TOP TEN BUILDING CODE VIOLATIONS FOUND BY FLORIDA BUILDING OFFICIALS

By

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Abstract of Thesis Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
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Since its creation in 1998, the Florida Building Code is periodically updated. In order for designers and contractors to keep up with these changes, a series of continuing education courses were instated.

The purpose of this study was to determine the top ten code violations observed by Florida building officials during inspections and to then use this information to make practical suggestions on ways to improve the continuing education courses, which in turn would reduce the frequency of these violations and improve the general welfare and safety of building occupants. A survey was sent out to building officials in which they were asked to identify the occurrence rate of inspection violations. The surveys were analyzed statistically and the results demonstrated that the majority of the top violations occur in the framing process. This information is useful in improving the current education programs.

CHAPTER 1
INTRODUCTION

When Hurricane Andrew hit South Florida, in August of 1992; thousands of homes and other structures were damaged or destroyed mainly due to high winds (National Oceanic and Atmospheric Administration [NOAA], 2002). Hurricane Andrew caused billions of dollars in damage and revealed a serious statewide problem: Florida's antiquated system of locally-administered building codes and building code compliance and enforcement (Florida Department of Community Affairs, 2004).

In the aftermath of Hurricane Andrew the Florida Building Codes Study Commission was established to evaluate the existing system and to recommend ways to improve or reform the system if this was necessary. During sixteen (16) months of study, the commission found a complex and confusing patchwork system of codes and regulations, which were developed, amended, administered and enforced differently by more than 400 local jurisdictions and state agencies. In the case of Hurricane Andrew, the problem was not weakness in the codes themselves that contributed to the extensive storm damage, rather it was the inability to enforce and comply with the confusing system of multiple codes and administrative processes. It had become clear that Florida needed a single, statewide building code system, and, in 1998, the Florida Building Code was created. This new code went into effect in March of 2001 and in order to improve the transition to the new code changes, a series of continuing education courses for building professionals were developed. Additionally to ensure compliance, penalties are instated

to designers and contractors who are found to violate the new code standards (Florida Department of Community Affairs, 2004).

Purpose

The purpose of this study is to determine the current level of general understanding and application of the Florida Building Code by collecting data on common code violations as observed by building inspectors. Through this data collection it will be possible to determine the top ten (10) code violations reported by building inspectors. The results of this study will determine which areas of the building construction process need further or revised code related education. It is hoped that the improved continuing education courses will help reduce the number of violation occurrences. Additionally it is hoped that the results of this study will serve to inform and educate the public about the most common code violations. Increased awareness about the most frequent code violations could reduce the occurrence rate of these infringements, which in turn would benefit the general public in several ways. Benefits from code violation reduction include the reduction in costs associated with rework and time delays, the reduction of insurance rates, and the increased safety and health of the building occupants.

In order to determine the top ten (10) building code violations, surveys will be conducted to code enforcement officials and the responses will be statistically analyzed. This study will be limited to code enforcement agencies in the state of Florida, and the results of this study are limited to the responding sample. Based on the level of response, the findings and results may vary.

Summary

In the next chapter (Chapter 2) the literature pertaining to the subject of codes and code violation studies will be reviewed. Then in Chapter 3 the methodology for this study

will be described, and the results of the study will be explained in Chapter 4. Chapter 5 will provide the reader with conclusions as well as with recommendations for future study.

CHAPTER 2
LITERATURE REVIEW

This section summarizes the existing literature that was found on building codes and building code violations. This section will cover the history and purpose of building codes, the Florida Building Code and previous studies that have been done regarding common code violations.

Purpose of Building Codes

The purpose of a building code is to establish minimum requirements necessary to protect public health, safety and welfare in the built environment. Model building codes provide protection from tragedy caused by fire, structural collapse and general deterioration. The primary application of a building code is to regulate new construction. Building codes usually only apply to an existing building if the building undergoes reconstruction, rehabilitation or alteration, or if the occupancy of the existing building changes to a new occupancy as defined by the building code (ICC, 2005A).

Safe buildings are achieved through proper design and construction practices along with a code administration program that ensures compliance. Model codes keep construction costs down by establishing uniformity in the construction industry. This uniformity permits building and materials manufacturers to do business on a larger scale—statewide, regionally, nationally or internationally. Larger scale allows cost savings to be passed on to the consumer. Codes also help protect real estate investments by providing a minimum level of construction quality and safety (ICC, 2005A).

History of Building Codes

For thousands of years, building codes and regulations have protected the public. The earliest known code of law—the Code of Hammurabi, king of the Babylonian Empire, written in 2200 B.C.—assessed severe penalties, including death, if a building was not constructed safely (Encyclopedia Brittanica, 1910). In the United States the modern building code's development can be traced back to the early 1800's. During the early 1900's, model building codes were written by code enforcement officials of various communities with assistance from all segments of the building industry. In 1915, code enforcement officials met to discuss common problems and concerns. Out of these meetings came the formation of three organizations of code enforcement officials. These organizations were: Building Officials and Code Administrators (BOCA), International Conference of Building Officials (ICBO), and Standard Building Code Congress International (SBCCI). In 1994 all three model code groups came together to develop a single set of codes without regional limitations and established the International Code Council (ICC). Since its creation 48 states have adapted the ICC unified code known as the International Building Code (ICC, 2005A).

Building Codes in Florida

The State of Florida first mandated statewide building codes during the 1970's. During the early 1990's a series of natural disasters, including Hurricane Andrew, together with the increasing complexity of building construction regulations precipitated the comprehensive review of the state building code system (Florida Department of Community Affairs, 2004). Historically there have been several occasions in which a city code is reassessed after a major disaster. For example after both the Chicago Fire of 1871 and the San Francisco Earthquake of 1906 the codes of these cities were revised to

prevent future similar disasters. In Florida, the study conducted after Hurricane Andrew, revealed that building code adoption and enforcement was inconsistent throughout the state, and that those local codes thought to be the strongest proved inadequate when tested by major hurricane events. The consequences of an inadequate code system were devastation to lives and economies and a statewide property insurance crisis. The response was the reformation of the state building construction code system that placed emphasis on uniformity and accountability. The Florida Building Code, which became effective March 1, 2001, supersedes all local codes. When distinctive local conditions are not specifically addressed or a jurisdiction believes that code provisions need to be updated, then amendments can be added. However these amendments will only be accepted if they are more stringent than the existing codes (Florida Department of Community Affairs, 2004).

In order to ensure that construction is in line with the Florida Building Code, building inspectors periodically visit each building or structure for which a permit has been issued. The inspections vary according to the different types of construction. After an inspection has been completed, an inspector will sign a permit card, which must remain onsite in an approved location (Plantation Building Department, 2005; City of Melbourne, 2005). The inspection process is administered at the city or county level and may vary slightly across municipalities statewide.

Code Education and Compliance

The Florida Building Code is updated by the Florida Building Commission every three (3) years. Designers and contractors must stay informed on all updates. In order to stay informed a series of education and training courses were established along with the code. Fourteen hours board-approved continuing education is required each biennium

prior to the renewal period for both certified and registered contractors. Of these at least one hour must deal with workplace safety, one hour on the subject of worker's compensation, one hour on the subject of business practices and one hour on Florida Building Code advanced modules. Additionally under the new system, designers and contractors will be penalized for repeated violations of code requirements through assessment of quadrupled re-inspection or plan review fees for third violations of the same requirement. Also, violations of code requirements that pose a significant threat to the health or safety of building occupants or substantial degradation of a building's systems will subject licensed designers and contractors to fines of between $500 and $5,000, and to disciplinary action against their license. All fines and disciplinary action will be recorded on an automated information system for review by permitting jurisdictions (Florida Department of Community Affairs, 2000).

Until recently, criminal liability did not come into play for building code violations. However, in March 2003, the Minnesota Court of Appeals affirmed the criminal conviction of a construction company's CEO for violations of the Uniform Building Code in the State v. Arkell case. The CEO was sentenced to pay a fine, make restitution to condominium owners and serve 90 days in jail (with 80 days stayed pending compliance with sentencing conditions).The Arkell case is a landmark decision for construction industry participants. Even though this case was overturned in May, 2005 (Thelen Reid & Priest LLP, 2005), construction company owners, officers and shareholders need to be aware that they may face personal criminal liability for unremedied building code violations. Construction companies should ensure they have adequate controls and checks in place to address any code violations that may arise and

code violations should be promptly addressed, with all corrective action adequately documented.

Code Violation Studies

Few code violation studies have been conducted in the United States or in other countries. An extensive search uncovered studies concerning common code violations for the following jurisdictions: Catawba County, NC (Catawba County, 2004); Clayton County, GA; Fayette County, GA; Henry County, GA; Coweta County, GA (Discovery Inspections, 1999); Columbus, OH (Columbus, 2000). Additionally the International Code Council conducted a nationwide study (ICC, 2005B), and studies have been found that were performed in Florida. Two of these studies was statewide conducted by the University of Florida (McCollum, 2004; Cox, and Issa, 2005), and two other studies were performed following Hurricane Andrew. One was performed by Siddiq Khan and Associates (SKA, 2004) for Miami-Dade County, and the other was put together by the American Society of Civil Engineers (ASCE, 1994). Another related study was a construction practices/quality assessment report done by the Florida Building Commission (FBC, 2005).

Catawba County

The Catawba County Government Building Codes and Services Department developed a list of the top twenty violations, with five violations in each of four categories: building, plumbing, mechanical and electrical. In the building category the top violations were inadequate roof trusses, design pressure ratings missing on garage doors, missing anchor bolts, improperly installed doors and windows, and rafter to plate connections (Catawba County, 2004). Apart from this list there was no information about

how the top violations were found nor was there information regarding the occurrence rate of each violation.

International Code Council

The most recent study found on building code violations was conducted by the International Code Council, which was done for the 2005 building safety week survey with the participation of more than 400 code officials (ICC, 2005B). This study was done with a nationwide survey and looked at new and existing home and building construction. In construction of new homes, code officials found the most common code violations to be: Structural and wood framing problems (30%), grading, foundation, footing and concrete problems (24%), and exit (egress) was also noted (11%), especially problems with stairway handrails. In existing homes, the most common code violations were found to be: Electrical problems (15%), structural and wood framing violations (14%), and exit problems and fire safety related issues (13%). The survey also looked at top code violations in new and existing buildings and found that in new buildings the top violations were structural and wood framing problems (24%), permit protocol violations (16%), and egress concerns (15%). In existing buildings the most common violations were: Egress concerns (21%), fire-related violations (17%), electrical violations (12%) and administrative problems (12%). The study also found that a large population of those surveyed is unfamiliar with all the requirements for sprinklers in new and in existing homes and buildings (ICC, 2005B).

University of Florida

The University of Florida conducted a study to find the most common plan review and building inspection violations in Florida. From this study two publications were written (McCollum, K., 2004; Cox, R. and Issa, R., 2005). This study was performed by

sending out a survey to plan reviewers in the state of Florida and then analyzing the data. Responses were received from 22 Florida counties. Results from this study determined the top ten violations and showed that the three most common code violations came from wind load and structural calculations (45.4%), from the Florida Accessibility Code (43.7%), and from not having revised plans on site (38.8%). This study received a 29% response rate that represented 33% of Florida's counties.

Forensic Engineering

In the aftermath of Hurricane Andrew, Siddiq Khan and Associates (SKA), a forensic engineering firm, conducted a series of investigative studies on behalf of the Miami-Dade County Building Department and the County Manager's Task Force charged with the review and revision of the South Florida Building Code. Investigative studies included seven residential subdivisions: Country Walk, American Homes, Hampshire Homes, Deerwood Homes, Lakes by the Bay, Saga Bay and Naranja Lakes. The data gathered, along with the expertise provided by SKA resulted in the publication of a 10 volume report, titled "Identified Code Violations and Construction Deficiencies". The investigated studies and subsequent reports became a basis for the revision of the South Florida Building Code (SKA, 2005).

Another publication that resulted from Hurricane Andrew and helped shape the new Code was entitled "Hurricanes of 1992: Lessons Learned and Implications for the Future" (ASCE, 1994). This publication resulted from the proceedings of a Symposium organized by the American Society of Civil Engineers (ASCE), which was held in Miami, Florida, December 1-3, 1993. This publication features a broad range of subjects relating to hurricanes and wind storms among which are building code implementation and enforcement (ASCE, 1994).

Florida Building Commission

In January, 2005 the Florida Building Commission released a report entitled "Issues, Options, and Recommendations Regarding Construction and Inspection Practices" (Blair, 2005). This report summarizes the findings of a study that was commissioned to Jeff Blair, the Commission facilitator with the Florida Conflict Resolution Consortium at Florida State University, to address the following three key issues:

- Study the current practices of builders and inspectors and make recommendations that will maintain the quality of construction and the effectiveness of home inspections.
- Review procedures used by tract builders regarding the post construction checklist, and the length of time for completing the list.
- Review current practices that inspectors use when doing home inspections as well as the number of inspectors that are available to conduct inspections.

The assessment was done mostly through phone interviews and by reviewing relevant construction and inspection documents. In relation to the building codes the study found that more education and coordination are needed. The study determined that there is a lack of coordination between the various professions, trades, associations, industries, regulating and licensing entities, and educational efforts related to construction and inspection practices (Blair, 2005).

Code Violation Books

In addition to code violation studies, a search was done to for books relating to this topic and it was found that few books have been written to educate contractors about common code violations. *The Code Check* (Casey and Kardon, 2003) series of books and *Common Code Violations…and how to fix them* (Underwood, 2004) are condensed guides to commonly cited code violations in residential construction and are based on the

International Residential Code. *Building Codes Illustrated* (Ching and Winkel, 2003) is based on the International Building Code but is directed towards architects and is therefore not applicable to this study. No books regarding commercial construction code violations were found during the literature review.

Summary

Building codes have existed to protect the public's welfare for thousands of years. In the United States the modern building code's development can be traced back to the early 1800's. Currently 48 of 50 states use the International Building Code. In Florida statewide building codes were first mandated in the 1970's. In 1992, after major damage from Hurricane Andrew, a comprehensive review of the state building code system was conducted and it was determined that a uniform statewide code was needed. The Florida Building Code went into effect in March, 2001, and it supersedes all local codes. Compliance with the Florida Building Code is enforced through building inspections, continuing education courses, and violation penalties. However code violations still occur and it is the purpose of this study to determine which violations are the most common and to then educate the population about these violations. Increased awareness about common code violations would reduce violation occurrences and in turn increase the safety and welfare of a building's inhabitants and users. Few studies have been done about the most common code violations, which gives this study added importance.

In Chapter 3, the methodology for this study will be laid out including how the survey was developed and its distribution. The results of this study will be discussed in Chapter 4 along with a discussion about what the implication of these results. Additionally in Chapter 5 conclusions and recommendations for future study will be given.

CHAPTER 3
METHODOLOGY

The objective of this study is to determine the most prevalent code violations observed by building officials during the existence of the current Florida Building Code. A survey was sent out to building departments statewide. The collected data was analyzed and the results of this analysis will be used in making recommendations about the content and success of the existing continuing education courses. This section discusses the methodology used to develop the questionnaire.

Limitations

The results of this study are limited to the responding building officials of the state of Florida. Additionally the survey does not specify if the violations are specific to commercial or residential construction. Many violations may be exclusive to either residential or commercial construction and further study in this area could concentrate on making this distinction. This study is also limited to finding top violations that occur only during the building inspection process and does not address violations that occur during the plan review process or any other types of violations.

Distribution

Once the questionnaire was finalized, it was sent to the University of Florida's Institutional Review Board to get approval for distribution. A copy of this approved form can be found on the Building Consent Form located in Appendix A Once this approval was received the intention was to send out the survey to all the building inspectors whose

name appeared on a master list that was compiled by the Building a Safer Florida (BASF). Because of the low response rate received in the study entitled "Top Ten Building Code Violations" (McKollum, 2004) the help of the Building Officials Association of Florida (BOAF) was enlisted to create more interest among the building officials in this study. Additionally the participation of the BOAF helped ensure that the respondents understood the importance of the survey and that they understood that the survey was not a performance evaluation in any way. It was felt that with the assurance of the BOAF the potential respondents would feel more comfortable filling out the survey and hence the response rate would be higher than in previous studies. Additionally this study was commissioned by the Building a Safer Florida (BASF). The BOAF compiled a list of all the building inspectors of building departments in Florida along with their contact information and the survey was sent out to these individuals electronically as an attachment. Building inspectors were asked to complete the form and fax or email it back. The survey was also put online with the appropriate link sent out electronically to inspectors. Through this method the inspectors could click on the link and fill out a survey online. This alternate method was developed to give the inspectors various choices in methods of completing the survey, as well as convenience to help promote responses.

Questionnaire Development

A survey was designed to obtain the quantitative data needed for statistical analysis. This survey entitled "Building Code Violations Questionnaire" can be found in Appendix B. Section I of the questionnaire asks for demographics data of the respondent, including government entity, name of respondent, county/location, and professional title and if the inspector would like to receive a copy of the results. Section II of the

questionnaire deals with identifying the occurrence rate of the listed building inspection violations per 10 violations seen. During this study a discussion arouse regarding whether the occurrence rate should be listed in reference to how often they occur per 10 inspections or how often they occur per 10 violations. It is noted that both possibilities would determine the same top violations however the occurrence rate for these violations would be expressed as a different number or percentage rat. Although most respondents did not seem to be confused with the wording of this survey, one building official in particular expressed confusion with regards to the phrasing of the survey questions. Perhaps in future studies surveys could be written using a different set of wording to determine if a changed phrasing would have an impact on the final results of this type of study. The list of violations was identified from a statewide search of building inspection cards. This search turned up inspection cards from thirteen (13) Florida counties. Once the inspection cards were found, a spreadsheet was created to determine what the most common inspections were. This spreadsheet can be seen in its entirety in Appendix C. Additionally a section of this spreadsheet that shows the nine main inspection categories that were found appears in Table 3-1.

Table 3-1: Determination of Most Frequent Inspections by County

	Charlote	Alachua	Hernanand	Lake	Orala	Osceola	Pinel.la	Putnam	Brevard	Highland	Jupiter	Walton	Escambia	Total
Site/ General	1		1			1						1		4
building framing	1		1	1	1	1		1		1		1	1	9
footer/ foundation	1	1	1	1	1	1	1	1	1	1	1	1	1	13
mono slab				1	1	1	1	1	1	1			1	8
building slab	1	1	1	1	1	1	1	1	1	1	1	1	1	13
wall sheathing	1		1	1			1	1		1	1	1	1	9
roof/sheathing	1	1		1		1	1	1		1			1	8
lintel			1	1	1	1	1	1	1	1				8
roof final	1	1	1	1	1	1	1	1		1			1	10
building final	1	1	1	1	1	1	1	1	1	1	1	1		12

In the development of this spreadsheet thirteen building cards were consulted and therefore a frequency of four (4) is equal to a frequency of 31% with the highest frequency being that of a thirteen (13) or 100%. This spreadsheet determined that the most common inspections can be categorized into nine (9) inspection types, these being: general, footing, slab, monolithic slab, tie beam/ lintel, sheathing, framing, roof, and final. The number of subcategories within those categories totaled up to 48. All these categories were put into the survey that was sent out to building officials. Additionally within each category, one subcategory named "other" was added for the respondent to add any other common violations experienced in their jurisdiction, along with their occurrence rate, that were not included in the questionnaire.

Section II of the questionnaire uses a seven point Likert Scale with possible answers being: "0", "1-2", "3-4", "5", "6-7", "8-9", "10". The online version of this survey separates the categories into individual numbers, creating eleven possible answers, instead of seven. In terms of frequency, a response of "1-2" indicates a violation is seen in 10-20% of the inspections, while a "10" would indicate that the violation is observed 100% of the time. At the end of this section of the questionnaire the participant is asked if there are any other violations that do not fit into any of the categories listed, if there is historical data backing up the inspectors perceptions regarding code violations and if so how access to this data can be gained. The last question asks if there is any other information that the respondent would like to add that would be relevant to the study. Another tool that was used in the development of the survey was the survey used in the study done by the University of Florida (McKollum, 2004). This was used as a baseline to determine the format of the survey as well as what questions regarding demographics

needed to be asked. In addition to the content of the survey, the length of the survey as well as the possible responses was different for both surveys. In the survey from the University of Florida study, possible responses ranged from one (1) through ten (10), and leaving the survey blank at any question was counted as a response of zero (0). In the survey done for this study, zero (0) was a possible response, and leaving the survey blank at any question was not counted, that is to say it was seen as a non response to the question. The length of this survey was longer than the previous survey. This was due to the fact that there were time limitations for this study and only one survey could be sent out. In an ideal situation, one long survey would be sent out to determine the most common violations and then a shorter survey would be sent out that would contain the top violations that were found in the first survey along with some randomly chosen violations. A shorter survey could increase the amount of responses, since some officials might be reluctant to answer a long survey.

Discussion of Survey Categories

The information about building inspections available to the public varied greatly from county to county. With regards to the necessary inspections, most building departments had websites but some websites did not mention anything about inspections while other websites provided lists that were detailed and gave a thorough explanation for each inspection item. For example for one inspection named monolithic slab the following are some of the different descriptions that were found for this item:

- 1010 Monolithic Footing/ Slab (Osceola County, 2006).
- Monolithic Footing/ Slab (222) Description: To be made after trenches are excavated, organic debris is removed and forms erected with all steel in place, supported and secured, and any required vapor barrier is installed and required termite protection is provided (Putnam County, 2006).

- Monolithic Slab Inspection: Verify depth and width of footing, ditches must be square, clean, and dry. Verify that wire mesh is in place and lapped properly. If fiber mesh is to be used, inspector will make a notation on the blue card and in the computer (Escambia County, 2006).

There were also discrepancies among the amount of inspections required in each county. This discrepancy might be due to the fact that some counties include various inspections under one general listing while other counties break the inspection down into smaller components. Additionally it can be inferred that some counties are more stringent with their inspections than other counties, and this is an item that would be useful to study in future research. As seen in Table 3-1 there was nine (9) main categories of inspections with forty eight (48) subcategories that were included in the survey. A list of the inspection items covered in the survey along with a brief description about what each inspection entails is given in the following pages.

General Inspection

The general category refers to items that must be completed before construction even begins. Among this list are having the approved plans on site, the building card posted, and sanitary facilities on site.

Foundation Inspection

This category was found on 100% of the referenced inspection cards. The subcategories within this category that were most common include the depth and width of the foundations, verification of the finished floor height, step downs and grade stakes. According to explanations given in various building inspection cards, the grade stake inspection is to demonstrate that the survey stakes for the proposed grading work have been placed according to the approved plan. The verification of finish floor height is to determine if vertical steel will be required. The step-down inspection should verify that

step downs are properly squared off and the depth and width inspection should also verify that ditches are square, clean and dry.

Slab Inspection

The Slab category was also found in 100% of the inspection cards. Among the subcategories under this item are verification of the vapor barrier being in place, verification of soil (termite) treatment being completed, verification that soil has been compacted properly, verification of grade beams in place, and verification of the slab depth. One explanation reported that the slab depth should not go under 3.5 inches in any part of the slab (Escambia County, 2006). Additionally at this time all the underground plumbing, electrical, mechanical, and gas must be in place to be inspected and approved.

Monolithic Slab Inspection

This category was listed 62% of the time. One reason for this lower occurrence might be that many counties consider the slab inspection to include this category as well. Among the subcategories under this item were verification of depth and width as well as verification of reinforcing (wire mesh).

Tie Beam/ Lintel Inspection

This category also occurred in 62% of the inspection cards viewed. This inspection must be made before the placement of any concrete and it is done to ensure that all forms and steel are in place and properly tied and supported. Additionally one subcategory that refers to cleanouts requires that all vertical downpours are according to plan and clean.

Sheathing Inspection

Among the inspection cards two separate categories were found for this category one was wall sheathing and one was roof sheathing. No general category called just sheathing was found but this was used as a category to be able to group together these

important sub-categories. Wall sheathing was mentioned in 69% of the inspection cards and roof sheathing was mentioned in 62% of the cases.

Framing Inspection

Framing was observed in 92% of the inspection cards but was listed under several names, some inspection cards called it framing, some called it structural framing. This category is the one that has the most subcategories. The subcategories listed are top/sole plate attachments, attic access, fire blocking, fireplace and chimney, windows and doors, connectors, wind braces, trusses, strapping, weatherproofing (house wrap), as well as all the MEP rough ins.

Roofing Inspection

Roofing was observed in 77% of the inspection cards, and different components of roofing were listed as well in a high percentage of the cards. Among the most common roofing components were flashing, fasteners and felt/paper.

Final Inspection

A final inspection was observed in 92% of the cases. Some inspection cards explained what the final inspection entailed while other ones just listed it as final. Some of the components that are a part of the final inspection and were included in this section are address, smoke detectors, guardrails/handrails/stairs, and all the final inspections for electrical, plumbing, mechanical and gas.

Building Officials Association of Florida

The Building Officials Association of Florida (BOAF) is a professional, non-profit, state-wide volunteer organization comprised of code officials and industry representatives from nearly every jurisdiction in Florida. Since it's inception in 1953, the Building Officials Association of Florida (BOAF) has been dedicated to the building

code enforcement profession. The goal of this association is to foster communication between all groups associated with the construction industry, and to provide for the safety, health and welfare of the citizens of the State of Florida; through the education, development, maintenance and enforcement of building codes (BOAF, 2006).

Building A Safer Florida, Inc. is a not-for-profit corporation formed in 2001 that is comprised by several other organizations including BOAF, Florida AIA, Florida Engineering Society (FES), Florida Home Builders Association (FHBA), Associated Builders & Contractors (ABC), Florida AGC Council, and Florida Roofing, Sheet Metal & Air Conditioning Contractors (FRSA). This corporation was formed to encourage, promote, and achieve coordination between industry associations to achieve compliance with Florida's building codes; to reach out to Florida licensees required to comply with Florida Building Codes training requirements and construction standards; to serve as a clearinghouse for training and other information relating to construction standards, best practices, innovative techniques, and other associated matters; to serve as a resource for information relating to construction standards in Florida (BOAF, 2006). Additionally both the BOAF and the BASF have websites that offer information for code officials such as code interpretations, discussion groups, and continuing education information as well as other useful links for both building officials and the general public.

Summary

A questionnaire was developed to determine the top building code inspection violations in the state of Florida. This questionnaire was then sent out to an email list of building inspectors, which was compiled by the Building Officials Association of Florida. In this questionnaire the respondents were asked to answer questions regarding demographics, identify the occurrence rate of code violations for close to 50 inspections;

list any other common violations that were not listed; and add any comments that could be useful to the study.

The questionnaire data was collected and analyzed and details of this analysis will be discussed in Chapter 4. Any conclusions reached will be used to analyze the content and success of the current Florida Building Code's continuing education programs for contractors. Once the current program's effectiveness is known and the areas that need improvement are identified, it will be possible to devise a more effective continuing education program.

CHAPTER 5
CONCLUSIONS AND RECOMMENDATIONS

A literature review for building code violations and the effectiveness of continuing education courses in construction found no information specific to the state of Florida. Only one study was found that dealt with the top violations in Florida and this study dealt primarily with plan review violations. To the extent of our knowledge this is the first study that looks at frequent violations in the inspection process within the entire state of Florida. This study along with the one conducted on plan inspection violations should provide a good point of departure for the reforms that will be preformed on the continuing education process.

The top two violations reported through this survey were strapping and trusses and both these categories were part of the framing category. Additionally seven out of the ten top violations were from the framing category. When analysis was done comparing inland versus coastal jurisdictions, similar results were achieved.

Conclusions

The primary purpose of this study was to identify the top violations that occur during the inspection process in the state of Florida. The purpose of identifying these top violations was to then use this information to make the appropriate additions and changes to the current continuing education process. From the results of this survey it is evident that more education is needed in the area of framing, specifically strapping and trusses.

Current Continuing Education Programs

Currently all designers and contractors must stay informed on all updates to the Florida Building Code through a series of education and training courses. Fourteen hours board-approved continuing education is required each biennium prior to the renewal period for both certified and registered contractors. Of these at least one hour must deal with workplace safety, one hour on the subject of worker's compensation, one hour on the subject of business practices and one hour on Florida Building Code advanced modules.

The Department of Business and Professional Regulation, through the Construction Industry Licensing Board, is in charge of regulating that contractors meet the requirements needed to obtain and retain their license. This department maintains a list of approved providers of education courses. Providers are approved through a three tiered process and once approved courses are valid for two years. The current approved list contains more than one hundred (100) providers. If a contractor does not fulfill the continuing education course each renewal period, they will get a deficiency letter, if after receipt they still fail to complete the required courses, their license will be revoked (Division of Business and Professional Regulation, 2006).

Suggested Improvements to Current Education

It is suggested that under the required hours for continuing education, it should be mandatory to take at least one hour on a specialty topic that relates to the most frequent violations. Furthermore a study similar to this one should be preformed every three to four years to keep abreast of what the common violations are and continuously update the education program. Because framing issues are the most frequent violations at this

moment, it is recommended that a mandatory framing class be added to the core requirements.

Additionally in order to promote learning and awareness more hours of education could be required and the class listing could be expanded to include more topics, so that contractors are continuously learning and not repeating the same classes year after year. This research did not address the current cost of continuing education classes or their location but perhaps these are two issues that could be addressed with regards to the current education program to determine if any changes to cost or location are needed.

Additionally one important step that the state of Florida can take to reduce code violations is to standardize the inspection process across the state. Currently the inspection process and required inspections vary widely from county to county, so if a contractor builds in more than one county they may be faced with inspection violations for items that they were unaware of. Standardization of the inspection process will strengthen the success of the Florida Building Code and of the continuing education program.

Recommendations for Future Research

This study is just the beginning of what could be a very long yet rewarding investigation. Because of the low response rate, future studies should try to achieve a higher response to cover most of the state of Florida. Gathering more information from the missing areas of Florida in regards to building inspection violations would yield a more complete study, which in conjunction with the study done on plan review violations would result in a very good starting point for assessing the current understanding of the Florida Building Code. Future studies should go into a greater detail about the exact nature of violations. For example now that it is known that strapping violations are the

most common, it would be good to know exactly what type of strapping violations are occurring. For example is the contractor leaving out the strapping, not installing it correctly or perhaps there is another type of violation. This type of study would give an even better idea about the specific areas where education courses need to be altered.

Additionally, studies should focus on whether the violations are occurring during new or existing construction and whether they are part of house or commercial building. There could be significant differences between these areas that could lead to important insight. Also studies should be done on the number of inspectors in a jurisdiction with regard to that areas population or to that areas building permit. This in addition to knowing the amount of violations in one area could lead to important findings on what the ratio of building inspectors to buildings should be.

APPENDIX A
INFORMED CONSENT

Dear Building Official,

On behalf of the Florida Building Commission, the M.E. Rinker Sr. School of Building Construction at the University of Florida is conducting a statewide study concerning the most prevalent code violations observed during the current Florida Building Code's existence.

We are asking you to participate in this survey due to your significant position in the construction industry. The purpose is to analyze your and other building departments' data concerning observed building code violations since March 1, 2001 (effective date of present Florida Building Code). The results will assist us in providing recommendations for training to contractors and with your help reduce the occurrence of code violations. The results of this study should make your job easier by helping to prevent consumer harm.

The survey will take you approximately 10 minutes to complete. There are no anticipated risks, compensation or other direct benefits to you as a participant in this survey. However, upon your participation, you will be provided with a summary report of the study following its completion. At all times, your identity will be kept confidential to the extent provided by law. You are also free to withdraw your consent to participate and may discontinue your participation in the survey at any time without consequence. If you have any questions about this research protocol, please contact me at 904-891-7277 or my faculty supervisor Dr. Robert Cox, at 352-273-1153. Questions or concerns about

your rights as a participant may be directed to the UFIRB office, University of Florida, Box 11225, Gainesville, Fl. 32611; Ph: 352-392-0433. By filling out the provided survey, you give me the permission to report your responses anonymously in the final manuscript to be submitted to the University Scholars Program as part of my research.

Sincerely,

Jessica Ligator
Research Assistant
University of Florida

No, I do not wish to participate in this survey _____

Signature Date

APPENDIX B
QUESTIONNAIRE

Section 1: Demographics
Name of Government Entity:_____
County/ Jurisdiction:_____
Name of Respondent:_____
Job Title:_____
Phone or other form of contact (optional):_____
Email Address (if you wish to receive a copy of the results):_____

Section 2: Code Violations
Based on your best judgment, please identify the occurrence rate per 10 violations for each of the following violations within your jurisdiction since March 1, 2001 (effective date of current Florida Building Code).

	Per 10 observed violations						
General							
1. Approved plans on site	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
2. Building card posted	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
3. Sanitary Facilities	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
4. Other (please specify)	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
Footing							
1. Depth and Width	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
2. Step downs	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
3. Grade Stakes	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
4. Finish floor height	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
5. Other (please specify)	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
Slab							
1. Soil Compaction	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
2. Termite Treatment	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
3. Vapor Barrier	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
4. Slab depth	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
5. Grade Beams	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
6. Underground electrical	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
7. Underground plumbing	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
8. Underground gas	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
9. Underground mechanical	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
10. Other (please specify)	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
Monolithic Slab							
1. Depth and Width	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
2. Wire Mesh	□0	□1-2	□3-4	□5	□6-7	□8-9	□10

3. Other (please specify)	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
Tie Beam/ Lintel							
1. Cleanouts (per plans & clean)	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
2. Formwork	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
3. Bracing	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
4. Other (please specify)	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
Sheathing							
1. Wall Sheathing	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
2. Roof Sheathing	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
3. Other (please specify)	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
Framing							
1. Sole/Top plate attachments	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
2. Attic access	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
3. Fire blocking	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
4. Fireplace and chimney	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
5. Windows and Doors	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
6. Connectors	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
7. Wind Braces	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
8. Trusses	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
9. Strapping	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
10. Weatherproofing (house wrap)	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
11. Rough in electrical	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
12. Rough in mechanical	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
13. Rough in plumbing	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
14. Rough in gas	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
15. Hurricane Clips	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
16. Other (please specify)	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
Roofing							
1. Flashing	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
2. Fasteners	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
3. Felt/ Paper	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
4. Other (please specify)	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
Final							
1. Address	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
2. Smoke Detectors	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
3. Stairs, handrails, guardrails	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
4. Final Electrical	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
5. Final Plumbing	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
6. Final Mechanical	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
7. Final Gas	□0	□1-2	□3-4	□5	□6-7	□8-9	□10
8. Other (please specify)	□0	□1-2	□3-4	□5	□6-7	□8-9	□10

If any other violations that are commonly observed in your jurisdiction that do not fit into the categories provided above please list them along with their occurrence rate.

_____
_____
_____

Is there historical data available regarding code violation occurrences within your jurisdiction? Y/N

If yes, how can we gain access to this data?_____
_____
_____

Please provide comments about the above statements or anything else you think would be helpful for us to know (Optional)._____

APPENDIX C
INSPECTIONS BY COUNTY

	charlotte	alachua	hernando	lake	orange	osceola	pinellas	putnam	brevard	highlands	jupiter	walton	escambia	Total
Site/ General			1						1	1			1	**4**
Permit posted/plans onsite									1	1			1	**3**
Sanitary facilities									1	1			1	**3**
Address posted										1			1	2
Building card			1						1				1	**3**
Notice of comencement										1			1	2
Proper setbacks										1			1	2
site					1									1
Building														0
termite	1						1	1	1	1			1	**6**
soil compaction	1						1			1			1	**4**
health approval	1	1												2
signed and sealed truss prog	1						1	1	1	1				**5**
building rough in/ framing	1		1	1	1	1		1		1		1	1	**9**
structural framing		1			1	1		1	1	1	1			**7**
structural concrete pour						1								1
stepdowns						1				1			1	**3**
gradestakes/elevation/ finish floor height	1									1			1	**3**
footer/ foundation footer/ grade beam	1	1	1	1	1	1	1	1	1	1	1	1	1	**13**
pilings/ pile caps							1							1
rough insulation				1						1				2
complete insulation	1	1	1	1	1	1	1	1		1	1			**10**
harv (high alpharesearch vehicle)rough	1													1
harv final	1													1
mono slab				1	1	1	1	1	1	1			1	**8**
building slab/ structural slab (thickness)	1	1	1	1	1	1	1	1	1	1	1	1	1	**13**
vapor barrier and reinforcement in slab							1	1		1			1	**4**
top/sole plate						1	1						1	**3**
floor decking			1											1
breakaway wall			1											1
stem wall fill				1									1	2
wingwall			1											1
pier			1											1
barricade	1													1
seawall			1											1
masonry wall reinforcing					1									1
fill cells	1													1
columns	1		1								1			3
prelath									1	1				2
bwall/column/stucco/lathe			1								1			2
formwork/ bracing	1			1		1	1							**4**
wall sheathing	1		1	1			1	1		1	1	1	1	**9**

drywall screw						1	1							2
drywall final							1				1			2
firestopping						1	1	1			1		1	5
windows					1									1
window installation/ door installation					1		1	1		1			1	5
cleanouts per plan & clean at all vert. downpours					1		1			1	1			4
lintel (lintel/beam/downcell)			1	1	1	1	1	1	1	1				8
roof flashing/other/roof dry in/weatherproofing	1				1	1	1	1		1			1	7
decking roof/sheathing nailing/ connectors	1	1		1		1	1	1		1			1	8
hurricane clips							1		1				1	3
strap inspection			1	1				1					1	4
tile roof top ply (cap sheet)														0
roof final	1	1	1	1	1	1	1	1		1			1	10
pre radiant barrier			1											1
connectors/braces						1				1	1			3
attic access			1					1		1				3
fireplace			1				1			1				3
aluminum			1											1
use permit					1									1
bldg. final (address, smoke detector, handrails)	1	1	1	1	1	1	1	1	1	1	1	1		12
rough demo			1											1
final demo			1		1			1			1			4
Electrical Inspections														0
temporary power pole		1	1	1	1	1		1		1	1			8
tug inspection					1	1		1						3
underground electric			1	1	1	1	1	1			1			7
semi permanent power		1												1
electrical bond			1											1
electrical rough in	1		1	1	1	1	1	1		1	1	1	1	11
electrical final	1		1	1	1	1	1	1		1	1	1		10
conduit inspection	1													1
meter reset					1									1
Plumbing Inspections														0
plumbing rough in	1	1	1	1	1	1	1	1	1	1	1	1	1	13
2nd rough in plumbing			1	1						1	1	1		5
final plumbing			1	1	1	1	1	1		1	1			8
plumbing tub	1						1							2
plumbig water	1					1								2
row line and grade	1													1
row pipe inspection	1													1
row stormwater	1													1
row final	1													1
plumbing sewer	1		1	1	1	1		1		1	1			8

final well	1													1
grease trap			1								1			2
dwv (drain, waste, vent)						1								1
backflorw/ crossconect						1								1
underground						1	1	1		1				**4**
Mechanical Inspections														0
fire inspection	1					1				1				3
fire alarm			1								1			2
fire rated assembly					1			1						2
fire wall inspection	1		1		1						1			**4**
fire sprinkler			1	1							1			3
mechanical framing/ rough in		1	1	1	1	1	1	1			1	1	1	**10**
mechanical final			1	1	1	1	1	1		1	1			**8**
grease hood			1								1			2
hood suppression system			1		1	1								3
solar			1		1						1			3
rough gas			1	1	1	1		1			1	1	1	**8**
final gas			1	1	1	1		1			1			**6**
underground mechanical					1	1	1				1			**4**

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BIOGRAPHICAL SKETCH

Jessica Rand Ligator was born in San Jose, Costa Rica, on March 5th of 1979. She is the middle child of three children born to Jamie and Anita Ligator. After graduating high school in 1996 Jessica attended Tulane University in New Orleans and obtained a degree in architecture. After working in the architectural field for two years, Jessica decided to attend the University of Florida to obtain a master's degree in building construction. While at the University of Florida Jessica worked as a teaching assistant for graphic communications and was a member of the construction honor society: Sigma Lambda Chi. Upon graduation Jessica wishes to move to Jacksonville and pursue a career in the construction industry with a focus on design-build.