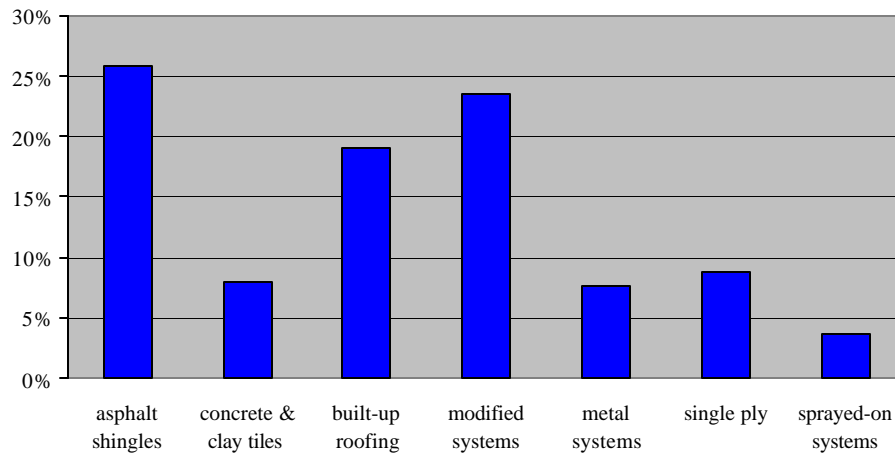


# A SAFETY SURVEY OF CONSTRUCTION FIRMS FRSA MEMBERS

By Jimmie Hinze, University of Florida

## INTRODUCTION

A safety survey was conducted with roofing construction firms in Florida, namely members of the Florida Roofing, Sheet Metal and Air Conditioning Contractors Association (FRSA). This survey addressed important safety issues that identified current trends in the safety practices of Florida roofing contractors. The survey included questions related to: safety program elements, safety personnel, employee safety training, drug testing, and general organization information. There were a total of **65** respondents, with each providing at least some of the information requested. The average (defined herein as the mean value for the sample) responding construction firm had total revenues of **\$6.1** million per year, **162** projects undertaken each year and **6** projects in progress at one time. The average firm was also found to employ **37** workers at one time, with **44** workers hired in the past year (w-4 filled out), and with **64.6%** of its current workers having been with the firm for over 1 year. The average firm also had **92.2%** of its revenues directly related to roofing work. Figure 1 reflects the break down of the type of roofing work performed by the average firm.



**Figure 1: Breakdown of Roofing Work Done by the Average Firm**

Further, the survey asked the roofing firms to identify their primary construction activities by SIC. The majority, (56 out of 65) firms confirmed SIC 176 (Roofing, siding and sheet metal work) as their primary construction activity (see Table 1).

TABLE 1: Distribution of Primary Construction Activity by SIC Code

<b>Standard Industrial Classification</b>	<b>No. of Respondents</b>
SIC 152 - General Building Contracting - Residential	3
SIC 154 - General Building Contracting - Commercial	3
SIC 171 – HVAC	3
SIC 176 – ROOFING	56
OTHER	1

The average firm was also found to have an estimated **77%** of its revenue from the private sector, with **22%** from the public sector.

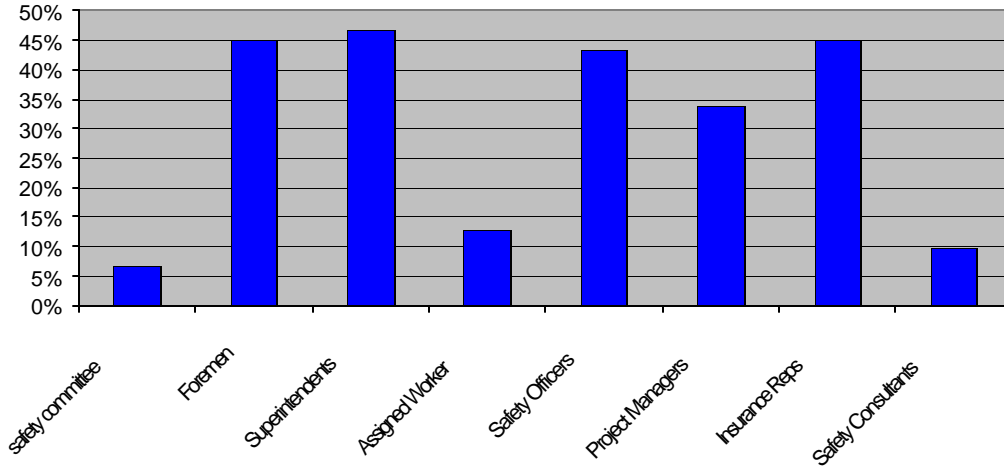
### **SAFETY PROGRAM ELEMENTS**

It was found that the majority of firms (**73.4%**) had a substance abuse testing program. Out of the firms that did have such a program, **83.3%** conducted pre-employment screening, **47.9%** conducted random testing, **77.1%** conducted reasonable cause testing, **83.3%** conducted post accident testing, **33.3%** conducted follow-up testing and **2.1%** conducted blanket testing. Previous research findings have indicated that safety incentives may lead to an improvement in safety performance. On the other hand, many effective safety programs do not include safety incentives or awards. Thus, safety incentives are not an essential ingredient of some successful safety programs. The majority (**53.8%**) of the respondents stated that they do not award incentives or rewards for safe practices. Out of the **46.2%** of respondents who did award safety incentives, **90.9%** awarded them to workers, **64.5%** awarded them to foremen, **29%** awarded them to safety officers, **38.7%** awarded them to superintendents and **22.6%** awarded them to project managers.

It is common for firms to have a statement of policy or a mission statement, which acts as the driving force behind its actions. Of the respondents, **16.1%** of the construction firms did not have safety reflected in their general policy or mission statement. The average firm was found to have an average of **4.3** workers injuries (requiring treatment by a medical doctor), and an average of **7** worker injuries (involving lost work days). Further, the average firm was found to have a median of **38,585.3** worker hours worked in the last year.

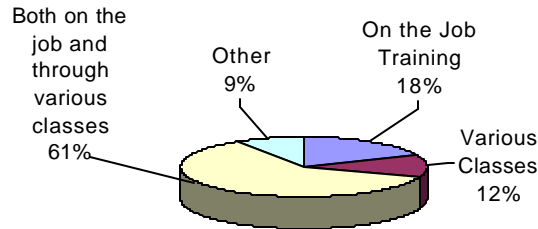
## SAFETY PERSONNEL

It is common (**96.9%** of the respondents) to conduct regular job-site safety inspections. It was found that the **96.9%** of firms that did conduct these safety inspections had a combination of several persons conduct them (see Figure 2).



**Figure 2: The Breakdown of Persons Respondents Used for Conducting Inspections**

Almost two thirds of the respondents (**64.1%**) were found to have field safety officers. However, only **3%** hired them in full-time positions. As for the level of training of these safety officers, it is reflected in Figure 3.

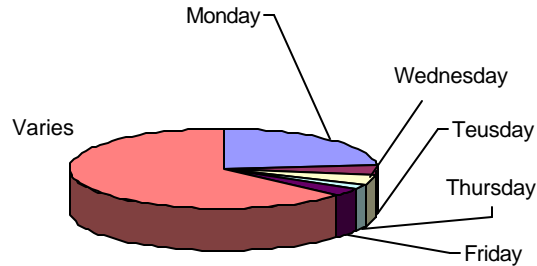


**FIGURE 3: The Level of Training for the Safety Officers**

The majority of respondents (**50.8%**) evaluated their field supervisors on safety performance, and almost half (**44.3%**) had their field personnel trained in first aid.

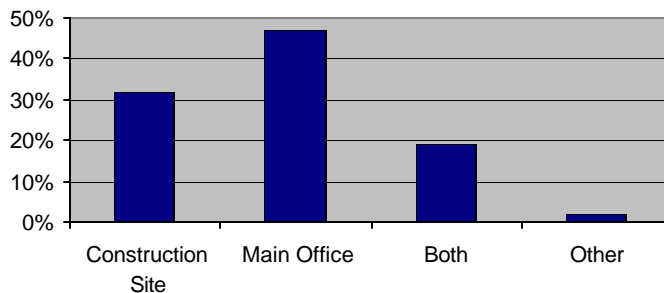
## EMPLOYEE SAFETY TRAINING

The majority (**81.3%**) of all respondents conducted their toolbox (safety) meetings on their job-sites. Of these, **36.2%** conducted them weekly, **14.9%** conducted them bi-weekly and **48.9%** conducted them more frequently than weekly. Furthermore, when asked which day of the week such meetings are held, the results were diverse (see Figure 4).



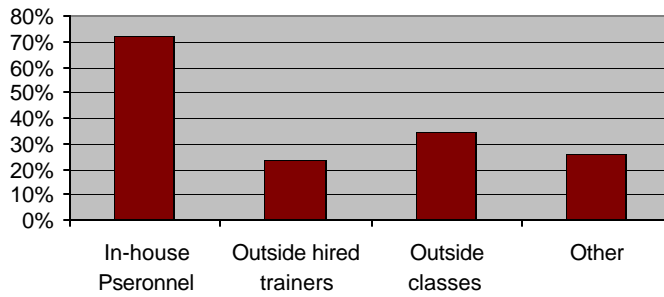
**Figure 4: Breakdown of Response to When Toolbox Meetings are Held**

A third of the respondents (**30.4%**) had their foremen preside at toolbox meetings, **16.1%** had their safety person preside, **21.4%** had their job-supervisors preside and **21.4%** had other people preside at toolbox meetings (such as owners' representatives). As for the place where toolbox meetings are held, almost half of the firms held them at the main office (see Figure 5).



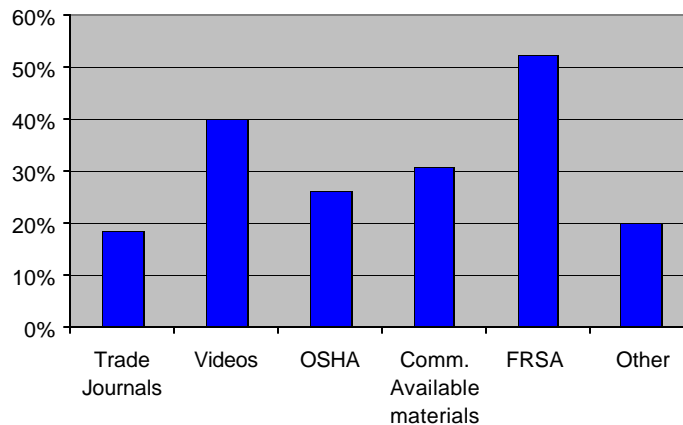
**FIGURE 5: Where Toolbox Meetings are Held**

Furthermore, **23.5%** of the respondents had their employees attend toolbox meetings that were held by other firms. On the other hand, more than two thirds of the firms (**68.3%**) had safety training for their employees (that was other than toolbox meetings). It was found that the majority of the firms (**72.1%**) chose in-house personnel to conduct such training (see Figure 6).



**Figure 6: Who Conducts Safety Training for the Firms**

Regarding safety training, the majority of the firms (**51.9%**) were found to have an estimated 1 to 2 hours of safety training per month for by their employees. Another **34.6%** of the respondents provided their employees with 1 to 2 hours of safety training per quarter and **5.8%** provided 1 to 2 hours of such training per year. As for the primary sources of safety information used by these roofing contractors, the FRSA Self-Insurance Fund proved to be the most popular choice (**52%** of respondents – see Figure 7).



**Figure 7: The Primary Source of Safety Information Used By the Firms**

The firms were asked if they held safety meetings or training sessions for their supervisors, and the majority (**52.3%**) did not. Those firms that held such meetings for their supervisors, held them either weekly (**12.9%**), monthly (**38.7%**), quarterly (**22.6%**), annually (**6.5%**) or on another time intervals (**19.4%**). Figure 8 summarizes the breakdown of the firms' responses to their top training needs.

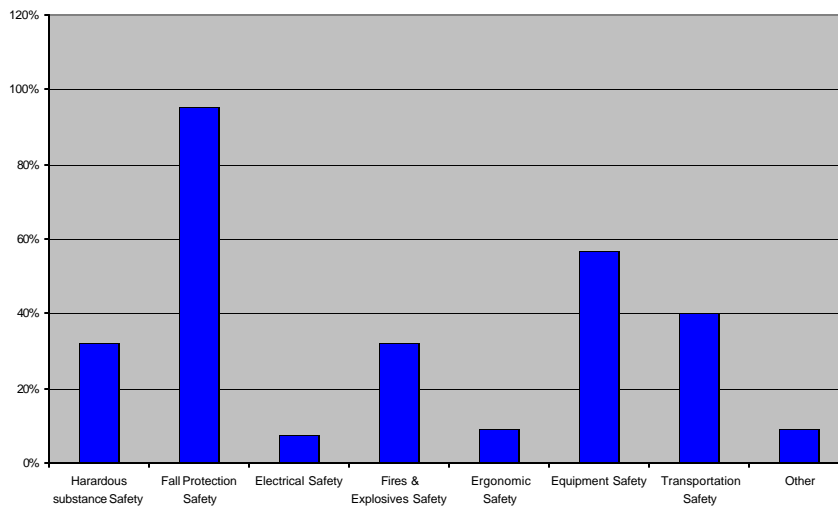


Figure 8: Top Training Needs Identified by the Firms

## SIGNIFICANT FINDINGS

Several variables were found to be significantly correlated with the injury-rate (I.R.), the frequency of injuries per 200,000 hours of worker exposure. A correlation was considered to be statistically significant if the level of significance was below 0.05. Trends were also noted when the level of significance was between 0.05 and 0.10. The responding firms had an average or mean injury rate of **11.83** injuries per 200,000 hours of worker exposure (ranging from 0 to 66.67) and a median (half are greater and half are less) injury rate of **5.0**.

**Company Size** - Results show that the smaller firms generally have better safety records. Size is defined in terms of annual revenues, number of projects undertaken, the number of workers, and the number of new hires (W-4's completed) in the past year (see Tables 2, 3, 4 & 5).

Table 2: Injury-Rate Correlated with the Firm's Revenues

Annual Revenues of the Firm	N	I.R. (mean)	I.R. (median)
< = \$1.5 million	28	7.33	0
> \$1.5 million	17	19.24	13.33
Corr. Coeff. = 0.35      N = 45      Significance = 0.001			

Table 3: Injury-Rate Correlated with the Average Number of Projects in progress at One Time

Number of Projects at one Time	N	I.R. (mean)	I.R. (median)
< = 3	27	9.91	0
> 3	16	15.35	11.05
Corr. Coeff. = 0.234      N = 43      Significance = 0.047			

Table 4: Injury-Rate Correlated with the Number of Workers

Number of Workers at one time	N	I.R. (mean)	I.R. (median)
< = 20	28	7.67	0
> 20	17	18.67	13.33
Corr. Coeff. = 0.345		N = 45	Significance = 0.002

Table 5: Injury-Rate Correlated with the Number of New Hires (W-4 Completed)

Number of W-4s Completed	N	I.R. (mean)	I.R. (median)
< = 15	27	5.99	0
> 15	15	22.29	13.33
Corr. Coeff. = 0.445		N = 42	Significance < 0.0001

**Type of Work** – Safer firms were noted when less “flat-roof” works were performed (see Tables 6 & 7). Flat roofing systems are represented through built-up and modified roofing systems.

Table 6: Injury-Rate Correlated with the Percentage of Built-up and Modified Roofs

Amount of “Flat Roof” Work	N	I.R. (mean)	I.R. (median)
% of work “Flat roofs” < 10%	8	5.55	1.43
% of work “Flat roofs” >= 10%	36	13.55	8.47
Corr. Coeff. = 0.216		N = 44	Significance = 0.055

Table 7: Injury-Rate Correlated with the Percentage of Built-up Roofing

Amount of Built-up Work	N	I.R. (mean)	I.R. (median)
% of work 'Built-up' < 10%	23	9.68	2.86
% of work 'Built-up' >= 10%	21	14.74	9.52
Corr. Coeff. = 0.196		N = 44	Significance = 0.092

**Private and Public Works** – Safer firms were those who had more of their revenues from private works and less of their revenues from public works (see Tables 8 & 9).

Table 8: Injury-Rate Correlated with the Percentage of Revenues from Private Sector

Percentage of Work that is Private	N	I.R. (mean)	I.R. (median)
< = 85%	18	16.20	11.25
> 85%	27	8.91	0
Corr. Coeff. = -0.204		N = 45	Significance = 0.001

Table 9: Injury-Rate Correlated with the Percentage of Revenues from the Public Sector

Percentage of Work that is Public	N	I.R. (mean)	I.R. (median)
< = 10%	26	9.25	1.43
> 10%	18	16.2	11.25
Corr. Coeff. = 0.201		N = 44	Significance = 0.083

**Safety Personnel** – Safer firms were those who had their safety personnel trained in first aid (see Table 10).

Table 10: Injury-Rate Correlated with the having Safety Personnel Trained in First Aid

Safety Personnel Trained in First Aid	N	I.R. (mean)	I.R. (median)
YES	18	9.49	0
NO	21	11.29	11.92
Corr. Coeff. = 0.251                      N = 43      Significance = 0.054			

**Toolbox Meetings** - Results show that the safer firms were those that did not have a set day on which toolbox meetings were held. While it is common to designate Monday as the day on which to hold toolbox meetings, the safer firms did not have such a fixed day for conducting these meetings (see Table 11). A possible explanation of this finding is that firms are safer if they conduct toolbox meetings when they are warranted rather than rigidly conducting them every Monday. It was noted by some respondents that they conducted safety meetings when new work tasks were undertaken, possibly resulting in two or more toolbox meetings being conducted in some weeks.

Table 11: Injury-Rate Correlated with the When Toolbox Meetings are Held

When Toolbox Meetings are Held	N	I.R. (mean)	I.R. (median)
Monday	8	26.93	18.07
Varies	27	8.89	0
Corr. Coeff. = -0.443                      N = 35      Significance = 0.003			

**Safety Inspections** – Safer firms were found to be those firms who had their project managers conduct regular job-site safety inspections (see Table 12).

Table 12: Injury-Rate Correlated with having Project Managers Conduct Safety Inspections

Project Manager Conducts Safety Inspections	N	I.R. (mean)	I.R. (median)
Yes	13	2.05	16
No	30	7.74	1.43
Corr. Coeff. = -0.305                      N = 43      Significance = 0.023			

**Source Documents for Training** - Training may be based on specifically prepared literature or other materials. One finding of interest was that companies that did not rely on trade journals for their training materials had better safety records (see Table 13). Seeking out more relevant safety information from a variety of sources appears to pay dividends in terms of safety.

Table 13: Injury-Rate Correlated with having Trade Journals a Primary Source of Safety Information

Trade journals are primary source of training materials	N	I.R. (mean)	I.R. (median)
YES	8	20.14	15.46
NO	37	10.03	2.86
Corr. Coeff. = -0.240                      N = 45      Significance = 0.069			



**Training Variables Incorporated into One Variable** – Another variable was created that consisted of three different training variables. The new variable, called “Cumulative training”, was the sum of “trade journals”, “level of training” and “when toolbox meetings are held”. This new variable was significantly correlated with the Injury-Rate, implying that better safety performance resulted when firms practiced all three training procedures, namely not relying solely on trade journals for training materials, providing workers with more formalized training and not setting a rigid day of the week for conducting toolbox meetings (see Table 14).

Table 14: Injury-Rate Correlated with “Cumulative Training Variable”

Training Emphasis	N	I.R. (mean)	I.R. (median)
High	11	6.57	0
Low	11	20.71	13.33
Corr. Coeff. = -0.360                      N = 22      Significance = 0.043			

Note: low level emphasis values imply that trade journals are generally the sole training materials, training is not formalized, and Mondays are consistently used as the day on which toolbox meetings are held.

**Acknowledgement**

The data for this research were collected and provided to the University of Florida by the Florida Roofing, Sheet Metal and Air Conditioning Contractors Association (FRSA). Gratitude is expressed to the FRSA’s willingness to share this information.