

Standard Steel Joists and Joist Girders

NATIONWIDE DESIGN, MANUFACTURE AND DELIVERY



NEW MILLENNIUM

BUILDING SYSTEMS

Building a better steel experience.



Overview

Steel joists are key components to your roofing and flooring system. New Millennium engineers and manufactures a full range of standard steel joists (also known as bar joists) plus composite joists (CJ-Series) and Joist Girders. We can provide early design assistance for total-project cost optimization, including load zone joist design. All joists are locally available, and manufactured in accordance with the specifications of the Steel Joist Institute.

Certifications

New Millennium is a Steel Joist Institute (SJI) member company, fully certified to manufacture K, LH and DLH-Series steel joists, and Joist Girders. New Millennium is also a Steel Deck Institute (SDI) member company, fully certified to manufacture roof deck, form deck and composite floor deck.

- New Millennium products meet FM, UL and ULC requirements
- The Indiana, Virginia, Florida, Tennessee, Arkansas and Arizona facilities are ICC certified
- F, B and N deck are Factory Mutual approved for use as a component in Class 1-60, 1-75 and 1-90 wind uplift metal roof decking construction
- Steel deck products are approved by Underwriters Laboratory and listed in the UL Fire Resistance Directory
- All acoustical deck has been tested in accordance with ANSI ASTM C423 and E795 to determine the noise reduction coefficient (NRC) rating
- Welders are certified in accordance with AWS D1.1 and D1.3
- The Indiana, Virginia and Nevada facilities meet CSA Standard W47.1 in Division 2 for open web joist
- The Indiana facility is certified in accordance with the requirements of the current IBC/Michigan Building Code, Chapter 17, Section 1705, Paragraph 2.2
- The Florida facility is certified in accordance with the requirements of the Miami-Dade County, Florida Building Code, Article IV, Chapter 8
- The Arkansas and Florida facilities are certified in accordance with the Houston, Texas Building Code, section 1704.2.2
- The Nevada and Mexico facilities are certified in accordance with the requirements of LA City
- The Nevada facility is certified in accordance with the requirements of Clark County

ICC Reports

ICC-ES, a nonprofit organization, evaluates building products and publishes reports that verify they comply with building codes. For complete reports of New Millennium deck verified by ICC-ES, please visit www.newmill.com/certifications/certifications.html



Standard Steel Joistspages 4-5

Steel joist products include K, LH and DLH Series joists, designed and manufactured in accordance with the specifications of the Steel Joist Institute. Single-piece joists can be produced up to 90' long, with field splices used to increase lengths and depths. Available with either under-slung or square ends.



Composite Joistspages 6-7

A composite joist (CJ-Series) is a steel joist designed for shear connection to the overlying concrete slab using field applied shear studs, such that when the decking is filled with concrete, the shear studs become embedded in the hardened concrete and a unified load bearing system is created that deflects as a single unit.



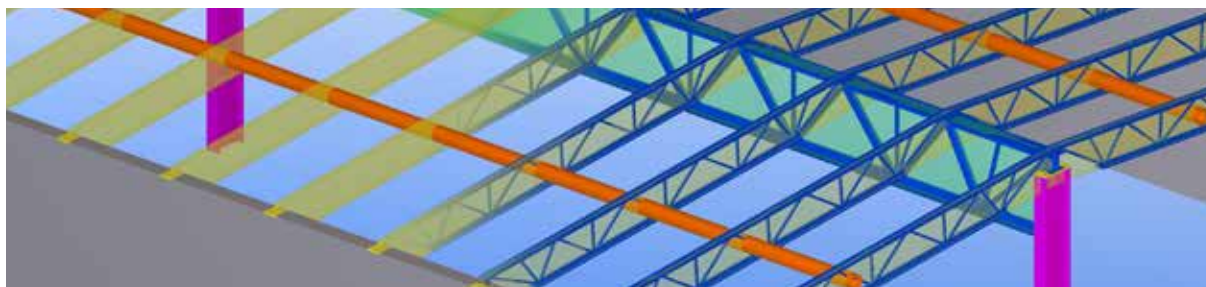
Joist Girderspages 8-9

Joist Girders are open web steel trusses that serve as primary framing members. They are designed as simple spans to support concentrated loads for a floor or roof system. These concentrated loads are normally considered to act at the top chord panel points of the Joist Girders.



Load Zone Joist Design.....page 10

An alternative to specifying KCS series joists is to specify joists designated as KZ to support the concentrated loads residing in specific areas defined as "load zones." With the zone boundaries defined and corresponding concentrated loads specified, New Millennium can substantially engineer steel material costs out of a project.



BIM Design page 11

Manage costs and improve project scheduling with support from the leading BIM steel joist and deck provider. Download the latest BIM object files for Autodesk Revit software and Dynamic Joist® BIM components for Tekla Structures software.

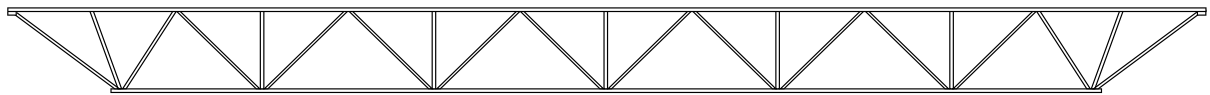


Standard Steel Joists

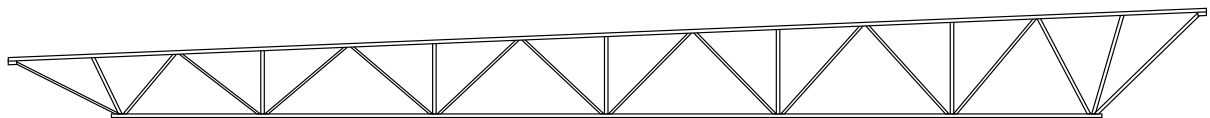
Steel joist products include K, LH and DLH Series joists, designed and manufactured in accordance with the specifications of the Steel Joist Institute. Single-piece joists can be produced up to 90' long, with field splices used to increase lengths and depths. Contact your local New Millennium facility.

- LH- and DLH-Series available with single-pitched or double-pitched top chords
- Standard SJI camber per table 4.6-1, unless specified otherwise

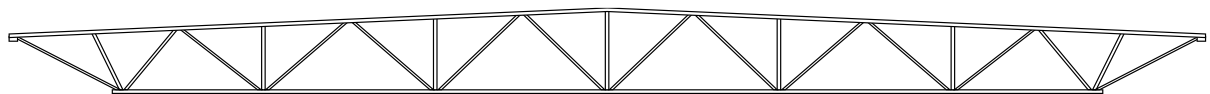
All standard profile joists are available with either under-slung or square ends. The depth indicated in joist designation is determined by the depth of single-pitched joists at the center of span and at ridge centerline of double-pitched joists. When top chord slope exceeds $\frac{1}{2}:12$, total and live top chord uniform loads must be provided. All standard profile joists with top chord pitch greater than $\frac{1}{2}:12$ will be provided with no camber unless otherwise specified in contract documents.



Parallel Chord



Single-Pitched Top Chord



Double-Pitched Top Chord



NewBay™ Bridging System

Our NewBay™ steel joist bridging system reduces construction time, giving you a competitive advantage over clamp-and-weld bridging.

- **Rapid, single-pass tap screw assembly of bridging members**
- **Standard hand tool fastening for speed, convenience and economy**
- **Joist spans to 60 feet reduce bridging counts**
- **Enhanced safety, using fewer parts – no bolting or welding**

Bridging goes in more quickly, safely, and economically using a single-pass tap screw instead of drilling and bolting or welding. It adapts to the design for all

manner of loading conditions, rooftop loading, and construction needs. In addition, it alleviates the need for welded termination bridging. The NewBay™ Bridging System is available across the country with the ease of a single point of contact for design, pricing and project management to accommodate even the tightest timeframes.

Our economic joist design not only reduces bridging, but it also enhances safety at the job site. Fewer parts are needed, with no welding required. NewBay™ is the non-weld option that owners are looking for to provide flexibility of joists, ease of erection, and nationwide availability and pricing.



Composite Joists

A composite joist is a steel joist designed for shear connection to the overlying concrete slab using field applied shear studs, such that when the decking is filled with concrete, the shear studs become embedded in the hardened concrete and a unified load bearing system is created that deflects as a single unit. Composite steel joist design is an example of Load and Resistance Factor Design (LRFD). It achieves a higher density floor structure, compared to more conventional methods, because structural elements are integrated into one compact joist and deck system.

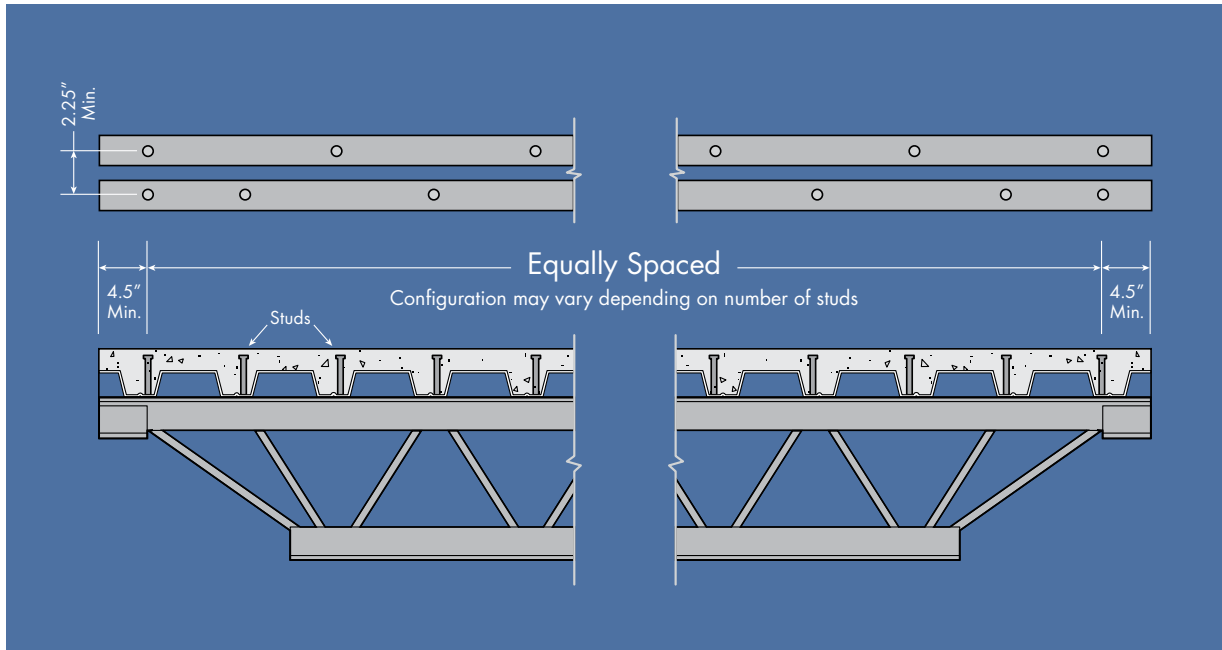
Advantages can include a stronger, stiffer, lighter and less expensive steel structure compared to other structural steel frame approaches. This integrated approach to steel joist and deck design can save time and money on a building project, and possibly improve the design of the building. The design also contributes to earlier erection, a potentially shorter construction timeline and earlier building occupancy.

Other advantages include:

- **Reductions in steel material and related costs**
- **Open web joists allow routing of MEP for lower floor-to-floor height**
- **Wider spaced and fewer columns for more open bays**
- **Stiffer floors for reduced live load deflections and reduced vibration**
- **Shortened construction timeline**

Because the concrete slab adds extra strength and the joist alone does not have to support full design loads, the top chords can be smaller, thereby reducing material costs. Joists can also be spaced farther apart, translating to reductions in steel, manufacturing, shipping and erection costs.

Using a composite joist narrows the floor, creating more headroom, often with adequate MEP routing options through the joist. Also, shear studs increase joist strength, thereby expanding the span-to-depth ratio limit to 30 times the joist depth, compared to 24 times the joist depth for non-composite joists.



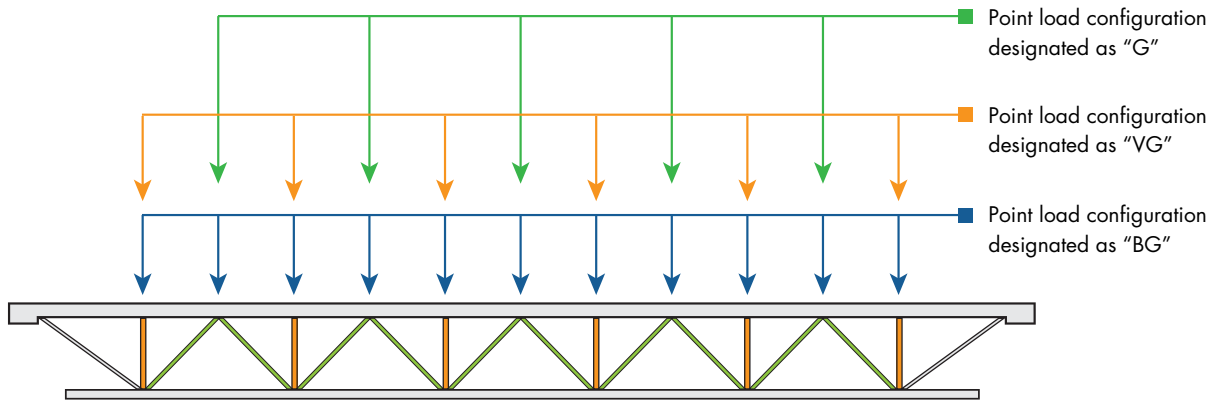


Steel Joist Girders

Joist Girders are open web steel trusses that serve as primary framing members. They are designed as simple spans to support concentrated loads for a floor or roof system. These concentrated loads are normally considered to act at the top chord panel points of the Joist Girders.

Other advantages include:

- Often more cost-effective than wide-flange steel beams
- Comparably easier and faster erection
- Open web design allows for MEP integration
- Standard depths from 20" to 120"
- Spans from 20' to 120'
- Available with single-pitched or double-pitched top chords up to 1/2":12"



The design of rigid moment frames using Joist Girders is very similar to that of wide-flange beams. End fixity is achieved by restraining the rotation at the ends of the Joist Girders. As with wide-flange beams, there are several methods of achieving this fixity, and for each approach, specific design, fabrication and erection concerns must be considered. With close coordination between the specifying professional and New Millennium Building Systems, material savings may be achieved without increasing fabrication or erection cost. In some cases, it is possible to attain savings in several phases of the project.

Advantages of using Joist Girders as part of a lateral load resistant frame include material efficiencies, a more evenly distributed diaphragm load path and decreased erection cost. Material efficiencies may be achieved utilizing Joist Girder chords in continuity moments as well as lateral frame moments. By collecting the diaphragm loads at each frame line, the diaphragm shear requirements and attachment may be reduced, as compared to using braced frames or shear walls at only a few locations.

Load Zone Joist Design

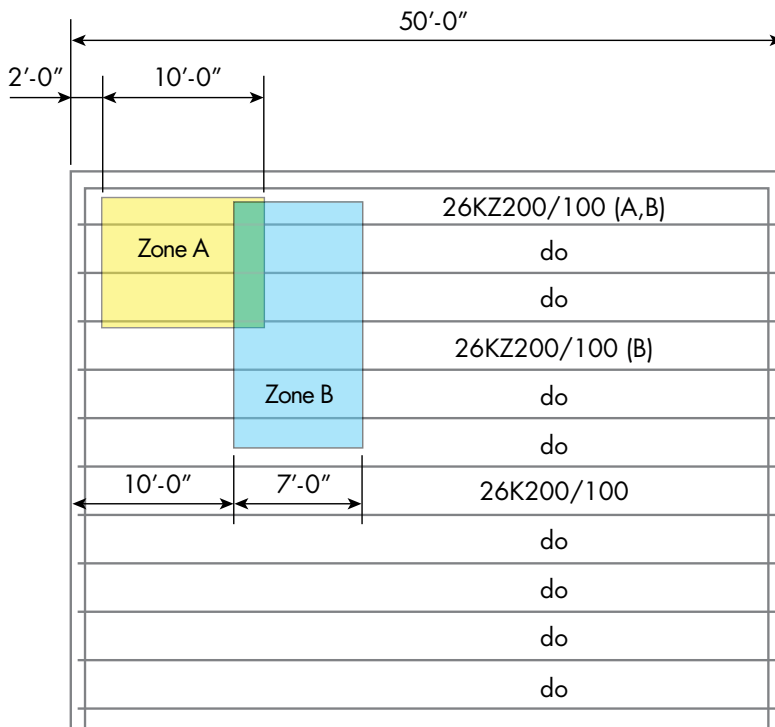
When the approximate locations of concentrated loads are known, the designer has the opportunity to design a more efficient joist. These joists can be designed to support concentrated loads residing in specific areas defined as "load zones." With boundaries of zones defined and the corresponding concentrated load specified, New Millennium engineers can substantially reduce steel material costs for your project.



The designer may specify as many loads and corresponding "load zones" as needed. The fewer zones specified, the more efficient the joist will be.

- Reduces costs through more efficient steel joist design
- Designed as either K or LH Series
- Shear and moment envelopes are developed for all load cases within the zones and the joists are designed accordingly, including any stress reversal which may occur

Joist chords and web members are designed to adequately support all specified load combinations. If a concentrated load does not occur at a panel point, then a field installed web member must be placed from a panel point to the point of concentrated load. Alternatively, some portion of the load may be specified as a bending load that may be located between panel points. This option eliminates the requirement for a field installed web member, at the expense of a larger chord size.



Load Zone Joists can be designed to support concentrated loads residing in specific areas defined as "load zones." With boundaries of zones defined and the corresponding concentrated load specified, New Millennium can design a more efficient joist.

Dynamic Joist® BIM Steel Joist and Deck Design

BIM-based steel joist and deck from a proactive supplier can improve the design of your building, reduce overall project costs and support a faster-to-market timeline. Our Dynamic Joist® BIM component was introduced in early 2010. Many software generations since, it's still the leading BIM steel joist component – and still a free download.

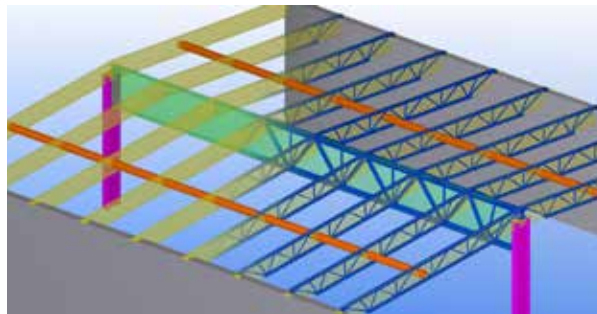
- Cut costs and timeline
- Address a range of cost/value decisions
- Design collaboration supports architectural goals
- Provides a lifelong facility management tool
- Includes joist configurations, specs, design guidelines
- Endorsed by the AISC strategy for interoperability

Managed Costs and Scheduling

Our Dynamic Joist® model integrates smoothly into the structural model, which in turn integrates into the building's "master" model, where they are joined by models from other participating trades.

In addition, our joist BIM development process pays off in ways beyond just the delivery of the steel joist model. The process fully leverages our value-added engineering capabilities, as we address a wide range of cost/value decision points, such as bridging placement and erection, evaluating and improving unusual connections, seeing where and how special load conditions can be better supported, or where an aesthetic architectural objective can be achieved using less metal and labor. The process also encompasses such cost-performance decisions as erection-synchronized joist delivery.

Our commitment to the BIM process has fostered an operational evolution within New Millennium across all disciplines, from design and engineering, through manufacturing and delivery. Within the steel joist model, we can call up such information as the type of joist to be



designed and the color of the paint. And once the model is approved, all of this information can seamlessly flow into our dynamic, timeline-sensitive, manufacturing systems.

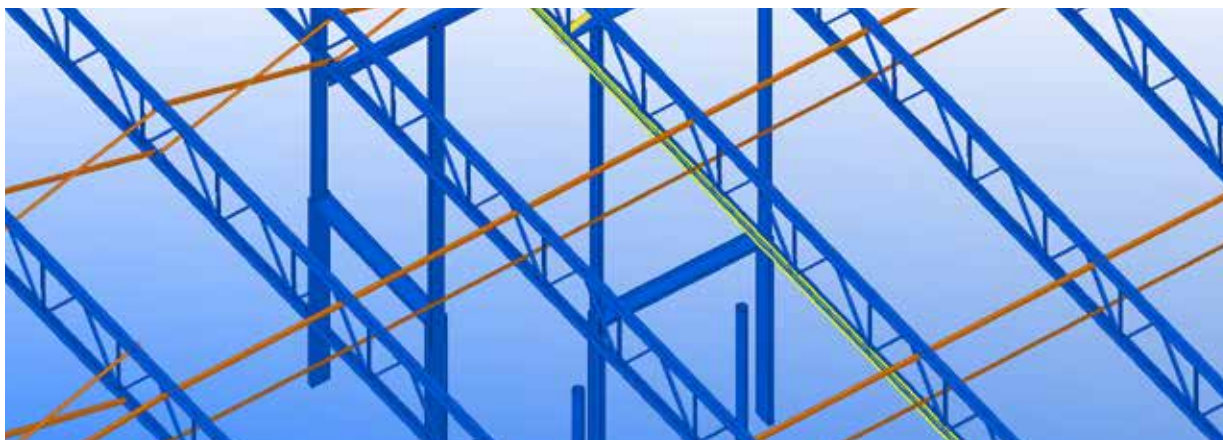
Our digital steel joist design component, together with our proven process for joist BIM development, serves the building owner's point of view – from start to finish, and beyond:

- Increases information sharing and problem ownership
- Improves structural design and smoother project flow
- Shortens project timelines for earlier building occupancy
- Eliminates errors resulting in a wide range of cost reductions
- Delivers to the owner a tool for lifelong facility management

BIM Object Files For Autodesk Revit Software



BIM Components For Tekla Structures Software





Your nationwide resource for the broadest range of cost-optimized, high-performance structural steel joist and deck solutions

- Structural steel joists, Joist Girders and deck
- Architectural decking solutions
- Multi-story long-span composite systems
- Custom engineering and design assistance
- BIM-based steel joist and deck design
- Nationwide manufacturing and availability
- Design-Build and Integrated Project Delivery (IPD)
- AIA and PDH courses for project optimization

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