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Construction Analytics 2019 Construction Economic Forecast – Nonresidential

This Dec. 2018 Construction Economic Forecast analysis addresses New Construction Starts, Inflation, Cash Flow or distribution of construction work over time, Annual Backlog and Spending. New Starts is new work entering Backlog. Cash Flow gives the pattern of Spending. Inflation differentiates between Revenue and Volume. Backlog, which can be referenced to assess expected future Volume and Spending, provides an indication of when Volume occurs or in what year Revenues occur. Starts data is from Dodge Data & Analytics. Spending data is from the U.S. Census Bureau. Jobs data is from the Bureau of Labor Statistics. Inflation data is from the source labeled. Cash flow, Backlog and Inflation forecast data are developed internally. All data in this report is national level data. All forecast data is by Construction Analytics.

NOTE 12-6-18: Dodge Data and Analytics new construction starts for October, released 11-20-18, reached the 2nd highest seasonally adjusted annual rate ever, 2nd only to June 2018. Most spending from these new starts will occur in 2020. This will increase the 2020 nonresidential buildings spending forecast, with the largest increase in manufacturing. Construction Starts for October, the Dodge end-of-year report and October spending, all released between 11-21-18 and 12-3-18 significantly alter this analysis. The biggest changes reduced residential spending for the next two years. ***See the 2019 Construction Economic Forecast – Summary for the residential analysis.***

This analysis was edited 12-6-18 to include that most recent starts data and the U S Census October spending data.

Summary

Total of All construction spending is forecast to increase 6% to $1.321 trillion in 2018 and 1.5% to $1.341 trillion in 2019. Spending in 2020 is forecast to reach $1.426 trillion.

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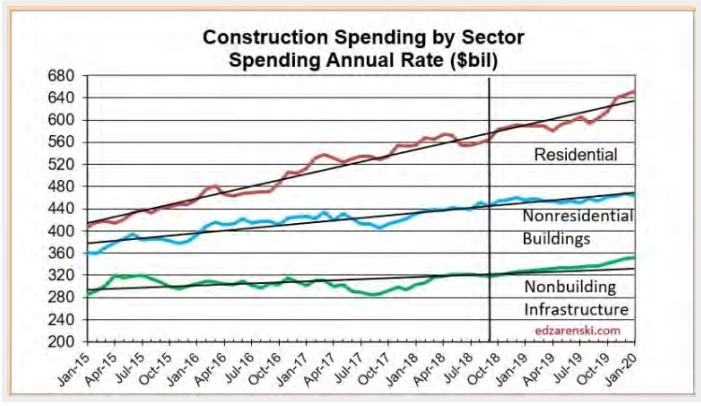
U.S. Total Construction Spending Summary

$ in billions % growth vs prior yr	Actual 2016		Actual 2017		Forecast 2018		Forecast 2019		Forecast 2020	
Total Construction	1192	7%	1246	5%	1321	6.0%	1341	1.5%	1426	6.3%
Residential	474	11%	532	12%	562	6%	564	1%	577	2%
Nonresidential Buildings	415	9%	419	1%	444	6%	443	0%	482	9%
Nonbuilding Infrastructure	303	-1%	295	-3%	316	7%	334	6%	367	10%
Educational	90.3	7%	91.2	1%	96.5	6%	92.8	-4%	103.4	11%
Healthcare	40.2	3%	41.9	4%	42.2	1%	41.1	-3%	46.6	14%
Amusement / Recreation	23.2	14%	24.9	7%	27.8	12%	31.1	12%	31.7	2%
Commercial / Retail	78.2	19%	87.7	12%	91.7	5%	90.8	-1%	90.3	-1%
Lodging	27.0	23%	28.7	6%	32.3	13%	31.0	-4%	31.6	2%
Office	67.6	22%	66.9	-1%	74.1	11%	78.6	6%	84.2	7%
Manufacturing	76.4	-4%	66.4	-13%	66.7	0%	65.3	-2%	82.2	26%
Other Nonres Bldgs	11.7	-3%	11.7	-1%	12.3	5%	12.3	0%	12.3	0%
Power	101.4	-2%	96.5	-5%	102.0	6%	108.6	6%	106.6	-2%
Highway / Bridge / Street	92.7	2%	89.1	-4%	92.1	3%	93.3	1%	105.3	13%
Transportation / Air / Rail	43.3	-4%	45.2	4%	54.5	21%	62.1	14%	75.1	21%
Sewer / Water / Conservation	43.8	-3%	39.4	-10%	43.1	9%	46.4	8%	56.2	21%
Communication	22.2	2%	24.8	12%	24.5	-1%	23.3	-5%	23.4	0%
Forecast includes U.S.Census October 2018 year-to-date spending										
Forecast includes Dodge construction starts data as of 11-21-18									edzarenski.com	

Nonresidential Buildings construction spending is forecast to increase 6% to $444 billion in 2018, 0% to $443 billion in 2019 and 9% to $482 billion in 2020. The forecast for 2019 will be supported by Office (which includes data centers) and Amusement/Recreation but there is downward pressure from slowdowns or timing of cash flow in Manufacturing, Lodging, Healthcare and Educational. Educational, Healthcare, Recreation, Office and Manufacturing all support growth in 2020.

Residential construction spending for 2018 was recently revised down and starts for 2019 are expected flat to down slightly. The forecast is now for an increase of 5.6% to $562 billion in 2018, 0.5% to $564 billion in 2019 and 2.3% to $577 billion in 2020. Although residential spending is still increasing, growth has slowed to less than inflation. Real volume after inflation is declining.

Nonbuilding Infrastructure construction spending is forecast to increase 7.2% to $316 billion in 2018, 5.7% to $334 billion in 2019 and 10.1% to $368 billion in 2020. Transportation spending provides strong growth for the next three years from record new starts in 2017 and the 2nd best year of starts in 2018. Public Works had strong growth in 2018 starts and Highway starts hit a new high in 2018.



In July of the following year the spending data for the previous two years gets revised. Those revisions are always up, although some markets may increase while others decrease. So, even though the current forecast for 2018 is $1,328 trillion, a gain of 6.5%, that will most likely increase.

Dodge Data construction starts are initially anticipated to finish 2018 flat compared to 2017. However, starts are always revised upward in the following year. I expect revisions will show 2018 starts increased by 4% over 2017. Even with revisions, 2018 starts will post the slowest growth since 2011. Starts increased 84% in the period 2012-2017, residential 150% and nonresidential buildings 80%. This forecast includes only a total of 10% growth for the 3-year period 2018-2020.

Starting backlog, currently at an all-time high, increased on average 10%/year the last three years. For 2019 starting backlog is forecast up 10% over 2018. 80% of all Nonresidential spending within the year will be generated from

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projects in starting backlog. Due to long duration jobs, 2019 nonresidential buildings starting backlog is up 50% in the last 4 years. Current indications are that 2019 backlog will be up 6%-8% across all sectors.

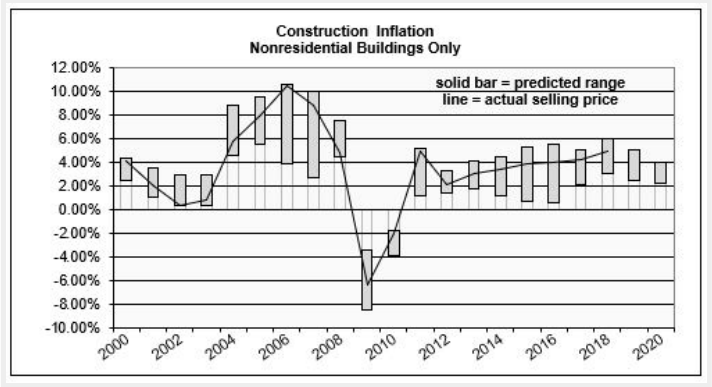
Construction Inflation Indices

Outside of recession years, nonresidential buildings construction spending year over year growth dropped below 4% only SIX times in 50 years. The long-term average inflation is 3.75%. Every year that spending dropped below 4% growth, nonresidential buildings real volume declined.

Construction Analytics Nonresidential buildings inflation forecast for 2018 is 4.9%. Current reliable inflation forecasts range from 4.7% to 5.6%. Inflation in this sector has been at 4% or higher the last four years.

Anticipate national average construction inflation for nonresidential buildings for 2018 and 2019, including steel tariff impact, of 4.25% to 5.5%, rather than the long-term growth average of 4%. Adjust for any other yet unknown tariffs that may hit after Jan 1, 2019.

In the following plot, Construction Analytics Building Cost Index annual percent change for nonresidential buildings is plotted as a line against a bar chart background of the range of all other nonresidential building inflation indices. Usually the lows are formed by market basket input indices while the highs are formed by other selling price indices.



Non-building Infrastructure indices are far more market specific than any other type of index. Reference specific Infrastructure indices rather than any average.

These links point to comprehensive coverage of the topic inflation and are recommended reading.

Click Here for Link to a 20-year Table of 25 Indices

Click Here for Cost Inflation Commentary – text on Current Inflation

New Construction Starts

All construction starts data in this report references Dodge Data & Analytics Starts Data.

For nonresidential buildings, approximately 20% of the spending occurs in the year started, 50% in the next year, 25% in the third year and only 5% in the fourth year or later year. This means that nonresidential spending growth in 2019 is still being affected by starts from 2016.

The following plot show the 3-month moving average and trend line of starts for Nonresidential Buildings. Starts can be erratic from month to month. The trend line gives a better impression of how starts impact spending. It is the rate of change in starts cash flows that provides a predicting tool for spending.

Starts are sometimes misinterpreted in common industry forecasting articles. Starts dollar values represent a survey of about 50% to 60% of industry activity, therefore Starts dollar values cannot ever be used directly to indicate the volume of spending. Also, Starts do not directly indicate changes in spending per month or per year. Only by including an expected duration for all Starts and producing a forecast Cash Flow from Starts data can the expected pattern of spending be developed. Finally, it is the rate of change in Starts Cash Flows that gives an indication of the rate of change in spending.

Starts is a survey sample of a portion of all construction, on average about 50% to 60% of all construction. This can introduce potential error when using starts to predict spending. In any survey, if sample size remains constant, let's say at 50% of population, but survey response increases 5%/year, then output of the population should increase at 5%/year. However, if survey response increases at 5%/year but sample size is increasing at 3%/year then output of the population should increase at only 2%/year.

If starts survey sample size varies from year to year, it's possible some of the anticipated spending growth reported by new starts may not represent growth in real volume of future work but could simply represent a change in sample size. Potential significant variations in sample size are seen in the data and may cause errors in the forecast. The detail of Education spending provides an example.

Starting Backlog

Nonresidential Buildings starting backlog at the beginning of 2018 reached an all-time high. For nonresidential buildings this backlog will contribute spending until the end of 2021. Starting Backlog for 2019 is forecast to increase 8%. For purposes of this analysis, I've set only moderate or low increases in starts for 2020 and 2021, so this forecast may hold down the future backlog and spending forecast. However, backlog leading into 2019 is up 70% in 5 years.

	FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG									
Cash Flow from Backlog	NonRes	Change	NonRes	Change	NonRes	Change	NonRes	Change	NonRes	Change
NONRESIDENTIAL BLDGS	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr
$ in billions	**2017**		**2018**		**2019**		**2020**		**2021**	
Backlog at Start of Year	250,938	10.9%	288,495	15.0%	312,049	8.2%	328,734	5.3%	350,122	6.5%
Backlog CF Within Year	180,989	**7.9%**	201,569	**11.4%**	208,680	**3.5%**	211,413	**1.3%**	232,592	**10.0%**
Backlog ETC at End Yr	69,950		86,926		103,369		117,320		117,530	
New Starts in Year	270,302	11.1%	274,734	1.6%	275,183	0.2%	284,295	3.3%	285,600	0.5%
New Bldg CF Within Yr	52,179	**1.4%**	49,644	**-4.9%**	50,232	**1.2%**	51,921	**3.4%**	52,343	**0.8%**
New Bldg ETC at End Yr	218,122		225,090		224,951		232,374		233,257	
Total CashFlow in Year	233,168	6.4%	251,214	7.7%	258,912	3.1%	263,335	1.7%	284,935	8.2%
Backlog ETC End Year	288,072	15.1%	312,016	8.3%	328,320	5.2%	349,694	6.5%	350,787	0.3%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Starting Backlog is the Estimate-to-Complete (ETC) value of all projects under contract at the beginning of a period. Projects in starting backlog could have started last month or last year or several years ago.

- 75%-80% of all **Nonresidential Buildings spending** within the year will be generated from projects in starting backlog.

- 80%-85% of all **Non-Building Infrastructure spending** within the year will be generated from projects in starting backlog.

Non-building Infrastructure starting backlog at the beginning of 2018 reached an all-time high. Some of this is very long-term work that will contribute spending until the end of 2025. In fact, more than half of all spending in 2019 comes from projects that started prior to Jan 2018. 2019 Backlog is forecast to increase 10%. Backlog is up 45% in 5 years but is up 50% in just the last 3 years.

	FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG									
Cash Flow from Backlog	NonBldg	Change	NonBldg	Change	NonBldg	Change	NonBldg	Change	NonBldg	Change
NONBUILDING INFRASTRCTR	infra	Yr/Yr	infra	Yr/Yr	infra	Yr/Yr	infra	Yr/Yr	infra	Yr/Yr
$ in billions	**2017**		**2018**		**2019**		**2020**		**2021**	
Backlog at Start of Year	258,143	14.9%	307,261	19.0%	337,766	9.9%	372,161	10.2%	414,079	11.3%
Backlog CF Within Year	135,886	**3.6%**	152,207	**12.0%**	159,498	**4.8%**	159,671	**0.1%**	173,360	**8.6%**
Backlog ETC at End Yr	122,257		155,054		178,268		212,490		240,719	
New Starts in Year	214,357	14.9%	209,263	-2.4%	215,478	3.0%	224,547	4.2%	227,539	1.3%
New Bldg CF Within Yr	29,340	**-5.6%**	25,404	**-13.4%**	21,708	**-14.6%**	23,133	**6.6%**	23,311	**0.8%**
New Bldg ETC at End Yr	185,017		183,859		193,770		201,414		204,228	
Total CashFlow in Year	165,226	1.8%	177,612	7.5%	181,206	2.0%	182,804	0.9%	196,671	7.6%
Backlog ETC End Year	307,274	19.0%	338,913	10.3%	372,038	9.8%	413,904	11.3%	444,948	7.5%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Cash Flow

Simply referencing total new starts or backlog does not give the complete picture of spending within the next calendar year. Projects, from start to completion, can have significantly different duration. An office building could have a duration of 18 to 24 months and a billion-dollar infrastructure project could have a duration of 3 to 4 years. New starts within any given year could contribute spending spread out over several years. Cash flow totals of all jobs can vary considerably from month to month, are not only driven by new jobs starting but also by old jobs ending, and are heavily dependent on the type, size and duration of jobs.

Although new nonresidential buildings starts increased only 1.6% in 2018 note that cash flow increases by almost 8% due to a very large increase from starting backlog. To a lesser extent the same thing happens in 2019.

Non-building infrastructure starts and cash flow follows a similar pattern. In 2018 and 2019 new starts decline moderately, spending from new starts declines substantially but starting backlog and spending from starting backlog increases are so strong that total cash flow within the year continues to increase.

Nonresidential Buildings Spending

Construction spending is strongly influenced by the pattern of continuing or ending cash flows from the previous two to three years of construction starts. Current month/month, year/year or year-to-date trends in starts often do not indicate the immediate trend in spending.

Nonresidential Buildings construction spending is forecast to increase 5.8% to $444 billion in 2018, fall -0.2% to $443 billion in 2019 and climb 8.9% to $482 billion in 2020. Office (which includes data centers) and Amusement/Rec support the 2019 forecast but there is downward pressure from slowdowns or timing of cash flow in Manufacturing, Lodging, Healthcare and Educational. Educational, Healthcare, Recreation, Office and Manufacturing all support growth in 2020.

U.S. Total Construction Spending Summary

$ in billions % growth vs prior yr	totals in billions current U.S. dollars				Forecast	Forecast	Forecast
	2014	2015	2016	2017	2018	2019	2020
Educational	79.7	84.8	90.3	91.2	96.5	92.8	103.4
	0.8%	6.4%	6.6%	1.0%	5.8%	-3.9%	11.4%
Healthcare	38.6	39.1	40.2	41.9	42.2	41.1	46.6
	-5.0%	1.3%	2.6%	4.4%	0.7%	-2.7%	13.5%
Amusement / Recreation	16.8	20.3	23.2	24.9	27.8	31.1	31.7
	10.3%	20.8%	14.3%	7.3%	11.7%	12.0%	2.0%
Commercial Retail	62.8	65.9	78.2	87.7	91.7	90.8	90.3
	18.2%	4.9%	18.6%	12.3%	4.5%	-1.0%	-0.5%
Lodging	16.7	21.9	27.0	28.7	32.3	31.0	31.6
	24.1%	30.9%	23.1%	6.3%	12.6%	-3.9%	1.7%
Office	46.6	55.5	67.6	66.9	74.1	78.6	84.2
	22.7%	19.2%	21.8%	-1.1%	10.9%	6.1%	7.1%
Manufacturing	58.6	79.9	76.4	66.4	66.7	65.3	82.2
	16.0%	36.3%	-4.4%	-13.0%	0.4%	-2.2%	25.9%
Other Nonres Buildings	12.8	12.1	11.7	11.7	12.3	12.3	12.3
	-2.1%	-6.0%	-2.6%	-0.7%	5.3%	0.0%	0.0%
Subtotal Nonres Buildings	332.7	379.5	414.5	419.3	443.6	442.9	482.2
% growth vs prior yr	9.7%	14.1%	9.2%	1.2%	5.8%	-0.2%	8.9%

Source $ Data: U.S. Census Bureau, Department of Commerce.
Actual Spending data includes revisions 2016-2017 issued 7-2-18
Forecast includes U.S.Census October 2018 year-to-date spending

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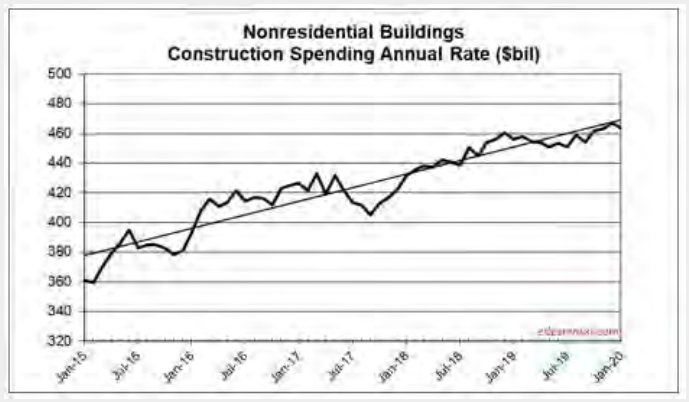
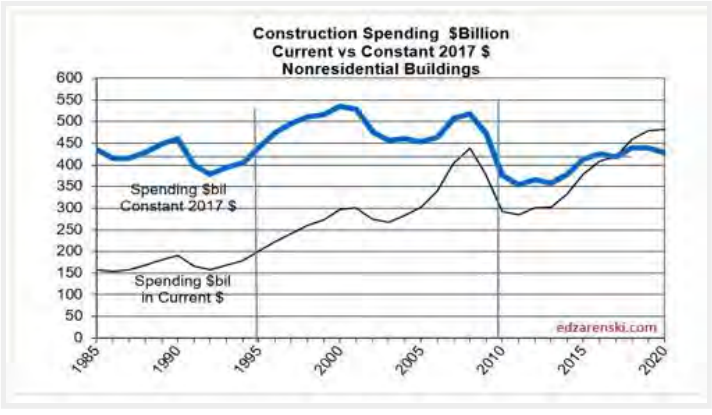


Nonresidential buildings construction spending in constant $ (inflation adjusted $ to base 2017) will reach $424 billion in 2018 after hitting a post-recession peak of $431 billion in 2016 and dropping to $419 billion in 2017. In 2019 constant $ spending will total $420 billion. Constant $ spending or real volume growth shows all years from 1996 through 2009 had higher volume than any years 2016-2019. Volume reached a peak near $530 billion in 2000 & 2001 and went over $500 billion again in 2008. In constant $ volume, I don't see returning to that peak before 2023.



Educational

New Starts averaged YOY growth of 11%/year for the last five years. Starts from the last five months of 2017 posted the highest 5mo total in at least seven years, 13% higher than the next best 5mo. The highest and 2nd highest quarters were both within the last 15 months, so both those periods contribute fully to 2018 spending. 2017 starts will support 25% of spending in 2019. Starts are expected to finish 2018 up 5%. 2018 starts will support 50% of spending in 2019 and 20% of spending in 2020.

	FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG									
EDUCATIONAL BLDGS	COMM Bldgs	Change Yr/Yr	COMM Bldgs	Change Yr/Yr	COMM Bldgs	Change Yr/Yr	COMM Bldgs	Change Yr/Yr	COMM Bldgs	Change Yr/Yr
$ in billions	2017		2018		2019		2020		2021	
Backlog at Start of Year	55,335	12.2%	57,449	3.8%	59,126	2.9%	64,933	9.8%	68,629	5.7%
Backlog CF Within Year	39,481	**9.8%**	42,343	**7.2%**	42,373	**0.1%**	45,493	**7.4%**	48,707	**7.1%**
Backlog ETC at End Yr	15,854		15,106		16,753		19,440		19,922	
New Starts in Year	52,043	-0.3%	54,904	5.5%	58,419	6.4%	60,207	3.1%	62,001	3.0%
New Bldg CF Within Yr	10,448	**2.3%**	10,884	**4.2%**	10,240	**-5.9%**	11,018	**7.6%**	11,346	**3.0%**
New Bldg ETC at End Yr	41,595		44,020		48,179		49,189		50,655	
Total CashFlow in Year	49,929	8.1%	53,227	6.6%	52,613	-1.2%	56,510	7.4%	60,053	6.3%
Backlog ETC End Year	57,449	3.8%	59,126	2.9%	64,933	9.8%	68,629	5.7%	70,577	2.8%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Backlog in five years 2014-2018 increased 11%/year. It is unusual that Starts and Backlog continue to grow for five years but that growth is not reflected in actual spending. **From 2013 to 2018 new starts increased 66% but spending for the period of those starts will increase only 34%.** That would seem to indicate a very large volume of work is growing in backlog and spending at some point should boom and remain high for an extended period, but the cash flow model is not in agreement. **A possible explanation is the sample survey of new starts has been increasing, so not all the starts growth for five years represents growth in new work. Some of the increase in starts is simply growth in sample size. Educational starts 2012-2015 averaged 50% sample size of total spending. In 2016-2018 the average sample size vs spending was 60%.**

Spending is now at a post-recession high. Spending increased 6%/year for 2015, 2016 and 2018, while 2017 increased only 1%. 2017 and 2018 are still subject to revision. Expect to see growth level off until mid-2019. Leveling at post-recession high is not a bad thing. A build-up of backlog is indicating that spending should increase substantially, but a disconnect in the analysis was noted above. Spending growth increases again in 2020.

At peak, educational represented 30% of all nonresidential buildings spending. Now it's only 22%. That's expected to increase slightly for the next three years.

Educational construction spending is forecast to reach $96 billion in 2018, $93 billion in 2019 and $103 billion in 2020.

Healthcare

Starts are at an all-time high, up almost 40% in the last 5 years. Some longer duration projects push a substantial amount of spending out to 2020.

	FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG									
HEALTHCARE	Bldgs	Change Yr/Yr	Bldgs	Change Yr/Yr	Bldgs	Change Yr/Yr	Bldgs	Change Yr/Yr	Bldgs	Change Yr/Yr
$ in billions	2017		2018		2019		2020		2021	
Backlog at Start of Year	26,563	11.1%	28,792	8.4%	29,720	3.2%	33,323	12.1%	34,436	3.3%
Backlog CF Within Year	19,825	**5.3%**	21,327	**7.6%**	20,157	**-5.5%**	23,158	**14.9%**	24,173	**4.4%**
Backlog ETC at End Yr	6,737		7,466		9,563		10,165		10,263	
New Starts in Year	27,880	3.9%	27,038	-3.0%	28,619	5.8%	29,494	3.1%	29,337	-0.5%
New Bldg CF Within Yr	5,825	**9.2%**	4,783	**-17.9%**	4,859	**1.6%**	5,223	**7.5%**	5,196	**-0.5%**
New Bldg ETC at End Yr	22,055		22,254		23,760		24,270		24,142	
Total CashFlow in Year	25,650	6.2%	26,110	1.8%	25,016	-4.2%	28,381	13.5%	29,369	3.5%
Backlog ETC End Year	28,792	8.4%	29,720	3.2%	33,323	12.1%	34,436	3.3%	34,405	-0.1%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Backlog increased 11% for 2017 and 8% for 2018. Backlog has been increasing unevenly and grew 30% in 4 years. Backlog increases 3% to start 2019 but is not indicating spending growth in 2019. Cash flow from backlog is indicating spending growth in 2020.

Spending has been very slow to recover, experiencing declines as recently as 2013 and 2014, hitting an 8 year low in 2014, when all other nonresidential building markets had already returned to growth. 2017 posted a gain of 4.4% but then 2018 gained less than 1%. Backlog is increasing but real spending gains won't materialize until 2020.

Like Educational, backlog growth has been exceeding spending growth for the last few years. That would indicate spending at some point may boom and remain high for an extended period. Cash flow models indicate this may occur in 2020. Other possible explanations are; starts are overstated; cash flow curves (average 28mo) are too short in duration; projects got canceled after starts were recorded; large spending revisions could get posted in the future.

Healthcare construction spending for 2018 is forecast to finish at $42 billion, an increase of only 0.7% over 2017. Considering 4% inflation, Healthcare real volume has declined every year since 2012 with exception of 2017 which would have been flat. It will decline again in 2019 with a forecast -2.7% decline in spending. 2020 realizes the 1st big spending increase in 8 years, +14% to $47 billion.

Amusement/Recreation

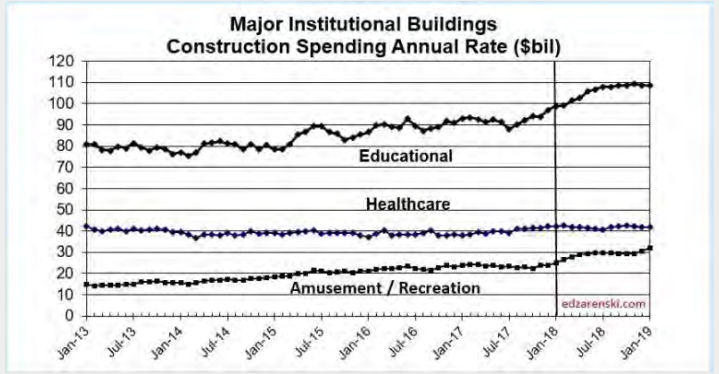
Starts are up 13% in 2018. Although down 1% in 2017, starts increased at an average rate of 15%/yr. from 2013 through 2017. Within the past 15 months there have been five billion-dollar project starts.

	FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG									
		Change		Change		Change		Change		Change
Amusement Recreation	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr
$ in billions	**2017**		**2018**		**2019**		**2020**		**2021**	
Backlog at Start of Year	18,164	16.9%	20,726	14.1%	23,390	12.9%	22,712	-2.9%	21,772	-4.1%
Backlog CF Within Year	12,323	**0.8%**	13,240	**7.4%**	17,277	**30.5%**	16,857	**-2.4%**	16,689	**-1.0%**
Backlog ETC at End Yr	5,841		7,486		6,114		5,855		5,083	
New Starts in Year	17,902	-1.2%	20,249	13.1%	19,751	-2.5%	19,859	0.5%	19,213	-3.3%
New Bldg CF Within Yr	3,017	**-8.0%**	4,344	**44.0%**	3,153	**-27.4%**	3,941	**25.0%**	3,740	**-5.1%**
New Bldg ETC at End Yr	14,885		15,905		16,598		15,917		15,472	
Total CashFlow in Year	15,340	-1.1%	17,584	14.6%	20,430	16.2%	20,798	1.8%	20,429	-1.8%
Backlog ETC End Year	20,726	14.1%	23,390	12.9%	22,712	-2.9%	21,772	-4.1%	20,556	-5.6%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Starting backlog increased 20%/yr for the last four years while spending was increasing at a rate of 10%/year. This means backlog should continue to support increased spending at least for the next few years.

Spending hit an 8 year low in 2013 but we've had 3 years of excellent growth of 10%/yr or more since then. 2017 spending increased only 7% and 2018 11%, but cash flow is indicating a 12% increase for 2019. This market is only 5% of nonresidential buildings spending.

Amusement/Recreation construction spending for 2018 is forecast to reach $28 billion, an increase of 12% over 2017. 2019 is forecast to increase 12% to $31 billion.



Commercial/Retail

Commercial/Retail starts have been increasing every year since 2010 but starts in 2018 are flat vs 2017 Starts are at a peak but after 5 years of 15%-20% growth/year are up only 4% in the last two years.

Commercial starts are seeing strong gains from distribution centers (warehouses which are in commercial spending). The decline in retail stores is being hidden by the increase in warehouses, which are at an all-time high. Stores are down 10% from the peak in 2016. Warehouses are still up only 4% in 2018 but increased 500% from 2010 to 2017.

In 2010, Warehouse starts were only 1/3 of Store new starts. In 2018, Warehouse starts are 25% greater than Store starts. Warehouse starts have increased between 20%-40%/year for seven years and are now five times greater than in 2010. See this Bloomberg article Warehouses Are Now Worth More Than Offices, Thanks to Amazon

FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG										
COMMERCIAL BLDGS	COMM Bldgs	Change Yr/Yr	COMM Bldgs	Change Yr/Yr	COMM Bldgs	Change Yr/Yr	COMM Bldgs	Change Yr/Yr	COMM Bldgs	Change Yr/Yr
$ in billions	2017		2018		2019		2020		2021	
Backlog at Start of Year	40,208	17.3%	42,319	5.3%	42,487	0.4%	42,476	0.0%	43,175	1.6%
Backlog CF Within Year	31,849	**23.7%**	32,814	**3.0%**	33,911	**3.3%**	33,210	**-2.1%**	34,144	**2.8%**
Backlog ETC at End Yr	8,359		9,505		8,577		9,266		9,031	
New Starts in Year	43,214	5.7%	42,464	-1.7%	42,889	1.0%	43,306	1.0%	43,077	-0.5%
New Bldg CF Within Yr	9,253	**0.4%**	9,482	**2.5%**	8,991	**-5.2%**	9,397	**4.5%**	9,347	**-0.5%**
New Bldg ETC at End Yr	33,960		32,982		33,899		33,909		33,730	
Total CashFlow in Year	41,102	17.6%	42,295	2.9%	42,901	1.4%	42,607	-0.7%	43,491	2.1%
Backlog ETC End Year	42,319	5.3%	42,487	0.4%	42,476	0.0%	43,175	1.6%	42,760	-1.0%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Some big projects from a period of strong new starts growth are ending. This will slow spending after 7 years of strong growth. 2018 backlog still produces a spending increase which may finish close to +5%, but forecast shows spending slows even more to only 2% in 2019 and less than 1% in 2020.

The biggest change in Commercial/Retail in the last few years is that backlog is now more heavily weighted with warehouse projects than store projects. The mix has shifted from 60/40 stores in 2014-2015 to 55/45 warehouses in 2018-2019.

Spending dropped from the high of $90 billion in 2007 to $40 billion in 2010. It has been growing steadily since reaching bottom in early 2011 and has recovered to an annual total rate of $92 billion in 2018. Spending increased an average of 13%/year for six years from 2012 through 2017. Spending growth will be flat in 2019 and 2020 but we are currently near the all-time high. It is worth noting that the $92 billion in 2018 dollars after accounting for inflation is still 30% lower than the $90 billion of spending in 2007.

Commercial/Retail construction spending is forecast to reach $92 billion in 2018, $91 billion in 2019 and $90 billion in 2020, flat to no growth after seven strong years.

Office

Starts finished 2018 up 8%. In 2016 starts were up 30% and had reached similar too highs in 1998 and 2006-2007. Starts have been increasing since 2010 with the strongest growth period 2013-2016, up 25%/year. Although the rate of growth slowed in 2017 and 2018, the total amount of starts is at an all-time high. In the last 12 months there are no less than a dozen project starts valued each at over $500 million, a few of those over $1 billion. That high-volume period of starts will elevate spending through 2019 and well into 2020. Data centers are included in Office.

FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG										
OFFICE BLDGS	OFFICE Bldgs	Change Yr/Yr	OFFICE Bldgs	Change Yr/Yr	OFFICE Bldgs	Change Yr/Yr	OFFICE Bldgs	Change Yr/Yr	OFFICE Bldgs	Change Yr/Yr
$ in billions	2017		2018		2019		2020		2021	
Backlog at Start of Year	36,850	17.5%	46,089	25.1%	54,697	18.7%	59,062	8.0%	61,804	4.6%
Backlog CF Within Year	24,986	**9.4%**	28,906	**15.7%**	33,831	**17.0%**	35,773	**5.7%**	40,398	**12.9%**
Backlog ETC at End Yr	11,864		17,183		20,866		23,289		21,406	
New Starts in Year	41,606	13.1%	44,712	7.5%	44,961	0.6%	46,188	2.7%	45,882	-0.7%
New Bldg CF Within Yr	7,380	**-12.5%**	7,198	**-2.5%**	6,765	**-6.0%**	7,672	**13.4%**	7,538	**-1.7%**
New Bldg ETC at End Yr	34,226		37,514		38,196		38,516		38,343	
Total CashFlow in Year	32,366	3.5%	36,104	11.5%	40,596	12.4%	43,445	7.0%	47,937	10.3%
Backlog ETC End Year	46,089	25.1%	54,697	18.7%	59,062	8.0%	61,804	4.6%	59,749	-3.3%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Backlog for 2017 was the highest in at least 8 years, more than double at the start of 2014 when the current growth cycle of office construction spending began. For 2018, backlog reached a new high, up 25% over 2017. Starting backlog for 2019, up 19%, is three times what it was just five years ago. Office starting backlog 2017-2019 increased an average of 20%/year. Backlog growth should support strong spending into 2020.

Growth of only 1% in starts for 2019 and 3% increase for 2020 keeps office starts near the all-time high. Even with low growth in new starts for the next two years, the amount of work in backlog from starts on record provides growth in spending for the next three years.

Spending increased by 20%/year from 2013 to 2016, but in 2017 it turned to a 1% decline. That was unusual and unexpected since 2016 starts and 2017 backlog had both reached 10-year highs. Possible explanations might be: a very large number of projects were canceled or delayed; potential revisions to 2017 Office spending may still be pending (In July every year, the previous two years of spending gets revised); but highly probable is the sample size of starts increased dramatically in 2016 and the 30% increase in starts was not all growth in real volume but was partially just a change in sample size, therefore the spending forecast may have been significantly overstated.

Again, it is worth noting that spending in 2018, which for the first time returned to the previous highs posted in 2008, once adjusted for inflation is still about 25% lower in real volume than 2008.

Office construction spending is forecast to reach $74 billion in 2018, $79 billion in 2019 and $84 billion in 2020.

Lodging

Lodging posted a new high for starts in 2018, up 8% over 2017. For the period 2011-2016 starts averaged over 30%/year growth for six years. In 2017, starts declined 4% but that remained near the 2016 high. Now with a gain in 2018, those three years average very evenly. Peak starts were in 2016.

FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG										
LODGING	Bldgs	Change Yr/Yr	Bldgs	Change Yr/Yr	Bldgs	Change Yr/Yr	Bldgs	Change Yr/Yr	Bldgs	Change Yr/Yr
$ in billions	2017		2018		2019		2020		2021	
Backlog at Start of Year	14,219	31.5%	14,788	4.0%	14,961	1.2%	14,674	-1.9%	13,773	-6.1%
Backlog CF Within Year	11,807	**28.9%**	12,892	**9.2%**	12,750	**-1.1%**	13,037	**2.2%**	12,249	**-6.0%**
Backlog ETC at End Yr	2,412		1,895		2,210		1,637		1,524	
New Starts in Year	16,831	-4.2%	18,190	8.1%	17,007	-6.5%	16,686	-1.9%	16,598	-0.5%
New Bldg CF Within Yr	4,457	**-11.0%**	5,123	**15.0%**	4,544	**-11.3%**	4,551	**0.2%**	4,526	**-0.5%**
New Bldg ETC at End Yr	12,374		13,066		12,464		12,136		12,072	
Total CashFlow in Year	16,264	14.8%	18,015	10.8%	17,294	-4.0%	17,568	1.7%	16,775	-4.6%
Backlog ETC End Year	14,786	4.0%	14,961	1.2%	14,674	-1.9%	13,773	-6.1%	13,596	-1.3%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Starting backlog averaged increases of 30%/yr. from 2015 to 2017. Lodging starting backlog jumped from $7 billion/yr. in 2014 to $15 billion/yr. in 2018. It has supported similar spending growth. Lodging projects have relatively short duration and timing of starts within the year is important to spending and next-year starting backlog. Compared to most other types of nonresidential buildings, a greater than average percentage of lodging spending occurs within the year started. So, movement in starts has a greater impact on spending within the year.

Lodging spending recorded the largest drop of any market, falling 75% from $36 billion in 2008 to $9 billion in 2011. However, it also recorded the strongest rebound of any market, climbing 20% to 30% per year for the 5-years 2012-2016. In 2011, Lodging dropped to only 3% of total sector spending. It rebounded to 7% in 2017. Lodging actual spending increased 12% in 2018. It's still not back to the previous high of $36 billion in 2008. Beyond 2018, spending will decline, but this is after 6 years of growth totaling 300%.

Lodging construction spending for 2018 is forecast to reach $32 billion, an increase of 12% over 2017. Spending is forecast at $31 billion for 2019 and $32 billion for 2020.

Religious and Public Safety

Spending of $11-$12 billion/year represents only 2.5% of total nonresidential building spending. In 2008-2009 it was 5% of the total. The religious building market has been declining since 2002 and is down 55% since then. Public Safety peaked in 2009 and has declined every year through 2017, down 40% from the peak. In 2018, public safety spending is increasing.

I don't track starts or backlog for these markets. I do track monthly spending and carry a forecast in the Table of Construction Spending classified as Other Nonres Buildings.

Religious and Public Safety currently amounts to $12 billion/year. A 10% change in spending of $1.2 billion in a year would amount to only 0.2% change in all nonresidential buildings spending. This category doesn't often change by 10% yr/yr, so it's affect is very small.

Manufacturing

Manufacturing reached record high starts in 2014 and record spending in 2015, posting a 100% increase in new starts in 2014 that drove starting backlog and spending to new highs in 2015 and 2016. New starts declined 20%-30%/year for the next two years after the high in 2014 but then 2017 starts increased 27%. Now 2018 starts have increased by 18%, yet that is still 15% lower than 2014.

Starts in June came in at four times the average of all monthly starts in the last three years. October came in at three times the average. Those two months would add up to more than half of annual starts for any of the last three years. Some of these projects will still be contributing to spending in 2023.

FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG										
MANUFACTURING BLDGS	MNFG Bldgs	Change Yr/Yr	MNFG Bldgs	Change Yr/Yr	MNFG Bldgs	Change Yr/Yr	MNFG Bldgs	Change Yr/Yr	MNFG Bldgs	Change Yr/Yr
$ in billions	2017		2018		2019		2020		2021	
Backlog at Start of Year	28,172	-17.1%	32,156	14.1%	40,505	26.0%	48,676	20.2%	51,367	5.5%
Backlog CF Within Year	17,920	**-18.5%**	18,770	**4.7%**	18,719	**-0.3%**	23,193	**23.9%**	29,957	**29.2%**
Backlog ETC at End Yr	10,253		13,386		21,785		25,483		21,410	
New Starts in Year	25,851	27.3%	30,540	18.1%	30,774	0.8%	30,952	0.6%	30,675	-0.9%
New Bldg CF Within Yr	3,947	**-4.6%**	3,421	**-13.3%**	3,883	**13.5%**	5,068	**30.5%**	4,905	**-3.2%**
New Bldg ETC at End Yr	21,903		27,118		26,890		25,885		25,769	
Total CashFlow in Year	21,867	-16.3%	22,191	1.5%	22,603	1.9%	28,261	25.0%	34,863	23.4%
Backlog ETC End Year	32,156	14.1%	40,505	26.0%	48,676	20.2%	51,367	5.5%	47,179	-8.2%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Starting Backlog remained equally high in 2015 and 2016, but then dropped 17% in 2017. Backlog dropped 17% in 2017 and actual spending dropped 13%. That was expected. What was unexpected is that 2017 posted another very strong year of new starts, up 27%. This will support a spending rebound in the future but not before a temporary drop in mid-year 2019.

Spending was forecast to fall in 2017 after peaking in 2015 from massive growth in new starts in 2014. Based on cash flows from starts, from April 2016 through the end of 2017 spending was expected to decline in 17 of 21 months. It did decline in 14 of those months. Over the next 30 months there are only six months have a forecast to decline, all of those between March and September 2019, all caused by uneven cash flows from very large projects either ending or pushing spending out to future years. This will hold down total spending in 2019. Although backlog for 2019 is up 40%, much of the cash flow from that will occur in 2020.

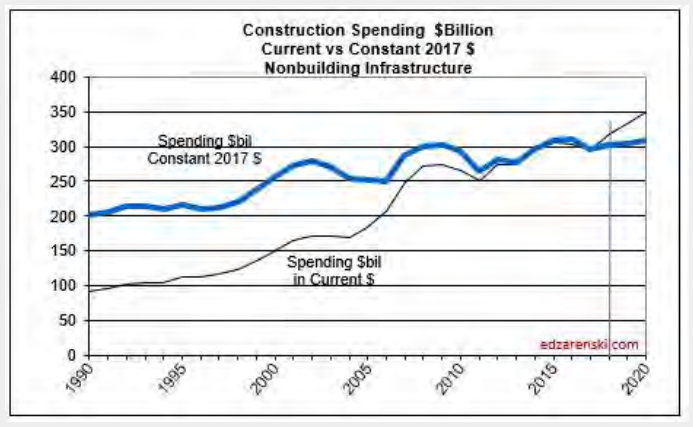
Manufacturing construction spending is forecast to reach $67 billion in 2018, $65 billion in 2019 and then jump 25% to $82 billion in 2020. Given the growth in backlog and some very long duration projects started recently, spending growth may increase again in 2021.

Non-building Infrastructure Spending

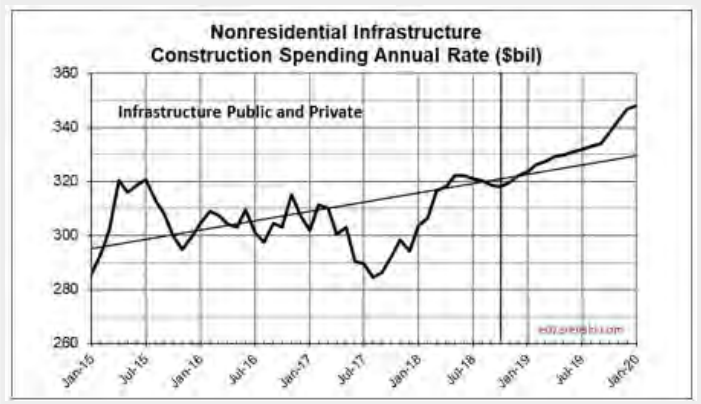
Non-building Infrastructure construction spending is forecast to increase 7.2% to $316 billion in 2018, 5.5% to $334 billion in 2019 and 9.9% to $367 billion in 2020. The forecast growth for 2019 will be supported by Transportation and Public Works but will be held down somewhat by Highway. Transportation terminals and rail project starts both increased more than 100% in 2017 and both are long duration projects types that will contribute spending for several years. Environmental Public Works project starts increased 20% in 2018 and boost spending in 2019 and 2020.

U.S. Total Construction Spending Summary							
$ in billions % growth vs prior yr	totals in billions current U.S. dollars				Forecast	Forecast	Forecast
	2014	2015	2016	2017	2018	2019	2020
Power / Electric / Gas	110.1	103.0	101.4	96.5	102.0	108.6	106.6
	18.0%	-6.5%	-1.5%	-4.8%	5.7%	6.4%	-1.8%
Highway / Bridge / Street	84.7	90.6	92.7	89.1	92.1	93.3	105.3
	4.2%	6.9%	2.3%	-4.0%	3.4%	1.4%	12.8%
Transportation / Air / Rail	42.0	44.8	43.3	45.2	54.5	62.1	75.1
	6.5%	6.7%	-3.5%	4.4%	20.5%	14.0%	21.0%
Sewer / Water / Conservation	43.9	45.3	43.8	39.4	43.1	46.4	56.2
	4.5%	3.2%	-3.3%	-9.9%	9.4%	7.7%	21.1%
Communication	17.3	21.7	22.2	24.8	24.5	23.3	23.4
	-2.7%	25.4%	2.2%	12.0%	-1.1%	-5.1%	0.4%
Subtotal Infrastructure	298.0	305.4	303.4	295.0	316.2	333.7	366.6
% growth vs prior yr	8.8%	2.5%	-0.7%	-2.8%	7.2%	5.5%	9.9%
Source $ Data: U.S. Census Bureau, Department of Commerce. Actual Spending data includes revisions 2016-2017 issued 7-2-18 Forecast includes U.S.Census October 2018 year-to-date spending						edzarenski.com	

Non-building Infrastructure constant $ volume reached a high of $309 billion in 2015 and peaked at the all-time high of $311 billion in 2016, but then dropped to $295 billion in 2017. 2018 saw a return to $303 billion and 2019 is projected to reach $309 billion. Only twice before, 2008 and 2009, did Infrastructure exceed $300 billion. Constant $ spending or real volume growth has been within +/- 3% for the last 5 years.



Non-building Infrastructure spending, always the most volatile sector, in mid-2017 dropped to 2013 lows. However, this short dip was predicted. Cash flow models of Infrastructure starts from the last several years predicted that dips in monthly spending would be caused by uneven project closeouts from projects that started several years ago, particularly in Power and Highway markets.



Current backlog is at an all-time high, up 10%+ each of the last 3 years, and spending is expected to follow the increased cash flows from the elevated backlog. Transportation terminals new starts in 2017 jumped 120%. Rail project starts increased more than 100%. Starting backlog for all transportation work is the highest ever, up 100% in the last two years. Transportation spending is projected to increase 15-20%/year for the next two years.

No future growth is included from infrastructure stimulus and yet 2018 spending is projected to increase by 7%. 2019 and 2020 are forecast to increase 6% to 10%.

Power

Power spending as reported by U.S. Census includes infrastructure for all electric power generation plants and distribution, gas and LNG facilities and all pipelines. In the last year there were more than twenty $billion+ project starts and a dozen more projects valued over $500 million each. In 2015 pipeline starts represented less than 10% of all power starts. In 2018 year-to-date, pipelines are half of all power work started. In three years, pipeline work increased by more than $20 billion or 500%.

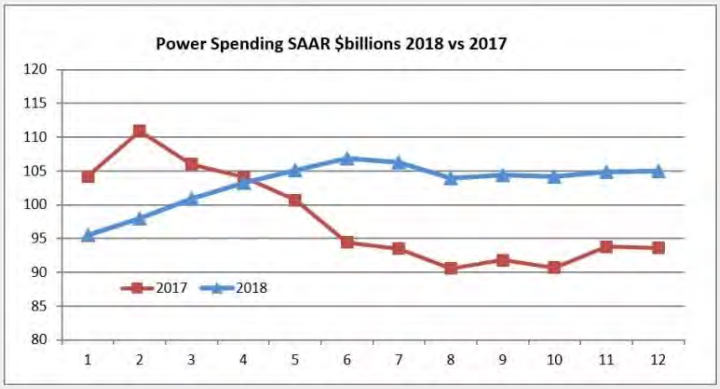
Starts, completions and pauses in work cause erratic movement in actual spending. Cash flow may be adversely impacted by very large projects ending or by the delay of large projects that started previously. A multi-billion-dollar nuclear power plant stopped work and large pipeline project delays after the start was recorded have adversely impacted the cash flow forecast. This impacted the spending forecast in 2017, which finished down 5%, 15% below initial projections, and again 2018 will finish 10% below initial projections for 2018 posted back in Nov. 2017.

			FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG							
		Change		Change		Change		Change		Change
Power	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr
$ in billions	2017		2018		2019		2020		2021	
Backlog at Start of Year	95,037	26.7%	110,477	16.2%	103,142	-6.6%	91,939	-10.9%	81,679	-11.2%
Backlog CF Within Year	38,115	24.2%	46,673	22.5%	51,771	10.9%	48,445	-6.4%	41,675	-14.0%
Backlog ETC at End Yr	56,922		63,804		51,371		43,494		40,004	
New Starts in Year	53,289	-7.2%	46,230	-13.2%	45,603	-1.4%	43,756	-4.0%	43,524	-0.5%
New Bklg CF Within Yr	6,662	-0.5%	6,892	3.5%	5,035	-26.9%	5,571	10.6%	4,854	-12.9%
New Bklg ETC at End Yr	46,627		39,338		40,568		38,185		38,670	
Total CashFlow in Year	44,777	19.8%	53,565	19.6%	56,806	6.1%	54,016	-4.9%	46,529	-13.9%
Backlog ETC End Year	103,549	9.0%	103,142	-0.4%	91,939	-10.9%	81,679	-11.2%	78,674	-3.7%
Source Starts data: Dodge Data & Analytics Oct 2018										edzarenski.com

Although total power starts for 2018 are down 13%, electric / power generation is down 35% but gas/LNG and pipelines starts are up. Starts peaked in 2015-2016, but total in backlog reached a peak in 2018. However, much of this work is very long duration projects, so 2018 backlog will be providing spending at least through 2021. Spending could see 5% gains in 2019 but unless 2019 starts increase 2020 will experience a modest decline. Dodge is predicting 2019 starts will decline 3%.

Power construction spending is forecast to reach $102 billion in 2018, $109 billion in 2019 but then only $107 billion in 2020.

Power spending highlights one of the biggest shortfalls of judging expected performance based on year-to-date change. Notice in the 1st quarter of 2018, spending year-to-date (YTD) was down 8% to 10% from 2017. It is clear now that did not give a good indication of how 2018 would proceed. A better indication is provided by the trend line expected in the current year versus the trend line in the previous year. If they diverge, then early YTD changes will not give a clear indication of expected performance in the current year. An example follows. Note, SAAR data shows performance trend but cumulative NSA$ is needed to get YTD$.



2017NSA$	8.46	16.81	25.05	33.15	41.42	49.47	57.33	65.07	72.89	80.79	88.77	96.51
2018NSA$	7.76	15.13	22.97	31.01	39.65	48.76	57.68	66.57	75.46	84.53	93.44	102.13
YOY %	-8.3%	-10.0%	-8.3%	-6.4%	-4.3%	-1.5%	0.6%	2.3%	3.5%	4.6%	5.3%	5.8%
	1	2	3	4	5	6	7	8	9	10	11	12

Power posted the highest spending for 2017 early in the year, then declined in the 2nd half. In 2018, the beginning of the year posted the lowest rate of spending for the year, increased through June, then stayed higher in the 2nd half. The YTD percent growth compared to 2017 has been increasing throughout the year. Higher spending in the 2nd half 2018 compared to the lowest values of the year in late 2017 will boost year-to-date spending every month through year end. Although YTD spending through August is up only 2%, I expect the total for the year will finish up 6%. Even if power spending declines 1% per month for the remainder of the year it will still finish up 5% over 2017.

Highway/Street/Bridge

Highway starts hit an all-time high in 2017 and are forecast to climb another 8% in 2018. This model is predicting starts growth will slow or level off after 2018.

FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG										
		Change		Change		Change		Change		Change
HiWay/St	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr
$ in billions	2017		2018		2019		2020		2021	
Backlog at Start of Year	98,163	7.6%	108,767	10.8%	124,384	14.4%	143,830	15.6%	157,279	9.4%
Backlog CF Within Year	51,267	**8.8%**	52,191	**1.8%**	51,375	**-1.6%**	57,560	**12.0%**	67,959	**18.1%**
Backlog ETC at End Yr	46,897		56,576		73,010		86,270		89,320	
New Starts in Year	69,841	11.4%	75,630	8.3%	77,841	2.9%	78,709	1.1%	78,292	-0.5%
New Bldg CF Within Yr	7,971	**-8.2%**	7,822	**-1.9%**	7,021	**-10.2%**	7,700	**9.7%**	7,659	**-0.5%**
New Bldg ETC at End Yr	61,870		67,808		70,820		71,009		70,633	
Total CashFlow in Year	59,237	6.2%	60,013	1.3%	58,395	-2.7%	65,260	11.8%	75,618	15.9%
Backlog ETC End Year	108,767	10.8%	124,384	14.4%	143,830	15.6%	157,279	9.4%	159,953	1.7%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Starting backlog increased 30% in the last 3 years and will increase another 14% leading into 2019. This long duration backlog is going to provide for a large increase in spending but not until late 2020 and even more-so into 2021.

Spending in 2018 did not increase in tandem with backlog, because the share of spending within the year from projects that started 1 or 2 years before began to decline. In 2020 and 2021, the share of spending within the year from projects that started 2, 3 and 4 years before is increasing.

Highway construction spending is forecast to reach $92 billion in 2018, $93 billion and then jump to $105 billion in 2020. 2021 may see an increase of 10% in spending.

Transportation

Transportation starts have two main parts, Terminals and Rail. Some analysts include transportation in nonresidential buildings. That does not account that airports include not only land-side terminals but also air-side runway work and rail includes platforms and all railway right of way work, which includes massive civil engineering structures. About half of all transportation spending is rail work.

Terminals and rail starts reached record high in 2017, both up 120% after a 35% increase in 2016. Spending in 2018 is forecast to finish up more than 20%. Starting Backlog increased 22% in 2017 then jumped 95% in 2018. **However, Transportation sample size of new starts potentially increased 30%, far more than any other market. A large portion of the 2017 increase in starts is expected to be change in sample size.** This model adjusts 2017 starts down by 20%. Still, most of that backlog spending will occur in future years. Some of the project starts in 2016 and 2017 have an eight-year duration. In the last 24 months there have been sixteen $billion+ new project starts and seven $500million+ new starts.

FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG										
		Change		Change		Change		Change		Change
TRANSPORTATION	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr
$ in billions	2017		2018		2019		2020		2021	
Backlog at Start of Year	18,853	22.5%	36,668	94.5%	50,151	36.8%	55,474	10.6%	55,989	0.9%
Backlog CF Within Year	12,125	**6.5%**	16,144	**33.2%**	21,799	**35.0%**	27,790	**27.5%**	32,177	**15.8%**
Backlog ETC at End Yr	6,729		20,524		28,352		27,684		23,812	
New Starts in Year	33,174	76.1%	34,338	3.5%	31,777	-7.5%	33,479	5.4%	33,302	-0.5%
New Bldg CF Within Yr	3,234	**-18.9%**	4,711	**45.7%**	4,656	**-1.2%**	5,174	**11.1%**	5,147	**-0.5%**
New Bldg ETC at End Yr	29,940		29,627		27,122		28,305		28,155	
Total CashFlow in Year	15,359	-0.1%	20,855	35.8%	26,455	26.9%	32,965	24.6%	37,324	13.2%
Backlog ETC End Year	36,668	94.5%	50,151	36.8%	55,474	10.6%	55,989	0.9%	51,967	-7.2%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

2018 total starts are 100% higher than any other year prior to 2017. Starting Backlog skyrocketed from $15 billion in 2016 to $55 billion for 2019. Backlog will support spending for several years to come. Keep in mind, when a $4 billion project first gets recorded in starts, that is the general contract. Many subcontracts will be awarded by the general contractor over the next few years.

Based on predicted cash flows from starts, spending is expected to increase at least into mid-2021. 2018-2019-2020 should see increases of 15% to 20%/year. Dodge is forecasting 2019 starts will stay close to the elevated levels of 2017 and 2018. I'm predicting starts in 2019 will decline from 2018 simply due to the huge volume of new work that started in the last two years. Even with that, backlog could set a record high in 2020.

Transportation construction spending is forecast to reach $55 billion in 2018, $62 billion in 2019 and $75 billion in 2020. Given the growth in backlog and some very long duration projects started recently, spending growth may increase again in 2021.

Environmental Public Works

Environmental Public Works includes sewerage projects, Water supply and Conservation, or Dams, water resource and river/harbor projects. New starts for all these type projects declined from 2014 through 2017. Then all showed gains in 2018 and the forecast is more gains in 2019. All of these projects are public spending and saw no real gains in spending from 2010 through 2017. With the projected increases in starts in 2018 and 2019, spending is now forecast to increase the next three years to a new high by 2020.

FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG										
		Change		Change		Change		Change		Change
Environmental Public Works	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr
$ in billions	**2017**		**2018**		**2019**		**2020**		**2021**	
Backlog at Start of Year	31,161	-12.0%	30,329	-2.7%	33,181	9.4%	39,259	18.3%	40,909	4.2%
Backlog CF Within Year	22,787	**-17.3%**	21,882	**-4.0%**	21,027	**-3.9%**	26,266	**24.9%**	28,438	**8.3%**
Backlog ETC at End Yr	8,374		8,447		12,154		12,994		12,471	
New Starts in Year	27,592	-9.7%	30,011	8.8%	32,942	9.8%	33,949	3.1%	33,769	-0.5%
New Bklg CF Within Yr	5,637	**-22.6%**	5,276	**-6.4%**	5,611	**6.3%**	6,034	**7.5%**	6,002	**-0.5%**
New Bklg ETC at End Yr	21,955		24,735		27,331		27,915		27,767	
Total CashFlow in Year	28,425	-18.4%	27,158	-4.5%	26,638	-1.9%	32,300	21.3%	34,440	6.6%
Backlog ETC End Year	30,329	-2.7%	33,181	9.4%	39,486	19.0%	40,909	3.6%	40,238	-1.6%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Public Works construction spending is forecast to grow 9% to reach $43 billion in 2018, $46 billion in 2019 and $56 billion in 2020.

Communications

Starts data for communications is not regularly reported. Total starts for the year is always recorded well after year end. A moderate forecast is included for future starts growth the next two years.

Actual spending is erratic, up 10% one year down 3% the next then up 25% followed by 2% growth. 2018 should finish down 1% after a 12% gain in 2017. The forecast shows a 5% decline in 2019 and flat spending into 2020.

FORECAST CASH FLOW FROM STARTING BACKLOG AND NEW BACKLOG										
		Change		Change		Change		Change		Change
Communication	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr	Bldgs	Yr/Yr
$ in billions	**2017**		**2018**		**2019**		**2020**		**2021**	
Backlog at Start of Year	9,156	-9.2%	8,723	-4.7%	8,306	-4.8%	8,490	2.2%	8,918	5.0%
Backlog CF Within Year	7,070	**-10.5%**	6,592	**-6.8%**	6,424	**-2.5%**	6,296	**-2.0%**	6,744	**7.1%**
Backlog ETC at End Yr	2,087		2,131		1,881		2,195		2,175	
New Starts in Year	9,011	-7.8%	8,585	-4.7%	8,829	2.8%	9,099	3.1%	9,051	-0.5%
New Bklg CF Within Yr	2,374	**-15.2%**	2,411	**1.6%**	2,220	**-7.9%**	2,375	**7.0%**	2,362	**-0.5%**
New Bklg ETC at End Yr	6,637		6,174		6,609		6,724		6,688	
Total CashFlow in Year	9,444	-11.7%	9,003	-4.7%	8,644	-4.0%	8,671	0.3%	9,106	5.0%
Backlog ETC End Year	8,723	-4.7%	8,306	-4.8%	8,490	2.2%	8,918	5.0%	8,863	-0.6%
Source Starts data: Dodge Data & Analytics Oct 2018									edzarenski.com	

Communication construction spending was up 12% in 2017 and finished at $24.8 billion The forecast for 2018 is down 1% to $24.5 billion. Expect $23 billion in 2019 and $23 billion in 2020.

For a PDF of this Nonresidential report **2019 Construct Econ Forecast – NONRES – Dec 2018 RVSD 12-6-18**

Link to 2019 Construction Economic Forecast – Summary

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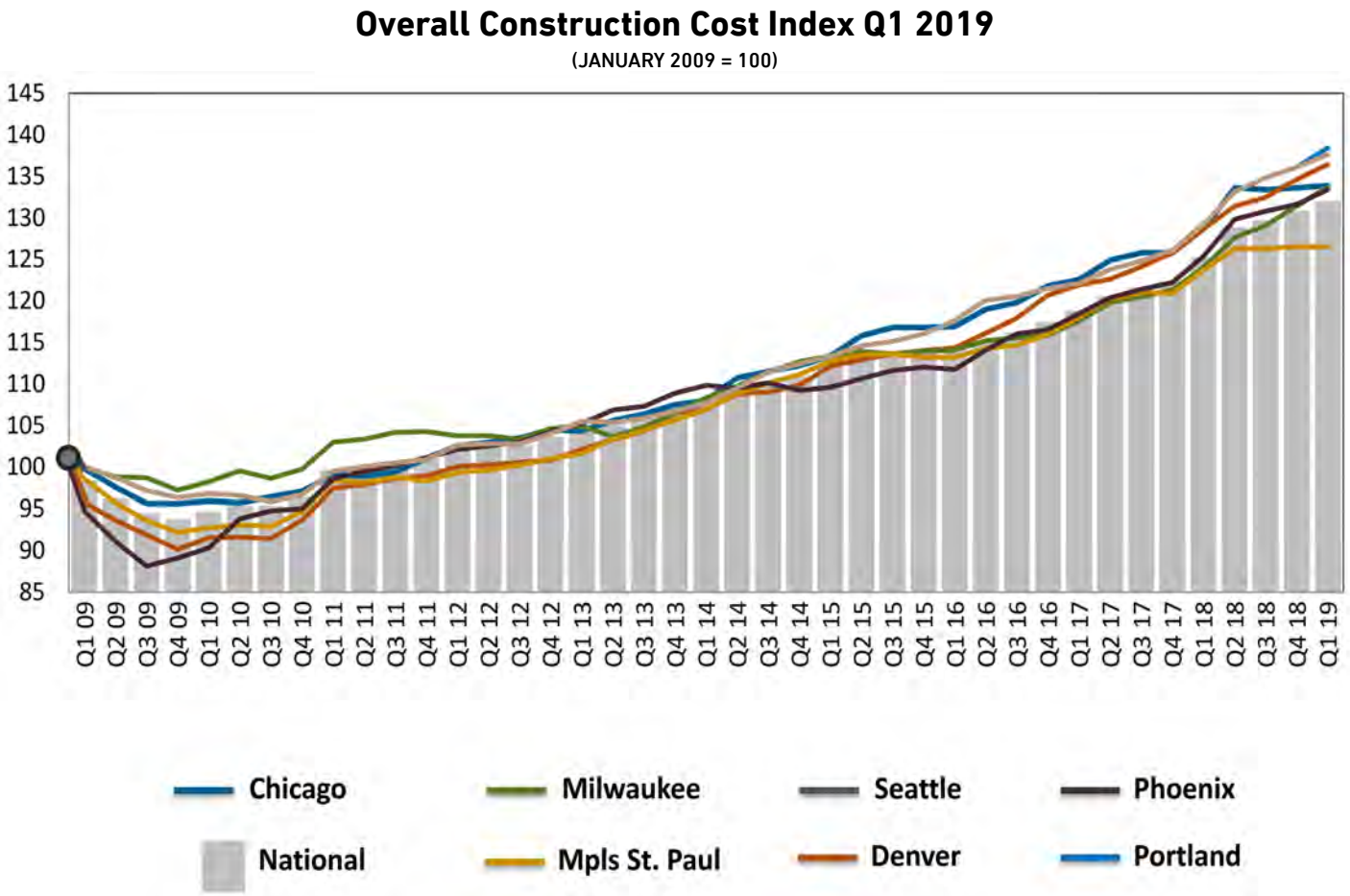
CONSTRUCTION COST INDEX BY CITY

The Mortenson Construction Cost Index is calculated quarterly by pricing a representative non-residential construction project in geographies throughout the country. Download the 1-page report for your location below.



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Chicago Construction Cost Index

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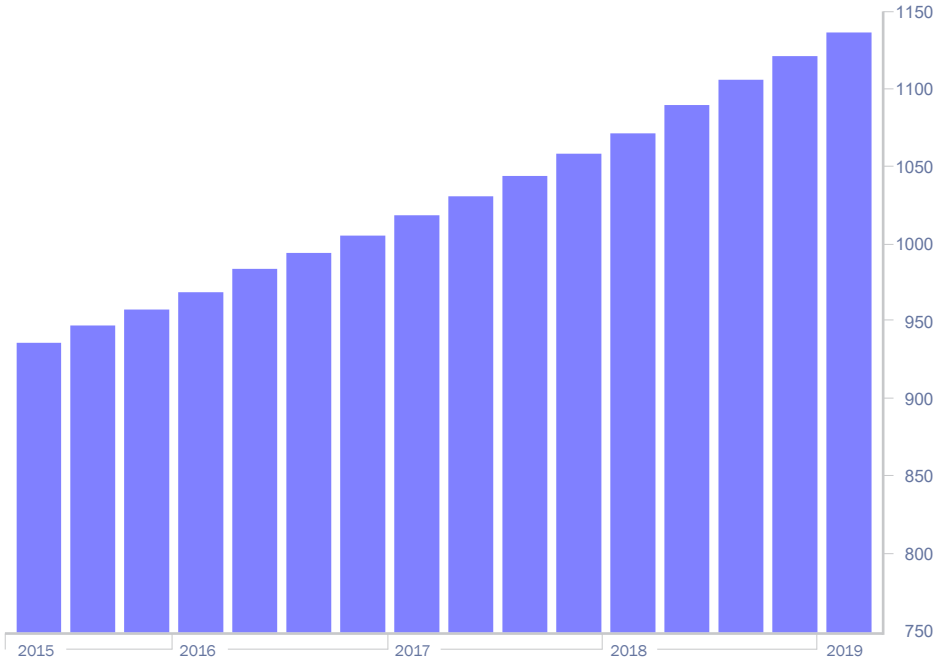
Turner Building Cost Index

2019 First Quarter Forecast

"Raw materials have seen some de-escalation since the end of 2018. Resources such as natural gas continue to have dramatic fluctuations month to month. Fabricated material prices stayed stable in the first quarter of 2019."

Attilio Rivetti
Vice President



PPG Science Pavilion
Pittsburgh, Pennsylvania

Quarter	Index	△%
1st Quarter 2019	**1135**	**1.34**
4th Quarter 2018	1120	1.36
3rd Quarter 2018	1105	1.47
2nd Quarter 2018	1089	1.68

Year	Average Index	△%
2018	1096	5.6
2017	1038	5.0
2016	989	4.8
2015	943	4.5
2014	902	4.4
2013	864	4.1
2012	830	2.1
2011	812	1.6
2010	799	-4.0
2009	832	-8.4
2008	908	6.3
2007	854	7.7
2006	793	10.6

The Turner Building Cost Index is determined by the following factors considered on a nationwide basis: labor rates and productivity, material prices and the competitive condition of the marketplace.

Turner

CONSTRUCTION MATERIAL COSTS INCREASE 7.4 PERCENT, AS CONTRACTORS CONTINUE TO BE SQUEEZED BY TARIFFS AND RISING FUEL PRICES

October 10, 2018

Fuel, Metal, and Asphalt Costs Increase by Double Digits As Labor Costs Continue to Rise, While Prices Contractors Charge to Build Projects Grow By Low Single Digits

The cost of many products used in construction climbed 7.4 percent over the past year due to double digit increases in commonly-used construction materials, according to an analysis by the Associated General Contractors of America of new Labor Department data. Association officials noted that the cost increases come as many construction firms are already grappling with shortages of skilled craftsmen essential for projects but have limited ability to increase prices for their services.

"The new construction materials cost data likely under-reports actual price increases, since federal officials collected most of their data in the first half of the month, before new tariffs affecting many construction materials started," said the association's chief economist, Ken Simonson. "Contractors are paying more for the materials they use and workers they employ but aren't able to pass most of those new costs on to their clients."

Simonson noted that the producer price index for inputs to construction industries—a weighted average of all goods and services used in construction—increased 0.2 percent from August to September and soared 6.2 percent since September 2017, while the index for goods except services rose at a faster pace of 7.4 percent. In contrast, an index that measures what contractors say they would charge to construct five types of nonresidential buildings rose just 3.5 percent over the year, indicating that contractors were absorbing more of the costs than they were passing on to owners.

Diesel fuel, steel pipe and tube, asphalt paving mixtures and aluminum products were among the diverse products that contributed to the large year-over-year cost increases, the economist said. He pointed out that from September 2017 to September 2018, there were producer price index increases of 29.3 percent for diesel fuel, 22.1 percent for steel pipe and tube, 11.7 percent for fabricated structural metal, 11.2 percent for asphalt paving mixtures and blocks and 10.7 percent for aluminum mill shapes. Additionally, the administration recently imposed an interim tariff of 10 percent on $200 billion worth of Chinese imports, including goods important to the construction industry, and plans to increase the rate to 25 percent in the new year.

A survey the association released in August found that 80 percent of respondents reported difficulty filling hourly craft worker positions. As a result, sixty-two percent of firms report they are paying higher salaries to attract and retain workers. "The more firms get squeezed by higher materials and labor costs, the less likely they are to continue hiring and investing in new equipment," said Stephen E. Sandherr, the association's chief executive officer.

View producer price indexes for construction. View the AGC workforce survey and workforce development plan.

Contractor Type: Utility Infrastructure Federal/Heavy Highway Building

Industry Priorities: Workforce Development

No End In Sight: Construction Costs Causing Headaches For D.C. Contractors, Developers

January 25, 2019 Jon Banister, Bisnow Washington, D.C.

https://www.bisnow.com/washington-dc/news/construction-development/no-end-in-sight-rising-construction-costs-causing-headaches-for-dc-contractors-developers-97124

The skyrocketing cost of construction has become one of the top impediments to new development across the country, and even as Washington, D.C., continues to build at a rapid pace, its contractors and developers are feeling the pain.

"There has not been a let up for quite a while now," said UIP General Contracting President Gerard Heiber, who will speak at Bisnow's DMV Construction Finance Summit Feb. 13. "It seems like it has been steady 5% inflation in construction costs per year for quite a while now, and there doesn't appear to be any let up in sight." Clark Construction, the largest general contractor in the D.C. market, has seen annual growth in construction costs of 3% to 4% over the past five years, Clark Division President Lee DeLong said. The rising costs have not stopped D.C. developers from building. Over $17.8B worth of projects started construction in the D.C. region in 2018, a 22% increase from the prior year, according to Dodge Data & Analytics. But Heiber said he has seen some developments affected by rising costs. "I've seen projects put on hold because of it," Heiber said. "I've seen investors pull out of projects where owners had to find new investors."

DeLong said he has also seen construction costs play a role in the scrapping of multiple projects, but he sees it as the exception rather than the rule. "We have not experienced a slowdown in the residential market, but there have been a select few [projects] that have certainly slowed down or been put on the shelf," DeLong said.

The primary factor driving up construction costs has been the labor shortage, DeLong said. Northern Virginia's emergence as a global leader in data centers has led to soaring development in that sector, which DeLong said puts a strain on D.C.'s construction labor market that other regions do not have. Even projects that are able to break ground despite rising construction costs are often producing narrower returns for developers, giving them less capital to deploy into additional development, Bennett Group President LuAnn Bennett said. "In the multifamily sector, building is still going on and people are compressing their yields they're willing to take," Bennett said. "Ultimately it gets passed on to the client, the costs of doing projects is higher and at some point they'll just table projects and decide not to do them."

The problem of rising construction costs is front of mind for many D.C. developers. When a panel including Meridian Group Chief Investment Officer Gary Block, Kettler CEO Bob Kettler and Foulger-Pratt CEO Cameron Pratt was asked at Bisnow's Tysons State of the Market Thursday about the largest challenge facing developers today, each of them discussed construction costs. "Costs have risen. It's tough to underwrite new office and residential development today," Block said. "It's important to create something uniquely different where tenants want to be, because rents are going to have to be very high to justify new development today." Pratt also said construction costs have made underwriting projects difficult, but he thinks the situation could improve. "You do have to be optimistic and look out to the future and project

things are going to get better and construction prices are not always going to go up 7% a year, but rents might," Pratt said. Contractors say they are still projecting steady cost increases for projects coming up in the near-term pipeline, but they are seeing some new innovations that could help bring costs down. DeLong said Clark is using virtual modeling and design before breaking ground on a project in order to use materials more efficiently and reduce waste, which can bring down cost. It is also using prefabricated materials to reduce on-site work for some projects, especially in the healthcare sector. "That [healthcare] work is very mechanically and electrically intensive," DeLong said. "To the greater extent we can have components assembled off-site and then move them on-site, it helps with labor, quality and safety, and there can be cost benefits." Heiber said he is seeing some prefabrication but it has not taken off yet. One partial prefab method he is seeing implemented more is using panels for the facades of buildings, allowing the exteriors to be built in pieces off-site and put together quickly.

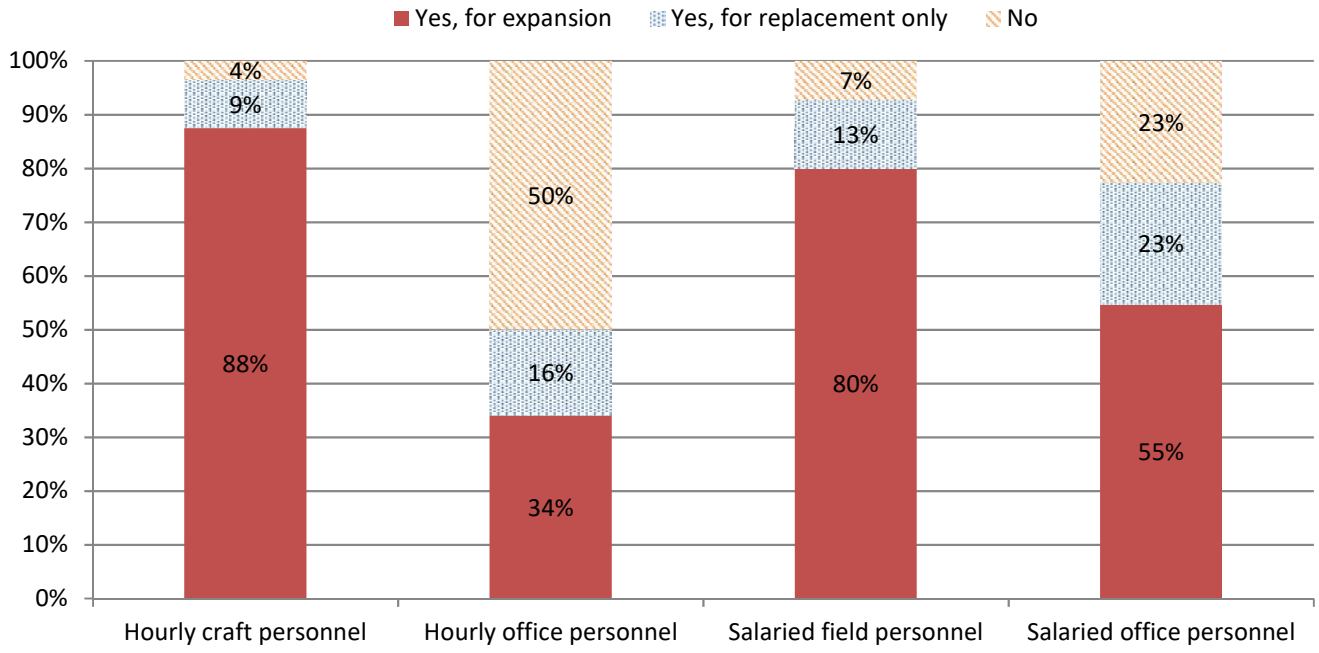
"It saves you labor in the field and saves you time," Heiber said.

2018 Workforce Survey Results

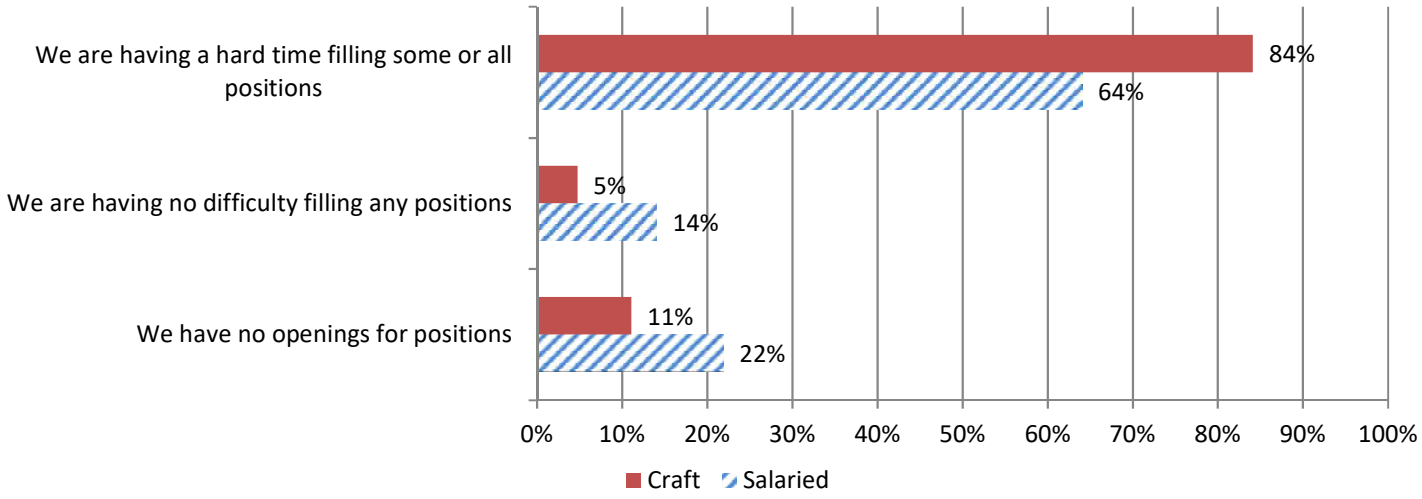
Virginia Results

Total responses: 65, but number varies by question. Percentages are based on responses other than "Don't know" for each question.

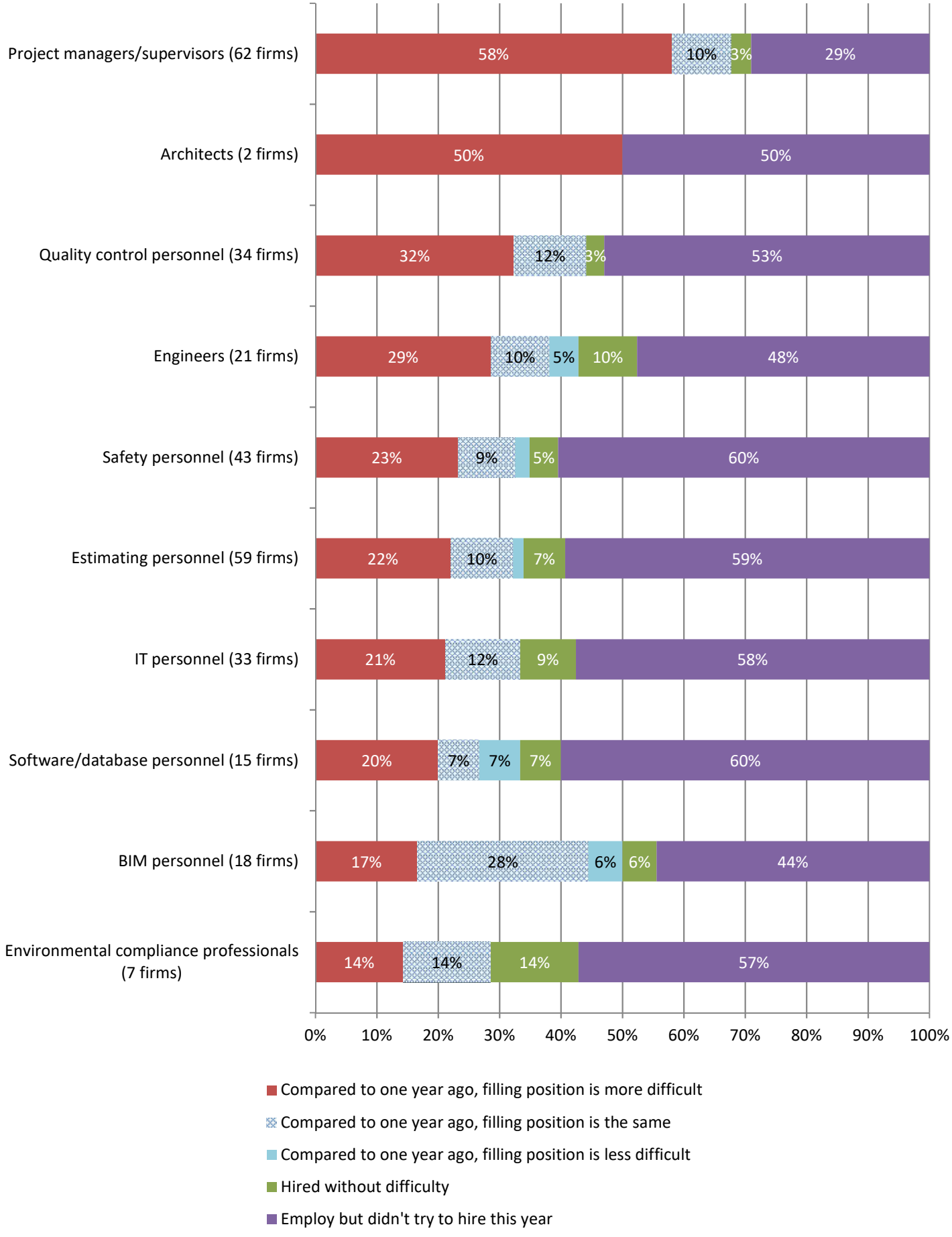
1. In the next 12 months, do you expect your firm will hire additional or replacement:



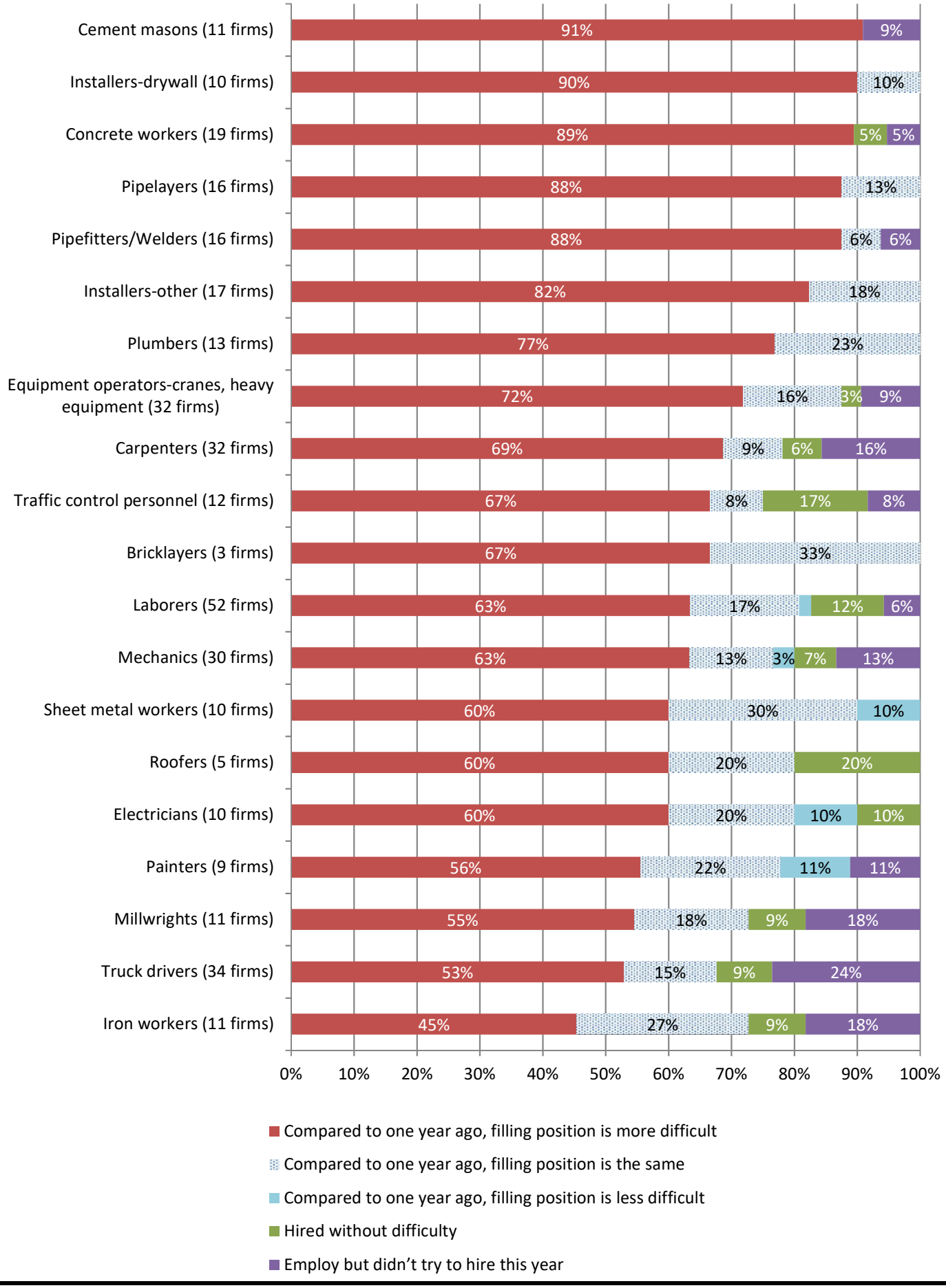
2. How would you describe your current situation in filling salaried and hourly craft positions?



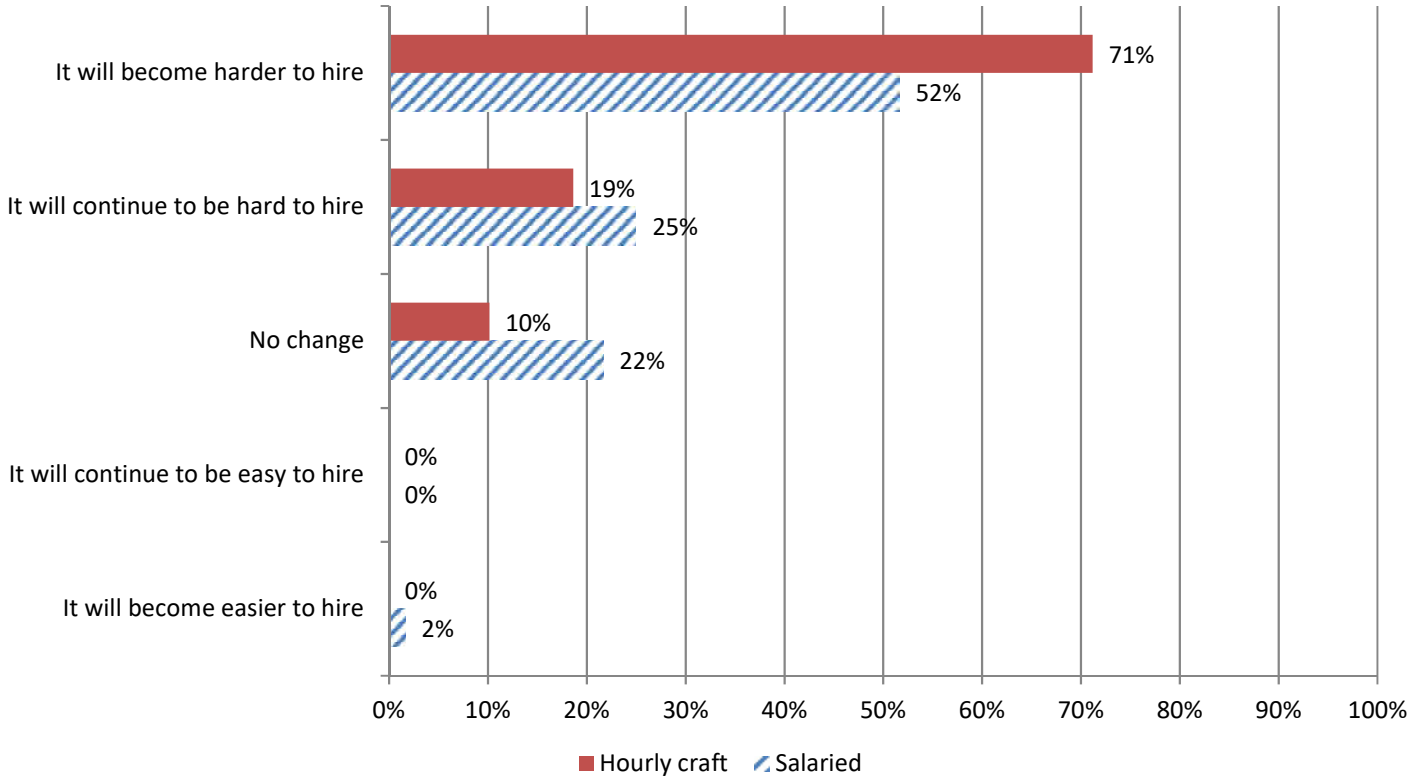
3. What has been your firm's experience this year in filling the following types of salaried positions?



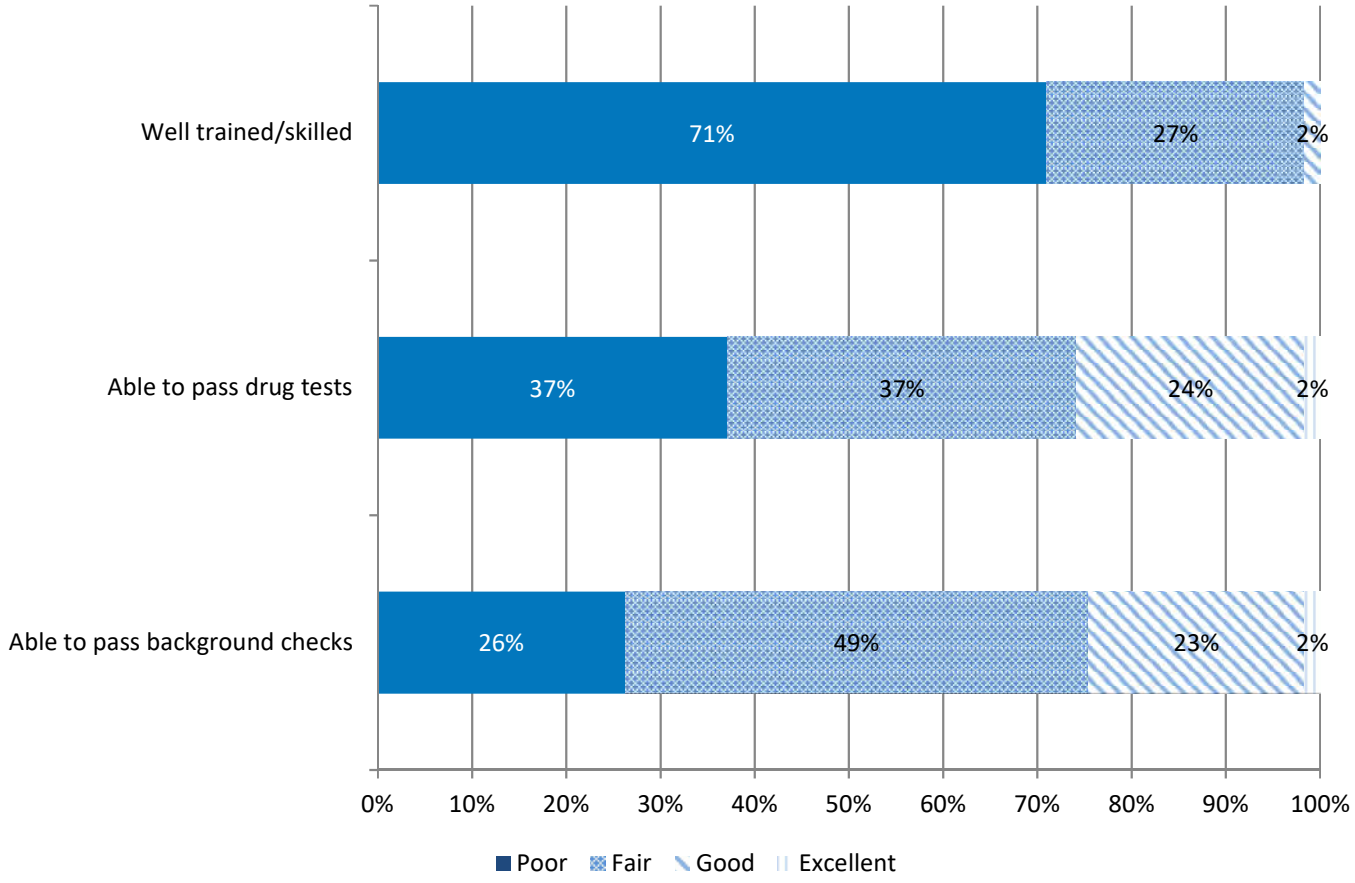
4. What has been your firm's experience this year in filling the following types of hourly craft positions?



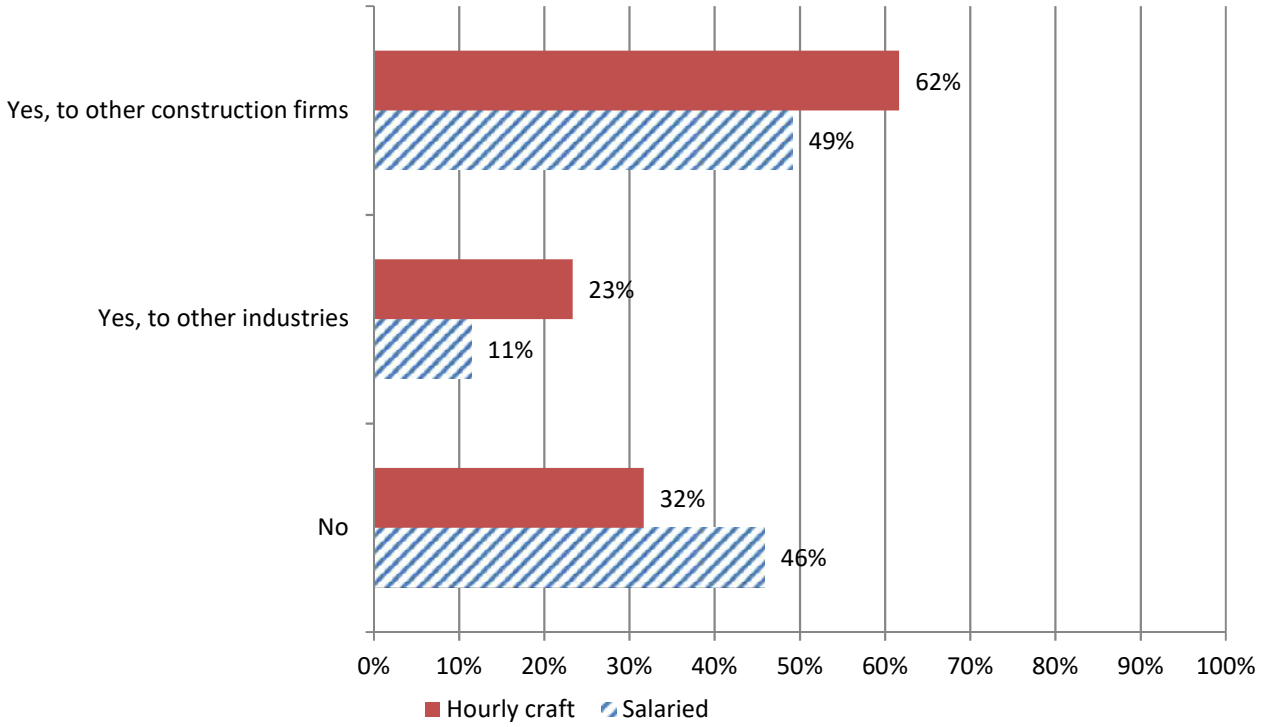
5. Do you expect any changes in the availability of hourly craft or salaried personnel over the coming 12 months?



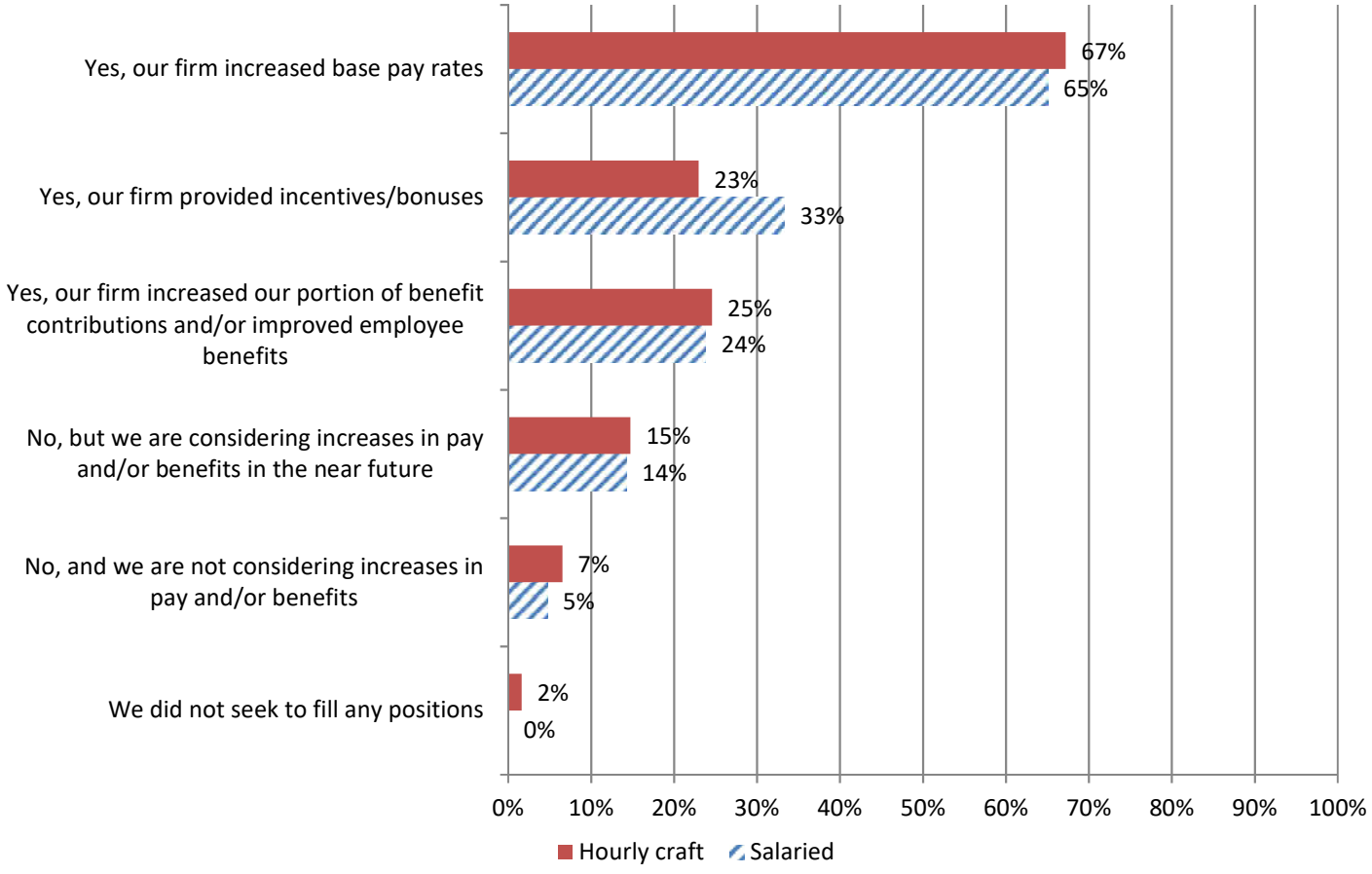
6. How would you rate the adequacy of the local pipeline for supplying craft personnel who are:



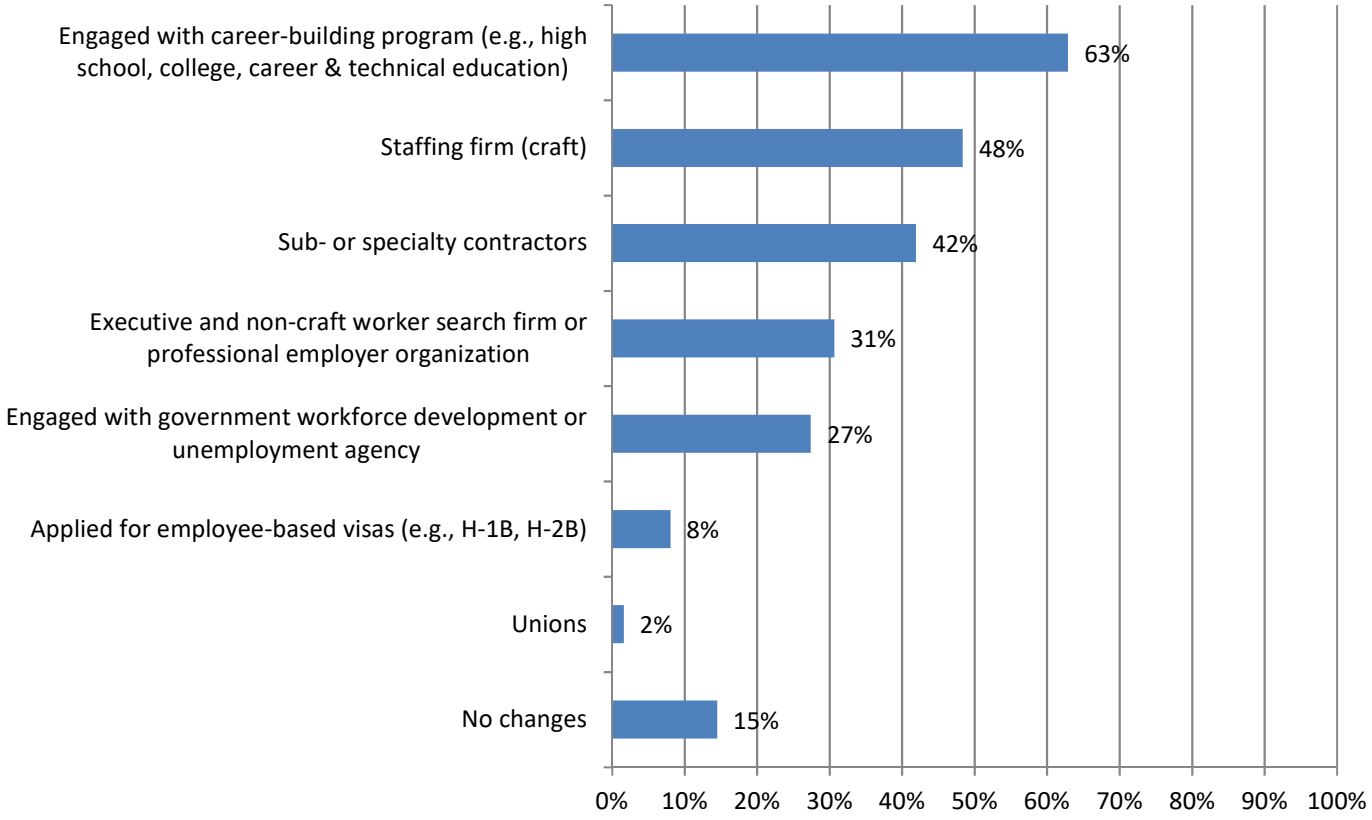
7. Is your firm losing hourly craft or salaried personnel to other employers? (Totals may add to more than 100%, as respondents could mark more than one answer.)



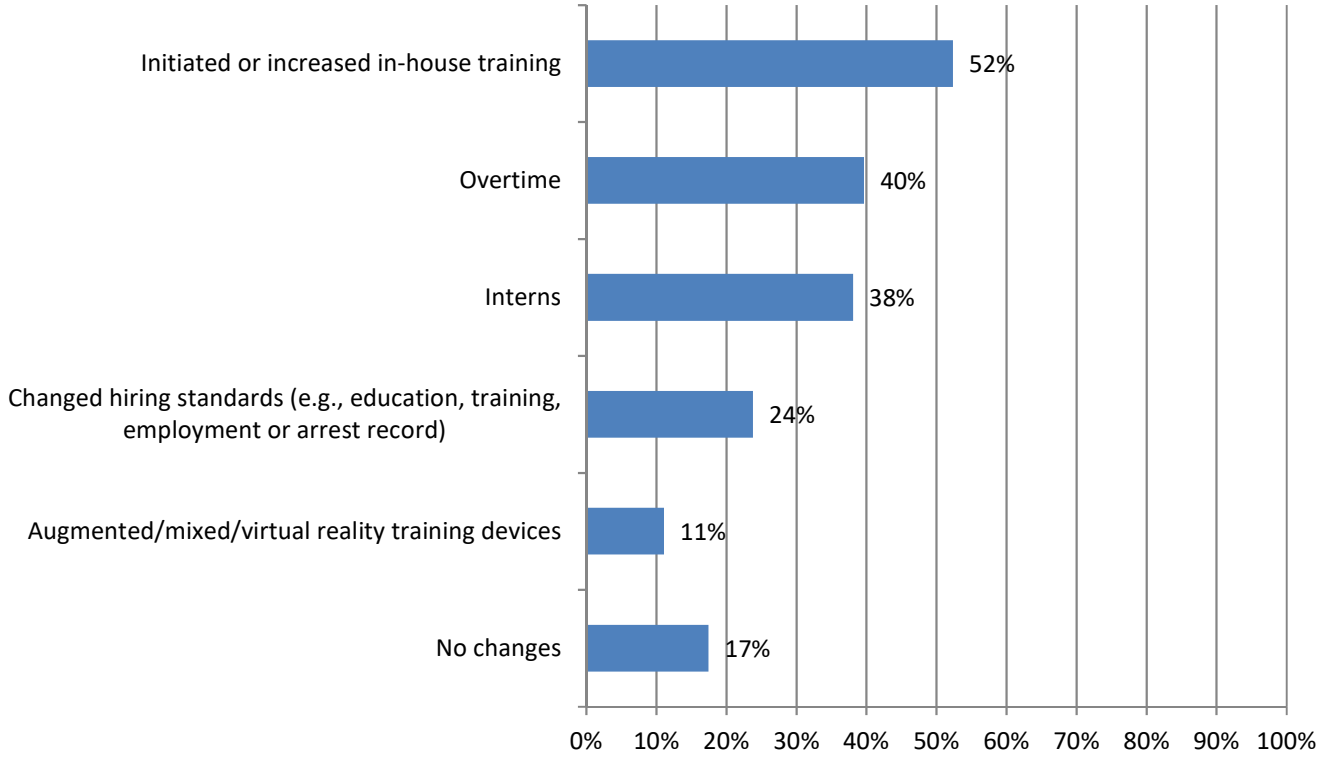
8. Has your firm increased pay and/or benefits for hourly craft or salaried personnel in the last year because of difficulty in filling positions? (Totals may add to more than 100%, as respondents could mark more than one answer.)



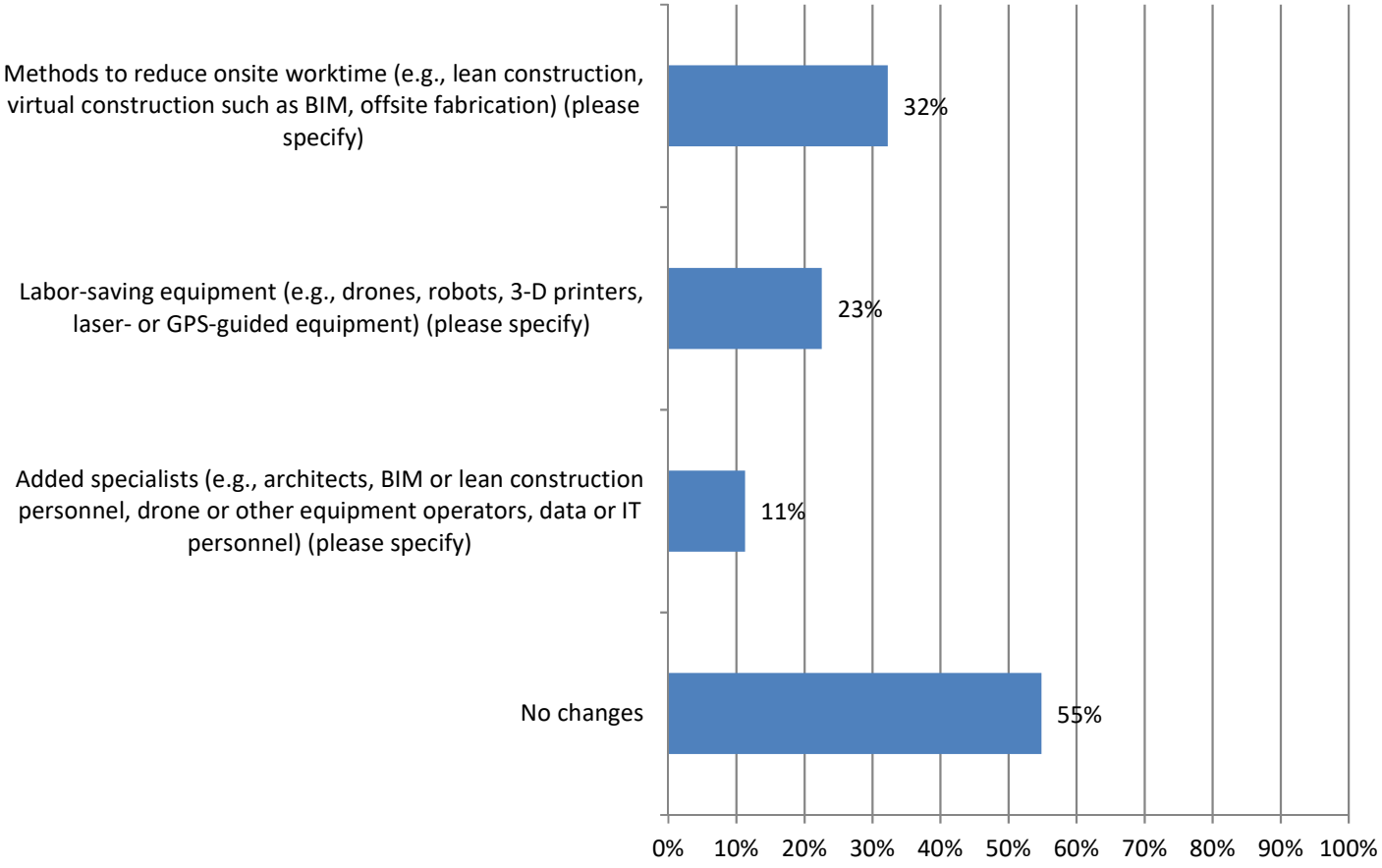
9. Has your firm added or increased use of the following to provide workers in the past year? (Totals may add to more than 100%, as respondents could mark more than one answer.)



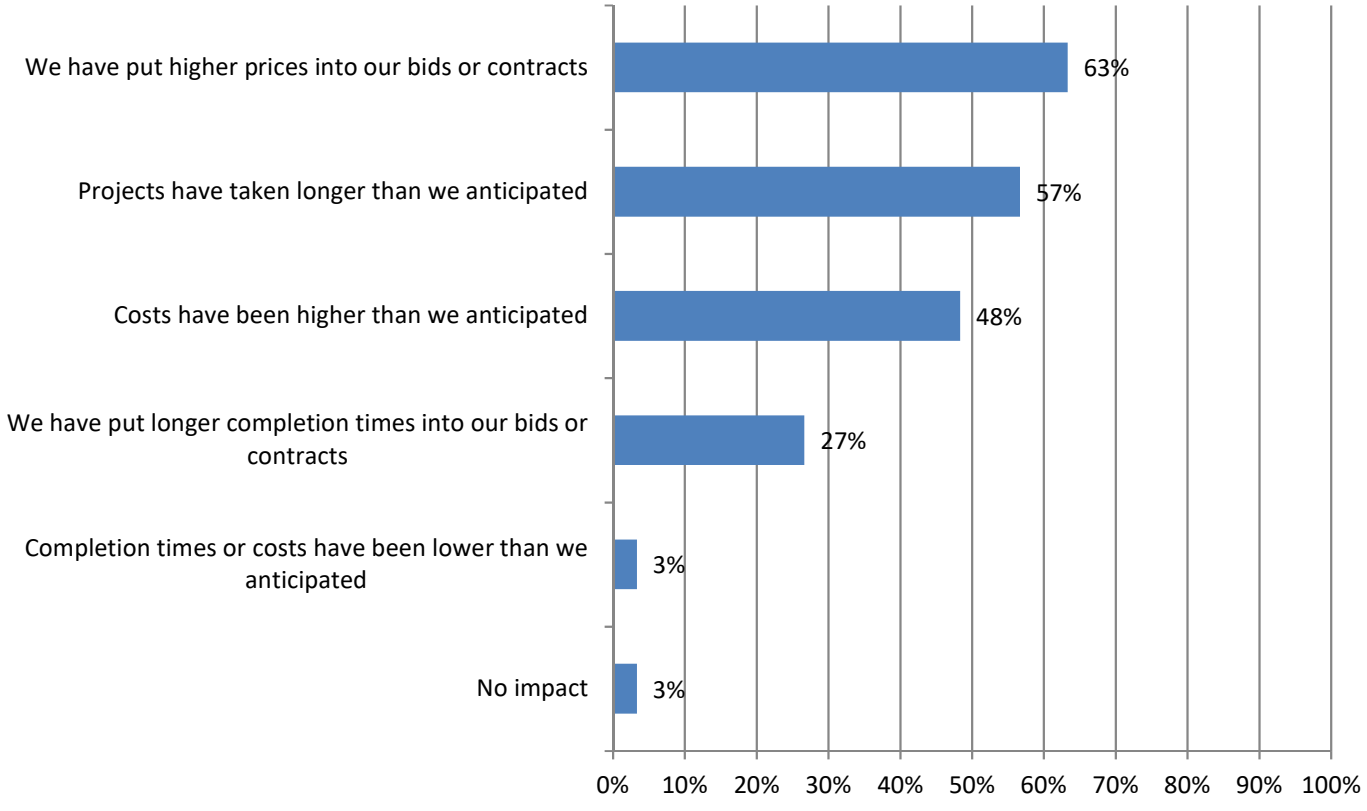
10. Has your firm made changes in hiring, training or scheduling to address worker or skill shortages in the past year? (Totals may add to more than 100%, as respondents could mark more than one answer.)



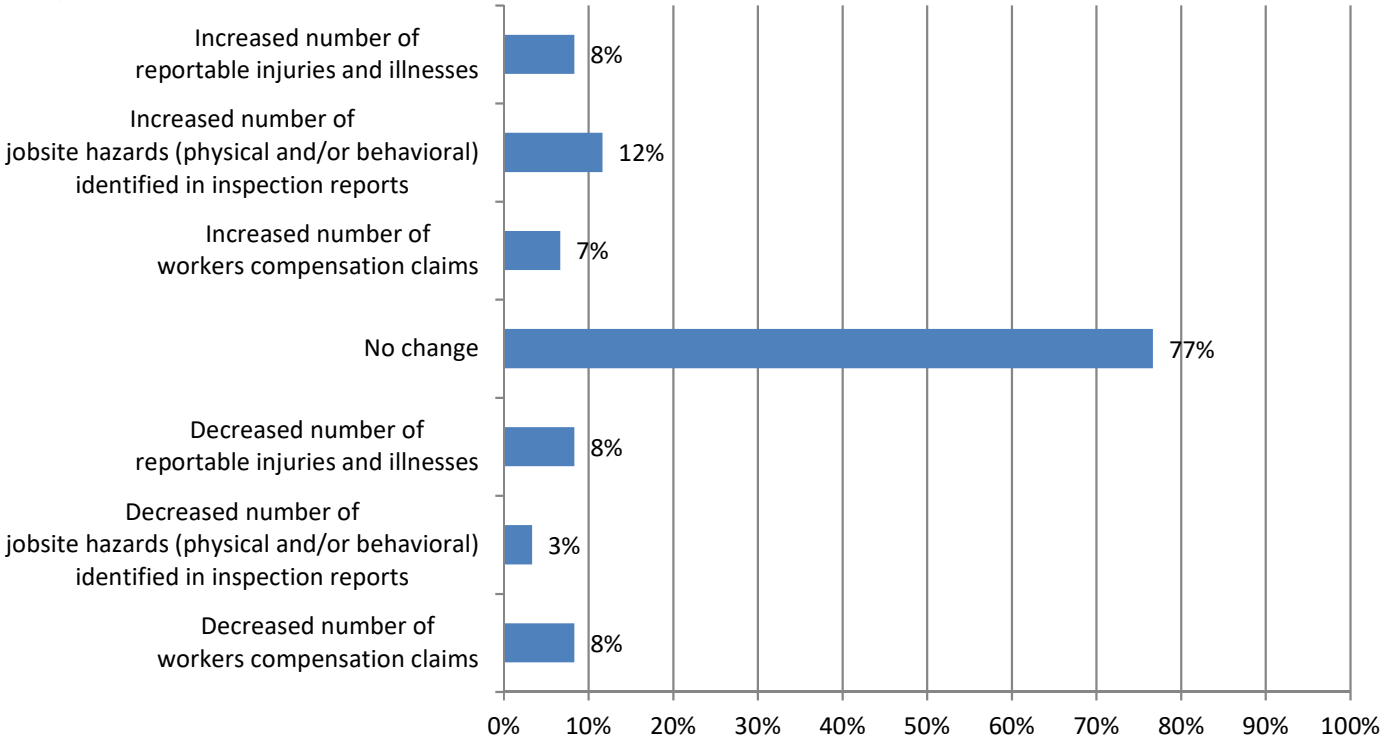
11. Has your firm adopted or increased use of the following to replace workers or skills? (Totals may add to more than 100%, as respondents could mark more than one answer.)



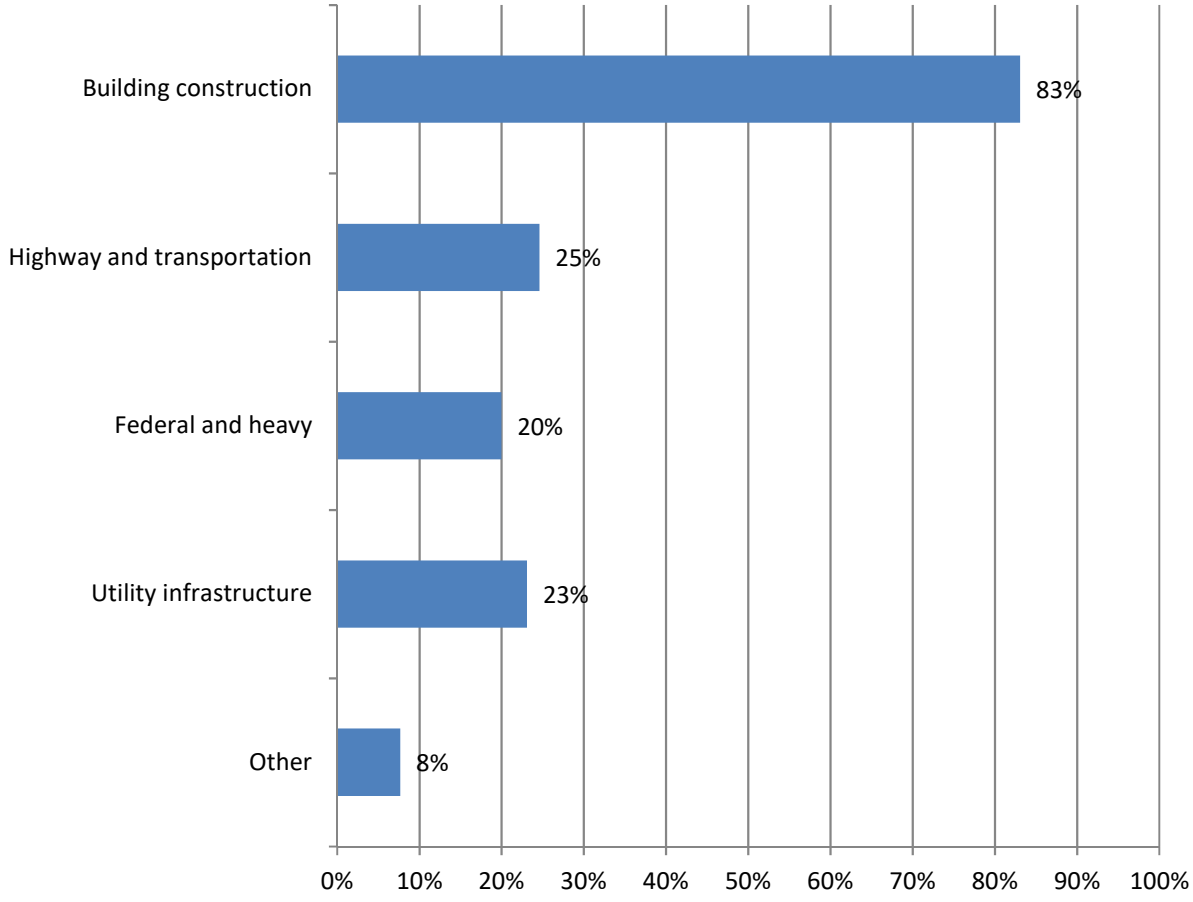
12. If your firm is experiencing staffing challenges, how would you describe the impact on your projects? (Totals may add to more than 100%, as respondents could mark more than one answer.)



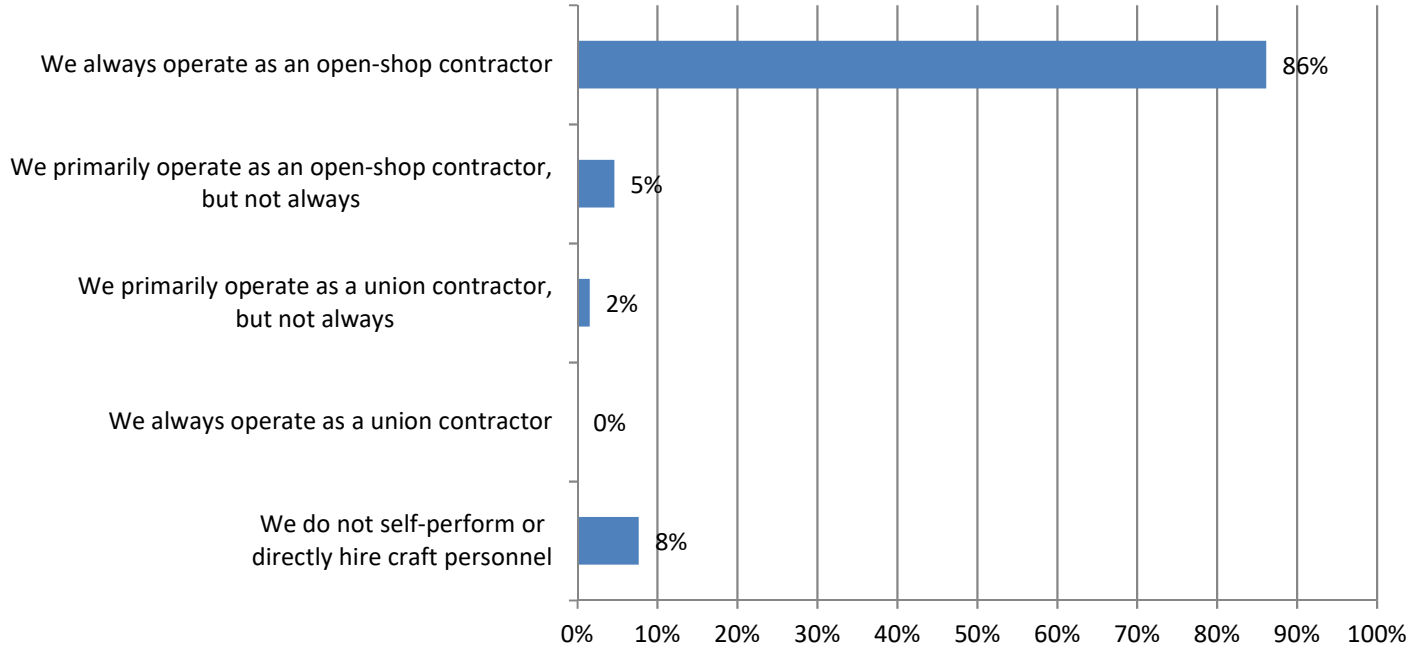
13. If your firm is experiencing staffing challenges, how would you describe the impact on your company's safety and health program or performance? (Totals may add to more than 100%, as respondents could mark more than one answer.)



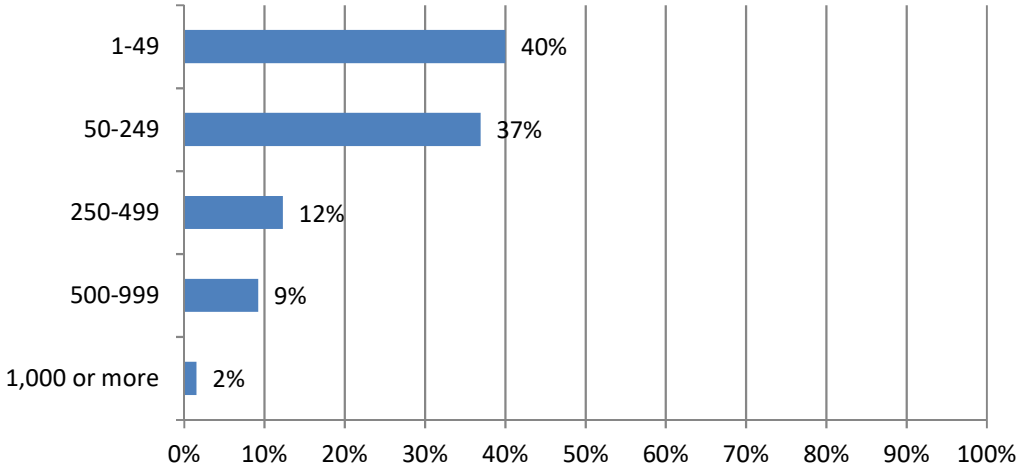
14. Please indicate which of the following types of construction projects your firm performs: (Totals may add to more than 100%, as respondents could mark more than one answer.)



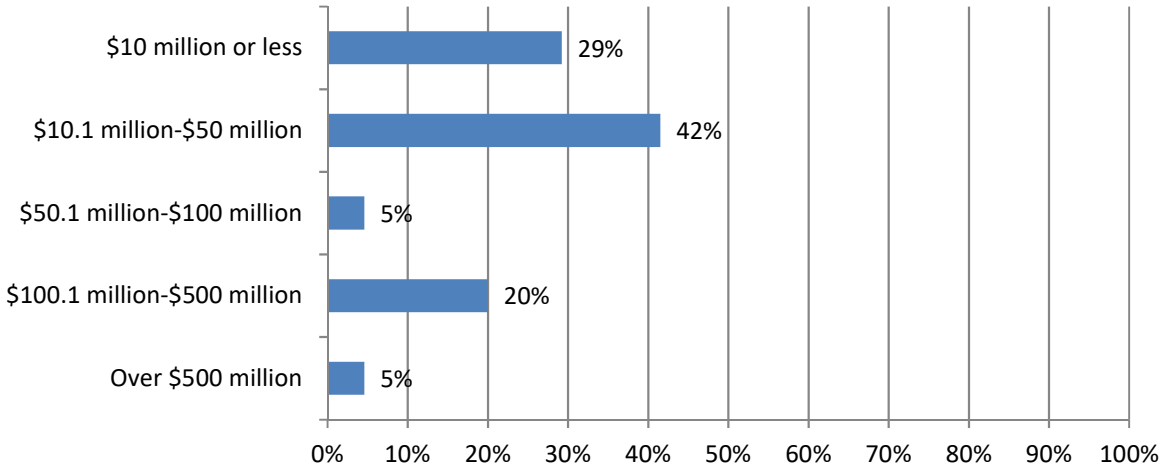
15. When you self-perform construction work, do you operate as a union contractor or an open-shop contractor?



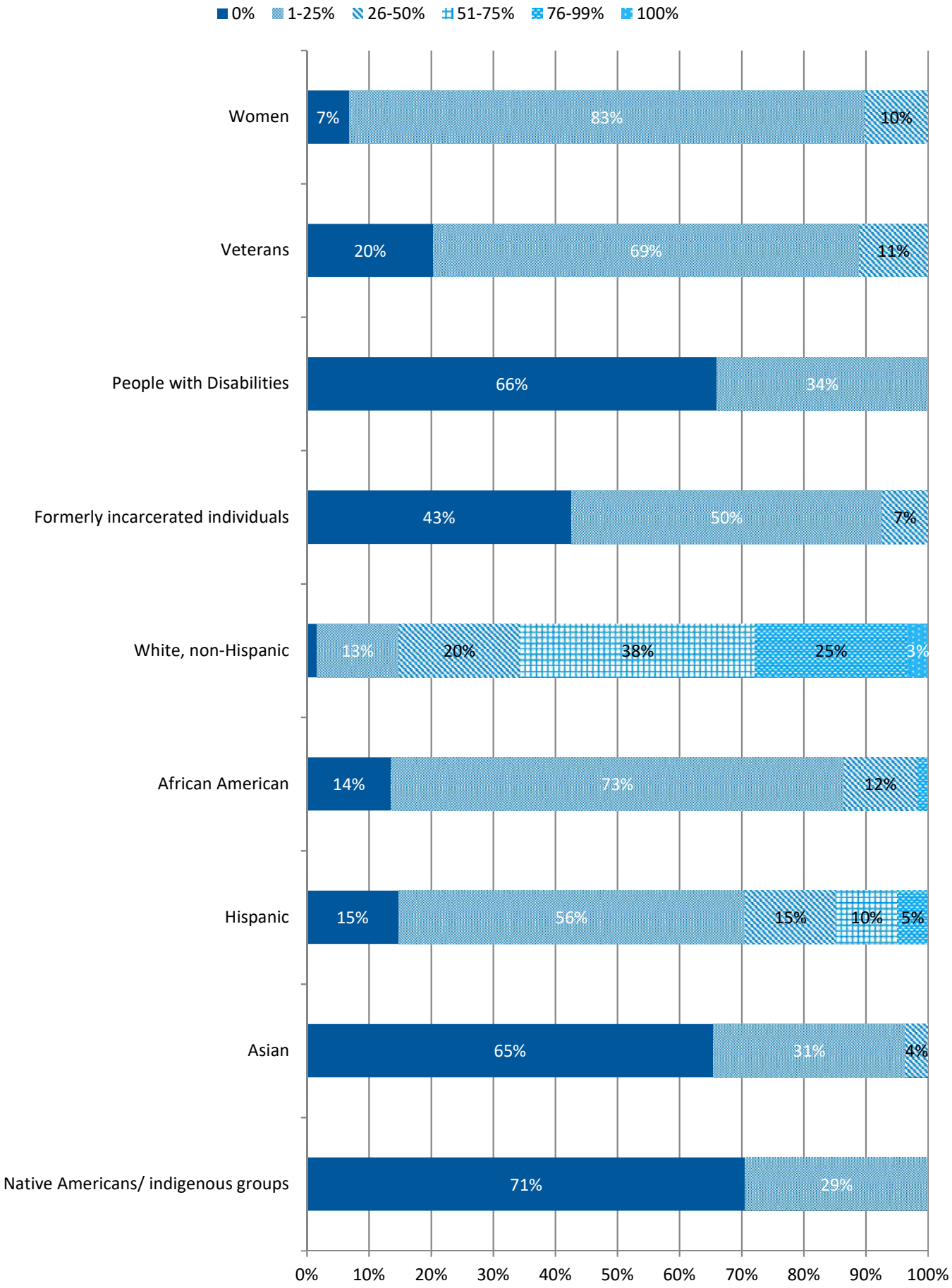
16. How many total employees does your firm employ at all of its locations?



17. Estimate the total dollar amount of work your firm performed during the past 12 months.



18. What percent of your employees are in each of these categories?



2017/2018 Construction Market Report: Washington DC Metro Region

Posted By: **Oliver Fox** | Category: **Cost and Risk Management** • **Research**

As reported by the Washington D.C. Economic Partnership, the Washington D.C. construction market just experienced its **sixth year of consecutive growth** and added a total of nearly 27 million square feet, the majority of which was private sector development.

The District's annual construction permit volume reached a six-year record high in 2017, a 30% increase from 2012 (when the District first began publicly releasing permit data). This includes over 30 developments each valued over $100 million, and a total combined construction value exceeding $9 billion.

Other cities within the Washington D.C. Metro Region such as Arlington and Bethesda have also experienced significant growth as they compete to attract businesses and as financing has become more accessible.

Construction markets within the Metro Region are closely interconnected, with capital and labor moving fluidly throughout the region. The continuous high volume of development activity throughout the Metro Region has reduced the competitiveness of the local construction market, impacting labor costs and increasing escalation rates and market volatility for most subtrades. The current condition is expected to continue as we see strong market activities extending through 2019.

This report will provide construction-related statistics that detail the volume of growth in construction permits and development activities, as well as an analysis of how the activity has impacted both our private and public sector clients.

Construction Permit Volume

Construction permit volume in Washington D.C. has climbed steadily since 2012, reaching a six-year record high in 2017. Last year's permit volume was not only higher in aggregate but also on a month-by-month basis, indicating a consistently more active construction market throughout the year.

This volume of permits has extended average permit processing in the District to an average of 6 to 12 months – a significantly longer timeline than similarly hot markets such as Seattle, which currently averages 4 months.

Permit processing in Washington D.C. is a complex affair, with 10 agencies involved in processing building permits. However, recent news of a **proposed bill to split** the Department of Consumer and Regulatory Affairs (DCRA) could streamline the construction permitting process and shorten processing times.

Note: Construction permit data referenced above is specific to Washington D.C. Granular-level data for surrounding counties, districts, and cities within the Washington D.C. Metro Region were not publicly accessible at the time of publication.

Sector Activity

Private Sector Activity

An expanding private job market has driven the region's economic growth in recent years. From 2007 to 2016, private sector employment has experienced a 16.6% growth, while the public sector grew by only 5.9%. With tens of thousands of new, high paying jobs created, private developers have rushed to accommodate the new demand, particularly in the commercial office and residential markets.

This explosion of work has been made possible as lending and financing rates have dropped to historic lows, and as institutions have made post-GFC loans more accessible to developers – particularly for project types with lower perceived risk, such as multi-family. But even "riskier" asset classes, such as hotels, are attracting large volumes of capital and have grown rapidly.

Learn how we're advising our hospitality clients in the Washington D.C. market here.

Foreign capital has also **played a significant role** in driving private developments in DC. Investors from China, Japan, and the Middle East are attracted by the stability of the market and been instrumental in financing a number of projects across the region.

Public Sector Activity

Entering last year, there were high hopes for increased infrastructure spending in the US. However, the Federal Reserve Economic Data (FRED) has reported that **public construction spending has generally remained stagnant across the country**.

In Washington D.C., the gap between private and public sector development activity has grown greater than the national average as public spending first plateaued and then declined.

The key driver of previous booms – large government initiatives and projects such as BRAC (Base Realignment and Closure) – are now notably absent. Public agencies such as the General Services Administration (GSA) are now not only facing **tighter budgets** but are also struggling to control construction costs in the hot, private sector driven market.

We can see the effects of these conditions throughout the public sector. Some agencies have taken drastic measures including placing projects on hold in the hopes that the prices will eventually settle back down, as in the case of the FBI headquarters project **cancellation**.

Other agencies are going through a redesign process to bring their projects back under previously established budgets, such as the Consumer Financial Protection Bureau (CFPB) headquarters which saw a **construction cost overrun by over 25%.**

Major Projects In Development

The current development pipeline in the Washington D.C. Metro Region is characterized by large-scale waterfront developments, mixed-use neighborhoods, and transit-oriented developments.

MGAC's Research Group has tracked 40 developments in the region valued above $100 million. The total combined value in the pipeline exceeds $12 billion.