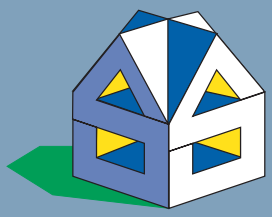
AN INTRODUCTION TO RESIDENTIAL STEEL FRAMING

GETTING INTO

A STEEL FRAME OF MIND

Homesteel



PREFACE

This publication is intended as a guide for home builders, developers, engineers and users of light gauge steel framing (LSF) in residential applications. LSF products are cold formed structural members for applications such as studs, purlins, rafters, joists and for use in such constructions as steel roof trusses and panelized wall assemblies.

The CSSBI would like to acknowledge the support and assistance provided by the American Iron and Steel Institute in the creation of this document. The growth of residential steel framing is spreading throughout North America and the AISI is a very active supporter of this effort. The CSSBI and the AISI cooperate on many issues of joint concern to everyone's benefit.

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RESIDENTIAL STEEL FRAMING

CONTENTS

CSSBI
Canadian Sheet Steel Building Institute

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AN INTRODUCTION TO RESIDENTIAL STEEL FRAMING

INTRODUCTION

For more than 150 years, steel has been used in the North American construction market. Today it remains one of the strongest, most durable and economically manufactured materials. While it has typically been associated with skyscrapers and bridges, steel is emerging as the material of choice for residential framing. Across Canada and the United States, builders, developers and homeowners are finding out about the many benefits that steel has to offer in the residential marketplace.

Although the name "steel" may conjure up images of a heavy or cumbersome material, the coated steel products used in residential framing are just the opposite. Cold formed sheet steel is a light weight, easy to handle, economical and high quality alternative to traditional wood framing materials. Among its other advantages, steel offers the builder a strong, dimensionally stable, easy to work with framing system.

Residential steel framing members were originally designed as a substitute for wood framing. However, they are now being manufactured in systems which reflect the superior strength and consistency of steel. The variety of available steel shapes, strengths and sizes has expanded beyond that of standard lumber, and this versatility offers the advantage of savings in both material cost and time while delivering a consistently high quality product.

Environmental and economic concerns have prompted the building industry to research alternative building materials and methods. This, in addition to its construction benefits and excellent recycling capabilities, is making steel framing a growing choice for residential construction. This follows the long time use of steel framing in commercial construction where steel has proven quality and performance records.

The first Homesteel project was built in Ancaster, Ontario. This home featured steel wall studs and floor joists in an otherwise traditional home.

WHY USE STEEL FRAMING?

The reasons why home builders are turning to steel framing members as replacements for wood are as varied as the homes they build. Here are some of the most significant benefits for both user groups, the builder and the homeowner, that give steel an edge over the competition.

Builder Benefits:

- Steel will not rot, shrink, swell, split, or warp and is non–combustible.
- Every steel stud is a good stud. There is no longer the need to sort through lifts of framing members to select suitable pieces. Steel framing is of consistent quality.
- Steel framing can be supplied to the exact lengths required thus eliminating much of the on–site cutting and most of the waste.
- Steel framing is a proven technology that is user friendly allowing for a smooth transition from other materials.
- Steel framing members are available in a variety of standard shapes and sizes in varying steel thicknesses to accommodate any structural requirements.
- Steel members weigh as much as 60% less than wood members; therefore, foundation and seismic loads can be reduced.
- Steel framing members are manufactured with pre–punched holes for running piping and electrical wiring, minimizing preparation work for other trades.
- Steel framing accommodates all types of commonly used finishing materials.
- The inherent strength of steel can be utilized to reduce the number of framing members required. It is not necessary to replace steel for wood stick–for–stick.
- Steel is competitively priced and consistent in quality. Steel prices are more stable than wood and steel supplies have historically been more readily available.
- Steel framing does not dry out and shrink over time, thus the costly call backs to repair warped walls, nail–pops and squeaking floors are eliminated.
- Building waste and pilferage from the construction site is greatly reduced.
- Steel members can easily be prefabricated at the construction site, at a central assembly point near the site or can be assembled in panels at a factory. Steel gives a flexible response to nearly every home builder requirement.
- No heavy equipment is necessary when light gauge steel framing is used.

"Steel framing was cheaper to install and featured many labour saving components. This product is an environmentally sound alternative to wood. It's the product that will lead the residential construction industry into the next century."

John Bruzzese, President
Armour Steel Framing Systems
Hamilton, Ontario

"In working with steel framing the major differences we found as a builder were the use of light weight materials, the various dimensional qualities, the use of screw guns and cut off saws in lieu of hammers and circular saws."

Wayne Barry, President
Metallic Homes Inc.
St. Albert, Alberta

"As a builder of quality homes, it is important to us to ensure that we are providing an excellent product at a competitive price. Our experience with the Ancaster Homesteel project has shown us that steel framing has a place in residential construction and we plan to build more steel framed houses in the future."

Robert Cooper, V.P. & G.M.
Alterra Developments Ltd.
Toronto, Ontario

"I know this (steel framing) goes against the great Canadian tradition of wood frame houses, but we are convinced it's the house of the future."

Joe Vella, V.P.
Fifthshire Homes Ltd.
Concord, Ontario

"Our commitment to LSF was brought about by the vagaries of lumber quality, supply and pricing. The ability of the manufacturers to produce LSF members to required lengths, tolerances and structural quality, greatly reduces the waste factor in the cost equation, in addition the decreased risk of drywall problems due to the stability of LSF components further enhances the desirability of using steel."

Peter J. Laughlin
Wessex Construction Management
Shawnigan Lake, B.C.

- Workers can be easily trained to work with steel framing elements. Assembly details are easy for workers to quickly pick up.
- Steel framing has been used for decades in commercial and condominium construction. It is a tried and well proven technology now available to home builders as an alternative to wood framing.
- Job–site scrap has resale value.

Homeowner Benefits:

- Steel's inherent strength and non–combustible qualities enable a steel framed house to resist such devastating events as fires, earthquakes, and hurricanes. Homes can be designed to meet the highest seismic and wind load specifications in any part of the country.

Steel can accommodate distinctive architectural details.

- Because of its strength, steel can span greater distances offering larger open spaces and increased design flexibility without requiring intermediate columns or loadbearing walls.
- Remodeling can be easily accomplished. Non– loadbearing walls can easily be removed, altered and relocated.
- Steel framing does not need to be treated for termites. It is free of resin adhesives and other chemicals used to treat wood framing products.
- Steel framing can be used for every home style from traditional to contemporary to ultra–modern and from low cost to luxury. Steel framed homes can be found in every climate.
- Steel framed walls are straight and remain that way. There is no shrinkage to cause nail–pops and squeaking floors.

Environmental Benefits:

- All steel products are 100% recyclable. The overall recycling rate of steel products in North America is 66%; the highest rate of any material.
- Steel products can be recycled repeatedly without degradation or loss of properties.
- The steel industry is the single largest recycler in North America because recycled steel is an integral ingredient in steel production.

The NAHB Resource Conservation House in Bowie, Maryland features steel framing.

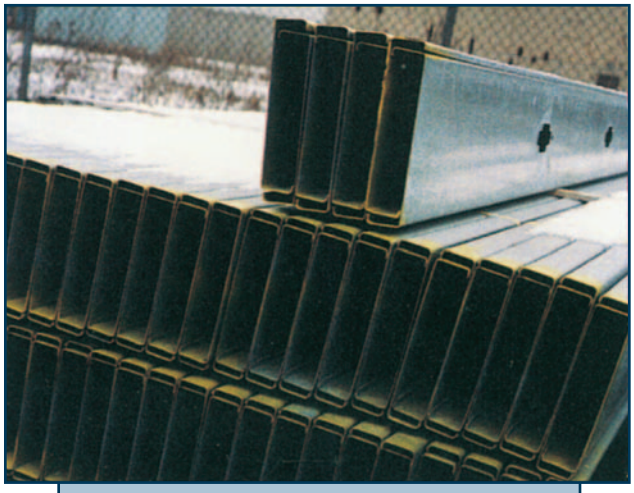
- During the last decade, more than 1 trillion pounds of steel scrap have been recycled, keeping a valuable commodity out of the country's landfill sites.
- Magnetic separation makes steel the easiest and most economical material to remove from the solid waste stream.
- The amount of energy needed to produce a ton of steel has been reduced by 34% since 1972 and continues to decrease.

MANUFACTURING AND DESIGN

Steel framing members are manufactured by a cold forming process in which strips of coated sheet steel are put through a series of roll forming dies which shape the sheet into the

desired profile, usually a "C" shape. The thickness of the sheet can be varied to meet the structural requirements and the length is cut precisely to order. The manufacturing process automatically punches regularly spaced holes into the centre of the section to accommodate the installation of bridging and electrical or other services.

The basis of cold formed steel design stems from the shape of the cross–section. A flat sheet of thin steel is not very strong, but when this sheet is formed into a "C" section, the bends act as stiffeners and increases the strength of the sheet many times over. Since most of the strength and stiffness of the section depends on the shape, not the thickness, strength–to–weight ratios are very favourable.



The most common shape is the "C" section.

The design of all cold formed steel structural products in Canada is covered by the National Building Code of Canada (NBCC) where the CSA Standard S136 "Cold Formed Steel Structural Members" is referenced. The design of these structural members is well developed over many years of research and development.

PRODUCT STANDARDS

Canadian manufacturers of light gauge steel framing follow a number of standards to ensure the quality of the components they produce meets the building code requirements. The standard used to specify these requirements is the CGSB Standard CAN/CGSB–7.1 "Cold Formed Steel Framing Components". This specifies minimum dimensions as well as establishing material and structural requirements for non–loadbearing, wind loadbearing and axial loadbearing members. For residential applications, the NBCC also specifies other specific requirements that must be met.

MATERIALS

The coated sheet steel used in the manufacture of steel studs and joists must meet very specific material standards. Most commonly, ASTM A653 standard specification for structural quality cold rolled sheet (replacing ASTM A446) is used to ensure the sheet steel is suitable for structural applications.

Steel is available in many different thicknesses and strength levels. The common design thicknesses are 0.018, 0.033, 0.036, 0.044, 0.048, 0.060, 0.075, and 0.105 inches (exclusive of any metallic coatings). It is important to specify sheet thickness by the decimal thickness to guarantee a minimum thickness of delivered product.

The sheet steel can be supplied in different strength levels to meet the structural requirements of the project. In general, for loadbearing product it is common to use material with a yield strength of 33 ksi for thicknesses up to 0.048 inches. For material in thicknesses 0.060 inches and greater, a 50 ksi yield strength material is common.

The material is also available with a number of different metallic coats needed for corrosion protection. A discussion on corrosion resistance is presented in a later section.

The manufacturer of the steel framing products will specify in their product literature the thicknesses and material strengths on which their load tables are based.

STEEL FRAMING COMPONENTS

There is a cold formed steel framing component for virtually any application. This variety allows for the simplification of the framing system while providing maximum structural efficiency, design flexibility and ease of installation.

Construction elements of a framed house are divided into three main assemblies: floors, walls and roofs. While these assemblies are often consistent with wood framed construction, some steel assemblies may also involve new and innovative framing systems.

The steel component known as the structural "C" is the predominant shape. The greater strength of steel can offer wider spacing between members and longer spans, a feature that makes for increased design flexibility as well as decreasing material and labour costs. Steel members can easily be spaced at 24 inches on centre.

Floors

Generally, builders opt for joist depths ranging from 6 to 12 inches with a steel thickness from 0.034 to 0.101 inches. Instead of using lapped joists on multiple span conditions, a single length of joist can be used to span continuously. However, a lap in the joist can be helpful in accommodating the deviations in the concrete or masonry foundation walls and for transportation.

Steel floor joists are easily installed and can span continuously across supports.

Floor joists can be supplied with knock–outs pre–punched into the webs at regular intervals. This will accommodate the installation of electrical and plumbing services.

Another advantage of the range of steel joist thicknesses and depths is in the flexibility it provides for the orientation of the joist spans. It is possible to increase the joist thickness to span the long length of a room to open up the area between the joist to run the HVAC ducts. This can add to the head room in basements without significant cost.

Walls

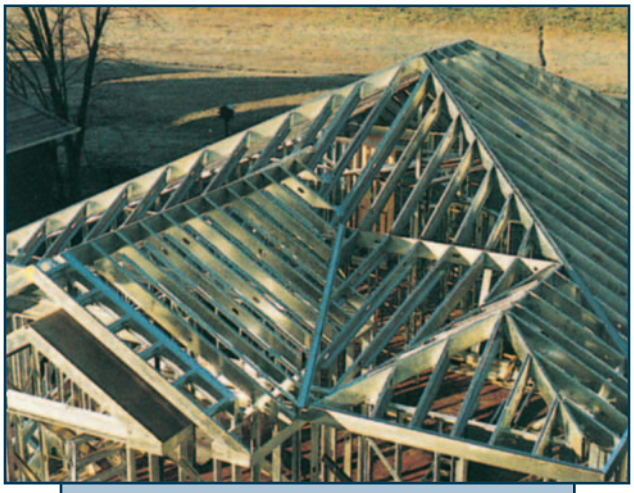
There are two basic types of steel studs: structural studs for interior and exterior loadbearing walls, and drywall studs for non– loadbearing interior partitions. The structural "C" studs used in the wall construction range in size from 2–1/2 to 8 inches and in thicknesses from 0.033 to 0.071 inches. The drywall studs are available in sizes from 1–5/8 to 6 inches and have thicknesses from 0.018 to 0.034 inches.

Steel stud walls can be stick-built or panelized

Although 3–5/8 and 6 inch walls are common in stick–built residential construction, wall thickness can be varied to meet the structural and insulation requirements of the building. Exterior rigid insulation is applied to the walls to minimize thermal bridging and comply with building code requirements.

Roofs

The broad range of available sizes and thicknesses allow steel framing to be used in virtually any roof system, from the simplest shed roof to the most complex hip and valley construction. Trusses can be built on–site or off– site in truss plants, in complete or sectioned assemblies.



Roof framing can include steel trusses or rafters.

Other Applications

It is easiest to consider the substitution of wood framing with steel framing because the two systems are essential interchangeable. It is also possible to use steel in many of the other components of a house, for example:

- The concrete foundation can be replaced with an insulated steel framed wall system.
- The asphalt shingles can be replaced with steel roof tiles or steel roof cladding systems.
- The traditional floor construction using joists and sheathing can be replaced with a composite steel and concrete floor system.
- Sheet steel can be used as the sheathing material on exterior walls.
- Mouldings can be formed out of prefinished sheet steel material.

All of these systems have been used in Canada and illustrate the innovations possible with steel while still complying with current building code requirements.

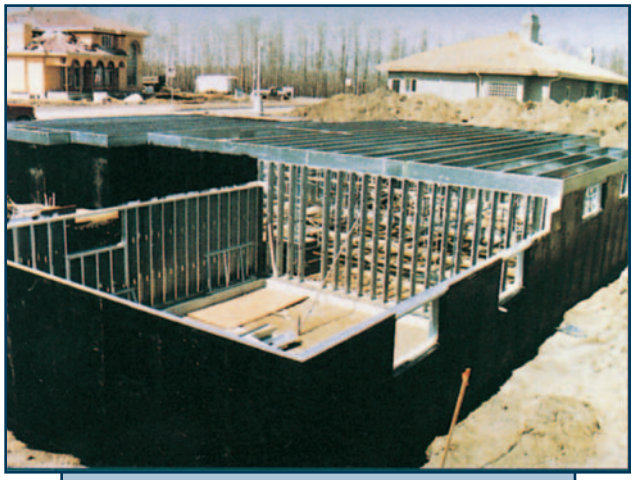
FRAMING METHODS

There are three basic residential steel framing assembly methods:

- Stick built construction
- Panelized systems
- Pre–engineered systems

Stick Built Construction

Stick built construction is virtually the same in wood and steel. This framing method has actually gone through a transformation incorporating many of the techniques used in panelized construction. The steel materials are delivered to the job site in stock lengths or in some cases cut to length. The layout and assembly of steel framing is the same as for lumber, except components are screwed together rather than nailed. Steel joists can be ordered in long lengths to span the full width of the home. This expedites the framing process and eliminates lap joints. Sheathing and finish materials are fastened with screws or pneumatic pins.



Basements can also be framed out of steel.

The Ancaster Homesteel Project utilized stick-built construction methods.

Panelized Systems

Panelization consists of a system for prefabricating walls, floors and/or roof components into sections. This method of construction is most efficient where there is a repetition of panel types and dimensions. Panels can be made in the shop or in the field. Steel studs and joists are ordered cut to length for most panel work, placed into a jig and fastened by either screws or welding. The exterior sheathing, or in some cases the complete exterior finish, is applied to the panel prior to erection.

Shop panelization can offer several significant advantages to the builder. The panel shop provides a controlled environment where work can proceed regardless of the weather conditions. Application of sheathing and finish systems is easier and faster with the panels in a horizontal position. The panels are then transported from the panel shop to the job site.

A major benefit of panelization is the speed of erection. A job can usually be framed in about one quarter of the time required to stick–build. When you consider that the exterior finish system may also be part of the panel, the overall time savings may be even greater.

This project in Ottawa was built up from prefabricated panel assemblies.

Pre–engineered Systems

With steel's high strength and design flexibility, innovative systems are possible which are not possible using other materials. Engineered systems may space the primary load carrying members more the 24 inches on centre, sometimes up to 8 feet. These systems use either secondary horizontal members to distribute wind loads to the columns or lighter weight steel in–fill studs between the columns. Furring channels used to support sheathing materials also provide a break in the heat flow path to the exterior, which increases thermal efficiency.

Many of the pre–engineered systems provide framing members which are pre–cut to length with pre–drilled holes for bolts or screws. Most of the fabrication labour is done by the supplier, allowing a home to be framed in as little as one day.

JOINING AND FASTENING

Steel framing procedures are much the same as conventional framing, using similar tools, but with different attachments. The main tools used in steel framing are tin snips, a screw gun, nibblers and a circular or chop saw. Construction workers who know how to use a power drill with a screwdriver attachment will have no trouble with steel framing assembly. Circular or chop saws are used for cutting steel by substituting abrasive wheels for wood cutting blades. It is as simple as that.

Self drilling screws are the most common fastener used in steel framing. These fasteners can be much more durable

Screwing is the most common means of connecting steel framing

than nails and can resist forces more effectively. It is recommended that zinc plated or phosphate coated screws be used on exposed exterior surfaces. A wide variety of self–drilling and self–tapping fasteners are available from local construction material suppliers. Make sure that the proper screw is selected for the job.

A question often raised by trim carpenters is how to attach interior trims and moulding to the steel frame. There are many different methods to accomplish this easily. Around windows and doors, a wood trimmer piece can be framed into the rough opening. This trimmer simplifies the installation of the window or door and provides a wooden member to fasten trim pieces to. For baseboards, there are finishing screws available that act the same as finishing nails. These screws have a small head that automatically countersink, ready to be finished.

Chop saws cut members to length.

Homeowners will also ask how they can hang a picture on a steel stud. In the majority of cases, the desired location for a picture never seems to line up with the location of a stud (true in any type of construction). When this happens, the picture is hung on the drywall using some type of common toggle bolt or expansion anchor. When it is necessary to fasten to a steel stud, it is simple to drill into the stud and install a screw the same as in wood construction.

CORROSION PROTECTION

Everyone knows that steel left unprotected in the environment will rust. This perceived drawback to steel has been addressed many years ago with the introduction of galvanizing. Galvanizing is the coating of the steel sheet with a layer of zinc. More recently, another coating system that uses an aluminum–zinc alloy coat (tradename Galvalume) has been introduced to the construction market.

The metallic coating (i.e. zinc, or aluminum–zinc alloy) has a much lower corrosion rate than uncoated steel and protects the steel from the environment. The metallic coating will also provide sacrificial protection to the steel.

Metallic coated steel is designed not to rust while on the construction site, during construction, or after construction. Corrosion is inhibited first by the coating acting as a protective barrier on the steel surface. This barrier protection does not allow moisture to contact the steel: without moisture there is no rusting.

Metallic coatings also protect the steel through sacrificial action. If scratched or dented, the metallic coating will continue to protect the exposed steel by sacrificial action. The importance of the metallic coating to the service life of the sheet steel is a key design criteria. Zinc or aluminum–zinc alloy coatings are available in a range of coating weights to suit different applications. The most common coating specifications for residential steel studs are G90 galvanized or AZ150 Galvalume.

THERMAL PERFORMANCE

In the colder climates of Canada and the northern United States, providing the appropriate thermal resistance for a building is an important design consideration. The following points should be kept in mind.

- Thermal bridging can be controlled by the addition of rigid insulated sheathing on the cold side of the stud. This acts as a thermal break which has been shown to provide increased thermal resistance greater than just the added insulation R–value.

- You can use the same types of insulation products for both wood and steel framing (e.g. glass fibre, mineral wool, cellulose fibre, foams, etc.). It is important to realize that a wood 2x4 is rectangular in shape, and when spaced 16" on centres, the insulating batts need to be roughly 14 1/4" wide to fill the cavity. However, because steel framing uses "C" sections, 16" wide batts are used to fill the wall cavity. This results in a greater percentage of the wall being insulated.

- It is expected that the National Energy Code for Housing (NECH) will be completed and referenced in the 1995 National Building Code of Canada. The NECH will stipulate targets for thermal performance of housing. Steel framing methods will be included in this new code.

The insulation manufacturers should be consulted to answer specific questions about using their products in a residential steel framed building.

Insulating rigid sheathing is an important part of the building envelope.

FIRE & ACOUSTIC PERFORMANCE

The questions about fire resistance and acoustical ratings are normally not an important design criteria for single unit residential buildings. However, for multiple unit structures, the code requires fire resistance ratings and minimum STC ratings for party walls. A research project was recently completed on the fire performance and acoustical ratings of many loadbearing and non–loadbearing wall assemblies, made from both wood and steel framing with different combinations of drywall and insulation. The results of this work shows the advantages of steel in both fire and acoustic performance. These results will be published in the Appendix to the 1995 National Building Code of Canada.

PROFESSIONAL INVOLVEMENT

The design and construction of single family homes in Canada is covered by Part 9 of the National Building Code of Canada. For most houses it is possible to obtain a building permit without the involvement of a professional engineer or architect. This is possible because the building code provides span tables and other rules for the construction of wood framed houses. However, if a builder wants to use steel framing for the same house, the building code requires that the structure be engineered.

The need for professional involvement in steel framed residential buildings is an important consideration that can affect the success of the project.

Typically, a builder or developer will have house plans drawn up by an architect based on wood framing. These drawings are then given to a structural engineer who is retained to convert the design to steel framing. The engineer will size the members, design the connections, bracing and other details needed to build the house in steel. The engineer will then create shop drawings which show the details needed to build the house according to the design. These drawings are fixed with the engineer's stamp and are included as part of the submission for the building permit.

There are some important aspects of this process that should be considered to ensure a successful transition for wood to steel.

- There are many structural engineers who are very experienced. When selecting an engineer, review their previous work in residential buildings. The engineering, if overly conservative, can put an extra burden on the cost of the house. However, an engineer with experience can

often recommend changes that will create a more cost effective design.

- The amount of detail shown on the shop drawings will depend in part on the experience of the framing contractor hired for the job. The engineer should interact with the framing crew to make sure that the house is built according to the design. If the engineer has worked with the framer before and knows that the framer has experience, there is less need for extensive details on the shop drawings. The opposite of this can also be true.
- It will help the project if the engineer and the framer get together before construction to review the plans. They should agree that the details created are practical and that the framer understands what must be done. This prior review is an important communication process.
- At the present stage in the growth of this market for residential steel framing, it is typical for a prospective builder to take plans created for wood framing and convert to steel stick–for–stick. While this is very easily accomplished, it does not recognize the inherent benefits of steel. There are many innovative ways to use steel at almost no cost penalty. An engineer can help in this regard.
- One of the real cost advantages for steel can be achieved through panelization. For multiple projects that can be designed with some standard wall or roof sections, it can be worthwhile to set up a fixture to panelize these assemblies. This will increase productivity and reduce construction time dramatically. This is another area where an engineer can help create a design to incorporate these cost saving features.

The CSSBI is working within the building code process to make it possible to design a house using steel framing the same way as a wood framed house, without requiring any professional involvement. Until such time, the skills of the engineers, architects and other professionals should be used to full advantage.

ADDITIONAL INFORMATION

Additional information about lightweight steel framing systems is available from the CSSBI, the AISI and the LSF manufacturers. Contact the CSSBI for a list of current publications and the phone numbers of the LSF manufacturers in your area.

Canadian Sheet Steel Building Institute
652 Bishop St. N., Unit 2A
Cambridge, Ontario, Canada N3H 4V6
Telephone (519) 650–1285
Fax (519) 650–8081

The American Iron and Steel Institute also has information available on residential steel framing. You can call the Steel Home Hotline at 1–800–79–STEEL, or write to AISI at:

American Iron and Steel Institute
1101 17th Street, N.W.
Suite 1300
Washington, D.C., U.S.A. 20036–4700

Ancaster Homesteel Project
Alterra Developments Ltd.
Ancaster, Ontario

The Ancaster Homesteel project was a cooperative effort between the CSSBI members, representing the steel framing manufacturers supplying the job, the local steel industry and Alterra Developments. This 2615 sq.ft. house used about 6 1/2 tons of steel made up of 16 to 20 gauge load bearing studs and 25 gauge non–loadbearing studs. Floor joists were 8" deep 18 gauge. All of the steel was galvanized.

The purpose of this industry project was to illustrate to the residential home builders that steel is a viable alternative to wood framing. This house was built in cooperation with Alterra Developments who are a well respected developer in the area. The house was designed to replace stick–for–stick the wood framing in the walls and floor with steel. Everything else about the house was kept the same as in wood frame construction to show that building with steel did not mean totally new ways of construction.

HOMESTEEL

Nerling Residence
Edmonton, Alberta

This project was the first "complete" metal home constructed in Canada. The 2600 sq.ft. house was one–and–a–half stories with a large solarium. The client presented the desired layout and gave permission to use steel in all possible aspects. In the end the only wood in the house was the roof sheathing. This home featured many innovative construction concepts such as steel framed basement walls, composite concrete/steel floor system with in– floor hot water heating system, sheet metal sheathing on the basement and exterior walls, plus a metal roof system.

The first all–metal home completed in Canada allowed the designers to "push residential construction to the limit".

HOMESTEEL

Fifthshire Homes Ltd.
Concord, Ontario

The R–2000 program in Canada has built a reputation as providing quality homes that meet exacting standards covering virtually all aspects of construction including high levels of insulation, mechanical ventilation, energy– efficient windows, and high efficiency heating. The first steel R–2000 home in Canada has been built in Concord, Ontario (just north of Toronto) by Fifthshire Homes.

All of the framing members were steel, including the roof framing. To maintain the thermal and air–tightness requirements of the R–2000 program, the wall assemblies incorporated a foamed–in–place Icynene insulation. Air leakage tests after construction substantiated the air tightness achieved.

HOMESTEEL

Bruzzese Residence
Hamilton, Ontario

As the owner of a company involved in the residential steel framing business, John Bruzzese had no qualms about building his new 4,000 sq.ft. home out of steel. This residence in Hamilton, Ontario utilizes standard steel framing except for the wooden roof trusses. The walls were prefabricated into panels, shipped to the site and erected.

The design of this home emphasizes the clear spans possible using steel. The basement has an open space 40' by 56' and the main floor family room is 20' by 21'. Most rooms have a 9' ceiling and the entrance foyer is a full two storeys. For added family enjoyment, there is an indoor swimming pool and hot tub.

HOMESTEEL

Home by Inspiration
Burlington, Ontario

This home in Burlington, Ontario was the second by this builder following a good experience with their first steel framed house. The project is a 2200 sq.ft. two story traditional single family unit. The advantages of steel framing have been used to create cathedral ceilings and an open concept. The framing uses standard 3 5/8" loadbearing studs for most applications except some 6" interior loadbearing members and 10" members for the stair framing. The roof was framed using steel rafters.

The framer for this project recognized some of the advantages of using steel framing: less scrap, recyclable, less cutting and less shrinkage. The applications for steel framing in this project have extended to the framing of interior handrails, backyard deck and garden shed.

HOMESTEEL

Wessex Construction Management Duncan, B.C.

HOMESTEEL

The first of five lots designated for load bearing steel framed houses is completed and sold in the Glenora district of Duncan, British Columbia. Owner and construction manager, Peter Laughlin is delighted with the first steel house framing results.

Laughlin's initiative pioneering residential steel framing has created an opportunity to build an additional 18 unit patio home development in nearby Mill Bay. The owner, framers, finishers, mechanical and electrical trades are convinced steel framing has a bright future in the residential market.

Minto Homes Ottawa, Ontario

HOMESTEEL

In the two model homes shown, steel was used for floor joists, exterior walls and interior partitions. As a result, steel will now be used for all interior non–loadbearing walls in this development.