Report

Example E.10

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| Prepared by: | Prepared for: |
| SDC Verifier |  |
|  |  |

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| --- | --- |
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| Customer: |  |
| Project Number: |  |
| Version: | 1 |
| Date: | 17 Sep 2014 |

# Preface

This document is generated with SDC Verifier 3.6.1 and calculated with FEMAP v11.1.0

Model File: D:\SDC\AISC Examples\Chapter E\Example E10\Example\_E.10.modfem

Project File: D:\SDC\AISC Examples\Chapter E\Example E10\Example\_E.10.sdcv

Report Profile: 1..Standards

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Femap and SDC Verifier models coincide. Checked information is presented below:

|  |  |  |
| --- | --- | --- |
| Entity | Femap Model Entities Count | SDC Verifier Model Entities Count |
| Nodes | 11 | 11 |
| Elements | 10 | 10 |
| Materials | 1 | 1 |
| Property | 1 | 1 |

# Model Entities

This paragraph shows detailed or brief model overview.

## Materials

This paragraph contains materials information.

### Materials Summary

|  |  |  |  |
| --- | --- | --- | --- |
| Title | Element(s) | Mass | Gravity Center |
| 1..Steel ASTM A500 | 10 | 1192464.0000 | [180.0000; 0.0000; 0.0000] |

### 1..Steel ASTM A500

|  |  |
| --- | --- |
| Property | Value |
| Elements | 10 |
| Mass | 1192464.0000 |
| Gravity Center | [180.0000; 0.0000; 0.0000] |
| X [Min;Max] | [0.0000; 360.0000] |
| Y [Min;Max] | [0.0000; 0.0000] |
| Z [Min;Max] | [0.0000; 0.0000] |

|  |  |  |
| --- | --- | --- |
|  | Property | Value |
| FEM Relevant | Young Modulus | 2.90e+07 |
|  | Shear Modulus | 0.000 |
|  | Poisson Ratio | 0.300 |
|  | Shear | 0.000 |
|  | Mass Density | 490.000 |
| SDC Verifier Relevant | Tensile Strength | 0.06e+6 |
|  | Yield Stress | 0.05e+6 |
|  | | | |

## Properties

This paragraph contains properties information.

### Properties Summary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Title | Element(s) | Material | Mass | Gravity Center |
| 1..HSS12x8x3/16 | 10 | 1..Steel ASTM A500 | 1192464.0000 | [180.0000; 0.0000; 0.0000] |

### 1..HSS12x8x3/16

|  |  |
| --- | --- |
| Property | Value |
| Elements | 10 |
| Type | Beam |
| Material | 1..Steel ASTM A500 |
| Mass | 1192464.0000 |
| Gravity Center | [180.0000; 0.0000; 0.0000] |
| X [Min;Max] | [0.0000; 360.0000] |
| Y [Min;Max] | [0.0000; 0.0000] |
| Z [Min;Max] | [0.0000; 0.0000] |
| Moment I1 or Izz | 140.0000 |
| Moment I2 or Iyy | 75.7000 |
| Moment I3 or Izy | 0.0000 |
| Area A | 6.7600 |
| Z Shear Area | 2.1835 |
| Y Shear Area | 3.8218 |
| Torsional Constant J | 153.0000 |
| Nonstructural Mass Length | 0.0000 |
| Warping Constant | 0.0000 |
| Perimeter | 40.0000 |
| Y Neutral Axis Offset | 0.0000 |
| Z Neutral Axis Offset | 0.0000 |

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|  |  |  |  |
| Geometry Property | Value | Points Of Interest | Value |
| Height | 12.0000 | Point 1 | [-6.0000 ; 4.0000] |
| Width | 8.0000 | Point 2 | [-6.0000 ; -4.0000] |
| h | 12.0000 | Point 3 | [6.0000 ; -4.0000] |
| b | 8.0000 | Point 4 | [6.0000 ; 4.0000] |
| d | 0.1740 |  |  |
|  | | | | |

## FEM Loads

This paragraph contains information about applied loads to model.

### 1..Dead load (26 kips)

|  |  |  |  |
| --- | --- | --- | --- |
| Definition Title | Load Type | Applied on | Value(s) |
| 1..26kips | Force | Node: 33 | (-26000;0;0) |

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### 2..Live load (77 kips)

|  |  |  |  |
| --- | --- | --- | --- |
| Definition Title | Load Type | Applied on | Value(s) |
| 1..77kips | Force | Node: 33 | (-77000;0;0) |

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## Constraints

This paragraph contains information about constrained parts of the model.

### 1..Pinned

|  |  |  |
| --- | --- | --- |
| Definition | Count | Type (DOF) |
| 1..top | 1 node(s) | Ty Tz Rx |
| 2..bottom | 1 node(s) | Tx Ty Tz Rx Ry Rz |
|  | | | |

# Standards

This paragraph shows detailed information about applied standards.

## 1..ANSI / AISC LRFD 360-10

#### General Information

|  |  |
| --- | --- |
| Property | Value |
| Title | ANSI / AISC LRFD 360-10 |
| Type | 11 |
| Constants | 8 |
| Classifications | 0 |
| Standard Tables | 0 |

### Constant

|  |  |
| --- | --- |
| Title | Value |
| F\_t | 0.9 |
| F\_c | 0.9 |
| F\_v | 0.9 |
| rolled | 1 |
| built\_up | 2 |
| nonslender | 3 |
| slender | 4 |
| NotSupported | -12345678 |

### Characteristics

This paragraph contains information about extra elemental characteristics

#### 1..Section Build Type

|  |  |
| --- | --- |
| Property | Value |
| Type |  |
| AliasName | Section\_Build\_Type |
| Groups count | 1 |

#### Description

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Property | Value | No. | Property | Value |
| 1 | 1..HSS12x8x3/16 | 1 |  |  |  |

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#### 1..Beam Length Y

|  |  |
| --- | --- |
| Property | Value |
| Type |  |
| AliasName | Ly |
| Groups count | 1 |

#### Description

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Property | Value | No. | Property | Value |
| 1 | Beam Member 1 | 360 |  |  |  |

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#### 2..Effective Length Factor Y

|  |  |
| --- | --- |
| Property | Value |
| Type |  |
| AliasName | Ky |
| Groups count | 1 |

#### Description

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Property | Value | No. | Property | Value |
| 1 | Beam Member 1 | 0.8 |  |  |  |

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#### 3..Beam Length Z

|  |  |
| --- | --- |
| Property | Value |
| Type |  |
| AliasName | Lz |
| Groups count | 1 |

#### Description

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Property | Value | No. | Property | Value |
| 1 | Beam Member 1 | 360 |  |  |  |

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#### 4..Effective Length Factor Z

|  |  |
| --- | --- |
| Property | Value |
| Type |  |
| AliasName | Kz |
| Groups count | 1 |

#### Description

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Property | Value | No. | Property | Value |
| 1 | Beam Member 1 | 0.8 |  |  |  |

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### Checks

This paragraph contains checks descriptions with their results.

#### 1..Beam Characteristics

|  |  |
| --- | --- |
| Property | Value |
| Category | Elemental Custom Check |
| Selection | 18 PropertyShape(s) |
| Parameters | 8 |

All (LS1, All Entities)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Check | | 1..Beam Characteristics | | | | Load Set: | | 1..LRFD | | | |
| Selection | | All Entities | | | | Direction | | All | | | |
| Load | Radius of Gyration Y | | Radius of Gyration Z | Slenderness Ratio Y | Slenderness Ratio Z | | Elastic Buckling Stress Y | | Elastic Buckling Stress Z | Critical Stress Y Q1 | Critical Stress Z Q1 | |
| Load Set '1..LRFD' | 4.5508 | | 3.3464 | 63.2852 | 86.0633 | | 71465.102 | | 38642.203 | 35136.2305 | 27949.3965 | |

#### 3..Rectangular Tube

|  |  |
| --- | --- |
| Property | Value |
| Category | Elemental Custom Check |
| Selection | 3 PropertyShape(s) |
| Parameters | 13 |

All (LS1, All Entities)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Check | | 3..Rectangular Tube | | | | | Load Set: | | | 1..LRFD | | | | |
| Selection | | All Entities | | | | | Direction | | | All | | | | |
| Load | Thickness | | | Height NoFlanges | Width NoFlanges | Uniform Thickness | | | Height to Thickness Ratio | | Width to Thickness Ratio | Slender Type | | Critical Stress Y | |
| Load Set '1..LRFD' | 0.1740 | | | 11.4780 | 7.4780 | 1.0000 | | | 65.9655 | | 42.9770 | 4.000 | | 0.04e+6 | |
| Load | | | Critical Stress Z | | Critical Stress with Q = 1 | | | Effective He | | | Effective We | | Net Reduction Factor Q | | |
| Load Set '1..LRFD' | | | 0.03e+6 | | 0.03e+6 | | | 7.1750 | | | 6.5260 | | 0.729 | | |

#### 8..Help

|  |  |
| --- | --- |
| Property | Value |
| Category | Elemental Custom Check |
| Selection | 17 PropertyShape(s) |
| Parameters | 17 |

All (LS1, All Entities)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Check | | 8..Help | | | | Load Set: | | 1..LRFD | | | |
| Selection | | All Entities | | | | Direction | | All | | | |
| Load | Polar Radius of gyration Square | | H\_parameter | Fcr z Torsional | Net Reduction Factor | | Slender Type | | Fez Torsional | Fe Single Symmetric | Fe Double Symmetric | |
| Load Set '1..LRFD' | 31.908 | | 1.000 | 0.000 | 0.729 | | 4.000 | | 0.0 | 0.0 | 0.0 | |
| Load | Fe Torsional | | Fey Torsional Controls | Fez Torsional Controls | Fey | | Fez | | Critical Stress Y | Critical Stress Z | Critical Stress T Shape | |
| Load Set '1..LRFD' | 0.0 | | 0.0 | 0.0 | 71465.1 | | 38642.2 | | 27568.8 | 23330.3 | 0.000 | |
| Load | | | | | | Critical Stress | | | | | | | |
| Load Set '1..LRFD' | | | | | | 23330.285 | | | | | | | |

#### 9..Axial

|  |  |
| --- | --- |
| Property | Value |
| Category | Elemental Custom Check |
| Selection | 17 PropertyShape(s) |
| Parameters | 4 |

All (LS1, All Entities)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Check | 9..Axial | | | Load Set: | | 1..LRFD | |
| Selection | All Entities | | | Direction | | All | |
| Load | | Nominal Compressive Strength | Design Tensile Strength | | Axial Force | | Utilization Factor | |
| Load Set '1..LRFD' | | 141941.5 | 279864.0 | | -154400.0 | | 1.09 | |