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### PUBLISHER

Tall Timber Group www.talltimbergroup.com

#### EDITOR

Jeff Burd 412-366-1857 jburd@talltimbergroup.com

#### PRODUCTION

Carson Publishing, Inc. Kevin J. Gordon

#### ART DIRECTOR/ GRAPHIC DESIGN

Carson Publishing, Inc. 321Blink

CONTRIBUTING EDITORS Anna Burd

#### CONTRIBUTING PHOTOGRAPHY

Peter Aaron Denmarsh Photography Construction Robotics Tall Timber Group Master Builders' Association of Western PA

#### ADVERTISING DIRECTOR

Karen Kukish 412-837-6971 kkukish@talltimbergroup.com

#### MORE INFORMATION:

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# PUBLISHER'S NOTE

e afraid. That seems to be the underlying message broadcast to us today. The images and words coming to us from television and the displays of our digital devices bombard us with things to fear. Bombings. Russians (again). Religious zealots. Vaccines. Climate change. Democrats. Republicans.

It takes a lot to step back and research the facts. Perhaps because this is a presidential election year like no other in modern times, there has been an increase in the amount of information being broadcast about the world that is misleading or flat out wrong. For a lot of people, trusted information sources are judged by how much the information reinforces their view of the world. Checking other sources might lead to upsetting information and most of us aren't looking to have our world view upset – even by the facts. Heck, it's difficult just to try to find information sources that are objective if you wish to search. We live in a time when information seems to come at us like water from a fire hose.

The value of finding out the facts is that the truth is frequently more comforting than the hype. Of course, what we know to be the truth today is often only true for a while. I'm not talking about values or physical laws here, but rather how we think the world works.

One of the truths that I think falls into this category is the idea that "high-paying manufacturing jobs" can be somehow created or returned to America. It truly surprises me when I hear someone from Pittsburgh lament the recent loss of manufacturing jobs, given that the region suffered the loss of hundreds of thousands of those kinds of jobs 30 years ago. There is a myth underlying the concept of the high-paying manufacturing job. Those jobs last only as long as it takes for manufacturers to find places where they can create low-paying manufacturing jobs.

Finding cheaper labor isn't entirely the fault of the manufacturers. We tell them to do that every time we buy an appliance for half what our parents paid for one. Americans love to consume and apparently they love bargains. Mostly they love to buy stuff that Americans can't make for the prices that Americans want to pay. I can get a toaster at WalMart for \$11.99. That's not a toaster American workers can profitably make.

But the myth isn't really that Americans can't make what Americans buy. It's that the dynamics of industrialization are somehow different in America from the rest of the world. When the industrial revolution happened, there was a lot of brain power in the U.S. that drove innovation but it's easy to forget that American labor was also plentiful and cheap (remember immigration?). We also had cheap energy and lots of resources. The same was true later for Japan and now for China. Like the U.S., as its workers prospered each of those countries lost manufacturing jobs because the workers couldn't add as much value to the products as their wages required.

Manufacturing jobs usually go away because most are routine and can be easily learned. Many jobs go away because their function can be automated. An older friend of mine describes the situation in America by saying that "workers should have known it was coming when they were promised a job for life that they could learn in a week." That's not a recipe for adding value.

Construction is different from manufacturing but there is a technological revolution coming that threatens to make many construction jobs obsolete. Machines are being taught to do things that humans have done up until now. Moreover, machines are now learning for themselves. Artificial intelligence allows machines to recognize objects and patterns easily and the advances in AI are breathtaking. For that reason, it's easy to imagine a not-too-distant future where machines are making many of the decisions in the construction process. It's interesting to note that the threat isn't to blue collar workers; it's to workers who do routine tasks.

That means the carpenter, design architect, project management secretary and superintendent are probably safe. Less so are the draftsperson, spec writer, take-off estimator or even the project manager.

We are a ways off from having AI making field decisions about a detail or robots banging together wall sections; however, using AI to do clash detection and lay out the building systems instead of an engineer isn't so farfetched. If a robot can pick your book order from Amazon's warehouse, can't one pick the metal studs and drywall for the next run of wall?

It's a natural human reaction to resist change. That's especially true when change is likely going to cost somebody their job. It will be a challenge for the industry to adopt revolutionary technology without creating unemployment. There will also be some failures along the road to adopting new technology. That won't stop the process. At the end of the day, the tasks that can be automated or made foolproof will be. Market pressures on costs, safety and workforce will drive the technology to do so. Whatever changes occur, construction will be better for them and they will create opportunities for humans to advance.

The blacksmith's loss was the steel industry's gain. The sharecropper's loss was the farmer's gain. Throughout history, when machines have replaced workers it was disruptive for the workers for a time; but the disruption moved all of society ahead and gave disrupted workers an opportunity to learn new skills, which moved them ahead. Embrace the change that is coming.

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## REGIONAL MARKET UPDATE

Through three quarters of 2016, the construction market in Pittsburgh has been something of a pregnant pause. On the heels of high levels of design activity, construction should have been sparked by the June announcement by Shell regarding the Monaca polyethylene facility. While the announcement seemed to spur development interest, the months since then have been marked by anticipation of what is to follow but not much in the way of projects to build.

Economic data for the year-to-date is also somewhat sluggish. Total employment in Pittsburgh remains near all-time high levels, although the number of jobs fell by 0.2 percent in August compared to August 2015. The good news is that unemployment has continued to rise at the same time the total number of jobs has increased. That's a result of more workers entering the market. Given Pittsburgh's aging demographics and the fact that the employment story has been positive here for six or seven years, an increasing workforce is more likely to be due to net immigration rather than discouraged workers returning to a job search. Considering the long lag in the Census Bureau's methodology, this hypothesis will be difficult to verify any time soon but an extended period of increasing workforce participation will be important to meeting the region's future workforce needs.

Several other metrics are negative for Pittsburgh, owing mostly to the decline in the energy sector since 2014. According to Pittsburgh Today, wages were down 5.8 percent through the first quarter of 2016 (the most recent quarter measured) and bankruptcy filings were up 2.6 percent during the same period. Both of these measures were dampened by the slowdown in the gas and coal industries.

The local housing market is holding its own, defying the downward trend in apartment construction in the larger U.S. market. In part, the relative strength of apartments in Pittsburgh is due to the reality that a "boom" in this region accounts for only 1,000 or so more units than in an average year. But there is also anecdotal evidence that the multi-family market has not softened as much in Pittsburgh as in other markets. Absorption remains strong in the urban market – where most of the starts in Pittsburgh have occurred. In the suburbs, rents have softened and new construction seems to be limited to exceptional locations, such as the areas within ten minutes drive of the Shell petrochemical plant.

From January through September 2016 there were permits for 3,778 housing units, an increase of 3.6 percent over the same period in 2015. Of that, 1,512 units of single-family detached housing were started; 557 units of attached townhomes or other single-family units were started; and 1,709 units of multi-family were permitted. The volume of the market segments through three quarters of 2016 was similar to the activity in 2015, with construction of all single-family units down 1.1 percent overall and multi-family starts up 10.3 percent.

Looking forward, the market for single-family housing seems to be reaching a tipping point but signals that pent-up demand is ready to drive double-digit growth in new construction have existed for several years.

Municipality	#SFD	#SFA	Total
Single-Family Detached			
Ohio Township	76	18	94
South Fayette Township	76	6	82
Collier Township	72	4	76
Pine Township	68	9	77
Cranberry Township	64	66	130
Adams Township	55	44	99
Moon Township	54	31	85
North Huntingdon Township	50	10	60
Cecil Township	46	23	69
North Strabane Township	46	8	54
Single-Family Attached/M-F			
Pittsburgh	44	994	1038
Bethel Park	32	440	472
Robinson Township	9	168	177
North Fayette Township	40	128	168
Cranberry Township	64	66	130
Total Pittsburgh MSA 2016:3	1,512	2,266	3,778
Total Pittsburgh MSA 2015:3	1,419	2,229	3,648
% Change	6.6%	1.7%	3.6%
By County	SFD	SFA	Total
Allegheny	785	2023	2808
Beaver	62	6	68
Butler	290	153	443
Fayette	45	0	45
Washington	181	40	221
Westmoreland	149	44	193

The start of construction on four new apartment projects pushed the number of housing starts slightly higher than through three quarters of 2015. Source: Pittsburgh Homebuilding Report.

Several factors appear to be setting the table for a surge in the next couple of years. The pace of development has increased and the number of lots in the entitlement process is higher, perhaps ending the lot shortage that has existed over the past decade. This trend will need to continue into 2017 and 2018 to support significant new construction growth. Secondly, the pipeline for apartments is smaller than at any time in the past six years, signaling that the stagnation in absorption in many of the submarkets is being recognized. Finally, the volume of sales is growing at twice the rate of new listings of existing home sales. According to West Penn Multi-list, sales volume through September was up 2.28 percent, while the number of homes sold rose 2.25 percent. The average sales price jumped 2.38 percent but new listings increased only 1.15 percent.

There are no good metrics that exist at the metropolitan area for forecasting when the short supply of existing homes and saturation of apartment units triggers a surge in new home construction. New construction has typically been the relief valve for a tight market but lacking buildable lots, Pittsburgh new home construction market has been restrained. Predicting

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the demand cycle is a matter of factoring employment, household income and market supply to judge the imbalance. Given that, 2017 should see new construction accelerate.

Figure 3: Under Construction

Source: CBRE Research, Q3 2016.

#### Figure 4: Asking Lease Rates



Heightened investor interest and major lease renewals helped push asking rents in Pittsburgh to an all time high in the third quarter. Source: CBRE.

Nonresidential and commercial construction in the sevencounty Pittsburgh metropolitan statistical area (MSA) totaled \$3.02 billion through September 30. That's an increase of 7.9 percent over the same period of 2015. It's worth noting that last year's volume through September was 45 percent higher than the volume in 2014.

Like in 2015, construction volume is being driven by a small number of large energy projects. Construction of the Tenaska combined-cycle power plants in South Huntingdon Township in Westmoreland County and the Revolution cryogenic processing plant in Smith Township – each worth roughly \$500 million – added significantly to the construction totals. Not yet in the totals are half-dozen new or expanded compressor stations, which are scattered across western Washington County in various stages of planning.

Shell's project, on the other hand, has added little in the way of new contracting in 2016. Since the final investment decision, a major concrete package has been awarded and a fivebuilding package of support buildings has been bid (and not awarded at the time of this writing), along with a general services package; however, most of the construction activity has been the execution of contracts previously let. Activity at the Monaca project has quickened, however, and that will have an impact on the market. Shell's heightened sense of urgency at the plant may be the reason why the final investment decision by PTT at its proposed site in Dilles Bottom, OH is rumored to be moving quicker. The Thai energy company is expecting to choose an engineering/procurement/construction entity from between Fluor and Bechtel in early 2017.

The strongest sector of the market remains commercial real estate. According to third quarter market reports by major commercial real estate service companies, the Pittsburgh market is seeing high levels of occupancy and rent growth in its two major categories of office and industrial building.

Newmark Grubb Knight Frank (NGKF) characterized both the office and industrial market as unusually active during the summer months, a time when vacations typically grind decision-making to a halt. NGKF reported that office vacancy was 16.2 percent overall, with rents rising to \$22.70 per square foot. The market was supported by net absorption of 183,042 square feet, the third consecutive quarter of positive net absorption of more than 180,000 square feet. CBRE reported rents at \$21.75 per square foot (\$28.32 in the Central Business District) and occupancy at 89 percent.

Helping the office market were the renewal of two major leases over 250,000 square feet. U.S. Steel decided to remain at 600 Grant Street, although with a smaller footprint, and Federated Investors renewed its lease in its headquarters at 1001 Liberty Avenue, which is currently for sale.

CBRE pointed to the influx of investment capital as a significant factor in the health of the Pittsburgh office market. According to CBRE's research, institutional and value-adding investors from gateway cities and overseas have looked at Pittsburgh to buy Class A buildings or to buy legacy buildings that could be upgraded to Class A. This market activity has resulted in the repositioning of several buildings, including the iconic Union Trust Building and PPG Place. Shorenstein Properties, from San Francisco, is currently in the process of investing \$80 million or more to update One Oxford Centre and Pearson Partners is expected to do the same with 525 William Penn Place. The invest-and-improve strategy has resulted in rent increases of between 15 and 20 percent after renovation. As the cycle of increases begins to push new rents well above \$30 per square foot, however, Pittsburgh's Downtown market will be tested.

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105 Brilliant Avenue · Aspinwall, PA 15215 412.784.1385 · workwear.aeconlinestore.com Industrial properties were also attractive for investors during the first nine months of 2016 and, like with the office market, absorption of new construction was faster than expected. This was especially true in the western suburbs and Airport Corridor, where nearly one million square feet of new construction has been under construction during the past year or so.

NGKF showed 8.4 percent of an overall inventory of 133 million square feet vacant and an average rental rate of \$4.79,



300,000 0 -300,000 3Q11 3Q12 3Q13 3Q14 3Q15 3Q16

#### **Market Summary**

	Current Quarter	Prior Quarter	Year Ago Period	12 Month Forecast
Total Inventory	133MSF	133MSF	125MSF	Ŷ
Vacancy Rate	8.4%	8.2%	8.0%	$\mathbf{+}$
Quarterly Net Absorption	423,939	378,550	-257,217	Ť
Average Asking Rent	\$4.79	\$4.79	\$4.76	1
Under Construction	624,000	1,016,374	1,486,200	1
Deliveries	756,374	399,500	0	1

Increased user demand kept the unusual amount of new supply entering the market in 2016 from pushing vacancy higher. Source: Newmark Grubb Knight Frank.

which was unchanged from the previous quarter. Net absorption was 423,939 square feet during the third quarter, strong on the heels of a second quarter during which 378,550 square feet were absorbed. NGKF forecasts improvements in all of the metrics for industrial property in the coming 12 months.

In an inventory of 141 million square feet, CBRE reported a vacancy rate of 7.6 percent and an average rate of \$5.27 per square foot. Its third guarter report showed net absorption

year-to-date of 1,670,449 square feet with 1.26 million square feet under construction.

The outlook for industrial construction should continue to improve beyond 2016, as the supply chain for the Shell cracker project begins to become clearer and whatever downstream manufacturing opportunities are announced. Another big opportunity for industrial development may exist in the construction of fulfillment centers, which have heretofore been located in larger cities or major logistics hubs. The one million square foot project planned for Chapman Westport is proceeding more slowly than initially expected but assuming that it is built - and assuming it is Amazon or some other online retailer - such a project would be proof of concept that the Pittsburgh market is sufficiently robust to warrant such centers. Considering the trend in retail and logistics, construction of such a center should be the first of several such projects.

Bidding activity after Labor Day has been atypical of the normal last-minute push to get work started. Although there has been little evidence that election politics have been a negative influence on activity, owners have not been releasing projects to be started as frequently as in the past. The amount of work in the pipeline and on the boards, however, remains higher than usual.

Contractors reflected these sluggish conditions in the third quarter Commercial Contractors Condition Index (C3), a quarterly survey of general contractors done by the Master Builders' Association of Western PA. After a surge in optimism about future business conditions in the second quarter, the contractors gave the market a 2.38 grade (out of 4.0), or a C+. Respondents cited lower backlogs and less optimism about current conditions.



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## NATIONAL MARKET UPDATE

Economic data from August and September painted a picture of a U.S. economy that remains stuck in a slow-growth cycle, but which is strong relative to its primary global partners. Job creation remains solid given the duration of the business cycle; and related data on wage growth and household incomes suggest that U.S. consumers have less to be concerned about today than even two years ago. Activity by business continues to weaken – albeit slightly – as a strong U.S. dollar, political uncertainty and weak global demand are sources of worry.

Labor markets remain the best source of optimism about the economy. Employment grew by 156,000 jobs in September, according to the October 7 report from the Bureau of Labor Statistics. After revisions were made to July and August job

creation estimates, the September data meant that the monthly job additions during the third quarter averaged 191,000 – higher than the average of 171,000 for the full year to date.

As important as the jobs gained is the increase in average workers' wages, which were up 2.6 percent year-over-year. Labor force participation also improved, with 444,000 more people entering the workforce. The average hours worked also jumped during the quarter. The September report showed a continuation of the upward trend in professional services and healthcare jobs, a possible end to the extended job losses in energy and further declines in manufacturing employment.

The extended decline in manufacturing tends to produce the most headlines and hand-wringing. Output in the U.S. has declined in 13 of the past 17 months. Concerns that the declines are more than cyclical aren't supported by data, however. China surpassed the U.S. as

the leading manufacturing economy in 2010 and outpaces American manufacturing by a three-to-two ratio. Output in China is also weaker, with the Caixan Manufacturing PMI rising above 50 (meaning increasing) since July after 16 consecutive months of decline. Slower demand in Russian, China, Brazil and Europe have slowed manufacturing throughout the globe.

Poor economic conditions abroad have further boosted the demand for and value of the U.S. dollar, circumstances that are great for investment in America but challenging for exporting. That's an additional burden on U.S. manufacturers.

Weaker demand for products keeps market pressure on interest rates low. In concert with the Federal Reserve Bank's

caution about lifting rates too soon, the lack of inflationary pressure from demand makes it easier for the Fed to stay the course of low rates. Feedback from the most recent meeting of the Federal Open Market Committee (FOMC) suggests that rates will get a minimal bump in December. Members of the Fed remain adamant that the committee's decisions will be driven by data, but the conflicting economic data makes no compelling case in one direction or another; and, ultimately, the low unemployment rate seems to be inconsistent with an environment of near zero interest rates.

While rising rates are often a concern for an economic cycle, the current environment has its own flaws. Low rates are a catalyst for development and construction but they also artificially compress capitalization rates, which lead to overvaluation of properties. Low interest rates also artificially increase demand for stocks and other risky investments, especially those made to boost fixed-income investors. Investments meant to throw off income are typically dependent upon bond yields but



U.S. construction activity has recovered to pre-recessions highs. Source: Census Bureau.

those yields are producing insufficient returns in many cases. That pushes demand higher for stocks and other assets not meant for income generation. Such conditions can lead to asset bubbles or sell-offs when rates spike. At the September 21 FOMC meeting, Federal Reserve Bank of Boston President Eric Rosengren voted against waiting further because of concerns about asset inflation. Rosengren commented specifically about commercial real estate when he warned about "potentially increasing financial market imbalances."

On balance, the health of the U.S. economy seems to be supportive of higher interest rates.

In the commercial real estate sector, property values have continued to rise throughout 2016, reaching roughly ten percent above the levels before the Great Recession. Market fundamentals have certainly justified the increase in values, as vacancy rates have fallen and rents increased during the extended slow economic recovery. But there is no question that low interest rates have helped push cap rates down and prices up. Moreover, the shortage of other investments with adequate yield has steered record levels of capital to the commercial real estate market.

	% Change		
Forecast	2016	2017	
Nonresidential Total	5.8	5.6	
Commercial Total	11.7	6.5	
Office	14.7	7.5	
Retail & Other Commercial	7.4	5.2	
Hotel	17.9	7.6	
Industrial Total	-2.1	2.9	
Institutional Total	4.5	5.8	
Health	2.3	5	
Education	6.5	6.3	
Religious	-0.4	1.9	
Public Safety	-3.7	3.3	
Amusement & Recreation	10	5.7	

The AIA's Consensus Construction Forecast Panel sees construction activity in 2017 growing 5.6 percent.

Regardless of the direction of rates over the coming 12 to 18 months, the evidence is that those segments with the most potential for overheating – apartments and hotels – are slowing. Likewise, the segments that benefit most directly from a strong labor market – offices, retail and industrial – should see more in rents and occupancy. Nearly all data and forecasts for construction of commercial real estate shows that this sector will outperform the overall industry in 2016.

Construction of multi-family projects has slowed in 2016, according to housing start data released by the Census Bureau on September 20. Starts of apartments slumped 6.9 percent from July to August, bringing the year-to-date activity to slightly above the levels started in 2015; however, permits for multi-family units have fallen by 15 percent compared to the first eight months of 2015. Permits for 256,000 multi-family units were issued through August, versus 251,000 units started. Based upon history, the small variance between permits and starts indicates that little backlog of multi-family projects exists.

The lack of buildable lot inventory continues to hold back single-family construction. Starts for August were down almost six percent from July, to an annualized rate of 1,142,000. Single-family starts were up 0.9 percent over the previous year, however. Permits for single-family homes declined 0.4 percent from July to August and 2.3 percent from August 2015. Completion of single-family homes is expected to reach roughly 750,000 units in 2016. With both slow new construction growth and declining existing home inventory for sale, home prices should appreciate again in 2016 at a faster-than-average clip.

Construction spending held steady at \$1.142 trillion in August compared to July but is up nearly 4.9 percent for the first eight months of the year compared to same period in 2015, according to an analysis by the Associated General Contractors of America (AGC). The association expressed concerns that the multi-year expansion in nonresidential construction may be fizzling out without increased investment in highways, sewers and bridges.

"While demand for construction remains robust, it is no longer growing like it was earlier this year," says Ken Simonson, AGC's chief economist. "There is little doubt that new public-sector investments in our aging infrastructure could help reinvigorate demand for construction."

The data for the first eight months of 2016 showed a marked increase in commercial construction – up 6.9 percent – with office construction leading the way at a 28 percent higher pace than in 2015. While construction of multi-family projects is slowing, spending in that category is up 13.9 percent from the previous year. Spending on manufacturing buildings is down 7.4 percent year-over-year and public investment in structures and infrastructure has decline by 8.8 percent. Construction spending on highways and streets within the infrastructure category is off 8.3 percent, accounting for the lion's share of the public spending decline.

The first forecasts for the market in 2017 have begun to roll out. Most see 2017 as a late-cycle year for the construction industry. It's interesting to note that forecasts are tending towards mid-single-digit increases in activity.

American Institute of Architects (AIA) Consensus Construction Forecast Panel - comprised of Dodge, IHS-Global Insight, Moody's Economy.com, FMI, Construction Market Data (now part of ConstructConnect), Associated Builders & Contractors, and Wells Fargo Securities – predicts that construction will grow 5.8 percent this year and 5.6 percent in 2017. Within the panel it is interesting to note that the forecasts from the construction reports are the outliers on the high side, with Dodge predicting 9.3 percent higher activity in 2017 and ConstructConnect looking for an increase of 6.9 percent.

The relatively flat variance between 2016 and 2017 in the consensus forecast should be noted with caution. Late in economic cycles, fewer indicators of growth tend to exist and indications of decline tend not to be observed until recessionary pressures have begun to build. The uncertainty about the political environment in 2017 and beyond may have as much to do with the forecasts as any supply and demand indicators.

# **MARKET** METRICS

BENCHMARK	Jan-Oct 2015	Jan-Oct 2016
Total SFD units	2,485	2,305
Total SFA/Multi-unit	1,822	1,706
Total residential \$\$	\$845.6 million	\$829.9 million
Total non-residential \$\$	\$2.82 billion	\$3.46 billion
K-12 additions/renovations	\$123.7 million	\$262.4 million
Higher Ed construction	\$95.6 million	\$248.4 million
Hospital construction	\$189.2 million	\$146.9 million
Hotel construction	\$123.4 million	\$122.6 million
Industrial construction	\$705.4 million	\$1.382 billion
Office construction	\$315.4 million	\$250.8 million









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## WHAT'S IT COST?

Data on prices has begun to show some consistent lift as the third quarter ended. Demand for construction nationally is pinching labor supply and is giving manufacturers the confidence to test the market with price increases. Consumer prices are nudging above the one percent level and wages are consistently up 2.5 percent or more year-over-year. Yet for all the talk of inflation beginning to trend towards "normal" levels, an examination of year-over-year changes in September shows that prices are more stable overall than in a number of years. spectively. Within the construction industry, final demand inflation was 0.1 percent for the month and 0.8 percent yearover-year. The PPI for inputs to construction, which is more heavily weighted toward the materials and products that go into construction, also rose by 0.1 percent in September from August, and 0.8 percent from 2015 to 2016. Few materials experienced unusual swings and most of those were materials heavily reliant upon the price of oil and diesel, which rose 9.8 percent for the month (although prices fell 3.2 percent yearover-year). Other year-over-year increases that exceeded five percent included asphalt paving mixtures (6.3 percent), cement (5.4 percent) and lumber and plywood (5.7 percent).

#### Since 2008, there have been two major swings in the price

of oil and energy that have induced big deltas in the prices of oil-related or energyintensive materials. October marked two full years since the collapse of the oil price and the impact is noticeable in the lack of a severe outlier among the basic materials and products. Even after an apparent agreement by OPEC producers is factored in, the price of oil should not swing the cost of construction materials dramatically.

At the micro level, manufacturers of products as diverse as cement, plastics, steel and sealants have announced plans to increase prices by between two and six percent in the coming months. Companies like Dow Chemical, Owens Corning, Simpson Strong-Tie, and Tremco are counting on forecasts of another five to six percent growth in commercial/institutional construction in 2017. The outlook for housing is a double-digit gain in the number of units built in 2017, which should embolden makers of drywall, studs and shingles to also bump prices. None of these gains is guaranteed to hold and none seem likely to begin a run higher for materials.

Except for energy prices, most inputs for construction have been within a tight range over the past 12 months. Even the more volatile energy categories have seen prices swing five or six percent in either direction – shifts that are small compared to the changes that occurred in energy prices in 2008 or 2014.

The Producer Price Index (PPI) for final demand in September increased 0.2 percent from August and 0.7 percent from September 2015, the Bureau of Labor Statistics (BLS) reported on October 14. That compared with increases in the Consumer Price Index of 0.3 percent and 1.5 percent re-

PERCENTAGE CHANGES IN COSTS	Sept 2	Sept 2016 compared t	
	<u>1 mo.</u>	<u>3 mo.</u>	<u>1 yr.</u>
Consumer, Producer & Construction Prices			
Consumer price index (CPI-U)	0.3	1.2	1.0
Producer price index (PPI) for final demand	(0.3)	0.7	(0.2)
PPI for final demand construction	(0.6)	(0.4)	0.8
Costs by Construction Types/Subcontractors			
New warehouse construction	0.2	(0.4)	1.1
New school construction	0.3	(1.1)	0.4
New office construction	(0.2)	(0.3)	1.2
New industrial building construction	0.3	(0.5)	0.1
New health care building construction	(0.2)	(0.8)	0.5
Concrete contractors, nonresidential	(0.1)	1.1	4.9
Roofing contractors, nonresidential	0.0	(0.1)	1.3
Electrical contractors, nonresidential	0.4	(1.7)	0.5
Plumbing contractors, nonresidential	(0.2)	(1.0)	(1.7)
Construction wages and benefits	N/A	0.9	2.7
Architectural services	0.0	0.2	1.8
Costs for Specific Construction Inputs			
#2 diesel fuel	9.8	6.8	(3.2)
Asphalt paving mixtures and blocks	(0.6)	0.3	(6.3)
Cement	0.0	0.4	5.4
Concrete products	(0.1)	0.4	3.2
Brick and structural clay tile	0.1	(0.2)	(0.1)
Plastic construction products	(0.2)	(0.2)	(0.2)
Flat glass	(0.2)	0.0	3.8
Gypsum products	0.1	0.6	3.3
Lumber and plywood	(0.6)	1.7	5.7
Architectural coatings	(0.1)	(0.1)	0.8
Steel mill products	(0.5)	3.1	1.1
Copper and brass mill shapes	(1.9)	3.3	(4.7)
Aluminum mill shapes	(0.3)	0.3	0.1
Fabricated structural metal	0.3	1.3	1.1
Iron and steel scrap	(4.6)	(11.7)	(0,1)
Source Bureau of Labor Statistics, Updated Octob	er 14, 2016	3	
Compiled by Ken Simonson, AGC Chief Economis	st		

# DISRUPTIVE TECHNOLOGY MT-4600

Wifft-pop! Wifft-pop! The sound of pneumatic nail guns is more than commonplace today; in fact, the sound of a framing hammer striking a nail has become almost quaint. That small technology change improved the accuracy and productivity of carpenters as soon as the new tool was adopted. Nail guns are a good example of a beneficial technological improvement, one which improves the workplace without threatening to disrupt it.

Ц О Ц merging technology in 2016 has the potential to be exponentially more beneficial to the construction industry than simple improvements in tools and equipment but, unlike the nail gun, these changes will also be disruptive. Robots, autonomous vehicles, drones and artificial intelligence are already changing how people work and live, even though the technologies are barely scratching the surface of their potential. As tech developers push the envelopes of the limits of these new technologies the results will be highly disruptive, changing employment



and business opportunities globally. Such prospects are the source of excitement and anxiety about the future of industry, including even the construction industry.

As a society, we have done this before. Computers made an entire generation of secretaries and clerks obsolete. Industrialization eliminated the need for thousands of crafts. Equipment pushed people out of the farm fields. The steam engine replaced human force in countless operations. There is a reasonable argument that can be made that the printing press created not only mass literacy possible but was the genesis of the formation of cities. These were massively disruptive technology improvements that drove masses of people to seek opportunities in different ways of working or different places to live. When the dust settled, the disruptions proved to be worth the cost of the disruption.

#### BIM UPDATE: ADOPTION NOT DISRUPTION

It's been a decade since the technology that allowed three dimensional design and modeling became available to the mainstream market. Although there have been significant improvements to the capabilities of building information modeling (BIM), the technology remains in the adoption stage more than expansion. Compared to other new technologies, BIM's rate of adoption is probably right on track, especially considering the complexity of the problems it is designed to solve. The obstacles to full-scale adoption include a

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basic human resistance to change, an inherent lack of trust in the industry and the propensity towards delivery systems that aren't designed to take advantage of BIM's potential. But there have been big strides in adoption.

Mark Dietrick, director of services for Case Technologies, explains that the analytical tools developed for BIM and the field applications for coordination and revision – like Navisworks Manage, BIM 360 Field or BIM 360 Glue – have extended the usage of modeling through the construction stage and into the realm of operations. But he also says that few, if any, cases of true integration exist yet.

"It goes back to the way we source projects. We don't typically align teams early in the process; we still have bid processes that don't promote collaboration," Dietrick asserts. "Most architects are using BIM but people are still primarily working in their own silos."

The promise of BIM – which builds upon a well-know 2004 white paper done by the Construction Users Roundtable (CURT) – was that information about the elements of a construction project would be captured and saved as the project moved from one stage of development to another and from one professional to another. CURT found that billions of dollars were wasted by the industry each year in reworking design and construction documents because information was integrated into the project lifecycle. Part of the solution was the technology, the use of an information model that retained all of the characteristics and data associated with



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the design of a building. That turns out to be the easy part of the solution (although technical obstacles remain). The hard part was adapting a collaborative model into a non-collaborative industry.

There is a creeping trend towards more collaborative environments. This is happening in other parts of the country to a much greater degree than in Western PA. Here, the charge towards more collaborative delivery systems is being led by the institutional owners, like hospitals or Penn State and Carnegie Mellon. Within the prevailing delivery methods, model sharing and integration aren't happening. Moreover, the usage of BIM is often being limited to improving design information integration to the ends of producing two-dimensional documents. That is certainly limiting the adoption of higher BIM capabilities, like integrating cost and scheduling data.

"On the estimating side of the business, unless we're going to build a project ourselves, we don't trust the documents when they are being used just to produce 2D documents," notes Bill Derence, director of virtual construction for Mascaro Construction Co.

Derence makes the point that unless the model is actually part of the contract documents – and he notes that Mascaro's BIM-designed projects have included the 2D documents rather than the model – too many architects and engineers find full use of the modeling software too time consuming. He gives the example of interior walls, which are laid out at the same heights on the model because it's easier to make notes on a drawing or wall schedule that specify heights from room-to-room. Without reliable height information, quantities won't be accurate and neither will cost estimates. Moving backwards from estimating to the model isn't cost-effective for the contractor, except on self-performed work where it owns the model. Derence says that schedule information is more frequently added to the model because of the time needed for the task.

"We use 4D any time we want to present to a client because we can put that together quickly," he explains. "One person can put the activity values in the model and create a schedule in a day or two."

Liz James is the estimator/BIM coordinator for Jendoco Construction. She used BIM extensively during the preconstruction of CMU's Scott Hall and has had a similar experience to Bill Derence's.

"For coordination it is fabulous," James says. "Since Scott Hall we used BIM on the Michael Baker Hall at Penn State and got the job done on time and under budget. The Benter Foundation project Downtown is a small project but very complicated and we're using 3D detection there as well. For estimating, it's fairly difficult to get cost information into the model. It's far too time-consuming."

The root of these problems with expanding BIM's use is still interoperability and a lack of standardization. Like with early applications on personal computers and smart phones, competing software providers and developers of expanded applications aren't using standard means for communicating information to the model. Moreover, standards for what fields and what kinds of data are to be included are still being formulated.

Dietrick explains that he is working with Erie Insurance to develop applications for its field people to use to develop models for operations and maintenance of their facilities. He says the challenge has been to create the framework from which users of the model can get useful information with which to keep up with Erie's buildings.

"Owners don't know the right questions to ask to build a maintenance model. We're working with all aspects of their buildings. What systems tend to fail? What components? You have to have information to ask for in order to create the model," Dietrick notes. "The myth is that you just have to ask for a level of BIM and you're good. That's not true."

For whatever difficulties exist in bringing information technology into line so that BIM can reach its potential, the industry continues to try to add value to the modeling process. On October 19, Dodge Data & Analytics and Autodesk announced a partnership aimed at integrating Sweets Catalogs with BIM. The partnership will enable architects, engineers and contractors working in Revit to have access to product manufacturers that distribute their information through Sweets' website. If successful, the Sweets/Autodesk partnership should grow BIM's adoption by integrating product attributes directly into the model.

Dodge's Tim Albert says that the process should streamline spec writing and enable communication between manufacturers and project teams, helping to avoid situations where the products selected for a project are inaccurately specified or inappropriately used.

"The spec writer will utilize the selections in the model to replace a disjointed communication process now," he says. "By utilizing the model, the process of getting the information into the spec writer's hands becomes streamlined. There can be no miscommunication about product selection [because] the data is in the model."

Sweets' database will include information on product size and function, material and finish, application environment, installation, warranty, classification and indexing. There is also a document repository that will have three-part specifications, product cut sheets, MSDS sheets, BIM objects, Sketchup files and information about warranty and product attributes.

In the near term, however, the database is updated and warranted by the manufacturers, meaning that the completeness and accuracy will be dependent upon their diligence. Sweets also only has information for less than one-fourth of the 100,000 products it hopes to ultimately display. There will also likely be similar attempts by competitors to integrate with Autodesk or other BIM developers. The upside is that the partnership with the software provider for modeling should ensure the proper standards are used.

This Sweets/Autodesk partnership will be subject to the same human and market forces that have slowed adoption of BIM more fully. Yet it's not a reach to see the dots connecting from conceptual design through operations using fully-informed models. The parallels to the computing application market seem relevant. Over time, the ability to import or export information and attributes within a model to and from all the parties involved should be as convenient as synching phonebook contacts.



#### **ARTIFICIAL INTELLIGENCE FOR CONSTRUCTION**

It is the stuff of science fiction and Hollywood. Thirty years ago, Terminator was a cinematic vision of machines taking over the world and exterminating the human life that ruined it. Fifteen years earlier, Stanley Kubrick won an Oscar for a story about a computer taking over a space mission. From 2001: A Space Oddity until today, artificial intelligence (AI) has made interesting fodder for moral dramas. In real life, however, the use of AI has mostly lagged drama. But the advances in technology and analytics have moved the science of machine learning ahead rapidly. Its emergence is upon us and the benign use of AI is something that will soon be taken for granted in most industries, including construction.

Machine learning makes use of artificial neural networks to simulate the functions that our brains perform when analyzing information. By adjusting the weighting that each neuron applies to types of information, the artificial "brain" can be taught to discern a balloon from a cat but also to understand the other properties of a balloon, like roundness or color, which can be applied to different problems. In 2012, researchers from the University of Toronto used advances in technology to accelerate and expand AI to do "deep learning" and the accuracy and breadth of problems that AI could solve soared. AI excels at applying mountains of data to perform routine functions. For that reason, AI has great potential for helping the neurosurgeon analyze symptoms but little value to the administrator scheduling surgery. Field superintendents perform such varied duties that AI won't disrupt their world. The same may not be true of the spec writer.

In 2012 Mark Dietrick, then president of AIA Pittsburgh, wrote an article about confronting change in the industry. The article was partly a response to a New York Times article about the use of CAD and information technology to bypass the architectural profession.

Rather than offering an outraged debunking of the concept, Dietrick instead chose to point out to his professional colleagues that information was at the heart of the business and that the technology existed to harness the information to make design dramatically better. Dietrick wasn't speaking about design from an artistic perspective but rather from the perspective of assessing and interpreting a client's needs and delivering a project that met the client's needs and budget. Using technology to reach beyond the limits of human capability – that is remembering every code, cost or product specification – was an opportunity today's architect has that their predecessors did not, he argued.

That sort of data capture and retention is one of the main purposes of BIM. It's the loss and rework of previous design information that is a big component of the waste in the construction process. BIM isn't meant to analyze, at least not at this point, but tools do exist to collect and interpret big data on construction projects so that architects, engineers and owners can do the kinds of predictive modeling that the construction industry so desperately needs.

In healthcare there is a great parallel to this prospective use of big data. Machine learning has accelerated to the point where diagnostic computers can analyze images like MRIs or X-Rays and compare them with millions of similar images to make diagnoses. In recent months, studies of such AI activity found that machines accurately diagnosed the patient condition more than 97 percent of the time. That's considerably more often than experienced doctors were able to achieve.

In place of X-Rays, architects have millions of bits of data about what they have designed. Crunched to a high degree, that data is proving to be equally accurate about things like budget and schedule, two areas of high dissatisfaction among project owners.



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In West Michigan, a company called Building Catalyst LLC is using the principles of industrial engineering guru W. Edmonds Deming to create models that take what is known about a building and predict the outcomes of buildings being designed. Building Catalyst bases its business on the theory that construction is an assembly of systems that are integrated with the goal of completing a building. The company uses data about the most finite of the system components to model buildings for its clients, many of whom are owners of multiple facilities.

Starting at a very granular level, Building Catalyst aims to predict the outcome of a building based on the function of its components. Rather than relying on estimates based on building types, Building Catalyst's systems builds an estimate - and before that a program - based on the multiple functions of the building. For example, its estimates assume that the drywall used in an operating room has a different cost from drywall used in a nurse's station. Using data from all hospitals, Building Catalyst can advise that a hospital in a specific location will need specific functions and will know the attributes to those functions (e.g. the number of operating rooms or the square footage of the ER). Rather than analyzing a completed model of a building to estimate its cost or duration, Building Catalyst assembles a model based on what it knows about the various elements that make up the completed system that is the building.

This method has proven surprisingly accurate in programming and even more so in budgeting. In a recent test, Building Catalyst was given only the construction drawings for ten completed buildings and provided estimates that were almost spot on the ultimate construction cost on all ten. Because its estimates are based on data from thousands of existing buildings with similar functions, Building-Catalyst didn't require as-built drawings or submittal information on the specific components of the projects. Its predictive analysis proved more accurate.

A technology that is currently being used for evaluating games or websites can also be adapted for use by architects to gauge designs. Al has been advanced to recognize changes in facial expression that convey specific emotions, using that information to judge how viewers of a website or players of a game are responding emotionally to the design. This technology is especially useful because gaming or other graphic interfaces can be deemed acceptable by a user on an intellectual or superficial level and yet be rejected by users over time. The emotions elicited by the experience can be cognitively ignored or unrecognized by a user; however, over time, the user's emotional response often dictates the long-term response. In other words, users may not object to their initial interaction with a screen and yet their emotional response betrays a negative reaction that will govern their behavior after repeated interactions.

Emotional responses to architectural design are even more difficult for the average user of space to articulate. Colors, orientation to windows or access to light are subtle factors that dictate how a space feels to the user, yet are very difficult to express. Like with the website interface, an interior layout may not be objectionable on an intellectual level but prove to be undesirable to the user's emotions. Such emotional analysis could be particularly effective when combined with virtual reality (VR) to test multiple designs on users.

One breakthrough area for this technology to advance the job site is worker safety. Bodymounted devices already exist in testing that can act as feedback devices, giving workers advice as to how they are standing or operating a tool in ways that are safest. Manufacturers and skill trainers (like the Joint Apprenticeship Training Centers of Pittsburgh's trades) can provide software developers with optimal body angles for holding tools or ideal distances for workers to be removed from a piece of equipment. That information can inform body-mounted monitors to alert workers to unsafe operating conditions, whether those conditions are life-threatening or merely a risk for injury.

Virtual reality is another technology tool that offers enormous potential for improvements in both safety and design.

In the latter case, VR has been used for decades to help graphically present completed designs prior to construction. The advances in technology have made what was once a primitive representation of a finished space incredibly realistic. Higher definition outputs and improved dimensional representation make VR experiences less cartoonish and easier to judge for the user.

Combining AI and VR offers a significant opportunity for improving workplace safety. The use of VR presents users with workplace conditions that are potentially unsafe, which can be simulated so that the response can be experienced by the worker without negative consequence. Using VR in this manner has been shown to create conditioned responses in the same way repetition does in practice for athletes. VR has been used to simulate practice reps for young or injured quarterbacks, for example, with improved decision-making results. In the same way construction workers can be presented with physical scenarios that reinforce good decision-making without the chance of an accident. AVISON YOUNG

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Augmenting situational response through VR by interpreting thousands of responses from other users of VR training can accelerate the conditioning to be gained by training. Al can analyze the full spectrum of trainee responses to better understand what decisions users make when specific conditions are presented. Information about how workers tend to respond to wind or rain, for example, can accelerate how workers learn the safest responses in those conditions.

In these kinds of applications, AI is useful in analyzing millions of bits of information to help inform and advise users. The technology doesn't actually make the choices or perform the tasks but it doesn't take much imagination to see how AI would be used as a crucial element of automating tasks.

### THE ROBOT CAN GET THAT

Of all the potentially disruptive technology emerging today, the use of robotics to automate physical functions performed by humans is the most urgent and poses the greatest threat to upsetting the apple cart.

The use of robots on the construction jobsite has already begun. For reasons of safety, productivity and performance, companies have begun employing autonomous vehicles, drones and even robotic installation equipment. For the most part, these technologies have been less disruptive to labor than prefabrication; however, with skilled labor shortages looming in the industry and cost pressures mounting, expanded use of machines instead of humans will displace employment in the future. The coal industry is a great indicator. For all the hue and cry about regulations killing the industry, automation has taken many more jobs than environmental intrusion. The problem is not one for the future either.

"Fitters and electricians are getting 'tech-ed' out of jobs every day," asserts Rich Stanizzo, business manager for Pittsburgh Regional Building and Construction Trades Council. "Local 5 tells me that electricians' hours are down as low as ever. It takes four electricians to do what 40 guys used to do."

Increased competition, both at the employer and trades levels, has put pressure on the industry to be more efficient. In many cases that's a pretty term for doing the same amount of work with fewer people. Prefabrication of field assemblies and automation are two ways that labor hours have been trimmed. Factor in the increased safety performance that accompanies such changes and it's easy to understand the case for more automation. There have been few reports of true robotic replacement of workers in the skilled trades in Western PA but the technology exists and is being used in many parts of the world. The benefits of such robotic labor are appealing. Robots don't get sick or have off days. Weather or fatigue won't impact production or safety. Once paid for, a robot's costs fall to the price of power and maintenance. And in trades with dwindling supply of skilled workers – like masons – robots can ensure that classes of work can still be done, regardless of workforce.

In many cases, these robots aren't operating independently. An operator often controls the machine remotely or in close proximity to the robot. That means a worker isn't replaced but retrained instead. With advances in AI, however, it's easy to see how robots performing routine or predictable tasks will function without an operator. In some cases that will improve the safety of the workplace.



"Operating engineers run robotic equipment too. In mills - where we're running remotely, given the environment – that has been going on for a while," notes James Kunz, business manager for Operating Engineers Local 66. "That hasn't displaced us but has added a layer of training to operate the equipment." Safe operating conditions were the goal of the mining industry when it first turned to remotely-controlled equipment. As the technology was developed, other advantages emerged that were incentives to automate other equipment functions. Caterpillar Inc. is one of the world's largest heavy equipment makers. According to Michael Murphy, chief engineer for mining technology, the nature of mining makes that industry a leader that other industries often follow.

"Mining machines run 24/7 and companies make money from moving the commodity not moving people," Murphy explains. "Mining tends to lead in automation and then the technology bleeds into construction. Adoption tends to be very high."

Murphy says that the machines offer predictability, productivity and consistency that can improve the mine's performance and safety record. He points out that without the routine downtime from shift changes, fatigue and breaks, miners see a 20 percent increase in productivity after automation.

"The prime driver for the mining company is safety. By taking the operator off the machine and into another area to control it, the machine becomes safer because it is predictable. Humans aren't predictable but an autonomous vehicle is 100 percent predictable," he says. "The other factor is productivity. Shift changes can take up to an hour. Trucks don't take lunch breaks. Trucks don't have to go to the bathroom."

Caterpillar has moved from mining equipment to heavy material hauling equipment at the mines and is beginning to engineer the same technology on its dump trucks for construction. Murphy says that a recent test showed it could control the largest bulldozer in Arizona from a remote control in Caterpillar's Peoria, IL headquarters. He admits that the technology for earthmoving is lagging, however, because the composition of the soil and subsurface conditions aren't consistent enough to automate yet, although successful tests of consistent soil have been conducted.

Jim Kunz understands the problem Caterpillar faces.

"When you run a piece of equipment it's not just your eyesight that you use," he explains. "The sound of the engine, the feel of the equipment through your body, these things tell you when you hit a pipe instead of a rock."

Another technology that is having remarkable results in early construction applications is the use of drones.

Pittsburgh-based Identified Technologies provides drones for video inspection and surveying of large construction job sites. While the drone is the sizzle of the operation, CEO Dick Zhang says that the real value of using drones is the high-level software his company developed to analyze and interpret the data gathered.

Zhang says that Identified Technologies aims to provide upper management with information that addresses four strategic initiatives: pushing critical information down to the next generation; safety; more successful estimating and more efficient operations."



## **STONE VENEER**

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"The fascinating disconnect we discovered is that the folks estimating are not on the job site," he observes. "There are senior estimators with 30 years experience who can look at drawings and be very accurate about a bid but the new talent will need ten years or more to learn what they need to know."

Drone technology allows companies to observe and calculate the amount of material being removed daily and can gain a high level of certainty about productivity from real time data that might take years to observe on a job site. Estimating learning curves can be shortened.

"On a 100-acre site, if you give a drone ten minutes in the air and a couple minutes in calculations, we can tell you the elevations every one-and-a-half inches," Zhang says.

Using drones to measure sites and site work progress is a big improvement for surveying as well. Aside from the accuracy, the use of drones saves wear and tear on surveyors dragging equipment up and down steep cuts during excavation. Clients get accuracy and safety.

Improvements in safety and productivity have been at the center of the efforts of both labor and management for generations. It's part of the dynamic tension between operating more profitably and providing a safe and comfortable workplace. But the advancements in technology have moved the argument past what is fair and safe to expect from workers. There is a level of inevitability about disruptive automation that makes it unlikely that workers will go untouched. Perhaps that will be the solution to the problem of attracting skilled workers to construction. Whether or not it displaces individual workers, it seems likely that automation will do to construction what mechanization did to farming.

"I'm not sure we're going to see it soon," predicts Kunz. "Is it something we're going to watch? Sure, but there are so many variables in construction. You're not on paved roads. Roads change all the time because of the equipment and weather."

Still, Kunz allows that the trade he learned a generation ago has changed forever. "The equipment I operated doesn't exist," he chuckles.

Rich Stanizzo also believes the industry he serves is not going back to the old days, no matter how much he may be concerned for the jobs that might be lost. He sees the financial realities as irresistible.

"There's no fighting it," Stanizzo says. "You just have to adapt." 🚳



## PROJECT PROFILE



# **PENN STATE** HEALTH AND HUMAN DEVELOPMENT BUILDING

enn State's largest college by enrollment, the College of Health and Human Development (HHD) also attracts a large share of the grants that the university receives each year. Housed in one of Penn State's oldest structures, HHD calls Henderson Hall home but its labs and researchers into healthy aging, diet, athletics and nutrition – to name a few fields – were spread out in buildings throughout the campus and town. By the late 2000s, Henderson Hall had moved to the top of the list of buildings in need of renewal in Penn State's ongoing master plan. The university, with funding assistance from the Commonwealth of Pennsylvania, planned to invest almost \$80 million into a program of modernization that would bring the various departments of the College of Health and Human Development under one roof.

processes, the team responded with a very different approach. The approach created an entirely different outcome. It also changed the minds of some skeptical old professionals. As a result, the HHD project became what the team refers to as "collaboration that actually worked!"

One of the more difficult challenges that an architect can face is the expansion and modernization of an aging but beautiful building, especially if that building has an iconic presence about it. When Bohlin Cywinski Jackson (BCJ) was hired to take on the design of the two-phase modernization of Henderson Hall, it faced the task of not only adding new space to a building that was tied to Penn State's original campus buildings - including Old Main – but also the additional challenge of updating buildings that sat squarely on the university's front door to the town of State College along College Avenue.



One of the more difficult challenges that a construction manager (CM) can face is trying to create a

The addition to the HHD had to integrate with the existing building and the adjacent Old Main and HUB lawns. Photo by Peter Aaron.

positive working environment among separate prime contractors on a public project. When Massaro Construction Management Services was hired to act as agency CM for the Henderson Hall project, that challenge was heightened by Penn State's charge that the environment be not just positive but collaborative.

The Henderson Hall project was actually split into two phases. The first phase was the \$32 million BioBehavioral Health Building (BBH), which included a 95,000 square foot addition to the Henderson North Building. A Department of General Services delegated project, the BBH phase involved public bidding of nine prime contracts. The bulk of the work was still under the general trades contractor. The delivery of BBH involved the use of a building information model (BIM) and the owner and its team intended for a collaborative environment, but the delivery method couldn't overcome the limitations of the separate prime dynamics. The project was completed successfully over a 26-month schedule between 2010 and 2013 but Penn State was disappointed in the process.

Prior to the start of the second phase, Penn State expressed its concerns to the design and construction management team. Rather than trying to get a better result by repeating the same

"Penn State requested that we try to develop better communications for phase two and that we use tactics that made collaboration possible," recalls Tim Jones, project manager for Massaro. "Penn State requested problem solving not finger pointing."

What the project had going for it was continuity. The project's key team members, Rachel Prinkey from the owner, Renee Sutterer from BCJ, and Jones were project leaders from the first phase and understood the difficulties that had been caused by the process. For phase two, the team came up with several radical changes to how the project would be delivered.

"We had already started to look at IPD [integrated project delivery] and collaboration, how that can help the owner get a better project. It seems backwards to take a multi-prime delivery [to see if it] could be collaborative," explains Prinkey. "The first phase wasn't going so hot. We had changed our project manager five times and the CM had three different project managers. There were a lot of decisions that weren't being made because we didn't have good leadership on the project. Halfway through construction of the first phase we looked at each other – and our management looked at us – and said try this. Make it happen."

## PROJECT PROFILE



Prinkey was the fifth project manager assigned by Penn State to Henderson Hall and design of HHD phase was just beginning. The team took lessons learned from the first phase and began applying them. They began rolling out some of the team-building techniques, eliminating separate meetings with the architect and CM. It made a difference.

"We had contractors that weren't going to bid phase two because they were losing superintendents. They were quitting," Prinkey recalls. "We had to finish out phase one with second shift and third shift work to get it done on time and they lost people. It affected their lifestyle and





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their families and we didn't want to do that again."

There were several enhancements that were meant to improve communication and collaboration but two in particular stood out. First, Penn State wanted to have more control of the schedule and accepted the fact that more control meant more risk on its part. To reduce the role of the general trades contractor, Penn State agreed to hold the contracts for 17 separate prime contractors. That exposed the university to the risk of default by nearly twice as many trade contractors but Penn State gained the necessary purse strings control over eight trades that had been subcontractors on the BBH phase. "Between owner-directed changes and omissions we added ten percent to the scope of the work and completed it in the same time as the original schedule,"

The second change was aimed at a subtler result: a shift in culture. In the candid assessment of lessons learned from phase one, Massaro and BCJ felt that many of the changes and errors were attributable to poor communication and the culture that accompanies design-bid-build. To remedy that culture, Massaro proposed collocation of the project team. Massaro and BCJ planned to work closely to fully vet the construction

documents – including using a designassist specialty contractor – and committed to working in the same trailer. It was decided to extend that concept by collocating all of the contractors in one open job trailer complex. Penn State agreed to the unique approach and, in fact, the bidding documents required contractors to include collocating a project manager and superintendent and instructed contractors not to carry any costs associated with separate trailers. As you might imagine, the concept wasn't an immediate hit.

"We hadn't done collocation before. Our concept was one open floor plan but John Wolf [superintendent for trade

contractor L. S. Fiore Inc.] refused to do collocation," chuckles Jones. "He is an old-school guy who wanted a private office. Penn State didn't back our concept so we put up some offices within the trailer. That concession on our part really helped with the atmosphere."

Jones says the trade contractors didn't take to collocation with full enthusiasm initially – "they called it the harmony hut" – but



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### PROJECT PROFILE

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that over time the advantages of having everyone under one roof became apparent.

"Just the fact that we were all in the trailer you got so much of what I call communication by collision. Because you share the coffee pot or the water bubbler, you just run into people," Jones points out. "You don't have to go looking for people."

This proximity of key personnel was intended to improve one important area of the project's management: communication. Trade contractors that are sequestered in separate job offices tend not to seek out other team members and save up questions or issues until the regularly-scheduled job meetings. The danger in that approach is that some issues require more timely resolution to keep the project moving on schedule. Collocation eliminated the silos. There was another step that Penn State took as owner that proved to be a key change to the process.

"Penn State recognized that the complications of the project – especially the existing building – needed answers at a faster
#### PROJECT PROFILE



pace so we could maintain the schedule so they paid more to have the architect on site more often," observes Jones. "On BBH there was an agenda for the weekly meeting and the problems were communicated then. When Renee was on site that often, she was part of the team solving the problems. If something came up, she went out to the job site right then and gave the contractors answers."

Sutterer agrees that her presence enhanced the project management outcomes.

"The whole level of collaboration we did, that was my first experience and it was a very successful experience and I look forward to doing it again. I was actually out there more than architect typically would be. I was there two or three days a week, which is a lot," Sutterer says with a laugh. "But it allowed me to see what was going on. It improved the problem-solving because I was in the field and aware of the issues. I could go out on site with the contractors, see first-hand why something didn't work and understand the problem. All of us could stand out there and brainstorm together. A lot of the RFIs I received



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#### PROJECT PROFILE

were confirming RFIs. We had already talked about it in the field and came to a conclusion of how an issue would be solved. The RFI was just documenting what had already been resolved for contractual reasons."

In fact, the way RFIs were handled was one of the key factors in the success of managing the HHD phase.

The project wasn't without plenty of challenges, regardless of the delivery method. Staging the project in the midst of an active campus required attention to the traffic plan daily. Because of the proximity to College Avenue extra measures had to be taken to be a good neighbor. It was imperative that the construction site

the collaborative approach and technology kept the scope creep from creating schedule creep.

"Between owner-directed changes and omissions we added ten percent to the scope of the work and completed it in the same time as the original schedule," says Jones.

In addition to solving problems better, the collaborative environment was a key element to the scheduling process, for which Massaro employed a lean construction technique known as pull planning. Pull planning differs from the critical path method schedule in that all activities are planned and identified starting at the project's end. All duration and logic is worked from the



Photo by Peter Aaron.

not impede street traffic and pedestrians shopping on State College's main drag. A weekly farmer's market obstructed deliveries to the site during warmer months. Once the contractors opened up the existing building they discovered unforeseen structural problems that added cost at the early stages of construction. A change in administration at the Department of General Services resulted in revisiting the processes for payment, which in turn created bottlenecks for the university's funding for a time. And, as can happen on a long project, changes in the owner's needs resulted in changes to the scope. On the HHD project, end towards the start identifying all resources and tasks needed for completion. Weekly pull planning meetings were held with all the trade contractors to ensure that the activities were properly resourced and completed. Potential issues with access or supply chain were identified well in advance of the activity. Pull planning also proved to be invaluable to managing the \$6.2 million in changes that were added to the project.

Enhanced communication was certainly an important key to the success of the project but there were also a number of tools and

#### "We just had a team of people who wanted to work together and solve the problems."

processes created that led to measurable improvements in the performance of phase two. As an owner investing more heavily in the second phase, Penn State looked for proof of its concept and Massaro tracked a lot of data to provide that proof.

BIM was used to greater potential on HHD and there was a BIM execution plan that added discipline to the process.

The model was created during design by BCJ and constructability was validated during that phase by Massaro, which was handed the model after bidding documents and bidding were completed. Massaro shared the design models with the prime contractors and the construction coordination model was created. That final construction model was approved by the architect, which also approved the show drawings. The model followed the project through construction administration, ultimately going to Penn State – with as-built and operations/maintenance documents included – for final approval after completion.

During HHD the team used BIM differently than phase one for construction coordination. For the BBH phase, all of the 11-month coordination process took place after the start of construction and \$250,000 in changes resulted. During the HHD phase, however, coordination began during the last eight months of design and carried only three months into construction. Only \$5,000 in changes arose from clashes during phase two.

Information management was an area the team saw as critical to a changed outcome from the phase one process. There was a 21-day standard for submittal turnaround. During the 22-month project duration there were several months when turnaround crept above 21 days but at the completion of the project, the 21-day standard was met or exceeded on 85 percent of the submittals received by BCJ.

Completed in the spring of 2015, the HHD building combines 93,000 square feet of new construction with 39,000 square feet of renovation of existing lab space. In addition to classrooms, labs and office space, the HHD Building houses the Dean's Office of the College of Health and Human Development. Public spaces were designed so that the college can host both formal and informal events. The new building brings the various departments and researchers together under one roof, which was a driving purpose for the project.

"The users were looking for a building that got you to walk the building. They had a lot of little departments that worked together that were spread out all over campus and off campus," notes Sutterer. "This building was an opportunity to pull them together and spark collaboration between departments, maybe get research projects going from 'water cooler' kind of talk or from seeing people in the hallways more often." The prominent site offered a challenge and opportunity to BCJ to both maintain the context of the Old Main side of campus to the west and the more modern Hetzel Union Building (HUB) to the east. Visitors to the building are often surprised to find out that the traditional brick elevation on the west face is new construction, which Sutterer takes as a compliment to their design intent. On the HUB lawn elevation, BCJ chose to enclose the addition with a four-story glass curtain wall.

More than a year after the project's completion, the architecture and the function of the building are what students and faculty experience in HHD. For the project team, the spirit of the working atmosphere remains the most vivid legacy of the job. Rachel Prinkey says that John Wolf even wrote her a note saying he hoped he could work on a project like HHD again. Tim Jones credits Penn State for having the vision and the will to create the environment. He also recalls that the success of HHD ultimately rested on the shoulders of the people charged with getting it done.

"Overarching all of those factors were the people involved in the project," asserts Jones. "We just had a team of people who wanted to work together and solve the problems."

The HHD project stands as the first example of what Penn State's management feels is the right way to deliver projects. The collaborative model was taken up a notch the following year when the IPD approach was used to do the Michael Baker Hall project at the Beaver campus and then formalized for the first time on the Agricultural Engineering Building at University Park, where an IPD is actually being used as the form of contract for the new construction. Rachel Prinkey is a believer that the upside for the university is significant.

"We feel that in the end when we empower the contractors to be part of the overall goal, as an owner, we get a better project," she asserts. "We strengthen our relationships with local contractors, which improves our bidding environment going forward."

"Massaro did an amazing job of really walking the walk. We've had other job sites where we've tried to roll this out and the CM just wants to come in and yell at people rather than participate in a genuine way. The daily behavior really drives it. Massaro did a great job of that and so did BCJ. They really stepped up."





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#### FIRM PROFILE

The new headquarters for Industrial Scientific, designed by CH2M/IDC Architects.

ow do you tell your company's story when half your company's clients won't let you talk about their projects? That's the challenge Mark Witouski, vice president of client relationships and development, and the management team of CH2M face in marketing its design services. A design firm preferred by computer and software companies for three decades, CH2M is constrained

from talking publicly about much of its portfolio. The constraints extend to the photos in CH2M's offices, for which the client on many is listed as "confidential."

"It probably hurts us, marketing-wise," allows Jeff Murray, FAIA, practice leader for CH2M's Pittsburgh architectural practice. "Sometimes our clients allow us to show the work but we can't use their names. Other times we're allowed to use their names in a proposal setting but we can't talk about them in public. And then there are some where we can't even use the work. There are a lot of projects where everyone involved has to sign an NDA [non-disclosure agreement] before working on the project."

ch2<sub>M</sub>

The leadership of CH2M's Pittsburgh office is working more now to tell its story. Up until the past year, the advanced technology division was known as IDC Architects but was always part of CH2M. IDC was formed in 1985 in Portland, OR by CH2M employees with the company's backing. In the 1980s, the main focus of CH2M was public sector environmental and water projects. There was an interest among the 17 original employees of IDC to move more into private industry and CH2M's management supported the idea.

"There was this nascent semi-conductor business and we had some exposure to that industry," explains Murray. "We thought

#### FIRM PROFILE

if we could be leaner and more agile, and less geared towards federal compliance but toward private industry, we could have success."

The timing of the spinoff of sorts was immaculate, as one of IDC's top electronics clients was beginning to lead a migration of semi-conductor research to the Portland area. IDC began to land work designing clean rooms in the semi-conductor space. At the start of the high tech boom, being positioned at the center of a key piece to the computer industry served IDC well. The firm's fortunes rose along with the semiconductor and computer industries and the growth led to a search for the next hot market.

"There was an interest to do business with IBM and Digital, companies on the East Coast," says Murray. "The question was where do we go next with this Portland group? They got hot and very busy. IDC did a search and at that time Pittsburgh was an airport hub and it reminded them a lot of Portland. It has this incredible engineering pedigree and lots of engineers available. So, Jim Carr came from Portland and opened the office in Pittsburgh."

While there was recognition that there were no semiconductor opportunities in Pittsburgh, there was a favorable cost structure and access to great engineers. The Pittsburgh office was able to support work with Digital in Massachusetts

and IBM in New York, as well as other clients – like Micron Technologies – along the eastern seaboard. By the early 1990s, however, the semiconductor industry matured and began to consolidate. It became, as Murray calls it, "massively cyclical."

"You were either incredibly busy and had to office up to 200 or 300 people at times or you'd shrink back down almost to nothing," he explains. "Because of this kind of roller coaster ride, IDC looked to diversify."

IDC's semiconductor experience played an interesting role in the move to diversify. Semiconductor plants required very sophisticated architecture. Occupancy codes for the buildings had to be reinvented with almost every new plant and CH2M had a deep bench of people with experience in writing the H5 occupancy codes. The plant buildings were unusually complicated because of the clean rooms and variety of high-level controls. The complex flow of the plant was something that was beyond the purview of the average industrial engineer and IDC's architects gained experience that would be transferable



Jeff Murray



Bob Roelle

to other industries. The problem was that the work wasn't exciting to the architects and IDC had a difficult time retaining staff. To optimize the benefit of the deep experience and to formalize its commitment to diversify its business, IDC created IDC Architects in 2000. Like with its original business, IDC Architects sprouted in Portland and opened its second office in Pittsburgh.

"The idea was to take those skillsets gained in semiconductors and move into things like research buildings, science and tech related projects that were architecturally led, like data centers. That diversification eventually led to workplace environments because office buildings have become so technically and socially complex," Murray notes.

Murray was recruited from Washington DC in 2003 to head up the Pittsburgh office's architectural practice. At the time there were two architects and roughly 80 engineers. The following year, CH2M acquired Lockwood Greene, a global company that had earlier purchased Pittsburgh-based Centerline Engineering which was focused on metals. One of Murray's biggest challenges was to diversify a business that had diverse talents without a diverse portfolio.

"It was pulling ourselves up by the boot straps. It was a huge challenge. We had to convince clients that we could do other things," recalls Murray. "It started out with some teaming arrangements.

One of the things that came with the Lockwood Greene acquisition was a fledgling higher education business. They had an opportunity that they were tracking at the University of Nebraska. We got engaged with that opportunity and partnered with a lab planner from St. Louis. We went up against HDR and Leo Daly Architects but we must have shown we wanted it more. That was a key project to our higher education practice."

The Nebraska Center for Virology was indeed the first of many projects in university and corporate science centers around the U.S. Murray recalls that the big break for IDC Architects in Pittsburgh came with an invitation from the University of Pittsburgh to propose a solution for its aging science buildings. IDC Architects was the only firm of those invited that tried to convince the university that it was better off repurposing the buildings, rather than tearing down and building new. That master planning led to the major renovations done at Benedum, Clapp-Langley-Crawford, and Parran/Crabtree halls over the past five years.

One of IDC's master planners, Roger Pearson, was instrumental

in opening a door that has led to the growth of the firm's corporate practice in Pittsburgh, and its biggest project to date.

Pearson had helped real estate service company CBRE revise the master plan for Tech 21 (now Innovation Ridge), which had been rejected by Marshall Township. When medical device maker Medrad decided to build its headquarters in the park, CBRE teamed with IDC Architects as one of the firms to compete for the project, which IDC won. That project led to opportunities at the campus of Medrad's eventual buyer, Bayer Corporation. And CBRE was the owner's representative for Industrial Scientific and gave IDC a shot when that company decided to build its new headquarters and research center overlooking the Parkway West near Ridge Road. That project won a number of local and national awards and is the signature project for IDC Architects in Pittsburgh.

IDC Architects grew its resume in Portland, Pittsburgh and Glasgow, and has begun to develop work from its Greenville, SC office, which works closely with the Pittsburgh office. There are about 140 people on staff in Pittsburgh, 11 of whom are architects.

Last year, like many other large corporations, CH2M decided to bring its various operating arms under one brand. IDC Architects and the various acquisitions are transition-

ing to the CH2M brand. The process has not been without its bumps and bruises. Murray, who is first vice president of AIA Pittsburgh Board of Directors (and will be president in 2017), was pulled aside at an AIA Board meeting by a close friend who was concerned about Murray's well-being. The friend had heard that IDC Architects was closing. Murray had to assure him that his firm was only re-branding, not closing its doors.

As part of a global design firm, CH2M architects have access to subject experts across the full spectrum of design and engineering experience base. There are 22,000 total employees at CH2M and the firm competes head-to-head with giants like HDR, AECOM, Jacobs Engineering, Fluor and Stantec. Unlike those global design firms, however, Murray says CH2M has not tried to saturate its resume across all types of work. Even with some existing clients CH2M chooses not to solve every problem.

"We don't do every kind of building," Murray says. "We're not going to do residential but we'll do a research building. We won't do speculative buildings but we would do a high-techoriented corporate headquarters like Industrial Scientific."

Murray explains that the firm's leadership has always shied away from being a general practice architect, choosing to focus on market segments where CH2M's expertise and experience can differentiate it from its competition. The branding integration coincides with an effort to increase integration among the various CH2M companies. Its architecture practice – which had long eschewed government contracts in favor of private sector opportunities – is now pursuing several large government research facilities. CH2M expects to take advantage of its systemic understanding of the government procurement and compliance regulations to help the operating entities without such experience navigate government work.

In the Pittsburgh office, Robert Roell is operations manager, responsible for the project management functions and for directing the business development for the office. Regis Susalla is design manager and responsible for ensuring that CH2M's planning is executed properly from a technical standpoint.

"That's been our charge: to make sure we're doing everything consistently across the board, that we're not treating electronics



www.ch2m.com mark.witouski@ch2m.com or metals projects differently from any other project," says Bob Roell. "We have to recognize that our customers are different. The deliverables are different; but we're trying to be consistent with customer satisfaction, exceeding customer requirements. That was one of the things that attracted me to CH2M. They have the philosophy of client for life."

Susalla notes that integration also gives them an opportunity to educate existing clients about other arms of CH2M that the clients had yet to work with.

"Even the clients that do know us well don't necessarily know what we do in all of these other industries," notes Susalla. "When you talk to people and say CH2M, actually the first place many of them go is our environmental business. They don't know that we serve all of these other industries in all of these different ways. And we do it well too!"

Witouski was brought on earlier this year to help with that education process. He points out the breadth of the work on the boards as evidence of the firm's capabilities.

CH2M is finishing the work on data centers for Penn State at the Hershey Medical and University Park campuses and is designing a data center for Michigan State. The firm is working on a large advanced research facility in London for the National Physics Lab, the English version of National Institute of Standards and Technology. It is doing studies for several groups at Carnegie Mellon University. CH2M's work at Carnegie Mellon has also led to a commission to do a small workplace design for a rapidlygrowing tech spinoff that expects to grow from 12 to 50 people in the coming two years. Not a surprise, that client required an NDA of CH2M.

"It is a very client-centered practice here. The fact that we can't talk about 50 percent of our clients, there is good with the bad because we have those clients' trust and they continue to give us projects to do," notes Witouski. "We can't talk about them. We can't show their work but, on the other hand, they keep engaging us."

## FINANCIAL PERSPECTIVE

#### Contract Security – How Do Surety Bonds Preserve Working Capital Unlike Other Forms of Security?

#### BY JAMES BLY, CPA, CPCU, AFSB

ontract bonds remain the security of choice for many prime and subcontractors due to the close relationship that is maintained between a contractor and its surety. An added benefit of posting bonds over other forms of contract security is that bonds preserve working capital while irrevocable letters of credit or job escrow arrangements erode liquidity.

Conditional surety bonds provide a built-in adjudication process that reduces the contractor's exposure to a liquidity crisis. When an irrevocable letter of credit (ILOC) is called the bank must immediately pay and the amount paid promptly converts to bank debt. Contractors and their banks are not given an opportunity to dispute the reasons for the default and the contractor's liquidity is impacted even when the contractor has a legitimate defense to the claim.

With a surety bond, the surety must weigh the merits of a surety bond default versus the contractor's defenses. The surety has legal duties that must be followed including timely response to the demand, evaluation of the contractor's defenses to the default and responding in good faith to the claimant. While the surety must respond under the terms of a bond for all valid claims (including paying for damages up to the penalty of the bond, financing the defaulted contractor to completion or hiring a replacement

contractor), the surety cannot force the contractor to perform if the contractor has valid defenses to the default. The surety claim process has the advantage of preserving the contractor's liquidity throughout the course of a dispute on a bonded contract until the facts are reviewed and a bond coverage determination is reached.

While U.S. sureties historically provide conditional bonds that only trigger when the claims process is finalized, they are now developing bond products that accelerate the adjudication process so that the surety must complete its claim investigation and reach a coverage position within a short period of time (60 days or less in some recent bond forms). These new bond forms offer accelerated payment terms to the beneficiaries of the bonds (the obligee) while providing the contractor with the protection of the surety dispute resolution process described above.

Sureties are beginning to use these products when providing bonds for prime contractors on large PPP projects or for subcontractors bidding to large CM customers that are demanding more liquid forms of security. In an effort to compete with subcontractor default insurance, the new surety products may provide general contractors with the flexibility to choose their course of remedy for a subcontractor bond default during the time that is required to evaluate the merits of the surety claim to minimize schedule impacts.

With these new forms of surety bonds, the impact on the contractor's line of credit is minimized - preserving working capital if the surety decides the bond claim lacks merit while the obligee receives the benefit of a prompt claim resolution process that is built into the bond form. What's more, the surety relies on the contractor's working capital as its primary source of security when extending additional surety credit. If a contractor's short term debt position is impacted because of a letter of credit call on a disputed



contract, it will have the compounding effect of reducing both the bank and bond capacity for a contractor while a dispute is resolved.

The use of surety bonds in lieu of an ILOC also allows contractors to maximize their bank borrowing capacity since letters of credit generally reduce the amount available to borrow when issued.

Sureties are also expanding their use of pay on demand bond forms to meet the contractual requirements in the PPP market. One surety has developed a hybrid bond that includes a pay on demand feature for a percentage of the bond penalty with the balance of the bond coming under the accelerated adjudication process. A few domestic and international sureties are also looking to provide bank syndication guarantees where the sureties become a participant on bank letters of credit guarantying up to 50% of the ILOC in a reinsurance agreement with the bank. To do so sureties are participating on a quota share basis while sharing in the bank's collateral package helping contractors expand their ILOC capacity through the use of the surety market.

Sureties are also becoming more sophisticated creditors through inter-creditor agreements that clearly define the first and second security positions for the banks and bonding companies. These agreements can help expand bonding capacity for contractors while eliminating disputes between the contractor's two largest creditors in the event of covenant violations or problems in the future.

Some owners and prime contractors rely on escrow or funds control agreements to preserve the unpaid contract balances during the course of construction to reduce the exposure to loss if a default occurs. While this practice has merit for contractors that have difficulty securing surety capacity, the contractor loses its ability to use project funds for financing overhead and debt service. What's more, escrow arrangements merely preserve contract balances while failing to provide coverage for cost overruns.

Given the choice of security requirements the surety market continues to provide the product with the best combined benefit for contractors and their obligee in today's evolving surety market.

Jim Bly is the managing director for Alliant Construction Services Group in Pittsburgh. He can be reached at 412-863-4589 or James.bly@alliant.com





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## **LEGAL** PERSPECTIVE

## Legal Issues in the Investigation and Discovery of a Party's Social Media

#### BY MARK T. CALOYER, ESQ.

n opposing party's or potential opposing party's social media profiles can be a trove of information for litigants and their counsel. However, gaining access through the discovery process, and outside it, can open the litigant and counsel in legal and ethical issues. As a general rule, attorneys can ethically view the public portions of a person's social media profile. When that profile is protected by privacy settings, courts and ethics boards have weighed in on what is permitted and what is not.

The first, and most straightforward rule falls under Pennsylvania Disciplinary Rule 4.2, which bars communication with a party represented by counsel. The Pennsylvania Bar Association's Committee on Legal Ethics and Professional Responsibility has concluded that "accessing the public portion of a represented party's social media site does not involve an improper contact with the represented party because the page is publicly accessible under Rule 4.2. However, a request to access the represented party's private page is a prohibited communication under Rule 4.2."

As to unrepresented persons, the committee concluded that "a lawyer may not use deception to gain access to an unrepresented person's social networking site. A lawyer may ethically request access to the site, however, by using the lawyer's real name and by stating the lawyer's purpose for the request. Omitting the purpose would imply that the lawyer is disinterested, contrary to Rule 4.3(a)", of the Disciplinary Rules. The committee stated its position that a lawyer may use information obtained from a social networking website in a legal dispute, so long as the information was obtained ethically. The committee noted that a competent lawyer has the duty to understand how social media works and how it may be used in a dispute because a client's postings on social media may potentially be used against the client's interests. In addition, there may be a trove of information about the user that may be discoverable in a legal dispute.

Pennsylvania Courts have permitted information from social media sites to be used in litigation, and have granted motions to compel discovery of information on private social networking websites when the public profile shows relevant evidence may be found.

For example, in McMillen v. Hummingbird Speedway, Inc., 2010 WL 4403285 (Pa. Com. Pl. Jefferson Co. 2010) the Court granted a motion to compel discovery of the private portions of a litigant's Facebook profile after the opposing party produced evidence that the litigant may have misrepresented the extent of his injuries. In the McMillen case the plaintiff claimed substantial injuries including possible permanent impairment, loss and impairment of general health, strength and vitality and an ongoing inability to enjoy certain pleasures in life. Upon review of the publicly accessible portion of the plaintiff's Facebook profile, the defendant discovered the plaintiff's comments about a fishing trip and his attendance, as a spectator, at a



car race in Florida. Thereafter, the defendant sought to compel the production of the plaintiff's user name and password to gain access to the private portions of the plaintiff's profile under the assumption that more relevant information might be contained within.

Because the public profile indicated that relevant information might be contained in the private portion showing that the plaintiff's injuries were exaggerated, and because no privilege exists between mere friends (and even if it did, any privilege was waived once the information was shared with others), the court directed the plaintiff to provide the defendant's counsel with the login and password Most jurisdictions require plaintiffs asserting fraud claims to prove a multitude of factors — including materiality, intent, justifiable reliance and proximate cause — to a stringent standard of proof.

information on a read-only basis. No information was to be divulged to any defendants in the case unless pursuant to further order of court.

In Largent v. Reed, 2011 WL 5632688 (Pa. Com. Pl. Franklin Co. 2011) the court granted a discovery request for access to a personal injury plaintiffs social media accounts. The Court engaged in a lengthy discussion of Facebook's privacy policy and Facebook's ability to produce subpoenaed information. The Court also ordered that plaintiff produce her login information for opposing counsel and required that she make no changes to her Facebook for 35 days while the defendant had access to the account.

Conversely, in Trail v. Lesko, 2012 WL 2864004 (Pa. Com. Pl. Allegheny Co. 2012), Judge R. Stanton Wettick, Jr. denied a defendant's access to a plaintiff's social media accounts, concluding that granting access to the plaintiff's Facebook account would have been needlessly intrusive under Pa. Rule of Civil Procedure 4011(b), which requires the party seeking

intrusive discovery that the information sought would provide relevant evidence not otherwise available.

Judge Linebaugh in York County noted that Judge Wettick could have based his ruling on Rule of Civil Procedure 4003.1 on the issue of relevance rather than the intrusiveness analysis, since he ultimately ruled the photographs sought on social media to be irrelevant. Hunter v. PRRC, Inc., 2013 WL 9917500 (Pa. Com. Pl. York Co. 2013). In the Hunter case, the court found the photographs sought on social media to be irrelevant under Rule 4003.1 and that no intrusiveness analysis was needed under Rule 4011. Judge Linebaugh instituted the following method for determining social media discovery requests:

Where discovery has been served requesting private information contained in an account held by a party on a social media platform that the party has specifically elected to make private pursuant to and in accordance with the commonly utilized privacy controls offered by the social media site, an objection lodged by that party to the discovery will be sustained unless the party serving the discovery makes a threshold showing

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that otherwise available information leads to the reasonable probability that relevant information is contained within the private portions of the account. The hypothetical possibility that relevant or discoverable information may exist in an account held privately is not sufficient to meet this showing. Actual facts must be shown and, for example, can consist of public postings on the party's Facebook page establishing that there are relevant private posts or information produced in discovery that establishes that there are relevant private posts. The Court will permit the discovery only where the public or otherwise available information establishes a reasonable probability that relevant information will be found on the private account. The Court does not use the language of "reasonably calculated to lead to the discovery of admissible information" because the party requesting discovery cannot know what is contained in the private pages and therefore cannot reasonably calculate that information found there will lead to relevant evidence. Otherwise, the result would be a fishing expedition.

However, if the opposing party can establish that the discovery would cause unreasonable annoyance, embarrassment, oppression, burden or expense, and therefore be prohibited by Rule 4011 or require limitation pursuant to Rule 4012, then the discovery will not be permitted or will be limited by an appropriate protective order. Depending on the facts in each specific case this showing may be very simple or more difficult. While there is no presumption that intrusion into a private account amounts to unreasonable embarrassment, etc., electing to make a social media account private is far different from publicly posting on the internet as it involves the active step of actually rendering the page private. Under the objectively reasonable expectation that information made private will not been seen by any person other than a select group of persons, a user may post personal, sensitive, embarrassing, or secret information, and their friends, in reliance on the privacy settings, may do the same. Averments as to the sensitive or embarrassing nature of posts by both the party served and that person's friends may be sufficient to require prohibiting discovery entirely or limiting discovery with a protective order. However, it is possible that this showing could not be made, perhaps in a circumstance where the party served previously had a public page and only changed the settings to private once served with discovery or where the social media page is used for purely professional purposes.

The upshot of these rulings is that discovery should be reasonably calculated, and should not resemble the proverbial "fishing expedition." But counsel's duty to zealously represent their clients means that they should be aware of proper methods of discovering relevant information on social media in pursuing their clients' claims and defenses. Clients should be made aware that their social media postings may be subject to discovery.

For more information contact Mark T. Caloyer at mtc@pietra-gallo.com.

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### Pittsburgh PLI Introduces BuildingEye to Applause

he City of Pittsburgh's Bureau of Permits, Licenses and Inspections (PLI) has been the frequent recipient of criticism for unresponsiveness, which PLI's Director Maura Kennedy understands comes with the territory. Kennedy hopes that the rollout of the department's new tracking application, called BuildingEye, will begin to change the perceptions about her department. If the initial reaction of some of BuildingEye's users is any indication, BuildingEye is a good first step in that direction

"My guys like it," says Brett Pitcairn. "They can go take a look not only at our work but at all the work that's going on in that area. It's an easy and accurate way to see what has been submitted and approved."

BuildingEye is a web-based interface between users and PLI. Pittsburgh is just the third major city in the U.S. that BuildingEye's developers have served. The other two are San Francisco and Palo Alto. You get to the system by going to pittsburghpa.buildingeye.com/building and exploring a map of the city that is covered in green and blue dots. Clicking on one of those dots will bring up the street address of the location, along with information about the permit, including the type of permit, a description of the work, the status of the permit and the permit workflow. Kennedy explains that there is more to BuildingEye's capabilities than just tracking permits.

"It's a tool to share all of the actions of the building department with all of our community members. That involves all of our customer types, from everyday citizens that are living and working in Pittsburgh to developers and contractors and small business owners," Kennedy says.

There are three main components to BuildingEye. Users can search current business licenses that PLI issues that are location-based. The system tracks neighborhood enterprises like bed-and-breakfasts and parking lots, giving neighbors the opportunity to verify that the business down the street does, in fact, have a license to operate. The system also has a way to click through to report an establishment that exists without a license.

The biggest change in the department related to BuildingEye is the ability to issue and track violations digitally. Heretofore, violations were issued manually – literally on a typewritten form – with no predictable mechanism for following up. Depending on the workload or initiative of the individual inspector, violations may have been followed up promptly or not at all. Judging by the response from Kennedy, far more of the violations were closer to the former than the latter. That made it more difficult for owners or contractors looking to respond to a violation – work by an unlicensed electrician or a vacant property for example – to understand when and how they should respond. And the sheer volume of unfiled paper trail made it almost impossible for PLI's management to follow.

"There were no standards to operate for violations before. It was completely up to the discretion of the inspector on what code section they wanted to cite, how long they wanted to take to cure, when and how they would take it to court," explains Kennedy. Noting that the paper system was so unmanageable, Kennedy allows that it was an easy system to get around. "They basically never moved into a computerized system for violations. You couldn't tell compliance stats or how many inspections were done each day. We got a really low level of compliance because people could play the game that we would forget or literally lose the piece of paper that had the violation," she laughs.

With the BuildingEye system, a complaint or violation is routed to the queue of the inspector with the certification or jurisdictional responsibility for the issue. A citation for an electrical contractor working without a permit is routed to one of the inspectors with electrical certifications; and the person responsible for managing that inspector's work receives a report that the violation has been put in the inspector's queue. Re-inspections to verify the violation has been cured are done on a documented schedule that is set by life safety priorities. A faulty fire suppression system will get a higher priority than paint peeling on a deck.

The third component is the system tracking building permits. Building permits are displayed and color-coded based on the stage of development. A blue dot denotes an active permit, one that is in the process between application and completion. A green dot means that the permit is in what Kennedy refers to as a "terminal stage," meaning that it is completed or has been revoked or denied.

As of now inspections are not yet shown but the plan review steps are. The current status is shown, including the date that the status was changed. This gives users the ability to check to see that requests for action from PLI are followed. Owners can check to see if the architect filed the revised drawings that were requested or if a subcontractor



Color-coded dots link to current information on plan review, building permit and inspection progress throughout the city.

applied for the permit for its scope of work. Kennedy says BuildingEye will be updated shortly to include more information about status – currently only the application date and the last action taken are displayed – but this capability is one for which she has already seen positive response. Pitcairn agrees.

"After a while it got frustrating to track down where things stand. We got frustrated. The owner got frustrated. The architect got frustrated," he says. "Now you can click on an interactive map and see what's going on in real time or close to it."

Kennedy points out that the BuildingEye data is actually updated nightly but says that users can get email updates about properties or projects in which they are interested. She explains that there are other information sources that PLI has made available to help the industry.

"Something I'd love to have more people use more regularly is our checklists. We're looking to take all the guess work out of having a permit," Kennedy asserts. "We've now created checklists for our inspection and review disciplines. So when all of our examiners are looking at a commercial building permit all of them are going off the same checklists and using standard comment letters to respond and we've made those standards public. I'd love every applicant to sit down before submitting [for a permit] and see how they are meeting these public standards."

Kennedy says she is seeing more people looking at that section but is anxious to see applicants review standards every time. BuildingEye is one of the first visible signs of the work that has been done to update PLI under the Peduto Administration. Maura Kennedy was brought in to bring the department into the 21st Century and discovered early on that there weren't nearly the resources devoted to operate a modern building department. Inspectors didn't have cell phones, let alone laptops or desktop computers. There weren't enough plan reviewers and inspectors to resource a department charged with enforcing 64,000 individual code sections. The improvements began immediately, even if they were incremental. Now Kennedy seems to feel some wind at her back.

"We were working towards this goal for two-and-half years. We really had to get there from day one because all of our files were on paper or in Excel files that lived on someone's desk," she recounts.

"We have a lot of really great people that work here, I have to say. That's what made it possible to come this far in such a short period of time. People are in these jobs because they love Pittsburgh and love their neighborhoods and they want to serve them," Kennedy concludes. "Creating systems and processes through which they can be successful in their individual jobs has been really exciting and people have become really excited about their jobs."



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## Trend to Watch

#### Technology Companies Are Changing How Real Estate is Used

It's about the workforce. Time and again, regardless of the information source, what comes through when the real estate needs of technology companies are discussed is the overarching need to attract and retain talent. For all of that has been written about the Millennials and the quirky open floor plan offices, the answer is that today's tech companies aren't doing what the Millennials want; they are doing what the talent wants.

You can be forgiven for protesting that this is splitting hairs. For most of the new technology companies, the pool being fished is stocked with Millennial generation talent but the more you dig into the motives of tech firms for building foosball tables and

farm-to-table cafes and beer kitchens into their floor plans, the more it seems that the Millennial thing is a coincidence. Tech companies are all about talent. Understanding what that talent looks like and expects will help you understand what the space they inhabit should look like. So, too, will understanding a little more about how tech companies operate.

It matters what tech companies need because that segment of the market is growing and currently makes up almost one-third the employment base in Pittsburgh. According to Pittsburgh Technology Council CEO Audrey Russo, 32 percent of total employment in metropolitan Pittsburgh comes from technology sector companies. That rivals or exceeds the share of the job market that steel made up 30 years ago. There are significant differences, however. For one thing, the steel industry was mature and there was

a fraction of the number of companies in that industry employing so many people. Second, and more relevant, tech companies are more dynamic and their share of the employment market is expected to increase even more over the next ten years.

For a region struggling to attract both population and workforce to offset a demographic wave that will leave a hole of 90,000-plus workers in 2025, a growing technology sector represents a great opportunity. The location of Carnegie Mellon University and University of Pittsburgh is a major factor in this sector's growth, as companies look to locate near the research and graduating students in Pittsburgh. This trend is somewhat recent, however, and the real estate community is still learning what it must do to accommodate these new companies. It's important that commercial real estate adjust as quickly as possible. Property owners and developers can provide a catalyst to a growing tech sector or be a drag to its expansion.

Tech companies are hardly homogenous but there are a few important characteristics that Pittsburgh-area firms seem to have in common. The strongest trait is their capacity for change. Most of the region's tech companies are still starting out and change in size and shape is part of the plan. Most also seem to be hiring more employees from outside Pittsburgh, even though they are locating here to be close to talent. Tech companies seem to need about 150 square feet per person and need places that are convenient to public transportation, since as many as 50 percent of their workers don't drive to the office.

What these requirements add up to first and foremost is flexibility.

"Every tech firm has to prepare for flexibility," notes Carrie Holdstead, CEO of Carrie S. Holstead Real Estate Consultants/ITRA Global. "You plan for everything to work out but you better have a contingency plan."

Holstead is part of a global tenant representative network and sees the concurrence of the needs of younger people and younger companies with her tech clients. One of the ways that flexibility manifests itself in real estate is in lease term. Companies that are growing their body count exponentially (or cutting) may have space needs that change annually so lease terms that are short will be favored. In a town where landlords are accustomed to ten- and five-year commitments, that's a paradigm shift.

Mark Bozzone, president of Bayberry Development, is the owner of a mixed-use building on Walnut Street in Shadyside that was home to Duolingo, one of Pittsburgh's faster-growing tech firms. Duolingo moved in 2016 to East Liberty after outgrowing its space in Bayberry's building. Bozzone says he went into the leasing relationship with eyes wide open and sees the long-term benefit to offering flexibility. For one thing, the tradeoff for a short-term or open-ended lease was that the tenant took on most of the buildout cost, giving Bayberry an upgraded space at lower cost. Another benefit is in the attraction of other tech tenants.

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"Duolingo expected to grow to 12 people at the time they moved in and expected to grow to 50 people within two years. We certainly didn't have the space for them," says Bozzone. On the heels of Duolingo's departure, Bozzone says another CMU startup heard about the space and is moving in, although its plans are to be too large in two or three years. Located midway between CMU's campus and the hot bed of East Liberty, Shadyside's Walnut Street is an ideal location for companies bouncing between the first and second steps of growth.

Gaming software developer Schell Games is a company that has moved beyond its toddler stage as well. Its South Side location was a function of good rent and proximity to Carnegie Mellon's Entertainment Technology Center at the Pittsburgh Technology Center, where founder Jesse Schell still teaches and from where Schell Games hires many of its grads. When the company looked to move in 2015, those needs were at the front and center of the search. A persistent tenant rep led Schell Games to a solution that was off the radar but right on target.

"We were close to doing a deal just a few blacks from our old office. Jack [Donahue] called and asked us to look at another space in Station Square. I said no but Jack convinced me to take a look," recalls Jake Witherell, COO at Schell. "We had a conversation with Jack and I said our people wouldn't want to be in Station Square. He asked when we were last there and said that it was very different now. He was right."

Schell Games took 16,500 square feet of bright, colorful, open space at a very competitive rent. What Witherell says they discovered was that Station Square met a number of other needs they hadn't considered. The proximity to Downtown and its amenities is very attractive to employees. Station Square offers multiple commuting options, including multiple public transit modes and bicycling. More important was the 24-hour security, which Schell Games hadn't had before. Witherell allows that the constant security is a big benefit for a workforce that will be working at all hours of the day. He says that in the final analysis, Station Square was a non-tech building that met the requirements of a tech company.

"The space was great but we realize now that there are all these other strategic reasons for being in Station Square," concludes Witherell.

One reason that a company like Schell Games could consider space that is more removed from the heart of Oakland's talent center is that its tech partner was located on Second Avenue. But the growth of tech companies in Pittsburgh was also a factor and the current state of the tech sector means that companies can look outside an immediate tech corridor. Part of Pittsburgh's business attraction problem heretofore was that there wasn't a critical mass of tech companies here. It's still debatable as to whether or not we've reached critical mass but the maturity of the tech sector in Pittsburgh means that there are enough companies that talent can be attracted and retained.

There's an interesting dichotomy to the talent factor in high tech. Having a dense cluster of tech companies makes it easier to attract tech talent. It also makes it easier to poach talent from other tech companies, a fact that is a plus to talent and to tech firms – up to a point. One company's recruit is another's turnover, however, and that is the downside to a dense tech cluster. For now, Pittsburgh is in the "Goldilocks" phase: not too big and not too small.

Denis Meinert is the CFO of Duolingo. He recalls that the company's search for venture capital was interwoven with its location.

"A Silicon Valley VC firm wanted us to move there. On the term sheet they provided there was a blank line that showed a date for us to fill in when we would be moving to the Bay Area," Meinert says. "Fortunately for us we also had an offer from Union Square Ventures out of New York City. Because of the high cost of New York and the relative ease to get to Pittsburgh, they agreed to let us stay in Pittsburgh.

"[Our] desire to stay in Pittsburgh was that we were a CMU company and were already in Pittsburgh. There's great benefit to talent retention. The average turnover rate in the Bay Area is 20 percent; Pittsburgh is less than five."

Talent attraction is something of a chicken or egg symbiosis, with higher turnover as the unintended consequence of success. Part of what has also developed when tech communities like Silicon Valley or Boston took off was the development of co-working space, where companies could affordably use different spaces as they started. Having enough co-working space is a key to developing a tech cluster. Attendees who were part of the 2014 regional benchmarking trip to Denver saw the role that ample co-working real estate played in the explosion of that city's high-tech Wasatch corridor. To the tech industry, ample co-working space means that a city's real estate industry understands how tech operates.

Co-working spaces offer access to workplaces from desks to multi-room offices, often for short terms. Space is leased daily, weekly or longer-term and can be swapped for other space as need and availability dictate. Desks with workstations can go for \$100 to \$250 per month, offices for as little as \$300 to \$500. Because the lessee is paying mostly just for space it uses, the cost is about 25 percent lower than a traditional office lease, if you could find a lease for a desk or one that allowed you to move from a desk to a conference room to a two-office suite – and back – in the same week.

Operating a co-working space is an administrative headache, not unlike running a hotel, but the resultant rental rates are also exciting. Tenants aren't looking for square footage but when the income is adjusted to a per-square-foot basis, rents are as much as twice the market rate. That's why WeWork's 3.5 million square foot business is valued at \$16 billion, nearly the same as Boston Properties – the largest publicly-traded office landlord – and its 45 million square foot portfolio.







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According to Faros Properties, the offices in Alloy 26 are fully leased and the co-working space is expanding by another 10,000 square feet. Photo by Denmarsh Photography.

"It makes sense for everybody," says Meinert. "You can get higher rents. But you have to have [inventory]. In Silicon Valley, we can look for space and move in next month and it would be great space and we'd get flexible terms."

There has been flexible incubator-type space in Pittsburgh for decades but co-working space is very different. It's Class A space that can be used flexibly. Developers have created many smaller co-working spaces over the past few years. Places like Beauty Shop, Cube, The X Factory, Revv Oakland, Catapult, StartUptown, BrunoWorks, Work Hard PGH and Pittsburgh Green Innovators' eWorkshop have carved out niches and supported startups in the region. Over the past couple years the reputation of Pittsburgh's tech cluster is beginning to attract bigger players. Level Office announced recently that it was buying the 48,400 square foot building at 606 Liberty Avenue for co-working space. Regus has several locations throughout Pittsburgh (although each is relatively small). WeWork announced plans to find a location for 40,000 to 60,000 square feet in Pittsburgh. Alloy26 is adding 10,000 square feet to the 30,000 square feet it opened just a few months ago in Nova Place, the former Allegheny Center Mall being redeveloped as a tech center by Faros Properties.

Faros has been successful in attracting tenants as it invests more than \$100 million to repurpose the former mall. Insurer United Healthcare is taking 70,000 square feet and Confluence has rented 40,000 square feet for its headquarters. But the company's managing partner, Jeremy Leventhal, sees the success of Alloy 26 as a validation of the property's tech branding and is investing significantly to expand upon the co-working concept further.

"The entire interior of what we call the concourse – the former mall – is intentionally being designed as co-working space," he explains. "We are bringing in partitions to break it up and putting in work stations, couches and furniture, televisions and other amenities."

Leventhal goes on to explain that this isn't being done to create leasable space. The roughly 40,000 square feet of co-working space that will result from renovating the concourse will be available to the tenants of the 1.5 million square foot office, as well as to the public at large. Along with other tenant amenities that have been attracted, the concourse is meant to add value to Nova Place's users, many of which Leventhal expects to be tech companies.

"The concourse is really about public collaboration and Alloy 26 is about private space," he notes.

Another trend in high tech is developing that may mitigate some of the turnover issues and make it easier to develop co-working space. The Affordable Care Act made it feasible for independent contractors to afford reasonable health care insurance. That has helped push the share of 1099 workers to 28 percent in the tech cluster. Audrey Russo believes a trend within that trend is creating demand for more co-working space.

"Independent contractors have gone through this evolutionary shift," Russo remarks. "They free lance and tried working from home

but that didn't work very well. So then they went to a coffee shop but that doesn't really let them set up. They need a place where they can have a desk and a place to meet when they need it."

The relationship between commercial real estate and the technology economy is important to Pittsburgh. Both startups and existing tech giants are finding the San Francisco area increasingly difficult for business. Costs for housing are astronomical. Regulations continue to increase. California's huge fiscal woes represent a risk of higher burdens for its employers. In recent years, high tech has been looking more favorably at second cities for locations. That's part of the reason that Google, Uber and others view Pittsburgh favorably. It's important to remember that – unlike the last industrial boom – tech companies aren't coming to Pittsburgh because of its rivers and railroads; they are looking to Pittsburgh for what draws talent. And that's affordability, diversity, flexibility and an economic infrastructure that understands the tech ecosystem. Real estate is part of that.

Cities like Denver and Austin have moved top of mind for tech companies as alternative locations to Silicon Valley. It's probably no coincidence that Denver and Austin are among the top handful of large cities in population growth, a factor critical to Pittsburgh's continued economic strength. Pittsburgh is working hard to be in the next wave and its property owners and developers must be part of the solution.

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## AWARDS & CONTRACTS

AIM Construction was awarded a contract from UPMC for the \$28.5 million Presbyterian University Hospital Heart and Vascular Institute renovation in Oakland. Construction on the first phase is scheduled to begin in December. Bostwick Design Partnership is the architect.

**PJ Dick Inc.** was awarded a contract for renovations to the Duquesne Club's first floor. Construction is underway on the \$6 million project. The architect is H. Chambers Company.

UPMC selected Massaro Corporation as contractor for the renovation of the Presbyterian University patient floor 5G. The architect for the \$5 million project is IKM Inc.

**Turner Construction Co.** was awarded a \$2.3 million contract for the renovations to the UPMC Passavant Hospital Heart and Vascular Institute. Stantec is the architect.

The University of Pittsburgh awarded **Turner Construction** a \$5 million contract for the renovations to Alumni Hall Admissions. Perkins Eastman Architects is the architect for the project. Construction is scheduled to start in August 2017, with a 20,000 square foot second phase backfill renovation to follow.

Facility Support Services, LLC (FSS) was recently awarded Phase I of the AT Building Office Space Alteration valued at \$18.1 million by Bechtel Marine Propulsion Corporation at Bettis Atomic Power Laboratory in West Mifflin, PA. The AT-Building first and second floor offices will feature all new interior finishes; major infrastructure and life safety upgrades; and new elevator.

**FSS** is providing tenant fit out services for 16th Floor Fit-Out of Tower Two Sixty for Coury Financial Group LLP. This 14,000 square foot project will complete December 2016.

**Jendoco Construction Corp.** is the general contractor for renovations to 9,600 square feet of the second floor for Invision Human Services on Perry Highway in Wexford, Pine Township. The architect is JC Pierce LLC.

**Mascaro** was selected as the construction manager for the UPMC Shadyside Patient Unit Renovation West Wing project. The scope of work includes upgrades to patient rooms on floors 3 through 7.

Carnegie Mellon University selected Mascaro as the construction manager on the Tata Consultancy Services Building. The project is currently in preconstruction.

**Mascaro** was selected as a contractor under the University of Pittsburgh's Job Order Contract program. Mascaro is currently working on two projects under this agreement.

UPMC awarded a contract to **Mascaro's Client Services Group** to renovate the fourth floor at UPMC Harbor Gardens.

Pittsburgh-based ground improvement specialists **Menard Group USA** successfully completed the installation of vibratory stone columns to stabilize the ground for a new 90,000 square foot warehouse and distribution facility in Elizabeth, NJ.

Remington Hotels Inc. awarded contracts to **F. J. Busse Co.** for renovations to two of its hotels in metropolitan Pittsburgh. Remington will invest \$1.5 million in upgrades to its Homewood Suites in Soutpointe, Cecil Township and at the Hampton Inn Meadowlands in North Strabane Township. The architect for the projects is George Sarfatty AIA.

**Rycon** and Desmone Architects are the design-builders responsible for the new \$41 million, 300-unit South Hills Village Apartments in Bethel Park. Suncap Properties/Dawson is the owner of the 330,000 square foot project.

**Rycon's Building Group** was awarded a construction management contract for the \$8 million first phase of improvements at Jameson Hospital in New Castle, PA.

A \$25 million construction management contract for a new 62,000 square foot dining hall at Eastern Kentucky University was awarded to **Rycon's Building Group**. Located in Richmond, KY, construction will continue until early 2018.

A \$6 million renovation of the fifth floor at Montefiore Hospital recently began. The 13,500 square foot project will be completed in eight months by **Rycon's Special Projects Group**.

**Rycon's Special Projects Group** is performing parking lot improvements at two PNC Bank branches in Western PA at Robinson Towne Center and Sewickley. Each project is scheduled to last approximately a month.

**Rycon's Special Projects Group** is wrapping up work on a light industrial renovation to FedEx Ground's Neville Island facility in Coraopolis, PA.

Oxford Development Company selected **Rycon** to complete a multi-million dollar renovation of Community Life, an assisted living facility in McKeesport, PA. IKM Architects is the designer.

At UPMC Shadyside, **Rycon's Special Projects Group** will soon begin work on a CT replacement. The renovation project is set to last four months.

A nuclear/infusion outpatient center is undergoing renovations by **Rycon's Special Projects Group** at UPMC East. The project is slated for completion before the end of the year.

Concord Hospitality selected **PJ Dick Inc.** as contractor for its \$40 million Autograph Hotel, to be built at the Pittsburgh Athletic Association site in Pittsburgh's Oakland section. The architect is PFVS Architecture.

South Park School District selected **PJ Dick** as construction manager for its \$9 million stadium and field house/concessions additions and renovations. The architect is HHSDR Architects & Engineers.

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**PJ Dick** was awarded a \$2.9 million contract by the Jewish Association on Aging for addition and renovations to its Memory Care Unit in Squirrel Hill. LGA Partners is the project architect.

Marshall University selected **PJ Dick** as construction manager for its Medical School Student Housing and Pharmacy in Huntingdon, WV. The project is being designed by Perkin + Will and Edward Tucker Architects Inc.

Crow Hill Development selected Mosites Construction as its contractor for the redevelopment of three former H. J. Heinz buildings into 125 luxury apartments. The \$25 million, 220,000 square foot project is being designed by Indovina Architects.

**TEDCO Construction** completed construction of the new boat house at the Island Sports Center on Neville Island for Robert Morris University. The 3,200 square foot facility was built in two months. RBA International was the architect.

Robert Morris University selected **TEDCO Construction** to build its new student recreation and fitness center at the North Athletic Complex on its Moon Township campus. The \$5 million to \$6 million building is in the early stages of design. RBA International is the architect.

**TEDCO Construction** is the construction manager agent for the \$40 million-plus expansion of Providence Point in Scott Township. Reese Lower Patrick Scott Architects is designing the project, which should bid in late spring 2017.

Highwoods Properties awarded a contract to **A. Martini & Company** for the tenant buildout for Industrious at One PPG Place.

**Volpatt Construction** was the successful contractor on the elevator addition and toilet room renovations at St. Theresa of Avila Roman Catholic Church in Ross Township. The architect is Hayes Design Group.



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## FACES & NEW PLACES

Burchick Construction Company, Inc. was recently honored as Restoration Contractor of the Year by StructureTec, a national structural engineering firm with corporate headquarters located in Kalamazoo, MI. Burchick received this award for its structural rehabilitation work on the 570 car UPMC Victoria Street Parking Garage located in the Oakland section of Pittsburgh.

Facility Support Services, LLC (FSS) announced that Michael McCormack has been promoted to president of FSS. As president, Michael will oversee all aspects of business strategy and operations. He will be responsible for providing FSS' direction, growth and performance to enhance revenues, profitability, operating efficiency and organizational development.

Nicholas Kochis has been promoted to operations manager at FSS. In his new role, Nick will oversee operations for project management, coordination and engineering in Pennsylvania and West Virginia. Nick joined FSS as a superintendent in 2013 and was promoted to project manager in 2015.

**Tammy DeMarco** has been promoted to estimating supervisor at **FSS**. Her responsibilities include overseeing the estimating and bidding process including all bid coordination and subcontractor development. Tammy joined FSS as office manager in 2011 and was promoted to estimating coordinator and executive assistant in 2014.

Alexandra Lees has been promoted to executive assistant/ project engineer at FSS. She is responsible for providing administrative support to the construction teams and managing subcontracts. Alex joined the firm as administrative assistant in 2015 and was promoted to project coordinator shortly thereafter. **Facility Support Services, LLC** anounced that President John P. Mroz has been promoted to the role of vice president of operations – Healthcare, Defense and Construction Group for Goldbelt Inc. FSS is one of 13 subsidiaries owned or partially owned by Goldbelt. Mroz graduated from the University of Pittsburgh with a chemical engineering degree and has more than 20 years of construction management experience in the federal and commercial construction industry.

**Shannon Gilman** became part of the **Mascaro** team in September, and is currently providing support to Mascaro's Client Services Group.

**Bridget Johnson** joined **Mascaro** in September as a manager of business development for Mascaro's Heavy/Industrial group. Bridget will be focusing on Mascaro's oil and gas market.

**Rycon Construction** added **April Austin** as BIM coordinator/project engineer in the Building Group. She earned a degree in Civil Engineering Technology from Point Park University and brings five years experience to the team.

**Rob Phillips** joined **Rycon's Casework & Millwork Division** as project manager. He has over 28 years experience in the casework/millwork trade.

**Stacey Wagner**, an experienced estimating assistant, recently joined **Rycon's Special Projects Group**.

**Rycon Cleveland** added administrative/estimating assistant **Mary Sack**. She brings over 15 years experience to the team.





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Lutheran Senior Life, Zelienople PA Interiors contractor, T. D. Patrinos Painting & Contracting Co. Another high quality MICA project Photo by Massery Photography



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## INDUSTRY COMMUNITY NEWS



(From left) Debra Lam from the City of Pittsburgh, Green Building Alliance board president Christine Mondor from Evolve EA, Luminary Award winner Mike Gable from Construction Junction, Legacy Award winner Jared Cohon from CMU with GBA/s Andrew Ellsworth and Aurora Sharrard at the GBA's Emerald Evening celebration.



Mascaro's Alyssa Kunselman with Tony Pitassi and Lisa Carver from PWWG (right).



Jendoco's Michael Kuhn (left) with Gary and Cherie Moshier of Moshier Studio.

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CMU's Rodney McClendon (left), Don Coffelt and Ralph Horgan.

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NECA's Cody Phillips (left) and Chad Jones (2nd from right) with Ferry Electric's Bill Puhlman and Jim Ferry (right) at the MBA golf outing.



Jim Bly from Alliant Insurance (left), MBA President Steve Massaro and Gennaro DiBello from Schneider Downs (right).



(From left) Michael Klein from Blumling & Gusky with A. C. Dellovade's Tom Haught, Joe Gizoni and Wade Stull.



(From left) A. Martini & Company golfers included Mike Yohe, Mike Larson-Edwards, Zach Roberts and John Latsko.



Celebrating BreakingGround's 10th Anniversary were PenTrust's Tyler Noland (left) with Seubert's Brian Jeffe and Jay Black (right).



(From left) Ray Volpatt Jr., Steve Massaro and Bernie Kobosky from PJ Dick.



Michael McCormack from Facility Support Services with Huth Technologies' Zach Huth (right).



David McKamish (left), Carson Publishing's Kevin Gordon and Naley McKamish.

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Uhl's Dave Hengelsberg (left) and TEDCO's Jim Frantz.



(From left) BDO's Heath Winsheimer, Patrick Sentner from Colliers International and Joe Bosick and Christopher Ballod from Pietragallo Gordon Alfano Bosick and Raspanti.



(From left) Jack Scalo, Rycon's Todd Dominick and Sharon Landau.



Pietragallo's Jim Buldas (left) with Frank Zottola from Independence Excavating.



The MBA's Jack Ramage (left) and Bob McCall (right) flank Jason Fincke of the Builders Guild.



Burns & Scalo's Derek Dennick (left) and Mike Halpin.



BDO's Tom Menk (left) and Dick Spence from Hill Barth King.



Joe Massaro III accepts the 2016 James Kling Fellowship award on behalf of his late father at the AIA Design Awards. The Kling Fellowship is awarded by the AIA/MBA Joint Committee and recognizes achievement in collaboration between the contracting and architectural communities.





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DLA's Kari Miller (left) and Nick Doichev with Stantec's George Halkias (right) at the AIA Design Awards. Photo by Renee Rosensteel



(From left) Rycon Construction's Mike Schesler and Nick Shafer with Lindsay Schwotzer from Continental Office Environments at NAIOP Pittsburgh's Night at the Fights.



Seubert's Brian Hartman and Mark Zywotko of Zywotko Development (right).



Jendoco's Michael Kuhn (left) and wife Megan Kuhn, Chris Burd and Domenic Dozzi at the Cystic Fibrosis Passion for Wine.







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# **CLOSING** OUT

## Al and Robotic Technology Will Transform Worksites DR. ANDREW W. MOORE, PHD

very day I look out my office window to see a construction crane, raising yet another new classroom building at Carnegie Mellon University out of the ground. It's exciting to watch. It's also exciting to think about how the technologies we're developing here might influence future construction projects.

Our Robotics Institute, for instance, has long specialized in building robots that can perform dirty and dangerous jobs. Our National Robotics Engineering Center (NREC) has worked with heavy equipment manufacturers to automate trucks, tractors and other machines, using the autonomous navigation technology that was pioneered at Carnegie Mellon and that is currently driving the self-driving car industry.

NREC also is working with a major mining company to build autonomous robots that can operate in mines with exceptionally low ceilings. Special purpose robots such as these can go places where workers just don't fit, or where they can't work efficiently. They also can do work in places where it simply isn't safe to send a human.

Similarly, one of our professors, Howie Choset, has spent years developing snake-like robots that can wriggle their way through collapsed buildings. But they also are adept at maneuvering through or around pipes, providing both new ways of "snaking" cables and of inspecting pipes, vents and similarly narrow spaces.

One rapidly growing tech area concerns unmanned aerial vehicles, particularly quadrotor drones. By now, we're all familiar with the types of photos these drones make possible. But researchers also have equipped drones with laser sensors (lidars) that can produce 3-D maps of their surroundings – simply fly the robot anywhere you want to map. We've been developing these flying machines for inspecting bridges and other infrastructure, finding ways of melding photo imagery with 3-D maps. These could also be used to provide updated maps of ongoing construction and to perform inspections in areas where it might be dangerous for workers.

We want people to be creative in making buildings better, rather than risking their necks.

It's important to note that we're not talking about robots necessarily replacing people. Rather, the pattern we see over and over is that robots can make workers better, either by doing jobs that were previously impossible to do or by working with people to make them more efficient. We've shown, for instance, that a robot working with a human can construct a custom Humvee frame in just two days, compared to the two weeks normally required by a human welding crew.

It's not just about robots, however. New technologies also can sense what workers are doing and provide some advice. One technology being developed with help from the National Science Foundation combines on-body cameras with super-fast network connections in a way that allows the computer to serve as "an angel on your shoulder." This system, called Gabriel, would enable an artificial intelligence to provide expert advice – and give warnings if near-catastrophes – when workmen are installing complex equipment.

Other technologies could enhance this further. It's now possible for a digital device to automatically detect that a worker is using a handsaw, or a power drill, or any number of other tools. If it creates vibration or uses an electrical current, it can be identified, enabling computers to understand what workers are doing, minute by minute.

Some of this new technology might be employed long before anyone breaks ground. We've seen some dramatic advances recently in emotional artificial intelligence – using computer vision to analyze the emotions of people. This information can be surpris-



ingly precise, so much so that it can help doctors diagnose or monitor depression.

This technology has been used to analyze the user experience with web sites, identifying when users appear confused or happy. I believe we can start using these same principles for designing new spaces, looking for how real people respond to a variety of environments. This could lead to development of new design principles that will ensure people are happy with their built environment. It might also be possible to test possible designs using virtual reality.

Tremendous advances in artificial intelligence – emotional or otherwise – are occurring now and we're finding new ways of incorporating AI into the workplace every day. Just as I don't know precisely what is going on as I watch that construction crane outside my window, I can't predict all of the ways that AI and robotic technologies will transform the construction industry. But I'm absolutely convinced that these technologies will enhance the safety and efficiency of work sites in the future and that the resulting structures will knock our socks off.

Andrew Moore is dean of the Carnegie Mellon University School of Computer Science. A member of Carnegie Mellon's faculty since 1993, Moore also served as director and vice-president of engineering for Google Pittsburgh from 2006-2013. He can be reached at awm@cs. cmu.edu.

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