

1                   **Residential Construction Risk Management: Does it**  
2                   **Happen in Real Life?**

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7   **Abstract.** Risk management is a key component to successfully operating a residential  
8 construction company, whether it is a spec builder, custom home builder, or a specialized  
9 subcontractor. With each type of contractor, there are many risks which exist but differ  
10 greatly between each type of contractor. With differing risks and business strategies,  
11 methods of mitigation is also expected to vary. Research was conducted where several  
12 residential contractors were interviewed to discuss their businesses, most important risks,  
13 and their risk management process. This was an exploratory study and did not pose a  
14 hypothesis or test relationships between variables. This research presents the thoughts  
15 and habits of homebuilders as they relate to risk management. This small sample size is  
16 not sufficient to conclude with any confidence how a specific type or size of builder is  
17 likely to see and respond to identified risks but gives insights into the processes  
18 companies go through in evaluating risks, how they perceive certain risks, their response,  
19 and factors that go into the allocation of these risks.

20                   **Keywords:** Residential, Risk Management, Custom Home Builders

21   **1 Introduction**

22   In 2018, the value of new private residential buildings put in place was around 540  
23 billion U.S. dollars. (US Census Bureau). New residential construction spending was  
24 projected to be approximately 672 billion (current) U.S. dollars in 2022. (FMI  
25 Corporation, n.d.). This statistic shows how important residential construction is to both  
26 the economy as a whole and to the individual builders across the country.

27   Residential home builders are faced with projects that represent substantial financial  
28 investments and inherently deal with a wide spectrum of associated risk. In the best  
29 interest of their business, the risks involved in their projects must be continually  
30 identified and managed. However, often, their main day- to-day problems shift their  
31 focus away from these risks and they are forced to devote much of their bandwidth to  
32 the task at hand- the actual building of the structure. Much of the associated risk is  
33 therefore not given the required attention and subsequently handled inefficiently. These  
34 builders do however have a great depth of knowledge and experience pertaining to what  
35 can happen on a project and how best to adapt. Whether they intentionally or

36 systematically identify and respond to their risks or not, they do have procedures and  
37 processes in place to deal with these risks.

38 Large commercial construction companies operate in an arena that can require an  
39 investment of vast amounts of capital and corporate assets in their projects. Therefore,  
40 these companies dedicate a significant amount of time, money and manpower to  
41 identify, assess, respond, and monitor risks. These companies recognize that creating a  
42 systematic, formal, and comprehensive Risk Management Plan (RMP) is essential for  
43 a project's success, and an effective use of corporate assets. Large residential  
44 construction companies can have projects that utilize large tracts of land to  
45 accommodate hundreds, even thousands, of homes. These companies also invest vast  
46 amounts of capital and corporate assets in their projects, and therefore recognize the  
47 need for, and benefits of, a comprehensive RMP.

48 Small residential construction companies typically do not have the corporate assets,  
49 either capital or labor, to invest in large projects. Their projects are small in terms of  
50 scope, size, and corporate assets invested. However, the risks they face can be just as  
51 impactful, and perhaps even more so than those faced by larger companies.

## 52 **2 Research Purpose**

53 The purpose of the study is to identify the perceived importance of risk management of  
54 any type as well as try to explain why (why not) risk management is happening. The  
55 research study will help us understand where the companies' priorities are in risk  
56 management and what real life risks they are concerned about on a daily basis. The  
57 research study will document the techniques and procedures used by small residential  
58 contractors in North Carolina in order to better understand how and why residential  
59 builders either perform or don't perform risk management.

## 60 **3 Literature Review**

61 The primary focus of this research is to gain a better understanding of the business  
62 practices and opinions of small residential contractors, their recognition of risk, and  
63 their preferred methods of responding to this risk. Unfortunately, no research literature  
64 was found directly on point that would provide a foundation upon which this research  
65 project could build. This being the case, a broader approach to examining the existing  
66 research on this topic was required. To this end, a review of the more pertinent literature  
67 researched follows.

68 Cullen (2016) suggests that risks can be classified in the following manner; schedule  
69 risk, cost risk, contractual risk, health & safety risk, reputational risk,  
70 organization/mission risk, technical feasibility, building performance risk, risk of  
71 technical obsolescence, dependencies between a new project and other projects, and  
72 physical events beyond direct control while Al-Bahar and Crandall (1990) identify the  
73 following classifications: financial and economical, design, political and  
74 environmental, construction related, physical, acts of god. This will be the classification

75 method used in this study. Finally, Schieg (2006) proposes placing each risk in the  
76 category of quality, personnel, cost, deadline, strategic decision, or external.

77 While risk management has been successfully implemented in the manufacturing  
78 and service industries, the construction industry, due to its one-off and project based  
79 nature, is not known for being effective managers of risk (Mills, 2001). For construction  
80 companies to find success managing risk, many believe corporate leaders must  
81 recognize that risk and opportunity are interrelated, and that the risk management  
82 process must move from corporate boardrooms to the project and individual levels to  
83 be effective (Mills, 2001), (Morris and Jamieson, 2005).

84 Systematic risk management, which includes identification, analysis, response and  
85 monitoring, should be started as early as possible in a project in order to establish some  
86 measure of control over the unexpected (Mills, 2001). The critical task of identifying  
87 risks should be performed by those directly affected by the risks, including risk  
88 analysts, project teams, work groups, and even peers outside the company (Mills,  
89 2001), (Hlaing et al., 2008), (Kaplanogu and Arditi, 2009). During risk analysis, critical  
90 risks are identified (Mills, 2001). Once identified, the critical risks can be responded to  
91 by transferring the risk to the party most affected by it, or to the party best able to accept  
92 it (Mills, 2001), (Liu et al., 2007). Common transfer vehicles include contract  
93 modification, subcontracting, and insurance (Liu et al., 2007). In terms of insurance,  
94 some owners and contractors buy project or umbrella policies for added protection  
95 against risks (Ndekugri et al., 2013). For accepted risks, Project Managers can play a  
96 significant role in designating the best party responsible for monitoring and control  
97 (Laufer et al., 2015).

98 Risk management should be viewed as a positive process that can save companies  
99 both time and money (Mills, 2001), (Hlaing et al., 2008). It is an exercise, when  
100 approached with realistic expectations, can be extremely effective and can contribute  
101 to construction projects' success (Mills, 2001), (Liu et al., 2007), (Hlaing et al., 2008).  
102 Some of the research above promotes a pragmatic approach to risk management, and is  
103 particularly relevant to this research project, especially for accepted risks. When risk  
104 management can be de-mystified and theories can be reduced to a more practical, even  
105 common sense level, more small builders and developers are likely to understand the  
106 benefits of identifying and managing risk. This is particularly true for understanding  
107 the costs associated with managing risk. A recent study conducted by Allen et al. found  
108 that while risk management does add to project cost, in most cases, the benefits of  
109 reduced risks outweigh the initial financial impact (Allen et al., 2015).

## 110 **4 Methodology**

111 This study involves qualitative research on small and local residential construction  
112 businesses. After the bulk of the literature research was completed, work began on  
113 designing the questions to be used in a survey of construction professionals. The  
114 questions were originally designed based on interviews of twenty one construction and  
115 real estate professionals. The first group of questions asked respondents to describe  
116 their companies in terms of number of employees, revenues, and production levels. The

117 respondents' answers to these questions helped categorize the results for comparison  
 118 purposes. The second group of questions concentrated on risk management. Data  
 119 collection was done through either a phone interview or a face to face interview. There  
 120 were 21 companies interviewed. All of these companies were based in North Carolina.  
 121 A summary of the risk management practices of the 21 residential contractors/sub-  
 122 contractors is presented next.

## 123 5 Results

124 Since it is not possible to present the details of the interview of all the 21 residential  
 125 contractors surveyed, a summary of the responses has been presented in a tabular format  
 126 as shown in Table 1 through 3.

127 **Table 1.** Summary of Risk Management Practices of Small Residential Contractors (1-7)

	Company 1	Company 2	Company 3	Company 4	Company 5	Company 6	Company 7
<b>Type/target market</b>	Residential spec general contractor	Residential specialty subcontractor	Real Estate Developer	Custom homebuilders	Custom homebuilders	Custom homebuilders	Residential spec general contractor
<b>Location:</b>	Pitt County, NC	Most of NC and parts of SC and TN	Outer Banks, NC	NC	NC	Pitt County, NC	Pitt County, NC
<b>Top 3 Risks:</b>	Unpredictable Real Estate Trends	Clients	Design Changes	Design Changes	Design changes	Design Changes	Financial risks
	Frequent changes in Interior Design and Layout	Changes by owner/client	Supply chain issues	Differing site conditions	Cost underestimation	Differing Site Conditions	Design changes
	Cost Under-Estimation	Changing site conditions	Cost Under-Estimation	Supply chain issues	Labor delays	Defective Design	Defective Design
<b>Risk Management Method:</b>	Formal Risk Management Technique	No Formal Risk Management Technique	Formal Risk Management Technique	No formal Risk Management	No formal Risk Management	Yes	Yes
<b>Type of Risk Management Most Concerned With:</b>	Risk Transfer and Retention Used Mostly	Risk Retention and Reduction Used Mostly	Risk transfer-subcontract	Risk transfer-subcontract	Risk transfer	Risk Transfer	Retain

<b>Use of Software to evaluate risks</b>	NO	NO	ProCore	NO	NO	NO	NO
<b>Focus Area For Top Risks:</b>	Market trends	Clients and employee/vendor performance	Ccustomer driven changes	Customer driven changes	Customer driven changes	Unforeseen conditions.	Design changes.
<b>Risk Mitigation Strategies</b>	Due to being a spec contractor, pricing typically cannot be adjusted to compensate for risks but usually just affects potential margins, etc.	Due to being a subcontractor, pricing will always be adjusted to compensate for identified risks of each project.	Has implemented 4 steps review process for design that goes through each department-legal, estimating, design & management to detect problems.	Relies on experience to do deal with construction risk- viewed as a trial and error program.	Utilized a well written contract to transfer any risk to the design firm.	Subcontracting and thus transferring the risks to the subcontractors was a major form of risk response techniques utilized.	Retaining the design risks and submitting a timely change order at a higher price.

128 **Table 2.** Summary of Risk Management Practices of Small Residential Contractors (8-  
129 14)

	<b>Company 8</b>	<b>Company 9</b>	<b>Company 10</b>	<b>Company 11</b>	<b>Company 12</b>	<b>Company 13</b>	<b>Company 14</b>
<b>Type/target market</b>	Renovation and Repair	Custom homebuilders	Custom homebuilder	Custom homebuilders	Residential spec general contractor	Residential spec general contractor	Residential spec general contractor
<b>Location:</b>	Pitt, NC	NC	NC	NC	NC	Central NC	Central NC
<b>Top 3 Risks:</b>	Design Changes	Lower Demand for product	Sub-contractor caused delay	Material/Labor Price Increase	Material/Labor Price Increase	Cost under-estimation	Bad Installation
	Unforeseen site conditions	Permitting delay	Material/Labor Price Increase	Design Errors & Omissions	Differing Site Conditions	Labor delays	Cost Under-estimation
	Defective Design	Design Changes	Weather delay	Lower Demand for Product	Design Errors	Design changes	Weather delays

<b>Risk Management Method:</b>	Yes	Yes	No	Yes	Yes	NO	NO
<b>Type of Risk Management Most Concerned With:</b>	Risk retention	Retain & Mitigate through market research	Elimination	Retain & Mitigate through market research	Avoiding the risks	Acceptance	Transfer
<b>Use of Software to evaluate risks</b>	NO	NO	NO	NO	NO	NO	NO
<b>Focus Area For Top Risks:</b>	Unforeseen site conditions	Market risks due to lower demand for product	Incompetent subs and their replacement always causes delays in the projects.	Market risks	Differing site conditions	Cost under-estimation as a result of design changes by the customer.	Cost under-estimation as a result of design changes by the customer.
<b>Risk Mitigation Strategies:</b>	By conducting renovations and repair work interview with the owner is a way of reducing the risk of design changes.	They rely on historical data and most of all, the judgment and experience of their management team	Proper vetting of subcontractors to reduce the risk of this delay.	They retain or mitigate risks through market research.	Presales are a way to avoid the risk and stay in business.	Acceptance of the risks was a popular risk response strategy.	Detailed meetings with the clients to have a mutual understanding of the product requirement

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131 **Table 3.** Summary of Risk Management Practices of Small Residential Contractors

132 (15-21)

	Company 15	Company 16	Company 17	Company 18	Company 19	Company 20	Company 21
<b>Type/target market</b>	Luxury homebuilder	Residential GC	Residential GC	Residential GC	Custom high-end homebuilder	Sub-contractor-Custom Trim	GC-Disaster Rebuilder
<b>Location:</b>	Central NC	NC	NC	NC	Guildford, NC	Guildford, NC	Guildford, NC
<b>Top 3 Risks:</b>	Weather delays	Cost Under-estimation	Labor injuries	Labor injuries	Unforeseen Site Conditions	Labor injuries	Warranty risks
	Cost Under-estimation	Labor injuries	Cost Under-estimation	Cost Under-estimation	Lower demand for Product	Cost under-estimation	Design changes

	Design changes	Differing site conditions	Differing site conditions	Design changes	Design changes	Material/Labor Price Increase	Labor injuries
<b>Risk Management Method:</b>	NO	NO	NO	NO	NO	NO	NO
<b>Type of Risk Management Most Concerned With:</b>	Acceptance	Elimination/transfer	Reduction	Reduction	Transfer	Elimination	Elimination
<b>Use of Software to evaluate risks</b>	NO	NO	NO	NO	NO	NO	NO
<b>Focus Area For Top Risks:</b>	Cost Under-estimation as a result of design changes by the customer.	Cost Under-estimation was prevalent and had consequences in their profit.	Labor injuries, although less likely, had severe impact.	Labor injuries, although less likely, had severe impact.	Financial exposure risk caused by building too many speculative homes is mitigated by maintaining a 2 to 1 ratio of spec homes to pre-sales.	Cost Under-estimation due to mistakes in item takeoff.	Warranty risks
<b>Risk Mitigation Strategies:</b>	Contractors choosing acceptance strategy have contingency plans such as back-up subs if the problem arises with the original subs.	Experience of managing the project for many years was perceived to be most useful and only available tool to deal with risks.	Workers safety was a major risk factor perceived and was handled through a safety meeting with the workers every day.	Reduction of the labor injuries (both the likelihood and the impact) through PPE and OSHA trainings.	Active risk management is not an important piece of the building process but certain techniques used in the past help reduce the risks.	Contracts are not used in the business as the work is only done for a handful of contractors. Eliminates the risk of not getting paid by the contractor by only working for certain companies.	The company gives a 5 year warranty on all insurance fed program work which is a risky thing but is offset by bidding at a higher price.

## 133 **6 Discussion**

134 The construction companies surveyed here have at least one thing in common with  
135 regards to risk management. They all rely on the judgment and experience of their  
136 management team on a case by case basis rather than relying on any structured risk  
137 management plan. Majority (62%) of the surveyed companies stated that they did not  
138 have a formal risk management structure in their company. The top three risks  
139 identified were design changes (57%), cost underestimation (48%), and differing site  
140 conditions (24%). Almost all of them, with the exception of one, stated that they did  
141 not use any risk management software or applications for dealing with risks. Even the  
142 one company that stated that they used software to manage risks actually used Pro-core  
143 software which is not truly a risk management software or application. As can be  
144 observed from Table 1, 2 and 3, there is no common theme of risk mitigation strategies  
145 adopted by these companies. In response to the risks each company approaches the  
146 subject from a slightly different perspective.

## 147 **7 Conclusions**

148 In conclusion, risk management at the residential construction level happens on a  
149 limited basis and the methods differ slightly between companies. The years of  
150 experience and types of projects undertaken play a large part in how risk management  
151 looks to each business. There is no question that risk management is important and  
152 would influence these businesses at all levels but the amount of time and effort needed  
153 to do it properly and in depth can be overwhelming for small companies. All of the  
154 businesses do identify the use of software would help to streamline the process but still  
155 require extra time to be dedicated to risk identification, risk assessment, risk response,  
156 and risk control and monitoring.

157 There does not appear to be a common theme in which risks are identified, assessed  
158 and mitigated among these relatively smaller companies. It is only natural that different  
159 people with different experiences would give different responses as to the impact and  
160 probability of certain events. Risk management is looked at as a trial and error program,  
161 where nothing is mitigated unless it is needed. The questions that must be asked are, do  
162 small residential contractors need to implement a risk management process? Does a  
163 process warrant the time and effort for projects costing between \$100-400k? It is  
164 believed that these contractors could still benefit from a systematic risk management  
165 process. Many of them are already doing something that resembles risk management,  
166 however they do it because it is what they have always done. A standard risk  
167 management procedure would establish a systematic process that could be referenced  
168 and taught to new employees and new supervisors. This would prevent each company  
169 having to solely rely on experience from project managers, superintendents or  
170 supervisors that have worked in the local area for years. This would also establish the  
171 foundation for making a company sustain the challenges and complexity of the new  
172 world that we live in.

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