

INCREASING REPRESENTATION OF MINORITIES, FEMALES AND UNDERREPRESENTED INDIVIDUALS IN JOURNEY LEVEL JOBS ON HIGHWAY CONSTRUCTION PROJECTS

FINAL REPORT

March 28, 2017

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In cooperation with

New Jersey
Department of Transportation
Bureau of Research
and
U.S. Department of Transportation
Federal Highway Administration

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1. Report No. FHWA-NJ-2017-004		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Increasing Representation of Minorities, Females and Underrepresented Individuals in Journey Level Jobs on Highway Construction Projects				5. Report Date March 2017	
				6. Performing Organization Code	
7. Author(s): Daniel, Janice R., Schachter, Hindy and David Washington				8. Performing Organization Report No.	
9. Performing Organization Name and Address Department of Civil and Environmental Engineering New Jersey Institute of Technology University Heights Newark, NJ 07102-1982				10. Work Unit No.	
				11. Contract or Grant No. NJDOT 2014 – 01	
12. Sponsoring Agency Name and Address N.J. Department of Transportation Federal Highway Administration 1035 Parkway Avenue U.S. Department of P.O. Box 600 Transportation Trenton, NJ 08625-0600 Washington, D.C. 20590				13. Type of Report and Period Covered Final Report November 1, 2015 – December 31, 2015	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
<p>16. Abstract</p> <p>Despite the expected growth of women and minorities in the workforce, women and minorities are still underrepresented and underutilized in highway construction employment. According to the United States Bureau of Labor, in 2013 there were 7,130,000 individuals employed in construction and extraction occupations. Of this total 2.6 percent were women, 6.2 were Black or African-American, 1.6 percent Asian and 31 percent Hispanic or Latino/Latina. NJDOT is committed to addressing these underutilized groups' participation in the heavy highway construction industry and assisting construction contractors to improve their workforce diversity. However, challenges exist that limits NJDOT's ability to meet its goal. New Jersey is a highly unionized state with union members accounting for 16 percent of all wage and salary workers in New Jersey, well above the 11.3 percent union members rate for the nation. As a unionized state, contractors working in New Jersey are reluctant to hire outside of the union because of strict, union hiring requirements. For this reason public work projects, including NJDOT construction projects, are fully staffed with union personnel.</p> <p>One approach for increasing the number of women and minorities employed in highway construction is through Federal Highway's (FHWA) On-the-Job Training (OJT) Program. Despite the recognized benefits of apprenticeship programs as a pathway to opportunities in the heavy highway construction industry, NJDOT's previously developed pre-apprenticeship training program aimed at women, minorities and other disadvantaged individuals, had very limited success due, in part to the strict construction unionized environment. This research seeks to provide NJDOT with information on ways in which to develop and implement a viable highway construction training program given the unionized environment on NJDOT construction projects.</p>					
17. Key Words Construction,			18. Distribution Statement No Restrictions.		
19. Security Classification (of this report) Unclassified		20. Security Classification (of this page) Unclassified		21. No of Pages 59	22. Price

ACKNOWLEDGEMENTS

The authors would like to acknowledge the support of the New Jersey Department of Transportation (NJDOT) including the Project Manager Paul Thomas and Camille Crichton-Sumners, Manager of the Bureau of Research. The authors thank the Research Selection and Implementation Panel members including: Vicki Tilghman-Ansley and Jeffry Overton. These individuals offered valuable comments and suggestions on the research resulting in an improved product.

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INTRODUCTION

Approximately one-third, 36 percent, of the workforce in the United States are people of color, including Hispanic, African-American and Asian. As our nation becomes more racially and ethnically diverse, the number of people of color in the workforce is also expected to increase. Diversity in our workforce is also seen across gender. Currently, women make up approximately half, 47%, of the workforce in the United States. The number of women in the workforce is expected to increase by 6.2% over the next 10 years with women outnumbering men in the workforce by 2020.

Despite the expected growth of women and minorities in the workforce, women and minorities are still underrepresented and underutilized in highway construction employment. The United States Bureau of Labor reports employment statistics on the construction sector which comprises establishments primarily engaged in the construction of buildings or engineering projects (e.g., highways and utility systems). According to the Bureau of Labor household data, in 2013 there were 7,130,000 individuals employed in construction and extraction occupations. Of this total, 2.6 percent were women, 6.2 percent were Black or African-American, 1.6 percent Asian and 31 percent Hispanic or Latino/Latina.

New Jersey Department of Transportation (NJDOT) is committed to addressing these underutilized groups' participation in the heavy highway construction industry and assisting construction contractors to improve their workforce diversity. However, challenges exist that limits NJDOT's ability to meet its goal. New Jersey is a highly unionized state with union members accounting for 16 percent of all wage and salary workers in New Jersey, well above the 11.3 percent union members rate for the nation. As a unionized state, contractors working in New Jersey are reluctant to hire outside of the union because of strict, union hiring requirements. For this reason public work projects, including NJDOT construction projects, are fully staffed with union personnel. Therefore, many construction contractors under contract with NJDOT usually compete amongst themselves for minorities and women in order to meet their respective project minority/female hiring and on-the-job training requirements.

One approach for increasing the number of women and minorities employed in highway construction is through Federal Highway's (FHWA) On-the-Job Training (OJT) Program. This program requires State Transportation Agencies (STAs) to accomplish three objectives: (1) to establish apprenticeship and training programs targeted to move women, minorities, and disadvantaged individuals into journey-level positions; (2) to ensure that a competent workforce is available to meet highway construction hiring needs, and (3) to address the historical under-representation of these groups in highway construction skilled crafts. The primary objectives of OJT/Supportive Services Program (OJT/SS) are to increase the overall effectiveness of each STA's approved OJT program in connection with Federal-aid highway construction projects, and to seek other ways to increase the training opportunities for women, minorities, and

disadvantaged individuals. In turn, OJT/SS is used to increase the participation of women, minorities, and disadvantaged individuals in skilled and semi-skilled crafts.

Despite the recognized benefits of apprenticeship programs as a pathway to opportunities in the heavy highway construction industry, NJDOT's previously developed pre-apprenticeship training program aimed at women, minorities and other disadvantaged individuals, has had very limited success due, in part to the strict construction unionized environment. Nevertheless, NJDOT continues to recognize that apprenticeship programs are great opportunities for individuals to acquire the appropriate training for careers in highly skilled construction occupations with excellent wages and benefits. What's more, NJDOT is required to establish a viable OJT/SS program to increase the representation of these under-represented groups' participation on NJDOT's federally funded highway projects.

This report documents work performed to provide NJDOT with information on ways in which to develop and implement a viable highway construction training program given the unionized environment on NJDOT construction projects.

RESEARCH OBJECTIVES

The overall objective of the research was to develop a framework for use by New Jersey Department of Transportation to establish a viable On-the-Job Training/Support Services (OJT/SS) pre-apprenticeship training program aimed at moving women, minorities and other under-utilized groups into journey-level positions in highway construction skilled crafts. Specific objectives of the research included:

- Perform a labor market analysis of New Jersey's highway construction industry as compared to the Northeast and US highway construction industry.
- Identify and gather information on successful skilled trades training and/or pre-apprenticeship programs connected to highway construction opportunities.
- Perform a survey of neighboring state transportation departments on their OJT/SS training programs.
- Gather information on New Jersey's current highway construction employment and to identify the opportunities in the construction trades.
- Gather information on union membership as it relates to employment on highway construction jobs.
- Make recommendations on the best approach for developing and implementing NJDOT's OJT/SS program.

RESEARCH APPROACH

The tasks performed to achieve the objectives include the following:

PHASE I. Conduct a literature search of state-of-practice

Task II-1: Develop Research Exit Criteria.

Task II-2: Refined Literature Search

Task II-3: Perform a labor market analysis of New Jersey's highway construction industry

Sub-Task II-3.1. Gather and analyze data on the current economic outlook of New Jersey's construction industry.

Sub-Task II-3.2: Assess the worker demand and supply for construction jobs in New Jersey.

Task II-4: Perform a survey of On-the-Job Training/Support Services (OJT/SS) Training Programs.

Sub-Task II-4.1: Survey neighboring state transportation departments on their OJT/SS training programs.

Sub-Task II-4.2: Identify and gather information on successful skilled trades training and/or pre-apprenticeship programs connected to highway construction opportunities

Sub-Task II-4.3: Identify strategies for successful OJT/SS apprenticeship training programs.

Task II-5: Gather and analyze information on Unions and union membership in New Jersey as it relates to employment on highway construction jobs.

Task II-6: Gather information from women and minority engineering technology students about perceptions of construction industry

Task II-7: Prepare recommendations for a viable On-the-Job Training/Support Services (OJT/SS) pre-apprenticeship training program.

Task II-8: Prepare quarterly and final reports.

The research began with a literature review on apprenticeship and pre-apprenticeship programs for highway construction and for other related fields. To assess when the requirements for the completion of the project have been met, research exit criteria were developed in Task II-1. In Task II-3, a labor market analysis of New Jersey's highway construction industry was performed. The task involved gathering and analyzing data on the current economic outlook of New Jersey's construction industry and assessing the worker demand and supply for construction jobs in New Jersey. A survey of the On-the-Job Training/Support Services (OJT/SS) Training Programs was performed in Task II-4. The survey involved both an interview-style of neighboring state transportation departments, as well as an online-style survey of Office of Civil Rights within state Departments of Transportation. The survey sought to identify and gather information on successful skilled trades training and/or pre-apprenticeship programs connected to highway construction opportunities.

In Tasks II-5 and II-6, the research team sought to gather and analyze information on unions and union membership in New Jersey and to gather information from women and minority engineering technology students about perceptions of construction industry. In Task II-7 recommendations towards the development of a viable on-the-job training/support services pre-apprenticeship training program were developed.

SUMMARY OF LITERATURE REVIEW

Understanding the Need

The recruitment and retention of minority group members and women in transportation construction is crucial for many reasons. As a legal matter, it is imperative to align transportation construction with civil rights and affirmative action policies. Through accords with FHWA, state departments of transportation agree to facilitate women and minority entry into construction trades. The U. S. Department of Transportation's on-the-job training programs require state agencies to establish programs to move underrepresented populations into journey-level jobs.

As a management matter, the construction industry needs to create new pipelines for skilled labor. New recruitment pools are especially important at a time when the graying of the workforce suggests agencies will not find sufficient qualified workers in their traditional pools, particularly with increased retirement by current workers (Holzer and Lerman 2007).

As a matter of economic progress, society needs significant numbers of people employed in well compensated jobs to maintain consumer spending. Construction workers on unionized projects receive a paycheck that enables them to join the middle class consumer population. As more women and members of minority groups enter this population, we will see a more equitable dispersion of middle class communities (Mayor's Advisory Commission on Construction Industry Diversity 2009).

Previous Research

Historically transportation has been a white male dominated field that did not benefit sufficiently from the talents of underrepresented groups (Bowling et al 2006). In the past decade and a half some improvement occurred in managerial and executive level jobs (Schachter 2005; Schachter 2008). However, the role of women and minority groups in blue collar construction remained subpar (Anderson et al 2007; Transportation Equity Network 2011). In the 1970s, U.S. Secretary of Labor Ray Marshall emphasized the importance of expanding the transportation construction labor pool and his department funded programs to aid recruitment and pre-apprenticeship programs. However, these efforts diminished in the 1980s, a decade that saw the downsizing of many government agencies (Coalition of Labor Union Women 2008). In 1991, Katherine Bishop noted that the federal government had set a goal of 20 per cent female participation in California's apprenticeship in 1978, but by her own day women only made up two per cent of the construction work force. Responding to such glaring disparities, in 1992, Congress passed the Women in Apprenticeship and Nontraditional Occupations Act (WANTO) which provides technical assistance to employers and labor unions to hire women as apprentices and in non-traditional spheres (U. S. Department of Labor 2011).

Most research on women and underrepresented minorities in transportation has focused only on managers and professionals, primarily civil engineers. Those studies that exist about blue collar workers tend to document reasons why women and minority group members do not enter the field. This literature tends to look at the experience of women *or* minority group members rather than examining both categories in tandem even though recruits to construction work have co-structured identities. Such identities mean that women have interlocking gender and race attributes that we may have to examine together to produce effective recruitment strategies (Hankivsky 2014). A strategy that proves effective for white non-Hispanic women might not necessarily work well in other female populations. For example, Hispanic women, in general, have lower employment rates than non-Hispanic white and black women (U. S. Department of Labor 2011). We may need to understand the reasons for this demographic pattern if we want to attract Hispanic women.

A Culture of Discrimination

Menches and Abraham's (2007) literature review found that many women perceive construction as a field for men because of the outdoor work and the current male domination. Anderson et al (2007) found culturally rooted perception problems including a sense that construction was an overwhelmingly male field that would not accept female participation. Dabke et al (2008) Cincinnati survey found that women perceived problems with pay, benefits and job security. Dainty and Lingard (2006) found that in the United Kingdom and Australia work practices and internal industry culture stymied women's careers.

An early study on race found that African American applicants often encountered discrimination if they attempted to access construction jobs (Waldinger and Bailey 1991). Up until recently unions were not sympathetic to enlarging the construction labor pool to include African Americans or other racial and ethnic minorities although they have now started to support pre-apprentice programs targeted to disadvantaged groups and women (Zopp 2013). If people in underrepresented minority groups anticipate hiring discrimination, they are not likely to apply for construction apprenticeships or jobs. Lawyers call this development "the chilling effect" produced by a far from level selection field (Mayor's Advisory Commission on Construction Industry Diversity 2009).

Little work has been done on Hispanic participants in apprenticeship programs. However, a study produced for the Iowa Department of Transportation noted the need to use culturally and linguistically appropriate teaching materials (National Concrete Pavement Technology Center 2007). Anderson et al (2007) proposed recruiting for on-the-job training and pre-apprenticeships in bilingual media.

While research on impediments to the entry of underrepresented groups in construction work is important for understanding the current terrain, it only gives information on the existing problems—not on how to overcome them! It is also important to examine how state and local transportation agencies are trying to design workable programs to increase labor pool diversity. We examine this literature in the next section.

Designing Workable Programs

In the northeast highway construction is a unionized field. Getting members of underrepresented groups into union apprenticeship programs is therefore a key to recruiting and training future workers. Traditionally women and minority applicants had trouble accessing such programs. To level the playing field consortia of unions, building trade organizations and government agencies have inaugurated pre-apprenticeship programs directed towards members of traditionally underrepresented populations. NJDOT had such a program but it had little success. It is thus important to analyze how other such programs are faring and what NJDOT can learn from programs that meet their goals. Because of the key role that unions play in this environment researchers need to know how each affected union works in order to recommend tailored change (Mayor's Advisory Commission on Construction Industry Diversity 2009).

Effective programs may vary depending on the work needs in a particular location. Aware of this imperative, the Louisiana Department of Transportation and Development's (2008, p. 4) advises contractors who supply on-the-job training that they are to "train according to their work force needs and as training opportunities exist on a project."

Transportation Equity Network (2011) has provided a key source for understanding on-the-job training and apprenticeship programs in all 50 states and Washington DC. While they concluded that most states are doing a poor job of training women and minority group members, they called Illinois and Indiana "standouts," and gave a good assessment to Connecticut and Minnesota. Using their report as a template, researchers could do interviews to learn the political networks and resources that undergirded development of these premier programs and how they work today.

Three types of literature on various pre-apprenticeship programs (in and outside the transportation field) could also support such an analysis. The Aspen Institute's Workforce Strategies Initiative analyzed over 200 pre-apprenticeship programs and chose four to explore most fully: Portland's Oregon Tradeswoman; Jumpstart 13 in Baltimore, Maryland; Hartford, Connecticut's Job Funnel; and Wisconsin's Regional Training Partnership. The researchers concluded that successful programs developed extensive networks including representatives of businesses, union leaders, trade association officials and public-agency representatives. Even with these networks programs had to work hard to mesh skill training with abilities projects needed in a given area. Keeping retention high in the pre-apprenticeship program itself was also an issue (Helman, Blair, and Gerber 2012).

Evaluations of individual pre-apprenticeship programs allow researchers to see which strategies have worked and which need improvement in specific cases. Fuchs, Warren and Bayer (2014) evaluated the Edward J. Malloy Initiative for Construction Skills Pre-apprenticeship Program in New York City. Through a long term partnership among city schools, apprentice programs, unions, contractors, local government administrators and the nonprofit workforce development community, this endeavor has placed minority

youth in jobs with an average salary of \$67,000. The evaluators found that an important aspect of the program's success was that program administrators had good relations with high school guidance counsellors.

Mabe (2007) evaluated a pre-apprenticeship program in Newark, New Jersey. He found that the program had better outcomes with adult participants than with students under 20. The program also needed greater outreach to the Hispanic community.

The Alaska Department of Transportation (2010) reported problems with its on-the-job training program. A goal was to have graduates find jobs but contractors preferred to hire apprentices rather than those people who had gone through the OJT program. The report also noted that OJT may work better in some construction fields than others. Work on ferries and the ferry terminal was one place where OJT graduates did find work.

An evaluation of Montana's on-the-job training program found that six of 50 participants reported being treated inappropriately during their training. Four participants said the inappropriate behavior occurred because of their gender. Five of the six participants who complained were Native Americans. As the complaints all arose from participants working with one contractor, this unfortunate outcome reinforces the need for DOTs to screen network members carefully (Baldrige 2007).

Connecticut's Permanent Commission on the Status of Women (2009) developed a manual for organizations that wanted to start pre-apprenticeship programs. The manual offers advice on managerial issues; for example, it urges programs to find multiple funding sources rather than to rely on one budgetary source. It also gives day-by-day operational-level advice such as suggesting that programs should reimburse each participant for a good pair of work boots.

LABOR MARKET ANALYSIS

A labor market analysis of New Jersey's highway construction industry was performed in Task II-3 of the research. The labor analysis involved gathering and analyzing data on the current economic outlook of New Jersey's construction industry and assessing the worker demand and supply for construction jobs in New Jersey. The New Jersey Department of Labor and Workforce Development performed two labor market analyses for the construction industry. The first analysis was performed in 2011 and the second in 2015 (Bureau of Labor Market Information, 2011; Paken, 2015). Presented here are some of the findings from those studies with additional research performed focusing on employment and industry outlook trends for the Heavy and Civil Engineering subsector. Mention is given to the other construction sectors for comparison purposes.

The United States Department of Labor (USDOL) defines the construction sector as consisting of three subsectors: Construction of Buildings; Heavy and Civil Engineering Construction; and Specialty Trade Contractors. The Heavy and Civil Engineering Construction subsector comprises establishments whose primary activity is the construction of entire engineering projects (e.g., highways and dams), and specialty trade contractors, whose primary activity is the production of a specific component for such projects.

Overview of Labor Market in US and NJ in 2016

In December 2016, the total nonfarm employment in New Jersey was 4,086,400 and the private sector employment was 3,473,000. Compared to the recessionary low point in September 2010, New Jersey's employment has almost recovered to pre-recession conditions. Between 2015 and 2016 total employment increased by 13,600 jobs. Much of this increase was in "Other Services", "Financial Activities", "Manufacturing" and "Construction". Unemployment rates in New Jersey mirrored that of the US at a rate of 4.7% in December 2016. By county, unemployment rates are much higher in the southern portion of the state, compared to the northern or middle counties.

Figure 1 shows the employment statistics for New Jersey's construction employment by industry for 1990 to 2014. The figure shows beginning in 2008 a sharp decline in construction employment due to the national recession. This decline is evident among all three construction subsectors. Since 2010 there has been a steady increase in the number of construction employees. In 2014, New Jersey's construction industry averaged 141,900 jobs. Of these jobs, 64 percent involved specialty trade contractors, 22.5% involved construction of buildings and 13.5 % involved heavy and civil construction.

Figure 2 shows the annual average employment change in the construction employment between 1990 and 2014 by industry. Between 1990 and 2014 there was a decrease in New Jersey’s construction industry employment of 3.9%. Construction of Buildings experienced the highest decrease of 9.1%, followed by a decrease of 5.4% in Heavy and Civil Construction and a 1.7% decrease in Specialty Trade Contractors. Between 2006 and 2010 there was a yearly decline in construction employment with the largest decline of 15.7% occurring between 2008 and 2009. Between 2010 and 2011, construction employment experienced its first increase after this recessional period. This increase would occur for the next four years. In 2012 and 2013, the construction industry experienced employment growth in all three components of the construction industry with an overall growth of 5.5% between 2012 and 2013 and a growth of 3.1% between 2013 and 2014. . Specialty trade contractors added 2,700 jobs, heavy civil engineering grew by 500, and construction of buildings increased by 1,100. Between 2013 and 2014, there was an increase of construction employment of 3.1%. Construction of Buildings experienced the highest increase of 3.6%, followed by Specialty Trade Contractors with an increase of 3.1% and a 2.7% increase in Heavy and Civil Construction.

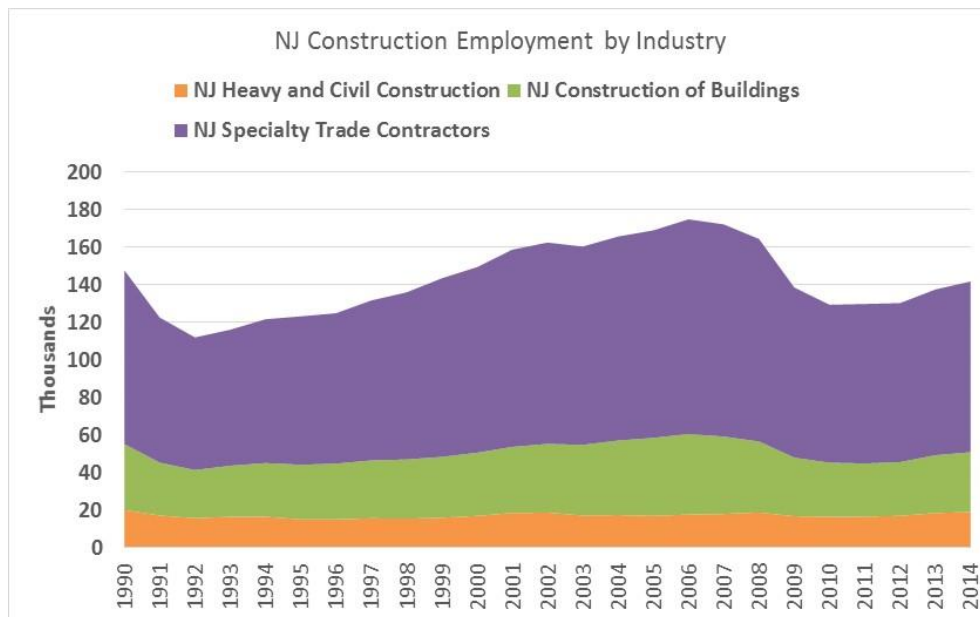


Figure 1. NJ Construction Employment by Industry

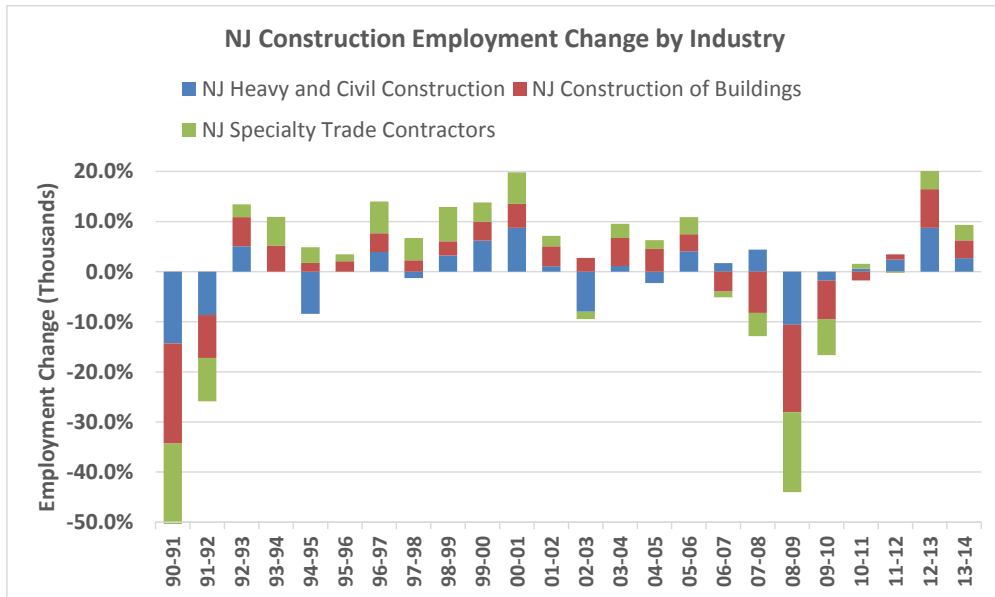


Figure 2. NJ Construction Employment Change by Industry

New Jersey’s construction industry directly contributed \$12.6 billion in 2005 inflation-adjusted dollars to the nation’s 2009 gross domestic product and paid higher average annual wages (\$60,588) than the average for the state’s private sector as a whole (\$54,542) (Bureau of Labor Market Information, 2011).

Gender and Ethnicity Differences

The US Department of Labor’s Labor Force Statistics from the Current Population Survey provides number of employed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity. Table 1 shows the number of employed persons for Construction and Extraction Occupations for 2013 and 2016. Women and each minority group represents less than one percent of the total employed in this field with Hispanic or Latino representing the highest number. Although there were increases in the number employed between 2013 and 2016, the increases are quite small when compared total number of those employed.

Table 1. Number of Employed Persons in Construction and Extraction Occupations by Sex and Race (In thousands)

Group	2013		2016		Percentage Change
	Number	Percentage	Number	Percentage	
Women	2.6	0.036%	3	0.038%	13.3%0
Black or African American	6.2	0.087%	6.8	0.086%	8.8%
Asian	1.6	0.022%	1.7	0.021%	5.9%
Hispanic or Latino	31	0.435%	34	0.429%	8.8%
Minorities		0.544%		0.536%	
Total	7130		7929		10.1%

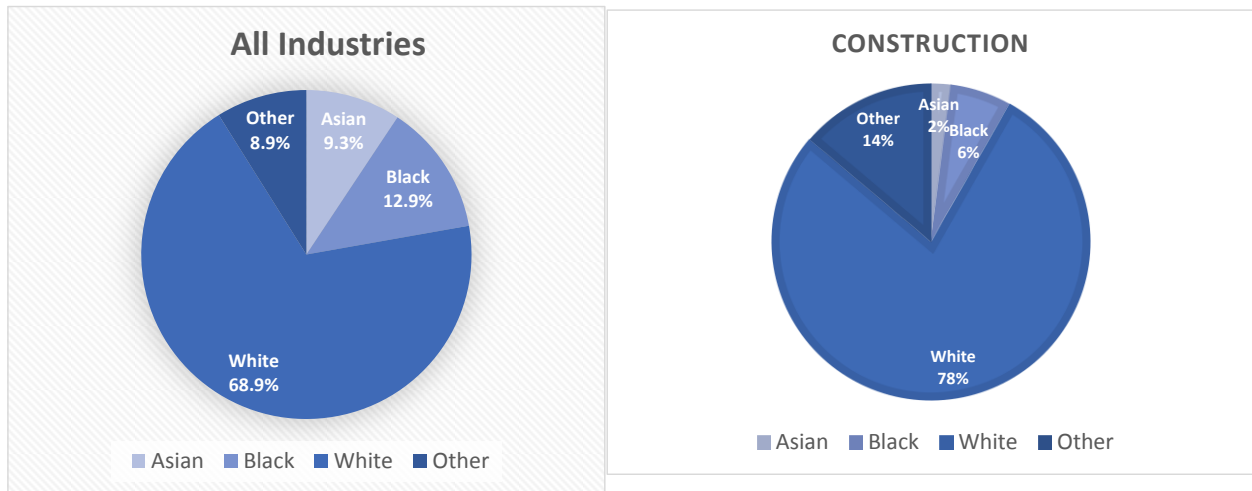


Figure 3. Racial Profile of New Jersey Residents within Construction (Packen, 2015)

Data from the 2013 American Community Survey provides a picture of the gender, racial and ethnic profile of New Jersey residents within construction. Females make up 9 percent of the construction workforce compared to 48 percent in all other industries. Figure 3 shows the distribution of New Jersey residents within construction by race. Compared to all industries, the construction workforce is much less diverse than all industries. Hispanics make up 24.8% of the employees within construction compared to 18.6 % in all industries, demonstrating that the construction workforce has slightly more Hispanics than average.

Construction Employment Projections

In 2011, the NJ Department of Labor and Workforce Development estimated that the number of workers employed in the state as construction laborers would increase through 2018. In 2015, as shown in Figure 4 it was projected that New Jersey's construction industry would grow through 2022 at an average rate of 2.5% per year. This is compared to an average 0.6% per year decrease in employment between 1990 and 2013. In 2011, the three most numerous construction trade occupations in New Jersey were carpenters (15,600), electricians 10,400) and plumbers (7,200), including pipefitters and steamfitters.

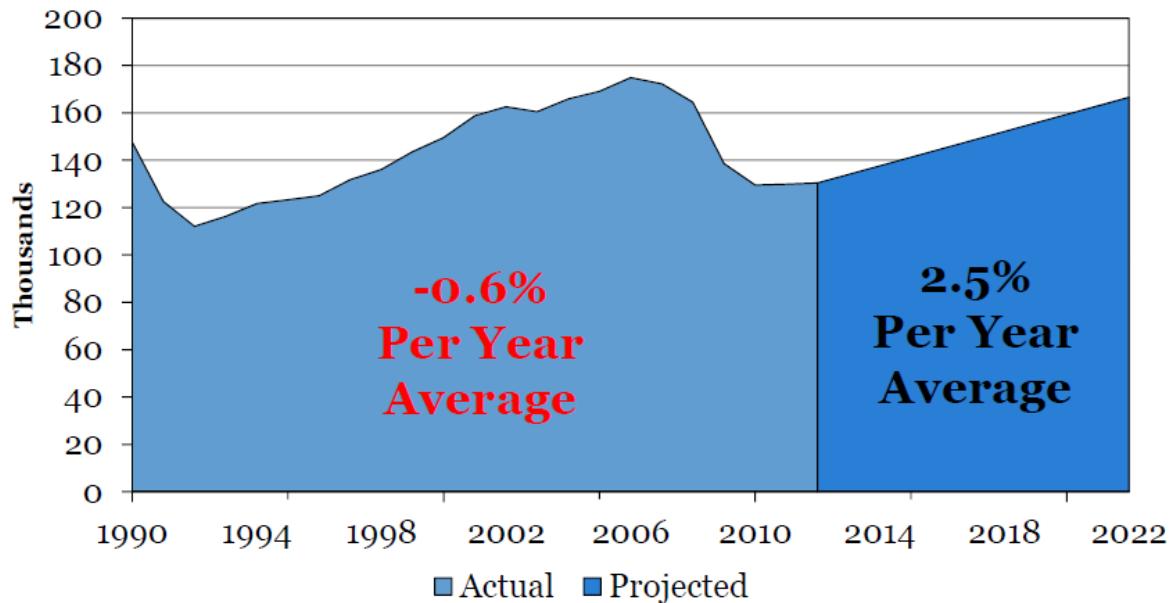


Figure 4. Actual and Expected Growth in the Construction Industry Employment (Packen, 2015)

Despite this expected growth, New Jersey still lags behind the US projected growth rate in the construction industry. Between 2012 and 2022, the construction industry in the US is projected to grow at an annual rate of 2.6 percent, compared to New Jersey's 2.5 percent growth rate. Within the same period, construction in the US is projected to see a total percent increase in employment of 28.8 percent compared to a projected growth of 27.7 percent in New Jersey. Within the construction sectors, construction of buildings is projected to see the largest annual percentage growth of 3.4% by 2022, compared to a growth of 2.4% for specialty trade and 1.1% for heavy and civil engineering.

SURVEY OF OJT/SS TRAINING PROGRAMS

Survey State Transportation Departments

In Task II-4 of the research a survey of On-the-Job Training/Support Services (OJT/SS) Training Programs was performed. The task involved three sub-tasks including: (1) Survey neighboring state transportation departments on their OJT/SS training programs; (2) Identifying and gathering information on successful skilled trades training and/or pre-apprenticeship programs connected to highway construction opportunities; and (3) Identifying strategies for successful OJT/SS apprenticeship training programs.

In the first sub-task a survey of OJT/SS neighboring states was performed. The goal of reviewing training programs from neighboring states was to capture information from states that may have similar demographic and construction conditions and states which may also be impacted by unions. The aim was to learn about best on-the-job training/support services practices implemented in neighboring state DOTs including Massachusetts, Pennsylvania, Connecticut, New York, Maryland. The survey was done through phone interviews and asked the following questions:

1. Who was involved in developing the OJT/SS training programs both in the DOT and among outside consultants?
2. What were the program's objectives?
3. How well were they accomplished?
4. If the program was not as successful as envisioned, what were the problems? Why did they occur? What, if anything, would administrators do differently in the future?

Neighboring State DOT OJT/SS Programs

The following provides a summary on how five neighboring state DOTs implemented Federal Highway Administration funded on-the-job (OJT) and supportive services (SS) programs designed to move women, minorities and disadvantaged individuals into journey level highway construction positions. The first section describes individual programs. The second provides discussion and analysis. The third uses insights from agency documents and telephone interviews with program administrators to recommend some ways DOTs can construct effective programs.

Massachusetts

MassDOT's Office of Civil Rights administers OJT programs designed to get a pipeline of construction workers targeting women, traditionally underrepresented minorities and people living below the poverty line. All contractors working on projects funded by the federal government have a mandatory obligation to sponsor one trainee for each \$3

million in funding. MassDOT compliance officers work with contractors to see that they fulfill their obligations.

In 2013 MassDOT ran its own pre-apprenticeship program. The department invited contractors to participate in safety training. This allowed contractors to meet the trainees and form relationships with them. Unions gave presentations about how people can get into their apprenticeships. For students, attendance was mandatory; they had to come on time to all sessions. Fifty eight of 60 students completed the program. Out of those 58, 40 found apprenticeship and/or job placements.

In 2014 the state used its funds to expand pre-apprenticeship programs provided by nonprofit organizations so that they would include underrepresented groups. One program was the Building Pathways Program led by the Metropolitan Boston Building Trades Council, a partnership of community groups and unions. This was a free, seven-week program. It provided classroom education and construction site visits. If trainees gained union apprenticeships or construction jobs, the DOT would give them up to \$1200 for supplies. Students must receive permission before purchase.

Dot staff members travel across the state giving over 100 presentations on the OJT programs yearly to women's groups and faith-based organizations. Translation services are available at presentations. The department also participates in Massachusetts Construction Career Day, an event that targets high school students. The department uses Facebook and Twitter to advertise the presentations.

The contact at MassDot stressed the need to understand the economy and contractors' actual needs before planning programs. The key is talking to contractors. Get them to articulate their needs and then build programs to support those needs. Engage the contractors in the training process. The contact also considered that it would be useful to expand pre-apprenticeship programs to include training for safety officers and quality assurance technicians. These jobs might attract additional women.

Pennsylvania

PENNDOT administers OJT programs out of its Civil Rights Office to train minorities and women for construction union journey status. Emphasis is put on teaching craft work skills and good work habits. Unions recruit graduates of the PENNDOT offerings for their apprenticeship programs.

PENNDOT has a contract with Global Quality and Engineering Consulting Co. to provide orientation and counselling services to OJT/SS students. This company also offers OJT graduates liaison to union apprenticeship offerings. The Department publicizes its offerings through career fairs held throughout the state. Generally the fair includes a presentation from DOT officials and a chance for applicants to ask questions.

PENNDOT follows up with program graduates to find out what happens to them after they complete the training. It sends a survey asking if they are employed. It uses phone calls to engage with those graduates who do not respond. PENNDOT involves unions and contractors in training. Participation is mandatory for contractors on federally funded projects.

Connecticut

Connecticut's OJT/SS programs are designed to forward entry of women and traditionally underrepresented minorities in highway construction. Contractors with federally funded contracts worth \$4.5 million must fund one trainee. The number of trainees rises with the contract amount up to a maximum of six trainees for firms holding contracts of \$40 million or more.

Currently Connecticut has a pre-apprenticeship program with 15 trainees. The first step in training is to give these students a needs assessment to see which skills they should learn. Connecticut uses the Comprehensive Adult Student Assessment to test basic math skills etc. The program also teaches job and life skills. A consultant firm, New Haven Construction Workforce Initiative 2, administers the program. This organization works with relevant unions and contractors to arrange useful presentations for the trainees. The program is classroom based with some site visits.

ConnDOT uses FHWA funds to offer additional post-graduation services to those people who complete the program. The DOT administrators can help graduates find jobs if they are laid off. The department helps program participants pay union dues; it also pays for work boots, tools, and child care. The program has a mandatory attendance requirement. Not everyone meets this requirement so not every student completes the program. But those who do finish the training acquire skills that can set them on the path for good jobs. The contact at ConnDOT stressed that the key to success is having the right partners—contractors, unions, and consultants. Also administering the program requires a great deal of paper work that can sometimes be difficult for state department administrators to complete within the time periods given.

New York State

New York contracts out its OJT training with a goal to get women and traditionally underrepresented minorities into construction jobs. In 2016, NYSDOT had an RFP circulating where they invited responsible consultants to apply to become program administrators for Heavy Highway Work Training. In the meanwhile, NYSDOT participates in Career Construction Days. Administrators introduce high school students to highway construction work with hands on presentations. Unions and contractors also participate in the sessions.

Until 2013 NYSDOT used federal Recovery Act funds to sponsor a Youth Construction Initiative Program for juniors and seniors in technical high schools. The program offered classroom instruction, education in life skills such as searching for jobs and preparing for interviews, and summer on-the-job training. NYS DOT contracted with Centro Civico, a Latino/Latina community organization, to coordinate and provide the training.

Maryland

Maryland's Build Up program aims to make disadvantaged people competitive for highway construction jobs. In different program segments the idea of helping the disadvantaged can focus on people who are low income, members of traditionally underrepresented minority groups, women, people who have been in foster care, and formerly incarcerated persons.

Because MDDOT does not have workforce development experience it coordinated the program with Maryland's Department of Labor in 2012. Subsequently it transferred the program to DOL. Community colleges and various nonprofits such as Catholic Charities and the Job Opportunities Task Force actually provide the services. They give recruits basic skills assessments to see what needs to be taught. In planning the programs, they consult with relevant unions to learn which skills are the key to success in the field. They invite contractors to make presentations at the training.

In 2012 MDDOT publicized the program on its website. The department received over 2,000 replies. It wanted to train 30 to 50 people. They selected from among the applicants by requiring a high school diploma or GED and giving drug tests which many people could not pass. The nonprofits also do background checks although no uniformity exists on which crimes are considered barriers to program entry.

The program gives stipends. Many participants are unemployed. Without funds they could not attend training. The state also pays for tools, boots and hard hats.

Each service provider has its own attendance requirements. One program had a policy that two unexcused absences removed you from the program. But my contact noted that for strict attendance policies to be appropriate you need to have counsellors who will call trainees who are absent and find out if they have a valid excuse.

Most of the training is classroom based. A lot takes place in community college labs.

About 75 to 80 per cent of trainees complete the program. Of these, about 60% get a job in the next six months. After that time, the program loses contacts with them.

My contact stressed the need to engage the contractors right from the start if you want trainees to get jobs. The program has to ask them which skills the trainees need. For

example this year a Baltimore program focused on welding because of its importance for bridge maintenance, a type of work which will be important in that city.

In addition, my contact stressed that the program is expensive for the number of people trained. Training with people who have not had jobs in this field requires spending money on counsellors to monitor the trainees, give them life skills assistance and help them succeed.

My contact also said that because of state political concerns, the department should try to spread programs geographically throughout the state. It should not limit funds to one area.

NATIONAL SURVEY OF STATE DOT OJT/SS PROGRAMS

The wealth of information obtained from the survey of neighboring states prompted the research team to expand the survey to gather information from a wider number of states. Similar to the survey performed of the neighboring states, the goal was to learn about best on-the-job training/support services practices implemented. The survey candidates included members and friends of the AASHTO Subcommittee of Human Rights. The member and friends list consisted of 70 individuals from state Departments of Transportation representing 50 states, the District of Columbia and Puerto Rico.

A copy of the survey form used is provided in Appendix D. Included in the survey were thirteen questions including:

1. Does your agency have an On the Job Training (OJT)/Support Services (SS) programs?
2. If so, which office manages this program?
3. What are the goals of your OJT/SS program?
4. What partners do you use to run your program?
5. How do you recruit participants for the program?
6. What media outlets do you use to advertise your program?
7. What expenses do you reimburse participants of the program?
8. What are your program's rules on attendance?
9. What are the components of the program?
10. What strategies are used to increase placement of participants in apprenticeship programs or jobs?
11. How would you rate the success of your program?
12. To what would you attribute your program's success or limited success?
13. What is the approximate size of your most recent training program?

Completed surveys were received from the 19 states and represented by the following organizations:

- Alabama DOT
- Arkansas State Highway & Transportation Department
- Delaware DOT
- Florida DOT
- Idaho DOT
- Illinois DOT
- Kansas DOT
- Kentucky Transportation Cabinet
- Massachusetts DOT
- Michigan DOT
- Missouri DOT
- New Hampshire DOT
- Oklahoma DOT
- South Carolina DOT
- Tennessee DOT
- Vermont Agency of Transportation
- West Virginia EEO Division/DOT
- Wisconsin DOT

The following provides a brief summary of key survey questions.

Eighteen of the 19 states reported they have On-the-Job Training (OJT)/Support Services programs. Thirteen of the States report that their OJT/Support Services program is run out of their Office of Civil Rights. The other states report their OJT/Support Services is run out of the following offices: Compliance and Business Opportunities Bureau; Equal Employment Opportunity Office; Office of Business and Workforce Diversity; and the Office of Minority and Small Business Affairs.

Program Goals

We asked respondents to state the goals of their OJT/SS programs. Overall, most programs focused on increasing the number of women and minorities in heavy highway construction trades. Other targeted groups for the program included disadvantaged individuals, especially veterans.

Partners

The types of partners used by survey responders to run the OJT/SS program is shown in Figure 5. For this question, participants were allowed to check all of the partners they use. A small percentage (11%) of the respondents indicated that they did not use partners. Of the possible partners listed in the survey, Women's Organizations were the highest selected partner with 44% of respondents indicating this group as a partner. Industry partners were next selected with 38.9% indicating this group as a partner. Unions and State Department of Labor were next selected with 33% selecting these groups as partners that are used.

Over 70 percent of respondents indicated partnerships with organizations not listed in the survey. These organizations included:

- Non-profit/Grass-root organizations
- Consultants
- Community, Technical Colleges and Minority Institutions of Higher Education
- FHWA
- Industrial partners
- Local Tribes
- Jobs Corps/One Stop Centers
- Regional Technical Centers
- Community Action Agencies
- Urban League/NAACP
- DBE Contractors Associations
- Government agencies including:
 - Department of Economic and Community Affairs
 - State Department of Education
 - Department of Social Services

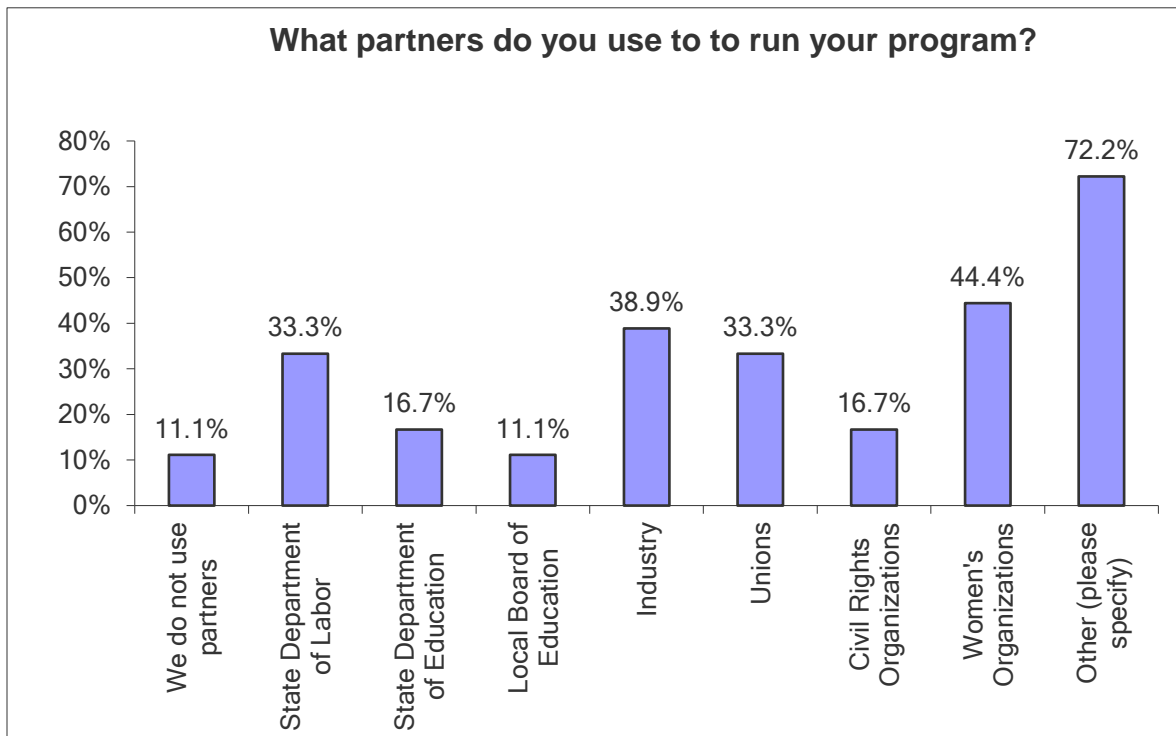


Figure 5. Program Partners

Recruitment

Survey respondents provided a broad range of approaches used to recruit participants to the program. Recruitment methods used more frequently by respondents included recruitment through community organizations including churches and Faith-based organizations. Paid advertisement was used as a recruitment method by several respondents. The type of media used included newspaper advertisement. Several participants relied on program partners for their recruitment. Contractors have an essential role in recruitment in some states. In one state the contractor recruits current employees or new employees to the program. Contractors may also utilize unions to recruit. Word of mouth was also stated by several responders as one of the recruitment mechanisms used. Some of the less frequently used recruitment methods included the following:

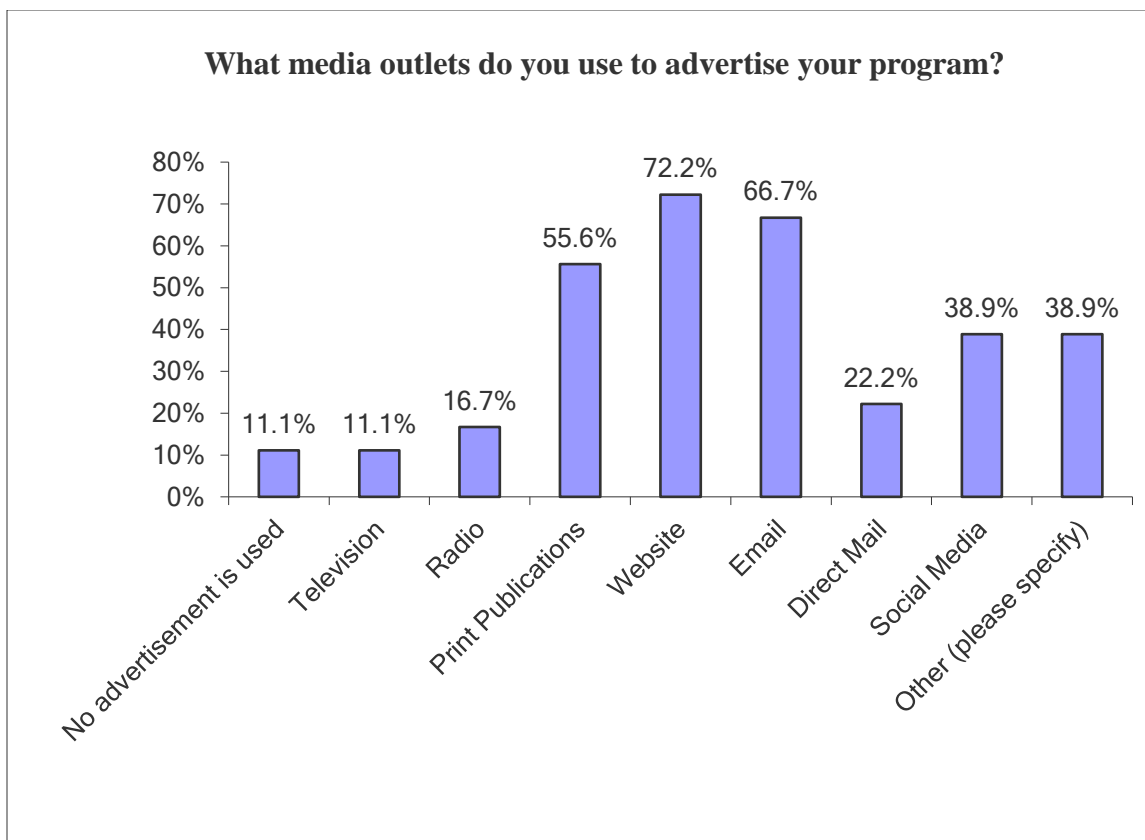
- Educational Institutions (e.g. trade schools)
- Participants are selected from previous programs if they are still seeking employment.
- Veterans Affairs
- Working with the state unemployment offices
- Public service announcements
- Graduate ambassadors

- Employment agencies
- Local tribes
- Department of Labor
- Program Events
 - Construction Career Days
 - Summer Transportation Programs
 - Forums
 - Grant-funded Construction-Career Consultant
- Job Fairs

One responder stated their goal to develop a database of interested individuals that can be accessed by contractors for both recruitment and employment.

Media Used for Advertisement

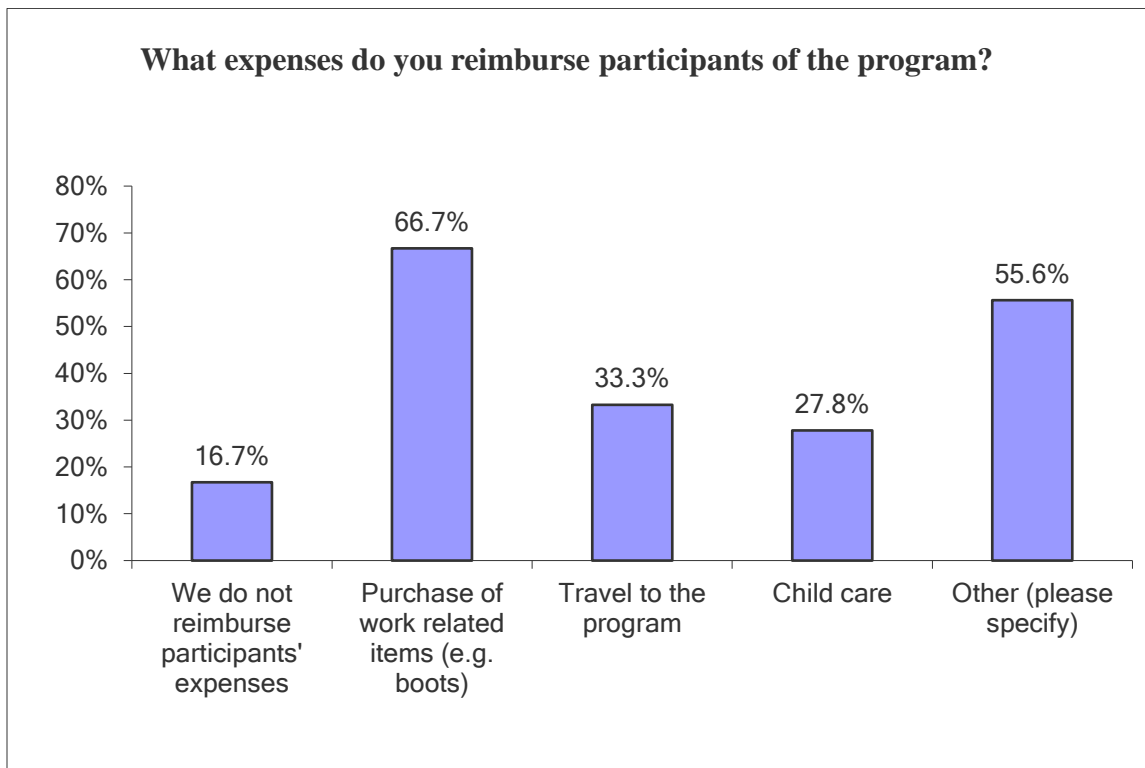
Survey respondents were asked to specify the type of media used for advertisement. Multiple media outlets could have been selected for this question. The three primary media used for advertisement included: Website (72.2%), Email (66.7%) and Print Publications (55.6%). Social Media was used by 39% of respondents. Few respondents did not use advertisement and few also did not use television or radio as a media outlet. Direct mail was used by 22 percent of responders.



Other media types used by responders included: Fliers, billboards, bus boards, word of mouth, job fairs and postings in job banks. One responder indicated that email and social media was the best avenue. Another stating that direct outreach to potential stakeholders and the contracting community was found to be a good way to advertise.

Reimbursement

We asked responders what expenses they reimburse participants of the program. A small percentage of responders (17%) do not reimburse participants' expenses. The highest reimbursement item was for work related items such as boots with 67% of responders indicating they reimburse for this type of item. Thirty-three percent of participants reimbursed for travel to the program and 28 percent reimbursed for child care.



Other types of reimbursement provided by responders included: providing a stipend to participants; for trade initiation fees; and paying \$0.80 for each training hour that the trainee worked on federally funded projects.

Rules on Attendance

Various types of attendance rules were reported by respondents. Most of the respondents indicated that participants must fully participate. Several responders indicated attendance rules were determined by the contractor. Specific rules provided by respondents included:

- Participants must complete all modules of classroom work and passing an exam.
- All missed classes must have an acceptable excuse.
- Participants are eliminated if they miss four days throughout the course.
- After four times being late, the participant receives a warning. After three absences, the participant is removed.
- There are no rules on attendance. Trainees must pass a standardized test to progress through the training program.
- Student are required to attend all training or have a valid documented excuse.
- Must attend 90% or more of classes.

Components of the Program

Responders were asked to indicate the percentage of each category that make up their program. The categories included: classroom instruction, fieldwork, presentations from contractors, presentations from unions and life skills/job readiness. Figure 6 shows the results of the survey. All of the categories were identified as being used in OJT/SS programs. There is a larger difference among the responders in the amount of classroom used in programs. Half of the responders indicate that between 0 and 20% of their program involves classroom instruction. The remaining responders indicate that classroom instruction makes up for 20 to 40 percent, 40 to 60 percent and 60 to 80% of their program. Similarly, there are large differences in the percentage of fieldwork included in the programs of the respondents. The largest number of responders indicate that field world makes up between 40 and 60% of their programs. "Presentations from Contractors" and "Presentations from Unions" have similar results with the majority of responders indicating that these components make up between 0 and 20% of their programs. Life skills/job readiness also has differences between respondents with the largest number of responders indicating that this component makes up between 0 and 20% of their programs.

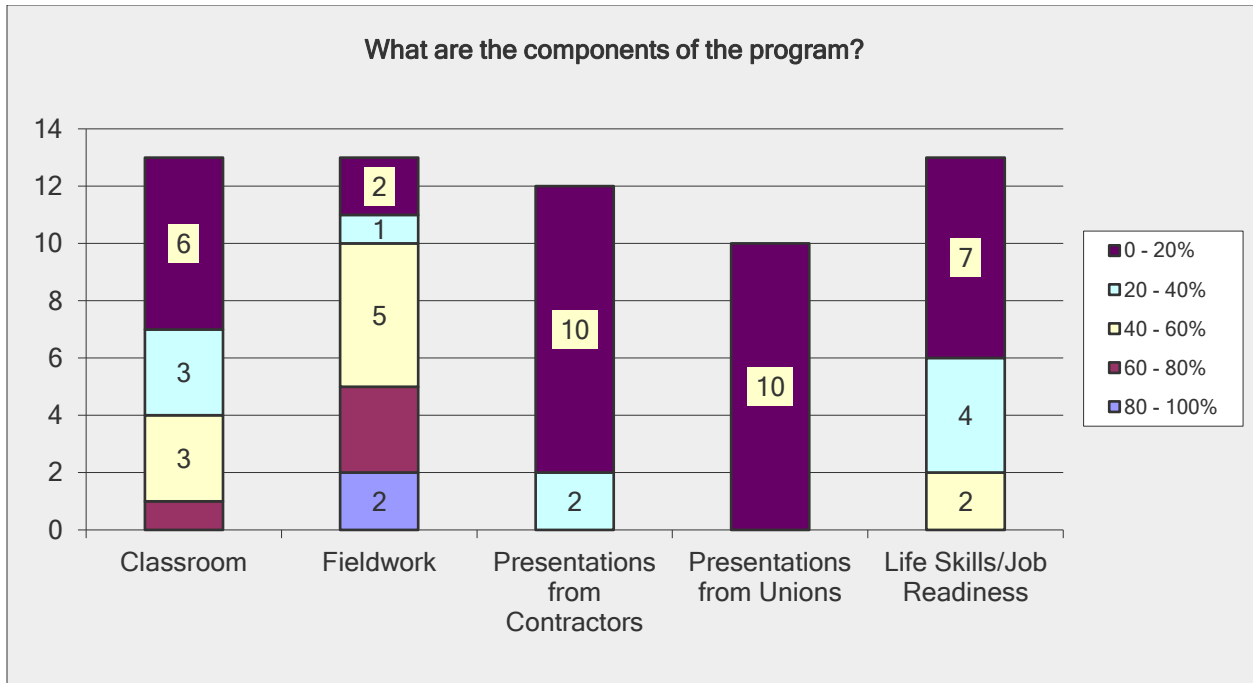


Figure 6. Components of the Program

Strategies to Increase Placement of Participants

Responders were asked to describe the strategies used to increase placement of participants in apprenticeship programs or jobs.

- **Reliance on Contractors:** Several responders indicated the need to rely on prime contractors. This involved building relationships with construction contractors, even allowing contractors to do the recruiting for the program. The employment needs of the contractor should match the qualifications and requirements of applicants to the program.
- **Build Relationships with Unions:** Similar to building relationships with contractors, responders indicated that an open line of communication is needed between program developers and union representatives. One responder indicated that direct entry agreements (or similar) should be developed with union and labor organizations.
- **Post-Graduate Follow-up:** Several strategies focused on providing opportunities for graduates of the program to connect with potential employers. Some of these strategies, which can also be used before participants graduate from the program, included:
 - Provide post-graduate workshops_monthly or one a year
 - Host a reverse job fair

- Provide a grant funded construction career consultant
- Provide referrals to contractors
- Other Partnerships: In addition to partnering with contractors and unions, partnerships should also be developed with state unemployment office, re-entry programs, grassroots organizations such as Job Corps, industrial partners.

Other strategies stated in the survey included:

- Use of a retention bonus
- Providing Individualized services
- Trainees are recruited and enrolled in the program for a specific federal aid project

Elements of Successful Programs

The survey asked responders to first rate the success of their programs and to then to indicate what elements led to a successful or not so successful program. Figure 7 shows how respondents rated the success of their programs. No respondent stated their program was either “Unsatisfactory” or “Outstanding”. Forty-one percent of responders indicated that their program was “Satisfactory”. Twenty-three percent indicated that their program “Needs Improvement” and thirty-five percent indicated their program “Exceeds Expectations”.

For the responders who rated their program as “Exceeds Expectation”, the program’s success was attributed to:

- Team building and partnerships
- The OJT/SS Program Manager and staff work under a contract and work plan that is monitored and evaluated. A requirement for quarterly and annual reports also provides accountability to ensure the success of the program.
- Well thought-out program coupled with extensive outreach to contractor for recruitment opportunities
- Good working relationships and industry participation
- Collaboration between state, local and federal programs with industry and union partners
- Communication is incredibly important with prospective trainees, current trainees, contractors and the state’s resident engineers before, during and after training.

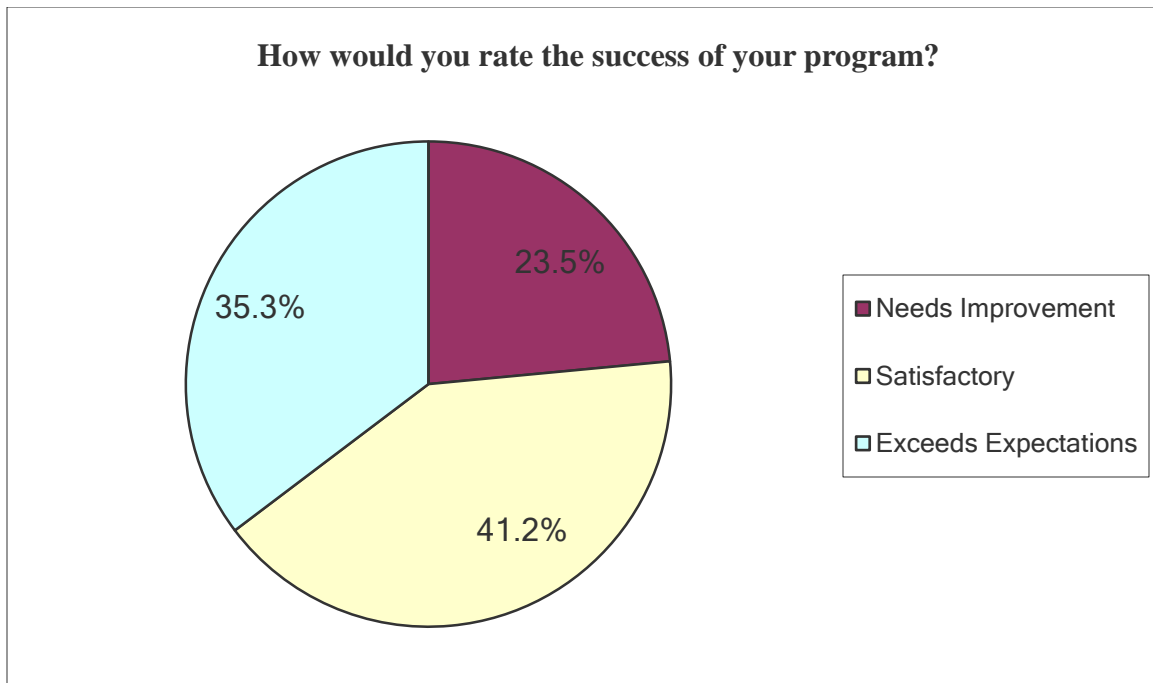


Figure 7. Success of Program

For the responders who rated their program as “Satisfactory”, the program’s success was attributed to:

- Having full industry involvement
- Good communication and working relationships
- Involvement of trainees as much as possible
- Communication with participants regarding expectations prior to being accepted into the program

For all responders, limited success was attributed to:

- The need to further “tweak” the program
- Low funds
- Need for more efficient partners
- Need for more actively involved prime contractors
- Limited resources and red tape and the lack of technology
- Low retention rates and trainees not reporting to work made it difficult for contractors to value the program

UNION DATA

One of the challenges to increasing underutilized groups' participation in the heavy highway construction industry is the fact that New Jersey is a highly unionized state with strict union hiring requirements. In Task II-5 of the research, the research team sought to gather and analyze information on unions and union membership as it relates to employment on highway construction jobs. We were particularly interested in any union participation in programs that help bring underrepresented populations into construction work.

This task proved to be particularly difficult to complete due to the limited amount of data the research team could obtain from the unions. Material for this study was therefore gathered from several sources, including: 1) interviews with contractors, the Associated Construction Contractors of New Jersey (ACCNJ) and union directors; 2) Data from Department of Labor websites; 3) personal surveys of contractors concerning their supervisory personnel; and 4) an extensive review of published and unpublished materials on the construction industry.

The heavy highway industry unions in New Jersey consist of a number of union trades as stated by the Utility and Transportation Contractors Association (UTCA) and listed in Table 1. This research investigated a cross section of trades and their training facilities along with some of their pre-apprenticeship programs, in a variety of cities. Three trades and their associated unions were studied:

- Heavy and General Construction Laborers (Laborers International Union of North America, LIUNA, Local union 172 and 472);
- Carpenters (United Brotherhood of Carpenters, UBC, and Joiners of America, Local union 253 and 254); and the
- International Union of Operating Engineers (IUOE, Local Union 825).

Table 2. NJ Heavy Highway Unions

NJ Heavy Highway Unions	Affiliated Local Unions
Construction & General Laborers	172
Dock builders	1556
Heavy Laborers Local	472
Ironworkers	11 and 350
Northeast Regional Council of Carpenters	251 to 255, 276 277, 279, 290, 291
Operating Engineers Local	825
Pipefitters	274
Teamsters Local	331, 469, 560,676

Heavy Highway and the Construction Trade

The construction industry consists of heavy highway, otherwise known as horizontal construction, and stick building, otherwise known as vertical construction. The construction industry can be further divided into construction of buildings (industrial, non-residential, residential and commercial construction); heavy and civil engineering construction (highway, street, bridge and other heavy construction) and specialty trades contractors (such as plumbing, painting and electrical work). The contracting firms consist of general contractors who oversee the execution of the entire project and specialty trade contractors or subcontractors (i.e. electrical, plumbing, roofing, etc).

Individuals who choose the heavy highway industry as a trade can come from a variety of education and training backgrounds. There are those who will enter construction from high school as laborers, helpers or apprentices. While some laborers' and helpers' jobs are simple to learn, the crafts that are related to these jobs take many years of experience and training. Training can be in the form of classrooms or on-the-job (OTJ) training, but the combination of both is preferred. Formal training and ranking of skilled workers come through local technical or trade schools, through military training, through employer training program or an apprenticeship program. This formal training may include working with journey level instructors or practical on the job training. This may lead to the apprentice obtaining the necessary certification and licenses that are required for their trade.

For this study, the focus of training was based on the union trades more than the other forms of training for this industry, therefore a broader understanding of the union trades is presented in order to better understand the mechanism of entry. On a national and international level, the AFL-CIO encompasses most of the unions including the unions in our study, LIUNA and IUOE, However the UBC has currently disaffiliated itself from this national union, but has become one of the largest trade unions in the United States. The local building trades unions are chartered by these international unions and represent the city and district councils to perform collective bargaining agreements. They also coordinate apprenticeship programs, administer pension and welfare funds, as well as partner with other unions in local trade councils and associations.

Although local bargaining is the most common practice, agreements at other levels are also important. Most contracts designate the National Joint Board for the settlement of jurisdictional disputes. The National Joint Board is composed of union and contractor representatives and a neutral umpire. The National Appeals Board is also involved along with the National Joint Board, as the bodies to which such disputes should be referred. The National Labor Relations Board may also intervene, but contractors and unions seem to prefer the simpler and expedient way of solving disputes using private adjustment of disputes (Marshall et. al 1973). The Associated Construction Contractors of New Jersey (ACCNJ) is an example of an association that act as a bargaining agent for the locals, interpreting unfamiliar contract provisions, assisting in the development of project labor agreements (PLAs). The ACCNJ performs such labor relations as well as preserves, identifies and expands employment opportunities for contractors.

Union Labor Relations with the Contractor

Despite of the disagreements that may occur between contractors and unions, contractors benefit from the fact that their skilled laborers can be supplied on demand by the various union halls, based on the cyclical volume of work that they are contracted to perform. Unions on the other hand depend on their contractor's projections in order to determine the number of apprentices they should initiate into their apprenticeship programs. The most powerful construction union leader acts as a business agent, because they are an elected official who must see that their labor demands are satisfied on a day- to day basis. When a nonmember of the union is hired by a union contractor, the unions will accept that individual as a member provided they meet certain requirements.

Apprenticeship Training

Finding competent individuals to enter the heavy highway trades is not a simple matter, especially for the minority and women demographic who may need to gain a competitive advantage in a tough marketplace. As mentioned earlier, apprentice programs accept a limited number of applicants based on the work demands of the contractors. Apprenticeship programs are designed to train unskilled laborers for this task. In this study, the local union apprenticeship programs requirements for accepting individuals is reviewed.

Apprenticeship programs are financed by monies from negotiated fringe benefit funds and are administered by Joint Training Apprenticeship Committees (JTACs) comprised of labor and contractor representatives. They are registered under the US Department of Labor's Bureau of Apprenticeship Training (BAT) , which oversees programs in a little less than half of the states, and State Apprenticeship Councils which oversee the remaining states (Kingslow, 2002). Even with these apprenticeship programs in place, certain elements of the system present considerable barriers to people with limited skills or from disadvantaged backgrounds. To aid in the process of overcoming these barriers, Community Based Organizations (CBO) and advocacy organizations (i.e. New Jersey Institute for Social Justice, NJISJ), along with civic and business leaders, have taken steps to develop and support Pre-Apprenticeship programs. These programs are designed to prepare minorities and women for the requirements of the apprenticeship programs. The USDOL, Employment and Training Administration (ETA), protects the equal opportunity regulatory framework for the National Apprenticeship Act (i.e. 29 CFR part 30, Equal Employment Opportunity (EEO) in Apprenticeship and Training), and the Equal Employment Opportunity Commission enforces the civil right acts of 1964, so that the legislation is in place to aid disadvantaged groups in getting an opportunity to participate. With this in mind, programs and support groups that have been developed to enable minority and women participation in the process of achieving and retaining journey level positions will be discussed further, especially focusing on entry level requirements for union apprenticeship programs.

Method of Entry into NJ Heavy Highway Unions

There are several traditional and non-traditional approaches to achieving a journey level position under the governing agencies of the union trades. A common method would be to serve three to five years in an apprentice program which combines on-the-job training for a wide variety of skills with classroom instruction in such related subjects as mathematics, blueprint reading, drafting, and layout work. At the end of this training, the eligibility for journeyman has been reached provided that policies and requirements have not been violated during the process. On the other hand, based on experience that was acquired through other programs and means, it is possible to simply apply for membership as a journey-man. Examples of this alternate route would be to gain experience through open shops, as a laborer or helper, or in the military. In such cases either a written or practical test of their general knowledge in their field of expertise along with a short probationary period is performed. For this study the focus on the union trade apprenticeship entry was surveyed for the purposes of heavy construction.

Laborers International Union of North America (LIUNA)

Laborers International Union of North America (LIUNA) is a union for general construction laborers with three locations for training in New Jersey. There is a window of about two weeks to apply after the announcement, and it is normally based on the market demands. The minimum age of 18 years is required (including GED or the option of a high school degree or equivalency while enrolled in the Construction Craft Laborer, CCL, and program). LUNA Training creates the courses, trains the trainers, and offers support for 70 affiliated training centers located throughout the United States and Canada. The process starts every 2 years or on an as needed basis. There are 1500 applications initially, and after the orientation they lose a couple hundred. They also have a test for reading and math along with an interview which decreases the number of applicants to around 500. The test screening is on a 8th to 9th grade level. One factor that could eliminate applicants is fear of height. Then there is a General Construction class and applicants who end up registered need to stay on for a two year period. If 4000 hours is completed on the books you can bypass the apprenticeship program. They discourage shopping around for work as individuals. All of the supplies are provided in class. At the apprentice level position, there is 1000 hours required per year in a number of various specialties (Scaffolding, Asphalt, Concrete and Masonry). For the journey level position 400 hours of classes (3 to 4 years) must be completed and 4000 hours of experience on the site. Some of the courses incorporated in the training program includes Safety (OSHA courses), Blue Print Reading, Confined Space Awareness, Craft Orientation, Fall Protection, First Aid/CPR, General Construction, Hazard Communication, Scaffold user, and Flagger. Upon graduation the apprentice joins the rank of journeypersons and begins a career as a skilled CCL.

United Brotherhood of Carpenters (UBC)

The Brotherhood of the Carpenter's Union has a minimum age requirement of 18 years old with a valid driver license required. An applicant needs to call for an appointment and take a proficiency test which is basically pass or fail. There is no ranking and you need a 70% or better to pass. There is an interview by the local and/or center, a drug test and a physical requirement. Once the candidate has completed these requirements they can commence the apprenticeship program and can be initiated into the local union. The entire training program is 5 years, requiring 1000 hours of related training (which is 200 hours per year for the five years). The apprentice is also required to do 5200 to 6000 hours of on the job training. The training program includes all trades plus safety and other general skills (i.e. blueprint reading, best health care, and trade orientation). The entire cost is approximately \$7,000 per year and is covered by the apprenticeship fund. Apprentice work with a journeyman instructor with a minimum of 10 years of experience in the field. At the completion of these requirements the new journeyman has earned 24 to 34 college credits, and lifelong learning at no cost to the individual.

International Union of Operating Engineers (IUOE)

The minimum age is also 18 years (with GED, military DD-214, or high school diploma) plus birth certificate and driver's license. Around 500 candidates respond to the announcement and then around 200 of them have to complete an aptitude test by a 3rd party which is on a 10th to 11th grade level. They are also interviewed and ranked once they pass the drug test. There are about 50 applicants who are registered to commence the apprenticeship program. The other 150 applicant's records are kept for 3 years. The apprenticeship program is 3 to 4 years with 1000 hours of on-the-job training. Candidate must complete 144 hours per year along with the on the job training for 4 years. After completing 1500 hours a year they can advance to the next level of apprenticeship. The training program includes a safety course (i.e. OSHA) and other instruction (i.e. Rigging Class, Single person class, and overhead practical). After completing an apprenticeship program and achieving journey-level status members are encouraged to take advantage of advanced training classes the IUOE offers.

Specialized Trades

There are some union trades that do not require a separate union training facility to acquire the skills required for the work needed. For example, Quarries, like Tilcon, Inc., train their own employees on the job. This includes Safety, driving skills, certifications (i.e. National Center for Asphalt Technology certification level 1 and 2). They also work with vendors of their heavy equipment and local unions who run safety training courses for their employees. The company establishes the level of position depending on the nature of the work. The highest paid position in the plant is the asphalt plant operator. The crane operator wage scale, for example, is predetermined. The International

Brotherhood of Teamsters, local 854, is involved in the collective bargaining agreements for the workers, but the outreach and training for minorities and women is handled by the company.

Table 3 summarizes the apprenticeship entry requirements for heavy highway related trades.

Table 3. Apprenticeship Entry Requirements for Heavy Highway Related Trades

Type of Trade	License, Drug Test and Min Age	Entry-Level Education	OJT Training (hrs/Yr)	Class Training (hrs/Yr)	No. of Years	Pre-Apprenticeship
Construction Equipment Operator (i.e IUOE local 825)	Min 18 yrs, Driver's License	High School or Equivalent	1000	144	4	-
Carpenters (i.e Joseph D'Aries Training Center	Min 18 yrs, Driver's License	Proficiency Test pass or fail	1000	200	5	Sisters in the Brotherhood, PRAHD
LIUNA (i.e IUOE local 472)	Min 18 yrs, Driver's License	High School or Equivalent	1500	400 over 3 to 4 years	3 – 4	Minority Based Outreach

Minority Program Outreach to the Heavy Highway Union Apprenticeships

Several programs and incentives have been provided through grants and other types of funding to create opportunities for women and minorities to overcome the challenges of the union trades. In some cases, these programs are referred to as pre-apprenticeship programs which may be housed within a faith based organization or Community Based Organization (CBO). Another model of this would be through a public advocacies organization, which would have direct services to the communities incorporated within it. An example of this would be the New Jersey Institute for Social Justice (NJISJ), a Newark-based urban research and advocacy organization. In 2000, the NJISI began to examine the economic development potential of the school construction program to find ways to channel local residents into the construction trade unions. NJISJ developed an academic program designed to help Newark residents pass the unions' entrance tests. This program focused on preparing individuals to meet all of the requirements necessary to become apprentices, and from that they piloted Essex County Construction Careers Program. This eight week program exposed participants to the construction trades and taught them math, reading and workplace readiness skills. Beyond this, partners from Newark public schools provided driver training and transportation to the Department of Motor Vehicles testing sites. The Essex County Building Trade Council, ECBCTC, took participants to visit apprentice schools and the

Building Contractors Association (now known as the ACCNJ) to them to construction sites. The demand was great at the time with school construction, downtown development, university expansion, port expansion and housing. The construction industry was booming and major construction activity was expected to exceed \$40 billion dollars for at least a decade (Brown et al.,2004).

In New Jersey, there are union training apprenticeships that have reached out to the minority and women demographic through special programs. One example of this is the Joseph D. Aries Training Center in Kenilworth, N.J. This organization works with five different local unions and are affiliated with a flagship women outreach apprenticeship program known as the Sisters in the Brotherhood (Smith, 2015). The success of their program is based on the job market being strong, their ability to recruit and retain, having a strong 5-year strategic plan and a strong sister committee. Their recruitment involves organizing a strong planning committee, educating various institutions as to their goals, and partnering with Community-Based Organizations (CBOs). Their retention program involves providing mentors to their women from those who have been successful in the trade, and providing their women with the necessary tools and resources for success.

In addition, they follow up with the CBOs and have mentor assignments with such social support services as the Puerto Rican Association for Human Development, Inc. (PRAHD). PRAHD maintains records documenting each applicant's progress during the program. PRAHD and the Northeast Regional Council of Carpenters (NRCC) are responsible to engage with applicants who have neglected to meet project benchmarks and the skills necessary to succeed in the program. Eligible applicants are accepted to participate in the Carpenter Pre-Apprentice program on a rolling basis. After one year, NRCC assesses the applicant for acceptance into the apprenticeship program. PRAHD provides emergency transportation needs for the applicants; basic tools; pays for the physical and the 10 panel drug test; reviews and assesses the applicant's ability to succeed in the placement of the apprenticeship program. The Sister in the Brotherhood achievements include but are not limited to open houses, providing development materials, training mentors in Las Vegas, and strong partnerships with CBOs, and social media videos. Their model can be envisioned as shown in Figure 8. As a result of Joseph D'Aries endorsement of such outreaches they have a 30% to 35% minority participation, but this number does not represent women only.

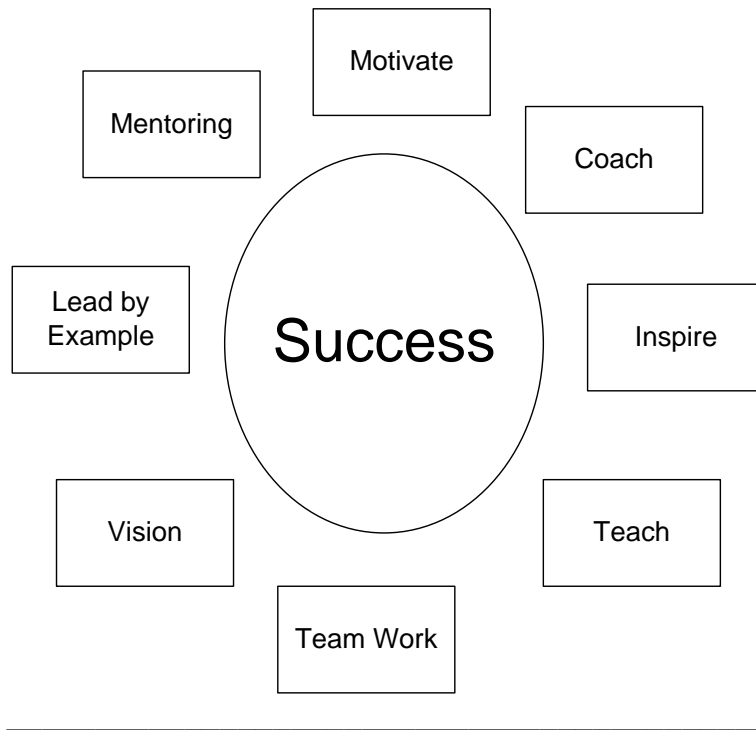


Figure 8. Model for Success of the Sisters in the Brotherhood

LIUNA espouses to a similar outreach program for minorities. They partner with CBOs and Faith Based organizations as well as host meetings and networking events to bring visibility to their program. Their goal is to enable women and minorities to meet the requirements of their apprenticeship program, by strengthening their math skills; preparing them to pass the GED, providing civic training so they can reach their potential, and assist them in preparation for the application process of the apprenticeship program. For those apprenticeship programs who will accept them, credits are given towards completion of apprenticeship training. Support services are another component of their program which includes child care or affordable housing, or the partnering of agencies that already provide these services. Although, it is difficult to find mentors who can move around with the apprentice as they train on various job sites, a mentoring program is provided. In addition, they host career days for women particularly of high school ages. When working with females they found it important to work with them individually without the influence of their male companions or other counterparts who may distract them from achieving their goals. LIUNA has eight areas of concentrations that minority and women can engage in and as long as jobs are available, everyone is encouraged to be trained to excel in these areas.

SURVEY OF CONSTRUCTION TECHNOLOGY STUDENTS

To better understand some of the perceived barriers faced by women and minorities in entering the construction industry, in Task II-6 the research team performed a survey of construction technology students. The research team sought to gather information about these students' perception of existing apprenticeship programs and the construction industry. The students included in the survey were New Jersey Institute of Technology students majoring in Engineering Technology. At NJIT, students can study engineering technology through several construction related programs including: Concrete Industry Management (CIM); Construction Engineering Technology (CET); and Construction Management Technology (CMT). Many of these students have had field experience and provide insight into how the OJT/SS program can be structured to be more attractive to women and minorities. The CET and CMT programs are also strongly tied in with the Associated Construction Contractors of New Jersey (ACCNJ) and provide internships for students in this industry

Previous studies have been performed to explain obstacles faced by women and minorities and methods to overcome these obstacles. Berik and Cihan (2002) reported that some women feel intimidated by the working conditions of the construction industry, whereas others feel intimidated by sometimes abusive treatment of women in this environment. Other studies, such as Kingslow (2002) show that minorities are challenged by the nature of the screening process to enter into the training process of heavy construction.

This study interviewed construction students from the Engineering Technology program at New Jersey Institute of Technology. About 45% of the students responding to the survey identified themselves as minorities. General findings of the survey include:

- Almost all of the students believed their families played a supportive role in encouraging them to enter into this profession.
- About 7% of respondents were concerned about the dangerous aspects of working in construction as a whole.
- A third of respondents encountered stereotypes and prejudices within the industry, but did not feel that it would hinder them from succeeding in their career.
- Most of the prejudices expressed were either towards women or due to a language barrier. Some of the prejudices towards women were mentioned in the survey by men.
- Half of the students were interested in working with the trades, and 19% of them already worked with people in the trade unions (i.e. local 153, 472, 825, and 731).

- Seven percent were already union members (i.e. local 472 and local 9).
- One of the students, who was not a minority and was not admitted into the apprenticeship program of his choice, felt he would have had a better chance if he had a family member in the union or a job currently in that industry.
- An African American female student, felt that women, as a whole, are intimidated in this field because they feel employers do not want to hire someone who will be on maternity leave or would have to be released early from a project for child care related activities.
- In another focus group discussion, primarily on the hardship women face in this workforce, the topic of female restrooms (or portable commodes) on the sites being separate from male was the issue of discussion.
- Another topic of discussion was the issue of respect for females who worked with male counterparts, especially for females who were in authority positions over other males on the site. There was a consensus that the owners or principals on the project had to have some form of accountability or precedent whereas if someone were to intimidate these individuals they would be penalized in some tangible way.
- There were also discussions regarding verbal abuse and threats that women encounter within the construction trade, which would discourage other women from entering the trade. Some of these perspectives from the students were validated by those who have worked in the industry. For example, some of the contractors lock the portable bathrooms in preference of the working women on site, only to find defamatory messages written on the door for those who it was intended to help.

RECOMMENDATIONS

The overall objective of this research was to develop a framework for use by New Jersey Department of Transportation to establish a viable On-the-Job Training/Support Services (OJT/SS) pre-apprenticeship training program aimed at moving women, minorities and other under-utilized groups into journey-level positions in highway construction skilled crafts. The literature review, survey of neighboring states, national survey and the review of union apprenticeship programs all indicate similar key elements needed for a successful pre-apprenticeship program.

Literature Review Findings

The literature suggests strongly that successful programs grow out of political and administrative decisions. Programs need shrewd champions who can construct vibrant networks of stakeholders. They also need to make intelligent decisions on how to structure the program. Literature suggests, for example, that in some cases women only programs increase female confidence and allow free discussion of gender-related issues such as sexual harassment and stereotyping. Program developers have to know how to communicate with potential apprentices, particularly through “new” media such as Facebook (Mayor’s Advisory Commission on Construction Industry Diversity 2009). To learn more about how to construct networks and make administrative decisions researchers for NJDOT’s project can supplement these reports with interviews with key actors in pre-apprenticeship offerings.

Survey of Neighboring States Findings

The most important decisions state DOT make in developing OJT/SS programs involve finding the right partners. OJT/SS is not an endeavor for unilateral action. Multiple kinds of experience are necessary to succeed. Time after time DOT contacts noted that getting the right partners is crucial for success.

An early decision each state DOT has to make is whether to administer programs unilaterally, contract with nonprofits, or hand responsibility over to another government agency. A clear majority of neighboring DOTs believe they have neither the background nor the personnel to implement programs on their own. Their solution in most cases is to contract with nonprofit groups to administer programs. For example, Mass DOT tried in-house implementation in 2013 but decided it would improve the program by contracting with nonprofits in the following year. After concluding it lacked workforce development experience, Maryland’s DOT transferred the program to the state’s Department of Labor. DOL then contracted with nonprofits to administer services.

Bringing contractors into the planning process is crucial. Contractors understand the local economic situation and their own job needs, key pieces of information for state DOTs to have. States have to tailor training to provide for jobs that will be available; one

-size training will not fit all. Workplace needs change over time. Contractor input allows states to align training with real world opportunities.

In addition, states want contractors to have a role in training implementation. They should make presentations at the training. By interacting with participants contractors come to know these recruits and may emerge with a sense of responsibility to employ OJT graduates.

Another decision DOTs have to make is when and where to approach members of traditionally underrepresented groups to learn if they are potential OJT participants. Contacts stressed that it is useful to allow members of traditionally underrepresented groups a chance to consider a construction career while they are still in high school. For this reason state DOTs participate in Career Construction days for high school students. Union and contractor involvement in such outreach efforts is important. DOT administrators also publicize the programs through myriad presentations at community events.

Once in a program students need to learn how to behave in a job setting. They may need continual counselling to ensure that they attend sessions and purchase needed equipment. Programs have to maintain rules that prod students toward the disciplined behavior they will need to hold jobs. For this reason most programs have fairly strict attendance policies.

Agencies noted that it is important to maintain some contact with program graduates at least in the short term to understand how the program actually impacts participants' lives. Such contact has two purposes. Agency staff can give graduates useful advice. Staff can also learn from actual student careers how to change OJT/SS programs to make them even more useful.

National Survey Findings

The National survey of OJT/SS programs found several elements that contributed to a successful program. These elements included:

- Team building and partnerships must exist
- Program administrators must work under a work plan that is monitored and evaluated with the need for regular reporting
- A well thought-out program coupled with extensive outreach to contractor for recruitment opportunities is needed
- Good working relationships and industry participation
- Collaboration between state, local and federal programs with industry and union partners
- Communication is incredibly important with prospective trainees, current trainees, contractors and the state's resident engineers before, during and after training.

Union Apprenticeship Program Findings

Underrepresentation and underutilization of minorities and women in highway construction has presented itself for many years. There have been many affirmative action efforts and training programs that have been instituted as a result of federally funded construction projects. Although these groups continue to have difficulty achieving journey level positions, there have been some successes assisting them into apprenticeship programs. Our research studies have shown that in spite of the obstacles of stereotypes, prejudices and disadvantage backgrounds, the common denominator of those who have chosen to endure this career path is a supportive family and/or consistency in mentorship. This impact seems to be more prevalent in the ages of K-12 grades.

In order to better understand the difficulties of progressing to journey level status, some of the challenges that minority, women and disadvantage individuals should be summarized. The application process for the apprenticeship program remains difficult for disadvantaged individuals in urbanized areas that do not have a car or driver's license, or have struggled academically to achieve a high school equivalency for graduation. This also becomes a problem for those applicants who have to travel to areas that do not have public transportation to reach the job site. If an individual is required as an apprentice to attend classes in the suburbs and then go to the site that may be on a highway for their on the job training, that may pose a problem if they are more accustomed to commuting by public transportation in a downtown city area. The limitations of apprenticeship applicants and the frequency of selection also serve as a limitation to minority and women selection. The intentional practice of hiring minority and low skilled workers based on a placement criteria only tends to draw criticism. Alternative structures of pre-apprenticeship programs to enhance the skills and selection process is needed. The retention of this group is also an issue due to the cyclic nature of the industry, the financial literacy of keeping funds during slow periods, and the social balance of being able to find support for home life during periods of transition between jobs.

There are still other areas that need to be explored in regards to increasing the recruitment and retention of minority and women in high level positions in the heavy highway industry. The ability of Disadvantage Business Enterprises (DBE), Minority Business Enterprise (MBE), or Women Business Enterprise (WBE) contractors to hire minorities and women, may be one approach to allow this group to get the hours and experience they need to achieve journey level standards with the union. Understanding the experiences of journey leveled minorities and women who may not have achieved their position through the union apprenticeship program would bring even more valuable information that may help in designing a pre-apprenticeship program.

Recommendations for NJDOT

1. Understand the department's strengths and weaknesses for developing and implementing OJT/SS programs.
 - Determine how will the program be administered (DOT-only? Contract with nonprofits? Another government agency?)
2. Involve contractors in program development and implementation.
 - Invite contractors to participate in the training. Make it mandatory for contractors on federally funded projects to be involved in the training.
 - Understand the economy and contractors' actual needs before planning programs. Build programs to support their needs.
3. Build relationships with unions.
 - Promote an open line of communication between program developers and union representatives.
 - Seek to develop direct entry agreements (or similar) with union and labor organizations.
 - Invite unions to discuss how people can get into their apprenticeships.
4. Partner with nonprofits and other government agencies that supplement a given department's strengths.
 - Partnerships should also be developed with state unemployment office, re-entry programs, grassroots organizations such as Job Corps, industrial partners.
 - Form partnerships with educational institutions and community groups to recruit students.
5. Provide academic and financial support for program participants
 - Perform needs assessment for students to determine which skills they should learn.
 - Attendance must be mandatory. Make allowances for legitimate excuses.
 - Provide financial support in terms of paying for supplies, union dues, work boots, tools, child care, etc.
 - Offer post-graduate services to those students completing the program.
 - Contract with agencies who can provide counselling services to OJT/SS students and to help students make connections with unions.
 - Monitor student careers at least in the short run.
 - Emphasize teaching craft work skills and good work habits.

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APPENDIX A. UNION AND APPRENTICESHIP INTERVIEW PARTICIPANTS AND DATES

- 1 Al Zabicki, Director, Local 825 (May 7th, 2015)
- 2 Keith Adolf, Director, Local 825 (May 7th, 2015)
- 3 Joe Scerbo, Heavy and General Laborers, Local 472 (May 4th, 2015)
- 4 Yvonne Lopez, Executive Director CEO, PRAHD (CBO) (June 29th, 2015)
- 5 Crystal Gibson, Journey person, Local 472 (June 29th, 2015)
- 6 Nichele Wilson, Associate Director, New Jersey Institute for Social Justice(NJISJ) (June 18th, 2015)
- 7 Frank Barszcz, MSW, LSW, Workforce Development Specialist, NJISJ (June 18th, 2015)
- 8 Scott Laudone, General Manager, Tilcon Inc., (March 6th, 2015)
- 9 John E. Mackay, Sr. , B.A. , Training Director, Joseph A.D’Aries Carpenter Training Center (May 6th, 2015)
- 10 New Jersey Institute of Technology Students, CET, CIM and CMT program, Newark , New Jersey (Fall of 2014)
- 11 Bernadette Rivera, Assistant Director of LIUNA Training, (June 22nd, 2015)

APPENDIX B. INTERVIEW QUESTIONS FOR UNION REPRESENTATIVES

1. What local unions in New Jersey are you in contact with for your minority program?
2. What is your title and responsibility
3. How does your union select applicants?
4. How do minorities handle the process of being selected?
5. Do you work with any pre-apprentice programs in New Jersey
6. How many applicants get trained at a time ?
7. How many times a year do you select applicants?
8. Do you track ethnicity or diversity amongst your applicants?
9. What is your retention rate for your program?
10. Do you have any NJ contacts that can be interviewed in the Apprenticeship Programs?
11. Do you know any minority Journey level people who can be contacted for an interview?
12. Do you know how many successful minorities have reached journey level positions?
13. Which aspect of heavy highway construction do you train applicants for?
14. What are the goals of your training program?
15. How do you measure if each goal is met?
16. Do you have partners or any other organizations to feed your program or provide assistance?
17. Please describe any use of social media in recruitment.
18. Please describe any use of community or ethnic media in your recruitment.
19. Do you charge your selected applicants for any of the materials or other fees that are required?
20. Do you reimburse participants for any expenses (e.g., need to buy work related items such as work boots)?
21. Do your programs have rules on attendance such as stipulations on maximum permitted absence?
22. If so, how do you enforce these rules?
23. What percentage of program work is classroom based?
24. What percentage requires field work?
25. What are your retention rates in the program?
26. What are your job placement rates?
27. Does your agency consider the program(s) to be successful?

APPENDIX C. INTERVIEW QUESTIONS FOR ENGINEERING TECHNOLOGY STUDENTS

A. Questions Related to your Background

1. What is your name?
2. What is the name of your degree program (i.e. CET, CMT, CIM, etc)?
3. Are you a US citizen?
4. Do you plan to work in the United states?
5. Why did you decide to major in Engineering?
6. How does your family feel about your choice of profession?
7. What part of the country would you prefer to live in or work in?
8. Do you deal with any cultural or family resistance to your chosen profession?
9. Why did you enter this field?

B. Questions Related to your Experience

1. Would you prefer an indoor or outdoor job?
2. What do you think makes a working environment hostile?
3. Have you noticed any stereotypes, biases, or prejudices in Engineering that discourage you?
4. What aspect of this field motivates you or captures your interest?

C. Questions Related to your Goals

1. What part of this construction industry do you see yourself involved with ?
2. How do you plan to get a job after graduation?
3. Do you have an interest in the trades?
4. What are your thoughts on Unions?
5. Would you be willing to receive sub-average wage for a training period of 3-4 years?
6. Do you have income requirements for the job you would take?
7. What field of engineering most captures your interest?

8. Do you have an interest in the area of obtaining a journey level position or managing that level position on heavy highway projects?

APPENDIX D. QUESTIONNAIRE FOR SURVEY OF OJT/SS PROGRAMS

Increasing Representation of Underrepresented Individuals in Journey Level Highway Construction Jobs

This survey is being performed as part of the research project “Increasing Representation of Minorities, Females and Underrepresented Individuals in Journey Level Jobs on Highway Construction Projects” which has been commissioned by NJ Department of Transportation. The objectives of the research are to: (1) To identify and gather information on successful skilled trades training and/or pre-apprenticeship programs; (2) To perform a survey of state transportation departments on their OJT/SS training programs; an (3) To make recommendations on the best approach for developing and implementing NJDOT’s OJT/SS program.

By completing this Web-based survey, the study partners will be able to identify the elements that contribute to successful OJT/SS programs.

The survey should take approximately 15 minutes to complete.

If you have any questions, you may contact Yuanyuan Fan (yf42@njit.edu) or Janice Daniel (Daniel@njit.edu, 973-642-4794).

Please complete the survey by March 10, 2016.

Thank you for your time and attention.

1. Does your agency have an On the Job Training (OJT)/Support Services (SS) programs?

Yes

No

2. If so, which office manages this program?

Office of Civil Rights

Other (please specify)

3. What are the goals of your OJT/SS program?

4. What partners do you use to run your program?

- We do not use partners
- State Department of Labor
- State Department of Education
- Local Board of Education
- Industry
- Unions
- Civil Rights Organizations
- Women's Organizations
- Other (please specify)

5. How do you recruit participants for the program?

6. What media outlets do you use to advertise your program?

- No advertisement is used
- Television
- Radio
- Print Publications
- Website
- Email
- Direct Mail
- Social Media
- Other (please specify)

7. What expenses do you reimburse participants of the program? State all that apply.

- We do not reimburse participants' expenses
- Purchase of work related items (e.g. boots)
- Travel to the program
- Child care
- Other (please specify)

60 - 80%	80 - 100%
<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>

8. What are your program's rules on attendance?

Rule 1:

Rule 2:

Rule 3:

9. What are the components of the program?

	0 - 20%	20 - 40%	40 - 60%
Classroom	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Fieldwork	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Presentations from Contractors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Presentations from Unions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Life Skills/Job Readiness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

10. What strategies are used to increase placement of participants in apprenticeship programs or jobs?

11. How would you rate the success of your program?

- Unsatisfactory
- Needs Improvement
- Satisfactory
- Exceeds Expectations
- Outstanding

12. To what would you attribute your program's success or limited success?

13. What is the approximate size of your most recent training program?

Number of Recruits:

Number of Graduates:

Number of Placements:

Year of most recent training:

14. Please provide your contact information.

Name:

Agency:

Email Address:

Telephone Number: