Report

Example E.9

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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 E9\Example\_E.9\_v11\_1.modfem

Project File: D:\SDC\AISC Examples\Chapter E\Example E9\Example\_E.9.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 | 1716960.000 | [120.000; 0.000; 0.000] |

### 1..Steel ASTM A500

|  |  |
| --- | --- |
| Property | Value |
| Elements | 10 |
| Mass | 1716960.000 |
| Gravity Center | [120.000; 0.000; 0.000] |
| X [Min;Max] | [0.000; 240.000] |
| Y [Min;Max] | [0.000; 0.000] |
| Z [Min;Max] | [0.000; 0.000] |

|  |  |  |
| --- | --- | --- |
|  | Property | Value |
| FEM Relevant | Young Modulus | 2.90e+07 |
|  | Shear Modulus | 0.00 |
|  | Poisson Ratio | 0.30 |
|  | Shear | 0.00 |
|  | Mass Density | 490.00 |
| 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..HSS12x10x3/8 | 10 | 1..Steel ASTM A500 | 1716960.000 | [120.000; 0.000; 0.000] |

### 1..HSS12x10x3/8

|  |  |
| --- | --- |
| Property | Value |
| Elements | 10 |
| Type | Beam |
| Material | 1..Steel ASTM A500 |
| Mass | 1716960.000 |
| Gravity Center | [120.000; 0.000; 0.000] |
| X [Min;Max] | [0.000; 240.000] |
| Y [Min;Max] | [0.000; 0.000] |
| Z [Min;Max] | [0.000; 0.000] |
| Moment I1 or Izz | 310.000 |
| Moment I2 or Iyy | 234.000 |
| Moment I3 or Izy | 0.000 |
| Area A | 14.600 |
| Z Shear Area | 5.760 |
| Y Shear Area | 7.413 |
| Torsional Constant J | 421.000 |
| Nonstructural Mass Length | 0.000 |
| Warping Constant | 39.145 |
| Perimeter | 44.000 |
| Y Neutral Axis Offset | 0.000 |
| Z Neutral Axis Offset | 0.000 |

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| --- | --- | --- | --- |
|  |  |  |  |
| Geometry Property | Value | Points Of Interest | Value |
| Height | 12.000 | Point 1 | [-6.000 ; 5.000] |
| Width | 10.000 | Point 2 | [-6.000 ; -5.000] |
| h | 12.000 | Point 3 | [6.000 ; -5.000] |
| b | 10.000 | Point 4 | [6.000 ; 5.000] |
| d | 0.349 |  |  |
|  | | | | |

## FEM Loads

This paragraph contains information about applied loads to model.

### 1..Dead load (85 kips)

|  |  |  |  |
| --- | --- | --- | --- |
| Definition Title | Load Type | Applied on | Value(s) |
| 1..85kips | Force | Node: 22 | (-85000;0;0) |

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### 2..Live load (255 kips)

|  |  |  |  |
| --- | --- | --- | --- |
| Definition Title | Load Type | Applied on | Value(s) |
| 1..255kips | Force | Node: 22 | (-255000;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..HSS12x10x3/8 | 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 | 240 |  |  |  |

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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 | 240 |  |  |  |

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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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#### 5..Torsional Length

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

#### Description

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Property | Value | No. | Property | Value |
| 1 | All Entities | 240 |  |  |  |

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#### 6..Effective Torsional Length

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

#### Description

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Property | Value | No. | Property | Value |
| 1 | All Entities | 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' | 4.608 | | 4.003 | 41.667 | 47.959 | | 164855.73 | | 124439.51 | 40929.559 | 39406.121 | |

#### 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' | 0.349 | | | 10.953 | 8.953 | 1.000 | | | 31.384 | | 25.653 | 3.00 | | 0.04e+6 | |
| Load | | | Critical Stress Z | | Critical Stress with Q = 1 | | | Effective He | | | Effective We | | Net Reduction Factor Q | | |
| Load Set '1..LRFD' | | | 0.04e+6 | | 0.04e+6 | | | 10.953 | | | 8.953 | | 1.00 | | |

#### 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' | 37.26 | | 1.00 | 0.00 | 1.00 | | 3.00 | | 558.7 | 558.7 | 107269.9 | |
| 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 | 164855.7 | | 124439.5 | | 40929.6 | 39406.1 | 0.00 | |
| Load | | | | | | Critical Stress | | | | | | | |
| Load Set '1..LRFD' | | | | | | 39406.12 | | | | | | | |

#### 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' | | 517796.4 | 604440.0 | | -510000.0 | | 0.98 | |