NEREIDE

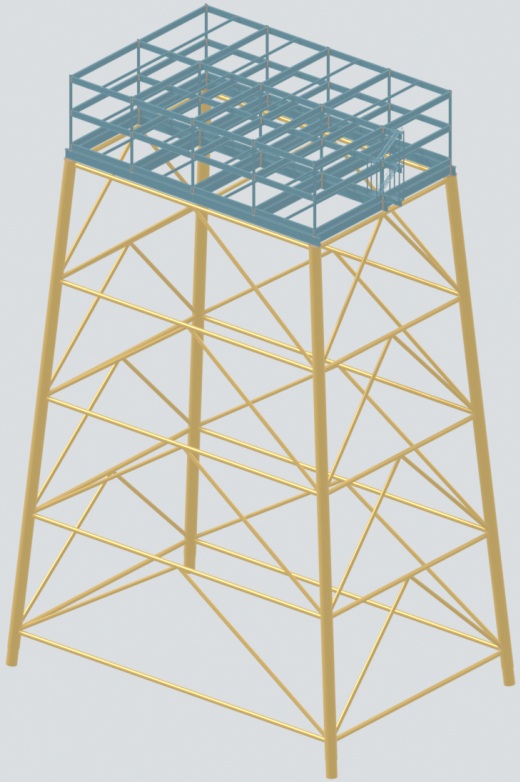
OFFSHORE STEELWORK

Offshore steelwork. From the structural system to the assembly detail.

ADIVOR for Frame Engineering

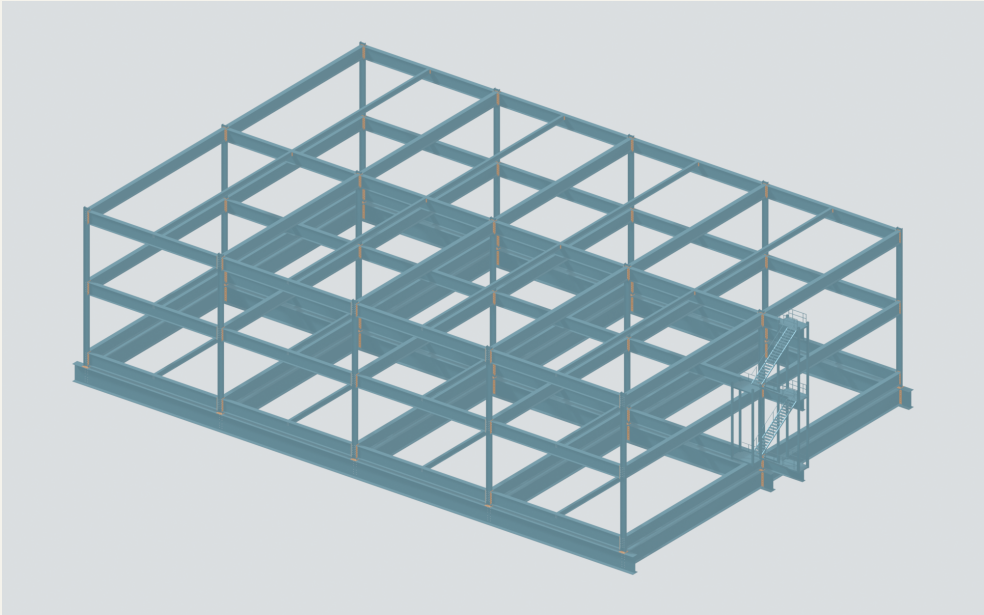
Angelo Rovida
adivor@adivor.it
adivor.it

C03 / 19.11.2026



A project to explore, part by part

Nereide demonstrates a complete steelwork modelling and documentation workflow: primary members, plates, fasteners, access structures, drawings and schedules tied to one revision. Dimensions and site conditions are assumed for this demonstration. Geometry is checked; strength, fatigue, foundations and offshore requirements require the actual structural design and site data.



9,097
physical components

157
geometry families

3
structural levels

0
detected BREP interferences

One model, consistent deliverables

Part marks connect each 3D component to its bill of materials, cut geometry and drawings. The portable folder brings together the presentation, technical appendix, models and checks. Frame can inspect a detail, discuss a revision and identify the affected component.

01

Model and marks

02

Drawings and schedules

03

Checks and revision

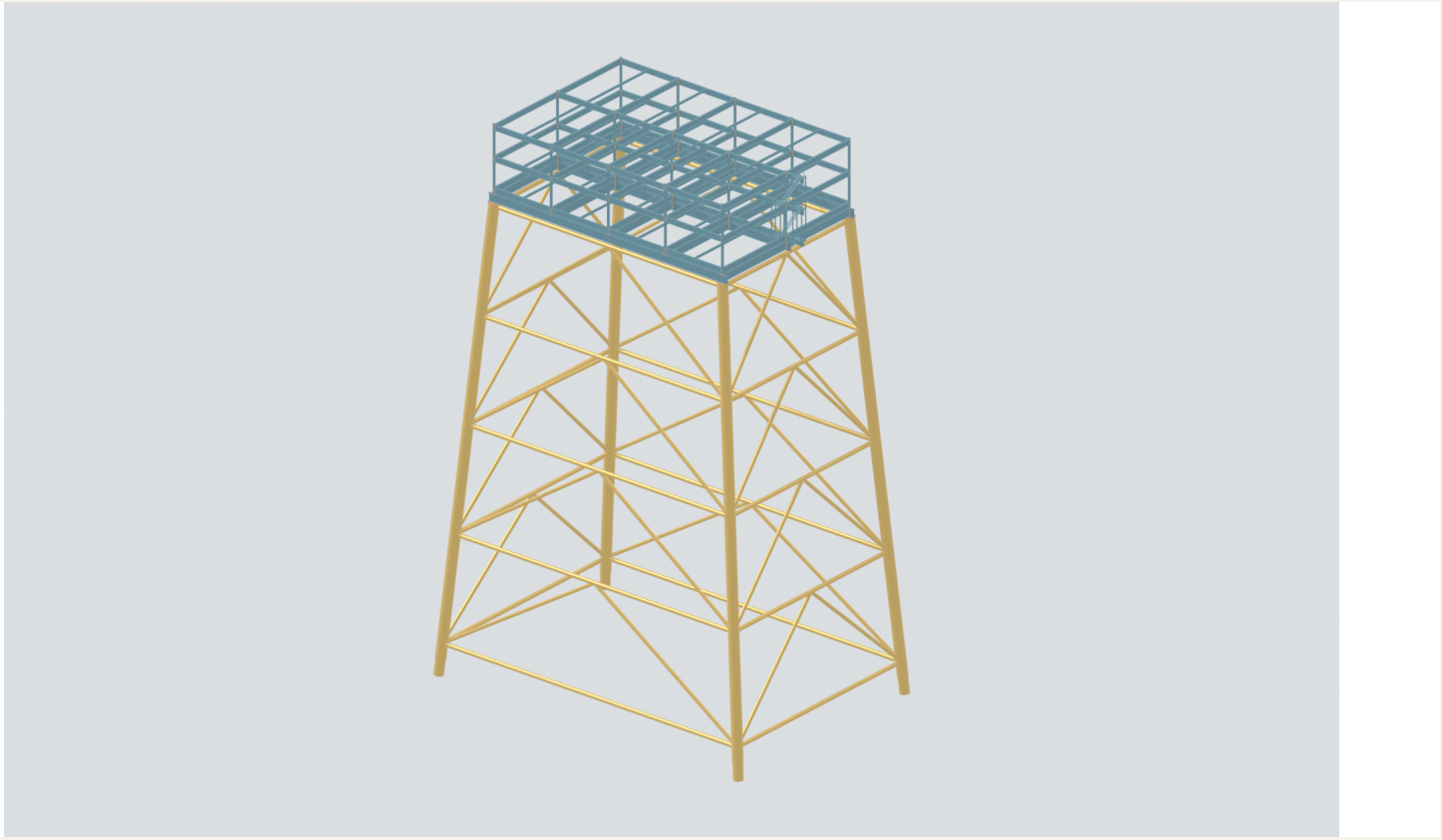
04

Portable handover

The offshore assembly

A tubular substructure supports a transition grillage and three steelwork levels. The side access module makes the connections between the primary structure, landings and stairs visible. The C03 structural grid occupies 68 x 46 m within the original Nereide concept envelope.

- Jacket and tubular piles
- Transition grillage
- Three levels and access module

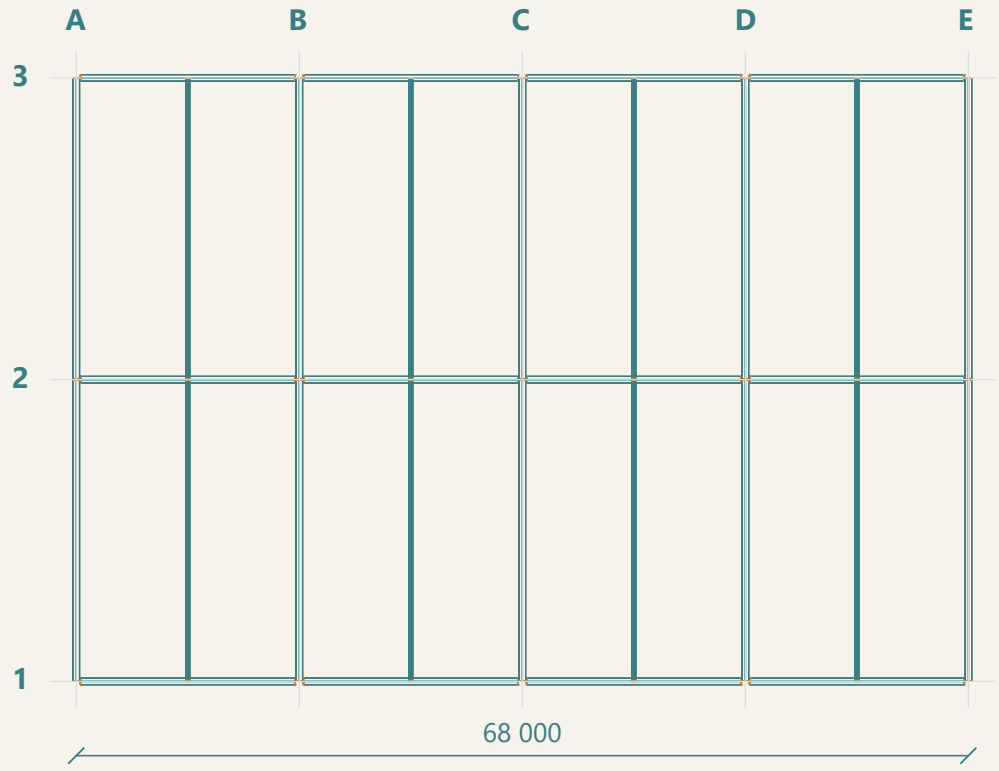


VIEW FROM THE C03 MODEL

A clear coordination grid

Coordinates are local, in millimetres, with Z upwards and the origin at the jacket centre. Levels +24, +32 and +40 m identify beam centrelines, not finished walking surfaces. The -96 m seabed is an illustrative assumption, without georeferencing.

- X: four 17,000 mm bays
- Y: two 23,000 mm bays
- Beam level spacing: 8,000 mm

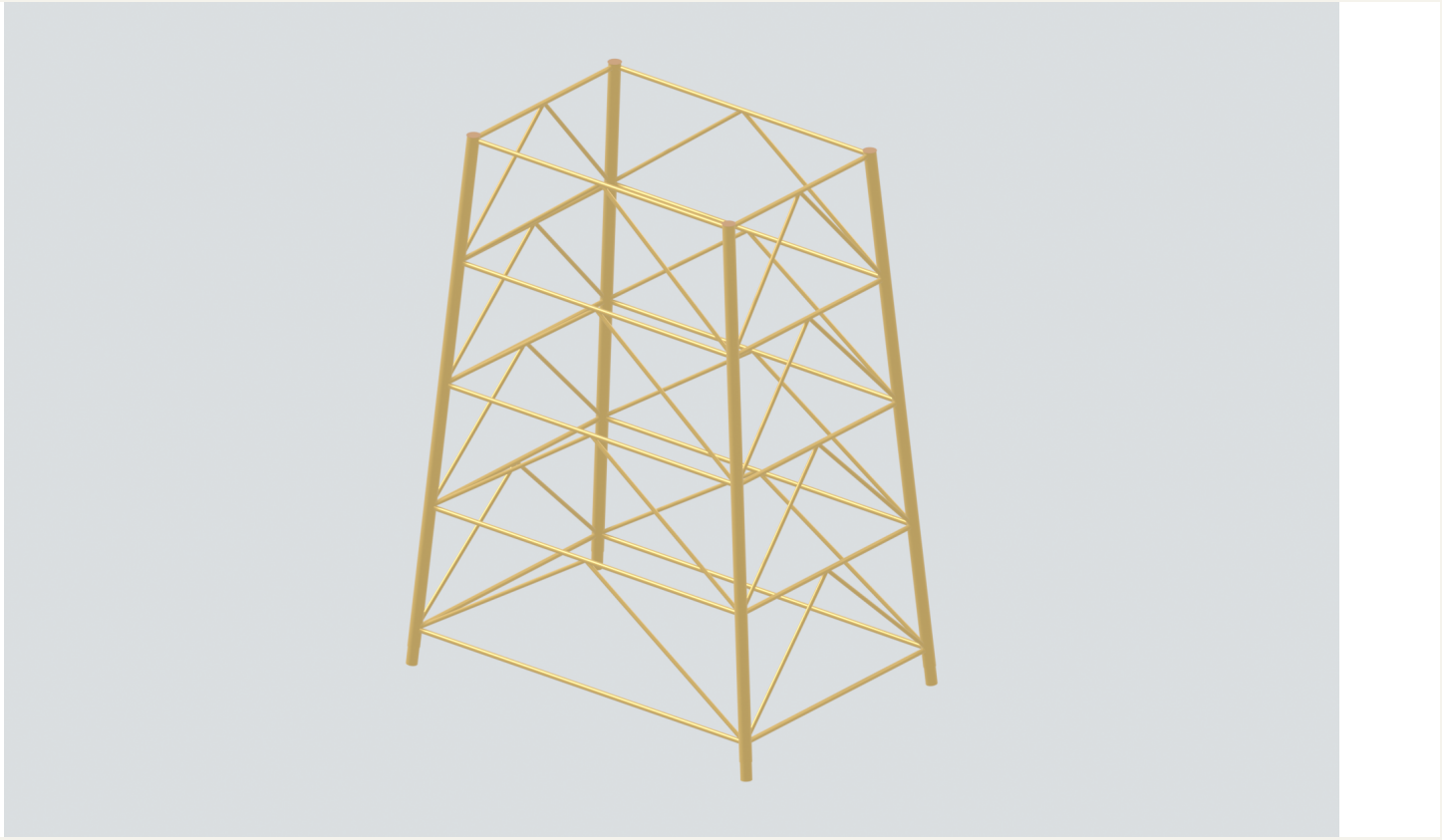


68 000 X 46 000 MM

Jacket: tubes, nodes, saddle cuts

Members are hollow tubes. Node ends are cut against the receiving tube geometry, and converging brace ends have actual separating cuts. Geometric joint interfaces can be inspected in the model; weld design and fatigue assessment remain part of the real engineering project.

- Legs: CHS Ø2700, t60
- Horizontal members: CHS Ø1100, t35
- Braces: CHS Ø900, t32

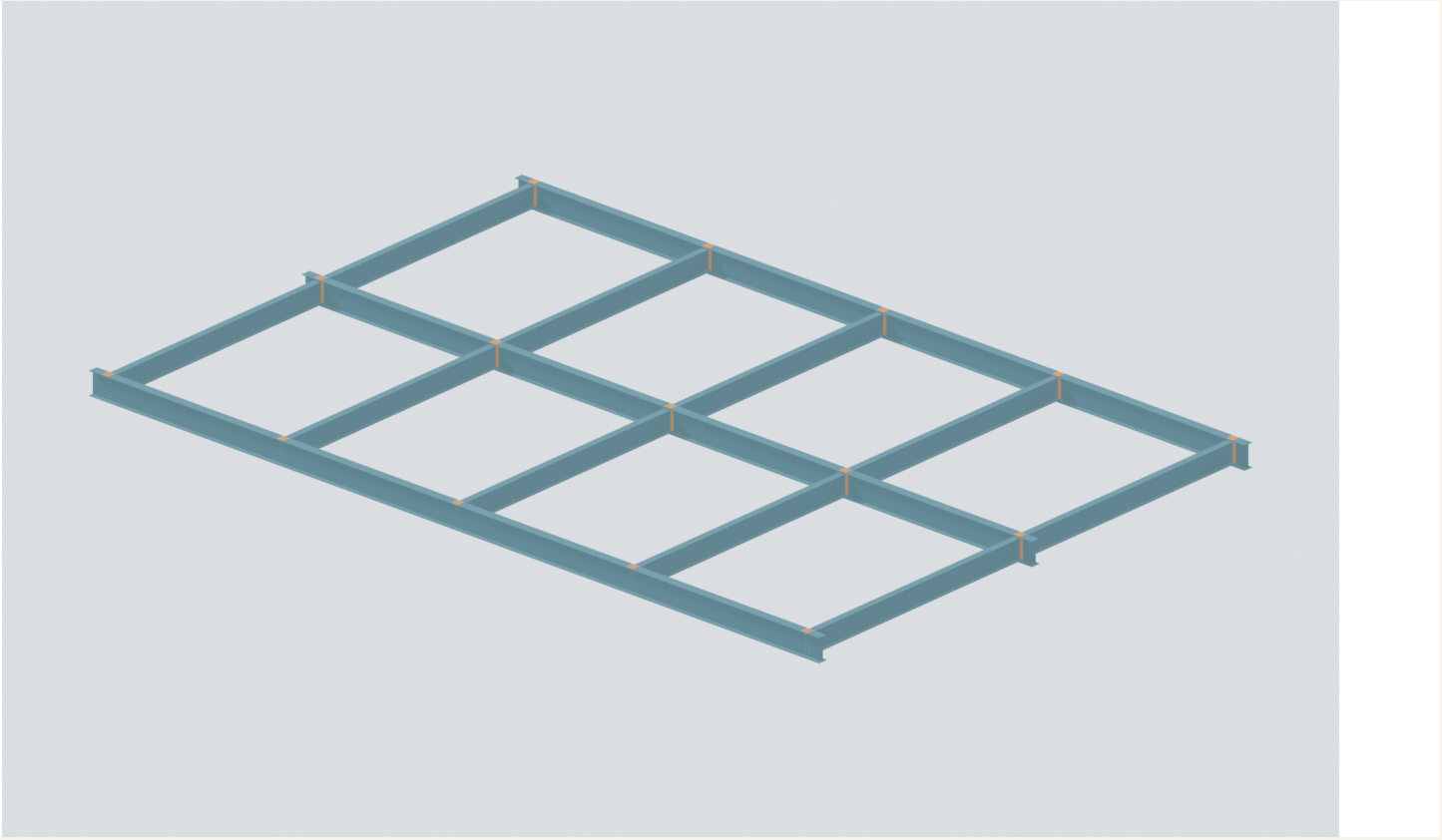


VIEW FROM THE C03 MODEL

Supports and foundations: explicit interfaces

The model separates piles from jacket legs and cap plates from the transition grillage. Annular clearance is geometric; it does not define a grouted connection, pile driving design or pile-to-jacket load transfer. These interfaces must follow geotechnical data and approved design reactions.

- Piles: CHS Ø2500, t50
- Leg inside diameter: 2580 mm
- Nominal radial clearance: 40 mm

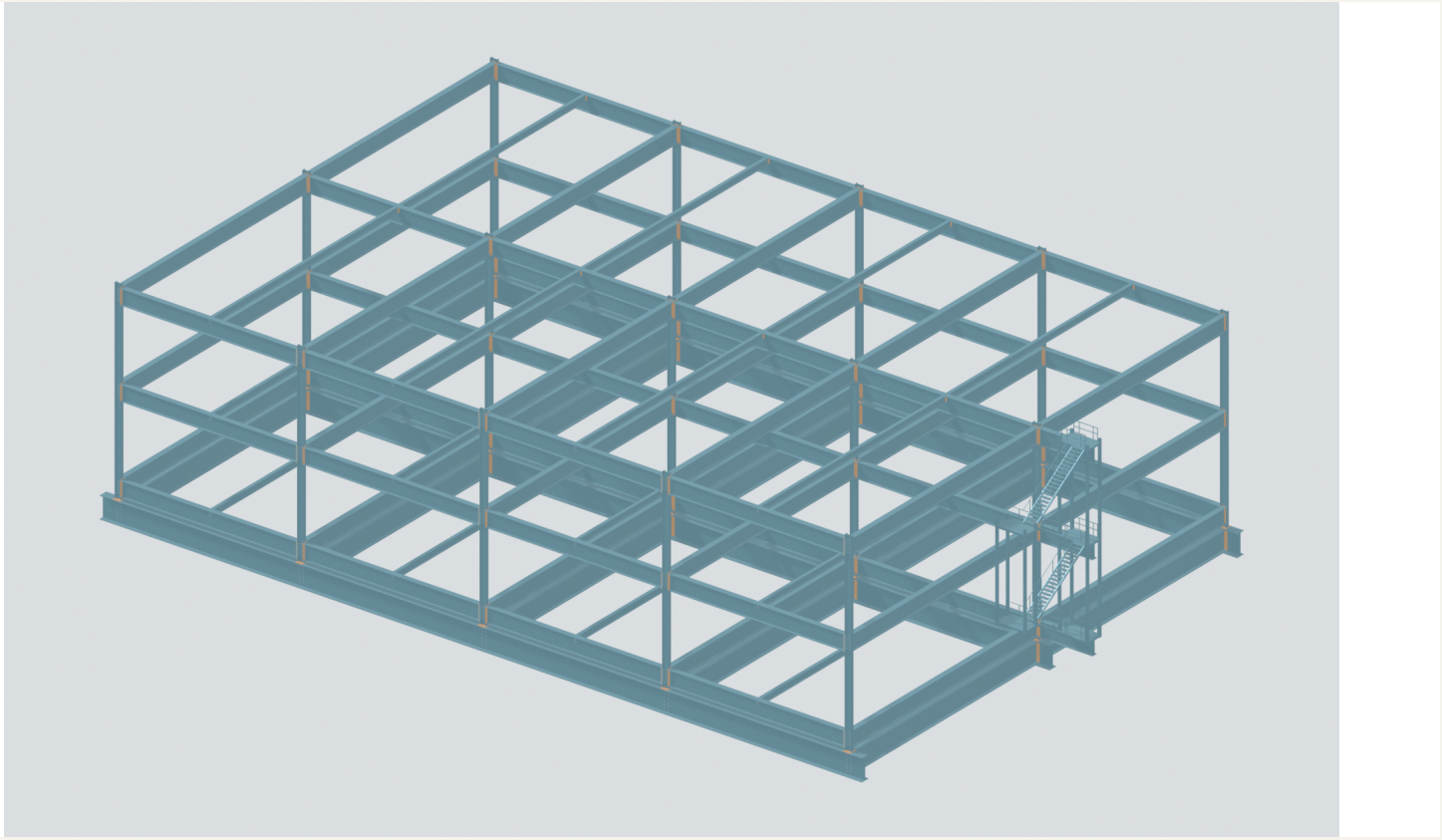


VIEW FROM THE C03 MODEL

The primary topside steelwork

Columns, primary beams and secondary beams carry separate marks and assembly groups. I-sections have actual webs and flanges; rolled sections include root fillets. Level-based assemblies allow areas to be isolated and repeated connections to be compared.

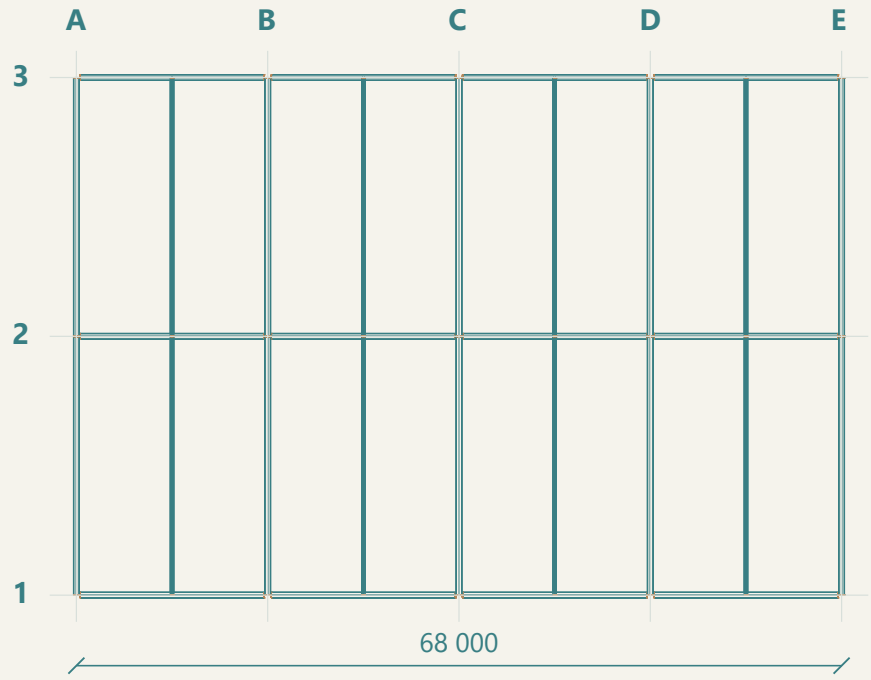
- HE 600 B columns
- Welded I 1400x500 primary beams
- HE 600 B secondaries with copes



VIEW FROM THE C03 MODEL

General structural plan

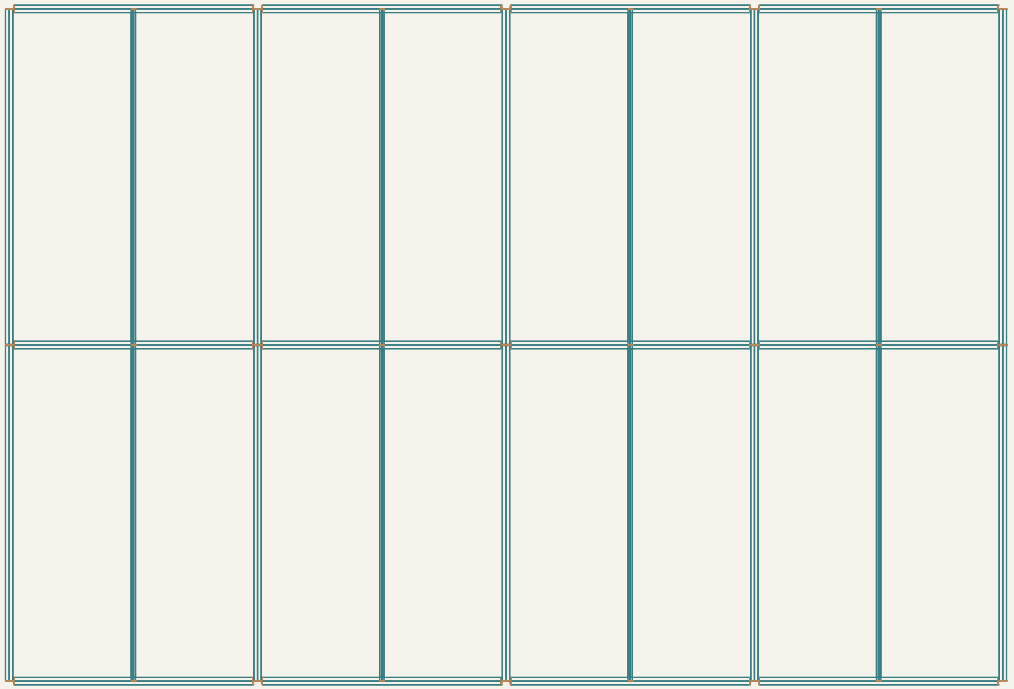
The plan is derived from C03 geometry with the reference grid overlaid. Bays and marks identify the steelwork. Process envelopes from the earlier concept are outside this check. The access module is coordinated on the east side.



Lower beam level / +24 m

The first level uses the same repeated joint logic as the upper levels. Its assembly group isolates the beams, plates and fasteners belonging to this level. The indicated elevation is the primary beam centreline.

- Assembly DECK_24000
- J01 and J03 plates
- Coordinated side access

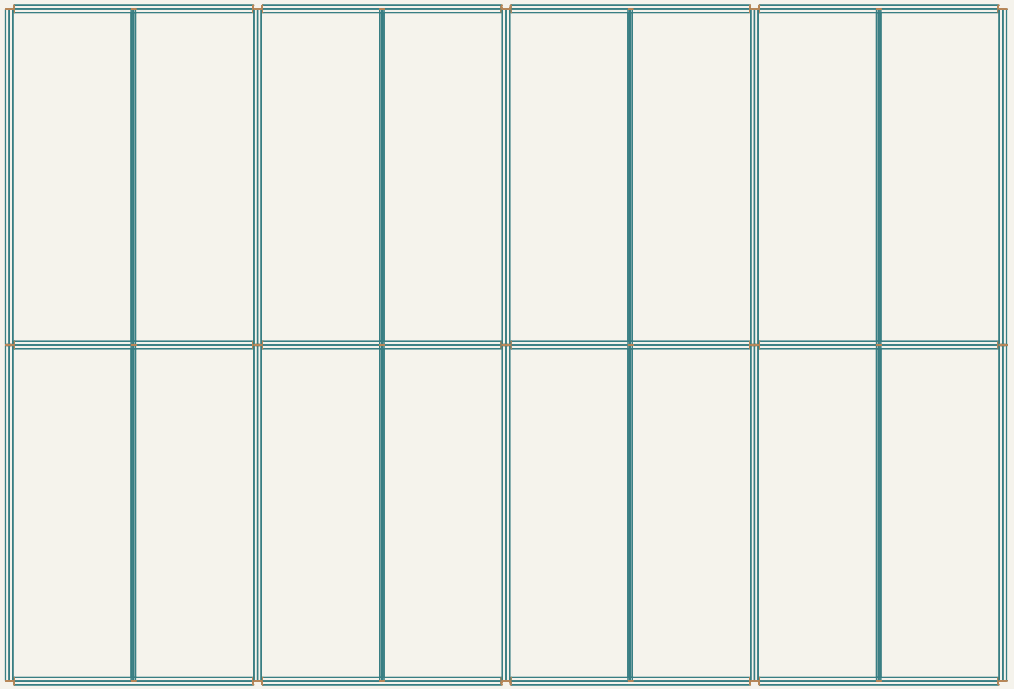


DECK_24000 / 2406 COMPONENTS

Main beam level / +32 m

Primary beams connect to columns through end plates and steel packing plates. Secondary beam joints have upper copes to avoid flange overlap. Every bolt is a separate physical component.

- Assembly DECK_32000
- Vertical level spacing: 8 m
- Physical holes and fasteners in the model

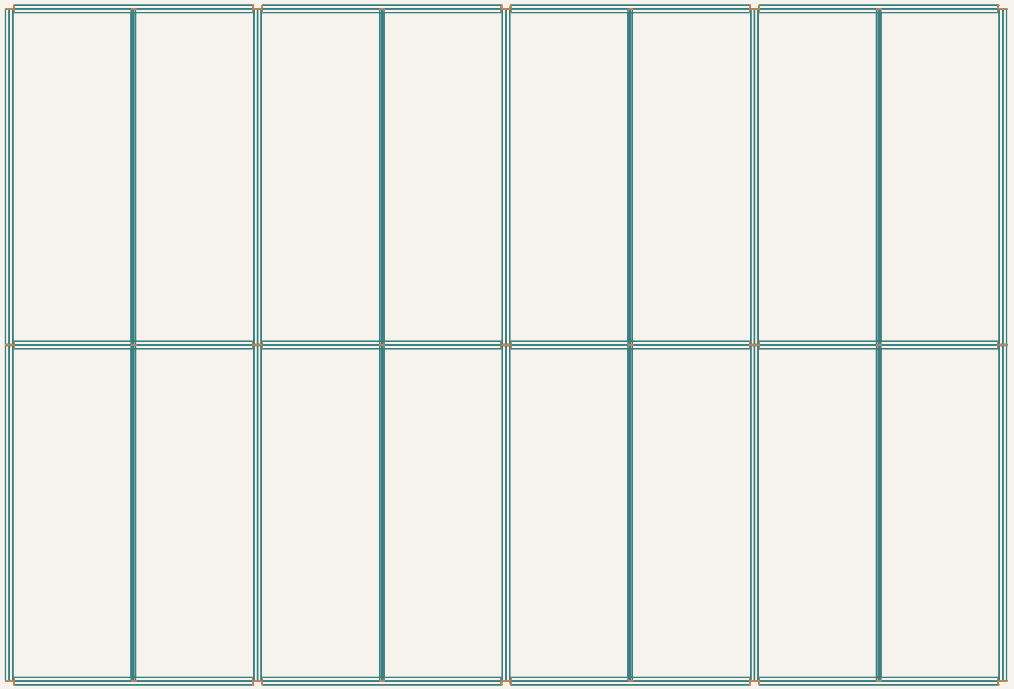


DECK_32000 / 2406 COMPONENTS

Upper beam level / +40 m

Controlled reuse of part families reduces variants while preserving unique assembly marks. The upper level completes the demonstrator frame and connects to the top landing. Roofs, a helideck and process systems require a separate design scope.

- Assembly DECK_40000
- Same grid and joint families as lower levels
- Upper interfaces to be defined for the real project

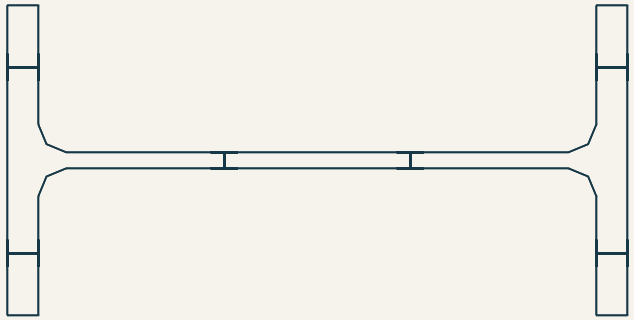


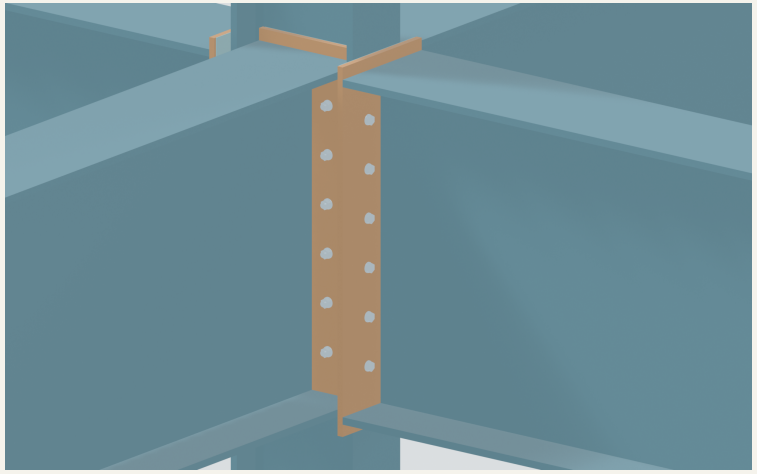
DECK_40000 / 2406 COMPONENTS

Columns and coordinated drilling

HE 600 B columns have physical connection holes. Edge and internal variants follow the beam positions. COLUMN_L, COLUMN_M and COLUMN_R identify different geometries rather than relying solely on drawing notes.

- Section: h600 / b300 / tw15.5 / tf30
- 27 mm root fillets
- Geometric length: 17,970 mm

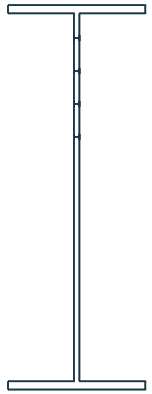




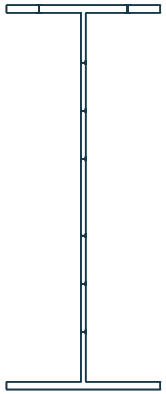
HE 600 B / R27

Primary beams: readable sections

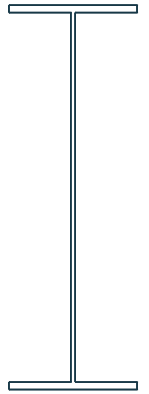
The demonstrator uses a welded I-section for the topside and two larger sections for the transition. Dimensions are demonstration assumptions. Dimensioned cross-sections show actual web and flange thicknesses instead of solid envelope blocks.



I 1400x500x20x30



Welded I 2000x800x25x40

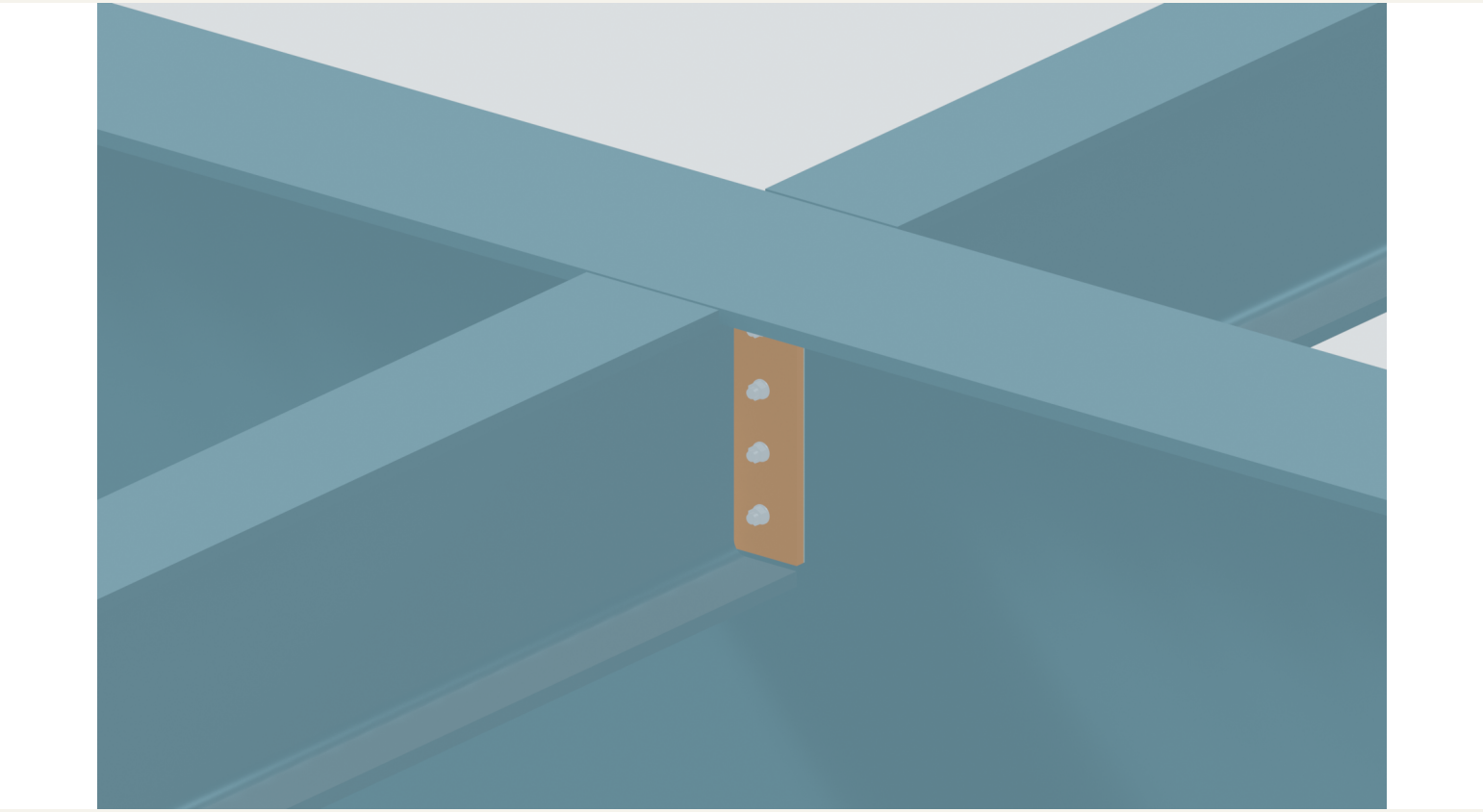


Welded I 1800x600x20x35

Secondary beams: cuts in the solid

Upper secondary-beam copes are actual geometric cuts. The joint includes an end plate, packing plate, holes through the receiving beam web and M20 fasteners. The assembled joint is included in the overlap check.

- HE 600 B with upper cope
- Cope length: 225 mm
- EP20 end plate and PACK20 packing

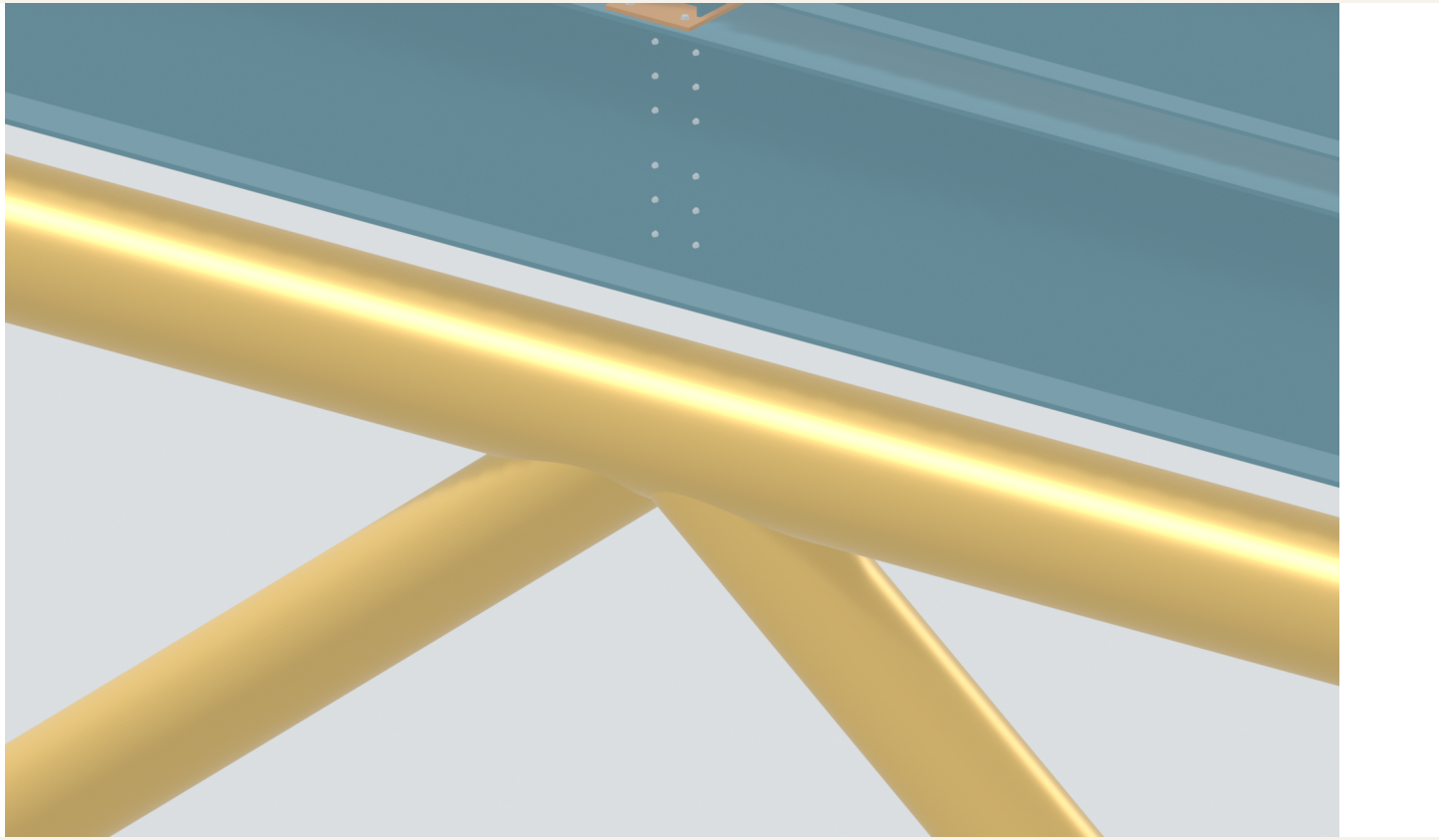


VIEW FROM THE C03 MODEL

Braces: compatible member ends

Tubular member ends follow the receiving surface through saddle cuts. Converging brace tips include separation planes between adjacent tubes. These interfaces support discussion of weld access, edge preparation and inspection requirements for the real project.

- Hollow Ø900 x 32 mm section
- Geometric separation at brace tips: 4 mm
- No fatigue verification is claimed

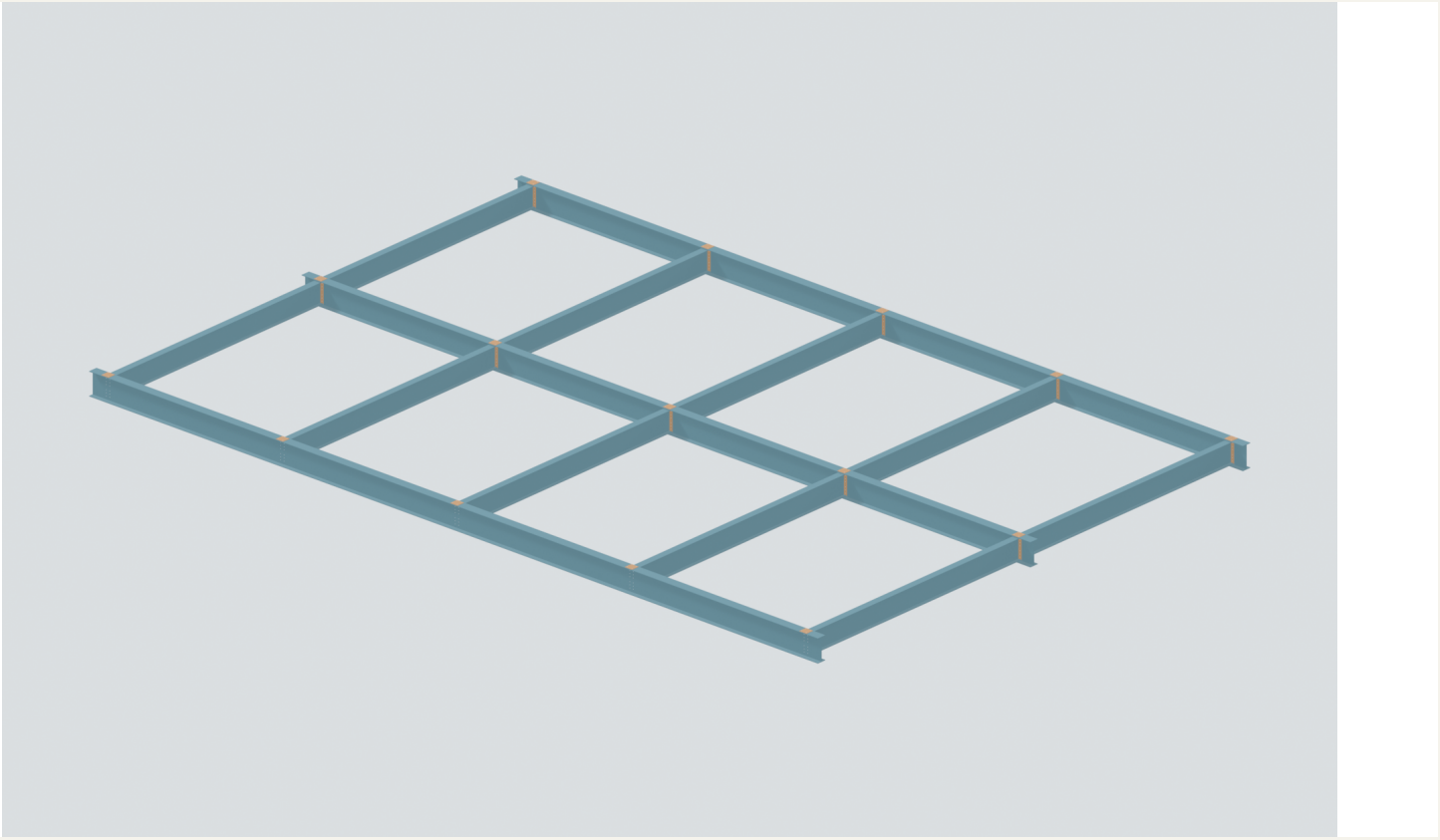


VIEW FROM THE C03 MODEL

Transition and module support

The transition grillage geometrically connects jacket and topside alignments. Column bases and transverse connections are identifiable as separate assemblies. Equipment supports and local reactions will be developed from client data.

- Transition beam centreline: +22 m
- BASE column plates
- M24 and M30 fasteners

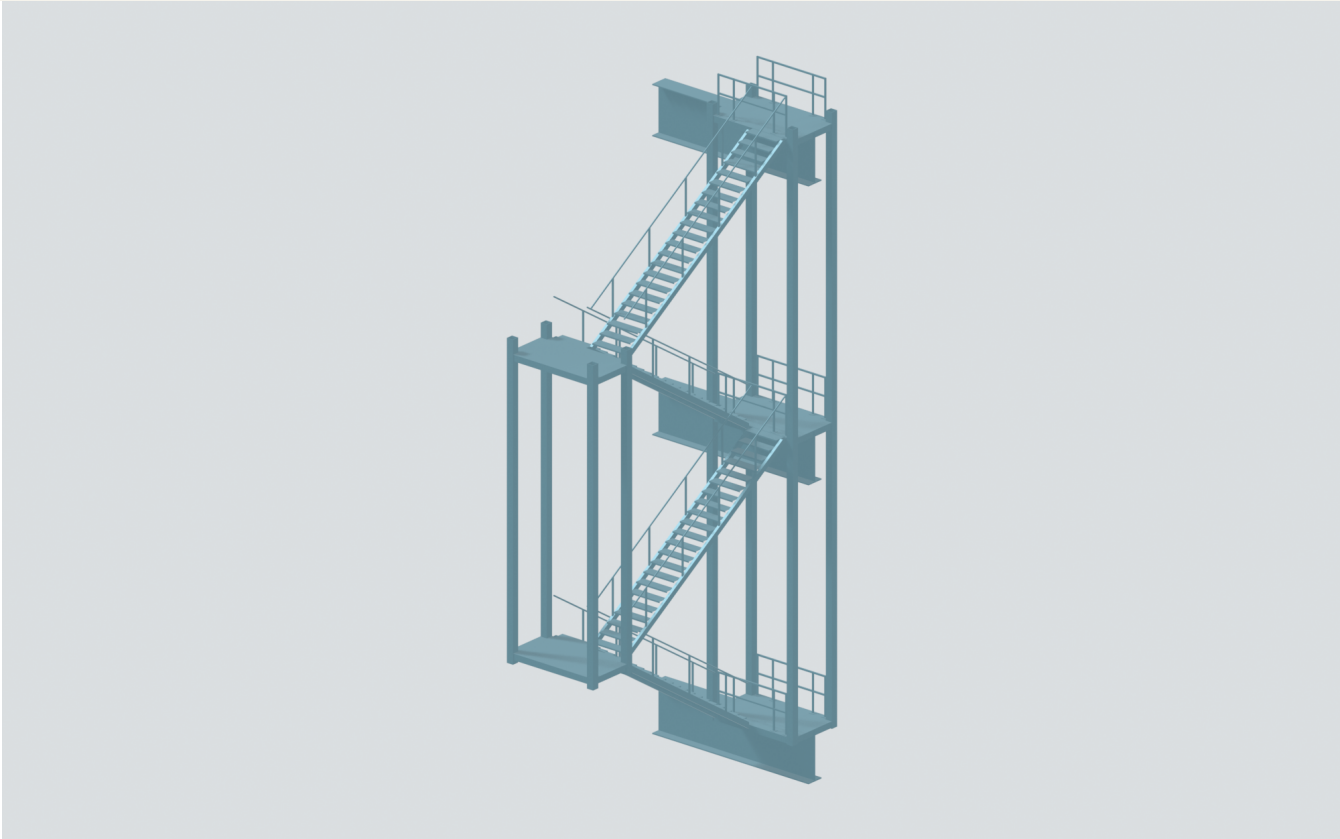


VIEW FROM THE C03 MODEL

Stairs and access steelwork

The side module includes four flights, main and intermediate landings, hollow stringers, pan treads and handrails. Stringer ends are trimmed at support interfaces. This is a demonstration arrangement; egress, slip resistance and regulatory geometry require project-specific verification.

- 4 flights and 88 treads
- Geometric rise: 181.8 mm
- Geometric going: 280 mm

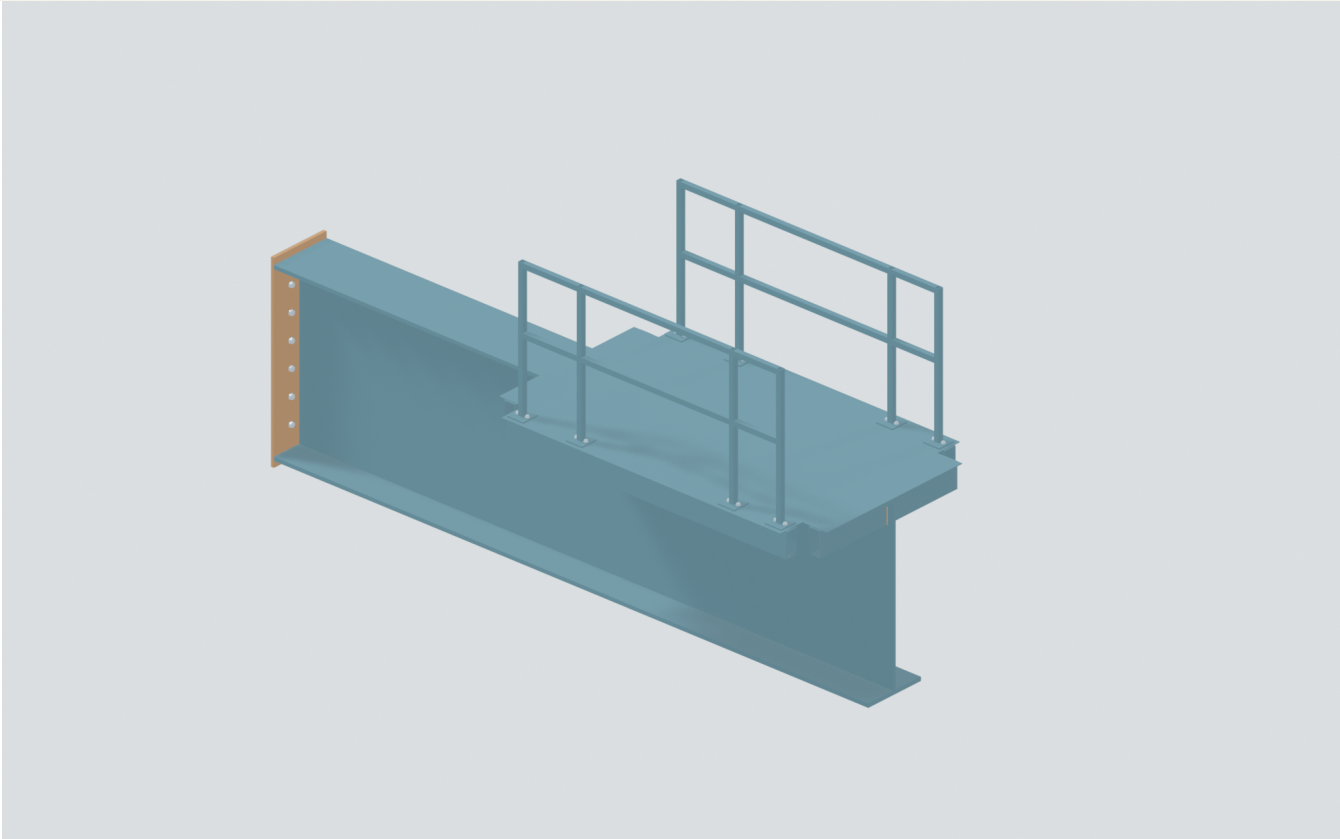


VIEW FROM THE C03 MODEL

Landings, treads and guardrails

Landing plates have actual cut-outs around posts. Pan treads include modelled folded lips; they are not grating envelopes represented as solid blocks. Guardrail posts sit on bolted base plates with anti-crush sleeves through hollow support members.

- Landing plate thickness: 5 mm
- Pan treads: 6 mm / 40 mm lips
- Separate guardrail and handrail components

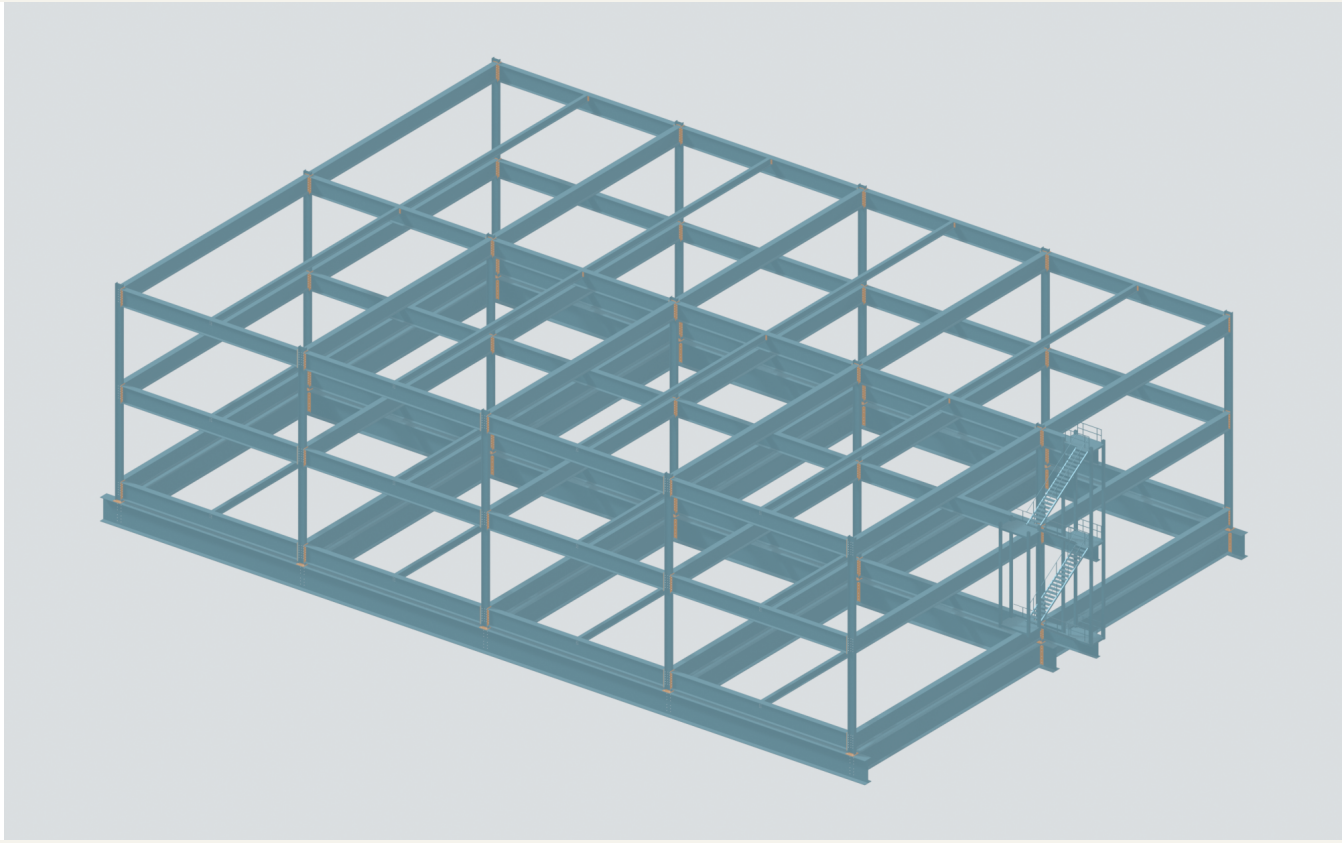


VIEW FROM THE C03 MODEL

Auxiliary structures and future interfaces

The delivered auxiliary steelwork consists of the access module and its supports. Any helideck, runway beams, extended walkways or process supports require a dedicated scope coordinated with Frame. They are not represented as already designed or checked C03 components.

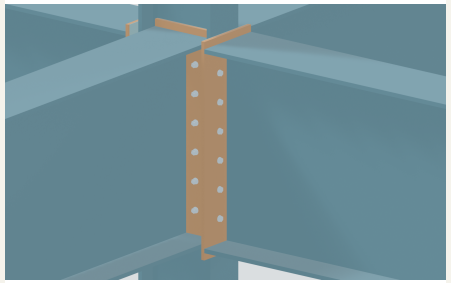
- Included: side access module
- To coordinate: equipment and process interfaces
- Additional modules to client specification



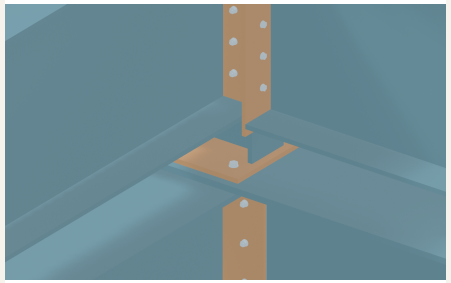
VIEW FROM THE C03 MODEL

Five joint families explain the system

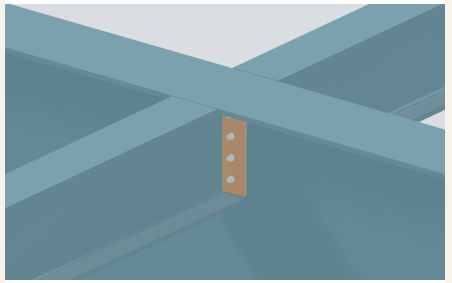
Five joint families provide a clear review structure. Each detail corresponds to actual model parts and exchange files in the same revision. Plates, holes and fasteners are not decorative rendering elements.



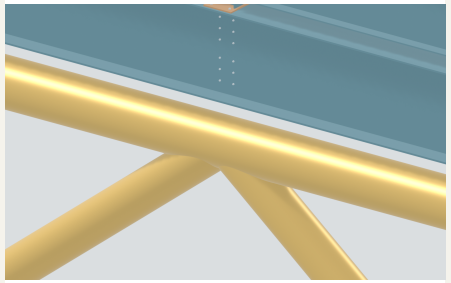
J01 Beam-to-column end plate



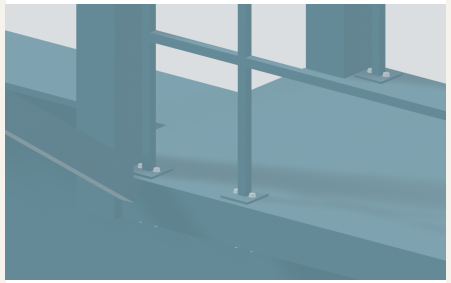
J02 Column-to-transition base



J03 Secondary-to-web connection



J04 Tubular saddle joint

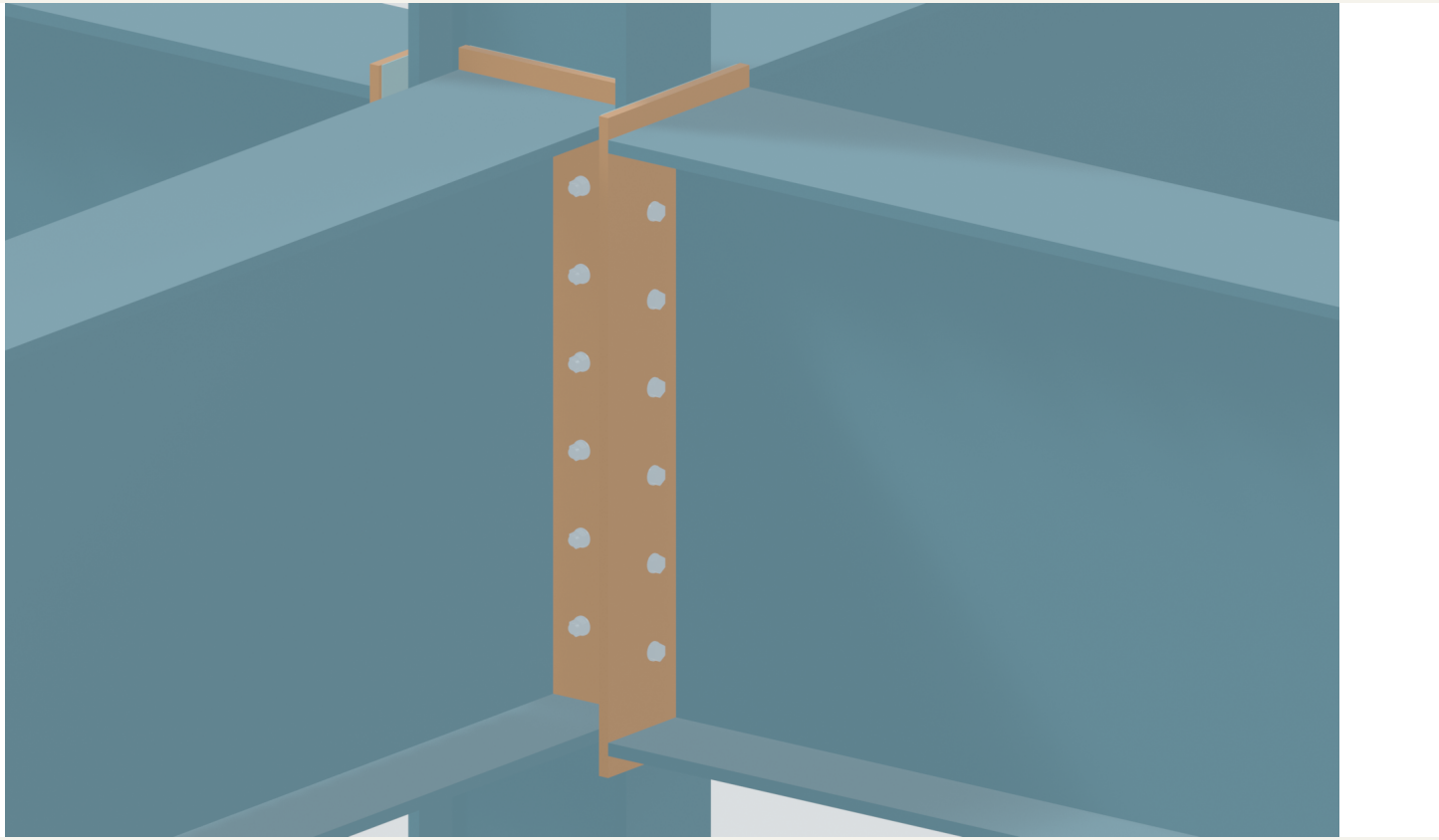


J05 Access guardrail and cross-member

J01 / Beam end plate

The joint uses EP24 end plates, PACK24 steel packing and M24 fasteners. Packing width clears the HE 600 B root fillets. Holes, washer seating and shaft passage are checked on the assembled connection.

- EP24: 1500 x 500 x 25 mm
- PACK24: 1500 x 480 x 3 mm
- 12 holes Ø26 per plate

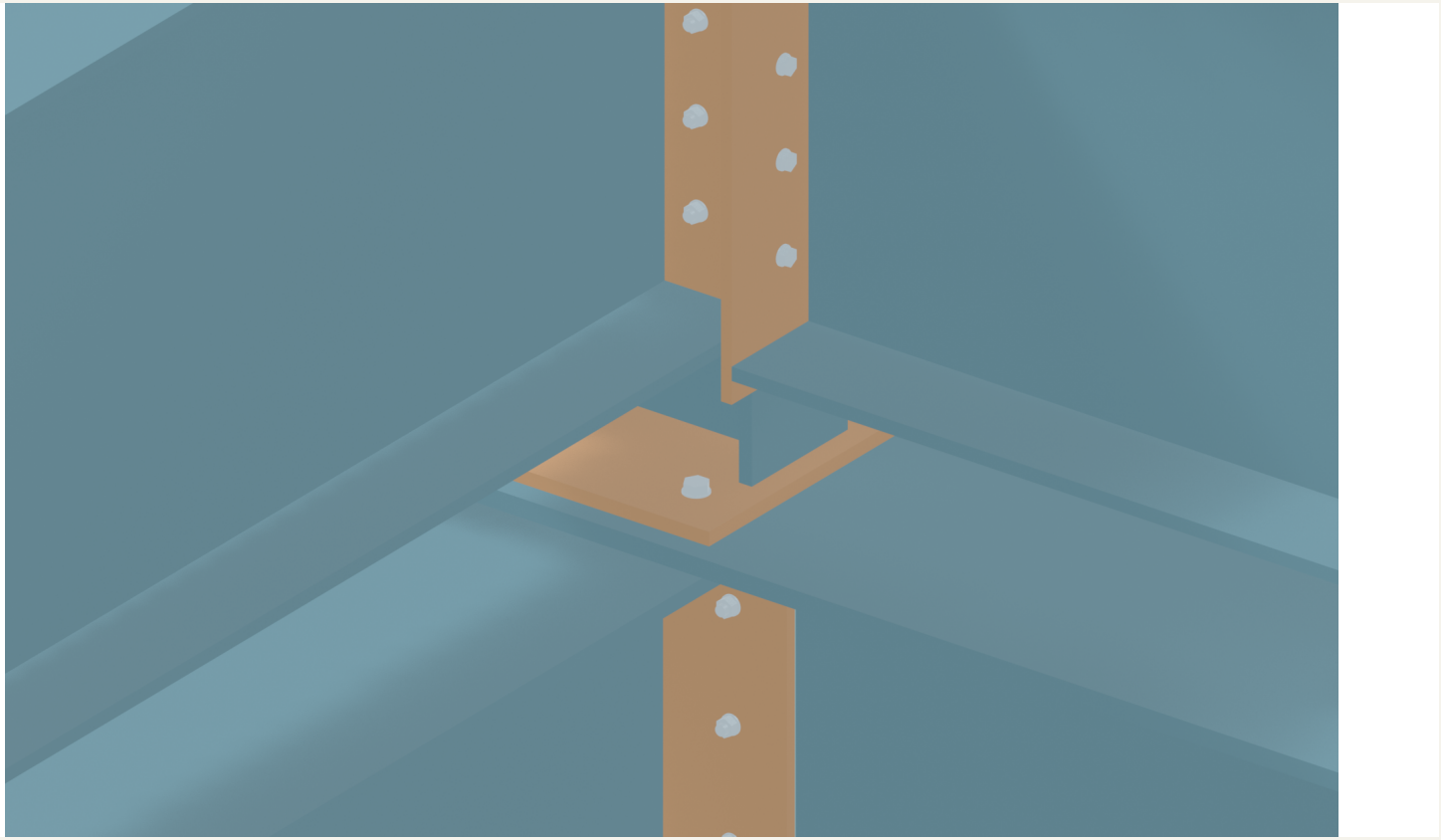


VIEW FROM THE C03 MODEL

J02 / Column base

The BASE plate sits on the upper transition flange and uses four M30 fasteners. Holes physically pass through the plate and flange. Geometric interface dimensions are separate from anchor resistance, local effects and weld design.

- BASE: 700 x 700 x 30 mm
- 4 holes Ø33 / 460 x 460 spacing
- Nominal bolt grip: 70 mm

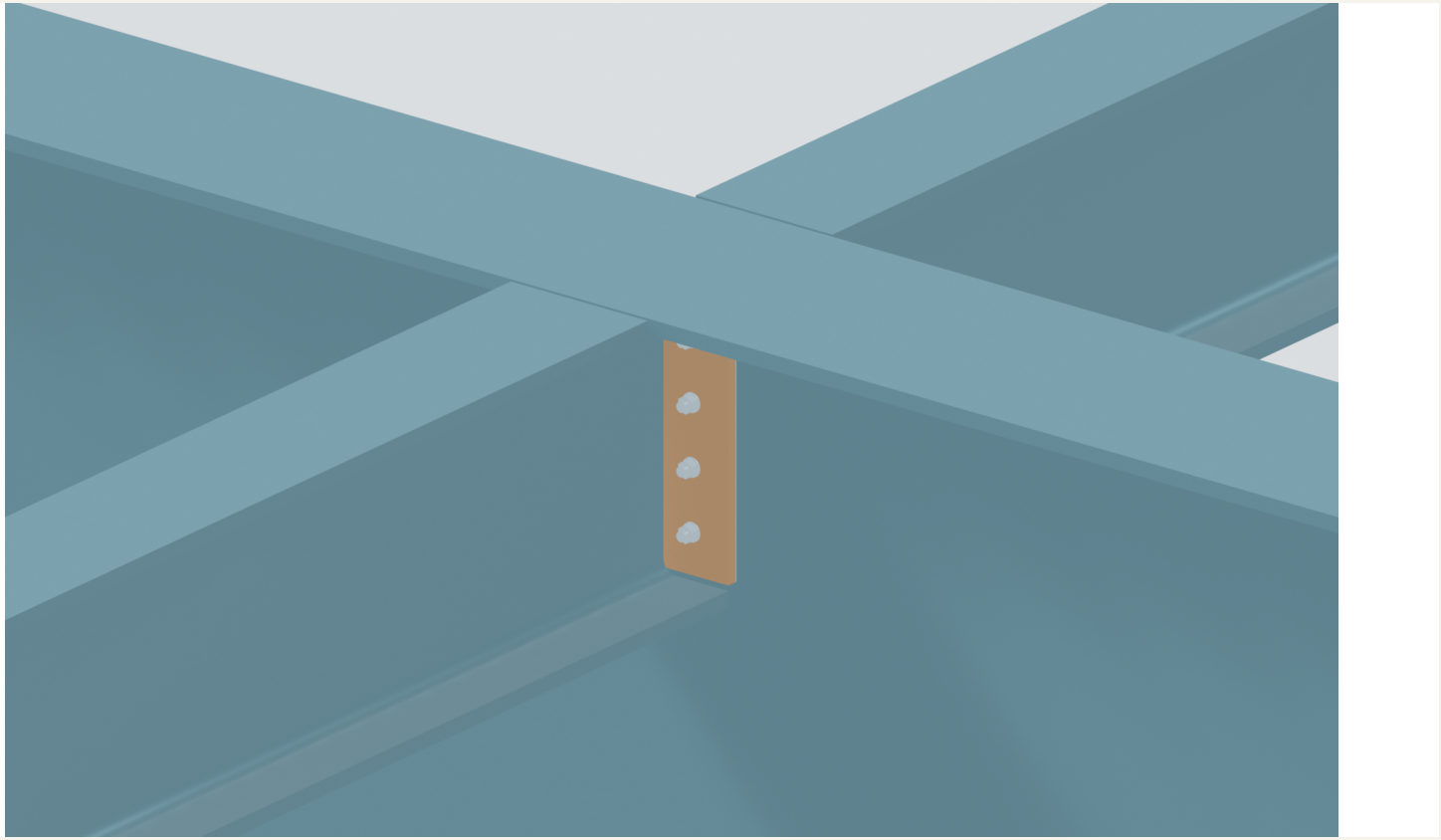


VIEW FROM THE C03 MODEL

J03 / Secondary beam to web

The joint coordinates the cope elevation, EP20 end plate and physical holes in the receiving web. PACK20 fills the modelled fit-up gap. The same connection logic is repeated across all three levels.

- EP20: 520 x 300 x 20 mm
- PACK20: 3 mm thick
- 8 holes Ø22 / M20 bolts

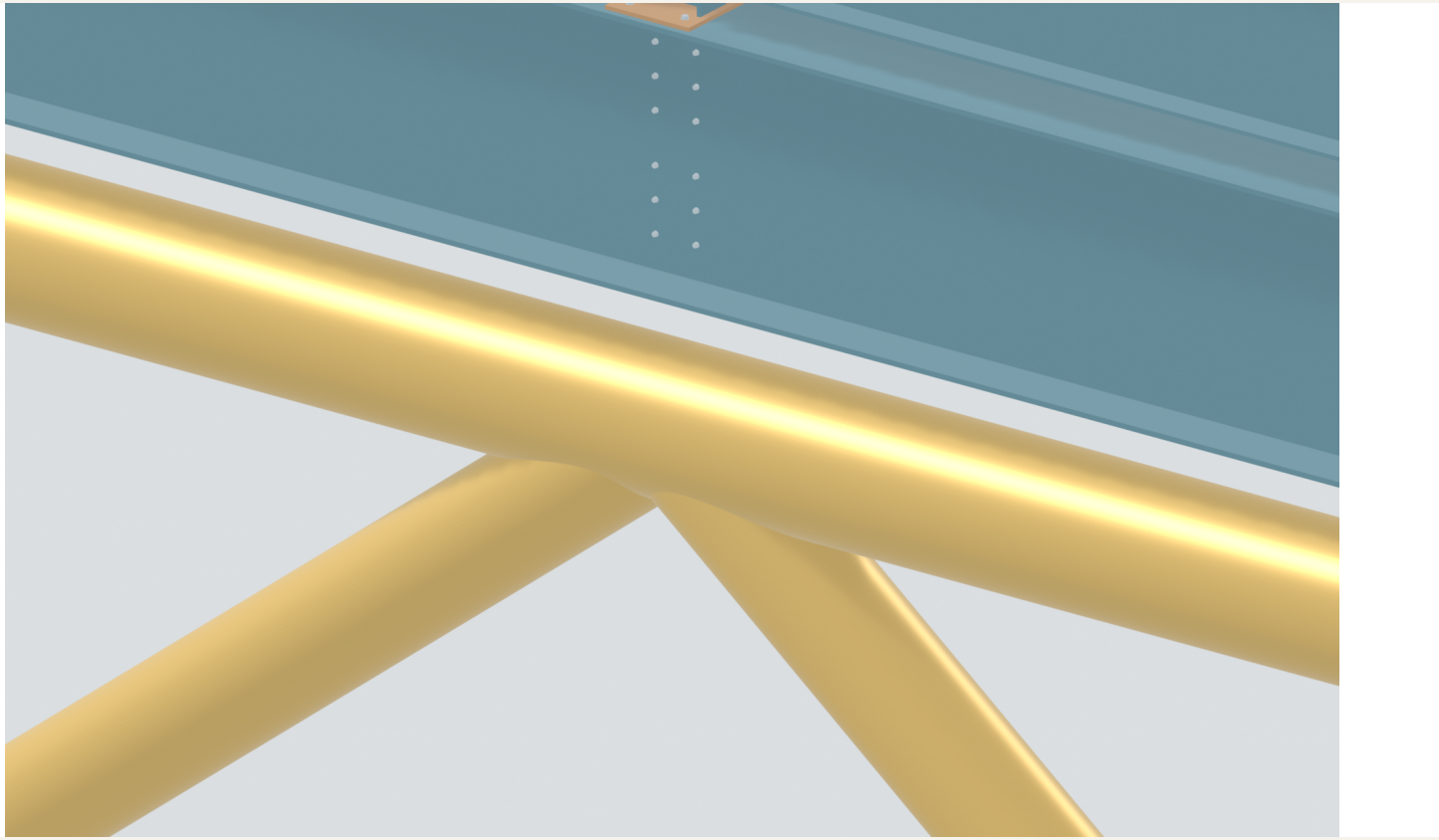


VIEW FROM THE C03 MODEL

J04 / The tubular interface

The saddle cut follows the receiving member and preserves the tubular wall thickness. Components remain separate and marked. Bevel preparation, qualified weld gaps and non-destructive testing must follow the client specification.

- Actual 3D end cut
- Hollow tubular wall
- Joint geometry distinct from welding procedure

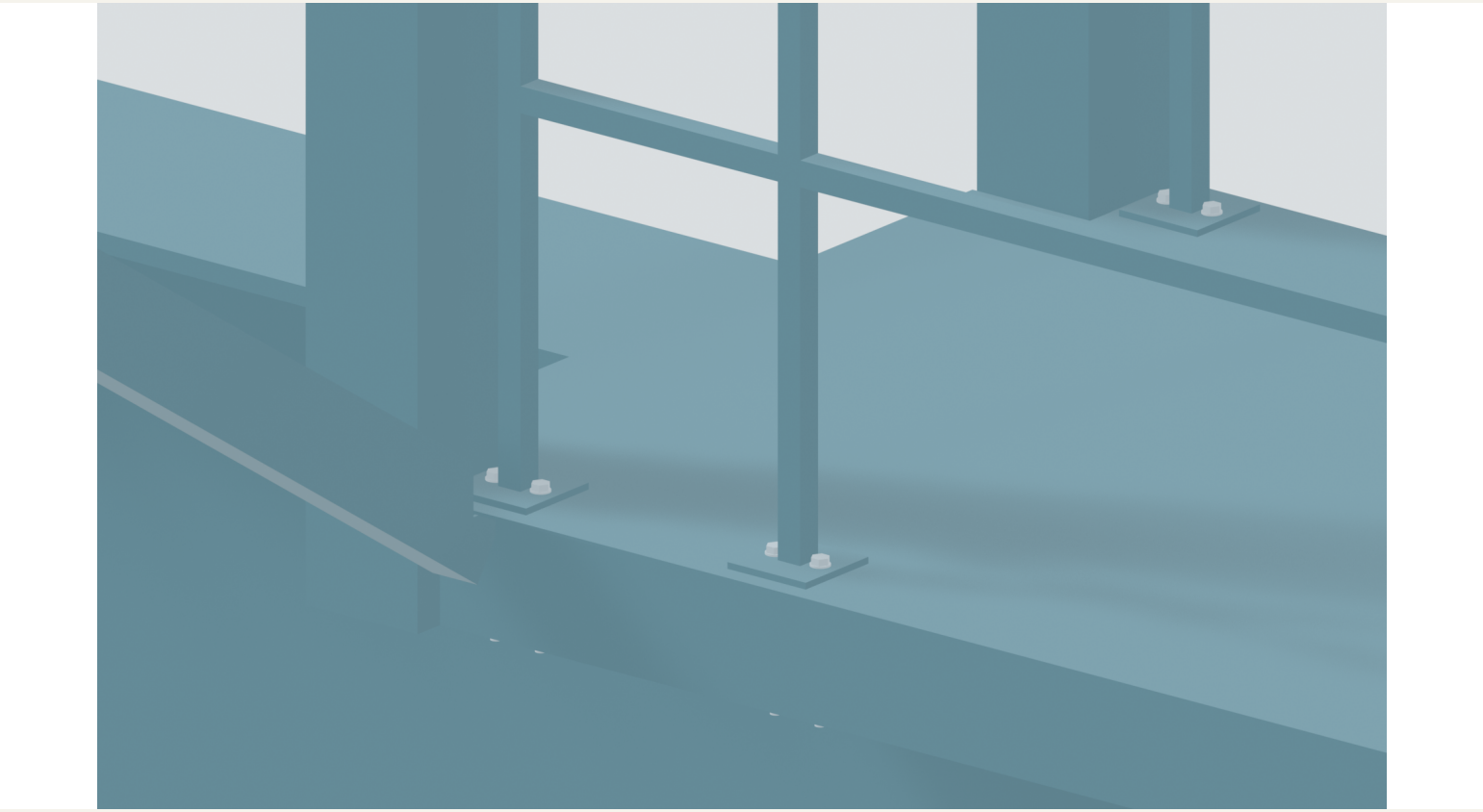


VIEW FROM THE C03 MODEL

J05 / Details that avoid rework

Guardrail posts are through-bolted to the hollow landing side member. Internal sleeves support the fastener passage geometrically. The lateral cross-member includes an actual cope and coordinated plate drilling.

- M16 through-bolts with two washers
- CHS Ø24 x 2.75 sleeves
- Coped RHS 200x100x8 cross-member

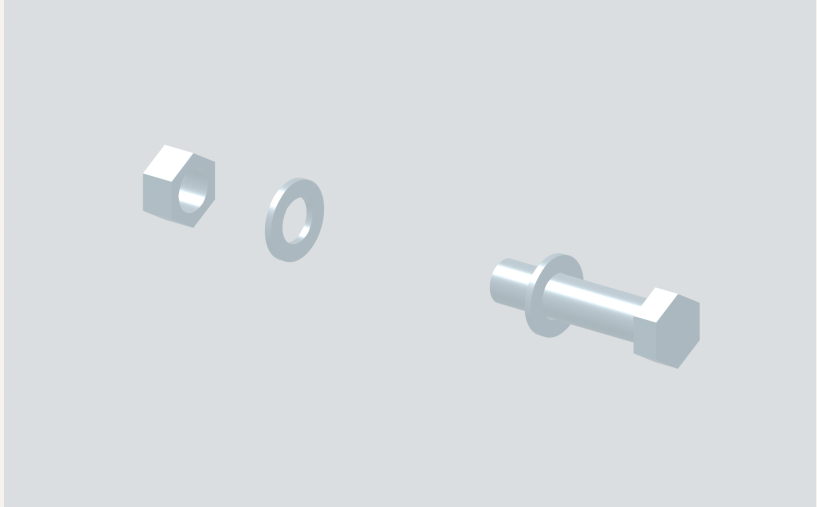


VIEW FROM THE C03 MODEL

Fasteners: grip defines bolt length

Bolt length follows total grip, two washers and nut height, with at least two pitches of protrusion. Threads are represented conventionally rather than as helical solid cuts. The bolt schedule retains diameter, length and grip for every stack.

- DIN 933 bolts
- DIN 934 nuts / DIN 125 A washers
- M16, M20, M24, M30



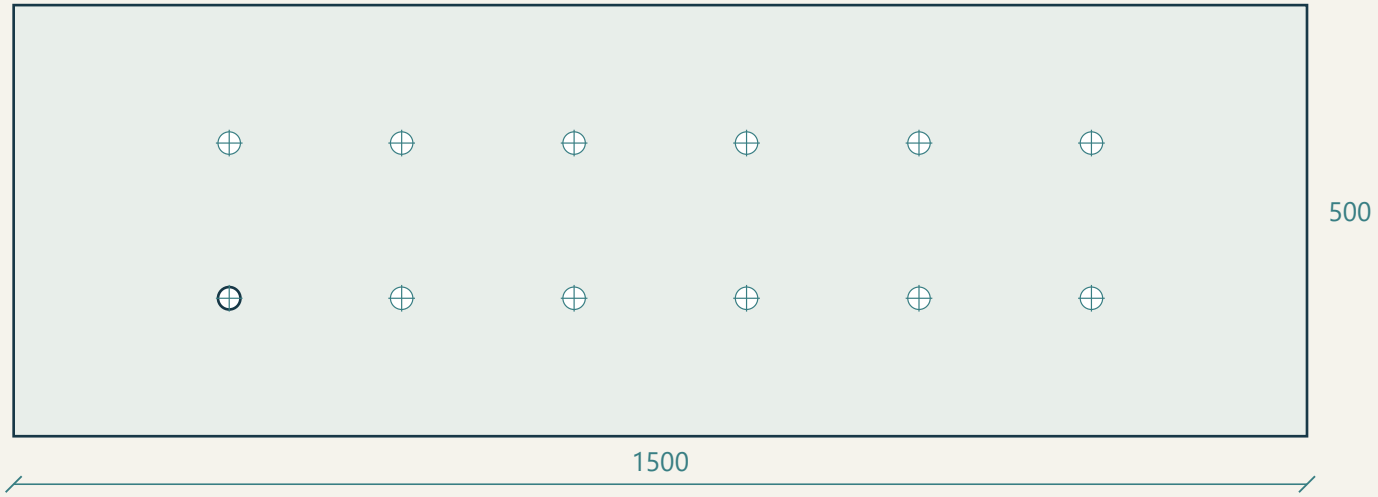
DIN 933	Qty	Washers	Protrusion
M16	72	2	2 p min
M20	288	2	2 p min
M24	1620	2	2 p min
M30	60	2	2 p min

Holes and spacing: inspectable dimensions

Flat plates retain their hole patterns in local coordinates. Drawings and DXF use the same centres and diameters as the model. EP24 shows two rows and six bolt levels; dimensions are geometric demonstration assumptions.

- EP24: two rows, 180 mm apart
- Six bolt levels / 200 mm vertical pitch
- Ø26 holes for nominal M24 shafts

EP24 / t25 / 12 holes

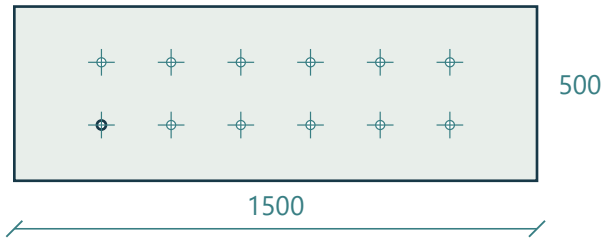


Ø26 / 12x / p200 / g180

Flat plates: from model to DXF

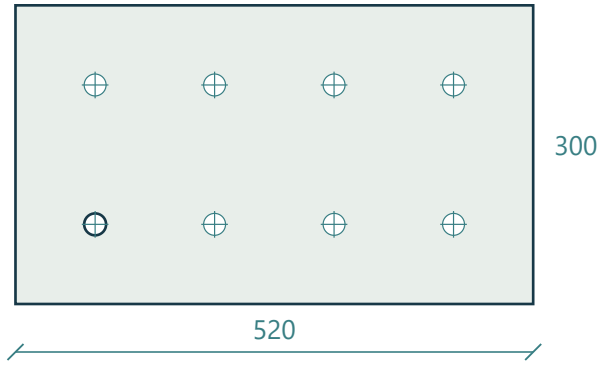
Outlines and circular holes are exported to DXF for declared flat-plate families. The technical PDF lists marks, quantities, thicknesses and part views. DXF files describe nominal geometry; kerf compensation, nesting and machine parameters are subsequent tasks.

EP24 / t25 / 12 holes



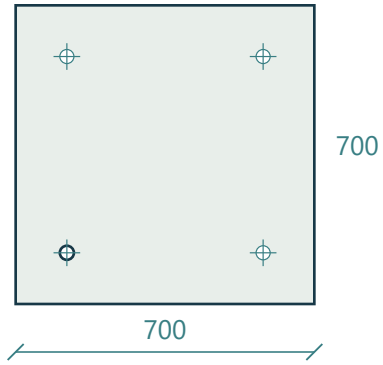
135 pieces

EP20 / t20 / 8 holes



48 pieces

BASE / t30 / 4 holes



15 pieces

Cuts, saddles, copes and finished parts

The cutting list distinguishes stock or centreline reference length from the trimmed part's longitudinal envelope. Complex end cuts are visible in the solid and its projections. Folded plates do not include a qualified flat pattern with validated bend allowances.

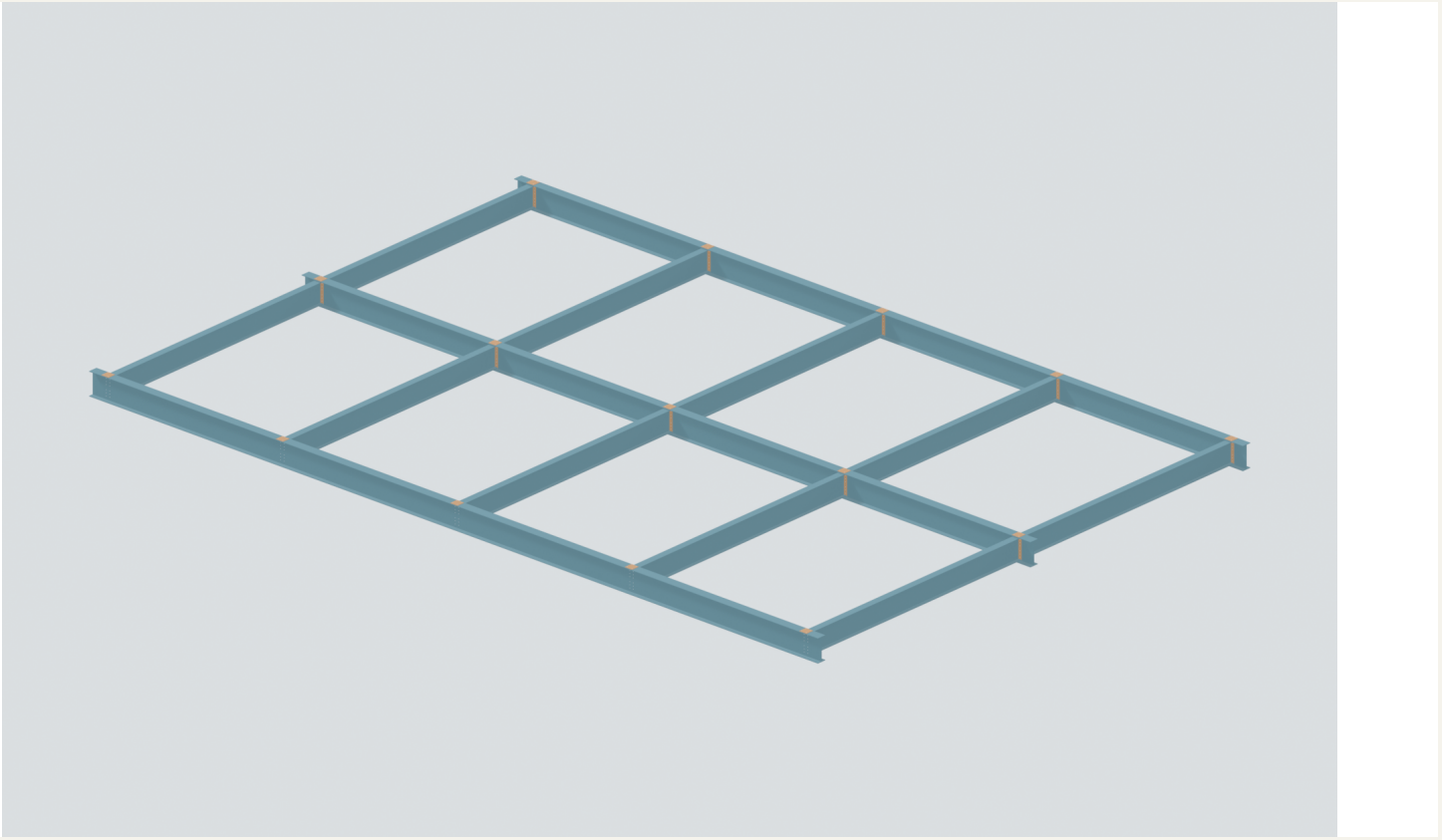
Mark	Stock/axis ref.	Finished span	Qty
MAIN_X	16,344.0	16,344.0	36
MAIN_Y	22,928.5	22,928.5	30
SECONDARY	22,934.0	22,934.0	24
COLUMN_M	17,970.0	17,970.0	10
STRING_0_0_0	7,464.0	7,450.1	1

mm / Actual cut is in the part file; values do not replace an approved fabrication drawing.

Weld interfaces and assembly order

The model contains geometric interfaces for welded joints; deposited weld beads are not separate solids. Final symbols, sizes, preparations, WPS and inspection requirements must follow loads and specifications. The sequence distinguishes workshop preassembly from bolted site closure.

- 1 Part preparation and identification
- 2 Preassembly and dimensional checks
- 3 Erection and joint tightening
- 4 Inspections agreed with Frame



VIEW FROM THE C03 MODEL

Bill of materials and solid-based masses

Quantities are derived from model occurrences. Masses use BREP solid volume and a uniform density of 7,850 kg/m³. They are not shipping weights and exclude tolerances, coatings and weld deposits. CAD conversion reports retain measured cross-kernel volume differences.

System	Qty	Mass / t
Jacket	56	3,902.40
Piles	4	96.67
Cap plates	4	6.66
Transition	13	325.05
Columns	15	56.97
Primary beams	66	569.03

System	Qty	Mass / t
Secondary beams	24	115.86
Plates and packing	445	29.88
Access structures	90	14.92
Guardrails and handrails	124	0.83
Stairs and treads	96	2.65
Fasteners	8160	1.24

Total geometric mass: 5,122.2 t

Traceable marks and cutting lists

A family mark identifies a geometry type; an assembly mark identifies a physical occurrence. Changes can be discussed at repeated-part level or at a specific location. CSV and JSON schedules support filtering without retyping model data.

Family	Occurrence	Assembly
MAIN_X	MX_0_0_0	DECK_24000
EP24	XE_0_0_0_1	DECK_24000
BOLT_M24_100	JX_0_0_0_1_0_B	DECK_24000

BOM / cutting_list / bolt_schedule / model_manifest

Interferences: the measured result

The check covers every physical C03 occurrence. Bounding boxes select candidate pairs, which are then intersected as BREP solids. Overlap volume is compared against a declared tolerance. No blanket overlap exemptions are applied to part families.

0
unintended overlaps

24,890
pairs tested with BREP intersection

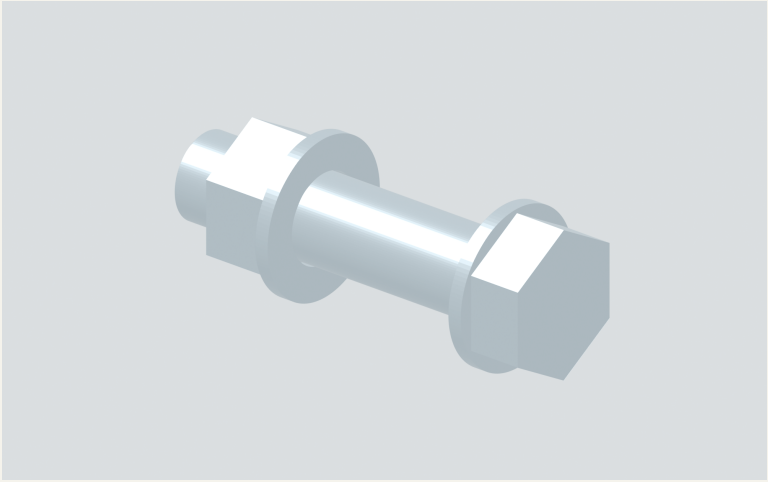
9,097
occurrences in scope

Check	Result
Valid solids	157 / 157
Duplicate occurrence marks	0
Overlap volume tolerance	0.05 mm^3
Shifted control	9 047.8 mm^3 / detected

Clearance, seating and tightening space

Every bolt stack is checked for shaft-gauge passage and annular washer seating on both steel faces. An assumed compact socket envelope is checked against the steelwork. Actual tooling and the tightening procedure require a dedicated review.

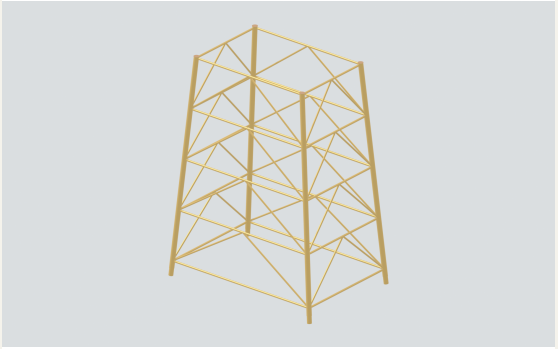
- Shaft gauge: +0.35 mm radially
- Support witnesses on both steel faces
- No bolt-preload verification is claimed



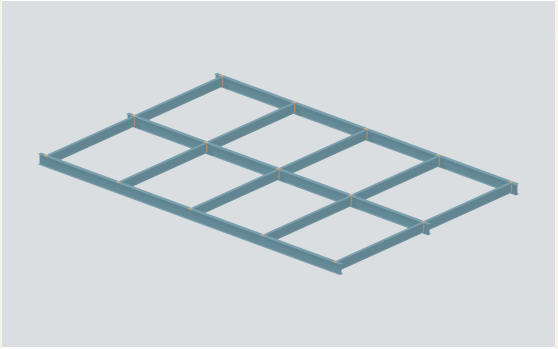
Geometric check	Result
Tested stacks	2040
Passage/seating issues	0
Socket-envelope collisions	0

A readable assembly sequence

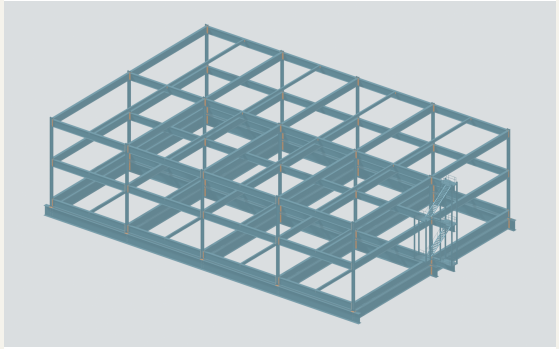
Model assemblies suggest an illustrative sequence for discussing workshop work, transport and erection. This is not a lift plan. Picking weights, certified centres of gravity, rigging and temporary stability require execution-stage engineering.



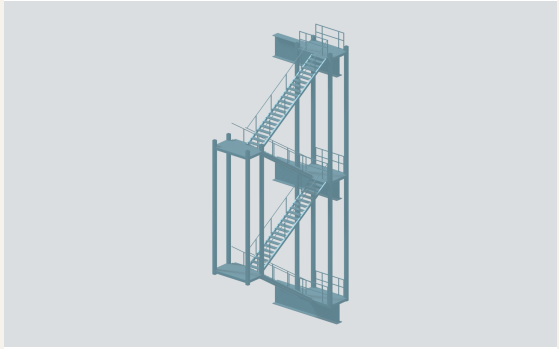
01 Jacket and interfaces



02 Transition and bases



03 Columns and decks



04 Access module and completion

Real files, declared formats

The handover distinguishes the Inventor assembly from Revit coordination solids. Imported solids retain holes and cuts, but do not recreate original feature history. Revit is a coordination model: SAT conversion gives volume differences up to 1.86%. Interference checking applies to the C03 source BREP solids.

INVENTOR 2026

IPT / IAM

Imported solids; assemblies and marks

REVIT 2027

RVT / IFC

Coordination BIM, imported geometry

EXCHANGE

STEP / DXF

Solids and nominal flat plates

PORTABLE

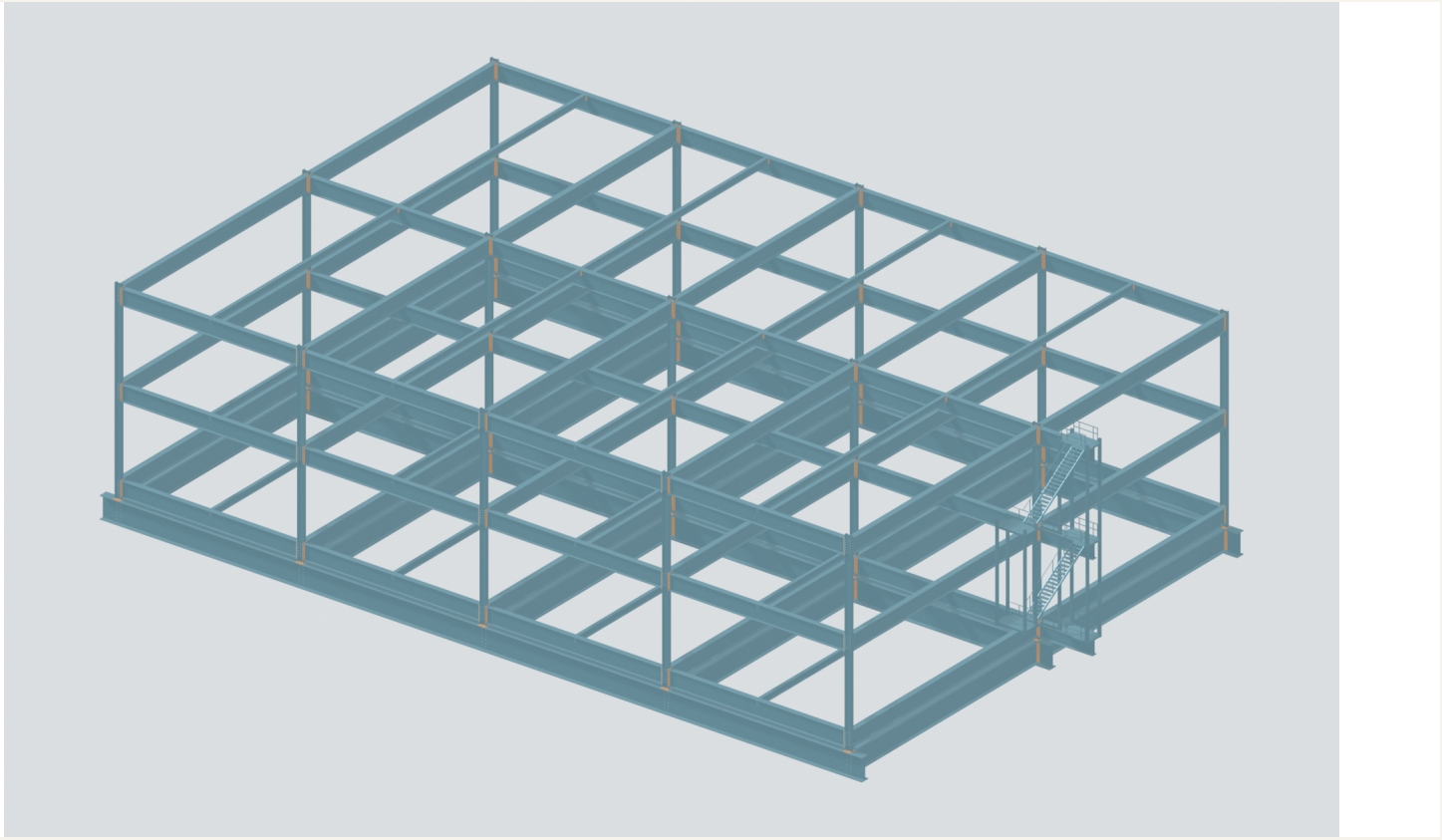
HTML / PDF

Local viewer and drawings

Work together on a real assignment

We propose starting with one of your products or assemblies, agreeing the input data and expected result. ADIVOR develops models and documentation through reviews with your technical office and workshop. Received material is handled in strict confidence.

- Named contact and shared priorities
- Review the first joint before repetition
- Deliverables defined per work package



VIEW FROM THE C03 MODEL

Agree scope and schedule before starting

The offer covers the agreed steelwork scope: model, connection detailing, drawings, schedules and geometric review. Required inputs include complete surveys, loads and reactions, approved structural reference design, material and welding specifications, formats and priorities. An indicative programme of around two working weeks starts on receipt of complete inputs and is confirmed after review.

INPUT

Surveys, loads, reactions and specifications. Confirm grid and interfaces.

OUTPUT

Model, details, drawings and schedules for the agreed steelwork scope.

REVIEW

First joint, sample drawing and priorities. Programme confirmed after input review.

The next collaboration

A defined assignment or ongoing monthly support: let us agree the arrangement that best serves your technical office.

FIXED PROJECT PACKAGE

€ 58,000

Steelwork development within the scope on page 39. Around two working weeks from complete inputs, with programme confirmed after review.

MONTHLY SUPPORT

20 hours / month	€ 2,000
50 hours / month	€ 4,500
100 hours / month	€ 8,000

Additional packages and projects are scoped and quoted as work packages to match agreed requirements.

VAT not charged under the Italian flat-rate scheme, Article 1, paragraphs 54-89, Law 190/2014, as amended.