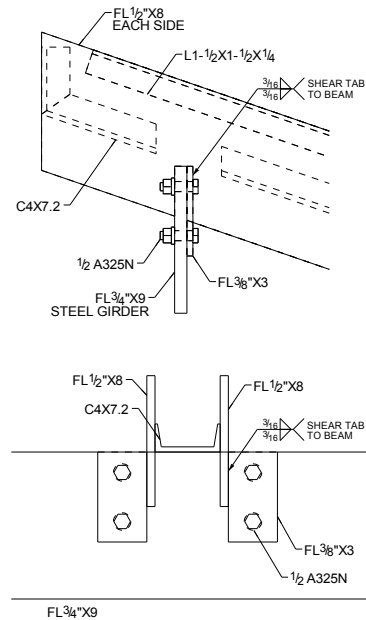
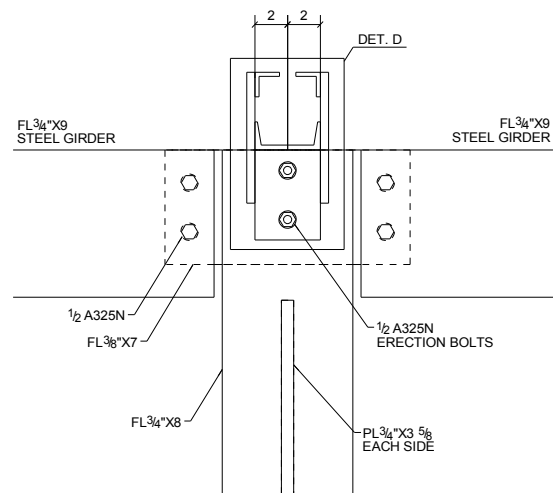


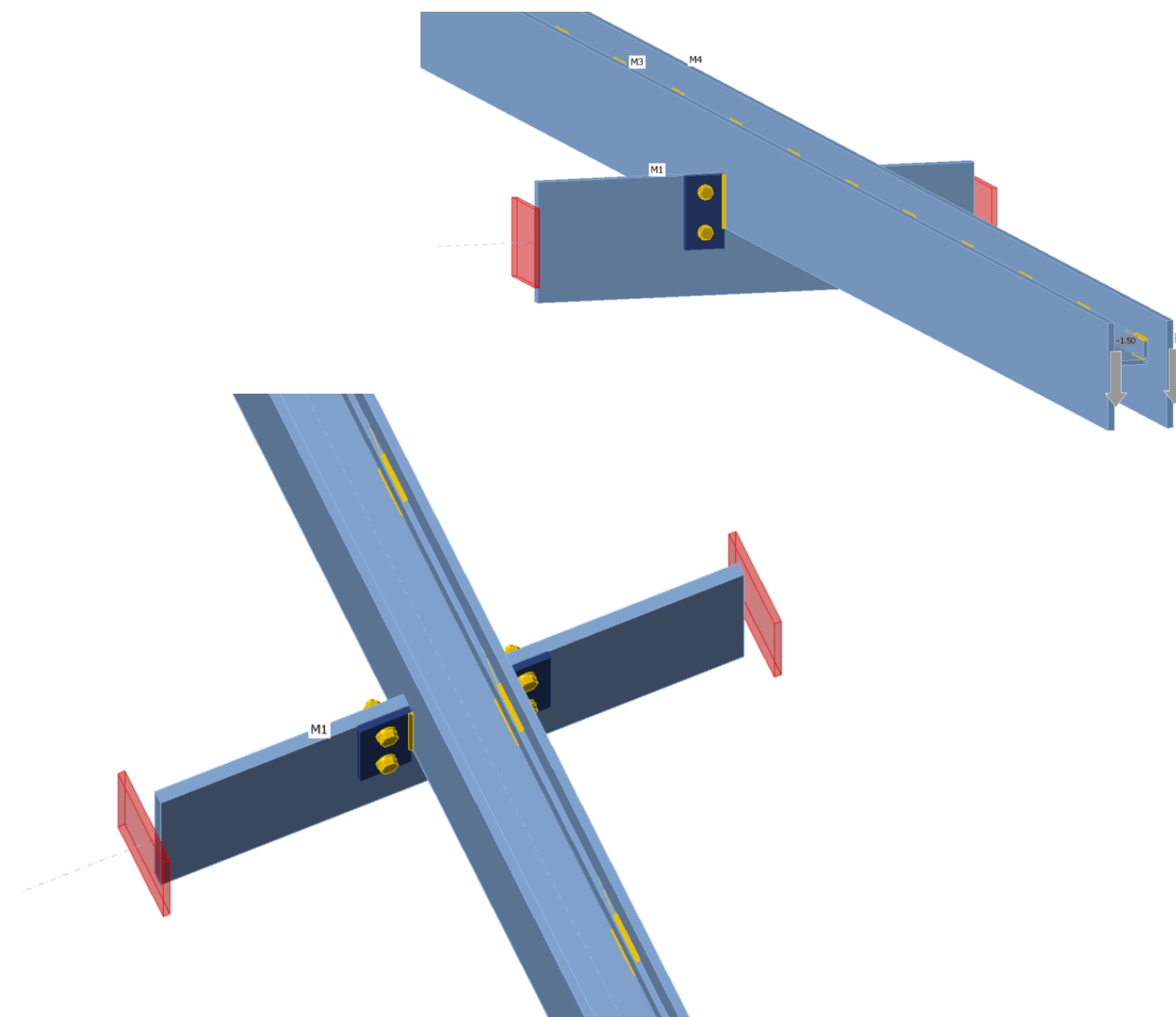
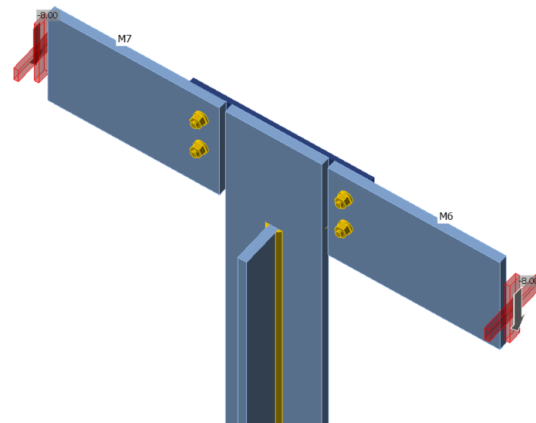
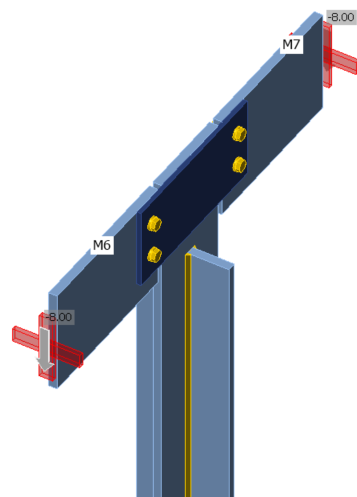
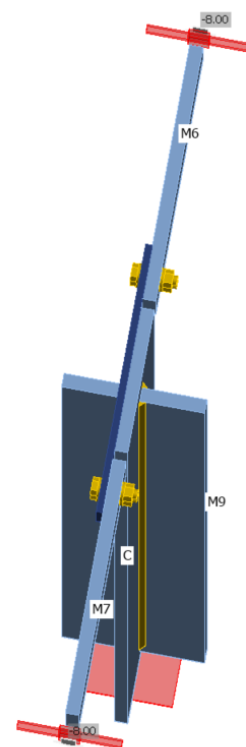
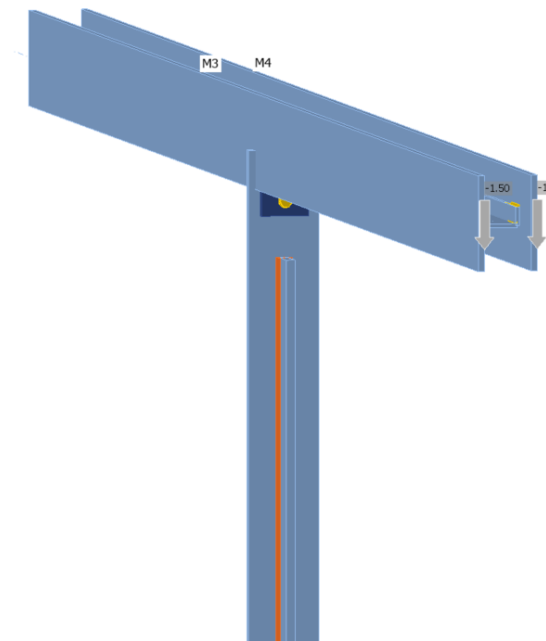
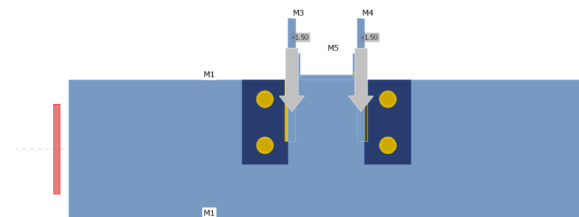
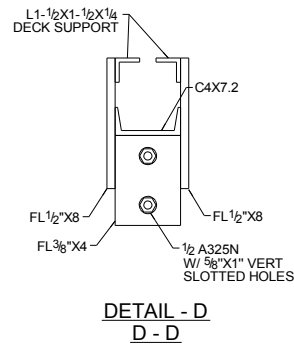




TYPICAL BEAM TO GIRDER CONNECTION DETAIL



TYPICAL BEAM/GIRDER TO COLUMN DETAIL





Daniel L. Gelinas, MS, PE, SECB

Phone: 978-465-6436

Email: danlg@gelinasstructural.com

579A North End Blvd. | Salisbury, MA 01952-1738 | www.gelinasstructural.com

November 20, 2025

REPORT:

Steel Connections,
Job – 25053, Drawings: -
(GSE Job No - 25762)

Prepared for:

Prepared by:

Gelinas Structural Engineering, LLC

Daniel L. Gelinas, P.E.

579A North End Blvd.

Salisbury, MA 01952-1738

Phone : 978.465.643 Danlg@GelinasStructural.com

Scope of Project

Steel Connections for B1, B2 Beams & Misc. Metals at

Design Criteria

For Connection design, ASCE 7-16, AISC 360-16 edition, IBC 2021 as amended by the Massachusetts State Building Code 10th edition, and the AISC 15th edition manual have been used.

All steel connections have been designed for the ASD Loads given on sheet S0.2

Materials

Structural steel shall be designed in accordance with the 'Specification for structural steel buildings' & American Society welding society (AWS D1.1) "Structural Welding Code - Steel". AISC 15th edition. All Bars, Steel plates, Channels, MC Sections, and angles of grade ASTM A36 shall be used. The high-strength bolts of A325N shall be used for Shear connections.

Table of Contents

Page Item

1) Shear Connection – Beam (B2) connecting to Column (C1) using 3/8" thick plate with (2) - 1/2" ϕ

A325N Bolts & 3/16" thick weld - For 8-kip Shear

2) Shear Connection – Beam (B1) connecting to Beam (B2) using 3/8" thick plate with (2) - 1/2" ϕ A325N

Bolts & 3/16" thick weld - For 3-kip Shear

3) Bearing Connection – Beam (B1) braced with Column (C1 & C2) using 3/8" thick plate with (2) - 1/2" ϕ

A325N Bolts & 3/16" thick weld - For 3-kip Shear

1) Shear Connection – Beam (B2) connecting to Column (C1) using 3/8" thick plate with (2) - 1/2" ϕ A325N Bolts & 3/16" thick weld - For 8 kip Shear

Project:

Project no:

Author:



Project data

Project name

Project number

Author

Description

Date

Code AISC

Material

Steel A36

Concrete 4000 psi

Project item Mayflower Meetinghouse Connections

Design

Name Beam (B2) connecting to Column (C1)

Description CON - 1

Analysis Stress, strain/ simplified loading

Design code AISC 360-16 (ASD) / ACI 318-25

Members

Geometry

Name	Cross-section	β – Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [in]	Offset ey [in]	Offset ez [in]
M1	8 - Plate 0.75, 8	0.0	-90.0	0.0	0.00	0.00	0.00
M6	6 - Plate 0.75, 9	-90.0	0.0	90.0	4.50	-4.50	0.00
M7	6 - Plate 0.75, 9	90.0	0.0	90.0	4.50	-4.50	0.00

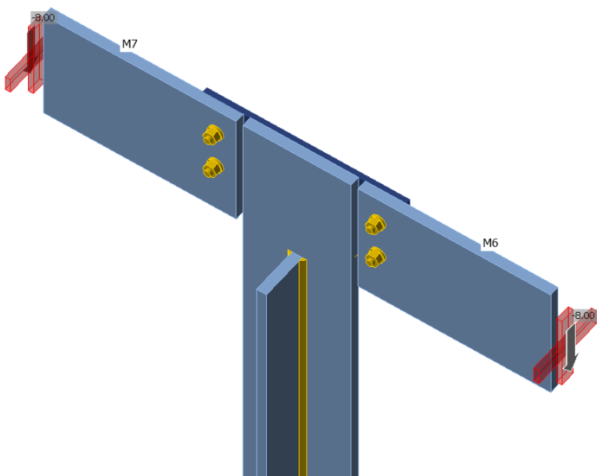
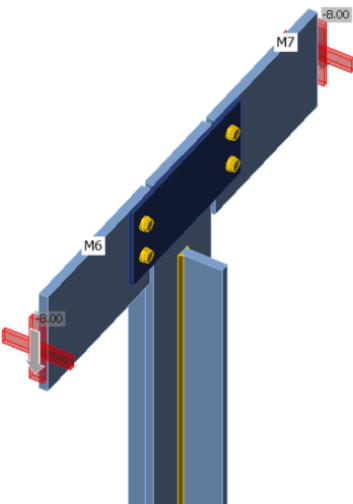
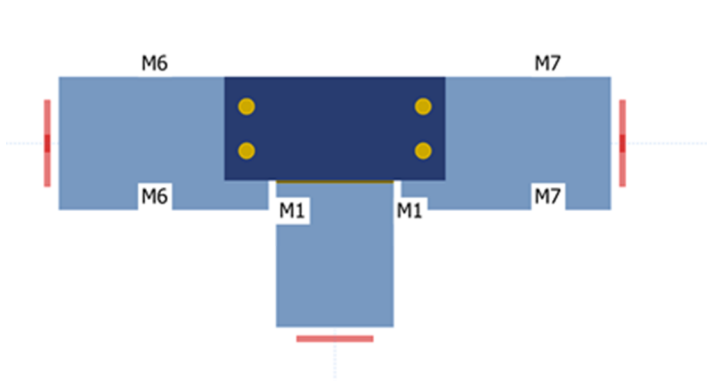
Supports and forces

Name	Support	Forces in	X [in]
M1 / end	N-Vy-Vz-Mx-My-Mz	Node	0.00
M6 / end	Mx-My-Mz	Node	0.00
M7 / end	Mx-My-Mz	Node	0.00

Project:

Project no:

Author:

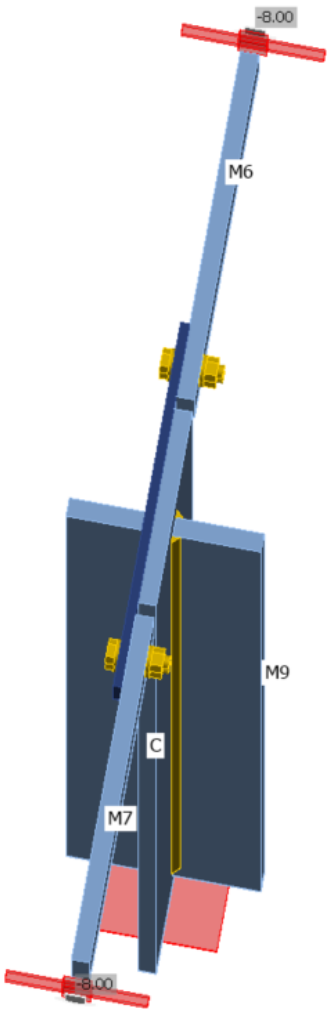


Cross-sections

Name	Material
8 - Plate 0.75, 8	A36
6 - Plate 0.75, 9	A36

Cross-sections

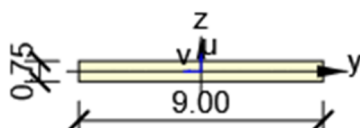
Name	Material	Drawing
8 - Plate 0.75, 8	A36	



Project:

Project no:

Author:

6 - Plate 0.75, 9	A36	
-------------------	-----	---

Bolts

Name	Diameter [in]	f_y [ksi]	f_u [ksi]	Gross area [in ²]
1/2 A325	0.50	92.0	120.0	0.20

Load effects (Equilibrium not required)

Name	Member	N [kip]	V _y [kip]	V _z [kip]	M _x [kip.ft]	M _y [kip.ft]	M _z [kip.ft]
LE1	M6 / End	0.00	-8.00	0.00	0.00	0.00	0.00
	M7 / End	0.00	-8.00	0.00	0.00	0.00	0.00

Check

Summary

Name	Value	Check status
Analysis	100.0%	OK
Plates	0.0 < 5.0%	OK
Bolts	82.9 < 100%	OK
Welds	76.4 < 100%	OK
Buckling	6.89	

Plates

Name	t_p [in]	Loads	σ_{Ed} [ksi]	ϵ_{PI} [%]	$\sigma_{c,Ed}$ [ksi]	Status
M1-bfl 1	3/4	LE1	11.9	0.0	0.0	OK
M6-bfl 1	3/4	LE1	12.7	0.0	1.2	OK
M7-bfl 1	3/4	LE1	12.7	0.0	1.3	OK
SP1	3/8	LE1	19.9	0.0	1.2	OK

Design data

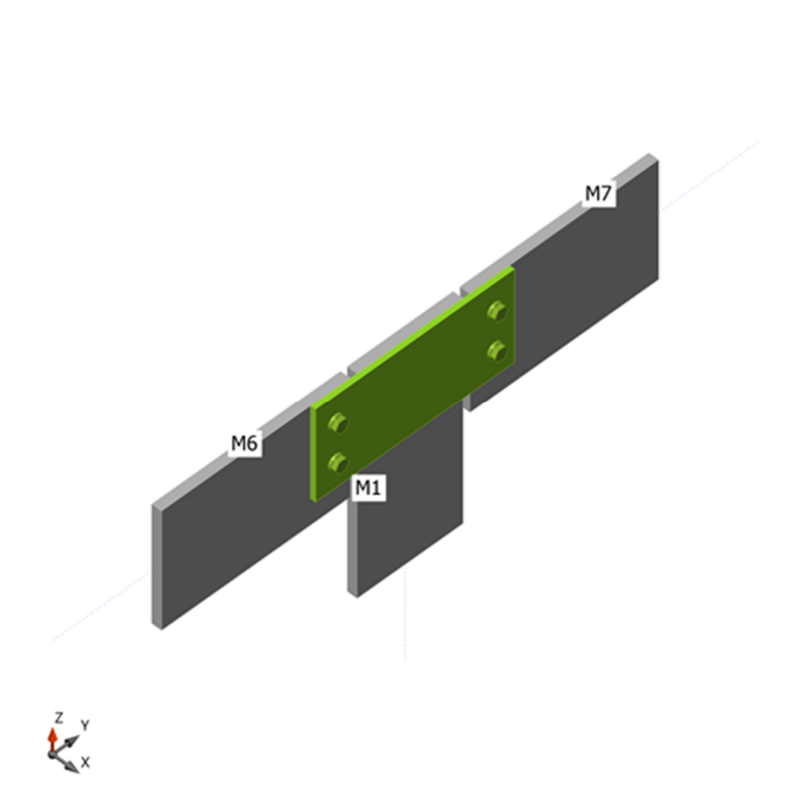
Material	F_y [ksi]	ϵ_{lim} [%]
----------	-------------	----------------------

Project:

Project no:

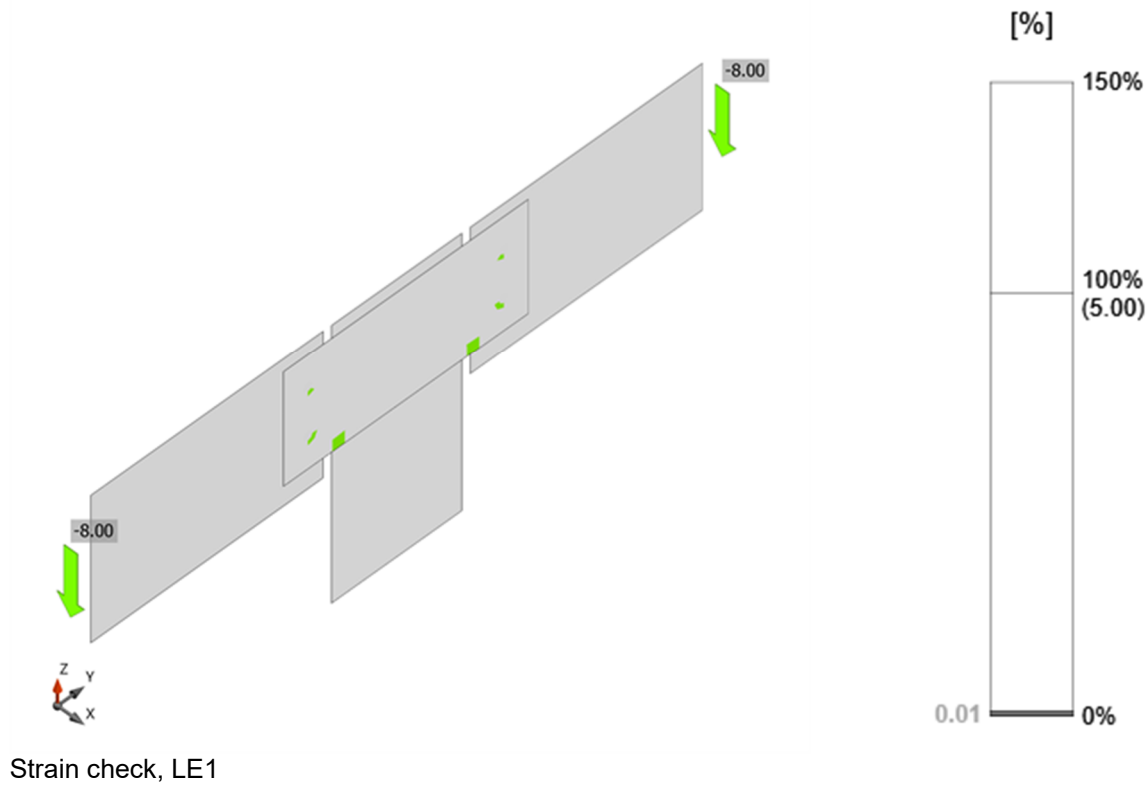
Author:

A36	36.0	5.0
-----	------	-----



Overall check, LE1

Project:
Project no:
Author:



Bolts

Shape	Item	Grade	Loads	F _t [kip]	V [kip]	R _{n,bearing} /Ω [kip]	U _{t_t} [%]	U _{t_s} [%]	U _{t_{ts}} [%]	Detailing	Status
	B1	1/2 A325 - 1	LE1	0.44	4.36	13.05	5.0	82.3	0.0	OK	OK
	B2	1/2 A325 - 1	LE1	0.84	4.39	13.05	9.5	82.9	0.0	OK	OK
	B3	1/2 A325 - 1	LE1	0.44	4.36	13.05	5.0	82.3	0.0	OK	OK
	B4	1/2 A325 - 1	LE1	0.84	4.39	13.05	9.5	82.9	0.0	OK	OK

Design data

Grade	R _{n,tension} /Ω [kip]	R _{n,shear} /Ω [kip]
1/2 A325 - 1	8.83	5.30

Welds

Item	Edge	Xu	t _w [in]	w [in]	L [in]	L _c [in]	Loads	F _n [kip]	R _n /Ω [kip]	U _t [%]	U _{t_c} [%]	Detailing	Status
M1-bfl 1	SP1	E70xx	▲ 1/8	▲ 3/16	7.98	0.66	LE1	2.02	2.64	76.4	60.5	OK	OK

Project:

Project no:

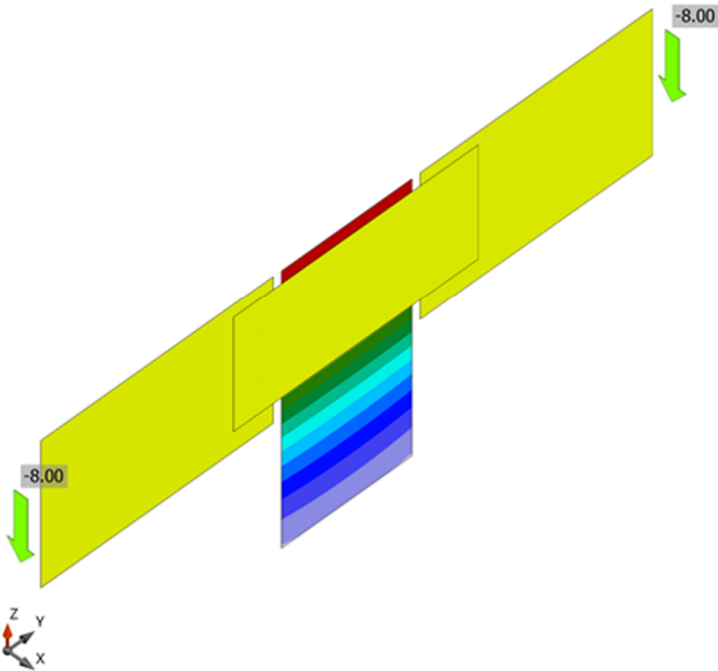
Author:

Design data

Material	F _{exx} [ksi]
E70xx	70.0

Buckling

Loads	Shape	Factor [-]
LE1	1	6.89
	2	15.60
	3	24.04
	4	47.62
	5	60.17
	6	61.95



First buckling mode shape, LE1

2) Shear Connection – Beam (B1) connecting to Beam (B2) using 3/8" thick plate with (2) - 1/2" ϕ A325N Bolts & 3/16" thick weld - For 3 kip Shear

Project:

Project no:

Author:



Project data

Project name

Project number

Author

Description

Date

Code AISC/ACI

Material

Steel A36

Concrete 4000 psi

Project item Mayflower Connections

Design

Name Beam (B1) connecting to Beam (B2)

Description CON - 2

Analysis Stress, strain/ simplified loading

Design code AISC 360-16 (ASD) / ACI 318-25

Members

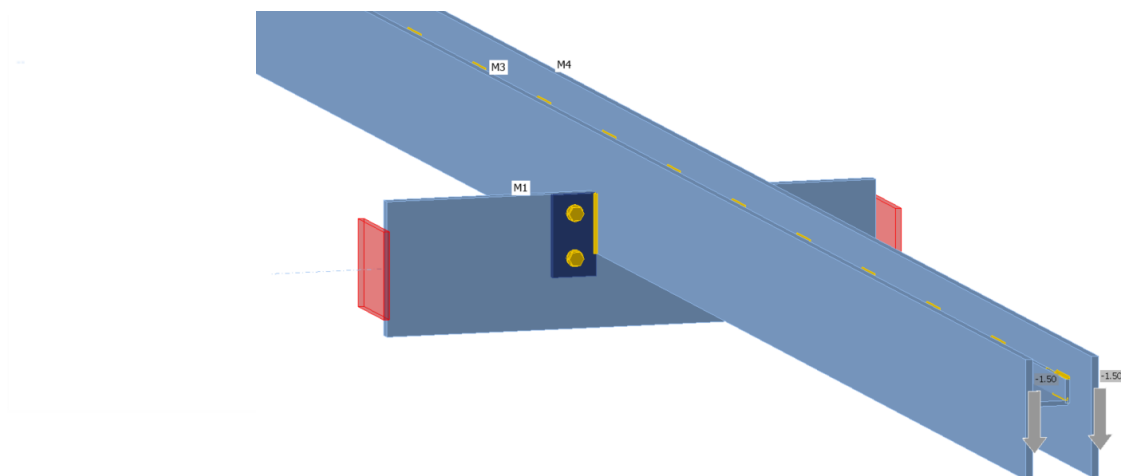
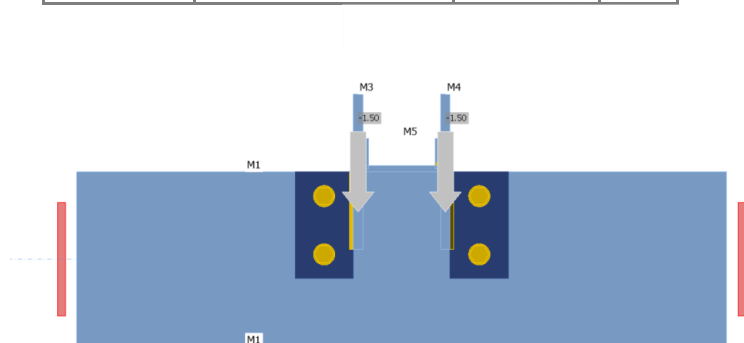
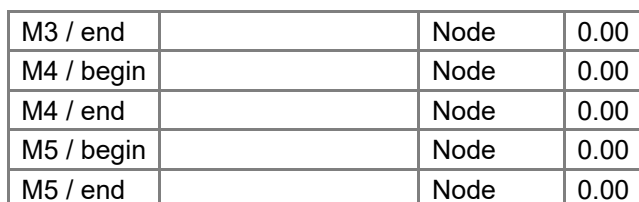
Geometry

Name	Cross-section	β – Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [in]	Offset ey [in]	Offset ez [in]
M1	13 - Plate 0.75, 9	90.0	0.0	90.0	0.00	-4.50	0.00
M3	12 - Plate 0.5, 8	0.0	0.0	90.0	0.00	0.00	2.25
M4	11 - Plate 0.5, 8	0.0	0.0	90.0	0.00	0.00	-2.25
M5	7 - C(Imp)4X7.25	0.0	0.0	90.0	0.00	0.50	0.00

Supports and forces

Name	Support	Forces in	X [in]
M1 / begin	N-Vy-Vz-Mx-My-Mz	Node	0.00
M1 / end	N-Vy-Vz-Mx-My-Mz	Node	0.00
M3 / begin		Node	0.00

Author:



Name	Material
13 - Plate 0.75, 9	A36
12 - Plate 0.5, 8	A36
11 - Plate 0.5, 8	A36
7 - C(lmp)4X7.25	A36

Name	Material	Drawing
------	----------	---------

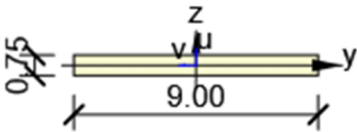
Project:

Project no:

Author:

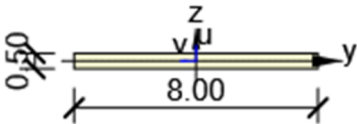
13 - Plate 0.75, 9

A36



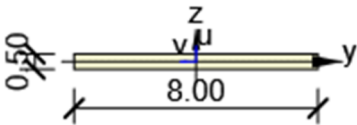
12 - Plate 0.5, 8

A36



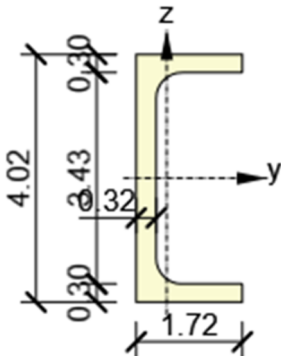
11 - Plate 0.5, 8

A36



7 - C(Imp)4X7.25

A36



Project:

Project no:

Author:

Bolts

Name	Diameter [in]	f_y [ksi]	f_u [ksi]	Gross area [in ²]
1/2 A325	0.50	92.0	120.0	0.20

Load effects (Equilibrium not required)

Name	Member	N [kip]	V _y [kip]	V _z [kip]	M _x [kip.ft]	M _y [kip.ft]	M _z [kip.ft]
LE1	M3 / End	0.00	-1.50	0.00	0.00	0.00	0.00
	M4 / End	0.00	-1.50	0.00	0.00	0.00	0.00
	M5 / End	0.00	0.00	0.00	0.00	0.00	0.00
	M3 / Begin	0.00	1.50	0.00	0.00	0.00	0.00
	M4 / Begin	0.00	1.50	0.00	0.00	0.00	0.00
	M5 / Begin	0.00	0.00	0.00	0.00	0.00	0.00

Check

Summary

Name	Value	Check status
Analysis	100.0%	OK
Plates	0.1 < 5.0%	OK
Bolts	0.1 < 100%	OK
Welds	75.2 < 100%	OK
Buckling	10.97	

Plates

Name	t_p [in]	Loads	σ_{Ed} [ksi]	ϵ_{Pl} [%]	$\sigma_{c,Ed}$ [ksi]	Status
M1-bfl 1	3/4	LE1	0.0	0.0	0.0	OK
M3-bfl 1	1/2	LE1	21.6	0.1	0.0	OK
M4-bfl 1	1/2	LE1	21.6	0.1	0.0	OK
M5-bfl 1	5/16	LE1	12.8	0.0	0.0	OK
M5-tfl 1	5/16	LE1	14.0	0.0	0.0	OK
M5-w 1	5/16	LE1	2.5	0.0	0.0	OK
SP1	3/8	LE1	0.1	0.0	0.1	OK
SP2	3/8	LE1	0.1	0.0	0.0	OK

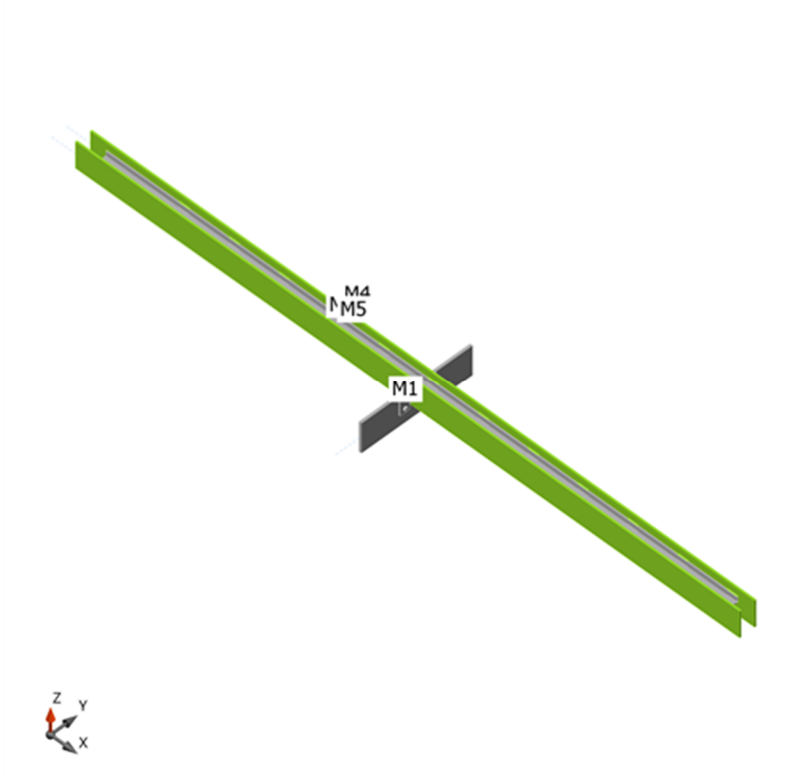
Design data

Material	F_y [ksi]	ϵ_{lim} [%]
A36	36.0	5.0

Project:

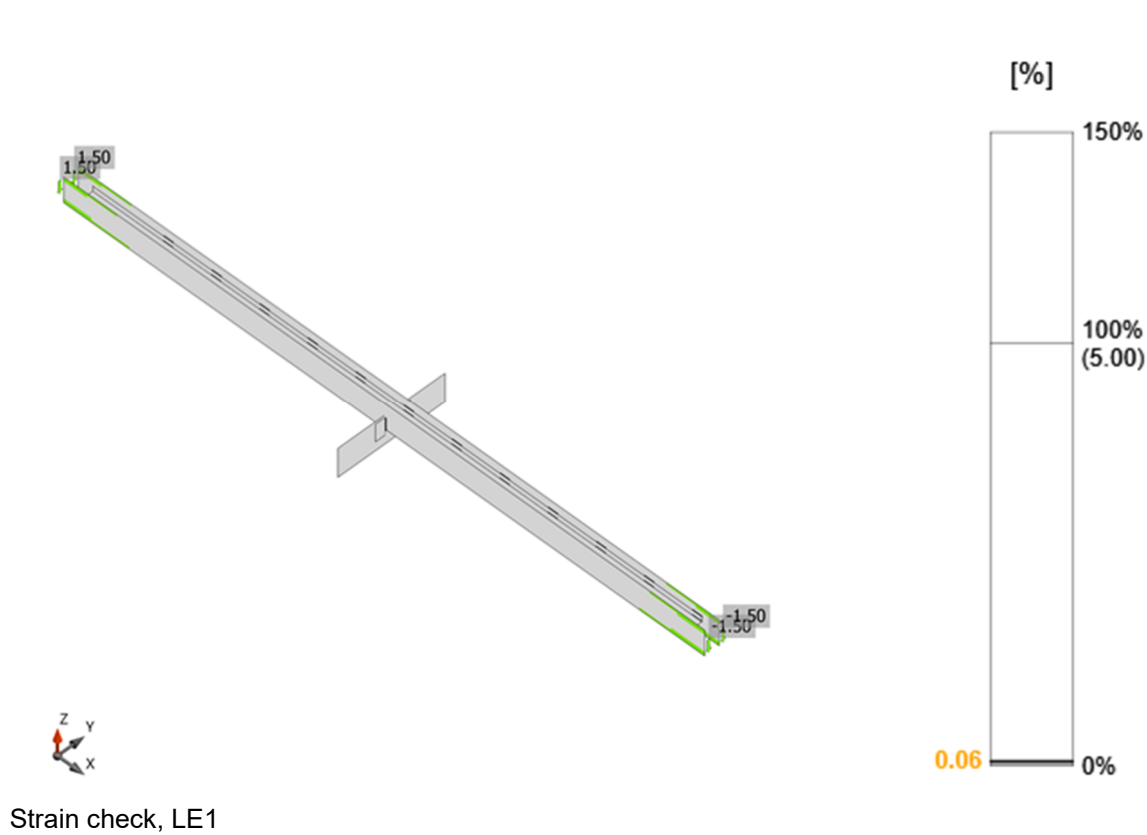
Project no:

Author:



Overall check, LE1

Project:
Project no:
Author:



Bolts

Shape	Item	Grade	Loads	F _t [kip]	V [kip]	R _{n,bearing} /Ω [kip]	U _{t_t} [%]	U _{t_s} [%]	U _{t_{ts}} [%]	Detailing	Status
	B1	1/2 A325 - 1	LE1	0.00	0.00	13.05	0.0	0.0	0.0	OK	OK
	B2	1/2 A325 - 1	LE1	0.00	0.00	13.05	0.1	0.0	0.0	OK	OK
	B3	1/2 A325 - 1	LE1	0.00	0.00	13.05	0.0	0.0	0.0	OK	OK
	B4	1/2 A325 - 1	LE1	0.00	0.00	13.05	0.1	0.0	0.0	OK	OK

Design data

Grade	R _{n,tension} /Ω [kip]	R _{n,shear} /Ω [kip]
1/2 A325 - 1	8.83	5.30

Project:

Project no:

Author:

Welds

Item	Edge	Xu	t _w [in]	w [in]	L [in]	L _c [in]	Loads	F _n [kip]	R _n /Ω [kip]	U _t [%]	U _t _c [%]	Detailing	Status
M3-bfl 1	M5-tfl 1	E70xx	▲ 1/8	▲ 3/16	35.79	0.33	LE1	0.70	0.94	75.2	46.8	OK	OK
M3-bfl 1	M5-tfl 1	E70xx	▲ 1/8	▲ 3/16	1.55	0.31	LE1	0.77	1.28	60.6	38.0	OK	OK
M3-bfl 1	M5-tfl 1	E70xx	▲ 1/8	▲ 3/16	35.57	0.33	LE1	0.11	0.97	10.9	0.0	OK	OK
M3-bfl 1	M5-w 1	E70xx	▲ 1/8	▲ 3/16	35.79	0.33	LE1	0.15	1.18	13.1	0.0	OK	OK
M4-bfl 1	M5-bfl 1	E70xx	▲ 1/8	▲ 3/16	35.79	0.33	LE1	0.73	0.97	75.0	47.4	OK	OK
M4-bfl 1	M5-bfl 1	E70xx	▲ 1/8	▲ 3/16	1.55	0.31	LE1	0.77	1.28	60.3	38.0	OK	OK
M4-bfl 1	M5-bfl 1	E70xx	▲ 1/8	▲ 3/16	35.57	0.33	LE1	0.14	1.06	13.5	5.0	OK	OK
M4-bfl 1	M5-w 1	E70xx	▲ 1/8	▲ 3/16	35.79	0.33	LE1	0.34	1.37	24.6	11.5	OK	OK
M3-bfl 1	SP1	E70xx	▲ 1/8	▲ 3/16	3.97	0.31	LE1	0.01	1.16	0.5	0.0	OK	OK
M4-bfl 1	SP2	E70xx	▲ 1/8	▲ 3/16	3.97	0.31	LE1	0.01	1.24	0.7	0.0	OK	OK

Design data

Material	F _{exx} [ksi]
E70xx	70.0

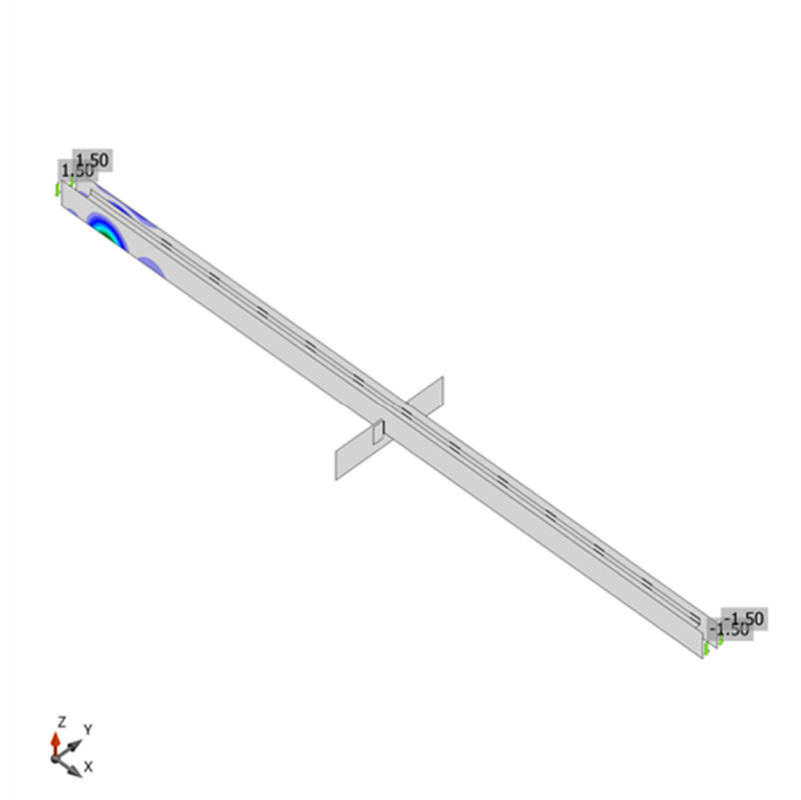
Buckling

Loads	Shape	Factor [-]
LE1	1	10.97
	2	11.14
	3	11.53
	4	13.38
	5	13.54
	6	14.85

Project:

Project no:

Author:



First buckling mode shape, LE1

3) Bearing Connection – Beam (B1) braced with Column (C1 & C2) using 3/8" thick plate with (2) - 1/2" ϕ A325N Bolts & 3/16" thick weld - For 3 kip Shear

Project:

Project no:

Author:



Project data

Project name

Project number

Author

Description

Date

Code AISC

Material

Steel A36

Concrete 4000 psi

Project item Mayflower Connections

Design

Name Beam (B1) connecting to column (C1 & C2)

Description CON - 3

Analysis Stress, strain/ simplified loading

Design code AISC 360-16 (ASD) / ACI 318-25

Members

Geometry

Name	Cross-section	β – Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [in]	Offset ey [in]	Offset ez [in]
M1	3 - Plate 0.75, 6	0.0	-90.0	0.0	0.00	0.00	0.00
M3	12 - Plate 0.5, 8	0.0	0.0	90.0	0.00	0.75	2.25
M4	11 - Plate 0.5, 8	0.0	0.0	90.0	0.00	0.75	-2.25
M5	7 - C(Imp)4X7.25	0.0	0.0	90.0	0.00	0.50	0.00

Supports and forces

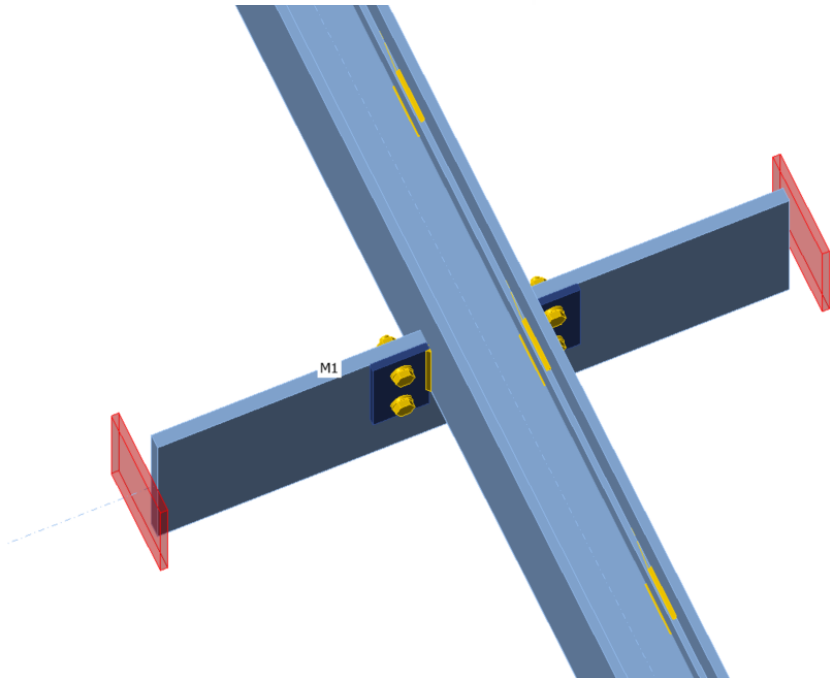
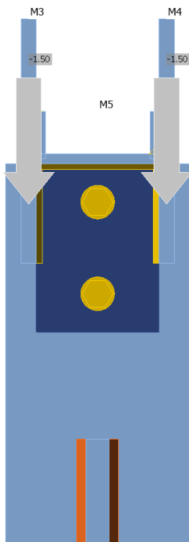
Name	Support	Forces in	X [in]
M1 / end	N-Vy-Vz-Mx-My-Mz	Node	0.00
M3 / begin		Node	0.00
M3 / end		Node	0.00

Project:

Project no:

Author:

M4 / begin		Node	0.00
M4 / end		Node	0.00
M5 / begin		Node	0.00
M5 / end		Node	0.00



Cross-sections

Name	Material
3 - Plate 0.75, 6	A36
12 - Plate 0.5, 8	A36
11 - Plate 0.5, 8	A36
7 - C(Imp)4X7.25	A36

Cross-sections

Name	Material	Drawing
------	----------	---------

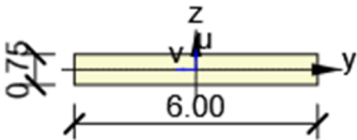
Project:

Project no:

Author:

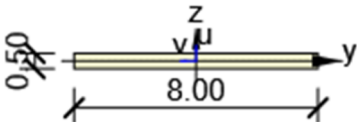
3 - Plate 0.75, 6

A36



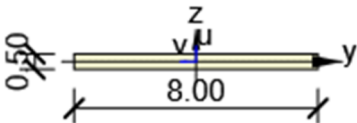
12 - Plate 0.5, 8

A36



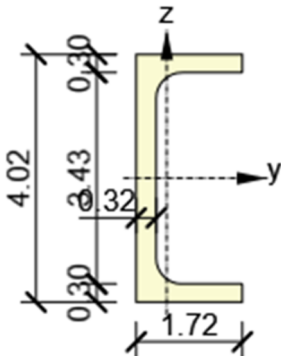
11 - Plate 0.5, 8

A36



7 - C(Imp)4X7.25

A36



Project:

Project no:

Author:

Bolts

Name	Diameter [in]	f _y [ksi]	f _u [ksi]	Gross area [in ²]
1/2 A325	0.50	92.0	120.0	0.20

Load effects (Equilibrium not required)

Name	Member	N [kip]	V _y [kip]	V _z [kip]	M _x [kip.ft]	M _y [kip.ft]	M _z [kip.ft]
LE1	M3 / End	0.00	-1.50	0.00	0.00	0.00	0.00
	M4 / End	0.00	-1.50	0.00	0.00	0.00	0.00
	M5 / End	0.00	0.00	0.00	0.00	0.00	0.00
	M3 / Begin	0.00	1.50	0.00	0.00	0.00	0.00
	M4 / Begin	0.00	1.50	0.00	0.00	0.00	0.00
	M5 / Begin	0.00	0.00	0.00	0.00	0.00	0.00

Check

Summary

Name	Value	Check status
Analysis	100.0%	OK
Plates	0.0 < 5.0%	OK
Bolts	28.6 < 100%	OK
Welds	45.4 < 100%	OK
Buckling	11.74	

Plates

Name	t _p [in]	Loads	σ _{Ed} [ksi]	ε _{Pl} [%]	σ _{c,Ed} [ksi]	Status
M1-bfl 1	3/4	LE1	3.2	0.0	0.5	OK
M3-bfl 1	1/2	LE1	21.6	0.0	0.0	OK
M4-bfl 1	1/2	LE1	21.6	0.0	0.0	OK
M5-bfl 1	5/16	LE1	5.6	0.0	0.0	OK
M5-tfl 1	5/16	LE1	8.2	0.0	0.0	OK
M5-w 1	5/16	LE1	4.5	0.0	0.0	OK
SP2	3/8	LE1	9.5	0.0	1.6	OK

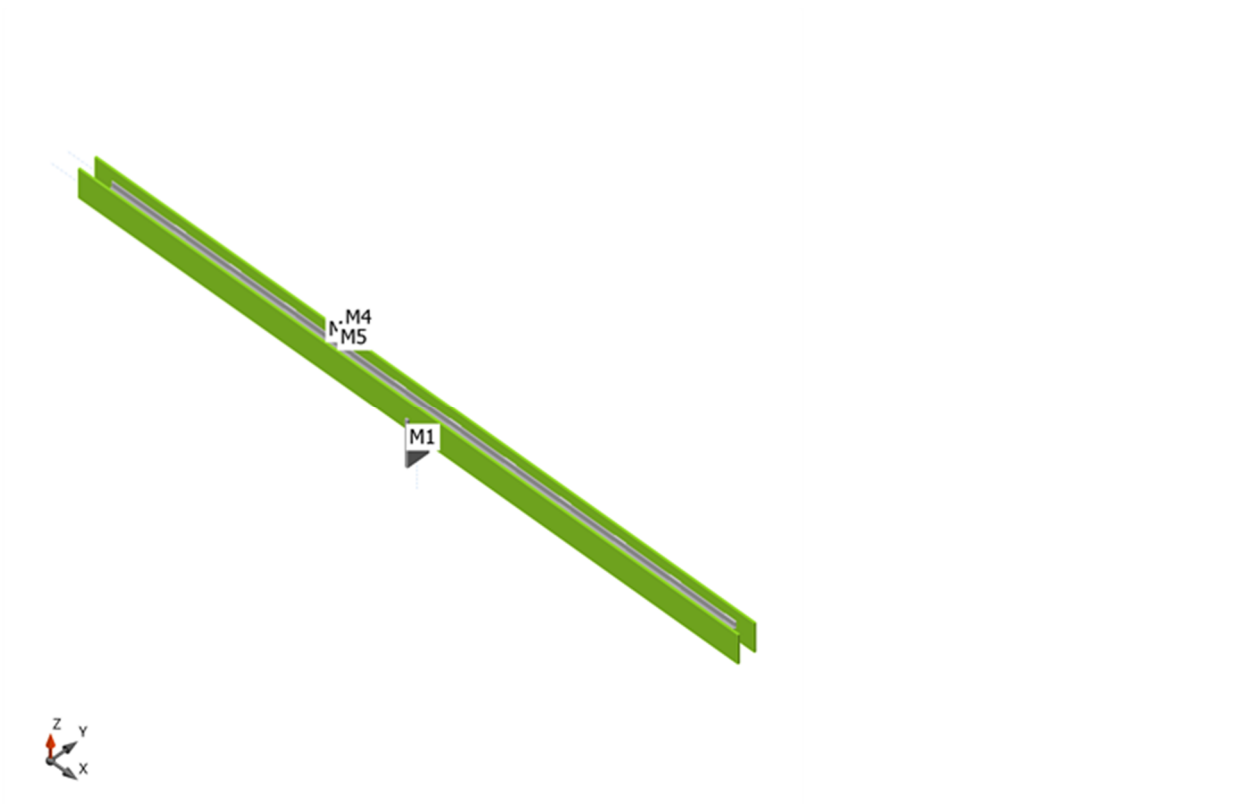
Design data

Material	F _y [ksi]	ε _{lim} [%]
A36	36.0	5.0

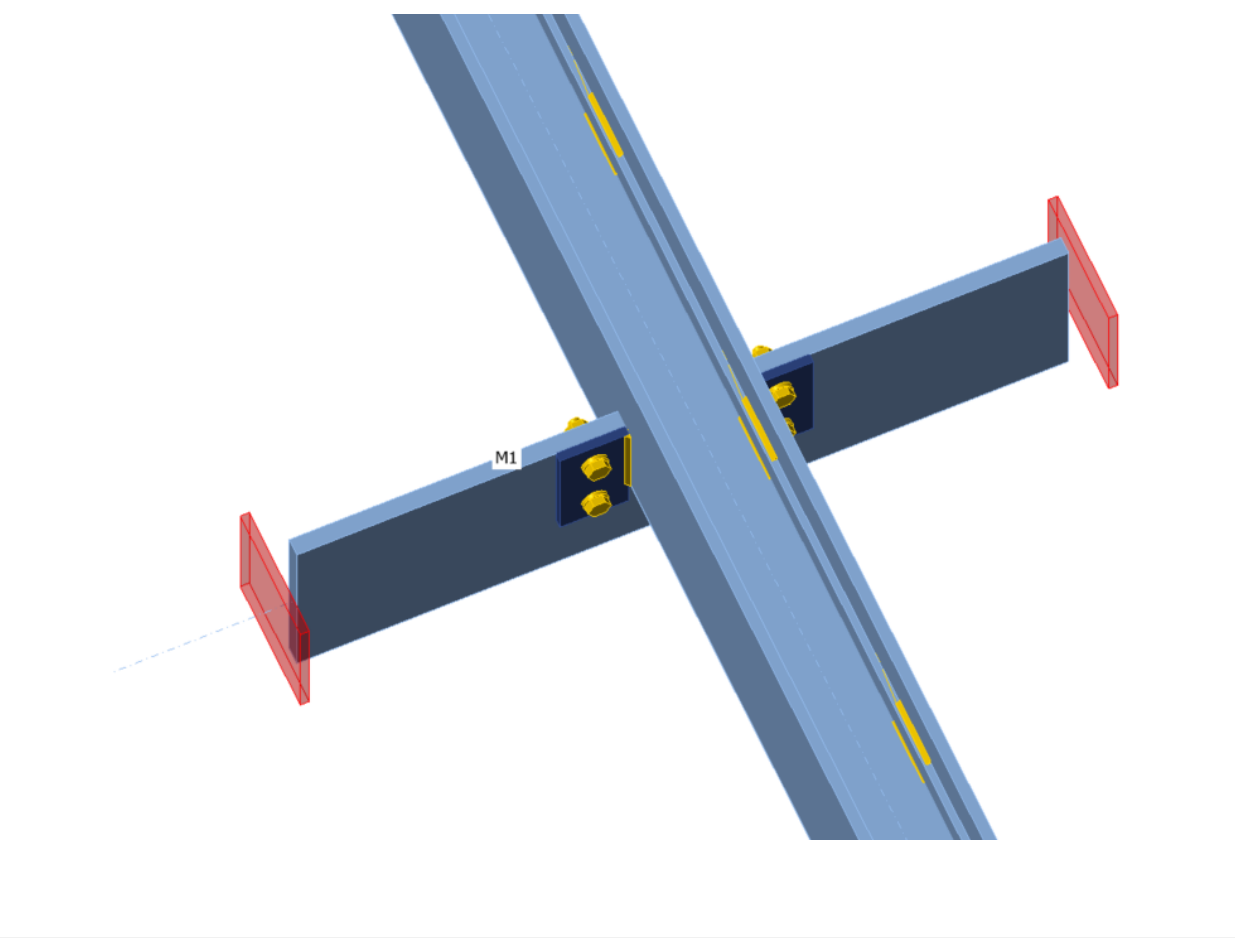
Project:

Project no:

Author:



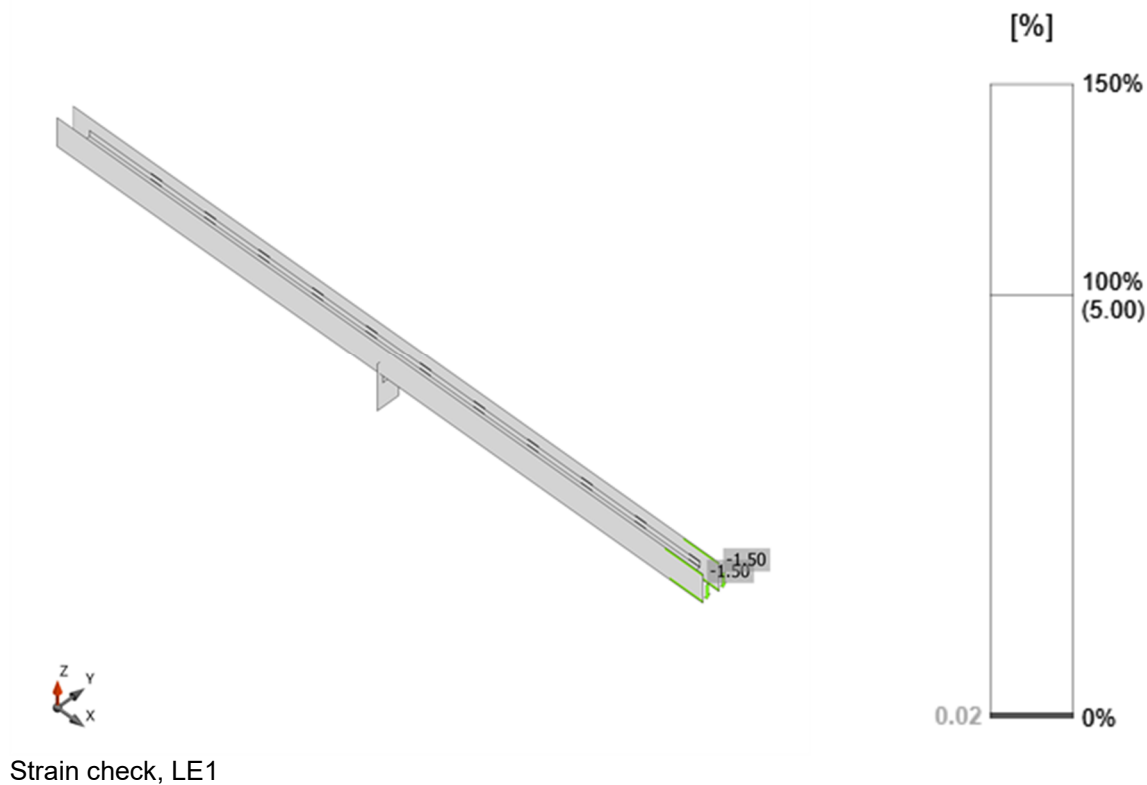
Overall check, LE1



Project:

Project no:

Author:



Bolts

Shape	Item	Grade	Loads	F _t [kip]	V [kip]	R _{n,bearing} /Ω [kip]	U _{t_t} [%]	U _{t_s} [%]	U _{t_{ts}} [%]	Detailing	Status
	B1	1/2 A325 - 1	LE1	0.22	1.52	12.64	2.5	28.6	0.0	OK	OK
	B2	1/2 A325 - 1	LE1	0.50	1.48	13.05	5.7	28.0	0.0	OK	OK

Design data

Grade	R _{n,tension} /Ω [kip]	R _{n,shear} /Ω [kip]
1/2 A325 - 1	8.83	5.30

Welds

Item	Edge	Xu	t _w [in]	w [in]	L [in]	L _c [in]	Loads	F _n [kip]	R _n /Ω [kip]	U _t [%]	U _{t_c} [%]	Detailing	Status
M3-bfl 1	M5-tfl 1	E70xx	▲ 1/8	▲ 3/16	32.81	0.33	LE1	0.58	1.35	43.2	24.1	OK	OK
M3-bfl 1	M5-tfl 1	E70xx	▲ 1/8	▲ 3/16	1.55	0.31	LE1	0.00	1.22	0.0	0.0	OK	OK

Project:

Project no:

Author:

M3-bfl 1	M5-tfl 1	E70xx	▲ 1/8	▲ 3/16	32.81	0.33	LE1	0.06	1.04	5.6	0.0	OK	OK
M3-bfl 1	M5-w 1	E70xx	▲ 1/8	▲ 3/16	32.81	0.33	LE1	0.06	1.02	6.3	0.0	OK	OK
M4-bfl 1	M5-bfl 1	E70xx	▲ 1/8	▲ 3/16	32.81	0.33	LE1	0.40	0.96	42.0	22.4	OK	OK
M4-bfl 1	M5-bfl 1	E70xx	▲ 1/8	▲ 3/16	1.55	0.31	LE1	0.00	1.15	0.0	0.0	OK	OK
M4-bfl 1	M5-bfl 1	E70xx	▲ 1/8	▲ 3/16	32.61	0.33	LE1	0.03	1.22	2.4	0.0	OK	OK
M4-bfl 1	M5-w 1	E70xx	▲ 1/8	▲ 3/16	32.81	0.33	LE1	0.47	1.03	45.4	25.8	OK	OK
M3-bfl 1	SP2	E70xx	▲ 1/8	▲ 3/16	3.23	0.32	LE1	0.37	1.24	30.3	13.9	OK	OK
M4-bfl 1	SP2	E70xx	▲ 1/8	▲ 3/16	3.23	0.32	LE1	0.37	1.24	30.2	15.4	OK	OK
M5-w 1	SP2	E70xx	▲ 1/8	▲ 3/16	3.70	0.31	LE1	0.15	0.94	16.3	7.6	OK	OK

Design data

Material	F_{exx} [ksi]
E70xx	70.0

Buckling

Loads	Shape	Factor [-]
LE1	1	11.74
	2	13.17
	3	15.63
	4	17.50
	5	18.03
	6	18.71

Project:

Project no:

Author:



First buckling mode shape, LE1