

# **Safety Management Practices in the Florida Construction Industry**

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This paper presents the findings of a pilot study conducted to investigate the current state of adoption and implementation of safety management practices in the Florida construction industry. The pilot study was undertaken via a questionnaire survey targeted to general and specialty contractors in Florida. Data was collected in eight key areas namely contractors' perception about safety, safety program documentation procedures used by them, safety policy and management support in their organizations, training and orientation in safety provided to their employees, safety administration and procedures in their organizations, safety work procedures addressed as part of their work rules, extent of involvement of Occupational Safety and Health Association (OSHA) in safety inspections in their organizations, and their safety performance history. Although the findings of the study are not conclusive in nature owing to the preliminary nature of the study, the results will aid in refining the structure, methodology and response rate of a detailed survey, which is expected to follow and the findings of which will be presented in a future research paper. Through this preliminary study, it was found that contractors in Florida, in general, are largely aware of the significance of safety toward providing better value to their projects and businesses. They have developed fairly mature safety programs, policies and procedures, with strong management commitment and support toward safety implementation. However, a number of areas have been identified for improvement. These include provision of improved management review processes, extended use of safety pre-qualification of subcontractors, use of project safety committees, regular and periodic updating of safe work procedures, increased OSHA involvement in contractor safety inspections, and development of a comprehensive safety performance measurement and improvement system (incorporating Experience Rating Modifier – ERM).

**Keywords:** Safety Management, ERM, OSHA, Construction Industry, Florida

## **Introduction**

Based on a previous research to study the overall risk management practices of Florida construction companies it was found that the majority of the companies (over 70%) depended on intuition /judgment /experience to manage risks in construction (Ahmed et al, 2002). Although a risk, such as that related to safety, may be unique and circumstances in which it happens may differ from one project to the other, root causes for the majority of the losses is associated with certain key management factors only, the identification and control of which require formal management systems.

Although dramatic improvements have taken place in recent decades, the safety record in the construction industry continues to be one of the poorest (Huang and Hinze, 2006). Research shows that the major causes of accidents are related to the unique nature of the industry, human behavior, difficult work site conditions, and poor safety management, which result in unsafe

work methods, equipment and procedures (Abdelhamid and Everett, 2000). In general, safety, by all means, should not be considered a luxury, and, when adopted as a value or need, should be an important function to be used against unnecessary loss of property, injury or death. Preventing occupational injuries and illness should be a primary focus of all employers. There should be an effort to raise the level of awareness between both employees and employers of the importance of health and safety at worksites. Emphasis in both developing and developed countries need be placed on training and the utilization of comprehensive safety programs (Koehn et al., 1995). All above research indicates the need of conducting assessment and improvement exercises for safety management implementation in the construction industry in general.

As regards the current state of adoption of safety as a culture in the construction industry, recent improvements in safety management have taken place as a combination of efforts of owners, contractors, subcontractors, and designers. The owner's involvement has shown to favorably influence project safety performance by setting safety objectives, selecting safe contractors, and participating in safety management during construction (Huang and Hinze, 2006). However, safety is implemented, in essence, by contractors on work sites who indeed need to adopt adequate safety related systems designed to respond to hazardous and potentially hazardous project conditions as well as designed to take the process to a safe state when predetermined conditions are violated. This is required for successful implementation of a safety management mechanism for the provision and control of work environment systems and human behavior, which together give relative freedom from those conditions and circumstances, which can cause personal injury, disease or death, or property damage (Samelson and Levitt, 1982). Hence presence of a safety culture in a contracting organization is immensely needed which should be concerned with the determinants of the ability to manage safety from top to bottom organizational attribute approach (Mohamed, 2003). This safety culture is largely dependent on a safety climate which is defined by the workers' perception to play a safety role in the workplace (Mohamed, 2003). Consequently, there is a research need to assess and improve the safety management practices of construction firms.

Moreover, from a financial standpoint, safety, and the effects of its absence – accidents – is a key cost driver for construction firms. Well run and profitable construction firms typically also support effective safety management programs, regardless of the direction of the insurance market (McDonald and Haymark, 2001). This is because a safe contractor, with a lower Experience Rating Modifier (ERM), can create a substantial competitive advantage through superior safe experience. Moreover, safe owners are reluctant to permit contractors to bid work without acceptable ERMs. Thus the most important step in controlling costs is to run safe construction projects, which require continuous and effective implementation of a well documented and periodically updated safety management program constituting safety policies, safety roles and responsibilities, safety training, orientation and implementation procedures as well as safety work rules.

Consequent to above, this research attempts to delve into the safety management practices of Florida contractors with the aim to assess the state of implementation of formal management systems for safety in the Florida construction industry, and to identify the areas of safety management implementation that require improvement. Because of the small size of the survey, this study is preliminary in its nature. However, the findings are expected to provide some

insight as well as improve the survey instruments and methods for a full-fledged survey of the Florida construction industry.

### **Objectives and Scope**

The objective of the research presented in this paper is to diagnose the safety practices associated with the construction industry of Florida and to diagnose the practices currently adopted by the contractors as measures of safe performance. It is expected that this study will provide some preliminary empirical data on the extent and type of safety dilemmas in the construction industry of Florida. The research reported in this paper is part of a larger scope research work currently in conductance by the authors to develop a *safety management model for the Florida Construction Industry*. The above-mentioned research work has three main objectives:

1. Investigation about the adoption and implementation of safety management in Florida construction industry.
2. Determination of the site and management factors (“what to measure”) that are most suitable and appropriate for measurement of safety performance during the construction project life-cycle.
3. Development of a model (“how to measure”) for the measurement and evaluation of the safety performance based on the critical factors identified in objective (2) as a tool for continuous safety improvement.

Since no accurate information regarding the extent of safety management usage in the Florida construction industry was available, as a first objective of this research work, the applicants (general and specialty contractors) were asked to investigate and document the adoption and implementation of safety management in their business. A questionnaire was developed to elicit information about safety management practices in their business, with the aid of guidelines provided by an Associated General Contractors (AGC) publication (Davis and Prichard, 2000). While this paper will focus on this objective only, the remaining research work will be reported in future papers.

It is expected that this study will be of a pioneering nature. For the local construction industry, this research has the potential of demonstrating tangible benefits of using safety management in their organizations. This will be done by showing that safety improvement efforts can be quantified, measured and analyzed - thereby enabling a construction company to continuously improve its working environment as well as meet and even exceed customer requirements.

### **Methodology**

To elicit information regarding the extent of safety management practices in the Florida construction industry, a questionnaire survey was conducted. Target population was general and specialty contractors registered in the state of Florida. A list of approximately 500 general and specialty contractors was prepared using the Associated General Contractors (AGC) Directory

(2002) and other local directories. From the 500 contractors, a sample of 100 contractors was randomly selected using 95% confidence level and 5% confidence interval. The questionnaire was sent to those 100 contractors and responses were collected over a period of three months. The questionnaire which comprised of 35 questions was divided into 8 parts as follows: contractors' perception about safety, safety program documentation procedures used by them, safety policy and management support in their organizations, training and orientation in safety provided to their employees, safety administration and procedures adopted and implemented in their organizations, safety work procedures addressed as part of their work rules, nature and extent of OSHA involvement in safety inspections in their organizations, and their safety performance history.

Of the 100 questionnaires sent, 20 valid responses were received; representing a total response rate of 20%. This response rate is typical of a construction industry questionnaire survey and can be used to draw preliminary conclusions (Akintoye and Macleod, 1997). Most firms which responded to the questionnaire were medium-to-large size general contractors (based on their annual turnover and number of employees). The questionnaires were completed by their top management who were involved in the safety management programs. Almost all of them (more than 90%) had over 10 years of construction experience. On the basis of their position, education, work experience and professional background, it can be inferred that the respondents had adequate knowledge of the quality management activities in their organizations.

To determine the areas of improvement, a careful assessment of the feedbacks from questionnaires was made and the major areas of safety non-performance were identified.

## **Analysis and Discussion**

The analysis and discussion about the questionnaire survey is organized in eight key areas as follows:

1. Contractors' perception about safety
2. Safety program documentation procedures
3. Safety policy and management support
4. Safety training and orientation
5. Safety administration and procedures
6. Safety work rules
7. OSHA inspections
8. Safety performance

In line with the format of the questionnaire, the results are reported in eight sections. The companies' responses are indicated as a percentage of total responses.

### ***Contractors' perception about safety***

In this section, 2 questions were asked to evaluate contractors' perception about safety. The results are as follows.

1. *Please rank in the order of importance (Cost, Time, Safety, Quality and Risk):*

According to the result, an interesting and favorable discovery was that safety was reported as the first priority of 45% respondents followed by cost and quality each with a 20% response rate and risk with a 15% response rate. Time is not the first priority for any of the respondents.

Safety and quality share the place for second priority favored by 35% respondents each. This is followed by time and risk each with a 15% response rate. Only 20% considered safety as their last priority, whereas, 40% considered cost and 30% considered risk as their last priority. The detailed results are illustrated in the table below in descending order of first priority.

| Option  | First Priority | Second Priority | Third Priority | Fourth Priority | Fifth Priority |
|---------|----------------|-----------------|----------------|-----------------|----------------|
| Safety  | 45%            | 35%             | 10%            | 5%              | 20%            |
| Cost    | 20%            | 35%             | 25%            | 10%             | 40%            |
| Quality | 20%            | 0%              | 25%            | 20%             | 0%             |
| Risk    | 15%            | 15%             | 15%            | 25%             | 10%            |
| Time    | 0%             | 15%             | 25%            | 40%             | 30%            |

Results indicate that contractors probably consider safety more important as compared to project quality, cost, risk and schedule.

2. *What is your perception about safety management in the US construction industry? (Value/ Need/ Compulsion/ Unsure)*

50% respondents considered safety as a need, while 45% respondents considered safety as a value. None of the respondents considered safety a compulsion. Only 1 respondent was unsure. These results indicate a positive trend toward the acceptance of safety by Florida contracting firms as a requirement for the industry. Results imply that contractors are largely aware of the significance of safety management in the US construction industry and do not consider it as an over-burden on them.

The analysis of this section indicates that majority of the contractors perceive safety as their top priority. They feel that safety management is very important for them in providing better value to their projects and businesses as well as fulfilling the need for successful project completion which will ultimately translate into higher profits for them.

### ***Safety program documentation procedures***

In this section, 3 questions were asked to find out how the contracting organizations document their safety program. Consistency checks were applied to the analysis of the responses for this section in order to discard any inconsistent responses.

3. *Do you have a written safety program manual? (Yes/No) Last revision date \_\_\_\_\_*

75% respondents said 'Yes', while the rest (25%) said 'No'. 25% respondents reported revision of their safety program manuals in 2006, while 20% indicated manual revisions in 2005. Only 1 respondent reported revision of its manual before 2006, while the rest (25%) did not mention the last revision date of their safety manuals. The results indicate presence of a written safety program manual with majority of the contractors surveyed, which is periodically under revision.

*4. Do you have a written safety field manual? (Yes/No)*

65% respondents have written safety field manuals, while the rest (35%) do not keep such a document. Consistent to the response to the previous question, these 65% respondents came from the group of 75% respondents who answered affirmatively to the previous question. The result shows the existence of written safety field manuals to a sufficiently prominent extent with the surveyed contracting organizations.

*5. Are all workers given a booklet that contains work rules, responsibilities, and other appropriate information? (Yes/No)*

The results showed that the 75% respondents who have written safety program manuals also provide their workers with booklets containing work rules, responsibilities and other appropriate safety information, whereas the rest 25% do not. This indicates that an effort is made by majority of the contracting firms, especially those who have adopted written safety program manuals, to ensure safe, efficient and responsible working environment on their projects by appropriately documenting and providing workers with information regarding work rules and their responsibilities.

The results of this section highlight that majority of the contracting firms document their safety program in terms of program manuals, field manuals as well as worker booklets. This in turn shows an existence of a fairly sufficient safety program documentation system with Florida contractors.

### ***Safety policy and management support***

In this section, respondents were asked 11 questions to explore facts about safety policy and management support in their organizations. With the results of the previous section in hand, consistency was maintained through appropriate checks.

*6. Do you have a safety policy statement for an officer of the company? (Yes/No)*

The response indicated that 80% organizations have a safety policy statement.

*7. Do you have a disciplinary process for enforcement of your safety program? (Yes/No)*

80% respondents, the same group which confirmed having a safety policy statement, indicated that they have a disciplinary process for enforcement of their safety program. It is important to note here that few companies (20%) claimed having a disciplinary process for enforcement of safety program although they do not have a written safety program manual. It may imply that these companies have some informal safety programs which are not appropriately documented but follow some kind of disciplinary enforcement. This aspect requires further research to reach a conclusion.

*8. Does management set corporate safety goals? (Yes/No)*

The results showed that 75% organizations have an active safety management support that sets goals as part of a corporate policy, while the rest do not have any such trend. This group of respondents came from the cluster of companies who responded affirmatively on having a safety policy statement as well as a disciplinary process of its enforcement.

9. *Does executive management review (a) accident reports? (b) safety statistics? (c) inspection reports?*

65% respondents reported that their executive management does review accident reports, 55% indicated a review of safety statistics, while 50% indicated review of inspection reports by their executive managements. The result shows quite an active involvement of executive management in enforcing safety management in the projects. It is interesting to note, however, that only 30% responding contracting firms have the most active executive management review support in that their managements review all three safety related statistics: accident reports, safety statistics and inspection reports.

10. *Do you safety pre-qualify subcontractors? (Yes/No)*

Only 45% respondents indicated that they safety pre-qualify subcontractors, whereas 55% of the respondents do not consider safety as an aspect for pre-qualification of subcontractors. This depicts a partially negative trend in that safety is not given due importance while selecting subcontractors.

11. *Do you have a written policy on accident reporting and investigation? (Yes/No)*

90% contracting organizations have written policies on accident reporting and investigation, showing their commitment to a strong accountability system.

12. *Do you have a light-duty, return-to-work policy? (Yes/No)*

80% respondents have a light duty, return-to-work policy, while 20% do not have such a policy.

13. *Is safety part of your supervisor's performance evaluation? (Yes/No)*

80% contracting organizations indicated that safety is an evaluation criterion of their supervisor's performance, 15% (3 contractors) reported otherwise while 1 contractor did not respond. The result supports the existence of a strong safety management enforcement system among the surveyed contractors.

14. *Do you have a personal protective equipment (PPE) policy? (Yes/No)*

85% contractors responded that they have personal protective equipment policy, indicating the management commitment to safety in their organizations. However, 15% (3 contractors) did not have such a policy.

15. *Do you have a written substance abuse program? (Yes/No) If yes, does it include the following:*

A total of 80% respondents indicated that they have a documented substance abuse program, while 20% respondents did not have any such program. The results are illustrated in the table below in descending order of response rate.

| Substance abuse program process | Response (%) | Substance abuse program process                 | Response (%) |
|---------------------------------|--------------|-------------------------------------------------|--------------|
| Pre-employment testing          | 75           | Return-to-duty testing                          | 45           |
| Post accident testing           | 55           | Disciplinary process                            | 35           |
| Random testing                  | 50           | National Institute on Drug Abuse 5 panel screen | 35           |
| Reasonable cost testing         | 50           | Alcohol testing                                 | 30           |

Results show that majority of respondents either focus on pre-process (pre-employment testing) or post-process (post-accident testing) response. It is interesting to note that approximately 40% surveyed contracting organizations include at least seven out of eight testing procedures in their written substance abuse programs.

*16. Does each level of management have assigned safety duties and responsibilities? (Yes/No)*

85% respondents responded affirmatively, while 15% (3 contractors) reported otherwise. This shows the existence of layers of management support in majority of surveyed contracting organizations for implementation of safety.

In summary, it is observed that there exists strong and evolved policy and management support for safety in majority of contracting firms. 80% contractors have a safety policy as well as a disciplinary process for enforcement of their safety programs. 75% organizations have an active safety management support that sets goals as part of their corporate policy. 85% organizations have PPE policy. 85% respondents have indicated that there exists in their firms a layered safety management structure with pre-assigned safety duties and responsibilities. All of the above show strong policy and management commitment toward safety. Management review process, however, is an area that needs improvement, particularly because only 30% contractors have appropriate management review process for all the various types of safety reviews required. Only 45% respondents indicated that they safety pre-qualify subcontractors, and this is perhaps the most important area that needs improvement. This is owing to the fact that majority of work is usually sub-contracted in the US construction industry and hence sub-contractor commitment to safety should be appropriately diagnosed and confirmed before award of work. 90% contracting organizations have written policies on accident reporting and investigation while 80% contracting organizations indicated that safety is an evaluation criterion of their supervisor's performance, both of which show strong management dedication toward accountability and performance appraisal in relation to safety. Although majority of respondents show inclination toward either a pre-process or a post-process mechanism of implementing a substance abuse program, almost 50% respondents focus on process-based mechanisms for implementing the substance abuse program.

### ***Safety training and orientation***

In this section, respondents were asked 5 questions to explore about safety related training and orientation programs designed for employees. Appropriate consistency checks were maintained.

*17. Do you conduct safety orientation training for each employee? (Yes/No)*

Results depict that 70% companies conduct safety orientation training for employees, while the rest do not.

*18. Do you conduct site safety orientation for every person new to the job site? (Yes/No)*

Results show that 70% respondents conduct site safety orientation for every new person to the job site, while the rest do not.

*19. Does your safety program require safety training meetings for each supervisor (foreman and above)? (Yes/No). If yes, how often?(Weekly/ Monthly/ Quarterly/ Annually)*

70% companies responded with 'Yes', while 30% responded with 'No'. Out of the 14 contractors (70%) who responded positively, 8 contractors specified a requirement of weekly training meetings, 2 contractors specified a requirement of monthly meetings, and 1 contractor specified a requirement of quarterly meetings, while another 2 contractors specified a requirement of annual meetings. It is important to note that 1 respondent did not mention the frequency of safety training meetings, which might infer irregular conductance of safety training meetings, most probably on as-needed basis. This may represent the company's commitment toward conducting safety training meetings but lack of commitment toward regular scheduled meetings.

*20. Do you hold tool box/ tailgate safety meetings focused on your specific work operations/exposures? (Yes/No) If yes, how often? (Daily/ Weekly)*

75% companies responded with 'Yes', while 25% responded with 'No'. Out of the 75% (15 contractors) who responded positively, 3 contractors indicated conductance of meetings on daily basis, 9 contractors indicated conductance of meetings on weekly basis, while 3 contractors did not mention the frequency of these meetings, which might indicate irregular conductance of tool box/ tailgate safety meetings, most probably on as-needed basis. This shows their commitment toward holding tool box/ tailgate meetings but lack of commitment toward regular scheduled meetings.

*21. Do you require equipment operation/certification training? (Yes/No)*

Majority of the respondents (80%) indicated that they do require equipment operation/ certification training, while the remaining 20% reported absence of such training in their organizations.

To summarize, in majority of the firms (70%), their employees are given safety orientation and site safety orientation training. An equal percentage (70%) of companies indicated that there is a requirement of safety training meetings for each supervisor, while majority of these companies (40%) indicated conductance of these meetings on weekly basis. 75% respondents reported that they hold tool box/ tailgate meetings focused on their specific work operations/ exposures, while majority of these companies (45%) indicated conductance of these meetings on weekly basis. Majority of the respondents (80%) indicated that they require equipment operation/ certification training. All of the above depict strong commitment of contracting firms toward conductance of safety related orientation and training.

### ***Safety administration and procedures***

In this section, respondents were asked 7 questions to explore facts about safety administration and procedures in their organizations.

*22. Does your written safety program address administrative procedures? (Yes/No)*

*If yes, check which apply.*

75% companies responded affirmatively, while the rest (25%) responded in negation. The results are illustrated in the table below in descending order of response rate. The results are self-explanatory.

| <b>Administrative Procedure</b> | <b>Response (%)</b> | <b>Administrative Procedure</b> | <b>Response (%)</b> |
|---------------------------------|---------------------|---------------------------------|---------------------|
| Emergency Procedures            | 75                  | Hazardous Work Permits          | 60                  |
| Accident                        | 70                  | Safety Committees               | 55                  |
| Investigations/Reporting        |                     |                                 |                     |
| Training Documentation          | 70                  | Substance Abuse Prevention      | 55                  |
| Audits/Inspections              | 70                  | Subcontractor                   | 55                  |
|                                 |                     | Prequalification                |                     |
| Record Keeping                  | 65                  | Preproject/Task Planning        | 55                  |
| HAZCOM                          | 65                  | Return-To-Work                  | 45                  |

23. *Do you have project safety committees? (Yes/No)*

Only 55% of the respondents confirmed that they do have a project safety committee.

24. *Do you conduct job site safety inspections? (Yes/No) If yes, how often? (Daily/ Weekly/ Monthly)*

90% companies responded affirmatively to this question. 15% (3 companies) confirmed that they conduct job site safety inspections on daily basis, 45% (9 companies) confirmed that they conduct these inspections on weekly basis, while another 15% (3 companies) confirmed that they conduct these inspections on monthly basis. 15% (3 companies) did not specify how often they conduct these inspections, which shows their commitment toward job site safety inspection but lack of commitment toward regular scheduled inspections.

25. *Do these inspections include a routine safety inspection of equipment (e.g., scaffold, ladders, fire extinguishers, etc.)? (Yes/No)*

The 90% responding organizations which answered affirmatively to the previous question answered this question. Out of these, only 1 respondent reported that their job site safety inspections do not include a routine safety inspection of equipment. This response, together with the response to the previous question, shows that safety inspections are considered extremely important and are conducted frequently by majority of contracting firms. Moreover, special emphasis is given on equipment safety.

26. *Do you investigate accidents? (Yes/No) If yes, how are they reported? (Total company/ By project/ By project manager/ By superintendent/ By foreman/ In accordance with OSHA)*

95% companies reported that they do investigate accidents, while only 1 company reported otherwise. In response to the mechanism of reporting of these accidents, 25% (5 companies) indicated accident reporting in accordance with OSHA requirements, 15% (3 companies) indicated accident reporting by superintendent, 15% (3 companies) indicated accident reporting at the level of total company, 20% (4 companies) indicated accident reporting by project, 15% (3 companies) indicated accident reporting by project manager, while only 5% (1 company) indicated accident reporting by foremen. This clearly depicts that a strong culture for investigation and reporting of accidents exists among majority of contractors; although a smaller percentage (15% of sample) still practice accident reporting at macro (company) level.

27. *Do you discuss safety at all preconstruction and progress meetings? (Yes/No)*

75% companies responded affirmatively, while 20% responded in negation. 1 respondent did not answer this question, which may indicate inclusion of safety as part of agenda in preconstruction and progress meetings but only when required, such as in case of a preconstruction meeting for

project that is likely to generate a highly unsafe work environment or in case of progress meeting after an accident. The results show that safety is an important part of the agenda of all project meetings prior and during construction for majority of contracting firms.

*28. Do you perform rigging and lifting checks prior to lifting? (Yes/ No/NA) If yes, for whom? (For personnel/ For equipment/ For heavy lifts more than 10000 lbs.)*

60% companies reported that they do perform rigging and lifting checks prior to lifting, 20% companies reported otherwise, while this question was not applicable to the rest of the 20% companies. Out of the 60% respondents who do perform rigging and lifting checks, 55% perform these checks for personnel, 50% for equipment, and another 55% for heavy lifts. It is interesting to note that 45% companies perform rigging and lifting checks for all: personnel, equipment as well as heavy lifts.

In summary, it is observed that there exist strong safety administration and elaborate safety procedures for majority of contracting firms. 75% respondents have administrative procedures incorporated in their safety programs, with a majority (more than 70%) having emergency procedures, audits/ inspections procedures, accidents investigation reporting and training documentation procedures incorporated. Of the 90% companies which responded affirmatively to the question as to whether they conduct job site safety inspections, 85% companies reported that their job site safety inspections do include routine safety inspections of equipment, while almost half of the respondents (45%) confirmed that they conduct these job site safety inspections on weekly basis. 95% companies reported that they do investigate and report accidents, out of which 25% indicated accident reporting in accordance with OSHA requirements. 75% respondents specified that they do discuss safety at all pre-construction and progress meetings. 60% companies (out of a total of 80% companies to whom this question was applicable) reported that they do perform rigging and lifting checks prior to lifting, out of which 45% companies reported that they perform rigging and lifting checks for personnel, equipment as well as heavy lifts. One area that requires improvement is the extent of existence of project safety committees, since only 55% of the responding contractors confirmed that they do have a project safety committee.

### ***Safety work rules***

In this section, respondents were asked 2 questions to explore facts about safety work rules in their organizations. The type of the organization (general contractor versus specialty contractor) and the nature of work usually undertaken by the company were taken into consideration while evaluating the responses.

*29. Do you periodically update work rules? (Yes/No) When was the last update? \_\_\_\_\_*

Results showed that 65% respondents periodically update their work rules, whereas 35% respondents do not. In relation to the response on the time for last update, 30% (6 companies) reported 2006 as the last update year, while 10% (2 companies) reported 2002 and earlier. It is interesting to note that 1 respondent reported that it updates its work rules on daily basis while another one reported that updating of work rules is a continuous process in its organization. The remaining 15% (3 companies) did not mention the time for last update of their work rules which may either imply continuous updating or updating on as-needed basis.

### 30. What work practices are addressed by your work rules?

Survey results show that 80% respondents address work practices in their work rules, while 20% do not. The response results for the extent of each type of work practice addressed is illustrated in the table below in descending order of response rate. The results are self-explanatory.

| <b>Work Practice</b>           | <b>Response (%)</b> | <b>Work Practice</b>            | <b>Response (%)</b> |
|--------------------------------|---------------------|---------------------------------|---------------------|
| CPR/First Aid                  | 65                  | Respiratory Protection          | 40                  |
| Barricades, Signs and Signals  | 60                  | Material Handling/Storage       | 40                  |
| Fire Protection and Prevention | 60                  | Equipment Guards and Grounding  | 40                  |
| Fall Protection                | 60                  | Flammable Material              | 40                  |
| Housekeeping                   | 60                  | Handling/Storage                | 40                  |
| Electrical Grounding           | 55                  | Trenching and Excavation        | 40                  |
| Emergency Procedures           | 55                  | Vehicle Safety                  | 35                  |
| Tools, Power and Hand          | 55                  | Public Protection               | 35                  |
| Communications                 | 50                  | Lockout/Tagout                  | 35                  |
| Cranes/Rigging and Hoisting    | 50                  | Confined-Space Entry            | 35                  |
| Floor and Wall Openings        | 50                  | Site Visitor Escorting          | 30                  |
| Ladders and Scaffolds          | 50                  | Monitoring Equipment            | 30                  |
|                                |                     | Energized/Pressurized Equipment | 30                  |
|                                |                     | Mechanical                      |                     |
| Traffic Control                | 50                  | Equipment/Maintenance/Pre-Op    |                     |
| Personal Protective            |                     | Checks/Operation                | 30                  |
| Equipment                      | 50                  |                                 |                     |
| Concrete Work                  | 45                  | Welding and Cutting (Hot Work)  | 30                  |
| Environmental Controls and     |                     | Blasting                        | 20                  |
| Occupational Health            | 45                  |                                 |                     |
| Access-Entrances/Stairs        | 45                  | Compressed Air and Gases        | 20                  |
| Site Sanitation                | 45                  | Temporary Heat                  | 20                  |
|                                |                     | Electrical Power Lines          | 20                  |

In summary, it is observed that majority (65%) of the contracting firms periodically update their work rules, out of which 30% have updated these rules only recently in 2006. This shows an acceptable trend. Addressing of the most important work procedures including first aid, fire protection and prevention, fall protection, housekeeping, emergency procedures, ladders and scaffolds work procedures is adopted by more than 50% contracting firms, which is again within acceptable range. However, certain areas like trenching and excavation, welding and cutting need further improvement with respect to addressing of work practices. Nevertheless, in the overall sense as well as keeping in view the significance of up-to-date safe work procedures, this area needs further improvement.

### **OSHA inspections**

In this section, respondents were asked 3 questions to investigate the nature and extent of involvement of OSHA in the safety inspections for various contracting firms.

#### 31. Have you been inspected by OSHA in the last three years? (Yes/No)

65% respondents reported that have been inspected by OSHA in the last three years whereas 35% indicated that they were not inspected by OSHA in the last three years.

32. *Were these inspections in response to complaints? (Yes/No)*

Out of the 65% respondents (13 companies) who confirmed that they have been inspected by OSHA in the last three years, 55% (11 companies) reported that the inspections were not in response to the complaints, while the remaining 10% (2 companies) reported that they were. This response, in combination with the response of the previous question, indicates that OSHA inspections in the last three years for the major contracting firms in Florida have been conducted as part of regular routine inspections rather than in response to complaints.

33. *Have you been cited as a result of these inspections? (Yes/No) If yes, describe the citations.*

Out of the 65% respondents who confirmed that they have been inspected by OSHA in the last three years, 35% respondents admitted that they have been cited as a result of these inspections, which represents more than 50% of those inspected.

To summarize the findings for this section, it can be stated that OSHA involvement in safety inspections of Florida contractors needs to be improved, since 35% of the respondents indicated that they were not inspected by OSHA in the last three years. Moreover, out of the 65% respondents who confirmed that they have been inspected by OSHA in the last three years, 35% respondents admitted that they have been cited as a result of these inspections (which is more than half of 65%). This is an alarming trend and should be controlled.

### ***Safety performance***

In this section, respondents were asked 2 questions to investigate their past safety performance.

34. *List your company's Interstate Experience Rating Modifier (ERM) for the three most recent years.*

Only 15% respondents (3 companies) listed their company's interstate ERM for the three most recent years, 5% (1 company) stated it as confidential, 10% (2 companies) responded to it as not applicable, whereas, 70% did not respond. This is an alarming statistics since ERM, derived from a company's recordable incident rate, in itself is essentially an incentive for firms to struggle for good safety records, as firms with poor safety records will pay higher premiums. A no-response rate of 70% as well as a not applicable response of 10% implies that majority of the contractors surveyed were neither using ERM as a means of measurement of their safety performance nor as an incentive for improvement of their safety performance. Based on only the 15% response of the companies who listed their interstate ERM for the last three years, the average ERM value for the Florida contracting firms comes out to be 0.90 (a 10% credit). However, this value is not meaningful until further investigated.

35. *List your company's number of injuries /illnesses from your OSHA 200 logs for the three most recent years for (a) Fatalities, (b) OSHA recordable incidents, (c) Lost work day incidents, (d) Total lost work days, (e) Total hours worked.*

Only 15% respondents (3 companies) listed their number of injuries/ illnesses, 1 company claimed it as confidential, 1 company reported it as not applicable, while the remaining 75% did not respond to this question. This again is an alarming statistics since response of majority of contracting firms (70% who did not respond and 1 company who considered it not applicable) identifies either the absence of a measurement and record-keeping system for maintaining and

trend-lining safety performance record for past years, or deliberate retention of performance related information which can only be, again, when their safety performance is inadequate. Since the response rate is too low, the results generated for the industry average fatalities per year, average OSHA recordable incidents per year, average lost work day incidents per year, average lost work days per year and total hours worked per year become meaningless and hence are not mentioned here.

Summarizing the findings for this section, it can be stated that the response rate for investigating the safety performance of contracting firms is fairly low (less than 20% - only 4 firms), which shows a negative trend as to the measurement, evaluation and improvement of safety performance of Florida contractors in general. One major reason for this may be attributed to the confidentiality of information, although a confidentiality statement was provided. Another reason for this lack of safety performance measurement and improvement system can be attributed to the finding of the previous section, which identified need for improved OSHA involvement in safety inspections. Further insight through research is needed in this aspect.

### **Conclusions**

The survey results indicated that the contractors in the state of Florida are generally aware of the importance of safety, as well as its significance in providing better value to their projects and businesses.

The majority of the contracting firms surveyed have a strong mechanism for documenting their safety program in terms of program manuals, field manuals as well as worker booklets.

Strong policy, management commitment, organizational structure and layered organizational support for safety implementation exist in majority of responding contracting firms. Moreover, well-documented policies on accident reporting and investigation, safety performance evaluation mechanisms and an established disciplinary process for enforcement of safety programs exist with majority of contractors, which show strong management dedication toward reporting, accountability and performance appraisal in relation to safety. Management review process, however, needs significant improvement and all safety related reviews need to be incorporated in order to achieve improved safety performance. Perhaps, one of the more important aspects that require improvement is the promotion of safety pre-qualification of subcontractors. Another aspect is that more process-based focus needs to be emphasized for implementation of substance abuse program in the industry.

In relation to safety orientation and training, majority of the targeted contracting firms disburse such orientations and trainings to their employees on regular basis. Regular safety training meetings and tool box/ tailgate meetings are also conducted, as well as safety is considered an important agenda in all pre-construction and progress meetings.

As regards safety administration and procedures, it is observed that majority of the contracting firms surveyed have various types of administrative procedures incorporated in their safety programs, including emergency procedures, audits/ inspections procedures, accidents

investigation and reporting procedures, and training documentation procedures. A majority of contracting firms conduct regular job site safety inspections, including routine equipment safety inspections. A vast majority of surveyed firms have established mechanisms for investigating and reporting accidents, almost half of which follow OSHA requirements in this respect. Another area that requires improvement is the lack of existence of project safety committees.

The preliminary investigation shows that more than half of the contracting firms periodically update their work rules, as well as address highly important work procedures such as first aid, fire protection, fall protection, housekeeping, emergency procedures, ladders and scaffolds work procedures, etc.; however, in the overall sense, as well as keeping in view the significance of up-to-date safe work procedures in all respects, this area requires further improvement.

Most importantly perhaps, OSHA involvement in safety inspections needs sufficient improvement. This is because the survey has shown that more than 50% of the respondents who confirmed that they have been inspected by OSHA in the last three years admitted that they have been cited as a result of these inspections. This clearly indicates their lack of commitment toward safety which can be improved by increased OSHA involvement.

One of the major bottlenecks identified through this research is the possible absence of a mature safety performance evaluation and improvement system (incorporating ERM) for Florida contractors. This is evident in the contractors not revealing their ERM data as well number of injuries record. This is surprising as well as intriguing because in series of surveys over several years, contractors generally do report the data.

The preliminary conclusions derived from the study need further data and stratification through full-fledged structured surveys. However, this pilot study does provide insight on the key focus areas that require further research and possibly should be prioritized for consideration of improvement.

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