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ICERES is approaching its third anniversary. As reflected in our bylaws, ICERES was organized to support high quality research on the issues facing the construction industry.

“The construction industry and its stakeholders face pressing long term issues regarding workforce sustainability, safety, productivity and integration of technology. The purpose of the corporation is to support research with the goal of finding and disseminating an understanding of and pragmatic solutions to these and other construction issues. To this end, the corporation will undertake and support nonpartisan research on issues facing the industry collaborating with existing construction researchers and attracting new investigators into the field of construction research. The corporation will also work to develop a network of researchers with ongoing programs on construction issues. In addition to its work in supporting research, the corporation will disseminate this research through appropriate means including a working paper series, a web presence, and conferences.”

Given ICERES brief history, we have achieved marked success. Over the last thirty-three months ICERES has sponsored eight substantial research projects, seven of which have been completed and five have been published. This year we have published a review of the academic literature on the prevailing wage, a study of the craft employment associated with pipeline construction, and a study of the demand and supply of craft workers in the Baltimore Washington market. The review of the empirical literature on the prevailing wage has been submitted and is currently under review at a scholarly journal. These studies as well as several earlier studies are available from the ICERES website (ICERES.org).

ICERES members have participated in scholarly panels on topics including construction apprenticeship and reconceptualizing labor supply and demand in construction. ICERES announced a paper competition for the best paper on construction employment issues. The winner will receive a prize of $3,000 at the next LERA meeting, we expect to receive letters of interest at the start of November.

ICERES finances remain satisfactory as we have received generous start-up donations and have raised income from Labor-Management Committees for several of our studies. However, our funding remains somewhat hand to mouth. We are grateful for the support we have received and hope that discussions among the board members over the next year will establish a path forward to a more sustainable financial position.

Finally, I have announced that this will be my last year as President of ICERES. I served as the coordinator predecessor of ICERES, the Construction Economics Research Network, for ten years and as President of ICERES for three years. It has become challenging to carry on with my teaching and research duties and keep ICERES moving forward. I will remain on the governing board of ICERES but it is time for me to step back and make room for another researcher to take on the presidency, utilizing ICERES for their own professional growth and providing the construction industry with top research as is the ICERES tradition.

Dale Belman, PhD
President, ICERES
Professor, Michigan State University
EXECUTIVE DIRECTOR’S MESSAGE

I have had the pleasure of serving as the Executive Director of the Institute for Construction Economic Research (ICERES) since its inception. I am pleased to report that, through the efforts of the Board of Directors, the Advisory Board, donors, and research sponsors, the Institute is well on its way toward meeting its mission: to conduct the highest quality research immediately useful to the construction industry and its stakeholders in all areas of employment relations.

As the Executive Director of a start-up Institute, much of my time has been spent building organizational infrastructure to support high quality research: website development, accounting practices, research review processes, database development, marketing documents, research affiliations, etc.

The Board of Directors have, in parallel, focused on the research needs of sponsoring organizations. The positive response we have received from the construction industry and the impacts we have witnessed signal that the Institute for Construction Economic Research is and will continue to be a needed service to the construction industry. To date, we have completed eight research studies (four summarized in this report).

Currently, we believe that the quality and usefulness of our research can best be measured by ‘repeat requests and referral to others’. Other measures of success will come in time, but for now, we are well on our way toward building an impressive research portfolio.

Julie L. Brockman, PhD
Executive Director, ICERES
Associate Professor, Michigan State University
Raising the Bar: Partnering for Construction Performance

**Lead Researchers:** Julie Brockman, PhD, Michigan State University & Dale Belman, PhD, Michigan State University

**Introduction:** A literature review revealed that employee engagement practices were linked to improved individual and organizational performance across organizations within various industries. However, it also became very clear that little research on the link between employee engagement and project performance had ever been conducted in the construction industry.

The implementation of the employee engagement research was developed and executed by the following partner organizations: DTE, Barton Malow, Laborers-Employers Cooperative Education Trust and Michigan State University’s School of Human Resources and Labor Relations. The research question: *How do employee engagement practices implemented on a construction project affect project performance?* was a joint effort. The partners then designed an employee engagement training curriculum to create an employee engaged culture on the Trenton Channel Power Plant Fly Ash Project (TCPP Project). In addition, DTE/Barton Malow incorporated several employee engagement best practices in its operation of the project. The training and research team developed and conducted a pre and post survey to compare best practices employees (all persons working on the project) had experienced on previous projects as well as the TCPP project. Interviews were then conducted to add depth and a more detailed account and explanation of employee engagement practices and experiences on the TCPP project. Following the interviews, an analysis of process and outcome indicators was conducted between the comparison projects (TCPP, St. Clair Power Plant and the River Rouge Power Plant).

**Results:** The data from our mixed-methods research suggests that DTE/BM and the TCPP Project Team achieved its goal of creating a higher level of engagement than personnel had experienced on other projects during the previous year. Interview data increases the confidence we have when interpreting the Part 2 Pre-Post survey comparison, which suggests that the engagement culture had a positive influence on job satisfaction and other job components. Interview data and results from the employee engagement orientation training evaluation indicates that the training had a positive effect on the job components of teamwork and collaboration which are critically important for project performance. In addition, it is clear when making survey comparisons and coupling those observations with interview data, that pre and post planning meetings are perceived to be essential to increased project performance.

**Impact:** This research will initiate a conversation with the owner/contractor community in Michigan regarding best practices in personnel engagement at the project level.
Lead Researchers: Russell Ormiston, PhD, Allegheny College & Dale Belman, PhD, Michigan State University

Introduction: The Building Trades in the Baltimore-Washington area are facing a unique opportunity to increase their membership and market share over the next three years as a surge of demand for construction on major industrial projects is expected through 2018 in the Southern Mid-Atlantic Region. Not only will this ensure that current membership is consistently employed, but it will also provide the Building Trades an important three year window to recruit skilled non-union craft workers and provide stable apprenticeship opportunities for new craft workers. Combined with healthy growth in commercial construction in the Baltimore-Washington area, it is expected that construction employers will need a considerably larger work force than they currently have available and will be seeking skilled, dependable craft workers. Taking advantage of this opportunity will require the Building Trades in the region to mobilize their significant capacity in labor-management recruiting and training; given the uniqueness of this period, rapid action is central to realize the potential gains in membership and market share. This report analyzes construction labor markets through 2018 using data from Industrial Information Resources (IIR), Dodge Reports, the Bureau of Labor Statistics, the Bureau of Economic Analysis, and information collected from Building Trades Councils and individual local unions.

Findings: Demand for craft workers on major industrial projects is expected to increase substantially for all trades in 2017 and 2018. While these gains may be temporary for some trades, others are poised to exhibit consistent gains on an annual basis over the next three years across the Southern Mid-Atlantic Region. By 2018, IIR projects that regional demand for electricians, carpenters, laborers, operators and millwrights on major industrial projects will increase by more than 23% compared to 2015 levels; double-digit percent increases are also projected for welders, plumbers and pipefitters, and instrumentation techs. In contrast, after initial increases in 2016, IIR projects that demand for boilermakers, insulators, ironworkers, painters and scaffolding workers in 2018 will return to or below their 2015 levels.

There are few craft workers available among union locals in Baltimore and Washington. Union locals typically report less than 15% of their members are available for work; many report no available workers. Although information is anecdotal, nonunion employers also indicate they are also having difficulty locating sufficiently skilled crafts workers.
Although there are a limited number of craft workers currently available among union locals in Baltimore and Washington to man new projects, the Building Trades and their signatory contractors have ownership of the largest and most robust workforce development and training capacity in the region. It is this existing training capacity that can be rapidly mobilized to meet the demand for skilled workers at any new projects slated for the area.

In the Baltimore and Washington DC region, this training capacity is controlled by CHOICE and its signatory contractor partners. CHOICE is North America’s Building Trades Unions (NABTU) regional Building Trades Council, composed of representatives from 28 local building and construction trades unions in the greater Baltimore/Washington, DC/Northern Virginia region.

Under the CHOICE banner, these 28 local unions and their contractor partners operate 24 training centers in the area, the vast majority of them within the boundaries of Prince George’s County, Maryland. In total, these 24 training centers have over 250,000 sq. ft. of training space, with potential seats for 1,200 apprentices (or journey level workers seeking skills upgrades) and an annual training budget of $19 million.

CHOICE joint labor-management training centers recruit and train the vast majority of construction apprentices in the State of Maryland. Over the period from 2013-2015, joint labor-management apprenticeship completions made up approximately three-quarters of the total number of apprenticeship completions in Maryland.

Overall, joint labor-management apprenticeship programs account for nearly 80% of the total number of programs in Maryland. In the period cited above, joint labor-management apprenticeship completions comprised no less than two-thirds of the total number of apprenticeship completions in Maryland: 78% in 2013, 76% in 2014 and 67% in 2015.

There will be a surge in construction on major industrial projects ($50+ million) in the Southern Mid-Atlantic Region between 2016 and 2018. IIR forecasts that regional total installed value (TIV) on major industrial projects will increase from $21.17 billion in 2015 to $31.04 billion in 2016, peaking at $32.27 billion in 2017.

This projected increase is largely attributable to an increase in the number of projects in the region with a TIV of $1 billion or more.

There will be 48 major industrial projects under construction in Eastern Maryland between 2016 and 2018 representing a TIV of $18.3 billion; this far exceeds the value of all other sub-regions in the Southern Mid-Atlantic Region.

Commercial construction will also rise between 2016 and 2018. The Dodge Reports forecast that commercial construction in the Baltimore-Washington area will grow by 4.0% annually.

**Impact:** This research was widely published and the information was used in multiple ways, from presentations to community stakeholders in various regions of the U.S. to political deliberations at state and national levels.
Empirical Research on the Effect of Prevailing Wage

Lead Researchers: Russell Ormiston, PhD, Allegheny College & Kevin Duncan, PhD, BCG Economics, LLC

Introduction: There is strong current interest in the effect of prevailing wage laws on the cost of construction, training, safety and the racial composition of the construction labor force. Research on the effect of prevailing wage differs in terms of methodologies employed to develop the results. Those interested in understanding the effect of prevailing wage on cost, training, safety, and racial composition will benefit from understanding studies that they can rely on for meaningful answers. The purpose of this study is to review the empirical research on the effect of prevailing wage laws on costs, training, and safety in the construction industry, as well as the effect of the wage policy on the racial composition of the construction labor force. The review provides a detailed and objective evaluation of the strengths and weaknesses of the methodologies employed in each of these areas.

Findings: The debate over prevailing wage laws has been fueled, in part, by the conflicting conclusions presented by a stream of academic and non-academic studies published over the past 17 years. A number of these studies, however, suffer from methodological shortcomings that offer, at best, misguided interpretations of the economic effects of prevailing wage laws. Through a critical analysis of the literature, this paper concludes that:

• The most methodologically advanced peer-reviewed studies indicate that prevailing wage laws do not increase public construction costs, although some exceptions—such as public housing in California—may exist.

• Although the number of peer-reviewed studies is limited, recent research indicates that prevailing wage laws promote worker training and increased safety.

• While the original intent of prevailing wage laws remains open for debate, the preponderance of the most advanced peer-reviewed research on the topic indicate that these regulations do not currently have a discriminatory effect against African-Americans.

In addition to summarizing the recent literature on prevailing wage laws, this study also highlights the fundamental importance of analyzing these issues using the most appropriate empirical methodologies. For instance, while numerous studies claim that prevailing wage laws substantially increase public construction costs, most of the papers arriving at this conclusion rely on a flawed empirical approach—the “wage differential” method—that demonstrates a clear misunderstanding of construction labor markets. Further, studies that depend entirely on summary statistics—such as Thieblot (1999)—ignore other socioeconomic and public policy factors; this empirical oversimplification leads to an increased likelihood of misinterpreting
the economic impact of prevailing wage laws. These concerns are largely mitigated—if not completely resolved—by more careful studies that feature properly specified multivariate empirical approaches; the importance of empirical methodology cannot be understated.

While the primary goal of this paper was to provide a critical summary of the most credible and up-to-date research on prevailing wage laws, this literature review also was designed to provide a road map to present and future researchers interested in this topic. In addition to strengthening existing areas of research, there are numerous unexplored research topics that could significantly expand the collective wisdom about the impact of prevailing wage laws. Most prominently, research has yet to examine the effect of prevailing wage laws on the on-time completion of public projects, an area of critical concern for policymakers. For instance, if a school construction project is not completed before the start of an academic year, this can impose a significant cost on a school district in a way that is not captured in the calculation of the explicit costs of construction. Another unexplored research area is that of downstream maintenance, including the costs of tear-outs or required renovations attributable to poor initial construction quality. Because the issue of prevailing wage laws is intimately tied to the questions of labor, capital and management quality, these regulations may (or may not) promote on-time, high-quality construction.

**Impact:** This study will provide academics and policy makers with an understanding of which research methodologies, and research outcomes, are reliable.
Skilled Trades Employment in the Pipeline Industry: 2006-2015

Lead Researchers: Ralph Gentile, PhD, Research Associate, Institute for Construction Economic Research

Introduction: Pipeline construction is an important contributor to the employment of skilled construction craft workers. Six to twenty-eight billion dollars were spent annually on new, additions to and the reconstruction of existing pipelines from 2006 to 2016. Industrial construction is an important source of jobs for the skilled construction trades. Individuals who engage in industrial construction have certifications, licensing, and training that provide guarantees that they are competent in difficult, specialized work. Pipeline workers are an important segment of this group.

Pipelines are important to the efficient operation of the U.S. economy, and pipeline construction is an important source of family supporting jobs for construction workers. What then are the economic and job impacts of pipeline construction for the construction trades? This report reviews pipeline jobs data from two principal sources. The first is actual hours worked on pipeline projects in 29 states by four key unionized trades: i) plumbers, fitters and welders, ii) operating engineers, iii) construction laborers, and iv) teamsters. The union segments of these trades are covered by the National Pipeline Agreement and the National Distribution Agreement.

This study draws upon a second set of estimates for skilled trades jobs associated with pipeline construction. Private information provider Industrial Info Resources, LLC, collects pipeline construction information and estimates craft utilization to model the man hour demand for 13 skilled occupations. The study includes the same 29 states covered by the union hours data. Plumbers, Pipefitters and Welders are the largest occupation in the IIR data and employment of this occupation varies between 2,000 and 5,000 from 2008 to 2015. In contrast, the union data in shows that union projects employed between 2,000 and 4,000 Plumbers, Pipefitters and Welders over this period but that the largest occupation by far was laborers with between 6,000 and 12,000 FTE equivalent workers employed between 2008 and 2015. This marked difference is due to the different treatment of pipeline preparatory and clean-up operations by the unions and IIR. Analyzing the two sources finds broadly similar trends in pipeline construction jobs.
Results: An annual average of 16,273 union fitters, operators, laborers and teamsters craft worker FTE’s are employed in pipeline construction and maintenance in the 29 states included in this report. How many craft workers are employed in all 50 states and the District of Columbia? We do not have direct estimates of employment in the other 21 states, but we have the net value of pipeline construction from the 2012 census of construction for the 29 states included in this study ($23,434,025) and for all the states in total ($36,187,544). The 29 states represent 65% of national value of construction. Assuming the proportion of craft workers involved in pipeline construction is similar between states, national craft employment among the big four union crafts in the 29 states would be 27,122 FTE workers. The big four crafts are no more than 60% of all union pipeline employment; total annual union employment for all crafts would be 41,726. Finally, union craft workers comprise about 60% of total, union and non-union employment. Total national craft employment would be 69,500 full-time jobs annually.

Using the BLS estimate for median weekly earnings in the construction industry of $1,168 for union members and adjusting for the difference in annual hours, the annual direct impact from wages in pipeline construction is over $1.9 billion per year for the nation. Adding a conservative benefits rate of twenty percent to this total brings the overall direct economic impact of union pipeline construction jobs in all 50 states to over $2.3 billion per year.

Impact: This research was used in multiple ways, from presentations to community stakeholders in various regions of the U.S. to political deliberations at state and national levels.
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