



ON THE RISE

CONSTRUCTION MATERIALS ESCALATION & AVAILABILITY REPORT

MARKET UPDATE AUGUST 2022

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IN May of 2021, we **published a market pricing analysis** that showed the current state of the construction industry and highlighted the major disruptors at the time, i.e. the confluence of pauses in production at mills and factories during COVID-19, supply-chain issues (e.g. the Suez Canal blockage and Texas winter storm), skilled labor shortages, tariffs (including steel, aluminum, and certain materials/products from China that were put in place in 2018), price of oil increases, and raw materials scarcity. Since then, several additional factors have impacted materials prices and availability. To help owners better understand how contractors are being affected, we've assembled a subsequent report compiled of the more recent major disruptors as well as material cost and schedule drivers and potential mitigation efforts.

MAJOR DISRUPTORS

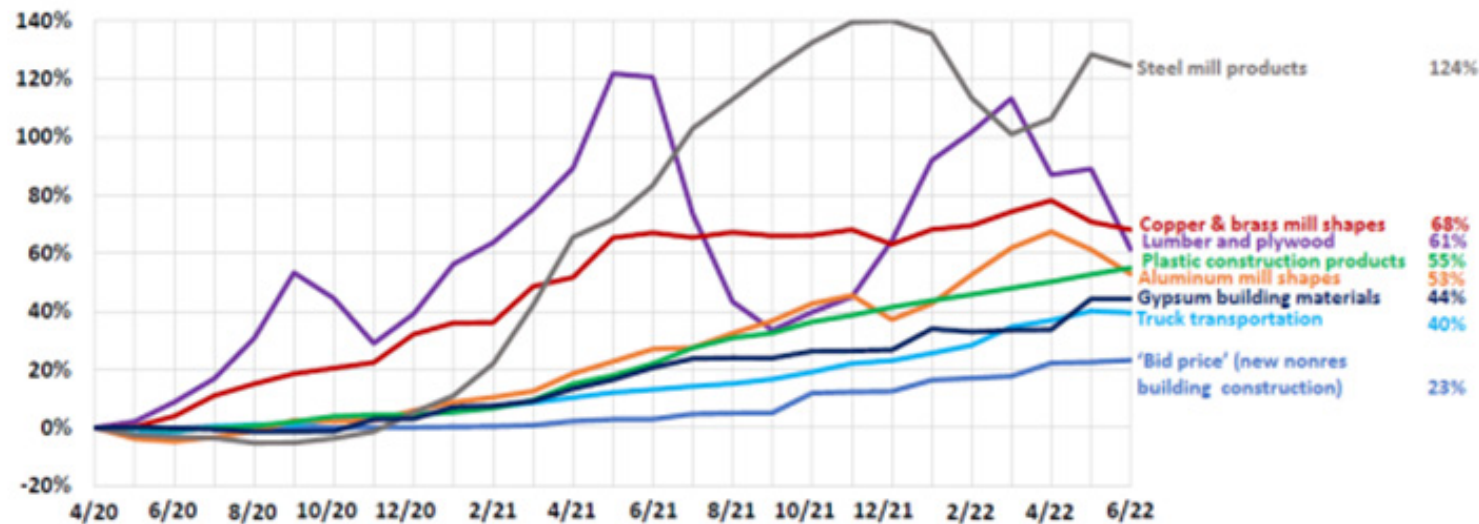
The recent major disruptors contributing to the continued increases in materials costs, supply-chain bottlenecks, and the tight labor market are as follows:

- Inflation
- Russian invasion of Ukraine
- China's prolonged shutdown of Shanghai
- COVID-19 variants
- Microchip shortage
- The Great Resignation
- Global energy
- Transportation

> INFLATION

ENR's July BCI Index is up 8.74% Year to Date (YTD), an annualized pace of 15%. According to the *Associated General Contractors' (AGC)* recently published an *Inflation Alert* to its membership, inflation is at a 40-year high, sapping consumers' purchasing power despite elevated wage increases.

PPIs for construction bid prices and selected inputs
cumulative change in PPIs, April 2020-June 2022 (not seasonally adjusted)



> RUSSIAN INVASION OF UKRAINE

The Russian invasion of Ukraine has caused energy prices to sky rocket as supply shrinks. U.S. retail gasoline prices have experienced a 36.77% increase from 1/1/22-7/1/22 and retail diesel prices have increased 45.73% from 12/31/21-7/25/22. Russian sanctions cut off the Russian supply, leading to a global shortage of natural gas and oil products. Russia produces 12% of crude oil and 18% of global natural gas.

> CHINA'S PROLONGED LOCKDOWN OF SHANGHAI

70-day lockdowns in Shanghai beginning in March of 2022 have had drastic effects on the global supply-chain. 80% of manufacturers in Shanghai experienced reduced production rates. The number of available workers has also been limited, leading to congested ports and delayed delivery dates. Chinese highways and shipping routes have been intermittently closed in hopes of slowing the COVID-19 omicron variant outbreak. China is the leading supplier for every import category for the United States. Top imports include:

- Machinery & Electrical: 24% of U.S. imports from China
- Miscellaneous: 19%
- Metals: 10%
- Textiles: 8%
- Plastics/Rubbers: 7%

Russian sanctions cut off the Russian supply, leading to a global shortage of natural gas and oil products.

> COVID-19 VARIANTS

With the onset of multiple COVID-19 variants, businesses were delayed in returning operations to full capacity.

> MICROCHIP SHORTAGE

Trade restrictions between the U.S. and China put into place in September of 2021, forced U.S. companies to source their chips from Taiwan, a region already running at maximum capacity. In June of 2021, a drought in Taiwan forced chip manufacturers to find a secondary water source for chip production, putting strain on output capacity. Additionally, 90% of semi-conductor grade neon used in the U.S. is refined and exported from Ukraine—placing further stress on an industry already experiencing major shortages—leaving microchip producers forced to find secondary sources and having to keep more inventory on hand.

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> GLOBAL ENERGY

Crude petroleum has experienced 77.1% increase Year over Year (6/21-6/22). Natural gas has experienced 224.5% increase Y over Y (6/21-6/22). Unprocessed energy materials have experienced 126.8% increase Y over Y (6/21-6/22). At the current consumption rate, oil reserves are expected to be depleted by 2052, and natural gas reserves are expected to be depleted by 2060.

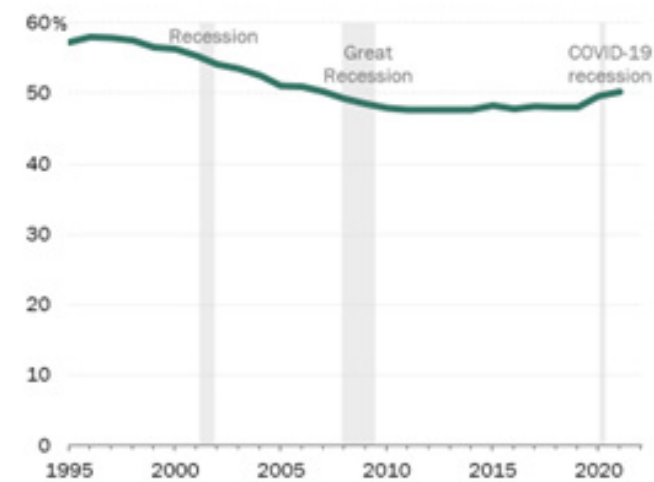


> THE GREAT RESIGNATION

COVID-19 caused many labor force members to enter early retirements, dismissing essential labor workers. In Q3 of 2019, 48.1% of adults 55+ in the labor force were retired compared to Q3 2021 where 50.3% of adults 55+ were retired. For Q3 2019, 64% of labor force members 65-74 were retired compared to Q3 2021 where 66.9% those adults were retired.

Unlike in other recent recessions, the pandemic has increased retirement among older adults

% of U.S. adults ages 55 and older who are retired



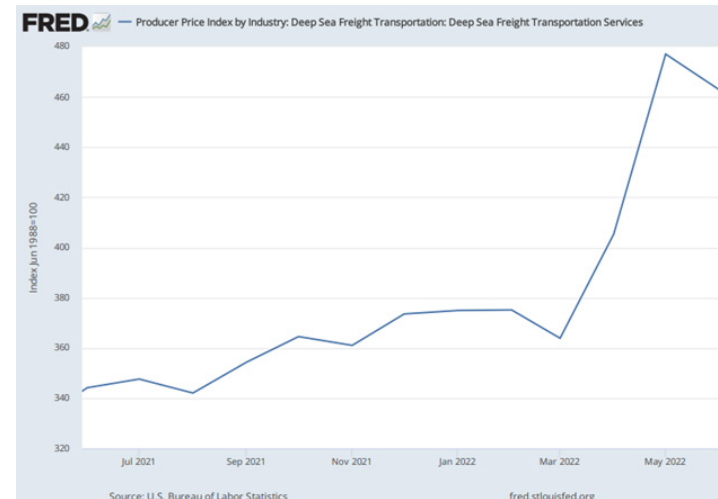
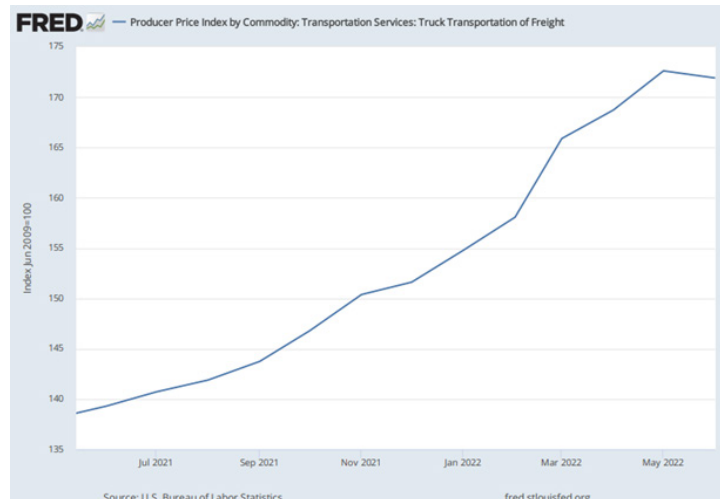
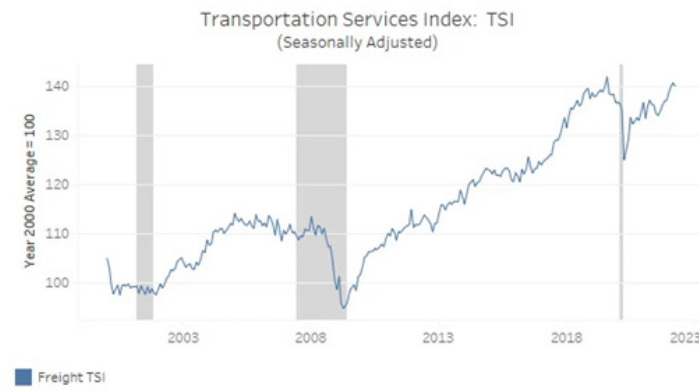
Note: "Retired" refers to those not in the labor force due to retirement. The COVID-19 recession began February 2020 and ended April 2020. Source: Pew Research Center analysis of July, August and September Current Population Survey monthly files (IPUMS).

PEW RESEARCH CENTER



> TRANSPORTATION

Currently, there is a 94-95% annual turnover rate in long-haul trucking sector. There are over 400,000 new Commercial Drivers Licenses issued every year. Additionally, shipping container prices are 2x-3x higher since prior to the pandemic. Container manufacture rates have decreased and the rate at which containers are imported from China is far higher than the exportation rate, leaving China with an insufficient number of containers for exports. Further delaying the congested ports.



MARKET ANALYSIS

THE FOLLOWING IS AN ANALYSIS OF WHERE THE MARKET STANDS TODAY (AUGUST 2022).

MATERIAL	CURRENT STATE (ESCALATION)
Steel (HRC)	6.39%
HVAC Systems	35%
Switchgear	20.93%
LED Lighting	9.02%
Concrete	14.62%
BATT Insulation	16% (6.21-6.22)
Roofing Insulation (RIGID) (Polystyrene)	45.40%
Rubber Roofing Products	15.44%
Asphalt	9.86%
Lumber	(3.69%)
Wood Panel	22.37
U.S. Diesel	64.79%
Electrical Contractors Producer Price Index (PPI)	19.04%

> STEEL

CURRENT STATE

Steel mill products have experienced a 22.4% price increase Y over Y (6/21-6/22) and are still up 124.3% since February of 2020 (pre-pandemic)

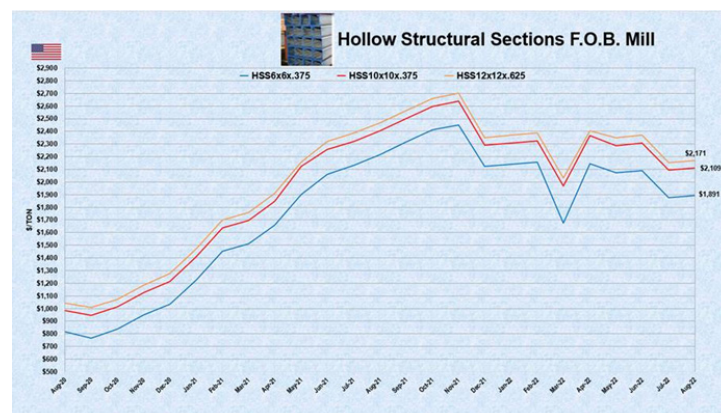
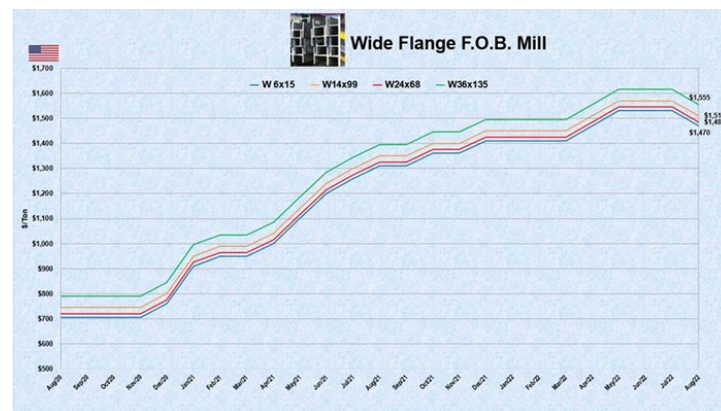
Wide flange has plateaued this summer, but is expected increase again due low manufacturing capacity

Joist and deck steel sourcing is delayed until March and April of 2023 due to the demand for warehousing distribution centers, and low fabricator capacity

Steel rebar has experienced a 16.38% decrease Y over present

Steel plant lead times for replacement equipment and parts have increased from 3 months to 9 months, limiting the capacity of fabricators

According to one of our subcontractor partners, steel plant lead times for replacement equipment and parts have increased from 3 months to 9 months, limiting the capacity of fabricators.



COST/SCHEDULE DRIVERS

Microchip shortages

China's prolonged lockdown of Shanghai

Coal, the energy source responsible for 80% of the energy in steel manufacturing has experienced a 133.52% price increase per ton, from 12/31/21-7/19/22

Input material prices are experiencing sharp price increases due to the energy intensive process of mining, shipping, and manufacture/refining material in addition to global demand

Transportation

> HVAC SYSTEMS

CURRENT STATE

HVAC equipment across the board has experienced 35% price increase in the last 2 years

Major manufacturers have implemented price hikes ranging between 5-9%

- Lennox has increased prices 9% as of 5/2/22
- Trane has increased prices 18% as of 5/16/22
- Carrier has increased prices 12% as of 7/11/22
- Specialized equipment is predicted to increase 10-30%

COST/SCHEDULE DRIVERS

Change from R22 refrigerant to 410 A refrigerant

Microchip shortage

Aluminum, (air ducts) pricing has sky rocketed due to the energy price increases

> AIR HANDLING UNITS (AHUs)

CURRENT STATE

Cost for custom and energy recovery AHUs are 35% more than standard units

20 to 28-week lead time on standard AHUs

28 to 36-week lead time on custom AHUs

COST/SCHEDULE DRIVERS

With the booming of the life science industry, AHUs are in higher demand than ever before



> COOLING TOWERS

CURRENT STATE

6% manufacture price increases effective 4/1/2022

Field erected cooling towers can take 20 weeks to complete onsite after material delivery

Preassembled units can take 6-8 weeks of in-factory assembly and 1-2 weeks of installation on site causing shipping times to vary

40 to 45-week lead times

COST/SCHEDULE DRIVERS

Surging global investments in oil, gas, and power plants are resulting in higher demand for cooling towers; the energy intensive process of petroleum refining requires massive amounts of cooling power in order to maintain production levels

Rapid industrialization, urbanization, data center development and HVAC market growth are huge drivers of demand; the rate at which the market demand is expanding exceeds the current production capacities leading to longer lead times and higher prices
Fiber reinforced plastic cooling tower prices continue to rise due to the resin shortage, as well as fiberglass raw material price increases; demand is growing due to lower corrosion and lower maintenance rates.

Rapid industrialization, urbanization, data center development and HVAC market growth are huge drivers of demand.

> ELECTRICAL

SWITCHGEAR

CURRENT STATE

12.8% price increase from 12/31/21-6/30/22

60-week lead times (+/- 5 weeks)

Manufacturers are being forced to find secondary suppliers as many suppliers are unable to operate due to current industry trends (labor, raw materials, transportation, etc.)

COST/SCHEDULE DRIVERS

Unpredictability of delivery dates

Global Power consumption is rapidly increasing; developing countries, and rapid urbanization in places like China and India cause the demand for switchgear to spike

In addition to increased power consumption, switchgear around the world needs upgrades due to green initiatives and operational expiration



PANEL BOARDS

CURRENT STATE

Q1 experienced a 22% increase in pricing in comparison to Q4 2021

10 to 12-week lead times

COST/SCHEDULE DRIVERS

Aluminum pricing is rising sharply due to rising energy costs and the high demand

In addition, aluminum demand is increasing due to the growing popularity of using aluminum alloys as a substitute for copper

Steel prices used in panels are on the rise

According to one of our subcontractor partners, labor shortages and rising labor costs are causing major delays and price increases. At manufacturing plants, even after materials are sourced, delays continue due to the low capacity of manufacturers.

CIRCUIT BREAKERS

CURRENT STATE

Q1 experienced a 22% increase in pricing in comparison to Q4 2021

60% of manufacturers still report a shortage of insulating resin needed

COST/SCHEDULE DRIVERS

Shutdown of commodity supplier operations

Issues sourcing raw materials

Turning to alternative suppliers that must be verified before continuing manufacture



LED LIGHTING

CURRENT STATE

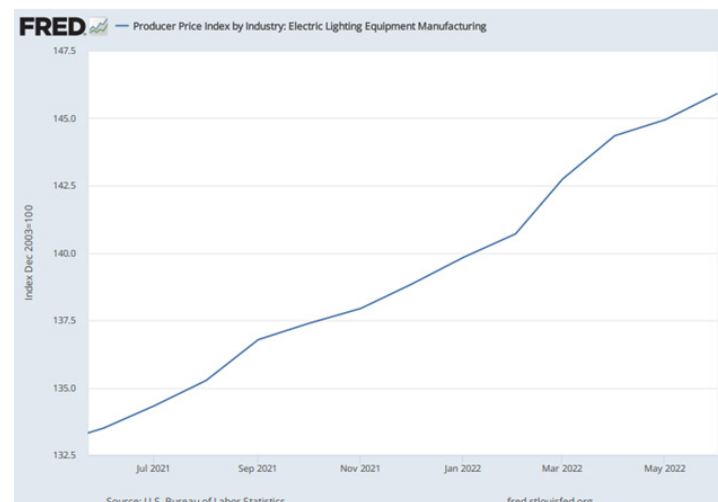
PPI increased 5.12% from 1/1/22-6/30/21

Manufacturers have raised LED fixture price by 2-8% and LED drivers by 9% since Q1 of 2021

China produces about 51% of U.S. LEDs; their shutdowns have affected the supply

COST/SCHEDULE DRIVERS

Global demand for LED lights has been growing for the past 10 years, as environmental initiatives, environmental mandates and energy efficient products have gained popularity; subsequently, when supply chain issues affect a growing industry, extensive delays and price increases are felt



> CONCRETE

CURRENT STATE

Concrete products have experienced a 13.6% increase Y over Y (6/21-6/22)

Cement plants experiencing outages due to the inability to source replacement parts

According to one of our subcontractor partners, cement prices are up 15% annually, while the industry trends are regularly 1-2%/ year. In addition, slag cement, a byproduct of smelting steel, has experienced a 25% increase due to the energy costs to procure it.

COST/SCHEDULE DRIVERS

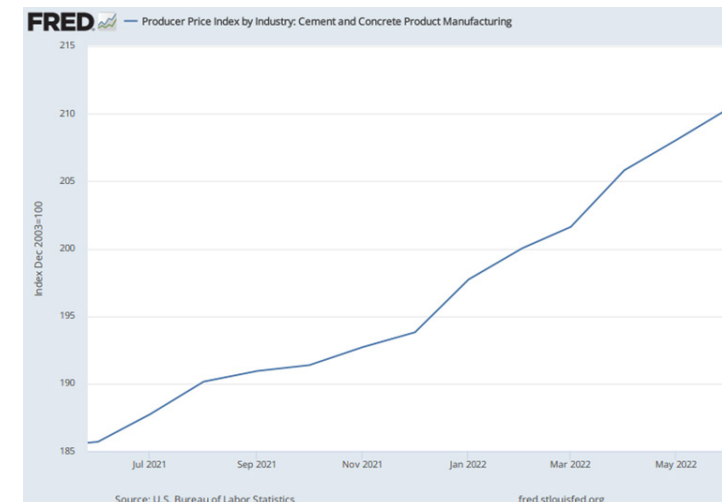
Precast concrete is likely to experience longer lead times and higher prices than place concrete due to the multiple steps in its supply chain

While the physical material is cheaper for cast in place concrete, the amount of labor required in the pouring process often off sets possible savings

Increased prices of coal, oil, and electricity

New environmental concerns regarding the source of sand/gravel deposits has limited the permitted sources of sand and gravel

Rapid infrastructure growth/development is causing a high demand for concrete



> INSULATION

BATT INSULATION

CURRENT STATE

16% PPI increase from 6/21-6/22

10-12% price increase announced and became effective 6/1/22

Insulation is currently on allocation

COST/SCHEDULE DRIVERS

China's fiber glass production

The demand for insulation has increased due to environmental initiatives, rising energy costs, and energy efficient construction projects; thus, more insulation is used at each job, and higher quality insulation is in higher demand due to its insulating efficiency

Production costs have experienced increases due to energy cost increases; glass production is an extremely energy intensive process, using both electricity and natural gasses; scarcity of energy has caused sharp price increases in the fiber glass production process

Glass raw materials price increases; sand, soda ash, and lime, the main components of glass have experienced drastic price increases in recent months mainly due to the elevated energy prices involved in mining and transporting material, but also due to environmental initiatives

> ROOFING MATERIALS

ROOFING INSULATION (RIGID)

CURRENT STATE

Lead time is 9 to 12-months as opposed to 3 to 6-months pre-pandemic

Manufacture price increases of 8.5-10% effective 6/1, 7/1, and 8/1

8.5% increases effective 9/1/22 on Polyiso Roof Insulation

Polystyrene foam products PPI increased 21.43% increase 1/1/22-6/30/22

COST/SCHEDULE DRIVERS

Petroleum byproducts make up RIGID insulation; subsequently, raw material prices experienced sharp increases, which drastically effected the manufacturing cost of RIGID insulation



RUBBER ROOFING PRODUCTS

CURRENT STATE

Synthetic rubber PPI has increased 8% (1/1/22 – 6/30/22)

Many suppliers currently have rubber roofing products on allocation

COST/SCHEDULE DRIVERS

High demand because of its affordability and durability

Rubber roofing products are exclusively synthetic rubbers, made up of a combination of petroleum byproducts; as a result, sourcing synthetic rubber has been a challenge, leading to price increases; in large part this is due to the Russia vs. Ukraine conflict, and its implications on the oil/petroleum industry; rubber roofing main components; EPDM, carbon black, and extending oils all come from the refining of petroleum, causing drastic price effects and shortages of raw material

Petroleum refining capacities shrank and never bounced back after COVID-19; the United States refining capacity shrank from 18.976 million barrels per day to 17.944 million barrels per day; refineries permanently closed or changed function due to the market shifts originally presented by COVID-19; subsequently, supply of petroleum products is extremely tight, and prices and sourcing problems follow



Petroleum refining capacities shrank and never bounced back after COVID-19; the United States refining capacity shrank from 18.976 million barrels per day to 17.944 million barrels per day.

ASPHALT

CURRENT STATE

Prepared asphalt prices have increased 22.2% Y over Y (6/21-6/22)

Bitumen, a byproduct of oil has experienced a significant shortage and price increase (28.55% 1/1/22—7/22/22)

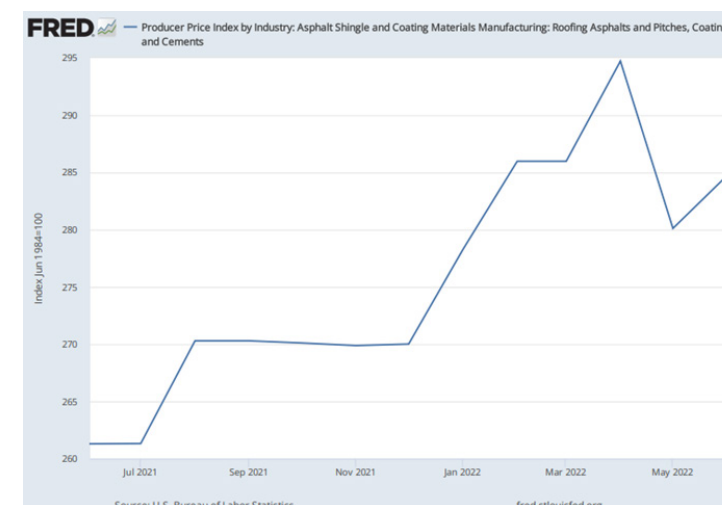
COST/SCHEDULE DRIVERS

The supply issues and price increases for petroleum products, due to the Russia vs. Ukraine conflict have created severe volatility in asphalt prices

Port congestion

Labor shortage

Increased energy prices



> LUMBER

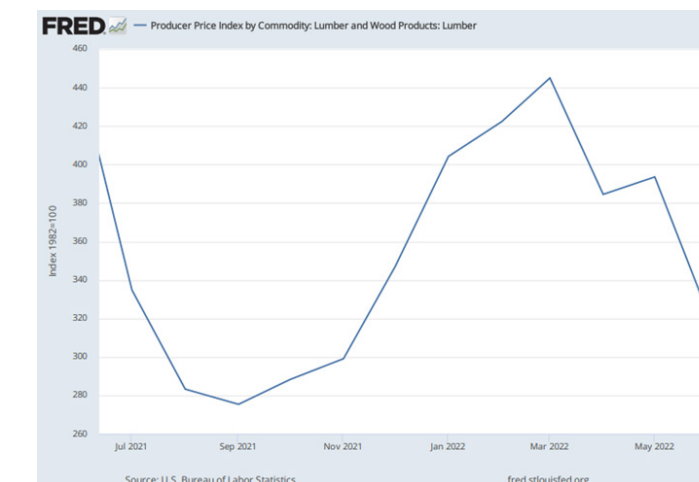
CURRENT STATE

Lumber has experienced a (57.43) decrease in prices Y over Y (12/31/21-8/4/22)

COST/SCHEDULE DRIVERS

The rising federal interest rate has assisted in reducing the price of lumber; due to increasing interest rates, and inflation, the U.S residential housing boom has slowed; subsequently, residential construction has slowed as well, leaving saw mills with excess supply; lumber mills order are shrinking, while saw mills are cutting prices in order to move supply on hand

When COVID-19 initially broke out, it caused manufacture shutdowns, supply chain issues and at home, do it yourself construction projects to reach a peak; due to demand, lumber prices reached record levels; subsequently, investments flowed into the lumber industry, in hopes of increasing industry capacity by 25%; now, removed from much of the uncertainty presented by the pandemic, and with the industry investments improving capacity, lumber prices are approaching pre-pandemic levels



WOOD PANEL

CURRENT STATE

12.06% PPI increase

Decreasing lumber prices are offset by the low resin supply and high prices

COST/SCHEDULE DRIVERS

Lumber capacity has increased, following industry investments after COVID-19 caused lumber prices to spike; demand has also decreased due to rising interest rates and the slowing of construction project starts

Surging petroleum prices had a trickledown effect on the wood panel market; petroleum-based resins experienced a supply shortage, leading to higher prices for manufactured wood panels

> ALUMINUM WINDOWS & CURTAINWALL

CURRENT STATE

Flat glass manufacturers have experienced 30-40% increases with 2 days' notice (June 2022)

Curtainwall material lead times 10 to 15-weeks, then it must be manufactured, additional 4 to 5-weeks to get materials to the site

Aluminum clad windows lead times are 22 to 52-weeks

The PPI for sand has increased 7.07% from 1/1/22—6/30/22

According to one of our subcontractor partners, aluminum used in curtainwall has experienced 50% increase in the past 12 months. Additionally, 2 years ago, ¼ inch tempered glass was around \$2.50/SF. Today, it is quoted at \$6.55/SF.

COST/SCHEDULE DRIVERS

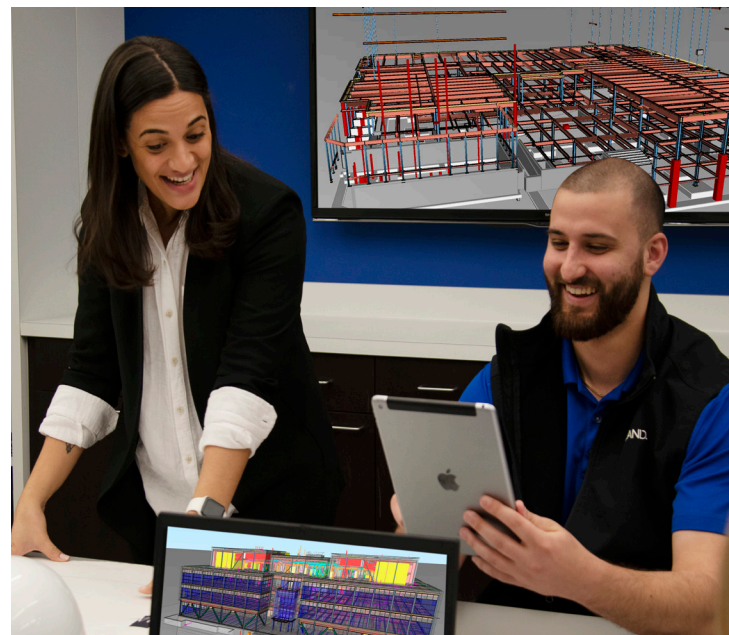
The prices of the main components of glass (sand, soda ash, and lime) have all increased due to the elevated energy prices involved in mining and transporting material as well as environmental initiatives

Port congestion

Labor shortage

China's prolonged lockdown of Shanghai

MITIGATION STRATEGIES FOR CONTRACTORS & OWNERS



This information was formulated based on current market research and extensive conversations with our subcontractor base. As cost and product availability fluctuates without near-term signs of relief, we continue to investigate various mitigation efforts. They are as follows:

- Expedite critical early release packages (shop drawings)
- Encourage architect/engineers to check availability and lead-times of specified products before contract documents are finalized
- Encourage owners to engage CM/GC early in preconstruction to strategize, identify, and secure long-lead items; a lump sum GC bid process loses valuable time versus a CM GMP process where supply chain issues can be mitigated during preconstruction

- Partner with key subcontractors/manufacturers early in design to help expedite design, submittals, shop drawing/approval process, procurement, and delivery/install
- Award scopes of work to subcontractor market as quickly as possible to lock in production and pricing
- Stay on top of getting submittals right after award and hold design team (and others) accountable to the agreed upon review and approval times to expedite official release of materials
- Confirm subcontractors have secured material and equipment orders
- Visit subcontractor production facilities
- Take delivery of materials early; find space onsite or coordinate for offsite storage; it is critical to have 100% control of the materials needed for the project
- Encourage subcontractors to have contingency plans for picking up materials from manufacturers/suppliers
- Encourage project stakeholders to be flexible and open to modifying the project's design

FUTURE FORECAST & CONCLUSION

*The Associated General Contractors (AGC) recently published an **Inflation Alert** to its membership. The AGC stated that "Several recent developments have raised the specter of a sharp slowdown or even a recession in the U.S. economy. Inflation is at a 40-year high, sapping consumers' purchasing power despite elevated wage increases. Major stock indexes have declined sharply—a frequent but not foolproof harbinger of recession. A growing number of companies have announced layoffs, although the job market remains vibrant, as indicated by large monthly employment increases, near-record job openings, and a persistently low unemployment rate. However, a recession is far from certain. Demand for infrastructure, manufacturing, and power construction appears to be strong and likely to strengthen further, perhaps for several years to come. In any case, the cost of construction materials and labor does not generally move in sync with the overall economy. In short, owners should not assume that delaying projects will enable them to avoid volatility and disruptions in construction costs, delivery times, and labor supply, even if the economy slows significantly."*

The construction industry is in the midst of a period of exceptionally steep and fast-rising costs for a variety of materials, compounded by major supply-chain



disruptions and difficulty finding enough workers—a combination that threatens the financial health of many contractors. Contractors and subcontractors may be taking on some of the risk holding material prices in order to make the projects "pencil out" and commence. Some subcontractors may already be building contingency dollars into their estimated material and labor increases costs to account for mid-project price spikes. Most will not hesitate to rescind their proposal or increase their prices prior to award. General Contractors are focused on getting owners to GMP as quickly as possible and locking in the proposed subcontractor rates. Doing this allows the project team to commence the procurement process and buyout materials before prices continue to climb. Owners need to factor in the new inflationary reality and support expedited procurement, appropriate adjustments to design, the potential for delayed completion dates due to material availability, and the potential impact on project budget to accommodate or work around these impediments.

Materials prices and availability do eventually reverse course and plateau or at least become more stable. Until then, cooperation and communication can help reduce the damage during this unprecedented time.

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