

CODES – STANDARDS – COMMON SENSE

INTRODUCTION

This document explains some of the interactions between Building Codes, Specifications, Standards, and plain old common sense with regard to evaluations of existing buildings.

Many people try and quote chapter and verse of a code entry to benefit themselves or prove a point. While it is appropriate and necessary to follow current code when working on buildings it is also important to know the intent of the code, the history of the structure, and the specific problem at hand.

Above all else, it is important to understand the current situation and apply reasoning when evaluating or working on a building.

TABLE CONTENTS	
1.	Definitions
2.	Prior to Building Codes
3.	Early Building Codes
4.	Code Enforcement
5.	Modern Building Codes
6.	Evaluating and Existing Structures
7.	Good Practice & Industry Standards
8.	Example 1 - Evaluating a Concrete Wall that is not Plumb
9.	Rebuilding after a Damaging Event
10.	Code Interpretation
11.	Repair vs Replace after a Fire
12.	Repair vs Replace – Code Discussion
13.	State Statute and Building the Code
14.	Hazard Conditions
15.	General Repair Rules

1. DEFINITIONS

Building Code – The published document of a governing authority that regulates building construction in that region.

Building Standard – A published technical document that may or may not be adopted by reference by the local Building Code.

Code Enforcement – The process of a governing authority to regulate building construction. This may include permitting, fees, fines, or stop work orders.

Construction – The process of fabricating and erecting building materials to create or repair a building.

Reasoning – Thinking about something in a logical, sensible way. Combining wisdom, knowledge, and experience to the situation.

2. Prior to Building Codes

Not so long ago, when people needed a structure, they would just build it. They may have had good knowledge on what would work well or may not have had good knowledge.

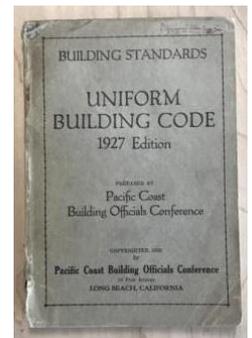
Things that worked well stayed up. Things that did not work well fell down or were removed.

For example, there are numerous buildings in Minnesota that were built not very well in the past but have continued to be occupied as they are passed to the next generation. Many older homes are fine and have no problems; however, others might eventually hurt people physically or financially as they fail in countless ways.

3. Early Building Codes

Governing authorities eventually stepped in and started writing rules on what could be done and what could not be done. Some of these rules were enforced and others were not. The mandatory rules showed up in early forms of what we call Building Codes. The first codes were very small.

- The first Uniform Building Code (UBC) was published in 1927.
- The first Standard Building Code (SBC) was first published in 1945.
- The first National Building Code BOCA was published in 1950.



These are all relatively young documents considering the first building constructed in Minnesota might have been in 1835.

There are numerous code topics that are regionally more important in some areas compared to others. A builder in Florida need not understand building on permafrost in Alaska. A builder in California better understand earthquakes while a builder in north Maine better understand heavy snow.

There are numerous code topics that are specific to the type of building being used. A school or trauma center in a heavily populated hurricane region must have significantly more rules to follow than an Iowa hog barn.

The task to cover all building conditions was overwhelming, but the modern building industry has significantly tackled the problem. Today's codes and standards offer extensive information that makes buildings safe.

4. Code Enforcement

Many populated cities have local building departments employing Building Officials that interpret the codes and attempt to protect the general public by enforcing smart building practices that are adopted into the building codes.

Less populated areas may not have code enforcement, but that does not mean that the code need not be followed in that area.

5. Modern Building Codes

Not so long ago, there were numerous governing authorities writing numerous requirements on all sort of issues. Today, the International Code Council (ICC) has come to the lead of the pack and is, for all practical purposes, the leading publisher of current building codes in the United States.

The ICC published one common code that could be used across all states. The goal was to bring all the information together in one place.

The first International Building Code (IBC) was published in 1997. This has replaced UBC, BOCA, and SBC.

The ICC publishes several documents including:

International Building Code (IBC)

International Residential Code (IRC)

These documents are normally accepted into law in whole (or partially) by governing authorities. The IBC and IRC are updated every 3 years and the governing authorities accept or reject certain aspects of the IBC or IRC.

For example, the current 2020 Minnesota State Building Code became effective March 31, 2020 and references the 2018 IBC. (<https://www.dli.mn.gov/>)

“It is the minimum construction standard throughout all of Minnesota. Although it is not enforceable by municipalities unless it is adopted by local ordinance, it creates a level playing field for the construction industry by establishing the Minnesota State Building Code as the standard for the construction of all buildings in the state”..

6. Evaluating Existing Structures

A person should not hold an older building to a higher standard that did not exist when it was built. We cannot expect a house built in 1933 to comply with every paragraph in the current code that has been modified and updated continually.

The code authorities have recognized this fact and have developed standards for existing buildings. Some are adopted while others area not. Codes are a moving target. For example, the first MN building code was adopted in 1972. The 2020 Minnesota Building Code

references the 2018 International Existing Building Code but still has not accepted Appendix J of the IRC which is titled, “Existing Buildings and Structures”. This leaves room for reasonable thought.

In general, whenever an existing residence is modified, repaired, or altered, the new material should meet today’s standards. However, it has never been the goal of the building codes to require every aspect of every building to be conforming to current new construction code. This would be a near impossible task and highly unnecessary and economically irresponsible. Reasoning and common sense needs to be used when evaluate existing structures.

7. Good Practice & Industry Standards

At the same time that code people were writing requirements, the building industries, manufacturers, and researchers continued to manufacture and create materials for buildings. New materials were introduced into the market and old ways of doing things were put aside or made obsolete. These people knew their products much better than the code writers.

They manufactured and developed materials based on science and economics. Associations formed with the main intent of promoting the materials for sale and generally advancing the materials.

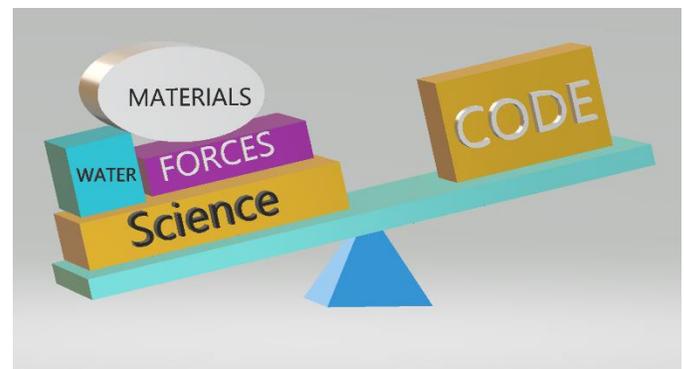
For example, the American Concrete Institute (ACI) has long been testing, researching, and publishing information about concrete and all of its many aspects for a very long time. ACI updates and publishes many documents. The following are three that apply to residential construction:

ACI 318 Building Code Requirements for Structural Concrete

ACI 332 Code Requirements for Residential Concrete

ACI 117 Specification for Tolerances for Concrete Construction and materials

The driving force that produces code is the market. If no one is using, buying, or selling the material, there is no need to regulate it.



8. Example - Evaluating a Leaning Concrete Wall

Problem:

A concrete basement wall was found to be out of plumb. The owner wants to know if the leaning wall is a major concern. Is the wall OK? Should something be done? How much leaning is too much? Is the wall out of acceptable tolerance? Was it built correctly? Should the contractor be held responsible for the wall? Is it built to code?

Given:

The concrete basement wall was measured to be leaning inward as much as 2 inches. There were cracks in the wall. The wall was 6 years old.

Answer:

The first task is to determine the cause. Is the wall moving? Had it moved, or was it constructed out of plumb?

If the wall is determined to be moving due to external loads and there is a lack of adequate support at the top of the wall, then, regardless of any code requirement, the wall would be considered a dangerous situation. It would be judged to have not been built adequately by any standard, and it must be given immediate attention. This would be a matter of looking at the laws of gravity, statistics, soil stability, and simple force evaluation.

If the wall is determined to be just poured out of plumb and determined to be structurally sound while not moving inward, it would likely be fine to remain. However, there may be finishing problems. There may be reason for a contractor to pay compensation for poor workmanship.

Code Analysis:

By studying the code(s) and standards that were enforced at the time of construction, it may be proven that the wall was not "built to code." For example, if the wall were built in 2020, the following statement would be true:

1. The governing code for the area is the 2020 MN Building Code
2. The 2020 MN Building Code references the 2018 IRC.
3. The 2018 IRC references ACI 322
4. The ACI 322 references ACI 117
5. ACI 117 states the maximum tilting of a concrete wall must be less than 0.3% of the height with a maximum of 1-inch. Therefore an 8-ft basement wall should not be out of plumb by more than $0.003 \times 8\text{-ft} (12\text{in/ft}) = 0.28$ inches.

Therefore, there is a problem with the basement wall. As a minimum, the wall did not conform to current code.

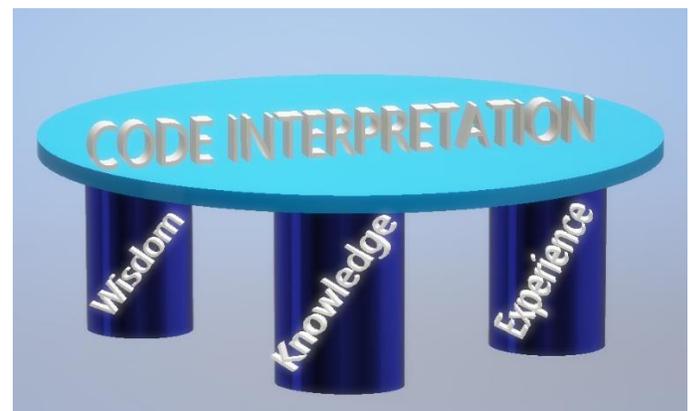
9. Rebuilding after a Damaging Event

Buildings can have very unique conditions before and after a damaging event. Nearly every building is unique based on its purpose and past history: The following is a short list that demonstrates the complexity of the rebuilding process after a damaging event due to existing conditions.

- a) Building codes, building materials, and building standards have historically been evolving at different rates based on geographical location. When and where a building was constructed has a lot to do with the present conditions of a building.
- b) Code enforcement had been evolving. What was required at the time of construction has changed over time. Building codes have generally been improving, so modifications and improvements, if done to code, have generally improved the state of the building.
- c) Materials have evolved over time. What type of materials were used, and how well the materials have functioned over time has a large impact on the overall general condition of an older building. New building materials have been introduced and others have been eliminated or improved.
- d) Owners have continued to modify buildings due to major and minor maintenance and repair.
- e) Workmanship can vary drastically between different contractors on the same crew. What was required and what was built can be two different things. The quality and accuracy can vary from one person to another. It is important to know if the past work was done correctly with a high standard of care or was it done sloppy or inadequate.

10. Code Interpretation

The code writers have attempted to make the code easy to read. Therefore, it is often written in simple direct ways for specific reasons with specific intent. When working with the code, a person must have the knowledge of why it was written, experience of the topic, and the wisdom to apply it to the current project. It is a 3-legged stool. Missing one element may result in the wrong outcome.



11. Repair vs Replace after a Fire – General Discussion

The previous section discusses how different buildings can be based on historical accounts of a building. Repairing of existing buildings can be complicated based on the existing conditions, the damage, and the current building requirements for repair.

The decision to repair or replaced ultimately depends on the overall economics of the project, the code requirements, the extent of damage, or the owner's preferences. Certain items may need to be removed and replaced. Others may not need replacement, modification, alteration, or repair. The following are categories of where an item might be classified when evaluating a repair project after a fire:

- a) No repair necessary - An item might not be damaged at all by the fire. The item might not need anything done to it.
- b) Remove undamaged item - An item may be obsolete or it may not be wanted as part of the clean-up process but it is not damaged.
- c) Clean materials only - An item may only need to be cleaned.
- d) Strengthening damaged materials - It may be prudent to strengthen damaged materials rather than replace.
- e) Remove and Replace (R&R) damaged material with new material of like kind - Damaged material may need to be removed and replaced with like kind and material. Often if a material is no longer code compliant, the repairs can be made with like kind and material if available and the repair is not excessive.
- f) Remove and Replace (R&R) damaged material with new and better material - Reasoning may dictate that the repairs goes beyond the damage areas to include replacing materials with better more restrictive building techniques. This can be a requirement that depends on a reasonable evaluation by a professional or a building official. Both are required to safeguard the general public.
- g) Improvement - The owner or contractor may see the repair project as a good opportunity to update the building. This is often not a bad idea, but it may not be code driven or related to the loss.
- h) Hazards beyond damage – Some items must be removed, repaired, strengthened, or modify that are not affected by the fire. A portion of the building may be determined to be a safety hazard. When the building goes through a repair permitting process, the design professional, or a building official may require certain aspects of a building be “fixed”. Without fixing the substandard condition, the project could not be permitted.

12. Repair vs Replace – Code Discussion

The building codes are still evolving to help quantify the level of complexity of a building repair project. The International Building Code (IBC) has different classifications based on what work is needing to be done. A construction project can normally be classified as new construction, repairs, renovations, alterations, or reconstruction.

In 2008, the Minnesota Legislature passed legislation (state Statue 326B.121) that establishes the State Building Code (SBC) as the minimum construction standard throughout all of Minnesota, including all cities, all townships, and all counties. Prior to this there were “non-code” areas where the State Building Code was not applicable or enforced.

The Minnesota Building Code must be followed no matter where the building is, and no matter if someone is going to look over the work.

326B.121 STATE BUILDING CODE; APPLICATION AND ENFORCEMENT.

Subdivision 1. Application. (a) The State Building Code is the standard that applies statewide for the construction, reconstruction, alteration, repair, and use of buildings and other structures of the type governed by the code.

(b) The State Building Code supersedes the building code of any municipality.

(c) The State Building Code does not apply to agricultural buildings except:

According to current code, if a structure is to be repaired, the end product must be safe according to today's standards. It has never been the intent of the building codes that every building must be upgraded to meet current new construction code; however, life safety is an ethical requirement that professionals must consider when evaluating and repairing existing buildings. Not everything must be removed and replaced by “code”. Code allows other options.



13. State Statute and Building Code

What needs to be repaired or replaced depends primarily on what is damaged and why? When evaluating a building for repair, a good question to ask is: What is the extent of damage?

State law in the 2019 Minnesota Statutes reads as follows:

65A.10 LIMITATION.

§Subdivision 1. Buildings. Nothing contained in sections 65A.08 and 65A.09 shall be construed to preclude insurance against the cost, in excess of actual cash value at the time any loss or damage occurs, of actually repairing, rebuilding or replacing the insured property. Subject to any applicable policy limits, where an insurer offers replacement cost insurance: (i) the insurance must cover the cost of replacing, rebuilding, or repairing any loss or damaged property in accordance with the minimum code as required by state or local authorities; and (ii) the insurance coverage may not be conditioned on replacing or rebuilding the damaged property at its original location on the owner's property if the structure must be relocated because of zoning or land use regulations of state or local government. In the case of a partial loss, unless more extensive coverage is otherwise specified in the policy, this coverage applies only to the damaged portion of the property.

It is important to restate the following two key ideas from the above statute:

Work must be done in accordance with the minimum code and the local authority is the final word on what is required.

Unless specified, coverage applies to only the damaged portions of the property.

14. Hazard Conditions

Professional engineers are licensed by individual states but are also regulated by the National Society of Professional Engineers (NSPE). The NSPE publishes and maintains the Engineer's Code of Ethics. <https://www.nspe.org/resources/ethics/code-ethics>

The first Fundamental Canon of the Code of ethics requires engineers to "hold paramount the safety, health, and welfare of the public"

Therefore, in general, when a dangerous condition exists often the engineer must notify people of potential hazards. The rule of practice reads as follows:

"If engineers' judgment is overruled under circumstances that endanger life or property, they shall notify their employer or client and such other authority as may be appropriate"

15. General Repair Rules

1. The sole authority for the interpretation and enforcement of the State Building Code resides with the designated building official of the municipality in question.
 2. Whether a Building Official closely reviews the project or not, does not determine if the building code should be followed.
 3. Some contractors like to tell insurance companies that they must "build to code" or risk losing their state license. Then they try to interpret the code for themselves in a way that maximizes the repairs that must be done so they can get as much money from insurance companies as they can. That is a common business practice. It is not a bad practice. It just might not be required.
 4. The Building Official can ultimately determine whether specific repairs must be made to a structure in a given location. Often, they may require the structure be inspected by a qualified professional engineer.
 5. Work shall never cause a structure to become unsafe or less conforming.
 6. The building codes have always had the intent of allowing owners to fix and maintain their buildings.
 7. Sometimes compliance with newer code rules may be infeasible or disproportional in cost to the required repair. In these cases, common sense and reasoning may be needed to determine the best solution.
- Knowing the intent of code, having a knowledge of the reasons behind the code is key to reasonable repair.
8. Hazardous conditions discovered or uncovered during an inspection or during a repair project must be reported. Dangerous conditions must never be left alone if the property is to be occupied.

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