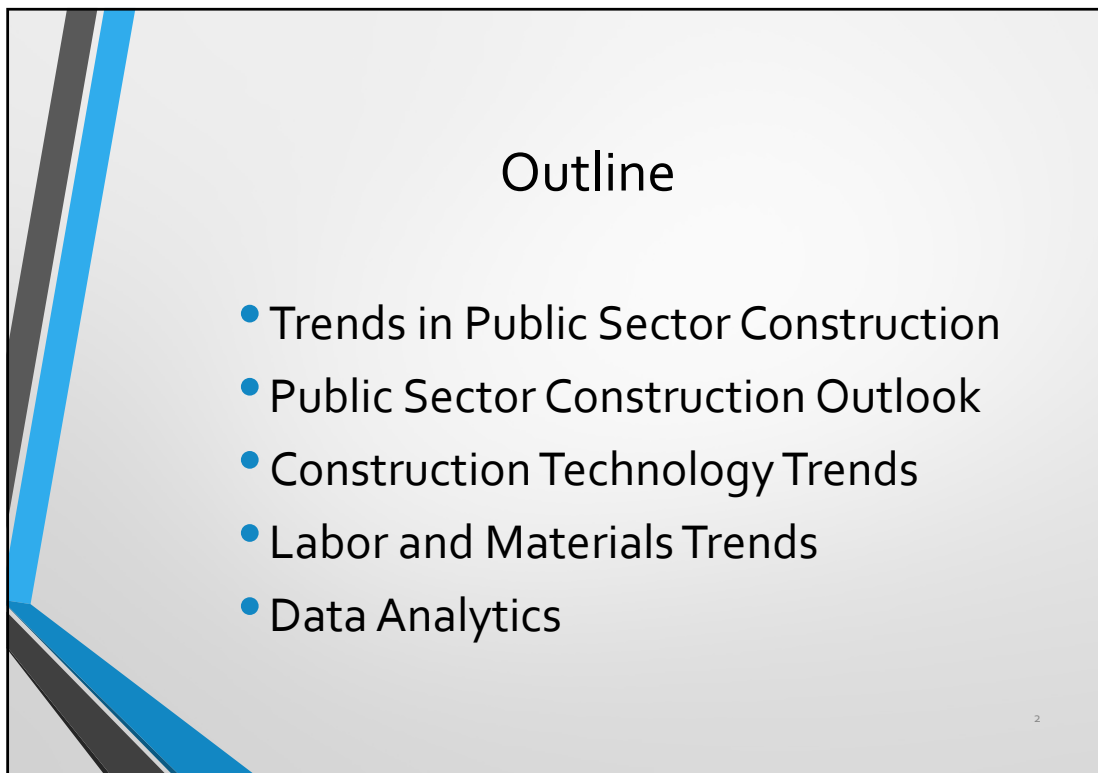




**Public Sector Construction Industry Trends &
Data Analytics in Construction Audits**

National Association of Construction Auditors
7th Annual Conference
South Lake Tahoe, California
September 17-19, 2018

Adam Rouse | BKD, LLP



Outline

- Trends in Public Sector Construction
- Public Sector Construction Outlook
- Construction Technology Trends
- Labor and Materials Trends
- Data Analytics

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Trends in Public Sector Construction

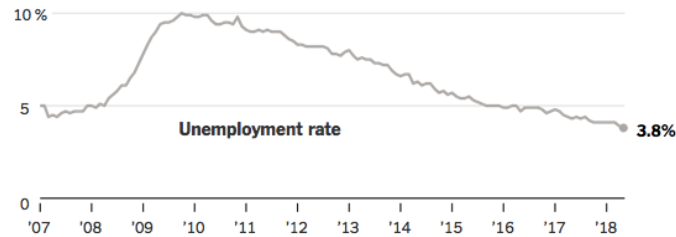


State of U.S. Economy

- Positive
 - Unemployment low
 - Low inflation
 - Soaring stocks
 - Low interest rates
- Negative
 - Bond market
 - Moderate economic growth

Job growth is strong, but wage growth is sluggish

U.S. job growth is strong, with the unemployment rate falling to an [18-year low of 3.8% in May](#). That means it is at its lowest since the days of the [dot-com boom in early 2000](#). It also matches the [lowest rate in half a century](#).



Source: Bureau of Labor Statistics

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- Economy slowdown
 - **risk of an economy-wide recession soon, slim likelihood of a significant acceleration in growth**. The consensus is that our economy will grow in the 2.0 percent to 2.5 percent range through the end of 2018. The Federal Reserve Board is in the midst of an interest-rate tightening cycle, which will serve to limit economic growth.

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- Industry Concerns

- **Rising materials costs** are a more immediate concern than rising interest rates. Over the past year, **oil-related products** (diesel fuel, asphalt) have been **rising at a 20 percent pace**, metals (steel, copper, aluminum) at a 10 percent pace, and other basic building commodities (cement, gypsum board, lumber and plywood) at a high single-digit pace.

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- Labor

- Labor is another ongoing problem affecting the industry. With the **unemployment rate in the construction industry falling from around 20 percent** in 2010 to much closer to the overall unemployment rate in our economy at present, there are limited options for attracting labor into the industry. A **particular concern** is that **immigrant labor accounts for close to 30 percent of the construction labor force**, with most of these being Hispanics, and the recent focus on immigration could limit the availability of this labor pool.

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What's going on?

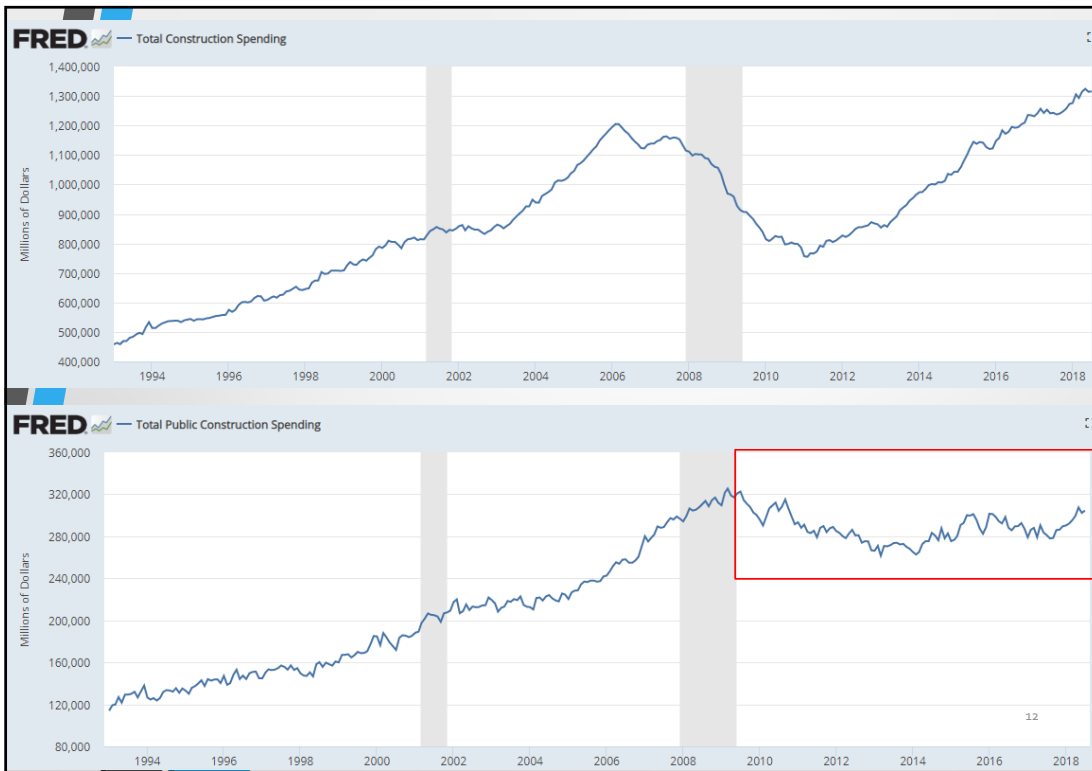
1. Collaborative project delivery methods becoming popular
2. Labor shortage will continue to plague the industry
3. Offsite/modular construction will gain popularity

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Public Sector Construction Outlook

- Positive
 - Booming private sectors
- Negative
 - Flat, but consistent public sector
 - Lack of skilled workers
 - Labor shortage
 - Cost escalation (low margins)

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Healthcare

- Uncertainty around federal health care policy continues to delay capital investments. Due to the repeal of the Affordable Care Act, providers anticipate an **increased number of uninsured patients, cutting into profitability.**
- Overall **movement away from large-scale** new hospital investments with an emphasis on expansions and renovation projects.

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Education

- The tax overhaul is expected to positively impact both public and private education markets.
 - Public markets will benefit through the **continued tax-free status of private activity bond financing**
 - Private markets will benefit from **new streams to fund private school tuitions**
- There are potential risks for reduced state and local funding into public schools as well as decreased donations toward colleges.
- K-12 enrollments are seen increasing in more than half of the states.
- Increased use of flexible space to accommodate year-round schools.

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Public Safety

- Similar to education markets, the broader public/government sector spending will benefit from the **uninterrupted flow of private activity bond financing under new tax reform**.
- **Overcrowding** in correctional facilities is a national issue. **State and local governments are facing significant fiscal constraints**. However, ongoing and increased interest in **privatization** of facilities can be expected under current administration.

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Transportation

- Airports estimate over **\$100 billion in infrastructure needs** over the next five years, 60 percent of which will be financed through private activity bonds. The **corporate tax rate reduction is expected to incentivize spending** towards engineering and construction, equipment and jobs.
- Airports are planning for the accommodation of new wide-body aircraft through larger terminals, storage facilities, and other related structures
- There is much-needed repair underway at hurricane-damaged ports; largely driven by government spending.

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Power

- Capital spending will continue to be directed towards **electric and gas transmission and distribution infrastructure** because of national renovation requirements, increasing use of distributed energy resources (DERs) and shifting dynamics in generation sources (e.g., natural gas and **renewables**).
- The outlook for the natural gas transmission and distribution investment is strong. **Natural gas-fired power plants are the primary source of any new utility-scale generating capacity.**
- The 2017 tax restructure maintained favorable renewable energy tax credits and boosted FMI's outlook towards wind and solar project spending.

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Highway and Street

- Federal funding is expected to remain flat/slight uptick for the coming year period, and **states are increasingly pushing for higher gas tax and user fees in order to increase revenues.**
- Projects generally are becoming larger and more complex while state agencies struggle to maintain a limited pool of resources. As a result, **alternative delivery methods (e.g., design-build) continue to gain traction**, where much of the project management and oversight can be outsourced. Private interest and financing tools are available, but various hurdles continue to weigh on **P3 investment opportunities.**
- Electric and autonomous vehicles continue to push boundaries in this space, creating both disruption as well as new opportunities.
- Current administrations focus on aging infrastructure.... Over **\$1trillion** discussed.

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Sewage and Waste Disposal

- Spending is directed at compliance, leaving limited resources to plan, build, maintain or improve infrastructure. Local governments are caught in an unsustainable financial situation resulting from eliminated or reduced federal assistance, but maintained mandates and regulations.
- There is continued uncertainty around the Trump administration's plans and decisions for the EPA.

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Water Supply

- Similar to sewage and waste disposal, funding and resources needed to plan, build, maintain or improve **infrastructure are crippled by an unsustainable financial situation.**
- Many anticipate technology advancements will aid in supply constraints, including **connectivity and monitoring solutions for resources** and asset management (e.g., smart irrigation, visualization) as well as increased reuse opportunities and projects to help meet high-capacity industrial needs.

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Education

- The construction of education facilities has faced **challenges** often resulting from the *decline of property values during the last recession*, and therefore declining property taxes to fund these new facilities. **Property values have recovered** in many markets across the country, **issues around basic demographics are at the forefront**.
- Demand for facilities at all education levels nationally has been declining.
- Education will continue to be a healthy construction market, but growth opportunities are hampered by demographic trends.

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Construction Technology Trends

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IoT Revolutionizing the job

Internet of Things

- Equipment
- Employee tracking
- Wearables
- Drone surveying

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Data Security / Protections

"...many contractors still lack standards for evaluating, managing, and protecting sensitive company information..."

CFMA

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Examples of Sensitive Information

- Financial statements
- Statement of cash flow
- Local, state, and federal tax information
- Gross margin reports
- Job profitability analysis
- Forecast margin amount and percentage
- Margin erosion
- Shipping, route, and delivery information
- Building and equipment maintenance
- ERP and payroll
- Employee and dependent benefit data
- Design specifications
- Price lists
- Manufacturing control systems
- Computer-aided design
- Architectural drawings and blueprints
- Project management details
- Jobsite details
- Work backlogs
- Resources commitments vs. availability
- Professional licenses, certifications, trade, and union
- Real estate inventory, permits, rent, and occupancy

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Google excel error cost

All Images Shopping Videos News More Settings Tools

About 46,500,000 results (0.47 seconds)

Costly Excel Errors – **\$24 Million** overspent by a Canadian firm was due cut-and-paste error. A dividend estimate was found to be off by **\$2.6 BILLION** dollars. Due to a missing minus sign on a capital loss line item. Fannie Mae discovered a **\$1.1 BILLION** dollar error due to 'honest mistakes' in a spreadsheet. May 12, 2016

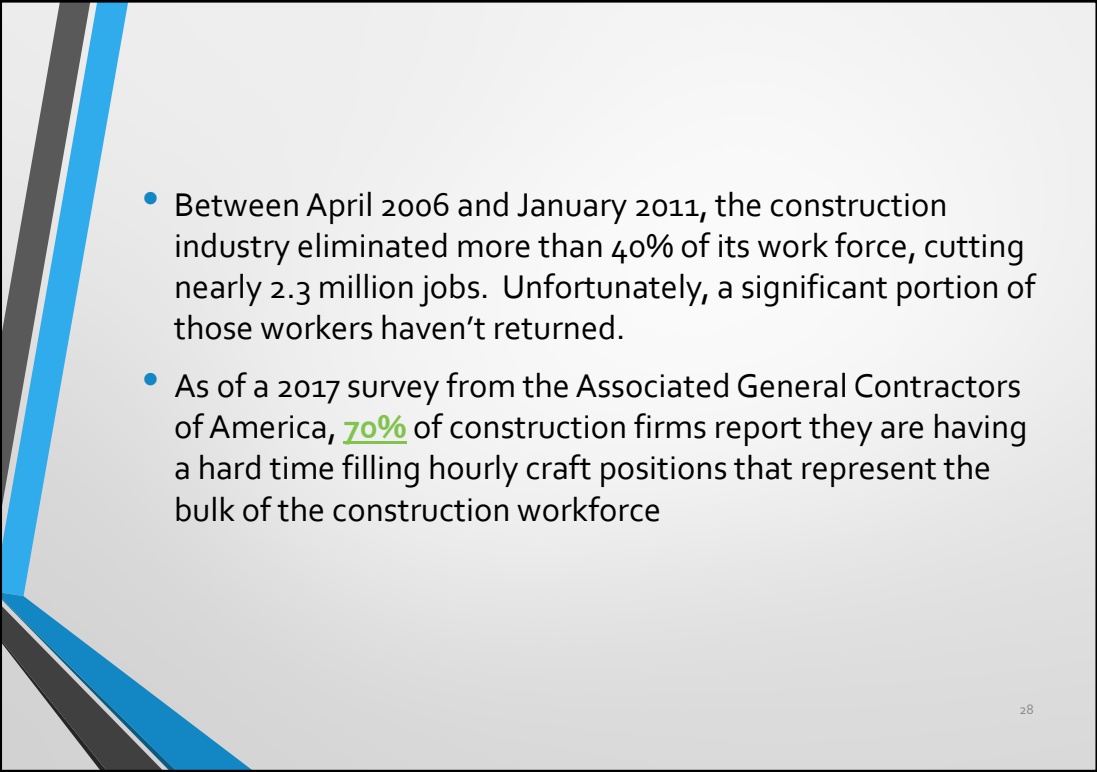
Billion Dollar Excel Errors Make You Think Twice - Centage Corporation
<https://www.centase.com/billion-dollar-errors-from-spreadsheets/>

About this result Feedback

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Labor and Material Trends

- 
- Between April 2006 and January 2011, the construction industry eliminated more than 40% of its work force, cutting nearly 2.3 million jobs. Unfortunately, a significant portion of those workers haven't returned.
 - As of a 2017 survey from the Associated General Contractors of America, **70%** of construction firms report they are having a hard time filling hourly craft positions that represent the bulk of the construction workforce

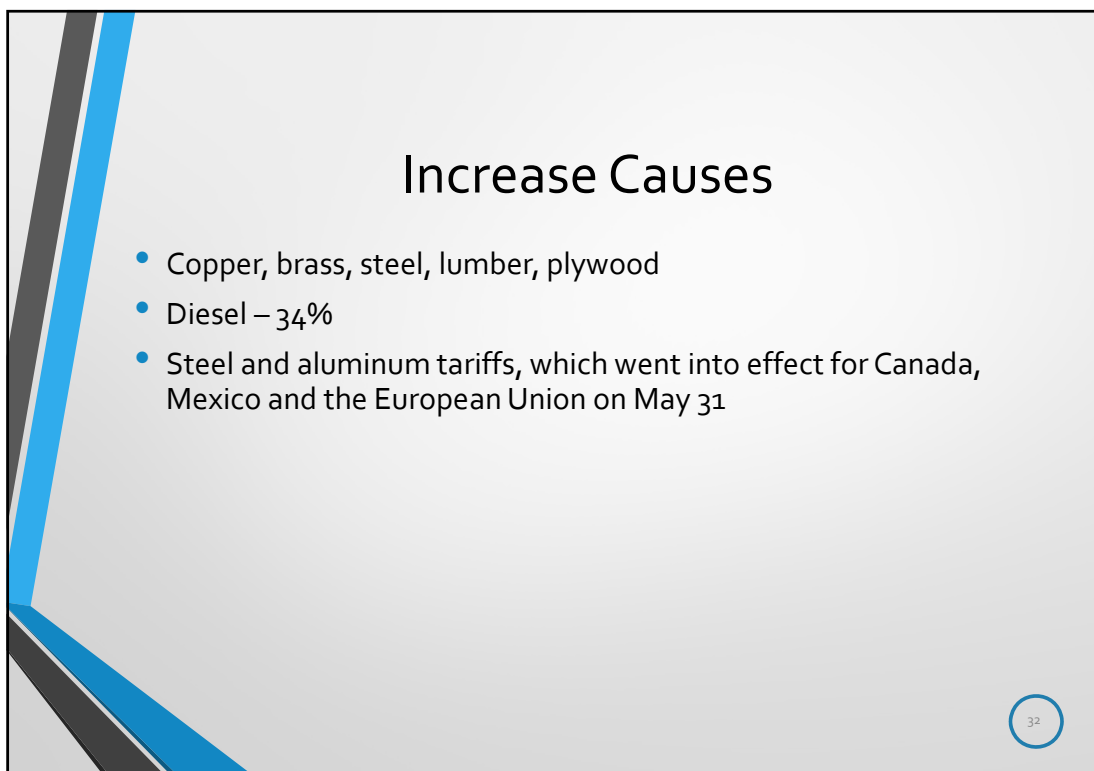
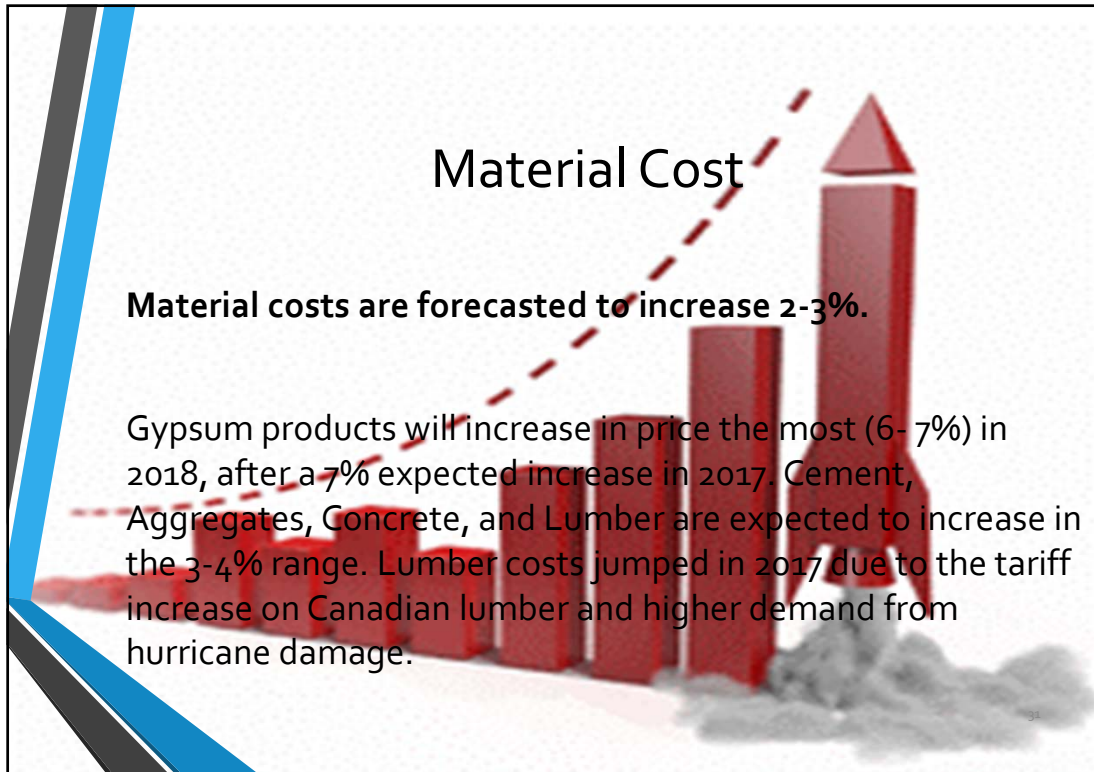
- “In the short-term, fewer firms will be able to bid on construction projects if they are concerned they will not have enough workers to meet demand,” said Stephen Sandherr, chief executive officer for the Associated General Contractors.
- “Over the long-term, either construction firms will **find a way to do more with fewer workers** or public officials will take steps to encourage more people to pursue careers in construction.

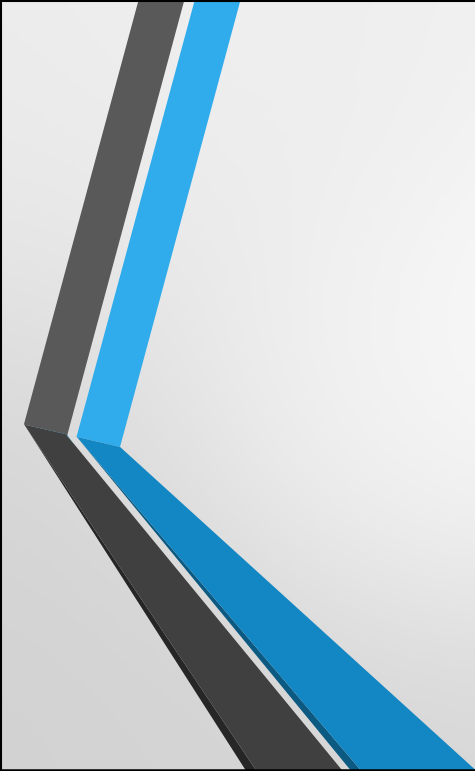
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The replacement of many manual workers by robots will most likely create a demand for a new type of workforce in construction.







Data Analytics



Contract Risk Assessment

- Contract length
- # of change orders
- Number of sub contractors
- Type of construction project
- Vertical vs horizontal

Internal & External - *Uses of Data*

Internal


- Risk prediction & analysis
- Evaluate performance
- Fine tune bids/pricing

External (Auditing)

- Trends with project/ contractors/ subcontractors
- Pinpoint financial milestones
- Change order analysis
- Duplicate vendor/payments
- Track certain elements of the projects


Cost & Time Schedule

- Past Performance
- Future Cost index
- Weather (past & future models)
- Type of Work
- Risk Forecast

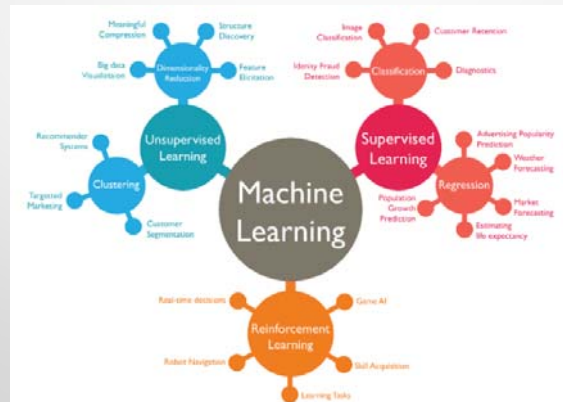


Common challenges:

- Multiple data systems (older & newer)
- Variety of contractors & sub contractors
- Paper based
- Lack of system connectivity



Machine learning & artificial intelligence



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- Data standardization (forms/ format)
- Contract reading software
- Online portals
- Use technology to read the unreadable

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Outputs

- Dashboards
- Better management reporting
- Helpful data

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Want more information?

Examples of dashboards, custom tailored reports, and other data visuals

Walkthrough some of the tools utilized & understand how data flows into models & assumptions used.



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Conclusion

- 👍 General outlook in public sector is positive
- 👍 Adoption of new technology (big data, artificial intelligence, robotics, software) is taking place
- 👎 Labor shortage and increasing costs for industry will continue to be a challenge