Photo: Carl Mydans for Farm Security Administration (1936)

Untangling the Skilled Labor Knot

For starters, it's a good thing that productivity is down

BY CLAYTON DEKORNE

In September 2019, I wrote "How Will Construction Solve Its Skilled Labor Crisis?" for *JLC*. That article defined the scope of our industry's labor problem and pointed out that we can temporarily solve for skilled labor by paying well and offering employees an appealing mix of benefits (including authentic gestures that foster a feeling of respect toward employees and pride in belonging to a crackerjack company), but ultimately our industry faces a demographic challenge: Skilled tradespeople are aging out, and we must attract more young people. The article prompted a flood of letters and emails, and a number of speaker invitations. It seemed I'd touched a nerve by uttering, "What never gets discussed in industry reports, but may prove to have the greatest impact on the lack of youth participation, is the issue of social class. Young people today don't want to align with outmoded, underserved, and culturally marginalized social groups. Put bluntly: Young folks don't want to be associated with what they perceive as low-class work."

REVISING THE "SOCIAL CLASS" THESIS

While I still feel there is some inherent truth in this "social class" thesis, it needs updating. First, I feel strongly that the idea of construction being perceived as low-class work is not everyone's reality. It's a social construct born out of a long history of public education choices, which I detailed in my previous article. A key marker in this history was the Smith-Hughes Act of 1917, which provided matching

The next generation of carpenters. Currently, about 20% of the construction workforce is age 55 and older, according to the U.S. Census Bureau, suggesting that a substantial portion could retire in the near future. This highlights the need to attract more youthful talent to the industry.

Women comprise about 11% of the construction workforce, but only about 4% are employed in field occupations. Making room for them in field operations could go a long way to filling the void.

funds to states for vocational training and, however unintentionally, set up conditions for tracking students along two career paths—one for the college-bound and another for the manual trades. This law remained in place until 1963, long enough for America's social strata to become deeply etched by the separation of an academically trained "professional class" and a poorer, marginalized "working class." Some of us have been conditioned to continue accepting this separation even though meaningful public vocational training is no longer widely available. (It's important to recognize that some effective school programs persist or have been made anew; we will come back to these.) What's important to understand (and that I was slow to acknowledge myself) is that this social pattern is largely ingrained as a historical condition and might not be true for everyone today. The U.S. Census sorts the population by profession but does not track the career paths that led to those professions, and in the absence of wide-scale institutional trades training, the career paths for our industry's workforce are immensely diverse.

A false dichotomy. There is a rallying cry, led in part by celebrity figures like Mike Rowe and Mike Holmes, to join the trades to avoid a high-priced college education, which saddles too many young professionals with years of debt. While parts of that may be valid, it puts college in poisonous opposition to the trades, which I think is a mistake. It's unnecessary and perhaps destructive to create a separation and make joining the trades or going to college an either-or choice. I've worked with carpenters and plumbers and roofers who have academic degrees, even advanced ones. I've also worked with a host of trade professionals who have pursued completely different professions before turning to work in the building trades, and many of them do not think college was a mistake. However much college might seem like an expensive diversion, for many, regardless of the field they studied, college proved a critical time of learning to think, of gaining exposure to a wide range of useful methods for organizing and analyzing work, and of forging a diverse network of intellectual and social support.

I whole-heartedly agree that college must not be deemed the only path to professionalism, as our public education system still presumes. But we also can't let the pendulum swing all the way to the opposite conclusion and surrender to a strict avoidance of college as the way to a successful career in the building trades. Indeed, what we fiercely need is to embrace everyone, regardless of background. By "background," I mean education and experience, but the larger context also pertains. To solve the demographic challenge, background must also encompass gender and ethnicity and family types and any other sort of distinction that separates us. On so many levels, division is not working. For the sake of fostering better building trades and increasing professionalism in the workforce, let's maintain an open mind and find common ground at every level.

Room for growth. According to the Home Builders Institute (HBI) Construction Labor Market Report, women comprised only 3.7% of construction and maintenance field occupations—the jobs that account for the largest number of employees in construction and where additional workers are most needed. (Though women are 11% of the total construction workforce, they're predominately employed in sales, management, administrative support, and business and financial operations.) Hispanics are overrepresented in field occupations in the construction industry, comprising 31.5% of the workforce compared to 18.8% across all industries (which closely mirrors the percentage in the total U.S. population at 18.9%). However, Hispanic participation varies widely by state: In Texas and California, Hispanics make up over 50% of the construction workforce, while in Vermont, West Virginia, and New Hampshire, they represent less than 1%.

Non-Hispanic whites account for 59% of the construction workforce, about the same as across all industries (59.6%) and the total

Photos: left, Richard Laughlin, Casa Über Alles; right, Adobe Stock

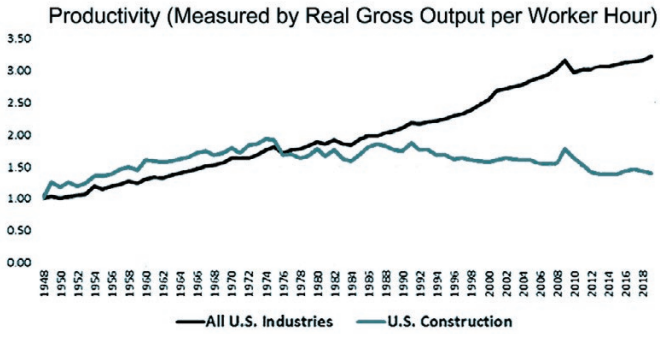
U.S. population (57.8%). Blacks (at 5.9% of the construction workforce vs. 13.9% of the total U.S. population) and Asians (1.6% vs. 6.2%) are underrepresented in the construction workforce.

Measuring excellence. The second "Aha" that helped me understand that my social-class thesis might be too simplistic came from reading *Shop Class as Soulcraft* by Matthew Crawford (see my review, Feb/20). Crawford makes a convincing argument that everyone—white-collar and blue-collar alike—suffers at the hands of a 20th-century trend toward "scientific management" that strives to separate thinking from doing. What was being forged in business schools and in the halls of newly minted industries around the same time that the Smith-Hughes Act was enacted was a corporate style of management that quickly dominated every industry. Under the scientific management model, managers spend their time planning and training, while workers perform their tasks "efficiently." This has concentrated the decision-making among a select group of managers and automated the production process, initially using simplified work routines, and later, as the technology developed, using machines.

The scientific management model depends on managers to set the workers' performance standard—an abstract standard that is governed by a desired productivity rate. The worker's understanding of the product, of its quality, and of the product's intended performance are irrelevant to the production process. If workers are designing or making a tangible thing in the usual mass-production environment, they are alienated from the situations where those things have purpose.

Crawford argues that manual work is more fulfilling because it is directed by the work itself. That is, the measure of performance is defined by the work, not by an arbitrary standard defined by a manager. For Crawford, who is a motorcycle mechanic, the standard of good work is indisputable: Does the motorcycle run clean or not? Carpenters have a range of indisputable truths about their work: Is the house frame level and square or out of whack? Are the miters uniformly tight or gaping at the heel or toe? Is the airtightness level lower or higher than 3 ACH50 (or 0.6ACH50, or whatever performance measure—not productivity measure—is set for the project)? Some truths are easier to grasp than others, and most of them need to be learned; they are rarely self-evident. Will water condense on the back of the sheathing? If so, will it dry out in a reasonable time or grow mold and rot? Will water drain through the assembly or get caught by a reverse lap and leak? Many building truths also require time to manifest. Callbacks are vital learning experiences, even if they come at a painful cost.

Stretching this out, we can begin to formulate possible solutions for attracting and retaining skilled workers: Do you reward workers for performance? The number of days without a callback might go hand in hand with number of days without an accident. Both safety and work quality are tangible results that can become motivations in the hands of the right business. Another way to reward quality and safety is through profit sharing, as profits will trend higher with fewer accidents and callbacks. Companies that are "employee-centered" (to lean on a term David Gerstel articulated in



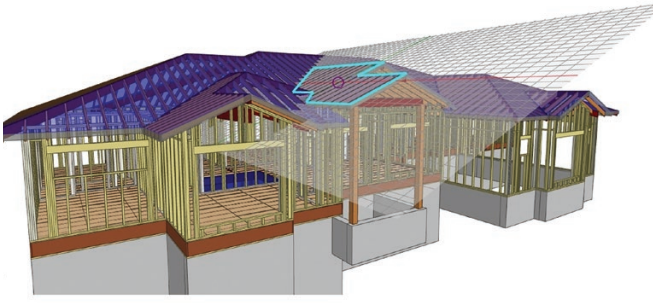
Construction productivity began to lag shortly after OSHA formed (1971) and the OPEC oil embargo (1973) raised demand for energy-efficient buildings. Coincidence or cause?

Working safely unquestionably takes more time. Still, falls remain the leading cause of injury and death in construction, though death rates have fallen sharply in the last 25 years.

Building better takes more time. It's not terrible that the productivity rate in residential construction has decreased. No one wants to live in a house built fast and cheap.

Chart data from Jesse Livemore, *Philosophical Economics*; photos: top, Tim Uhler; bottom, Tim Healey

Houses aren't iPhones or cars. The transportation challenges of moving prefab housing suggest that off-site methods will work only in select, concentrated markets where demand is high enough to justify the intense capital expense of setting up a housing plant. Currently, only about 3% of U.S. housing is built off site, and given the geographic expanse of the U.S., off-site methods will probably never fully meet demand.



Construction is seeing radical digital improvement. One example is MiTek's Sapphire, which can generate a 3D "BIM" model, optimize the framing, and spit out a bill of materials (BOM) to send to suppliers.

his article "The Employee-Centered Company and Your Financial Freedom," Mar/23) prove especially successful at nurturing and retaining a skilled workforce.

Construction has avoided a complete takeover by scientific management for a number of reasons. For starters, construction doesn't easily and inexpensively lend itself to a factory environment, where efficiency experts have been most successful at consolidating the decision-making and reducing labor to series of isolated steps. That is not to say construction can't be translated to the controlled conditions of a factory. The resurgence of interest in what is now dubbed "off-site construction" speaks to the industry's yearning to improve construction productivity.

THE LABOR PRODUCTIVITY OBSESSION

First, let's touch on productivity, as it's closely tied by policy makers and pundits to the skilled labor gap. The predominant thinking is that we can increase productivity by reducing the amount of labor used to produce buildings. Productivity is generally defined as output (in our case, buildings, in a specific amount of time) over input (multiple factors: labor hours, fuel, materials, equipment, purchased services needed to complete a building, and so forth).

The trouble I have with productivity is that it often equates with producing the most stuff in the shortest time. Typically, labor is the chief expense, so multifactor productivity is skimmed over and labor productivity (focusing on just one input among many) used as a shorthand. It's easier to measure and timely data is readily available, and it works as a shorthand because changes in other inputs change labor productivity. But it also tends to obscure true productivity, which is building the most stuff with the least expense. Either way, however, productivity boils down to building fast and cheap, and experience demonstrates that no one wants to live in a house built fast and cheap. While owners often go with the lowest bid, the history of housing shows that the truly fast and cheap houses (Levittown, house trailers, shanties) are not what homebuyers are looking for.

A look at the timeline showing a comparison of construction productivity with other industries (see chart, previous page) reveals that the lag in construction begins in the 1970s. These figures lump all construction types together, but the pattern and timing hold true for residential construction. I can't help but notice that the lag begins shortly after 1971, when OSHA forms and just around the time of the OPEC oil embargo that raised widespread demand for more energy-efficient buildings. Brian Potter (whose exceptionally smart newsletter, *Construction Physics*, recently took up the relationship of construction productivity to construction safety) makes the case that safety requirements have had a greater impact on construction than on other industries, helping to link increased safety with lower construction productivity. He concludes that while certainly part of the story, it hasn't had as big an impact in residential construction because, in his opinion, not many residential construction workers abide with regulations such as tying off with fall arrest equipment near a leading edge. I have a different experience within the *JLC* community, where I think there has been increasing interest in providing employees with a safe work environment as an authentic action of care for their well-being. It's a central tenant of Gerstel's employee-centered company, which provides the best blueprint I know for attracting and retaining a skilled workforce.

The correlation of construction productivity to energy-efficient building practices, and to better building standards in general, is a more speculative leap than the safety correlation. It derives from a general premise that construction quality and building performance are better drivers of long-term economic strength for housing than measures of productivity. Houses, or even roads and power plants don't make good consumables and probably shouldn't be measured by the same economic measures as cars, iPhones, or paper plates.

Photo: Roe Osborn; rendering: MiTek

THE TECHNOLOGY RUSE

Economists generally point to four common levers to pull to increase industry productivity over time:

- Technological advances.
- Improved worker skills.
- Improved management practices.
- Economies of scale in production.

Productivity rates for multifamily construction are higher than for single-family homes, so economies of scale do matter. However, our chief concern here is with the single-family residential sector (though long-term, housing affordability will likely continue to tilt the residential industry toward multifamily).

Let's ignore improved management practices. Building on Crawford's critique outlined above, we've established that management practices based on separating thinking from doing seem to conflict with sustaining a fulfilled and accomplished workforce. That leaves technological advances and improved worker skills as viable drivers for improving productivity.

Off-site construction methods continue to be the oft-cited solution for increasing construction productivity and for bringing the construction workforce under the control of scientific management practices, but we have a long way to go before realizing any meaningful change. Since I wrote my article in 2019, off-site methods have backslid to around 2.5% of the 970,000 new homes built in 2021 (the most recent U.S. Census figures), with the remainder (946,000) being stick built. That's a huge margin. At the very least, it will be decades before we significantly change the proportion of off-site to stick-built homes. True, the U.S. population is shifting away from rural areas, which make up the majority of U.S. land area. But I think the economics will never pan out to make off-site the majority building practice: Whenever I hear someone say we ought to build houses like cars, I ask them, how many houses fit on a truck? While there is no question off-site methods will play a greater role in concentrated building markets where housing demand is strong enough to justify the intense capital investment needed to set up a housing plant, the industry is unlikely to consolidate around large corporate building solutions that can satisfy the housing demand across all urban and suburban markets. The investment is too steep and the transportation requirements too great. In countries like Sweden, off-site methods comprise 85% of housing. But Sweden has a landmass about the size of California, which makes up only 4.3% of the 3,796,742 square miles that comprise the U.S. landmass.

Technology is playing a meaningful role in improving housing productivity in the form of more sophisticated building components, however. Drywall, window and door units, plywood (then OSB, then Zip System sheathing), trusses, I-joists, structural insulated panels, and insulated concrete forms are all examples that have meaningfully shaved time off the production process.

We have also witnessed homegrown solutions that improve safety and jobsite efficiency like Tim Uhler's methods of preassembling the eaves and siding on rake walls before standing them (see "Rake Wall Framing," Sep/14). Lee McGinley realized considerable savings in time and increased safety by prefabricating roof assemblies on site and lifting them into place with a crane (see "How to Safely Frame a Roof on the Ground," Apr/14). Companies like Davis Frame Co. in Claremont, N.H., and Sprowl Building Components in Searsmont, Maine, have been

Building faster and safer: Tim Uhler installs the siding, vent, and eaves on rake walls before lifting them in place.

Prefabrication doesn't always need a factory. Lee McGinley found it safer and more efficient to build this roof assembly on the ground and crane it into place.

A range of new technologies in residential construction have sped up construction while improving energy efficiency. ICF foundation forms are an example.

Photos: top, Tim Uhler; center and bottom, Lee McGinley

panelizing walls for more than 30 years. The history of homebuilding has been a continuous evolution of building components and process improvements. So why has productivity essentially been flat since the pre-WWII era? Precisely because we are building vastly better homes today and killing fewer workers in the process.

THE BUILDING TRADES MARKETING CHALLENGE

This brings us to improving worker skills as the most promising way to improve construction productivity. The astute reader will undoubtedly wonder why, if this was my thesis to begin with, it's taken me all the way to the end to get to it. The reason is that I am compelled to address pundits, policy makers, and tech companies that persistently seek to "fix" construction, rather than recognizing the unique challenges of residential construction apart from agriculture, manufacturing, and wholesale/retail industries. If the investment made in Katerra—the Silicon Valley-based company founded in 2015 that promised to "disrupt the housing industry" by vertically integrating the entire supply chain, design, and building process, but went bankrupt in three years after blowing through $2 billion—had been applied to developing construction skills training, we would be well on our way to improving productivity.

Many effective programs are in play already, which could benefit immensely from meaningful investment to help them scale and replicate throughout the U.S. Examples of programs that are working but reaching only a fraction of residential construction workers include Nora Spencer's Hope Renovations, which prepares women for careers in the construction trade through a 12-week pre-apprenticeship program; YouthBuild KCK, one of the many effective YouthBuild programs that helps out-of-school youth ages 16 to 24 obtain their high-school credentials and trains them for a job in construction; Richard Laughlin's Casa Über Alles, a joint program of The Hill Country Builders Association and the Fredericksburg, Texas, High School Advanced Building Trades Class (see photo, top left, page 36).

What we can all do constantly is raise awareness of what construction is really like. What's desperately lacking in every corner of the country is trust in the building trades. Instead, mistrust has been etched into the social fabric and manifests in ugly ways. After every natural disaster, we get every newsroom's favorite trope: stories about contractors scamming consumers. Certainly scams do happen, but they are disproportionately aired and don't accurately represent the majority of builders. We need the trust of school counselors to guide students equally toward college or the building trades; of teachers to integrate building-science and statics into high-school STEM curriculums; of moms and dads to recognize that building can be both fun (first and foremost, but also engaging, meaningful, fulfilling, the list of positive qualities goes on) and lucrative, and to believe it enough to support their children in choosing the best career path, independent of the fear of missing out if their student doesn't get into the right college. And we need the trust of economists and policy makers and industry leaders to recognize how construction productivity can truly be fixed: by investing in building the skills of the construction workforce.

Clayton DeKorne is chief editor of JLC.

The history of successful construction technology is an evolution in building components. Carpenters used to build doors and windows on site. Now we install "units," which requires skill, to be sure, but is considerably faster.

Augustine Sackett's invention of drywall in 1894 trimmed weeks off the construction of a new home compared with nailing up lath (split lath was even slower) and finishing with wet plaster.

Photos, from top: Rick Luck; Historic American Buildings Survey (Library of Congress); Linda Ferguson