

2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

09:48 : 11/11/14

C:\root\My Documents\EXCEL\EuroTutorials\RCGrillageNoT95.X00

**Job Name :2 Span Reinforced Concrete Deck Example**

Structure Type = Grillage  
 No of joints = 273  
 No of members = 512

**Analysis Settings**

Analysis method = Linear Elastic

**Sections**

Data last edited at 09:13 on 11/11/14

**Section 1 : Longtl A : General**

Ax = 507000.00 mm<sup>2</sup> Az = 0.00 mm<sup>2</sup>  
 Ix = 10.00e-7 mm<sup>2</sup> Iy = 1.76e+10 mm<sup>2</sup>  
 Cz = 0.0 mm<sup>2</sup>

**Section 2 : Longtl B : General**

Ax = 804000.00 mm<sup>2</sup> Az = 0.00 mm<sup>2</sup>  
 Ix = 10.00e-7 mm<sup>2</sup> Iy = 5.50e+10 mm<sup>2</sup>  
 Cz = 0.0 mm<sup>2</sup>

**Section 3 : Longtl C : General**

Ax = 867000.00 mm<sup>2</sup> Az = 0.00 mm<sup>2</sup>  
 Ix = 10.00e-7 mm<sup>2</sup> Iy = 6.52e+10 mm<sup>2</sup>  
 Cz = 0.0 mm<sup>2</sup>

**Section 4 : Transv Cant : General**

Ax = 830000.00 mm<sup>2</sup> Az = 0.00 mm<sup>2</sup>  
 Ix = 10.00e-7 mm<sup>2</sup> Iy = 1.32e+10 mm<sup>2</sup>  
 Cz = 0.0 mm<sup>2</sup>

**Section 5 : Transv Deck : General**

Ax = 1810000.00 mm<sup>2</sup> Az = 0.00 mm<sup>2</sup>  
 Ix = 10.00e-7 mm<sup>2</sup> Iy = 1.36e+11 mm<sup>2</sup>  
 Cz = 0.0 mm<sup>2</sup>

**Supports**

Data last edited at 18:04 on 29/4/09

| Joint No | DZ (kN/m) | RX (kN.m/deg) | RY (kN.m/deg) |
|----------|-----------|---------------|---------------|
| 43       | Rigid     | Free          | Free          |
| 53       | Rigid     | Free          | Free          |
| 63       | Rigid     | Free          | Free          |
| 85       | Rigid     | Free          | Free          |
| 95       | Rigid     | Free          | Free          |
| 105      | Rigid     | Free          | Free          |
| 127      | Rigid     | Free          | Free          |
| 137      | Rigid     | Free          | Free          |
| 147      | Rigid     | Free          | Free          |
| 169      | Rigid     | Free          | Free          |
| 179      | Rigid     | Free          | Free          |
| 189      | Rigid     | Free          | Free          |
| 211      | Rigid     | Free          | Free          |
| 221      | Rigid     | Free          | Free          |
| 231      | Rigid     | Free          | Free          |

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Loadcase Titles

| Loadcase No | Reference | Title                           |
|-------------|-----------|---------------------------------|
| 1           | B1        | Concrete Dead                   |
| 2           | B2        | Surfacing                       |
| 3           | B3        | F'way Dead                      |
| 4           | B4        | Parapet                         |
| 5           | B5        | HL:HA Span 1                    |
| 6           | B6        | HL:HA Spans 1 and 2             |
| 7           | B7        | HL:HB Sag Span 1                |
| 8           | B8        | HL:HB Hog Span 1 & 2            |
| 9           | B9        | Settlement                      |
| 10          | B10       | HL:Accidental Wheel Sag Span    |
| 11          | B11       | HL:Accidental Wheel Hog Span    |
| 12          | B12       | Footway Sag Span 1              |
| 13          | B13       | Footway Hog Spans 1 & 2         |
| 14          | B14       | HL:HA Shear Span 1              |
| 15          | B15       | HL:HB Shear Span 1              |
| 16          | B16       | HL:HA Shear at Pier             |
| 17          | B17       | HL:HB Shear at Pier             |
| 18          | C1        | Dead Load SLS                   |
| 19          | C2        | Dead Load ULS                   |
| 20          | C3        | Permanent Loads SLS             |
| 21          | C4        | Permanent Loads ULS             |
| 22          | C5        | Dead + HA + Fwy Sag SLS         |
| 23          | C6        | Dead + HA + Fwy Sag ULS         |
| 24          | C7        | Dead + HB + Fwy Sag SLS         |
| 25          | C8        | Dead + HB + Fwy Sag ULS         |
| 26          | C9        | Dead + HA + Fwy + Settl HogSLS  |
| 27          | C10       | Dead + HA + Fwy + Settl Hog ULS |
| 28          | C11       | Dead + HB + Fwy + Settl Hog SLS |
| 29          | C12       | Dead + HB + Fwy + Settl Hog ULS |
| 30          | C13       | Dead + HA + Fwy Shear Span 1 U  |
| 31          | C14       | Dead + HB + Fwy Shear Span 1 U  |
| 32          | C15       | Dead + Footway Span 1 SLS       |
| 33          | C16       | Dead + Footway Span 1 ULS       |
| 34          | C17       | Dead + Accidental Wheel SLS     |
| 35          | C18       | Dead + Accidental Wheel ULS     |
| 36          | C19       | Dead + HA + Fwy + Settl Shear @ |
| 37          | C20       | Dead + HB + Fwy + Settl Shear   |

Combination Loadcase 1 : Dead Load SLS

Data last edited at 18:32 on 26/7/09

| Entry no | Loadcase reference | Load Factor |
|----------|--------------------|-------------|
| 1        | B1                 | 1.000       |
| 2        | B2                 | 1.200       |
| 3        | B3                 | 1.000       |
| 4        | B4                 | 1.000       |

Combination Loadcase 2 : Dead Load ULS

Data last edited at 18:32 on 26/7/09

| Entry no | Loadcase reference | Load Factor |
|----------|--------------------|-------------|
| 5        | B1                 | 1.150       |
| 6        | B2                 | 1.750       |
| 7        | B3                 | 1.200       |
| 8        | B4                 | 1.200       |

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**Combination Loadcase 3 : Permanent Loads SLS**

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| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 9           | C1                    | 1.000          |
| 10          | B9                    | 1.000          |

**Combination Loadcase 4 : Permanent Loads ULS**

Data last edited at 18:32 on 26/7/09

| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 11          | C2                    | 1.000          |
| 12          | B9                    | 1.200          |

**Combination Loadcase 5 : Dead + HA + Fwy Sag SLS**

Data last edited at 18:32 on 26/7/09

| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 13          | C1                    | 1.000          |
| 14          | B5                    | 1.200          |
| 41          | B12                   | 1.000          |

**Combination Loadcase 6 : Dead + HA + Fwy Sag ULS**

Data last edited at 18:32 on 26/7/09

| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 15          | C2                    | 1.000          |
| 16          | B5                    | 1.500          |
| 42          | B12                   | 1.500          |

**Combination Loadcase 7 : Dead + HB + Fwy Sag SLS**

Data last edited at 18:32 on 26/7/09

| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 17          | C1                    | 1.000          |
| 18          | B7                    | 1.100          |
| 43          | B12                   | 1.000          |

**Combination Loadcase 8 : Dead + HB + Fwy Sag ULS**

Data last edited at 18:32 on 26/7/09

| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 19          | C2                    | 1.000          |
| 20          | B7                    | 1.300          |
| 44          | B12                   | 1.500          |

**Combination Loadcase 9 : Dead + HA + Fwy +Setl HogSLS**

Data last edited at 18:32 on 26/7/09

| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 21          | C1                    | 1.000          |
| 22          | B6                    | 1.200          |
| 45          | B13                   | 1.000          |
| 57          | B9                    | 1.000          |

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**Combination Loadcase 10 : Dead + HA + Fwy + Setl Hog ULS**

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| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 23          | C2                    | 1.000          |
| 24          | B6                    | 1.500          |
| 46          | B13                   | 1.500          |
| 58          | B9                    | 1.200          |

**Combination Loadcase 11 : Dead + HB + Fwy + Setl Hog SLS**

Data last edited at 18:32 on 26/7/09

| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 25          | C1                    | 1.000          |
| 26          | B8                    | 1.100          |
| 47          | B13                   | 1.000          |
| 59          | B9                    | 1.000          |

**Combination Loadcase 12 : Dead + HB + Fwy + Setl Hog ULS**

Data last edited at 18:32 on 26/7/09

| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 27          | C2                    | 1.000          |
| 28          | B8                    | 1.300          |
| 48          | B13                   | 1.500          |
| 60          | B9                    | 1.200          |

**Combination Loadcase 13 : Dead + HA + Fwy Shear Span 1 U**

Data last edited at 18:32 on 26/7/09

| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 29          | C2                    | 1.000          |
| 30          | B14                   | 1.500          |
| 49          | B12                   | 1.500          |

**Combination Loadcase 14 : Dead + HB + Fwy Shear Span 1 U**

Data last edited at 18:32 on 26/7/09

| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 31          | C2                    | 1.000          |
| 32          | B15                   | 1.300          |
| 50          | B12                   | 1.500          |

**Combination Loadcase 15 : Dead + Footway Span 1 SLS**

Data last edited at 18:32 on 26/7/09

| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 33          | C1                    | 1.000          |
| 34          | B12                   | 1.000          |

**Combination Loadcase 16 : Dead + Footway Span 1 ULS**

Data last edited at 18:32 on 26/7/09

| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 35          | C2                    | 1.000          |
| 36          | B12                   | 1.500          |

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**Combination Loadcase 17 : Dead + Accidental Wheel SLS**

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| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 37          | C1                    | 1.000          |
| 38          | B10                   | 1.200          |

**Combination Loadcase 18 : Dead + Accidental Wheel ULS**

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| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 39          | C2                    | 1.000          |
| 40          | B10                   | 1.500          |

**Combination Loadcase 19 : Dead + HA + Fwy + Settl Shear @**

Data last edited at 18:32 on 26/7/09

| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 51          | C4                    | 1.000          |
| 52          | B16                   | 1.500          |
| 53          | B13                   | 1.500          |

**Combination Loadcase 20 : Dead + HB + Fwy + Settl Shear**

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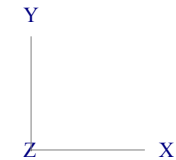
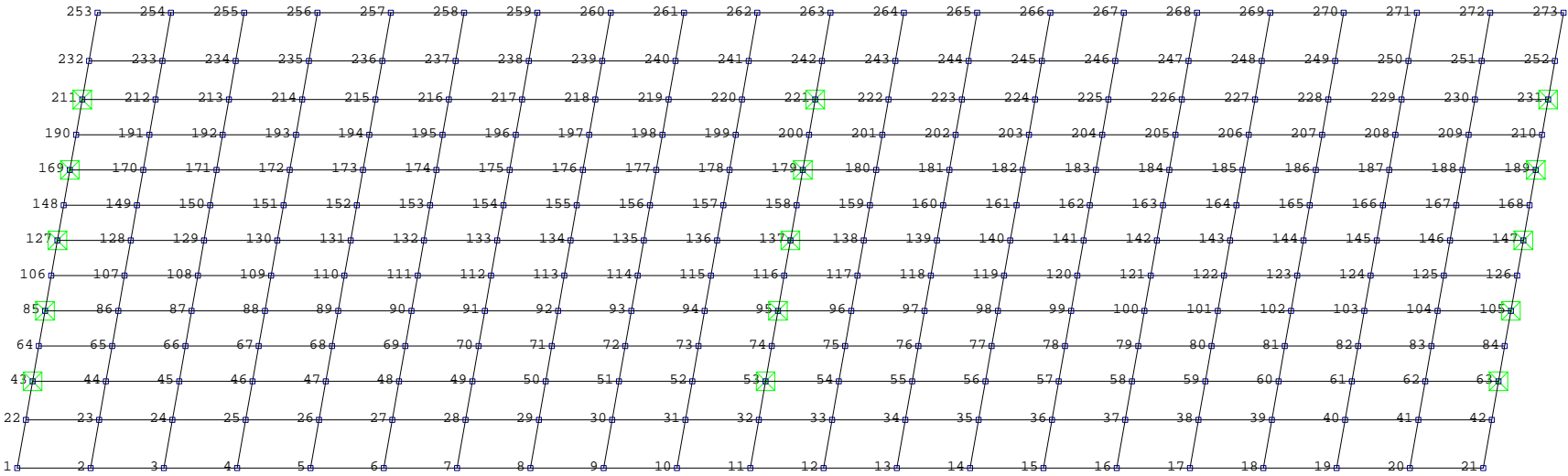
| Entry<br>no | Loadcase<br>reference | Load<br>Factor |
|-------------|-----------------------|----------------|
| 54          | C4                    | 1.000          |
| 55          | B17                   | 1.300          |
| 56          | B13                   | 1.500          |

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SCALES  
Structure 1:179



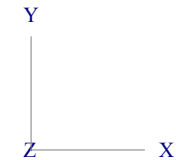
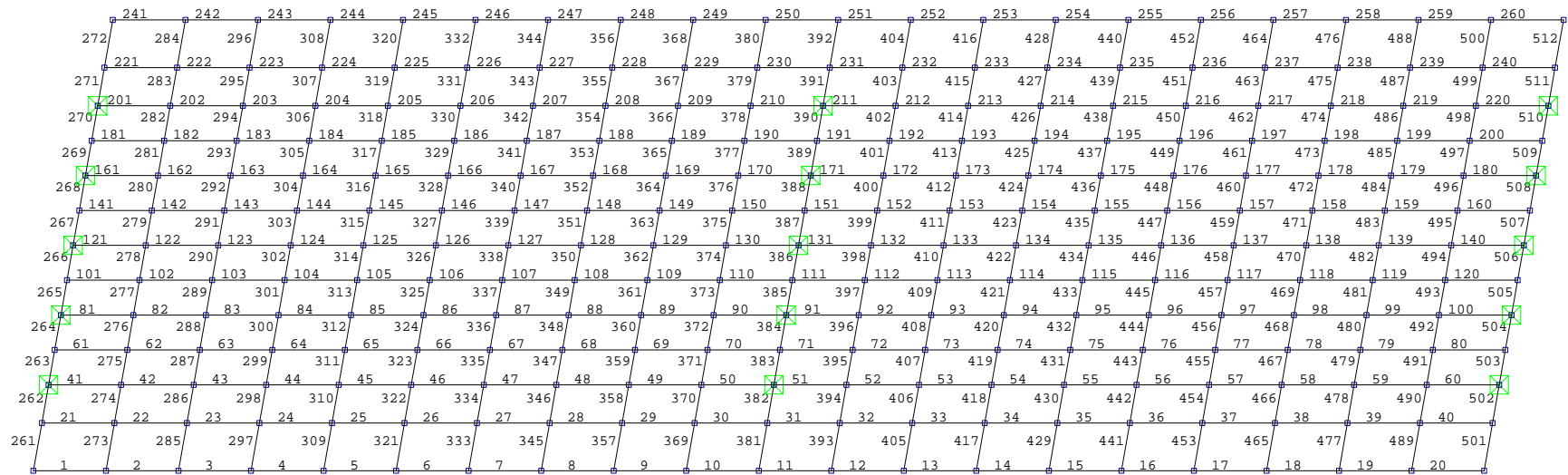
Structure Set : ALL

2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

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SCALES  
Structure 1:179



Structure Set : ALL

2 Span Reinforced Concrete Deck Example  
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**Longitudinals : Minimum Member End Forces**

Loadcase C5 : Dead + HA + Fwy Sag SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 30     | 31    | -0.000           | -626.091h                | -317.293            |
| 51     | 53    | -0.000           | -1678.074h               | 450.908             |
| 50     | 53    | -0.000           | -1678.072h               | -559.210            |

**Longitudinals : Maximum Member End Forces**

Loadcase C5 : Dead + HA + Fwy Sag SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 64     | 67    | 0.000            | 1101.658s                | 69.352              |
| 124    | 131   | 0.000            | 1198.481s                | 24.293              |
| 51     | 53    | -0.000           | -1678.074h               | 450.908             |

**Longitudinals : Minimum Member End Forces**

Loadcase C7 : Dead + HB + Fwy Sag SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 30     | 31    | -0.000           | -622.648h                | -309.151            |
| 210    | 221   | -0.000           | -1749.336h               | -593.368            |
| 210    | 221   | -0.000           | -1749.336h               | -593.368            |

**Longitudinals : Maximum Member End Forces**

Loadcase C7 : Dead + HB + Fwy Sag SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 224    | 235   | 0.000            | 995.538s                 | 62.160              |
| 205    | 215   | 0.000            | 1256.183s                | -35.287             |
| 211    | 221   | -0.000           | -1749.334h               | 459.148             |

**Longitudinals : Minimum Member End Forces**

Loadcase C9 : Dead + HA + Fwy +Setl HogSLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 30     | 31    | -0.000           | -926.107h                | -310.313            |
| 210    | 221   | -0.000           | -2034.025h               | -560.656            |
| 50     | 53    | -0.000           | -2033.978h               | -560.918            |

**Longitudinals : Maximum Member End Forces**

Loadcase C9 : Dead + HA + Fwy +Setl HogSLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 44     | 46    | 0.000            | 827.302s                 | 37.145              |
| 205    | 215   | 0.000            | 849.203s                 | -29.988             |
| 51     | 53    | -0.000           | -2033.980h               | 544.970             |

**Longitudinals : Minimum Member End Forces**

Loadcase C11 : Dead + HB + Fwy + Setl Hog SL

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 30     | 31    | -0.000           | -916.860h                | -308.025            |
| 210    | 221   | -0.000           | -2117.254h               | -563.175            |
| 210    | 221   | -0.000           | -2117.254h               | -563.175            |



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**Longitudinals : Maximum Member End Forces**

Loadcase C11 : Dead + HB + Fwy + Setl Hog SL

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 84     | 88    | 0.000            | 814.523s                 | 42.378              |
| 205    | 215   | 0.000            | 889.560s                 | -19.309             |
| 211    | 221   | -0.000           | -2117.252h               | 564.763             |

**Longitudinals : Minimum Member End Forces**

Loadcase C6 : Dead + HA + Fwy Sag ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 231    | 242   | -0.000           | -1535.436h               | 334.225             |
| 51     | 53    | -0.000           | -2007.402h               | 533.798             |
| 50     | 53    | -0.000           | -2007.400h               | -672.905            |

**Longitudinals : Maximum Member End Forces**

Loadcase C6 : Dead + HA + Fwy Sag ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 64     | 67    | 0.000            | 1339.875s                | 84.874              |
| 124    | 131   | 0.000            | 1460.240s                | 31.450              |
| 51     | 53    | -0.000           | -2007.402h               | 533.798             |

**Longitudinals : Minimum Member End Forces**

Loadcase C8 : Dead + HB + Fwy Sag ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 231    | 242   | -0.000           | -1591.574h               | 335.481             |
| 210    | 221   | -0.000           | -2073.041h               | -705.248            |
| 210    | 221   | -0.000           | -2073.041h               | -705.248            |

**Longitudinals : Maximum Member End Forces**

Loadcase C8 : Dead + HB + Fwy Sag ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 224    | 235   | 0.000            | 1186.267s                | 74.847              |
| 185    | 194   | 0.000            | 1497.483s                | -54.651             |
| 211    | 221   | -0.000           | -2073.038h               | 541.878             |

**Longitudinals : Minimum Member End Forces**

Loadcase C10 : Dead + HA + Fwy + Setl Hog UL

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 30     | 31    | -0.000           | -1114.066h               | -373.676            |
| 210    | 221   | -0.000           | -2448.402h               | -675.070            |
| 50     | 53    | -0.000           | -2448.343h               | -675.397            |

**Longitudinals : Maximum Member End Forces**

Loadcase C10 : Dead + HA + Fwy + Setl Hog UL

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 44     | 46    | 0.000            | 997.774s                 | 44.906              |
| 205    | 215   | 0.000            | 1024.989s                | -35.902             |
| 51     | 53    | -0.000           | -2448.346h               | 655.462             |

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**Longitudinals : Minimum Member End Forces**

Loadcase C12 : Dead + HB + Fwy + Setl Hog UL

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 30     | 31    | -0.000           | -1094.049h               | -366.809            |
| 210    | 221   | -0.000           | -2523.787h               | -671.373            |
| 210    | 221   | -0.000           | -2523.787h               | -671.373            |

**Longitudinals : Maximum Member End Forces**

Loadcase C12 : Dead + HB + Fwy + Setl Hog UL

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 84     | 88    | 0.000            | 969.100s                 | 50.164              |
| 205    | 215   | 0.000            | 1057.689s                | -23.166             |
| 211    | 221   | -0.000           | -2523.785h               | 673.249             |

**Longlt at Abument : Minimum Member End Forces**

Loadcase C13 : Dead + HA + Fwy Shear Span 1

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 242    | 254   | 0.000            | 132.731s                 | 86.919              |
| 242    | 254   | 0.000            | 132.731s                 | 86.919              |
| 242    | 255   | 0.000            | 260.867s                 | 47.961              |

**Longlt at Abument : Maximum Member End Forces**

Loadcase C13 : Dead + HA + Fwy Shear Span 1

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 2      | 2     | 0.000            | 133.883s                 | 87.283              |
| 62     | 66    | 0.000            | 1024.072s                | 183.613             |
| 102    | 107   | 0.000            | 595.553s                 | 250.392             |

**Longlt at Abument : Minimum Member End Forces**

Loadcase C14 : Dead + HB + Fwy Shear Span 1

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 242    | 254   | 0.000            | 141.331s                 | 92.904              |
| 2      | 2     | 0.000            | 127.640s                 | 83.983              |
| 2      | 3     | 0.000            | 250.198s                 | 45.026              |

**Longlt at Abument : Maximum Member End Forces**

Loadcase C14 : Dead + HB + Fwy Shear Span 1

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 2      | 2     | 0.000            | 127.640s                 | 83.983              |
| 202    | 213   | 0.000            | 1059.239s                | 163.977             |
| 82     | 86    | 0.000            | 600.463s                 | 246.777             |

**Longitudinals : Minimum Member End Forces**

Loadcase C15 : Dead + Footway Span 1 SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 231    | 242   | -0.000           | -1081.255h               | 279.060             |
| 51     | 53    | -0.000           | -1405.571h               | 426.591             |
| 210    | 221   | -0.000           | -1405.571h               | -441.508            |

2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

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**Longitudinals : Maximum Member End Forces**

Loadcase C15 : Dead + Footway Span 1 SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 224    | 235   | 0.000            | 604.952s                 | 40.911              |
| 65     | 68    | 0.000            | 744.833s                 | -16.006             |
| 51     | 53    | -0.000           | -1405.571h               | 426.591             |

**Longitudinals : Minimum Member End Forces**

Loadcase C17 : Dead + Accidental Wheel SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 190    | 199   | -0.000           | -714.339h                | -367.009            |
| 210    | 221   | -0.000           | -1570.384h               | -491.446            |
| 210    | 221   | -0.000           | -1570.384h               | -491.446            |

**Longitudinals : Maximum Member End Forces**

Loadcase C17 : Dead + Accidental Wheel SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 223    | 234   | 0.000            | 640.179s                 | 131.857             |
| 205    | 215   | 0.000            | 1070.123s                | -3.291              |
| 211    | 221   | -0.000           | -1570.383h               | 441.734             |

**Ppt Edge Beam : Minimum Member End Forces**

Loadcase C16 : Dead + Footway Span 1 ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 251    | 263   | -0.000           | -322.426h                | 52.546              |
| 10     | 11    | -0.000           | -322.426h                | -61.206             |
| 9      | 10    | -0.000           | -243.145h                | -107.273            |

**Ppt Edge Beam : Maximum Member End Forces**

Loadcase C16 : Dead + Footway Span 1 ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 244    | 256   | 0.000            | 231.415s                 | 23.600              |
| 5      | 5     | 0.000            | 239.246s                 | 6.347               |
| 12     | 12    | 0.000            | -255.538h                | 101.536             |

**Ppt Edge Beam : Minimum Member End Forces**

Loadcase C18 : Dead + Accidental Wheel ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 251    | 263   | -0.000           | -385.862h                | 49.784              |
| 251    | 263   | -0.000           | -385.862h                | 49.784              |
| 249    | 262   | -0.000           | -282.431h                | -126.150            |

**Ppt Edge Beam : Maximum Member End Forces**

Loadcase C18 : Dead + Accidental Wheel ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 244    | 256   | 0.000            | 329.293s                 | 71.339              |
| 244    | 257   | 0.000            | 431.888s                 | 36.656              |
| 252    | 264   | -0.000           | -324.222h                | 104.728             |

2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

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**Longtl at Pier : Minimum Member End Forces**

Loadcase C19 : Dead + HA + Fwy + Setl Shear

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 9      | 9     | -0.000           | -176.890h                | -90.497             |
| 109    | 115   | -0.000           | -1342.753h               | -439.528            |
| 89     | 94    | -0.000           | -1336.201h               | -445.241            |

**Longtl at Pier : Maximum Member End Forces**

Loadcase C19 : Dead + HA + Fwy + Setl Shear

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 12     | 12    | 0.000            | -383.170h                | 130.345             |
| 12     | 13    | 0.000            | -172.320h                | 91.601              |
| 92     | 96    | -0.000           | -1311.538h               | 442.577             |

**Longtl at Pier : Minimum Member End Forces**

Loadcase C20 : Dead + HB + Fwy + Settl Shear

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 9      | 9     | -0.000           | -168.741h                | -89.371             |
| 169    | 178   | -0.000           | -1400.177h               | -406.568            |
| 89     | 94    | 0.000            | -1351.293h               | -420.279            |

**Longtl at Pier : Maximum Member End Forces**

Loadcase C20 : Dead + HB + Fwy + Settl Shear

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 12     | 12    | 0.000            | -379.474h                | 126.966             |
| 252    | 265   | -0.000           | -109.354h                | 105.217             |
| 92     | 96    | -0.000           | -1246.827h               | 449.411             |

**Critical Members : Member End Forces**

Loadcase C1 : Dead Load SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 50     | 52    | -0.000           | -614.056h                | -371.211            |
|        | 53    | 0.000            | 1366.183h                | 420.501             |
| 65     | 68    | 0.000            | 695.632s                 | -15.690             |
|        | 69    | -0.000           | -621.252s                | 62.605              |
| 82     | 86    | 0.000            | 314.562s                 | 144.815             |
|        | 87    | -0.000           | -545.142s                | -97.900             |
| 89     | 93    | -0.000           | -193.833h                | -236.607            |
|        | 94    | 0.000            | 687.956h                 | 283.522             |
| 92     | 96    | -0.000           | -687.956h                | 283.522             |
|        | 97    | 0.000            | 193.832h                 | -236.608            |
| 102    | 107   | 0.000            | 308.846s                 | 145.254             |
|        | 108   | -0.000           | -540.258s                | -98.339             |
| 125    | 131   | 0.000            | 695.626s                 | -15.063             |
|        | 132   | -0.000           | -622.437s                | 61.978              |
| 205    | 215   | 0.000            | 695.590s                 | -14.810             |
|        | 216   | -0.000           | -620.625s                | 64.100              |
| 210    | 220   | -0.000           | -614.055h                | -371.213            |
|        | 221   | 0.000            | 1366.185h                | 420.502             |

2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

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**Critical Members : Member End Forces**

Loadcase C2 : Dead Load ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 50     | 52    | -0.000           | -723.522h                | -436.437            |
|        | 53    | 0.000            | 1607.692h                | 494.267             |
| 65     | 68    | 0.000            | 819.373s                 | -18.257             |
|        | 69    | -0.000           | -731.754s                | 73.973              |
| 82     | 86    | 0.000            | 370.896s                 | <b>170.755</b>      |
|        | 87    | -0.000           | -642.401s                | -115.039            |
| 89     | 93    | -0.000           | -228.245h                | -278.544            |
|        | 94    | 0.000            | 810.408h                 | 334.260             |
| 92     | 96    | -0.000           | -810.409h                | 334.260             |
|        | 97    | 0.000            | 228.245h                 | -278.544            |
| 102    | 107   | 0.000            | 364.340s                 | <b>171.280</b>      |
|        | 108   | -0.000           | -636.842s                | -115.564            |
| 125    | 131   | 0.000            | 819.504s                 | -17.533             |
|        | 132   | -0.000           | -733.261s                | 73.249              |
| 205    | 215   | 0.000            | 819.338s                 | -17.554             |
|        | 216   | -0.000           | -731.046s                | 75.385              |
| 210    | 220   | -0.000           | -723.521h                | -436.439            |
|        | 221   | 0.000            | 1607.694h                | 494.269             |

**Critical Members : Member End Forces**

Loadcase C3 : Permanent Loads SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 50     | 52    | -0.000           | -838.671h                | -387.737            |
|        | 53    | 0.000            | 1622.198h                | 437.027             |
| 65     | 68    | 0.000            | 594.886s                 | -28.955             |
|        | 69    | -0.000           | -495.301s                | 75.870              |
| 82     | 86    | 0.000            | 289.512s                 | 131.359             |
|        | 87    | -0.000           | -494.526s                | -84.445             |
| 89     | 93    | -0.000           | -395.104h                | -250.379            |
|        | 94    | 0.000            | 915.392h                 | 297.293             |
| 92     | 96    | -0.000           | -915.392h                | 297.294             |
|        | 97    | 0.000            | 395.104h                 | -250.379            |
| 102    | 107   | 0.000            | 284.020s                 | 131.742             |
|        | 108   | -0.000           | -489.761s                | -84.828             |
| 125    | 131   | 0.000            | 594.781s                 | -28.233             |
|        | 132   | -0.000           | -496.569s                | 75.148              |
| 205    | 215   | 0.000            | 594.886s                 | -28.122             |
|        | 216   | -0.000           | -494.629s                | 77.412              |
| 210    | 220   | -0.000           | -838.670h                | -387.739            |
|        | 221   | 0.000            | 1622.200h                | 437.029             |

**Critical Members : Member End Forces**

Loadcase C4 : Permanent Loads ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 50     | 52    | -0.000           | -993.061h                | -456.269            |
|        | 53    | 0.000            | 1914.910h                | 514.099             |
| 65     | 68    | 0.000            | 698.478s                 | -34.176             |
|        | 69    | -0.000           | -580.613s                | 89.892              |

2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

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**Critical Members : Member End Forces (Contd)**

Loadcase C4 : Permanent Loads ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 82     | 86    | 0.000            | 340.836s                 | 154.609             |
|        | 87    | -0.000           | -581.662s                | -98.892             |
| 89     | 93    | -0.000           | -469.770h                | -295.069            |
|        | 94    | 0.000            | 1083.332h                | <b>350.786</b>      |
| 92     | 96    | -0.000           | -1083.332h               | <b>350.786</b>      |
|        | 97    | 0.000            | 469.770h                 | -295.069            |
| 102    | 107   | 0.000            | 334.549s                 | 155.067             |
|        | 108   | -0.000           | -576.245s                | -99.350             |
| 125    | 131   | 0.000            | 698.490s                 | -33.337             |
|        | 132   | -0.000           | -582.220s                | 89.053              |
| 205    | 215   | 0.000            | 698.493s                 | -33.528             |
|        | 216   | -0.000           | -579.851s                | 91.359              |
| 210    | 220   | -0.000           | -993.060h                | -456.270            |
|        | 221   | 0.000            | 1914.912h                | 514.100             |

2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

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**Transv Deck : Minimum Member End Forces**

Loadcase C2 : Dead Load ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 394    | 33    | -0.000           | -102.083h                | -98.390             |
| 391    | 221   | 0.000            | -905.492h                | 756.822             |
| 390    | 200   | 0.000            | -49.994h                 | -922.867            |

**Transv Deck : Maximum Member End Forces**

Loadcase C2 : Dead Load ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 403    | 222   | 0.000            | -201.948h                | 98.389              |
| 386    | 116   | 0.000            | 199.918s                 | -479.867            |
| 383    | 53    | 0.000            | -905.491h                | 922.867             |

**Transv Deck : Minimum Member End Forces**

Loadcase C4 : Permanent Loads ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 394    | 33    | -0.000           | -105.293h                | -101.804            |
| 391    | 221   | 0.000            | -939.268h                | 785.681             |
| 390    | 200   | 0.000            | -50.793h                 | -958.442            |

**Transv Deck : Maximum Member End Forces**

Loadcase C4 : Permanent Loads ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 403    | 222   | 0.000            | -208.623h                | 101.804             |
| 386    | 116   | 0.000            | 208.320s                 | -499.769            |
| 383    | 53    | 0.000            | -939.267h                | 958.441             |

**Transv Deck : Minimum Member End Forces**

Loadcase C6 : Dead + HA + Fwy Sag ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 379    | 220   | -0.000           | -231.136h                | 111.157             |
| 382    | 53    | 0.000            | -1088.792h               | -914.259            |
| 390    | 200   | 0.000            | -47.607h                 | -1122.588           |

**Transv Deck : Maximum Member End Forces**

Loadcase C6 : Dead + HA + Fwy Sag ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 370    | 31    | 0.000            | -118.375h                | -111.173            |
| 386    | 116   | 0.000            | 252.043s                 | -601.752            |
| 383    | 53    | 0.000            | -1088.792h               | 1123.096            |

**Transv Deck : Minimum Member End Forces**

Loadcase C8 : Dead + HB + Fwy Sag ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 269    | 169   | -0.000           | 52.238s                  | -144.750            |
| 391    | 221   | 0.000            | -1130.766h               | 949.757             |
| 390    | 200   | 0.000            | -58.787h                 | -1156.397           |

2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

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**Transv Deck : Maximum Member End Forces**

Loadcase C8 : Dead + HB + Fwy Sag ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 370    | 31    | 0.000            | -117.148h                | -111.597            |
| 387    | 158   | 0.000            | 254.022s                 | 606.004             |
| 383    | 53    | 0.000            | -1062.552h               | 1100.667            |

**Transv Deck : Minimum Member End Forces**

Loadcase C10 : Dead + HA + Fwy + Setl Hog UL

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 379    | 220   | -0.000           | -256.749h                | 125.646             |
| 382    | 53    | 0.000            | -1199.815h               | -1008.836           |
| 390    | 200   | 0.000            | -51.845h                 | -1237.931           |

**Transv Deck : Maximum Member End Forces**

Loadcase C10 : Dead + HA + Fwy + Setl Hog UL

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 370    | 31    | 0.000            | -129.214h                | -125.663            |
| 386    | 116   | 0.000            | 278.255s                 | -664.199            |
| 383    | 53    | 0.000            | -1199.815h               | 1238.303            |

**Transv Deck : Minimum Member End Forces**

Loadcase C12 : Dead + HB + Fwy + Setl Hog UL

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 394    | 33    | -0.000           | -127.298h                | -123.783            |
| 391    | 221   | 0.000            | -1236.110h               | 1036.040            |
| 390    | 200   | 0.000            | -72.812h                 | -1254.907           |

**Transv Deck : Maximum Member End Forces**

Loadcase C12 : Dead + HB + Fwy + Setl Hog UL

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 510    | 210   | 0.000            | -63.366h                 | -379.144            |
| 386    | 116   | -0.000           | 272.322s                 | -650.354            |
| 383    | 53    | 0.000            | -1184.050h               | 1221.344            |

**Transv Deck : Minimum Member End Forces**

Loadcase C13 : Dead + HA + Fwy Shear Span 1

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 379    | 220   | -0.000           | -227.317h                | 109.206             |
| 382    | 53    | 0.000            | -1070.203h               | -898.474            |
| 390    | 200   | 0.000            | -46.833h                 | -1103.237           |

**Transv Deck : Maximum Member End Forces**

Loadcase C13 : Dead + HA + Fwy Shear Span 1

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 370    | 31    | 0.000            | -116.540h                | -109.228            |
| 386    | 116   | 0.000            | 247.805s                 | -591.622            |
| 383    | 53    | 0.000            | -1070.203h               | 1103.863            |



2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

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**Transv Deck : Minimum Member End Forces**

Loadcase C14 : Dead + HB + Fwy Shear Span 1

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 262    | 22    | -0.000           | -109.969h                | -378.346            |
| 391    | 221   | 0.000            | -1065.279h               | 892.093             |
| 390    | 200   | 0.000            | -59.823h                 | -1084.635           |

**Transv Deck : Maximum Member End Forces**

Loadcase C14 : Dead + HB + Fwy Shear Span 1

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 370    | 31    | 0.000            | -114.546h                | -107.164            |
| 386    | 116   | 0.000            | 241.550s                 | -574.427            |
| 383    | 53    | 0.000            | -1061.799h               | 1092.004            |

**Transv Deck : Minimum Member End Forces**

Loadcase C16 : Dead + Footway Span 1 ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 269    | 169   | -0.000           | 38.806s                  | -106.661            |
| 391    | 221   | 0.000            | -950.863h                | 794.593             |
| 390    | 200   | 0.000            | -57.064h                 | -964.186            |

**Transv Deck : Maximum Member End Forces**

Loadcase C16 : Dead + Footway Span 1 ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 403    | 222   | 0.000            | -209.139h                | 101.437             |
| 386    | 116   | 0.000            | 205.397s                 | -494.224            |
| 383    | 53    | 0.000            | -950.862h                | 964.185             |

**Transv Deck : Minimum Member End Forces**

Loadcase C19 : Dead + HA + Fwy + Setl Shear

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 394    | 33    | -0.000           | -127.523h                | -119.991            |
| 382    | 53    | 0.000            | -1178.560h               | -991.239            |
| 390    | 200   | 0.000            | -39.242h                 | -1226.223           |

**Transv Deck : Maximum Member End Forces**

Loadcase C19 : Dead + HA + Fwy + Setl Shear

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 403    | 222   | 0.000            | -252.078h                | 122.558             |
| 386    | 116   | 0.000            | 282.877s                 | -670.915            |
| 383    | 53    | 0.000            | -1178.559h               | 1226.071            |

**Transv Deck : Minimum Member End Forces**

Loadcase C20 : Dead + HB + Fwy + Setl Shear

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 394    | 33    | -0.000           | -126.562h                | -121.556            |
| 391    | 221   | -0.000           | -1166.910h               | 981.954             |
| 390    | 200   | -0.000           | -30.720h                 | -1225.664           |

2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

09:50 : 11/11/14

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**Transv Deck : Maximum Member End Forces**

Loadcase C20 : Dead + HB + Fwy + Settl Shear

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 263    | 43    | 0.000            | -414.611h                | 379.314             |
| 387    | 158   | -0.000           | 280.629s                 | 664.427             |
| 383    | 53    | -0.000           | -1158.551h               | 1201.544            |

**Transv Cant : Minimum Member End Forces**

Loadcase C1 : Dead Load SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 393    | 12    | -0.000           | -0.000h                  | -68.812             |
| 392    | 242   | 0.000            | -117.444h                | 92.548              |
| 381    | 11    | 0.000            | 0.000s                   | -92.548             |

**Transv Cant : Maximum Member End Forces**

Loadcase C1 : Dead Load SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 404    | 243   | 0.000            | -87.323h                 | 68.812              |
| 464    | 269   | 0.000            | 0.000s                   | 15.960              |
| 392    | 242   | 0.000            | -117.444h                | 92.548              |

**Transv Cant : Minimum Member End Forces**

Loadcase C2 : Dead Load ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 393    | 12    | -0.000           | -0.000h                  | -80.444             |
| 392    | 242   | 0.000            | -137.317h                | 108.209             |
| 381    | 11    | 0.000            | 0.000s                   | -108.209            |

**Transv Cant : Maximum Member End Forces**

Loadcase C2 : Dead Load ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 404    | 243   | 0.000            | -102.083h                | 80.444              |
| 464    | 269   | 0.000            | 0.000s                   | 18.211              |
| 392    | 242   | 0.000            | -137.317h                | 108.209             |

**Transv Cant : Minimum Member End Forces**

Loadcase C3 : Permanent Loads SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 393    | 12    | -0.000           | -0.000h                  | -70.920             |
| 392    | 242   | 0.000            | -121.180h                | 95.493              |
| 381    | 11    | 0.000            | 0.000s                   | -95.493             |

**Transv Cant : Maximum Member End Forces**

Loadcase C3 : Permanent Loads SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 404    | 243   | 0.000            | -89.997h                 | 70.920              |
| 464    | 269   | 0.000            | 0.000s                   | 15.983              |
| 392    | 242   | 0.000            | -121.180h                | 95.493              |

2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

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**Transv Cant : Minimum Member End Forces**

Loadcase C4 : Permanent Loads ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 393    | 12    | -0.000           | -0.000h                  | -82.973             |
| 392    | 242   | 0.000            | -141.801h                | 111.742             |
| 381    | 11    | 0.000            | 0.000s                   | -111.743            |

**Transv Cant : Maximum Member End Forces**

Loadcase C4 : Permanent Loads ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 404    | 243   | 0.000            | -105.293h                | 82.973              |
| 464    | 269   | 0.000            | 0.000s                   | 18.239              |
| 392    | 242   | 0.000            | -141.801h                | 111.742             |

**Transv Cant : Minimum Member End Forces**

Loadcase C15 : Dead + Footway Span 1 SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 393    | 12    | -0.000           | -0.000h                  | -70.965             |
| 392    | 242   | 0.000            | -122.132h                | 96.243              |
| 381    | 11    | 0.000            | 0.000s                   | -96.243             |

**Transv Cant : Maximum Member End Forces**

Loadcase C15 : Dead + Footway Span 1 SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 404    | 243   | 0.000            | -90.054h                 | 70.965              |
| 464    | 269   | 0.000            | 0.000s                   | 15.971              |
| 392    | 242   | 0.000            | -122.132h                | 96.243              |

**Transv Cant : Minimum Member End Forces**

Loadcase C16 : Dead + Footway Span 1 ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 393    | 12    | -0.000           | -0.000h                  | -83.673             |
| 392    | 242   | 0.000            | -144.350h                | 113.751             |
| 381    | 11    | 0.000            | 0.000s                   | -113.751            |

**Transv Cant : Maximum Member End Forces**

Loadcase C16 : Dead + Footway Span 1 ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 404    | 243   | 0.000            | -106.181h                | 83.673              |
| 464    | 269   | 0.000            | 0.000s                   | 18.228              |
| 392    | 242   | 0.000            | -144.350h                | 113.751             |

**Transv Cant : Minimum Member End Forces**

Loadcase C17 : Dead + Accidental Wheel SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 261    | 1     | -0.000           | -0.000h                  | -44.787             |
| 392    | 242   | 0.000            | -131.000h                | 103.231             |
| 381    | 11    | 0.000            | 0.000s                   | -85.689             |

2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

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**Transv Cant : Maximum Member End Forces**

Loadcase C17 : Dead + Accidental Wheel SLS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 369    | 10    | 0.000            | 0.000s                   | -65.020             |
| 308    | 256   | -0.000           | 0.000s                   | 34.995              |
| 392    | 242   | 0.000            | -131.000h                | 103.231             |

**Transv Cant : Minimum Member End Forces**

Loadcase C18 : Dead + Accidental Wheel ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 261    | 1     | -0.000           | -0.000h                  | -51.638             |
| 392    | 242   | 0.000            | -154.263h                | 121.562             |
| 381    | 11    | 0.000            | 0.000s                   | -99.636             |

**Transv Cant : Maximum Member End Forces**

Loadcase C18 : Dead + Accidental Wheel ULS

Analysed at 09:46 hrs on 11/11/14

| Member | Joint | Torque<br>(kN.m) | Bending Moment<br>(kN.m) | Shear Force<br>(kN) |
|--------|-------|------------------|--------------------------|---------------------|
| 369    | 10    | 0.000            | 0.000s                   | -75.704             |
| 308    | 256   | -0.000           | 0.000s                   | 42.183              |
| 392    | 242   | 0.000            | -154.263h                | 121.562             |

**Abutment Reactions : Support Reactions**

Loadcase C1 : Dead Load SLS

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 43    | 0.000              | 0.000              | 709.901         |
| 85    | 0.000              | 0.000              | 146.048         |
| 127   | 0.000              | 0.000              | 488.472         |
| 169   | 0.000              | 0.000              | 146.047         |
| 211   | 0.000              | 0.000              | 709.902         |

Total = 2200 kN

**Abutment Reactions : Support Reactions**

Loadcase C2 : Dead Load ULS

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 43    | 0.000              | 0.000              | 833.772         |
| 85    | 0.000              | 0.000              | 174.334         |
| 127   | 0.000              | 0.000              | 575.731         |
| 169   | 0.000              | 0.000              | 174.333         |
| 211   | 0.000              | 0.000              | 833.773         |

Total = 2592 kN

**Abutment Reactions : Support Reactions**

Loadcase C3 : Permanent Loads SLS

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 43    | 0.000              | 0.000              | 664.589         |
| 85    | 0.000              | 0.000              | 133.494         |
| 127   | 0.000              | 0.000              | 455.356         |
| 169   | 0.000              | 0.000              | 133.493         |
| 211   | 0.000              | 0.000              | 664.589         |

2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member StiffnessDate : 23/7/09  
Job No. : 001  
Checked by :

09:50 : 11/11/14

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**Abutment Reactions : Support Reactions**

Loadcase C4 : Permanent Loads ULS

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 43    | 0.000              | 0.000              | 779.397         |
| 85    | 0.000              | 0.000              | 159.269         |
| 127   | 0.000              | 0.000              | 535.992         |
| 169   | 0.000              | 0.000              | 159.268         |
| 211   | 0.000              | 0.000              | 779.398         |

**Abutment Reactions : Support Reactions**

Loadcase C13 : Dead + HA + Fwy Shear Span 1

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 43    | 0.000              | 0.000              | 1267.437        |
| 85    | 0.000              | 0.000              | 397.891         |
| 127   | 0.000              | 0.000              | 968.737         |
| 169   | 0.000              | 0.000              | 397.868         |
| 211   | 0.000              | 0.000              | 1269.979        |

Total = 4302 kN

**Abutment Reactions : Support Reactions**

Loadcase C14 : Dead + HB + Fwy Shear Span 1

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 43    | 0.000              | 0.000              | 1226.000        |
| 85    | 0.000              | 0.000              | 393.690         |
| 127   | 0.000              | 0.000              | 1004.401        |
| 169   | 0.000              | 0.000              | 460.209         |
| 211   | 0.000              | 0.000              | 1384.589        |

Total = 4469 kN

**Abutment Reactions : Joint Displacements**

Loadcase C1 : Dead Load SLS

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 43    | 0.000380            | 0.001972            | -0.000                 |
| 85    | 0.000333            | 0.001934            | -0.000                 |
| 127   | 0.000339            | 0.001924            | -0.000                 |
| 169   | 0.000349            | 0.001934            | -0.000                 |
| 211   | 0.000315            | 0.001972            | -0.000                 |

**Abutment Reactions : Joint Displacements**

Loadcase C2 : Dead Load ULS

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 43    | 0.000447            | 0.002322            | -0.000                 |
| 85    | 0.000393            | 0.002279            | -0.000                 |
| 127   | 0.000400            | 0.002268            | -0.000                 |
| 169   | 0.000411            | 0.002279            | -0.000                 |
| 211   | 0.000372            | 0.002322            | -0.000                 |

2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

09:50 : 11/11/14

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**Abutment Reactions : Joint Displacements**

Loadcase C3 : Permanent Loads SLS

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 43    | 0.000169            | 0.000787            | -15.000                |
| 85    | 0.000125            | 0.000750            | -15.000                |
| 127   | 0.000130            | 0.000740            | -15.000                |
| 169   | 0.000140            | 0.000750            | -15.000                |
| 211   | 0.000108            | 0.000787            | -15.000                |

**Abutment Reactions : Joint Displacements**

Loadcase C4 : Permanent Loads ULS

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 43    | 0.000194            | 0.000901            | -18.000                |
| 85    | 0.000143            | 0.000858            | -18.000                |
| 127   | 0.000149            | 0.000847            | -18.000                |
| 169   | 0.000160            | 0.000858            | -18.000                |
| 211   | 0.000123            | 0.000901            | -18.000                |

**Abutment Reactions : Joint Displacements**

Loadcase C13 : Dead + HA + Fwy Shear Span 1

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 43    | 0.000743            | 0.003912            | -0.000                 |
| 85    | 0.000671            | 0.003882            | -0.000                 |
| 127   | 0.000683            | 0.003874            | -0.000                 |
| 169   | 0.000696            | 0.003875            | -0.000                 |
| 211   | 0.000635            | 0.003898            | -0.000                 |

**Abutment Reactions : Joint Displacements**

Loadcase C14 : Dead + HB + Fwy Shear Span 1

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 43    | 0.000721            | 0.003796            | -0.000                 |
| 85    | 0.000665            | 0.003843            | -0.000                 |
| 127   | 0.000690            | 0.003918            | -0.000                 |
| 169   | 0.000719            | 0.003999            | -0.000                 |
| 211   | 0.000666            | 0.004090            | -0.000                 |

**Pier Reactions : Support Reactions**

Loadcase C1 : Dead Load SLS

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 53    | 0.000              | 0.000              | 2272.379        |
| 95    | 0.000              | 0.000              | 684.470         |
| 137   | 0.000              | 0.000              | 1419.507        |
| 179   | 0.000              | 0.000              | 684.469         |
| 221   | 0.000              | 0.000              | 2272.380        |

09:50 : 11/11/14

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**Pier Reactions : Support Reactions**

Loadcase C2 : Dead Load ULS

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 53    | 0.000              | 0.000              | 2668.225        |
| 95    | 0.000              | 0.000              | 813.364         |
| 137   | 0.000              | 0.000              | 1675.038        |
| 179   | 0.000              | 0.000              | 813.363         |
| 221   | 0.000              | 0.000              | 2668.226        |

**Pier Reactions : Support Reactions**

Loadcase C3 : Permanent Loads SLS

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 53    | 0.000              | 0.000              | 2359.126        |
| 95    | 0.000              | 0.000              | 717.035         |
| 137   | 0.000              | 0.000              | 1478.580        |
| 179   | 0.000              | 0.000              | 717.034         |
| 221   | 0.000              | 0.000              | 2359.127        |

**Total = 7631 kN****Pier Reactions : Support Reactions**

Loadcase C4 : Permanent Loads ULS

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 53    | 0.000              | 0.000              | 2772.321        |
| 95    | 0.000              | 0.000              | 852.442         |
| 137   | 0.000              | 0.000              | 1745.925        |
| 179   | 0.000              | 0.000              | 852.441         |
| 221   | 0.000              | 0.000              | 2772.322        |

**Total = 8995 kN****Pier Reactions : Support Reactions**

Loadcase C9 : Dead + HA + Fwy + Setl HogSLS

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 53    | 0.000              | 0.000              | 2981.972        |
| 95    | 0.000              | 0.000              | 993.509         |
| 137   | 0.000              | 0.000              | 1941.437        |
| 179   | 0.000              | 0.000              | 993.514         |
| 221   | 0.000              | 0.000              | 2981.134        |

**Pier Reactions : Support Reactions**

Loadcase C10 : Dead + HA + Fwy + Setl Hog UL

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 53    | 0.000              | 0.000              | 3588.793        |
| 95    | 0.000              | 0.000              | 1198.354        |
| 137   | 0.000              | 0.000              | 2338.269        |
| 179   | 0.000              | 0.000              | 1198.360        |
| 221   | 0.000              | 0.000              | 3587.745        |

**Total = 11912 kN**

2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

09:50 : 11/11/14

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**Pier Reactions : Support Reactions**

Loadcase C11 : Dead + HB + Fwy + Setl Hog SL

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 53    | 0.000              | 0.000              | 2968.224        |
| 95    | 0.000              | 0.000              | 986.145         |
| 137   | 0.000              | 0.000              | 1906.413        |
| 179   | 0.000              | 0.000              | 902.057         |
| 221   | 0.000              | 0.000              | 3048.735        |

**Pier Reactions : Support Reactions**

Loadcase C12 : Dead + HB + Fwy + Setl Hog UL

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 53    | 0.000              | 0.000              | 3540.419        |
| 95    | 0.000              | 0.000              | 1170.888        |
| 137   | 0.000              | 0.000              | 2269.075        |
| 179   | 0.000              | 0.000              | 1071.511        |
| 221   | 0.000              | 0.000              | 3635.569        |

Total = 11687 kN

**Pier Reactions : Support Reactions**

Loadcase C19 : Dead + HA + Fwy + Setl Shear

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 53    | 0.000              | 0.000              | 3550.236        |
| 95    | 0.000              | 0.000              | 1256.961        |
| 137   | 0.000              | 0.000              | 2370.923        |
| 179   | 0.000              | 0.000              | 1255.597        |
| 221   | 0.000              | 0.000              | 3551.113        |

Total = 11985 kN

**Pier Reactions : Support Reactions**

Loadcase C20 : Dead + HB + Fwy + Setl Shear

Analysed at 09:46 hrs on 11/11/14

| Joint | Moment X<br>(kN.m) | Moment Y<br>(kN.m) | Force Z<br>(kN) |
|-------|--------------------|--------------------|-----------------|
| 53    | 0.000              | 0.000              | 3478.669        |
| 95    | 0.000              | 0.000              | 1212.441        |
| 137   | 0.000              | 0.000              | 2353.773        |
| 179   | 0.000              | 0.000              | 1294.811        |
| 221   | 0.000              | 0.000              | 3564.382        |

Total = 11904 kN

**Pier Reactions : Joint Displacements**

Loadcase C1 : Dead Load SLS

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 53    | 0.000076            | -0.000000           | 0.000                  |
| 95    | -0.000017           | -0.000000           | 0.000                  |
| 137   | -0.000000           | -0.000000           | 0.000                  |
| 179   | 0.000017            | 0.000000            | 0.000                  |
| 221   | -0.000076           | 0.000000            | 0.000                  |



2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

09:50 : 11/11/14

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**Pier Reactions : Joint Displacements**

Loadcase C2 : Dead Load ULS

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 53    | 0.000089            | -0.000000           | 0.000                  |
| 95    | -0.000020           | -0.000000           | 0.000                  |
| 137   | -0.000000           | -0.000000           | 0.000                  |
| 179   | 0.000020            | 0.000000            | 0.000                  |
| 221   | -0.000089           | 0.000000            | 0.000                  |

**Pier Reactions : Joint Displacements**

Loadcase C3 : Permanent Loads SLS

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 53    | 0.000079            | -0.000000           | 0.000                  |
| 95    | -0.000018           | -0.000000           | 0.000                  |
| 137   | -0.000000           | -0.000000           | 0.000                  |
| 179   | 0.000018            | 0.000000            | 0.000                  |
| 221   | -0.000079           | 0.000000            | 0.000                  |

**Pier Reactions : Joint Displacements**

Loadcase C4 : Permanent Loads ULS

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 53    | 0.000093            | -0.000000           | 0.000                  |
| 95    | -0.000021           | -0.000000           | 0.000                  |
| 137   | -0.000000           | -0.000000           | 0.000                  |
| 179   | 0.000021            | 0.000000            | 0.000                  |
| 221   | -0.000093           | 0.000000            | 0.000                  |

**Pier Reactions : Joint Displacements**

Loadcase C9 : Dead + HA + Fwy + Setl HogSLS

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 53    | 0.000072            | -0.000145           | 0.000                  |
| 95    | -0.000048           | -0.000147           | 0.000                  |
| 137   | -0.000026           | -0.000147           | 0.000                  |
| 179   | -0.000004           | -0.000147           | 0.000                  |
| 221   | -0.000123           | -0.000146           | 0.000                  |

**Pier Reactions : Joint Displacements**

Loadcase C10 : Dead + HA + Fwy + Setl Hog UL

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 53    | 0.000085            | -0.000182           | 0.000                  |
| 95    | -0.000059           | -0.000184           | 0.000                  |
| 137   | -0.000033           | -0.000184           | 0.000                  |
| 179   | -0.000006           | -0.000184           | 0.000                  |
| 221   | -0.000149           | -0.000182           | 0.000                  |

2 Span Reinforced Concrete Deck Example  
Deck with Zero Torsional Member Stiffness

09:50 : 11/11/14

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**Pier Reactions : Joint Displacements**

Loadcase C11 : Dead + HB + Fwy + Setl Hog SL

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 53    | 0.000077            | -0.000114           | 0.000                  |
| 95    | -0.000037           | -0.000088           | 0.000                  |
| 137   | -0.000011           | -0.000061           | 0.000                  |
| 179   | 0.000017            | -0.000035           | 0.000                  |
| 221   | -0.000104           | -0.000007           | 0.000                  |

**Pier Reactions : Joint Displacements**

Loadcase C12 : Dead + HB + Fwy + Setl Hog UL

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 53    | 0.000092            | -0.000135           | 0.000                  |
| 95    | -0.000044           | -0.000104           | 0.000                  |
| 137   | -0.000013           | -0.000073           | 0.000                  |
| 179   | 0.000020            | -0.000041           | 0.000                  |
| 221   | -0.000124           | -0.000009           | 0.000                  |

**Pier Reactions : Joint Displacements**

Loadcase C19 : Dead + HA + Fwy + Setl Shear

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 53    | 0.000120            | 0.000032            | 0.000                  |
| 95    | -0.000020           | 0.000033            | 0.000                  |
| 137   | 0.000006            | 0.000032            | 0.000                  |
| 179   | 0.000031            | 0.000029            | 0.000                  |
| 221   | -0.000109           | 0.000024            | 0.000                  |

**Pier Reactions : Joint Displacements**

Loadcase C20 : Dead + HB + Fwy + Setl Shear

Analysed at 09:46 hrs on 11/11/14

| Joint | X Rotation<br>(rad) | Y Rotation<br>(rad) | Z Displacement<br>(mm) |
|-------|---------------------|---------------------|------------------------|
| 53    | 0.000143            | 0.000172            | 0.000                  |
| 95    | 0.000038            | 0.000359            | 0.000                  |
| 137   | 0.000096            | 0.000546            | 0.000                  |
| 179   | 0.000153            | 0.000723            | 0.000                  |
| 221   | 0.000043            | 0.000881            | 0.000                  |