Training for the Workforce of the Future:

Advantages or disadvantages of using registered apprentices in two county GOB projects

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Executive Summary

On November 2, 2004 the electorate of Miami-Dade County passed the "Building Better Communities General Obligation Bond" (GOB) initiative, which authorized the county to issue bonds for up to $2.925 billion over the next 30 years. Two of these projects were the renovation of the Orange Bowl and the expansion of Jackson South Community Hospital campus, with the county contributing $50 million of the $150 million Orange Bowl project and $52 million toward the total $100 million cost of the hospital expansion.

This report analyzes the advantages and disadvantages to the county in using registered apprenticeship programs for some of the work on these projects. The purpose is to see whether apprentice usage is a desirable practice for the county.

This study establishes the following:

(1) There is a skilled labor shortage in the construction industry, and this shortage is even more acute in south Florida than it is nationwide. The shortage is not a lack of bodies, but a lack of trained and skilled people.

(2) This shortage hurts the industry and also harms end-users or customers (through delays, re-work of work originally done wrongly, an unstable workforce, possibly inferior final product, etc.), to such a degree that the Construction Users Roundtable recommends that users insist on training as part of the procurement process.

(3) Apprenticeships in general are the most successful job training programs in the United States today. This is widely acknowledged, from the federal government down.

(4) Although the evidence is not definitive, the studies that have been done indicate that use of apprentices on construction projects is efficient, and that there is a positive return-on-investment (ROI) for employers as a group and for end users in their use. Scientific studies on this question are expensive and hard to design, but the few studies we have are positive. A Canadian study found that on average, for each $1 invested in an apprentice, the employer derived a benefit of $1.38.

This positive return does not mean that individual employers will adopt apprenticeship, however, unless they belong to a contractor's association bargaining the program with a labor organization that guarantees a supply of skilled workers for the apprenticeship investment, or are required to by the end user. Absent one or both of these conditions, most employers avoid apprenticeship for fear that their investment will be lost through other employers "stealing" their trained employee.

(5) Use of apprentices is a good way to ensure that the work goes to local employees, since apprentice programs are by their very nature local.

(6) Apprenticeships bring higher wages to the trained employee than does any alternative form of training, thus maximizing incomes in the local community. A December 2004 study for the state of Florida found that apprenticeship outperformed public school system or community training significantly, raising apprentices' wages upon completion over $10,000 in all but one of the trades that were studied.

(7) Use of apprentices can be a tool for diversity in the workforce, thus granting a steady and well-paying career to disadvantaged communities, if the end user requires or encourages through incentives that a number of the apprentices come from disadvantaged and/or discriminated-against populations.

(8) The evidence is strong that construction workers trained through an apprenticeship program work safer, and thus apprenticeships further a public interest in safe work.

(9) Construction apprenticeship programs are highly successful forms of workforce development. They exhibit superior outcomes to most forms of training, and they are extremely cost-efficient compared to most forms of training. A Florida study found that between 81% and 90% of apprentices were employed upon completion, an astoundingly successful placement rate for a job training program. The federal government estimates that it receives $50 back for every $1 it spends on apprenticeship programs.

(10) Even among construction apprenticeship programs that are registered with the government, there are differences in quality, and the county might want to use a "best value" form of contracting that rewards the ones with better outcomes (higher graduation rates, higher "value added" for the apprentice through higher wages), by giving them more points in a point-based bidding system.

(11) In general, the evidence leads to the conclusion that the county would be wise to either require or encourage by means of incentives in the procurement process the use of apprentices in the renovation of the Orange Bowl and the expansion of Jackson South Community Hospital.

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Introduction

On November 2, 2004 the electorate of Miami-Dade County passed the "Building Better Communities General Obligation Bond" initiative, which authorized the county to issue bonds for up to $2.925 billion over the next 30 years. The money raised is to be used in a number of projects aimed at improving the county in a variety of ways.

A general obligation bond is issued without any assets being used as collateral; instead the lender is promised repayment based on the borrower's ability to tax. Future tax revenues of the county will be used to pay off the bond obligations. Thus, this is a large expenditure of the taxpayer's money, spread out over a 30 year period.

The money raised is to be used in eight different areas. The largest amount is to be spent on constructing and improving parks and recreational facilities ($591 million). Cultural, library and multicultural educational facilities account for the second largest amount ($510 million). Water, sewer and flood control systems are allocated $479 million, followed by bridges, public infrastructure and neighborhood improvements at $328 million. Public safety facilities will receive $325 million, and $242 million will go to public outreach facilities to improve community access to services. Finally, emergency/healthcare facilities and elderly and family housing assistance will each receive about $138 million.

The raising and expenditure of almost $3 billion dollars is clearly a major undertaking utilizing the taxpayer's money. The types of projects being funded are clearly important and useful to the county, so it is important to county taxpayers that the money be spent wisely and that the maximum benefits accrue to county residents from the money spent.

Beyond the immediate benefit to be gotten from the finished product (a new park, improved sewage system, etc.), there are also possible "spin-off" benefits from the projects funded under the General Obligation Bond. One such spin-off benefit is the extra employment created by the construction projects being funded, and the many benefits that come with that additional employment. In the implementation of the bond construction projects, it would be wise for the county to also pay attention to these indirect benefits and to work to ensure their maximization.

The South Florida Jobs with Justice chapter, in conjunction with the South Florida AFL-CIO and the South Florida Building Trades Council, took an interest in two of the projects to be funded under the general obligation bond program: the renovation of the Orange Bowl and the expansion of the Jackson South Community Hospital. Together they have set up a task force to monitor these two projects and to work to maximize their employment benefits to the county's residents.

As part of this effort, South Florida Jobs with Justice contracted with RISEP to research the impact of alternate ways of employing labor in these projects. One question of interest is the **impact of using, or not using, apprentices from registered apprenticeship programs** on the construction projects. **What are the advantages or disadvantages of using such apprentices? Would it be wise or unwise to employ such apprentices in this work?** This research report is an attempt to answer these questions. Answers require that we examine the state of the construction industry, the role of apprenticeships within it, existing research on apprenticeship impacts and the "return on investment" in such programs, the county's stake in workforce development and training, and the local context.

Context: the shortage of skilled labor in the construction industry

The construction industry has been experiencing a shortage of skilled labor, according to a wide variety of knowledgeable sources. Furthermore, all reports indicate that the shortage is getting worse and is projected to worsen even more in the immediate future.

In the past decade, The Business Roundtable first raised the alarm with a report entitled *Confronting the Skilled Construction Work Force Shortage, a blueprint for the future* in 1997.[1] This report indicated that crisis would ensue if strategies were not implemented to assure an adequate work supply. Projecting needs and likely supply in the years 2000 – 2010, the Construction Labor Research Council found the same result a year later.[2] Studies in 1999 from the Center for Construction Industry Studies at the University of Texas at Austin noted the same problem, and outlined a research and action agenda that may help address it.[3]

The shortage of the needed workers has several aspects to it. The workforce is aging; government statistics show that from 1980 to 2000, the proportion of construction workers aged 40-49 increased 65% while the proportion aged 20-29 decreased by 34%.[4] As the "baby boomer" generation now in their 50s and early 60s retire, there is an ever-increasing need for replacements. A study by the Construction Labor Research Council estimates that between 2005 and 2015, construction craft employment is projected to increase by 90,000 persons annually, but due to the aging of the workforce, another 95,000 new entrants will be needed to replace those who retire or leave for other

[1] See Business Roundtable, *Confronting the Skilled Construction Work Force Shortage, a blueprint for the future*, October 1997.
[2] Construction Labor Research Council, *Craft Labor Supply Outlook, 2000-2010*, Washington, D.C., 1998.
[3] Richard L. Tucker, Carl Haas, Robert Glover, Christine Alemany, Lynn Ann Carley, Ana Maria Rodriguez, and David Shields, *Key Workforce Challenges Facing the American Construction Industry: an Interim Assessment*, March 1999; and Robert Glover, Donald Long, Carol Haas, and Christine Alemany, *Return-on-Investment (ROI) Analysis of Education and Training in the Construction Industry*, March 1999. Both studies were done at the Center for Construction Industry Studies, the University of Texas at Austin, Austin, Texas.
[4] "Worker Age in Construction and Other Industries," Chapter 14 in *Construction Chart Book*, (Washington D.C.: Center to Protect Workers' Rights, 2002).

employment.[5] Thus, at least 185,000 new skilled construction workers will be needed each year. (Other publications from the U.S. government and the Construction Users Roundtable put the need even higher: between 200,000 and 250,000.)

In reality, **the "labor shortage" that is growing more acute is not an actual shortage of people – it is a shortage of <u>qualified</u> and <u>trained</u> people.** As the Construction Labor Research Council puts it, in the coming 2005 – 2015 period, "An actual shortage of bodies is highly unlikely. A shortage of labor in construction means a shortage of adequately trained, skilled, productive persons."[6]

Yet, the industry has had a hard time attracting the new recruits needed to supply the manpower needed. Uniformly, those in the industry claim that a major problem is the "image" of the industry to young people. A *Wall Street Journal* poll of high school-aged vocational technology students found that they ranked "construction worker" 248th out of 250 occupations they could choose.[7]

A recent study by the Construction Industry Institute found that a majority of craftworkers responding to a survey indicated that they would not recommend that their own children enter a construction trade as a career. The reasons given for the high turnover and inability to retain workers were insufficient wages and benefits, impermanency of employment, unsafe job sites, poor working conditions, and unfair treatment of employees.[8]

However, it is not the case that all construction workers are dissatisfied or contemplating leaving the industry. A second study by the Construction Industry Institute found that the workforce is divided into two quite distinct segments, one a stable group seeing construction as a career and the other much more unstable and transient:

> The construction work force can be characterized as two divergent work forces: one that is satisfied with the work and is willing to participate and improve skill levels; and a second that is transient, unsatisfied, and will quickly leave the industry when other opportunities arise.[9]

The shrinkage of the first segment of the workforce, and the growth of the second, is a cause for major concern of all those involved in the construction industry. Increasingly, end users of constructed buildings are involving themselves in these matters as an

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[5] Construction Labor Research Council, *Craft Labor Supply Outlook 2005-2015*, Washington, D.C., 2005, p. 14.
[6] Ibid, p. 16.
[7] Cited in the U.S. Department of Labor, Employment and Training Administration, *America's Construction Industry: Identifying and Addressing Workforce Challenges*, December 2004, p. 11.
[8] See Construction Industry Institute, "Attracting and Maintaining a Skilled Workforce," the executive summary of a research project. This executive summary is available on the web at: http://construction-institute.org/scriptcontent/more/rr135_11_more.cfm. Accessed June 25, 2006.
[9] Construction Industry Institute, "The Shortage of Skilled Craft Workers in the U.S.", executive summary of a research project. On the web at: http://construction-institute.org/scriptcontent/more/182_1_more.cfm. Accessed June 25, 2006.

interested party, because cost overruns, shoddy workmanship, and delays in completion resulting from the shortage of skilled workers make it in their interest to attempt to correct the problem.

All of the problems noted above are present in Miami-Dade County, and are even accentuated.[10] The construction labor force in the county has lower pay, lower unionization levels, higher accident rates, and greater instability than the construction workforce nationally. **Therefore, end users of constructed buildings and products, and in particular the county, need to pay attention to the same issues as those discussed above.**

The role of apprenticeship programs in the construction industry

Apprenticeship plays a very important role in the construction industry, because this industry is based on craft-based skilled labor. Many young people enter the industry through apprenticeship programs, which include both classroom training and on-the-job experience under the close supervision of a trained craftsperson. The U.S. Department of Labor sets quality standards for those apprenticeship programs registered and recognized by the federal government. For example, they require that the program last at least a year or 2,000 hours of on-the-job training and recommend at least 144 hours of formal instruction.[11] Most apprenticeship programs last between 3 and 5 years, 3-4 years being the average.

Alternative ways for construction workers to learn the skills needed to become a craftsman include initial training through a high school or vocational school, but it is widely acknowledged that such programs generally provide only beginning or rudimentary skills that only partially fulfill the needed training. The most common way outside of apprenticeship is simply "learning by doing" while on the job, picking up the skills much more slowly and less systematically than would happen under an apprenticeship. This method of learning results in haphazard learning, more mistakes in workmanship along the learning path, less safety training and probably more accidents, but over time a number of workers who entered the industry without formal training do become skilled craftspersons simply by learning on the job.

The advantages of apprenticeship to employers include consistent skills, more permanent workforce, a more safety-conscious worker, and a given supply of workers at a given level of skill. For workers, apprenticeships provide advanced skills and a widely recognized credential in the industry, greater awareness and tools to work safely, training valued at an estimated $40,000 to $150,000, and a future career.

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[10] The latest indication of this is a news account: Niala Boodhoo, "Skills Wanted: South Florida's shortage of skilled tradesmen isn't going away soon," *Miami Herald*, July 29, 2006, pp. 1A, 24A.

[11] "Apprenticeships in Construction and Other Industries," Chapter 31 in *Construction Chart Book*, (Washington, D.C.: The Center to Protect Workers' Rights, 2002).

Apprenticeship programs are of two types. Joint programs are run jointly by a construction union and employers who have signed a collective bargaining agreement with that union, and are financed by a negotiated fund based on a funding formula of a certain number of cents for every hour worked under the collective bargaining agreement. Individual apprenticeship programs funded by a single employer also exist on the non-union side, sometimes set up by non-union associations such as Associated Builders and Contractors (ABC). It is widely acknowledged that the union programs have been more extensive – a 2003 study found that 61% of all apprentices were trained in joint apprenticeship programs.[12] They also have a better track record for completions, a point to which we will return later.

Why Should the County Care? Apprenticeship Impacts on County Interests

Whatever the overall role of apprenticeship is in the construction industry as a whole, the question remains as to why the county, as an "end user" of the Orange Bowl and Jackson Hospital South projects, should concern itself with whether apprentices are used on these projects or not. There are six possible reasons why the county may find it advantageous to use apprentices on these projects:

(1) First, it may be the case that a workforce that includes apprentices is more economical and efficient than an alternative workforce without them. In other words, apprentices may provide a good "return on investment" (ROI);

(2) Second, use of apprentices from local apprenticeship programs may ensure that the work is being done by local people, which is demonstrably advantageous to the county;[13]

(3) Third, if use of apprentices would lead to higher incomes for Miami-Dade County construction workers, employing them could further a county goal of increasing local living standards;

(4) Fourth, if the use of apprentices was coupled with a requirement that the apprenticeship programs enroll residents of the lowest income or disadvantaged communities, apprenticeship could be a mechanism to provide stable and well-paying jobs (i.e., real careers) to the county's neediest residents;

(5) Fifth, if apprentices work more safely than those without equally formalized training, the construction could be performed in a safer manner; and

(6) Sixth, use of apprentices could fulfill a county goal completely independent of its role as an end user of the buildings by fulfilling a workforce development function.

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[12] Cihan Bilginlsoy, "The Hazards of Training: Attrition and Retention in Construciton Industry Apprenticeship Programs," *Industrial and Labor Relations Review*, Vol. 57, Issue 1, 2003, p. 58.

[13] See Bruce Nissen, *Hiring Our Own? The Impact of Local verses Non-Local Hiring Practices in the Orange Bowl Renovation and Jackson Memorial Hospital South Expansion Work*, July 2006.

The county spends a great deal of money on training; utilizing apprentices could be a very inexpensive or perhaps even cost-free way to support a very successful form of job training, which is a clear county goal for its residents.

Of course, each of these potential advantages could also be a potential disadvantage if the evidence shows that apprenticeship programs accomplish the opposite of the hoped-for results listed above. In other words, if they are less efficient than alternatives, move the work away from local people, minimize earnings, steer jobs away from low income communities, make the work less safe, or are unsuccessful as a form of training, they clearly would be inappropriate vehicles for providing some of the workforce on these projects. So, what is the evidence on each of these six issues? Do apprenticeship programs provide advantageous or disadvantageous results in each area? In the following sections, we will examine the available evidence in each area.

Prior to examining each of the six questions above, we briefly survey the general attitudes of the U.S. government and of the only organization of construction customers of which we are aware about apprenticeships in construction.

The federal government has an extremely favorable attitude toward apprenticeship programs. Its office of apprenticeship has registered programs since 1938. In its brochure "Registered Apprenticeship: a Solution to the Skills Shortage," it claims that apprenticeships lead to reduced turnover, reduced worker compensation costs due to safety training, quality results and skilled workers trained to employer specifications, generally higher wages, and the like. In a personal email to RISEP personnel in response to questions, Mr. James Conley of the U.S. Department of Labor Office of Apprenticeship stated that these aspects of apprenticeship were known based on the "feedback and continuous participation by apprenticeship sponsors over our 65+ years of having a national apprenticeship system."

In general, the argument is that these facts are so well established by now that they can be taken for granted because of the long success of apprentice programs. The federal government claims that it gets back over $50 for every $1 it lays out for apprenticeship programs.[14] It claims that this "return on investment in registered apprenticeship clearly outperforms other types of government-sponsored job training programs."[15]

Indeed, we have been unable to find any significant criticism of apprenticeship programs from within the construction industry. Apprentice programs in construction are widely considered the most successful job training programs in the country. Among employers, both the union and the non-union sectors of the construction industry praise apprenticeships highly, with the former touting their long and successful apprenticeship tradition and the latter lamenting past difficulties and claiming some progress in establishing quality apprenticeship programs of their own. No one within the industry seems to have any doubts about the value of apprenticeship programs.

[14] "Registered Apprenticeship: a Solution to the Skills Shortage," p. 2.
[15] Ibid.

ONE VIEW FROM WITHIN THE INDUSTRY: CHRIS BLACK, PRESIDENT AND CEO OF NEW BEACH CONSTRUCTION COMPANY

Chris Black is an African-American contractor whose company does inside finish carpentry and drywall work in the Miami-Dade County area. We asked him his opinion of apprenticeships. Below are excerpts from the interview.

"I think it builds character. I myself went through an apprenticeship program, and it was very helpful for my entire life. Actually, it changed my life. . . I was one of the kids who had ambitions to learn something, and I didn't want to go to college. I wanted to get a trade background experience. (Carpentry)."

"So, I think it's a very positive thing for the community, and it also brings the younger guys up under the older guys. So, when the older guys retire, you have a background of younger guys taking the baton and taking it to the next level. I think it (apprenticeship) will be very successful for a lot of the city youth that are out there."

"(With apprenticeship) you're now building a workforce. You might pay a little bit more, but you're building a mind. . . I think that the end result is that you'll have a very competent, capable workforce out there that's well trained, that can be very productive, which can be very productive for all of the owners out there. And you'll have a pool of resources and manpower that we all can pull from, because everyone will be educated.

(Apprentices work) not only safer, but more productively. Yeah, safer is one of the aspects. More productive. More production is what we as owners all strive for. Safer, and more productive is what makes my life a lot easier. When you can estimate on a job and you can put in a certain productivity factor in there, and you can achieve that productivity factor, then that means we are profitable at the end of the job."

"We now employ between 200 and 250 men under our umbrella. I would say a good 25, maybe 30 percent of that is apprentices. It is a little bit tedious at times because you have to, you know, you have to bring that young fellow or young lady under your arms and pretty much nurture them. But once you nurture them and teach them . . the right way, then that person is going to be ultimately the most productive person.

"We have to look at our community as a whole. The people that are going to put back into the community, that are going to be productive, that are going to stay and leave a mark or make a difference for other kids, and stuff like that – those are the people that I think we should invest our dollars in. I will swear up and down that that's the way to go, because that's what I know. I started at the lowest end of the ladder, and that's been very successful for me. So I think that if it can happen to me, it can happen to anyone.

We're only as good as the people that do the work for us. Owners are not the ones out there that are making things happen. The guys on the front line are the ones that are making us all profitable, and you have to be able to put into the people that are doing that for you . I'm a firm believer that apprentices should be – how can I put it? – they should have a value. I feel you should reward your guys."

Among users, the most organized voice is the Construction Users Roundtable (CURT). CURT is composed of many of the largest users of construction services in the country, including Boeing, Caterpillar, Dow Chemical, Dupont, Eastman Kodak, General Electric, General Mills, General Motors, Honda, Intel, Johnson and Johnson, IBM, Intel, McGraw-Hill, Merck, Owens Corning, Pfizer, Procter & Gamble, Southern Companies, Sunoco, Toyota, the U.S. Army Corps of Engineers, etc. CURT is very concerned about the shortage of skilled construction workers, and argues that "owners should require contractors to invest in training and maintain the skills of their workforce as a condition of employment. That approach could ensure that contractors make training a priority."[16] In particular, regarding apprenticeships, CURT states that it "encourages the increased use of apprentice craftspeople on jobsites."[17]

CURT goes further, and argues that end users or owners should require training commitments from contractors doing work for them. Specifically, owners must:

- Only do business with contractors who invest in training and maintain the skills of their workforce.
- Make contractor commitment to craft training a factor in the prequalification process. Owners should require the following in contract documents:
    - A description of the contractor's overall company training program.
    - Details on investments made on training.
    - Information on any specific training planned for the proposed project.
    - Specific methods used to evaluate skill proficiencies, such as skills assessment testing, rework measurement, repairs, weld rejection rate, etc.
    - Evidence of support for the continued updating and improvement of apprenticeship training and journeyman upgrade training in the union sector.[18]

Thus, a very general overview of the advantages and disadvantages of apprentice programs shows a very positive picture. In fact, the organization of large construction users argues that end users or owners should require apprenticeship or similar training from the contractors doing the building. This alone does not prove that the county would be wise to require the use of apprentices in the Orange Bowl renovation and the Jackson Hospital South expansion, but it does point in that direction. We turn now to the available evidence on the six issues listed above for further guidance.

Question 1: Would use of apprentices be more economical and efficient than use of an alternative workforce? Would there be a good "return on investment" (ROI)?

Empirical studies addressing this question are quite rare. In a study titled *Return-on-Investment (ROI) Analysis of Education and Training in the Construction Industry* the Center for Construction Industry Studies at the University of Texas surveys the state of

[16] Construction Users Roundtable, *Confronting the Skilled Construction Workforce Shortage* (June 2004), p. 8.
[17] Ibid.
[18] Ibid., p. 9.

the research and the many reasons that definitive research on this topic is so rare.[19] Truly rigorous research would require an accurate measure of the full costs of alternatives, which are hard to pin down. It would also attempt to minimize the almost inevitable reliance on subjective estimates to measure benefits. Finally, it would have to attempt to isolate the impact of the apprenticeship or training, again a difficult proposition.

The cost of doing research that is sufficiently reliable and generalizable to satisfy academic standards is very high, which explains the scarcity of studies. Anecdotal evidence and practitioner testimonials are valuable, but not definitive. (In a sidebar, we earlier produced the testimony of one contractor on the value of the apprenticeship to his very successful business operation in south Florida, which is useful and valuable but by itself insufficient to generalize to the entire industry.)

The only empirical research we have been able to find on this topic comes from Canada. In Alberta province, a sophisticated engineering report employing on-the-job observation supplemented by survey data resulted in a 2002 research report on apprentices in the pipefitter and construction electrician trades.[20] This research gathers productivity data for various individual tasks performed in these trades, and from the results derives productivity data and unit labor costs. It then examines different ratios of apprentices and journeymen that could be used on jobs, with an eye to seeing which combination would be most productive. Weather data and task-specific delays are also measured to eliminate the effects of extraneous impacts on productivity. Finally, the data are supplemented by survey questionnaire data to derive additional information on what makes for effective or ineffective use of apprentices.

The particulars of all of the tasks measured for each trade, and the results for each, are too detailed and complicated to reproduce here. (For detailed descriptions, tables, and charts, the reader is referred to the original, accessible through the website cited in footnote 19.) Small sample size limits our ability to be sure that results can be generalized widely, but overall the findings are that apprentices can perform a number of (although not all) tasks at about the same efficiency as that of a journeyman. The integration of apprentices into the workforce was found to be quite efficient, according to this preliminary study. Many of the study's recommendations concern the proper ratio of apprentices to journeymen, given the demonstrated proficiency of apprentices at certain tasks and the need for journeymen in proper numbers to continue the training of the apprentice in further tasks.

A second study is more recent. The Canadian Apprenticeship Forum has completed two phases of a three-phase research program on the return on investment (ROI) of apprenticeships in that country. Almost 2,000 employers using apprenticeships were

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[19] See Robert Glover, Donald Long, Carl Haas, and Christine Alemany, *Return-on-Investment (ROI) Analysis of Education and Training in the Construction Industry*, University of Texas Center for Construction Industry Studies, March 1999. Available on the worldwide web at: http://www.ce.utexas.edu/org/ccis/a_ccis_report_06.pdf.

[20] To see this preliminary study, go to the website http://workforcedev.coaa.ab.ca/apprentices/library.asp. This is the apprenticeship part of the website of the Construction Owners Association of Alberta. The findings in the following paragraph come from this study.

surveyed, as were their apprentices and training providers. A cost-benefit model employing all conceivable costs (wages and benefits, "opportunity costs" of not investing the money elsewhere, wastage, disbursements, and administrative costs) and employer benefit (revenue gathered from the apprentice's work) was employed, subtracting total costs from total benefits.[21]

The research design of this study is sound, and to a great degree it relies on "hard" data rather than simple subjective assessments for its results. (Assessments supplement the main results, but are auxiliary to the main findings, which rely on monetary data collected from large numbers of employers.) Research results follow:

(1) On average, for each $1 invested in an apprentice, a benefit of $1.38 accrues to the employer.
(2) All 15 trades studied show an overall net benefit of apprenticeship training.
(3) 66.1% of employers **perceive** that apprentices' productive value exceeds training costs by the end of the second year; in **reality**, apprentices for all 15 trades generate net benefits for employers within a short period of time. Twelve of 15 trades show a net benefit after year one, all but one after year 2.
(4) Employers perceive that there is a benefit of employing a journeyperson (full trained skilled craft worker) who is trained as an apprentice.
(5) A majority of employers across all business sizes and regions perceive a "homegrown" journeyperson as more productive than an externally trained journeyperson.

The 38% payoff for the employer in all trades varies from one trade to another. Table 1 shows the ratio of benefits to costs (the benefit/cost ratio) for employers in a variety of building trades employers in Canada.

Table 1
Ratio of Benefits to Costs of Apprentices for Employers in Canada, Different Crafts

TRADE	Apprenticeship Length (years)	Benefit/Cost Ratio*
Bricklayer	4	1.34
Carpenter	4	1.12
Construction Electrician	5	1.23
Air Conditioning Mechanic	4	1.31
Sheet Metal Worker	4	1.19
Sprinkler System Installer	4	1.64

*Ratios do not average to 1.38 (either as a weighted or unweighted average), because the entire study included other trades not in the construction industry, such as auto mechanic, cook, etc.

[21] A research report is expected out in the fall of 2006. In the meantime, the results have only been disseminated via a power point presentation, "Return on Apprenticeship Training Investment. Conference Presentation", Canadian Apprenticeship Forum. A copy of this power point is in the author's possession. Thanks for Professor Paul M. Goodrum, Department of Civil Engineering at the University of Kentucky, Lexington, KY for sharing this power point with me. All the results and data in the following few paragraphs are from this power point.

These results were brought to "roundtables" of employers in different parts of the country. Employers in general confirmed the cost-benefit results, although there were regional variations. Employers agreed that apprentices generate a net return for their organization. A roundtable of economists validated the methodology of the research, and noted that it exceeds the breadth of any previous study.

These results from Canada all point to the conclusion that apprentices are a wise resource in which to invest: the "return on investment" in apprentices is positive. A couple of cautions are in order, however. First, results from Canada may not apply in south Florida due to differences in existing apprentice programs, industry wage structures, and the like. Second, the results are somewhat preliminary because this type of research on the return-on-investment of apprenticeship is relatively new. Despite these cautionary notes, **all the existing evidence we have is unanimous: apprenticeships pay off and are a good investment for both the employer and the end user or owner.**

Given this evidence, why don't all construction employers utilize an apprenticeship program? The answer lies in what economists call the "moral hazard problem." Simply put, the problem is this: many employers know that investment in an apprenticeship would pay of <u>if they could be assured that the trained apprentice would remain employed with them rather than move to a competitor employer</u>. Because apprenticeships cost money, it is more convenient, from an individual employer's perspective, to allow someone else pay for the training or apprenticeship, and then hire away the newly trained worker. For the individual employer, benefits from training and apprentice programs are thus maximized and costs are borne by someone else. This opportunistic and parasitic behavior (the "moral hazard" in the market) works best from the individual employer's point of view, but creates a sub-optimal situation for the industry as a whole, which is stuck with an inadequately trained workforce and perpetual shortages of skilled workers.

A solution to the moral hazard problem in a craft-based industry like construction could take several forms. One answer would lie in aligning the individual interests of the individual employer with those of employers as a whole by ensuring that the individual employer is guaranteed a trained worker in exchange for an investment in training. The unionized side of the construction industry ensures this by making all apprentices available to all contractors who sign the collective bargaining agreement and pay into the apprenticeship training fund. Thus, an individual contractor has pretty strong assurances that paying into the training fund will result in trained workers available when needed. Thus, in the union sector, apprenticeships are virtually universal because the "moral hazard" problem has been solved by joint organizations such as contractor associations and worker organizations (unions). The non-union side of the industry has had a much harder time solving the moral hazard problem; despite efforts by non-union associations such as Associated Builders and Contractors (ABC) to create viable apprenticeship programs, these have been only partially successful. This is an issue we return to later in this report.

However, putting aside any union vs. non-union issues, **a second way to solve the moral hazard problem is for end users (owners) to either require or encourage through**

some type of "point system" that work be done utilizing apprentices. This second way of aligning the employer's individual self-interest with the collective interest of the industry's employers and its end users (owners) is the subject of this report. **The evidence available indicates that the "return on investment" (ROI) of such encouragement or requirement would be positive, although the evidence is not definitive.**

Question 2: Would use of apprentices ensure that work is being done by local people, thus maximizing public return from the investment in these projects?

The answer to this question is simple. Since the apprentice programs are all local in nature, they ensure that at least the apprentice proportion of the workforce would consist of local people. Since apprentices usually are relatively recent entrants to the construction labor force, the alternative workforce to using them may include a higher-than-usual proportion of out-of-area workers drawn to south Florida by the building boom currently occurring. These are more likely to be the type of "transient, unsatisfied" worker with little attachment to construction as a career referred to earlier by the Construction Industry Institute. Extensive use of such workers is not desirable for the industry, for the end user (owner), or for the local economy.[22]

Question 3: Would use of apprentices lead to higher incomes for local construction workers, thereby furthering a county goal of increasing living standards?

The data from Florida on this question are clear: apprenticeship is an extremely effective way to raise earnings. For this reason, apprentice programs are considered among the very best, most successful training programs in the state.

A memo a decade ago from the then-administrator for apprenticeship of the Florida Department of Labor and Employment Security starkly shows the earnings value of apprenticeship. This memo reveals that a report (known as the FETPIP report) on over 2,000 apprentices who had completed their training showed the following:

- Apprenticeship completers earn twice as much as high school graduates;
- Apprenticeship completers earn more than higher education graduates with Associate in Arts and Bachelor degrees;
- Apprenticeship completers earn about the same as graduates with Associate in Science degrees, but less than graduates with Masters and Doctorate degrees.

The same memo notes that apprenticeship completers have the highest rate of retained, continuous employment when compared to high school graduates, and those receiving AA, AS, MA, and Ph.D degrees. Also found: that apprenticeship completers show

[22] For evidence based on data that hiring local workers is much more beneficial than hiring out-of-area workers, see Bruce Nissen, *Hiring Our Own: The impact of local vs. non-local hiring practices in two county GOB projects,* Research Institute on Social and Economic Policy, July 2006.

extremely low rates of incidence in receiving public assistance or criminal justice system involvement.[23]

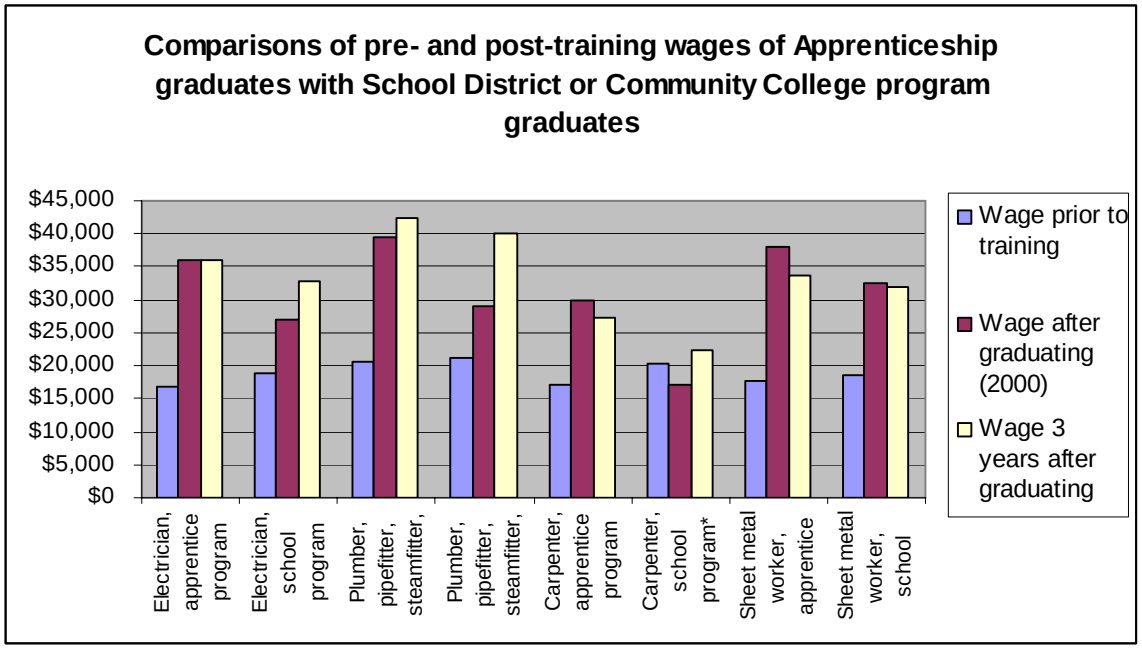
This success continues up to the present. A December 2004 report issued jointly by the state's Agency for Workforce Innovation (AWI) and the Council for Education Policy, Research and Improvement (CEPRI) employs a more sophisticated methodology and looks at much more recent data, but arrives at similar conclusions.[24] In fact, it demonstrates that apprenticeships "add more value" to the program participant than does training in the same field provided by a school district or community college. Table 2 compares the pre-training and post-training yearly wages of apprenticeship graduates with school district or community college program graduates for four construction trades that have widespread apprenticeship programs.

Table 2
Comparisons of pre- and post-training wages of Apprenticeship graduates with School District or Community College program graduates, four construction trades

OCCUPATION	Wage prior to training	Wage after graduating (2000)	Wage 3 years after graduating	Wage growth to graduation	Wage growth to 3 years after graduating
Electrician, 4-yr. apprentice program	$16,884	$35,912	$36,088	**$19,028**	$19,204
Electrician, school program*	$18,972	$26,864	$32,664	**$7,892**	$13,692
Plumber, pipefitter, steamfitter, 4-yr apprentice program	$20,720	$39,524	$42,344	**$18,804**	$21,624
Plumber, pipefitter, steamfitter, school program*	$21,236	$29,052	$39,976	**$7,816**	$14,740
Carpenter, 4-yr. apprentice program	$17,200	$29,996	$27,420	**$12,796**	$10,220
Carpenter, school program*	$20,444	$17,180	$22,328	**-$3,264**	$1,884
Sheet metal worker, 4-yr. apprentice program	$17,792	$38,068	$33,640	**$20,276**	$15,848
Sheet metal worker, school program*	$18,632	$32,492	$31,980	**$13,860**	$13,348

Source: Author's computations on data from Table 8, p. 14 of publication cited in footnote 23.
Dollars adjusted for inflation, so wage changes reflect real changes in purchasing power.
*School programs are 3 years in length, unlike the 4-year apprenticeship program.

[23] Memorandum dated November 19, 1996 from Joseph M. Stephens, Administrator, Apprenticeship, of the FDLES to State Apprenticeship Council Members, 2 pages. (Copy in the author's possession.)
[24] See *An Analysis of the Need for New or Expanded Apprenticeship and Workforce Education Programs*, December 2004. On the web at: http://www.cepri.state.fl.us/pdf/Complete%20CEPRI-AWI.pdf .



The next-to-last column, in **bold**, shows how much wages grew after the training for those who completed apprentice programs or school district/community college programs. **For every trade (electrician, plumber or pipefitter, carpenter, or sheet metal worker) the wage gains from apprenticeship were much larger than those from the alternative form of training, by over $10,000 per year for every trade except sheet metal worker.** The final column shows that the "apprenticeship advantage" remains even after 3 years post-graduation, although the advantage has lessened somewhat. (The likely reason for the diminution of the advantage is that apprentice graduates are already full-fledged "journeymen" with all skills needed in the trade, while their less fully-trained counterparts from other training programs continue to pick up additional skills in the following three years, thus lessening the gap but never closing it or reaching the status of an all-rounded skilled journeyman.)

If apprenticeships increase wages this much compared to workers formally trained by other means, it is obvious that they would do so even more compared to workers who have **no** formal training – a worker "hired off the street" who must slowly pick up skills informally in a "hit-and-miss" manner while working. In summary the **evidence is overwhelming that apprenticeships in construction are an extremely effective way to maximize earnings of construction employees, an important part of the county's workforce.**

Question 4: Could the use of apprentices be coupled with a requirement or encouragement for the apprenticeship programs to enroll residents of the lowest income or disadvantaged communities in the county, thus using the apprentice programs as a mechanism to provide stable and well-paying jobs (i.e., real careers) to the county's neediest residents?

In principle, there is no reason that an apprenticeship requirement or encouragement for work on these two projects could not be "coupled" with a requirement or encouragement that apprenticeships enroll residents from low income and disadvantaged communities.[25] If this was done, apprenticeship could be an instrument for accomplishing a goal of county government: improving the livelihoods of those residing in the county's lowest income neighborhoods.

Question 5: Do apprentices work more safely than those without equally formalized training, thus providing an advantage if the county wants the work done safely?

Construction work is dangerous. It consistently ranks as one of the industries whose workers are most likely to be injured on killed on the job. In 2004, construction nationally accounted for 1 in 5 on-the-job fatalities and 1 in 10 nonfatal workplace injuries and illnesses. That places the industry fourth highest in fatalities that year. Florida had the most fatalities of any state in the union (115). It also was one of three states (Texas and California were the other two) that accounted for over a quarter of all nonfatal injuries and illnesses causing loss of work for a day or more.[26] In addition to the human tragedies embodied in such statistics, the industry widely acknowledges that unsafe work also is ultimately expensive and unproductive. For these and a host of other reasons, the county has an interest in attempting to ensure that work done under its auspices is done safely. Will the use of apprentices likely make the work safer?

To the best of our knowledge, no study directly investigating this question has been done. However, a variety of types of evidence can be brought to bear on the topic. First is the fact that every officially recognized apprenticeship program includes safety and health training, beginning with the standard OSHA 10-hour training program. In addition, in particular trades, further training is mandatory and is built into the apprenticeship. There is strong evidence that safety and health training leads to less accidents and injuries: recent research on over 8000 construction laborers found that laborers who received safety and health training during the period of the study were 12% less likely than untrained laborers to file for workers compensation. Among workers 16 to 24 years old, training was associated with a 42% reduction in claims.[27] And apprentices are among the most highly trained workers on safety matters in the field.

Second, the opinion of many in the industry supports the same conclusion. We have not conducted a formal survey, but it is hard to find any industry practitioners who do not

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[25] For the purposes of this report, we do not enter into legal questions about exactly how any requirements would be constructed or enforced, which are questions beyond our purview here. We do note that certain types of "set asides" with hard-and-fast quotas for minority communities have been found to be illegal, but also note that many programs and methods are perfectly legal, a number of them already pursued by the county.

[26] Samuel W. Meyer and Stephen M. Pegula, "Injuries, Illnesses, and Fatalities in Construction, 2004," article available on the U.S. Bureau of Labor Statistics web page. Last accessed July 10, 2006 at: http://www.bls.gov/opub/cwc/print/sh20060519ar01p1.htm (posted May 24, 2006).

[27] Xiuwen Dong, Pamels Entzel, Yuron Men, Risana Chowhury, and Scott Schneider, "Effects of Safety and Health Training on Wowrk-Related Injury Among Construction Laborers," *Journal of Occupational and Environmental Medicine*, Vol 46, No. 12 (December 2004), pp. 1222-1228.

believe that more and better safety and health training leads to safer work. As one construction supervisor in south Florida told us, the apprentices have safety so "drilled into them" in their apprenticeship school that they definitely work in a safer manner.[28] Such sentiments would not be unanimous, of course, but we have yet to hear from anyone who would argue the opposite: that those without formal apprentice training work safer.

Third, even though no direct study exists on the question, indirect but persuasive evidence does exist. Unfortunately, virtually no government data bases include apprenticeship training as a variable, so we have to rely on a "proxy," or close approximation, to stand in for those who have received apprenticeship training. The closest proxy that exists in government statistics is union membership. This is not a perfect measure, because a number of union members have not gone through an apprenticeship program, and some non-union workers went through an apprenticeship program, either union-sponsored or not. However, it will work as a close proxy, because the pool of union workers has a much higher proportion of apprentice-trained members than does the non-union pool.

Therefore, if we compare safety statistics for very highly unionized states with those for very minimally unionized states, we have a rough approximation of whether apprenticeship programs are associated with better or worse safety outcomes. We compared the number of construction fatalities per 100,000 workers for the 10 most unionized states in the construction industry with the same ratio for the 10 least unionized states in the construction industry. Those states are presented in Table 3.

Table 3
Ten most and ten least unionized states in the construction industry, 2004

10 most unionized states in construction	% unionized (construction)	10 least unionized states in construction	% unionized (construction)
Illinois	45.3%	South Carolina	0.0%
Hawaii	37.1%	North Carolina	0.8%
New Jersey	32.1%	Virginia	2.1%
Missouri	30.4%	Arkansas	2.4%
Michigan	30.1%	Texas	3.4%
Minnesota	29.9%	Vermont	3.4%
New York	28.9%	Florida	3.5%
Indiana	27.4%	Maine	3.6%
Massachusetts	26.3%	Arizona	3.7%
Rhode Island	25.4%	New Mexico*	4.5%

Source: Website http://www.unionstats.com .
* New Mexico is actually the 12th least unionized in the construction sector, but the 10th and 11th (Oklahoma at 4.1% and South Dakota at 4.3%) lack statistics on total construction workforce needed in Table 4, so we use the next closest (New Mexico) for the 10th least unionized.

[28] Interview with Bob Blanchette, construction supervisor for New Beach Construction, a firm doing carpentry work, June 29, 2006.

Because of the extreme differences in unionization rates (25% - 46% for one column and 0.0% - 4.5% in the other), we are extremely confident that we have captured a major difference in the rate of workers who have gone through an apprenticeship program in the above two samples. Even if it is not a perfect proxy measure, unionization differences of such an extreme nature are virtually guaranteed to capture major differences in apprenticeship rates also.

Table 4 compares the most unionized and the least unionized in the number of workplace fatalities per 100,000 workers.

Table 4
Number of construction workplace fatalities per 100,000 workers in 2004 in the 10 most unionized and 10 least unionized states

Category of states	Construction workforce	Number of workplace fatalities	Fatalities per 100,000 workers
10 most unionized	1,546,100	215	**13.9**
10 least unionized	1,946,000	392	**20.1**

Source: Website http://stats.bls.gov/iif/oshwc/cfoi/tgs/2004/iiffi04.htm.

What these tables show is that, given a specific workforce size, states with higher construction unionization rates are associated with far less fatal worksite accidents than are states with low unionization rates. In fact, the latter have fatal accident rates almost 50% higher than the former. For our purposes, this strongly implies that **a construction workforce trained through apprenticeship is much more likely to work safely than is one trained either informally or by alternative means.**

A pilot study of immigrant construction workers in south Florida arrives at similar conclusions: safety outcomes (measured by amount of training, use of personal protective equipment, and employer safety policies and practices) is significantly improved if the worker is a union member, and an estimate is that 90% of the union safety training occurs in the apprenticeship program.[29] The "safety value" of apprenticeship is again reconfirmed.

In sum, **apprenticeships guarantee extensive safety training, and the available evidence points to the conclusion that the use of apprentices on construction projects is likely to lead to work being done more safely.** If the county values having work being done under its auspices performed safely, the use of apprentices in its construction work is likely to be a plus.

Question 6: Independent of its role as an end user of the buildings, does the county have an interest in using apprentices on these projects? Might use of apprentices fulfill a workforce development function? Since the county spends a great deal of money on training, could the use of apprentices be an inexpensive or perhaps cost-free way to provide high quality training and secure careers for county residents?

[29] See Bruce Nissen, *Construction Safety Practices and Immigrant Workers: a Pilot Study*, April 2004. On the web at: http://www.risep-fiu.org/reports/Immigrant%20Construction%20Workers%20Safety.pdf

Much of the answer to this question is contained in the material presented earlier in this report. We have already noted the superiority of construction apprenticeships over other forms of training in terms of wages: apprentice graduates out-earned graduates of school district or community college programs by an average of over $10,000 in the four most apprenticed trades (electrician, plumber/pipefitter/steamfitter, carpenter, sheet metal worker) upon completion of the program (see Table 2, above).

Beyond simply wages, apprentice graduates also have very high job placement rates. A December 2004 study of Florida apprenticeship and training programs finds that **between 81% and 90% of construction apprentice graduates were employed after completion of the program.**[30] This was higher than for school district or community college trained counterparts, and is an incredibly successful placement rate for a training program.[31]

We also noted earlier the federal government's estimate that it receives $50 back for every $1 spent on apprenticeship programs. Industry insiders tell us that the county already spends approximately $250,000 per year on pre-apprenticeship training. This, combined with the aforementioned benefits of apprenticeship, indicate that the county has a clear interest in promoting apprenticeship training in the construction industry, completely independent of its interests as an end user of certain construction projects.

Requiring or encouraging the use of apprentices on the renovation of the Orange Bowl and the expansion of the Jackson South Community Hospital could thus further a separate county interest: workforce development. At apparently no cost, the county could ensure successful and value-added training for workers in an important local industry.

One additional measure would also be advisable: tying the county's pre-apprenticeship training in to registered apprenticeship programs. This would maximize the benefits of the pre-apprenticeship training already being undertaken, ensuring a smooth progression of the young students on a proven path toward a well-paying productive career.

Quality of Apprenticeship Program also a Factor to be Considered

The preceding evidence has pointed to the conclusion that use of apprentices in registered apprenticeship programs is likely a very desirable option for these construction projects. However, to maximize the benefits of apprentice use, the county might want to also consider the quality of the apprenticeship program being utilized, for it turns out that there are some major differences, even if the choice is restricted to only programs that are registered by the government. Some programs are superior to others in completion rates

[30] See the report by the Council for Education Policy, Research and Improvement and the Agency for Workforce Innovation, *An Analysis of the Need for New or Expanded Apprenticeship and Workforce Education Programs*, December 2004, Table 7 on p. 13. On the web at: http://www.cepri.state.fl.us/pdf/Complete%20CEPRI-AWI.pdf .

[31] For a review of the dismal record of most training programs in this regard, see Gordon Lafer, *The Job Training Charade*, ILR Press, 2004.

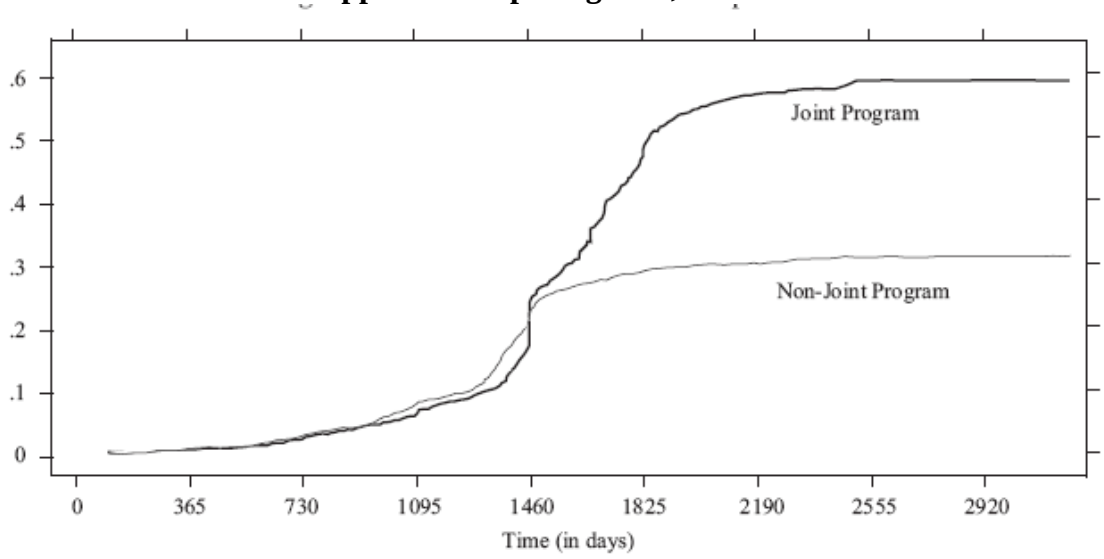
and in their ability to raise skills (and therefore wages). So, if the county were to use some form of "best value contracting"[32] that awards extra points in the bidding process to firms having a recognized apprentice program, it might also wish to give more points to the more successful programs (grater completion, higher "value added," etc.)

Several studies have examined and compared construction apprenticeship programs. In a 2003 study that compared completion rates by 1995 for those enrolling in 1989, economist Cihan Bilginsoy found that apprenticeship programs that were jointly negotiated and operated by a union and an employer's association (i.e., "joint programs") had a much higher completion rate than those operated by a single employer:

> The percentage of completion is higher by a substantial margin in the joint programs than in the non-joint programs (58% versus 30%). Symmetrically, relative to the non-joint program apprentices, a smaller fraction of joint program apprentices canceled.[33]

He also found that joint programs enroll a significantly higher percentage of minorities and women than do non-joint programs (for women by 4.5% vs. 1.8%, and for minorities (15.8% vs. 12.7%).[34] The differences in completion rates over time are shown in Table 5.

Table 5
Cumulative Incidence of Completion, Joint and Non-Joint Construction Apprenticeship Programs, 1989-1995



Source: BAT/AIMS.

[32] For a discussion of the advantages or disadvantages of using a "best value contracting" method, see the companion report to this one: Marcos Feldman, *Best Value in Publicly Funded Projects: Contractor selection in two county GOB projects*, Research Institute on Social and Economic Policy, July 2006.
[33] Cihan Bilginsoy, "The Hazards of Training: Attrition and Retention in Construction Industry Apprenticeship Programs," *Industrial & Labor Relations Review*, Vol. 57, Issue 1 (2003), p. 58.
[34] Ibid., pp. 59, 61.

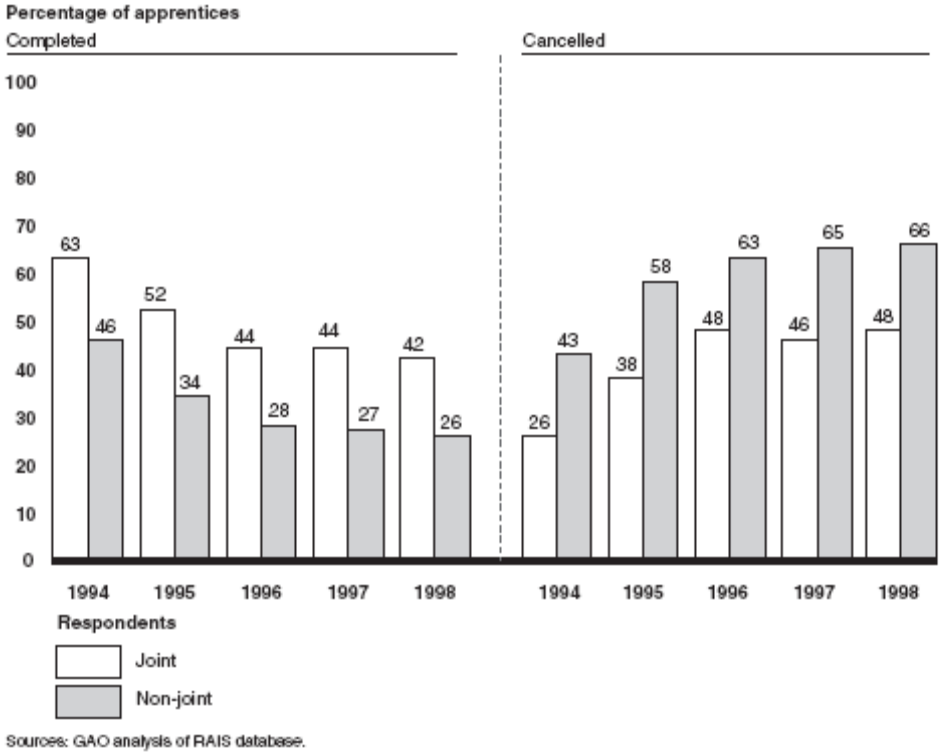
(Table 5 reproduced from source cited in footnotes 32 and 33.)

A 2005 study conducted by the U.S. Government Accountability Office (GAO) found a similar pattern, although completion rates had slipped somewhat. It also found that wages upon completion were significantly higher for graduates of joint programs than those graduating from non-joint ones:

> Completion rates and wages for construction apprentices in programs sponsored jointly by employers and unions were higher than those for programs sponsored by employers alone. Of apprentices beginning training between 1994 and 1998 (and completing by 2004), on average, 47 percent of those in programs sponsored jointly with union completed compared with 30 percent in programs sponsored solely by employers, a 17 percent difference. . . Construction wages were generally higher for apprentices in joint programs than for those in non-joint programs – being more than $2.00 per hour higher on average at the start and $6.00 per hour higher on average a completion of training in 2004, the first full year Labor (U.S. Dept. of Labor - BN) began collecting wage data.[35]

Table 6 shows the differences in completion rates for the years 1994 through 1998.

Table 6
Completion Rates after 6 Years for Apprentices Entering Construction Programs in FY 1994 through 1998



[35] United States Government Accountability Office (GAO), *Registered Apprenticeship Programs: Labor Can Better Use Data to Target Oversight*, August 2005 (GAO report # GAO-05-886), p. 4.

(Table 6 reproduced from the publication cited in footnote 34, p. 18.)

In south Florida, by far the biggest construction apprenticeship program that is not a joint one is run by the Florida East Coast Associated Builders and Contractors (ABC), the association of non-union construction employers and associated suppliers and service providers. A recent study shows that its 5 year completion rates are also relatively low, at 34%.[36] Table 7 shows the figures for enrollees during the 1995-1999 period, as of 2004.

Table 7
Florida East Coast ABC Apprenticeship Program Completion Rates, 1995-1999 Enrollees as of 2004.

Status	Number	Percent
Cancelled	921	64%
Completed	495	34%
Still listed as registered, 2004	21	1%
TOTAL	1437	100%

Source: Study referenced in footnote 35, p. 20.

We do not have South Florida figures for any non-joint apprenticeship programs that may be run independently of the ABC, if any exist. However, it is unlikely that many exist, and if they do they would not be likely to differ from patterns established above.

The point of these comparisons is not to argue that all non-joint apprenticeship programs should be penalized simply because they belong to a type of apprenticeship that is less likely to actually produce graduates. That would constitute "guilt by association." However, it does show that the quality of apprenticeships does vary considerably, and that the county would be well advised to individually favor the programs with highest completion rates and the most "value added" to participants, irrespective of their "joint" or "non-joint" status. This could be done rather simply in a "best value contracting" method of procurement, simply by giving more points to those programs that perform more successfully on these measures.

Conclusion

This study establishes the following:

(1) There is a skilled labor shortage in the construction industry, and this shortage is even more acute in south Florida than it is nationwide.

(2) This shortage hurts the industry greatly, and it also harms end-users or customers (through delays, an unstable workforce, possibly inferior construction, etc.), to such a

[36] Building and Construction Trades Department, AFL-CIO, *A Final Report on Associated Builders and Contractors Apprenticeship Training: Flawed and Failing Programs*, April 2005. Because this report is issued by a union group, it may be questioned whether it is biased against non-union apprenticeship programs. However, all the data in the report cited come from government sources, not subjective estimates. The numbers and percentages given also are consistent with others in reports from the U.S. government and an independent academic.

degree that the Construction Users Roundtable recommends that users insist on training as part of the procurement process.

(3) Apprenticeships in general are the most successful job training programs in the United States today.

(4) Although the evidence is not definitive, the studies that have been done indicate that use of apprentices on construction projects is efficient, and that there is a positive return-on-investment (ROI) for employers as a group and for end users in their use. (This does not mean that individual employers will adopt apprenticeship, however, unless they belong to a contractor's association bargaining the program with a labor organization that guarantees a supply of skilled workers for the apprenticeship investment, or are forced to by end user requirement. Absent one or both of these conditions, most employers avoid apprenticeship for fear that their investment will be lost by other employers "stealing" their trained employee.)

(5) Use of apprentices is a good way to ensure that the work goes to local employees, since apprentice programs are by their very nature local.

(6) Apprenticeships bring higher wages to the trained employee than does any alternative form of training, thus maximizing incomes in the local community.

(7) Use of apprentices can be a tool for diversity in the workforce, thus granting a steady and well-paying career to disadvantaged communities, if the end user requires or encourages through incentives that a number of the apprentices come from disadvantaged and/or discriminated-against populations.

(8) The evidence is strong that construction workers trained through an apprenticeship program work safer, and thus apprenticeships further a public interest in safe work.

(9) Construction apprenticeship programs are highly successful forms of workforce development. They exhibit superior outcomes to most forms of training, and they are extremely cost-efficient compared to most forms of training.

(10) Even within the construction apprenticeship programs that are registered with the government, there are differences in quality, and the county might want to use a "best value" form of contracting that rewards the ones with better outcomes (higher graduation rates, higher "value added" for the apprentice through higher wages), by giving them more points in a point-based bidding system.

(11) In general, the evidence leads to the conclusion that the county would be wise to either require or encourage by means of incentives in the procurement process the use of apprentices in the renovation of the Orange Bowl and the expansion of Jackson South Community Hospital.