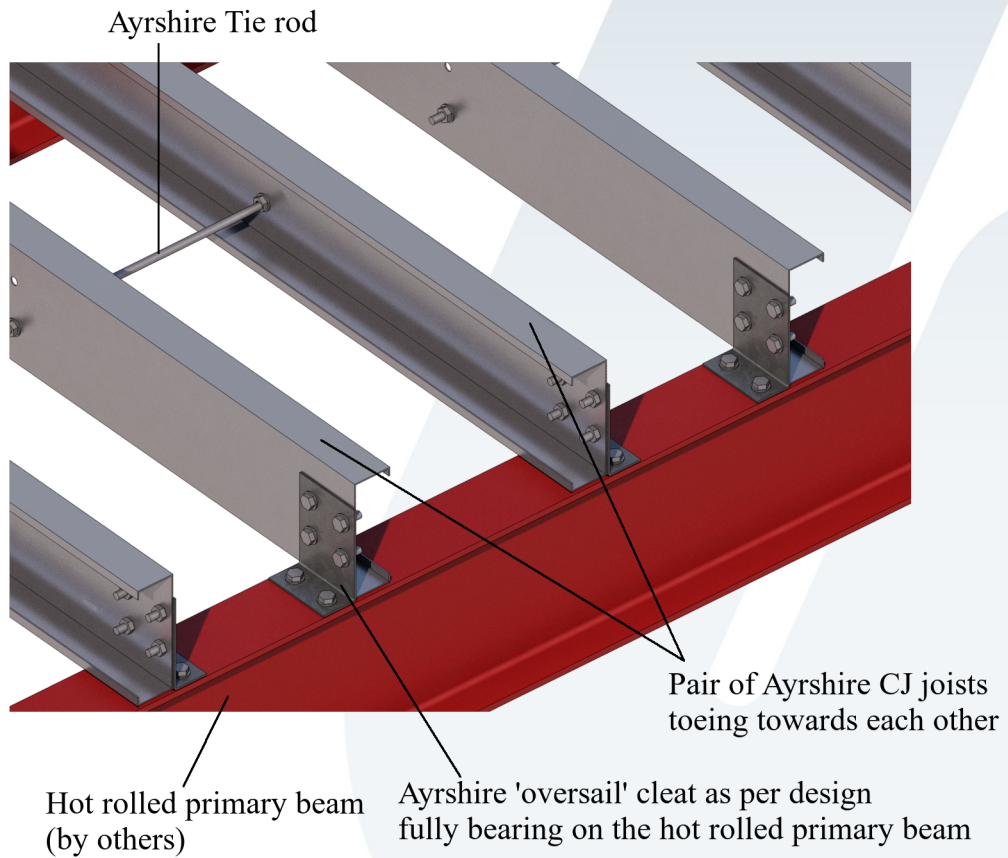
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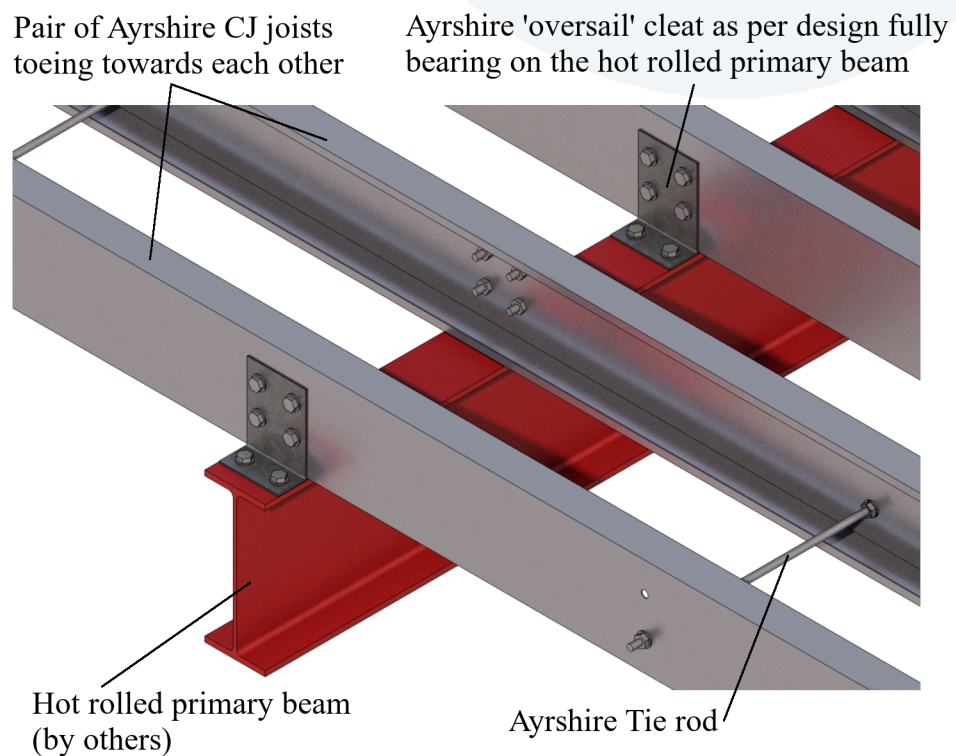
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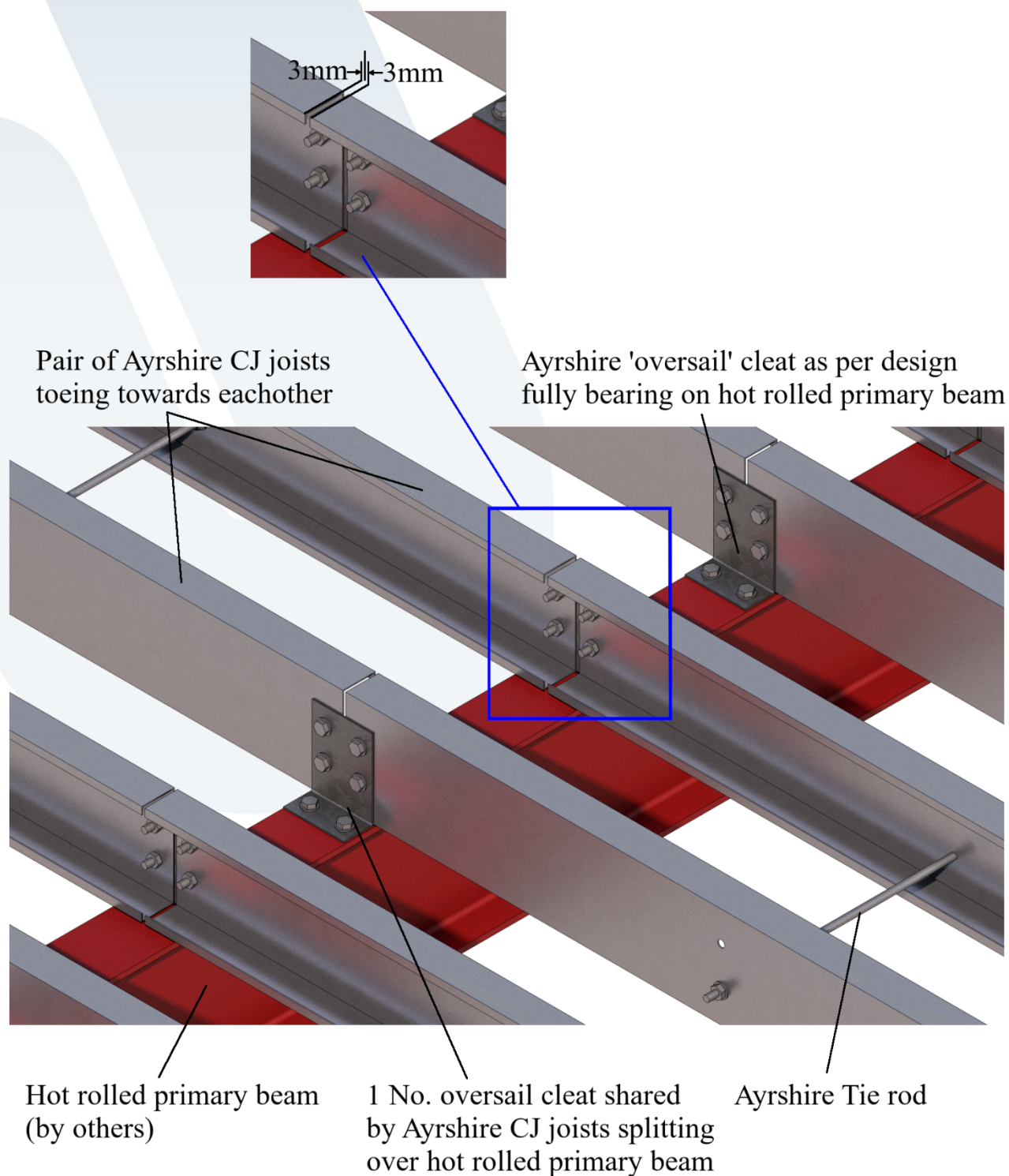
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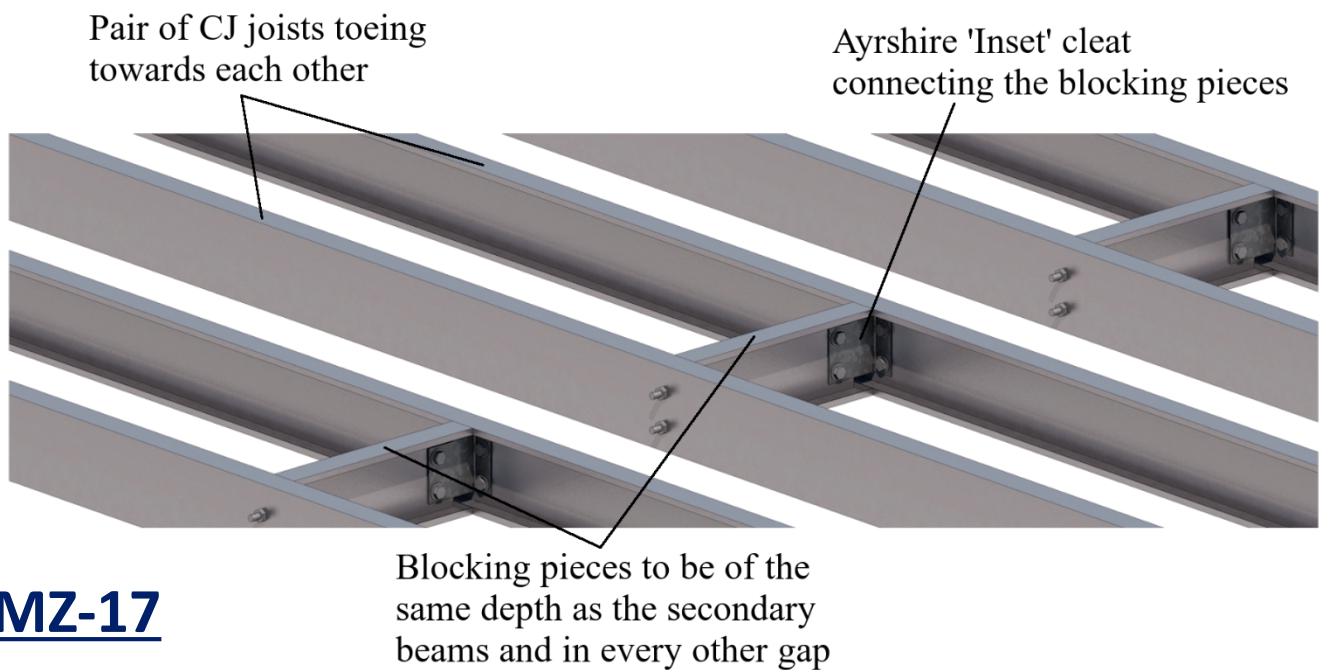
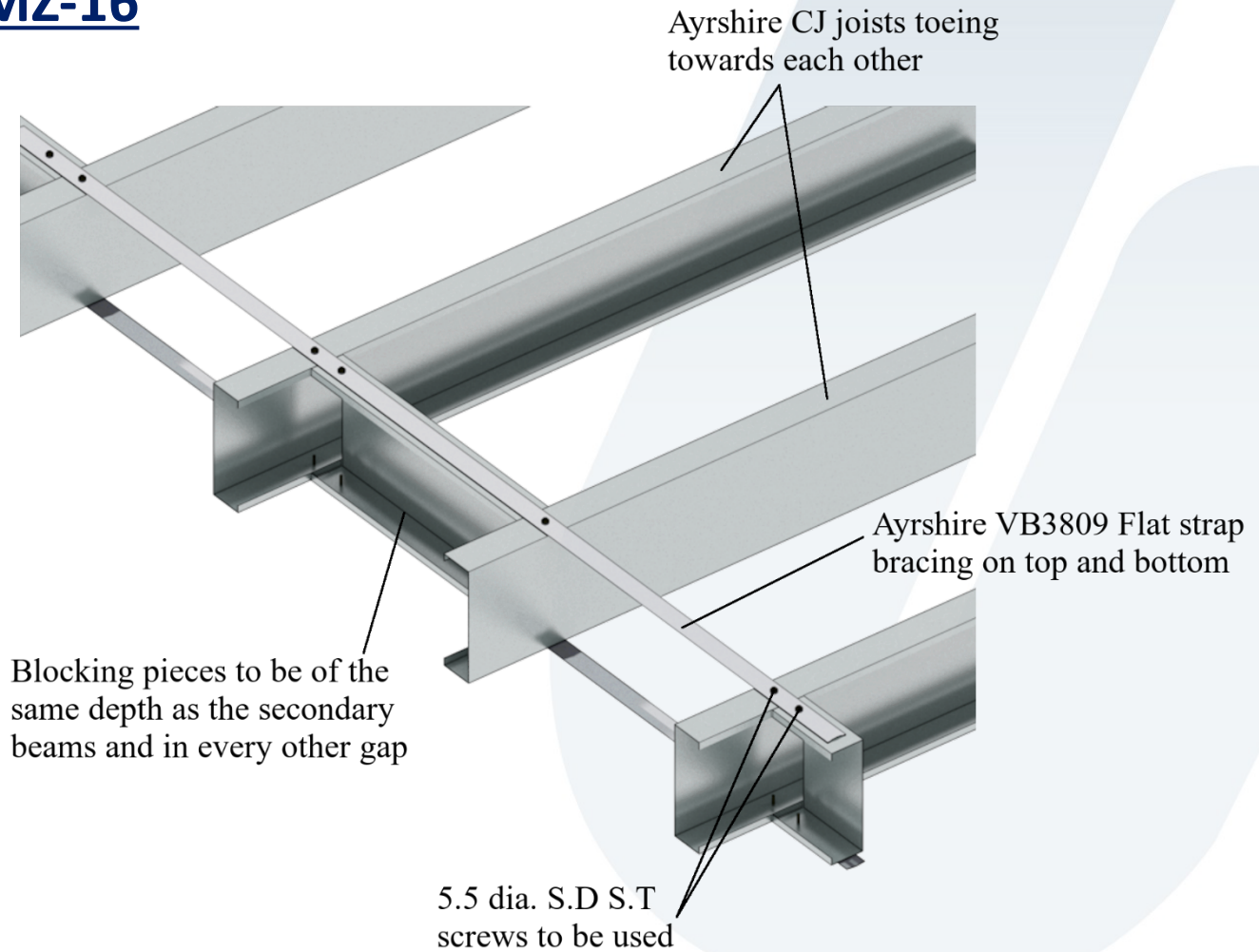
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MZ-15

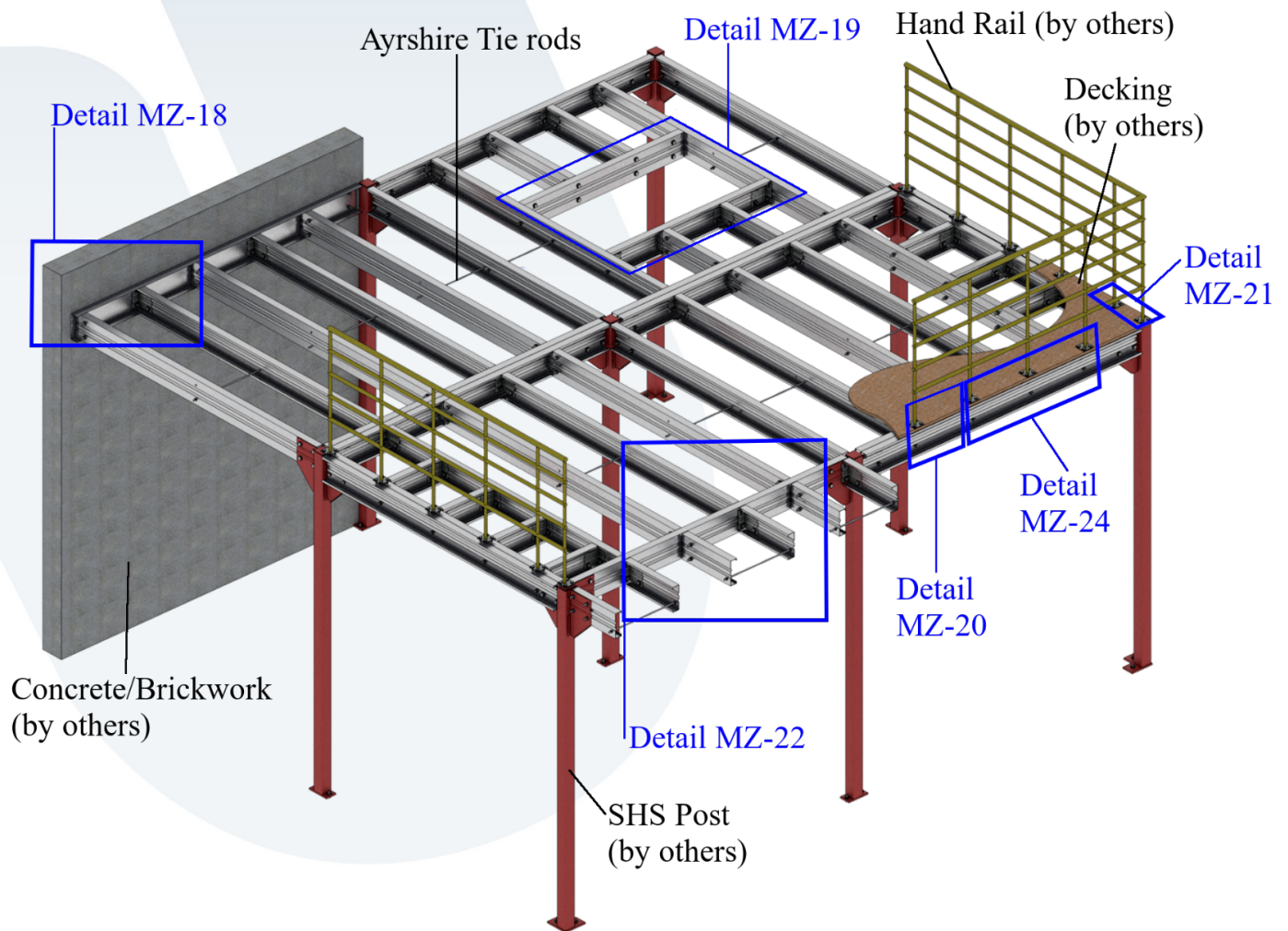


MZ-16



MZ-17

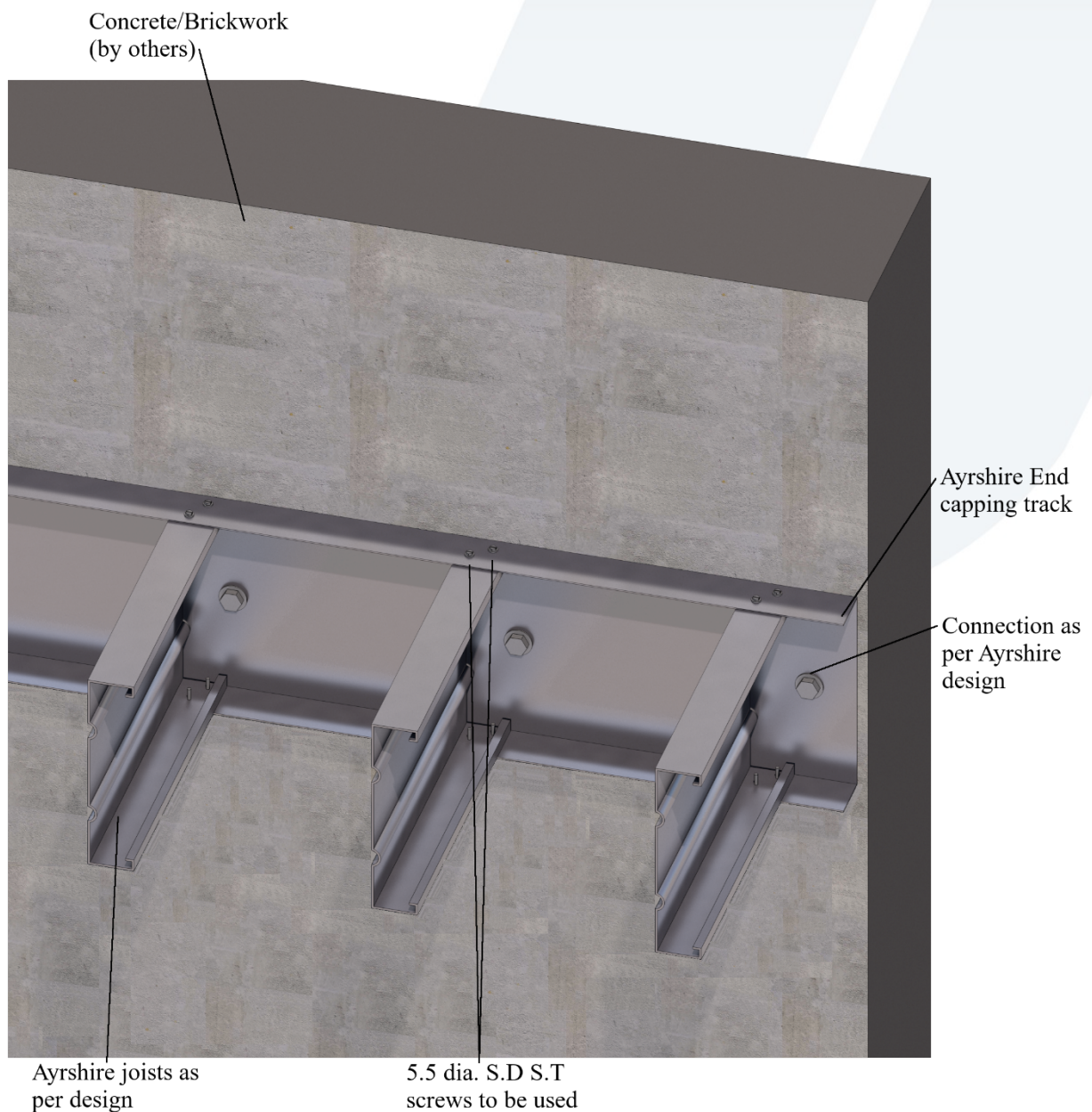
Additional Details



Connection of Ayrshire joists to Brickwork / Concrete

- Ayrshire end capping tracks required to connect joists to the wall.
- Standard end capping tracks available or end capping tracks can be pressed to suit the beam size.
- **Type & number of fixings as per Ayrshire's Design Calculations.**

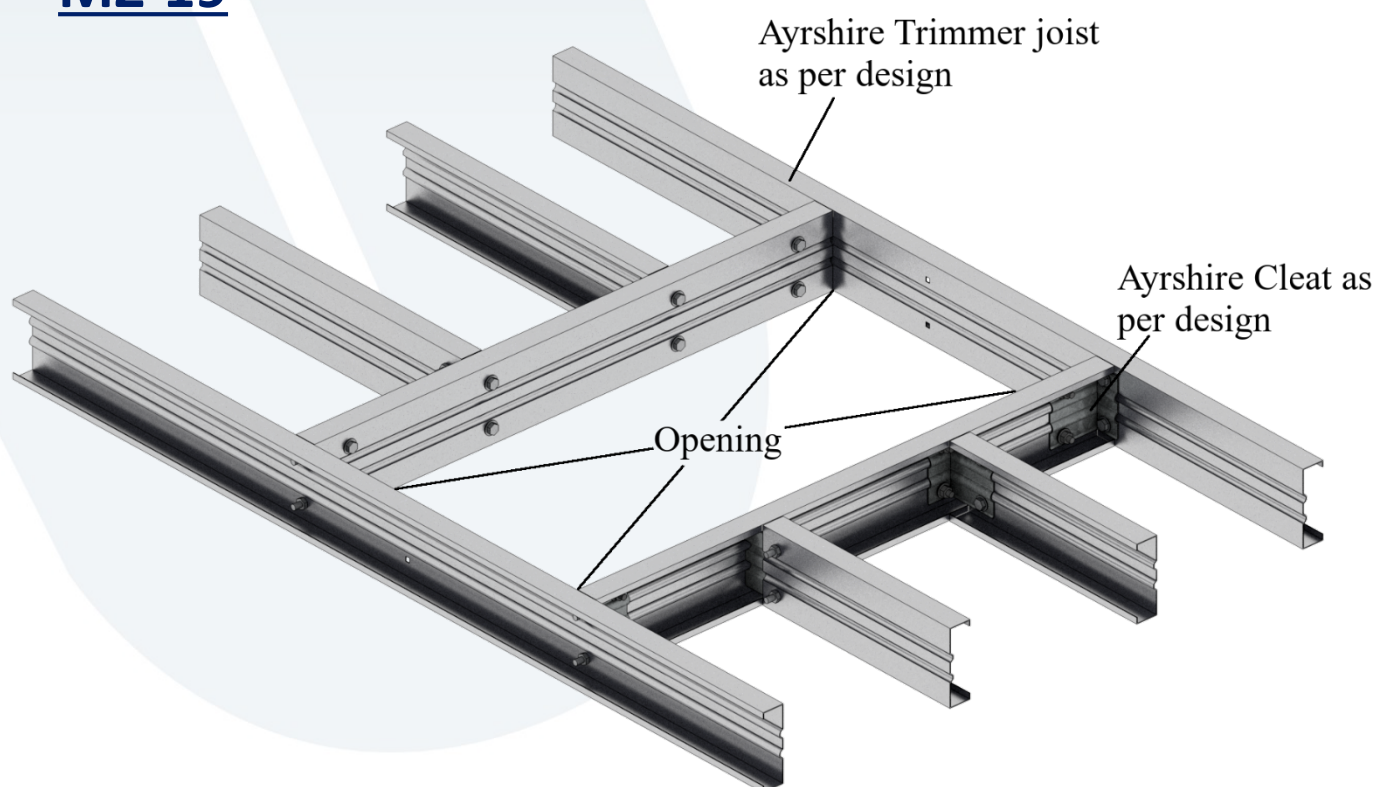
MZ-18



Trimmers

- Below is a general illustration of how trimmers can be formed using SwageBeam™ or CJ sections.
- **For type & number of cleats please refer to Ayrshire's Design Calculations.**

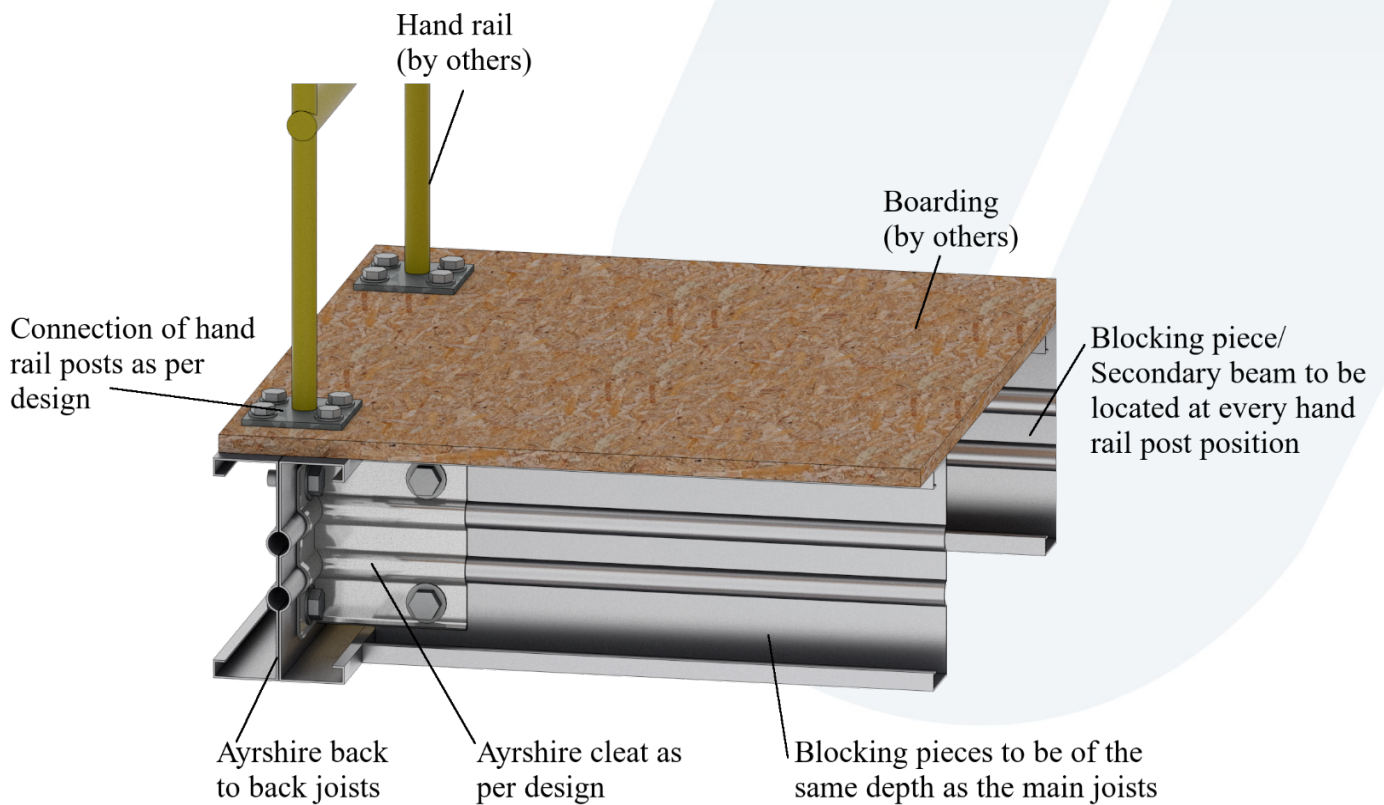
MZ-19



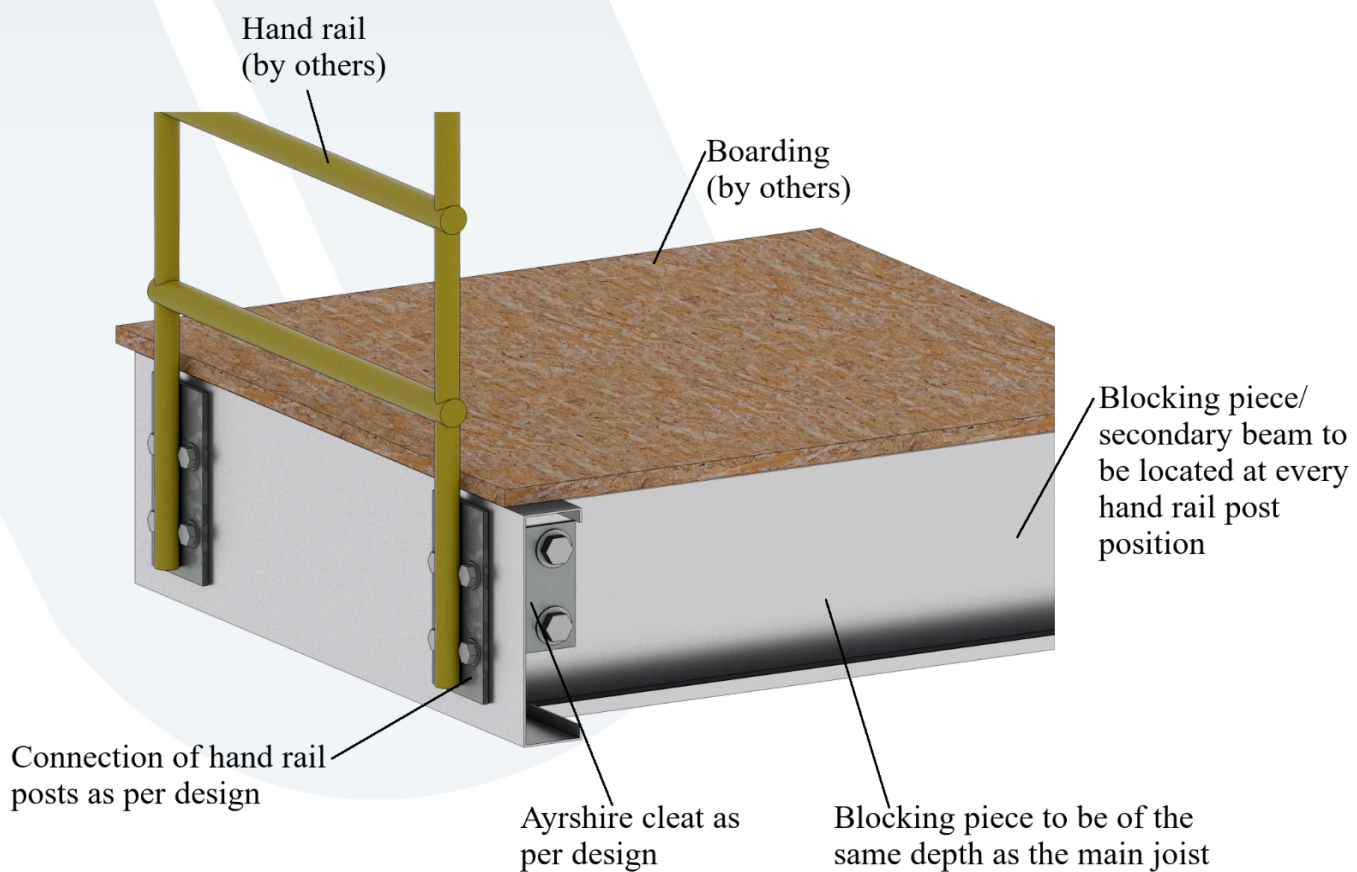
Handrails

- Below are general illustrations of how handrails can be fixed to SwageBeam™ or CJ sections.
- For connection details please refer to Ayrshire's Design Calculations.

MZ-20



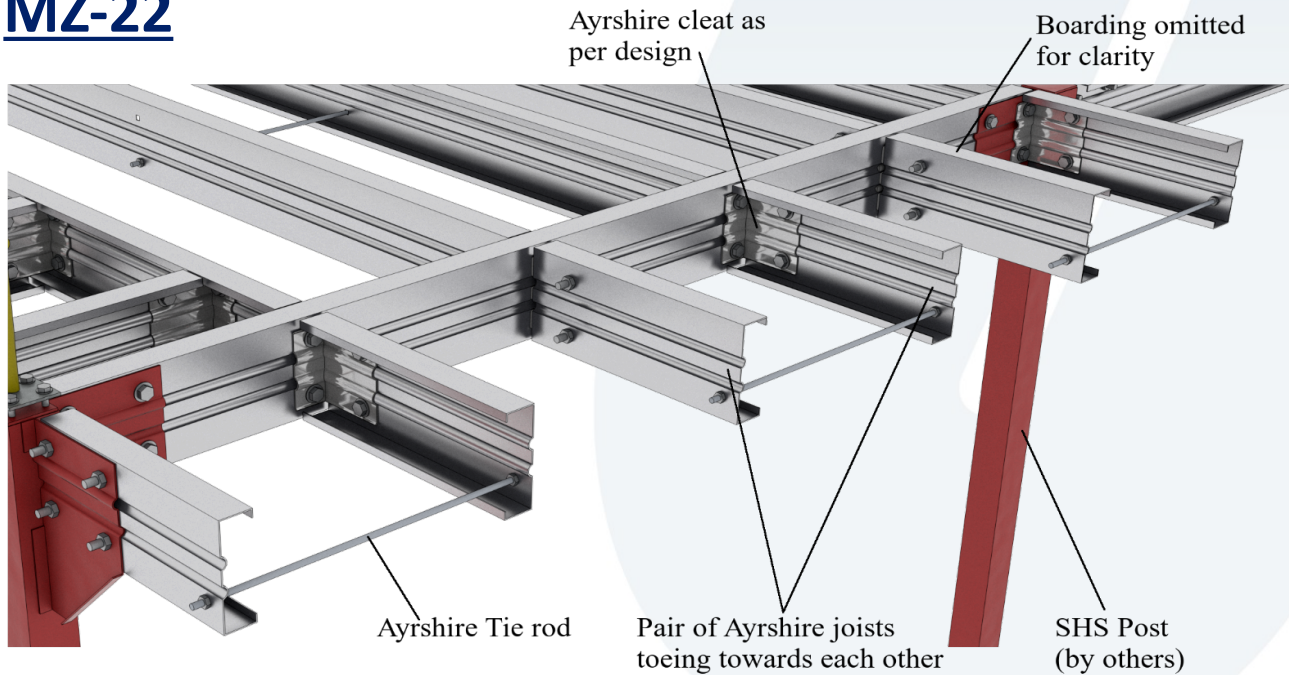
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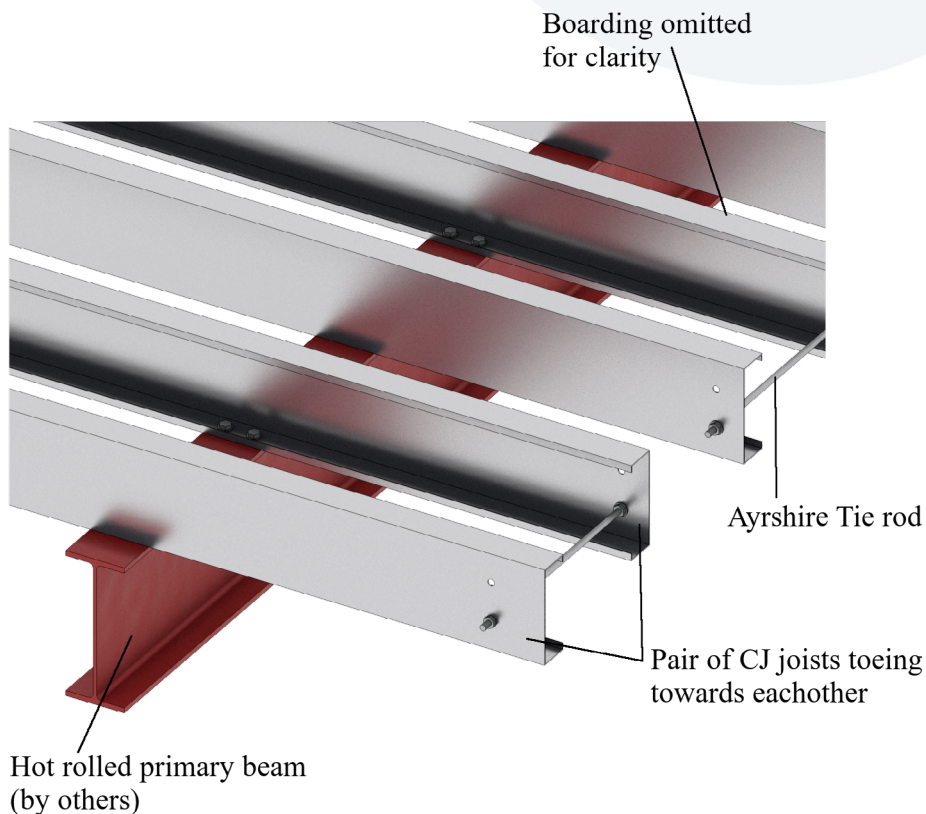
Cantilever

- Below are general illustrations of how cantilevers can be formed using SwageBeam™ or CJ sections.
- Depending on cantilever length / loading, trimer beams may be required to join the free ends of the cantilever joists together.
- **For connection details please refer to Ayrshire's Design Calculations.**

MZ-22



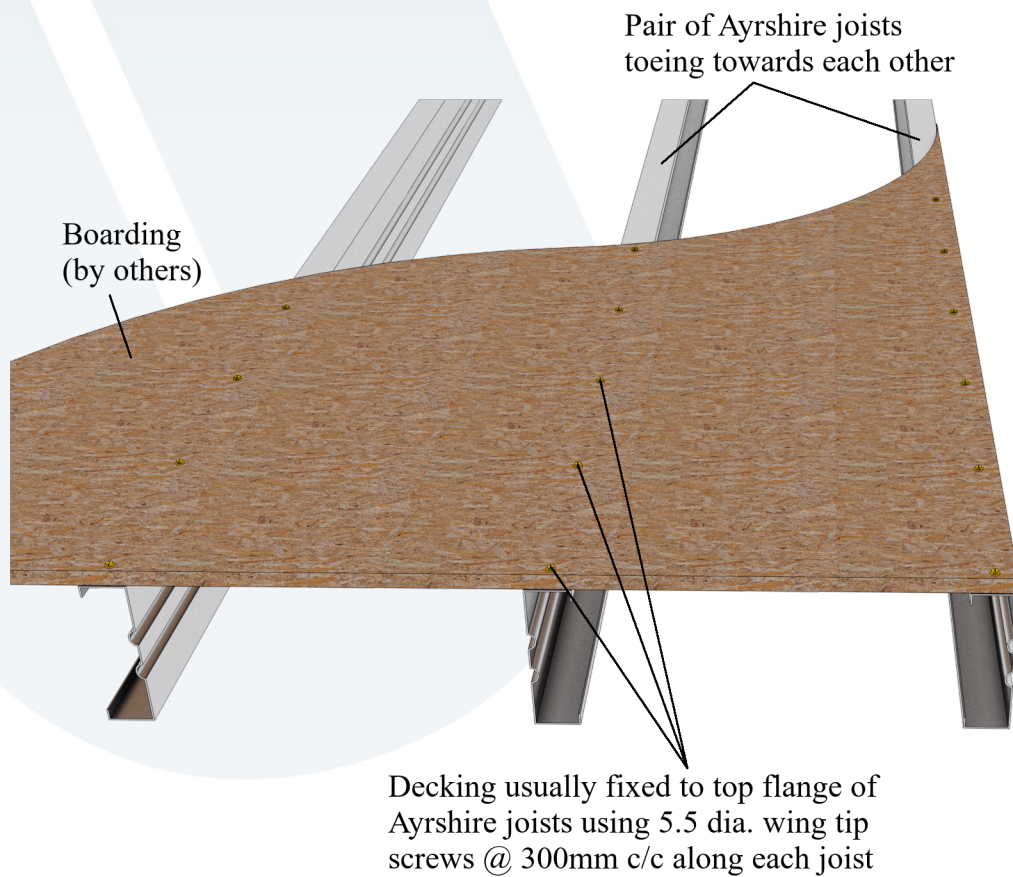
MZ-23



Connection of Decking

- Below is a general illustration of how decking can be connected to SwageBeam™ or CJ sections.

MZ-24





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www.ayrshire.co.uk



**LIGHT STEEL FRAME
ASSOCIATION**
MANUFACTURING MEMBER

