THE BEST PRACTICES FOR
SUBCONTRACTOR MANAGEMENT IN CONSTRUCTION

A Thesis in
Civil Engineering
by
Christopher J. Flynn

@2009 Christopher J. Flynn

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The thesis of Christopher J. Flynn was reviewed and approved* by the following:

H. Randolph Thomas  
Professor of Civil Engineering  
Thesis Adviser

Shelley Stoffels  
Associate Professor of Civil Engineering

John I. Messner  
Associate Professor of Architectural Engineering

Peggy Johnson  
Professor and Head of Civil and Environmental Engineering

*Signatures are on file in the Graduate School
ABSTRACT

To achieve efficiency and quality, the construction industry must have a number of companies and individuals from various backgrounds working together. To effectively allow for the coordination of these varying companies, a construction management firm is often hired. The management firm may either act as a general contractor, in which they perform some of the work themselves, or as a construction manager, strictly focusing on administration. It is common for both types of management to use subcontractors for specific portions of the project. These subcontractors focus in a precise area of construction, and as a result, gain an expertise in that specialty. Subcontracting minimizes project costs by eliminating the time needed to learn and perfect new trades.

Although it is certainly a benefit for a company to spread work among experts, many problems do tend to arise when combining the efforts of varying subcontractors. As project sizes amplify, the number of hired subcontractors usually increases as well, leading to problems in subcontractor management.

This thesis examines problems that exist in subcontractor management, as well the best practices that should be followed to alleviate these obstacles. In order to provide a guideline for managing subcontractors, five individuals from varying construction backgrounds have been interviewed and asked a series of questions pertaining to their experiences and opinions on managing subcontractors. The collected responses have been analyzed and organized into a survey. The five interviewees, along with five other practicing professionals, have taken the survey and rated the practices based on
importance. The recommendations for subcontractor management have been rated and ranked in this thesis to serve as a guide for practicing and future construction managers.
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Chapter 1: Introduction

Construction is a demanding industry that requires skills from varying subcontractors in order to complete a project in the most efficient and economical manner. Construction managers or general contractors are hired by project owners to successfully coordinate each project. To keep costs low and complete a project as quickly as possible, construction managers utilize the skills of subcontractors. These subcontractors are experts in their trade and provide a valuable service to any project. Working with subcontractors prevents management from needing to train their own employees on how to complete numerous project tasks.

Though subcontractors are both beneficial and necessary to successful bidding and timely project completion, they can be problematic. These problems, between management and subcontractors, have the potential to significantly delay an established completion date. When multiple subcontractors are involved in the construction, the risks for delays can increase exponentially and can have serious detrimental effects on the overall success of a project. It becomes the responsibility of the construction manager to coordinate and organize the skills of these subcontractors in the most efficient manner. If managed correctly, problems arising from subcontractors can be quickly resolved.

This thesis explores practices that can help to alleviate the difficulties involving subcontractors. Due to the highly competitive construction industry, subcontractor management is an important issue. Construction management firms must maintain low costs in comparison to their competitors in order to successfully bid a project. Utilization of subcontractors aids in reducing a bid price. Winning a project, however, is only part of
the process to making money. Once construction commences, subcontractors must perform the work according to the schedule so that everyone can financially profit. If schedule delays continue to arise, profits may be reduced and reputations can be ruined, diminishing the prospect of future work. Therefore, it is essential that construction managers utilize the “best practices” when managing subcontractors to minimize problems and thus allow all parties involved to benefit.

**Approach**

This thesis has been compiled based upon information from varying sources. The initial step in research collection was to conduct a literature review. Through numerous books, journals, and internet sources, a categorical content analysis was performed. Each source was identified for key thoughts and ideas. After each source had been analyzed, the ideas from all sources were grouped together based upon similarity. For the purpose of this thesis, key thoughts and ideas were identified as an introduction into subcontractor management, problems, and solutions to alleviate the problems related to subcontractor management.

Once all relevant information had been gathered through a literature review, five individuals were interviewed in person or via telephone. Each interview was recorded so that a second categorical content analysis could occur. In an effort to span the construction industry and include others who manage subcontractors, interview subjects were chosen from fields including commercial and residential construction as well as information systems and technology. Similar to the analysis for the literature review, each subject’s interview was dissected into key ideas and suggestions. After each interview
was categorized by relevant information, similar findings were grouped together. These findings were identified as either problems with subcontractors, or practices for successfully managing subcontractors.

Upon completion of both categorical content analyses, questions about several important practices were developed into a survey. The survey was taken by ten practicing professionals who were asked to rank the practices according to importance in subcontractor management. The principles were then ranked according to the averaged responses from the ten professionals. This ranking serves as the arrangement for practices throughout Chapter 6, starting with most important and finishing with least important.

With the combination of a literature review, interviews, and a survey, a list of “best practices” for subcontractor management has been created.

**Goals of Thesis**

The goal of this thesis is to identify practices that will assist construction management firms and project managers to understand, manage and motivate subcontractors to perform to the best of their ability, while building relationships and completing the project on schedule. This thesis will identify performance enhancing techniques by analyzing experiences and recommendations of professionals in the field of construction management.

**Objectives**

1. Identify problems in the field of subcontractor management and the need for improvement.
2. Create a list of best practices to assist in subcontractor management.
3. Provide a basis for further research in the field of subcontractor management.

**Reader’s Guide**

This thesis has been arranged into the following chapters:

**Chapter 2: Methodology**

The process of research collection is identified in Chapter 3. This chapter identifies the manner in which information was gathered through literature and from practicing professionals. Similarly to that for the literature review, a content analysis was conducted.

**Chapter 3: Review of Literature**

The second chapter introduces a review of literature. Books, journals, and internet sources have been utilized to gain an understanding of the process of, problems emerging from, and practices to alleviate problems with subcontractor management. A content analysis was conducted on all sources.

**Chapter 4: Problems with Subcontractor Management**

The fourth chapter identifies problems that have come as a result of subcontractor management. They have been identified by five practicing professionals. These problems identify a need to develop a list of “best practices” to improve upon subcontractor management.
Chapter 5: Analysis of Practices

The fifth chapter identifies the process of analysis that has been conducted to achieve a list of “best practices” for subcontractor management. The addition, removal, and reworking of practices from the original survey list is discussed in this chapter.

Chapter 6: Best Practices for Subcontractor Management

The Best Practices for Subcontractor Management are identified in the sixth chapter. In this chapter, practices are identified and explained in detail. These practices have come as a result of the varying forms of research collection.

Chapter 7: Conclusions

The conclusion of this thesis provides a validation of the practices. It also identifies limitations of this thesis and the research collection method. These limitations exist as a potential for future work, which is also explained in further detail in the conclusion.
Chapter 2: Methodology

Several journal articles have been published by Dr. H. Randolph Thomas, including Fundamental Principles of Workforce Management (Thomas 2006), Fundamental Principles of Site Material Management (Thomas 2005), and Fundamental Principles for Avoiding Congested Work Areas (Thomas 2006) that have served as a guide for the structure of this thesis. Each article presents objectives, covers a review of existing literature, explains research methodology, description of fundamental principles, and identifies conclusions. This thesis follows a similar pattern; however, the difference is that in this thesis, practices are identified rather than fundamental principles.

Task 1: Literature Review

The first step in the process of establishing the “The Best Practices for Subcontractor Management in Construction” was to conduct a literature review. Studying existing research allowed for an understanding of what practices currently exist for managing subcontractors. A content analysis was used in order to identify the best practices from literature. This was conducted in accordance with Colorado State University’s Writing Guide description of a content analysis, which identifies key ideas and concepts within texts that related to a specific topic and then groups them with similar findings (Busch 2005). Sources for the literature review and content analysis include books, journals, databases, and internet websites. Each source was analyzed for information pertaining to subcontractor management. This information was divided into three sections that included an overview of subcontractor management, problems with
subcontractor management, and solutions for improving upon subcontractor management practices. Within each of the three major sections, related topics were again identified and categorized. This included a specific problem or solution. Once each source had been completely categorized, all similar findings from varying sources were grouped together. The content analysis provided an outline for how the literature review was written, dividing subcontractor management into three sections with corresponding subsections. An example of a literature review content analysis is attached in Appendix A: Example of Content Analysis.

This information has been identified and explained in the literature review. The research also provided a framework for future interviews that were conducted. By gaining knowledge of existing findings, interviews were able to proceed with ease.

**Task 2: Interviews**

The second step involved the interviewing of five practicing professionals. These five individuals are profiled in Table 1: Interview Subject Profiles. Each individual was interviewed either over the telephone or in person, and each interview was recorded in order to analyze responses. The interviews were partitioned into three parts. The first part involved questions regarding the interview subject’s career and experience in the field of subcontractor management. The second looked into problems that the professional has had with subcontractors during their course of experience. And the third part included questions regarding solutions to those problems previously addressed in the second section. An outline was used to keep the interview on target; however, the interview subjects were encouraged to discuss anything they thought relevant. A list of questions
that were asked during the interviews is included in Appendix B: Interview Questions. These individuals were selected for the interview process because of their varying experience in the field of subcontractor management.

**Task 3: Interview Content Analysis**

Following completion of the interviews, the results were organized. The interviews were analyzed similarly to the literature review with a content analysis. Each interview was repeatedly listened to and key concepts relating to subcontractor management’s problems and improvements were noted. Specific problems and improvements were also identified and categorized. After all interviews had been analyzed, similar findings were grouped together. These findings served as an outline for Chapter 4 and Chapter 6 of this thesis.

**Task 4: Online Survey**

After a majority of “best practices” for subcontractor management had been identified, an online survey was created. The survey required participants to provide their name and current employer, experience with subcontractors, and rate the practices according to their importance. The practices were rated on a scale from one to five. One identified the practice as unimportant and two identified the practice as minimally important. The rating value of three was identified on the survey as neither agree or disagree, and this meant that the practice was of medium importance. The rating of four identified the practice as important, and the rating of five identified the practice as very important for subcontractor management.
This survey was taken by ten practicing professionals. These professionals are from varying geographic regions, are in different aspects of subcontractor management, and have had diverse experiences with subcontractors. A brief profile of survey participants is listed in Table 2: Survey Participants. An example of the survey is attached in Appendix C: Online Survey.

**Task 5: Analysis of Survey Responses**

After the surveys were completed, responses were analyzed based upon importance. Ratings were attributed to each response on a scale from one to five. Those receiving higher scores were recognized as more important than those with lower scores. After each best practice was rated and averaged, they were organized in a list from most to least important. These ratings are only a result of the experience and opinions of the ten survey participants.

Some questions asked on the survey were not applicable to the professional. Specifically, anyone not involved directly with construction had their responses regarding safety training or safety pre-qualification removed because of its lack of relevance to their profession. Average ratings were again calculated based upon the remaining relevant responses.

**Task 6: Writing of Thesis**

Once all research had been collected and organized, the written portion of the thesis commenced. Problems and “best practices” for subcontractor management are identified in detail throughout this thesis. The practices identified during the survey
served as a sectional framework for the organization of Chapter 6: Best Practices for Subcontractor Management. Within each section, practices were either added or removed based upon their ratings and relevance to subcontractor management.
Interview Subjects

Listed below is selected career information of the five individuals interviewed during the process of data collection. These interview subjects are from varying geographic regions and different fields in subcontractor management, specifically, commercial and residential construction as well as information, systems, and technology. While these subjects are from varying divisions in the field of subcontractor management, their responses may not speak for the field as a whole, since they are limited in number and may only be the opinion of a minority.

Table 1: Interview Subject Profiles

<table>
<thead>
<tr>
<th>Interview Subject #1</th>
<th>Type of Organization</th>
<th>Geographical Region</th>
<th>Position</th>
<th>Years of Experience</th>
<th>Average No. of Subcontractors on Project</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Residential Construction - General Contractor</td>
<td>Northeastern Pennsylvania</td>
<td>Owner / Project Manager</td>
<td>29</td>
<td>20</td>
</tr>
<tr>
<td>Interview Subject #2</td>
<td>Information, Systems, and Technology - Owner</td>
<td>New York City</td>
<td>Project Manager</td>
<td>36</td>
<td>5</td>
</tr>
<tr>
<td>Interview Subject #3</td>
<td>Commercial Construction - Construction Manager</td>
<td>Northern New Jersey / New York</td>
<td>Project Manager</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>Interview Subject #4</td>
<td>Commercial Construction - General Contractor</td>
<td>Center Pennsylvania</td>
<td>Vice President</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>Interview Subject #5</td>
<td>Commercial Construction - Owner</td>
<td>Pennsylvania</td>
<td>Project Manager / Owner Representative</td>
<td>25</td>
<td>2-12</td>
</tr>
</tbody>
</table>
Survey Participants

A brief profile of the survey participants, explaining their experience with subcontractors, is listed in Table 2: Survey Participants. Eight of the survey participants were in the field of construction management and two were in the field of Information, Systems, and Technology. All five interview subjects completed the survey and are included in the list below. As previously mentioned, an example of the online survey is included in Appendix C: Online Survey.

<table>
<thead>
<tr>
<th>Survey Participant #</th>
<th>Type of Organization</th>
<th>Average No. of Subcontractors on Project</th>
<th>Maximum No. of Subcontractors on Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey Participant #1</td>
<td>Information, Systems, and Technology</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Survey Participant #2</td>
<td>Commercial Construction</td>
<td>5</td>
<td>10</td>
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<td>Survey Participant #3</td>
<td>Residential Construction</td>
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<td>Survey Participant #8</td>
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<tr>
<td>Survey Participant #9</td>
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<tr>
<td>Survey Participant #10</td>
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Chapter 3: Review of Literature

Introduction

Construction utilizes skills and abilities from individuals across varying trades. Construction managers or general contractors work simultaneously with subcontractors in an effort to complete a desired product. It is management’s responsibility to complete a project by the scheduled completion date utilizing subcontractors (Teets 1976).

During the course of a project, multiple subcontractors may be involved with construction. In fact, subcontractors are often responsible for the majority of work completed (Keats 2008). According to Hinze and Tracy, general contractors usually subcontract more than 80 percent of the work (Hinze 1995). Since subcontractors specialize in a specific area of construction, combining their efforts allows for a project to minimize time and money.

Each party enters into construction with the objective of completing the job successfully (Melvin 1979). Successful completion not only means completing a structure satisfactorily, but also finishing a project on time, while still making money. A goal of any company is to make a profit, but without adequate capital, a company cannot survive. Therefore, in order to receive payment, construction managers and subcontractors must create a product that is safe and at a high quality level. This also improves upon each party’s reputation and reveals opportunities for future work. This future work is essential to the ongoing success of each company involved.

Since numerous tasks are required to deliver a satisfactory product to the owner, a joint effort among many people is necessary (Design, Build, Own, & Operate 2008). This
requires individuals (i.e. managers, engineers, laborers, etc.) to work together harmoniously. The ability of construction managers to properly delegate responsibility and keep all parties on task and schedule has the opportunity to produce quality results. Proper managerial approaches can significantly improve a construction manager’s reputation and as a result attract future business as well as continued work with skilled subcontractors (Design, Build, Own, & Operate 2008).

Construction is a demanding business that requires great skill and coordination. As a result, problems will often arise (Thomas 2005). It is the construction manager’s responsibility to handle any dilemma in an effort to keep the project on schedule and still return a profit. Construction management practices have the potential to improve so that schedules can be reduced and profits can increase. If construction managers can continue to find new and improved ways to manage subcontractors, the relationship between the two parties as well as the project can benefit.
Problems Arising During Subcontractor Management

The process of subcontractor management has a significant impact on the construction industry because it has helped to transfer risk from the general contractor to the subcontractor as well as encourage specialization (Maturana 2007). While subcontractor management has the opportunity to produce quality results, it also has the potential to disrupt a project if performed incorrectly (Maturana 2007). If relationships cannot exist in accord, unnecessary tension may be added to a jobsite (Proctor 1996). Poor subcontractor management can also result from lack of planning and coordination. If construction management is unable to provide this necessary direction, subcontractors may not work to the best of their ability.

One of the major issues and obstacles for subcontractor management is organizing and coordinating various trades. Since subcontractors usually do not interact with one another for an extended period of time, there is little opportunity to develop relationships or trust; however, a project requires that subcontractors work together (Levitt 1993).

A current problem that exists when managing subcontractors is that, often, each party involved is only interested in their own well-being. Rather than focusing on the overall goal of the project, each subcontractor desires the most profitable approach, regardless of the adverse effects it may have on others (Thomas 2005). Management must take steps throughout the project to ensure that each party included in the construction process is working towards the same, unified goal.

The continued disruption that may exist between subcontractors and managers, as well as among subcontractors comes as a result of a lack of trust. If each party involved feels as though they are being wronged, a group mentality is impossible to build. Without
a group mentality, completing projects on schedule and under budget becomes increasingly difficult. It is vital for the project manager to bring trust to the group in order to resolve detrimental issues (Thomas 2005).

Problems have and will continue to exist during construction; however, management should recognize solutions to solving problems with subcontractors. Time and effort that is invested by management to ensure safety and productivity will benefit the subcontractor and the overall success of the project (Levitt 1993).
Solutions to Alleviate Problems from Subcontractor Management

Solutions to aid in improving the practice of subcontractor management are explained in this section. Each subsection concludes with a statement of a proposed solution.

Communication and Cooperation

Two of the most important aspects to improve upon the aforementioned deficiencies in the industry are the ideas of communication and cooperation (Proctor 1996). If all parties have the ability to share information in an efficient manner, then problems can be resolved quickly. However, if parties are unable to engage in discussion, there exists a potential for reduced productivity and schedule delays. By working together to achieve project completion, the construction manager and subcontractors can improve relationships and reputations, while ensuring future work. While it is important to communicate information to other parties, it is equally important to listen and understand what others have to say (Thomas 2005). One-sided conversations will prove ineffective in the construction industry because each party has valuable information that should be shared among everyone involved.

Another valuable tool to improve communication is to create a plan for all to understand and follow (Terry 2008). By presenting each party with the opportunity to understand what actions are necessary, subcontractors can improve upon their communication and cooperation. The simple action of a construction manager creating a plan can significantly benefit the overall project due to the subsequent actions of subcontractors.
To cooperate in a highly efficient manner, communication becomes a critical requirement. Without the ability to discuss problems and foster ideas to advance past difficult situations, delays inevitably continue to accumulate. In order to improve communications, each party should be allowed to express its opinion on the situation so that others can understand opposing viewpoints (Melvin 1979).

**Solution:** Develop a strong line of communication with subcontractors.

**Relationships**

A valuable prevention to dilemmas that may arise is the formation of positive relationships between management and subcontractors. The creation of this relationship enables many aspects of the managerial process to be improved upon including teamwork and trust (Wallace 2007).

One of the major components of creating lasting relationships is to be aware of differences among subcontractors. The ability to recognize that each subcontractor is comprised of individuals from varying backgrounds and experiences allows management the chance to create a strong work environment for each individual by catering to specific needs (Thomas 2005). Personality clashes may emerge on a jobsite, but if a prior relationship exists, solutions can be resolved quickly.

To develop a successful relationship, trust among both parties must be established. Each party must understand the capabilities and limitations of others (Thomas 2005). Fairly delegating responsibilities to subcontractors as well as recognizing their value and contribution to the job fosters respect for management (Proctor 1996).
This continued respect leads to trust which allows for further advancement of a team environment.

A practice that can ruin the relationship between a construction manager and a subcontractor is bid shopping (Hinze 1994). Because bid shopping unethically attempts to force subcontractors to lower their bid price on a project, animosity between the two parties can occur (Arditi 2005). Division that arises between management and subcontractors before a project commences does not provide a positive outlook for future relations.

**Solution:** Develop and maintain trusting relationships with subcontractors. Also, bid shopping should not be practiced.

**Contract Administration**

Prior to a project’s commencement, construction management must create a contract that each subcontractor is obligated to sign. Establishing a set of rules and guidelines that must be followed by all subcontractors not only ensures successful completion of the project, but also minimizes risks placed on the construction manager (Gilbreath 1992).

Whether problems result from personality clashes or schedule delays, a project manager must ensure that the overall project is not hurt as a result. A project manager can avoid labor disputes among subcontractors by creating a contract that identifies what measures should be taken when disagreements emerge (Goldhaber 1977). The contract requires all subcontractors to act according to the signed documentation.
When management enters into an agreement with an owner to commence construction, they are required to sign a contract. It then becomes the responsibility of the construction manager to complete the project according to specifications. Therefore, when subcontractors are hired, they too must complete the project according to the original contract. In order to assure that this action is taken correctly, construction managers should administer the same contract requirements to their subcontractors (U.S. Department of Energy 2006).

**Solution:** Draft a contract that identifies all aspects and responsibilities for each party involved.

**Submittal and Change Order Log**

In an effort to record all documentations received by and sent to subcontractors, it is beneficial for construction managers to utilize submittal and change order logs. The submittal log should identify dates that each submittal is due. Also, both the submittal and change order log should be updated regularly and distributed at meetings so that all parties are aware of changes (Strategic Construction Management 2008).

**Solution:** Maintain a submittal and change order log.

**Review of Subcontractor Performance**

One of the most efficient ways to understand the value of work performed by subcontractors is to perform project reviews. Whenever subcontractors are involved with construction, management should conduct constant reviews of their work (Wallace 2007). Continuously critiquing the practices of subcontractors allows construction managers the
opportunity to take corrective action. Subcontractors can be advised to increase productivity if it is viewed that their performance is not meeting expectations. This constant review allows for a greater overall success of the project.

Management can conduct safety walks as a means of project review. They serve as inspections in which construction managers can familiarize themselves with the safety conditions on site (Hinze 2003). With knowledge of jobsite conditions, management can request improvement on the part of subcontractors.

Another valuable project review tool is a daily report submitted by each subcontractor (Fessler 1990). This form identifies work performed each day by the subcontractors and can be used by management to track productivity. Management can also identify areas of construction that need attention through this review process.

At the completion of a project, management can review the work performed by each subcontractor. This can be achieved through a rating system which identifies areas of success or failure for a subcontractor’s performance (Dream Builders Northwest). This rating system can assist management in the future when selecting which subcontractor bid to accept.

**Solution:** Conduct regularly reviews of subcontractor performance, including safety walks.

**Rewards and Incentives**

Subcontractors can meet, exceed, or fall behind a construction manager’s level of satisfaction. When subcontractors exceed expectations, management has the opportunity
to provide rewards. This provides compensation for subcontractor’s high productivity and increased performance.

To reward subcontractors for their impressive results, one of the most effective means is monetarily. If project management decides to engage in a reward system, it should be established prior to project commencement (Thomas 2005). Agreeing to this idea before a project begins prevents any future debates regarding the appropriate amount that should be awarded. A reward system may motivate subcontractors to perform beyond their own expectations.

**Solution:** Utilize rewards and incentives for subcontractors.

**Training**

An important aspect of subcontractor management is training. By teaching subcontractors the most efficient way to perform their tasks, and educating them on the overall goal of the project, results have the opportunity to greatly improve. According to Coulter, a company returns three dollars in profits for every one dollar spent on training (Coulter 1989). Therefore, money invested early can significantly reduce the overall cost of a project. Not only is training a financially encouraging factor, but it also promotes loyalty and motivation for subcontractors (Coulter 1989). Improving the skills of subcontractors can assist in developing a positive work environment.

Safety training is a valuable tool used to prevent accidents on a jobsite (Rietze 1990). Explaining potential obstacles and the appropriate measures that should be taken to handle problems provides laborers with the opportunity to commence work in the safest and most efficient manner (Hinze 2003). This training should be conducted by the
construction manager so that all expectations regarding safety can be clearly explained to the workforce.

**Solution:** Provide subcontractors with safety training.

**Meetings**

An essential component to project completion is an established regular schedule of meetings (Proctor 1996). Meetings allow management and subcontractors the ability to communicate and coordinate required work. It is important that these meetings are conducted on a regular basis so that all parties involved have the opportunity to gain a clear understanding of how the project must progress (Thomas 2005). Continuous meetings with subcontractors allow management the opportunity to consistently explain expectations which can improve quality and productivity on the project (QIA Excellence Gateway 2008).

Prior to the bid, management should hold a meeting with all subcontractors to discuss objectives, schedule, communication, and conflict resolution (Levitt 1993; Orczyk 1993). This provides subcontractors with expectations of how the work is to be completed (Uher 1985). This allows all aspects of the subcontractor’s work to be discussed so that each party feels as though they are being treated fair which can help develop a team mentality at an early stage (Hinze 1994).

It is vital for meetings to occur among management, but it is also important for meetings to occur among the trade workforce. These meetings are identified as toolbox meetings and should include the subcontractors’ workforce. It is beneficial to explain
project objectives and goals as well as safety precautions to the trades so that they may implement their understandings into construction practices (Levitt 1993).

Solution: Hold regularly scheduling meetings, including toolbox meetings for the workforce.

Pre-qualification

Pre-qualification is important for construction managers to consider when selecting which subcontractor bid to accept (Lin 2003). Pre-qualification can be based on a subcontractor’s previous work. By selecting a subcontractor who has repeatedly proven he is capable of completing a project on schedule and under budget, a project manager can be relatively assured that similar results will follow (Maturana 2007). Construction managers should select a subcontractor that has proven capable of completing the contracted work (RTA 2008).

Pre-qualification can also be based upon safety. Selecting subcontractors with good safety records enables management to expect that construction will proceed in a safe and cautious manner (Levitt 1993). It is also beneficial for a project manager to select a subcontractor who has an established safety program (Arditi 2005). This improves safety practices because laborers have already been exposed to these requirements.

Financial pre-qualification should also be utilized by construction managers. Problems frequently arise when managing subcontractors, but these problems can significantly worsen if a subcontractor is financially unstable (Ceschini 2004). Financial
instability can hinder a project because a subcontractor may not be able to meet schedule demands.

**Solution:** Prequalify subcontractors based upon previous work, safety performance, and financial situation.

---

**Payment**

Subcontractors are hired by management to complete a task. Since they are providing a service, subcontractors deserve to be fairly compensated. It is recommended by numerous sources that construction managers pay subcontractors on time at the completion of their work and in accordance with contract documents (Jackson 2004; Hsieh 1998; Proctor 1996). Not only is this an ethical action, but it promotes positive relationships between management and subcontractors. As the relationship develops, the probability of future work together continues to increase.

**Solution:** Pay subcontractors on time in accordance with contract documents.
Need for Further Research

A review of existing literature provides a broad list of practices to assist in the process of subcontractor management; however, these practices are not readily available in one comprehensive list. Although some sources identify several practices, there are still many more that should be included. Also, existing literature does not provide a prioritized list of which practices are most important. A ranked list could clearly identify what practices have the greatest potential to improve upon the process of subcontractor management.
Chapter 4: Problems with Subcontractor Management –
Identified by Interview Subjects

Problems have the potential to exist when managing subcontractors. This can come as a result of subcontractor’s varying backgrounds, experiences, and personalities. If management can not find reasonable solutions to control these problems, the project can suffer as a result. This chapter explains problems identified by the five interview subjects. Each problem has been experienced by one or more of the interview subjects.

Business Knowledge

The subcontracting industry may present difficulties for construction managers due to the environment in which these problems can occur. One reason these difficulties have the potential to exist is because many subcontractors are family owned businesses. As a result of this ownership, these companies may suffer from under financing, understaffing, or have limited managerial skills (Sweet 2004). It is also potentially problematic that, often, a foreman is the highest ranking employee on a jobsite. Many foremen have not had the opportunity to learn expert managerial practices and this lack of knowledge can negatively affect the project (Sweet 2004).

Scheduling

One of the major problems that currently exists in subcontractor management is scheduling. Since construction works on a critical path, meaning that certain tasks can not start until other tasks have been completed, delays are possible on every project. These
delays can become magnified when several subcontractors are included. The reason that these delays are such a problem is that “time is money” (Interview Subject #2). The longer it takes to finish a project beyond the intended completion date, the more money that must be spent to continue operations.

These schedule delays are not simply the result of a subcontractor working at a slower rate than expected. “There can be a lack of manpower, a lack of equipment and materials, unforeseen conditions, or a lack of schedule” (Interview Subject #5). A lack of manpower indicates that the subcontractor either underestimated the amount of work or anticipated higher productivity. A lack of equipment and materials, can be prevent the completion of work. The ability to repair or relocate equipment to the jobsite can take a significant amount of time. Also, certain materials require a long lead time for their delivery, which can seriously hinder a project if not ordered early enough. Unforeseen conditions can have significant effects on the schedule, thus necessitating intensive revisions to the plans.

Delays

Another problem on the jobsite that arises with subcontractors is that “often times everyone is late. When one [subcontractor] sees that another trade is not going to be finished on time, they figure they can take their [laborers] to another job. However, when time comes for them to work on their originally scheduled job, they are nowhere to be found” (Interview Subject #1). The more work that subcontractors are able to complete allows them to make more money; therefore, a subcontractor does not want to leave laborers on a project if they are not performing work. Dispersing laborers to other jobs
allows for additional work to be completed, and ultimately for the subcontractor to make money. Problems develop when the original project site requires their efforts. Time is needed to gather all laborers and relocate them, resulting in additional delays.

**Cash Flow**

“These schedule delays can result in serious cash flow problems” (Interview Subject #1). If the owner is paying the construction manager or general contractor according to how much work is completed, the delays can have a detrimental effect on the financial well-being of a company. Money that was originally expected to be received by a certain date may not come for days, weeks, or months. If the general contractor or construction manager does not receive money from the owner, they may not pay their subcontractors. Without income, subcontractors may not have enough money saved to purchase materials or continue to pay their laborers.

**Differing Backgrounds**

“The biggest problem discussed is scheduling, but there are other issues as well. A lot of the time it is personality, some subcontractors just don’t get along with other people, including other subcontractors or management, whether it is because of someone’s attitude, race, ethnicity, religion or background” (Interview Subject #4). It should not be overstated that construction is a business that combines the efforts of many people from various backgrounds. When people from differing backgrounds interact with one another, there exists the possibility of conflict. If subcontractors cannot trust one another or their management, then the work environment becomes unhealthy.
Drawings

Other issues that arise on construction projects are “discrepancies in the drawings. There exists a lack of information on the drawings or one drawing shows one thing and another drawing shows something else. These problems must be addressed by the architect, engineer, owner, contractor and subcontractor” (Interview Subject #5). When the subcontractor is provided with the plans, he is expected to complete his work accordingly; however, if one set of drawings does not match the others, serious problems can occur if they are not caught early enough.

Business knowledge varies among subcontractors. “A lot of the time subcontractors are not that sophisticated (Interview Subject #4). This lack of understanding of how a business should be run in today’s fast pace and high demand society may come as a result of many subcontractors being “family owned businesses. After the second or third generation of ownership, the company is just not run correctly” (Interview Subject #4). Companies are passed down to family members that may not have the best interests of the company in mind or are incapable of running a business.

“Safety is another aspect of subcontractor’s practices that is often under par” (Interview Subject #3). Many construction companies have different views and practices when addressing safety. Often, subcontractors have low standards for safety that do not meet the requirements of the construction manager or general contractor. Without proper safety precautions, trades can be placed in dangerous situations. While one of the main objectives on any project is to finish on schedule, the most important aspect of construction is to preserve the health and lives of all parties involved. Subcontractors that
do not have high safety requirements, or choose not to follow such policies, place themselves in unwarranted danger.
Chapter 5: Analysis of Practices

Varying sources contributed to the compilation of a list of “best practices” for subcontractor management. This includes journals, books, databases, internet sources, interviews and an online survey. Through a content analysis of these sources, practices to improve upon subcontractor management have been identified.

Following a literature review and the interviewing of five professionals, a list of practices was created for an online survey. Ten professionals in the field of subcontractor management completed the survey and were asked to rate the practices based upon their relevant importance.

Listed in Table 3: Online Survey Data is the data collected from the practicing professionals’ responses to the survey. Following the data is Table 4: Ranking of Practices, which is a list of some of the best practices arranged from most to least important based upon the opinion and experience of the respondents. These principles were rated during the survey on a scale from one to five, one being unimportant and five being very important towards subcontractor management. Rating values of two and four mean that the practice was regarded as minimally important and important, respectively. A rating value of three, which on the survey was explained as the respondent neither agreed or disagreed, meant that the practice was of medium importance. The rating average, or mean, was calculated by dividing the sum of the practices’ ratings by the number of survey participants.

As previously explained, two survey participants responses were omitted because the practices were not applicable to their profession, Information, Systems, and
Technology. These practices included safety training and safety pre-qualification. The average ratings of these two practices were recalculated based upon the eight relevant responses.
<table>
<thead>
<tr>
<th>Task Description</th>
<th>Not Important</th>
<th>Minimally Important</th>
<th>Neither agree nor disagree</th>
<th>Important</th>
<th>Very Important</th>
<th>Average</th>
<th>Rating</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing and maintaining trust and relationships with subcontractors.</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>40.0% (4)</td>
<td>60.0% (6)</td>
<td>4.60</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Providing subcontractors with training on how to manage paperwork on the job prior to construction.</td>
<td>0.0% (0)</td>
<td>10.0% (1)</td>
<td>20.0% (2)</td>
<td>60.0% (6)</td>
<td>10.0% (1)</td>
<td>3.70</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Providing subcontractors with safety training prior to construction.</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>50.0% (5)</td>
<td>20.0% (2)</td>
<td>30.0% (3)</td>
<td>3.80</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Developing a strong line of communication. (providing bonuses for work completed early by subcontractors).</td>
<td>10.0% (1)</td>
<td>30.0% (3)</td>
<td>50.0% (5)</td>
<td>10.0% (1)</td>
<td>0.0% (0)</td>
<td>2.60</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Implementing a Bonus clause (implementing penalties or liquidated damages for work completed late due to subcontractors).</td>
<td>0.0% (0)</td>
<td>10.0% (1)</td>
<td>70.0% (7)</td>
<td>20.0% (2)</td>
<td>0.0% (0)</td>
<td>3.10</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Developing more stringent contract documents.</td>
<td>0.0% (0)</td>
<td>10.0% (1)</td>
<td>20.0% (2)</td>
<td>60.0% (6)</td>
<td>10.0% (1)</td>
<td>3.70</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Schedule and Plan a project in further detail than a CPM Schedule.</td>
<td>10.0% (1)</td>
<td>0.0% (0)</td>
<td>20.0% (2)</td>
<td>50.0% (5)</td>
<td>20.0% (2)</td>
<td>3.70</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Meet with subcontractors at a minimum of once every two weeks, more if necessary.</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>50.0% (5)</td>
<td>50.0% (5)</td>
<td>4.50</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Pre-Qualify subcontractors based on their financial situation.</td>
<td>0.0% (0)</td>
<td>10.0% (1)</td>
<td>10.0% (1)</td>
<td>60.0% (6)</td>
<td>20.0% (2)</td>
<td>3.90</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Pre-Qualify subcontractors based on their previous work.</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>10.0% (1)</td>
<td>40.0% (4)</td>
<td>50.0% (5)</td>
<td>4.40</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Pre-Qualify subcontractors based on their safety record.</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>30.0% (3)</td>
<td>30.0% (3)</td>
<td>40.0% (4)</td>
<td>4.10</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Establish a system for submittals and change orders to be followed by all subcontractors.</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>10.0% (1)</td>
<td>20.0% (2)</td>
<td>70.0% (7)</td>
<td>4.60</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Explain expectations to subcontractors, prior to construction.</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>20.0% (2)</td>
<td>80.0% (8)</td>
<td>4.80</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Explain potential of repeat work with subcontractors if expectations are met or exceeded.</td>
<td>10.0% (1)</td>
<td>0.0% (0)</td>
<td>20.0% (2)</td>
<td>40.0% (4)</td>
<td>30.0% (3)</td>
<td>3.80</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Pay subcontractors on time.</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>50.0% (5)</td>
<td>50.0% (5)</td>
<td>4.50</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Use a score card to rank subcontractor performance at the completion of a job.</td>
<td>0.0% (0)</td>
<td>10.0% (1)</td>
<td>10.0% (1)</td>
<td>60.0% (6)</td>
<td>20.0% (2)</td>
<td>3.90</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Use a score card to rank subcontractor performance periodically throughout the job.</td>
<td>0.0% (0)</td>
<td>10.0% (1)</td>
<td>40.0% (4)</td>
<td>20.0% (2)</td>
<td>30.0% (3)</td>
<td>3.70</td>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>
## Ranking of Practices from Online Survey

Table 4: Ranking of Practices

<table>
<thead>
<tr>
<th>Practice</th>
<th>Adjusted Rating Average</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain expectations to subcontractors, prior to construction.</td>
<td>4.80</td>
<td>1</td>
</tr>
<tr>
<td>Developing a strong line of communication.</td>
<td>4.70</td>
<td>2</td>
</tr>
<tr>
<td>Developing and maintaining trust and relationships with subcontractors.</td>
<td>4.60</td>
<td>3</td>
</tr>
<tr>
<td>Establish a system for submittals and change orders to be followed by all subcontractors.</td>
<td>4.60</td>
<td>3</td>
</tr>
<tr>
<td>Meet with subcontractors at a minimum of once every two weeks, more if necessary.</td>
<td>4.50</td>
<td>5</td>
</tr>
<tr>
<td>Pay subcontractors on time.</td>
<td>4.50</td>
<td>5</td>
</tr>
<tr>
<td>Pre-Qualify subcontractors based on their previous work.</td>
<td>4.40</td>
<td>7</td>
</tr>
<tr>
<td>Pre-Qualify subcontractors based on their safety record.</td>
<td>4.38</td>
<td>8</td>
</tr>
<tr>
<td>Providing subcontractors with safety training prior to construction.</td>
<td>4.00</td>
<td>9</td>
</tr>
<tr>
<td>Pre-Qualify subcontractors based on their financial situation.</td>
<td>3.90</td>
<td>10</td>
</tr>
<tr>
<td>Use a score card to rank subcontractor performance at the completion of a job.</td>
<td>3.90</td>
<td>10</td>
</tr>
<tr>
<td>Explain potential of repeat work with subcontractors if expectations are met or exceeded.</td>
<td>3.80</td>
<td>12</td>
</tr>
<tr>
<td>Providing subcontractors with training on how to manage paperwork on the job prior to construction.</td>
<td>3.70</td>
<td>13</td>
</tr>
<tr>
<td>Developing more stringent contract documents.</td>
<td>3.70</td>
<td>13</td>
</tr>
<tr>
<td>Schedule and Plan a project in further detail than a CPM Schedule.</td>
<td>3.70</td>
<td>13</td>
</tr>
<tr>
<td>Use a score card to rank subcontractor performance periodically throughout the job.</td>
<td>3.70</td>
<td>13</td>
</tr>
<tr>
<td>Implementing a Penalty clause (implementing penalties or liquidated damages for work completed late due to subcontractors).</td>
<td>3.10</td>
<td>17</td>
</tr>
<tr>
<td>Implementing a Bonus clause (providing bonuses for work completed early by subcontractors).</td>
<td>2.60</td>
<td>18</td>
</tr>
</tbody>
</table>
Following the completion of the survey, additional practices were identified to assist in the process of subcontractor management. In an effort to keep the ranking system in place, additional practices were grouped into categories of existing similar practices. An example is the addition of the practice identifying whether or not subcontractors can accommodate acceleration to the category of pre-qualification. Although not listed in the survey, this practice was categorized with other forms of pre-qualification because of their likeness to subcontractor procurement.

Also several practices identified during the survey were reworked to fit the description of a “best practice.” Items originally listed on the survey that were not considered “practices” were reworked so that construction managers could identify them as steps that should be taken to improve upon subcontractor management. An example of this change is the practice of establishing a clear line of communication. Specific steps to improve communication were added so that it could be understood as a practice that should be followed by construction managers. Also, all practices were refined to begin with an active verb. This was performed so that each practice could be understood as a direction that should be followed during the process of managing.

Following the completion of the survey, certain practices were removed from the list based upon their ratings. The two practices removed were the implementation of a bonus and penalty clause into a contract with subcontractors. The reason that these two practices are not recommended as best practices is a result of the poor ratings they received during the survey. The implementation of a penalty clause and bonus clause, received ratings of 3.10 and 2.60, respectively. These practices received the two lowest ratings from the survey. Also, the implementation of a bonus clause was the only practice
to receive a rating below 3.0. A value of 3.0 indicated that the practice was of medium importance; therefore, a rating of 2.60 indicated that survey participants felt that this practice was more closely linked to minimally important in terms of subcontractor management. The practice of implementing a bonus clause did receive a value above 3.0; however, it received a rating much lower than the next lowest practice. Also, it was removed because management should not implement a penalty clause unless a bonus clause is put in place as well. Due to the lack of support for these practices, they have been removed from the list of “best practices” for subcontractor management. All other practices on the survey were either kept or reworked because they received a high average rating. The lowest rated practice that has been kept received a value rating of 3.70. This rating is close to the value of 4.0 indicating that a practice is important and it is significantly higher than the next lowest practice.

As explained in Chapter 6: Best Practices for Subcontractor Management, the practices were divided into two sections, subcontractor procurement practices and subcontractor management practices. Subcontractor procurement practices were categorized as practices that management should utilize before accepting a subcontractors bid, and subcontractor management practices should be used following bidding and for the remainder of the construction process. To correspond with the established ranking system from the survey, the practices in both sections have been ranked independently from the practices in the other section.
Chapter 6: Best Practices for Subcontractor Management

Listed below are “The Best Practices for Subcontractor Management in Construction.” They have been identified through various means including, literature reviews, interviews, and an online survey. Interview subjects and survey participants support most current recommendations identified in the literature review. The origins of practices, identified by sources from literature or interview subjects, are explained in detail at the beginning of each section.

The practices have been arranged into two major categories, subcontractor procurement practices and subcontractor management practices. Subcontractor procurement practices should be utilized by construction management prior to accepting a subcontractor’s bid. Subcontractor management practices should be used once a subcontractor’s bid has been accepted and throughout the remainder of the construction process. To correspond with the established ranking system from the survey, the practices in both categories have been ranked independently from the practices in the other category.

Subcontractor Procurement Practices

Expectations

1. Explain expectations to subcontractors prior to bidding. These expectations can include safety precautions, proper managerial approaches, housekeeping, meeting schedules and duration.
Pre-qualification

2. Pre-qualify subcontractors based on their previous work, safety record, and financial situation.

3. Identify whether or not subcontractors can accommodate acceleration.

4. Require that subcontractors have their own health and safety procedures.

Subcontractor Management Practices

Communication

1. Develop a strong line of communication with subcontractors by sending frequent updates, regularly scheduling meetings, identifying key contact personal, and utilizing the same forms of communication (i.e. cellular phones or electronic mail).

Relationships

2. Develop and maintain trusting relationships with subcontractors.

3. Do not practice bid shopping; it is unethical.

Submittals and Change Orders

4. Establish a system for submittals to be followed by all subcontractors that includes a schedule with due dates.

5. Establish a system for change orders to be followed by all subcontractors.

6. Do not pay for changes to work where there is not proper notice.

7. Maintain a submittal and change order log.

8. Require notice for any changes performed by subcontractors.
Meetings

9. Meet with subcontractors at a minimum of once every two weeks, more if necessary.

Payment

10. Pay subcontractors on time according to contract documents.

Training

11. Provide subcontractors with training on how to manage documents, prior to construction.

12. Require toolbox safety meetings.

13. Provide subcontractors with safety training, prior to construction.

Project Review

14. Use a score card to rank subcontractor performance periodically or at the completion of a project.

15. Conduct safety walks regularly to check for proper safety practices and ensure good housekeeping.

Repeat Business

16. Explain potential of repeat work with subcontractors if expectations are met or exceeded.

Contract Guidelines

17. Follow contract provisions accurately.
Planning / Scheduling

18. Require superintendent or foreman to fill out daily field reports to assist in project review.

19. Include lead subcontractors in development of schedule.

The following pages elaborate on the previously mentioned practices which are categorized into sections. Each practice should be used by professionals to improve subcontractor management. The sections have been arranged in order of most to least important practice based upon the average ratings of ten professionals in the field of subcontractor management. Multiple practices exist within each of the following sections and are identified in bold throughout this chapter. Additional practices were identified through survey comments and committee input and are integrated with the original ranked practices. Ranked practices are a result of the opinions and responses of the survey participants.
Expectations

Procurement Practice #1: Explain expectations to subcontractors prior to bidding. These expectations can include safety precautions, proper managerial approaches, housekeeping, meeting schedules and duration.

This practice of explaining expectations was identified through a review of existing literature. All interview subjects supported this practice and it was rated by survey participants as the most important for subcontractor management.

Before any project commences, a project manager should “tell [subcontractors] the expectations up front” (Interview Subject #4). Explaining expectations allows subcontractors the opportunity to understand how they should operate during the course of the project. These expectations can include safety precautions, proper managerial approaches, housekeeping, meeting schedules and duration, as well as many others.

Another major expectation that can be explained by a project manager to subcontractors is the need for exemplary results. A result of quality work on a given project has the potential to lead to repeat business in the future. The desire for a subcontractor to please management, and thus receive future work, will be a strong motivating factor (Interview Subject #2). Similarly, the fear of disappointing and receiving poor recommendations from a project manager may also assist in motivating subcontractors to perform to the best of their ability.
Pre-qualification

Procurement Practice #2: Pre-qualify subcontractors based on their previous work, safety record, and financial situation.

Procurement Practice #3: Identify whether or not subcontractors can accommodate acceleration.

Procurement Practice #4: Require that subcontractors have their own health and safety procedures.

The practice of pre-qualifying a subcontractor based upon their previous work, safety record, and financial situation was identified during the literature review. Survey responses indicated that the two pre-qualifying forms, previous work and safety, were more valuable to subcontractor selection than financial pre-qualification. The requirement of subcontractors to have their own health and safety procedures has been identified through a review of existing literature.

Pre-qualification is the act of assessing whether or not a subcontractor has the ability to perform a project based upon specific company attributes. Researching the history of a company provides the construction manager with the ability to distinguish between subcontractors. The three main types of pre-qualification are financial, safety and previous work.

Financial Pre-qualification

The first of the three forms is financial pre-qualification. Financial pre-qualification identifies the economic stability of a subcontractor’s company. “[Project managers] should perform a financial check on [a subcontractor’s] background to make
sure that they are financially sound” (Interview Subject #3). The reason for this verification is that without proper financing, projects may not have the ability to run soundly. Problems often occur on a job site, some of which include material delivery delays, shortage of manpower, increase in needed equipment, or required rework. Solutions to these jobsite situations include proactive responses such as bringing more laborers onto the jobsite or having current laborers work overtime. Both of these actions require additional financing beyond what may have been expected during the bid process; however, if the subcontractor does not have the financial ability to accelerate the work as required, the project will be forced to fall further behind schedule.

**Safety Pre-qualification**

“Pre-qualification based on safety performance is paramount” (Interview Subject #5). When entering into contract with a subcontractor, arguably the most important aspects of a company are their safety procedures and safety record. While construction is a business established for the purpose of building, preservation of human life is of utmost importance. Safety regulations have become stricter and safety practices have improved over the years, yet not everyone acts in the same professional manner.

When a construction manager is deciding on which subcontractor to hire, the issue of safety must be addressed in the prequalification process. This is important for several reasons. The first is that human life should be regarded as the most important aspect of any project. Project managers should never try to save money at the expensive of someone’s health or life. Throughout the construction industry, safety practices greatly
vary. Each subcontractor should be analyzed to determine if that company does everything in their power to protect their laborers when on the job site.

Secondly, when subcontractor’s laborers enter a jobsite, it is the project manager’s responsibility to ensure that each employee understands the appropriate project safety procedures. Safety prequalification eliminates the need to train laborers who are inexperienced in proper safety practices, thereby saving management time and money.

The third reason for safety pre-qualifications is a lack of safety delaying a project. A less severe case of this delay could come as a result of Occupational Safety and Health Administration (OSHA) shutting down a project due to poor safety practices. If a member from OSHA becomes aware of unsound construction practices which threaten the well-being of the laborers, they have the power to prevent further construction from taking place. This delay can end up costing the project a great amount of money.

“[Construction managers] should require that [subcontractors] have their own health and safety program. [Subcontractors] need to provide [construction managers] with that documentation as well as their insurance information” (Interview Subject #3). By requiring safety information from subcontractors, construction managers have the ability to approve or disapprove of certain practices. Understanding which subcontractors value the health and safety of their employees allows a construction manager to select a company that will bring the best practices and potentially greatest results to the project.
Previous Work Pre-qualification

Financial history, credit checks, and safety procedures can only reveal a limited amount when analyzing a subcontractor for potential work. A project manager should also study previous projects that the subcontractor has worked on to gain a greater understanding (Interview Subject #2). If a subcontractor has performed well on previous projects while keeping safety and quality in mind, then it can be expected that he will provide the same type of service on future projects; however, if a subcontractor is known for poor safety practices, not completing the work according to specifications, and is constantly late delivering the finished product, it can also be expected that he will provide a similar service on future endeavors.

Pre-qualification Overview

A combination of the three pre-qualifying factors enables a project manager to make the most educated decision when hiring a subcontractor. While it is important to respect the bid price, finances, safety, and previous work are strong indicators of how well a project can advance due to subcontractor performance.
Communication

Management Practice #1: Develop a strong line of communication with subcontractors by sending frequent updates, regularly scheduling meetings, identifying key contact personal, and utilizing the same forms of communication (i.e. cellular phones or electronic mail).

The practice of developing a strong line of communication was the product of a literature review. Similarly, interview subjects and survey participants believe communication is one of the most important aspects to successful subcontractor management.

Communication is essential not only between construction managers and subcontractors, but also among varying subcontractors. It is the project manager’s responsibility to ensure a clear line of communication between all parties involved. Construction requires the collective efforts of many people from various trades and disciplines, making communication between these parties a key element in project completion.

“The project manager must control communication. He must make sure that information is provided to the right people quickly” (Interview Subject #3). Information can be dispersed among all subcontractors by sending frequent updates to all subcontractors as well as regularly scheduling meetings. This clear line of communication allows for information to pass freely.

Management can accelerate the communication process by identifying each party’s key contact personal. The construction manager and subcontractor should each be provided with the individual’s names and contact information responsible for managing
certain aspects of the construction process. This eliminates wasted time searching for the correct person to resolve the situation.

In recent years, technology has provided the construction industry with advances in communication. “Cell phones have made a tremendous improvement in communication” (Interview Subject #1). This direct form of communication provides project managers and subcontractors with the opportunity to discuss the project whenever necessary. The power of the internet has also made for effective collaboration of information between construction managers and subcontractors. Drawings and plans can be exchanged and problems can be resolved via e-mail in a very short amount of time. Project managers should require that subcontractors utilize these forms of communication during the course of a project.
Relationships

Management Practice #2: Develop and maintain trusting relationships with subcontractors.

Management Practice #3: Do not practice bid shopping, it is unethical.

Developing and maintaining trusting relationships are practices identified throughout a review of existing literature. Interview subjects and survey participants agree that this practice is a very important managerial approach. Similarly, avoiding bid shopping is practice identified during a literature review.

When working with a subcontractor, a project manager enters into a relationship that has the potential to either succeed or fail. The outcome of the project is largely due to the relationship that forms between a construction management team and its subcontractors. The most effective way for a project to succeed is for all members involved to function as a team. “[Construction managers] need [subcontractors] and [subcontractors] need [construction managers]” (Interview Subject #3). Each party relies on the other for support and information.

An important aspect to promote a relationship with subcontractors is to “have the best interest of the subs in mind” (Interview Subject #4). Most subcontractors are not only looking to make money on a project, but also to produce something that they can be proud of after completion. If a project manager can understand a subcontractor’s viewpoint, problems may be much easier to resolve. This attitude to resolving problems will continue to develop and foster a positive relationship.

Similarly to showing respect, project managers should make an effort to promote positive relationships with all individuals involved on the project. “[Project management]
should maintain relationships with subcontractors, and go out of [its] way to treat people fairly” (Interview Subject #4). If subcontractors feel as though they are being treated unfairly, or feel that their work is not being properly recognized, the quality of their work may begin to falter. It is the responsibility of the project manager to ensure that workers coexist which provides the opportunity for each party to gain knowledge and assistance.

While there are other factors that should be taken into account when hiring a subcontractor (i.e. safety record, financial history, and previous work), the price is a major issue. A contractor bids a project in an effort to win over other competitors. If his price is not low enough, regardless of other factors, he will most likely not get the job. “Price means a lot. You need to have the right price as a subcontractor to keep up business” (Interview Subject #3). If project managers can continuously require bidding, either on every job or every few jobs, they can keep subcontractors honest and receive the lowest rates. While the practice of bidding should be utilized, a construction manager should not engage in the practice of bid shopping. Bid shopping is an unethical practice that forces subcontractors to minimize their profit in an attempt to win a project over other subcontractors. Not only is this unfair to the subcontractors, but it does not provide a positive image for the construction manager.
Submittals

Management Practice #4: Establish a system for submittals to be followed by all subcontractors that includes a schedule with due dates.

Interview subjects identified the need for the establishment of a submittal system that should be followed by all subcontractors. Although rated highly by survey participants, this practice was not identified during a literature review.

Upon completion of the drawings and the successful bidding by a construction manager or general contractor, submittal packages must be addressed. These submittal packages include shop drawings as well as material information and samples that must be submitted by the construction manager to the architect, or engineer, for final approval. This approval exists as the last measure of quality control prior to the products entering the field.

Since the construction manager utilizes the skills of varying subcontractors, it is the subcontractors who are often responsible for material selection and shop drawings. The subcontractor must create a submittal package to be approved by the architect and engineer. When managing multiple subcontractors, the number of submittals may be extremely high. Because each submittal must be approved, a project can experience significant delays if submittals are not presented on time. It is the responsibility of the construction manager to ensure that each subcontractor submits any and all submittals quickly and in full entirety.

“As soon as [a project manager] awards the contract, [he] should expect each contractor to go through the drawings and give [him] their submittal packages within ten days” (Interview Subject #3). By providing a time frame for which subcontractors must
submit their information, the project is able to commence as scheduled. A project manager should continuously monitor each subcontractor to ensure that delays will not occur unexpectedly. This can be prevented by regularly contacting the subcontractor and asking for a status update.

Submittal forms should be universal for all subcontractors. This provides greater ease for the construction management team when dealing with a large volume of submissions during the course of a project.
Change Orders

Management Practice #5: Establish a system for changes orders to be followed by all subcontractors.

Management Practice #6: Do not pay for changes to work where there is not proper notice.

The establishment of a system for change orders is a recommendation of interview subjects. Similar to submittals, this practice was rated highly by survey participants, but was not found in a review of the literature.

A change order is a mutual agreement to change some aspect of the original contract documents. When problems or obstacles are encountered on a project, the subcontractors and construction manager can submit a change order to the owner, architect, and engineer to request the original contract documents be altered. Work can either be added or removed from the initial specifications in order to accommodate the new conditions. Similarly to the submittal process, a project manager should require subcontractors to submit change orders in a quick and efficient manner because the schedule may not be able to proceed until approval has been received. As previously mentioned, work should never be altered by subcontractors without proper approval. To assure this, work that is not approved should not be paid for by management.

The manner in which change orders are handled is also important. “[A project manager] should tell every [subcontractor] that they do not just send a change order to [the project manager’s] office, but they must be reviewed with the owner” (Interview Subject #3). By including the owner, and explaining change orders at meetings, every party involved with the project has the opportunity and ability to gain an understanding of
what scope of work is being altered. Also, each member present at the meeting is able to provide insight and possible alternative solutions to those proposed by the subcontractor.

Similarly to submittal forms, all subcontractors should be required to use the same change order form. When dealing with a large number of change orders during the course of a project, the construction manager can quickly and efficiently manage all submissions so that the schedule is not delayed.

Submittal and Change Order Management

Management Practice #7: Maintain a submittal and change order log.

Management Practice #8: Required notice for any changes performed by subcontractors.

The practice of creating and maintaining a log to manage submittals and change orders has been identified through a literature review. Providing continuous reminders to subcontractors is a practice identified by interview subjects.

The process of managing submittals and change orders can be very difficult for a construction management company. Due to the possibility of thousands of submittals and hundreds of change orders in a large project, appropriate staffing is the most efficient way of organizing these vital submissions and alterations. “Having an extra person to handle submittals and change orders would be very beneficial to the company” (Interview Subject #1). An additional staff member dedicated to receiving submittals and change orders from subcontractors, documenting the information in a submittal and change order log, and sending it to the engineer or architect could save a company a great deal of time and money. This process allows an individual to become an expert in submittal and
change order management. Experts in any field are usually more efficient than someone who has not mastered the material. This individual, as well as the project manager, should also be responsible for constantly reminding subcontractors that notice is required before any changes can be made.
Meetings

Management Practice #9: Meet with subcontractors at a minimum of once every two weeks, more if necessary.

The review of literature identified the need for meetings to occur continuously throughout the project; however, it is a recommendation of all interview subjects that these meetings occur a minimum of once every two weeks.

Meetings between construction managers and subcontractors are a vital aspect to the success of any project. In an effort to exchange information, key players (i.e. owners, engineers, architects, construction managers, and subcontractors) on a project must be brought together regularly. Meeting durations and schedules can be flexible depending on the size of the project; however, two weeks is the maximum amount of time that should lapse between meetings. For jobs that require more attention, meetings can occur more frequently.

An obstacle, but necessary requirement, is that “all the major trades are at every meeting” (Interview Subject #3). If a subcontractor is currently involved in construction on the project, he should have a representative at the meeting. Attempting to coordinate a meeting with many subcontractors can be difficult; however, it is necessary and of great importance.

There should be several tasks that a project manager demands of his subcontractors prior to meetings. “[Subcontractors] should get to the jobsite no later than an hour before the meeting to review their activities so that when [a project manager] ask[s] a question, they have an answer” (Interview Subject #3). This assists in making meetings quicker and more efficient.
Prior to bidding a project, a construction manager should hold a meeting for all potential subcontractors. Management should take this opportunity to explain the dynamics of their company so that subcontractors can decide whether or not they want to work with that type of management and proceed in the bidding process. Also, before a project is open to bid, “meeting schedules should be explained to the subcontractors” (Interview Subject #5). This provides subcontractors with future expectations of meeting requirements.
Management Practice #10: Pay subcontractors on time according to contract documents.

The practice of paying subcontractors on time was identified during a review of literature and it is also recommended by all interview subjects as an important managerial practice. It has been identified by survey participants as one of the most important practices for subcontractor management.

A project manager should make it a priority to pay each and every subcontractor on time. A subcontractor is providing a service for a construction manager and as a result deserves to be compensated for that service. “The subcontractor is looking for a fair return for what he does” (Interview Subject #1). Paying subcontractors on time does not only look good for the construction manager or general contractor, but also helps to promote the relationship between the involved parties. If subcontractors feel as though they are being respected enough to be paid on time, they may be more willing to provide a higher level of service than if their paychecks are continuously late.

“The biggest reward is to pay people early” (Interview Subject #1). A project manager should never use the threat of withholding money as a tool for motivation, but he can advance payment to subcontractors. If work has been completed early, a project manager may have the opportunity, depending on contract documents, to pay his subcontractors earlier than expected. This early payment proves to be act of good faith by the project manager and it also continues to promote the efforts of the subcontractor.
Training

Management Practice #11: Provide subcontractors with training on how to manage documents, prior to construction.

Management Practice #12: Require toolbox safety meetings.

Management Practice #13: Provide subcontractors with safety training, prior to construction.

Safety training for subcontractors is a practice identified during the review of literature; however, interview subjects were more specific in their training recommendations. They explained the opportunity to train subcontractors on the management of documents. Survey responses indicated that safety training is more valuable to a project than document management training. The practice of requiring toolbox meetings has been identified through literature reviews, but is also supported by all interview subjects.

There are two main types of training that a project manager can perform with a subcontractor prior to construction. The first is teaching subcontractors the proper way to manage paperwork on the job. The second is to provide each subcontractor with safety training.

Document Management Training

Subcontractors may have unique habits for document management (i.e. submittal packages, change orders, requests for time extensions, etc.). In order to minimize confusion resulting from varying approaches to the same issue, project managers can train their subcontractors on how to handle important aspects of documentation. Training
can teach the proper way to fill out forms as well as explain expectations for when and how often forms should be submitted. This information can be easily explained in a short training session. By requiring all subcontractors to submit documents to upper management in the same way, time and money can both be preserved (Interview Subject #2).

**Safety Training**

Safety is a paramount issue on construction projects. In order to ensure that the lives of all employees on construction projects are safe and protected, safety training should be mandated by upper management. Many subcontractors enter a jobsite with their own regulations and safety requirements; however, some subcontractors may not have stringent safety policies. To guarantee that everyone is protected from harm, the construction manager should take the initiative to provide all individuals with the proper safety training.

While safety training should occur on every project, project managers should only hire subcontractors who have an established safety policy and a good safety record. Requiring subcontractors to have their own policies provides an easy transition for laborers to follow the safety standards of the construction manager. While training should occur before construction, subcontractors “need to have their own safety and health program. Subcontractors are required to attend [construction management] safety programs; foreman and [superintendents] included. They must sign off that they attended the safety meeting” (Interview Subject #3). Implementing safety meetings, or toolbox meetings, throughout the project allows for laborers to be continuously reminded of the
dangers that exist on a jobsite, and proper precautions that should be taken to avoid
injury. Requiring foreman and superintendents to prove meeting attendance with
signatures, continues to reinforce the importance of the safety meetings. If these
individuals are absent, the project manager should report the issue to the individual in
charge of the specific subcontracting company not in attendance.

At the conclusion of each day, the construction manager’s superintendent or
foreman should complete a form identifying observed safety concerns. These forms
should either be addressed immediately or at the next meeting between the project
manager and subcontractors, depending on the severity of the matter. Reviewing current
construction practices of the subcontractors enables safety to continuously improve over
the course of the project.
Project Review

Management Practice #14: Use a score card to rank subcontractor performance periodically or at the completion of a project.

Management Practice #15: Conduct safety walks regularly to check for proper safety practices and ensure good housekeeping.

A review of literature identifies the need for projects to be continuously reviewed which can be accomplished through the use of a ranking score card. Interview subjects proposed the option of conducting the reviews periodically or at the completion of a project. More specifically, survey participants indicated that project reviews are more valuable if utilized at the completion of a job rather than periodically. The practice of conducting safety walks has also been identified during a review of existing literature.

In order to gain an understanding of how activities are progressing and how subcontractors are performing, the construction management team should utilize project reviews. “Projects should be reviewed either at completion or at certain points in the year” (Interview Subject #3). These reviews serve to find weaknesses and errors in the construction process, while figuring out potential solutions. This process can be achieved by either verbal or written documentation as well as periodic or project completion reviews.

While it can be effective to verbally discuss a project, providing written documentation allows management a greater opportunity to understand a subcontractor’s influence. The best way to achieve documentation of a subcontractor’s performance is to utilize an evaluation scorecard. The evaluation scorecard should address each attribute of
the subcontractor’s performance. This includes, but is not limited to: quality of work, teamwork, communication, submittal and change order practices, scheduling and safety.

An evaluation is most effective when “all people involved, sit down and review a project. [Project managers] should use actual forms in order to evaluate each subcontractor” (Interview Subject #3). The scorecards will provide evidence as to whether or not the subcontractor was a positive influence on the project or if his presence was detrimental to the schedule, job and surrounding craftsmen. This evaluation will assist when considering a subcontractor for future employment.

Another aspect of project review that should be conducted regularly is the procedure of safety walks. They should be performed by a member of the construction management team to ensure that subcontractors are following safety regulations and maintaining proper housekeeping on the jobsite. Executing this task will help to minimize safety hazards and improve conditions for the workforce.
Repeat Business

Management Practice #16: Explain potential of repeat work with subcontractors if expectations are met or exceeded.

Explaining the potential of repeat work is a practice identified by interview subjects. A majority of the interview subjects and survey participants believe this is an important managerial approach.

As with most businesses or companies, one of a subcontractor’s main objectives is to make money; however, a high profit for a company does not necessarily come as a result of a single project. Continued work with a construction manager or general contractor has the possibility to yield great deals of money for a subcontractor; therefore, it should be a main goal of each subcontractor to remain close with upper management so that repeat business has the opportunity to occur. If a subcontractor disappoints or simply does not get along with a project manager, he runs the chance of removing himself from that project manager’s bidder’s list. The bidder’s list is a series of subcontractors who are invited to bid on an activity. “It is so tough, especially today, to get on someone’s bidder’s list. So once [a subcontractor] gets there, he wants to stay there. Everyone has their own group of people that they trust. So getting [on the bidder’s list] and earning that trust is something that [a subcontractor] does not want to change” (Interview Subject #3). By having their name removed from a bidder’s list, they no longer possess the opportunity to make increased profit with repeat business.
Management Practice #17: Follow contract provisions accurately.

Following the contract accurately is a practice identified through a review of literature and supported by all interview subjects. Developing a strict, detailed contract was a practice originally listed on the survey; however, because this practice can have serious detrimental effects on a small subcontractor, it has been removed from the list of “best practices.”

Contract documents exist in order to explain what is expected to be completed and how the work should be performed. These contracts exist between many different parties. There are contracts between owners and engineers, owners and construction managers, as well as construction managers and subcontractors.

These contracts can be written with varying detail. Some documents provide generalizations for how projects ought to be completed, while other documents are very specific and explain each aspect of the project in detail. It is recommended by various field professionals to have stringent contract documents. “Strict contract documents spell things out. [Project managers] know what to expect from the subcontractor and what the client expects” (Interview Subject #3). When disagreements or problems occur on the job site, they can be easily resolved if the contract is written in great detail. The details of the contract allow each party to know who is responsible for each and every activity. While parties may not be pleased with the guidelines set forth in the contract, it is still the ruling document once it has been signed by both parties.

Not only are strict contract documents beneficial during the course of a project to resolve debates, but they also serve to assist in any legal argument. When issues are
brought to court following the completion of a project (i.e. liquidated damages) the judges and attorneys can easily resolve disputes if everything has been explained in the contract. If enough detail is provided in the contract, a reason to take legal action as the answer to the debate is clear to both sides may not exist.

When dealing with subcontractors, as a construction management firm, it is beneficial to make the contract as thorough as possible. Greater detail provides explanations on how to handle troubles encountered during the course of the project. The strict contract guidelines will provide insurance for each party involved in the project, as all responsibilities are clearly identified.
Planning / Scheduling

Management Practice #18: Require superintendent or foreman to fill out Daily Field Reports to assist in project review.

Management Practice #19: Include lead subcontractors in development of schedule.

A literature review identified the need for Daily Field Reports to be completed in order to assist in project review, planning, and scheduling. On the original survey, the practice of planning a schedule in further detail than a CPM schedule was included; however, because this practice may not be beneficial to every project, it has been removed from the list of “best practices.”

Every construction project requires planning and scheduling. In order to finish a project quickly and under budget, activities must be sequenced to flow smoothly and minimize wasted time. The most widely accepted form of scheduling is the Critical Path Method also known as CPM. CPM scheduling prioritizes tasks in the schedule that must be completed before another task can begin. The CPM schedule allows for a clear and concise schedule that all parties involved in the construction must follow.

If each subcontractor were to complete work according to the schedule, delays would not occur; however, that is rarely the case. “The best thing [a project manager] can do is use critical path method scheduling because it provides a critical path of activities through the project and it can change day to day” (Interview Subject #5). By allowing for continuous change to the schedule, CPM scheduling enables a project manager to handle unexpected problems or obstacles that could potentially cause a delay.

Reviewing the past week’s schedule for accuracy is a beneficial way of making the next week’s schedule more efficient and successful. Effective reviews can be
accomplished by requiring that “each foreman have daily sheets to monitor what is occurring every day; the weather, what trades are on site, and what work is being accomplished” (Interview Subject #3). During schedule review, these daily sheets will serve to explain why delays may have occurred and where potential problems can arise later in the project.

While “delays are inevitable on a project, where and when those delays will occur is nearly impossible to predict” (Interview Subject #2). It is the responsibility of the project manager to use all information available to overcome any and all obstacles. Continuously updating the schedule allows for individual delays to have a minimal impact on the overall schedule.

A beneficial approach to scheduling is to include lead subcontractors in the process. This allows for major parties to provide input and explain difficulties or offer solutions to certain tasks. The inclusion of these subcontractors in scheduling allows for the schedule to potentially improve.
**Bonus – Penalty Clauses**

From the literature review, a reward or bonus system was recommended; however, based upon low ratings from survey responses, it is not recommended that a bonus or penalty clause be used by management. Bonus and penalty clauses were the two lowest rated practices by survey participants. Survey participants did not feel that these practices were beneficial to subcontractor management. A bonus clause was the only practice identified during the survey to receive an average rating below 3.0, indicating that it is relatively unimportant according to the survey participants.

When working on construction projects, the anticipated schedule and profit are usually different than the actual schedule and profit. A project has the possibility of falling behind schedule and losing money, but it also has the opportunity of outperforming the predicted schedule and becoming more lucrative than expected. Bonus – penalty clauses are used for the purpose of penalizing or compensating subcontractor’s work on a project when the schedule alters. Neither a bonus nor penalty clause should be used independently of one another. If a construction manager chooses to utilize one, the other should also be included in the subcontractor’s contract.

**Bonus Clause**

The first option that can be implemented into a contract is a bonus clause. The bonus clause exists as an incentive for subcontractors to work to the best of their ability (Interview Subject #5).

Financial motivation is a powerful tool; however, it is often difficult to place a bonus clause into the contract. It is difficult for a construction manager or general
contractor to assess how much time and money was saved by the subcontractor for completing their activity early. Because a subcontractor finished their portion of the project early, it does not necessarily mean that the following activity or subcontractor could immediately commence. The problem with a delayed start may be due to the fact that the following subcontractor does not have the proper manpower, materials, or equipment on site to begin work prior to the date established in the contract documents.

**Penalty Clause**

A penalty clause punishes a party for breach of contract. One example of this is liquidated damages. “Liquidated damages are a penalty... It must be calculated based on certain expenditures” (Interview Subject #5). Liquidated damages are fees that the contractor and subcontractors are responsible to pay to the owner if the project is not finished by the scheduled completion date. Depending on the scope of the project, liquidated damages are written into the contract documents and can vary greatly in cost.

Since subcontractors can be responsible for a large portion of the work performed on a project, “liquidated damages are flowed down to the subcontractors” (Interview Subject #4) by construction managers and general contractors. The liquidated damages passed along to subcontractors address two major issues. The first is a financial insurance for the construction manager or general contractor. If a delay causing monetary penalties against management, subcontractors become responsible for payment.

The second major benefit of passing along liquidated damages is that it provides financial motivation to subcontractors. Contrary to a bonus clause, liquidated damages threaten the financial welfare of all parties involved. Depending on the magnitude of the
liquidated damages set by the owner in the contract documents, some penalties could significantly hurt a subcontractor’s finances and potentially ruin his company.

While liquidated damages are beneficial because they penalize the party responsible for the problems and delays, there is also a negative aspect involved. Since neither party, subcontractor or construction manager, wants to be held responsible for paying penalties and fees, legal action may come as a result of passing along liquidated damages. Subcontractors may fight monetary penalties in the court of law. While it is necessary to find a reasonable and legal solution to the problem, court fees and the amount of time invested in trial can be a serious financial burden for both parties involved.
Chapter 7: Conclusions

Construction requires that management utilize skills from varying subcontractors in an effort to complete a project on schedule and under budget. Unfortunately, problems have the potential to develop when managing outside companies. These problems can magnify as the number of trades increase. It is the responsibility of the construction manager or general contractor to resolve each problem so that the project does not suffer as a result. This study analyzed a number of interviews and survey responses, as well as literature review sources, to provide a list of “best practices” for subcontractor management in construction. The list of “best practices” for subcontractor management in construction can be used by construction managers to significantly reduce the negative effects stemming from problems related to subcontractor management.

This thesis provides several contributions to the process of subcontractor management. These contributions include a comprehensive list of practices to follow during subcontractor management, a ranking of these practices based upon their importance, and a description of each practice. Existing literature provides a majority of the practices that construction managers should utilize when working with subcontractors; however, they are not organized into a comprehensive list. The research for this thesis has gathered a wide range of practices from numerous sources and compiled them into one extensive list. Also, through interviews and surveys, professionals in the field of subcontractor management have identified and rated practices according to their importance. This rating has allowed for each practice to be ranked in comparison to other practices. This ranking helps to identify which practices are regarded
with greater importance. The final core contribution of this thesis is that each practice is explained in detail.

Although the list of Best Practice for Subcontractor Management has the potential to help project managers during the course of construction, there are still limitations. During the collection of research, only five individuals were interviewed and only ten individuals took the survey to rank these practices. This small number of participants may not represent the viewpoints of all construction managers. Responses may vary throughout different regions of the world and among varying disciplines in construction (i.e. residential or construction). Another limitation involving the interview subjects and survey participants relates to the amount of subcontractors each professional has worked with during the course of the career. The average number of subcontractors that the surveyed professionals have worked with during the course of their career is twelve, and the maximum number of subcontractors managed from any survey participant is forty-five. While these are impressive figures, there are many projects that utilize many more or many less subcontractors on a regular basis. The final limitation is that the list of “best practices” has not been validated quantitatively. Rather, they are strictly a result of a consensus among several practicing professionals. Until proven quantitatively or agreed upon by many more professionals, these practices can not be identified as solid truths necessary to improve upon subcontractor management in the construction industry.

Fortunately, the limitations reveal an opportunity for others to conduct future research on the topic of subcontractor management. This research can include the testing of these practices in case studies. By studying their effects on actual projects, quantitative evidence can be provided to identify whether or not these practices should be adopted by
all construction managers. Additional research could conduct more interviews and surveys among a larger population to attempt to prove the value of these practices. With the combination of this thesis and future research, these practices have the opportunity to greatly assist in the process of subcontractor management.


Interview Subject #1. Personal interview (recorded on audiotape). May 5, 2008.

Interview Subject #2. Personal interview (recorded on audiotape). May 6, 2008.

Interview Subject #3. Personal interview (recorded on audiotape). May 12, 2008.

Interview Subject #4. Personal interview (recorded on audiotape). May 2, 2008.

Interview Subject #5. Telephone interview (recorded on audiotape). April 15, 2008.

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Appendix A: Example of Content Analysis
Example of Content Analysis

Below is an excerpt from a literature review source, *Construction Safety Management* by Raymond Elliot Levitt and Nancy Morse Samelson (Levitt, 1993), used to identify problems, and practices that can improve subcontractor management.

“Meshing the many different subcontractors’ workers into the project organization for their, often short, periods on the project is a major challenge. Yet without their integration into the total job, they can become a danger to themselves and others. In addition to the important humanitarian consideration, subcontractor accidents can impact the whole project schedule and the injured employees of subcontractors may sue both the general contractor and the owner. The time and effort that job-site managers devote to making sure subcontractors do a sage and productive job during their time on site will pay off dramatically in safety, quality, and productivity both for the subcontractors and for the project as a whole. On all counts, effective subcontractors are a major ingredient in the success of a project.

Subcontractor selection is the first step in the process of being sure that subcontractors contribute to the safety performance of the project rather than sabotage it. Subcontractors who have proven records of safety on previous jobs will help the project get off to a good start. Details of how to undertake a selection process are given in Chapter 26, Selecting Safe Contractors and Subcontractors.” (Levitt 1993)

Through the use of a content analysis, several key components regarding subcontractor management have been identified from the previous passage. The first is that with regards to the project as a whole, subcontractors are very important. This idea is understood based upon the quotation, “on all counts, effective subcontractors are a major ingredient in the success of a project” (Levitt 1993).

The previous excerpt also identifies a problem that exists when managing subcontractors. This problem is that without proper jobsite unity, accidents can occur that have the potential to delay the schedule. This is identified in the first three sentences of the passage where the author discusses “meshing the many different subcontractors’ workers” and “subcontractor accidents can impact the whole project schedule” (Levitt 1993).
Finally, a beneficial practice is identified in this same excerpt. The author discusses the need to pre-qualify subcontractors based upon their previous safety performance. Also, explaining that this practice will help the project commence successfully. This practice is explained in the second paragraph of the excerpt when the author explains “subcontractors who have proven records of safety on previous jobs will help the project get off to a good start” (Levitt 1993).

Through a content analysis, an introduction, problems and solutions to subcontractor management are able to be identified. A content analysis was conducted on each source used in research for this thesis to identify key concepts. The concepts for each source were then grouped with similar ideas from other sources, providing an outline for the thesis.
Appendix B: Interview Questions
Interview Questions

Personal Information

- What company do you work for?
- How long have you been with said company?
- What type of work does your company perform?
- Have you worked for any other companies?
- If so, name and scope of work?
- To what extent are you involved in dealing with subcontractors?

Problems with Subcontractor Management

- What are some problems you have encountered when dealing with contract management?
- Have you been significantly delayed on projects due to subcontractors?
- Have you had to accelerate a project due to the negative affects of a single or multiple subcontractors?
- Have subcontractors on your projects been responsible for decreased profit?
- Have you witnessed, been involved, or heard of direct conflicts among varying subcontractor trades?
- Have you witnessed, been involved, or heard of direct conflicts between construction managers and subcontractors?

Solutions to Subcontractor Management

- Do you feel there is room for improvement in this field?
• Would Fundamental Principles of Subcontractor Management be beneficial to you as a project manager?

• Would Fundamental Principles of Subcontractor Management be beneficial to other professionals in the field of construction management?

• What do you feel are possible solutions to the problems encountered during contract management?

• Have you considered the idea of more stringent contract guidelines?

• Have you considered or do you practice profit sharing for subcontractors?

• Have you considered the idea of cash bonuses for finishing before schedule?

• Do you feel that organization and planning needs to increase?

• How important is effective communication?

• Would mandatory training be beneficial for subcontractors?

• How often do meetings occur between the subcontractor and project manager?

• How often do meetings occur among subcontractors?

• Do you feel there should be an increase, decrease or no change in the number of meetings that occur between project managers and subcontractors?

• Do you feel there should be an increase, decrease or no change in the number of meetings that occur among subcontractors?

• Would you consider benchmarking (showing work comparison to others on job) beneficial to improvement?

• Would openly showing the work schedule of subcontractors (behind or on schedule) improve or hurt performance in your opinion?
• Is there anyway to change the subcontractors view from caring only about his own company to caring more about the project?

• Are there any other recommendations you may have for improving relationships between subcontractors and project managers?

• Are there any other recommendations you may have for improving relationships among subcontractors?

• Do you have any other ideas you feel would serve as fundamental principles for subcontractor management?
Appendix C: Online Survey
Thank you for agreeing to take the time to assist me with the process of completing my thesis, your input is greatly appreciated.

Through various interviews, research, and this survey, I am looking to review and develop the most effective ways to manage subcontractors during the course of construction projects.

1. What is your name?

2. What company do you currently work for?

3. On average, how many subcontractors do you usually work with during the course of a project?

4. What is the maximum number of subcontractors you have worked with on a project?

5. Please rank the possible solutions based upon how important or unimportant you feel they are or could be when managing subcontractors.

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<tr>
<th>Neither</th>
<th>Not Important</th>
<th>Minimally agree</th>
<th>Important nor</th>
<th>Important</th>
<th>Very Important</th>
<th>Important</th>
<th>Disagree</th>
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<tbody>
<tr>
<td>Developing and maintaining trust and relationships with subcontractors.</td>
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<td>Providing subcontractors with training on how to manage paperwork on the job prior to construction.</td>
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<tr>
<td>Providing subcontractors with safety training prior to construction.</td>
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<td>Developing a strong line of communication.</td>
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<td>Implementing a Bonus clause (providing bonuses for work completed early by subcontractors).</td>
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</table>
Implementing a Penalty clause (implementing penalties or liquidated damages for work completed late due to subcontractors).
Developing more stringent contract documents.
Schedule and plan a project in further detail than a CPM Schedule.
Meet with subcontractors at a minimum of once every two weeks, more if necessary.
Pre-Qualify subcontractors based on their financial situation.
Pre-Qualify subcontractors based on their previous work.
Pre-Qualify subcontractors based on their safety record.
Establish a system for submittals and change orders to be followed by all subcontractors.
Explain expectations to subcontractors, prior to construction.
Explain potential of repeat work with subcontractors if expectations are met or exceeded.
Pay subcontractors on time.
Use a score card to rank subcontractor performance at the completion of a job.
Use a score card to rank subcontractor performance periodically throughout the job.

6. If you have any questions or additional comments please list below.