

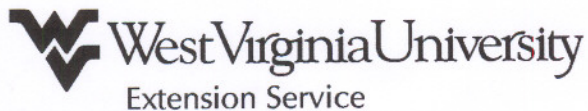
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Building Trades Apprentice Training in West Virginia

*A Comparison of Union and Non-Union
Building Trades Programs in the 1990s*

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Institute for Labor Studies and Research

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All opinions expressed in this report are those of the authors.

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Building Trades Apprenticeship Training in West Virginia

Executive Summary

Having an adequate supply of competent craft workers has preoccupied the construction industry for more than a decade. All three major industry associations report that members consistently find shortages of skilled workers to be one of their biggest headaches. Building and construction trade unions, too, express concern over maintaining an adequate pool of skilled workers to meet employers' needs.

The attention to this issue is not unwarranted. The most recent estimates from the Bureau of Labor Statistics project steady, if not large, growth in construction industry employment. Although construction trades will not increase as a proportion of the total U.S. work force, projected annual employment increases of about 1.3 percent per year will require another 989,000 workers nationally through 2010. Anticipated replacement needs of nearly 1.5 million construction industry workers in this first decade of the new century puts the problem into even sharper contrast.

Surveys among members of the major employer groups – Associated General Contractors, Associated Builders and Contractors and the National Home Builders Association – all point to existing and anticipated difficulties in identifying trained construction workers, or in recruiting new workers to learn skilled trades.

Traditionally, the need for skilled construction labor has been addressed by apprenticeship training, provided either by the trade unions, by employers, or through some joint effort. However, some evidence – both factual and anecdotal – exists to indicate that the union status of employers may influence the effectiveness of apprenticeship programs. For instance, a 1997 study in Kentucky (Londrigan and Wise, 1997) found that although the majority of training programs occurred in the non-union sector of the construction industry, a majority of apprentices were enrolled in programs jointly sponsored by unions and employers. Moreover, these jointly sponsored training programs produced the greatest proportion of journeymen.

Our findings revealed a similar pattern in West Virginia, although fewer apprenticeship programs exist and only a very small number are not union-related. The West Virginia experience is that, during the 1990s, apprentices were being trained in all 17 construction crafts. The overwhelming majority of the 3,194 apprentices registered between 1990 and 1999 (nearly 95%) were in union-related programs. Fewer than one-quarter of all apprentices dropped out of their training programs, although among non-union programs more than half of apprentices exited. While nearly two in five of all apprentices completed their work force preparation and achieved journeyman status, the record of non-union programs was dramatically worse: less than 10 percent finished a training program. About equal proportions of all apprentices were still in training at the end of the decade, although the numbers of non-union trainees were obviously very small.

Besides completion and retention rates, another benchmark sometimes used to measure apprenticeship's success is its ability to attract and keep members of minority groups. For non-union apprenticeships, the record is very poor: only three females, and no male minorities, were enrolled during the entire 10-year period. Among union-related apprenticeships, though the percentages of new female and male minority apprentices fluctuated from year to year, the overall record for the decade was comparable to other data. For instance, proportions of female apprentices were about the same as skilled female construction workers nationally, and while male minority rates were lower than national figures, they were in keeping with their presence in the general population of West Virginia.

Like Kentucky, West Virginia's experience is that the majority of apprentices are produced by union-sponsored training programs. One difference is that in West Virginia 66% of the apprenticeship programs were union-sponsored, whereas in Kentucky only 18% were union-sponsored. As this 10-year review plainly suggests, union-sponsored apprenticeships are the most dependable method of developing journeyman construction workers through BAT-approved programs. As West Virginia, like the rest of the nation, contends with shortages of skilled trades workers, registered apprenticeships may assume even greater importance in the preparation of workers for this new century.

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Building Trades Apprenticeship Training in West Virginia

A Comparison of Union and Non-Union Building Trades Programs in the 1990s

Current and predicted future shortages of qualified workers in the construction trades have generated concerns about both recruitment of apprentices and their retention until completion of the training program. Although a formal apprenticeship program is by no means the only method of acquiring job-related skills, it remains a valued and respected route to occupational training. Under this system of combining productive work with related classroom training, employers acquire highly skilled workers who, in turn, develop job skills while earning a wage that increases with competence.

Historically, apprenticeship programs were established by craft unions, whose journeymen and master craftsmen undertook the training of inexperienced workers. Federal government support for apprenticeship was added to traditional union-sponsored training in 1934, with establishment of the Federal Committee on Apprenticeship. Public policy was codified by passage of the National Apprenticeship Act of 1937, or Fitzgerald Act (29 U.S.C. 50). It continues through the Office of Apprenticeship Training, Employer and Labor Services (OATELS), which includes the Bureau of Apprenticeship and Training (BAT).

In 23 states, the BAT provides technical consultation to unions and/or employers who choose to register an apprenticeship program; in the remaining 27 states and the District of Columbia, a BAT-recognized State Apprenticeship Council (SAC) is responsible (U.S. Dept. of Labor, OATELS, 2001). West Virginia is a state that relies on the BAT to qualify, monitor and certify apprenticeship programs and their enrollees. Although apprenticeships may be formalized without benefit of BAT sanction, official registration carries a mark of formal approval that is widely accepted. The BAT also serves as a central clearinghouse for apprenticeship information. Therefore, this analysis relies on BAT data.

Typically, a registered apprenticeship program¹ includes, by law, a plan for at least 2,000 hours of on-the-job training for each credited year, and a curriculum for

¹ Although job-related skills may be obtained through a number of sources (e.g., secondary schools, vocational schools and employers), the focus in this report is on training programs registered with the U.S. Bureau of Apprenticeship and Training. This agency sets standards in consultation with employers, or, in the case of joint programs, with employer and labor representatives, in accordance with the National Apprenticeship Act.

144 hours of related classroom instruction per year (National Apprenticeship Act, 29 CFR 29.5). Depending on the craft, apprenticeship training programs typically range from two to five years in length. For non-union programs, responsibility for designing, organizing, managing and financing the program rests solely with the employer. In a union setting, the program is jointly operated through a labor-management committee, and usually is funded through an hourly contribution negotiated in the collective bargaining agreement. Federal regulations also require an equal opportunity pledge, a progressively increasing schedule of wages, and appropriate record keeping to document apprentices' development.

Apprentices may come with a variety of educational backgrounds; primary requirements are minimum age of 18 and good physical health (U.S. Dept. of Labor, BLS, 2002). In 1990, the number of registered apprentices nationwide in all occupations was about 283,000 civilian workers; by 2000, the number had risen to 360,511 (U.S. Dept. of Labor, OATELS, 2001; U.S. General Accounting Office, 1992). More than half of all apprentices (213,000, or 59.2%) were enrolled in building trades apprenticeship programs. Of this number, Associated Builders and Contractors, the national non-union contractors' organization which touts its apprenticeship programs through a program called Wheels of Learning, trains about 15,000 apprentices annually (or 4.2% of all apprentices) (Associated Builders and Contractors, 2001).

Despite its reputation for producing high-caliber workers, apprenticeship is not without controversy. The composition of apprentice groups and the ability of a program to produce journeyman craftsmen are important considerations. Formal apprenticeship programs are also carefully scrutinized for their enrollment of minorities and females. Registration of apprentices, for what often is a lengthy and rigorous period of learning and skill-building, may be meaningless unless they complete the program. Thus, completion rates and the record of diversity among participants often are used to measure success.

The Building Trades Apprenticeship Coordinators/Directors Association of Kentucky and the Greater Louisville Building and Construction Trades Council, AFL-CIO, commissioned a study (Londrigan and Wise, 1997) that compared union and non-union apprenticeship training programs in that state for the period 1985 to 1994. Among their findings were that while the majority of registered building trades apprenticeship programs were in the non-union sector, the majority of apprentices and journeymen emerged from union-related apprenticeships. In addition, union programs trained a wider range of crafts and enrolled a more diverse group of apprentices. The study's authors concluded that "Kentucky's building trades apprentice training programs have outperformed non-union apprentice training in every critical measure of program success."

This study, conducted by West Virginia University's Institute for Labor Studies and Research, replicates the Kentucky study in West Virginia for the 1990-1999 time period.

Methodology

In West Virginia, apprenticeships are registered with the federal Bureau of Apprenticeship and Training (BAT). The authors filed a Freedom of Information Act request to obtain data for West Virginia building trades apprentices for the period 1990 to 1999. Information reported herein is limited to records kept by the BAT, and includes:

- name of the program
- status as a joint (union) or employer-only (non-union) project
- title of the trade being learned
- any credit for previous experience
- dates of indenture, completion and cancellation
- gender
- ethnic origin
- veteran status

Care was taken to select only construction industry apprenticeships. Industry sector and trades were identified by Standard Industrial Classification (SIC) and Standard Occupational Classification. In some cases, although the occupational title was a building trades category, the industrial code made clear that the apprenticeship program was not, in fact, in the construction industry (e.g., most were either manufacturing or correctional institutions).²

As furnished by the BAT, the data identified each program by name and sponsor, which facilitated segregation into union and non-union groupings. The data was entered into a statistical software program for analysis, which enabled not only computation of overall percentages, but examination by categories. Because so few programs and so few apprentices are registered in the non-union sector in West Virginia (see Appendix, Tables A1 and A3), testing for statistically significant differences between the sectors was not feasible. Where relevant, however, non-union totals and comparisons are made.

² It should be noted that some apprentice programs may be registered in other states, but nevertheless have substantial numbers of apprentices that live and work in West Virginia. With the exception of the sheet metal workers and the boilermakers, all of the data reported herein is for programs registered with the BAT in West Virginia.

West Virginia Experience

In the decade between 1990 and 1999, the BAT in West Virginia registered apprenticeships for 55 different sponsors (see Table 1). Six of those programs – two union and four non-union – enrolled no apprentices during the period. One registered in Ohio (i.e., sheet metal workers) and another in Florida (i.e., boilermakers) but operated training programs here. With the addition of the sheet metal workers' and boilermakers' data, information from 50 different sponsors who actually had apprentices was available for analysis (see Table 2). The total number of trades for which data was obtained was 17.

The total number of registered programs was larger than the number of sponsors because some sponsors obtained approval for training programs in more than one craft. This brings the total number of registered building trades craft training opportunities to 74 (see Table 1). However, 13 of these specialties had no enrollees. Therefore, 50 sponsors had 61 different training opportunities in which there were enrollees (see Table 2).

This distinction between sponsors and approved apprenticeship specialties can be made clearer by looking at the data. For 41 of the sponsors, training was approved for a single craft (Table 1). Among the other sponsors, 13 were prepared to offer training in two crafts and one proposed to offer training in seven crafts. In most cases, the two-trade apprenticeships were in allied trades, such as plasterers and cement masons. The sponsor that proposed to offer training in a total of seven different trades – bricklayer, carpenter, construction laborer, electrician, ironworker, pipefitter and plumber – was the Associated Builders and Contractors (ABC) in Charleston.

Union-sponsored programs most often trained in only one skilled craft. Those that offered training in two trades concentrated their efforts on allied skills, as noted previously. For instance, plasterers and cement masons, members of the same international union, were

**Table 1
Apprenticeship Sponsors
by Number of Specialties Registered**

	Number of Sponsors	Specialties Registered
	41	1
	13	2
	1	7
Total	55	74

**Table 2
Apprenticeship Sponsors by Number
of Specialties with Enrollees**

	Number of Sponsors	Specialties with Enrollees
	42	1
	7	2
	1	5
Total	50	61

listed as separate trades but trained under the same programs. In one case, a carpenter apprenticeship trained both carpenters and millwrights, although the other programs concentrated on either carpenter or millwright apprentices only. Similarly, plumbers and pipefitters were enrolled in the same apprenticeship when both types of training was offered (one trained no plumbers), though separated by craft on the BAT reports. The reasons for such differences make little difference to the overall analysis. They are worth noting, however, because it illustrates the difficulty of calculating the numbers of sponsors, apprenticeships registered, the total considered active, and the number with registered apprentices.

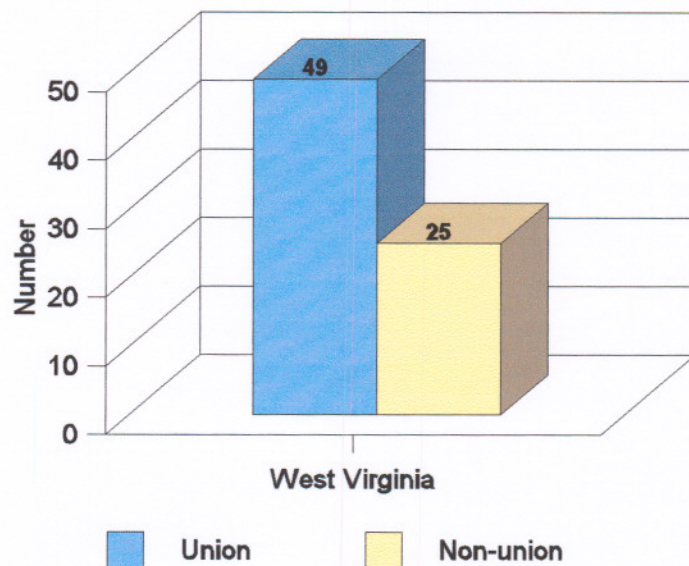
Consistent with apprenticeship's long history, and the BAT's own background, many of West Virginia's apprenticeship programs are more than half a century old, having been registered in the mid-1940s. Apprenticeship's dynamic and still-relevant status is demonstrated by the fact that programs have been registered in each subsequent decade, and as recently as 1999.

Registered Programs

Among the 74 specialty craft plans that were recognized by the BAT, about two-thirds (49, or 66.2%) were sponsored by unions (see Chart 1). However, only 55 registered programs (74.3%) had apprentices, leaving 19 programs (25.7%) with no enrolled apprentices during the decade. (Details of numbers and proportions of programs in each craft, and union or non-union status, appear in the Appendix, Tables A1 and A2.)

Union-sponsored apprenticeships also represented a large majority (42, or 76.4%) of the 55 programs that actually enrolled apprentices during the decade (Chart 2). In the union sector, all 17 trades had at least one apprenticeship program with registered apprentices. In six trades, one union-sponsored program was doing training, while in all others, from two to six training programs were available in the state (see Appendix, Tables A1 and A2). Only five trades –

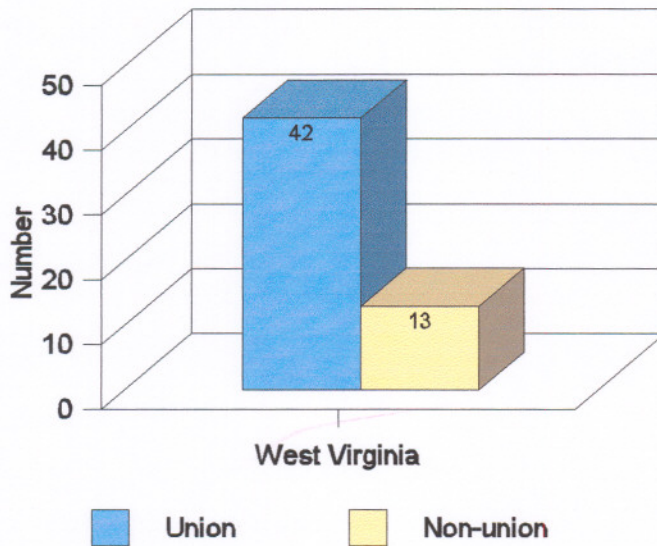
Chart 1
Total Registered Programs, by Affiliation
(number)



bricklayer, millwright, pipefitter, plasterer and plumber – had any union apprenticeship programs that did not register apprentices with the BAT (see Appendix, Table A1).

Programs without union affiliation did not fare so well. Of the 25 non-union programs, only 13 (or 24.1% of all programs) had any registered apprentices. Moreover, these were concentrated in 10 of the 17 crafts (see Appendix, Tables A1 and A2). In addition, while union apprenticeships had enrollees in all trades, non-union programs were developing future workers in only six specialty occupations:

Chart 2
Registered Programs with Enrollment
 (number)



carpenter, cement mason, construction laborer, electrician, painter and roofer. Electricians dominated, with 8 of the 13 training opportunities. Non-union sponsors received BAT approval for apprenticeship programs in seven trades – bricklayer, carpenter, electrician, ironworker, pipefitter, plumber and roofer – that did not enroll any apprentices.

Overall, 85.7% of joint union-employer apprenticeships succeeded in enrolling apprentices during the 1990s. Employer-only programs secured enrollment in just 52% of these apprenticeships.

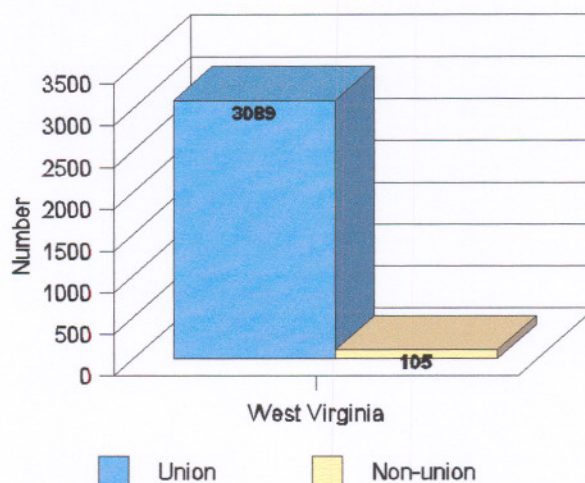
Registered Apprentices

During the 1990s, West Virginia apprenticeships registered approximately 3,200 individuals in 17 occupational specialties. Total enrollments in apprenticeship programs are even more heavily skewed toward unionized programs than are the numbers of training plans. Only 3.3 % of all apprentices, or 105, were enrolled in employer-only programs (see Chart 3). One program – the Associated Builders and Contractors’ apprenticeship in Charleston – accounted for nearly a quarter of these non-union apprentices, with 27 enrollees during the decade. However, these 27 were dispersed across five trades: bricklayer (2), carpenter (3), electrician (16), ironworker (2) and laborer (4). (Details of numbers and proportions of apprentices

in all programs for each craft, union and non-union, are in Appendix Tables A3 and A4.)

Union-affiliated plans, on the other hand, had the vast majority of apprentices, with 3,089. While some trades had few apprentices, that usually occurred when the skill was a sub-specialty. For instance, only eight glaziers were registered, but they were part of a training program for both painters and glaziers, which registered a combined total of 243 apprentices.

Chart 3
Registered Apprentices
(number)



The average size of apprentice training programs followed a similar pattern, in that union programs apprentices were not only more numerous, but generally enrolled larger numbers. Among active employer-sponsored programs, the average number of apprentices was eight, while union-sponsored training plans had an average size of 63. Overall size of non-union programs was also smaller; non-union programs registered between 1 and 63 individuals. Union-related programs were much larger, with a range during the decade of 8 to 475 (see Appendix, Table A3).

Characteristics of Apprentices

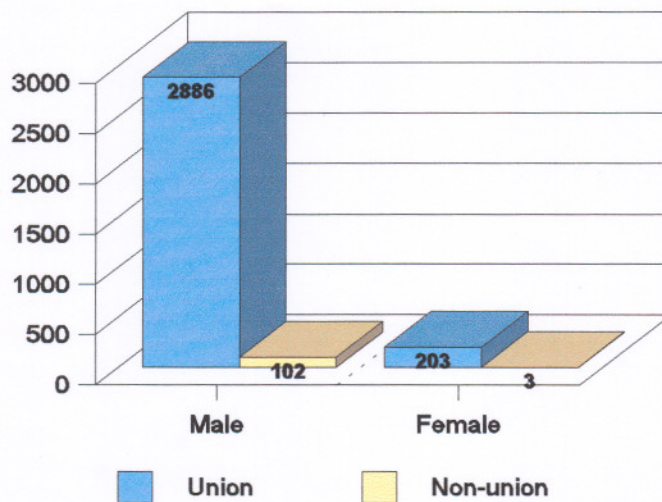
Without individually surveying the apprentices, this analysis is bound by the data collected by the BAT. While information about any previous training and veteran status is compiled by the BAT, most apprentices in the study had no previous training, and there were too few with veteran status to analyze. Therefore, description of apprentices as a group is primarily limited to gender and ethnic origin. No information is available about age or educational background, and knowing how apprentices came to enroll in an apprentice training program is impossible.

The building trades, historically, have had relatively few minorities and even fewer women in apprenticeship programs or working as journeymen. Particular attention often is paid to the ability of apprenticeship programs to attract and train these two groups. This section of the report describes the record of recruitment for male minorities and females. Their experience with retention and completion will be described in a subsequent discussion.

Females

By most measures, recruitment of female apprentices in West Virginia surpasses the national industry record of female employment. During the 1990s, West Virginia apprentices were predominantly male (94%). In 1999, however, in the state's construction industry as a whole, women held about 8.1% of all jobs (WV BEP, 2000). This compares favorably to national data, which indicates that the proportion of women in the construction industry averages only 2.6% of all non-supervisory jobs³ (*Statistical Abstract of the United States*, 2000, 1996 and 1992).

Chart 4
Apprentice Enrollment by Gender
(number)



West Virginia building trades apprenticeships also enrolled women at higher rates in the 1990s. In the specialty trades, women were about 3.9% of total employment at the end of the decade (WV BEP, 2000). During the study period, 206 women were accepted as building trades apprentices (see Chart 4).⁴ Annual registrations of women ranged from 4.0% to 9.1% of all enrollments. The peak year for number of female apprentices, 1996, saw 31 women accepted into apprenticeships (7.9% of the year's total).

Of the 50 programs available, 36 enrolled female apprentices. Only three women (2.9%) were admitted to non-union apprenticeships – as carpenter (1) and roofer (2) – among the 105 non-union enrollees. At the same time, union-affiliated programs enrolled 203 females, or 6.4% of the total of 3,194 apprentices. While the percentages are small for both union and non-union programs, the union enrollments far exceed their non-union counterparts. Of the 37 union-sponsored programs, only three had no female apprentices. Two of these (i.e., bricklayer and glazier) were quite small, with fewer

³ This number may actually overstate the proportion of women working in skilled trades, since it includes clericals and other support staff.

⁴ Seventeen women – 14 black and three with other ethnic origins – are included in this analysis, rather than the discussion of male minority apprentices (see next section).

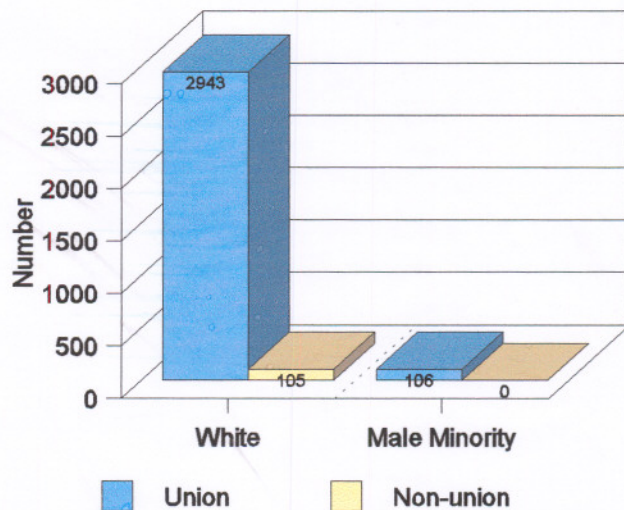
than 10 apprentices during the entire decade; the third, a pipefitter apprenticeship, enrolled 84 individuals. The only trades that had no female apprentices in any program were glazier and plasterer. Again, these trades had few apprentices overall, with only eight training to be glaziers, and 28 learning to be plasterers.

Male Minorities

The construction industry in West Virginia has recruited minority apprentices nearly in proportion to the state's minority population. Minority apprentices comprised 3.9% of all West Virginia apprentices during the 1990s. Although this is substantially lower than the national industry employment average (about 20%), the state's performance should be viewed in the context of its own minority population which was only 4.3% (*Statistical Abstract, 2000*).⁵ Most minority apprentices were male (86.2%) and comprised 3.3% of all apprentices in the study period.

During the decade, union apprenticeships had 106 male minority members (classified as "black" or "other" by the BAT) enrolled, while the non-union programs had no male minorities (see Chart 5). Annual registrations during the 1990s ranged from 1.7% to 4.6% of all enrollments. The peak year for number of male minority enrollments was 1996, when 16 apprentices (4.1% of the year's total) were accepted.

Chart 5
Apprentice Enrollment by Minority Status
(number)



Of the 50 programs available, 25 included blacks or other minority members as apprentices. While none of the 13 non-union apprenticeships included male minorities, the same was true for 13 of the union-related programs. As with female enrollments, most of these tended to be small in size. While that does

⁵ The number of minorities working in construction is subject to the same limitation as national data for women in the construction industry, in that it includes persons working in jobs that may not be skilled trades.

not explain why more male minorities were not included, it does reveal how limited opportunities were for that demographic group.

Among the 17 trade specialties, three did not register minority group members in any program: boilermaker, millwright, and plumber. These three crafts also had either limited numbers of approved programs (two in the case of millwright) or relatively few total enrollees (28, in the case of plumber). The largest total number of minority enrollments were in the three union carpenter apprenticeships, which had 31, and the three roofer apprenticeships, which had 21 minority enrollees. Among the larger apprenticeships, the electricians enrolled a total of 12 minorities; operating engineers, 13; and ironworkers, 12.

Apprentices by Occupation

Nationally, 13 of the construction trades in this study are in the top 25 occupations with active apprentices (including non-construction trades). West Virginia apprenticeship enrollments follow many national trends (see Table 3). For instance, electricians, carpenters, ironworkers, roofers and pipefitters are among the apprenticeships with larger total enrollments in the 1990s.

Each of the five largest apprenticeships in West Virginia had more than 300 enrollees during the decade. Electricians, the largest, had 520, followed by carpenters, 482; ironworkers, 403; roofers, 345; and pipefitters, 336 (see Charts 6A and 6B, on the following pages, and Appendix Table A3).

The smallest apprenticeships were glaziers, with 8, and plasterers and plumbers, with 28 each. The apparent departures from national trends are plumbers, which rank fourth in the United States, and the cement masons, who rank high in West Virginia, but train relatively few apprentices across the country.

Table 3
Comparison of Rankings of Occupations by Number of Apprentices

Occupation	Rankings	
	West Virginia	National
Asbestos Worker	12(t)	–
Boilermaker	7	13
Bricklayer	14	7
Carpenter	2	2
Cement Mason	9	–
Construction Laborer	10	10
Electrician	1	1
Glazier	17	–
Ironworker	3	6
Millwright	12(t)	12
Operating Engineer	11	9
Painter	6	11
Pipefitter	5	3
Plasterer	15(t)	–
Plumber	15(t)	4
Rofer	4	8
Sheet Metal	8	5

(t) = tie

Chart 6B

Apprentices by Occupation, Union and Non-union
(number)

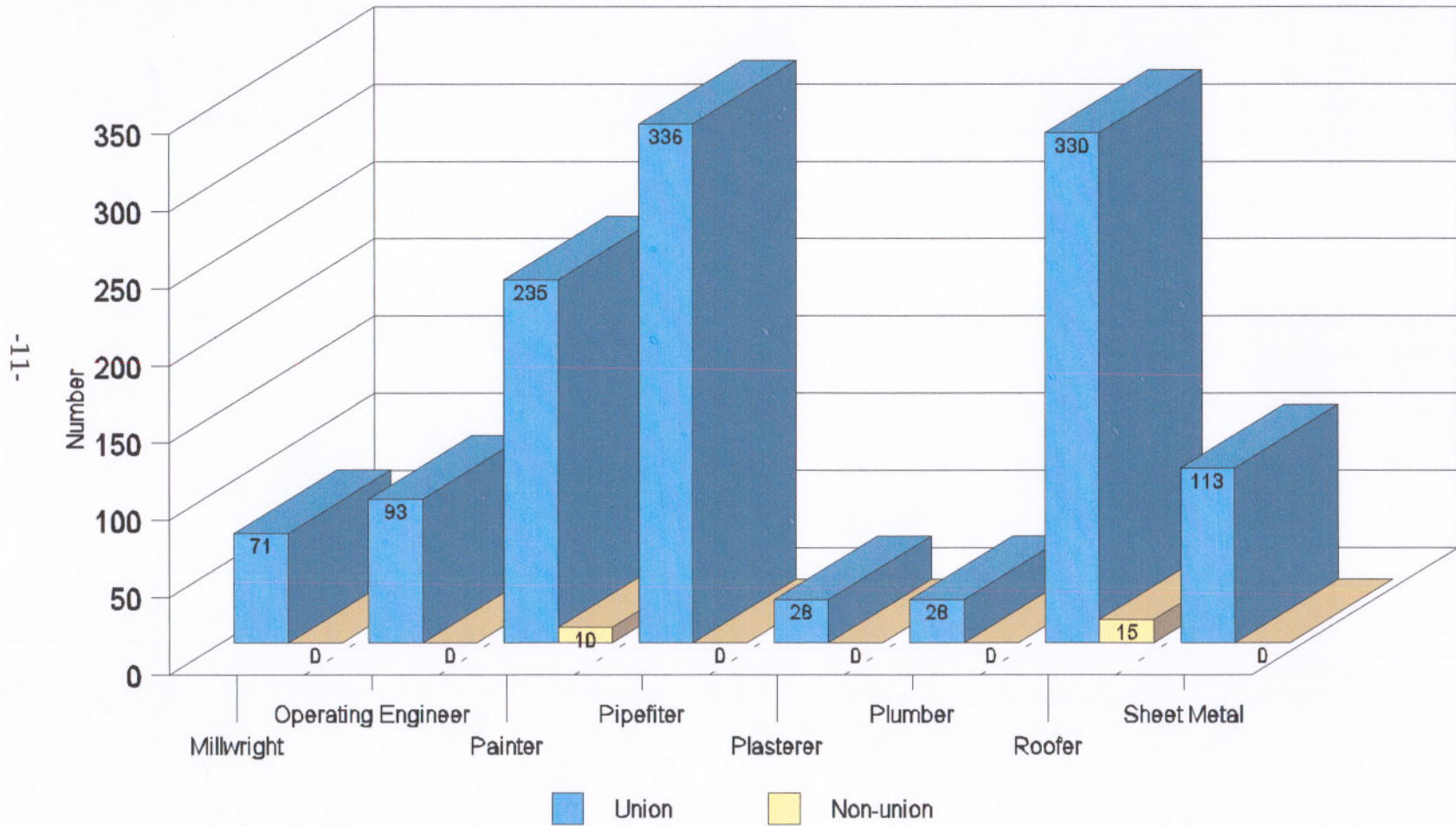
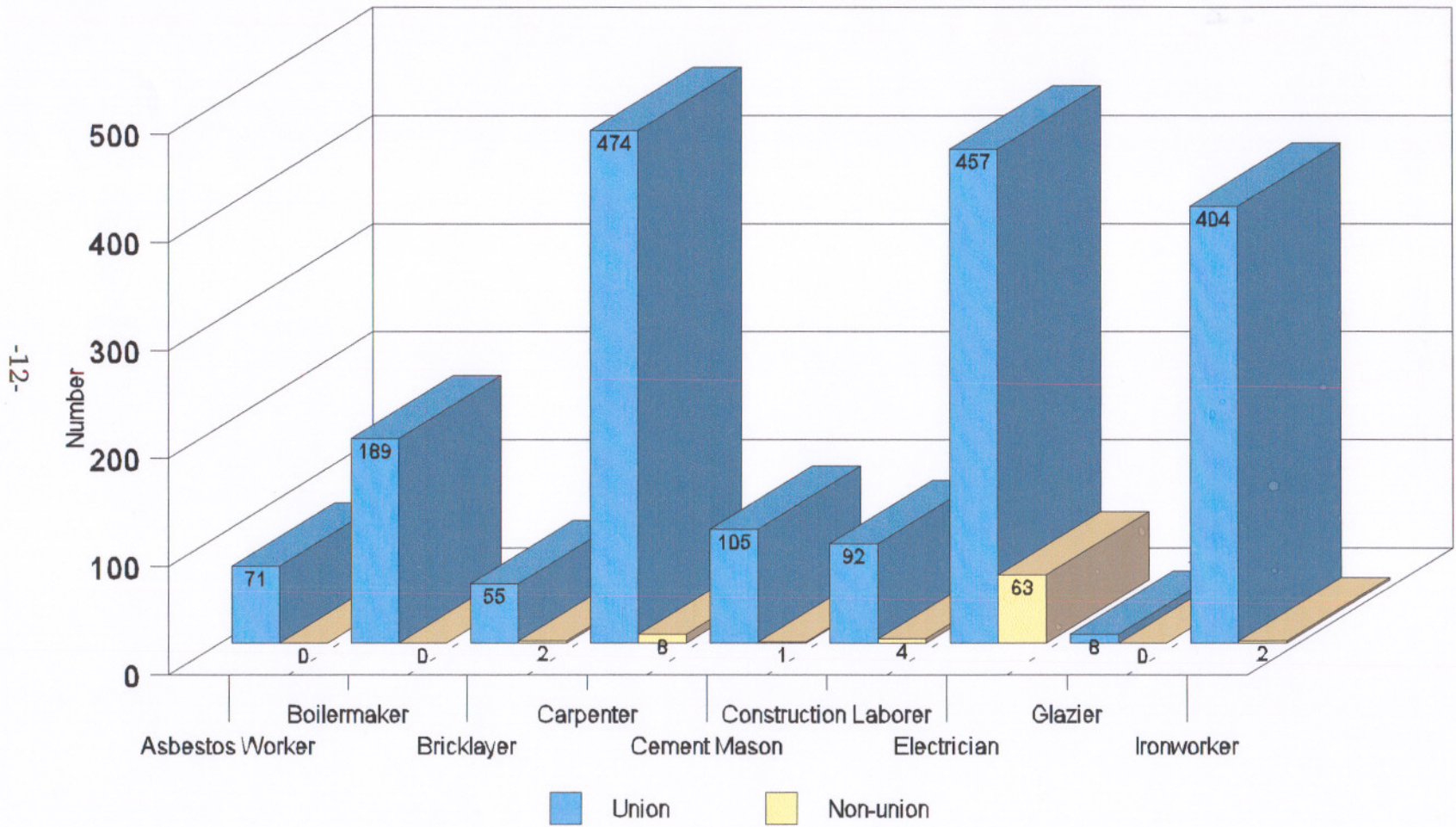


Chart 6A
Apprentices by Occupation, Union and Non-union
 (number)

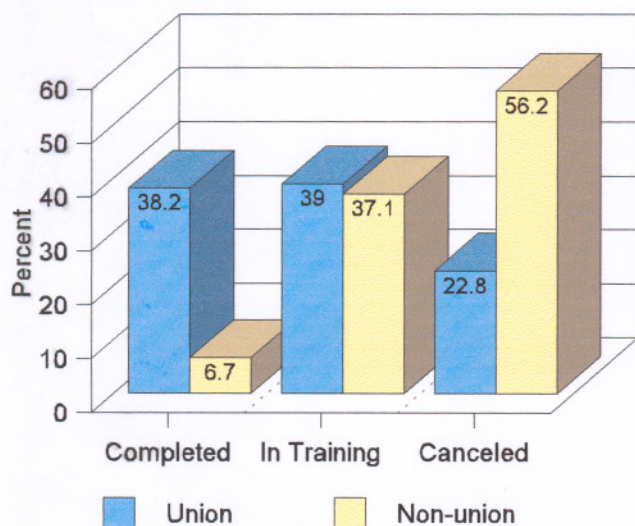


Status of Apprentices

When an apprentice is registered with BAT, the agency also receives notification of subsequent actions that might be taken by sponsors. In nearly all cases in West Virginia, the report was to advise the BAT that an enrollment had been canceled (at whose request is not recorded) or that an apprentice had completed all classroom and on-the-job training and been awarded journeyman status.⁶

Overall, union apprenticeships have been more successful in retaining enrollees through completion of a training program. Among non-union programs, more than half (56.2%, or 59) of the 105 apprentices had canceled by decade's end

Chart 7
Status of Apprentices, Overall
(percent)



(see Chart 7). Among union apprentices, more than one-third (38.2%, or 1,180) completed their training and attained journeyman status (see Chart 7). A similar proportion (39%, or 1,203) remained in training at the end of the decade, and less than one-quarter (22.8%, or 706) were listed as having been canceled. In non-union apprenticeships, seven individuals (6.7%) completed their programs. The only similarity to union apprenticeships was in the proportion still in training (37.1%; see Chart 7), although this group was obviously a much smaller in size, at 39.

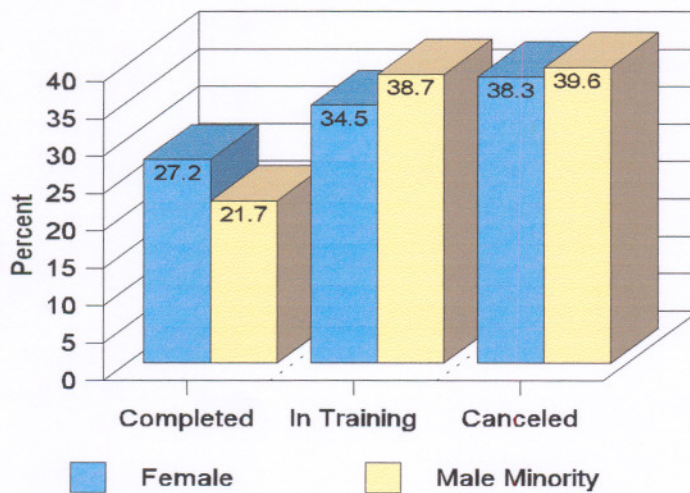
The percentage of apprentices who are still in training does not necessarily reflect delays in progress. For example, 292 apprentices started learning their trades

⁶ Apprentices also may be suspended and/or reinstated during the training period. In West Virginia, the number of occurrences is so small (21 individuals or 0.7% of all apprentices) that analysis is meaningless.

in 1999, and thus could not have completed the minimum hours of required training. Nearly a third of apprentices (1088) began with expected completion dates beyond 1999, the end of the period under study. Only 132 of these newest apprentices had left training by the end of the decade, and six had completed their apprenticeships earlier than expected.

Of the 1,242 apprentices still in training beyond the 1990s, 950 apprentices had expected completion dates beyond 1999, which leaves 292 (only 9.1%) who were beyond their original target date for finishing. Since apprenticeship programs vary in length according to the trade being learned, and because on-the-job training opportunities are affected by adverse weather or unfavorable economic conditions, there is no reason to believe that their apprenticeship experience will vary significantly from others discussed in this study.

Chart 8
Status of Apprentices, Female and Male Minorities
 (percent)



Women and Male Minorities

The outcomes of apprenticeship are quite similar for women and male minorities (see Chart 8).⁷ Both groups have slightly higher cancellation rates, and somewhat lower completion records, than did all apprentices in West Virginia. The proportion in training, however, is nearly identical to the overall completion records, giving some possibility that completion rates could rise. By the end of

⁷ Because there were no non-union male minorities, and only three non-union female apprentices, a separate listing of completion rates, those still in training or those that had cancelled was impractical. In fact, only one of them (a roofer) had not left her apprenticeship by the end of the decade. Therefore, Chart 8 includes the three non-union women apprentices.

the 1990s, 56 of the 206 women registered (27.2%) had achieved journeyman status (see Chart 8). Similar proportions were still in training (71, or 34.5%) or had left their apprenticeships (79, or 38.3%).

Among the male minorities, all of whom were in union programs, about one in five (23, or 21.7%) of the 106 registered had become journeyman craft workers (see Chart 8). Nearly equal proportions were still apprentices (41, or 38.7%), or had left training (42, or 39.6%).

Discussion

Two characteristics of apprenticeship training in West Virginia are most striking. First is the overwhelming proportion of apprentices in union programs: 3,089 union apprentices compared with only 105 non-union apprentices registered during a 10-year period. Another notable feature is the extent to which registered apprenticeships are available in the full spectrum of building trades.

While precise figures are difficult to obtain, it is generally true that a majority of the construction work being done in West Virginia is non-union. Therefore, the union sector is clearly providing the overwhelming majority of the BAT-registered apprentices, while controlling less than half of the industry.

Undoubtedly, the high involvement of the trade unions with apprenticeship training is an important factor in the West Virginia experience. The unpredictable nature of construction contracts and the vagaries of the weather surely have a strong impact on the ability of a single contractor to maintain enrollments in an apprenticeship. By comparison, the union practice of securing a constant stream of funding and establishing fixed training sites and permanent staff enables union-sponsored apprenticeships to provide more abundant and more stable opportunities for training.

At least anecdotally, in recent years many contractors and unions report significantly smaller applicant pools, which makes it more difficult to recruit a sufficient number of qualified applicants. The construction industry has been wrestling with existing and impending shortages of skilled labor for a decade or more. This is no less true in West Virginia than it is in the rest of the nation. The state's record of construction industry employment gives an indication of the potential magnitude of the problem.

Employment and industry projections specifically for West Virginia are not available by craft, but are reported for the industry as a whole. Construction industry employment in 1990, which was 27,000 (*Statistical Abstract*, 1992, Table 644),

increased by more than one-quarter (7,000) to 34,000 in 1999 (*Statistical Abstract, 2000*, Table 683). The value of construction contracts also rose by about 25%, from \$1.2 billion to \$1.5 billion. Even if that rate slows, the industry, like the nation, will need skilled workers for both new jobs and replacement openings. If apprentices continue to attain journeyman status at the same rates as the 1990s, the discrepancy between available jobs and available skilled tradesmen is likely to carry through the first decade of the 21st century and beyond.

The issue of skilled worker shortages has been noted by the industry's major employer associations. Eighty percent or more of contractors declared that a shortage of skilled labor headed their list of concerns in surveys ("Skilled Labor Shortage," 2001; "Finding Time," 1999) conducted by both the Associated General Contractors (AGC), the major contractor group, and by the Associated Builders and Contractors (ABC), the largest non-union association. The National Association of Home Builders also weighed in, with a report that skill shortages were adding as much as 20 days to construction time-lines for homes in major metropolitan areas. In addition, the National Center for Construction Education and Research, with support from both AGC and ABC, conducted a 1997 study which found that more than 90% of national construction firms experienced shortages of skilled labor, and over 85% said that their workers were not as skilled as they should be (Shelar, 1998).

Under its grants program, the Federal Mediation and Conciliation Service provided funding to the National Joint Labor-Management Committee on Skill Shortages in the Construction Industry.⁸ Citing sources as varied as the Business Roundtable, Bureau of Labor Statistics, and Dun and Bradstreet, the committee provided compelling evidence that shortages are both prevalent and likely to become more significant (National Committee, *Strategic Plan*, 2000a).

Reports in the most recent issue of *Occupational Outlook Quarterly* project a need for 989,000 new construction industry workers through 2010. In addition, they estimate net replacement needs at 1.47 million construction industry workers ("Occupational Employment," 2001-02, pp. 11-12). While many of the new workers needed will be office or other support staff, about two-thirds of all construction industry workers in 2000 were specialty craftsmen (U.S. Dept. of Labor, 2001).

The FMCS-funded research estimated that serious skill shortages will exist over the next decade:

⁸ This 10-member committee consisted of equal representation from major construction unions and signatory contractor organizations. The group also worked with the Construction Industry Partnership, composed of 15 building and construction trade unions and 7 national signatory contractor associations.

The magnitude of the shortage ranges anywhere from 3% to 5% of the installation, repair, and maintenance construction workforce for any given year, and cumulatively over the decade could exceed 20% of the workforce of the industry. Importantly, the shortage has two related but distinct dimensions: (a) there is a shortage of skilled workers in most trades and in many places in the United States; and (b) there is a shortage of specific skills within a portion of the available workforce and among pools of applicants for the workforce. (National Committee, *White Paper*, 2000b, p. 4)

The *White Paper* goes on to assert a variety of reasons for the skills shortage, including the decline of construction wages relative to other, traditionally high-wage industries (though construction workers still earn more, on average, across all industries), changing demographics, under-use of the apprenticeship system, poor public image of the construction industry, and difficulties associated with changing preferences and skill levels of the target group of new workers. The recession of the early 1980s contributed to the decline of the apprenticeship system which, at current levels, is not expected to meet replacement needs over the next decade, much less fill new openings for skilled craftsmen. The last two issues – poor public image and changing preferences – combine to make recruitment of construction trades apprentices more difficult: As construction trades have slipped from highly desirable to not so desirable in the public view, young people have also lost their taste for physically demanding work.

In some part, these difficulties with apprenticeships were not unexpected. Certainly, a 1992 federal government report (U.S. GAO, 1992) focused attention on the issue of apprenticeship enrollments. This study found that the number of registered apprentices had declined 11 percent during the 1980s. The impact of this trend on the construction industry is considerable; historically, half or more of all apprentices have been learning specialty trades in construction. The ratio of construction apprentices to all others seems to be declining⁹, partly because more occupations outside of construction receive apprenticeship approval, and because attracting young people to construction trades has become more difficult.

Several parties to the apprenticeship system have initiated efforts to promote interest in construction trades careers. Starting in 1997, the Associated General Contractors has been developing a Construction Futures campaign. This campaign includes “Build Up!”, a tool kit for fifth-grade students to explore jobs in the

⁹ The 1992 GAO report stated that about two-thirds of apprentices work in the construction and metal trades. Many analysts now claim that the proportion is nearer 55%. Nonetheless, in any year, the construction trades have more than 175,000 apprentices, both new and on-going, in BAT-registered programs.

construction industry. Eventually, AGC foresees expanding Construction Futures to other grades as a means of enhancing the industry's image as a rewarding career. In a similar vein, ABC's Wheels of Learning curriculum is the foundation of its registered apprenticeships (though also used for craft training in non-registered programs).

The federal government has confirmed its commitment to apprenticeship several times over the last 15 years. During the late 1980s, the U.S. Department of Labor sponsored workforce research that resulted in Apprenticeship 2000, which identified apprenticeships, or work-based learning programs, as the ideal model to meet changing demands for skilled workers brought about by demographic and technological change. The Federal Committee on Registered Apprenticeship (FCRA), consisting of representatives of labor, industry and the public, has awarded a \$1.2 million contract for a pilot project to market and expand use of apprenticeship. While this project may extend beyond construction trades, it reconfirms the quality and desirability of formal apprenticeship skills training.

Adding to the attraction of apprenticeship as a means of preparing young people for the world of work is the Workforce Investment Act of 1998 (29 U.S.C. 2842). Section 122(a)(2)(B) of the WIA specifically identifies organizations that carry out training under the National Apprenticeship Act. In an analysis of the opportunities that BAT and the SACs might have to promote apprenticeship training (*Workforce Investment Act, 2000*), the U.S. Department of Labor recognizes the clear linkage between apprenticeship and the market-driven, customer-focused job preparation system anticipated in the Workforce Investment Act.

The results of this analysis of West Virginia apprenticeship data, the survey efforts of interested parties, and public policy support, in combination, bolster the place of apprenticeship training as a means of training high-quality, skilled workers. In the case of West Virginia, at least, this 10-year analysis clearly indicates that union-sponsored apprenticeship training is, unquestionably, the only viable channel for producing significant numbers of much-needed journeyman craftsmen who have come through a BAT-registered apprenticeship program.

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Appendix

Table A2

Status of West Virginia Apprenticeship Programs by Occupational Specialty Enrollments, 1990-1999

(percent of total*)

Craft	Program Affiliation and Enrollment History					
	Union		Non-union		Total	
	Programs with Apprentices Enrolled	Programs with No Apprentices Enrolled	Programs with Apprentices Enrolled	Programs with No Apprentices Enrolled	Programs with Apprentices Enrolled	Programs with No Apprentices Enrolled
Asbestos Worker	2.0	0	0	0	1.3	0
Boilermaker	2.0	0	0	0	1.3	0
Bricklayer	4.1	2.0	0	8.0	2.7	4.1
Carpenter	6.1	0	4.0	4.0	5.4	1.3
Cement Mason	6.1	0	4.0	0	5.4	0
Electrician	10.2	0	32.0	16.0	17.6	5.4
Glazier	4.1	0	0	0	2.7	0
Ironworker	6.1	0	0	4.0	4.1	1.3
Laborer	2.0	0	4.0	0	2.7	0
Millwright	2.0	4.1	0	0	1.3	2.7
Operating Engineer	2.0	0	0	0	1.3	0
Painter	12.3	0	4.0	0	9.5	0
Pipefitter	8.2	2.0	0	8.0	5.4	4.1
Plasterer	4.1	2.0	0	0	2.7	1.3
Plumber	6.1	4.1	0	4.0	4.1	4.1
Roofer	6.1	0	4.0	4.0	5.4	1.3
Sheet Metal	2.0	0	0	0	1.3	0
<i>Subtotal</i>	85.5	14.2	52.0	48.0	74.2	25.6
Total	99.7		100.0		99.8	

*May not equal 100% because of rounding.

Table A1

Status of West Virginia Apprenticeship Programs by Occupational Specialty Enrollments, 1990-1999
(number)

Craft	Program Affiliation and Enrollment History					
	Union		Non-union		Total	
	Programs with Apprentices Enrolled	Programs with No Apprentices Enrolled	Programs with Apprentices Enrolled	Programs with No Apprentices Enrolled	Programs with Apprentices Enrolled	Programs with No Apprentices Enrolled
Asbestos Worker	1	0	0	0	1	0
Boilermaker	1	0	0	0	1	0
Bricklayer	2	1	0	2	2	3
Carpenter	3	0	1	1	4	1
Cement Mason	3	0	1	0	4	0
Electrician	5	0	8	4	13	4
Glazier	2	0	0	0	2	0
Ironworker	3	0	0	1	3	1
Laborer	1	0	1	0	2	0
Millwright	1	2	0	0	1	2
Operating Engineer	1	0	0	0	1	0
Painter	6	0	1	0	7	0
Pipefitter	4	1	0	2	4	3
Plasterer	2	1	0	0	2	1
Plumber	3	2	0	1	3	3
Roofer	3	0	1	1	4	1
Sheet Metal	1	0	0	0	1	0
<i>Subtotal</i>	42	7	13	12	55	19
Total (union and non-union)	49		25		74	

Table A3
Status of West Virginia Apprentices by Occupational Specialty, 1990-1999
(number)

Craft	Status of Apprentices							
	Completed		In Training		Left Training		Total	
	Union	Non-union	Union	Non-union	Union	Non-union	Union	Non-union
Asbestos Worker	28	0	40	0	3	0	71	0
Boilermaker	76	0	88	0	25	0	189	0
Bricklayer	0	0	45	2	10	0	55	2
Carpenter	172	0	165	5	137	3	474	8
Cement Mason	23	0	54	1	28	0	105	1
Electrician	243	6	179	15	35	42	457	63
Glazier	0	0	8	0	0	0	8	0
Ironworker	174	0	138	2	92	0	404	2
Laborer	18	0	43	3	31	1	92	4
Millwright	28	0	34	0	9	0	71	0
Operating Engineer	27	0	30	0	36	0	93	0
Painter	75	0	64	1	96	9	235	10
Pipefitter	153	0	151	0	32	0	336	0
Plasterer	5	0	11	0	12	0	28	0
Plumber	21	0	3	0	4	0	28	0
Roofer	71	1	121	10	138	4	330	15
Sheet Metal	66	0	29	0	18	0	113	0
<i>Subtotal</i>	1180	7	1203	39	706	59	3089	105
Total (union and non-union)	1187		1242		765		3194	

Table A4
Status of West Virginia Apprentices by Training Accomplishment, 1990-1999
 (percent of total*)

Craft	Status of Apprentices							
	Completed		In Training		Left Training		Total	
	Union	Non-union	Union	Non-union	Union	Non-union	Union	Non-union
Asbestos Worker	2.4	0	3.2	0	0.4	0	2.2	0
Boilermaker	6.4	0	7.1	0	3.3	0	5.9	0
Bricklayer	0	0	3.6	0.2	1.3	0	1.7	0.1
Carpenter	14.5	0	13.3	0.4	17.9	0.4	14.8	0.2
Cement Mason	1.9	0	4.4	0.1	3.6	0	3.3	0
Electrician	20.5	0.5	14.4	1.2	4.6	5.5	14.3	2.0
Glazier	0	0	0.6	0	0	0	0.3	0
Ironworker	14.7	0	11.1	0.2	12.0	0	12.7	0.1
Laborer	1.5	0	3.5	0.2	4.1	0.1	2.9	0.1
Millwright	2.4	0	2.7	0	1.2	0	2.2	0
Operating Engineer	2.3	0	2.4	0	4.7	0	2.9	0
Painter	6.3	0	5.2	0.1	12.5	1.2	7.4	0.3
Pipefitter	12.9	0	12.2	0	4.2	0	10.5	0
Plasterer	0.4	0	0.9	0	1.6	0	0.9	0
Plumber	1.8	0	0.2	0	0.5	0	0.9	0
Roofer	5.9	0.1	9.7	0.8	18.0	0.5	10.3	0.5
Sheet Metal	5.6	0	2.3	0	2.4	0	3.5	0
<i>Subtotal</i>	99.5	0.6	96.8	3.2	92.3	7.7	96.7	3.3
Total	100.1		100		100		100	

*May not equal 100% because of rounding.

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