

Working stresses in the above tables are given for continuously dry locations. The Building Inspector shall determine the values to be used as follows:

Continuously dry locations shall apply to use in interior or protected locations, not subject to conditions of excessive dampness or high humidity.

Wood used in positions subject to more serious exposure than the above shall have a corresponding reduction of the working stresses as shall be determined by the Building Inspector.

**Framing Details.**

8.704 All portions of the structural framework shall be so framed, anchored, tied or fastened together as to develop the maximum strength of each member.

**Vertical Members.**

(a) Wood columns and posts shall be squared at the ends and provided with metal base plates and dowels. Preservatives shall be applied to column-ends where necessary to protect against possible dampness.

**Horizontal Members.**

(b) Girders or beams where entering or resting on masonry walls shall have a bearing of at least 4 lineal inches. The under surface shall be protected from dampness.

Horizontal members shall be fastened together to form an adequate tie across the building.

Built up members shall have timbers fastened securely and tightly together.

Joists and rafters shall have adequate bearing.

Wood members entering masonry party or fire walls shall be separated from the opposite side of the wall and from other beams entering the opposite side of the wall by 6 inches of solid masonry. The ends of joists, beams or girders shall be fire cut to properly release in the event of failure of the member.

Anchors for each tier of joists shall be provided where they enter masonry walls and anchors connecting not less than 3 parallel joists shall be provided where joists are parallel to such walls. Anchors shall be spaced not more than 6 feet apart. Such anchors shall not be less than iron or steel straps 3/16 in. by 1 inch by 2 feet long, well spiked to joists near the lower edge. Such anchors shall in all cases occur on the opposite ends of the same run of joists and ends of joists shall be lapped and spiked so as to form a continuous tie across the building.

Roof structures resting on masonry bearing walls shall be anchored to such walls by steel anchors not less than 0.19 square inches in cross-section, such anchors shall extend into the masonry not less than 16 inches, be securely bonded or anchored to the masonry and shall be spaced not to exceed 4 feet on centers.

The minimum permissible thickness of joists, rafters and studs shall be 1 5/8 inches actual thickness.

Header joists supporting over 20 square feet of floor construction shall be hung in approved joist hangers. Tall joists over 12 feet long shall be hung in approved joist hangers. Trimmer joists shall be designed to safely carry the imposed loads.

Joists supporting partitions and being parallel thereto, and joist around any floor opening, shall be doubled. Doubled joists supporting partitions may be separated a distance not to exceed 1 inch greater than the width of the partition above, and such double joists shall be provided with solid bridging, of the same size as the joist, spaced not to exceed 4 feet on centers.

Cross bridging shall be placed between joists if the span is over 7 feet. The distance between bridging or between bridging and bearing shall not exceed 7 feet. Wood cross bridging shall be at least 2 square inches in net cross sectional area. Metal cross bridging of equal or greater strength may be used.

Deflections of joists beams or girders shall be limited to 1/360 of the span.

**Stud Walls.**

(c) Stud partitions shall be provided with sole plates with dimensions not less than those of the studs, where the partition studs do not rest on walls, girders, beams, or do not pass through the floor to the top plate of the partition below.

In bearing partitions the top plate shall be doubled and lapped at each intersection.

Studs in bearing partitions and walls shall be not less than 2 inches by 4 inches in size placed with the larger dimension at right angles to the wall.

Where studs pass through from floor to floor they shall be fire-stopped at point of passage through floors.

Angles at corners where stud walls or partitions meet shall be framed solid so no lath can extend from one room to another.

Openings in stud partitions and walls shall be framed around with double studs at each side and double headers across the top resting on the short studs at each side. The double studs at each side shall have a solid bearing on the sole plate or there shall be a header provided below the opening of sufficient strength to transfer the load from the double stud to the studs below the opening.

**Trusses.**

(d) Wood trusses and truss framing shall have all joints accurately cut and fitted together so that each bearing is true and drawn tight to the full bearing. All such trusses shall be properly secured in place by lateral bracing. Washers of sufficient size to distribute the loads properly shall be used in connection with rods or metal members. Before a truss is loaded the tension rods shall be well tightened. Timber trusses shall be securely anchored to the wall at points of bearing.

**Fire Stopping.**

(e) Fire stops shall be provided at all intersections of all interior and exterior walls with floors, and either ceilings or roofs in such a manner as to effectively cut off communication by fire through hollow concealed spaces and prevent both vertical and horizontal drafts. Such fire-stopping shall be not less than 2 inches in nominal thickness. Where balloon-frame construction is used, or where the joists are supported on a ribbon board, fire stopping shall be provided both immediately above and below the joists.

**Section 8.8 GYPSUM**

**Gypsum.**

8.801 Gypsum construction shall conform to the following requirements:

**Materials.**

(a) Gypsum and gypsum concrete shall conform to the requirements of Section 7.105.

**Design.**

(b) Gypsum suspension systems, poured in place or pre-cast, shall be not less than 3 inches in thickness. They shall be of such character that the stresses in same shall be readily calculable by the use of accepted engineering formulas. In such systems the stress in the suspension wires shall be as determined by the following formula:

$$T = \frac{WL}{8d} \sqrt{L^2 + 16d^2}$$

In which

T equals the maximum tension in wires in pounds per foot of width of slab.

W equals load (live and dead) in pounds per square foot.

d equals clear span in feet between supports.

L equals deflection or dip of wires in feet at center of span.

The wires used shall be cold drawn steel for which the allowable working stress shall not exceed 20,000 pounds per square inch.

The design in which the gypsum acts structurally the design shall be in accordance with the formulas and assumptions as given in this Code for reinforced concrete.

**Allowable Stresses.**

(c) The maximum allowable stresses in gypsum shall not exceed the following:

Extreme fiber stress in bending.....	0.25 f <sub>c</sub>
Direct compression or bearing.....	0.20 f <sub>c</sub>
Bond between gypsum and reinforcing steel	
Plain bars.....	0.02 f <sub>s</sub>
Deformed bars or welded wire mats.....	0.04 f <sub>s</sub>
Shearing stress.....	0.025 f <sub>c</sub>
Modulus of elasticity: 1,000,000 for neat gypsum, 300,000 for gypsum concrete with 12.5 percent fiber binding material or aggregate concrete, of 1.5 parts gypsum, 1 part sand and 3 parts coarse aggregate.	

NOTE: f<sub>c</sub> is the ultimate unit compressive strength of the gypsum and shall be taken at not more than the values as given in Section 7.105, unless tests are conducted to assure the Building Inspector the larger values are being maintained.

**CHAPTER IX**

**Precautions During Building Operations**

**Section 9.1 TEMPORARY OCCUPANCY OF STREETS**

**Permits.**

9.101 (a) During the construction of a building the extent of the occupancy of any sidewalk and/or street shall be covered by the terms of a permit issued for such occupancy. No street, sidewalk, or other public property shall be occupied for the storage and handling of material or other use connected with the construction of any building without a permit having been obtained for such occupancy.

**Issued By.**

(b) Such permits shall be issued by the Building Inspector and approved by the Chief of Police and the Village Manager.

**Permit for Adjacent Frontage.**

(c) If the written consent of and a waiver of claims for damage against the Village by the owners or lessees of property adjoining the site of any proposed building is first obtained and filed with the Building Inspector a permit may be granted for the occupancy of a portion of the street and sidewalk in front of the property for which the consent has been secured upon the same terms and conditions as those here-in fixed for the occupation of sidewalk and street in front of the building site.

**Deposit.**

(d) Before a permit is issued for the use of any street or sidewalk a cash deposit shall have been deposited with the Village Treasurer in the amount of one dollar for every 2 feet of frontage or fraction thereof, with a minimum of ten dollars. Such deposit, less a charge of one dollar for such permit, shall be returned upon restoration of said public property to a condition equally as good as before such use.

**Terminating Permit.**

(e) When in the opinion of the Building Inspector the building operations have progressed to such an extent that the use of said street is no longer justified he shall order the same to be vacated and restored to its original condition. In the event this is not done within seven days he shall order the same done and charge the cost of such cleaning against the deposit.

**Exception.**

(f) In the uncongested areas of the Village, where such use will not interfere with the normal use of the street or sidewalk, that portion of the street between the sidewalk and gutter may be used for the storage of material and other uses incidental to building construction without a permit being obtained therefor.

**Revoking Permit.**

(g) Any permit issued for the use of such street or portion thereof may be revoked by the Building Inspector at any time for improper use of space or any other cause which the Building Inspector may deem sufficient.

**Bond.**

(h) No permit shall be issued for the occupancy of any street or portion thereof until the occupant thereof shall have deposited with the Village Treasurer a bond in such form as is approved by the Village Attorney, with securities approved by the Village Treasurer, in an amount of \$10,000.00. This bond shall not be required if satisfactory evidence is submitted of adequate coverage by liability insurance.

**Use of Street For Building Purposes.**

9.102 (a) The occupancy of streets and sidewalks for the purpose of building is intended only for use in connection with the actual erection, repair, alteration or removal of buildings, and shall terminate with the completion of such operation. Such occupancy shall be in accordance with the following provisions.

**Material Storage.**

(b) Building materials required for use in connection with the construction of a building may be placed upon the street or sidewalk in front of the building site. The maximum amount of the street occupied shall not exceed 1/2 of the width of the street, measured from property line to property line, but in no case shall the space within 11 feet of the nearest rail of any railway tracks be so occupied. The sidewalk space may be occupied for building construction purposes provided the owner or his agent construct a temporary sidewalk not less than 3 feet in width except that a walkway of greater width than 3 feet shall be provided if required by the Building Inspector, in the outer portion of the permissible occupied space, and such sidewalk shall be protected as specified in 9.2.

**Street to be Cleaned.**

(c) Pavements, curb and gutter, sidewalk and all other portions of the street shall be well cleaned of all building materials upon the completion of the work.

**Excavation Guards.**

(d) The person causing any excavation to be made shall properly guard and protect the same. Any excavation in a street or within a distance from the street line equal to its depth shall be properly protected by a fence.

**Section 9.2—PROTECTION OF PUBLIC.**

**General Requirements.**

9.201 All building operations shall be conducted in a safe and care-manner, with due regards to the safety of the public, and the following provisions shall be complied with.

**Temporary Egress and Walkways.**

(a) Whenever any building or part thereof is to be erected, added to or demolished, any enclosing wall of which is within ten feet of the street line, and the foregoing operations are not carried on entirely within the enclosing walls of the building, a substantial fence not less than 6 feet in height shall be maintained on the building side of the walkway and a substantial roof, of not less than 8 feet in clear height above the walkway, shall be maintained over such walkway, except that when the building is less than 40 feet in height and no enclosing wall of which is within 7 feet of any walkway, the walkway need not be roofed over.

**Warning Lights.**

(b) Guard lights shall be displayed during the legal hours of darkness on all obstructions and around all dangerous excavations within the public right of way. Such lights shall be placed not to exceed 25 feet apart.

**Precautions During Demolition.**

(c) In demolishing any building or part thereof, the upper story shall be completely removed before starting the removal of the story below. No material shall be stored upon any floor of a building in the course of demolishing and all material shall be lowered to the ground immediately upon displacement. Materials which in their removal cause an excessive amount of dust shall be wet down. (See Section 7.105, (a) 1.)

**Not to Obstruct.**

(d) No Building material, fence, shed, or obstruction of any kind, shall be placed so as to obstruct free approach to any fire hydrant, lamp

post, manhole, fire alarm box, catch basin or inlet, or be placed so as to interfere with drainage.

**Section 9.3—PROTECTION OF WORKMEN**

**General Requirements.**

9.301 All building operations shall be conducted in a safe and careful manner, with due regards to the safety of the workmen, and the following provisions shall be complied with.

**Scaffolding.**

(a) All scaffolds used in connection with the erection, alteration or demolition of any building shall be constructed with due regard to the safety of the workmen and all persons passing under or near them.

**Floors.**

(b) Sub floors shall be completed as soon as practicable after the erection of the framework.

In erecting steel frame buildings of 4 or more stories in height, planking shall be provided by the contractors over the entire floor area of each floor from which steel is being erected. This floor shall be left in place until the riveting or welding is completed up to the next erection platform. At no time shall any riveter, welder or erector work more than 3 stories above a completely planked floor. The planking shall be sufficiently strong and rigid to serve as a working floor and to protect workmen from falling objects.

**Floor Openings.**

(c) All openings in the floor framing intended for stairways, elevators, or any other openings shall be enclosed or fenced in on all sides except those sides which are used for handling materials or on which ladders land.

**Section 9.4—SANITARY REQUIREMENTS**

**General Requirements.**

9.401 Immediately upon the beginning of the erection of a building satisfactory provision shall be made for the sanitary requirements of the workmen.

A temporary toilet is preferable. If a temporary vault is used it must be placed in the least objectionable position, be at least 4 feet deep, be screened from view in a satisfactory manner, be sprinkled with lime daily during use and be back-filled at once upon discontinuance of its use. The use of the vault shall be discontinued as soon as it is practicable to install a temporary toilet.

Sanitary provisions shall be made in a manner satisfactory to the Building Inspector.

**Section 9.5—FIRE PROTECTION DURING CONSTRUCTION**

**Standpipes.**

9.501 (a) In all buildings in which standpipes are required by this Code, such standpipes and their connection at each floor shall be installed as the construction progresses. Such standpipes shall be provided with fire department connections on the outside of the building at the street level, and with one outlet at each floor. All outlets, connections, and fittings, whether temporary or permanent, shall be designed to fit the Fire Department equipment.

**Temporary Heat.**

(b) All temporary heating plants or devices shall be installed and arranged to prevent danger from fire.

When salamanders or other temporary heating devices are used, they shall not be set on combustible flooring or platforms unless thoroughly insulated therefrom by a bed of sand or cold ashes not less than 4 inches thick and extending at least 2 feet beyond such device on all sides, or other equivalent protection.

**Miscellaneous Requirements.**

(c) All building operations shall be conducted in a safe and careful manner with due regard to the danger from fire. The Building Inspector shall require that proper precautions be taken to safeguard against fire.

Combustible material shall not be stored so as to create a fire hazard. Scaffolding and shoring if of combustible material, shall be kept at a minimum.

Adequate facilities for exits in case of fire shall be maintained.

**CHAPTER X**

**Construction Requirements for Fire Protection**

**Section 10.1—GENERAL REQUIREMENTS**

**Fire Test.**

10.101 (a) The fire resistance rating of building materials and construction types shall be rated in terms of time as determined by performance under tests conducted in accordance with the specifications for "Fire Tests of Building Construction and Materials," A 2—1926, of the American Standards Association.

Materials and construction types shall be rated as having a 1, 2, 3 or 4 hour fire resistive rating dependent upon the time during which such materials or construction types successfully withstand the fire test.

**Materials.**

(b) Brick, Concrete block or tile, gypsum block or tile, gypsum, gypsum plaster board or plaster, hollow clay tile, metal, asbestos, Portland cement concrete, any combinations of these materials or any materials or construction which will meet the requirements of the prescribed fire test shall be accepted as fire resistive construction with a rating equal to the period which the material or construction type withstood the fire test. Materials, to receive the fire resistive rating permitted in this Code, shall be of the quality required by this Code for the material specified. Hollow clay tile used for protection of structural members shall conform to the "Standard Specifications for Hollow Burned-Clay Fireproofing, Partition and Furring Tile"; A. S. T. M. Designation C 56-30, of the American Society for Testing Materials.

(c) The materials and construction which are given a fire resistive rating in this Code shall be of the materials and constructed in the manner prescribed in this section.

**Masonry Units.**

1—All fire resistive construction of burned clay, concrete, gypsum or other similar units shall be solidly bedded and laid in gypsum mortar, lime-cement mortar or cement mortar; provided, that gypsum units shall be laid in gypsum mortar only. All such joints shall be thoroughly bonded together by broken joints in alternate courses.

Soft tile protecting beam and girder flanges shall be tied to the flange with steel or iron ties. All masonry units used for fire resistive coverings for structural members shall be provided with metal mesh in all bed joints.

**Cast in Place Protection.**

2—All concrete, gunite, gypsum or similar protection which is cast, poured or similarly applied, shall be reinforced by metal rods, wire mesh, or other reinforcing to provide against cracking and disintegration of the protective covering. Reinforcement to conform to the above requirements shall be not less than number 10 B, and S, gauge wrought or tied round members at not more than a 6-inch pitch or spacing. All such protection shall be placed not less than 3/4 of an inch from the outer surface of the protecting material and shall be held away from the structural member.

**Plaster Protection.**

3—All plaster fire protection shall consist of gypsum mortar, Portland cement mortar or other equally fire resistive material. Gypsum plaster only shall be used on gypsum units. Wherever plaster is used for fire protection purposes it shall be reinforced with metal mesh or metal lath; provided, that where such plastering is placed on masonry or reinforced con-