SFIA
STEEL FRAMING INDUSTRY ASSOCIATION
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Cold-Formed Steel Chase Walls

November 18, 2025

SUMMARY:

- A chase wall is defined as a wall assembly that incorporates two rows of framing running parallel and adjacent to each other. The adjacent individual studs of the two framing systems may be braced web-to-web. This version is the more traditional assembly used to create a vertical chase for utilities (System A). The other use for this type is for increased acoustical performance where the adjacent studs are not connected by bracing (System B or C).
- Since sheathing is only applied to one flange of each stud, lateral bracing must be considered. Lateral bracing can be accomplished through the use of 54 mil bridging channels (U-sections) that run through the individual stud punchouts. This bracing must be mechanically attached to each stud. As an alternative, the bracing of adjacent studs in the two rows of framing is acceptable. The studs are sized using SFIA's "*Limiting Wall Height Tables - Non-Composite."* The anticipated upper floor deflection should be determined to ascertain the appropriate track for the head of the chase wall.
- Chase walls have achieved up to three-hour fire resistance ratings. Individual designs can be found in the SFIA Fire and Acoustical Guide. There are designs for all three systems (A – C). Fire-resistive tests have inherent tolerances built into all designs. When a design is applied to a specific project these tolerances cannot be exceeded for it will jeopardize the intended performance. In certain designs there are specific requirements for type, thickness, and density of cavity insulation. There may be a need for the use of a head-of-wall design to meet the fire integrity of the overall system.
- Chase walls are ideal solutions for enhanced acoustical performance. They either minimize (System A – B) or totally eliminate (System C) the negative acoustical impact due to the framing itself. With the opportunity of achieving exceptionally high sound ratings, i.e., upper 60's STC, cold-formed steel framed chase walls are a desired solution.

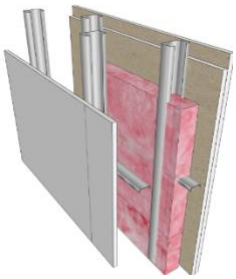
What are chase walls?

Wall assemblies that use two rows of framing that run parallel to each other have been in practice for many years, dating back to lath and plaster systems. Traditionally they were utilized to create a chase within the wall cavity. In recent times these walls have come into vogue for their excellent acoustical performance characteristics.

To understand what a chase wall is, one must first understand the term *chase.* In this context the definition of the term with AI assistance is:

> *A vertical chase is a concealed vertical space within a wall or building structure designed to house and route pipes, ducts, or electrical wiring from one level to another.*

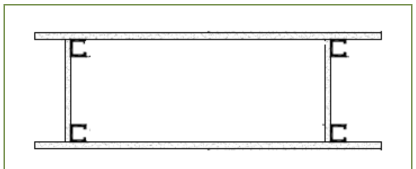
In the case of a framed wall, a chase is typically achieved with a double row of studs where the framing is spaced far enough apart to achieve the desired space.



The detail shown here is indicative of a common chase wall constructed with cold-formed steel studs. It depicts two rows of studs where the adjacent studs are connected via a steel track. The presence of the track acts as a gusset which effectively stiffens the studs, thus allowing for thinner width studs to be utilized. This, in turn, increases the chase area.

What are cold-formed steel framed chase walls?

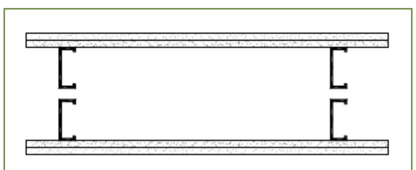
Chase walls are commonly framed with either wood or cold-formed steel. This paper will focus only on those walls constructed of cold-formed steel framing. Cold-formed steel's inherent sound performance characteristics has been a stimulus for the evolution in the design of double row steel framing. At this time, there are three versions of what may be considered steel framed chase walls.



System A

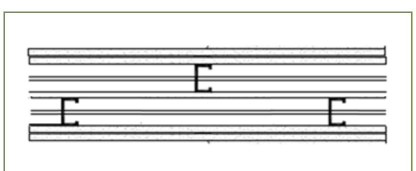
The more traditional version, shown here as System A, has a double row of steel studs with a minimum depth of 1-5/8 inches. Tying the two rows of studs are gussets made of either gypsum board or cold-formed steel track that is a minimum of 4-1/4 inches long. The gypsum board option has a maximum limit of 9-1/2 inches. In ASTM C754 *Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products*, (Section 5.4.2) the maximum width of a gypsum gusset is set at 20 inches. The vertical spacing of either brace is set to a maximum spacing of 48 inches. This framing configuration is the basis for either a one- or two-hour fire resistance rating and is listed as UL Design U420.

Using the track as a bracing option, and setting the length of the track at its minimum, provides a vertical chase within the assembly cavity of one inch space between the parallel running track or in other words a one-inch chase.



System B

In System A, with the minimum separation between the runners at 1-inch leaves very little room for a chase area. This becomes highly apparent in System B where the separation between the framing is also set at 1 inch. This assembly depicts UL Design V463 Configuration C. This system is used more for its acoustical attributes than to develop a chase for utilities. Omitted for clarity in this illustration is the requirement for lateral bracing that must run through both rows of framing. The fire rating does not require the addition of insulation in the stud cavity, however most designs for acoustical performance do require the inclusion of insulation.



System C

System C takes an additional acoustical enhancement by staggering the studs. This drawing reveals the required lateral bracing and depicts UL Design V469. Similar to System B insulation is not required for fire, but acoustical designs do require insulation in the stud cavities. The minimum separation distance between the two rows of framing is one inch. There are specific acoustical system designs where that separation dimension is increased. A challenge is that each design requirement will have a potential impact on the other design parameters.

What are the design considerations?

The three main considerations for designing a chase wall are fire, sound, and structure. The question to answer is what size stud and spacing must be utilized to meet project wall height and service demands. The second question is what fire resistance rating is required. The final question is what are the acoustical performance requirements that must be met.

Structural

One of the primary structural design requirements for cold-formed steel framing is to restrain the stud from rotating when a load is introduced to the framing system. This load can either be vertical (axial) in its orientation or horizontal as a live load. The requirement for lateral bracing can be found in AISI S100 *North American Specification for the Design of Cold-formed Steel Framing Structural Members* (reaffirmed 2020) Section C2.2. In nonstructural partitions the presence of sheathing mechanically attached to both flanges of the steel stud provides the required bracing. In chase wall design, there is no layer of sheathing on the inboard (cavity side) flange. In System A shown above the fact that the adjacent studs are tied together via either a steel or gypsum brace means that the studs are adequately braced laterally through the steel or gypsum that tie the stud webs together.

Illustration 1

That is not the case in Systems B and C. The framing does require additional bracing within the individual rows of studs. Illustration 1 is a photo of lateral bracing in a loadbearing partition. The concept is the same for chase walls, where a cold-formed steel U - Section channel that is 54 mils thick is run horizontally through the punchout in the webs of the studs. These channels must be mechanically attached to each individual stud. The vertical spacing of the bracing is 48 inches on center. What is shown is a generic solution. Many SFIA members have proprietary solutions for this condition. What is important to understand is that although the bracing requirement is for structural reasons, the bracing is shown in many fire-resistant designs, and becomes part of the fire rated assembly.

The allowable height of a cold-formed steel stud gypsum board partition is determined by an analysis that focuses on limiting the deflection of the wall itself and stress on the steel framing members. The deflection limit is controlled by the finish materials that will be used. For gypsum board and other elastic materials, the deflection is limited to L/240 where L is the span (or height in this case) of the stud in inches. The deflection limit is reduced if the finish material is brittle. Conventional plaster and ceramic tile are examples of materials that should be limited to L/360. These deflection limits should be delineated in the construction documents, specifically the architectural specifications.

The cladding and finish may also dictate the allowable spacing of the framing. For gypsum boards the studs may be spaced at 24 inches on center. If the cladding is to be cement board, then the spacing is reduced to 16 inches on center. At the base of the cold-formed steel framed chase wall the studs are individually seated in the track. At the head of the chase wall, the design and installation should take into account the anticipated movement of the floor above. A deep leg track may be required. If the wall is fire-resistant rated then a "head-of-wall" system must be incorporated.

The individual stud selection is based on the required wall height, the allowable stud spacing, allowable deflection, and the required transverse applied loading. This can be seen as a balancing act as all of these parameters are juggled to determine the best fit for a given project. Wall height tables can be found with individual SFIA manufacturers or in the *SFIA Technical Guide for Cold-Formed Steel Framing Products*. The appropriate tables for this application are called "Limiting Wall Height Tables – Non-Composite." The reason for using this table is that in chase wall design the contribution to wall stiffness that can be provided by the gypsum board option cannot be considered.

Chase walls that fall under System A that were originally tested for fire resistance were framed with 1-5/8-inch x 18 mil studs spaced at 24 inches on center. The table in the *SFIA Technical Guide* would limit the stud to a span of 6 foot – 1 inch at an allowable deflection of L/240. What mitigates that height is the fact that in System A there are two studs tied together with a gusset made of gypsum or steel. This increases the overall stiffness of the chase wall. The height calculations on the 1-5/8-inch x 18 mil studs at 24 inches on center, even in a braced configuration, yields a marginal wall height of 7 feet - 8 inches. Going to deeper studs is a possible solution.

Calculating the allowable height of a chase wall in an Option A configuration is not necessarily straightforward and should be undertaken by an engineer familiar with cold-formed steel framing. An example is provided in the appendix. Using this procedure and evaluating a wall constructed with a double row of 2-1/2-inch x 18 mil studs spaced 24 inches on center and braced with gussets vertically spaced at 48 inches generates an acceptable wall height. This wall height is 10 feet – 7 inches with a 5 pounds per square foot live load while limiting deflection to L/240. This is an increase from 8 feet 5 inches if the studs are not braced together.

Both Systems B and C cannot take that increased stiffness into account for the studs are completely independent of each other. That is why, in part, walls of this type are framed with deeper studs. For example, from the SFIA table using the same design parameters a 3-5/8-inch x 18 mil stud has an allowable height of 10 foot – 1 inch.

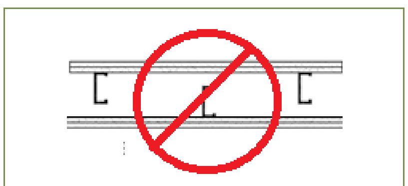


Illustration 2

One final thought on structural considerations is that a particular design that works for wood will not work for cold-formed steel framing. There is a design where 2 x 4 wood studs are installed on a common 2 x 6 wood plate and alternating the location of the studs from one edge of the plate to the other helps to decouple the assembly and reduce the negative effect of the framing on the overall wall acoustical performance. While this works for wood, it will not work for steel. See illustration 2. Using a deeper track and alternating the studs from one flange of the track to the other does not allow for the required lateral bracing. The flange of the stud buried within the wall cavity is totally unbraced, and there is no means to install lateral bracing.

Fire

There are many wall assemblies tested and recognized that achieve from one hour up to three-hour fire-resistant ratings. They can be researched and analyzed in the ***SFIA Guide to Fire & Acoustic Data for Cold-Formed Steel, Floor, Wall & Roof Assemblies.*** Individual designs are available that incorporate all three system configurations (A through C).

When considering fire rated designs, there are only a few deviations from what was tested. From a steel-framed chase wall standpoint the following should be acceptable with final approval coming from the *Authority Having Jurisdiction* over the project:

- Steel stud thickness is the minimum. Thicker steel may be acceptable.
- Stud spacing is a maximum, reducing stud spacing from what is tested is acceptable.
- Stud depth is a minimum, therefore increasing stud depth is acceptable.
- Specific to chase walls, the distance between the rows of studs is a minimum. Therefore, the distance between the framing can be increased.

In most cases the use of insulation in the cavity is an option. However, there are some designs that require insulation. The design under consideration should be evaluated to determine if there is a requirement for the insulation. Multiple rating designs often have an associated table that provides information on the number of layers of a specific thickness gypsum board and if insulation is required to achieve the rating with that gypsum board. The *SFIA Guide to Fire & Acoustic Data for Cold-Formed Steel, Floor, Wall & Roof Assemblies* will clarify all the potential options as an aid for the user.

Sound

Chase walls can be an excellent choice for walls that require high acoustical performance. There are four factors for acoustical performance and a chase wall has a positive impact on all four factors. Sound Transmission Classification, STC ratings can achieve the upper 60's with a chase wall. That is an exceptional wall for sound performance. The one downside of chase walls is their inherent overall partition width, which may eliminate their use on projects where there is limited floor area.

The first factor is mass, which is provided by the gypsum board. The greater the amount of gypsum board that is installed, the greater the mass of the wall which in turn enhances STC.

The second factor is isolation and that occurs when the mass is divided and set a distance apart. In theory, as the gypsum wall board is isolated from itself by virtue of the depth of the chase wall, the greater the acoustical performance.

The third factor is absorption. This comes in the form of fibrous insulation such as glass or mineral fiber in the wall cavity. More insulation which is a benefit can be added to larger wall cavities.

The last is decoupling and the intent here is to eliminate any loss of performance through the framing itself. System C offers the greatest decoupling for the studs are spaced one inch apart so they do not come in contact with each other and further, they are offset one-half of the stud spacing from each other. Decoupling the mass or gypsum membrane can be a critical decision as sound performance is affected by framing spacing and the stiffness of the framing. This is explained in a SFIA article titled *Frequently Asked Questions Regarding Architectural Acoustics and Cold-Formed Steel (CFS) Framing (SFIA A101-24)*. (Click the hyperlink to go to the article). The article discusses the negative impact triggered by the framing and methods to mitigate that impact. When steel thickness is 15 or 18 mil, STC is enhanced. However, when the framing gets to 54 mil, the cold-formed steel framed assembly starts behaving like wood framing with a significant drop in acoustical performance. System C chase wall with 54 mil framing then proves to be a very beneficial solution.

Appendix

Example:

6 inch chase wall requires a height of ***10*** feet.

The criteria is:

- 24"o.c. spacing;
- 5 psf interior lateral load;
- L/240 deflection limit;
- Maximum wall depth (studs only) = 6"

This example assumes that both flanges of both studs in each stud pair are restrained at the ends. Studs are to be installed in 2-1/2-inch tracks rather than a single 6-inch track.

This member has an M_{rx} of 0.93 In-K and an I_{xe} of 0.090 in^4, along with an L_u of 29.0 inches. The resistance moment is limited by distortional buckling strength since there will be no sheathing on one flange. Additionally, the unbraced length of the member with standard bridging will be 48 inches which is greater than the L_u. The double stud wall connected together, such as with gussets, will act as a shared beam loading case, in effect doubling the properties of a single stud. However, this does not double the limiting height since the effects of bending (or moment strength M_r) is a function of the square of the height, and the effects of stiffness (or the moment inertia I_x) are a function of the cube of the height.

The problem is in determining the limiting height of a double wall forming a chase and connected at 48 inches on center vertically. Sometimes the new limiting height can be found by taking 1.26 x the single member limiting height, but due to the unbraced length of 48-inch, may require commercially available software and the expertise of an engineer.

Once the units are set and inputted and the new properties are recalculated (either just doubled, or doubled and reduced for the 48-inch unbraced L), the L lim per stiffness in this case equals $(E \times I_{xe} / 450\ w)^{1/3}$;

and L lim per strength in this case equals $(8 \times M_{rx} / w)^{1/2}$.

Once this is all calculated, instead of only an ***8-foot 5-inch*** limiting height, this wall can span ***10-feet 7-inches*** if gusseted or connected at 48 inches on center.

Therefore, the 10'-0" height for the prescribed wall would be acceptable.