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Everyday Questions About

STRAN-STEEL

FIRE - SAFE

FRAMING

Answered Briefly



STRAN-STEEL CORPORATION

6100 MCGRAW AVENUE
DETROIT » MICHIGAN

Foreword

MANY of the critics of the Modern Homes group at the 1933 Century of Progress in Chicago were kind enough to say that the Stran-Steel house was the outstanding exhibit of the group. During and after the exhibit inquiries for detailed information on Stran-Steel framing poured in from all over the world.

In an endeavor to lighten the task of handling this tremendous volume of correspondence, various pieces of printed matter were prepared, including this "*Questions and Answers*" booklet. The demand for this booklet persisted even after much more detailed booklets were available.

Answers to the fundamental question: "How does the use of Stran-Steel framing prevent plaster cracks?", and others of equal interest, will be found herein. Perhaps the answers to some of your own individual problems are included.

We hope that you will find this booklet of value, if only because it may serve to better acquaint you with Stran-Steel framing, a product which, we believe, constitutes a basic contribution to the building industry.

Carl A. Strand, *President*

General Questions

1. *Why is it desirable to substitute steel framing for wood?*

Steel is stronger, more uniform, more resistant to fire, rot, termite and rodent damage than wood, and will not shrink or warp.

2. *Is the idea of steel framing for light load bearing structures new?*

No. For more than twenty-five years experiments have been conducted and "systems" of steel framing for light load bearing structures have been tried experimentally and offered for sale.

3. *Have the so-called "systems" of steel framing produced in the past met with any degree of public acceptance?*

No. While they all offered the well-known advantages of steel, each introduced one or more basic difficulties which kept it in the experimental, novelty class, and prevented it from enjoying universal acceptance.

4. *What were some of the "basic difficulties" which prevented these "systems" from winning widespread acceptance?*

One was the *weight* of the members. This factor made them costly to handle and erect, and expensive to ship. Another difficulty was that their erection depended upon structural steel workers, welders, and other classes of labor not universally available and not, as a rule, familiar with small building construction. A third basic difficulty was that they depended upon special clips or "gadgets" to attach collateral material. These special attachments could only be secured from the manufacturer, were relatively expensive, slow to attach, and were usually ineffective in firmly securing the collateral materials to the frame.

5. *Does Stran-Steel avoid these difficulties?*

Yes. It is rolled from coils of round edged, light gauge, strip steel and its great strength is a function of its shape rather than its weight or structural area. Also, it is erected by carpenters, a class of labor universally available, or by anyone familiar with standard building practice. Further, all collateral materials are *nailed directly to the steel* using 6d common to 10d box nails, such as are sold at any hardware store.

6. *How is it possible to nail to Stran-Steel?*

The main members are made in two sections rigidly attached to each other, yet with a laterally curved nailing space between. The nails, being of lower

temper than the Stran-Steel members, are deflected when driven into this space and held by the clinching action of the curved nailing groove. (Patented in U. S. A. and all foreign countries.)

7. *Can nails be pulled out of Stran-Steel?*

Yes. They hold with upwards of twenty-five per cent more grip than in wood, yet may be pulled with the ordinary claw hammer.

8. *What tools are used to erect Stran-Steel?*

Stran-Steel is erected in just the same manner as wood framing, entirely in accord with the traditional practice of carpenters. The same tools, for the most part, are used as in the case of wood framing. To the tools found in every carpenter's kit, convenience suggests the addition of a few extra hack saw blades, a hand shear somewhat heavier than the ordinary tin snips, and a No. 7 Whitney metal punch with three sizes of dies, as supplied by most hardware stores. The dies should be for punching holes for nails ($\frac{1}{4}$ "), and for $\frac{1}{4}$ " and $\frac{3}{8}$ " bolts. A $\frac{5}{8}$ " drill for hand brace is sometimes necessary for anchor bolt holes at the foundation plate.

9. *How much cutting and punching of Stran-Steel is required on the job?*

Very little. A wide range of standard lengths and the adjustable features of the connections practically eliminate cutting. Some mitering of channel plate is customary and some punching or drilling of additional holes is occasionally required. However, nearly all attachment holes are pre-punched at the factory and main members are pre-punched with large holes for wiring and conduit.

10. *To what type of structures is Stran-Steel framing adapted?*

Stran-Steel framing is particularly adapted for use in any light load bearing structure such as houses, shops, small apartments, service stations, barracks, etc. In structures of this type it is used with all the convenience of wood but brings to the structures all the enduring qualities of steel.

11. *Is Stran-Steel framing adapted to partitions?*

Yes. Stran-Steel is particularly well suited to partition work. Where partitions carry hot air ducts, the standard $3\frac{5}{8}$ " stud is used. Where nothing larger than gas, water or steam pipes and wiring are enclosed, an economy is effected by using the $2\frac{1}{16}$ " narrow stud. Wall board or lath are nailed to the studs. If the partition is subsequently removed, the Stran-Steel framing is one hundred per cent salvable. The rigidity of Stran-Steel in partition work is one of its outstanding features. No bracing is required to hold the partition in alignment during erection or plastering, or while plaster is drying. Stran-Steel framed partitions may be plastered on one or both sides simultaneously. No fussy, laborious wiring of

grounds is required; they are *nailed* to the Stran-Steel. Ample strength at the picture mould is attained; the application of mould stiffens Stran-Steel framed partitions instead of weakening them.

Stran-Steel framing eliminates plastering troubles which always attend the use of flimsy partition-framing materials. Stran-Steel partitions are rigid and strong and protect plaster against the slamming of heavy doors or the deflecting of partitions.

Framing a partition of Stran-Steel is rapid and permits rapid completion of plastering and finish. Piping is accessible; furring and casing are minimized. Cheaper partitions may be built but the slight additional cost of Stran-Steel framed partitions constitutes an economy throughout the life of the structure.

12. *Does Stran-Steel find any uses in connection with structural steel work?*

Very important economies result from the use of Stran-Steel in connection with structural steel columns and trusses. Stran-Steel may be used effectively in combination with structural steel as roof purlins and as girts supporting corrugated metal or other exterior sheet-type coverings for structural steel frames. Recommendations by competent engineers will be given on any specific uses of this nature for Stran-Steel.

Prospective Home Owners Ask

1. *What is meant by the term "Modern Home"?*

Many contributions to beauty, sanitation, and convenience are offered to the home builder today, and are included in his idea of what constitutes a "modern" home. However, considerations of convenience and style have, in many instances, diverted attention from a fundamental significance of the term "modern" as applied to homes. The fact that between four and five thousand people are fatally burned in residence fires in the United States each year is inescapable.

To be "modern," according to the basic connotation of the term, a home must be fire-safe.

2. *How does Stran-Steel framing qualify in this sense of the word "modern"?*

Fire underwriters state that seventy per cent of residence fires originate below the first floor level. Consequently, if a house is built with Stran-Steel first floor joists set on masonry walls, and covered with a concrete sub-floor on ribbed, metal lath, running clear to the outside walls, a complete fire bulkhead is thus built into the house, which eliminates seventy per cent of the fire hazard.

The underwriters also state that fifteen per cent of residence fires originate on the roof. Stran-Steel rafters with fire-safe roofing material eliminate this fire hazard also.

If, with these two major hazards eliminated, Stran-Steel studs with fire-safe collateral materials are used in walls and partitions, all fire hazard to the structure has been eliminated and a "modern" fire-safe house is the result.

3. *Are Stran-Steel structures lightning-proof?*

Yes. The whole structure is thoroughly grounded by water and soil pipes and is entirely lightning-proof.

4. *Are Stran-Steel framed structures earthquake shock-proof?*

Engineers and architects agree that, when on proper foundations, Stran-Steel framed buildings are as resistant to earthquakes as any type of framing available and much safer in earthquake areas than even solid masonry structures.

5. *Are Stran-Steel framed structures proof against termites, rot, rodents, etc.?*

Obviously. It is estimated that termites alone are responsible for \$40,000,000 damage to wood structures in the United States each year. Prevention of termite damage to any wood structure is costly and of indeterminate value. Stran-Steel forever resists termites, rats, fungi, and dry rot.

6. *How does the use of Stran-Steel framing prevent wall cracks?*

In various ways. Most plaster cracks are caused by warping and shrinking of wood frames. It is impossible to prevent this condition where lumber is involved. All changes in atmospheric moisture, as well as any exposure to direct moisture, cause warping and contraction or expansion of wood framing. This warping or shrinking is transmitted through the lath to the plaster which cannot expand or contract as rapidly as does the wood framing. Cracks inevitably result.

Wood framed partitions butting in solid masonry walls shrink eventually and pull away from the masonry, causing corner cracks and cracks around chimneys or other masonry columns. Plaster cracks cannot be permanently repaired since green or wet plaster will not adhere to dry plaster. Patching compounds, consequently, crack loose soon after application, due to the same causes which occasioned the original cracks.

Stran-Steel framing *eliminates* all plaster cracks due to shrinking and warping of the framing.

7. *How does the use of Stran-Steel framing eliminate sagging, squeaking, warping floors, and sticking doors and windows?*

These common and annoying faults are caused in precisely the same manner as are plaster cracks. Warping and shrinking wood framing members are

the reason for them. Stran-Steel framing is the only cure for them. A Stran-Steel house built over three years ago in Detroit, shows not a single wall crack. All doors and windows open and close exactly as when originally fitted. The floors are level and quiet.

Architects Ask

1. *Is Stran-Steel framing suited to other than rectangular structures?*

Stran-Steel framing is suited to any structure which may be framed in wood. One large house recently completed in Jackson, Michigan, was a typical Tudor style home. It was originally designed to be framed in wood. The roof was broken by hips and valleys and dormer windows, and included nine different pitches. Stran-Steel was merely substituted for wood and no difficulties were encountered.

2. *Do architectural plans have to be altered or modified to permit the use of Stran-Steel?*

No changes whatever are required in plans to permit the use of Stran-Steel. Full scope is allowed to individual taste and personal preference. Anything which may be framed with lumber may be framed with Stran-Steel.

3. *How should Stran-Steel be specified on architectural plans?*

Standard Stran-Steel specification data will be supplied upon application.

4. *Are there various grades of Stran-Steel?*

No. There is only one grade. There is no possibility of substitution of materials for those specified, as in the case of wood framing.

5. *Is Stran-Steel rust-resisting?*

Yes. Stran-Steel is given two coats of heavy, rust-resisting enamel after rolling. When in place there is no more danger of rusting than there is in the case of steel filing cabinets or steel furniture. Stran-Steel is thoroughly protected by collateral materials as well as the two coats of enamel.

Reports of the American Institute of Steel Construction, dealing with the results of examinations of many steel framed structures which have been in service for

long periods, and some which have been torn down due to obsolescence, state the conclusion that "when steel is used for the framing of properly built residences it may be expected to offer a high degree of resistance to corrosion."

The late F. W. Skinner, consulting engineer of Brooklyn, New York, made an extensive study of the corrosion possibilities of steel structures. His conclusion was that "the steel in the interior of dry, warm, clean buildings never corrodes and scarcely needs paint as a protection."

In 1907, a home was built in Tuxedo Park in which wall and partition studs, as well as floor and ceiling joists and rafters, were all made of sheet steel sections. In 1932, portions of the floor, roof, and walls were opened for the purpose of making alterations.

A report covering these operations stated that "the steel sections, after twenty-five years of service were found to be in as good condition as when installed." Many similar reports might be quoted, if space permitted, all showing conclusively that corrosion of the framing need not be considered as a deteriorative factor.

Questions Asked by Builders and Contractors

1. *How does the cost of erecting Stran-Steel compare to the cost of framing in wood?*

Erecting a Stran-Steel frame, when done by an experienced builder or contractor, costs little, if any more than the cost of framing a similar structure in wood.

2. *What class of labor is best suited to the erection of Stran-Steel framing?*

Any type of labor familiar with small building or house construction may satisfactorily erect Stran-Steel.

3. *Why are Stran-Steel members spaced 24 inches on center instead of 16 inches as in wood construction?*

Spacing is determined by the strength of materials involved. In the case of Stran-Steel framing the spacing is determined by the distance which the collateral materials will span. Its own strength is such that Stran-Steel may safely be spaced on 48-inch centers. Few collateral materials, however, are sufficiently strong to span more than 24 inches.

4. *Is there any difficulty encountered with electric wiring or piping where Stran-Steel is used?*

None whatever. Holes are pre-punched in studs and joists to permit passage of BX or conduit as specified. The same is true of piping. Stran-Steel standard $3\frac{5}{8}$ " studs furnish ample thickness to partitions to conceal hot air ducts. Partitions which must conceal 4" stacks are easily furred out with Stran-Steel half studs. Construction methods also easily permit framing in 4" waste lines running horizontally, irrespective of the relative directions of the long dimensions of partitions and floor joists.

5. *How are two pieces of wall board or rocklath attached where they come together at a Stran-Steel stud?*

This may be done in various ways. The edges may be straddled by roofing nails with half-inch heads, or by using small, cupped and pierced washers, punched through the center to receive a common nail. Entirely satisfactory joists may be secured on certain materials by toenailing.

6. *Can changes be made in Stran-Steel framing after it is erected?*

Easily. All attachments are made with bolts or metal screws. Members may be removed and relocated at will.

7. *Does the attachment of wood trim or ornamentation present any difficulties where Stran-Steel framing is used?*

None. Wood trim of all kinds are framed with look-outs in the conventional manner.

Questions Asked Concerning Availability of Stran-Steel

1. *Who makes Stran-Steel framing?*

It is made by the Stran-Steel Corporation, subsidiary of Kelsey-Hayes Wheel Company, the world's largest manufacturer of wheels. The Stran-Steel Corporation's main office, sales, and engineering departments are located at 6100 McGraw Avenue, Detroit, Michigan. Branch offices are located in Chicago, Pittsburgh, and New York City.

2. *Who sells Stran-Steel?*

A list of responsible, experienced representatives sell Stran-Steel framing throughout the United States. Plans or sketches may be given to any of these repre-

sentatives for estimating. These plans will be carefully analyzed by Stran-Steel engineers, who will promptly advise just how Stran-Steel framing may be used most economically and exactly how much it will cost laid down at the nearest siding.

Questions Concerning Cost of Stran-Steel

1. *How is Stran-Steel framing priced?*

By the foot, exactly in the same manner as wood framing is priced. Prices per foot vary slightly throughout the country due to freight rates, but the freight per foot is exceedingly small on account of the relatively light weight of the members.

2. *Is the price per foot of Stran-Steel the same as the price per foot of the lumber which it replaces?*

The price per foot of Stran-Steel framing is, naturally, somewhat higher than the price per foot of wood framing. However, there are various "catch-ups" on this price differential. Where wood framing is spaced 16 inches on center, Stran-Steel is never set closer than 2 feet on centers. This means a saving in actual footage of material required as well as less members to lay or erect in a given floor, wall or roof panel.

3. *How does the completed cost of an all fire-safe Stran-Steel framed structure compare to the cost of a similar structure of all-combustible materials?*

From five to ten per cent more. It is interesting, however, to note the over-all economy which this slight additional cost includes.

First and foremost is the elimination of the fire hazard with its potentialities of loss and tragedy. Secondly, this type of structure effects continual savings by reducing the cost of upkeep, repairs, insurance premiums, and financing charges.

Thirdly, ownership is enhanced by elimination of unsightly plaster cracks, squeaking, sagging floors and sticking doors and windows.

Fourthly, there is no prospect of extensive repairs necessitated by the destructive work of termites, fungi, dry rot, and rodents.

Finally, the danger of destruction of a Stran-Steel framed structure by lightning or earthquake shock is practically eliminated.

*Additional sales booklets and
technical information on the
subject of Stran-Steel fire-
safe framing may be secured
from Stran-Steel representa-
tives, or, by writing directly to:*

STRAN-STEEL CORPORATION

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