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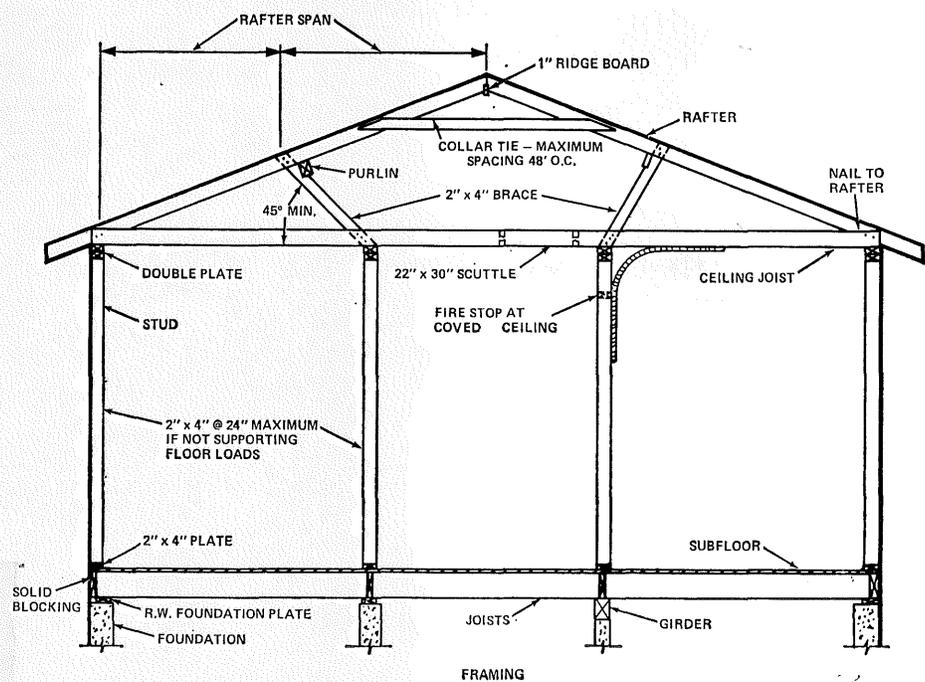


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AN INTRODUCTION TO CODE ADMINISTRATION AND ENFORCEMENT FOR BUILDING OFFICIALS



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STATE PLANNING AGENCY
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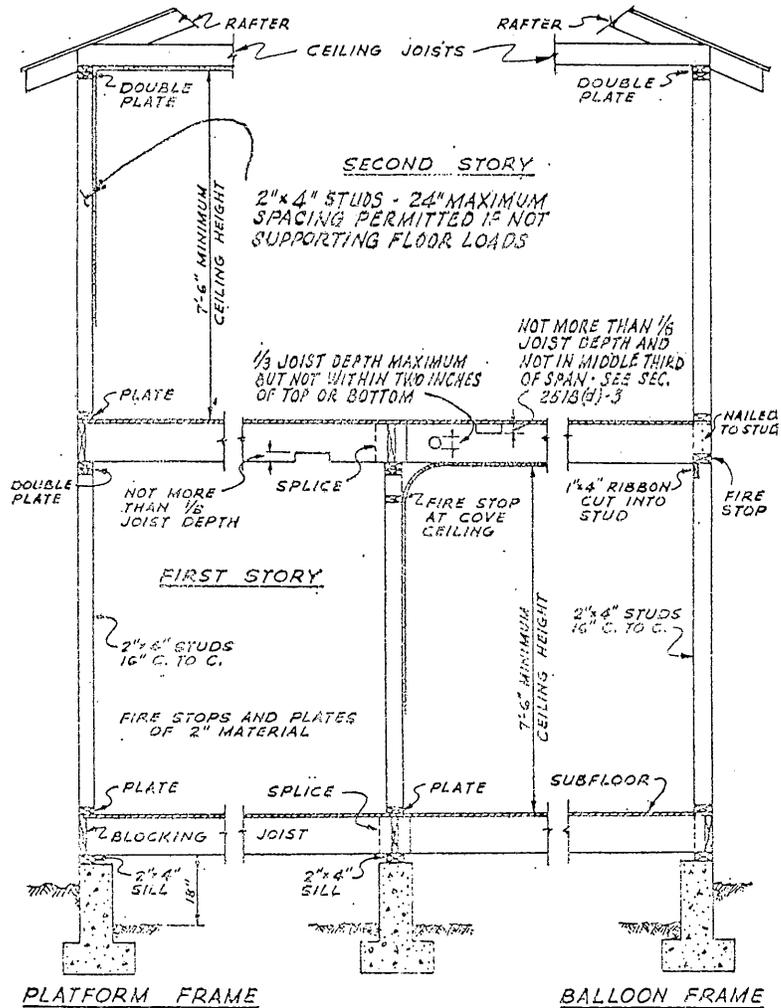
AN INTRODUCTION TO CODE ADMINISTRATION AND ENFORCEMENT FOR BUILDING OFFICIALS

This training manual has been prepared by the Office of Local and Urban Affairs of the Minnesota State Planning Agency with the cooperation and technical assistance of the State Building Code Division.

The manual is based on a series of training seminars conducted in various municipalities in the State of Minnesota in 1973. It includes information based on questions from the participants as well as faculty presentations. Some of the material in the "Dealing With The Public" Section is presented by permission of the Association of Minnesota Counties.

The purpose of the manual is threefold: first, to assist those desiring to become certified as municipal building officials; second, to be source material for individual study prior to enrollment in advanced training courses; and third, to serve as a guide to building officials in training their personnel.

The manual also includes information required to effectively administer the Minnesota State Building Code.



Office of Local and Urban Affairs

MINNESOTA STATE PLANNING AGENCY • CAPITOL SQUARE BUILDING • ST. PAUL, MINNESOTA 55101

A GENERAL INTRODUCTION TO BUILDING CODES

Major fire losses have been the greatest single impetus for the development of building codes. In fact, the constant threat of personal injury or death due to a building failure or inadequate fire and life safety provisions make sound construction procedures essential.

Building codes, by definition, are "laws, adopted by political subdivisions to regulate the construction, repair, alteration, demolition, and occupancy of the structure for the health, safety, and welfare of the general public." They constitute a set of MINIMUM structural, life safety, and health requirements to protect a building's occupants.

There are four "model" building codes in the United States. They were created as models to be adoptable by cities as their building regulations. The oldest of these is the National Building Code promulgated by the American Insurance Association (AIA). The first edition was published in 1905. The first edition of the Uniform Building Code, written by the International Conference of Building Officials (ICBO), was published in 1927. The Uniform Building Code (UBC) is part of the Minnesota State Code. The first edition of the Southern Building Code was published in 1945 by the Southern Building Code Congress. The Basic Building Code was first published in 1950 by the Building Officials Conference of America, predecessor to Building Officials and Code Administrators International (BOCA).

The minimum building standards contained in the model codes are based on the combined experience of knowledgeable persons in the construction industry, design and engineering professions, fire service, code administration, various institutes representing materials groups, independent testing and research agencies, and others.

There are three major categories of building codes: structural stability, life safety, and environmental health. "Structural stability" refers to the quality and design of building materials and assemblies. Chapter 23-28 of the UBC cover structural and construction materials requirements.

Codes which relate to "life safety" include the Uniform Building Code, fire prevention codes, exit codes, National Electric Code, heating and ventilating codes, and excavating and grading laws.

Codes applicable to "environmental health" include the UBC, zoning ordinances, sanitation and plumbing codes, housing, and sign ordinances.



BUILDING CODES ARE MINIMUM SETS OF STANDARDS. They do not guarantee a functional building — only a safe one. The local building official has a continuing obligation to enforce the building code using his own judgment as to the application of the code's provisions. Generally speaking, if there is a conflict in the requirements of various codes, the more restrictive rule should apply. Also, a specific requirement should take precedence over a general one. Thus, it is the local building official's responsibility to analyze the specific situation, research the code, and apply the code as it relates to the situation.

THE MINNESOTA STATE BUILDING CODE

The State Building Code is a compilation of three state and three national publications. It supersedes all local building codes. If a municipality adopts a new code or changes its existing one, the code has to conform to the State Code. However, the State Building Code does exempt from its provisions all farm buildings as well as buildings within municipalities that have never adopted any type of building code. It is important to remember that while the State Building Code is the standard for construction, it is also a common sense document which should be applied in a common sense manner.

THE STATE BUILDING CODE: CONTENT

- A. The Uniform Building Code (1970 edition, as amended).

The Uniform Building Code is a modern building code and as such attempts to define the end result rather than specify the use of a particular product, material, or method. It is a performance document in the sense that a wide variety of materials can be utilized as long as they meet certain performance criteria. The Uniform Building Code is covered in greater detail in the next section.

- B. The National Electric Code (1971).

The Electric Code is a series of American National Standards Institute (ANSI) criteria enforced by the State Board of Electricity through their inspectors, and/or municipal building departments. It is essential that the building official has a close working relationship with the electrical inspector.

- C. American National Standard and Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks (1971).

This code is also developed by ANSI and is enforced by the State Department of Labor and Industry and/or municipal building inspection departments. It includes standards for the construction of elevators in single family homes.

- D. The Minnesota State Plumbing Code (1969).

The Plumbing Code was developed by the State Department of Health. It is enforced by their plumbing unit and municipal building departments. In addition to its technical aspects, the code contains a series of plumbing principles which the

building official should be familiar with. The Plumbing Code also contains recommended practices for installation of individual disposal systems.

- E. State Fire Marshal Rules Providing Accessibility and Usability Features for Physically Handicapped Persons (1971).

M. S. 471.465 Et. Seq. requires that all buildings, with the exception of one and two family dwellings, must comply with the State Fire Marshal's Regulations.

- F. Minnesota Heating, Ventilating, Air Conditioning, and Refrigeration Code (SBC 7101).

This code, along with all of the other standards in the State Building Code, establishes minimum performance criteria for the preservation of the safety, health, and public welfare in this specific area of building inspection.

If questions are raised on any part of the State Building Code—including amendments—the Commissioner of Administration, pursuant to MS 16.86, Subdivision 4, can hold public hearings to clarify the code.

EFFECTIVE USE OF THE UNIFORM BUILDING CODE: BUILDING CLASSIFICATION AND PLAN REVIEW

The Uniform Building Code classifies a building according to its location in a fire zone, its occupancy, and its type of construction. These classifications are summarized as follows:

1. Classification of buildings based on location in fire zone
 - A. Fire zone #1 — high hazard areas
 - B. Fire zone #2 — medium hazard areas
 - C. Fire zone #3 — low hazard areas

It is important to note that a community's "fire zone" differs from its "fire rating". The former constitutes a geographical area with a high, medium, or low potential fire loss. The latter is a measure of a municipality's capability to suppress fires within its jurisdiction. In reviewing construction plans, the building official should always ascertain what fire zone the particular building is in, keeping in mind that all buildings in fire zone #1 must be fire resistive.

2. Classification of buildings by occupancy group

	“A”	Assembly building with a stage and occupant load over 1,000	
Primarily Life Hazard	“B”	— 1 With stage and occupant load less than 1,000 — 2 Without a stage and occupant load over 300 — 3 Without a stage and occupant load less than 300 — 4 Stadiums — reviewing stands — bleachers	
	“C”	— 1 Schools with more than 50 occupants — 2 Schools with less than 50 occupants — 3 Day care centers (more than 6 children)	
	“D”	— 1 Mental hospitals — jails — prisons — 2 Hospitals — nurseries — nursing homes (non-ambulatory patients) — 3 Nursing homes — ambulatory patients	
	“E”	— 1 Storage and handling of explosives and flammables other than liquid — 2 Storage and handling of flammable liquid (Class I-II-III) — 3 Wood working shops — flour mills — cotton mills — 4 Repair garages — 5 Aircraft repair hangars	
High Fire Hazard			
Medium Fire Hazard	“F”	— 1 Gasoline service stations (no welding) — 2 Retail stores — office buildings — dining and drinking establishments (less than 100 occupants) — factories — warehouses — 3 Aircraft storage hangars (no welding)	
	Low Fire Hazard	“G”	Ice plants — cold storage — creameries — power plants
	Housekeeping	“H”	Hotels — motels — apartments
Occupancies	“I”	Dwellings — lodging houses	
Other	“J”	— 1 Accessory buildings (no human occupancy) — 2 Fences over 6 feet high — 3 Tanks and towers	



Football Stadium — A “B-4” occupancy classification

Each occupancy classification has its own standards for construction, height and allowable area as well as for protection of exterior walls. The standards are based on the proximity to property lines, exit facilities, and fire extinguishing systems. A guide to occupancy classification has been compiled and is available through the Building Code Division. It is a 20 page document which lists a variety of building types with their appropriate classification.

3. Classification of buildings by type of construction (STRUCTURAL ELEMENTS).

TYPE I. Non-combustible structural elements (steel-iron-concrete-masonry)

TYPE II. Non-combustible structural elements (steel-iron-concrete-masonry)

TYPE III. N — any material permitted by the code
1 hour — 1 hour fire resistive throughout
heavy timber (as provided in section 2007) — non-combustible exterior walls

TYPE IV. N — non-combustible materials (not fire resistive)
1 hour — 1 hour fire resistive throughout

TYPE V. N — any material permitted by the code
1 hour — 1 hour fire resistive construction throughout

Chapters 17-22 of the UBC cover the requirements for type of construction. Table 17A summarizes the differences in the fire resistive capabilities of different assemblies.

The building official will often have to make decisions regarding mixed occupancy classifications. In these cases, the separation of occupancies depends upon the degree of fire and life hazard. Occupancy separations are either vertical (wall separations) or horizontal (floor-ceiling separations) or both. The four types of occupancy separations are:

1. 4 hour occupancy separation — no openings permitted.
2. 3 hour occupancy separation — openings protected with 3 hour fire resistive assemblies.
3. 2 hour occupancy separation — openings protected with 1½ hour fire resistive assemblies.
4. 1 hour occupancy separation — openings protected with 1 hour fire resistive assemblies

Table 5-B, of the UBC, summarizes the separation requirements in buildings of mixed occupancy. It is essen-

tial that the building official, when making a plan review, ascertain the occupancy of a given portion of the building and, if required by the code, make sure there is an occupancy separation from that area to other areas.

In the plan review, the building official should classify the building as to its proximity to property lines to verify that fire resistive requirements as set forth in Table 5-A are met. This table pertains to type IV and V construction and is based on the exposure hazards of adjoining buildings. The specific requirements for wall and opening protection based on property location are found in Section 504 of the UBC and Table 5-A.

Another element of plan review which the building official must be cognizant of is the correlation between allowable areas, the type of construction, and occupancy. The plan review must determine whether the allowable area has been exceeded. Sections 505 and 506 and Table 5-C of the code detail allowable areas and the conditions under which the allowable area may be increased. Area separation walls in type I, II, and III construction must be 4 hour fire resistive, while those in type IV and V construction must be 2 hour fire resistive. For purposes of computing areas, portions of buildings separated by area separation walls may be considered separate buildings.

One aspect of the plan review, as it relates to classification of occupancy, is the occupant load. The building official should presume that every area of a building is occupied simultaneously. The occupant load is calculated by dividing the square footage of the room assigned to that use by the square footage per occupant as set forth in Table 33-A. Thus, for a single family home, the load should be determined on the basis of 300 square feet per occupant. Section 3301(d) of the UBC details these requirements.

When classifying the occupancy of buildings, the building official should realize that a judgment factor is often necessary because all buildings simply do not fit into clear-cut occupancy categories. If the occupancy is not listed in the code, it should be classified in the category it most nearly resembles.

After classifying the building, the building official should:

1. verify compliance with occupancy requirements (Chapters 6-15)
2. verify compliance with type of construction (Chapters 17-22)
3. verify compliance with exiting requirements (Chapter 33)
4. verify compliance with detailed code regulations (Chapters 30-43, 47-54)
5. verify compliance with engineering requirements (Chapters 23-29)

He has then completed the plan review.

COMMON BUILDING CODE QUESTIONS
STATE BUILDING CODE — UNIFORM
BUILDING CODE

- Q: How much latitude is the building official permitted under Section 106 of the SBC?
- A: He is permitted considerable latitude in determining equivalencies. He should, as Section 106 indicates, require sufficient evidence that new methods, products, or materials are the equivalent to that required in the code.
- Q: Does a building official have the authority to exceed the requirements of the State Building Code?
- A: No.
- Q: Does the State Building Code regulate the construction of signs?
- A: No. However, at least two of the "model code" publishers print sign codes which may be adopted by municipalities.
- Q: With the Uniform Building Code being the State code, does the local appeal board have any jurisdiction for granting variances?
- A: No. The usual function of the appeals board is to rule on the equivalency of alternative materials and/or systems and zoning ordinance requirements. SBC 201.A requires the actions of the appeals board be reported to the State Building Inspector within 15 days for review.
- Q: Can permit fees be based on basis of estimated cost?
- A: Yes (fee schedule based on square footage is also acceptable).
- Q: Can a permit be avoided if a small amount of construction is completed annually over several years?
- A: Yes, if the fee schedule of the municipality exempts permits under a certain amount. Many municipalities do exempt permits for construction up to a specified dollar figure, i.e. \$100.00, \$200.00, \$300.00.
- Q: Does the state code extend to areas that haven't adopted it?
- A: The state code supersedes municipal building codes. If a municipality has never adopted a code of any kind, it would not be under the state code.
- Q: Why is a swimming pool in a hotel/motel considered a different occupancy classification from the guest rooms? Is an occupancy separation always required?
- A: The pool area is an assembly area and there is an increased life hazard. Some jurisdiction, under Section 106, have considered installation of a sprinkler system to be equivalent to the one hour occupancy separation required in Table 5-B.

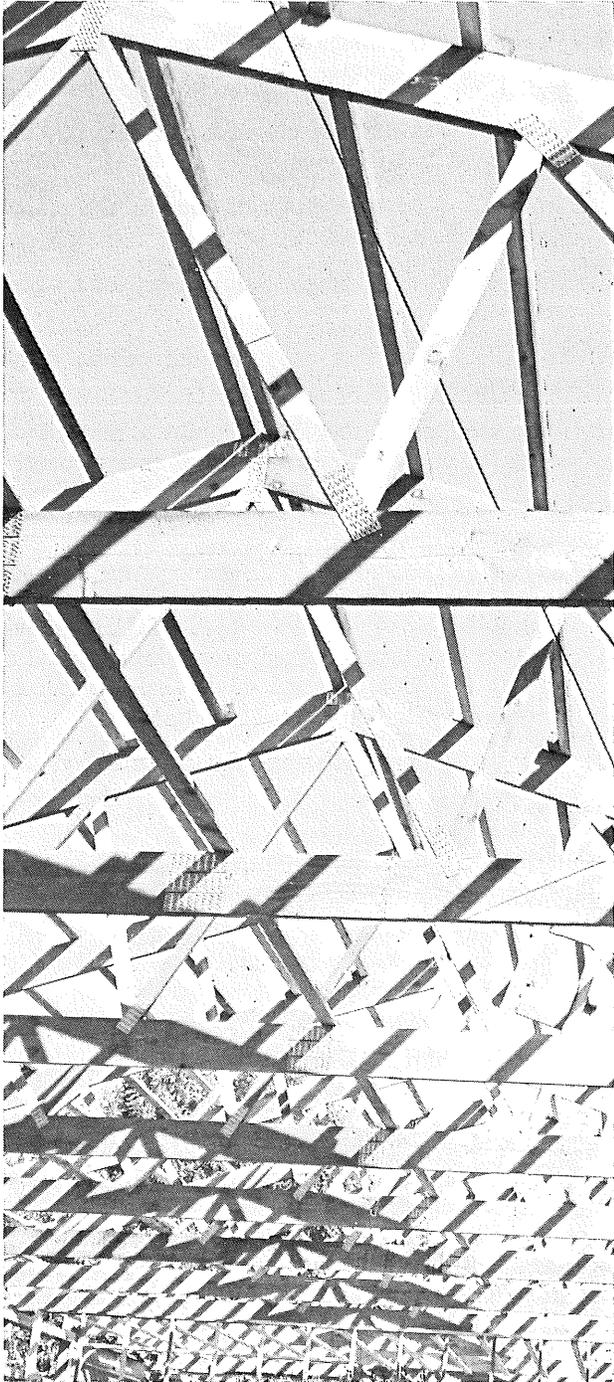
- Q: In order to determine fire resistive requirements for exterior walls, must a property line be defined between two adjoining buildings on the same lot?
- A: Yes, but it does not necessarily have to be the property line of record.
- Q: Are there requirements for the number of fire exits in different types of warehouses?
- A: Yes, for specific requirements, refer to Chapter 33 (Table 33-A) and UBC, Sections 3301 and 3302.
- Q: Are there requirements for draft stopping of enclosed spaces?
- A: Yes — refer to Section 2517(f) of the UBC.
- Q: What is classified as a habitable room?
- A: Section 409 of the UBC defines habitable room.
- Q: What is the occupancy classification of a day care center used in day time only?
- A: Group C — Division 3 Occupancy is the class it most nearly resembles.
- Q: What is the ceiling height requirement for a restaurant?
- A: The UBC prescribes no minimum ceiling height, except in corridors (UBC 3304c).
- Q: What sections of the UBC should a municipality adopt for code administration and enforcement?
- A: Chapters 2 and 3 or the equivalent.
- Q: For single ply application, does the code require 5/8" type x gypsum wall board on fire resistive walls?
- A: Assemblies listed in Table 43-B of UBC require 5/8" type wall board. Other assemblies, if tested according to UBC standard 43-1, shall be rated in accordance with the results of the test.
- Q: How do building codes and fire codes differ?
- A: The Building Code regulates construction, remodeling, additions, and relocation of buildings. The Fire Code regulates storage and handling of flammable materials, maintenance of fire suppression devices, etc.

BASIC ENGINEERING FOR THE
BUILDING OFFICIAL

The building official should be among the first to recognize the changes in the technology of the construction industry and the new demands placed on him by those changes. For example, rapid development of high rise office and residential complexes have increased the problem of fire protection immensely. In New Orleans recently, 7 people died after a fire on the 14th floor of an office building trapped them in their offices. There was simply no way to fight the fire effectively.

In residential construction, the development of trusses has completely altered many of the traditional "rules-of-thumb" by which building officials have lived. Today it is possible to design trusses capable of spanning almost any distance. Engineering calculations can determine the size of members to be used and the methods of connections to be employed to maintain the members in proper configuration.

If a contractor proposes a change, the building official should make sure that what is proposed is the equivalent of that specified in the code. In the case of trusses,



the building official should have a print of the approved engineering design so that he can tell what possible alterations can be made.

There are a variety of construction problems that must be recognized by the building official. Many of these problems may cause — or be the result of — structural defects. Some construction methods which may cause problems are:

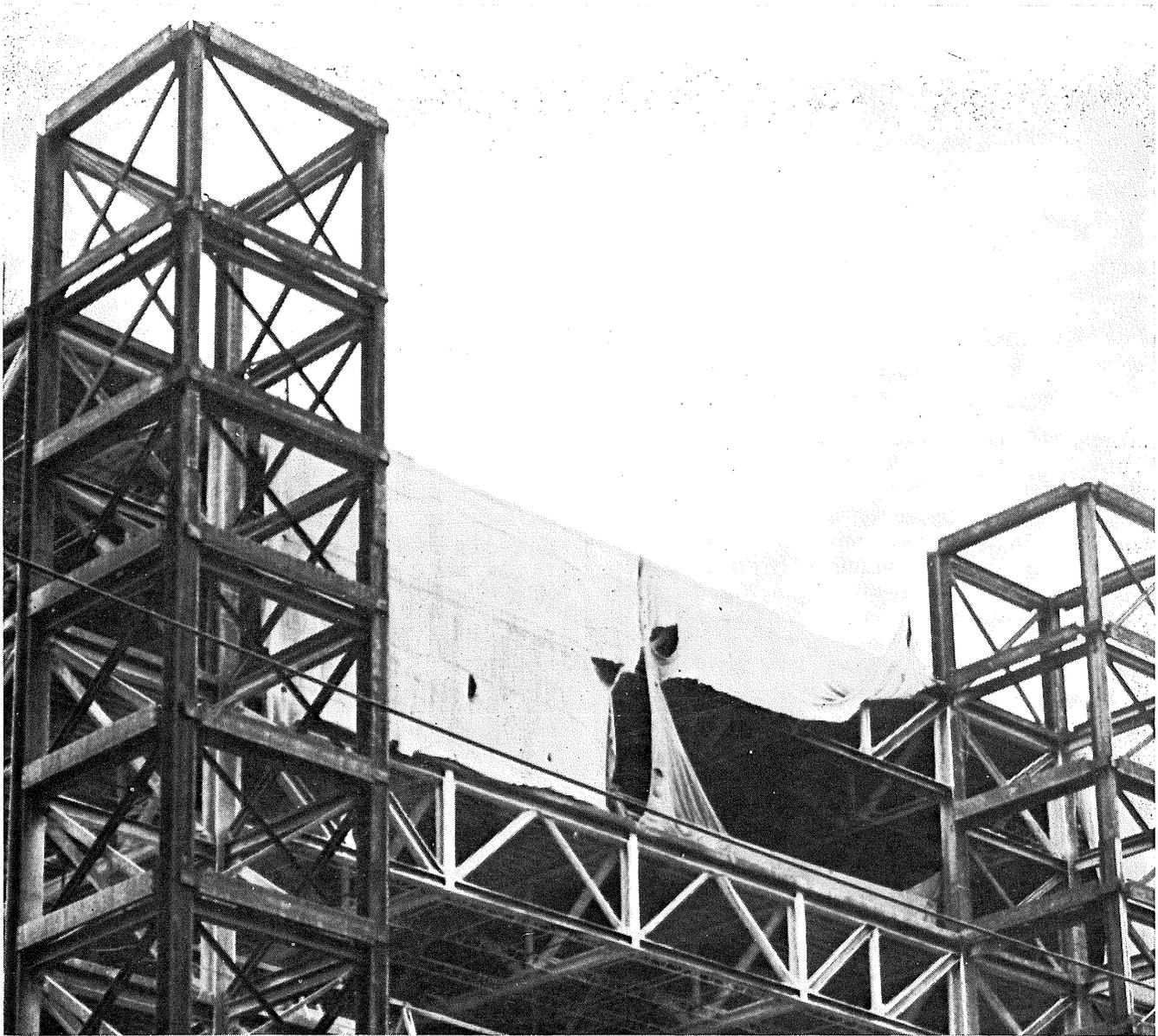
1. Footings placed on soil with inadequate bearing capacity.
2. Footings placed on uncontrolled fill (inadequate compaction).
3. Unreinforced masonry retaining walls (foundation).
4. Incorrect installation of anchor bolts.
5. Undermining footings while installing plumbing and mechanical system.
6. Structural damage while installing electrical, mechanical, and plumbing systems, or remodeling.
7. Improper placement of reinforcing steel in poured concrete.
8. Improper concrete mixes and placement and curing of concrete.
9. Improper forming methods, inadequate fasteners.
10. Lack of proper shoring and/or bracing during construction process.

Obviously, the building official cannot be expected to know all of the intricacies of construction engineering. **HOWEVER, IT IS HIS RESPONSIBILITY TO RECOGNIZE THAT AN ENGINEERING PROBLEM MAY EXIST AND TO CONSULT A COMPETENT ENGINEER FOR HIS ANALYSIS OF THE PROBLEM.**

A series of 12 engineering lessons for the building official have been prepared and are available through the ICBO. The lessons cover such basic concepts as wind loads, dead and live loads, bearing, shear, bending moment, stresses on structural elements, and others.

COMMON BUILDING CODE QUESTIONS BASIC ENGINEERING FOR THE BUILDING OFFICIAL

- Q: Will a truss support itself without interior bearing walls?
- A. Trusses, in general, are designed to support on exterior bearing walls. As soon as anything is attached firmly to the low chord of a truss designed for end bearing, the risk of destroying the entire truss design is introduced.



Q: Will a truss be marked for a center support if it is designed for that?

A: The building official should obtain a print of approved engineering design from the contractor to verify the type of material, plates, location, bearing points, spacing, etc.

Q: Can trusses be modified in the field?

A: They should not be unless design modifications are approved prior to the modification.

Q: Is there a typical size truss?

A: No — they vary with the truss design.

Q: Are trusses with utility grade stamp acceptable?

A: No.

Q: Is there a manual for truss designs?

A: Yes — Truss Plating Institute has published one.

Q: Will the 40 lb. snow load requirement be amended?

A: The State is now divided into two snow zones. A 40 pound zone is comprised of the following counties: Anoka, Carlton, Carver, Chisago, Cook, Dakota, Hennepin, Isanti, Lake, Pine, Ramsey, St. Louis, Scott, and Washington. All other counties are in a 30 pound zone.

THE BASIC PRINCIPLES OF THE MINNESOTA PLUMBING CODE

The State Building Code (Sec. 8701) adopts, by reference, the Minnesota Plumbing Code. The building official should not be expected to know all of the intricacies of plumbing. However, he should be familiar with the principles of the code and how they relate to the technical provisions of the code. The principles and the chapters of the code they relate to are as follows:

MINNESOTA HEALTH DEPARTMENT RULES AND REGULATIONS MINNESOTA PLUMBING CODE

MHD 120 Basic Plumbing Principles. This code is founded upon certain basic principles of environmental sanitation and safety through properly designed, acceptably installed and adequately maintained plumbing systems. Some of the details of plumbing construction may vary but the basic sanitary and safety principles desirable and necessary to protect the health of the people are the same everywhere. As interpretations may be required, and as unforeseen situations arise which are not specifically covered in this code, the twenty-three principles which follow shall be used to define the intent.

- (a) All premises intended for human habitation, occupancy, or use shall be provided with a potable water supply which meets the requirements of the Minnesota State Board of Health. Such water supply shall not be connected with unsafe water sources nor shall it be subject to the hazards of backflow or back-siphonage. (Page 45 MHD 130 (a)(1) and (2); (e)(1) and (e)(3) Tables 130(e)(9)(gg1) and 130(e)(9)(gg2))
- (b) Plumbing fixtures, devices, and appurtenances shall be supplied with water in sufficient volume and at pressures adequate to enable them to function properly and without undue noise under normal conditions of use (Page 48 MHD 130(c)(7) and Table 130(c)(7); Page 47 MHD 130 (c)(2))
- (c) Plumbing fixtures shall be designed and adjusted to use the minimum quantity of water consistent with proper performance and cleaning. Hot water shall be supplied to all plumbing fixtures which normally need or require hot water for their proper use and function. (Page 56 130(f)-(f)(1))
- (d) Devices for heating water and storing it shall be designed and installed to prevent all dangers from explosion and over heating. (Page 56 130(f)(2) and (aa) and (aa1) and (aa2) and (ee))
- (e) Every building with installed plumbing fixtures and intended for human habitation, occupancy or use when located on premises where a public sewer is available within a reasonable distance shall be connected to the sewer. (Page 14 MHD 122(g)-(1)-(2)-(3))
- (f) Each family dwelling unit shall have at least one water-closet, one lavatory, one kitchen type sink, and one bathtub or shower to meet the basic requirements of sanitation and personal hygiene. All other structures for habitation shall be equipped with sufficient sanitary facilities. (Page 34 Table 127(b)(1))
- (g) Plumbing fixtures shall be made of durable, smooth, non-absorbent and corrosion resistant material and shall be free from concealed fouling surfaces. (Page MHD 123(a)(15))
- (h) The drainage system shall be designed, constructed, and maintained to conduct the waste water with velocities which will prevent fouling, deposition of solids and clogging. (Page 57 MHD 131(a)(1) Tables 131(a)(2)A and Table 131(a)(2)B)
- (i) The piping of the plumbing system shall be of durable material free from defective workmanship and so designed and constructed as to give satisfactory service for its reasonable expected life. (Page 17 MHD 123(a) and Table 123(c)(3))
- (j) The drainage system shall be provided with an adequate number of cleanouts so arranged that in case of stoppage the pipes may be readily cleaned. (Page 30 MHD 125(8)-(8)(b)(1) and (2) and (4))
- (k) Each fixture shall be provided with a separate, accessible, self-scouring, reliable water-seal trap placed as near to the fixtures as possible. (Page 26 MHD 125(a)(1)(aa) and (cc) and (dd) and (6)(aa) and (bb) and (cc))
- (l) The building drainage system shall be designed to provide adequate circulation of air in all pipes with no danger of siphonage, aspiration or forcing of trap seals under conditions of ordinary use. (Page 63 MHD 132(c) and Table 132(a)A and Table 132(a)B and Table 132(1)(1))
- (m) Each vent terminal shall extend to the outer air and be so installed as to minimize the possibilities of clogging and the return of foul air to the building. (Page 65 MHD (d)(1) and (2) and (3))
- (n) The plumbing system shall be subjected to adequate tests and to inspections in a manner that will disclose all leaks and defects in the work or the material. (Page 31 MHD 134(a); MHD 134 (d) and (l) and (1)(aa) and (1)(bb) and (2))
- (o) No substance which will clog or accentuate clogging of pipes, produce explosive mixtures, destroy the pipes or their joints, or interfere unduly with the sewage-disposal process shall be allowed to enter the drainage system. (Page 31 MHD 126 (a)(1) and (3)(aa) and 4(aa)(bb1)(bb2)(bb3); Page 85 MHD 126(a)(4)(bb); MHD 129(d)(1)(aa)-(bb)-(cc)-(dd) (2)(bb))

- (p) Proper protection shall be provided to prevent contamination of food, water, sterile goods, and similar materials by backflow of sewage. When necessary, the fixtures, device, or appliance shall be connected indirectly with the building drainage system. (Page 43 MHD 129(a)(1)(2))
- (q) No water-closet or similar fixture shall be located in a room or compartment which is not properly lighted and ventilated. (See Section 605 UBC)
- (r) If water-closets or other plumbing fixtures are installed in a building where there is no sewer within a reasonable distance, suitable provision shall be made for disposal of the building sewage by methods of disposal which meets the requirements of the Minnesota State Board of Health and the Minnesota Pollution Control Agency. (Page 135 Appendix E)
- (s) Where a building-drainage system may be subjected to back flow of sewage, suitable provision shall be made to prevent its overflow in the building. (Page 33 MHD 126(b)(1) and (2) and (3) and (4))
- (t) Plumbing systems shall be maintained in a safe and serviceable condition from the standpoint of both mechanics and health. (Page 74 MHD 134(o))
- (u) All plumbing fixtures shall be so installed with regard to spacing as to be accessible for their intended use and cleansing. (Page 33 MHD 127 (c)(1) and (2))
- (v) Plumbing shall be installed with due regard to preservation of the strength of structural members and prevention of damage to the walls and other surfaces through fixture usage. (Self Explanatory)
- (w) Sewage or other waste shall not be discharged into surface or subsurface water unless it first has been subjected to an acceptable form of treatment. (Page 135 Appendix E)

In making ROUGH-IN plumbing inspections, there are a number of code requirements which the building official should watch for. These include:

1. proper depth for sewer and water trenches.

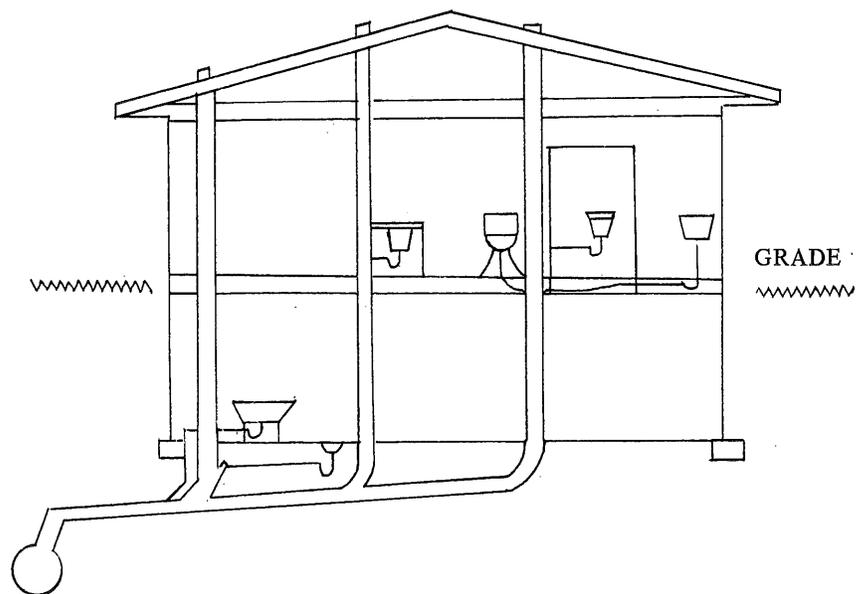
2. proper sizing of pipe—both drain, waste and vent pipes, and water supply.
3. use of approved materials, properly connected.
4. vent all traps—proper vent terminals.
5. correct trap arm lengths.
6. proper cleanouts.
7. all pipes properly supported and if required, room for expansion.
8. see that plumbing installation has not weakened structure.
9. air test drains, waste and vent system at 5 pounds per square inch pressure to assure absence of leaks.
10. gas piping is to be concealed, air test at 10 pounds per square inch.

Some items to check in the FINAL inspection include:

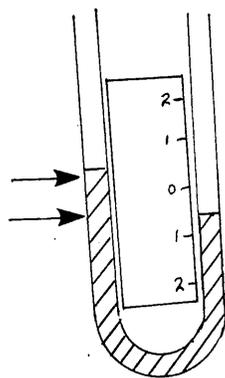
1. Use monometer to test if system is tight.
2. Use of proper materials and installation, pipe sizing.
3. Vacuum breakers and anti-siphon devices where needed.
4. Proper shut off valves at service entry, water heater, and hose bibs.
5. Pressure-temperature relief on water heater.
6. Proper drop pipe on relief valve.
7. Proper venting of water heater (if gas or oil fired).
8. Access panels where needed for servicing plumbing.
9. Proper supports on all piping.
10. Accessibility of all cleanouts.

The building official should air test the whole job and record all inspections. If part of a job is covered prior to inspection, an inspector can demand the piping be uncovered. **THE FINAL PLUMBING INSPECTION SHOULD BE COMPLETED BEFORE ALLOWING OCCUPANCY OF THE BUILDING.**

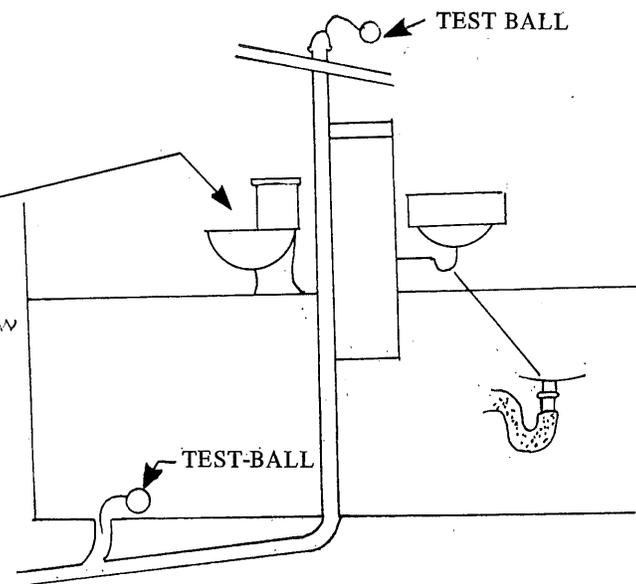
Typical Household Fixture Set Installation Ready For Final Test



One inch differential between the two water levels.



All parts of the plumbing system including fixture traps shall be tested with a pressure equal to a one inch water column. All outlets - drain, stack etc. plugged with test-ball plugs. One inch pressure being transmitted to all trapped fixtures. If the pressure holds, there is no leak.



**COMMON BUILDING CODE QUESTIONS
THE MINNESOTA PLUMBING CODE**

- Q: Have counties adopted Department of Health standards for individual disposal systems in shoreland management areas?
- A: Yes—the basic standards of the Health Department and the Department of Natural Resources have been adopted.
- Q: Is cast iron hubless pipe acceptable?
- A: Yes.
- Q: Is an air test for sewers from building to property line required?
- A: No.
- Q: How far can a pipe extend before a clean-out is necessary?
- A: On a 4" pipe — 100'
On a 3" pipe — 50'
Also, a fixture trap can be used as a clean-out in some instances.
- Q: What are the provisions of the licensing law?
- A: In cities of 5,000+, a journeyman's license is necessary to plumb and a masters license is neces-

- sary to be in business. In cities of less than 5,000, a license is not necessary but plumbing must comply with state code.
- Q: What plumbing system plans should be submitted to the Department of Health?
- A: Plans should include: plot plans, floor plans, roof plans, soil-waste-vent piping diagram, and water piping diagram. Specifications should include: a statement that the plumbing system is to be installed in accordance with the code; schedule of all fixtures to be installed; and specification of the protective devices necessary to conform to MHD 130.
- Q: How is the plumbing code to be applied?
- A: MS 326.37 specifies how the code is to be applied.
- Q: Can municipal governments be more restrictive in individual sewage disposal requirements?
- A: Yes—the appendix items of the SBC are not mandatory.
- Q: Are frost proof vent terminals needed?
- A: Yes—see Health Department regulations 132(d) (2).

**IDENTIFICATION AND GRADING
LUMBER AND PLYWOOD**

Because lumber is a basic element of construction, it is essential that the building official be able to make a determination on the quality of the product. He must also determine whether the lumber is used properly and can withstand the loads to which it will be subjected.

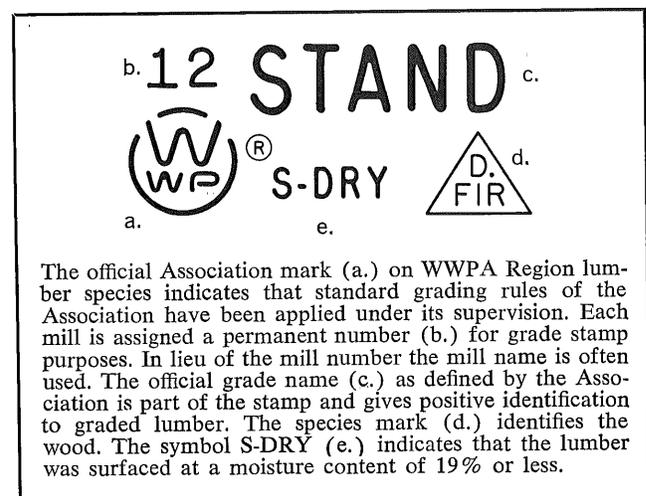
There are several independent agencies, such as the Western Wood Products Association, which establish grading rules and issue grade stamps. Thus, the independent agencies can simplify the building official's job to some extent.

The building official should look for the grade stamp and understand its contents. **LUMBER WITHOUT GRADE STAMPS SHOULD ALWAYS BE REJECTED.**

The Western Wood Products Association is developing a new type of grade stamp consisting of a paper label with adhesive backing. The new label will be easier to read and will last longer.

The Western Wood Products Association has also developed a span computer to assist the building official in determining spans. It takes into account factors such as dead load, live load, stiffness and strength in determin-

ing the appropriate spans for joists and rafters. The span computer, as well as a publication on span tables and grading rules, can be obtained from the Western Wood Products Association.



To further assist the building official, the American Plywood Association has published a **Guide to Plywood Grades** and also **Plywood Excerpts From the Uniform Building Code**. The latter publication also includes ICBO research recommendations and interpretations.

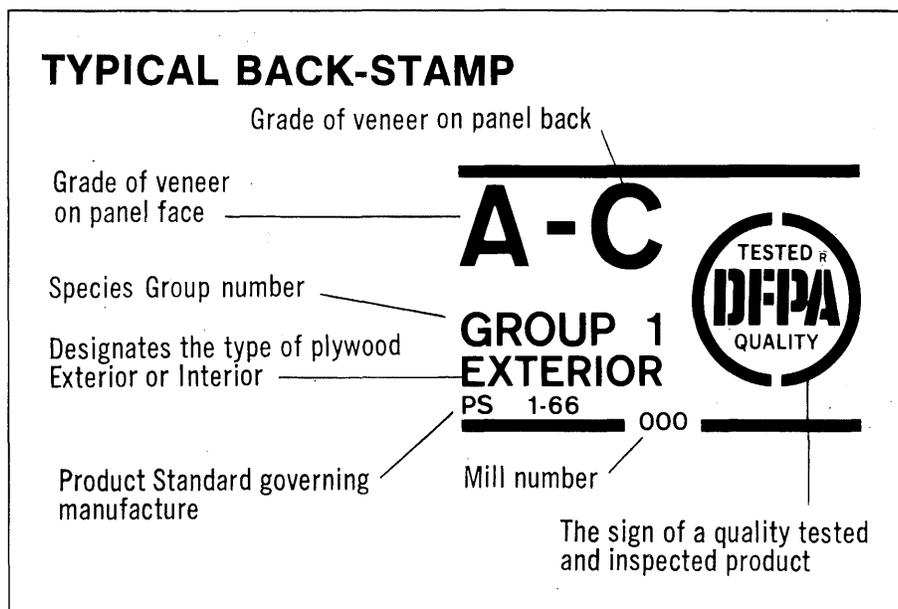
Plywood is a basic wood product used in all phases of construction. It is made from a number of thin sheets of wood (veneers). There are two basic types of plywood — “exterior”, which is waterproof, and “interior”, which is moisture resistant. Within the basic types, there are three different grades of plywood — appearance, engineered, and veneer. Standards for all of the grades are established through the joint cooperation of the U.S. Department of Commerce and the plywood industry.

The Building official should reject all plywood which does not have an approved grade stamp. A typical plywood grade stamp contains the following information:

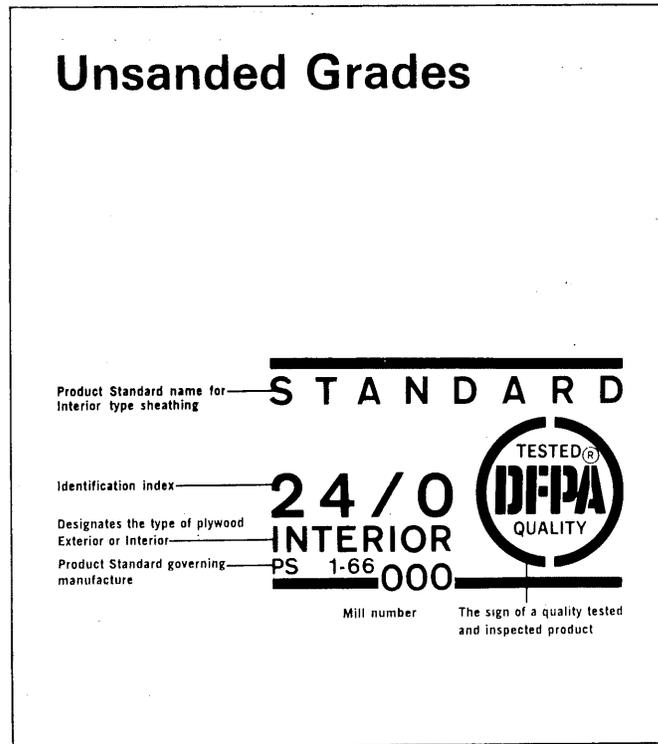
**COMMON BUILDING CODE QUESTIONS
LUMBER AND PLYWOOD IDENTIFICATION**

- Q: Will lumber mills put a grade stamp on every 3-4 feet?
- A: No — it’s too expensive
- Q: What kind of lumber can be used in truss — web member construction?
- A: Any grade except economy grade can be used.
- Q: Are all plys (face, back, interior) of structural plywood graded?
- A: Yes.

- Q: Are there many inquiries on plywood that does not meet code requirements?
- A: Yes — most frequently encountered is plywood being used that has not been grade stamped by an approved quality control agency.
- Q: Are imported plywood panels legal?
- A: The state will approve imported panels if they are tested and certified by an approved quality control agency.
- Q: Are there minimum requirements for plywood wall sheathing?
- A: Yes — refer to UBC 2514.
- Q: What is the recourse of a contractor if plywood delaminates?
- A: The contractor should call the supplier and have him contact the mill for an adjustment (will need to have mill number from grade stamp).
- Q: What are some problem areas which the building official should be aware of when working with plywood?
- A: Some problems include the use of noncertified material, improper nailing, and butting of panels too tight.



Unsanded Grades



PLAN REVIEW AND INSPECTION — SINGLE FAMILY RESIDENCE

The municipal building official should always keep the goal of the State Building Code in mind. As stated in SBC 102:

The purpose of this code is to provide uniform standards to safeguard the life, limb, health, property, and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy of all buildings and structures.

Because of the variety of code requirements covering single family dwellings, the building official should maintain a check list for each house. The check list should include the address, name of the builder, permit number, date of inspection and details of the inspection.

There are a number of construction techniques that the building official must review in terms of the code requirements. Some important points to remember are as follows:

1. Plan Review (check nonstructural features)
 - placement of house on lot

- room sizes, window sizes
- exit facilities—doors, windows
- stairs
- occupancy separations if garage is attached
- attic access
- attic and crawl space ventilation
- water resistive material in shower areas
- combustion air for heating system if necessary
- roof covering — exterior wall finish — flashing
- mechanical systems — flues — vents — fans
- fireplace details

- *2. Plan Review (check structural features)
 - footing sizes (reinforcing if necessary)
 - foundation design — anchorage — beams and columns
 - framing details — joists, headers, rafters, sheathing

3. Inspection

- check soil compaction (test if not sure)
- check for proper footings
 - a) width and depth — continuity
 - b) if reinforcing steel is used, it should be tied in place and wired together
 - c) proper ground cover (deck posts should have frost footings)
 - d) use of sill anchors required
- check for proper ventilation of attic and crawl spaces and furnace rooms
 - a) for every 150 square feet of attic area there should be 1 square foot of roof vent. (If there are vents in the roof and soffit both, then 300 square feet of attic area is acceptable.)
 - b) crawlspace should be vented. They can be vented to the basement in most cases.
 - c) if the house has a vaulted ceiling, each joist space should be vented. In enclosed spaces, ventilation and combustion air can be provided by means of a louvered door. (Clothes dryer fires often occur because of poor venting practices.)
- check for adequate occupancy separation
 - a) in the garage, the fire wall should extend to the rafter and roof sheathing
 - b) problem of fire in recessed light fixtures because of poor installation
 - c) fire resistant gypsum board or equivalent should be used. A solid wood core door between the garage and the house or its equivalent is required
 - d) in houses where there is a living area over the garage, the beams supporting it must be protected as well as the floor-ceiling assembly
- check for draft spaces which may carry fire into the attic
 - a) fire blocks should be used at the plumbing access and ceilings
 - b) block all spaces around plumbing pipes, heating ducts, and flues, and electrical conduits

*The plan reviewer should be a perfectionist and indicate all items of noncompliance and potential problems on the plans.

- check fireplaces to minimize the hazard
 - a) check for adequate clearances to combustibles
 - b) code requires 18" hearth and 20" firebox
 - c) fibre board in wall construction around fireplace is a hazard
 - d) check ratio of the opening to flu size (flu should be 1/10 the opening)
 - e) keep headers and other combustibles out of fireplace throat
 - f) solid masonry units are required
- check shower/tub installation
 - a) water resistive gypsum board in shower area should not be taped
 - b) make sure safety glass is used in shower doors
 - c) water resistive wall board should be used, with a skim coat of tiled adhesive and a bedding coat to seal out moisture
 - d) nailing schedule must be adhered to
- check for handrails
 - a) a tight, spiral staircase is not permitted by the code (minimum tread width is 6")
- check exit windows
 - a) exit windows should be "openable," 4' off of the floor and 20" wide
- check general framing and construction methods
 - a) holes in joists are okay if they are not more than 1/3 depth of the joist and not closer than 2" to bottom or the top (notches are limited to 1/6 depth of the joist and may not occur in the middle 1/3 of the span.)
 - b) check separation walls on townhouses (literal interpretation of present code does not require 2 one hour walls in all cases), see Table 5A of the UBC
 - c) check garage door headers to make sure they are adequate for the span.

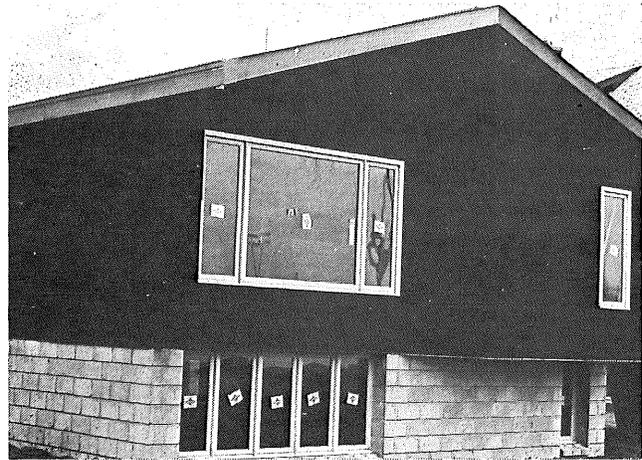
It cannot be overemphasized that, although the general level of workmanship required is established in Chapters 23-24 of the UBC, the building official will still have to make many personal judgment decisions regarding construction methods as well as construction quality. If the building official discovers a problem, he should bring it to the attention of the contractor. If the contractor is not on the premises, the inspector should "tag" the job and place the correction notice in a prominent spot so it will be recognized. (The ICBO does have a field manual on inspection forms which can be used as to guide the local inspector.)

**UNIFORM BUILDING CODE
RESIDENTIAL PLAN CHECK LIST**

Conform
Yes No

GENERAL

503(d)4 5-B	GARAGE DWELLING SEPARATION
1404	BEDROOM WINDOW EXIT
1405(a)	LIGHT & VENTILATION
1407(a)	CEILING HEIGHT
1407(b)	ROOM SIZE (REGULAR)
1407(c)	ROOM SIZE (KITCHEN-WATERCLOSET)
1410	HEATING FACILITIES
2517(c)7	SEPARATION FROM EARTH
3302(a)	EXITS — NUMBER
3303(a)(d)	EXITS — WIDTH
3305(c)	STAIRWAY TREAD/RISER
3305(o)	STAIRWAY HEADROOM
3704(j)	FIREPLACE HEARTH
Table 47-G	GYPSUM WALLBOARD TABLE
5401(a)	GLASS SUBJECT TO IMPACT
5406	GLASS SUBJECT TO IMPACT



FLOOR SYSTEMS

Table 23-A	FLOOR BEAMS
2505	LUMBER GRADE IDENTIFICATION
2506(g)1	JOIST S-LATERAL SUPPORT
2518(d)3	JOIST SPACING
2518(d)4	HEADERS @ OPENINGS
2518(d)4	JOIST HANGERS
Table 25-0	NAILING SCHEDULE
Table 25-Q	FLOOR AND ROOF SHEATHING
Table 25-R	COM. SUB-FLOOR— UNDERLAYMENT
Table 25-T	FLOOR JOISTS

WALL SYSTEM

1707(a)	WEATHER PROTECTIVE BARRIERS
1707(b)	FLASHINGS
1711(b)	SHOWER WALL TREATMENT
2514(c)	SHEATHING MATERIAL PLYWOOD
2515	SHEATHING MATERIAL FIBER
2517(g)	SIDING MATERIAL
2517(g)6	SIDING FASTENING
2518(b)	FOUNDATION ANCHORAGE
2518(c)	GIRDERS
2518(f)1&2	STUD SIZE
2518(f)3	STUD SPACING
2518(f)4	PLATES — TOP & BOTTOM
2518(f)5	WALL BRACING
2518(f)7	HEADERS & SUPPORTS
Table 25-O	NAILING SCHEDULE

ROOF SYSTEM

1704	ROOF COVERING FIRE-RESISTANT
2505	LUMBER GRADE IDENTIFICATION
2518(g)	ROOF DESIGN
2518(g)7	SHEATHING MATERIAL
Table 25-O	NAILING SCHEDULE
Table 25-Q	ROOF AND FLOOR SHEATHING
Table 25-V40	ROOF JOISTS 4 TO 12 PLUS
Table 25-WSL40	ROOF JOISTS FLAT
3203(d)2	ROOFING FASTENING
3203(d)2	ROOFING PAPER
3203(f)4&5	ROOFING MATERIAL
3204	INSULATION — ROOF
3205(a)	ATTIC ACCESS
3205(c)	VENTILATE ATTIC

**COMMON BUILDING CODE QUESTIONS
SINGLE FAMILY RESIDENCE —
PLAN REVIEW AND INSPECTION**

- Q: Do local building officials have responsibility for single family home elevator construction?
- A: Yes—The Department of Labor and Industry does not regulate elevator construction in single family homes.
- Q: Should frost footings be used across the front of garage at the door openings?
- A: Yes:
- Q: What procedure should be followed when there is a cold joint on an unreinforced footing?
- A: The inspector should require reinforcing steel in a bond beam in the wall through the area to make up for what the contractor omitted in the footing.
- Q: When installing a flue, should a fire stop (metal collar or equivalent) be installed at the floor over the basement and at the ceiling?
- A: Yes — see Section 2517(f) of the UBC.
- Q: What kind of fire alarm system will be required in the 1973 uniform building code?
- A: It is U.L. standard 168 and UBC standard 43.6.
- Q: In a single family residence, can a 1" topping of cement be placed on top of wood joints without any additional design? (For example, for ceramic tile installations).
- A: The additional load should be considered in calculating spans of joists.
- Q: In an unfinished basement of a conventionally framed house, from the floor to what point is the ceiling height measured?
- A: To the bottom of the floor joists.
- Q: In application of composition shingles for roof covering, is lacing of shingles at the valley permitted?
- A: Yes. Metal flashing is not required if this method is used.

- Q: What is the minimum design criteria for foundation walls retaining earth?
- A: Refer to UBC 2310.
- Q: Do poured concrete walls need reinforcement?
- A: Refer to Table 3A of the 1-2 family dwelling code. It allows 7' unbalanced fill on 8", 10" and 12" poured concrete walls.
- Q: What is the required size and depth of garage footings and foundations?
- A: On an attached garage, if the foundation walls are 8" block, the footings would be 16" wide and 8" deep. If the foundation walls are 12" block, the footings would be 20" wide and 8" deep. Footings should extend below the frost line.
- Q: What is the correct height for guard rails?
- A: UBC 1714 requires 42". This has been amended in the SBC to permit 36" height for I occupancy.
- Q: How big does an exit door on a single family residence have to be?
- A: There is no requirement in the 1970 code unless

occupant load is more than 10. The 1973 code requires a 3' door.

- Q: Is a diverter rib on valley flashing mandatory?
- A: Yes — refer to UBC 3207.
- Q: Should gypsum wall board be applied vertically or horizontally?
- A: Both applications are approved.
- Q: Can gypsum wall board be applied with adhesive?
- A: Yes — refer to Table 47G in the code for nailing schedule with adhesive and without.
- Q: Are door closers required on the door between garage and house?
- A: Yes — refer to Section 503(d), exception #4.
- Q: Is there a recommended sequence for framing inspections?
- A: Yes — the framing inspection should be done after the mechanical and electrical installations are completed. It should be the last one prior to installing interior finish material.

STATE INSPECTION PROGRAM FOR MOBILE HOMES AND MANUFACTURED BUILDINGS

With the passage of the State Building Code, and the State Mobile Home Code, standards have been established for manufactured buildings and mobile homes. These standards, along with the state certification program, permit acceptance of industrialized housing without inspection by the local building official during construction of the units at the manufacturing plant. Both of the standards went into effect on July 2, 1972. The State Building Code applies to manufactured buildings which will be located in municipalities that are regulated by the Code. The Mobile Home Code (ANSI A119.1) applies to all mobile homes which are manufactured after July 1, 1972. It is illegal to sell, offer for sale, manufacture, or park in a mobile home park in this State any mobile home which does not bear a seal.

The rules allow plan review and inspection by independent quality control agencies, such as Underwriters' Laboratories, Pittsburgh Testing Laboratory, Product Fabrication Service, or U.S. Testing Service. The Building Code Division monitors these efforts and makes only periodic inspections. In the case of manufactured buildings, however, the plans must be reviewed by the State regardless of independent inspections.

After the State has approved the plans, a letter of approval, plus a set of drawings showing which specific models have been approved, are returned to the applicant. The building official should ask the applicant for proof of state approval when a permit is requested for a manufactured building.

The manufacturers of both mobile homes and manufactured buildings are required to fill out a code compliance certificate. The certificate lists the date of manufacture, the serial number of the unit, signature of one of the officers of the plant, and the state seal number. In effect, the code compliance certificate is a warranty for the purchaser of a manufactured building or mobile home that the unit complies to the Code.

The Building Code Division carries out unannounced inspections in both types of manufacturing plants. Currently, the manufacturer is being charged \$10.00 per hour plus expenses for the inspection plus \$6.00 for each seal. On-site inspections and inspections in dealers' sales lots are also made to verify compliance with the code.

Typical code violations found in manufacturing facilities are similar to those found on construction projects. Improper nailing, improper lumber and plywood grade, electrical and plumbing violations, etc., are some of the violations found. Since manufacturers produce their products on an assembly line, any given violation is apt to be repeated on each unit built. Therefore, the manufacturer is required to have an effective quality control program including his own inspectors.

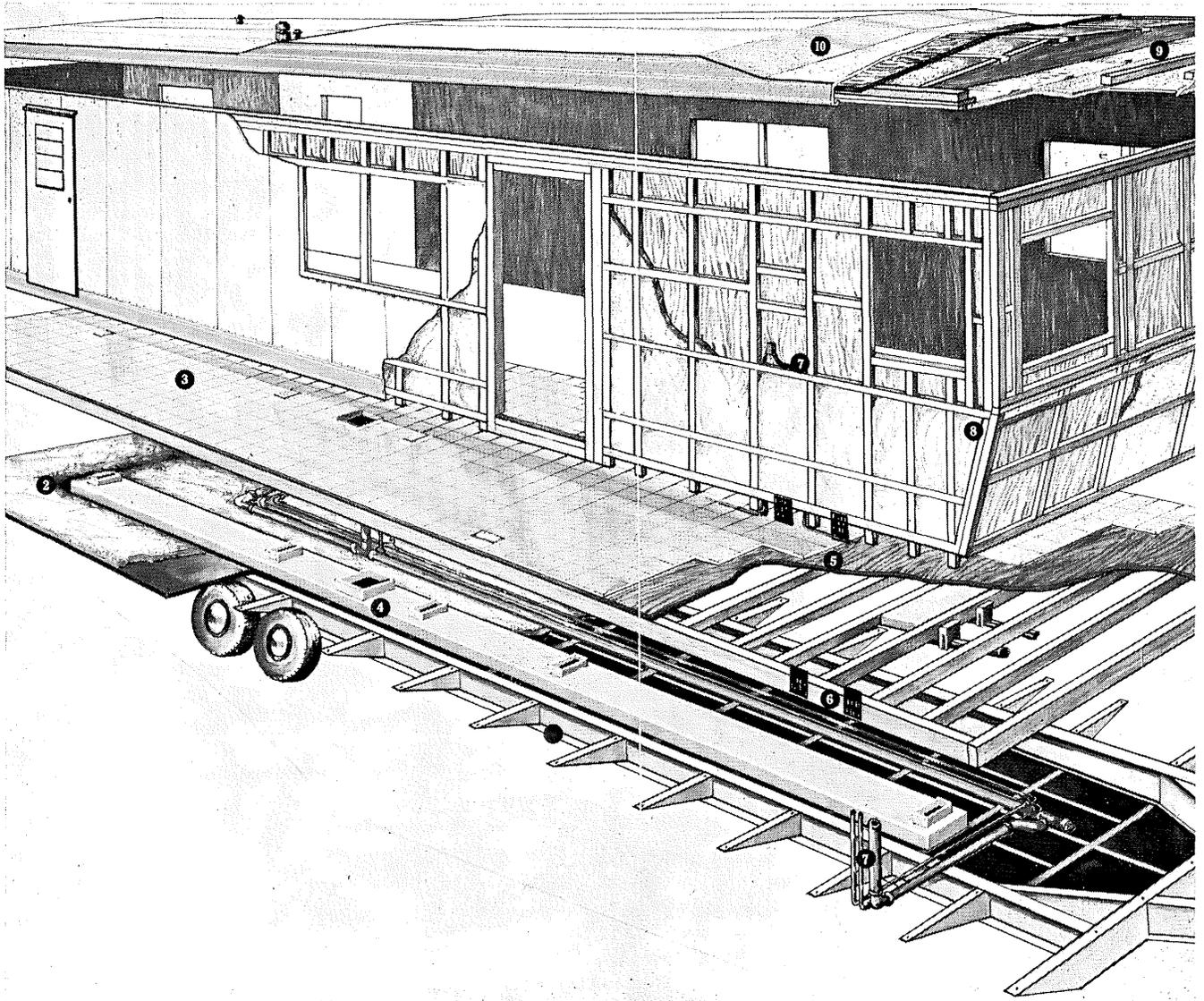
The Minnesota Building Code Division has instituted an inspection program for both mobile homes and manufactured buildings. The inspection results in a seal which all mobile homes and manufactured buildings manufactured after July 1, 1972 must have. The mobile home seal contains the following information:

1. certification of compliance with the Code.
2. date of manufacture.
3. Building Code Division plan approval number.

4. manufacturer's serial number and code number.
5. state seal number.

The manufactured building seal contains the same information except that it deletes the "manufacturer's code number" and adds space for the stamp of the "approval agency." On a mobile home, the seal is placed near the door or the left rear of the coach. There is no specified location for placement of seals on manufactured buildings.





The structural elements of a typical mobile home can be seen in the illustration. The parts include:

1. siding
2. floor insulation
3. finished floor
4. heat duct
5. deck
6. floor framing
7. wall framing
8. wall insulation
9. roof insulation
10. metal roof

If municipalities permit mobile homes, they should adopt an ordinance which provides for on-site inspection before the units are occupied. Two important

things which the local building officials should check are:

1. The sewer connection of the riser from the ground to the unit. A poor seal may let sewer gas escape into the space under the unit and get into the furnace.
2. Air test the gas line to check for leaks.

The potential for a fire in a mobile home is increased by an excessive amount of heat tape wound around the water pipes.

Similar on-site inspection procedures should be followed for manufactured buildings. In fact, the State Building Code authorizes local enforcement agencies to

inspect the installation of manufactured buildings, components and systems and determine that such installation is in complete accordance with its certification. The local enforcement agency may

inspect, to the maximum extent possible without causing undue delay, manufactured buildings, components, and systems at the installation site for compliance with the code. Such inspections shall not require the removal of permanent parts of the structure. Evidence of non-compliance shall be reported to the State Building Inspector.

In any event, the local building official should require proof of Building Code approval. In addition he should require the manufacturer's foundation plan. This plan contains such information such as column spacing and support as well as footing sizes and column loads.

Anchoring a manufactured unit to a foundation is not too much different than a stick-built house. Some manufacturers are using straps and anchor bolts. At the present time, the State has no anchoring requirements for mobile homes. It is expected that the 1973 Edition of the Mobile Home Code will require some type of anchoring.

COMMON BUILDING CODE QUESTIONS MOBILE HOME — MANUFACTURED BUILDINGS

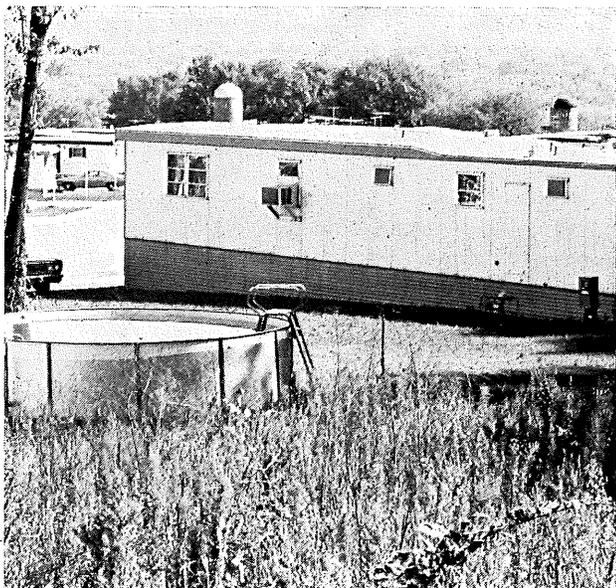
Q: Do small lumber yards who manufacture buildings in their yards to be moved to another site have to be in compliance with the rules and regulations for manufactured buildings?

A: Yes — they will have to submit plans for approval and be inspected prior to issuance of a seal.

Q: Are state seals on mobile homes applicable only after July 1, 1972?

A: Yes — code does not apply to mobile homes manufactured before July 1, 1972.

Q: If there is a serious code violation in mobile homes, will the seal be removed?



A: Not as a general rule — a repair order is usually issued. However, if it is a very serious violation, the seal may be removed.

Q: Is there a plan review and inspection for out-of-state mobile home manufacturers?

A: Yes — the same procedures apply to both out-of-state and in-state manufacturers.

Q: Can a building official air test the gas line of mobile homes after location on the site?

A: Yes.

Q: Is the interior finish of mobile homes regulated by the code in terms of fire protection?

A: There is a flame spread rating required on walls and ceiling finishes.

Q: Is the valuation of the entire house used in establishing a building permit surcharge fee for a manufactured home?

A: Yes.

Q: Do mobile homes placed on agricultural land need a state seal?

A: All homes manufactured after July 1, 1972, and offered for sale in the State of Minnesota must have a seal regardless of where it is to be located.

Q: What if a vocational school builds a house?

A: If the home is built at the school to be relocated at another site, it must have a state seal.

Q: Are there mandatory requirements in the mobile home code for anchoring mobile homes?

A: Not at the present time. A city ordinance may require it.

Q: Are there any regulations on mobile home alterations?

A: Alterations to mobile homes bearing a seal must have prior approval of the Building Code Division.

Q: Are there provisions in the code for water meters on mobile homes?

A: No.

Q: What is the problem with heat tapes on mobile homes?

A: There is usually improper installation and/or lack of maintenance which creates a fire hazard.

Q: Is there a new design for mobile home parks?

A: Yes — stacking in a metal frame is one but there have been many innovations recently. The State Health Department regulates mobile home parks.

Q: Does mobile home code apply to those built before July 1, 1972?

A: No.

HOW A BUILDING INSPECTOR DEALS WITH PEOPLE

If you are thinking of becoming a building official or you have just recently assumed the job, you may be asking yourself: "What does it take to become a successful building official?" Of course, there is no formula which can be applied to the job. However, there are several general characteristics of building officials and, in dealing with the public, a building official should recognize them and act accordingly.

First, A BUILDING INSPECTOR IS REALLY SEVERAL PERSONS.

- A building official is usually a skilled craftsman—or perhaps an ex-builder who's supervised other craftsmen. He has the advantage of insights, understandings, as well as knowledge gained in this experience.
- A building official serves the public, sharing a common mission with police officers, sanitarians, pollution monitors, water and sewer technicians, firemen and others.
- The work of a building official is largely unknown among many persons. Therefore, he must constantly be working to educate and inform others about the importance of good inspection programs. The role of educator may seem a strange one, but it is an essential part of the job. Every personal contact an official makes has an informational and educational nature as well as a technical side.
- A building official is an individual and his personality is going to influence how he does his respective jobs as inspector, public representative, and educator.
- A building official may deal with people who try to influence or use him. For example, during the holiday seasons, it is common for building officials to receive gifts. Individual jurisdictions set guidelines as to what may be accepted—such as "if you can spend it, sell it, or put it in your living room, don't take it."

All of this means that the building official has to take a balanced and perhaps skeptical outlook on how people deal with him. If his actions in dealing with people give any indication that he can be "bought", the impression will spread and his total effectiveness will be lessened **regardless of his technical competence.**

Second, REALIZE THAT YOUR SUCCESS IS ALSO DEPENDENT UPON OTHER FACTORS AND OTHER PEOPLE.

- Build support for good inspection with the elective municipal council or county board using proper organizational channels.

1. Whenever a public body decides to start or upgrade an inspection program, encourage it to do so with a resolution that spells out the purpose of an inspection program.
2. Provide the elective body with at least an annual report of the results of the inspection program.
3. Whenever new councilmen or board members are elected, offer to explain the inspection program to them.
4. Assuming that the elective officials and perhaps an overall administrator do not have a technical understanding of building construction, constantly educate them about the **results** of poor inspection or no inspections.

- Build support for good code enforcement among the construction industry.

1. Make yourself available (as much as possible) for question/answers and pre-construction conference (plan review).
2. Work with the builder in scheduling inspections at times which will be of mutual convenience in that they do not unduly hold up construction nor waste time of the inspector.
3. Treat all builders in an equal, fair way so as to minimize any possible charges of favoritism.
4. Don't be afraid to acknowledge good craftsmanship when you come across it.
5. Keep yourself up to date in your field as to new materials and methods as well as trends.

- Encourage community awareness and support of good building inspection programs.

1. Printed public information pamphlets about code, permits and inspection should be available at the City Hall and Courthouse.
2. If you enjoy public presentations, make yourself available for appearances before civic organizations.

Third, DEAL WITH DIFFERENT PUBLICS IN DIFFERENT WAYS.

- **People performing the work**—as a former craftsman, the building official may know many of the persons whose work he will inspect. In fact, he may be inspecting the work of a former co-worker. In inspecting this work, the only consideration should be whether it does or does not meet code requirements. "Shop talk" should consist of industry concerns, trends, and events without commentary about what a specific builder may or may not be doing.

This is one of the difficult areas of a building official's job because of familiarity with the persons involved and the naturalness of the situation to engage in friendly banter.

- **People paying for the work**—To a developer or builder, time means money and a late arriving inspector can hold up work. Similarly, unexpected demands for code conformance which go beyond normal tolerances can cause expensive delays and diversion of the work force.

On the other hand, the building official should be kept completely informed of the rate of construction and when inspections will be necessary—especially when a series of inspections are necessary.

These are the concerns and “trade offs” that builders and inspectors have to offer each other in developing a working relationship. It should begin with a pre-construction review of plans by the inspector and be followed by close communication of all stages of construction.

“Going out of the way” to perform an inspection after normal working hours or on the weekend should be considered only on a policy basis — either you do it for everyone or not at all. There is logic for providing after hours inspections especially during weather shortened construction seasons. There is equal logic to insist that inspectors be given as much advance warning as possible when inspection is necessary.

This “give and take” relationship should always be characterized by an inspector’s insistence that there be equal and fair code enforcement for everyone.

- **People who have to live with the work**—A building official often performs his work under the watchful eye of a homeowner. This is a mixed blessing because poor public relations can result as well as good public education. Questions can be answered which improve an understanding of the importance of code enforcement.

To understand the “PR” possibilities of the home inspection, the building official must start with the realization that, **“IT’S NOT ONLY WHAT YOU DO—BUT HOW IT APPEARS YOU ARE DOING IT.”** For a concerned homeowner, probably the most important factor in the inspection process is, **did the inspector spend enough time.**

A building official may have “a trained eye” and be able to very quickly determine whether work conforms to code. However, if time permits and it should, extra measuring or viewing in the sight of the homeowner is a good investment. It should always be kept in mind, that most citizens are not familiar with building techniques and see much greater complexity in the work than the building official.

Another area of concern for the homeowner is how the work looks. Sloppy craftsmanship, even if it conforms to code is still upsetting and produces questions. The inspector must not get in the middle between a homeowner and craftsman in this matter even though it might seem the “right thing” to do.

Fourth, REALIZE THERE ARE DEFINITE IMPRESSIONS YOU WANT TO MAKE WITH YOUR PUBLICS.

Impressions You Want to Convey	Impressions You Don't Want to Convey
Pleasant	Easily influenced
Fair	Inconsistent
Forceful	Arrogant
Concerned	Complacent
Thorough	Sloppy
Honest	Suspect
Knowledgable	Ignorant
Competent	Incompetent
Trustworthy	Sneaky
Courteous	Curt
Consistent	Erratic
Exacting	Unrealistic
Human	Impersonal
Equitable	Unfair

There is a “fine line” between many of these impressions and the personal nature of each contact a building official makes must be taken as seriously as the technical skills he applies to the inspection.

One of the most important jobs of the building official is to LISTEN. The following guidelines will help to improve your listening skills:

- (1) maintain an awareness of your own motives in listening
- (2) show interest in what the speaker is saying
- (3) arrange favorable physical conditions for listening
- (4) develop the ability to sustain attention
- (5) strive to grasp the central idea of the message
- (6) spend time analyzing-anticipating speaker’s message
- (7) seek frequent experience in listening to difficult material (practice listening!)

Fifth, GIVE YOURSELF THE FOLLOWING TEST WHEN YOU’VE COMPLETED AN INSPECTION.

Was the public interest served by the way the inspection was conducted?

Was the credibility of the inspection program **intact** at the conclusion of the inspection?

Was your personal credibility **intact**?

Was there direct communication between you and the persons involved in the inspection?

Was anything left uncompleted? If so, did you follow up?

Were the words you used at the conclusion of the inspection clear, direct and to the point?

Did you speak in a clear, understandable manner? (no mumbling!)

Did you report the results of your inspection to the correct person?

It is apparent that one of the most difficult questions a local official has to answer — both in practice and on the certification test — is how to deal with the public. Because each inspection situation is different, there is no “formula” which can be applied when dealing with the public. The following examples are actual inspection situations faced by local building officials in the State of Minnesota. The examples have been generalized so that YOU can put yourself in the situation and analyze how YOU would react.

1. Footing Inspection of a Commercial Building Addition

When the building official arrived on the job, he noticed that the footings were already poured. The footings were very wet looking and, upon closer examination, the building official discovered that a wooden stake set into the footings would probably collapse. Obviously, an extremely large amount of water had been added to the concrete.

When confronted with the problem, the concrete foreman admitted that he didn't have manpower enough on the job to wheel all the cement around the footings so he told the Ready-Mix driver to add an additional 35 gallons of water to the 4 cubic yard mix. Thus, the cement would flow evenly to the ends of the trench and seek its own level.

The building official told the foreman the footing was not acceptable. The foreman was further told that he would be well advised to remove the material from the trench before it set up because he would not be allowed to build on it. The foreman became very abusive. When the building official's supervisor reviewed the situation, he decided to allow the contractor to take 5 bags of concrete and sprinkle the contents over the footing and mix it into the footing with a rake.

Thus, the basic decision to remove the footing was reversed and the contractor was allowed to continue construction.

2. Office Building (Type V — I Construction)

In requesting a permit for a 45' x 100' office building, the contractor was unaware of M.S. 362.02 et. seq, requiring the preparation and certification of structures over \$30,000 by a registered architect or engineer. Because the footings and foundation were well over Uniform Code minimum, the building official issued the builder a permit for excavation footings and foundation. The architect's plans arrived in time

to continue construction. The contractor was pleased that he was able to meet his completion schedule.

3. Commercial Building

Building inspector “A” drove by a construction site enroute to another inspection at 9 A.M. on a February day. The temperature had been -5° F that morning and now was approximately 10° F.

He had made an inspection at the site prior to pouring of concrete for footings at 3 P.M. the previous day, had approved the pouring of concrete and departed from the site. He observed in passing that there was no covering hay in evidence on the banks of the excavation. He stopped, walked to the excavation and noted that the concrete which had been placed the day before had not been covered to prevent it from freezing. A close observation disclosed ice crystal formations on the concrete.

A stop order was issued and the masonry contractor was advised that the footings were condemned. He insisted that they were not frozen, were completely adequate and no detrimental effects would occur if a house were constructed on the footings. He further pleaded that his crew of block layers did not have another job to which they could be assigned. The building inspector was accused of being arbitrary and unreasonable. The contractor was given the option of removing the concrete or covering it with an insulating material (such as marsh hay) for a minimum of seven days and drilling a test core of the concrete to be tested for compressive strength by a qualified independent testing laboratory.

The contractor appealed the inspector's decision to his immediate supervisor who, after a conference with his inspector, upheld the decision of his inspector. He then covered the concrete, waited two weeks and engaged a testing agency to drill a core sample from the concrete in the presence of the inspector.

The core drilling operation required water as a cooling agent for the drill. The water separated the concrete and aggregate so that they crumbled and it was not possible to obtain a core sample.

This was conclusive evidence that the concrete was in fact not capable of performing its function of supporting a structure.

The footings were removed and replaced at a later date.

4. Single Family Residence

Building official “A” received a telephone call from a homeowner who indicated that there were several discrepancies in his new home and he could not get any satisfaction from the builder in correcting them. The home was occupied prior to a final inspection.

He arranged for an inspection of the home with the homeowner who had a long list of items of complaint.

The building official reviewed the list, made a careful inspection of the premises and compiled his own list of deficiencies and omissions which were related to the code.

A comparison of the lists indicated several items on the owner's list that were not code related in that they dealt with interior trim, painting, cabinetry, carpeting, kitchen floor covering and other items not regulated by the building code.

The owner was advised that the builder would receive a written correction notice of the code related items which dealt with health, safety and welfare, but that the builder could not be forced, by the building official, to repair the non-code related items. The homeowner was very unhappy with the inspector's determination and emphatically voiced his opinion that the code and the inspection department did not adequately protect the consumer. He further voiced other grievances against government agencies in general. The building official spent a considerable length of time patiently explaining to the owner the purpose, scope, and application of building codes.

He offered to assist the owner by advising the builder of the non-code deficiencies listed by the owner at the time the correction notice was sent to him.

Compliance with the correction notice was obtained on the code items and most, though not all, of the non-code items were corrected at the same time. The homeowner, though not completely satisfied, was appreciative of the assistance obtained from the building official.

COMMON BUILDING CODE QUESTIONS PROBLEMS OF THE MUNICIPAL BUILDING OFFICIAL

Q: Where does liability begin and end for building officials?

A: From Day #1 to death! If the inspector's actions have been that of a prudent man, the chances of an adverse court decision are very remote.

Q: Can an inspector force compliance of the code in areas where it doesn't apply?

A: No — not legally.

Q: Are there legal/ethical questions where a building inspector does construction work in the same community he is employed as an inspector?

A: There is a definite conflict of interest but there are no specific rules in the building code law or code regulating it. The State Board of Electricity rules do not permit electrical inspectors to do contracting. It is suggested that an inspector from an adjoining community inspect the work.

Q: Would the state take over local inspection responsibilities?

A: Only as a last resort. MS 16.861 provides for state inspection if a municipality doesn't provide it.

Q: What is the importance of experience in the certification procedure?

A: Experience is definitely an asset. An interview board of three members evaluate the experience and personality characteristics of the individual inspector.

Q: What can be done when a building official over-extends his authority in demanding standards in excess of the state code?

A: An appeal may be instituted to the Commissioner of Administration pursuant to MS 16.863.

Q: Can a person be certified as a building official if he is not sponsored by a municipality?

A: Yes.

Q: Is there a minimum time of practical experience in building before being certified.

A: No specific criteria have been established.

Q: Can a HUD-FHA Housing Authority override the local building official?

A: HUD may not waive building code requirements. Any financial or lending agency may have requirements more restrictive than state code.

Q: How can inspections be performed most effectively?

A: The procedure should be pre-planned, but not rigid.

Q: Are field notes of inspections important?

A: Yes — Often they are necessary at a later time for informational purposes, or as evidence in court proceedings.

Q: Should inspection reports be detailed?

A: They should be brief and concise but contain all pertinent details.

APPENDIX

REFERENCE LIBRARY FOR BUILDING OFFICIALS

MANDATORY BOOKS

Document	Publisher
Minnesota Building Code Minnesota Plumbing Code 1971 State Fire Marshal Rules Governing Buildings Providing Accessibility and Useability Features for Handicapped Persons (SFM 501)	Department of Administration Documents Section 140 Centennial Building St. Paul, Minnesota
Uniform Building Code Vol. 1 1970 Edition	International Conference of Building Officials 5360 South Workman Mill Road Whittier, California 90601
American National Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks ANSI A 17.1 — 1971	The American Society of Mechanical Engineers United Engineering Center 345 East 47th Street New York, New York 10017
National Electrical Code 1971 Edition	National Fire Protection Association 60 Bottery March Street Boston, Mass. 02110

RECOMMENDED BOOKS

Uniform Building Code Standards	I.C.B.O.
Training Manual of Field Inspections of Buildings and Structures	I.C.B.O.
Plan Review Manual	I.C.B.O.
Research Recommendations —	I.C.B.O.
Uniform Sign Code	I.C.B.O.
Uniform Fire Code — 1971	I.C.B.O.
National Fire Codes — 10 Volumes 1972-73 Edition	N.F.P.A.
U.L. Building Materials Directory	Underwriters Laboratories Publications Department 207 East Ohio Street Chicago, Illinois 60611
Federal Register — O.S.H.A.	
Design Date — Fire Resistance Fire-Sound-Structural 1973-74	Gypsum Association 201 North Wells Street Chicago, Illinois 60606

Document**Publisher**

Wood Structural Design Data

National Forest Products Assn.
1619 Massachusetts Avenue N.W.
Washington, D. C. 20036

Uniform Plumbing Code — 1973

International Association of Plumbing &
Mechanical Officials
5032 Alhambra Avenue
Los Angeles, California 90032

ASTM Standards in Building Codes
Tenth Edition — 1972

American Society for Testing and Materials
1916 Race Street
Philadelphia, Pennsylvania 19103

Building Department Administration
by Robert E. O'Bannon

I.C.B.O.

Structural Steel Design — 2nd Edition — 1971
by Jack C. McCormac
ISBN 0-7002-2342-8

Intext Educational Publishers
Scranton, Pennsylvania 18515

Simplified Concrete Masonry Planning and
Building — 2nd Edition
by J. Ralph Dolzell

McGraw Hill Book Company
New York, N.Y.



STATE OF MINNESOTA

DEPARTMENT OF HEALTH
717 DELAWARE STREET S. E.
MINNEAPOLIS 55440
January 14, 1970

INFORMATION ON NEW MINNESOTA PLUMBING CODE

The old Minnesota Plumbing Code was adopted as an advisory code by the Minnesota State Board of Health on July 20, 1937. The code could be made mandatory by having its provisions included in a local ordinance. Several hundred Minnesota municipalities did adopt the code as a local ordinance by reference, and enforced it through a system of licensing, permits, and inspections.

The new Minnesota Plumbing Code was adopted by the Board in May 1969, and was reviewed and approved by the Attorney General and filed with the Secretary of State and the Department of Administration in June of 1969. The new code is mandatory and will apply as stated in Minnesota Statutes, Section 326.37:

"The State Board of Health, may, by regulation, prescribe minimum standards which shall be uniform, and which standards shall thereafter be effective for all new plumbing installations, including additions, extensions, alterations, and replacements connected with any water or sewage disposal system owned or operated by or for any municipality, institution, factory, office building, hotel, apartment building, or any other place of business regardless of location or the population of the city, village, or town in which located. Such regulations, upon approval of the Attorney General and their legal publication, shall have the force of law, and the violation of any part thereof shall constitute a misdemeanor."

The new Minnesota Plumbing Code applies, therefore, to any building connected with any municipal water supply or sewage disposal system. In addition, it applies to the plumbing systems of any commercial and other types of buildings listed in the statutes, whether or not served by a municipal water supply or sewage system and regardless of where they are located. In order to provide effective enforcement of the plumbing code, all municipalities and especially those having a water supply and/or sewage system are urged to adopt the code by reference as a local ordinance. The limited inspection capabilities of the Minnesota Department of Health will be used primarily, as in the past, to make inspections of public and commercial buildings and to provide advice and consultation to local plumbing inspectors.

Municipalities may amend the code to require more stringent standards than the minimum standards set forth in the code, but may not amend it to allow standards lower than the minimum set forth in the code. The State Board of Health is the administrative authority in the interpretation of the code and should be consulted regarding any local changes in it.

Additional copies of the code may be obtained from the Documents Section, Department of Administration, Room 140 Centennial Building, St. Paul, Minnesota 55101, at a cost of \$3.50.

Any questions concerning the code or requests for service in its adoption and enforcement may be addressed to the Minnesota Department of Health, Division of Environmental Health, 717 Delaware Street S.E., Minneapolis 55440.

