



# ***CHIEF'S FILE CABINET***

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## Building a Box

A building is a just a large version of a box. It has a top, a bottom and four sides. When it is complete, it is expected that it will shelter human beings and/or their possessions against most of the normal forces of nature. This might include rain, wind and perhaps even a jolt from the ground from plate tectonics.

How well a building is built, i.e. its dimensions and construction materials determine to a large degree the resistance that the building will have against those forces of nature; wind, flood, earthquake, fires. These are all physical assaults on buildings with specific forces. What we, as a society, allow to be put into the buildings creates the contents of the box. Interesting fact is that some archeologists have postulated that the very first buildings were used to protect the tribal source of fire. In more modern times the degree to which the box protects the contents we have a safe building. The degree to which the box satisfies the owner we have a desirable purchase.

If one goes back in the history of codes to the days of Hammurabi one can observe a requirement in the set of rules created at that time. It was a requirement that sort of made a difference as to whether the builder of the building had a stake in the future of the structure. In short, the code stated that if an architect designed a building that collapsed and killed the owner's son; the architects' son would be punished by execution.

Modern codes do not call for such harsh penalty, but they do call for a building to be constructed to be intrinsically safe. The building should be able stand up on its own and it should resist the forces of destruction. These two criterions have not changed very much in 3,000 years. We have; however, developed more specific guidelines to the way building elements and attributes can be combined to create different ways for a building to be occupied and used.

Hence the fire and building codes. It should be noted that a building code is a construction code. The fire code is a maintenance code. The building code has created ground rules for the assembly of a structure to meet specific needs. And, the fire code allows certain activities to go on inside of the building.

Once a building is constructed and permission is given to occupy it; it is now legal. That is true even if that date of construction was 100 years ago. As time goes on, society imposes new rules on new buildings, but seldom do we as a society (except under specific retrofit conditions) ask a building to come into total conformance with the latest modern code. That is a term that has been the paternal orientation of "grandfathering."



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Recognizing that certain conditions have, in the past, resulted in catastrophic losses of both life and property, there have been many new conditions introduced into building codes to reduce that possibility in newer buildings. The number of changes is evidenced by the breadth and depth of the building codes over the last 100 years. The first code documents looked more like information pamphlets; contemporary building codes often encompass hundreds of pages and sometimes are bound in multiple volumes.

In summary, a building built according to code will remain in that physical condition unless remodeled, damaged by an event, torn or burned down. Each generation's buildings are part of the basic building blocks of our overall community risk profile. They are legally authorized for use and can continue to do so in that condition into perpetuity. Over time a fire department may be facing a risk profile that contains everything from soup to nuts in terms of age, condition and issues associated with building factors.

The fire code, on the other hand is not intended to be a construction code. It is intended to be a maintenance code. In other words, the fire code is aimed at keeping conditions in a structure as fire safe as possible by halting deterioration or malfunction of features put in by the building code.

Given that a building does not deteriorate, and that the occupants observe the ground rules a structure can be anticipated to be relatively fire free for a long time. The word relative is a key word in this sentence, for fires do occur in buildings of all ages, and total destruction on a building that was built to a code that did not expect a fire to extinguish itself is a common scenario. As my old and departed friend Fire Chief Charlie Rule used to say; "All buildings are burned down according to code!"

Building and fire codes have been evolving in this parallel fashion for about 125 years. At one point the building code did not contain much fire resistance other than passive protection offered by firewalls. At one time the fire code was limited to restricting just a few features of a structure, like the size and placement of exits and storage of flammable substances.

The fire code began its evolution based on a need to reduce the risk of events from the acts and omissions of the occupants of buildings as a result of catastrophic fire events. In the beginning a fire code was mostly things that were prohibited from being done. One of the early fire regulations in this country was the decision by our pioneer forefathers to add the requirement that candle dipping could not be done indoors, for example. As a maintenance code, the fire code addresses things that are not structural in nature.

Originally the fire code and the building code were not correlated at all. The building community did not ignore fire safety, but rather took it for granted because much of the building code was prescriptive requirements based on fire concerns that emerged from the experience of the urban conflagration.



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There were things like wall resistance, exit width, door swing, lighting configuration and even fire flow or water supply that were calculated in these codes.

Currently, the two codes are not separate and distinct. They are now part of what is called a family of codes. This has come about as a result of several philosophical shifts over time. The most touted reason is to raise the level of uniformity between the need to build a building and the need to maintain its integrity over time. This reason has led many organizations on a quest for standardization and uniformity that is seamless from the time a building is conceived up to its remaining years in service.

Not unlike other concurrent developments, the fire service has begun to use one body of knowledge to help develop another. In this case, occupancy and risk typification has led to the concept of risk assessment for developing parameters for station location and fire station staffing and deployment plans. Practitioners in station location planning have attempted to assess the existing (and projected) building inventory into a scheme that would characterize how difficult it would be to handle and emergency in progress. If we go back to the basic box created by a basic code that creates attributes of a building, these features are to some degree dimensional; height, length, and width. Now it includes interior features that can mitigate an emergency

Beginning in about 1984, the fire community began to embrace this concept of risk based response as part of the framework. In the simplest of terms small, risk – small response, bigger risk, bigger responses.

The line of logic at this point made a lot of sense in that most communities that were trying to match the company against the problem were dealing with decades of existing complicated non-compliant structures. Among the attributes to measure and therefore provide a scheme of evaluating existing risk was created. It was called RHAVE. This software is no longer supported, but the concept remains viable

Risk, hazard and value evaluation was designed to be a total fire company attribute of building so that policy choices could be made regarding resources that would be needed in high risk, high value scenarios.

As the professional literature continued to observe the outcomes of the concept of risk assessment an area of interest began to develop on how to measure risk factors as a standpoint of fire prevention. It should be noted that in many fire organizations the process for controlling the building process is divorced from the process of fighting fires. This is one of the challenges of the future for the fire service for contemporary building techniques are changing faster than the operational fire service is training to deal with the changes. As a fire marshal one of your top priorities ought to be to take the knowledge of how buildings are being built and transfer that information to your departments training division to



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assure that firefighters are adequately informed to be able to predict the performance of the boxes we call our communities “fire problem”