

Hawaii Construction Workforce Action Plan

HAWAII JOBS INITIATIVE
FALL 2006



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Executive Summary

According to the recently completed work of the Hawaii Jobs Initiative, the expanding construction industry in Hawaii will require an *additional 9,400 workers through the year 2012 with an average demand of 1,200 workers each year*. Our current apprenticeship training system, which is attempting to meet this growing demand, produced *only 200 journeyworkers* in 2005. Thus, worker shortages are expected in almost all construction-related trades. Analysis of available data and input from industry observers offers compelling support for collaborative action between Hawaii's various government and private sector programs to address critical shortages of experienced construction industry workers.

The Hawaii Jobs Initiative, using research by University of Hawaii labor economist Sang-Hyop Lee, PhD; key informant interviews; a review of current and potential strategies; and guidance from a broadly representative Advisory Committee, has developed the **Hawaii Construction Workforce Action Plan**, which offers the following four strategies to address our current and future construction workforce shortages:

A. Improve the readiness of persons interested in entering apprenticeship programs and increase the proportion of applicants who are accepted into apprenticeship programs.

- B. Improve apprenticeship program retention and completion.
- C. Increase numbers of persons applying to apprenticeship programs in general, and to targeted trades in particular, through targeted marketing and outreach campaigns.
- D. Continue and expand efforts to develop, organize, coordinate, monitor, and report on workforce development initiatives outlined in this plan.

The **Hawaii Construction Workforce Action Plan** also addresses both policy and budgetary implications of pursuing the above strategies, including a call for the state legislature to fund public-private partnerships targeted to expansion of apprenticeship and pre-apprenticeship programs, as well as coordinated, ongoing marketing to enhance the pool of candidates interested in entering the construction industry.

The implementation of the **Hawaii Construction Workforce Action Plan** will require ongoing collaboration and long-term dedication of business, labor, and government organizations, which will be the focus of the next phase of the Hawaii Jobs Initiative.

I. INTRODUCTION

Hawaii's construction industry is expecting significant growth over the next eight to ten years, driven by military construction, private development, and Hawaii's ongoing high demand for residential housing. Taken together, projects underway and planned will cost several billion dollars and require the addition of thousands of new workers to the industry's workforce. Economic forecasts presented at the 2004 Hawaii Jobs Summit projected a need for 7,500 new construction workers between 2003 and 2008. Hawaii does not appear to be adequately prepared at this time to meet the current and upcoming construction boom. The industry's workforce entered the current growth cycle still recovering from the major losses of workers resulting from the last construction downturn in the late 1990s.

Faced with significant growth, and recognizing the potential impacts of labor shortages, the Hawaii Institute for Public Affairs (HIPA), together with the Hawaii Department of Labor & Industrial Relations (DLIR), Chamber of Commerce of Hawaii, and the Pacific Resource Partnership, launched the Hawaii Jobs Initiative (HJI), a year-long public-private partnership aimed at ensuring that Hawaii's construction work force needs will be adequately met. The HJI is the follow-up to HIPA's 2004 Hawaii Jobs Summit, which examined a number of critical workforce issues surrounding the growth in Hawaii's construction industry. Funding for the HJI was appropriated by the 2004 Hawaii State Legislature to the DLIR, which contracted with HIPA through DLIR's Workforce Development Council to administer the HJI. An Advisory Committee composed of representatives from industry, business, labor, government, and training organizations has provided enlightened guidance to the project (Attachment A).



At this juncture, HJI has generated and organized reliable data, and engaged key stakeholders in discussion and development of strategies that will result in the effective coordination of workforce demand and supply. HJI has generated projections of workforce needs through 2012 and compared these estimates to the numbers of workers that are being generated by existing training programs, to identify and quantify areas of potential shortages. Based on this assessment of potential shortages and a review of current workforce development activities, both of which are summarized below, HJI has produced this **Hawaii Construction Workforce Action Plan** (the Plan). The Plan offers four primary strategies and their underlying components that, when fully implemented, will provide Hawaii residents with enhanced opportunities to acquire the skills needed for employment within Hawaii's construction industry. Over the next several months, HJI will continue to convene key stakeholders to begin the implementation of a number of components of the Plan.



II. PROJECTIONS OF CONSTRUCTION LABOR SUPPLY AND DEMAND THROUGH 2012

University of Hawaii labor economist, Sang-Hyop Lee, PhD, was commissioned to develop industry supply and demand projections through 2012 (Attachment B). Overall, Dr. Lee reinforced key informant predictions for continued, steady growth. However, Dr. Lee projects that construction industry growth will peak around 2008-2009, with either a leveling off or a slight decrease in demand through 2012.

For the construction industry as a whole, Dr. Lee projects that about 9,400 construction workers will be needed over an eight-year period, with an annual demand of 1,174 workers through 2012. As stated in Dr. Lee's projections, 56 percent of the total workforce need is due to worker retirement or other reasons, while the remaining 44 percent of workforce need is due to increased construction industry demand. Based upon the current composition of the workforce, in which registered apprentices account for about 15 percent of work force, the remaining 85 percent or 998 workers of the 1,174 new workers will need to be journeyworkers.



Table 1. Journeyworker Demand and Supply by Type of Trade - July 2004 to June 2005

A	B	C	D	E	F	G
Trade	Annual Journey-worker Demand	Achieved Journey-worker Status	Percentage of Demand Met by Supply =C/B x 100	Annual Shortage =B-C	Annual Demand due to Replacement	Percentage of Replacement Demand Met by Supply =C/F*100
Construction Total	998	192	19%	806	559	34%
First line supervisors/managers	62				39	
Brickmasons and blockmasons	4	5	117%	-1	7	66%
Stonemasons	6	1	16%	5	3	33%
Carpenters	123	43	35%	80	89	48%
Carpet installers	9				5	
Tile and marble setters	15	8	54%	7	8	106%
Cement masons and concrete finishers	38	4	10%	34	19	19%
Construction laborers	203	39	18%	167	113	32%
Operating engineers	33				34	
Drywall and ceiling tile installers	19	13	68%	6	13	101%
Tapers	15				7	
Electricians	69	26	37%	43	47	54%
Painters (construction & maintenance)	56	25	44%	31	38	65%
Plumbers, Pipefitters, and Steamfitters	64	1	1%	63	46	2%
Roofers	27	0	0%	27	15	0%
Sheet metal workers	11	3	26%	8	9	30%
Helpers – Carpenters	19				17	
Helpers – Roofers	6				4	

Currently, the supply of new journeyworkers produced by existing apprenticeship programs meets only 19 percent of demand, resulting in an annual shortage of 806 journeyworkers. There are projected unmet needs in nearly all of the major trades, with the most pronounced shortages for plumbers, stone and cement masons, and roofers. Supply in these trades, as provided by the existing training system, is projected to satisfy less than 20 percent of demand. Carpenters, tile and marble setters, drywall and ceiling tile installers, and electricians are in a somewhat better position. However, in no trade, except for drywall and ceiling tile installers and brick and block masons, does expected supply exceed 55 percent of demand. The projected shortages in the numbers of workers for each trade are largest for laborers (167 per year), carpenters (80 per year), plumbers and pipefitters (63 per year), and electricians (43 per year).

Table 1 also examines the number of journeyworkers needed to replace those who are expected to leave the industry, due primarily to retirement. The annual supply of new journeyworkers produced by the apprenticeship system will account for only 34 percent of demand due to replacement, leaving an annual shortfall of about 560 journeyworkers.

In addition to the shortfall estimates, Dr. Lee's analysis produced other findings that provide both cause for concern and a clear direction for future action. For the number of persons registered in the apprenticeship programs, the number of people completing their apprenticeships appears to be very low. Further, while these apprentices do represent an addition to the construction work force, the benefit to be gained from their numbers is tempered by the inexperience and lack of skills of the new workers. Dr. Lee's study views supply in terms of workers who successfully complete their apprenticeships and achieve journeyworker status.

One positive indicator noted by Dr. Lee is that the number of registrations has increased markedly in the last couple of years in response to construction industry growth, which should translate to more completions in the next three to five years. However, the current completion rate



is quite low; with over 5,000 persons in registered apprenticeship programs, only 192 individuals completed their apprenticeships in 2005. Between July 2004 and June 2005, there were 1,358 new apprentices registered. The number of new and old apprentices who cancelled their apprenticeships totaled 653, leaving a net gain of apprentices of about 700. Thus, in terms of the numbers of registered apprentices who were in the system prior to the current expansion, it appears that a sizable number of apprentices either left the program or were not actively pursuing completion of their apprenticeships. If 1,000 persons were to complete their apprenticeships each year (one-fifth of the 5,000 enrolled, based on a five-year apprenticeship), there would be very close to sufficient numbers of workers to supply the industry through the present expansion, in terms of both new and replacement workers. Thus, targeted efforts to improve the completion rate would be of great benefit to the construction industry in the immediate and near future.

However, the estimates presented here should be interpreted with a degree of caution. The annual work force projection is calculated based upon one year of data (2004-2005), and is assumed to be constant over time, but will likely change in the future. While the number of completions will increase because of the larger numbers of apprentices currently registered, the amount and rate of increase will be a function of how effectively and efficiently apprenticeship programs are able to expand and operate in the coming years. Furthermore, the gap between demand and supply could be reduced through non-training approaches such as use of overtime and importation of skilled workers. Indications are that use of overtime is increasing. There is anecdotal information about workers moving to Hawaii from the mainland but data is not available on their numbers.



III. FINDINGS FROM KEY INFORMANT INTERVIEWS, REVIEW OF CURRENT WORKFORCE DEVELOPMENT ACTIVITIES, AND ADVISORY COMMITTEE DELIBERATIONS

As part of HJI’s assessment and planning phase, project staff interviewed 36 individuals representing labor, developers, contractors, state and county government, non-profits, and education (Attachment C). Key informants were asked for their assessment of current and future workforce conditions and their perspectives on strategies for meeting the state’s construction work force needs over the next six to seven years. All major findings and issues were presented to the HJI Advisory Committee, which validated the information and elaborated on a number of areas of concern and possible opportunity.

Overall, most agree that efforts to increase the supply of workers are impacted by a host of related economic and social factors, including government policies affecting business; the cost of housing; insurance, liability, and bonding restrictions; consolidation of contractors and the declining number of small contractors; the interest of large national developers and builders in Hawaii; and state procurement and county permitting practices.

Increasing Costs Exacerbate Supply Shortfall. Construction costs are rising, primarily driven by cost of materials and fuel, and to a lesser extent by a rise in labor costs, although increasing work hours result in increasing overtime costs. This increasing demand for workers appears to have a more detrimental impact on small companies and non-union companies as the unions attempt to recruit workers from non-union shops. Imbalances of demand and supply vary from island to island, with workers commuting to major project venues on O’ahu and in Kona.

Gaps Exist in Apprenticeship and Recruitment Efforts.

Many individuals cited the large percentage of applicants to apprenticeship programs who are rejected due to an inability to pass the entry exam. Many also commented on another large number of individuals who leave the program after a short time, due primarily to unmet or unrealistic expectations about the nature of the work and training. According to construction industry practitioners, most half of those taking the entrance tests fail, due in large part to an inability to pass the math portion of the exams. Of those who pass and are accepted into the programs, more than half leave after a few weeks or months. The United Brotherhood of Carpenters, Local 745 estimates that of a typical recruitment of 150 apprentices, ten to 15 leave after the three-day pre-screening. About 30 leave a short while later when they discover they are not suited for the work. Forty or so will leave the program due to an inability to respond to job calls because of conflicts with other jobs or because of a need for immediate work. Finally, failure to pass contractors’ drug tests will cause the loss of an additional ten to 12 individuals.

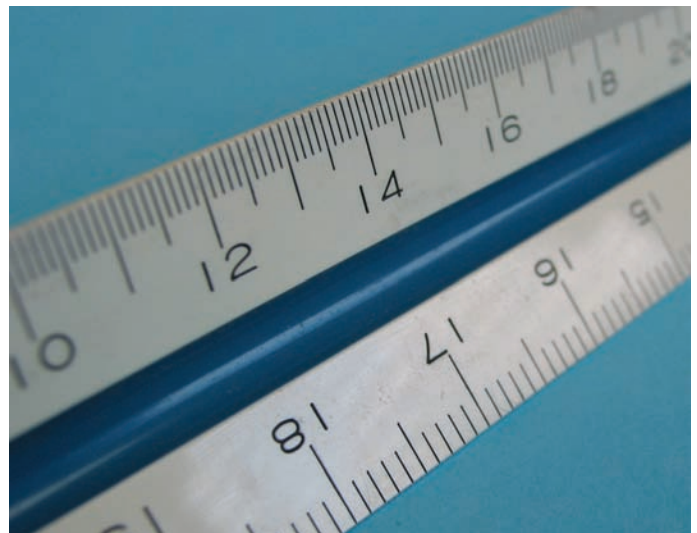
The low acceptance rate and high dropout rate highlight the existence of gaps in the apprenticeship system, in terms of the readiness of applicants and the screening, selection, and orientation of apprentices. There are also implications for recruitment and marketing from the initial point of contact, if interested individuals are not being provided an accurate picture of the demands of the work. Finally, the actual nature of the training delivered and the extent to which the programs actively work to support apprentices early in their careers need to be further examined.

Current Apprenticeship Programs Need to be Expanded.

There are a number of promising activities currently underway, such as Honolulu Community College's (HCC) Construction Academy, which is providing construction-related curriculum to students in eight high schools, and the pre-apprenticeship training program provided by the Building Industry Association (BIA). Trade unions are actively recruiting and apprenticeship enrollment is rising. The Department of Education has completed a realignment of its career pathways in career-technical education with one pathway focused on the construction industry. Winners at Work is developing the capability to provide training and coaching to members of the armed forces returning from Iraq and Afghanistan, a number of whom could be interested in construction jobs. These efforts need to be expanded and new strategies must be created. Solutions should be driven and supported by those in the industry, i.e., contractors, unions, and developers, in partnership with state and county governments.

Current Workforce Development Strategies Need Improvement.

The HJI examined a wide range of workforce development strategies, assessing the extent to which they were being implemented, and the length of time needed for various approaches to positively impact the workforce. In terms of pre-apprenticeship training, HCC's Construction Academy enrolled about 130 high school seniors in 2005; BIA's Construction Training Center will serve an estimated 90-120 persons in 2006; and approximately 300 individuals are taking construction-related credit courses at community colleges. An additional 240 public school seniors are enrolled in related career-technical education courses. Associated Builders and Contractors provides training to about 100 persons annually in project management and construction supervision. The Department of Education provides several options for adult remedial education including a cooperative arrangement with the BIA to help persons gain entry into its pre-apprenticeship program, and a transition program that combines adult education classes with vocational training provided by the community colleges. The numbers served in these venues is modest at present, though the DOE is working to grow these cooperative programs. All of these efforts can be expected to have direct, near-term benefits by increasing the numbers of persons who are better prepared to enter and succeed in apprenticeship programs.



Construction Labor Workforce Demands Can be Met with Concerted Efforts. While there are definitely concerns about the future supply of workers and a general acceptance that more can and needs to be done to build the workforce, no one expressed a sense of impending crisis. Industry observers also recognized the possibility of over-building the supply of workers, with the accompanying displacement of workers that would occur in the next downturn. Most observed that the large U.S. military construction initiatives



represent a stabilizing influence for Hawaii's construction industry. The prevailing opinion is that with attention and action, the State should be able to grow the labor supply to accommodate the current growth cycle predicted through 2012.

Of note, the review of potentially effective strategies indicates that planned, concerted, and ongoing marketing to generate interest in pursuing careers in construction is not occurring. Also, while a number of persons expressed interest in various types of overall project coordination and scheduling to optimize access to available workers, no efforts are underway to develop the necessary processes and systems. Finally, there were suggestions from key informants and Advisory Committee members to develop an ongoing capacity to organize and coordinate broadly-based, collaborative, construction industry workforce development efforts, as such capacity does not presently exist. These needed but not currently existing efforts are included as elements of the strategic directions outlined below.

IV. RECOMMENDED STRATEGIC DIRECTIONS FOR CONSTRUCTION WORKFORCE DEVELOPMENT

After reviewing and discussing both the quantitative data and input from key informants, HJI's Advisory Committee developed the **Hawaii Construction Workforce Action Plan**. This plan of action, consisting of *four major strategies*, will support the preparation of Hawaii residents for construction industry job, with the primary goal to increase the number and quality of workers and avert severe shortages through the year 2012, a period of anticipated growth and high demand.



Strategy One: *Improve the readiness of persons interested in entering apprenticeship programs and increase the proportion of applicants who are accepted into apprenticeship programs.*

- » Expand access to pre-apprenticeship programs.
- » Seek public and private support for expansion of pre-apprenticeship training programs and academic remediation.
- » Work with the Department of Education to increase the numbers of high-school students taking construction-related courses. Promote the development and expansion of partnerships between the DOE, community colleges and the industry.
- » Convene and facilitate negotiations among a working group representing contractors, unions, educational institutions, and training organizations to collaborate on developing and implementing these pre-apprenticeship and remediation initiatives.



Strategy Two: *Improve apprenticeship program retention and completion.*

- » Identify and build on current efforts to improve retention and completion rates for apprenticeship programs.
- » Convene a working group of key organizations to identify and develop additional measures and facilitate negotiations and problem solving to enable their implementation.
- » In concert with recruitment efforts, provide interested candidates with a more realistic perspective on the demands and expectations involved in working in the construction industry.

Strategy Three: *Increase numbers of persons applying to apprenticeship programs in general, and to targeted trades in particular, through focused marketing of apprenticeship and employment opportunities within the construction industry.*

- » Develop a public-private partnership to create and sustain a comprehensive marketing effort targeting potential recruits, such as high school students, workers from other industries, deployed soldiers returning to Hawaii, and recipients of government financial assistance.
- » Organize a representative group of stakeholders to work with a qualified marketing consultant to develop and implement the campaign.
- » Coordinate the marketing effort with contractors' and unions' recruitment needs and activities, particularly recruitment for high-demand trades.

- » Create industry partnerships with schools to build student interest in working in the industry and to support career-technical education programs (e.g., summer internship programs, “hard hat” tours).
- » Involve active construction workers in recruitment activities.
- » Explore the potential of recruiting among the population of young adults without a high school diploma, who represent an untapped pool but one that will require a significant investment.

Strategy Four: *Develop an ongoing capacity to organize, coordinate, monitor, and report on the workforce development initiatives outlined in this plan.*

In order to build and maintain the momentum of construction workforce improvement, a number of essential functions need to be performed, including:

- » Advocating for development and adoption of public policies needed for the successful implementation of this plan;
- » Convening, organizing, and facilitating working groups and partnerships necessary to carry out plan activities;
- » Providing a communications hub for all organizations involved;
- » Tracking and reporting on progress; and
- » Continuing evaluation, projection, and data collection.



V. POLICY IMPLICATIONS

It is important that the organization or organizations charged with performing these mobilizing, headquarters-type functions work effectively with multiple stakeholders from business, labor, and government. Therefore, a certain level of independence and neutrality on the part of the designated organization(s) is needed to facilitate the delivery of these activities. One of the remaining tasks of the HJI is to identify funding for these capacity-building activities. Ideally, support should be in the form of a public-private partnership, as this newly-developing capacity will serve the larger economic interests of the State and the construction industry.

In addition to pursuing the strategies described above, this organizing capacity could also be used to explore the feasibility of a system and process of construction scheduling and coordination, including some form of master calendaring (10-15 years out) of major projects and improved coordination between public and private sector construction, so that employers can make more efficient use of available construction labor.

The strategies outlined in this plan carry both budgetary and policy implications. While longer-term policy recommendations have yet to be developed, the state administration and the state legislature should move forward with the following near-term actions that will move the development of the construction industry's workforce in the right direction.

- » Increase funding, through a public-private partnership, to expand construction industry-related pre-apprenticeship and apprenticeship programs. Ongoing discussions with representatives from the construction industry, relevant training organizations, state program administrators, and legislative leaders should be held to identify the level of funding needed for each year through 2012 to expand apprenticeship and pre-apprenticeship programs to an appropriate and feasible level.
- » The State, in partnership with the construction industry, should consider providing some financial assistance toward marketing and recruitment efforts. Additional funding for this purpose should be requested by the appropriate state agency assigned the responsibility for developing marketing efforts to be designed via the process described in Strategy Three, above.

VI. SUMMARY



- » Capacity-building within the construction industry should also receive public and private funding. State funding for this purpose could provide the underlying capacity and the private sector could be called upon to support specific initiatives and projects. The appropriate state agency should seek an appropriation from the legislature for the functions described in Strategy Four, above.
- » The State should explore all opportunities to seek federal funds available to support construction industry workforce development. The appropriate state agency should prepare a report that: a) inventories all available federal funds that can be tapped for activities specifically intended to boost construction industry workforce development; b) provides specific recommendations for targeting federal dollars to improve construction industry worker training and other support systems, and c) provides an action plan and timeline for increasing the use of federal dollars to support industry workforce growth.
- » Current teacher certification requirements represent an impediment to recruitment of otherwise qualified instructors to teach career-technical education classes in the public schools. The board of education, along with the state administration and the legislature should call for all involved agencies to develop a set of recommendations that: a) addresses the need to expand career-technical education in the public high schools and b) improves the Department of Education's ability to recruit and hire instructors who are qualified and competent in their technical fields.

Hawaii's construction industry is experiencing a period of expansion that represents a major opportunity for Hawaii residents to learn a valuable set of skills that can help them to support themselves and their families. In order to take full advantage of this opportunity, the system in place for preparing construction industry workers needs increased administrative and financial support, targeted marketing and promotion, and process improvement aimed at improving the readiness of apprenticeship applicants and increasing retention and completion rates of persons in apprenticeship programs.

This action plan builds upon a number of current approaches using targeted strategies with enhanced components in order to create a more cooperative and better coordinated effort to ensure that Hawaii's construction industry workforce development system is able to fulfill current and future needs for skilled workers.

Attachment A

HAWAII JOBS INITIATIVE ADVISORY COMMITTEE MEMBER ORGANIZATIONS



Actus Lend Lease
Alu Like
Associated Builders and Contractors
Building Industry Association of Hawaii
Chamber of Commerce of Hawaii
Department of Education
Department of Labor and Industrial Relations
General Contractors Association
Hawaii AFL-CIO
Hawaii Building and Construction Trades
Hawaii Business Roundtable
Hawaii Employers Council
Hawaii Government Employees Association
Hawaii Hotel and Lodging Association
Hawaii Institute for Public Affairs
Hawaii Military Communities/Forest City Enterprises
Hawaii State House of Representatives
Hawaii State Senate
Honolulu Community College
International Brotherhood of Electrical Workers Local 1186
International Union of Painters and Allied Trades District Council 50
Laborers International Union Local 368
Nanakuli Housing
Oahu Workforce Development Board
Oahu Worklinks
Pacific Resource Partnership
United Brotherhood of Carpenters Local 745
University of Hawaii Office of the Vice President for Academic Planning and Policy
U.S. Small Business Administration
Winners at Work
Workforce Development Council, DLIR

Attachment B

PROJECTIONS OF LABOR DEMAND AND SUPPLY IN THE CONSTRUCTION SECTOR TO 2012 FEBRUARY 17, 2006

Sang Hyop Lee, Ph.D.

DATA

The primary source of data for projecting labor demand is the Occupational Employment Statistics (OES) survey, a federal-state cooperative program between Bureau of Labor Statistics (BLS) and state workforce agencies. The OES survey provides estimates of employment and hourly and annual wages for all wage and salary workers in 22 major occupational groups and in 801 detailed occupations. The BLS produces the survey materials and selects the establishments to be surveyed. The collected OES survey is then used to produce occupational estimates at the national, state, and sub-state levels.

While other data sets, such as the Industry Staffing Pattern (ISP) estimates, only provide information on national estimates for some particular industries, the collected OES survey produces occupational estimates at the national, state, and sub-state levels for all non-farm establishments. The current occupational classification system has been used since 1999.

For our estimation purpose, we use annual survey data of the OES for 1999-2002 and semi-annual survey for 2003 and 2004. Using two data points in 2003 and 2004 naturally gives more weight to recent years in the estimation. Survey data for 2005 is not available at this time. The estimated labor demand by type of trade is then compared with the data on registered apprenticeship provided by the Workforce Development Division (WDD) in the Department of Labor and Industrial Relations (DLIR). The labor supply data includes information on the total number of registrations, additions, cancellations, and completions for registered apprenticeship by type of institute providing apprenticeship and by type of trade.

ESTIMATION METHODOLOGY

We project the labor demand in the construction industry through 2012 by type of trade. This estimation consists of two parts: one, estimating labor demand due to growth; and the other, labor demand due to replacement.

First, using the historical OES data mentioned above we estimate a change in jobs (sensitivity) in each trade with respect to a change in total employment in the construction industry. Jobs in each trade do not grow proportionally with respect to a change in the construction industry. When the industry grows at one percent annually, the number of carpenters can grow faster or slower than that. Using a common statistical method, we measure the sensitivity for each occupation. For example, the result shows that a one person increase in the construction industry is related with an increase in “first-line supervisors/managers” by 0.14 person. This calculation was done for all occupations in the construction industry.

Second, we project total employment in the construction industry through 2012. The assumption on projection closely follows the assumptions made by the University of Hawaii Economic Research Organization (UHERO). For example, we expect the construction cycle to approach its peak around 2008-09. There are several grounds for expecting total contracting receipts to slow toward its cyclical peak. Most of all, as expectation of price appreciation decline and rising interest rates and construction costs mount, Hawaii real estate is becoming a less attractive investment, particularly for offshore

investors. So far, the housing market continues to be very strong across the state. However, having roughly doubled in the past five years, high Hawaii home prices are eroding affordability. While long-term interest rates remain at low levels, the Fed continues to raise short-term rates. At the same time, construction costs have risen because of strong global demand, high oil prices, and reconstruction in the mainland due to hurricanes. Large military building programs will somewhat stabilize the downturn influence for the industry to 2012, but it may not totally offset the downturn in private housing construction.

Third, using the calculated coefficient in the first step and the projected number in total employment in the second step, the demand for labor by occupation in each year is calculated. Labor demand due to growth is calculated as the difference in demand for labor year by year.

Finally, the demand for labor due to replacement is calculated by multiplying the projected labor demand in each occupation by its replacement rate. It is known that the average replacement rate in the construction industry is about 2 percent. The replacement rate is much higher for “helpers” (about 4 percent) and lower for “first line supervisors/managers” (1.5 percent). We apply these replacement rates to each occupation to calculate the labor demand due to replacement. These two measures, demand for labor due to growth and due to replacement, represent the total need for workers.

SUMMARY OF RESULTS

Table 1 shows the results for labor demand. Columns 7 & 8 present estimated results for worker need due to growth and replacement, respectively, while column 9 presents the sum of columns 7 & 8. Annual need for workers in columns 10 to 12 is calculated by simply dividing the numbers in columns 7 to 9 by eight (8 years from 2004-2012).

For construction as a whole, about 9,400 workers are needed between 2004-2012. That is, about 1,174 workers should be added to meet the annual demand. About 56 percent of the need is due to replacement of jobs, while job need due to growth accounts for 44 percent of total job need. The most demanded occupation is construction laborers (239 annually), followed by carpenters (145 annually). Around 70 workers are needed annually for first line supervisors, electricians, plumbers, and painters, respectively.

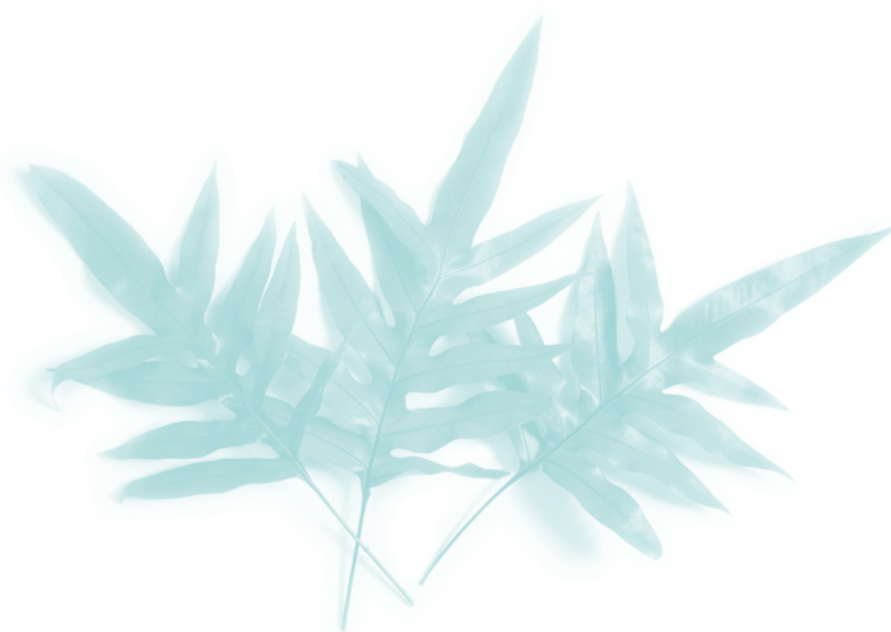


Table 1. Labor Demand by Occupation

1	2	3	4	5	6	7	8	9	10	11	12
Code	Occupation Title					Need 2004-2012		Total	Annual Need		Total Annual Need
		2002	2003	2004	2012	Due to Growth (G) 2004-2012	Due to Growth (R) 2004-2012	G+R	G	R	G+R
470000	Construction Total	24430	25165	27390	31516	4126	5265	9391	516	658	1174
471011	First line supervisors/ managers	1900	1970	2275	2491	216	367	583	27	46	73
472021	Brickmasons and blockmasons	330	255	380	352	-28	65	37	-4	8	5
472022	Stonemasons	100	95	110	139	29	26	55	4	3	7
472031	Carpenters	3630	3820	4260	4580	320	841	1161	40	105	145
472041	Carpet installers	210	245	240	273	33	50	83	4	6	10
472044	Tile and marble setters	300	255	320	391	71	73	144	9	9	18
472051	Cement masons and concrete finishers	470	565	795	967	172	182	354	22	23	44
472061	Construction laborers	4070	4000	4840	5695	855	1060	1915	107	133	239
472073	Operating engineers	1690	1545	1755	1749	-6	318	312	-1	40	39
472081	Drywall and ceiling tile installers	390	535	590	648	58	120	178	7	15	22
472082	Tapers	150	245	280	356	76	67	143	10	8	18
472111	Electricians	2670	2660	2280	2481	201	444	645	25	56	81
472141	Painters (construction & maintenance)	1730	1850	1820	1985	165	361	526	21	45	66
472152	Plumbers, Pipefitters, and Steamfitters	1400	1560	2125	2299	174	429	603	22	54	75
472181	Roofers	430	495	625	737	112	138	250	14	17	31
472211	Sheet metal workers	570	635	470	486	16	85	101	2	11	13
473012	Helpers – Carpenters	440	385	405	430	25	156	181	3	20	23
473016	Helpers – Roofers	..	70	65	92	27	34	61	3	4	8

The estimated labor demand by type of trade in Table 1 is compared with the data on registered apprenticeship. Table 2 shows the result. For the number of persons registered in the apprenticeship programs, the number of people completed is very low. With over 5,000 registered, completion was slightly less than 200 in 2005. Either large numbers are not actively pursuing completion or are dropping out of the programs. If 1,000 persons completed their apprenticeships each year (one-fifth each year, based on a five-year apprenticeship), there would be sufficient numbers of workers to supply the industry through the present expansion, both in terms of new and replacement workers. Between July 2004 and June 2005, there were 1,358 new apprentices registered. Cancellations totaled 653 new and old apprentices, leaving a net gain of apprentices of about 700. While these apprentices do represent an addition to the labor force, the benefit to be gained from their numbers is tempered by the inexperience and lack of skills of the new workers. Also, registered apprentices only account for about 15 percent of the industry's current workforce.

Table 2. Apprenticeship Enrollment and Completions; Completions Compared to Journeyworker Demand (June 2004-June 2005)

1	2	3	4	5	6	7	8	9	10	11
Code	Occupation Title	As of June 2004	Added	Cancelled	Completed (Archived Journeyworker Status)	Total-June 2005	Annual Total Demand	Annual Journey worker Demand	Percentage of Journeyworker Demand Met by Supply	Annual Journeyworker Shortage
		A	B	C	D	E=A+B-C-D	F	G=F*0.85	D/G	G-D
470000	Construction Total	4550	1358	653	192	5063	1174	998	19%	806
471011	First line supervisors/ managers						73	62		
472021	Brickmasons and blockmasons	52	15	12	5	50	5	4	117%	-1
472022	Stonemasons	7	4	4	1	6	7	6	16%	5
472031	Carpenters	1232	315	281	43	1224	145	123	35%	80
472041	Carpet installers						10	9		
472044	Tile and marble setters	114	59	17	8	148	18	15	54%	7
472051	Cement masons and concrete finishers	122	40	19	4	139	44	38	10%	34
472061	Construction laborers				39		239	203	18%	167
472073	Operating engineers						39	33		
472081	Drywall and ceiling tile installers	292	100	72	13	307	22	19	68%	6
472082	Tapers						18	15		
472111	Electricians	465	154	19	26	574	81	69	37%	43
472141	Painters (construction & maintenance)	460	152	70	25	518	66	56	44%	31
472152	Plumbers, Pipefitters, and Steamfitters	38	21	2	1	56	75	64	1%	63
472181	Roofers	430	87	28	0	489	31	27	0%	27
472211	Sheet metal workers	140	45	18	3	164	13	11	26%	8
473012	Helpers – Carpenters						23	19		
473016	Helpers – Roofers						8	6		

These two tables are combined to show the annual (July 2004 to June 2005) journey worker deficit by type of trade. The result is shown in **Table 3**. There are projected unmet needs in all of the major trades through 2012, with the most pronounced shortages for stone and cement masons, plumbers, and roofers. Supply of journey workers in these trades is projected to satisfy less than 20 percent of expected demand. Carpenters, tile and marble setters, drywall and ceiling tile installers, and electricians are in better shape. However, in no trade, except for drywall and ceiling tile installers and brick and block masons, does expected supply exceed 55 percent of demand. The projected shortages in the numbers of workers for each trade are largest for laborers (167 per year), carpenters (80 per year), plumbers and pipefitters (63 per year), and electricians (43 per year).

Table 3. Journeyworker Demand and Supply by Type of Trade - July 2004 to June 2005

A	B	C	D	E	F	G
Trade	Annual Journey-worker Demand	Achieved Journey-worker Status	Percentage of Demand Met by Supply =C/B x 100	Annual Shortage =B-C	Annual Demand due to Replacement	Percentage of Replacement Demand Met by Supply =C/F* 100
Construction Total	998	192	19%	806	559	34%
First line supervisors/managers	62				39	
Brickmasons and blockmasons	4	5	117%	-1	7	66%
Stonemasons	6	1	16%	5	3	33%
Carpenters	123	43	35%	80	89	48%
Carpet installers	9				5	
Tile and marble setters	15	8	54%	7	8	106%
Cement masons and concrete finishers	38	4	10%	34	19	19%
Construction laborers	203	39	18%	167	113	32%
Operating engineers	33				34	
Drywall and ceiling tile installers	19	13	68%	6	13	101%
Tapers	15				7	
Electricians	69	26	37%	43	47	54%
Painters (construction & maintenance)	56	25	44%	31	38	65%
Plumbers, Pipefitters, and Steamfitters	64	1	1%	63	46	2%
Roofers	27	0	0%	27	15	0%
Sheet metal workers	11	3	26%	8	9	30%
Helpers – Carpenters	19				17	
Helpers – Roofers	6				4	

Estimates calculated here should be interpreted with caution. The annual supply of labor is calculated based on only one year of data (July 2004-June 2005), and it is assumed to be constant over time. But supply is likely to increase in the future. Unfortunately, we do not have information on the progress of the current registered apprentices. The number of completed apprenticeships might increase in the future because the large number of people registered over the last couple of years. When they graduate, the supply will be much larger than presently. However, it is also possible that there will be a large number of cancellations as the construction cycle moves toward a downturn. It is difficult to predict how the annual supply of labor will change based on these uncertainties. Furthermore, the gap between demand and supply could be closing in a different manner. Increasing use of overtime and importing of skilled workers from outside of Hawaii might affect the degree of shortage of labor.

Attachment C

KEY INFORMANT INTERVIEWS

Edmund Aczon	United Brotherhood of Carpenters Local 745
Julie Ahue Murray	Winners at Work
L. Vaughn Baker	Office of the Vice President for Academic Planning and Policy, University of Hawaii
Jonathan Brown	United Brotherhood of Carpenters Local 745
Kirk Caldwell	Hawaii State House of Representatives
Kyle Chock	Pacific Resource Partnership
Linda Chu Takayama	Hawaii Military Communities/Forest City Enterprises
Bruce Coppa	Communications Pacific
Bennette Evangelista	Actus Lend Lease
Kathy Kawaguchi	Office of Curriculum, Instruction, and Support Services Branch, Department of Education
Lynn Kinney	International Union on Painters and Allied Trades District Council 50
Stephen Kow	Office of Curriculum, Instruction, and Support Services Branch, Department of Education
Peter Lee	Pacific Resource Partnership
Brian Lee	International Brotherhood of Electrical Workers Local 1186
Judy Leon	Workforce Development Division, Department of Labor and Industrial Relations
David Lim	Associated Builders and Contractors
Alan Lerchbacker	Construction Academy, Honolulu Community College
Dennis Mactagon	United Brotherhood of Carpenters Local 745
Michael Magaoay	Hawaii State House of Representatives
Ann Mahi	School and Community Leadership Branch, Department of Education
David Moakley	American Electric
Karen Nakamura	Building Industry Association
Ramsey Pedersen	Honolulu Community College
Michael Rota	Office of the Vice President for Community Colleges, University of Hawaii
John Sabas	Oahu Workforce Development Board
Tony Saguibo	Laborers International Union Local 368
Norman Sakamoto	Hawaii State Senate
Calvin Say	Hawaii State House of Representatives
Barry Soalo	Oahu Workforce Development Board
Tjet Sun	Building Industry Association
James Tollefson	Chamber of Commerce of Hawaii
Dean Uchida	Land Use Research Foundation
Winona Whitman	Alu Like
Gary Wiseman	Associated Builders and Contractors
Ann Yamamoto	Workforce Development Council, Department of Labor and Industrial Relations
Gerald Yuh	International Brotherhood of Electrical Workers Local 1186



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