Interior Columns used with Interior Frames

Interior columns (at Continuous Beam [CB] or Continuous Truss [CT] frames) exist solely to support something – a rafter, or a crane, or simply a girt – but their proper application is critical. As taught in our Product Seminar, the more you reduce the span of a member, the more you reduce the cost – up to a certain point. For example, placing an interior column in the middle of a 200'-0" spanning frame will significantly decrease the cost of that frame under nearly any loading condition. Adding a second interior column can reduce the cost further. Your loading (Live, snow, etc.) will dictate what interior column spacing makes sense for your specific project. A project in Georgia (with less snow) can have greater interior column spacing than one in Maine – if cost is the driving factor.

It is important to remember that while you may be reducing the cost of your frame, you must consider the additional material and labor cost involved in the foundation and erection of the additional columns. Thus, saving a few hundred dollars on a frame may not justify what you will ultimately spend for total in-place cost and may even lose in flexibility in having the additional interior columns.

Figures 1 and 2 below show the pricing results for Continuous Beam frames containing interior columns at varying spacing under 70 psf and 10 psf Ground Snow respectively. Note that these are for interior frames. *Generally, Interior column spacing should never be less than 30'-0 and preferably around 40'-0 or greater dependant upon your loading and project needs.*

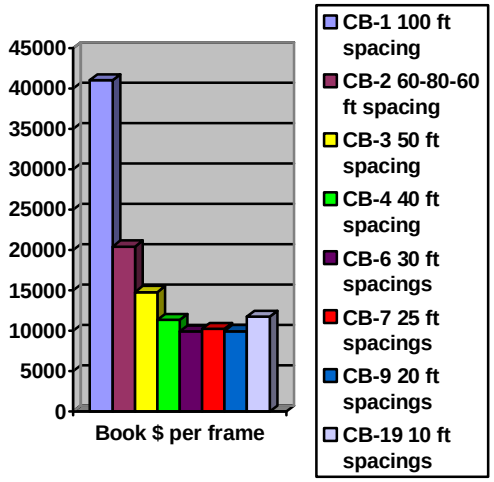

Figure 1: IBC 2000, 70 psf Ground Snow
200w x 250 l x 20 eh – 25'-0 bay spacing

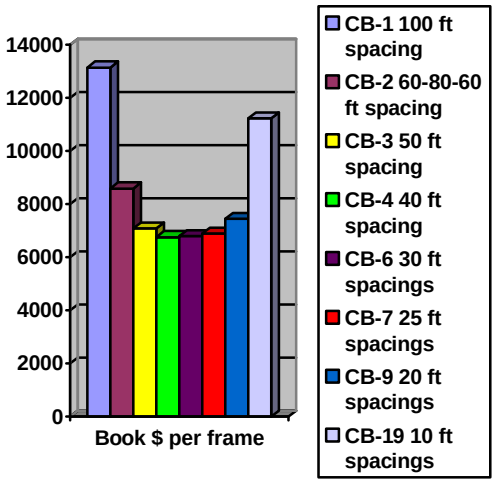

Figure 2: IBC 2000, 10 psf Ground Snow
200w x 250 l x 20 eh – 25'-0 bay spacing

In both examples shown in Figs. 1 and 2 note that the CB-19 is more costly than the CB-9 plus you have much more foundation and labor to consider!

Interior Columns used with End Frames

There are times when you need to use Continuous Beam (or Continuous Truss) frames at an endwall, such as when too much sheeting and girt material must be removed for brick, glass, large framed openings, or other and a Post and Beam is no longer stable; or when future expansion at the endwall of the building must be considered. CB or CT frames with Interior columns at an economical (and logical) spacing combined with "endposts" is a much better option than using a CB frame with Interior Columns spaced as you would for a typical endframe: for example, 23'-0 center span with 20'-0 spans approaching the sidewalls.

With these endframe conditions in mind, let's talk about interior column orientation. Standard Interior column (IC) orientation at interior frames with three-plate columns is for the IC web to run in the same direction as the main frame (web perpendicular to the sidewall (fig. 3). When ICs are used at an endframe for girt attachment, the column is "turned" or rotated 90 degrees so that the web is now perpendicular to the endwall (fig. 4).

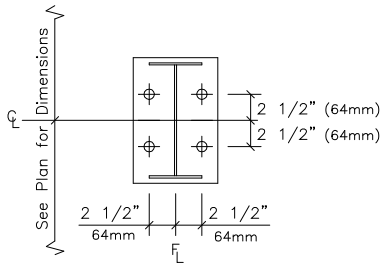

Figure 3: IC detail at interior

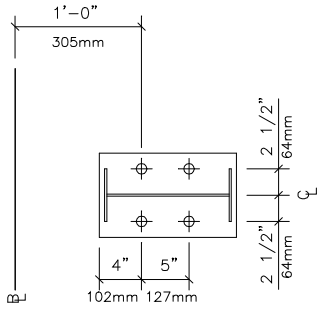

Figure 4: IC detail at end frame

Interior Pipe and Tube Columns

Tube columns may be used at endwalls (as an endpost) when there is a showroom condition with lots of glass, however it is not economical in normal conditions with girts and metal wall panels.

Tube and pipe, but particularly tube, become more cost effective at interior columns on taller buildings where the interior column length exceeds somewhere

around 28 feet. At these conditions, it is advisable that both options (tube and three-plate) be run through VPCommand to see which is most economical or more desirable.

Interior Column Spacing near Sidewalls

If an interior column is located too near an exterior column, undesirable and excessive uplift forces may result at the exterior column due to gravity loads – think of a diving board as shown in figure 5 below.

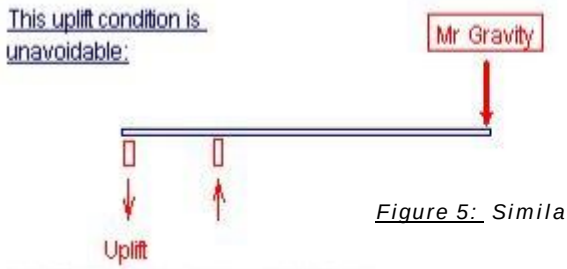

Figure 5: Similar to a "diving board"

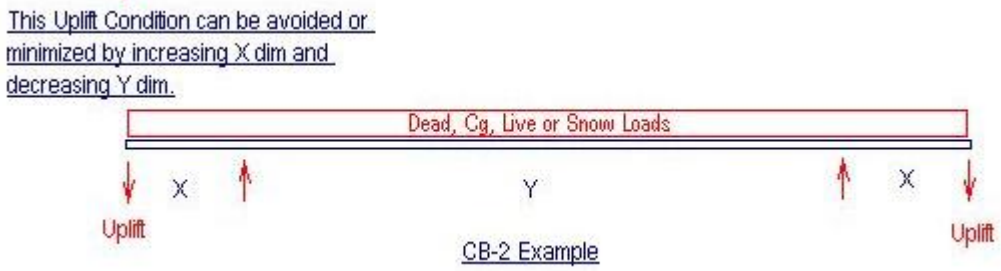

Figure 6: Interior Column nearest to sidewall column

Summary

If you find a situation where you require a vertical supporting member near a sidewall column such as at a shopping center walkway or other, Instead of locating an interior column consider using Rigid Frame with an Endpost (or endpost at a CB frame), or even a Rigid Frame with a Lean-to – or other frame keeping in mind not to locate an Interior Column too close to the sidewall column. Remember to consult your VP service Center for assistance. Use the design expertise available to you.

Remember to take advantage of the fast, reliable design of frames in VPCommand. Run alternates with varying interior column spacing keeping in mind that less expensive is not always what suits your customer's needs, but you have a powerful tool in VPCommand and creating different scenarios are quite easy.