



Providing Vision and
Leadership for the Future
of the HVAC and
Sheet Metal Industry

A COMPARISON OF OPERATION COST FACTORS

UNION VERSUS NONUNION HVAC AND SHEET METAL CONTRACTORS

vision

A COMPARISON OF *future* **OPERATION COST FACTORS:**

UNION VERSUS NONUNION HVAC AND SHEET METAL CONTRACTORS

2007 Prepared By:
FMI
Raleigh, North Carolina

NEW HORIZON FOUNDATION SUPPORTERS

Charter Guarantor - \$250,000

Karl Rajotte

Estimation, Inc.
809 F Barkwood Court
Linthicum Heights, MD 21090-1475
Tel: (800) 275-6475
Fax: (410) 636-6021
E-Mail: info@estimation.com
Web Site: www.estimation.com

Foundation Champion - \$200,000

Bay Area SMACNA Chapter

Joseph Parisi, Chapter Representative
Gary L. Schwenk, Executive Vice President

SMACNA - Los Angeles Chapter

Richard Rivera, Chapter Representative
Kevin O'Dorisio, Executive Director

SMACNA - St. Louis Chapter

Howard Stine, Chapter Representative
John Lueken, Executive Director

Summit Challenge Council - \$100,000

George L. "Butch" Welsch, Chairman

Welsch Heating & Cooling Company, Missouri

Ron and Cindy Rodgers, Chairman Emeritus, Arizona

Ronald J. Palmerick

AABCO Sheet Metal Company, New York

Robert P. Vlick

ACCO Engineered Systems, California

Phil Meyers

Bright Sheet Metal Co., Inc., Indiana

George R. Edinger, Sr.

C & R Mechanical Company, Missouri

Lawrence Nejasmich

EMCOR GROUP, Inc., California

David L. Parks

Holaday-Parks, Inc., Washington

Harry Bizios

Lennox Industries, Inc., Texas

Kevin R. Gill

McCusker-Gill, Inc., Massachusetts

James R. Myers

Sheet Metal Connectors, Inc., Minnesota

Frederick L. Streimer

Streimer Sheet Metal Works, Inc., Oregon

Joseph Parisi

Therma, Inc., California

Kevin Yearout

Yearout Mechanical, Inc., New Mexico

Chicagoland Sheet Metal Contractors Association

Jack Baer, Chapter Representative
Tony Adolfs, Executive Director

Columbia Chapter SMACNA

(Chapter Rep. to be determined)
Thomas J. Goodhue, Executive Director

SMACNA – Western Washington, Inc.

Douglas A. Happe, Chapter Representative
Baron W. Derr, Executive Vice President

*Sheet Metal and Air Conditioning Contractors'
National Association, Inc.*

NEW HORIZON FOUNDATION SUPPORTERS – CONTINUED

Summit Challenge Circle - \$50,000

Mark C. Watson, Vice Chairman
Climate Engineers, Inc., Iowa

Dwight D. Silvia
D.D.S. Industries, Inc., Massachusetts

Richard Rivera
Key Air Conditioning Contractors, Inc.,
California

Keith E. Wilson
Miller Bonded, Inc., New Mexico

James M. Boone
New England Sheet Metal Works, California

Robert B. Gawne, Sr.
Stromberg Sheet Metal Works, Inc., Maryland

Paul M. Le Bel, Sr.
Walsh Mechanical Contractors, Massachusetts

New Mexico Sheet Metal Contractors Association
Alan Weitzel, Chapter Representative
David M. McCoy, Executive Director

SMACNA Boston, Inc.
Jeffery Chase, Chapter Representative
Thomas J. Gunning, Executive Director

Sheet Metal Contractors of Iowa, Inc.
(Chapter Rep. to be determined)
Dennis D. Hogan, Chapter Manager

*Sheet Metal Contractors Association of Philadelphia
and Vicinity*
John A. Burke, Chapter Representative
William F. Reardon, Chapter Executive

Other

Paul Keobane
CMF, Inc., California

William K. Ecklund
Felhaber, Larson, Fenlon & Vogt, P.A.,
Minnesota

Michael Gonzalez
Kinetic Systems, Inc., Arizona

David McKamish
McKamish, Inc., Pennsylvania

Joe Toso
Tri-Metal Fabricators, Ltd., Canada

Bruce J. Stockwell / John Unger
U.S. Sheet Metal, Inc., Michigan

Edmund J. Bransfield
William J. Donovan Company, Pennsylvania

CONTENTS

Executive Summary	1
Key Findings	2
Introduction	8
Challenges	8
Positive Movement	10
Research Methodology	11
Secondary Research	12
Primary Market Research: In-Depth Interviews.....	12
Contractor Survey.....	12
Study Findings	12
Business Characteristics.....	12
Organizational Issues	17
Cost Factors.....	20
Price	27
Net Profit.....	28
Planning	31
Staff Development.....	36
Performance/Effectiveness.....	41
Issues Expressed by Survey Respondents	43
Appendix A: Contractor Survey	45
Acknowledgements	47

1 EXECUTIVE SUMMARY

The New Horizons Foundation (the Foundation), a Heating, Ventilation, and Air Conditioning (HVAC) and Sheet Metal Industry Initiative, was established by leading sheet metal and HVAC contractors and stakeholders in conjunction with the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA). The Foundation is involved with a number of initiatives including the identification and analysis of workforce-related trends affecting the HVAC and sheet metal industries as a whole.

Throughout the United States (U.S.) economy, union membership has declined significantly in most industries, and unions in the construction industry – including sheet metal and HVAC – have not escaped this trend. In light of these developments, the Foundation decided to sponsor a study focused on the comparison of operating costs between union and nonunion sheet metal and HVAC contractors. The intent of this study is to determine some of the operational differences, if any, that may impact the contractors' cost structure and resulting competitiveness (or seeming lack thereof) in the market. These results can provide the foundation with future industry and individual company initiatives to enhance operating performance. The findings will provide comparative information for both union and nonunion firms of all types and sizes.

FMI Corporation (FMI), one of the leading management consulting companies specializing in the construction industry, was engaged in July 2006 to conduct a survey for the Foundation to gain better understanding of the key operating costs and selected business

practices for union and nonunion sheet metal and HVAC contractors. The findings presented in this study are the result of interviews conducted with selected industry stakeholders and surveys with a representative sample of HVAC contractors and related firms throughout the country. The study was designed to acquire subjective input on a variety of cost-related issues for the HVAC contractor. In all, response was collected from slightly more than 100 firms. While the sample size does not support precise quantitative metrics, we believe that the consistency of responses provides strong directional input regarding the cost structure differences between union and nonunion firms.

Cost differences identified through this study included the following:

- *Total Costs:* As indicated by the perceived cost differentials between union and nonunion firms shown through bid prices and cost information, the differences ranged from 12 percent (%) to 21% higher for union firms, depending upon job size and public versus private work. In general, the union firm is more cost competitive on larger jobs (greater than \$500 thousand (K)) and public work.
- *Labor Costs:* Labor rates are predictably higher for union workers at all levels with fully burdened rate differences from 22% at the entry level, 33% at the apprentice level, and 39% at the journeyman level. These rate differences are consistent with other industry published studies.
- *Fabricated Ductwork:* Again, significant differences exist with the union contractors having costs about 20% higher than their nonunion competitors.

- *Crew Mix:* The ratio of apprentices (laborers) to journeymen (tradesmen) provides another significant cost advantage to the nonunion contractors. With between a 5-6:10 crew mix ratio for union firms versus a 30:10 crew mix ratio for nonunion firms, the mix creates an even more favorable blended rate for the nonunion firm.

Balancing some of these cost differences, the apparent higher productivity levels of the union field workers help to mitigate the enormous cost differentials existing with the current model. In addition, according to survey respondents, union firms have lower field supervision/management costs, lower employee turnover at all levels, and less rework. All these factors help to narrow the cost gap that exists today. Both union and nonunion firms are enjoying strong backlogs and profit levels due to the vibrancy of the non-residential market. The strong market is likely masking the inherent cost advantage of the nonunion contractor. When the market returns to more normal levels and experiences the inevitable downturn, the advantage to the low-cost producer becomes more noticeable and critical.

Opportunities for improvement exist for all HVAC and sheet metal firms regardless of type, size, and union affiliation. Most industry reports indicate that a significant amount of time in the field is considered “recoverable lost time” and can be minimized through effective field and management productivity.

For example, the survey results show profit erosion (see Figure 22) for both union and nonunion firms. Pre-job planning practices (see Figure 25) are another area for

improvement as many firms spend little time on this important job management function. In addition, as indicated by the responses dealing with training, many field/shop managers are not receiving training in the critical areas of planning and scheduling, communication skills, and customer relations.

While the market is strong, many successful contractors will use this time to better understand and manage their costs while investing in key areas to enhance current and future performance.

2 KEY FINDINGS

2.1 Business Characteristics

The results of this survey overwhelmingly represent the operating structure of HVAC and mechanical contractors.

Survey respondents are largely concentrated at either end of the revenue scale (less than \$5 million (M) and greater than \$20 million, respectively).

Both 100% union and 100% nonunion respondents indicated that the majority of their annual sales were attributed to non-residential work. The 100% nonunion respondents, however, reported a significantly higher percentage of annual sales attributed to residential work compared to the 100% union respondents (approximately three times as much on a percentage basis).

Survey respondents representing small companies (less than \$20 million) have a stronger focus on the residential and service

markets compared to large companies (equal to or greater than \$20 million) represented in this study.

2.2 Organizational Issues

2.2.1 Median Number of Employees

The survey revealed some noticeable differences with regard to the median number of employees engaged in certain positions in union and nonunion companies. Union respondents reported approximately five to six times the median number shop labor indicated by nonunion respondents.

Stakeholder interviews and previous studies suggest that union firms are more likely to fabricate their own ductwork, which may explain why some union companies tend to employ a larger amount of shop labor relative to nonunion companies.

2.2.2 Crew Mix

The survey results support the interviews and reveal a significant difference in crew mix when comparing 100% union firms with 100% nonunion firms. This is most pronounced in the apprentices/laborers to journeymen/tradesmen ratio. On average, nonunion respondents staff about three laborers for every one tradesman on both large (equal to or greater than \$20 million) and small (less than \$20 million) jobs. By comparison, union respondents employ less than one (between a 0.5 and 0.6) apprentice to every journeyman. In other words, nonunion firms report that they have a ratio of 30 laborers for every 10 tradesmen and union firms report that they have a ratio of only about six apprentices for every 10 journeymen.

The union firms may be compounding these crew mix differences due to preferred rather than allowed staffing options. One interviewee mentioned that these ratios were often dictated by labor agreements, but, despite the fact that they were allowed to have a slightly higher ratio of less skilled workers, they wanted to keep more highly skilled workers on the job to drive the work and productivity.

Nonunion survey respondents note a much greater dependence on laborers versus tradesmen (apprentice/journeyman equivalent). This is consistent with comments made by several leading contractors who were interviewed. The survey indicates that this is one of the key areas in which nonunion firms have established a cost advantage. The cost of field supervision as a percentage of annual sales for union survey respondents is slightly lower compared to that of nonunion respondents (8% versus 11%).

In addition, interviewees mentioned several times the loss of productivity as crew size increases. One interviewee estimated that, for every worker added, there is a 25% loss in productivity. According to interviewees, larger crews require additional supervision and management, which is usually associated with higher paid employees and therefore increased costs.

2.3 Cost Factors

2.3.1 Labor Rates

The survey results describing labor rates for union and nonunion respondents become more disproportional with increasing positions of authority and responsibility. For

positions with lower authority and responsibility, the average union inexperienced apprentice/laborer rate is 22% greater than the nonunion rate – a \$6.34 difference. Then, for positions of higher authority and responsibility, the union foreman rate is 43% greater than nonunion foreman rate – a difference of \$26.49.

The labor rates for all positions are consistently higher in smaller companies (less than \$20 million) compared to larger firms (equal to or greater than \$20 million).

More than 80% of survey respondents, regardless of union or nonunion labor posture, said union labor rates are higher than nonunion (apprentice/laborer, journeyman/tradesman). These results are consistent with comments made by interviewees who estimated that union labor is approximately 10% to 30% more expensive than nonunion labor. Interviewees attributed the higher union rates to relatively higher medical, retirement, and other benefits. Survey respondents reported slightly higher rate differentials, stating that union labor is about 25% to 35% more expensive than nonunion labor.

Nonunion survey respondents perceived smaller differences in labor rates for all positions compared to their union counterparts. Based on these results, nonunion contractors may be underestimating the rate differential. There are numerous possible explanations for this, one being that nonunion contractors, particularly in the residential sector, do not really compete against union contractors on a regular basis and therefore are less aware of actual labor rate differences. In addition, nonunion firms may not be considering all of their labor-related costs.

Another possible explanation may be that, in some areas of the country, particularly in the

Gulf Coast region, the high demand for labor is closing the labor rate gap between union and nonunion craft labor. According to a study conducted by PAS Inc., the annual escalation rate for nonunion craft labor in 2006 was 6% to 10 % in many areas, and even 12% in some areas, depending on local economics (Engineering News-Record, September 25, 2006).

2.3.2 Ductwork

Ninety-four percent of all survey respondents answered that union-fabricated ductwork was more expensive (22% more expensive, on average) than nonunion fabricated ductwork.

FMI finds that the perceived price difference is consistent with interview input, since many union shops employ highly trained personnel who are typically paid higher labor rates compared to nonunion labor in similar positions.

Interviewees also believe that nonunion contractors pay less since they can purchase duct wherever they like. Fabrication costs are generally lower for nonunion contractors as well, since they can employ less costly workers compared to union contractors.

2.3.3 Cost Breakdown

Based on the survey results, union respondents have a higher direct cost component (71%) compared to their nonunion counterparts (64%). Costs for labor appear to be the main reason for this cost difference between union and nonunion study participants.

Overall, union respondents reported significantly (10%) lower costs for materials and equipment compared to nonunion respondents. On the other hand, nonunion participants reported 12% lower labor costs

compared to union participants. These cost differences are partially attributable to the higher amount of fabrication done in-house by union firms.

In an examination of the breakdown of costs by company revenue (as a percentage of annual sales), the survey data reveal that larger companies (revenue equal to or greater than \$20 million) have approximately 15% more total direct costs compared to smaller companies (revenue less than \$20 million). Fixed and variable overhead costs, on the other hand, are significantly lower for larger companies compared to smaller companies in this survey.

This result may indicate that large union companies tend to carry significantly more direct costs compared to their nonunion counterparts. Inversely, smaller, nonunion firms tend to have higher fixed and variable overhead costs. Labor costs are the primary reason for these costs differences.

2.4 Pricing and Profits

2.4.1 Bid Pricing

Interviewees indicated that union bids were typically 10% to 20% higher than nonunion bids. These estimates were confirmed by the survey in which 80% of the respondents reported a bid differential of approximately 12% to 21%, between union and nonunion bids, depending on customer type (public versus private) and job size.

Interviewees perceived bid differentials to be lower on public projects. Reasons for this include the requirement for nonunion contractors to pay prevailing wage rates, making union contractors more price

competitive. This assumption was also confirmed by the survey.

Interestingly, respondents perceived the price differential between union and nonunion bids to be greater on smaller jobs (less than \$250 thousand, both on public and private jobs) than on larger jobs (greater than \$500 thousand). In other words, the perceived price differential is inversely related to project dollar amount.

Overall, the union versus nonunion price difference is approximately 12% to 21% between union and nonunion bids, according to survey respondents. FMI believes that this estimate is realistic, based on previous industry research studies conducted nationwide. For example, a similar operational cost study conducted for the Electrical Contracting Foundation revealed that the average bid price of union electrical contractors was about 11% higher than the bid price of nonunion electrical contractors.

2.4.2 Net Profit

Both groups reported relatively high net profit levels compared to historical standards (9% nonunion, 7% union). These results are quite a bit higher than historical profit levels due in part to today's strong construction market coupled with the high-performance profile of many survey respondents. The respondents' estimates of budgeted and actual job profits indicated that profit erosion is more problematic for union contractors than for their nonunion counterparts, who were often able to achieve higher actual job profit levels to coincide with those budgeted.

FMI's research indicates that there may be some correlation between the higher levels of

profit erosion indicated by union respondents, and the lower levels of pre-job planning and project schedule updating, which these respondents indicated in response to other survey questions.

Lower levels of pre-job planning than their nonunion counterparts could lead union contractors to encounter more unanticipated problems on projects. These mid-project problems, which can erode profits, are the types of problems that can be avoided or anticipated through thorough pre-job planning. Similarly, less frequent project schedule updating can result in reduced efficiency and profitability. Often, these challenges can be identified and overcome if regular schedule updates are undertaken to monitor and improve project coordination, profitability, and productivity.

Both union and nonunion respondents assign job profit responsibility in approximately the same manner by role. Union and nonunion respondents apportioned profit responsibility to project managers and estimators at almost identical levels, and both indicated that foremen also hold a significant level of profit responsibility, though the nonunion respondents more often indicated that foremen have profit responsibility than did their union counterparts.

2.5 Planning

According to survey responses, 47% of 100% union survey respondents indicated that they devote minimal time to pre-job planning and scheduling (2% or less compared to total project duration). Almost half these respondents spent less than 1%. A similar percentage (22%) of 100% union survey

respondents also reported that they spend minimal (never or infrequently) time conducting periodic schedule updates. Overall, these results may explain why union contractors experience more erosion on job profits compared to their nonunion counterparts.

An operational cost study conducted by the National Electrical Contracting Foundation revealed very similar results. According to this study, union electrical contractors typically let their field personnel handle a large percentage of the planning (on-the-job planning and change orders). In contrast, nonunion contractors – who presumably have less confidence in their field laborers' training and background – typically have their project managers develop extensive plans for all aspects of the project, including the majority of the pre-job planning.

In contrast, the majority (56%) of union survey respondents reported that they involve a larger variety of stakeholder types in regular meetings to communicate planning and scheduling information, compared to nonunion survey respondents. There are two ways of interpreting these results: one, since union respondents spend minimal time pre-job planning and scheduling, they are more inclined to involve different stakeholders further along during a project in job-site type meetings and discussions.

A second reason for these results may be explained through crew ratios: nonunion respondents use a higher proportion of less experienced people in the field. Consequently, nonunion contractors tend to conduct a thorough pre-job planning process, as they cannot rely as heavily on their field crews to manage and adjust project needs on an

ongoing basis (similar to the results found in the National Electrical Contractors Association (NECA) study).

These challenges are not unusual for the industry: in FMI's 2005-2006 U.S. Construction Industry Training Report, project managers rated planning/scheduling as their top concern and senior managers placed leading/motivating as their number one challenge. Field managers indicated that communicating effectively was their top concern in 2006.

2.6 Staff Development

2.6.1 Training Costs

Union respondents spend approximately 1.3% (of total sales) on out-of-pocket training activities. When adding the apprenticeship contributions, training costs add up to about 1.9% for union contractors. Nonunion respondents reported training costs of 2%.

According to Training magazine's 2005 Training Top 100, organizations nationwide are allocating 3.7% of their budgets to training. According to FMI's 2005-2006 U.S. Construction Training Survey, construction companies were allotting only 2.7% of their payroll towards training, or roughly about 1% of sales.

2.6.2 Employee Turnover

Survey responses suggest that employee turnover is not a significant problem for many union contracting firms with low turnover rates compared to industry standards. This was also confirmed by stakeholder interviews.

There was disagreement among the interviewees as to whether union or nonunion firms had higher turnover, and several respondents mentioned that they believe there is very little difference between the two. According to survey responses, turnover at union contracting firms is slightly lower than at nonunion contracting firms.

Several interviewees mentioned that the low turnover rates could be attributed to a strong bonus program and recognition for outstanding performance. This not only motivated employees to remain with the company but also fostered a sense of friendly competition. Many respondents gave awards for specific aspects of the job, such as safety. Nearly all respondents mentioned the use of events such as picnics, holiday parties, sporting events, etc., to help establish a sense of community, belonging, and teamwork.

2.7 Performance Effectiveness

Both union and nonunion survey respondents indicate very similar beliefs about their own performance and effectiveness, though the union respondents' perceptions regarding performance and effectiveness in the areas of scheduling and pre-job planning may be overstated (see above results in the *Planning* section above).

Union respondents indicate that a relatively small proportion of their jobs require excessive rework, which is likely due to successful union training programs that prepare workers to produce high-quality work products.

The majority of the union respondents (91%) reported that fewer than 5% of their jobs require excessive rework. Only about 9% of

the union respondents indicated that 6% or more of their jobs require excessive rework. In contrast, only 74% of the nonunion respondents reported that fewer than 5% of their jobs require excessive rework. Of the remaining nonunion respondents, 26% indicated that 6% or more of their jobs require excessive rework.

2.8 Issues Expressed by Survey Respondents

Survey respondents cited several issues of concern to HVAC and sheet metal contractors:

1. Insufficient labor availability and quality (union and nonunion respondents' concern),
2. Market competitiveness against nonunion firms (union respondents' concern),
3. Elevated and rising materials prices (union and nonunion respondents' concern), and
4. Adverse evolution of legal and regulatory conditions that are causing respondents to be concerned about problems such as mold contamination liability, workers' compensation claims, labor regulations, and pension obligations (union and nonunion respondents' concern).

3 INTRODUCTION

Throughout the U.S. economy, union membership has declined significantly in most industries, and unions in the construction industry have not escaped this trend. Construction industry union experts place unions' loss of market share in the construction industry at roughly 50% during the last three decades.¹ The Construction Users Roundtable cites U.S. Bureau of Labor Statistics figures, which estimate that open shop market share has grown to between 70% and 80% in most market sectors.² Similarly, the U.S. Bureau of Labor Statistics' yearly union membership reports suggest that construction industry union membership has continued to falter since 1999, with slight increases in union membership being followed closely by significant declines in membership during subsequent years.³ See Figure 1 on page 9.

3.1 Challenges

While many factors, both internal and external, have contributed to declining union market share and membership in the construction industry, image problems and member recruitment and retention are two foremost concerns. Unions' image problems in the construction industry have been formed by many years of tension between

¹ Breslin, Mark. "Unions Are at a Critical Crossroads." *Engineering News-Record*. 06-JUN-2005.

² "Confronting the Skilled Construction Workforce Shortage." *The Construction Users Roundtable*. JUN-2004.

³ United States Department of Labor. Bureau of Labor Statistics. *Yearly Union Membership Reports (2000 to 2005)*. www.bls.gov.

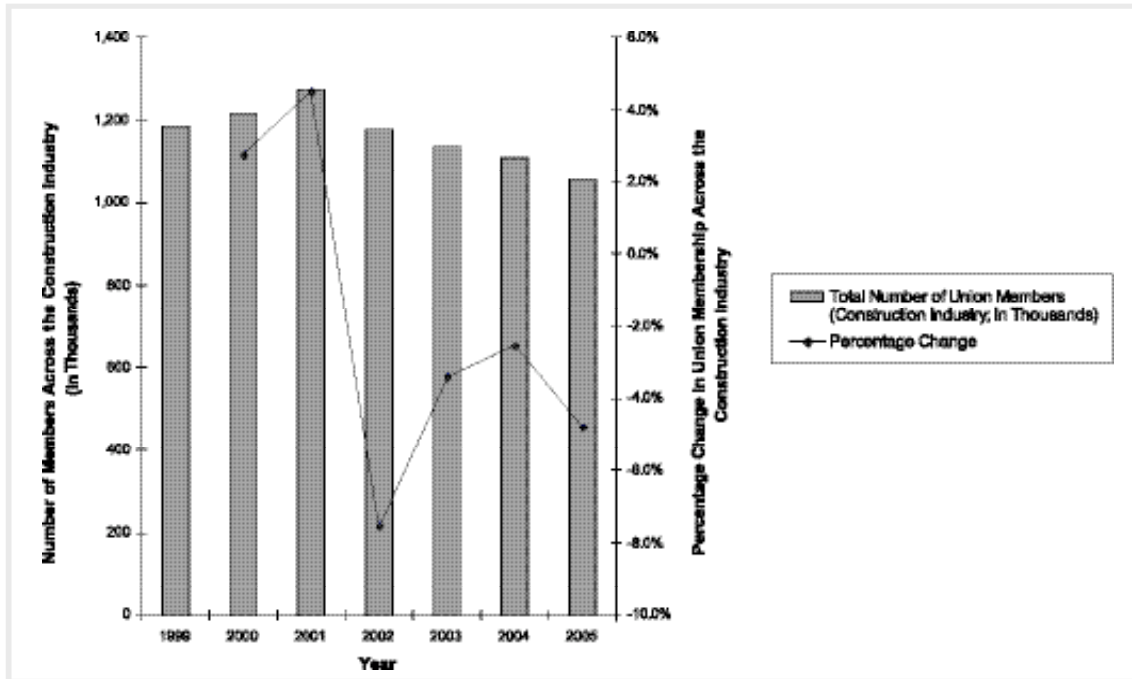


Figure 1: Construction Industry Union Membership (1999 to 2005)

Source: United States Department of Labor: Bureau of Labor Statistics

unions and union contractors with project owners, and tensions within organized labor have exacerbated unions' image problems within the construction industry.

In examining these factors more closely, unions' image problems in the construction industry are not a recent development. For many years, project owners' feelings toward the internal tensions and jurisdictional disputes within organized labor have ranged from concern and frustration to outright vocal displeasure.⁴ In recent years, the internal tensions of the American Federation of Labor-Congress of Industrial

Organizations (AFL-CIO) have resulted in well-publicized schisms within organized labor – particularly noteworthy were the departures of the carpenters and the teamsters from the AFL-CIO and its Building and Construction Trades Department.⁵ From a project owners' perspective, splits such as these only increase the likelihood of jurisdictional disputes and other internal tensions that sometimes cause delays and walkouts, which quickly derail schedules. These disruptions can create an adversarial relationship between union labor and project owners, which can result in unnecessary costs to owners.⁶ Despite the higher worker

⁴ "Mechanical Crafts Unite to Protect Turf." *Engineering News-Record*. 19-SEP-2005; and Winston, Sherie. "A Fresh Approach to Union Projects; An unusual industry coalition tackles extended overtime, work disruptions, and other issues." *Engineering News-Record*. 28-JUN-2004.

⁵ Rubin, Debra K., and E. Michael Powers and Bruce Buckley. "Union Shifts and Market Shakeups Create Complex Trade Relations." *Engineering News-Record*. 04-SEP-2006; See also Tuchman, Janice. "Coalition Moving Forward on Work Force Initiative." *Engineering News-Record*. 22-NOV-2004.

⁶ *Id.*

qualification levels, project quality, and safety standards, which unions may promote to increase market share, apprehension regarding possible significant and costly interruptions in work, combined with higher union labor rates, can cause project owners to favor nonunion labor.

Along the same lines, unions' recruitment and retention problems stem from the longstanding negative perceptions of those outside the construction industry, regarding careers in the industry. These negative perceptions grew alongside the unions' image problems with project owners and peer, nonunion construction firms. Factors further exacerbating the recruitment and retention problems facing the construction industry overall, and unions in particular, have been the rise of new technology careers involving computers and concurrent shifts in education trends.

Demographics are also changing, and this is a further concern for recruitment and retention problems facing unions in the construction industry. The baby boomer generation's rate of retirement will only increase in the coming decade, thereby increasing the need for recruitment, while reducing the numbers of skilled journeymen to participate in apprenticeship and training programs.⁷ In 2004, the Construction Users Roundtable estimated that, given the high rates of attrition in construction trade and craft positions, the construction industry would need to recruit 200,000 to 250,000 new craft workers per year to meet the industry's future needs.⁸ Unions' recruitment and retention

efforts must be especially pronounced, given their ineffective performance in countering decreasing union membership in recent years, and in light of the compounding effect that the national demographic shift will have on the trade and craft labor shortage in the construction industry.

3.2 Positive Movement

Unions are addressing image, recruitment, and retention problems, and proactive steps are underway to address these shortcomings, as part of a greater effort to increase union market share and membership.

First, with regard to image problems, union workers have taken part in productivity analysis and improvement measures such as the recent Construction Industry Institute's effort to create productivity metrics that will help its members to benchmark both engineering and construction projects against other projects.⁹ Participation like this by union workers helps to improve union labor's image within the construction industry by demonstrating that unions, like other organizations in the construction industry, are interested in improving productivity and efficiency.

Next, efforts by unions to reorganize for greater cooperation and more efficient resource utilization appear to be somewhat successful. The AFL-CIO's Metal Trades Department has recently suggested possible affiliation with the Building and Construction Trades Department, which is revising its

⁷ Breslin, Mark. "Organizing: An Analysis of Options and Alternatives." Breslin Strategies, Inc. General President's Report. APR-2006.

⁸ Id.

⁹ Tuchman, Janice. "Productivity Benchmarking Effort Produces Results." Engineering News-Record. 07-AUG-2006.

operations in the wake of the teamsters' and carpenters' departures.¹⁰ Additionally, six of the mechanical crafts have formed the Mechanical Allied Crafts Unit, a new division within the Building and Construction Trades Department, which they hope will allow the plumbers, boilermakers, electrical workers, ironworkers, asbestos workers, and sheet metal workers to present a stable, unified business partner to owners.¹¹

Economic factors such as rising demand for labor throughout the construction industry, and events such as the recent hurricanes in the Southeast and Gulf Coast regions, have also helped to improve the competitive image of union labor. While demand for labor is pushing up union wages and fringe benefits, it is also diminishing the gap between union and nonunion craft labor in particularly high demand areas such as the Gulf Coast.

This decrease in the labor cost differential (on a very local level) helps to improve contractors' and owners' perceptions regarding the affordability and value of union labor, as these groups focus more on factors like work quality and training, rather than price, when evaluating labor. Labor agreements between contractors desperate for workers and local labor unions are also helping to increase industry perceptions that unions are dependable sources of labor in times of disasters and high demand for labor.¹²

Finally just as economic conditions such as increasing demand for labor help to decrease the labor cost gap between union and nonunion

labor, thereby improving contractors' and owners' perceptions of union labor, outsourcing is making construction careers more appealing to potential workers. With recent moves to outsource many technical jobs to foreign markets, many careers in construction, including union trade careers, are becoming more appealing to students. The strong employment outlook, and the impossibility of job outsourcing for many positions in construction in general, but sheet metal positions in particular, are making these careers more appealing to students and young workers.¹³

It is within this larger context that the Foundation decided to conduct this study, focusing on the operational cost differences between union and nonunion sheet metal and HVAC contractors, to get a better understanding of current fundamental business and organizational trends within the industry. Although the operational cost differences between union and nonunion contractors represent only one aspect of many challenges in the overall situation of union market performance, the Foundation feels that these study findings will serve as an important benchmark for developing future market development initiatives.

4 RESEARCH METHODOLOGY

The FMI team gathered market intelligence through three main steps: (1) an analysis of

¹⁰ Winston, Sherie. "Machinists Make Bid to Join the Building Trades' Group." *Engineering News-Record*. 19-SEP-2005.

¹¹ "Mechanical Crafts Unite," *Supra*.

¹² Powers, E. Michael, Debra K. Rubin, and William G. Krizan. "Worker Gaps in South Push up Costs." *Engineering News-Record*. 25-SEP-2006.

¹³ Olszynski, Jim. "Outsourcing Won't Impact the Sheet Metal Industry; Mind Your Business." *Snips*. 01-APR-2006.

secondary data, (2) in-depth interviews with key industry stakeholders, and (3) a quantitative survey. The triangulation of approaches was applied to check the validity and reliability of the findings.

4.1 Secondary Research

Experienced industry researchers performed an extensive secondary search using both print and electronic media. Information was collected from academic institutions, industry trade reports, and industry and association publications. The information was then analyzed to identify underlying trends.

4.2 Primary Market Research: In-Depth Interviews

Professional research consultants with extensive industry experience conducted interviews with selected union HVAC and sheet metal contractors. The in-depth interviews were conducted by telephone and were intended to gain a better understanding of current perceptions and the extent of the industry/market knowledge. These interviews also served as a basis for designing the subsequent contractor survey described below.

4.3 Contractor Survey

Based on the findings of the industry interviews and the secondary data synthesis, the FMI team collaborated with the Foundation Task Force Group to develop an online survey tool (Appendix A). In a next step, the FMI team developed an extensive database with more than 4,000 contacts of HVAC and sheet metal

contractors nationwide. Both union and nonunion contractors were then contacted by mail, phone, email, or in person, which resulted in 98 responses. Of the 98 respondents, 48 represented 100% union firms, 35 represented 100% nonunion firms, and the remaining 15 respondents represented firms with a combination of union and nonunion workforce.

5 STUDY FINDINGS

The study findings for both the industry interviews and the contractor survey are presented in the following sections.

When comparing union to nonunion responses in the following analysis sections, FMI interpreted the 100% union and nonunion responses only, to ensure an “apples-to-apples” comparison.

5.1 Business Characteristics

5.1.1 Description of Company Business

The results of this survey overwhelmingly represent the operating structure of HVAC and mechanical contractors (Figure 2).

- The majority of all survey respondents (56%) selected “HVAC” as the best description of their company business. “Mechanical” was the second most commonly reported business description (28% of all respondents).
- Seventy percent (70%) of all survey respondents selected only one of seven possible choices to describe their company’s business. Similar to the overall

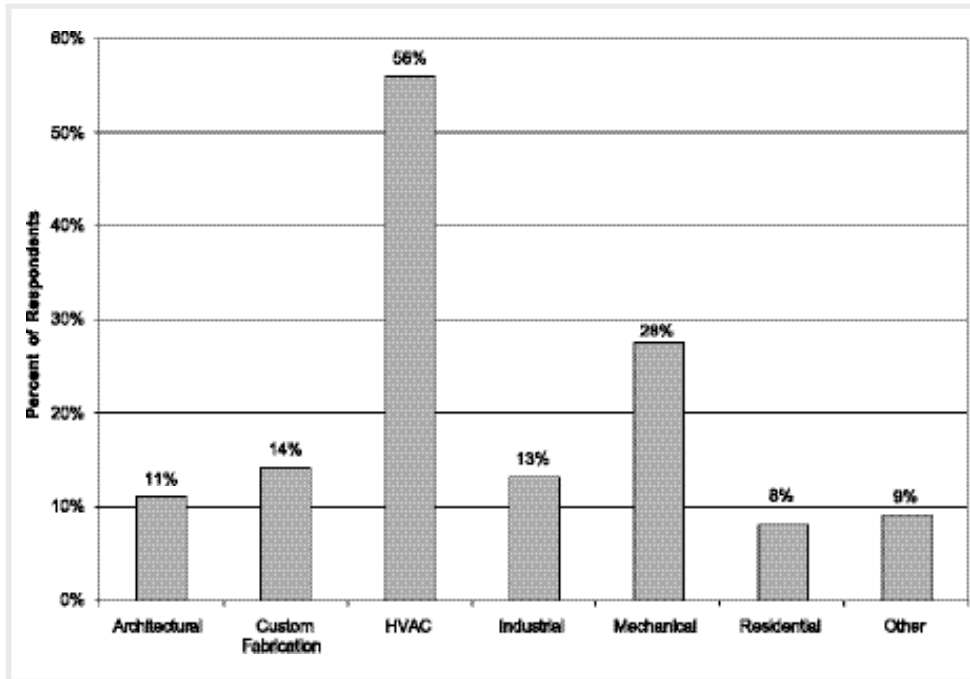


Figure 2: Description of Company Business (All Respondents)¹⁴

response pattern, the most often selected definition was “HVAC” (45%), followed by “Mechanical” (25%).

- Thirty percent (30%) of all survey respondents selected more than one of the seven possible business descriptions. Again, the most frequent combination of responses was “HVAC” and “Mechanical.” “HVAC” and “Custom Fabrication” was also a common business combination among survey respondents.

5.1.2 Annual Sales Volume

Survey respondents are largely concentrated at either end of the revenue scale (less than \$5 million and greater than \$20 million, respectively), rather than exhibiting a normal distribution of revenue levels (Figure 3 on page 14).

- Almost half (44%) of all survey respondents reported annual sales volumes of \$5 million or less. Twenty eight percent (28%) of all respondents reported annual sales volumes greater than \$20 million. The union survey respondents, however, appear to be more evenly distributed along the scale, particularly in the \$2 to \$20 million range. Furthermore, a substantial share (31%) of the union survey

¹⁴ Since numerous respondents selected more than one primary business category, the numbers do not add up to 100%.

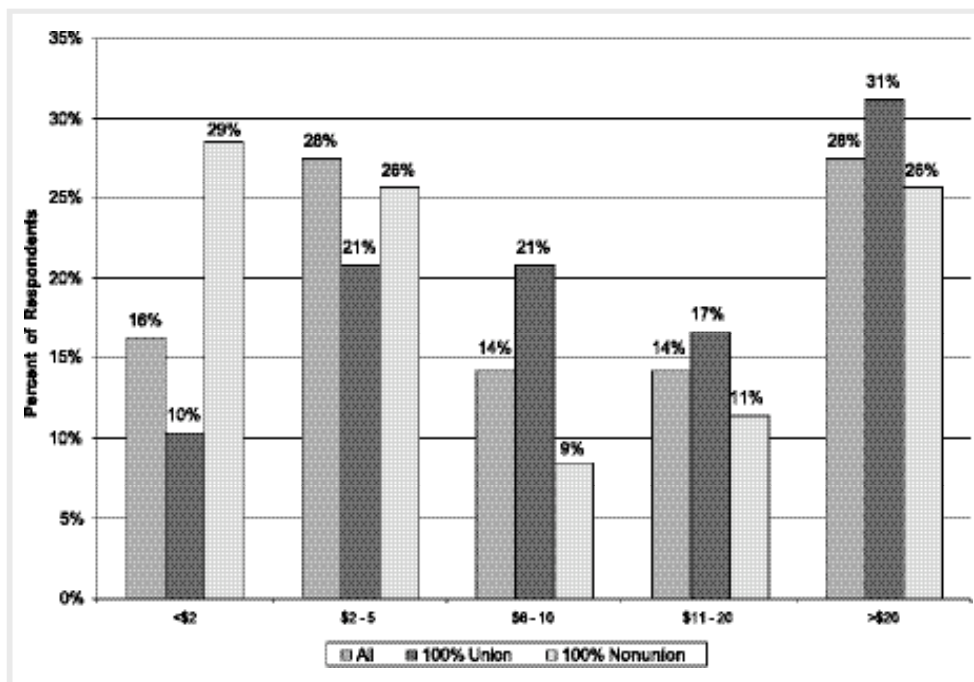


Figure 3: Annual Sales (Millions)¹⁵

respondents reported annual sales volumes greater than \$20 million – this means that union respondents often represented mid-to large-size companies.

- In contrast, nonunion survey respondents often represent smaller firms, in terms of annual sales volume, compared to their union counterparts. More than 50% of nonunion survey respondents reported annual sales volumes of \$5 million or less. Only 26% of nonunion survey respondents stated annual sales volumes greater than \$20 million, and relatively few respondents represented mid-size nonunion companies in this study.

5.1.3 Annual Sales by Market

Both 100% union and 100% nonunion respondents indicated that the majority of their annual sales were attributed to non-residential work. The 100% nonunion respondents, however, reported a significantly higher percentage of annual sales attributed to residential work compared to the union respondents (approximately three times as much on a percentage basis) (Figure 4).

¹⁵ Note: the category “All” includes all the 100% union and 100% nonunion respondents, as well as the remaining 15 respondents representing firms with a combination of union and nonunion workforce.

¹⁶ This study did not focus on regional differences.

- Union survey respondents were more likely to have a significant proportion of their sales concentrated in the commercial (37%), industrial (23%), and institutional market sectors (22%). Commercial sales were reported almost twice as often by union respondents than by nonunion respondents. In contrast, nonunion survey respondents reported a significantly greater percentage of annual sales in the residential sector (27%) – three times residential sector sales of their union counterparts (9%).

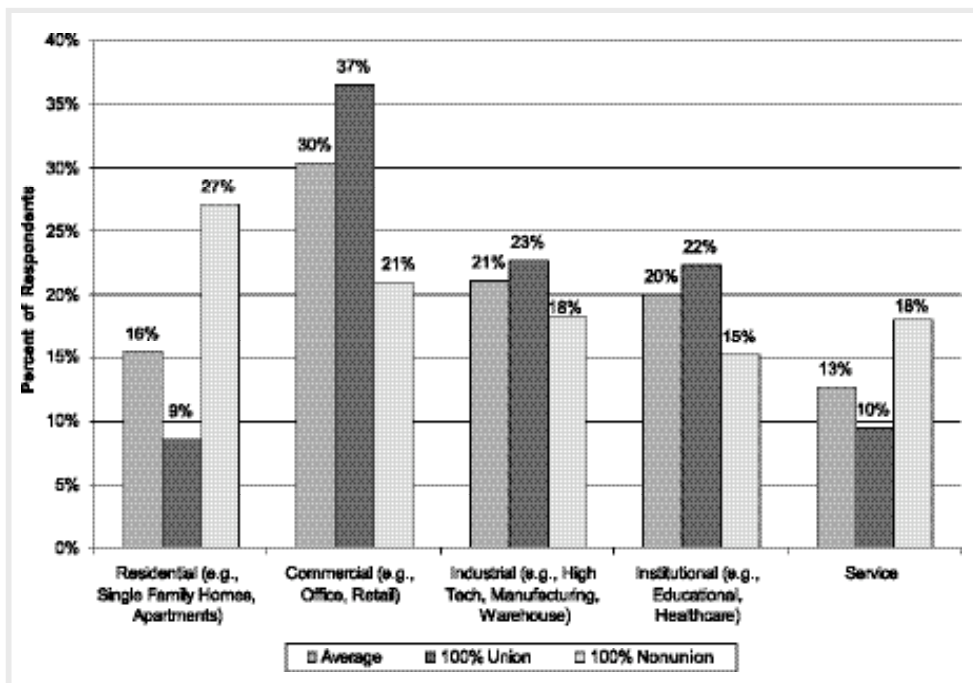


Figure 4: Annual Sales by Market (Average (All Respondents), Union, and Nonunion)

Survey respondents representing small companies (less than \$20 million) have a stronger focus on the residential and service markets compared to large companies (equal to or greater than \$20 million) represented in this study (Figure 5).

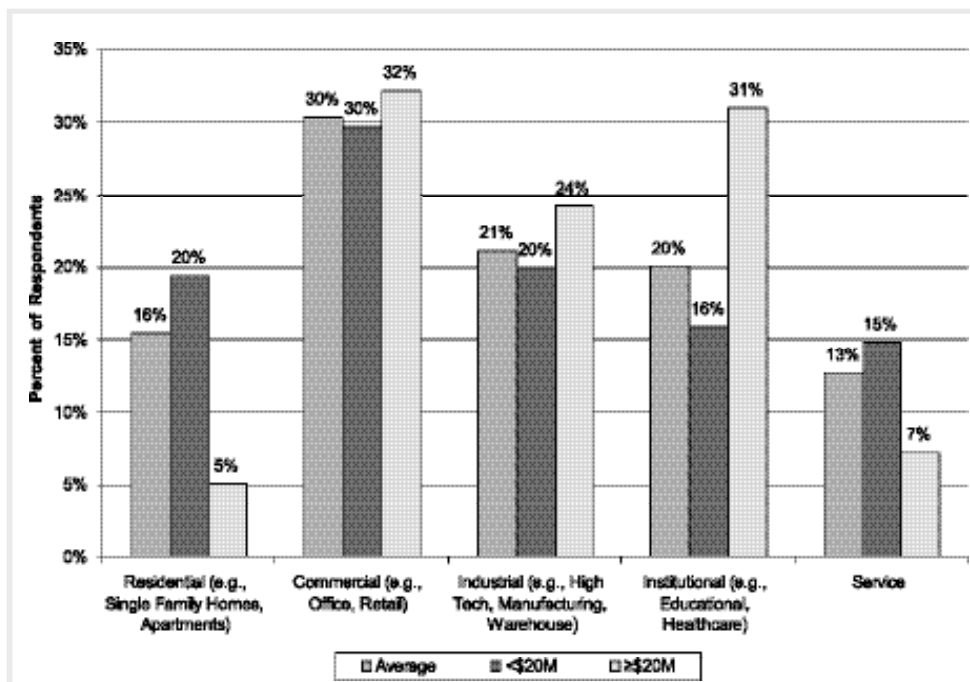


Figure 5: Annual Sales by Market (Average (All Respondents), Companies with Revenue <\$20M and ≥\$20M)

- These results support anecdotal statements that union contractors tend to focus more frequently on the non-residential market sector, whereas nonunion companies have a stronger concentration in the residential market. However, it is important to note that these results may vary by region, and contractors located in particular geographic markets may have significantly different focuses on business sectors such as industrial, residential, and architectural, depending on the local market's demand.¹⁶ For example, in strong residential markets such as Atlanta, Georgia, contractors are more likely to specialize in the residential sector, compared to contractors located in geographic markets with strong industrial economies, such as those markets often described as “rustbelt” areas.
- Based on the results from sections titled *Annual Sales Volume* and *Annual Sales by Market*, the majority of union survey respondents represent mid- to large-size companies, focused primarily on the non-residential market sectors (commercial, industrial, and institutional). At the same time, the nonunion respondents represent primarily small (less than \$5 million) or large (greater than \$20 million) companies, which focus on the residential (27%), commercial (21%), industrial (18%), and service market sectors (18%).
- In general, union companies tend to be larger in terms of annual revenue, and they often specialize in the non-residential market sectors. Large nonunion companies are also likely to derive substantial revenue

¹⁶ This study did not focus on regional differences.

from the commercial and industrial market sectors, where complex projects typically require highly skilled personnel and greater resources.

5.2 Organizational Issues

5.2.1 Employment

The survey revealed some noticeable differences with regard to the median number of employees engaged in certain positions in union and nonunion companies. Union respondents reported approximately five to six times the median number of shop labor indicated by nonunion respondents (Figure 6).

- The median number of employees in office management, field management, and administrative positions is approximately the same for both union and nonunion survey respondents.

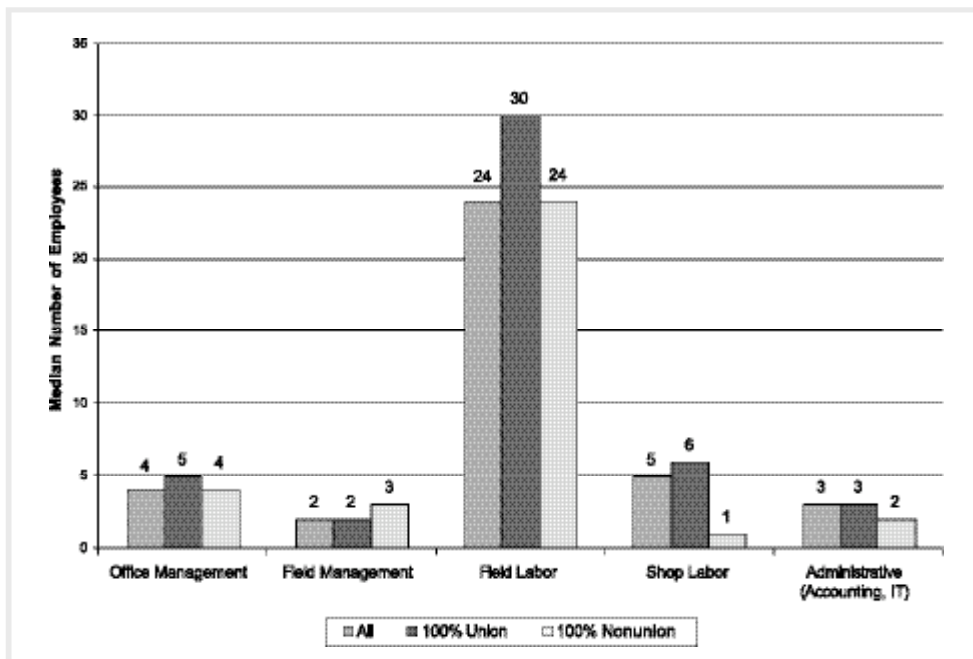


Figure 6: Median Number of People Employed, 100% Union Versus 100% Nonunion¹⁷

¹⁷ Note: the category “All” includes all the 100% union and 100% nonunion respondents, as well as the remaining 15 respondents representing firms with a combination of union and nonunion workforce.

Figure 7 shows the median number of people employed for companies with revenues below \$20 million. The differences noted in Figure 6 become slightly less pronounced when comparing union and nonunion firms of approximately the same annual revenue.

- There remains, however, considerable difference in the median number of shop labor. The 100% union firms employ approximately five times the median number of shop labor compared to their 100% nonunion counterparts. This coincides with stakeholder interviews, which confirmed that union companies generally produce more ductwork internally, as opposed to their nonunion competitors; hence the greater number of shop labor employees.

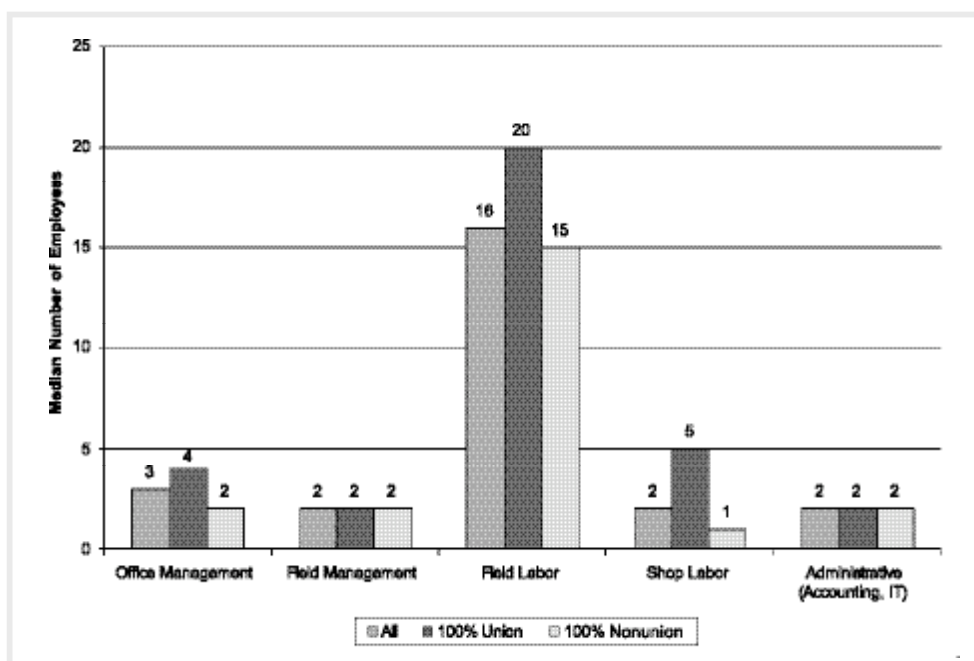


Figure 7: Median Number of People Employed, 100% Union Versus 100% Nonunion (Revenue <\$20M)¹⁸

¹⁸ Note: the category "All" includes all the 100% union and 100% nonunion respondents, as well as the remaining 15 respondents representing firms with a combination of union and nonunion workforce.

Interviewees mentioned several times the loss of productivity as crew size increases. One interviewee estimated that, for every worker added, there is a 25% loss in productivity.

- According to interviewees, larger crews require additional supervision and management, which is usually associated with higher paid employees and therefore increased costs. As a result, respondents try to keep crew sizes as small as possible with as many apprentices as possible.

5.2.2 Crew Mix

Crew mix is considered by many to be among the key areas in which nonunion firms attain a job cost advantage. Nonunion firms heavily staff jobs with less experienced helpers and laborers and fewer tradesmen or more skilled individuals. By comparison, union firms limit the number of less experienced apprentices on jobs (relative to nonunion firms), relying more on journeyman-level or higher-level personnel. According to those interviewed, typical ratios vary dramatically depending on job size. However, for smaller projects with crews consisting of around five, union ratios are said to be generally in the area of one foreman to three journeymen to one apprentice.

The survey results support the interviews and reveal a significant difference in crew mix when comparing 100% union firms with 100% nonunion firms (see Figures 8 and 9). This is most pronounced in the apprentices/laborers to journeymen/tradesmen ratio. On average, nonunion respondents staff about 30 laborers for every 10 tradesmen. By comparison, union respondents report having 5 or 6 apprentices for every 10 journeymen.

The union firms may be compounding these crew mix differences due to preferred rather than allowed staffing options. One interviewee mentioned that these ratios were often dictated by labor agreements, but, despite the fact that they were allowed to have a slightly higher ratio of less skilled workers, they wanted to keep more highly skilled workers on the job to drive the work and productivity.

	Crew Mix Ratio
	Apprentices/Laborers to Journeymen/Tradesmen Ratio (X to 10)
100% Nonunion	27.7 to 10
100% Union	5.2 to 10
	Journeymen/Tradesmen to Foremen Ratio (X to 1)
100% Nonunion	6 to 1
100% Union	5 to 1
	Foremen to Supervisors Ratio (X to 1)
100% Nonunion	5 to 1
100% Union	5 to 1

Figure 8: Crew Mix Ratio (Large Jobs, ≥ \$20M)

	Crew Mix Ratio
	Apprentices/Laborers to Journeyman/Tradesmen Ratio (X to 10)
100% Nonunion	33.3 to 10
100% Union	6 to 10
	Journeyman/Tradesmen to Foremen Ratio (X to 1)
100% Nonunion	4 to 1
100% Union	3 to 1
	Foremen to Supervisors Ratio (X to 1)
100% Nonunion	6 to 1
100% Union	4 to 1

Figure 9: Crew Mix Ratio (Small Jobs, < \$20M)

Numerous interviewees mentioned that wage rates play a critical role in the way companies are organized.

- According to respondents, union companies, in particular, tend to employ a large amount of skilled (and generally more expensive) labor on every job, whereas nonunion companies tend to use fewer skilled workers and more non-skilled “helpers.” This trend is forcing union companies to achieve higher productivity in order to compete against their price-competitive nonunion counterparts.

The cost of field supervision as a percentage of annual sales for union survey respondents is slightly lower compared to that of nonunion respondents (8% versus 11%) (Figure 10 on page 21).

- Figure 10 shows the cost of field supervision as a percentage of sales for companies with revenues below \$20 million and above \$20 million. The results are almost the same for both small and large companies (approximately 10%).

5.3 Cost Factors

5.3.1 Labor Rates

The survey results describing labor rates for union and nonunion respondents become more disproportional with positions of increasing authority and responsibility (Figure 11 on page 21).

- For positions with lower authority and responsibility, the average union inexperienced apprentice/laborer rate is 22% greater than the nonunion rate – a \$6.34 difference. For positions with higher authority and responsibility, the union foreman rate is 43% greater than nonunion foreman rate – a \$26.49 difference.
- Interviewees stated that nonunion contractors are not bound by contractual obligations such as health and pension plans, as well as rules pertaining to start and stop times and ratios of skilled workers to “helpers.”

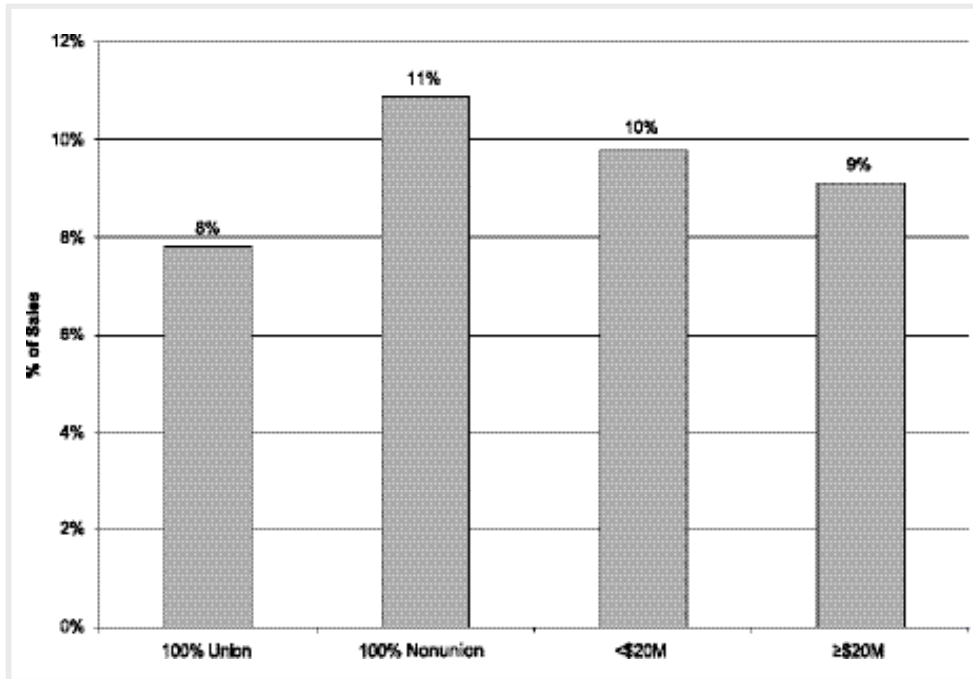


Figure 10: Cost of Field Supervision as a Percentage of Sales

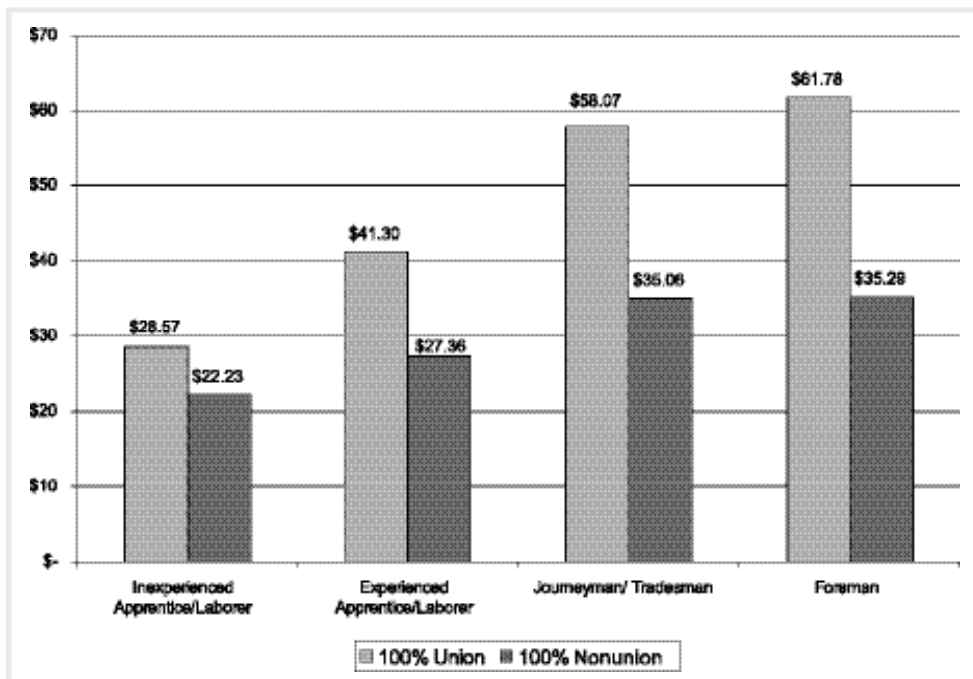


Figure 11: Average Fully Burdened Labor Rate (e.g., Taxes, Benefits)

Labor rates for all positions are consistently higher in smaller companies (less than \$20 million) compared to larger firms (greater than or equal to \$20 million) (Figure 12).

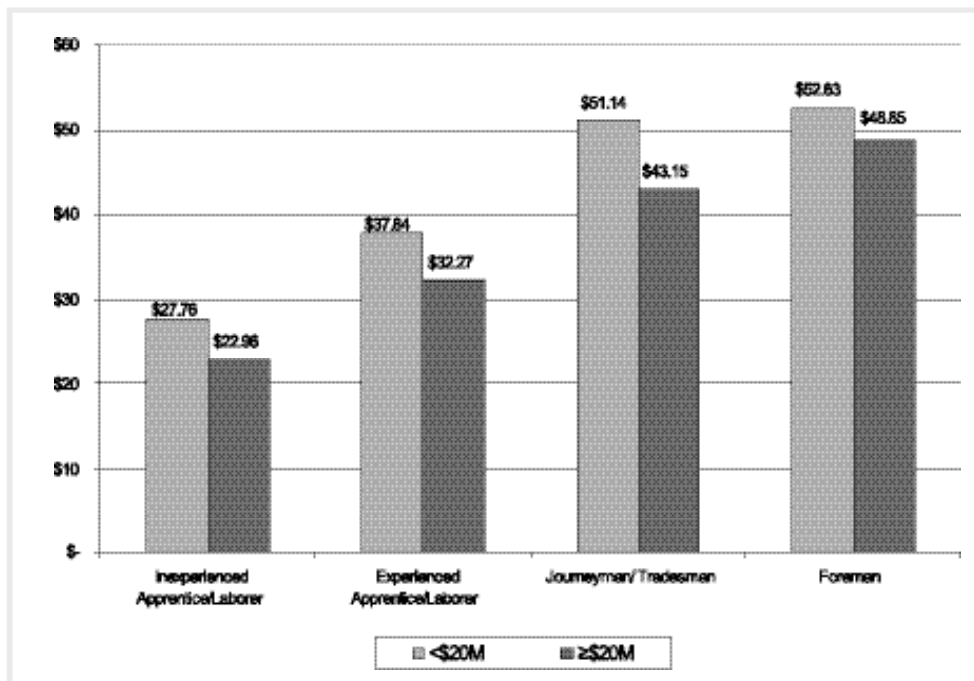


Figure 12: Average Fully Burdened Labor Rate (Revenue <\$20M and ≥\$20M)

More than 80% of survey respondents, regardless of union or nonunion labor posture, said union labor rates are higher than nonunion (apprentice/laborer, journeyman/tradesman) (Figure 13). These results are consistent with comments made by interviewees who estimated that union labor is approximately 10% to 30% more expensive than nonunion labor. Interviewees attributed the higher union rates to relatively higher medical, retirement, and other benefits. Survey respondents reported slightly higher rate differentials, stating that union labor is about 25% to 35% more expensive than nonunion labor.

- Overall, survey respondents reported that union labor is 25% to 35% more

expensive than nonunion labor. The only divergence from this cost range was in the foreman category: Nonunion survey respondents reported that union labor is 13% more expensive on average, for this particular position.

Nonunion survey respondents perceived smaller differences in labor rates for all positions compared to their union counterparts (Figure 13 on page 23).

- Compared to the average fully burdened labor rates reported, both union and nonunion respondents may be significantly underestimating the price differential for journeyman/tradesman and foreman positions.

		Percent Reporting Union Is More Expensive	Labor Rate Differential
Apprentice/ Laborer	100% Union	83%	31%
	100% Nonunion	87%	26%
Journeyman /Tradesman	100% Union	81%	34%
	100% Nonunion	86%	25%
Foreman	100% Union	70%	28%
	100% Nonunion	83%	13%

Figure 13: Fully Burdened Labor Rate Differential (Union Versus Nonunion)

- Based on these results, nonunion contractors may be underestimating the rate differential. There are numerous possible explanations for this, one being that nonunion contractors, particularly in the residential sector, do not really compete against union contractors on a regular basis and therefore are less aware of actual labor rate differences. In addition, nonunion firms may not be considering all their labor-related costs.
- Another possible explanation may be that, in some areas of the country, particularly in the Gulf Coast region, the high demand for labor is closing the labor rate gap between union and nonunion craft labor. According to a study conducted by PAS Inc., the annual escalation rate for nonunion craft

labor in 2006 was 6% to 10% in many areas, and even 12% in some areas, depending on local economics (ENR, September 25, 2006).

5.3.2 Ductwork

Ninety-four percent of all survey respondents answered that union-fabricated ductwork was more expensive (22% more expensive, on average) than nonunion-fabricated ductwork (Figure 14 on page 24).

- FMI finds that the perceived price difference is consistent with interview input, since many of the union shops employ highly trained personnel who are typically paid higher labor rates compared to nonunion labor in similar positions.
- Interviewees also believe that nonunion contractors pay less since they can purchase duct wherever they like. Fabrication costs are generally lower for nonunion contractors as well, since they can employ less costly workers compared to union contractors.

5.3.3 Cost Structure

Based on the survey results, union respondents have a higher direct cost component (71%) compared to their nonunion counterparts (64%) (Figure 15 on page 24). Costs for labor appear to be the main reason for this cost difference between union and nonunion study participants.

- Nonunion survey respondents reported 7% lower total direct costs compared to union respondents. Conversely, nonunion respondents listed slightly higher (5%) fixed and variable overhead costs as well as higher net profit than union participants.

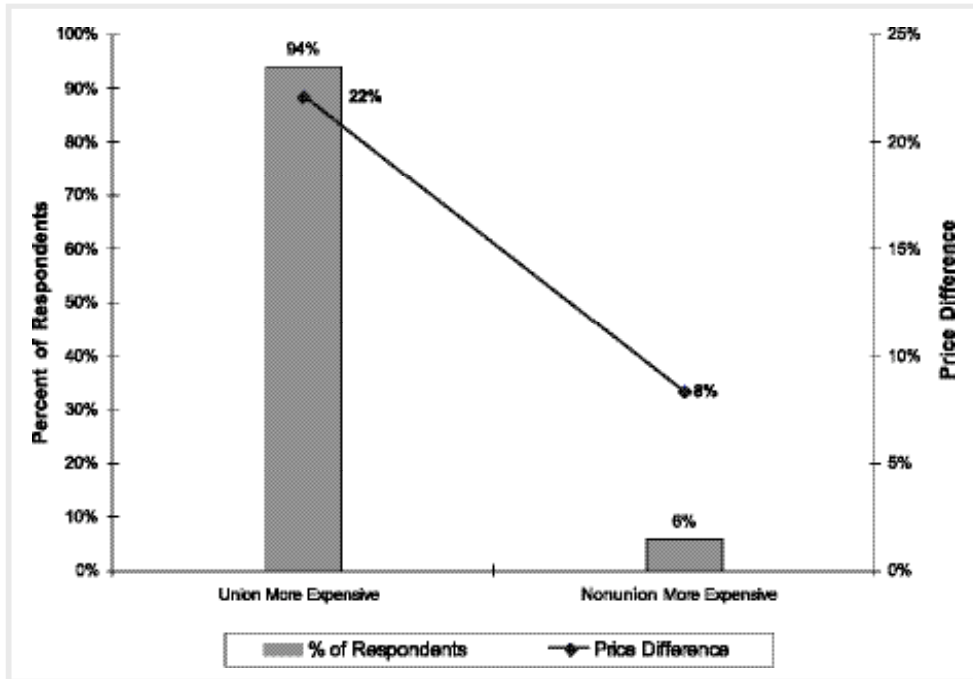


Figure 14: Market Price Differential of Union Versus Nonunion Fabricate Ductwork

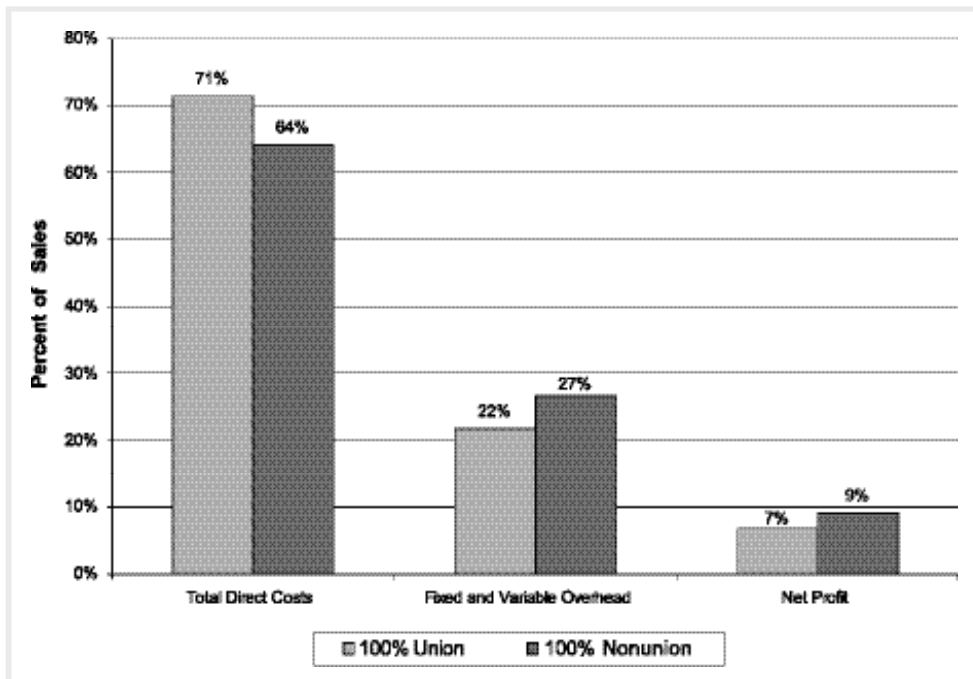


Figure 15: Breakdown of Costs (As a Percent of Annual Sales)

In an examination of the breakdown of costs by company revenue, the survey data reveal that larger companies (revenue equal to or greater than \$20 million) have approximately 15% more total direct costs compared to smaller companies (revenue less than \$20 million). Predictably, fixed and variable overhead costs, on the other hand, are significantly lower for larger companies compared to smaller companies (Figure 16).

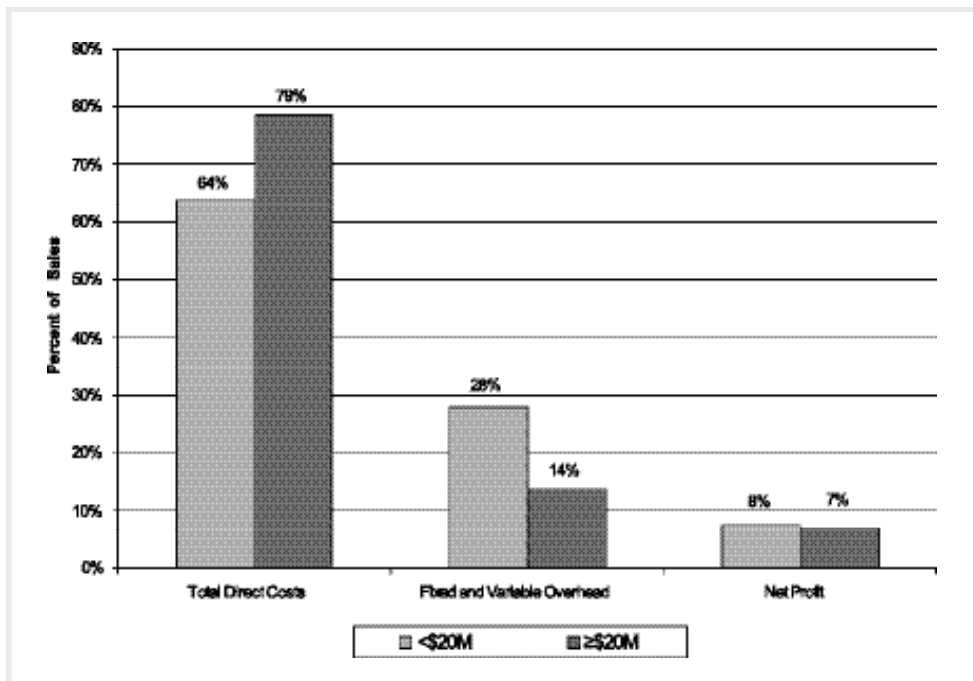


Figure 16: Breakdown of Costs (As a Percent of Annual Sales, Revenue <\$20M and ≥\$20M)

- This result may indicate that large union companies tend to carry significantly more direct costs compared to their nonunion counterparts. Inversely, smaller, nonunion firms tend to have higher fixed and variable overhead costs. Labor costs are the primary reason for these costs differences (Figures 17 and 18).

Figure 17 shows a breakdown of direct costs as a percentage of annual sales. Overall, union respondents reported significantly (10%) lower costs for materials and equipment compared to nonunion respondents. On the other hand, nonunion participants reported 12% lower labor costs compared to union participants. It is expected that part of this difference is due to the higher internal duct fabrication by union contractors.

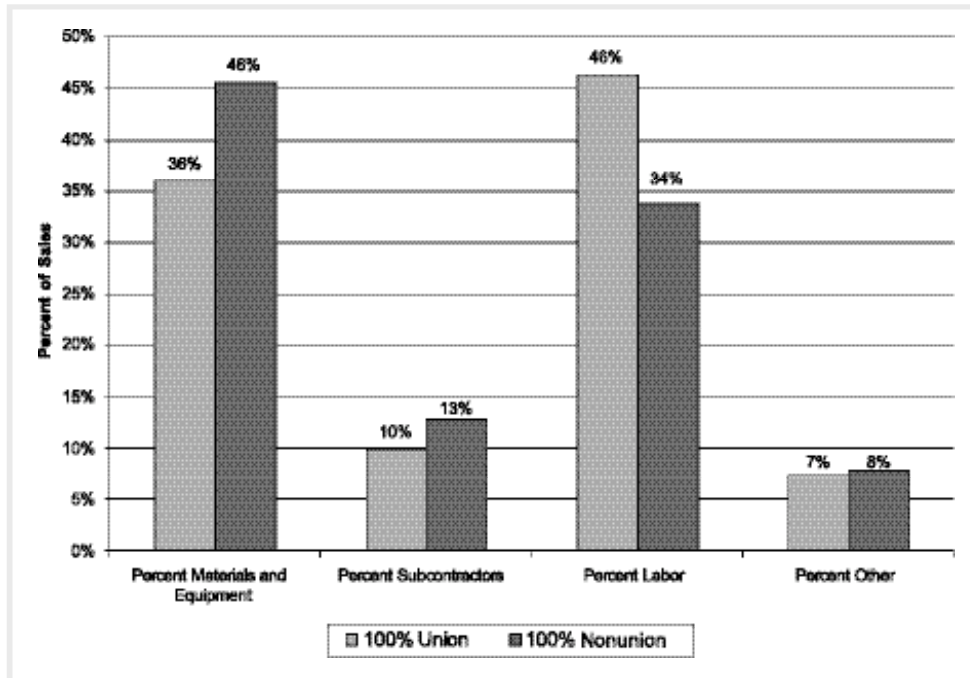


Figure 17: Direct Costs (As a Percent of Annual Sales)

Figure 18 on page 27 shows the breakdown of direct costs (as a percentage of annual sales) by company revenue. Interestingly, all cost components are higher (as a percentage of annual sales) for larger companies, except for labor. This may be explained by the fact that smaller companies are characterized by higher labor rates relative to large companies (as indicated in Figure 12) and the heavier use of subcontractors.

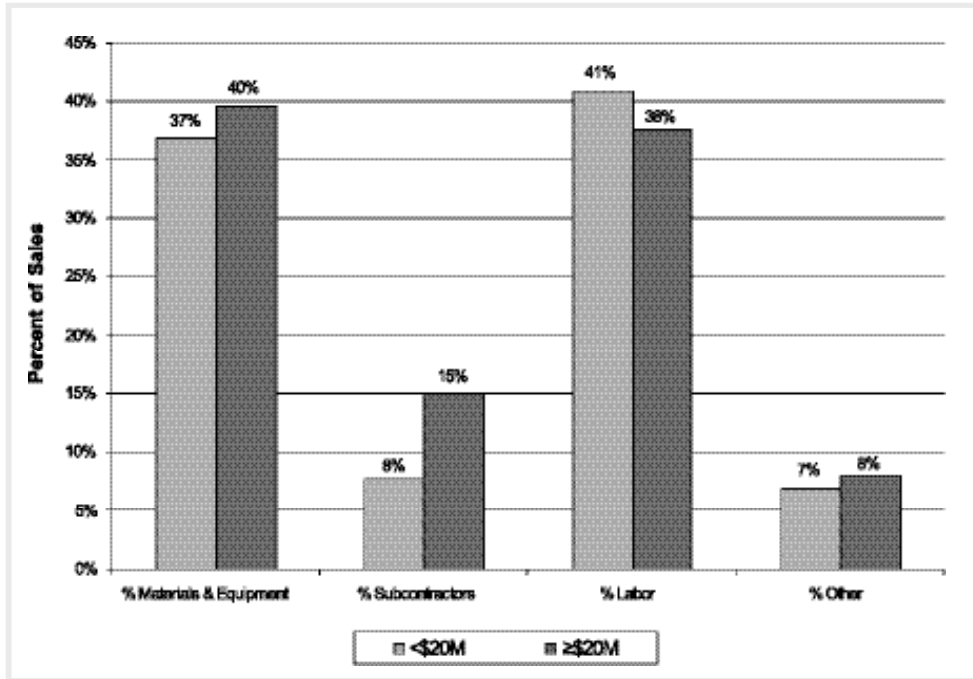


Figure 18: Direct Costs (As a Percent of Annual Sales, Revenue <\$20M and ≥\$20M)

5.4 Price

Interviewees indicated that union bids were typically 10% to 20% higher than nonunion bids. These estimates were confirmed by the survey in which 80% of the respondents reported a bid differential of approximately 12% to 21% between union and nonunion bids, depending on customer type (public versus private) and job size (Figures 19 and 20 on page 28).

- Interviewees perceived bid differentials to be lower on public projects. Reasons for this include the requirement for nonunion contractors to pay prevailing wage rates, making union contractors more price competitive. This assumption was also confirmed by the survey.

- Interestingly, respondents perceived the price differential between union and nonunion bids to be greater on smaller jobs (less than \$250 thousand, both on public and private jobs) than on larger jobs (greater than \$500 thousand). In other words, the perceived price differential is inversely related to project dollar amount.
- Overall, the union versus nonunion price difference is approximately 12% to 21% between union and nonunion bids, according to survey respondents. FMI believes that this estimate is realistic, based on previous industry research studies conducted nationwide. For example, a similar operational cost study conducted for the Electrical Contracting Foundation revealed that the average bid price of union electrical contractors was about 11% higher than the bid price of nonunion electrical contractors.

	Union Is More Expensive		Union Is Less Expensive	
	% of Respondents	Price Differential	% of Respondents	Price Differential
<\$250K	80%	17%	20%	12%
\$250-\$500K	77%	14%	23%	12%
>\$500K	77%	12%	23%	12%

Figure 19: Typical Bid Price (Public Work)

	Union Is More Expensive		Union Is Less Expensive	
	% of Respondents	Price Differential	% of Respondents	Price Differential
<\$250K	80%	21%	20%	19%
\$250-\$500K	81%	18%	19%	16%
>\$500K	82%	15%	18%	16%

Figure 20: Typical Bid Price (Private Work)

Based on job type, interviewees mentioned that union contractors were submitting lower bids on piping and high-technology jobs. This was mainly attributable to union shops having the skilled labor necessary for these types of projects.

- Interviewees stated that nonunion contractors seemed to have lower bids on repetitive projects, such as residential condominiums and strip malls, as well as commercial structures and schools.

5.5 Net Profit

Survey respondents' estimates of budgeted and actual job profits indicated that profit erosion is more problematic for

union contractors than for their nonunion counterparts, which were often able to achieve higher actual job profit levels to coincide with those budgeted (Figures 21 and 22 on page 29).

- Nonunion respondents reported budgeted typical job profit levels that are somewhat higher than the budgeted job profit levels reported by their union counterparts. Approximately 68% of the union respondents indicated that their budgeted job profits were between 3% and 10%, with 34% of union respondents indicating that their budgeted job profits are between 3% and 5%, and another 34% of union respondents indicating that their budgeted job profits are between 6% and 10%. Only 30% of the union respondents reported

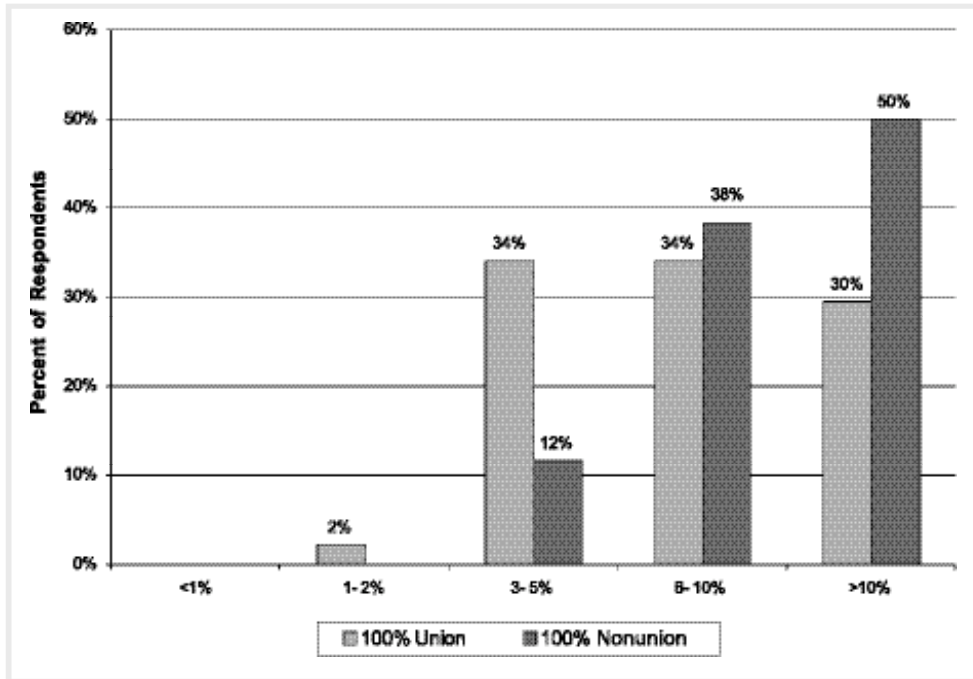


Figure 21: Typical Job Profit (Budget)

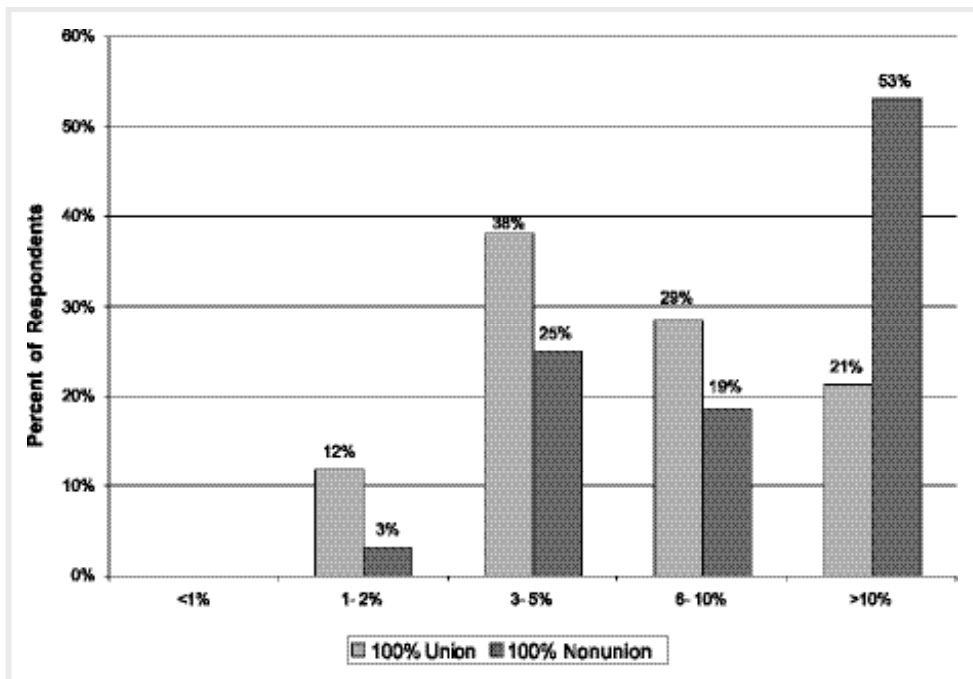


Figure 22: Typical Job Profit (Actual)

budgeted job profit levels of greater than 10%. In contrast, 88% of the nonunion respondents indicated budgeted typical job profit levels of 6% or greater, with 38% indicating budgeted job profits of 6% to 10%, and 50% indicating budgeted job profits of greater than 10%.

- The nonunion respondents indicated that they are often able to realize relatively high actual typical job profit levels of profitability, which match their higher budgeted job profit levels. Over half of the nonunion respondents (53%) indicated that their actual typical job profits exceed 10%. Then, 19% of nonunion respondents indicated actual job profits between 6% and 10%, and another 25% indicated actual job profits between 3% and 5%. Overall, only 3% of nonunion respondents indicated actual job profits of 1% to 2%.
- Inversely, union respondents indicated that their actual typical job profits are often lower than budgeted levels of profitability. While 29% of union respondents indicated actual job profit levels between 6% and 10%, and an additional 38% of union respondents indicated actual job profit levels between 3% and 5%, only 21% reported actual job profits of greater than 10%. Additionally, in comparison to their nonunion counterparts, of whom only 3% indicated 1% to 2% actual typical job profits, 12% of the union contractors indicated that their actual typical job profits are only 1% to 2%. For union contractors, this is an increase from 2% to 12% when comparing budgeted to actual.
- The survey data suggest that profit erosion may be a more acute problem for union

contractors than for nonunion contractors. FMI's research indicates that there may be some correlation between the higher levels of profit erosion, indicated by union respondents, and the lower levels of pre-job planning and project schedule updating, which these respondents indicated in response to other survey questions.

- Lower levels of pre-job planning than their nonunion counterparts could lead union contractors to encounter more unanticipated problems on projects. These mid-project problems, which can erode profits, are the types of problems that can be avoided or anticipated through thorough pre-job planning. Similarly, less frequent project schedule updating can result in reduced efficiency and profitability. Often, these challenges can be identified and overcome if regular schedule updates are undertaken to monitor and improve project coordination, profitability, and productivity.

Aggregating the responses shows that budget versus actual differential is 13% for union contractors and 8% for nonunion firms, as shown in Figure 23.

	Budget	Actual	Erosion	
			Absolute	Percent
100% Union	7.1%	6.1%	-0.9%	13%
100% Nonunion	8.5%	7.9%	-0.7%	8%

Figure 23: Typical Job Profit (Budget Versus Actual Differential)

Both union and nonunion respondents allocated similar levels of profit responsibility on the different positions (Figure 24).

- Union and nonunion respondents apportioned profit responsibility to project managers and estimators at almost identical levels, and both indicated that foremen also hold a significant level of profit responsibility, though the nonunion respondents more often indicated that foremen have more profit responsibility than do their union counterparts.

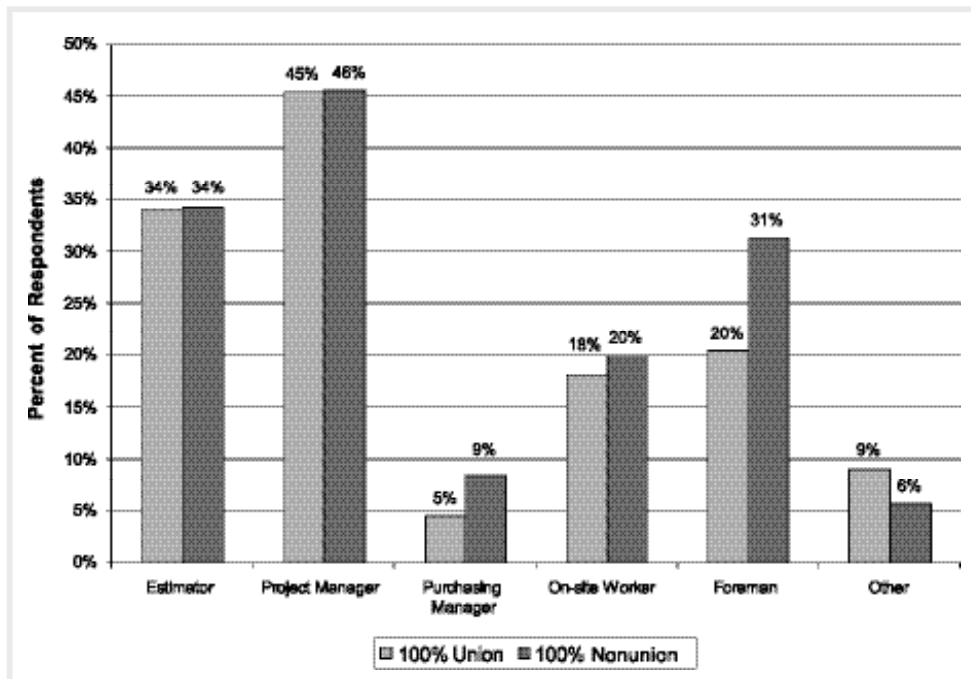


Figure 24: Job Profit Responsibility¹⁹

5.6 Planning

5.6.1 Pre-Job Planning

According to survey responses, many union survey respondents indicated that they devote minimal time to pre-job planning and scheduling (Figure 25 on page 32).

- Relatively high percentages of union survey respondents reported spending little time on pre-job planning and scheduling. As a percentage of total project duration, 21% of union survey respondents reported spending less

¹⁹ Values add to more than 100% due to respondents indicating multiple individuals responsible for job profit.

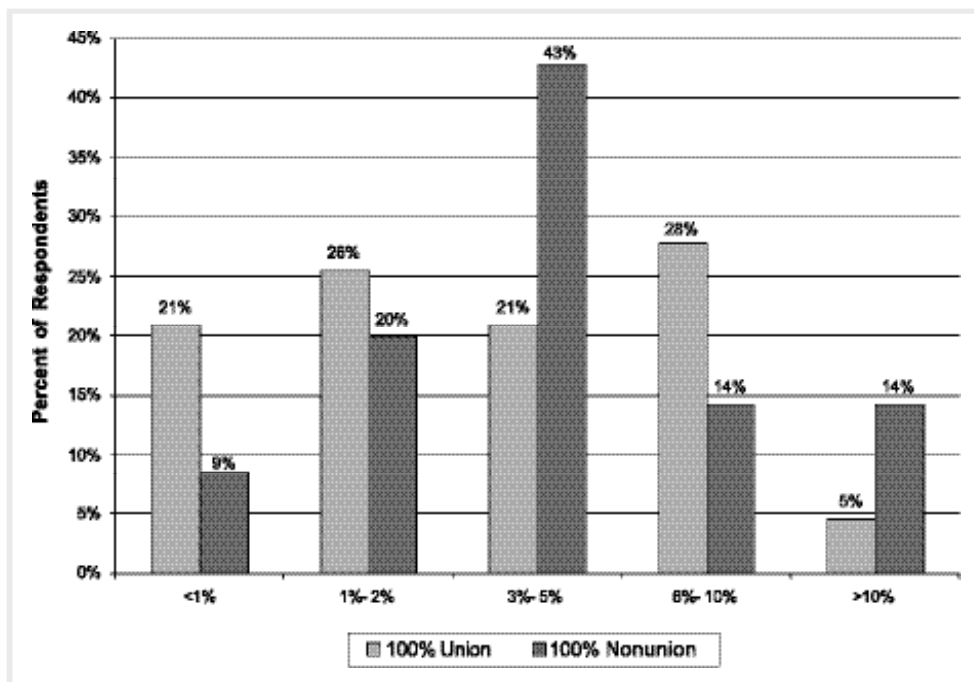


Figure 25: Pre-job Planning and Scheduling Time Spent Versus Total Project Duration

than 1% of their project time on pre-job planning and scheduling, and another 26% of union survey respondents indicated that they devote only 1% to 2% of the total project duration to these functions. Furthermore, only 5% of union survey respondents indicated that they devote more than 10% of the total project duration to pre-job planning and scheduling. Overall, while 21% of union survey respondents reported spending 3% to 5% of the total project duration, and 28% reported devoting 6% to 10% of the total project duration to pre-job planning and scheduling, the combined 47% of union survey respondents who reported spending 2% or less of total project duration on pre-job planning and scheduling is notable.

- On the other hand, of the nonunion survey respondents, only 9% reported spending less than 1% of their project time on pre-job planning and scheduling, and only 20% reported devoting 1% to 2% of the total project duration to these functions. Additionally, 43% of nonunion survey respondents indicated that they devote 3% to 5% of the total project duration to pre-job planning and scheduling, and 14% indicated that pre-job planning and scheduling is 6% to 10% of their total project duration. Finally, 14% of the nonunion survey respondents reported devoting more than 10% of the total project duration to pre job planning and scheduling.
- These challenges are not unusual for the industry: in FMI's 2005-2006 U.S. Construction Industry Training Report,

project managers rated planning/scheduling as their top concern and senior managers placed leading/motivating as their number-one challenge. Field managers indicated that communicating effectively was their top concern in 2006.

- An operational cost study conducted by the National Electrical Contracting Foundation revealed very similar results. According to this study, union electrical contractors typically let their field personnel handle a large percentage of the planning (on-the-job planning and change orders). In contrast, nonunion contractors – who presumably have less confidence in their field laborers' training and background – typically have their project managers develop extensive plans for all aspects of the project, including the majority of the pre-job planning.

5.6.2 Schedule Development

According to survey responses, union contractors involve many of the various stakeholder types in regular meetings to communicate planning and scheduling information (Figures 26 through 28).

- There are two ways of interpreting these results: one, since union respondents spend minimal time pre-job planning and scheduling, they are more inclined to involve different stakeholders further along during a project in job-site type meetings and discussions.
- A second reason for these results may be explained through crew ratios: nonunion respondents use a higher proportion of less experienced people in the field. Consequently, nonunion contractors tend to conduct a thorough pre-job planning process, as they cannot rely as heavily on

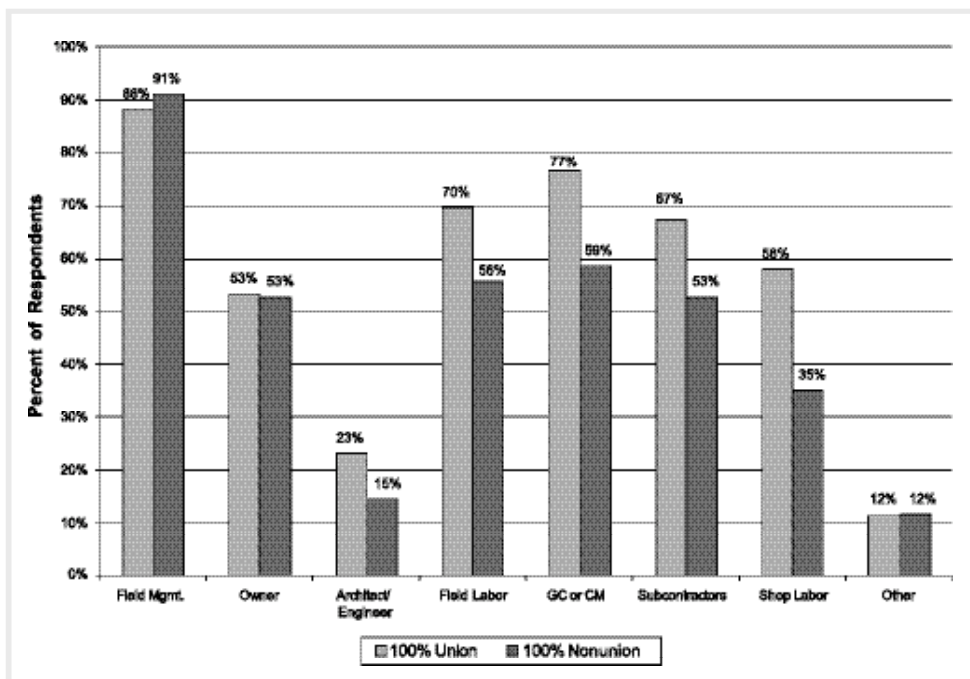


Figure 26: Involved in Developing and/or Communicating Schedule

	Office Management	Field Management	Shop Management	Field/Shop Workers	Administration
Project kick-off	81%	79%	35%	23%	33%
Project hand-off	53%	79%	26%	30%	16%
Daily huddle/ toolbox talk	14%	65%	33%	81%	0%
Project progress	67%	81%	30%	16%	26%
Project closeout	74%	70%	19%	16%	28%
Project post-mortem	74%	65%	30%	9%	28%

Figure 27: Regular Meeting Attendance by Position (100% Union)

	Office Management	Field Management	Shop Management	Field/Shop Workers	Administration
Project kick-off	50%	75%	28%	22%	41%
Project hand-off	50%	78%	22%	25%	19%
Daily huddle/ toolbox talk	13%	72%	9%	72%	6%
Project progress	59%	91%	31%	31%	34%
Project closeout	59%	72%	16%	19%	44%
Project post-mortem	50%	53%	13%	13%	41%

Figure 28: Regular Meeting Attendance by Position (100% Nonunion)

their field crews to manage and adjust project needs on an ongoing basis (similar to the results found in the NECA study).

- In terms of developing and communicating the project scheduling information, union survey respondents report greater involvement of most project stakeholder types than their nonunion counterparts.

Union respondents indicated particularly high participation in the development and communication of project scheduling among field management, general contractors or construction managers, field labor, subcontractors, and shop labor.

- In terms of regular meeting attendance, during which functions such as project

planning and scheduling are completed and communicated, survey responses suggest that union office management is more often involved in project kick-off, project progress, and project closeout meetings than nonunion office management. Survey responses also suggest that union shop management is more often involved in regular meeting types than nonunion shop management – particularly daily huddle/toolbox talk and post-project meetings.

5.6.3 Schedule Update Frequency

As with pre-job planning and scheduling, many union survey respondents indicate that they spend minimal time conducting periodic schedule updates (Figure 29).

- However, with regard to schedule updating, the high participation levels across stakeholder types that were indicated by union

respondents for schedule creation and communication do not continue into the project execution. Many more union than nonunion respondents indicated that they never or infrequently update the project schedule – 22% of union respondents versus 3% of nonunion respondents. In sum, most union and nonunion respondents indicated that schedule updating is done weekly, on an ongoing basis, or monthly. Anecdotal evidence suggests that larger firms are more likely to update schedules on a frequent basis compared to smaller firms.

- According to survey data, union contractors more often involve most project stakeholder types in developing and communicating the project schedule, and union contractors effectively involve various stakeholder types in regular meetings. However, FMI believes that the survey responses also indicated two

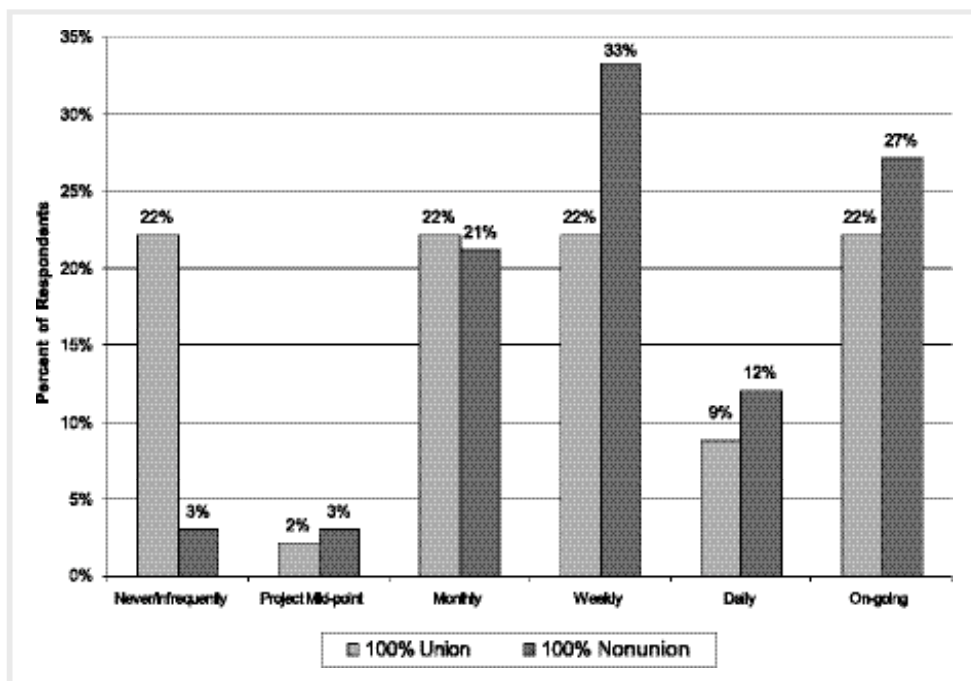


Figure 29: Schedule Update Frequency

potential areas of concern for union contractors. First, a comparatively high proportion of union respondents indicates that they devote little of the total project duration to pre-job planning and scheduling. Second, a comparatively high proportion of union respondents indicate that they never or infrequently update project schedules. These trends suggest inconsistent planning and schedule management practices that are inadvisable for long-term firm stability and customer satisfaction, in addition to profitability.

5.7 Staff Development

5.7.1 Training

Union respondents spend approximately 1.3% (of total sales) on out-of-pocket training activities. When adding the apprenticeship contributions,²⁰ training costs add up to about 1.9% for union

contractors. Nonunion respondents reported training costs of 2% (Figures 30 through 32).

- Survey responses indicate that union contractors' out-of-pocket training expenditures tend to be less than the training expenditures of nonunion contractors. According to survey responses, the biggest difference in union and nonunion contractors' training expenditures as a proportion of payroll by position was for office management. With regard to training for office management personnel, 55% of union respondents indicated that it accounted for less than 1% of their payroll, whereas only 39% of nonunion respondents indicated that training for office management personnel accounted for less than 1% of their payroll, and 27% of nonunion respondents indicated that it accounted for 3% to 5% of their payroll.

		Office Management	Field Management	Field/Shop Workers	Administration
<1%	100% Union	55%	49%	40%	60%
	100% Nonunion	39%	30%	26%	52%
1-2%	100% Union	32%	35%	40%	26%
	100% Nonunion	30%	36%	41%	36%
3-5%	100% Union	9%	12%	19%	12%
	100% Nonunion	27%	27%	21%	12%
>5%	100% Union	5%	5%	2%	2%
	100% Nonunion	3%	6%	12%	0%

Figure 30: Training as a Percent of Payroll by Position (Percent of Respondents)

²⁰ The national average percentage of apprenticeship contributions vs. total wage is 1.18% (data source: SMACNA).

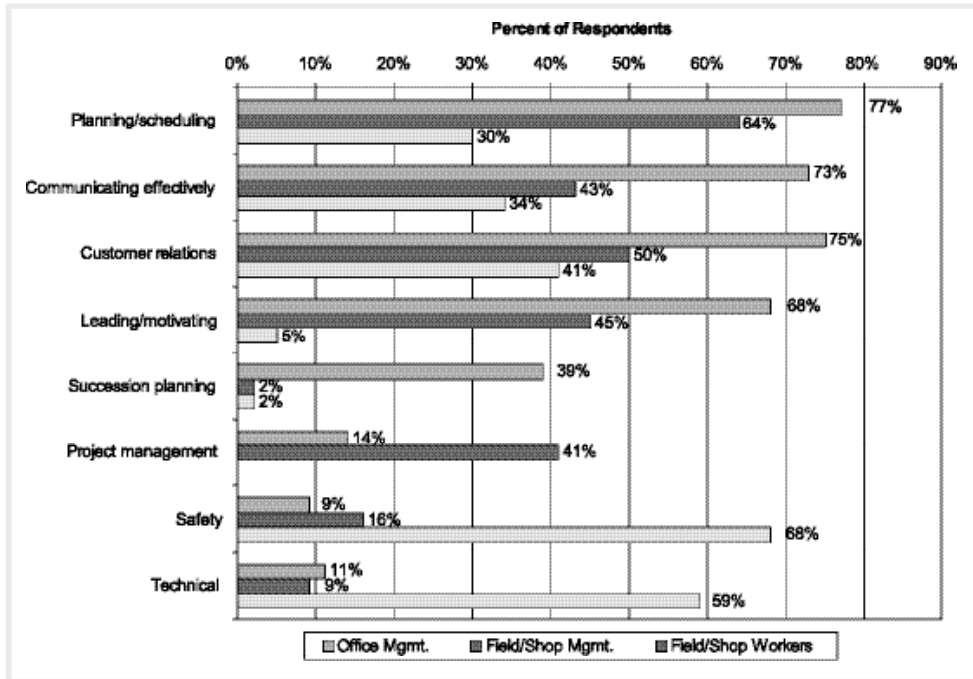


Figure 31: Training by Position (100% Union; Percent of Respondents)

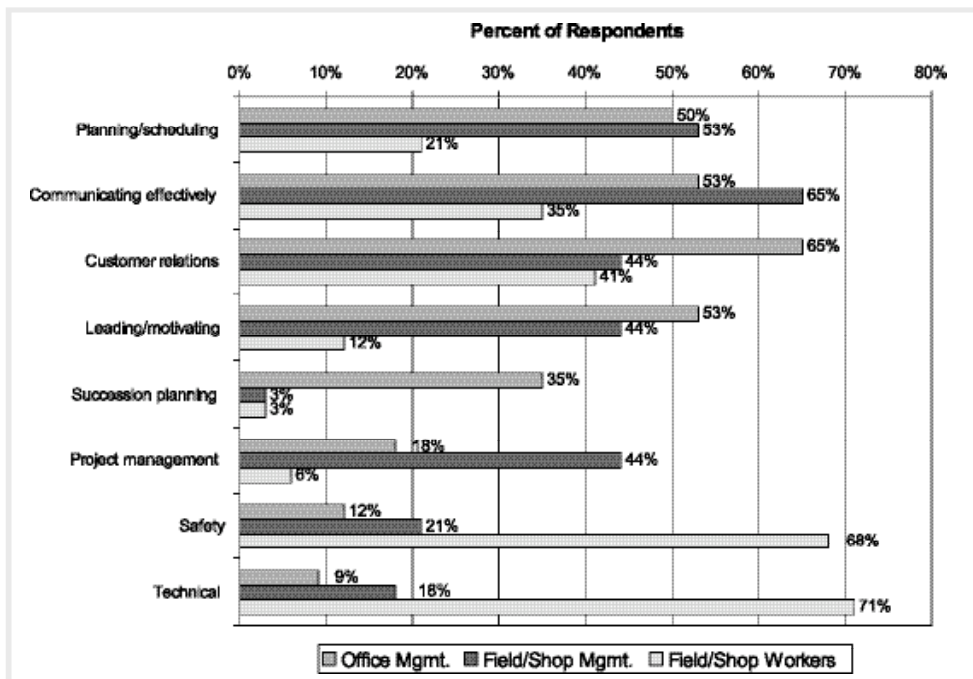


Figure 32: Training by Position (100% Nonunion; Percent of Respondents)

- In broader terms, when measuring out-of-pocket training expenditures in relation to sales rather than payroll, union respondents indicated that their training expenditures represent 1.3% of their total sales. Nonunion respondents indicated that training expenditures represent 2% of their total sales.
- According to Training magazine's 2005 Training Top 100, organizations nationwide are allocating 3.7% of their budgets to training. According to FMI's 2005-2006 U.S. Construction Training Survey, construction companies were allotting only 2.7% of their payroll towards training, or roughly about 1% of sales.
- Survey responses regarding training efforts by position indicated noteworthy variances in training by position between union and nonunion respondents. First, according to survey responses, union contractor training for office management in the areas of planning/scheduling, communicating effectively, and customer relations was more common than nonunion contractor training in the same concentration areas for office management personnel. As expected, survey results indicated that nonunion contractors' technical training efforts for field and shop workers was more common than union contractors' technical training efforts for their field and shop workers. Additionally, planning/scheduling training for field and shop workers was more common according to nonunion respondents, whereas union respondents less often mentioned planning/scheduling training for field and shop workers.

5.7.2 Turnover

Overall, interviewees reported very low turnover, which coincides with the results reported by union survey respondents. Based on various positions, craft/field labor appears to be much more susceptible to turnover than office staff. This is partly due to aggressive recruiting or "poaching" from other contractors who are willing to offer journeymen positions as superintendents/foremen, particularly in areas of tremendous growth.

- There was disagreement among the interviewees as to whether union or nonunion firms had higher turnover, and several respondents mentioned that they believe there is very little difference between the two. According to survey responses, turnover at union contracting firms is slightly lower than at nonunion contracting firms.
- Several interviewees mentioned that the low turnover rates could be attributed to a strong bonus program and recognition for outstanding performance. This not only motivated employees to remain with the company but also fostered a sense of friendly competition. Many respondents gave awards for specific aspects of the job, such as safety. Nearly all respondents mentioned the use of events such as picnics, holiday parties, sporting events, etc., to help establish a sense of community, belonging, and teamwork.

Survey responses suggest that employee turnover is not a significant problem for many union contracting firms, but more comprehensive training programs may help unions and union contracting firms to increase market share and further reduce employee turnover (Figures 33 and 34).

		Office Management	Field Management	Field/Shop Workers	Administration
<5%	100% Union	98%	93%	59%	98%
	100% Nonunion	91%	82%	26%	85%
5-10%	100% Union	2%	5%	26%	2%
	100% Nonunion	6%	12%	26%	6%
11-25%	100% Union	0%	2%	13%	0%
	100% Nonunion	0%	3%	26%	6%
26-50%	100% Union	0%	0%	2%	0%
	100% Nonunion	3%	3%	20%	3%
>50%	100% Union	0%	0%	0%	0%
	100% Nonunion	0%	0%	3%	0%

Figure 33: Annual Turnover (Percent of Respondents)

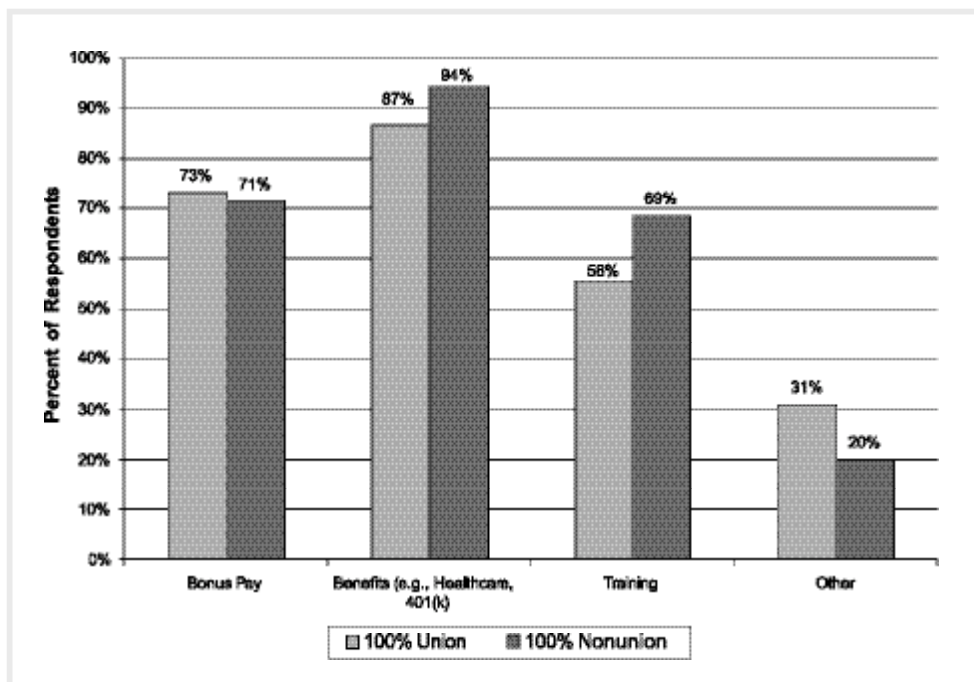


Figure 34: Strategies Employed to Reduce Turnover

- By industry standards, turnover is very low with union contracting firms, according to survey responses. To illustrate the lower turnover rates experienced by union contracting firms, 59% of union respondents indicated that their field and shop worker turnover rate is less than 5%, but only 26% of nonunion respondents indicated that their field and shop worker turnover rate is less than 5%. Similarly, only 2% of union respondents indicated that their field and shop worker turnover rate was 26 to 50%, compared to 20% of nonunion respondents. Along the same lines, 93% of union respondents indicated that their field and shop management turnover rate was less than 5%, but only 82% of nonunion respondents indicated a similarly low turnover rate for field and shop management personnel.
- As approaches to reduce turnover rates, survey responses suggest that nonunion contractors use training and benefits such as healthcare and 401(k) plans as employee retention tools, more commonly than union respondents. Nonunion respondents mentioned benefits as incentives used to reduce turnover in 94% of their responses, compared to union respondents who mentioned benefits only 87% of the time with respect to strategies for decreasing turnover. Training was also mentioned by 69% of the nonunion respondents as a tool to reduce turnover, whereas only 56% of union respondents mentioned training with respect to strategies for decreasing turnover. Union respondents mentioned bonus pay and other incentives more often than nonunion respondents for decreasing turnover – 73% to 71% and 31% to 20%, respectively. The other incentives, which union respondents mentioned more often than nonunion respondents, include things like efforts to improve employee work environment and steps taken to make employees feel valued.
- FMI believes that the lower proportion of payroll spending devoted to training, and the comparatively lower rate of training being used to reduce turnover, which union respondents indicated, are likely a result of the overall structure of the union system. Since union locals provide training to field and shop workers, union contractors largely do not need to address technical training for these employees. Accordingly, union contracting firms may not need to have technical training programs that are as extensive as their nonunion counterparts. As a necessity, the nonunion contracting firms often have extensive and thus more costly training systems in place for employees at all levels. Furthermore, because unions sponsor much of the training that employees at union contracting firms receive, the 2% portion of total sales that training represents for nonunion contracting firms may actually be significantly lower than the proportion of total sales that training would represent for union contracting firms. If the value of the union-sponsored training was factored into the total training value estimate for a particular union-contracting firm, training expenditures could jump from 1.3% of total sales to a proportion much greater than 2%.
- In addition, FMI notes training trends that correspond to the unions' efforts to increase market share. The union survey responses indicate that efforts to improve the customer service and communications skills of union contracting firm employees are being implemented through training.

Survey responses suggest that office management personnel at union contracting firms more commonly receive training in the areas of planning/scheduling, communicating effectively, and customer relations. This may be a result of comprehensive efforts by unions across construction trades to increase their market share by improving perceptions regarding unions among both project owners and other contractors. However, worthwhile training efforts for union contracting firms may be directed toward planning and scheduling skills improvement for field and shop workers and field and shop management, given the pre-job planning and scheduling and schedule updating practices of some union contracting firms that were discussed earlier.

- Overall, FMI notes that survey responses suggest favorable retention rates for union

contracting firms, compared to nonunion contracting firms. However, while focus on bonus pay and other incentives to reduce turnover is yielding comparatively low turnover rates, according to survey responses, further emphasis on improved training and benefits as incentive to reduce turnover could help unions to further enhance performance.

5.8 Performance/Effectiveness

5.8.1 Performance/Effectiveness

Both union and nonunion survey respondents indicate very similar beliefs about their own performance and effectiveness, though the union respondents' perceptions regarding performance and effectiveness in the areas of scheduling and pre-job planning may be overstated (Figure 35).

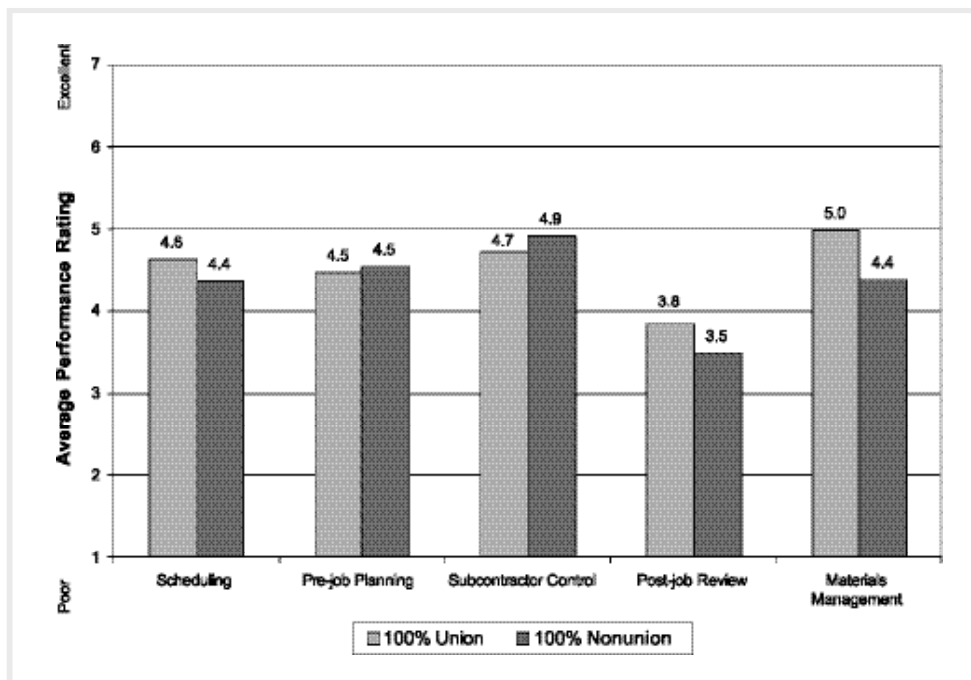


Figure 35: Perceived Performance (Effectiveness)

- Most union and nonunion respondents indicated that they consider their own performance and effectiveness to be roughly average. On a scale of 1 being poor to 7 being excellent, union and nonunion respondents ranked themselves in the categories of scheduling (4.6 to 4.4; union to nonunion), pre-job planning (4.5 to 4.5), subcontractor control (4.7 to 4.9), and materials management (5.0 to 4.4). Then, with regard to post-job review, both union and nonunion respondents indicated that their own performance is somewhat below average – union respondents gave themselves an average rating of 3.8, and nonunion respondents gave themselves an average rating of 3.5. Thus, the perceptions indicated by union and nonunion respondents regarding their performance and effectiveness have no significant variance.

5.8.2 Rework

Union respondents' indications that a relatively small proportion of their jobs require excessive rework may indicate successful union training programs, which prepare workers to produce better quality work products than their independently trained nonunion counterparts (Figure 36).

- Although respondents' perceptions of their own performance were largely consistent, nonunion respondents indicated that a significantly higher percentage of their jobs requires excessive rework. The majority of the union respondents (91%) reported that less than 5% of their jobs require excessive rework. Only about 9% of the union respondents indicated that 6% or more of their jobs require excessive rework. In contrast, only 74% of the nonunion

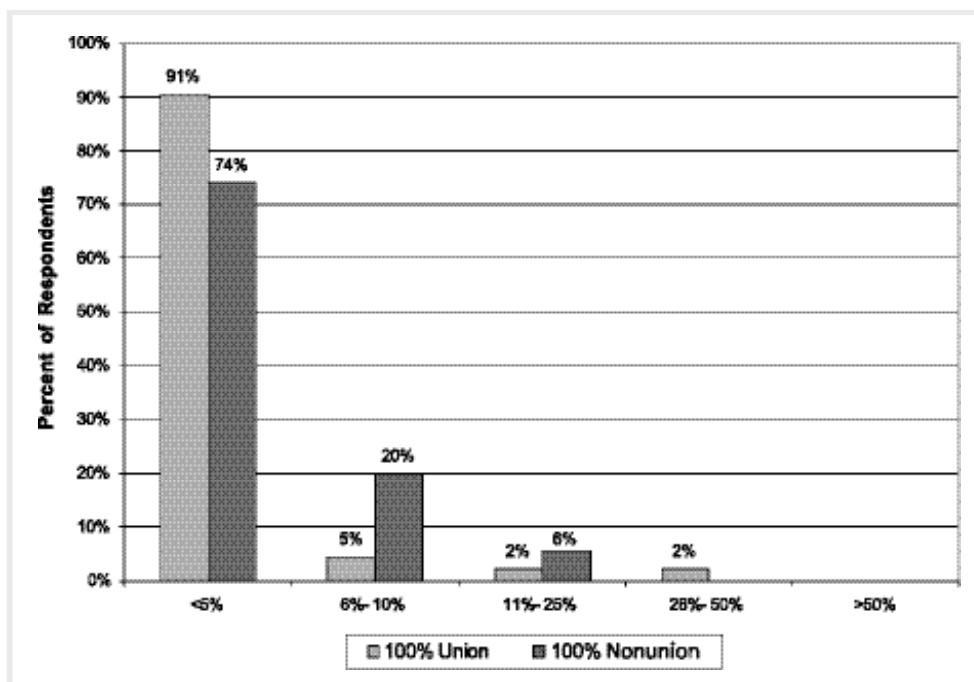


Figure 36: Percent of Jobs Experiencing Excessive Rework

respondents reported that less than 5% of their jobs require excessive rework. Of the remaining nonunion respondents, 26% indicated that 6% or more of their jobs require excessive rework.

- FMI believes that union respondents' perceptions about their own performance and effectiveness reveal two critical facts. First, union respondents' perceptions that their performance and effectiveness in scheduling and pre-job planning are average, and equal to that of nonunion respondents, may be inaccurate. A notably high proportion of union respondents reported that they spend little time on scheduling and pre-job planning, and that they seldom update schedules. FMI believes that regular schedule review and prudent pre-job planning and revision are important processes for any contractor, and that these practices are vital for the overall success of contractors and their individual jobs. Therefore, the union respondents' indications about their performance and effectiveness in scheduling and pre-job planning may demonstrate a misperception and overestimation of the effectiveness of their scheduling and pre-job planning processes.
- Second, FMI believes that the union respondents' perceptions regarding materials management, which give their performance and effectiveness in this category an average rating of 5.0, are likely accurate. The nonunion respondents' perceptions regarding materials management gave their performance and effectiveness a somewhat lower average rating in this category – 4.4. There is likely some correlation between union respondents' higher performance and effectiveness rating, and the more extensive

in-house fabrication shop facilities operated by many union contractors. The internal fabrication facilities likely give union contractors more control over materials management processes, and thus allow them to achieve higher performance and effectiveness in this operational category.

- FMI believes that union respondents' reporting about excessive rework indicates that union contractors are generally able to produce relatively high quality work products without an excessive number of problems or mistakes requiring rework. The nonunion respondents' indications that a higher proportion of their projects require excessive rework may have some correlation with the quality of independent field and shop worker training compared to the quality of union apprentice to journeyman training systems. If union apprentice to journeyman training systems are superior to independent training systems, this could explain the survey responses' indication that nonunion projects more often require excessive rework, compared to union projects.

6 ISSUES EXPRESSED BY SURVEY RESPONDENTS

Typical concerns mentioned by union and nonunion respondents regarding both imminent and future challenges for the industry include:

- **Insufficient labor availability and quality (union and nonunion respondents' concern).** FMI believes that insufficient labor availability and quality will be a leading challenge for the

construction industry as a whole in coming years. The combined effect of vast numbers of retiring baby boomers will combine with dwindling numbers of young workers entering and remaining in construction careers, both degreed and trade positions, to cause an acute and troublesome labor shortage for many firms in the construction industry. For this reason, it will be increasingly important for employers and unions to take effective measures to attract and retain suitable employees. Such recruitment and retention measures will include improvements in training, advancement, compensation, benefits, flexible scheduling, work-life balance, and work environment quality.

- **Market competitiveness against nonunion firms (union respondents' concern).** As mentioned earlier in this report, industry research indicates that unions and union contracting firms have lost significant market share to nonunion firms in recent years. This simple trend, combined with factors such as poor owner and peer contractor perceptions, means that steps being taken by some unions to improve competitiveness are of vital importance to the future of unions in the construction industry. Unions must actively promote the advantages of union labor in order to combat the further commoditization of many construction labor functions.
- **Elevated and rising materials prices (union and nonunion respondents' concern).** FMI believes that elevated and rising materials prices, like labor availability and quality, will pose ongoing challenges to the construction industry at large in coming years. Union and nonunion

contractors alike face margin contraction, and high materials prices, which tend to erode demand and increase costs for contractors, which only exacerbate the problem. As there is little that contractors can do to combat directly rising materials prices and labor rates, secondary profit-enhancing strategies such as increasing productivity, reducing other operational costs, and increasing the quality and discipline of financial management are critical for contractors throughout the construction industry.

- **Adverse evolution of legal and regulatory conditions are causing respondents' to be concerned about problems such as mold contamination liability, workers' compensation claims, labor regulations and pension obligations (union and nonunion respondents' concern).**

FMI expects that legal and regulatory issues will remain an important concern for contractors in this industry. Tort and contract liability for construction defects continues to be a danger for the profitability, and sometimes the survival, of construction contractors. Additionally, safety measures are increasingly important for construction firms, in light of recent substantial workers' compensation insurance premiums increases. Similarly, increasingly stringent regulatory requirements from federal, state, and local agencies often result in more complex and costly construction technologies and harsh penalties for violators. Finally pension obligations are becoming a significant concern for many industries, not just construction.

FMI / Operating Costs Survey

19. Which meetings do the following positions regularly attend?

	Office Mgmt.	Field Mgmt.	Shop Mgmt.	Field/Shop Workers	Admin.
Project kick-off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Project hand-off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Daily huddle/toolbox talk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Project progress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Project close-out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Project post-mortem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. How often do you update the project schedule?

- ☐ Never/ infrequently ☐ Monthly ☐ Daily
☐ Project mid-point ☐ Weekly ☐ On-going

21. For which of the following does your staff receive training?

Office Mgmt.	Field/Shop Mgmt.	Field/Shop Workers
<input type="checkbox"/> Planning/scheduling	<input type="checkbox"/> Planning/scheduling	<input type="checkbox"/> Planning/scheduling
<input type="checkbox"/> Communicating effectively	<input type="checkbox"/> Communicating effectively	<input type="checkbox"/> Communicating effectively
<input type="checkbox"/> Customer relations	<input type="checkbox"/> Customer relations	<input type="checkbox"/> Customer relations
<input type="checkbox"/> Leading/motivating	<input type="checkbox"/> Leading/motivating	<input type="checkbox"/> Safety
<input type="checkbox"/> Succession planning	<input type="checkbox"/> Project management	<input type="checkbox"/> Technical

22. What percent of your payroll goes towards training?

Office Mgmt.	<input type="checkbox"/> <1%	<input type="checkbox"/> 1-2%	<input type="checkbox"/> 3-5%	<input type="checkbox"/> >5%
Field Mgmt.	<input type="checkbox"/> <1%	<input type="checkbox"/> 1-2%	<input type="checkbox"/> 3-5%	<input type="checkbox"/> >5%
Field/Shop Workers	<input type="checkbox"/> <1%	<input type="checkbox"/> 1-2%	<input type="checkbox"/> 3-5%	<input type="checkbox"/> >5%
Administrative	<input type="checkbox"/> <1%	<input type="checkbox"/> 1-2%	<input type="checkbox"/> 3-5%	<input type="checkbox"/> >5%

23. What are your total training costs as a percent of sales? ____%

24. Regarding Workers Compensation Insurance, what is your current Experience Modification Rate (mod rate)? ____

25. What is your average annual employee turnover rate?

Office Management	<input type="checkbox"/> <5%	<input type="checkbox"/> 5-10%	<input type="checkbox"/> 11-25%	<input type="checkbox"/> 26-50%	<input type="checkbox"/> >50%
Field/Shop Mgmt.	<input type="checkbox"/> <5%	<input type="checkbox"/> 5-10%	<input type="checkbox"/> 11-25%	<input type="checkbox"/> 26-50%	<input type="checkbox"/> >50%
Field/Shop Workers	<input type="checkbox"/> <5%	<input type="checkbox"/> 5-10%	<input type="checkbox"/> 11-25%	<input type="checkbox"/> 26-50%	<input type="checkbox"/> >50%
Administrative	<input type="checkbox"/> <5%	<input type="checkbox"/> 5-10%	<input type="checkbox"/> 11-25%	<input type="checkbox"/> 26-50%	<input type="checkbox"/> >50%

26. What strategies do you implement to prevent turnover?

- ☐ Bonus pay ☐ Benefits (e.g., healthcare, 401K)
☐ Training ☐ Other: _____

27. How do you rate your effectiveness relative to the following on a scale of 1 (poor) to 10 (excellent)?

	Poor	Excellent
Scheduling	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	
Pre-job planning	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	
Subcontractor control	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	
Post job review	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	
Materials management	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	

28. What do you believe are the major issues HVAC contractors currently face?

Thank you for your participation. Your responses will be treated with the strictest confidence. All survey data will be reported in aggregate only and no individual respondents or their data will be identified.

FAX to (303) 377.3535, attn: Sabine Hoover, FMI Corp.

If you have any questions, please feel free to call Sabine directly at (303) 398.7238.

For a complimentary copy of the survey results, please provide the following contact information.

Name	Title	
Company		
Address		
City	State	Zip
Phone	E-mail	

8 ACKNOWLEDGEMENTS

The FMI research team would like to acknowledge the contributions of the New Horizons Foundation Task Force whose members provided significant guidance and support on this project. The Task Force was made up of the following individuals:

Dennis Bradshaw, Executive Director
New Horizons Foundation
Chantilly, Virginia

George R. Edinger, Sr.
C & R Mechanical Company
Bridgeton, Missouri

Paul Frascione
New Horizons Foundation
Chantilly, Virginia

David Parks
Holaday-Parks, Inc.
Seattle, Washington

Ron Rodgers, Foundation Chairman Emeritus
Peoria, Arizona

Frederick L. Streimer
Streimer Sheet Metal Works, Inc.
Portland, Oregon

Mark C. Watson, Foundation Vice Chairman
Climate Engineers, Inc.
Cedar Rapids, Iowa

George (Butch) L. Welsch, Foundation Chairman
Welsch Heating & Cooling Co.
Saint Louis, Missouri

Keith E. Wilson
Miller Bonded, Inc.
Albuquerque, New Mexico