







888-372-4266  
 ICON Building Systems  
 4340 I-10 West, Seguin TX 78155  
 Open Mon-Fri 8am to 6pm, Sat 8am to Noon  
 Se Habla Español

[log-in](#)

[Home](#) | [Instant Pricing](#) | [Photo Gallery](#) | [Accessories](#) | [General Guidelines](#) | [Structural Design](#) | [Specifications](#) | [Insulation](#) | [Overhead Doors](#)

Need help designing your building?  
 Call Charlene 888-798-8794 x508 to  
 get a quote right over the phone!



**LIVE HELP**  
 CLICK HERE FOR SUPPORT



## Design Practices

### 1. Introduction

Construction using a steel building system has gained acceptance as the preferred method for all types of low-rise building projects. Today, in the United States, the metal building industry accounts for over 65% of all construction in this category using the systems approach. The results are high quality, attractive buildings with higher reliability, flexibility, and lower life cycle costs than alternatives.

The building systems industry has gained its leadership position by constantly researching and developing technology to meet modern construction demands. The industry has developed structural systems designed to be compatible with ordinary construction materials such as masonry, glass and wood. Through research, this industry has been able to refine materials, manufacturing and construction techniques to gain the optimum results for in-place construction.

Throughout the history of the metal building industry, certain practices relating to the design, manufacture, sale and erection of a metal building have become traditional. These practices have delegated certain responsibilities to each of the parties involved in the sale of a metal building.

The objective of this Design Practices section is to provide general design information used by some building codes. Unfortunately, this information has not been consistent from one edition of a code to the next edition, much less among the different codes themselves. **More specific information may be obtained by contacting your local code enforcement or building official.**

### 2. Design Responsibility

If the End Customer hires a design professional for a construction project, it is the responsibility of the design professional to specify the design criteria for the metal building including all applicable design loads. If the End Customer does not retain a design professional, it is the responsibility of the End Customer to specify the design criteria for the metal building including all applicable design loads. It is MetalBuildingDepot.Com's responsibility to design the metal building to meet the specifications including the design criteria and design loads incorporated into the Order Documents. MetalBuildingDepot.Com is not responsible for making an independent determination of any local codes or any other requirements not part of the Order Documents.

MetalBuildingDepot.Com is responsible only for the structural design of the metal building it provides. MetalBuildingDepot.Com or MetalBuildingDepot.Com's engineer is not the Design Professional or Engineer of Record for the construction project. MetalBuildingDepot.Com is not responsible for the design of any components or materials not provided by MetalBuildingDepot.Com or their interface and connection with the metal building unless such design responsibility is specified in the Order Documents.

MetalBuildingDepot.Com does not investigate the influence of the metal building on existing building or structures. The End Customer assures that such buildings and structures are adequate to resist snowdrifts, wind loads or other conditions as a result of the presence of the metal building. When specified by the Order Documents, MetalBuildingDepot.Com is responsible for supplying adequate evidence of compliance with the specifications, design criteria, and design loads, and other specified information.

### 3. Building Codes

There are several national model building codes used in the United States, along with numerous state and city codes. Generally, the state and city codes are patterned after one of the national codes, possibly with some special local requirements. The national model codes include BOCA, SBC and UBC. ASCE 7 and the MBMA are not considered a building code because their content is limited to structural design criteria. On December 9, 1994, the International Code Council (ICC) was established as a nonprofit organization dedicated to create the single family of model building regulations, the International Codes, to promote unprecedented code uniformity throughout the country.

### 4. Building Use Classifications

Some building codes use a system of building use classifications, based on the nature of occupancy, for purposes of applying wind, snow and earthquake provisions. When buildings or other structures have multiple uses (occupancies), the category selected shall be based on the highest classification. If a code uses a use classification, the category must be listed on the Order Documents. The following definitions were taken from ASCE 7-98 and are provided for general reference only. Nature of Occupancy Category Buildings and other structures that represent a low I hazard to human life in the event of failure, including, but not limited to:

- Agricultural facilities
- Certain temporary facilities
- Minor storage facilities

All buildings and other structures except those II listed in Categories, I, III, and IV. Buildings and other structures that represent a III substantial hazard to human life in the event of failure including, but not limited to:

- Buildings and other structures where more than 300 people congregate in one area
- Buildings and other structures with day-care facilities with capacity greater than 150
- Buildings and other structures with elementary or secondary school facilities with capacity greater than 150
- Buildings and other structures with a capacity greater than 500 for colleges or adult education facilities

- Health-care facilities with a capacity of 50 or more resident patients but not having surgery or emergency treatment facilities.
- Jails and detention facilities.
- Power generating stations and other public utility facilities not included in Category IV
- Buildings and other structures containing sufficient quantities of toxic, explosive or other hazardous substances to be dangerous to the public if released including, but not limited to:
  - Petrochemical facilities
  - Fuel storage facilities
  - Manufacturing or storage facilities for hazardous chemicals
  - Manufacturing or storage facilities for explosives

Buildings and other structures that are equipped with IV secondary containment of toxic, explosive or other hazardous substances (including, but not limited to double wall tank, dike of sufficient size to contain a spill, or other means to contain a spill or a blast within the property boundary of the facility and prevent release of harmful quantities of contaminants to the air, soil ground water, or surface water) or atmosphere (where appropriate) shall be eligible for classification as a Category II structure. In hurricane prone regions, buildings and other structures that contain toxic, explosive or other hazardous substances and do not qualify as Category IV structures shall be eligible for classification as Category II structures for wind loads if these structures are operated in accordance with mandatory procedures that are acceptable to the authority having jurisdiction and which effectively diminish the effects of wind on critical structural elements or which alternatively protect against harmful releases during and after hurricanes Buildings and other structures designated as essential facilities included, but not limited to:

- Hospitals and other health-care facilities having surgery or emergency treatment facilities
- Fire, rescue, police stations and emergency vehicle garages.
- Designated earthquake, hurricane, or other emergency shelters
- Communications centers and other facilities required for emergency response.
- Power generating stations and other public utility facilities required in an emergency
- Ancillary structures (including, but not limited to communication towers, fuel storage tanks, cooling towers, electrical substation structures, fire water storage tanks or other structures housing or supporting water or other fire-suppression material or equipment) required for operation of Category IV structures during an emergency
- Aviation control towers, air-traffic control centers and emergency aircraft hangers
- Water storage facilities and pump structures required to maintain water pressure for fire suppression
- Buildings and structures having critical national defense functions

## 5. Definitions Of Loads

All MetalBuildingDepot.Com buildings are custom designed to meet the specific requirements of each project. Our engineers design each structure in accordance with the required Building Code and design loads. The following is a brief description of design criteria.

### Dead Load

The dead load is the weight of the building itself, and is comprised of the roof panels, trim, mastic, screws, purlins, eave struts, bolts and the structural frame.

### Collateral Load

Collateral loads are additional dead loads hung from the building, such as sprinkler systems; drop ceilings, HVAC equipment, lighting etc. The MBMA Low Rise Building Systems Manual recommends the following collateral loads:

- Sprinkler system - dry 1.5 PSF - wet 3
- Ceilings - Suspended Acoustical Fiber 1
- Gypsum Board - 1/2" 2 - 5/8" 3
- Lighting 0.1 to 1
- HVAC Ducts 1

### Roof Live Load

The roof live loads are produced (1) during maintenance by workers, equipment, and materials, and (2) during the life of the structure by movable objects such as planters and by people, but do not include wind, snow, seismic or dead loads. A clear distinction is made between "live" and "snow" loads. It is important that these two loads be treated separately because the probabilities of occurrence for snow loads are very different from those for roof live loads. Roof live load defined by the model codes is a reducible 20 pounds per square foot.

### Ground Snow Load

The maps in the building codes for snow are for ground snow load, based on a 50-year mean recurrence interval.

### Roof Snow Load

The roof snow load is almost always less than ground snow load based on the natural phenomenon that only a portion of the fallen snow would remain on the roof. Each building code has its own way of determining the roof snow load from the ground snow load.

### Snow Exposure Factor

Some codes use an exposure factor to account for variations in the wind blowing the snow off the roof of a building as a result of the surrounding terrain. The following factors were taken from ASCE 7- 93, and some editions of BOCA and SBC also use them. ASCE 7-95 and the 1996 MBMA use a more detailed variation of this factor. Roofs located in generally open terrain extending 0.6 one-half mile or more from the structure. Structures located in densely forested or sheltered 0.9 areas. All other structures 0.7

### Snow Thermal Factor

Some codes use a thermal factor to account for the roof snow melting as a result of the interior heat warming the roof. The following was taken from ASCE 7-98. Some editions of BOCA and SBC use essentially the same factors. A "structure kept just above freezing" would be a warehouse or manufacturing facility with a few space heaters installed. The "Unheated Structures" would be the same warehouse or manufacturing facility without any space heaters, or a building that has walls open to the exterior that are intended to remain open. Thermal condition\* Factor All structures except as indicated below 1.0 Structures kept just above freezing and others with 1.1 cold, ventilated roofs in which the thermal resistance between the ventilated space and the heated space exceeds 25°F·h·sq ft/BTU Unheated structures and structures



intentionally 1.2 kept below freezing.

*\*These conditions shall be representative of the anticipated conditions during winters for the life of the structure.*

#### Snow Drifts

In areas where the ground snow load is 5 PSF or greater, snow drifting caused by roof projections or multi-level roofs must be investigated by design. Drifts can also occur on separate, lower structures located within 20 feet of the new building. It is important, when applicable; to show all roof obstructions and lower adjacent structures within 20 feet of the new building on the order documents.

#### Wind Load

Almost all nationally recognized building codes in the United States, beginning in the early 1980's, have adopted some form of wind design procedure based on extensive research on low-rise buildings conducted at the University of Western Ontario. That research project began in 1976 and has continued to present.

#### Wind Exposure Factor

ANSI, ASCE-7, BOCA and the UBC currently use wind exposure factors. The exposure factor is to account for variations in the wind pressure on a building as a result of the surrounding terrain. The following definitions of exposures are taken from ASCE 7-98. The other codes have similar definitions.

##### **Exposure B.**

*Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the single-family dwellings or larger. Use of this exposure category shall be limited to those areas for which terrain representative of Exposure B prevails in the upwind direction for a distance of at least 1,500 feet or 10 times the height of the building or other structure, whichever is greater.*

##### **Exposure C.**

*Open terrain with scattered obstructions having heights generally less than 30 feet. This category includes flat open country, grasslands and shorelines in hurricane prone regions.*

##### **Exposure D.**

*Flat, unobstructed areas exposed to wind flowing over open water (excluding shorelines in hurricane prone regions) for a distance of at least one mile. Shorelines in Exposure D include inland waterways, the Great Lakes and coastal areas of California, Oregon, Washington and Alaska. This exposure shall apply only to those buildings and other structures exposed to the wind coming from over the water. Exposure D extends inland from the shoreline a distance of 1500 feet or 10 times the height of the building or structure - whichever is greater.*

#### Partition Load

In offices and other buildings where partitions will be erected, rearranged, or relocated, provisions must be made to support the actual weight of such partitions where the partitions occur, or for an equivalent uniform load, which may be assumed to be not less than 20 PSF. Provisions for partition weight must be made whether or not partitions are shown on the construction documents, unless the specified live load exceeds 80 PSF.

#### Seismic Load

When an earthquake occurs, vibrations are produced in the ground near the surface that creates inertia forces and movements within the building structure. The magnitude of this force generally increases with the dead load of the structure. Metal building systems, due to their low dead load, do not usually have their design governed by seismic forces. Post disaster investigations following earthquakes reveal that metal building systems perform far better than any other type of construction.

» [Setting the Standard](#) » [Steel Building Benefits](#) » [Benefits of DIY](#) » [Why Choose Us](#) » [Financing](#)

[Policy & Procedures](#)

[Customer Support](#)

[About Us](#)

[Builder Information](#)

[Employment Opportunities](#)

[Photo Gallery](#)

[Site Map](#)



We gladly accept



Copyright © 2003-2015 MetalBuildingDepot™. All Rights Reserved. [Privacy Policy](#)



888-372-4266  
 ICON Building Systems  
 4340 I-10 West, Seguin TX 78155  
 Open Mon-Fri 8am to 6pm, Sat 8am to Noon  
 Se Habla Español

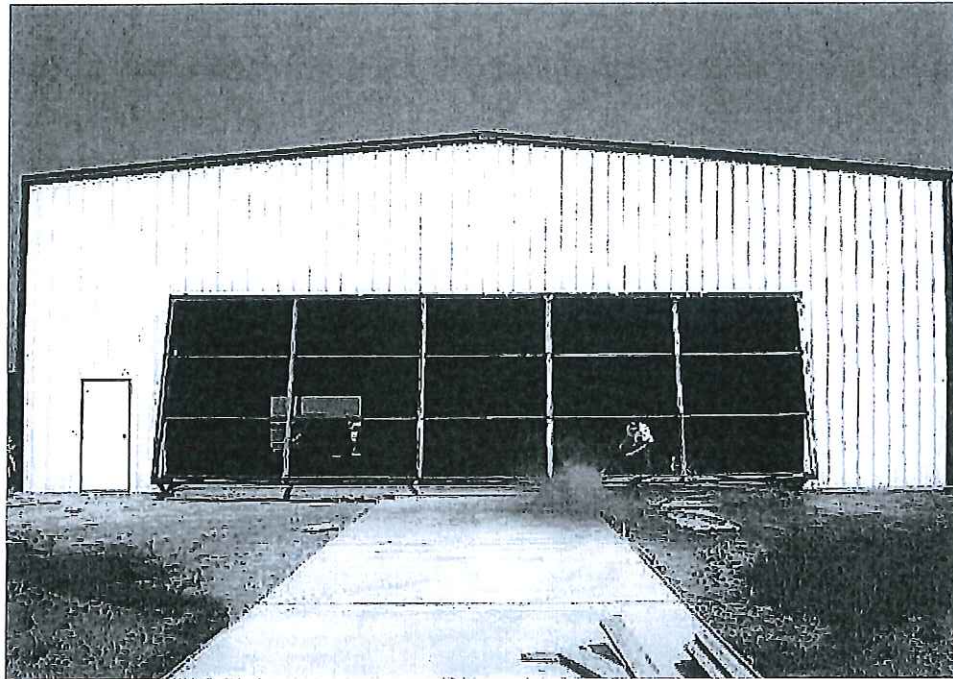
[log-in](#)

[Home](#) | [Instant Pricing](#) | [Photo Gallery](#) | [Accessories](#) | [General Guidelines](#) | [Structural Design](#) | [Specifications](#) | [Insulation](#) | [Overhead Doors](#)

Need a building quote right now?  
 Call Cristina 888-798-8794 x605 to  
 get an INSTANT quote by phone!



**LIVE HELP**  
 CLICK HERE FOR SUPPORT



## Building progression picture books

Our customers occasionally send in pictures of their building installation. See how they did it:

[30 x 60' building erected in California \(PDF\)](#)

[Steel building showing steel structure \(PDF\)](#)

[Two bay building with gutters and a 4/12 pitch roof \(PDF\)](#)

[Steel home with garage and stone facade \(PDF\)](#)

» [Setting the Standard](#) » [Steel Building Benefits](#) » [Benefits of DIY](#) » [Why Choose Us](#) » [Financing](#)

[Policy & Procedures](#)

[Customer Support](#)

[About Us](#)

[Builder  
Information](#)

[Employment Opportunities](#)

[Photo Gallery](#)

[Site Map](#)







888-372-4266  
 ICON Building Systems  
 4340 I-10 West, Seguin TX 78155  
 Open Mon-Fri 8am to 6pm, Sat 8am to Noon  
 Se Habla Español

[log-in](#)

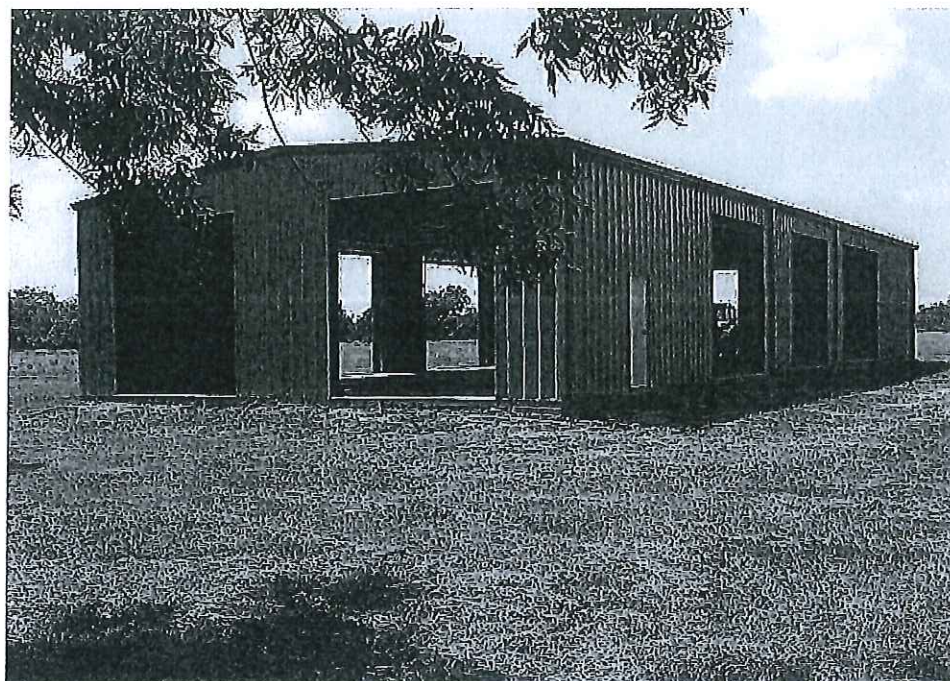
Need a building quote right now?  
 Call Cristina 888-798-8794 x505 to  
 get an INSTANT quote by phone!



**LIVE HELP**  
 CLICK HERE FOR SUPPORT



[Home](#) | [Instant Pricing](#) | [Photo Gallery](#) | [Accessories](#) | [General Guidelines](#) | [Structural Design](#) | [Specifications](#) | [Insulation](#) | [Overhead Doors](#)



## Building progression picture books

Our customers occasionally send in pictures of their building installation. See how they did it:

[30 x 60' building erected in California \(PDF\)](#)

[Steel building showing steel structure \(PDF\)](#)

[Two bay building with gutters and a 4/12 pitch roof \(PDF\)](#)

[Steel home with garage and stone facade \(PDF\)](#)

» [Setting the Standard](#) » [Steel Building Benefits](#) » [Benefits of DIY](#) » [Why Choose Us](#) » [Financing](#)

[Policy & Procedures](#)

[Customer Support](#)

[About Us](#)

[Builder  
Information](#)

[Employment Opportunities](#)

[Photo Gallery](#)

[Site Map](#)







888-372-4266  
 ICON Building Systems  
 4340 I-10 West, Seguin TX 78155  
 Open Mon-Fri 8am to 6pm, Sat 8am to Noon  
 Se Habla Español

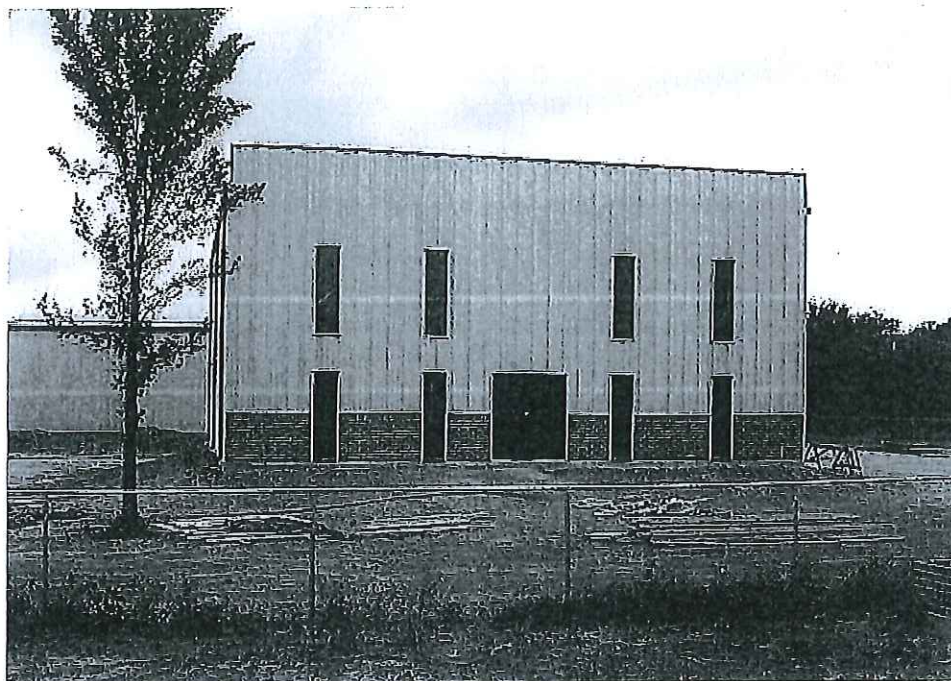
[log-in](#)

[Home](#) | [Instant Pricing](#) | [Photo Gallery](#) | [Accessories](#) | [General Guidelines](#) | [Structural Design](#) | [Specifications](#) | [Insulation](#) | [Overhead Doors](#)

Need a building quote right now?  
 Call Cristina 888-798-8794 x505 to  
 get an INSTANT quote by phone!



**LIVE HELP**  
 CLICK HERE FOR SUPPORT



## Building progression picture books

Our customers occasionally send in pictures of their building installation. See how they did it:

[30 x 60' building erected in California \(PDF\)](#)

[Steel building showing steel structure \(PDF\)](#)

[Two bay building with gutters and a 4/12 pitch roof \(PDF\)](#)

[Steel home with garage and stone facade \(PDF\)](#)

» [Setting the Standard](#) » [Steel Building Benefits](#) » [Benefits of DIY](#) » [Why Choose Us](#) » [Financing](#)

[Policy & Procedures](#)

[Customer Support](#)

[About Us](#)

[Builder  
Information](#)

[Employment Opportunities](#)

[Photo Gallery](#)

[Site Map](#)





888-372-4266  
**ICON Building Systems**  
 4340 I-10 West, Seguin TX 78155  
 Open Mon-Fri 8am to 6pm, Sat 8am to Noon  
*Se Habla Español*

[log-in](#)

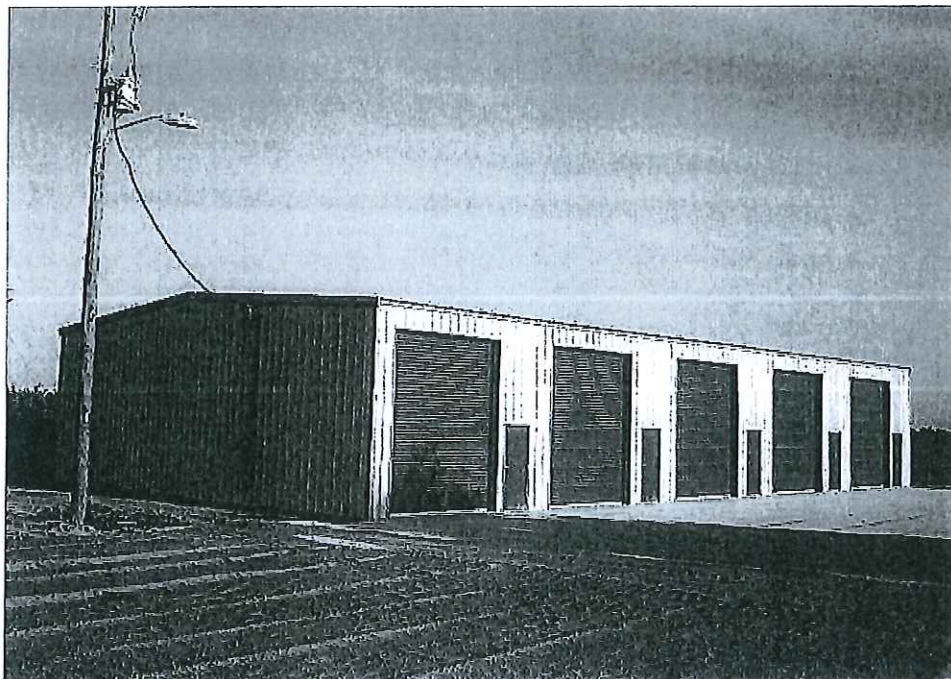
Need a building quote right now?  
 Call Cristina 888-798-8794 x505 to  
 get an **INSTANT** quote by phone!



**LIVE HELP**  
 CLICK HERE FOR SUPPORT



[Home](#) | [Instant Pricing](#) | [Photo Gallery](#) | [Accessories](#) | [General Guidelines](#) | [Structural Design](#) | [Specifications](#) | [Insulation](#) | [Overhead Doors](#)



## Building progression picture books

Our customers occasionally send in pictures of their building installation. See how they did it:

[30 x 60' building erected in California \(PDF\)](#)

[Steel building showing steel structure \(PDF\)](#)

[Two bay building with gutters and a 4/12 pitch roof \(PDF\)](#)

[Steel home with garage and stone facade \(PDF\)](#)

» [Setting the Standard](#) » [Steel Building Benefits](#) » [Benefits of DIY](#) » [Why Choose Us](#) » [Financing](#)

[Policy & Procedures](#)

[Customer Support](#)

[About Us](#)

[Builder  
Information](#)

[Employment Opportunities](#)

[Photo Gallery](#)

[Site Map](#)







888-372-4266  
 ICON Building Systems  
 4340 I-10 West, Seguin TX 78155  
 Open Mon-Fri 8am to 6pm, Sat 8am to Noon  
 Se Habla Español

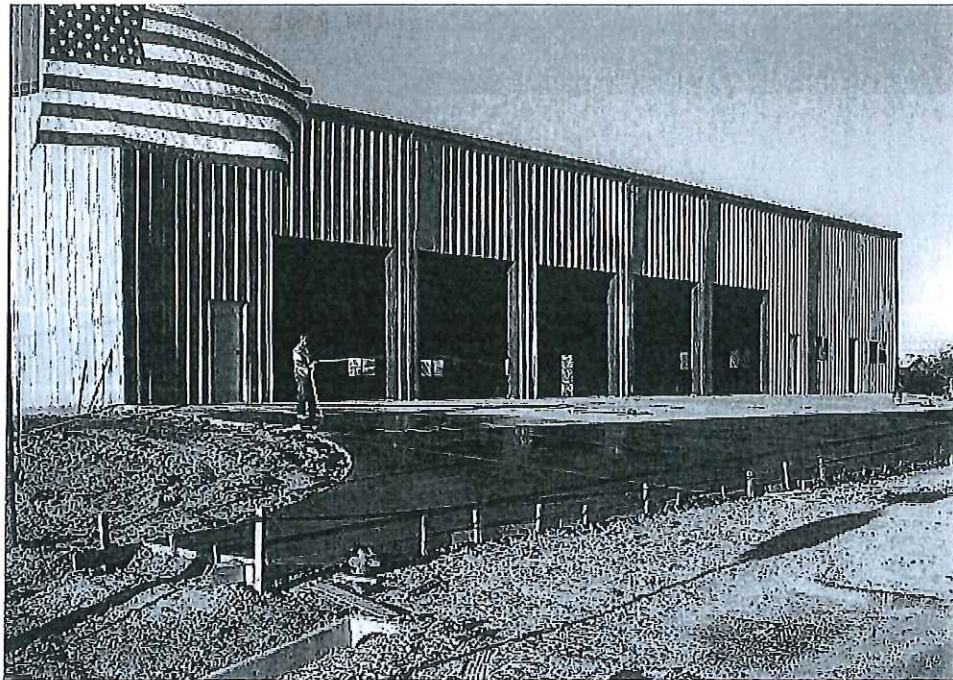
[log-in](#)

[Home](#) | [Instant Pricing](#) | [Photo Gallery](#) | [Accessories](#) | [General Guidelines](#) | [Structural Design](#) | [Specifications](#) | [Insulation](#) | [Overhead Doors](#)

Need a building quote right now?  
 Call Cristina 888-798-8794 x505 to  
 get an INSTANT quote by phone!



**LIVE HELP**  
 CLICK HERE FOR SUPPORT



## Building progression picture books

Our customers occasionally send in pictures of their building installation. See how they did it:

[30 x 60' building erected in California \(PDF\)](#)

[Steel building showing steel structure \(PDF\)](#)

[Two bay building with gutters and a 4/12 pitch roof \(PDF\)](#)

[Steel home with garage and stone facade \(PDF\)](#)

» [Setting the Standard](#) » [Steel Building Benefits](#) » [Benefits of DIY](#) » [Why Choose Us](#) » [Financing](#)

[Policy & Procedures](#)

[Customer Support](#)

[About Us](#)

[Builder  
Information](#)

[Employment Opportunities](#)

[Photo Gallery](#)

[Site Map](#)

