



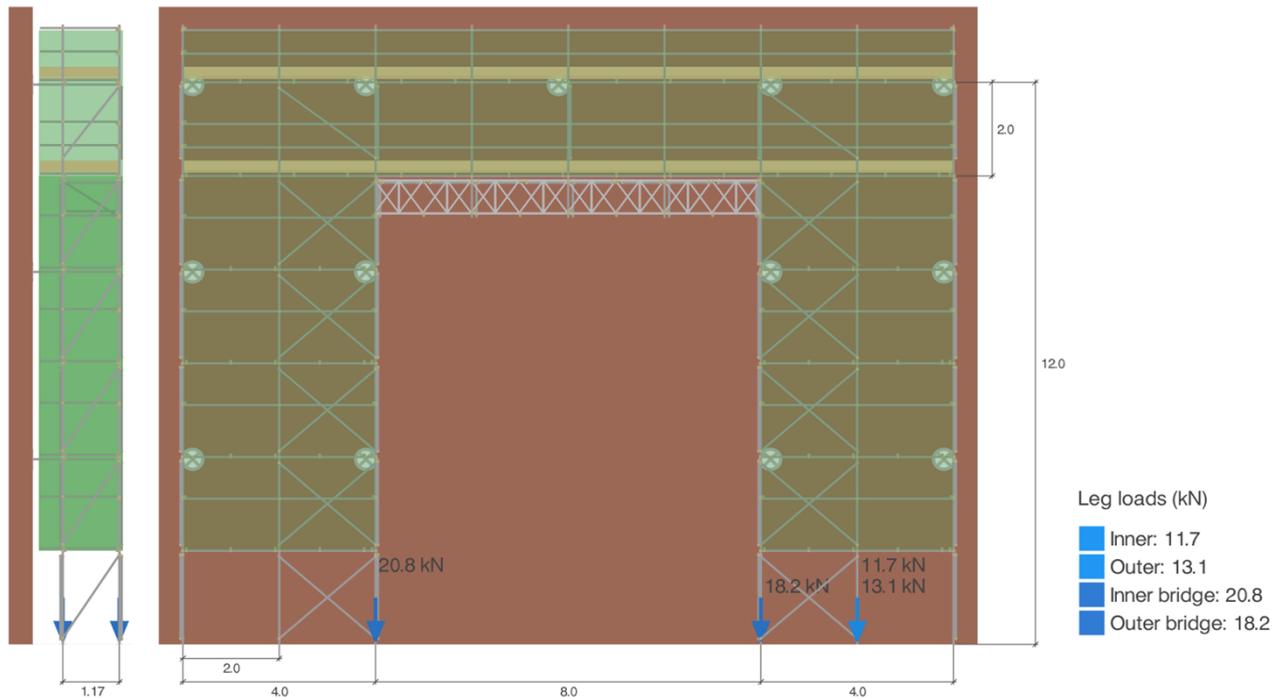
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| Project no | 0001 | Date | 11/09/2019 |
| Name | Sample project | Prepared by | TR |
| Item | Scaffold 001 | Checked by | BB |
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Tied independent scaffolding bridge beam

For tube and fitting scaffolding, in accordance with BS EN 12811-1:2003 and NASC TG20:13.

i This calculation should be read in conjunction with the wind factor, leg load and tie duty calculation reports, or with a suitable TG20:13 compliance sheet.



Site location

| Description | Value |
|--|---|
| Site address | East Overcliff Drive, E Overcliff Dr, Bournemouth BH1, UK |
| TG20:13 wind factor, $S_{TG20:13}$ | 26.6 |
| Peak velocity pressure at 13.00 m, $q_p(z = 13.00m)$ | 0.888 kN/m ² |

Scaffold dimensions

| Description | Value |
|-----------------------------------|--------|
| Number of boarded lifts, n_b | 2 |
| Number of unboarded lifts, n_u | 4 |
| Maximum lift height, H_{lift} | 2.00 m |
| Maximum bay length, L_{bay} | 2.00 m |
| Number of main boards wide, n_m | 5 |
| Number of inside boards, n_i | 2 |

Edge protection

| Description | Value |
|--|-------|
| Guard rails at boarded lifts, $n_{gr,b}$ | 2 |
| Guard rails at unboarded lifts, $n_{gr,u}$ | 1 |
| Inner guard rails at boarded lifts | None |
| Inner guard rails at unboarded lifts | None |
| Inner toe boards | None |



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Scaffold configuration

| Description | Value |
|------------------------------------|-------------------------|
| Cladding | Debris netting |
| Facade permeability ⁽¹⁾ | Impermeable |
| Tie pattern | TG20:13 A |
| Top lift tied | At ledger-braced frames |
| Structural transoms | None |

⁽¹⁾ No significant openings.

Loading

| Description | Value |
|--|------------------------|
| Main platform working load, P_m | 2.00 kN/m ² |
| Inner platform working load, P_i | 0.75 kN/m ² |
| Number of loaded lifts, n_l | 1 |
| Number of 50% loaded lifts, $n_{l,50}$ | 1 |

Bridge dimensions

| Description | Value |
|--|--------|
| Bridge vertical position | Lift 5 |
| Bridge start standard position, x_b | 4.00 m |
| Bridge span between supporting standards, L_b | 8.00 m |
| Supporting standards doubled to the top beam chord | No |

Beam properties

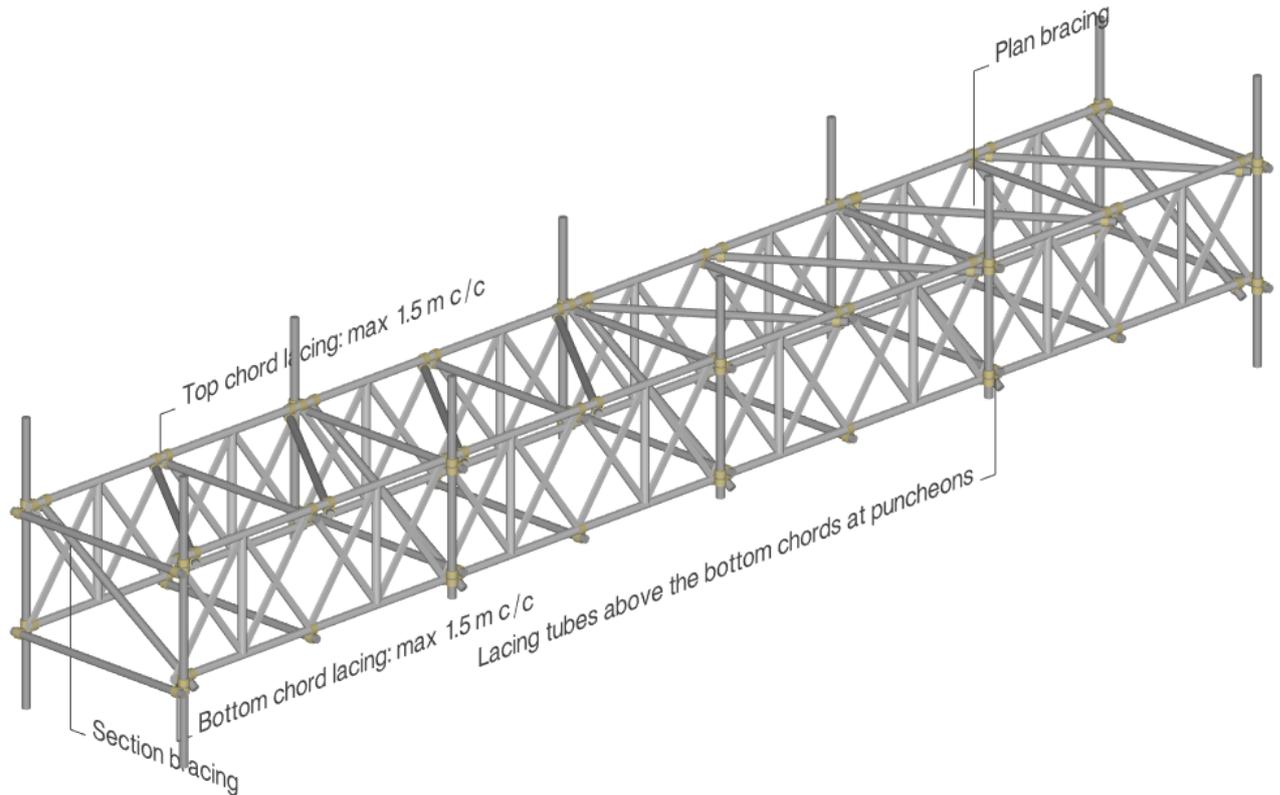
| Description | Value |
|---------------------------------------|---------------------------|
| Apollo 750 mm aluminium X-beam | |
| Beam material | Aluminium (EN AW 6082 T6) |
| Beam depth (c/c), d_{bm} | 0.70 m |
| Beam unit mass, P_{bm} | 8.00 kg/m |
| Beam solidity ratio, ϕ | 0.32 |



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Beam assembly



Structural analysis

Vertical loads

| Load description | Inner face | Outer face | Unit |
|--|------------|------------|------|
| Dead load on unboarded lift ledgers | 0.144 | 0.091 | kN/m |
| Dead load on boarded lift ledgers | 0.439 | 0.283 | kN/m |
| Dead load per end standard per unboarded lift | 0.254 | 0.270 | kN |
| Dead load per end standard per boarded lift | 0.408 | 0.405 | kN |
| Dead load per unbraced intermediate standard per unboarded lift | 0.098 | 0.196 | kN |
| Dead load per ledger-braced intermediate standard per unboarded lift | 0.169 | 0.267 | kN |
| Dead load per unbraced intermediate standard per boarded lift | 0.098 | 0.304 | kN |
| Dead load per ledger-braced intermediate standard per boarded lift | 0.169 | 0.375 | kN |
| Dead load of facade bracing | 0.058 | 0.058 | kN/m |
| Dead load per tie tube | 0.072 | 0.034 | kN |
| Bridge assembly dead load | 0.251 | 0.251 | kN/m |
| Imposed load on loaded lift ledgers | 1.598 | 1.115 | kN/m |
| Imposed load on 50% loaded lift ledgers | 0.799 | 0.557 | kN/m |

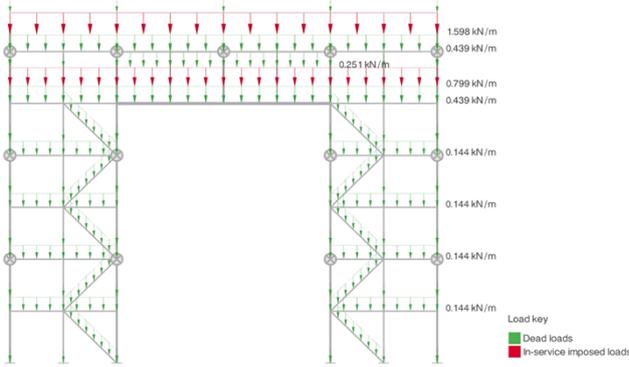


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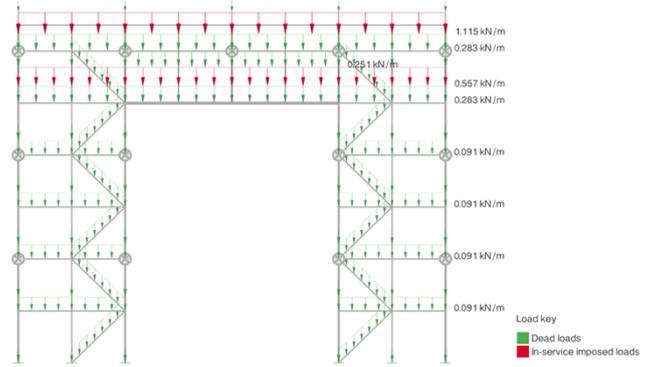
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i The horizontal loads have been omitted from this report as they are not critical to the beam analysis results for the scaffold.

Inner face



Outer face



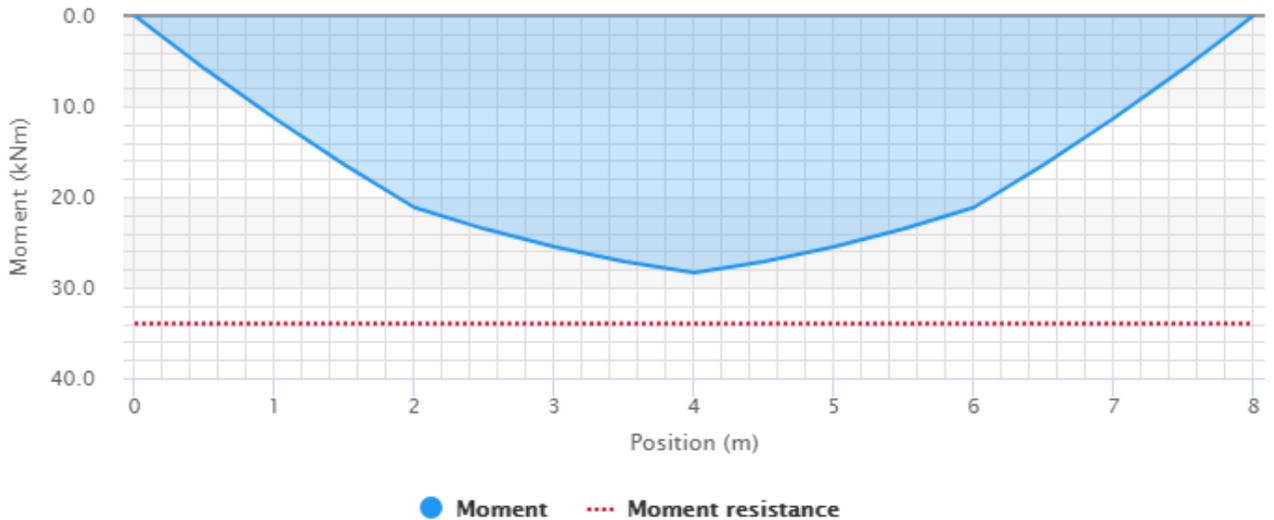
The analytical model is shown for load combination: 1 - Dead + in-service imposed.

For clarity, the point loads and horizontal loads are not labelled in the figures. Refer to the load tables above for values.

Analysis results

| No. | Load combination | Maximum moment (kNm) | | Maximum shear (kN) | | Maximum deflection (mm) | | Maximum coupler slip (kN) | |
|-----|---------------------------|----------------------|-------|--------------------|-------|-------------------------|-------|---------------------------|-------|
| | | Inner | Outer | Inner | Outer | Inner | Outer | Inner | Outer |
| 1 | Dead + in-service imposed | 28.4 | 20.0 | 12.1 | 8.6 | 19.4 | 13.7 | 6.0 | 4.3 |

Moment results





**SMART
SCAFFOLDER**

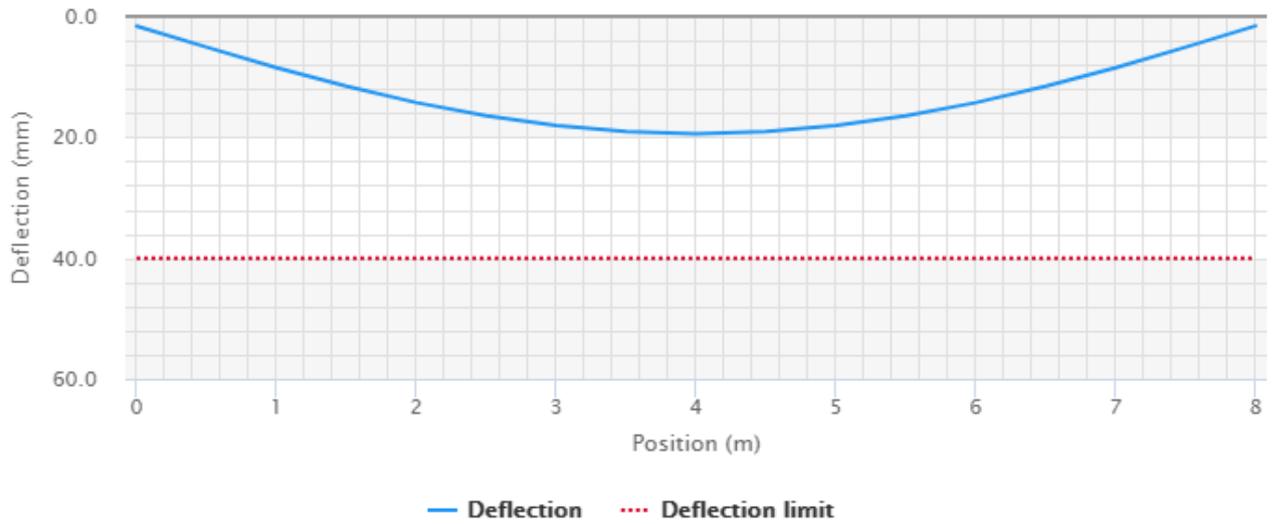
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Shear results



Deflection results

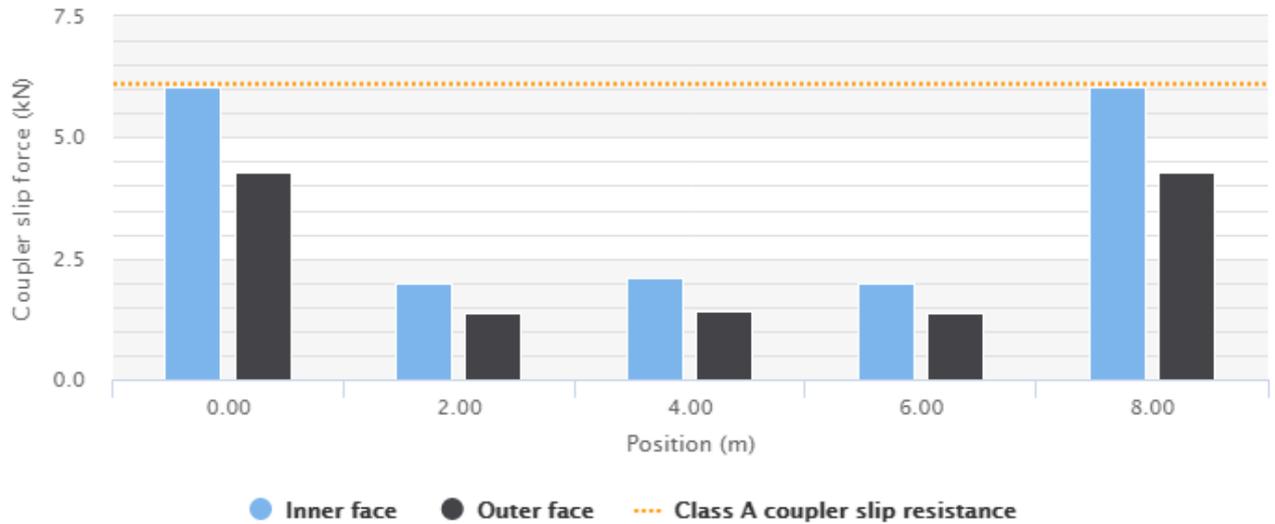




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Coupler slip capacity check



Beam capacity check

| Description | Value | Resistance | Utilisation | Result |
|--|--------------------------------|------------|-------------|--------|
| Selected beam | Apollo 750 mm aluminium X-beam | | | |
| Safe working moment resistance check * | 28.4 kNm | 34.0 kNm | 83.5 % | ✓ Pass |
| Safe working shear resistance check | 12.1 kN | 32.0 kN | 37.7 % | ✓ Pass |

* With chord restraints at a maximum spacing of 1.5 m.

i This calculation must be used in conjunction with the technical guidance from the beam manufacturer.

✓ The beam capacity check has passed.

Deflection check

| Description | Value | Min. deflection : span ratio ⁽¹⁾ | Limit | Utilisation | Result |
|-----------------------|---------|---|---------|-------------|--------|
| Beam deflection check | 19.4 mm | 1 : 200 | 40.0 mm | 48.6 % | ✓ Pass |

⁽¹⁾ This value is user-specified.

✓ The beam deflection check has passed.

Coupler slip capacity check

| Description | Value | Resistance | Utilisation | Result |
|---------------------------------------|--------|------------|-------------|--------|
| Class A coupler slip resistance check | 6.0 kN | 6.1 kN | 99.0 % | ✓ Pass |

✓ The coupler slip capacity check has passed.