RESIDENTIAL FIRE SPRINKLERS AND HOUSING ECONOMICS

A LEGISLATOR'S GUIDE TO LIFE SAFETY

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EXECUTIVE SUMMARY

TALKING POINTS

- Our nation's fire service commends those homebuilding companies that have embraced residential fire sprinklers that are required in all of the applicable national model building and fire codes.
- A vote to block the adoption of the national model code requirement for fire sprinklers in new residential occupancies has the following effect:
    - Will have absolutely no change in the current housing market which is driven by interest rate, credit history and mortgage availability.
    - Gives the new homebuilder an advantage over the existing home seller.
    - Retains the fire damaged home rebuild market with no regard to property loss, insurance cost/lost ratios, loss of life's belongings, and loss of life.
    - Costs government more money on infrastructure and services.
    - Restricts local government from managing growth.
    - Shifts the cost of growth from the builder to government.
    - Creates a greater exposure to liability for the homebuilder.
- Our nation's housing crisis during 2006-2009 and continuing hopefully for just a couple more years has absolutely nothing to do with the cost of fire sprinklers or granite countertops. The nation's housing crisis is directly related to mortgage availability or lack thereof. To argue the cost of fire sprinklers or granite countertops will hamper market recovery is grossly false as both can be installed in any priced new home. Our nation is in a deep recession because housing prices rapidly escalated faster than the median wage and some lending institutions chose to grab the moment by weakening loan acceptance criteria – now millions of workers are unemployed.
- The new homebuilders' motivation is to add as much "glitter" to the new home making it more attractive to the homebuyer than property available in the vast existing home market. For the want of providing money for more "glitter" in the new home so they can gain a "more attractive" competitive advantage over the existing home market, some homebuilder organizations are actively pursuing repealing or blocking the adoption of fire sprinkler requirements that are part of all the national model building and fire codes. Or, stated as seen in the eyes of our nation's fire service, ***the homebuilders have placed their want to add glitter to the new home to gain a market advantage over the existing home above the health, safety and welfare of the public.***
- The total dollar loss from fire in small residential occupancies each year in our nation is over $6 billion dollars. Fire loss studies from credible third party non-stakeholder sources, specifically Scottsdale, Arizona in its 15-Year report, shows the average fire loss in fire sprinkler protected homes at $2,166 and non-sprinklered homes at a $45,019, or a 95.189% decrease in property damage when fire sprinklers are present. Prince George's County Maryland in their 12-year report shows a 96.461% reduction in property loss when fire sprinklers are present. Fire sprinklers don't work for the new homebuilder because they reduce their potential rebuild market by 95%+. The fire service's view is ***for the homebuilders" interest in stopping the reduction in the rebuild market that comes with fire sprinklers that has been clearly proven in non-stakeholder studies is not a valid reason for a Legislator to support placing the new homebuyer in peril.***
- Local government must provide fire protection services and to restrict local government's ability to apply the national model building and fire codes causes local government to spend more money on services and infrastructure such as water distribution systems – prohibiting local government from adopting a fire safety code, or provisions therein is considered an ***unfunded mandate.*** Therefore, state government should reimburse local government for the millions of added infrastructure and recurring services costs created by this prohibition to decide what is best for their community.

EXECUTIVE SUMMARY

TALKING POINTS (CONTINUED)

- The homebuilder has an obligation to build a fire safe home regardless of what government does or does not do or what government allows or does not allow. The national standard of care for new homes in all of the applicable national model building and fire codes requires all new homes to be fire sprinkler protected. Blocking local government from adopting fire safety standards for new homes simply deepens the liability hole for the homebuilder, particularly when they are members of an association that actively lobbies for this unsafe condition for the want of a greater profit margin.
- Homebuilders falsely argue that smoke detectors are the fail-safe solution to reducing fire deaths and tout the reduction of fire deaths during the past 30 years. The truth is because of increased public awareness there ***has been a reduction in the number of home fires during the past 30 years by 44.851%.*** There was an average of one fire death for every 123.36 fires in 1977 compared to one death in every 139.22 fires in 2007. This means we have only 15.86 more home fires without a fire death in 2007 than we had in 1977 – good but not impressive. Smoke detectors save lives but they are not the fail-safe cure all purported by the homebuilders. The success of fire sprinklers today is demonstrated by the statistic that the most vulnerable in fires are the very young and the elderly or those who cannot self-evacuate when the alarm signals, or people expected to occupy homes.
- Most insurance companies provide a reduction for homes that are protected with a fire sprinkler system. The reduction ranges between 5 - 15% but averages 7%.
- While large commercial fire sprinkler systems must be maintained by a trained and qualified contractor, the uncomplicated residential fire sprinkler system requires little maintenance. The owner can conduct the minor tests on the system such as opening a valve to ensure water flows, and checking fire sprinklers to make sure they are not obstructed. Plumbing systems typically cost more to maintain than fire sprinkler systems because fire sprinkler system materials must meet a much higher level of laboratory testing.
- Fire sprinkler system material meets a much higher standard than plumbing. The fire sprinkler system is tested for leaks at a high pressure for an extended period of time prior to occupancy of the home. Accordingly, these systems do not accidentally leak.
- Homebuilders argue new homes are much more fire safe than older homes. This is grossly false – NAHB is totally aware of this fact. New homes typically have more open space; therefore less fire compartments to control the fire. Light-weight materials used in 65% of roof trusses and 25% of floor trusses in today's homes provide superior strength but do not fare well in fires causing roof and floor collapse after much less exposure to fire temperatures than the material used in older construction. There have been firefighter deaths and injuries directly related to this material used in new construction - a news media investigative report clearly outlining this major life safety concern of the fire service and can be seen at http://www.wisn.com/video/17971947/index.html.
- Let the owner decide is another argument used to persuade against a fire safe home. This is like saying let the truckers decide what the speed limit will be on our highways. However, there is a difference, the truckers know the consequences of their speeding; the homebuyer is not aware of the consequences of deleting fire safety and other code required features in their homes. Should the owner decide on roof truss strength, electrical grounding, load-bearing walls? If not then why should safety items that are required in our nation's model codes be subjected to a decision from the untrained and not technically knowledgeable homebuyer?
- Pipe freeze is another concern raised by homebuilders as they debase fire safety. Yes, water filled pipe, plumbing or fire sprinklers, will freeze in cold weather conditions. The difference is the fire sprinkler installation standard has temperature limits and insulation requirements that address this concern. The problem is mitigated by simply following installation and insulation standards.

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PREFACE

There have been numerous incidents throughout the nation of overzealous homebuilders and/or their lobbyists misrepresenting the economic impact of fire sprinklers in all residential occupancies. This unfair debasing of the life saving fire sprinkler system includes misrepresentations of the fire safety effectiveness in newly constructed homes. New construction practices have not been favorably fire safe effective, in fact there are many within the fire service that have grave concerns with the "new" construction practices used in new homes as these construction practices have definitely contributed to the death and injury of firefighters.

This guide is intended to be used as a source of ***factual and logical information for correct decision making*** should the issue of residential fire sprinklers for homes becomes a Legislative discussion issue. It is not expected that Legislators will read this entire document. Therefore, the Executive Summary is intended to provide Legislators with statements on the key issues to help guide them through the debate process.

There may be questions asked of Legislators and Legislative staff that need more explanation than is provided in the Executive Summary – thus the details in and the length of this document. The Table of Contents should guide those wishing more detail on a specific topic to the appropriate section of this document where it is discussed.

Additionally, in Part 5 of this document are questions that Legislators may wish to ask those who would testify before a committee. And also in this section is language that can be used by Legislative staff in drafting a report on legislation that may be filed.

Fire sprinklers save lives and property. Knowing this fact makes the adoption of the national building and fire codes and standards that require fire sprinklers in new homes the right action to take in the legislative process.

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A MUST READ OVERVIEW

Our nation's fire service has had enough! We are tired of responding to fire death emergencies in residential occupancies – a place where 91% of U.S. fire deaths in structures occur annually. And we are even more outraged when one of our firefighters is killed or injured fighting fire in a residential occupancy that lacks fire suppression features recognized as far back as President Harry Truman as the solution to our nation's fire problem. We implore all elected officials to make fire safety decisions based upon factual information and to discard the blatant misrepresentations and exaggerations lobbied by builders whose interest is market share gain, market shift from existing home to new homes, and profit margins – at the expense of life safety.

As this paper is being written our nation is in a deep recession. A major contributing factor for this recession is the housing bubble which burst when the subprime mortgage problem imploded. With fallout from the housing, credit and financial crisis – the worst in our nation since 1930 – ricocheting through the economy, predictions of over 3 million jobs vanishing are coming from analysts even if the stimulus package is swiftly approved in Congress. The public is pretty angry as the financial crisis they face was driven by greed as home prices escalated at an unreasonable rate and some lending institutions bent previous rules allowing misguided borrowers to fall into a deep financial hole. The public is doubly outraged when lending institutions that helped bring us this crisis receive "bailout" money from government but still foster greed during this time of pain in America by giving millions and billions of bonus money to the very people that helped cause this crisis. Now comes some homebuilders seeking government to pass a law that has the force and effect of continuing the tragic loss of life and property so they can keep a strong rebuild market, gain

a competitive advantage over the existing home seller thereby prolonging the financial pain so many homeowners face because of the mortgage loan fiasco. These people in or close to foreclosure must find a buyer for their existing home. And the homebuilders want to restrict local government from managing growth thereby unfairly shifting infrastructure costs from the homebuilder to government. The homebuilder wants the Legislature to throw out fire safety measures that are in all of the national model building and fire codes thereby placing the residents of these new homes and our firefighters at greater risk. Supporting homebuilders over the public, local government and the fire service does not appear to be a wise and prudent political move.

Statistical information about housing economics has been grossly misrepresented by the builders so factual housing economic data from third party non-stakeholders is presented in this paper. When home builders argue that the cost of fire sprinklers is chasing away potential buyers we must ask how many are they chasing away with their granite countertops? The subprime mortgage crash is the cause of the demise of new housing development, not the addition of a fire sprinkler system or a granite countertop. And recovery of the housing crisis will be the result of improvements and availability in housing financing.

Homebuilders argue the cost of a fire sprinkler system chases away potential homebuyers. How many are they chasing away with granite countertops?

While we acknowledge many elected officials wish to minimize governmental regulations, we strongly opine that local government must be empowered to manage the interests of their community. And a key role of local government is to provide a safe environment for its residents and visitors. We must argue that local government not only has the right to set building and fire code standards for their community, they have an obligation to do so; an obligation to ensure the safety of their community, safety from substandard latent construction defects from unregulated builders and safety from the ravages of fire.

Let the owner decide is another argument used to persuade against a fire safe home. This is like saying let the truckers decide what the speed limit will be on our highways. However, there is a difference, the truckers know the consequences of their speeding; the homebuyer is not aware of the consequences of deleting fire safety and other code required features in their homes. Should the owner decide on roof truss strength, electrical grounding, load-bearing walls – why should safety items that are required in our nation's model codes be subjected to a decision from the untrained and not technically knowledgeable homebuyer? Is not the homebuilder attempting to shift cost for code required life safety items to high-demand items like kitchen islands and granite countertops to gain a competitive advantage over the existing home market? The homebuilder wants to sell the homebuyer "glitter" items like kitchen islands, granite countertops, and exotic showers, items intended to distinguish the new home from the existing home market, the homebuilders' number one competition. New homebuilders vehemently opposed smoke detectors and ground fault circuit interrupters when these safety items were also placed in the national building codes as a requirement for new construction. The bottom line – homebuilders want to spend their money on attractive "glitter" items that is going to distinguish the new home from the existing home market. If the new codes required all new homes to have a kitchen island there would be no opposition to this government regulation as this is the number one consumer demanded item in new homes. By accepting the new homebuilder's "glitter" card, the legislature is causing a negative push on the existing home sales market including those caught in the foreclosure crisis.

The "Glitter" effect argument contained in this paper is another must read to ensure one understands the true economic consequences as the new homebuilders seek to gain a market advantage over the existing home market. This is one basic reason for the homebuilder's attack on fire sprinklers. Another is the homebuilders desire to retain their rebuild market. Fire loss data during the past 20 years from non-stakeholders show a 95%+ reduction in property damage in fire sprinkler protected homes verses non-sprinkler protected homes. With an annual fire loss in excess of $6 billion dollars in residential occupancies, it is clear that one primary reason for the

homebuilders' opposition to fire sprinklers is to protect their rebuild market. Some argue that in the February, 2009 economic crisis the ONLY work some homebuilders have is in the rebuild and renovation market – the homebuilders seek to benefit from others pain. And when addressing fire deaths, there is no dollar value that can be used to replace a loved one. And I suggest any Legislator wishing to consider the economics of fire death consider their evaluations as if the death was their child instead of mine.

There is a strong correlation between model construction code requirements and the cost of providing emergency services. As a fire chief, I have the option of building fire stations, buying fire apparatus, and hiring fire fighters the volume or size of which is related to the level of the application of model building and fire codes. The balance between the codes and the level of fire suppression services MUST' be determined by local government, not the homebuilders' lobby. Builders should not be allowed to construct properties that are not in compliance with the national model construction codes, then take their money and leave a higher and forever increasing fire suppression cost burden for taxpayers and the community to absorb. While there will always be a need for fire service operations, building fire stations, buying fire apparatus, and hiring firefighters is not the option many communities can afford. As a result, many communities respond to the uncontrolled growth promoted by homebuilders demanding absolutely no government oversight with low-staffed firefighting crews creating greater risk for our nations bravest – we must protect and properly compensate our firefighters.

Local government must provide fire protection services and to restrict local government's ability to apply the national model building and fire codes causes local government to spend more money on services and infrastructure such as water distribution systems – prohibiting local government from adopting a fire safety code, or provisions therein is considered an ***unfunded mandate.*** Therefore state government should reimburse local government for the millions of added infrastructure and recurring services costs created by this prohibition. Local government is in the best position to manage local growth.

The costs of residential fire sprinklers have been grossly distorted by homebuilders and these misrepresentations are addressed in this paper. A cost estimate of $5,000 to install a fire sprinkler system in a new home means one thing if the home is 10,000 square feet and another if it is 1,000 square feet. But then, new homes are high-end, the homebuilders seek the larger home for greater profit margins – affordable housing is really not the new homebuilders objective. This is clearly demonstrated by the separation between the median home prices for new homes which is much higher, $69,900 higher in the Northeast, than the median price of the existing home. Affordable housing is discussed later in this paper. Another distortion is the homebuilder square footage game where they fail to report basement and other space as part of the total fire sprinkler protected square footage when computing costs per square foot.

This paper is intended to provide Legislators and Legislative Staff with factual, logical, and practical information on which to base their decision to allow government to adopt national model fire safety standards that require fire sprinklers in new residential occupancies. This paper will focus on housing economics and clarify the economic concerns of installing residential fire sprinklers. In doing so, we will also respond to the common misrepresentations and exaggerations that are emanating from those opposing residential fire sprinklers. There is a disconnect here in that the fire service response to the Legislature is with honesty and integrity while the opposition blatantly misrepresents the issues and facts. We will analyze the impact of an increase in the asset price for new housing by discussing the many underlying forces that affect supply and demand of housing. We will discuss the U.S. fire problem as well as the cost of fire and what government must do to provide cost effective and environment friendly fire safety within their communities. We will also discuss actions that may be taken by local government to make the installation of residential fire sprinklers even more economically palatable for the homebuilder and the public.

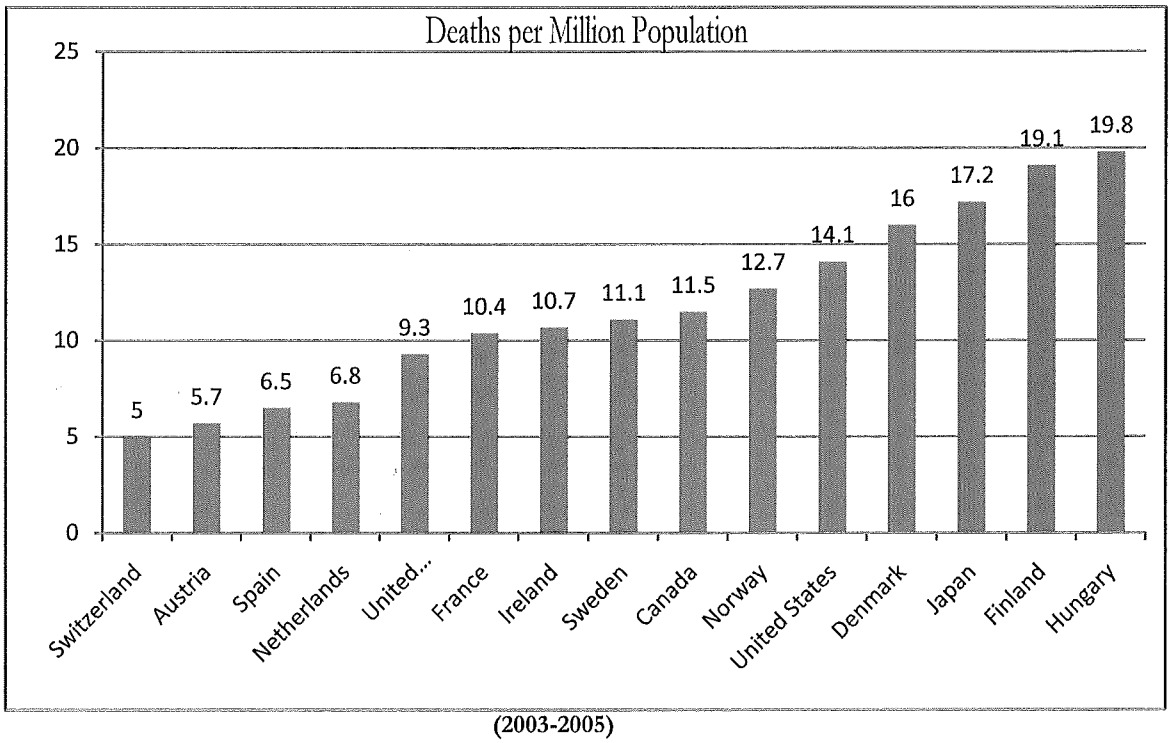
This paper is written in parts. The Part 1 will detail our nation's fire problem focusing on our residential fire problem. We also discuss the effectiveness of smoke detectors in this Part and explain, using data from third party non-stakeholders, and the dismal progress made in reducing fire

deaths during the past 30 years. Part 2 will detail Housing Economics with factual data from non-stakeholders. This section shows that the factor that determines the dollar value of the new or existing home a homebuyer can purchase is solely based upon the limits of the mortgage for which they have qualified – that the cost of a fire sprinkler system or a granite countertop has no bearing as these features can be installed in a new home of low, medium, or high prices. Part 3 counters common misrepresentations used by those opposing fire sprinklers. This section also examples misrepresentations recently presented before a Legislative Committee in North Dakota. Part 4 discusses governments' role in fire safety or what government can do to further reduce the cost of improving property and life safety in our nation's residential environment; again 91% of our nations fire deaths in structures are in residences. And Part 5 will include sample questions the Legislators may wish to ask those commenting before committees. This Part will also include information that can be used by the legislative staff analysts.

PART 1: OUR NATION'S FIRE PROBLEM

A. Our Nation's Fire Death Statistics. We are doing better but the United States still has one of the highest fire loss rates of the industrialized world - in both terms of fire deaths and fire losses. This unenviable status has mystified world fire service experts because the solution to significantly reduce the fire death rate is available and affordable. The simple solution to minimize our nation's fire death rate is residential fire sprinklers. But there exists opposition to installing these new technologically advanced residential fire sprinklers because of perceived economic reasons. And yes, with reports of a 95%+ reduction in property loss in fire sprinkler protected homes over non-sprinkler protected homes there will be a diminishment of the fire damaged home rebuild market as residential fire sprinklers become more wide spread in use.[1,2]

AVERAGE FIRE DEATH RATE BY COUNTRY



(2003-2005)

Figure 1. Source: *International Association for the Study of Insurance Economics*

The United States has led the industrialized world in the number of fire deaths and fire losses for decades. Is the U.S. fire problem getting any better? The International Association for the Study of Insurance Economics studied the fire death rates of 15 industrialized nations for the period of 2003 to 2005. Using fire death data from the United States Fire Administration we see that the United States fire death rate fell from 36.3 fire deaths per million population in 1979 to 19.5 fire deaths per million population in 1992 and averaged 14.1 fire deaths per million population during this 2003-2005 3-year period. (Figure 1). This study also shows that while the United States has shown remarkable improvement in its fire death rate during this period, so have the rest of the industrialized nations. The U.S. fire death rate is many times that of Switzerland, the nation with the lowest rate of all the countries considered in the study.[3]

There is a significant reduction in the number of fire incidents even though there has been a growth in the number of properties. During the 1970s, the U.S. Fire Service embarked on an extensive Public Education program – all must recall one example promoted by the National Fire Protection Association (NFPA) the "Stop, Drop, and Roll" program. The three main causes of fire are men, women, and children and these public education and public fire safety awareness programs proved very successful in reducing the number of fire incidents as one can see in Figure 2 from 723,500 fires in homes in 1977 to 399,000 in 2007. This 44.851% reduction in the amount of fires occurring in homes during the past 30 years again is from increased public awareness of fire safety. Smoke detectors do not stop fires, they detect fires. The homebuilders argue the reason we have had a reduction in fire deaths is because of smoke detectors. The number of new homes during this period did not diminish the number of older homes – in fact, many new homes built during this 30 year window are clearly existing homes using today's database. Homebuilders falsely argue that new homes do not burn; that fires and fire deaths occur in older homes. Well, the duh statistic here is there are many more older homes than new homes – yes there will be more fires in older homes. And remember people cause fires notwithstanding the age of the home. And when does a new home become an old home – mine is 30 years old.

Home structure fires by year

Year	Fires	Civilian deaths	Civilian injuries	Direct property damage (In billions) As reported	Direct property damage (In billions) In 2007 dollars
1977	723,500	5,865	21,640	$2.0	$7.0
1978	706,500	6,015	20,400	$2.1	$6.7
1979	696,500	5,500	18,825	$2.4	$6.8
1980	734,000	5,200	19,700	$2.8	$7.2
1981	711,000	5,400	19,125	$3.1	$7.1
1982	654,500	4,820	20,450	$3.1	$6.8
1983	625,500	4,670	20,750	$3.2	$6.7
1984	605,500	4,075	18,750	$3.4	$6.7
1985	606,000	4,885	19,175	$3.7	$7.1
1986	565,500	4,655	18,575	$3.5	$6.6
1987	536,500	4,570	19,965	$3.6	$6.6
1988	538,500	4,955	22,075	$3.9	$6.8
1989	498,500	4,335	20,275	$3.9	$6.5
1990	454,500	4,050	20,225	$4.2	$6.6
1991	464,500	3,500	21,275	$5.5[1]	$8.3[1]
1992	459,000	3,705	21,100	$3.8	$5.6
1993	458,000	3,720	22,000	$4.8[2]	$6.8[2]
1994	438,000	3,425	19,475	$4.2	$5.9
1995	414,000	3,640	18,650	$4.3	$5.8
1996	417,000	4,035	18,875	$4.9	$6.4
1997	395,500	3,360	17,300	$4.5	$5.8
1998	369,500	3,220	16,800	$4.3	$5.4
1999	371,000	2,895	16,050	$5.0	$6.2
2000	368,000	3,420	16,975	$5.5	$6.7
2001	383,500	3,110	15,200	$5.5	$6.5
2002	389,000	2,670	13,650	$5.9	$6.8
2003	388,500	3,145	13,650	$5.9[3]	$6.7[3]
2004	395,500	3,190	13,700	$5.8	$6.4
2005	381,000	3,030	13,300	$6.7	$7.1
2006	396,000	2,580	12,500	$6.8	$7.0
2007	399,000	2,865	13,600	$7.4	$7.4

Figure 2. Source: NFPA.org

[1] Includes $1.5 billion in damage caused by the Oakland Fire Storm, most of which was lost to homes but for which no detailed breakdown by property type was available.

[2] Includes $809 million in damage caused by Southern California wildfires.

[3] Does not include the Southern California wildfires.

Direct property damage figures do not include indirect losses, like business interruption. Inflation adjustment to 2007 dollars is done using the consumer price index.

Another great statistic here is the reduction in the number of fire deaths. Using the data in Figure 2, we see that while we have had 44.851% reduction in the number of fires in homes during

this 30-year period, if we compute the number of ***fire deaths per fire*** we only had a 11.392% reduction in fire deaths. In 1977 we had 723,500 fires in homes and the fire death rate computes to one fire death for each 123.36 fires. In 2007 we had 399,000 fires in homes and the fire death rate computes to one fire death for each 139.22 fires. One could argue if we had a 44%+ reduction in the number of home fires during the past 30 years if all contributing variables to fire death are equal we should have a 44%+ reduction in fire deaths – why only 11.392%? ***While the aggregate of the number of fire deaths reduced by half during the past 30 years, the reduction in the number of fires in homes also came near to this same rate of reduction – the number of fire deaths per fire has not significantly changed as the fire death rate per fire only changed to one death per 139.22 from 123.36. Stated another way, in 2007 we have only an additional 15.86 home fires without a fatality than we did in 1977.***

Homebuilders argue that the number of fire deaths has significantly reduced in the past 30 years because of smoke detector installation. Statistics show that the 44.8% reduction in the number of fires in homes during the past 30 years is a very significant contributing factor in the reduction of fire deaths.

During the four-year period of 2003-2006, an estimated 388,750 home structure fires, on average, were reported per year. These fires caused an annual average of 2,987 civilian deaths, 13,289 civilian fire injuries, and $6.3 billion in direct property damage. Home fires accounted for 73% of all reported structure fires, 91% of civilian structure fire deaths, 86% of the civilian structure fire injuries, and 69% of the direct property loss. Cooking equipment is the leading cause of home structure fires and home fire injuries, while smoking materials are the leading causes of home fire deaths. Roughly half of all home fire deaths result from incidents reported between 11:00 p.m. and 7:00 a.m. Twenty-four percent of all home fire deaths were caused by fires that started in the bedroom; 23% resulted from fires originating in the living room, family room, or den. Although smoke alarms operated in 52% of the reported home fires, no working smoke alarm was present in 63% of the home fire deaths.[4]

B. Our Nations Fire Service Response. Ninety-one percent of our nation's fire deaths in structures are in homes! Legislators must not assume that the fire service is willing to ignore the fact that 91% of our nation's fire deaths are in the home to appease some homebuilder. There are numerous examples where smoke detectors have saved lives and their use is highly recommended by our nation's fire service. But the reality of smoke detection devices – they give the home occupant *the opportunity* to respond to save their life. Fire death statistics show that the most vulnerable to fire are the young and the old – or those who often cannot respond promptly to the fire alarm. Children under five and adults 65 and over face the highest risk of fire death.[4]

This is most disturbing as the homebuilders promote the false belief that an operating smoke detector is a failsafe fire safety device. In some of these cases, the detector may have gone off too late to allow the victim ample time to safely exit or the victim may have been too inebriated or feeble to react. But data shows that no working smoke alarm was present in 63% of the home fire deaths. Detection devices may be battery powered or powered from the electrical system and assuming continuous electrical service the device should function.

What has the fire services so convinced is the reality that these fire deaths can be ***reduced by an estimated 82%*** if new technology residential fire sprinklers were installed along with the smoke detectors.[5] But this study was done 25 years ago when residential fire sprinkler technology was at its infancy. If this test were to be done today, we suspect the reductions in fire deaths if a fire sprinkler was installed in homes along with smoke detectors to approach 98%. Approximately 124,505 lives were lost in homes during the past 30 years in our nation – a 98% reduction would means 122, 015 lives could have been saved and even with the dated 82% conservative reduction rate we still could have saved over 102, 095 lives from home fires. The fire service has been asking for decades – ***when are we going to start building new homes fire safe?*** Actually today's homes are less safe than homes built 20 years ago.

The homebuilders control the code process – the process of the development of the model national construction codes that are used and adopted by state and local government as the

construction codes and standards for new homes. When we say the homebuilders control the process – they have prominent seats on the Board of Directors, fund much activity of the code promulgating entity and have the voting majority on the committees that oversee residential code requirements, the International Residential Code (IRC). The voting process of this code established by the Board of Directors requires a 2/3 vote to overrule the decision by the self-interest committee. Code revision cycle after cycle, fire safety features felt needed by our nation's fire service met deft ears by the homebuilder controlled committee. Those who vote on the final code adoption are code officials, the building and fire officials, but getting a 2/3 vote to overrule the self-serving committee was difficult if not impossible. The fire service came in force at one code hearing in New York state but it was still not enough to produce the 2/3 vote. This motivated the fire service whose large contingent came to the Minnesota hearing where the self-serving committee vote was overturned in favor of life and property safety by over 73% of the votes. The message to the homebuilders from the fire service is simply this – we have had enough; it is time the homebuilders embraced fire safety to protect the public and the firefighters of America; if you responded to the concerns of the fire service in 1982 when the first study promoting the fire sprinkler concept in homes was released, tens of thousands of lives would have been saved.

C. Third Party Fire Sprinkler Data. Many local governments have adopted residential fire sprinkler ordinances, some decades ago. These growing communities chose residential fire sprinklers as a method of controlling the cost and size of their infrastructure as well as recurring operating costs. For example, fire sprinklers use approximately 90% less water to fight fires; the national water distribution system design standards allow for less water when all buildings are fire sprinkler protected; less water means smaller water mains; smaller water mains means less water supply and less maintenance and less cost to install – the list of savings is very long. So now comes the question, if these communities have had fire sprinkler ordinances in place for decades, is there data available that shows a return on investment?

Scottsdale, Arizona adopted a residential fire sprinkler ordinance in July, 1985 and the ordinance was implemented on January 1, 1986. The far-reaching ordinance was an effort to switch the delivery of fire protection services from a ***reactive*** nature to a ***proactive*** nature. Technology was hanging and serious discussion was beginning to take place within the fire protection community that

Reactive Fire Protection

Traditional fire service organization; where a problem has occurred before it is addressed with passive building codes and the hope that the fire department resources that have been amassed will be able to beat the clock and arrive soon enough to have a positive impact on the emergency incident.

Proactive Fire Protection

This philosophy is accomplished by embracing new, proven technology and built-in protection, like automatic sprinkler and early detection systems, combined with an aggressive code enforcement and strong public education programs.

was related to developing better methods of providing more efficient and effective community fire safety. The study results are incredibly impressive. It is significant to note that this data came from the fire service, not the homebuilders or the fire sprinkler industry.

From the Scottsdale Arizona 15-year report; a community that has 41,408 homes, more than 50 percent of the homes in Scottsdale, protected with fire sprinkler systems:

Lives Saved

In the 15 years there were 598 home fires. Of the 598 home fires, 49 were in single-family homes with fire sprinkler systems:

- There were no deaths in sprinklered homes.
- 13 people died in homes without sprinklers.
- The lives of 13 people who would have likely died without sprinklers, were saved

Less Fire Damage

There was less damage in the homes with sprinklers:

- Average fire loss per sprinklered incident: $2,166.
- Average fire loss per unsprinklered incident: $45,019.

• Annual fire losses in Scottsdale (2000-2001) were $3,021,225 compared to the national average of $9,144,442 for communities of similar size.

Reduced Water Damage. Only the sprinkler closest to the fire will activate, spraying water directly on the fire. 90% of fires are contained by the operation of just one sprinkler.

According to the Scottsdale Report, there was less water damage in the homes with sprinklers:

• Sprinkler systems discharged an average of 341 gallons of water/fire.

• 2,935 gallons of water/fire were released by firefighter hoses fighting fire in non-sprinklered homes.

Cost

Recent technology breakthroughs make sprinklers more affordable and easier to install in homes. On a national average, they add only 1% to 1.5% of the total building cost.

• In Scottsdale, the average cost is less than $.80 per square foot.

Prince George's County Maryland also has exemplary data showing the result of its residential fire sprinkler ordinance including homes effective January 1, 1992. The results of fire sprinkler successes outlined in the 12 year report by Prince George's County is equally impressive.[2] Over 30 fires in single-family homes were detailed in this report showing an average loss of $3,673 per fire in sprinkler protected homes and $31,667 average loss in non-sprinkler protected homes. This report indicates there were 33 fire deaths in single-family homes from 1988 to 1999 and ZERO fire deaths during this period in sprinkler protected homes.

Data from communities that have extensive experience with residential fire sprinklers is impressive. While showing sizable reductions in property loss is very impressive to the fire service, the homebuilders wishing to retain the rebuild market are not equally impressed. However, the fire death reductions must be a factor in any legislative decisions. Between just these two communities during a 12 year period in one and a 15 year period in the other, 46 lives were lost as a result of fires in single-family homes that were not protected with fire sprinklers. There were NO lives lost in fire sprinkler protected homes and the number of single-family homes sprinkler protected is substantial; over 50% of all homes in Scottsdale are fire sprinkler protected. Fire sprinklers work, they save lives and property. They save government money on infrastructure costs – this is a win-win for all. The homebuilders would be wise to embrace fire sprinklers instead of being a barrier for life safety and thereby soon becoming the target for litigation from those who have lost loved ones.

PART 2: HOUSING ECONOMICS

A. Basic Housing Economics – Why the Bubble Burst.

Our nation's housing crisis that started its downturn from the incredible 2005 peak in early 2006 is not the result of the residential fire sprinkler movement or any other construction feature required by code or voluntarily added to the new home by the homebuilder. Today's (February 2009) home prices can best be described as a deep recession, but are most often referred to as a burst bubble. Housing prices have grown so much in the last decade that they are now completely disconnected from the fundamentals that have historically ruled the real estate market. Housing prices of 2005 and 2006 were simply are not sustainable. And the graph in Figure 3 demonstrates why.

The Disconnect Between Wages and Home Prices

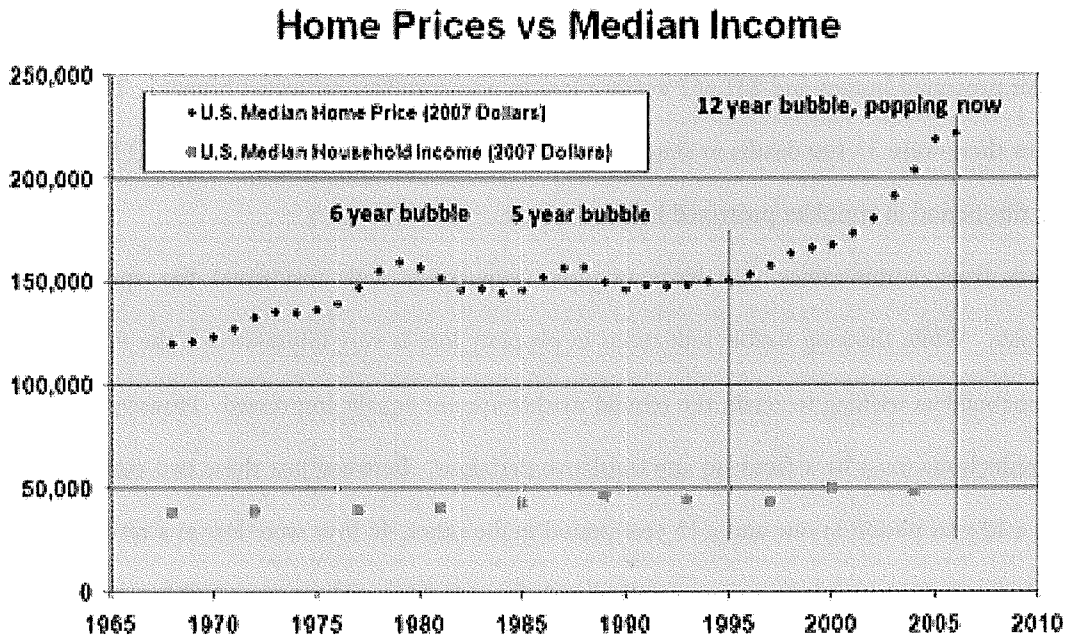


Figure 3. Source: efinance Directory, July 9, 2007

Housing price increases are nothing new, since home values tend to go up over time. What makes this housing bubble different, besides the fact that it is the largest bubble in U.S. history, is the complete disconnect between home prices and the basic fundamentals that typically rule the housing market. For example, increases in home prices typically keep pace with increases in wages. But this

has not happened. National median home prices have increased by more than 45 percent in the last decade (when adjusted for inflation). Median wages per worker, on the other hand, have only increased by 10 percent in the same period. As a result, for the first time ever except maybe during the Great Depression, individuals who are making the median household income cannot afford to buy a median priced home.

In order to qualify buyers for loans, lenders loosened credit regulations and encouraged risky mortgage products like interest-only loans, negative amortization loans and adjustable rate mortgages or ARM loans – I like to call this ARM and LEG loans. This made it easier to get a mortgage, but admittedly much harder to keep it. During the inflation period of this huge bubble, a large portion of the buyers bought out of their price range. In many cases, their loan qualification was based on a teaser rate and/or an interest-only mortgage payment. Now when the interest rate became due to reset on these loans, millions were not be able to afford their mortgage and this has led to their losing their homes to foreclosure as indicated by the largest foreclosure rate in the history of the United States. Again, the mortgage crisis has nothing to do with granite countertops, exotic showers or fire sprinklers – this foreclosure is the result of inflated housing prices far above median income and an overzealous mortgage market. The increase in homeownership can be easily traced back to the lenders who loosened credit and mortgage lending restrictions. Thanks to these lenders, buyers who would have never stood a chance of getting a mortgage just a few years ago were now being approved for outrageous amounts of money. And during this period the Feds lowered its interest rate. As the bubble continued to expand at exponential rates, there were many who just took advantage of the cash cow of the inflated housing prices.

Home prices have increased by 45%; wages have increased by only 10%. Individuals making the median household income cannot afford the median income priced home – that is until mortgage lenders bent the rules.

Although the disconnect between home prices and home sales was not present during the housing boom, it most certainly is now. The public has either lost interest or simply cannot afford to

buy into the current housing market. People are paying mortgages rates on a home that is now valued at 30-40% less than what they paid if they bought at the top of the bubble. Home sales are down significantly in cities throughout the nation and will only get better when mortgage lenders again begin to lend and homebuyers have confidence they will be able to sustain a mortgage through this very deep economic recession that is leading to unemployment figures second only to those of the Great Depression. As a result, supply has now exceeded demand in most areas further driving prices lower. It would take several months, and in some cases years, to sell all of the homes that are currently on the market. If sales do not pick up soon, home prices will most definitely begin to fall even deeper in this recession.

To help one better understand housing economics, we will discuss technical aspects of the field of economics. Price changes also influence the supply of housing. The elasticity of supply is the percentage change in quantity supplied divided by the percentage change in price. The supply side of the housing equation is a more complex issue with developers particularly with respect to short and long run implications. In the short run, an increase in demand is countered by an increase in price while supply remains pretty much constant as the time to build a new single-family home could take longer than the period of the increased demand. Thus the developer is speculating *what the demand will be* months later when the house is completed. Considering material and labor costs, the homebuilder is always looking for innovative ways to construct the new home at the least cost because of the *uncertainty* of the market once the home is available for sale.

In most studies on housing construction, the production or supply side of new housing units is determined by the price of the house.[6] The average price of the new stock increases as this stock grows, because useable land becomes scarcer. High price levels will generate an increased flow of units only until the current stock catches up with the long run supply schedule.[7] But what happened in this 2006-2007 housing bubble, the weakening of credit thresholds and new creative financing caused an unprecedented increase of the supply side as builders sought to capitalize on the profit margins coming from the higher price. Had the typical controls on mortgage lending been applied

the increased demand would have slowed before prices continued to rise to unrealistic and unsustainable levels. This can be illustrated in a supply and demand graph as in Figure 4.

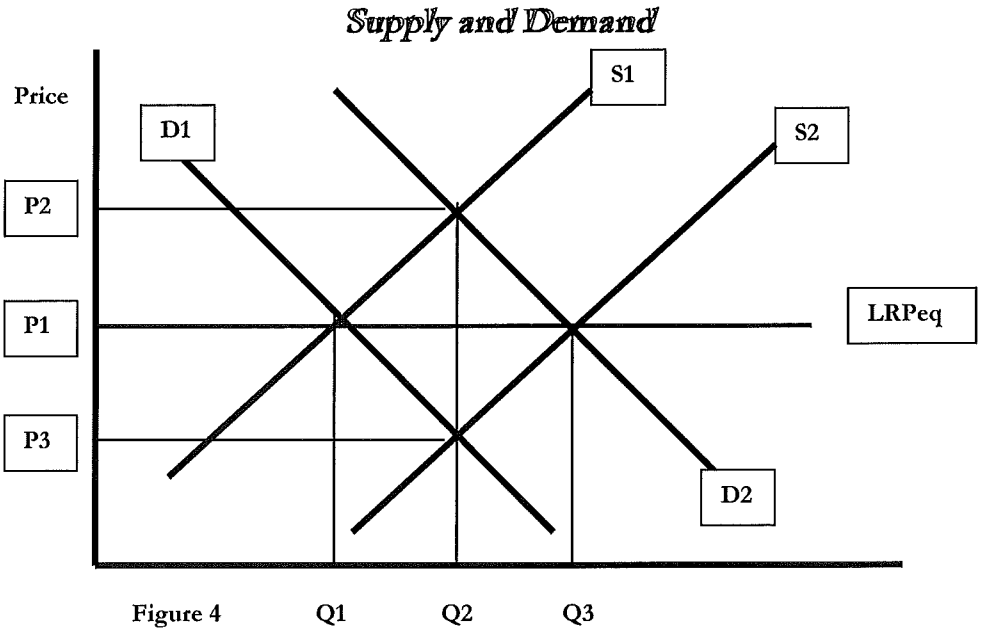


Figure 4

Assuming that some market shock such as increased income or tax incentives causes the demand for housing to shift from D1 to D2. Due to an inelastic supply in the short run (it takes time for construction to react to the demand shift), the price of housing increases from P1 to P2 in response to the increased demand, the increased demand also causes the change quantity consumed from Q1 to Q2. Homebuilders, seeing that the long run equilibrium price (LRPeq) is below the current market price, increase production to take advantage of the profit margins from the increased price. As new housing stock enters the market, the supply cure shifts from S1 to S2 at which time the market is again at its long run equilibrium prices. As the prices lower towards equilibrium, consumption increases to Q3. Thus, new construction results from a price that exceeds the long run replacement cost of housing. It therefore can be argued that an increase in price could be beneficial to the developer with the clear understanding that overbuilding is problematic.[8]

If the housing stock is being produced at the D2-S2 level of long run price equilibrium as shown in Figure 4 and the demand shifts back to D1 because of new tax law changes or decreases in

disposable income or other negative demand drivers, the homebuilder has few options to survive. The homebuilder has the option of maintaining the higher price level in hopes of finding one with excess disposable income or lowers the price towards P3. Because many actions external to the construction process may cause a negative shift in demand, it is good business practice for the homebuilder to take every action possible to keep construction cost down. ***We suggest that it is the uncertainty of the future housing market that is the foundation of the developer's resistance to adding fire sprinklers or any other feature in the new home except those that create "glitter."*** While the impact of a price change is the most substantive issue addressed herein, we will also discuss other factors impacting demand.

What happen in the 2006 bubble was changes in the mortgage policy caused an ever increasing demand for housing. The price at P2 continued to move upward as supply never kept up with demand. A great indicator of this excessive demand is the volume of rental property decreased as more bought homes – the level of renters per capita in 2006 is the lowest since WWII. Now that the bubble has burst, demand is virtually zero but supply continues to grow as foreclosures become commonplace and forever growing. Prices have dropped to P3 in Figure 4. But because of the severe economic conditions, the long range probability of extremely low demand and increasing supply, dragging down the long range equilibrium price to a new low is a highly likely. The long range equilibrium price can best be described as the median price that slightly escalates over time consistent with inflationary changes.

Why did not the homebuilders foresee the industry devastating giant bubble and take action to minimize the impact of its burst? Well there were many indicators. What is occurring today, February 2009 in the U.S. is almost a mirror of the housing bubble in Japan who is still reeling from the damage caused when their housing bubble burst during the late 1980s. Almost every circumstance leading up to the Japan housing crash has been present in the U.S. during the last decade:

- Historically low interest rates
- Housing touted as a "can't miss investment"

- Median home prices doubled
- Median home prices in the six largest cities tripled
- Lenders offered bad loans
- Government acted as a partner to industry
- Home price increases far outpaced wages and rents

After reaching peak values, Japanese home prices declined by an average of 40 percent. In the country's largest cities, the declines were worse, averaging 65 percent. Homes in Tokyo lost 80 percent of their value and are still on the downward slide to this day, 15-20 years later.

The changes that have occurred in the U.S. housing market in the last decade aren't much different than the changes that occurred in Japan's boom market. Home prices have doubled nationally. Prices in bubble states like California and Florida--where some of largest cities are also located--have almost tripled in the last 7 years. The greed of the moment appears to have masked sound economic thinking and now the entire economy of the U.S. pays.

How does this lesson on housing economics relate to the cost of installing a fire sprinkler system in a new home? Well there is no relationship as the elasticity of demand is very inelastic – to be detailed in the next section. The cause of the housing crisis was out of control lending as mortgage lenders lowered standards allowing people to qualify for a mortgage price far above their repay capabilities. Then the lending institution quickly sold this mortgage to Wall Street money markets. If the house had a fire sprinkler system, granite countertops, kitchen islands or other glitter features it did not impact any of this. If I qualified for a $200,000 home, that was my limit and I would seek an existing or new home at or below that price that met my needs. The homebuilder can install granite countertops in lower priced homes just as they can install fire sprinklers, kitchen islands and other glitter items. The argument that the 1% added cost typical for the fire sprinkler system is chasing away thousands of potential buyers has no validity. A fire sprinkler system can be installed in affordable housing, median priced housing and the high-dollar housing. Also, see the section on "glitter" items to see one of the real reason homebuilders argue against fire sprinklers.

B. Elasticity of Demand for Housing. How significant is a 1% or 1-1/2% increase in construction costs on the demand for new housing? We will be reviewing current literature in the

field of elasticity of supply and demand for many of these underlying factors. First, it is important to understand the complexity of the housing market in an economic perspective. At the time the homeowner buys a home, the transaction is best labeled as an investment in a particular asset, ***housing stock.*** During the time after occupancy, it is possible to define the ***consumption*** of housing services including many variables like the annual cost of debt, the opportunity cost of equity in the house, depreciation and maintenance, and the effect of homeownership upon tax liabilities. Thus, recognition of this dual nature of housing - ***housing is both an investment good and a consumption good*** - is essential to understanding the market for owner-occupied housing. [10] The cause and effects of the price of housing is a more complex issue than for an ordinary consumption good because one must consider that housing is both a ***consumption and an investment good.***

Price impacts both the supply and demand for housing and both are time sensitive. **The focus of this section of the paper is to determine if a minor increase (1%) in the price of a new home has a *substantive* impact on the ability of the homebuilder to sell new housing stock, *the demand for housing.*** Price-elasticity of demand is defined ***as the percentage change in new home sales divided by the percentage change in price.*** Elasticity is a ***measurement*** of ***responsiveness.*** The word "measure" means that elasticity results are reported as numbers, or ***elasticity coefficients.*** The word "responsiveness" means that there is a stimulus-reaction involved. Some change or stimulus (1% increase in price) causes people to react by changing their behavior (forgo buying a new house), and elasticity measures the extent to which people react. If the price-elasticity of demand coefficient is greater than 1, the demand is then elastic. When the demand is elastic, a small change in price has a relative big change in quantity consumed. A good example may be sugar – if the price of sugar increases, the buyer may stop buying sugar and switch to the many sugar substitutes that are available. There is another trend that also examples elasticity. The products I typically consume have changed in size while the price has stayed the same or escalated. For example, the volume of meat in my favorite frozen dinner has been downsized to the extent that I no longer consume this product – I switched to another brand.

Figure 5 shows an elastic demand curve. The price at P1 was increased to P2. The corresponding shift of quantity consumed from Q1 to Q2 represents a significant reduction in quantity consumed when compared to the price increase. When price-elasticity of demand is

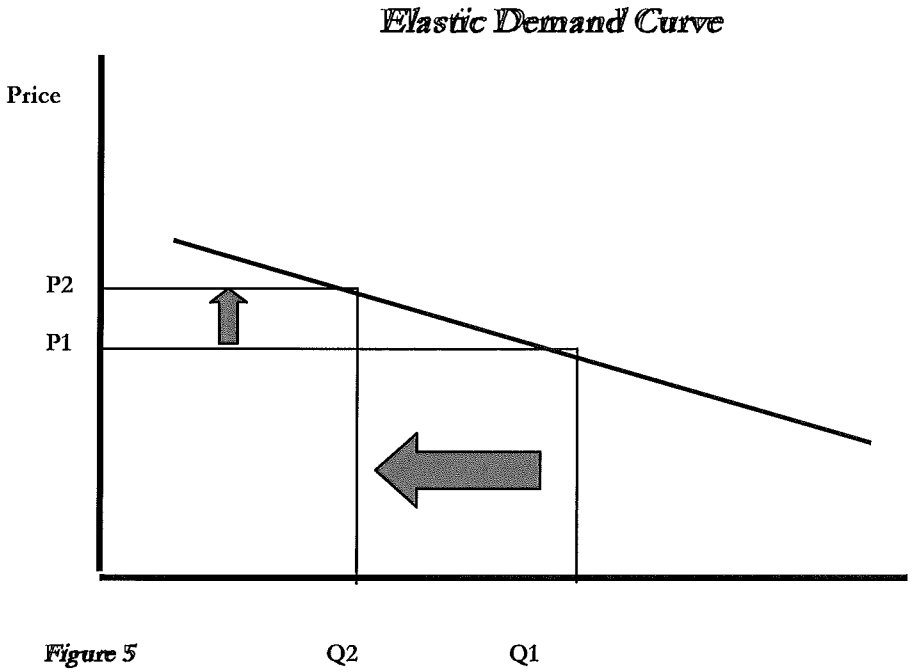


Figure 5

considered in the context of volume of new homes sold, an elastic demand, ***or an elasticity coefficient greater than 1,*** means that an increase in the sales price will significantly impact the developer's ability to sell the home. The greater the elasticity coefficient is above 1, the greater the impact. When the price-elasticity of demand coefficient is greater than 1, as the price increases, the associated decrease in quantity consumed ends in a decrease in revenue.[8] Thus, **if** the elasticity of demand coefficient for housing is greater than 1 then the homebuilders argument that a mere 1% or any other increase in price would be a key factor in chasing away potential homebuyers may have some degree of validity. This would also mean that adding granite countertops, which in many cases would exceed the cost of the fire sprinkler system, will also have an effect on the sale of the new home. And then there is the kitchen island, the roof architecture to make the new home "glitter" in the eyes of the buyers are all added costs that would chase away potential buyers.

When the elasticity coefficient is ***less than 1,*** demand is considered to be ***inelastic***. When the demand is inelastic, a change in price will have a small impact on the quantity sold. (Figure 6)

Inelastic Demand Curve

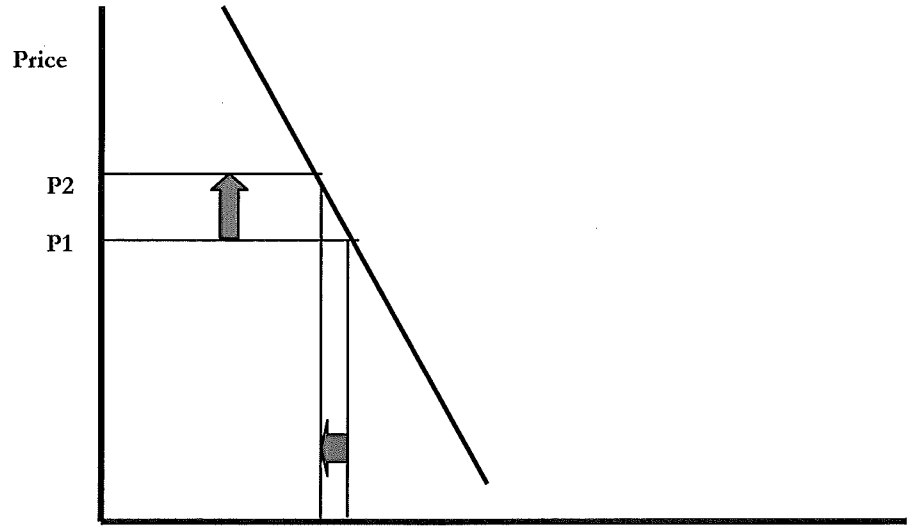


Figure 6

The price at P1 was increased to P2. The corresponding shift of quantity consumed from Q1 to Q2 represents an insignificant reduction in quantity consumed when compared to the price increase. While there is a reduction in the quantity of products consumed when the elasticity of demand coefficient is less than 1, ***or inelastic, the responsiveness of the consumer's preference is insignificantly affected by the increase in price.*** If the elasticity of demand coefficient is less than one, or inelastic, the increase in price brings in more revenue than that lost by the insignificant reduction in quantity consumed. [8]

Now comes the question what is the price-elasticity of demand for new housing or the percentage change in new home sales divided by the percentage change in new home prices? Computing price-elasticity is far beyond the scope of this paper. We have, however, researched current writings on elasticity and the housing market in an effort to determine if this demand is ***elastic or inelastic.***

In a research paper, DiPasquale and Weaton, the price-elasticity of demand was computed numerous times using a series of different adjustment models.[7] The adjustments factored into the equation included the cost of the land, which often is not computed in other studies, and the expected age of ownership. The price-elasticity of demand coefficient for all equations with and without adjustment factors fell between -0.09 to -0.19 or a very ***inelastic coefficient.***[7] While the law of supply and demand dictates that an increase in price will result in a reduction in quantity consumed, an inelastic demand coefficient suggests that the revenues generated by the increase in price offset the lost volume of sales. An elasticity of -0.09 means that for every 1% increase in price, the quantity demanded will decrease by 0.09%. The DiPasquale study produced a lower price-elasticity of demand coefficient than other studies. Quigley's study also produced inelastic coefficients ranging between -0.5 to -0.7.[11] The difference is that the DiPasquale study included variables that addressed

2006 Housing Inelastic Demand Curve

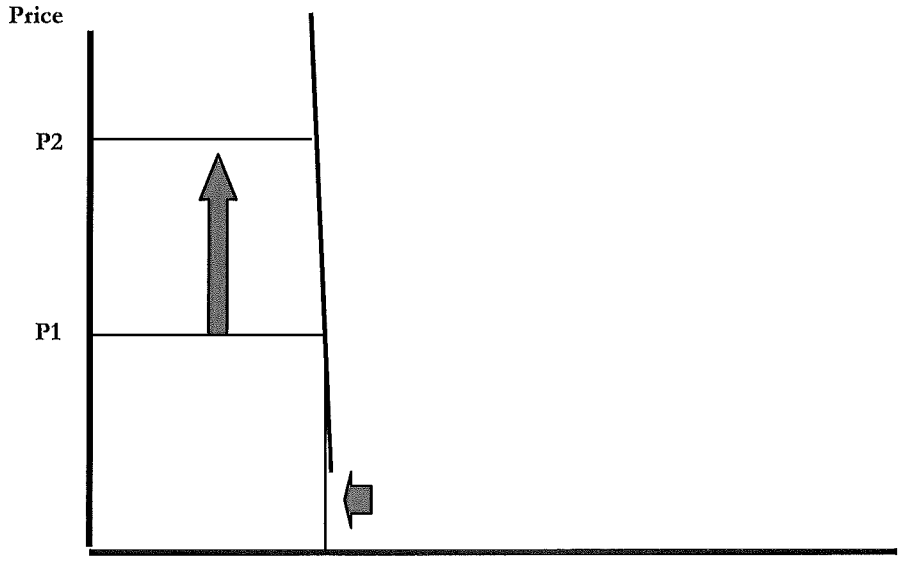


Figure 7

housing as both a consumption and an investment good while the Quigley study only used consumption good variables – homes really are also an investment good – foreclosures exemplify this point.

The price-elasticity of demand being less than 1, as reported in these studies conducted by third party sources (not connected to the homebuilder or fire sprinkler industry) clearly demonstrate that the installation cost of the fire sprinkler system, which relate to a 1% cost increase, will have a negligible impact, if even measurable, on the sale of the new home. The very inelastic demand curve for housing demand is almost a vertical straight line. To put this in the real world perspective, the 2005-2006 rapid bubble growth as prices rose at incredible rates; there was also a rapid increase in sales – never been better – driven by the mortgage industry. The financial market had much to do causing this out of control growth and the deep recession we now face. But the factors in home buying remain the same: the homebuyer comes to the table with a set amount of money for a down payment, a credit score, a valid recurring income to make monthly payments, and the interest rate – these four factors determine what dollar value home I may purchase. I may be told that the highest value house my financial condition would allow me to purchase is $200,000. I then seek the housing market, new and existing homes, to find the home that is the most attractive to our tastes and meets our family needs. This all leads right into one of the homebuilders key objections to fire sprinklers – what I call the "glitter" factor.

C. The "Glitter" Factor. I have been approved to buy a home with a limit of $200,000. I now start looking at the homes and quite frankly, some of the floor plans of the existing homes are very bland. I look at new homes but they are much more expensive than the $200,000 limit that I have qualified with my mortgage lender. I like the kitchen island and the granite countertops, and the shower – but I cannot afford this beautiful new home. I talk to my mortgage broker and am told I could pay just the interest and because the home is escalating in value I could refinance in a few years putting the accrued earnings back as a down payment. So I buy the $275,000 home and after the bubble burst I become aware of what foreclosure means.

The new homebuilder's biggest competition is the existing home market. The National Association of Home Builders (NAHB) and the National Association of Realtors both have active web sites that paint the housing market picture. From these sites one can gleam a number of key

factors. One, the volume of new homes available for sale verse existing homes is roughly 10%. This means the potential homebuyer has 90% more existing homes to view than new homes when deciding what to buy. The median price for new homes is higher than the median price of existing. Many existing homes were purchased at a much lower cost and over time their value per square foot has escalated but not to the point where the new builder has priced their product.

How does the new home builder sell homes when 90% of their competition typically has a lower price per square foot? Well, the NAHB actively surveys consumers to identify their wants and needs. Used to be that sunken tubs with water jets were high on the list but most who bought homes with this item say they rarely use the tub. So now high on the consumer want list are exotic showers with water release from multiple points. The highest on the consumer want list is a kitchen island and along with this is a high demand for granite or other stone type countertops.

So the existing homebuilder, who only has 10% of the supply available for sale, gains their competitive advantage by adding more "glitter" to their new home. The kitchen island, the granite countertop, and the other high demand items that will make their home stand out above the existing home market is how the new homebuilder gains a competitive advantage. But adding these glitter items cost money – often the reason the median price for new homes is above the median price for existing.

To ensure more money can be spent on glitter items, the new homebuilder opposes any and all actions that may raise the cost of the home. The NAHB actively opposed smoke detectors when they hit the market in the 1970s - the NAHB actively opposed ground fault circuit interrupters when they too became a code requirement about this same era, both these products intended for life safety.

So when a homebuilder argues that the cost of adding fire sprinklers is chasing away potential homebuyers, what they are really saying is: that they put profit margins above life safety; that the money to be spent for fire sprinklers would be better spent on "glitter" items so they can gain a competitive advantage over the existing home market; that because of high demand the mark-up on

glitter items is ten-fold higher than the mark-up they can place on the fire sprinkler system; and that they do not care about their liability exposure.

D. Affordable Housing. My son has a degree in engineering is gainfully employed, works long hours and is living the America dream. He lives a frugal life style while saving money for a down payment for a home – he currently rents. At the end of the year even after saving money he is farther away from his dream because of the rapid escalation of housing prices. He rejected the subprime loan as being too risky. The median home price where my son lives outside of Orlando, Florida, peaked in 2006 at $327,500. Using data available to everyone from the NAHB web site, 88.2% of U.S. Households cannot afford this level of price for a new home. NAHB says that 58.6 of U.S. households can afford only $175,000 or less for a home. In 2006 one would be hard pressed to find a new single-family stand alone home with a yard so the dogs can run for $175,000 in the outlying areas of Orlando.

The real world – affordable housing is the existing homes. The value of the existing home escalated over time and that level of gain is more negotiable in a sale. But the new home costs more to build with all the glitter and therefore the price is more often than not out of reach for the first time home buyer. The Orlando Regional Realtors Association reported on January 12, 2009 that the average first time buyer's price range was $145,987 or less. Add over $125,000 to this first time buyers price range and you will reach the current median price in the region.

I shook my head in amazement at one public hearing in the Phoenix basin area where there exists wide spread acceptance of the residential fire sprinkler concept. This homebuilder argued the cost of fire sprinklers was hampering their ability to provide affordable housing. One commissioner asked, "What is the typical square footage of the homes you build?" The response was over 3,500 square feet. The hearing ended at this point. The proper response when homebuilders argue fire sprinklers curb affordable housing efforts is to ask a report on how successful the new homebuilder market has been in providing affordable single-family stand alone homes? And I have been involved

with fire sprinkler installation in affordable housing – Habitat for Humanity. Sprinklers can be installed in any size property and the cost of fire sprinklers is affordable.

The truest picture depicting the differences between new and existing home prices can be found at the NAHB web site. This data available to all identifies the median price for both new and existing homes in four regions and the Total United States. In Figure 8 we show this 2007 data.

	Median Price New Home	Median Price Existing Home	Dollar Difference	Percent Difference
Total U. S.	**$230,600**	**$197,100**	**$33,500**	**14.53%**
West	**$295,600**	**$275,400**	**$20,200**	**6.83%**
Mid-West	**$197,600**	**$150,500**	**$47,100**	**23.84%**
Northeast	**$341,400**	**$271,500**	**$69,900**	**20.47%**
South	**$202,100**	**$170,000**	**$32,100**	**15.88%**

Figure 8. Source: NAHB Free Access Website.

What this data shows is that in all regions of the United States, the median dollar cost for a new home is higher than the median price for the existing home. In the Northeast, the dollar difference between the median price of the new and the existing home is $69,900! While the homebuilders like to argue that the cost of a fire sprinkler hampers the low income family from buying a new home, the reality here is the new home is beyond reach of the low income family who in many cases can barely afford a house whose cost equals the $69,900 median price difference between existing and new homes in the Northeast. If you look at this NAHB data, the West Region shows a Median Price for existing at only $275,400 and new at $295,600. But a different picture emerges when one looks at the median home prices in California during November 2008 as reported by California Realtors: Santa Barbara, $875,000; San Ramon, $790,000; Danville, $789,000; Arcadia, $692,500; Berkeley, $690,000; San Mateo, $670,000; Redondo Beach, $667,500; San Francisco, $648,000; Alameda, $635,500; and Irvine, $635,000. This suggests the NAHB West Region includes states that have lower housing costs than California. A clear understanding of statistics or the differences between median and mean or average is important. MEDIAN price is the price halfway between the least expensive and

most expensive homes sold in an area during a specific period of time. During that particular period, half the buyers purchased homes that cost more than the median price and half the buyers purchased homes for less than the median price. Average home prices would be skewed upward as the high dollar homes were added to the list. Median price projects the best picture. The new low income homebuyer has a limited choice – the home will either be a new home or an existing home. If the median price for the new home was equal, near equal or even less than the median price for existing homes then there is a viable option that the new homebuilder is interested in affordable housing. However, the significant difference between the median prices of new over existing homes clearly indicates the new home builder is not in generally interested in building affordable housing. And when local government demands that the homebuilder offer low-cost housing for the right to develop land for multi-million dollar mansions, the response is typically multi-family units, not stand-alone single-family homes.

E. Cost of Fire Sprinklers. Much has been written about the cost of fire sprinklers. The most recent and most detailed study by a non-stakeholder is the Home Fire Sprinkler Cost Assessment published by the Fire Protection Research Foundation headquartered with the National Fire Protection Association.[12] This study averages home fire sprinkler costs throughout the nation and determines the average cost is $1.61 per square foot. This study assessed home fire sprinkler systems that had access to municipal water service as well as those isolated with wells and water storage tanks for the fire sprinkler water supply.

The cost figure of $1.61 per square foot is high in many areas of the country. Fire sprinkler systems are being installed in many regions of the nation at under $1.00 per square foot. The decisive factor in lowering fire sprinkler costs is the market size. Costs are the lowest in those regions where the widespread use of fire sprinklers in new construction is common – simple economies of scale. In every case, the start up or ramp up to widespread fire sprinkler use typically starts with a higher price and these prices lower as competition increases.

One data source for computing the $1.61 per square foot figure was a very large home isolated in the mountains with no water supply. And making this an even more costly project, the owner demanded the more expensive copper piping to be used for the fire sprinkler systems. This expensive copper pipe, plus the water storage tank, drove the cost up for this project to $3.66 per square foot. But then the property was isolated and probably uninsurable if it were not fire sprinkler protected. But this is an isolated case, not the norm, and using this $3.66 as part of the computations that generated the $1.61 per square foot skews the average upwards – in econometric circles this is known as an outlier. Thus, the $1.61 per square foot is on the high end of the spectrum and as markets develop there will surely be lower costs, again approaching or going below the $1.00 per square foot experienced in many markets.

Most disheartening is the gross misrepresentation of fire sprinkler costs that emanate from fire sprinkler opponents. A $5,000 fire sprinkler system cost means one thing if the home is 10,000 square feet and another if it is 1,000 square feet. Almost never do home builder opponents speak about fire sprinkler costs with actual figures from bids from legitimate contractors. In fact, should a Legislator ask to see the bid from which these outrageously high bids are being reported, the fire sprinkler opponent cannot produce one or they produce a document with dollar figures they created absent any input from the fire sprinkler contractor. And, the contracting business includes identifying acceptable bids. I recall receiving 6 bids for a roof replacement on my house – a 40% difference between the high and low bid. We should be quoting the low bid not the high bid.

Another way to look at offsetting the cost of a residential sprinkler system is to look at how many square feet would need to be reduced to pay for the system. For example, if the homebuilder wanted to build a 2,500 sq. ft. home and the construction cost was quoted at $122.00 per sq. ft., the house would cost 305,000.00.

-- At $1.61 per sq ft sprinkler system cost $ $ 4,025.00.
-- If you would reduce the sq. ft. of the house by 32 sq. ft. you would off-set the cost of the system.
-- That is equivalent to a four foot by eight foot space.
-- You would have a 2468 sq. ft. home fully fire sprinkler protected.

The cost for fire sprinklers varies and is dependent upon many factors, wages being the largest cost driver. The Fire Protection Research Foundation's study showing $1.61 per square foot is a viable number and in most regions the cost will fall far below this number as competition increases.

F. Homebuilder Liability. The homebuilder has an obligation to build a safe house. This obligation is long-standing, real and far reaching. For example, if I build a new home and there is a problem with the electrical wiring and someone is killed from an electrical shock, I may be sued. Government's failure to apply or inspect the national model electrical code has absolutely no impact on the litigation filed against the homebuilder for their failure to follow national codes and standards. Because there is a clearly articulate standard of care, (The International Residential Code and the Life Safety Code) the defense costs alone could be devastating for a builder who was alleged to be negligent because they omitted code required life safety devices. Can you imagine how a jury would respond after learning about the few dollars saved by a homebuilder when lives were lost as a result of the failure to install the best known method to limit a fire and fire death, a sprinkler system?

Notwithstanding what government does or does not do with respect to the adoption and enforcement of the national model codes, the homebuilder has an obligation to build a safe home and the standard of care is that what is published in the national model codes. Stated another way, if a local government decides that they no longer were requiring seat belts on new cars, this does not eliminate the car manufacturer from liability should an accident occur where the seat belt would have been a factor in a life saved or less injury.

So along comes the International Code Council's International Residential Code (IRC) and the National Fire Protection Association's Life Safety Code (LSC), the codes used to direct construction of homes and ***both*** are requiring fire sprinklers in new single-family homes. This therefore is the national standard of care or the level of safety the homebuilder is obligated to provide in the homes they build. Imagine trying to defend a weak position that the government did not make me do it. This is an unconsciously weak argument when lives are lost from fire in a new home, especially when the homebuilder is active in the association who lobbies against the life saving fire sprinklers using

data clearly known to be false and misleading. Add to it the lightweight construction problems which can be mitigated with fire sprinkler systems and the liability exposure is even greater. Why should it take multiple fire deaths and lawsuits before the light of reason turns on in the minds of those who pay dues to the NAHB whose actions of knowingly misrepresenting facts is creating greater liability exposure for its members?

Our nation's fire service has given the NAHB a very big message. Self-interest control over the IRC code promulgation process is not acceptable, particularly when this construction code allows new construction materials that have without any doubt led to fire fighter death and injury. Failure to respond to these unsafe construction practices is not an option.

PART 3: RESPONDING TO MISREPRESENTATIONS

In an effort to debase fire sprinklers, many opponents chose the low road of attacking the fire sprinkler concept. The most commonly heard misrepresentations and exploitation of myths is addressed in this Part including a response to public misrepresentations before a North Dakota Legislative Committee.

A. Fire Insurance. Fire sprinkler opponents argue that fire insurance premiums will increase because of the fear of water damage. This is simply false and misleading. Most insurance companies provide an insurance reduction on homeowners polices for fire sprinkler protection. The deduction varies but averages 7% according to the Home Fire Sprinkler Cost Assessment report.[12] While this is positive, it still is a dismal figure when one looks at the property saving numbers reported by communities that have had long-standing fire sprinkler ordinances.

When Scottsdale Arizona and Prince George's County Maryland reports a 95%+ reduction in property loss when fire sprinklers are present, one would think the insurance company would provide a greater reduction. The Scottsdale reports the average fire damage loss in a fire sprinkler protected home at $2,166 and the non-sprinklered average fire loss home is $45,019. The $2,166 cost to repair fire damage in the fire sprinkler protected home includes the cost to repair water damage. Fire hoses, on average, use more than 8 1/2 times the water that sprinklers do to contain a fire. According to the Scottsdale Report, a 15-year study of fire sprinkler effectiveness, a fire sprinkler uses, on average, 341 gallons of water to control a fire. Firefighters, on average, use 2,935 gallons of water fighting fires in the non-sprinkler protected home. Reduced water damage is a major source of savings for homeowners.

A rate reduction of 7-10% does not seem adequate when reviewing the 95%+ reduction in fire losses reported by communities with widespread residential sprinkler use. This unfairness of the low insurance reduction is an issue that needs to be raised in the insurance regulatory agencies of each

state – surely a rate reduction of 25-35% is more appropriate. But notwithstanding the small insurance reduction, it is a reduction. There are very few if any items or features within the home that afford any insurance reduction. But the factual information is there is a reduction in insurance for home owners who install a fire sprinkler system in their homes, it could and should be greater than the 7% average, many are getting 10%.

B. Fires in New Homes Verses Older Homes. Some argue that fires only occur in older homes; that the new homes are built fire safe. Again, this is false and there have been many misleading reports wrongly suggesting new homes do not burn. One mother who lost her daughter in a tragic fire in a recently built beach house testified before the International Code Council just before they voted to require fire sprinklers in all new homes. The substantive point is people cause fires and just because the home is new does not mean people will not be careless.

New homes are constructed differently today than were older homes. A more open floor plan means less fire resistive barriers, floor and roof supports use fabricated material that has less resistance to fire, vinyl siding is used, all of which contribute to or do not impede fire spread. And many developers build homes as close together as codes will allow further complicating fire suppression as neighboring homes need more protection from fire exposure. It is not uncommon to see vinyl siding damaged on homes located next to the home that burned.

There are many statistical anomalies with this issue. First and foremost there are many more older homes. When does a new home become a old home? If only 10% of the home sales market is new homes, this suggests that 90% of the homes for sale are older. This is consistent with other available demographic data but to be conservative, let's suggest that 80% of our nation's homes are older. Then, all things being equal, one would expect 80% of our home fires to be in older homes. So when one says there are more fires in older homes they are correct only to the point that there are more older homes. To suggest that the newer home is much safer than the older home is a statement we do not support and is discussed in the next section.

C. New Construction Materials Pitfall. Light weight construction may be cost saving for the homebuilder, and some items like light weight trusses may have equal or better strength than other materials, but there exists uncontroverted proof supporting many in the fire service with major concerns with occupant AND firefighter safety in our new homes. As an experienced firefighter, after reviewing video clips (http://www.wisn.com/video/17971947/index.html) of investigative reports on the unsafe material used in new construction, coupled with details of the tragic fire in a North Carolina beach house with roof collapse and trusses protruding every which way, we strongly support the fire services' concern. And an excellent article by Azarang(Ozzie) Mirkhah and Sean DeCrane, two fire service leaders, published at Everyonegoeshome.com brings further clarity to the issue.[13]

Seven young college students died in this beach house fire. One can quickly see the collapsed roof as well as an absence of siding which disappeared in the flames exposing support beams. This "new" construction did little to contain and restrict fire growth; but it exemplifies "new" low cost construction homebuilders falsely argue as safer than older homes.

Lightweight wood truss construction is being used more and more with new construction because it offers builders savings in cost, easier access to run utilities and ventilation, larger spans without obstacles such as columns for support and they can support a weight load equivalent to a solid structural member under normal conditions. According to the truss manufacturing industry, it is estimated that 65% of roofs and 25% of floors in new residential construction feature lightweight truss construction.

In tests done by the building industry, a 2,600-square-foot home was constructed within 148 labor hours using truss components as opposed to 401 hours using conventional construction methods. In that test, the truss construction also utilized 26% less lumber than the conventionally built home. Numbers such as these should raise the awareness level of every firefighter when discussing the probability of structural collapse under fire conditions.

Concern about the poor performance of the engineered lightweight wood construction under the fire conditions led the fire service to seek a code change during the recent International Code Council's (ICC) Final Action Hearings in Minneapolis for the 2009 edition of the building construction codes. There was a code proposal that would have required lightweight construction in residential properties to be protected with a 30-minute barrier, a recommendation that came from the National Institute for Occupational Safety and Health (NISOH), a position they foster after investigating firefighter deaths.

Underwriters Laboratories also conducted tests to determine the fire resistance of light weight wood trusses. It is interesting to see that the difference in the temperature at the top assembly compared to the inferno below. In one fire test, after only five minutes, the temperature showed a comfortable 73 degrees on the floor level above the fire; meanwhile, the temperature below was 1,378 degrees. Firefighters use a thermal imaging camera (TIC) to determine temperatures in an effort to locate the fire. But because the flooring and carpets do not transfer that temperature, the TIC registers only 73 degrees; firefighters enter the door and fall through the floor because the fire below damaged the lightweight constructed floor trusses.

Based on these reports, the lightweight construction, the increased fuel load, and the synthetic petroleum-based materials in modern structures all contribute to much greater fire growth. Needless to say, faster fire growth significantly increases the probability of sudden catastrophic structural failure in these new homes. Time is working against us when fighting fires, and delayed response times could have direct adverse impact on the outcome of the call. Time is a luxury we don't have

when responding to these lightweight construction fires; catastrophic structural collapse and firefighter fatalities could be the end result as will increase litigation exposure for the homebuilder.

So when homebuilders argue new homes are built safer than older homes, they are grossly misrepresenting facts as they know of the long-standing concern of unstable structures in fire conditions when using modern light weight construction material. Florida went so far as to pass a law requiring all new residential occupancies constructed with light weight material to affix a warning sign on the exterior to warn firefighters – and homebuilders claim the new home is safer! One would think the homebuilders would embrace fire sprinklers as a solution to help resolve the light weight truss concerns expressed by our nation's fire service.

D. Accidental Activation of Sprinklers. Fire sprinkler opponents argue that fire sprinklers accidentally operate on a frequent basis causing great water damage. I responded to two incidents where fire sprinklers activated when there was no fire. One was hit with a football that was being thrown by children in a bedroom and the other was intentional opened by vandals. I have responded to many fire sprinkler activations that were caused by fire.

Concealed fire sprinklers solve many of the accidental activation concerns of the activities of children. Also, training of the owner on fire sprinkler system basics may also prevent accidental activation, particularly those that occur when items are hung from the fire sprinkler.

Another myth is that all fire sprinklers operate at the same time causing total water damage throughout the facility. While this portrayal of fire sprinklers is common in Hollywood movies, the truth is each fire sprinkler acts alone, each has its own fusible link that activate at a set temperature, typically 165 degrees Fahrenheit. The overwhelming majority of fires in fire sprinkler protected homes are controlled by 2 or less fire sprinklers. And fire sprinklers are effective 97% of the time.[14] Accidental activation of fire sprinklers does not happen – activations when no fire is present are caused by objects hitting or coming in contact with the fire sprinkler. The homeowner has an obligation to use caution with their fire sprinklers just as they need to use caution with toilets, sinks, tubs and other fixtures within the home through which water flows.

E. System Maintenance: Homebuilders argue the cost to maintain the fire sparkler system will be prohibitive and will chase away potential homebuyers. False! Home fire sprinklers require very little maintenance. It is essential to keep the water valve turned on, so a simple visual inspection should be done routinely to ensure the valve is open. And, inspect the pipes and sprinklers occasionally to make sure nothing is obstructing them. Every home sprinkler system should have a water flow test on a regular basis. It is a simple test that can be done by the homeowner and does not require the hiring of a contractor. The process is simple. There is a check valve in the system that is used to stop backflow into the water supply. Over time, water surges in the utility system will cause water pressure at this check valve to increase. By simply opening the drain valve we relieve the pressure and ensure that water flows on the system side of the valve. The fire sprinkler system actually is less costly to maintain than the plumbing system as there are fewer and more reliable parts in the fire sprinkler systems. The toilet valve or facet washers need replacement much more frequent than any part of the fire sprinkler system. The fire sprinkler system in my home is 15 years old and the total cost for me to maintain this system over the 15 years is $0.00.

F. Pipe Freeze. Homebuilders argue that the fire sprinkler pipe freezes thereby causing water damage. As this paper is being written, it is cold outside. And farther North in America the temperature is colder. Those who live in a freeze zone take action to protect their plumbing from freezing. All that is needed is that the fire sprinkler system also be on the homeowner's freeze protection list.

The installation standards suggest water filled pipe be installed in areas that can maintain 40 degrees Fahrenheit. If this temperature cannot be maintained, then there needs to be insulation placed over the fire sprinkler piping to protect it from freezing just as one would insulate plumbing pipe exposed to freeze conditions. It is that simple.

G. Misrepresentations Presented by Homebuilders before North Dakota Legislative Committee on January 29, 2009. It is disheartening that the homebuilders would so blatantly misrepresent issues before the Legislature as our elected leaders seek factual information on which to

base a decision. We are confident that the North Dakota Legislature and the Governor will seek the truth and then place the safety of the citizens of North Dakota and the nation's fire service above the self-serving special interests of the homebuilders. These misrepresentations and a factual response are provided.

- The Homebuilders lobby stated: **It will cost $ 5. 8 Billion dollars to put these residential fire sprinklers in if you do not pass this bill.** ***Figures on fire sprinkler installation costs from third-party non-stakeholders is $1.61 per square foot and that this is approximately 1% of the value of the home.[12] The median price for new homes in the mid west according to the NAHB during 2008 was $197,600. Therefore, using the 1% figure derived from non-stakeholder sources, this would mean the typical fire sprinkler system would cost $1,976 per house. If I divide the $5.8 billion dollars by $1,976, this computes to 2,935,223 new homes – a housing and population growth rate for North Dakota we do not believe anyone can validate. In fact, from the U.S. Census web site we see there were only 307,802 existing homes in North Dakota in 2006 and do not believe that there were 2,627,421 new homes built in North Dakota since this 2006 census report.[15] In fact, from the NAHB web site. one can find statistics that shows there were only 2,190 permits in 2007 and 1,720 permits in 2008 pulled in the entire State of North Dakota during this time period – or 2,642,911 more homes unaccounted for if the homebuilder lobbyist was truthful.[16] And if one looks at the total national new home permits issued, using the 973,300 new home permits issued in 2007, as 2008 was a bad year, when we multiply this number by $2,000 per home we end up with $1.947 billion. This is a $3.853 billion exaggeration using national figures and using 2,000 homes built each year in North Dakota, a $5.796 billion exaggeration in the North Dakota housing market. The real cost of fire sprinklers is discussed starting on page 34 of this document.***

- The homebuilders lobby argues: <u>It will cost $5000 to $7000 per home to put fire sprinklers in homes in an already trouble market putting homes out of reach of those that really need housing.</u> *Using the third party derived $1.61 per square foot price for fire sprinklers, the total square footage of the cost range quoted by the NAHB is 3,106 to 4,347square foot homes – tell me can those who really need homes afford a 3,106 to 4,347 square foot home? The homebuilders are not building housing intended to assist the first time homebuyer into a home – they seek the luxury home buyers. The median price of new homes sold in the Mid West in 2008 is $197,600 and the median price for existing homes was $150,500.[17] This means the median price for a new home was 33.1% higher than the existing home. This means the median price for the new home is $47,100 higher than the median price for the existing home. This suggests the new homebuilding market is targeting other than those who really need housing.*
- The Homebuilders lobby stated: <u>We have smoke alarms and they are doing a good job and we do not need sprinklers, smoke alarms are enough.</u> *We are losing close to 3,000 people in home fires each year. Yes, smoke detectors have helped, there are many documented cases where potential fire victims responded to the fire alarm and safely exited the burning structure. But equally effective has been the public awareness campaign implemented by or nations" fire service in the mid 1970s which has resulted in a significant reduction in the number of fires (44.851%) – people cause the vast majority of fires. And while we strongly support smoke detection as a critical part of the solution to our nations fire death problem, statistically we have not really done that much better in saving lives from fire. In 2007, on average, there were just 15.87 more home fires without a fire death than in 1977 – thirty years of progress but only 15.87 additional home fires without a fire death. In 2007 we have an average of one fire death for every 139.22 fires and in 1977 the death per fire ratio was 123.36 – progress but not great progress. The non-stakeholder Federal Agency that is now the National Institute of Science and*

Technology (NIST) reports a study finding that there will be an 82% reduction in fire deaths if we put a fire sprinkler along with the smoke detectors in our homes. This factual study, coupled with the fact that 91% of fire deaths occur in residential occupancies, has significantly contributed to the fire service's decision to attend code hearings to improve life safety for the public and the firefighters.

- The homebuilder's lobbyist stated: Sprinklers will leak and destroy your home and your valuables, causing mold problems that could cause you to have to move from your home, maybe permanently. *Fire sprinkler systems are different than plumbing. Fire sprinkler piping and all components meet more stringent testing standards than pipe and components used in plumbing. Fire sprinklers because they meet this higher standard do not leak. Yes, poor installation practices can cause a problem, but fire sprinkler systems are required to undergo pressure testing for leakage prior to approval to occupy the building. While mold is an issue in many regions of America, much of the mold problem in high humidity regions is caused by poor construction practices; specifically poor insulation.*
- The homebuilders argue: The adoption of this code will not fix the older homes and the new homes are so much better built they are safer than the older homes. *There are numerous examples where this is simply not true. Lightweight wood truss construction is being used more and more with new construction because it offers builders savings in construction cost, easier access to run utilities and ventilation, larger spans without obstacles such as columns for support and they can support a weight load equivalent to a solid structural member under normal conditions. Light-weight manufacturers report 65% of roofs and 25% of floors in new residential construction feature lightweight truss construction. Floor trusses are particularly problematic for fire fighters as there have been numerous cases where firefighters have been killed or injured when entering new homes only to experience a floor collapse because the light-weight truss do not fare well*

in fire conditions. If one would Google "North Carolina Beach Fire" you will find a series of pictures that clearly show how well new homes fair in fires. There are pictures showing the roof failure, not uncommon because gusset plates fail to retain the truss properly secured during fire conditions. There are also pictures showing the siding completely absent. The Vinyl Siding Institute will quickly report that vinyl siding has limited combustibility and low energy release rate and won't ignite, even in the presence of a flame, until approximately 730 degrees Fahrenheit. *The fire service will quickly tell you that 730 degrees Fahrenheit is a very low temperature in fire. Notwithstanding ignition of the vinyl siding, the product clearly melts, becomes deformed, and as a result* exposing the *building or insulating materials underneath. Thus, it aids in fire spread by not providing a consistent barrier to radiant heat or direct flame contact. Buildings that contain lightweight wood truss construction are susceptible to collapse from fire exposure in a very short amount of time. There are recommended code changes coming from the fire service to address these critical home occupant and fire fighter life safe concern. And yes, this new code requirement does not address older homes; but going forward over 1 million families would receive this new life safety feature each year – a positive start in solving our nations fire death problem.*

- Homebuilders argue: <u>Sprinklers fail and go off when they are not supposed to and do tremendous water damage to your home.</u> *This is simply not true. Fire sprinklers are independently heat activated. There is no credible information or data that suggests sprinklers just simply fail. While Hollywood movies like to show fire sprinkler systems completely flooding homes, over 95% of all fires in homes are controlled by two or less fire sprinklers. And again, the UL and FM testing and listing criteria for fire sprinkler systems is very stringent and products used for fire sprinklers meets a higher standard than typical plumbing piping and fixtures.*

- Homebuilders argue: <u>Sprinklers and kids don't mix; kids play around sprinklers and knock them off by throwing balls and just playing in the house.</u> *Well, yes! Balls are hard on windows as well. This would never happen in my home because of two reasons: 1. I have installed concealed fire sprinklers, and 2. my kids have been informed of the dangers and know better. The simple solution if there is concern about out of control kids in the home is use concealed fire sprinklers.*
- The homebuilders argue: <u>We have very good and dedicated firefighters and fire departments that can put out the fires.</u> *Yes, we do have very good and dedicated firefighters serving the communities of our nation. It is about time the homebuilders started to do something to help the fire service instead of creating additional life threatening hazards. The homebuilders are clearly aware of the light-weight material hazards; when are they coming to the table to correct the problem? The homebuilders are aware of instances where firefighters have died or were injured when falling through the floor where light-weight floor trusses were used; when are they coming to the table to correct the problem? The homebuilders are aware that the new home is more prone to collapse, surely they are aware of gusset plate testing being done by UL; when are they coming to the table to correct the problem? The homebuilders seem to think that they can build whatever they want because they control the national IRC committee and once it is built it is up to the community to pay with firefighter death and injury; pay for added infrastructure services, pay more workers" compensation for our firefighters, the community pays more for insurance and fire suppression costs – all shifted to the tax payer as the homebuilder has taken their money and run. The heart-breaking issue here is the fire ground commander must make the decision to allow firefighters to enter a burning home to attempt life safety of occupants – how many have decided no interior attack because they were aware of the collapse hazard of the materials used in new construction? It is unconscionable that the homebuilders do not get it – the fact that the*

vast majority of the problems they create with their new construction techniques and material could be resolved by meeting the code required fire sprinkler requirement. The homebuilder's total lack of concern for the fire service and protecting our firefighters is grossly offensive.

- The Homebuilders argue: <u>Homebuilder customers do not want fire sprinklers in their homes, never had anyone ask me to put them in.</u> *Well, I suspect very few if any homebuilders offer fire sprinklers as an option. In fact, there are many documented cases where the homebuyer asked the homebuilder to install a fire sprinkler system in the new home and the homebuilder refused. I suspect there were no potential customers asking for Ground Fault Circuit Interrupters to be installed as well, a device electricians install to prevent electrocution, and the homebuilders used the same argument in the 1970s when smoke detectors became affordable as fire sprinklers are today. The issue is the homebuilder has an obligation to build a fire safe home; the homebuyer cannot be expected to understand all of the code requirements, that is what the contractor is supposed to do.*

- The Homebuilders argue: <u>The fire sprinkler system requires expensive annual maintenance and inspection.</u> *A fire sprinkler system has been installed in my home for 15 years and the total cost during this period to maintain my system has been $0.00. The homeowner simply needs to check the water pressure gauge on a recurring basis and occasionally open the water flow valve to ensure water flows through the system. These small and uncomplicated systems pose no more difficulty in maintenance oversight than other systems in the house – in fact much less since I have spent nothing maintaining my fire sprinkler system during the past 15 years but have spend hundreds of dollars replacing leaky toilet seals and sink facets.*

- The homebuilders argue: <u>Your fire insurance will increase if you put in a fire sprinkler system because of the potential for leaks.</u> *This is grossly false – the homebuilders know*

better. Insurance providers are part of the Home Fire Sprinkler Coalition and most insurance companies provide a reduction for fire sprinklers in homes; not an increase. Studies done by Scottsdale Arizona, a community with over 40,000 homes or over 50% of all homes in the community protected with fire sprinklers are impressive. The average fire loss (water damage included) in a fire sprinkler protected home is $2,166 and the non-sprinklered home is $45,019. This is a 95%+ reduction in loss and the home builders think the insurance companies will charge more! They know this statement is false and untrue. I get 10% savings on my system, some get more, some less. The substantive issue for the State Insurance Commissioner is when data shows a 95%+ reduction in property loss, why is the insurance company only giving a 10% reduction?

- The homebuilders argue: <u>We are in the North Country and it gets cold up here, the systems will freeze up, we are not like those homes in the south.</u> *There are issues with freezing in many parts of America. That is why the codes require pipes that would be exposed to temperatures below 40 degrees Fahrenheit to be insulated. Surely the homebuilders are not arguing the piping for plumbing should be insulated but the pipe for fire sprinklers not!*
- The homebuilders argue: <u>Smoke is what kills people and that is what smoke alarms are for – smoke, fire sprinklers will not stop the smoke.</u> *Again, the homebuilders know better – this is an intentionally false and misleading statement. Smoke is the byproduct of fire. If there is no fire, there is no smoke. Fire sprinklers extinguish or control fire growth – control it to the point where smoke generation is survivable. There have been numerous fire deaths in homes protected solely by smoke detectors – we have over 3,000 fire deaths each year in America. In most cases, the fire death victim was very young or elderly and could not respond in a timely manner to the smoke detector alarm There are also numerous cases, in fact a high percentage of 20 – 45 year old deaths, where impairment such as that induced by alcohol consumption was a contributing factor in their failure to*

respond to the smoke detector. There have been the rare fire death in fire sprinkler properties; in all cases the victim was intimate to the fire source. There have been cases where occupants have not even been aroused by the flow of water from fire sprinklers because of impairments who were later rescued by firefighters – certain fire death had it not been for the fire sprinkler system.

- The homebuilders argue: Adoption of fire sprinkler codes could cause people to move to communities that do not adopt the codes and build their new homes. *The International Residential Code requires all new homes to be protected with fire sprinklers. This should mean all communities adopt and enforce the same code. Again, the homebuilder has an obligation to build a fire safe home notwithstanding what government does or does not do or adopts or does not adopt. The national codes, all of the national codes, require new homes to be fire sprinkler protected; this is the standard of care that is expected of the homebuilder. Should they seek alternative ways or locations to build an unsafe home, they do so at their own peril.*
- The homebuilders argue: The builders want consistency across the state and if the legislators make the decisions on preventing adoption it will provide consistency. *The nation's fire service wants consistency here with one major exception – the Legislature must adopt the national model building and fire safety codes for all new homes in the state – not prevent it! If the Legislature wishes not to mandate a statewide adoption of national model building codes and leave this decision to local government, they need to do just that – no specifying what is or is not acceptable. The issue here is some jurisdictions may have a growth management plan for governmental services that includes fire sprinkler protection. By doing so they can reduce their infrastructure costs as well as their recurring costs of doing business. The homebuilders asking the Legislature to prohibit local government from making the call on what meets local needs is a step in the wrong direction – an unfunded mandate.*

PART 4: RESPONSIBLE GOVERNMENT

There are many actions that local government may take to make residential fire sprinklers more affordable and practical. We encourage government to accept the fire sprinkler concept. If one would review the success stories of Scottsdale, Arizona and Prince George's County, Maryland they could very quickly understand the many costs saving that comes to government.

A. Water Supply Issues. Key to successful fire sprinkler operation is adequate water supply. The national design and installation criteria for automatic fire sprinkler systems have been adopted by most state governments for statewide application through statutory empowerment. The role of local government is to ensure these national fire sprinkler system design standards are met when these fire sprinkler systems are installed in new and existing buildings. Compliance with these national design standards, for the most part, are consistently applied and enforced throughout the nation by fire and building departments.

However, even though these national standards establish optional criteria for water supply connections, these national fire sprinkler design standards in many parts of the nation are ignored by water purveyors. These nationally accepted and approved standards provide for alternative designs for water supplies feeding fire sprinkler systems but often the water purveyor rejects these options for the want of additional fees. These standby water fees and extra tap fees are viewed by many as solely for revenue generation.

There is tremendous costs savings to local government and we suggest many governments and water purveyors are missing out on these savings. Community water distribution systems are sized based upon expected growth and water supply demand. Typically a water department will provide fire protection for the community they serve by providing the required fire flow for fighting fires. The size of a water distribution system is often governed by the expected demand of the calculated fire flow for that area. This demand on the water system will increase the diameter of the piping and the amount of water that is in storage resulting in an increase in the cost of a water distribution

system. A savings of 20-80% is possible on fire flow demands when sprinkler systems are installed. Thus, with proper planning, infrastructure demands would be far less, piping could be smaller and these savings completely connect with "Green" America. This reduction can save the water authorities thousands of dollars each year in excess water supply and maintenance costs.

Recommendation: A focus group should be established to discuss ways of reducing the size of water distribution system fire flow requirements where widespread use of fire sprinklers is present. Again, widespread demand for fire sprinklers already exists for many occupancy types in the current International Building Codes.

Cross-Connection protection is a substantial issue impacting the cost of fire sprinkler systems. While nobody disputes the liability avoidance need for cross-connection protection, the type and degree of cross-connection protection requirements imposed in many communities is very problematic.

Cross-connection protection has been greatly reviewed and reported on by many water purveyor industry related associations. Specifically, **AWWA Manual M-14, *Recommended Practice for Backflow Prevention and Cross-Connection Control,* 3rd Edition, 2004,** has been publish to provided expert guidance to the water purveyor on cross-connection or backflow protection. But many water purveyors are requiring a separate tap for fire sprinklers thereby requiring an additional cross-connection device. National design standards allow for one cross connection device then on the customers side of the device the lines are branched to feed the fire sprinkler and domestic water flow. But also problematic is the type of cross connection device. The national standards (M-14) specify cross-connection devices based upon severity of the potential contaminant. Yet some water purveyors require very costly cross-connection devices that provide protection beyond what is needed – a Rolls Royce when we want a Ford.

Recommendation: The provisions of **AWWA Manual M-14, *Recommended Practice for Backflow Prevention and Cross-Connection Control,* 3rd Edition, 2004,** should be adopted for statewide application.

B. Infrastructure Incentives. There are many incentives that local government can provide homebuilders to help reap the most form the code required fire sprinklers in new homes. Items that local government may consider to assist the homebuilder include an assessment of the cost savings from any reduced or eliminated impact fees if applicable, the reduction in special fire district tax, insurance fees, and other taxes or fees imposed, and the waiver of certain infrastructure requirements including the reduction of roadway widths, the reduction of water line sizes, increased fire hydrant spacing, increased dead-end roadway length and a reduction in cul-de-sac sizes.

There are many costs savings that government reaps as fire sprinklers become more wide spread. Probably the most important is a reduction in workers' compensation claims. There will always be a need for fire fighters but fire sprinklers make their jobs less hazardous, particularly when light weigh materials are being used in construction.

Recommendation: Local government should be tasked with determining ways to provide incentives for residential fire sprinklers that is acceptable to all parties.

PART 5: LEGISLATORS AND LEGISLATIVE ANALYSTS

This Part of the document is intended to assist Legislators and Legislative staff with questions to ask those who may appear before a committee. Also included in this section is a draft staff analysis.

A. Questions for Legislators to ask.

For the Homebuilder.

- If you say the cost of the fire sprinkler system is driving away potential homebuyers, how many are you chasing away with granite countertops?
- Is not the key to my getting a mortgage loan the interest rate, the amount of money I have available for a down payment, the amount of money I have available for a monthly payment and my credit rating – I then am told the maximum dollar value of the home I may purchase?
- Once I qualify for a mortgage I am told what the maximum dollar amount I can spend on a house. If this amount is $200,000 or $400,000 I still can buy a house with a fire sprinkler system installed can I not?
- Then is not the issue you would rather spend the money on granite countertops, kitchen islands and other items that makes the new home more attractive to the homebuyer than the existing home market?
- What is the ratio of existing homes for sale verses new homes for sale?
- How big is the after fire rebuild market? If it is that small then you do not need it?

For Government.

- What tax or fee incentive have you planned to implement when the residential fire sprinkler requirement becomes effective?
- Have you coordinated with your water utility provider to ensure unreasonable tap fees and other cost driving requirements have been favorably addressed?

- Will there be a standby water fee imposed by government for water existing in these systems?

For Realtors.

- You sell both new and existing homes?
- What is the market difference – what percentage of the homes for sale are new verses existing?
- You understand the builder of the new home wants to spend all available money of items that makes the new home more attractive to the customer than the existing home?
- Do you feel it is acceptable to support the new home builder's efforts to gain a competitive advantage over 90% of your sales base?

For Insurance Company Representatives.

- Data from communities that have over 15-years experience with residential fire sprinklers report over a 95% reduction in property loss in single-family homes. How much is your premium discount for fire sprinkler protected homes? Why is it so low?

For the Fire Sprinkler Contractor.

- What is the average cost per square foot for installing fire sprinklers in new homes in this State?

B. Staff Analysis Notes.

The median price of new homes is typically above that of above the median price of the housing market – some areas as much as $69,900 as reported by the NAHB on their web site.[16, 17] Therefore, the new home typically costs the homebuyer more money than the existing home so housing affordability really is with the existing home market. But to make the new home more attractive to the homebuyer that may be in the top 20% who can afford the price asked for the new home, the homebuilder adds "glitter" items to make the new home just so attractive the homebuyer must find a way to purchase the higher priced new home. The mortgage market found creative ways to allow people into homes that were above their ability to sustain – thus the housing bubble which finally

burst and now the far-reaching foreclosure problem looming over America. Many of the new home mortgages from those with questionable abilities to sustain the mortgage payment were sold to Wall Street money markets – thus the recession.

Now, more than ever, there are millions of existing homes on the market for sale, again many in foreclosure. This has caused a severe downturn in the new home market. The builders of new homes want to gain a competitive advantage over the existing home market. To gain this competitive advantage they must provide an excessively attractive home that contains all the wants and assumed needs of the buying public. To pay for all of these glitter items, the new homebuilders must find creative ways to build homes cheaper. One path has brought prefabricated light-weight materials for use in roof and floor trusses – strong material but products that do not fare well during fires. In fact the fire services of our nation have expressed grave concerns after firefighter death and injury have occurred in building collapse when these new innovative products failed. One path also pushed by some homebuilders is repealing the national model code and standards that require fire sprinklers in all new homes. Again, the want is to spend the money on glitter items, not fire and life safety items. The opposition to fire sprinklers echoes the opposition by homebuilders in the past when smoke detectors became a code requirement and also when ground fault circuit interrupters were required in the electric code. The number one consumer want item today in the new home is the kitchen island. If the fire sprinkler system was the number one demanded item there would be no opposition from the homebuilders. Thus, the homebuilding market is driven by consumer demand, the items in highest demand must be in the new house for it to gain competitive advantage over the existing home and items required by government and national codes that do not fit in the high demand category are rejected by homebuilders even if they are life safety systems.

Economic Impact. The Housing Economics section of this paper clearly outlines housing economics, the recession, the causes of the recession, and the truth about home mortgages and fire sprinkler systems. The homebuyer goes to the mortgage broker with a set amount of money for a down payment, a set amount of money available for a monthly payment, a credit rating, and the

interest rate – these four factors determine the highest value of a home they may purchase. They then embark within their community seeking a home whose cost is equal to or less than their mortgage limit. A fire sprinkler system can be installed in a home of any value – the fire sprinkler system is not chasing away the buyer from buying the home, if the home is within their limit then they will buy. What attracts buyers to the "right" home, be it existing or new is the floor plan – today's buyer wants a more open floor plan. The new home provides a more open floor plan. Today's buyers want a kitchen island. There is a greater probability the kitchen island will be in the new home. The sole issue here is those items high on the buyers want list may not include the fire sprinkler system. So the entire issue here is the builder of the new home wants a competitive advantage over the existing home market and to get this competitive advantage they want to add all of the high demand "glitter" items to make the new home stand out in the eyes of the buyer – sprinklers are not on their "glitter" list; yet.

There are numerous third party sources for credible data on the economic benefits of fire sprinklers. The two best sources are the National Fire Sprinkler Association (NFPA.org) and the Home Fire Sprinkler Coalition (homefiresprinkler.org). From these sources one can find papers and studies from third party non-stakeholders whose data is absent from influence.

The Scottsdale 15-Year Report, downloadable from homefiresprinkler.org, provides exceptional data. With 41,408 homes protected with fire sprinklers in their community, over 50%, the comparative data has strong validity as being statistically significant. The data shows the average loss per fire in a fire sprinkler protected home is $2,166 and the non-sprinklered home is $45,019 or a 95.189% reduction in property loss. And there were no fire deaths in homes protected with fire sprinklers and 13 fire deaths in the non-sprinkler protected homes. The annual fire loss in Scottsdale was $3, 021,225 compared to the national average of comparable communities at $9,144,442. And government savings were also clearly evident. Water usage estimates for fighting fires in fire sprinkler protected homes was an average of 341 gallons per fire while the non-sprinkler protected homes the water usage was an average of 2,935 gallons per fire. This is an 88.382% reduction in

water usage – water being critical in the Phoenix basin – this is a critical "Green" benefit. All economic indicators make fire sprinklers a win-win for all. Well there will be a reduction in the rebuild market. The substantive question should the public be subjected to loss of life-long belongings and heirlooms, the loss of their home, the loss of their pets, the loss of their love ones, just so the homebuilder can retain a rebuild market or add more glitter items? Public safety and welfare must come first.

A draft staff analysis of legislation that would have the force and effect of repealing the national model code requirement of fire sprinkler in new homes would be:

Reports from communities that have required fire sprinklers in new homes report significant economic benefits. Reports indicate a 95% reduction in fire loss in single family homes and a 100% reduction in fire deaths. Also government reaps benefits as these communities report substantial savings in water usage for fire suppression services. Also, with proper planning, governments long-range infrastructure costs will be reduced with code allowed downsizing of water lines as less water is needed for firefighting services which is the greatest factor in determining water flow demands within a community.

Costs of installing fire sprinklers in a new home is reported by the Fire Protection Research Foundation, of the National Fire Protection Association to be an average of $1.61 per square foot and all indicates are these costs will reduce as the market and competition grows. A report from a community that has over 40,000 homes protected with fire sprinklers indicates the cost to be less than $0.80 per square foot.

The elasticity of demand for housing is very inelastic. What this means is an increase in price has no bearing on consumer demand. The homebuyer is given a mortgage dollar limit and the home they buy must be at or below this limit regardless of what features are in the home. The new or existing home is either at or

below the homebuyers acceptable mortgage rate or it is out of reach. The National Association of Home Builders reports on their web site that 58.60% of the households in America can afford a home of $175,000 or less. Many jurisdiction report new stand alone homes far above this $175,000 mark. A fire sprinkler system can be installed in any value house.

The homebuilders want is to provide a high quality home at the least cost to the consumer. But to be competitive with the existing home market they must build the new home with features currently demanded by the consumer. Homebuilder opposition to fire sprinklers is simply they wish to spend the money needed for fire sprinklers on items that will make the new home more attractive to the homebuyer when compared to the existing home.

The fire loss and life saving statistics are impressive and appear to be the factor driving the push from our nation's fire service to mandate fire sprinklers in all new homes. Over 91% of the U.S. annual fire deaths in structures are in homes and the fire service and those impacted by fire by their showing at the International Code Council hearings in support of fire sprinklers in homes is a clear message fire sprinklers are needed.

It is important that both sides of an issue be truthfully heard and considered before the Legislature makes a decision. Many in the fire service have been disappointed with the posture on fire safety issues displayed by the homebuilders. Tolerating willful and wanton misrepresentations presented before a legislative committee should not and must not be allowed and censorship should be imposed.

The homebuilder's failure to grasp the situation is depressing. For them to expect the fire service to sit silently when 91% of our nation's annual fire deaths occur in homes is shortsighted. The image the representatives of the trade association representing the homebuilders is painting is

one that brightly shows a complete lack of concern for the health, safety and welfare of the public and the fire services. Failure to respond to the nation's fire service concerns on new construction practices and materials further debases the homebuilding industry. The posture being presented by homebuilder interest groups is leading right straight to the litigation pit as homebuilders know or should know that fire sprinklers save life and property and will mitigate the new construction material concern. The smartest path for the homebuilders is to embrace the fire sprinkler concept and ask the fire services and government to help identify ways to lower the cost.

About the author: Buddy Dewar was graduated from Florida Atlantic University with a Bachelors of Science in Economics with concentration in **econometrics** – quantitative economic analysis. Buddy Dewar also was graduated from Nova Southeastern University with a Master in Business Administration and is a member of the International Honor Society Sigma Beta Delta.

He has a distinguished fire service career, which includes working as a firefighter, fire officer, and fire chief; Superintendent of the Florida State Fire College, and Director of Florida's State Fire Marshal's Office. Buddy currently is serving as Director of the Regional Operations for the National Fire Sprinkler Association.

He has served on numerous committees and commissions including former Chair of the Firefighter Professional Qualifications Committee (NFPA 1001, 1002, and 1003); current member of the Technical Committee on Health Care Occupancies (NFPA 101 and 5000); former Chair of the Florida Fire Code Advisory Board; former Chair Florida Public Safety Education Committee; former member of the Florida Fire Safety Board; former member of the Florida Emergency Medical Services Council; and served a two-year term as President of the Florida State Firefighters' Association. Buddy is also a decorated Viet Nam veteran.

Buddy has authored many papers and is a highly recruited and energetic program speaker. He has received numerous awards for his fire service and his programs have been featured in ***People Magazine.*** He has been awarded Life Membership in the Florida State Firefighters Association, The Florida Fire Marshals and Inspectors Association and the National Fire Protection Association.

Cites

1. *Scottsdale Report – 15 Year Fire Loss Data,* City of Scottsdale Arizona, 2002

2. *Residential Sprinklers: One Community's Experience Twelve Years After Mandatory Implementation,* Prince George's County, Maryland, January, 2001.

3. *World Fire Statistics.* (October 2008) International Association for the Study of insurance Economics, The Geneva Association.

4. *Home Structure Fires,* (January 2009) National Fire Protection Association.

5. Ruegg, Rosalie T. and Fuller, Sieglinde K. (1984) *A Benefit-Cost Model of Residential Fire Sprinkler Systems,* NBS Technical Note 1203, Gaithersburg, Maryland.

6. Follain, J. R. (1992). *The Outlook for Owner-Occupied Housing in the Year 2000.* Syracuse University Press.

7. DiPasquale, D. and Weaton, W. (1994). Housing Market Dynamics and the Future of Housing Prices. *Journal of Urban Economics* **35,**1-27.

8. Brickley, J., Smith, C., Zimmerman, J. (1997). *Managerial economics and organizational architecture.* McGraw-Hill.

9. Smith, L. B. (1969) A model of the Canadian housing and mortgage markets. *Journal of Political Economy,* **77(5),** 795-816.

10. Alm, J. and Follain, J. (1994) Shocks and Valuation in the Rental Housing Market. *Journal of Urban Economics,* **36**, 17-142.

11. Quigley, J. (1979). What have we learned about urban housing markets? *Current Issues in Urban Economics,* John Hopkins University Press

12. *Home Fire Sprinkler Cost Assessment,* (2008) Fire Protection Research Foundation.

13. *Entering Through the Door, Falling Through the Floor.* (2009) Azarang(Ozzie) Mirkhah and Sean DeCrane, everyonegoeshome.com

14. *U.S. Experience with Sprinklers and Other Fire Extinguishing Equipment,* (2007), National Fire Protection Association, Quincy, Massachusetts.

15. **http://quickfacts.census.gov/qfd/states/38000.html**

16. **http://www.nahb.org/fileUpload_details.aspx?contentID=55104.**

17. **http://www.nahb.org/fileUpload_details.aspx?contentID=55768**