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Construction Industry Craft Training in the United States and Canada

**Prepared by
Construction Industry Institute
Construction Industry Craft Training Research Team**

**Research Summary 231-1
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Executive Summary

Enhanced craft training is where safety training was 15 years ago. Safety improvements garnered much attention then, and efforts to improve the skills of the industry's work force are now receiving similar attention. Improving safety resulted in large payoffs, and continuing to emphasize safety is the right thing to do. Evidence exists that craft training pays off just as well.

CII established the Construction Industry Craft Training Research Team to examine construction craft training. The team concludes that each dollar invested in craft training can yield \$1.30 to \$3.00 in benefits. The benefits accrue in the form of increased productivity and reductions in turnover, absenteeism, rework, and other areas.

Since the 1980s, the average age of craft workers has continued to climb. Currently, real wages are rising rapidly and could attract new entrants, who unfortunately may stay only briefly. Craft training will be one major way to retain these new entrants in the construction profession and make them fully productive.

A large body of evidence shows that construction craft training can be effective in a broad range of circumstances. The research presented here shows that the business case for craft training improves the longer craft workers are engaged in training.

Some owners have begun requiring craft training and certification for all craft workers. Current shortages of certified workers are driving up wages, which will attract new craft workers to enter the profession. These new workers will need training in construction basics and will benefit greatly from mentoring and formal on-the-job training programs. When new craft workers recognize that efforts on their part to obtain training pay off in higher wages, they will make the sacrifices necessary to move ahead.

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Introduction

Over the years, the North American construction industry has not invested enough to nurture and develop an adequate construction craft work force required to sustain economic growth. Over the past couple of decades, several demographic, sociological, and economic factors have contributed to craft shortages.

According to the U.S. Bureau of Labor Statistics, the average age of craft workers was 36 in 1985. By 2003, the average age increased to 39. The average age of craft workers on CII projects is higher than the national average. According to a recent CII survey, the average craftworker's age was 42. The Construction Labor Research Council predicts that 185,000 new craft workers must be attracted, trained, and retained each year until 2016 in order to replace those leaving and to sustain growth expectations. CURT has estimated the rate to be closer to 200,000 to 250,000 new craft workers required per year.

The construction industry's unfavorable image continues to hamper recruitment of young craft workers. In the *2002 Jobs Almanac* by Krantz, construction occupations ranged from #182 (construction foreman) to #247 (ironworker) out of 250 jobs in analyses that involved high school seniors that considered salary, stress, work environment, career outlook, job security, and physical demands. In addition to craft demographics and industry image, prior research has identified declining real wages, poor work environment, and lack of stable career paths. One way to begin addressing the current shortage of skilled craft workers is through more industry training.

Problem Statement

Craft training could assure an adequate craft supply in the future, but it is not being done. Numerous factors contribute to training resistance among the construction community, including: 1) reluctance to lose a bid due to added training costs; 2) reluctance to train and then possibly lose trained craft workers to competitors; 3) reluctance to invest in

unproven training programs; 4) reluctance to address the general need for training, since craft workers can be attracted from competitors; 5) lack of employee acceptance of formal training programs; and, perhaps most importantly, 6) lack of the ability to quantify the improved productivity and other benefits that can be realized through training.

Research Scope and Objectives

The purpose of this research was to identify and quantify the business case for construction craft training. Significant debate exists in the industry regarding the value of craft training. Providing quantifiable data regarding the benefits and costs of training will identify which concerns are legitimate and also serve as a first step toward their resolution. The research identified the potential benefits of training including improved productivity, improved safety, improved quality, decreased absenteeism, and decreased turnover.

The research team considered existing data sources as well as collecting data of its own. The research was coordinated and complimentary to other ongoing research and craft training initiatives in the industry, including previous CII research, CURT, NCCER, Associated Builders and Constructors (ABC), and the Center for Construction Industry Studies (CCIS). Objectives include:

1. Research, classify the types, and quantify the costs of training for construction craft workers.
2. Identify results of types of training in terms of high and low impact and payback.
3. Evaluate tradeoffs that organizations should consider for training (e.g., technical versus leadership training and hiring costs versus training costs).

Current State of Training in North America (U.S. & Canada)

Craft training currently exists in North America both informally (on-the-job training) and formally (classroom). Not all on-the-job training is informal. Training on the job can be formalized through mentoring and through providing performance feedback to the trainee.

The research team examined data from the Survey of Employer Provided Training (SEPT), which was conducted by the U.S. Bureau of Labor Statistics in 1995. SEPT involved approximately 1,000 private, nonagricultural business establishments and examined different aspects of training, including the type of training (formal or informal) provided to employees. The survey found that 76 percent of the training provided in construction was informal. Only the retail sales industry reported a higher percentage of informal training.

The research team also examined the percentage of total training hours that involve formal and informal training provided in construction and found that similar percentages of formal and informal training still exist, at least among the surveyed companies (Table 1).

Table 1. Formal versus Informal Training in Construction

Trade	Percentage of Formal Classroom Training Provided	Percentage of Informal (OJT) Training Provided
Civil	19%	78%
Electrical	23%	70%
Piping	22%	71%
Other Mechanical	23%	70%
Equipment Operator and Maintenance	20%	74%

(Data source: CII RT 231 Survey)

Note: formal training includes classroom training as well as computer based and home curriculum self-study.

Both union and open-shop construction arenas have formal training programs. In the union sector, formal apprenticeships and other training programs are established jointly by unions and employers. The national unions strive to make the content of the training programs consistent through standards adopted by national Joint Apprenticeship and Training Committees (JATCs). Union-sector training is funded through contributions to training funds based on each hour of work, as mandated through collective bargaining agreements.

In some areas, open shop formal training programs are funded through cents-per-hour voluntary contributions from owners and contractors into a local training fund, although this rarely happens as frequently compared to the union sector. Open-shop apprentices often pay for all or a portion of training. NCCER, a non-profit education foundation affiliated with the University of Florida, has developed standardized curricula, instructional materials, assessments, and certifications that have become a standard in the open-shop sector.

The classroom portion of training varies by trade. In electrical, mechanical, and hard metal trades, a significantly higher percentage of classroom training time is required due to the technical content of the trades. Civil trades have a lower percentage of time in formal classroom training.

The survey by the research team examined the barriers that organizations experience in conducting a formal training program. The barriers identified are listed in order from the greatest to the least important:

1. Lack of new craft workers interested in training programs
2. Training schedule conflicts with work schedule
3. Training takes too much time to complete
4. Lack of financial resources
5. Lack of adequate instructors
6. Once trained, employees leave the training organization

7. Lack of support from job-site supervisors
8. Inadequate completion rates of existing training programs
9. Language barriers
10. Training location is not accessible to employees
11. Lack of adequate training facilities and
12. Lack of adequate instructional material

Currently, craft training is insufficient to keep pace with the demand for qualified craft workers. This situation is aggravated by an aging work force and high retirement rates of experienced craft workers. Shortages of craft workers and the barriers to formal training are intertwined. Indeed, geographic regions in North America that are experiencing the most significant craft shortages are also experiencing significant increases in craft real wages. In time, higher real wages will attract more craft workers to construction, but it is uncertain whether this will balance out. It is not economically efficient for wages and training capacity to swing wildly. Spikes in wage levels due to temporary shortages distort expectations of new craft entrants and result in excessive turnover.

Means and Best Practices of Training

Although it is possible, most organizations do not measure the effectiveness of craft training. Contractors typically keep general records of the costs associated with training, but few maintain records of the benefits of training. The effectiveness and benefits of training can be seen in data that is commonly collected by contractors, which include:

- Absenteeism rate: the rate of occurrence of absence from work or duty
- Turnover rate: the rate of the number of craft workers hired by a company/project to replace those who have left voluntarily in a given period of time
- OSHA recordable rate: The rate, per 100 craft workers, of the number of times per year a craft worker received treatment beyond basic first aid for an occupational injury or illness
- Rework rate: the amount of rework, wastage and off-quality product produced during a project or within a company during a given period of time
- Labor productivity rate: the amount of craft hours used to complete a given quantity of work.

By tracking and evaluating the changes in value of these key data indicators, a contractor can determine the effectiveness and benefits of training at a project, division, or overall company level.

Various kinds and numerous providers of craft training can be found. The current training infrastructure in construction consists of apprenticeship training, craft and task training programs that may include craft progression programs, high school, community colleges, trade schools, school-to-career programs, cooperative training efforts, vendor training, government-based training such as job corps and prison-based programs, military construction force training, and various forms of structured or unstructured on-the-job training (OJT).

Training can also be categorized as either short term or long term. Short-term training is specific and has a limited number of hours offered. Short-term training is generally referred to as task specific or journeymen upgrade training. Examples of short-term training are a 30-hour blueprint class or a 24-hour motor controls class. Long-term training is craft training and generally takes several years to complete.

Apprenticeships cover a wide range of skills over a specified number of years and produce a full craft professional. Task training can be structured as a part of long-term training. For example, a helper takes only the first year of an electrical program using NCCER Electrical Level I curriculum. Apprentices and other craft trainees can take training simultaneously in the same classroom. The differences in these two types of training will be discussed in more detail below.

New instructional methodologies emerge as needs and demands change in the industry. Notable new methodologies include technology-based instruction and accelerated craft training models. Technology-based instruction includes computer-based, web-based, and simulation methods. Due to the pressing needs for skilled craft workers in the construction industry, accelerated craft training models are being tested and implemented.

Accelerated models are based on compressing long-term craft training instruction into dramatically shorter periods of classroom instruction. Three- and four-year training programs have been compressed into blocks of 6 to 24 months. Significant benefits and notable challenges to technology-based and accelerated models can be found. The primary benefit is faster preparation of crafts to meet the pressing work force demands. The primary challenge is in meeting the hands-on skills development requirements of craft training under these models.

While technology-based and accelerated models enhance or facilitate classroom delivery, hands-on skills development is still essential to the overall training needs of a craft worker. Hands-on skills development takes time, is difficult to simulate or accelerate, and must not be overlooked in developing a craft professional. Historically, government regulators have