Technical Bulletin

FROM SPEIGHT, MARSHALL & FRANCIS, P.C.

Structural Engineers
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On a regular basis, we plan to distribute these informational leaflets about crucial - but often ambiguous - structural engineering topics. With the knowledge of our featured subjects, our goal is to help our clients improve their profitability while reducing their liability. We suggest distributing a copy of our technical bulletins throughout your office and keeping them on hand for quick reference.

PRE-ENGINEERED METAL BUILDINGS

CONVENTIONAL STRUCTURAL STEEL BUILDINGS

Introduction:

The general conception that *pre-engineered metal buildings (PEMB's) are less expensive than conventional structural steel framed buildings* warrants discussion. Initially, PEMB's were used for agricultural structures, warehouses, and storage facilities; however, during the past 50 years the use of PEMB's to provide building shells has become extremely popular. The intent of this "Technical Bulletin" is to provide our clients with supplementary information on this topic so that they can effectively and factually discuss the pro's and con's of using PEMB's with project owners.

Discussion:

PEMB's are well suited for structures that do not have strict requirements regarding flexibility and durability. PEMB's are typically designed for structures with minimal gravity and lateral loads which do not possess any more strength than minimal requirements. Allowances for collateral loads are generally very small. The modern day metal building can be designed for any load requirements; however, their competitive edge disappears rapidly when structural requirements increase.

Limitations of Metal Buildings:

1. **Expansion** - Many buildings require additions to accommodate growth. PEMB's are not easy to add on to, unless the addition is an extension of the existing building in a direction parallel to the ridge.

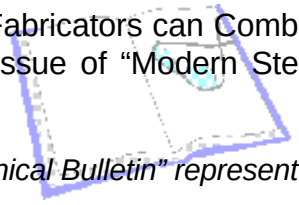
2. **Roof Top or Hanging Metal Units** - The roofs of PEMB's are typically framed with light gage cold-formed metal purlins. The purlins are not designed to support any additional equipment loads nor can they be easily strengthened. Hence, additional structure must be added to deal with mechanical loads.

3. **Durability and Future Value** - The metal siding and roofs of PEMB's fade quickly and are easily dented - contributing to unsightly conditions (seldom does one see a 20-year-old PEMB that visually looks similar to when it was built). Owners should be made aware of this possible decline in the future value of their investment.

4. **Buildouts** - Finishing construction of a PEMB is difficult. With exterior wall girts spaced at 5 to 7 feet apart, drywall cannot be directly attached without adding additional structure. If the wall needs to be insulated, then an additional wall is generally used. This exterior wall will decrease the leasable square footage. Also, columns are generally large and bulky, making them difficult to hide.

5. **Flexibility of Structure** - PEMB's are extremely flexible and deflections are much higher than those of conventional steel buildings. These large movements cause masonry veneers to crack and windows and doors to leak. If suspended ceilings are hung from the roof structure, then large differential deflections due to deflecting roof beams may be apparent.

For additional information on this topic, see the article titled "How Fabricators can Combat Metal Buildings" by Jeffrey S. Nawrocki, P.E. in the May 1997 issue of "Modern Steel Construction".



Please keep in mind that the items discussed in this issue of our "Technical Bulletin" represent a small part of this topic.

Call us! *We are available to conduct group seminars for your firm on any subject presented in our "Technical Bulletins." Use our expertise to your firm's advantage!*

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