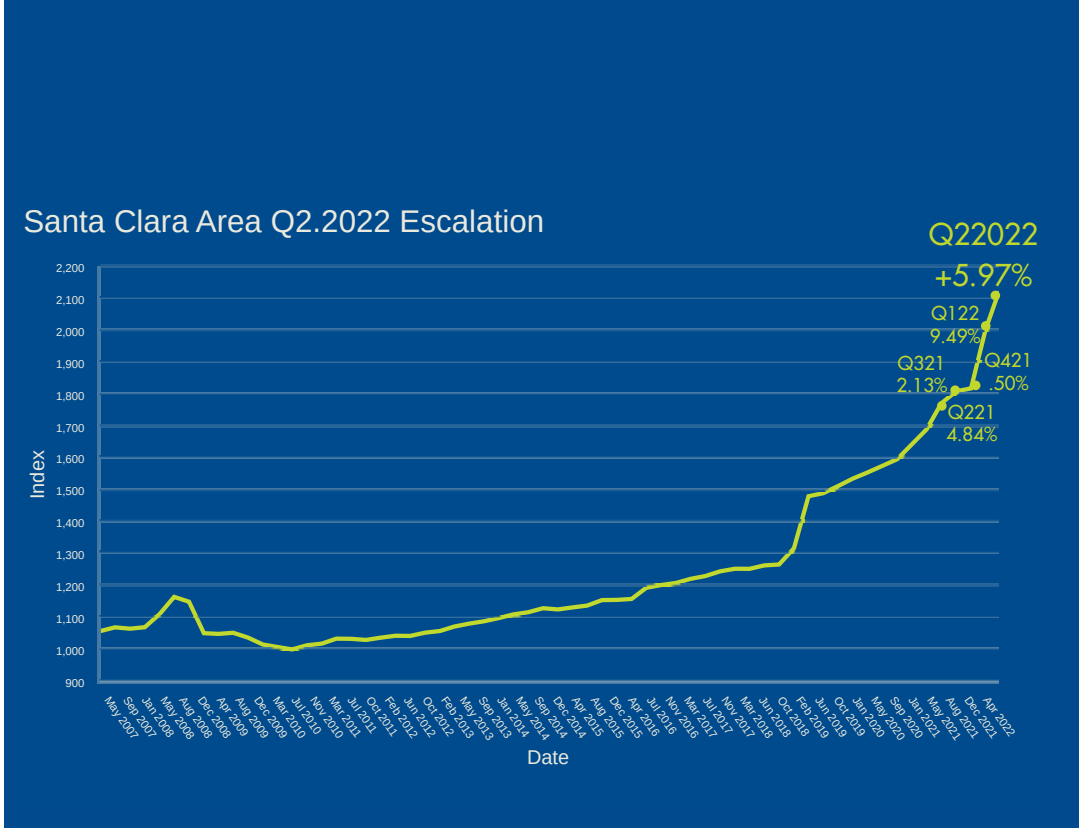
JE DUNN CONSTRUCTION

2022 Q2

THE LOOK AHEAD

Market Overview

Every day we are asked "When will this end?" or "Is the rest of the country experiencing this?" when talking about inflation and escalation. In the second quarter, inflation soared to a 40-year high. Wholesale inflation (Producer Price Index) experienced an 11.3% increase from June 2021 to June 2022 while the Consumer Price Index (the driving force of our economy) showed an increase of 9.1% in the same time frame. Central banks are using aggressive rate hikes to reign in inflation but at the same time high levels of personal savings from pandemic stimulus, backlogged demand, and a tight labor market keep the gas pedal on growth.



THE SANTA CLARA MARKET

Silicon Valley trade partners are currently operating with close to their desired backlog and are thus choosing projects more deliberately than in the first quarter of 2022. The market remains generally competitive, though, as companies are concerned about being well-placed to weather possible economic difficulties on the horizon. Labor availability continues to be good, although wage growth is pushing up labor costs. Material prices this quarter have been leveling out, and in some cases even decreasing. Domestic shipping has improved. International shipping and specialty components are still experiencing delays and cost escalation due to continued disruption and increased demand. Clients in the semiconductor, biotech, and related sectors should anticipate continuing cost escalation due to these material increases and a shortage of related specialty skilled labor and management.

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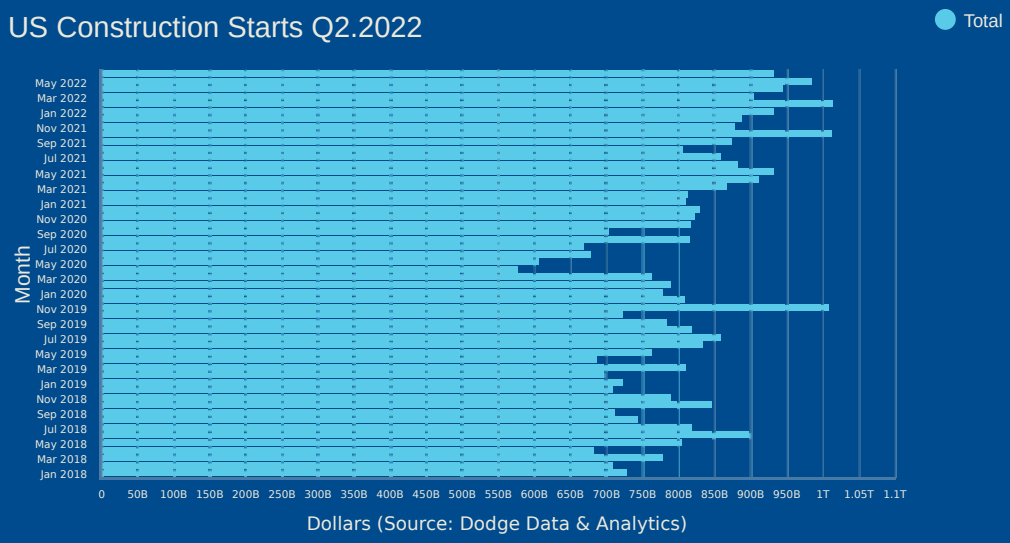
LABOR & MATERIAL TRENDS THIS QUARTER			
Labor Wage Change		**Material Price Change**	
Carpenter	7.18%	Fabricated Steel	3.00%
Laborer	7.10%	Fabricated Copper	-9.76%
Sheet Metal Worker	8.80%	Fabricated Aluminum	-5.39%
Plumber/Fitter	9.91%	#2 Diesel Fuel	4.85%
Electrician	8.75%	4,000 psi Concrete Ready Mix	2.57%
Bricklayer	4.37%	Lumber, FOB Jobsite	14.87%
Iron Worker	5.16%	Glass	1.58%
Glazier	2.88%	Sheet Metal	3.35%
Roofer	3.40%	Gypsum	-5.28%
Operator	4.34%	Other Materials	5.77%

Other Materials consists of brick, block, precast insulation, floor covering, ceilings, and Miscellaneous materials

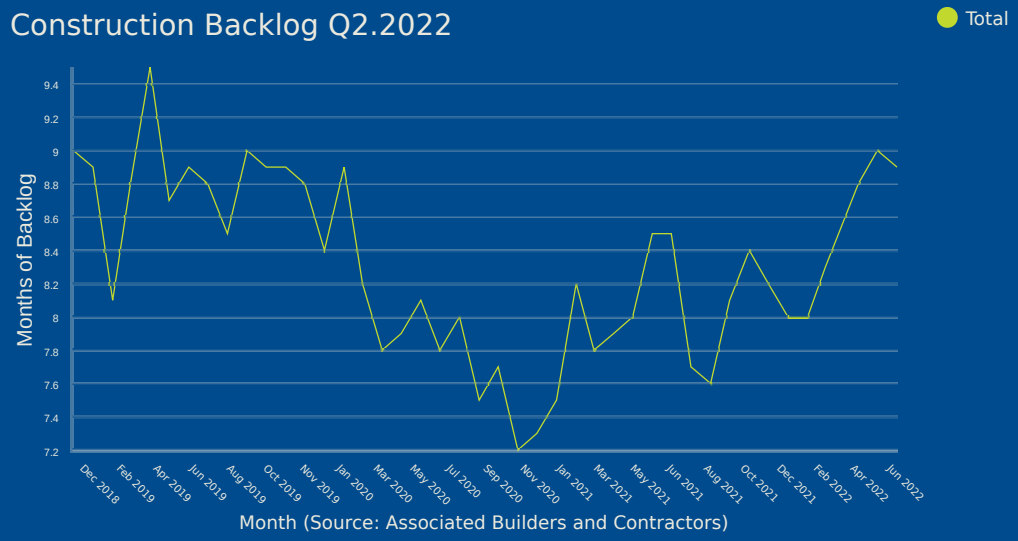
NATIONAL CONSTRUCTION INDICATORS ACTIVITY & PRICING METRICS

Architectural Billings Q2.2022

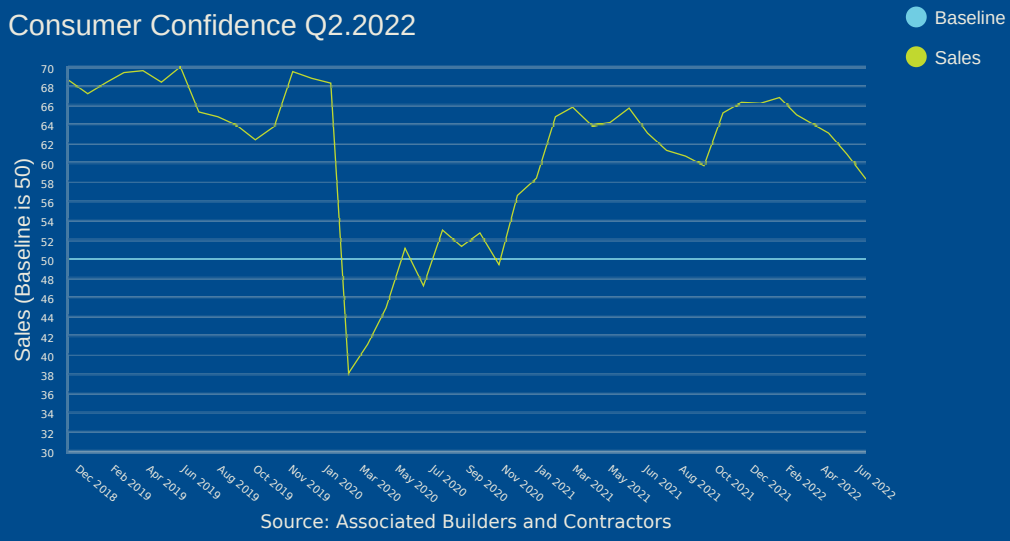
US Construction Starts Q2.2022



Construction Backlog Q2.2022

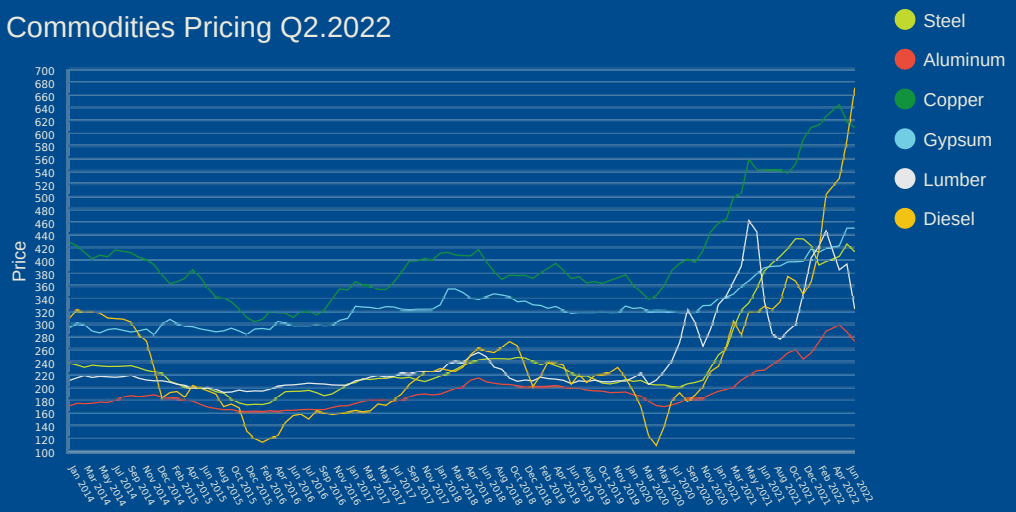


Consumer Confidence Q2.2022



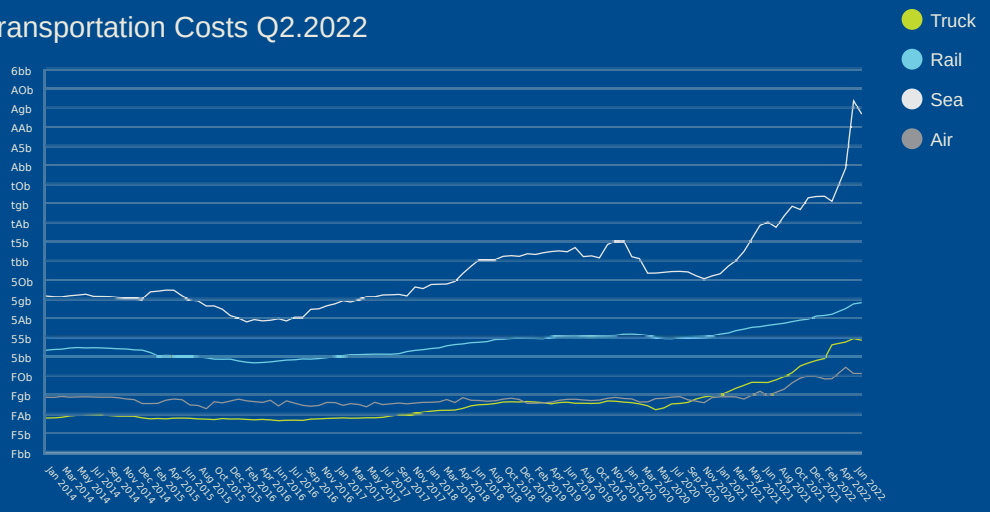
NATIONAL CONSTRUCTION INDICATORS ACTIVITY & PRICING METRICS

Commodities Pricing Q2.2022



Source: www.bls.gov

Transportation Costs Q2.2022



Month (Source: www.bls.gov)

FEEDBACK FROM OUR Q1 REPORT

Why is escalation for lumber so different across the country? It looks like there is as much as a 40% difference?

The number truly does have that wide of a variance around the country. Lumber is extremely volatile and is heavily driven by the housing market. If you look at the cities where the housing market is booming, those will likely have the highest increases for lumber.

What is inflation across the country?

This is a difficult question to apply a percentage answer to. High growth regions of the country are experiencing inflation spikes almost double those of slower growth areas and these can change significantly quarter to quarter. Current quarterly inflationary rates range between 1%-12% from city to city. Mega projects in cities such as Phoenix and Austin also drive spikes in those areas as the trade pool is taxed. At the end of this report, we share location-specific reports to offer you the most applicable information for your local economy.

It would be helpful to provide market-specific information about all the large-scale projects planned in one area.

We agree! Our Client Solutions team maintains this information at a local level and we hope to provide this information in our next issue and moving forward.

ADVANCED INDUSTRIES

Within JE Dunn's Advanced Industries team, we service a variety of clients. These clients include semiconductor, large battery, and pharmaceutical manufacturers. The facilities that manufacture semiconductors are commonly referred to as "fabs." Since 2013, we have been building fabs and have seen the demand for these facilities grow exponentially. Semiconductors include memory chips, microprocessors, and integrated chips used in items such as smartphones, TVs, computers, video games, advanced medical diagnostic equipment, and radios.

In this quarter's spotlight, our Advanced Industries **Preconstruction Services Director, Bryan Cook,** takes an in depth look at the challenges facing the semiconductor industry and some of the construction solutions we are employing daily to mitigate these challenges.

Global Need and Incentives

While the COVID-19 pandemic is responsible for a multitude of issues within the global supply chain and unprecedented escalation, the semiconductor industry was struggling to match supply to demand long before March 2020. As technology and automation replace antiquated products and processes, semiconductors are integral to everything we do.

The initial issue facing the semiconductor industry is a supply gap spurred by the need for three different types of semiconductors. The leading-edge digital semiconductor fabs make chips for mobile devices and modern computers. Next, legacy digital technology fabs make chips for less intensive applications such as those used in automobiles. Last are analog chip fabs which are commonly used in radios. Each chip type serves a different need and production capacity at one facility may not be able to backfill another type, thus creating the supply gap and driving expansion and growth in each type.

Taiwan currently leads the world in production of chips, holding 65% of the market share as of 2021 Q4. South Korea is second at 15%, the United States rounds out the top three with 7% and China comes in a close fourth at 6%.[1] It is important to note that we don't produce any of the leading-edge chips domestically and our market share has been steadily falling for 30 years. In 1990, the U.S. produced 37%.[2] Since then, foreign governments have offered subsidies and incentives the U.S. has not, tipping the advantage overseas. This is problematic as we depend on a global supply chain often negatively impacted by international conflict and geopolitical challenges. Foreign chips used for military applications also pose a national security threat.

Q4 2021 Chip Production Market Share

1. **Taiwan** 65%
2. **South Korea** 15%
3. **United States** 7%
4. **China** 6%

In response, the U.S. is attempting to pass legislation geared toward increasing domestic production: CHIPS (Creating Helpful Incentives to Produce Semiconductors) for America Act, America COMPETES (Creating Opportunities to Meaningfully Promote Excellence in Technology) Act and the FABS (Facilitating American-Built Semiconductors) Act. The CHIPS act passed in late July 2022, but the others are awaiting passage. **Construction spending on new fabs in the U.S. is projected to grow from $18B in 2018 to almost $30B in 2023.[3]**

Despite these efforts, the U.S. could be playing catch-up for decades due to overseas enticements. Taiwan subsidies for fabrication facilities include 50% for land costs, 45% for construction and facilities and 25% for equipment costs in addition to R&D investments and other incentives.[4] South Korea's and Singapore's semiconductor subsidies reduce the cost of facility ownership by 25-30%. Europe also passed their own version of the CHIPS act and aims to control 20% of the global chip production by 2023.[3] In China, government and non-government support for the semiconductor industry is estimated to be as high as $200B between 2015 and 2025.[5]

While the American CHIPS act promises to provide more than $52B in incentives, the incentives issued by these foreign governments will likely continue to leave the U.S. at a disadvantage.

Manufacturer Investments Drive Domestic Production

Despite attractive offers from overseas, many American tech manufacturers are moving forward with plans to increase domestic production. In November of last year, Samsung announced a $17B semiconductor fab in Taylor, Texas for processors to support mobile, 5G, high-performance computing and artificial intelligence. That same month, Texas Instruments announced it would spend $30B for a new plant in Sherman, Texas. Cree plans to spend $1B to expand an existing North Carolina facility.

In June, Intel announced plans to invest $20B building two new fabs in Ohio. To support development of the new site, Intel pledged an additional $100M toward partnerships with local universities to build a pipeline of worker talent and bolster research programs in the region.

Compounding Issues

With plans in place to expand fabs and alleviate the pinched global supply chain, providing the engineering resources to design, the labor to build, and then the technical staff to operate the fabs is the next obstacle. The recently-passed CHIPS act provides funding to increase STEM education as well as specific training centers for semiconductor design and fabrication.

The U.S. is currently the leader in R&D and chip design in the world with Intel and AMD dominating

personal computer CPU market. However, since 1990, enrollment of American students in semiconductor related programs has remained flat, while international student enrollment has tripled. These graduates are then drawn to southeast Asia where more opportunity to work within fabs exists.

Executive Order 14017 (enacted to alleviating supply chain issues and different from the CHIPS act), makes recommendations to address the labor shortages we are seeing. The report indicates labor has been driven down rather than focusing on it as an investment and suggests hiring mandates from apprenticeship programs, implementing labor agreements, and increasing wages through collective bargaining.

Just as described with fab construction, manufacturers and their vendors must make investments today in labor to even hope to stay competitive and retain market share.

How We Meet These Needs

At a domestic level, JE Dunn is rapidly growing its reputation in the semiconductor space by bringing new and innovative solutions to our clients. We begin with a Preconstruction team that has a different composition than most commercial construction firms.

We seek out a diverse pool of STEM graduates and train specifically for the highly technical nature of this type of work. By having Subject Matter Experts (SMEs) on the preconstruction side, we define systems and components to a granular level from the outset. We also create extremely detailed estimates when only conceptual level information exists. We then use this level of understanding to guide and evaluate design development for completeness and accuracy.

These methodologies produce much greater certainty of results and satisfy the rapidly changing and technical demands of these facilities for all parties rather than utilizing traditional high-level parametric estimating practices. Our team also integrates with a team of Design Managers early on who have come from design firms and now are able to help drive the development of design to the correct level which supports procurement and installation needs.

As our projects grow larger and supply chain issues impact our ability to obtain materials and equipment on time, the strategy has shifted from coordinating "Just-in-Time" deliveries to a "Get-it-Early" mentality. JE Dunn has pivoted to managing warehouses with staff to receive and track inventories. This has allowed us to identify deliveries at risk much earlier than standard practices. We have a team of procurement specialists who focus on tracking and expediting the securing of materials in order to alleviate potential project delays. This team has developed a repeatable and scalable way to evaluate and onboard key suppliers, execute national agreements, track and expedite submittals, ensure shipping and delivery dates, and implement customized solutions that best fit the Owner's needs.

With only half of the 8 million skilled-labor jobs that were lost during the pandemic being filled, a severe marketplace shortage remains. As the trade partner community now has more work than it can support, they can pick and choose who they want to work with. To make JE Dunn projects more attractive and easier for trades to engage with, we extract and share granular data and metrics from our estimates to support trade partner workflows. We supply manpower curves, project valuations, and cashflow curves for every trade bid package. This can save significant time and effort from when we first engage trade partners to when they actively start planning their project approach.

These strategies add value and "go the extra mile" to support our clients and partners. By contributing excellence and innovation at every level, we offer solutions which help secure economic independence and national security.

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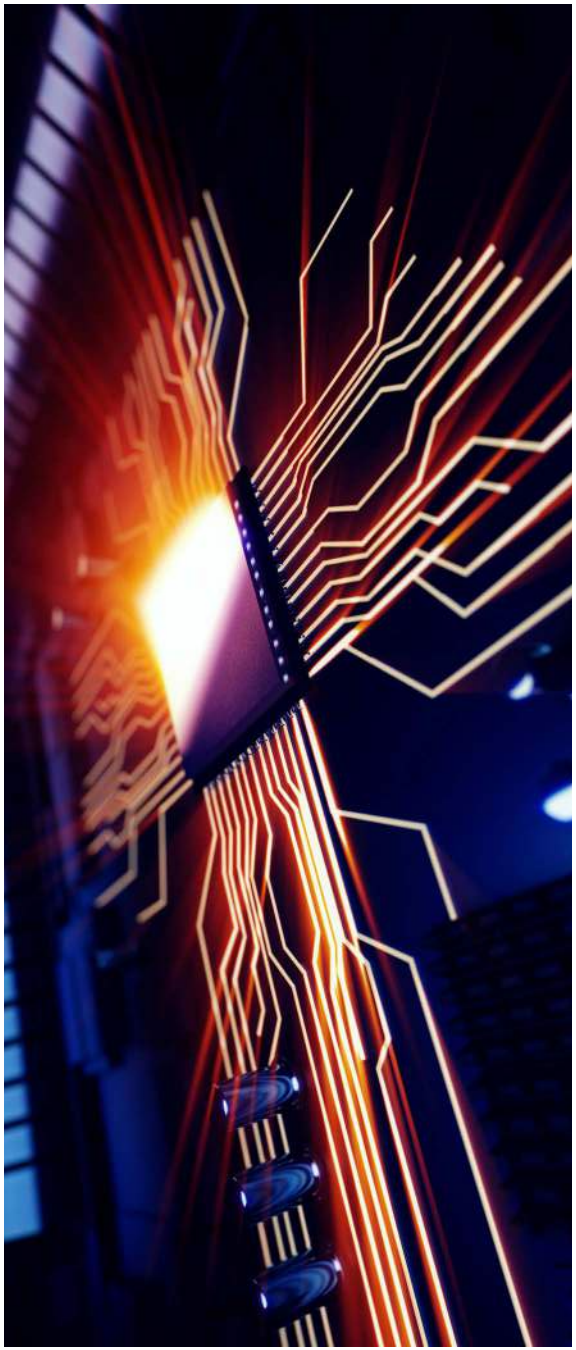


Sources: 1) Tecvalue.com 2) Intel.com 3) Semi.org 4) Washingtonpost.com 5) Whitehouse.gov

LABOR TODAY

If a U.S. business has reopened post-pandemic, chances are there's a "Help Wanted" sign in the window. It seems every industry is scrambling to hire, not just the ones experiencing rapid growth. Many are struggling to replace employees lost during the pandemic while others are trying to retain the ones they already have.

Sector Shifts

In April, 11.6M jobs were available while the number of unemployed workers was only 6M.[1] That math doesn't add up to the pandemic causing the current labor pinch though, and this is why: most unemployed workers are back to work, but the needs of the market look completely different than pre-pandemic. Industrial and transportation are booming, while leisure, government, and education are in decline.

New Business Starts

A large contributing factor to the shortage is the record number of people starting new businesses. In 2010, the number of new business applications was 2.50 million. In 2020, this number was 4.38M, an increase of 75%. Over the last two years that number has continued to grow as entrepreneurs cite being laid off or the changing needs of the consumer market as opportunities to start these new businesses.[2] While returning to work in new and growing industries is ultimately good for our economy, it does not help employers looking to backfill existing positions.

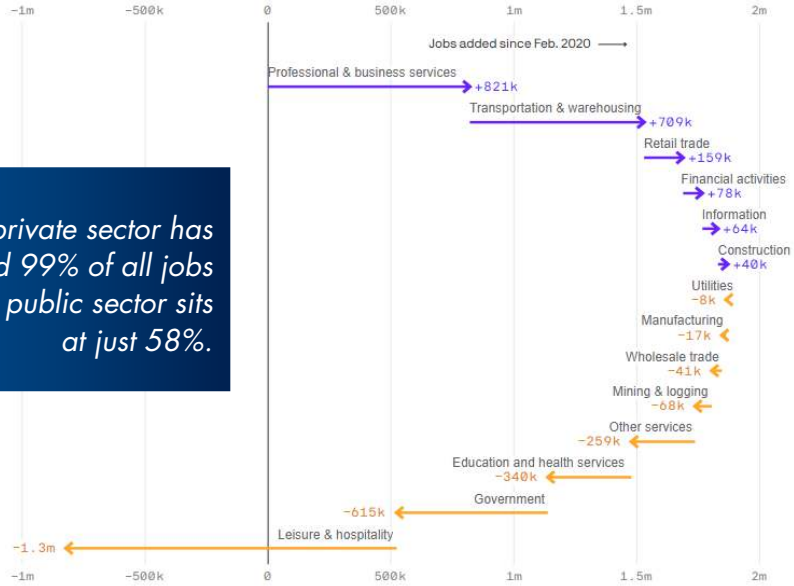
The construction industry is no stranger to the workforce struggle as skilled trades were difficult to staff even before the pandemic. However, as e-Commerce has boomed, so has the trucking and manufacturing industries which often pull labor from the same pool as construction.[3]

Other Factors

Other factors contributing to the current labor shortage include lack of childcare, having more in savings from federal stimulus money, and baby boomers (defined as anyone born between 1946 and 1964) leaving the workforce. This generation's youngest workers were age 56-58 in the last two years, and many of them opted to take early retirement. We will dive deeper into this issue in our five-year labor outlook.

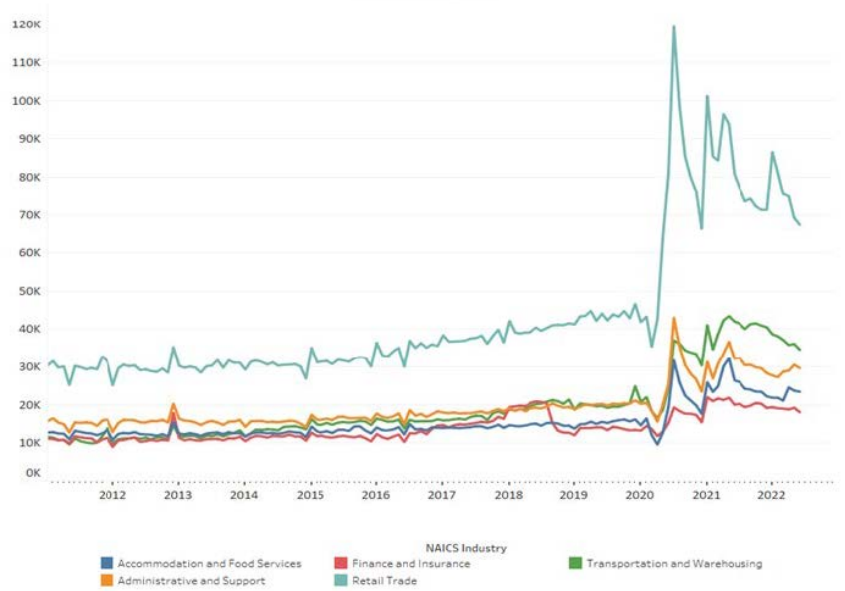
The private sector has recovered 99% of all jobs lost, but the public sector sits at just 58%.

CHANGE IN JOBS FROM FEBRUARY 2020 TO MAY 2022 BY SECTOR



SOURCE: COMMITTEE FOR A RESPONSIBLE FEDERAL BUDGET. U.S. BUREAU OF LABOR STATISTICS; CHART: SIMRAN PARWANI/AXIOS

MONTHLY BUSINESS APPLICATIONS BY NAICS SECTOR (SEASONABLY ADJUSTED)



SOURCE: U.S. CENSUS BUREAU, BUSINESS FORMATION STATISTICS, JULY 14, 2022

Sources: 1) Uschamber.com 2) Census.gov 3) Axios.com

LABOR IN FIVE YEARS

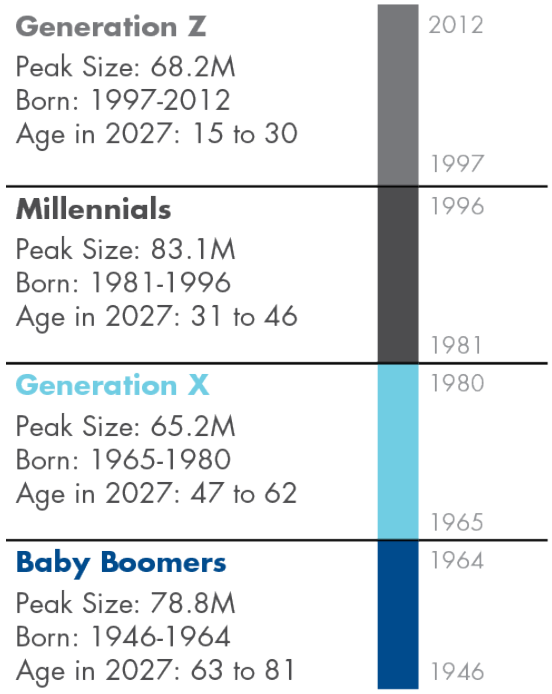
According to a survey from Manpower Group published in February of 2020, 70% of U.S. employers reported a shortage of talent even prior to COVID-19.[1]

The pandemic exacerbated two issues that have been looming over our population for decades, retiring Baby Boomers and a shrinking Labor Force Participation Rate (LFPR).

The Baby Boomers account for 76M Americans and had been retiring at a rate of approximately 2M per year prior to 2020. Over 3M retired in 2020 in the wake of COVID. Not only do the Boomers outpace other generations in size, but they have also amassed wealth that complicates the LFPR. Boomers are retiring with an average net worth of $1.2M, allowing many to retire early.

With Boomers' children standing to inherit these fortunes, many pursue part-time work or no work at all which negatively impacts the LFPR as well.

GENERATIONS IN 2027



The LFPR (calculated by workers age 25 to 54) trended up through the 70s, 80s, and 90s, and peaked at 67.3% in 2000.[2]

In May of 2022, it was 62.3% due to many of the reasons we've already covered. In addition, due to a natural dip in the birth rate in the 70s, there simply aren't as many people in the workforce.

Percentagewise, these LFPR drops may not seem like a huge change over such a long time period, but it amounts to more than 17M workers.

To maintain our current population, the Total Fertility Rate (TFR) would need to be at 2.1 children born to each woman. In 2021, the TFR was 1.78. For comparison's sake, Boomers were born into families that had 4 children on average, but Boomers only averaged having 2 children.[3] In general, those children make up Generation X, which – with the smallest population (65M) of the four generations currently configured into the LFPR– cannot cover the gap left by the Boomers.

In the next article, we will look at trends in anticipation of this massive labor gap.

Sources: 1) CNBC.com 2) Census.gov 3) Economicmodeling.com

LABOR IN THE FUTURE

What should employers do today in anticipation of continued labor shortages, particularly in construction, over the next decade?

Partnerships

Many are "getting creative" by offering tuition assistance, extended benefits, and partnering with trade schools.

"We are partnering with groups such as the National Center for Construction Eduction and Research to help develop curriculum for our skilled trades employees," said Chris Cole. Cole is a Group Manager within JE Dunn who specializes in recruiting and developing the company's skilled labor force.

"This allows us to access the pipeline of the best trained individuals, continuing education for our existing employees, and ensures the certifications and licenses they issue are covering the skills we need our employees to know," said Cole.

Cross-Training and Upskilling

Cole also added that JE Dunn is making extra effort to retain the existing labor force by cross-training and upskilling employees who are hard workers but may be interested in expanding their skillsets into different trades or areas of expertise.

This sentiment was echoed by Dane Brumagin, a Talent Acquisition Director within JE Dunn.

"We are looking internally for employees who may have transferable skills to a harder-to-fill position. For example, we may move someone who is in a non-construction supervision role over to a Workforce Manager role, a position typically filled by a Superintendent. The primary competencies needed to be a Workforce Manager are strong communication and organizational skills. A move like this leaves an experienced Superintendent in the field and allows more growth opportunity for all employees involved," Brumagin said.

As we covered in our Labor Today overview, this type of reskilling may be necessary in several sectors due to shifts created by the pandemic.

The Importance of Today

Both Brumagin and Cole reinforced the need to be proactive rather than reactive today and into the future. Recruiting from other industries, mentoring through schools and unions, and developing relationships with college and trade school instructors were also mentioned as strategies JE Dunn is employing today in anticipation of a continued labor shortage in the future.

Another strategic differentiator we are using today which is already returning dividends is Casey Cantone, a Senior Talent Acquisition Specialist who is fully dedicated to recruiting for our skilled trade workforce. Recognizing the pinch in that particular labor segment, we see this role as crucial to our future labor force.

We also recently added a role within our Community Impact Department for an Education Manager. Chera Hishaw fills that role and recently launched "Building the Future", a K-12 workforce readiness initiative centered on construction careers. Through partnerships with local schools and educational nonprofits, students will experience hands-on engagement and build awareness of the many opportunities in the construction industry.

Prefabrication: Doing More With Less

No discussion about labor in the future is complete without mentioning prefabrication. Stacy Scopano is JE Dunn's National Prefabrication & Manufacturing Director.

"Industry advances in shifting labor demands offsite during prefabrication help to lessen the quantity of labor hours needed onsite. This directly impacts hiring dynamics by both reducing the quantity of employees needed and changes the role requirements per employee which broadens the potential candidate pool," said Scopano.

Environmental Improvements

The impacts on labor can be understood when you consider the process changes enabled by prefabrication. Worker efficiency gains results from the predictability of what is being produced, as well as, how.

"Ergonomics, standardization, and even automation can all combine to drive outcomes that affect quantity and type of worker needed to produce the same scope of work on site. Employment for a facility that is climate controlled, inherently safer, and consistently close to home can also provide an added quality of stability to construction roles that might otherwise seem less attractive, when compared to the shorter term variability moving project-to-project, site-to-site," said Scopano.

Ultimately, all of these factors combine to positively impact the breadth of labor that can be recruited for production, which can directly impact the current constraints to construction capacity and supply.

Students participating in "Introduce A Student To Construction Day" sponsored by JE Dunn.