NEMETSCHEK GROUP

COMPONENTS — Hide

BEAMS +
- Aluminum
- Concrete Beam - Optimize
- Concrete Beam - Explicit
- Hot Rolled - 0
- Hot Rolled - 90
- Hot Rolled
- Cantilever Condition
- Stainless Steel
- Wood
- Distributed Load

COLUMNS +
- Cold Formed Steel
- Concrete Column
- Concrete 12"x12"
- Concrete 18" x 12"
- L4x3x5

Hot Rolled
AISC 15th (360-16): ASD
Governing (1.4 DL) I View ▾
Code Check = 0.02

1.841 k
2.38 k
0.056 klf 0.448 k 0.558 k 0.484 k 0.056 klf
-0.353 k
3 ft -0.932 k 16 ft
-1.45 k

DETAIL REPORT ⬇ Download Show All

Axial Compression Analysis 0 k 76.361 k -

CHECK SLENDERNESS RATIO: COMPRESSION

$F_y = 50 ksi$ — Specified minimum yield stress

$E = 29000 ksi$ — Modulus of elasticity

$t_w = 0.35 in$ — Thickness of web

$t_f = 0.43 in$ — Thickness of flange

$b = \frac{b_f}{2} = 4.07 in$ — Half the full flange width

$h = d - 2t_f = 19.74 in$ — Clear depth of web inbetween flanges

$\lambda_f = \frac{b}{t_f} = 9.465$ — Flange slenderness ratio

$\lambda_r = 0.56\sqrt{\frac{E}{F_y}} = 13.487$ — Limiting width to thickness parameter for a slender element subject to axial compression (Table B4.1a, Case 1)

$\lambda_f < \lambda_{rf} \rightarrow Non\text{-}slender\ flange = 3$

$\lambda_w = \frac{h}{t_w} = 56.4$ — Web slenderness ratio

PROPERTIES

W21X48 (A992)

Material
Hot Rolled Steel

Shape Type
I O O C T T

Shape
W21X48 ⓘ

Material Type
A992

Rotation
0° 90° 180° 270°

SPAN

DESIGN

LOADS

May 14, 2020 11:30 UTC

Introducing RISACalc

The new RISACalc allows users to analyze single members (beams and columns) of all materials: hot rolled steel, wood, concrete, cold formed steel, aluminum, and stainless steel. The intuitive interface makes it easy to set up your model, apply loads, and view results.

With an open interface, you can set up the properties of your model and see the changes reflected live in the main view. Additionally, the model space itself is dynamic and interactive. Click on the member, loads and boundary conditions to activate the corresponding dimension lines or input section so you can see the properties and make changes.

LOADS
Hide

∨ POINT LOADS   ⊕

RLL 0.32k

EL 0.417k

LL 0.3k   🗑

Magnitude (k)

| 0.3 |

Direction

↓ → ↺

Category

| DL | LL | EL | WL | SL | RLL | LLS |

Location (ft or %)

| 10 | ft |

DL 1.7k

DL 0.32k

❯ DISTRIBUTED LOADS   ⊕

❯ LOAD COMBINATIONS   ⚙

RISACalc also includes robust results and reporting. Internal forces and reactions can be displayed graphically right on your screen and the roll-over functionality allows you to see the forces at various locations as you move your mouse along the member.

1.367 k-ft

1.677 k-ft

0.951 k-ft

Moment
8.784 ft
-1.744 k-ft

-3.506 k-ft
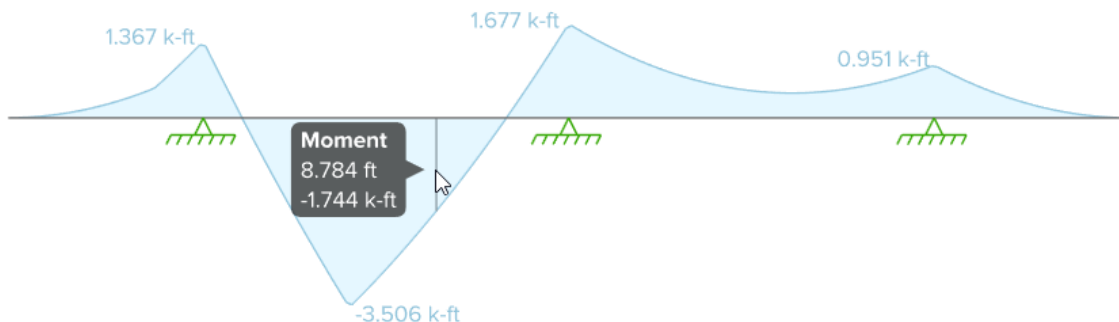
The interactive Detail Report presents all the input parameters and provides one location to view the force diagrams, boundary conditions, reactions and code check results. The material code checks also include expanded calculations for each limit state, providing complete transparency for the calculated capacities.

CALCULATIONS   Hide

AISC 15th (360-16): ASD Code Check

Limit State	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-
Applied Loading - Shear	-	-	-	-
Axial Tension Analysis	0 k	422.156 k	-	
Axial Compression Analysis	0 k	76.361 k	-	
Flexural Analysis	3.506 k-ft	189.28 k-ft	-	
Shear Analysis	1.841 k	144.2 k	0.01	Pass
Bending & Axial Interaction Check (UC Bending Max)	-	-	0.02	Pass

$P_r(comp)=0k$	Required axial compressive strength at governing location
$P_c=76.361k$	Allowable axial compressive strength
$M_{rz}=3.506k-ft$	Required flexural strength about z-axis at governing location
$M_{cz}=189.28k-ft$	Allowable flexural strength (strong axis)
$M_{ry}=0k-ft$	Required flexural strength about y-axis at governing location
$M_{cy}=36.744k-ft$	Allowable flexural strength (weak axis)
$For\ \frac{P_r}{P_c}<0.2, \frac{P_r}{2P_c}+\left(\frac{M_{rx}}{M_{cz}}+\frac{M_{ry}}{M_{cy}}\right)\le1.0=0.019$	Bending and Axial Interaction	(Eq. H1-1b)

When you're ready to share the results, download a PDF report which includes all the input and output of your model.

Designer: Benjamin Follett
Date: 04-15-2020
Project: BF Test
Component: Concrete Beam

CA | RISACalc

PROPERTIES

INPUT DATA

Shape	Member Type	Length	Rotate (deg)	Material Type
CRECT18X12	Beam	14 ft	0	Concrete

MATERIAL PROPERTIES

Material	E	G	f'c	Density	Nu	Lambda
4000 NW	3644 ksi	1584 ksi	4 ksi	0.145 k/ft³	0.15	1

Finally, our online platform lets anyone in the company share and access projects. This makes collaboration seamless and you never have to worry about who has the most updated model.

Browse Projects

🔍 Project Search

Project Name ⌄	Components ⌄	Date Modified ⌄
Test DP	1	03/04/2020
S- Test_HRCol_GY - Column 1 -...	1	03/20/2020
S- Test_ConcBM_GY - Beam 1 -...	1	03/20/2020
S- Test - Wood_CS - Test - Woo...	1	03/20/2020
S- Test - Wood_CS - Test - Con...	2	03/31/2020
S- Sample Concrete Beam Mod...	1	03/19/2020
S- SUPERtestProject - SuperBe...	1	03/27/2020
S- Project 2 - Beam 1 - ashleya+...	1	03/13/2020
S- Project 11 - Beam 1 - francisco...	1	04/03/2020 🗑
S- HR Beam - Column 1 - ashley...	1	03/13/2020

+ Create New Project

To see RISACalc in action, check out the video below:

About the Nemetschek Group

The Nemetschek Group is a pioneer for the digital transformation in the AEC industry. With its software solutions, it covers the complete life cycle of building and infrastructure projects and guides its customers into the future of digitalization. As one of the world's leading corporate groups in this field, the Nemetschek Group increases quality in the construction process and improves the digital workflow of all those involved in the construction process. This revolves around the use of open standards (Open BIM). The innovative solutions of the 16 brands in the four customer-oriented divisions are used by approximately six million users worldwide. Founded by Prof. Georg Nemetschek in 1963, the Nemetschek Group today employs more than 3,000 experts.

Publicly listed since 1999 and quoted on the MDAX and TecDAX, the company achieved revenue in the amount of EUR 556.9 million and an EBITDA of EUR 165.7 million in 2019.

Contacts

Benjamin Follett
Director of Sales & Marketing
RISA
benf@risa.com