Gilbane

CONSTRUCTION ECONOMICS

MARKET CONDITIONS IN CONSTRUCTION

2014 SPRING

CONTENTS

DATA INCLUDED IN THIS REPORT

- Construction Spending (Put-In-Place) through February, released April 1, 2014
- Construction Starts through February, released March 20, 2014
- Construction Jobs through mid-March, released April 4, 2014
- Producer Price Index Materials through February, released March 14, 2014
- Producer Price Index Markets through March, released April 11, 2014
- Producer Price Index Historical Graphs through December (4th quarter) 2013
- Architectural Billings Index through February, released March 21, 2014
- Dodge Momentum Index through March, released April 7, 2014
- Consumer Inflation Index through February, released March 18, 2014

TABLES AND FIGURES

SUMMARY

CONSTRUCTION GROWTH LOOKING UP

- Construction Spending for 2014 will finish the year 6.6% higher than 2013. Nonresidential Buildings will contribute substantially to the growth. See Table 2.
- The Architecture Billings Index (ABI) in 2013 dropped below 50 in April, November and December briefly, indicating declining workload. Overall the ABI portrays a good leading indicator for future new construction work. See Figure B.
- ENR published selling price data for 2013 that shows contractors adding to their margins.
- Construction jobs grew by 156,000 in 2013, less than anticipated. However, hours worked also grew by 3%, the equivalent of another 150,000+ jobs.

FIGURE A: ALL CONSTRUCTION SPENDING RATE OF GROWTH 2012-2014

Total spending of ALL types of construction will grow just under 7% year over year from 2013 to 2014. We started the year at an annual rate of spending near $940 billion and should finish at a rate of $990 billion. We may experience a Q1-Q2 2014 slowdown, but expect continued growth after May. Residential and nonresidential buildings lead the expansion while nonbuilding infrastructure holds back growth.

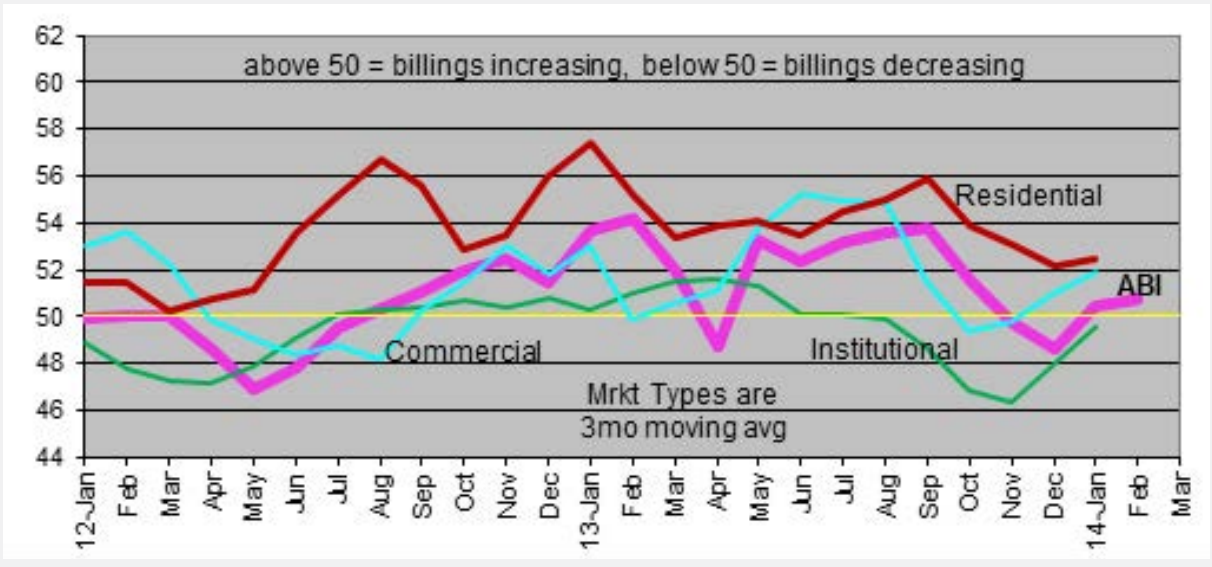
SOME ECONOMIC FACTORS ARE STILL NEGATIVE

- We are experiencing a slight slowdown in construction spending that could last through May, influenced by a slight dip in nonresidential buildings and a brief flattening in residential, but more so by a steep decline in nonbuilding infrastructure spending. The monthly rate of spending for nonbuilding infrastructure may decline by 10% through Q3 2014. Refer to Figure 7.
- The construction workforce and hours worked is still 22% below the 2006 peak. At peak average growth rates, it will take a minimum of five more years to return to previous peak levels.
- Construction volume is 23% below peak inflation adjusted spending, which was almost constant from 2000 through 2006. At average peak growth rates of 8% per year, and factoring out inflation to get real volume growth, it will take eight more years to regain previous peak volume levels.
- As workload expands in the next few years, a shortage of available skilled workers may have a detrimental effect on cost, productivity and the ability to readily increase construction volume.

THE EFFECTS OF GROWTH

- Construction spending during the first five months of 2013 declined from the rate of spending in Q4 2012. Growth has been inconsistent, even in the booming residential sector, which has seen recent declines. We see more consistent growth in 2014 for buildings.

FIGURE B: ARCHITECTURAL BILLINGS INDEX 2012-2013



- As spending continues to increase, contractors gain more ability to pass along costs and increase margins. The growth in contractor margins slowed since last year. However, expected increases in volume should reverse that in 2014.
- ENR's Third Quarter 2013 Cost Report shows general purpose and material cost indices increased on average about 2% to 2.5% year over year. However, selling price indices increased 4% on average. The difference between these indices is increased margins.

IMPACT OF RECENT EVENTS

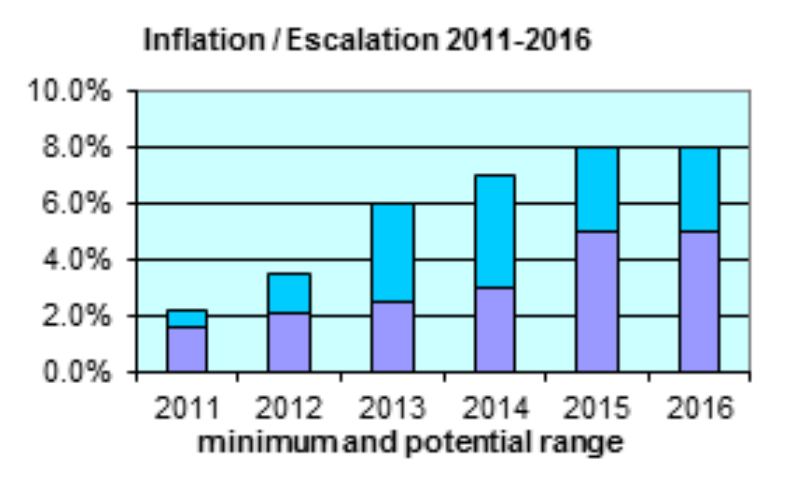
- There are several reasons why spending is not rapidly increasing: public sector construction remains depressed as sequestration continues; the government is spending less on schools and infrastructure; lenders are just beginning to loosen lending criteria; consumers are still cautious about increasing debt load, including the consumers' share of public debt and we may be constrained by a skilled labor shortage.

FIGURE C: INFLATION / ESCALATION 2011-2016

Future escalation, in order to capture increasing margins, will be higher than normal labor and material cost growth. Lagging regions will take longer to experience high escalation. Residential escalation is near, or even above, the upper end of the range.

We advise a range of:

- 3% to 7% for 2014
- 4% to 8% for 2015
- 5% to 8% for 2016



Supported by overall positive growth trends for year 2014, I expect margins and overall escalation to climb more rapidly than we have seen in six years.

Growth in nonresidential buildings and residential construction in 2014 will lead to more significant labor demand, resulting in labor shortages and productivity losses. Margins regained a positive footing in 2012 and extended those gains in 2013. Expect margins to grow stronger in 2014. When activity picks up in all sectors, escalation will begin to advance rapidly.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CONSTRUCTION STARTS

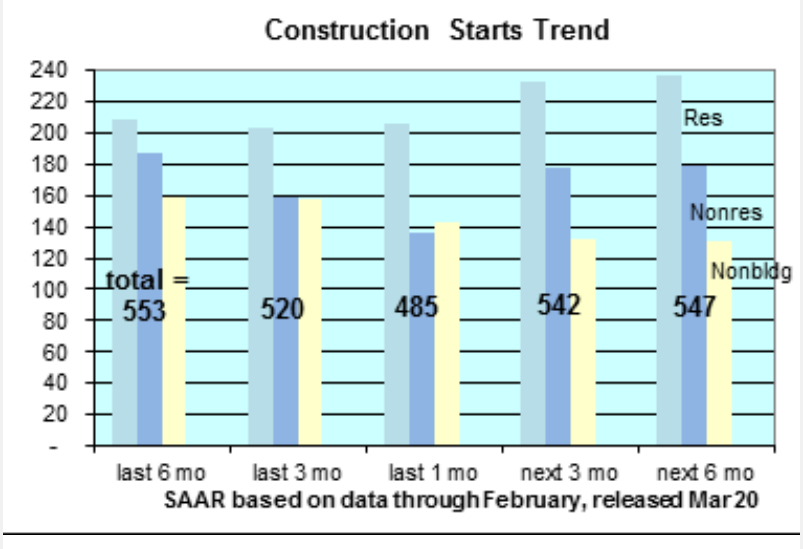
McGraw Hill Construction (MHC) publishes Construction Starts data, information that includes actual monthly data and a Seasonal Adjusted Annual Rate (SAAR) for each monthly starts value. Construction Starts data is volatile from month to month and this can skew the interpretation of the output. Over the last two years, 40% of the time, consecutive monthly totals have varied by more than 10%. The nonbuilding data has varied by more than 25% from month to month more than one third of the time over the last five years. This causes unusual peaks and valleys in the data. For that reason, Gilbane uses the three-month moving average (3mma) of Starts data. To observe trends in the data, I compare the latest month to the last three months and the last six months.

FIGURE 1: CONSTRUCTION STARTS TRENDS 2013-2014

Residential (Res) starts have varied month to month only slightly and have shown consistent slow to moderate growth for three years.

Nonresidential buildings (Nonres) starts were 30% above average in October and 20% below average in February. This skews the last 6 month and last 1 month bars.

Nonbuilding (Nonbldg) starts have been the most erratic over time, varying by as much as 60% from average, so short-term trends are often skewed.



EXPECTATIONS FOR 2014 BASED ON MCGRAW HILL CONSTRUCTION STARTS DATA

- McGraw Hill predicts new construction starts will increase 9% in 2014, upward movement influenced by a 22% increase in residential starts. Gilbane predicts total growth of approximately 5% for 2014.
- Nonresidential buildings in January dropped to a 5-month low and in February dropped to a 12-month low. McGraw Hill predicted nonresidential building starts would increase 8.2% in 2014. Due to the decline in the first two months, I expect total starts for nonresidential buildings will grow only 5% in 2014.
- From Q1 2011 to Q1 2013, the rate of new residential starts grew from $120 billion to $200 billion - 67% growth. Starts have been over $200 billion for twelve of the last thirteen months. But the average for the last six months shows less than 2% growth over the previous six months. McGraw Hill predicted total residential construction starts would increase 22.5% in 2014. Based on the slow growth in the last six months, I predict only 16% growth in residential starts in 2014.
- Although nonbuilding infrastructure starts reached a 16-month high in December, they retreated in January and February by 30% to lower than the 2013 average. I agree with McGraw Hill's prediction that nonbuilding infrastructure starts will decline by 9% in 2014.

TABLE 1: U.S. CONSTRUCTION MARKET OUTLOOK NEW STARTS 2009-2014

	TOTAL CONSTRUCTION STARTS				MHC	Gilbane	MHC
	Actual 2009	Actual 2010	Actual 2011	Actual 2012	Revised 2013	Revised 2014	Forecast 2014
Nonresidential Buildings	167,955	161,194	165,048	158,222	172,220	176,149	176,700
		-4.0%	2.4%	-4.1%	8.8%	2.3%	8.2%
Residential Buildings	111,851	121,155	126,299	166,159	205,493	237,559	254,200
		8.3%	4.2%	31.6%	23.7%	15.6%	22.5%
Nonbuilding Construction	141,899	148,088	147,851	162,823	143,697	130,705	124,400
		4.4%	-0.2%	10.1%	-11.7%	-9.0%	-9.4%
Total Construction	421,705	430,437	439,198	487,204	521,410	544,412	555,300
percent change YOY		2.1%	2.0%	10.9%	7.0%	4.4%	9.3%

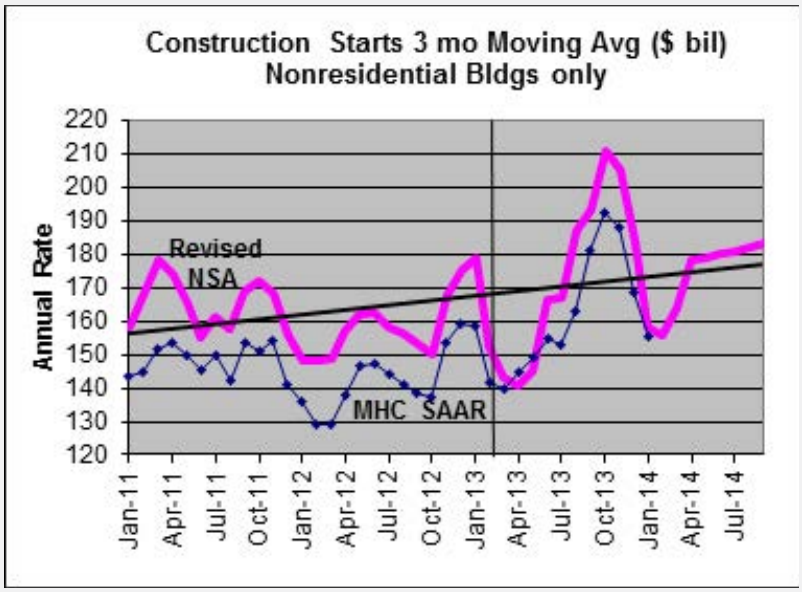
dollars in millions
includes McGraw Hill data for Feb released March 20, 2014
Year-to-Date total for previous YTP is revised every month

Over the last 12 months housing permits growth averaged 2.5% per quarter. In the previous 12 months, permits growth averaged 8% per quarter. Based on the decline in permits issued, I lowered my 2014 predicted starts for residential construction to 15.6% versus 22.5%, well below McGraw Hill Construction Outlook.

FIGURE 2: CONSTRUCTION STARTS – NONRESIDENTIAL BUILDINGS 2011-2014

The bulk of nonresidential buildings starts that will be spent in early 2014 started in the 15 months prior. Low starts in early 2013 may indicate below average spending in Q1-Q2 2014, before the April 2013 to October 2013 increase in starts leads to accelerated spending on nonresidential buildings. See Figure 3.

Note: All Starts SAAR data is revised 1 month later and NSA data is revised 12 months later. MHC SAAR includes 1-month adjustment. Revised NSA previous year values include 12-month adjustments. The vertical line shows the revision month.

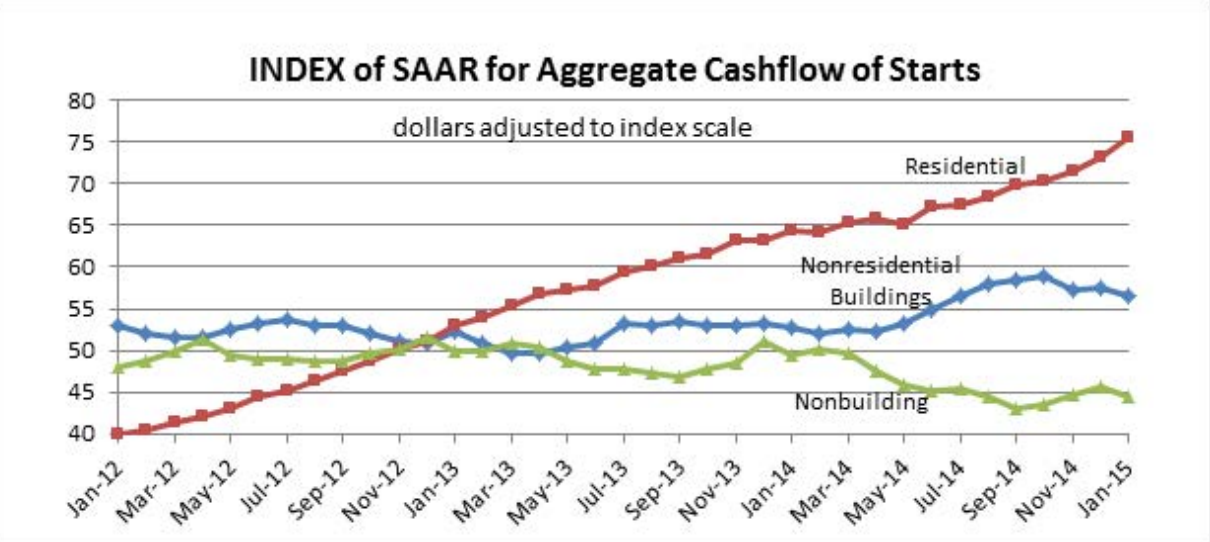


MHC Construction Starts can act as a leading indicator. Even though not all construction projects are captured in the starts data (only about 50% is captured), we have more than enough data to develop cash flows over time that will show the expected direction in construction spending activity. Starting with the 3-month moving average of actual starts, Figures 2 and 3 show this relationship for nonresidential buildings.

MHC measures new starts. To visualize expected trends in spending volume, we need to create a cash flow of the value of new starts over the expected duration specific to the project type. Using an appropriate duration for each major market sector, it may take the previous 24 months of new starts to find the resultant cumulative cash flow in any given month. New starts can be used as a leading indicator of work 6 to 24 months out.

Starts represent the value of project contracts signed. We can assume durations for the various major categories of projects and cash flow the starts. A cash flow spreads out the value of the new project starts over the expected duration from start to finish. Generally project durations can range from 6 to 9 months for small projects and up to 24 to 30 months for very large projects. Project duration and cash flow begins in the month the data is posted.

FIGURE 3: CONSTRUCTION STARTS – CUMULATIVE CASH FLOW OF STARTS 2012-2014



The cumulative cash flow total in the current month from all monthly starts over the last two years shows the relative change in spending caused by fluctuation in starts. The cash flow plot in Figure 3 shows a continued upward growth in residential construction and a moderate decline in spending for nonbuilding infrastructure work; this decline clearly supported by the drop in new starts for infrastructure projects. For nonresidential building work, we see a slight downward trend through Q1 2014 before it resumes upward growth through Q3 2014.

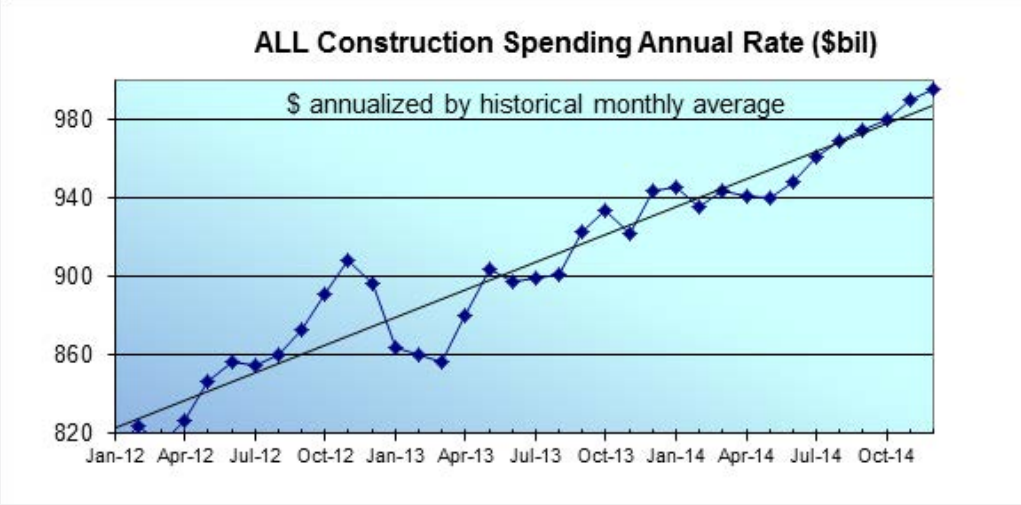
CONSTRUCTION SPENDING

Total spending for all types of construction in 2014 will reach $960 billion, up 6.6% year over year from 2013.

In Q1 2012, the monthly rate of spending was $820 billion and in Q4 2012 reached $900 billion. In Q1 2013, the monthly rate of spending dropped to $860 billion and in Q4 2013 reached $930 billion. I expect the monthly rate of spending will start Q1 2014 at $940 billion and in Q4 2014 will reach $990 billion.

For 2013, both nonresidential buildings and nonresidential infrastructure spending were flat or below 2012 levels. Nonresidential buildings after inflation actually declined.

FIGURE 4: ALL CONSTRUCTION SPENDING RATE OF GROWTH 2012-2014



Nonresidential infrastructure spending hit an all-time high in Q4 2012 but by Q4 2013 had dropped 12%. By Q4 2014, it will drop another 5%.

TABLE 2: TOTAL CONSTRUCTION SPENDING SUMMARY 2006-2014

U.S. TOTAL CONSTRUCTION SPENDING SUMMARY								
Totals in billions current U.S. dollars								
	Actual							Forecast
	2007	2008	2009	2010	2011	2012	2013	2014
NONRESIDENTIAL BUILDINGS	403.9	437.7	375.7	290.4	284.0	298.5	298.7	324.7
% change year over year	18.9%	8.4%	-14.2%	-22.7%	-2.2%	5.1%	0.1%	8.7%
NONBUILDING HVY ENGR	248.1	272.1	273.5	265.0	251.4	272.0	263.4	255.8
	19.4%	9.7%	0.5%	-3.1%	-5.2%	8.2%	-3.2%	-2.9%
RESIDENTIAL	500.7	357.8	253.9	249.1	252.7	286.6	337.8	379.0
	-19.2%	-28.5%	-29.0%	-1.9%	1.4%	13.4%	17.9%	12.2%
TOTAL	1152.7	1067.6	903.1	804.5	788.0	857.1	899.9	959.5
	-1.3%	-7.4%	-15.4%	-10.9%	-2.1%	8.8%	5.0%	6.6%
Residential includes new, remodeling, renovation and replacement work.								
Source: U.S. Census Bureau, Department of Commerce.								
Actual Spending data through February 2014								
Forecast 2014 = Gilbane								

(Gilbane Building Company analysis uses in-house developed historical factors for individual monthly rates of spending. These historical rates vary from the US Census Bureau Seasonally Adjusted Annual Rate [SAAR] factors and give a somewhat different prediction of annual rates of spending than SAAR).

Total growth in nonresidential buildings spending will be held back by a dip early this year. The rate of spending decreased from an average of $300 billion in Q4 2012 to $286 billion in Q2 2013. However, the rate of spending recovered by 9% from Q2 2013 to Q4 2013. Due to early year declines, total spending for nonresidential buildings showed no increase in 2013.

A comparison of most recent projections is shown in Table 3. Gilbane projections are compared to Reed Construction Data (REED) and FMI.

Reed Forecast
FMI Forecast

TABLE 3: TOTAL SPENDING PREDICTIONS COMPARISONS 2013-2014

SPENDING PREDICTIONS COMPARISONS							
data updated 3-24-2014	2013 Actual	2013 Gilbane	2013 REED	2013 FMI	2014 Gilbane	2014 REED	2014 FMI
Residential	337	335	331	338	379	388	384
Nonresidential Buildings	299	295	297	301	325	320	314
Nonbuilding	263	267	265	278	256	282	276
TOTAL Nonres	562	561	562	579	581	602	590
TOTAL ALL	899	896	892	917	960	990	974
Gilbane data 2013 = Dec 2013 report; 2014 = Apr 2014 report							
Reed data 2013 = 12/23/2013 report; 2014 = 3/27/2014 report							
FMI data 2013 = 4th Qtr 2013 Outlook report; 2014 = 1st Qtr Outlook report							
FMI Transportation and Communication moved from Buildings to Nonbuilding							

NONRESIDENTIAL CONSTRUCTION SPENDING

Total spending for all nonresidential construction in 2014 will reach $581 billion, up 3.4% year over year from 2013.

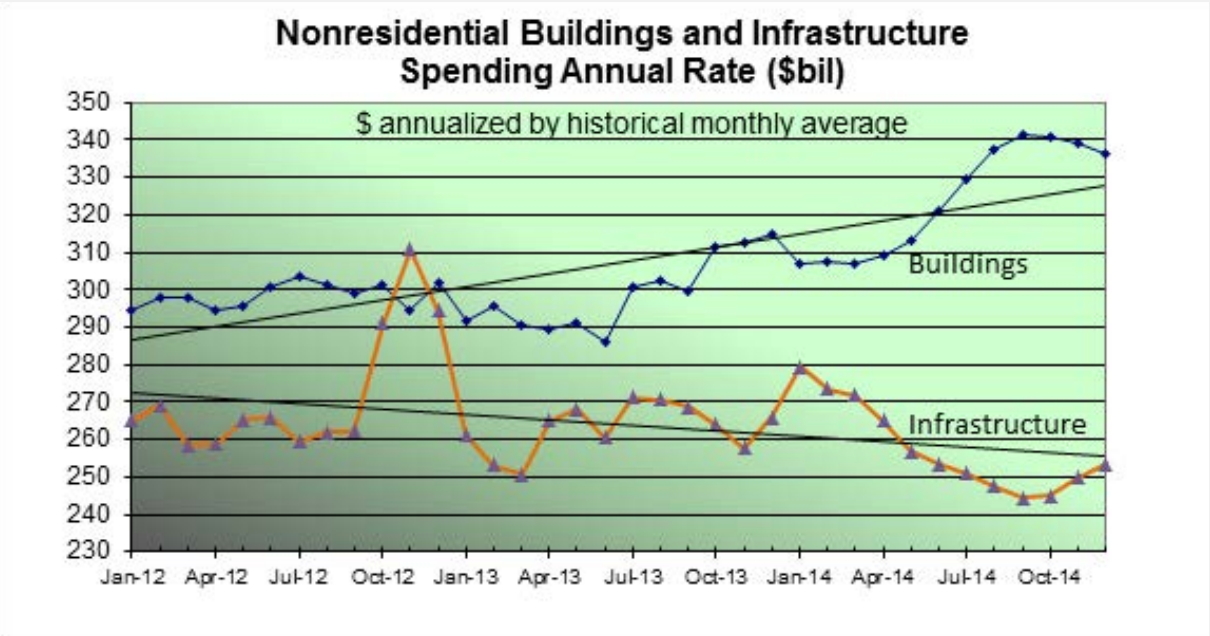
Nonresidential construction consists of two main categories

- Nonbuilding infrastructure projects
- Nonresidential buildings

Nonbuilding projects are composed of heavy engineering, heavy industrial and infrastructure projects. They include transportation, communication, power, highway and street, sewage and waste disposal, water supply and conservation and development. Almost 60% of non-building work is public work.

The largest components of nonbuilding infrastructure work are power and highway/street. Erratic movement in new starts in the power industry causes unusual fluctuations in total nonresidential spending. A 55% decline in new power starts in 2013 may drive nonbuilding infrastructure spending to a steep decline in 2014. The period from July 2012 through August 2013 has the lowest average new starts for infrastructure work of any period in the last six years. The effect of all of those declining monthly starts will be felt in 2014. The decrease in new starts will result in a decline in 2014 infrastructure spending.

FIGURE 5: NONRESIDENTIAL BUILDINGS AND INFRASTRUCTURE SPENDING GROWTH 2012-2014



NONRESIDENTIAL BUILDINGS SPENDING

The ABI shows a decline into April 2013 that should soon be reflected in lower new nonresidential buildings starts. The end result will show up as inconsistent nonresidential buildings spending at least into the Q2 2014, although the range has been within a few percent for about 18 months and will stay within that narrow range.

Total spending for nonresidential buildings construction in 2014 will reach $325 billion, an 8.7% increase from 2013.

From June 2011 to September 2013, for 28 consecutive months, nonresidential buildings construction spending fluctuated in a narrow, nearly flat range. In the Q4 2013 spending broke above that range, and it is expected that it will remain higher and grow through 2014.

For all of 2012, the monthly rate of spending was $299 billion +/- 1%. For the first six months of 2013, the monthly rate of spending declined, hitting a low in June of $286 billion. Since then, the average has climbed to $312 billion. We will experience some soft activity through April, but by Q3 2014 the rate of spending will be over $330 billion.

TABLE 4: SPENDING PREDICTIONS COMPARISONS – NONRESIDENTIAL BUILDINGS 2013

2013 SPENDING PREDICTION COMPARISONS - NONRESIDENTIAL BUILDINGS						
data updated 3-25-2014	Early Estiamte 2013		Midyear Estimate 2013		Last Estimate 2013	
U.S. CONSENSUS FINAL Actual 2013						
Gilbane Building Company	305	1	298	2	295	3
REED Construction Data	311	4	293	5	300	6
FMI	314	7	297	8	301	9
Associated Builders & Contractors	373	10	353	11	308	12
McGraw Hill Construction	307	10	299	11	296	12
IHS Global Insight	271	10	314	11	293	12
Moody's Economy.com	305	10	-		290	12
Wells Fargo	317	10	299	11	300	12
		see notes		see notes		see notes
Values are billions of dollars Actual Total 2013 U S Census reported 2-3-2014 Gilbane data 1= Mar'13 report 2=Jul'13 report 3=Dec'13 report REED data 4=Feb'13 report 5=Jul'13 report 6=Jan'14 report FMI Outlook data 7= Apr'13 1st Qtr 8=Jul'13 2nd Qtr 9=4th Qtr 10 = AIA Jan 2013 Consensus report 11 = AIA July 2013 midyear Consensus report 12 = AIA Jan 2014 Consensus report						

The last estimates in 2013 varied by 6% from highest to lowest prediction even though nine months of actual data were known. The initial predictions for 2014 spending on nonresidential buildings are much tighter than estimates in 2013, varying by only 4% from highest to lowest.

TABLE 5: SPENDING PREDICTIONS COMPARISONS – NONRESIDENTIAL BUILDINGS 2014

2014 SPENDING PREDICTION COMPARISONS		
Nonresidential Buildings		
data updated 3-25-2014	Early Estiamte 2014	
Gilbane Building Company	325	1
REED Construction Data	320	2
FMI	314	3
Associated Builders & Contractors	324	4
McGraw Hill Construction	312	4
IHS Global Insight	320	4
Moody's Economy.com	316	4
Wells Fargo	312	4
		see notes
1 = Gilbane Apr'14 report		
2 = REED Mar'14 report		
3 = FMI 1st Qtr 2014 outlook		
4 = AIA Jan 2014 Consensus report		

The major institutional sectors, healthcare and educational, represent 23% of all nonresidential construction and ±40% of nonresidential buildings spending. Both peaked in 2008, with educational at an annual rate of $105 billion and healthcare at $47 billion. Education is 80% public while healthcare is 80% private.

Commercial and office sectors represent 15% of all nonresidential construction and ±30% of nonresidential buildings spending. Commercial peaked in 2007, while office peaked in 2008. Both declined 50% from their peaks. Commercial is 95% private and office is 70% private.

These four market sectors represent 70% of all nonresidential buildings spending. See Table 5.

TABLE 6: CONSTRUCTION SPENDING MAJOR NONRESIDENTIAL MARKETS 2007-2014

U.S. TOTAL CONSTRUCTION SPENDING								
Totals in billions current U.S. dollars								
	Actual							Forecast
	2007	2008	2009	2010	2011	2012	2013	2014
EDUCATIONAL	96.8	104.9	103.2	88.4	85.0	84.6	79.2	80.1
% change year over year	14.0%	8.4%	-1.6%	-14.3%	-3.9%	-0.4%	-6.4%	1.1%
HEALTHCARE	43.8	46.9	44.8	39.3	40.2	41.8	40.6	41.8
	13.8%	7.1%	-4.4%	-12.3%	2.2%	4.0%	-2.9%	2.9%
COMMERCIAL	89.7	86.2	54.1	39.5	43.4	46.3	49.4	56.5
	16.9%	-3.9%	-37.3%	-27.0%	10.0%	6.7%	6.6%	14.4%
OFFICE	65.3	68.6	51.9	37.9	36.0	38.4	38.5	44.3
	20.4%	5.1%	-24.3%	-27.1%	-4.9%	6.7%	0.2%	15.1%
TOTAL	295.5	306.6	254.0	205.0	204.6	211.2	207.7	222.6
	16.2%	3.7%	-17.1%	-19.3%	-0.2%	3.2%	-1.7%	7.2%

Source: U.S. Census Bureau, Department of Commerce.
includes public and private
Actual Spending data through February 2014
Forecast 2014 = Gilbane

Total spending for educational buildings construction in 2013 was only $79.2 billion, down 6.4% year over year from 2012. I predict 2014 spending will reach $80.1 billion, up only 1.1% from 2013.

K-12 projects are often municipally-funded (public spending) and municipalities lag states in reaction to economic movement. Therefore, we should still expect further declines in K-12 spending due to future economic reactions. Private colleges and universities will generate higher rates of spending than the general education spending percentages would indicate. A recent New York Times article, citing statistics from the US Census construction spending survey, states “spending on construction of primary and secondary education buildings is running 40% below peak levels, but spending on higher education buildings is down only 15%.”

Total spending for healthcare buildings construction in 2013 was only $40.6 billion, down 2.9% year over year from 2012. I predict 2014 spending will reach $41.8 billion, up 2.9% from 2013.

Total spending for commercial buildings construction in 2013 was $49.4 billion, up 6.6% year over year from 2012. I predict 2014 spending will reach $56.5 billion, up 14.4% from 2013.

Total spending for office buildings construction in 2013 was $38.5 billion, up only 0.2% from 2012. I predict 2014 spending will reach $44.3 billion, up 15.1% from 2013.

TABLE 7: SPENDING PREDICTIONS COMPARISONS – MAJOR NONRESIDENTIAL MARKETS 2014

2014 SPENDING PREDICTION COMPARISONS								
Major Nonresidential Markets								
data updated 3-25-2014	Educational 2014		Healthcare 2014		Commercial 2014		Office 2014	
Gilbane Building Company	1.1%	1	2.9%	1	14.4%	1	15.1%	1
REED Construction Data	-0.6%	2	4.4%	2	11.8%	2	13.1%	2
FMI	2.8%	3	1.5%	3	6.6%	3	2.0%	3
Associated Builders & Contractors	2.1%	4 see notes	6.7%	4 see notes	5.3%	4 see notes	1.1%	4
1 = Gilbane Apr'14 report 2 = REED Mar'14 report 3 = FMI 1st Qtr 2014 outlook 4 = AIA Jan 2014 Consensus report								

PUBLIC/PRIVATE

Total construction can be split into public and private spending.

The largest public construction markets are highway and educational. Those two markets alone represent more than half of all public construction, followed by transportation, a distant third, and waste disposal fourth. All other markets together make up less than 30% of public work.

In 2013 public spending decreased by 2.5% but private spending increased by 8.6%.

Private spending volume is almost two and a half times that of public spending. If we take out residential construction, private spending would be only 10% greater than public spending.

Total public construction spending in 2013 was $272 billion, down 2.5% year over year from 2012. I predict 2014 spending will drop to $268 billion, down 1.4% from 2013.

Total private construction spending in 2013 was $628 billion, an increase of 8.6% year over year from 2012 but still more than 30% below the peak of $912 billion achieved in 2006. I predict 2014 spending will climb to $691 billion, up 10.1% from 2013. The annual rate of spending will climb steadily throughout the year to over $700 billion by December.

TABLE 8: TOTAL CONSTRUCTION SPENDING PUBLIC VS. PRIVATE 2007-2014

U.S. TOTAL CONSTRUCTION SPENDING								
Totals in billions current U.S. dollars								
	Actual							Forecast
	2007	2008	2009	2010	2011	2012	2013	2014
PRIVATE	863.4	758.8	588.1	500.5	501.6	577.9	627.8	691.1
% change year over year	-5.3%	-12.1%	-22.5%	-14.9%	0.2%	15.2%	8.6%	10.1%
Private Residential	493.2	350.2	245.6	238.6	244.1	280.2	331.9	364.6
Private Nonresidential	370.2	408.6	342.5	261.8	257.5	297.8	295.9	326.4
PUBLIC	288.9	308.7	315.0	303.7	286.4	279.0	272.2	268.5
	13.1%	6.9%	2.0%	-3.6%	-5.7%	-2.6%	-2.5%	-1.4%
TOTAL	1152.3	1067.5	903.1	804.2	788.0	857.0	899.9	959.5
	-1.3%	-7.4%	-15.4%	-11.0%	-2.0%	8.7%	5.0%	6.6%

Source: U.S. Census Bureau, Department of Commerce.
Actual Spending data through February 2014
Forecast 2014 = Gilbane

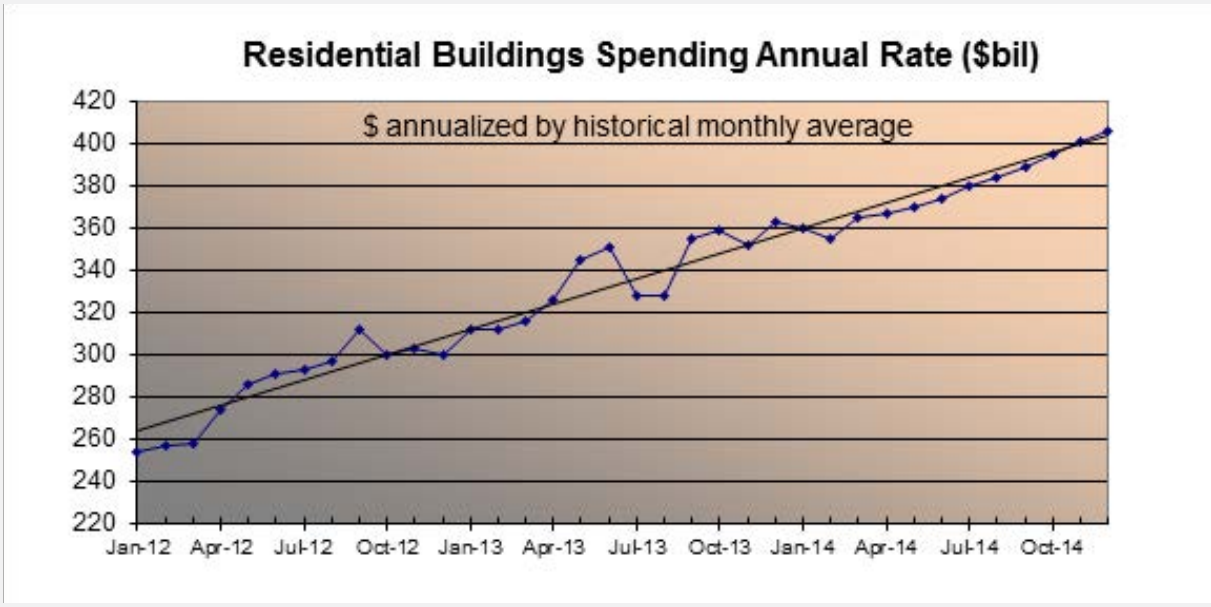
Private construction is predominantly residential. 96%+ of all residential work is private and constitutes just over half of all private work. (A historical note: in 2005-2006, residential work constituted 70% of all private work and more than half of all construction spending. From 2008 to 2012, residential spending comprised less than 50% of private work and only 33% of all construction. For 2013 and 2014, residential work constitutes 53% of private spending and nearly 40% of all spending.) Manufacturing (8%) and commercial (7.5%) are the next largest private buildings sectors. Non-buildings make up a large portion of private work; all power (17%) and communication work (3.5%) is private work.

RESIDENTIAL CONSTRUCTION

Total spending for residential construction in 2014 will reach $379 billion, up 12% year over year from 2013.

- *In Q1 2012, the monthly rate of spending was $260 billion, and in Q4 2012 it had reached $300 billion, a growth of 15%.*
- *In Q1 2013, the monthly rate of spending averaged $313 billion and in Q4 it reached $358 billion, a growth of 14%.*
- *We started 2014 with a monthly rate of $355 billion. We should see 2014 finish with a spending rate at $400 billion, resulting in a growth in rate of 13%*

FIGURE 6: RESIDENTIAL BUILDINGS SPENDING RATE OF GROWTH 2012-2014



In 2013 construction started on 925,000 new housing units; 617,000 (67%) were single family units and 308,000 (33%) were multifamily units. That was growth of 145,000 units more than 2012. 2012 had growth of 172,000 units over 2011.

The National Association of Homebuilders (NAHB) predicts new housing starts for 2014 will reach 1,093,000 new units, volume growth of 168,000 new units over 2013 or growth of 18% over 2013. There are numerous predictions that new housing starts will reach over 1,100,000 in 2014, growth of more than 175,000 new units.

For seven quarters through the end of 2012, permits growth averaged 7.3% per quarter. For the first three quarters in 2013, permits growth averaged less than 1% per quarter. Growth increased dramatically in November and December to 14% but fell back in January and February to only 2.2% over Q3 2013. Based on the low rate of growth in permits issued, I anticipate future starts growth will remain lower than the peak rates of new starts in 2012 and 2013.

I predict new housing starts for 2014 will reach a total of 1,050,000 growth of 125,000 new units over 2013. For the first three months of 2014, starts averaged only 923,000 new units. Starts would n eed to grow at an unusually fast average rate of 1,150,000 every month for the remainder of the year to reach the NAHB estimate of 1,093,000. It is highly unlikely that will be achievable.

The longest smooth growth period for new home building was from 1991 to 2005. Total new homes built within a year went from 1.0 million units per year in 1991 to 2.0 million per year in 2005. Units include single and multifamily houses, apartments and condominiums. ***The fastest rate of building growth during that period was 170,000 additional new units in 1994.*** In the boom years from 2002 to 2005, growth only increased about 100,000 units per year. We duplicated the fastest annual growth in 2012. As expected, we did not duplicate that peak growth rate in 2013. I do not expect that we will duplicate that rate of growth in 2014.

Inflation must be factored out to see volume growth. In the last 20 years, residential construction "volume" has reached 10% annual growth only 4 times; 1994 was 13%, 1996 was 10% and 2012 was 9.5% and 2013 was 10.5%. We have never come close to growth rates of 23% to 33% new volume per year.

In 1994, the largest single volume growth in residential construction in 30 years, 340,000 new construction jobs, predominantly residential, were created in 12 months, an average of 28,000 jobs per month. That's the largest "residential" volume and workforce expansion in 30 years. The largest ever net annual gain in jobs was an average of 35,000 jobs per month over 14 months, but that's "ALL" construction: residential, nonresidential and heavy engineering, so it is not a realistic target.

We actually started 780,000 new residential units in 2012, 170,000 more than 2011, and 925,000 new units in 2013 - 145,000 more than 2012. We may potentially add 125,000 to 140,000 more new units in 2014. If we were to add 200,000 to 250,000 new units in 2014, the workforce would need to grow more than 35,000 jobs per month for a year. That would be as fast as the entire construction industry has ever grown at any time in the last 25 years. That is not very likely to occur to support just one sector.

Extreme fast growth rates in volume would put such great demand on labor that it would draw workers away from entering the nonresidential side of construction. Wage growth would accelerate. The workforce would be so watered down, productivity would plummet and quality would suffer. But more important, analysis simply seems to indicate that even in boom times, the workforce doesn't expand that fast.

My conservative growth projection has new home starts growth rates down to 14% for 2014. The 2014 total will be affected by the slow start in the first three months.

A fast growth rate often results in productivity losses resulting in needing even more workers. Fast growth also causes quality issues due to watered down workforce, rapid inflation, potential material shortages and finally labor shortages. None of those issues are good for the industry.

A recent survey by NAHB shows 15% to 20% of contractors and 25% to 35% of suppliers are experiencing shortages of oriented strand board, gypsum wallboard, framing lumber, plywood and roofing materials. Nearly 50% of residential contractors are experiencing labor shortages and also report delays in completing projects on time.

For residential construction, the good news is activity will continue to grow for the next few years.

INFLATION ADJUSTED VOLUME

Spending is typically reported in unadjusted dollars and total revenue in current dollars (for current dollars see Table 2). It is a true indication of current dollars spent within any given year, but does not give quite as clear a comparison of volume from year to year. To see a clear comparison of volume from year to year, we must look at inflation adjusted dollars, constant dollars (for constant dollars see Table 7). If spending increases by 2% from one year to the next, but inflation drove up the cost of products by 5% during that same time, then inflation adjusted dollars would show that net volume actually declined 3% during that time period. Dollars spent would have needed to grow by 5% just to keep pace with inflation at zero volume growth compared to the previous year.

Table 7 adjusts total construction spending for construction inflation and the changes in margin costs. All dollars in this analysis are adjusted to 2013 equivalent dollars. In the next analysis, dollars will be adjusted to 2014. The rate of inflation each year is determined individually for nonresidential buildings, nonbuilding heavy engineering and residential.

TABLE 9: TOTAL CONSTRUCTION SPENDING SUMMARY 2007-2014 (CONSTANT 2013 $)

U.S. TOTAL CONSTRUCTION SPENDING								
Totals in billions current U.S. dollars ADJUSTED to 2013 $								
	Actual							Forecast
	2007	2008	2009	2010	2011	2012	2013	2014
NONRESIDENTIAL BUILDINGS	401.9	415.6	377.5	314.7	301.4	309.0	298.7	312.2
% change year over year	10.9%	3.4%	-9.2%	-16.6%	-4.2%	2.5%	-3.3%	4.5%
NONBUILDING HVY ENGR	271.7	280.0	294.3	290.4	265.3	282.3	263.4	243.6
	8.4%	3.0%	5.1%	-1.3%	-8.6%	6.4%	-6.7%	-7.5%
RESIDENTIAL	438.0	352.1	274.9	268.0	278.7	305.3	337.8	351.0
	-17.7%	-19.6%	-21.9%	-2.5%	4.0%	9.5%	10.7%	3.9%
TOTAL	1111.7	1047.7	946.7	873.1	845.5	896.6	899.9	906.8
	-2.9%	-5.8%	-9.6%	-7.8%	-3.2%	6.0%	0.4%	0.8%
Residential includes new, remodeling, renovation and replacement work.								
Source $ Data: U.S. Census Bureau, Department of Commerce.								
Indices references: Gilbane Margin Index, Selling Price indices, NAHB New Home Price Index, BLS PPI inputs see Escalation Growth vs. Margin Cost for Gilbane inflation/deflation adjusted margin cost								

2012 shows 8.8% increase in revenue over 2012, but only a 6.3% increase in volume as compared to 2011 after adjusting for inflation. 2013 revenue inreased by 5.0%, but 2013 volume incrased by only 0.5% after inflation compared to 2012. Essentially, there has been almost no volume growth in 2013.

If you are not looking at spending after inflation, or real volume, you may be missing the big picture.

Total Spending in 2013 ended at $900 billion, up 5.0% from 2012. However, after inflation is removed from the total, we find that volume was up only 0.5% from 2012.

Spending in 2013 nonresidential buildings ended at $299 billion, essentially no change from 2012. After inflation is removed, volume is down 2.8%.

Spending in 2013 for nonbuildings infrastructure ended at $263 billion, down 3.2% from 2012. After inflation is removed, volume is down 6.5%.

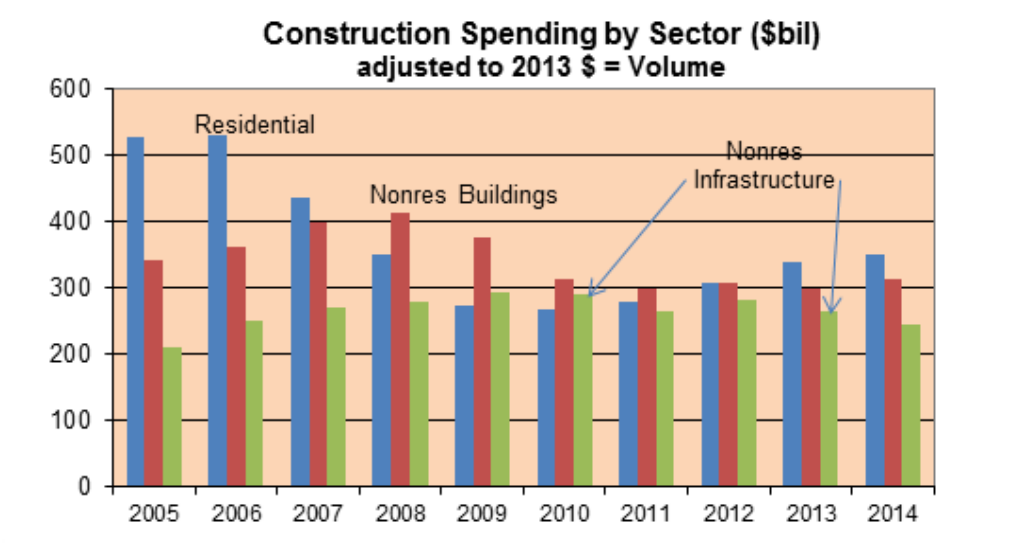
Spending in 2013 for residential buildings ended at $338 billion, up 18% from 2012. After inflation is removed, we see volume is up only 10%.

Almost every year from 2000 to 2011 was negative or flat constant $ growth. In that 12-year period, we had a net decline of 28%.For example, residential spending increased 200% from 1993 to 2005, an average of 10% each year. However, in constant after-inflation dollars, volume increased only 36%.

In constant inflation adjusted dollars, 2013 volume has not yet returned back to the level of 1993.

I expect a 6.6% revenue growth in 2014, but due to rapidly increasing escalation that will not result in much volume growth. 2014 volume growth may be less than 1%, primarily due to a large decline in infrastructure work.

FIGURE 7: CONSTRUCTION SPENDING BY SECTOR 2005-2014 CONSTANT 2013 $



WHY IS IT SIGNIFICANT TO ANALYZE BOTH REVENUE AND VOLUME?

Contractor fees are generally determined as a percentage of revenue. However, workload volume determines the size of the workforce needed to accommodate the annual workload. It is valuable to know how many employees were required to accomplish the workload volume based on the past several years of data. From the standpoint of workforce planning, we are not so much concerned with the value of the revenue as we are with the volume of the work. There is a bit more to this analysis, so we will investigate this further in the Jobs/Productivity section of this report.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JOBS AND UNEMPLOYMENT

In addition to watching for new job gains, there is benefit to understanding what is represented by the unemployment rate and tracking the number of lost employees. Those who run out of unemployment benefits or drop completely out of the workforce are no longer counted as unemployed, but they most definitely are workers lost from the workforce. As can be seen from the last several years' data, the unemployment rate can be headed downward without increasing jobs.

Unemployment by itself does not tell you much about the condition of the workforce. The real construction employment situation is far worse than the unemployment figures would lead you to believe. The construction industry had been losing employees for more than five years. We reached a low point of jobs in January 2011, but we didn't fall to the low point of workforce until 3rd quarter 2012 and again in 3rd quarter 2013. Currently we are just barely above a 15-year low.

If the unemployment rate goes down but there are few gains in the number of new jobs, that can only mean one thing: the number of people reported as still in the workforce has gone down. The drop in the construction unemployment rate would be almost entirely due to workers dropping out of the construction workforce. ***The reduction in available workers in the workforce could have a detrimental effect on cost and ability to increase potential volume in the future.***

TABLE 10 - CONSTRUCTION EMPLOYEES ALL 2004 THROUGH MARCH 2014

INDUSTRY: CONSTRUCTION													
DATA TYPE: ALL EMPLOYEES, THOUSANDS													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr Avg
2004	6848	6838	6887	6901	6948	6962	6977	7003	7029	7077	7091	7117	6973
2005	7095	7153	7181	7266	7294	7333	7353	7394	7415	7460	7524	7533	7333
2006	7601	7664	7689	7726	7713	7699	7712	7720	7718	7682	7666	7685	7690
2007	7725	7626	7706	7686	7673	7687	7660	7610	7577	7565	7523	7490	7627
2008	7476	7453	7406	7327	7274	7213	7160	7114	7044	6967	6813	6701	7162
2009	6567	6446	6291	6154	6100	6010	5932	5855	5787	5716	5696	5654	6017
2010	5587	5508	5536	5555	5524	5512	5502	5525	5503	5507	5504	5462	5519
2011	5432	5464	5475	5496	5520	5524	5551	5553	5590	5584	5585	5606	5532
2012	5627	5622	5627	5630	5613	5620	5635	5647	5648	5666	5687	5720	5645
2013	5743	5789	5813	5811	5816	5829	5830	5836	5849	5864	5896	5876	5829
2014	5926	5945	5964										
U.S. Bureau of Labor Statistics - 2009 through 2013 data was revised February 7, 2014.													

Table 8 includes both residential and nonresidential construction employment, as well as all trades and management personnel. A few cautions about the jobs report: the data is recorded for the week ending in which the 12th of the month occurs, so in some months the data represents a period of 35 days and in other months only 28 days. For any given month, the reliability of “ALL JOBS” data is +/- 100,000, therefore the BLS suggests do not use any single month but look at long term trends in the data. The Construction Employment Report is but a small subset of the entire Employment Report, so the reliability variance is much tighter than +/- 100,000, but it is still the trend that is more important.

Employment shows the number of active working people. Construction Workforce shows the total of employed plus unemployed. The size of the workforce is important because it tells us how many workers are available to draw from for future volume growth.

We gained 150,000 jobs over the last 12 months and 88,000 jobs year to date. Over the past year, jobs growth is averaging 12,500 per month bu over the last 6 months it is averaging 20,000 per month. Over the last 3 months, jobs growth exceeds 25,000 per month.

The total construction workforce still remains lower than the total number of workers that were gainfully employed at any time from 2000 to 2008. This has significant implications for expansion. Without a large volume of available trained workers in the unemployment pool to draw from, the rate of expansion will be constrained.

Between 2006 and 2008, the workforce peaked near 8.5 million, approximately 7.7 million working and 800,000 unemployed. By August 2011, the workforce dropped to a 15-year low near 6.4 million. Remarkably, after recovering slightly, the workforce once again dropped below 6.4 million in Q3 2012 and yet again in Q3 2013. In Q1 2014, we are just back to a total workforce of 6.75 million, equal to 1998-1999. The construction workforce is still near a 15-year low, about 1.7 million (~20%) below the 2007 peak.

From the 2006-2008 peak to the 2011-2013 low, approximately 2 million workers, or nearly 25% of all trained construction workers, left the workforce. The workforce declined because workers have either retired, been discouraged from seeking work and no longer qualify for benefits, or moved on to another profession.

From January 2010 to March 2014, we've gained nearly 400,000 jobs but the workforce total dropped by 700,000. Therefore, in just the last 50 months, although we've gained over 400,000 jobs, in that time we've lost a total of 1.1 million construction workers from the total workforce.

We need a large pool of unemployed to draw from as workload increases rapidly. However, even prior to the recession, the long-term construction unemployment rate averaged 6% to 7%. Therefore we cannot count all of the currently unemployed as readily available for work.

Long term, if we are to see construction volume grow back even close to previous levels, we need the workforce to expand in tandem. To support residential construction volume at my predicted growth rates, which are lower than the consensus and only half of the high end consensus estimates, we would have needed to add more than 200,000 jobs in 2013 and 250,000 jobs in 2014. Without a pool of unemployed to draw from, it will be very difficult to add that many new jobs, especially with experienced workers.

The unemployment rate is not seasonally adjusted. This adds to the short-term fluctuation. The seasonal fluctuation can be seen in Figure 8 where the upper (blue) line shows a repeated annual rise and fall in the unemployment rate. Some of the short term fluctuations in the unemployment rate and the workforce might be explained by portions of workforce working under-the-table, as has recently been reported in California and Texas, particularly with respect to residential construction. A recent news article from southern California stated that as much as 50% of the residential construction workforce may be working under-the-table and not counted in the construction employment numbers.

FIGURE 8: CONSTRUCTION JOBS VS. CONSTRUCTION WORKFORCE 2005-2014

EXPECT WORKFORCE SHORTAGES

Some of the slack in the decreased workforce was taken up by an increase in productivity since 2006. But that still leaves us short almost 1.3 million construction workers. These problems arise:

- Since 1970, jobs have grown at more than 30,000/month for a full year only three times. During the greatest construction expansions in the last 30 years, the rate of jobs growth approached 35,000 jobs/month but did not maintain that growth rate for a year. At no time since records dating back to 1970 have jobs grown at 30,000/month for two years.
- Only once, from Q1 2005 to Q1 2006, jobs grew at an average rate over 40,000/month for 12 months, but then did not grow at all for the next 9 months and soon afterward started a rapid decline.
- During periods of high volume and workforce expansion, productivity declines.
- Workforce shortages may force extended work schedules.

The first workers to be lost or let go are typically those that represent the least value to an organization. However, not all of the lost workers are “wanted turnover.” Some of the workers that were let go, moved on, or dropped out of the workforce, had many years of experience and were highly trained. Unfortunately, some will never return. As a result, when work volume picks up, there are going to be both general worker shortages as well as at least some shortage of these more valuable skilled and experienced workers. Over the next few years, when work volume does pick up, this industry is going to be faced with a lack of available workers and shortage of skilled, experienced workers. Both of those issues have the tendency to DRIVE COSTS UP and QUALITY DOWN due to the need to pay a premium for skilled workers and the necessity of training new workers in their job and company procedures.

A major concern in the next few years is that the extreme growth in residential construction will require so many new workers that it will draw available workers from entering the nonresidential side of construction.

In a recent article from the AGC, Chief Economist Ken Simonson states, “The number of unemployed workers with construction experience has fallen to low enough levels that firms in a growing number of locations and segments are having trouble finding people with the needed skills.” A recently published NAHB survey states more than half of builders reported labor shortages over the past six months that have caused them to pay higher wages to secure labor.

The BLS job openings and labor turnover survey (JOLTS) for the construction sector indicates the number of unfilled positions stands at 156,000 for February. This is the 14th consecutive month that the number of open positions is over 100,000 and the first time since 2007 that this has occurred. The construction job opening rate is now at its 2nd highest since 2007.

The job openings rate has been climbing for the last year. This is a good indicator for future hiring, but highlights the importance of workers having the right skills. Due to shortages of skilled workers, over the next five years we can expect eventual labor shortages, declining productivity and rapidly increasing prices. If you are in a location where a large volume of pent-up work breaks loose all at once, you may be the first to experience these three issues.

MANPOWER EMPLOYMENT OUTLOOK Q2 2014

Manpower figures measure the percentage of firms planning to hire minus the percentage of firms planning to lay off and report the results as the “net” percentage hiring outlook. The overall national employment (all jobs) picture is positive for Q2 2014 with a projected net +13% of firms planning to hire. Employers have had a positive outlook for 18 consecutive quarters. 19% of employers surveyed expect to add to their workforce.

The Manpower report indicates the construction industry sector should experience increased hiring in Q2 2014 in all regions. Manpower reports total hiring in the construction industry for Q2 2014 is anticipated to be a net +9%. While the Midwest and Northeast expect only a net increase of 6% each, the South and West expect to add 9% and 12% respectively.


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JOBS/ PRODUCTIVITY

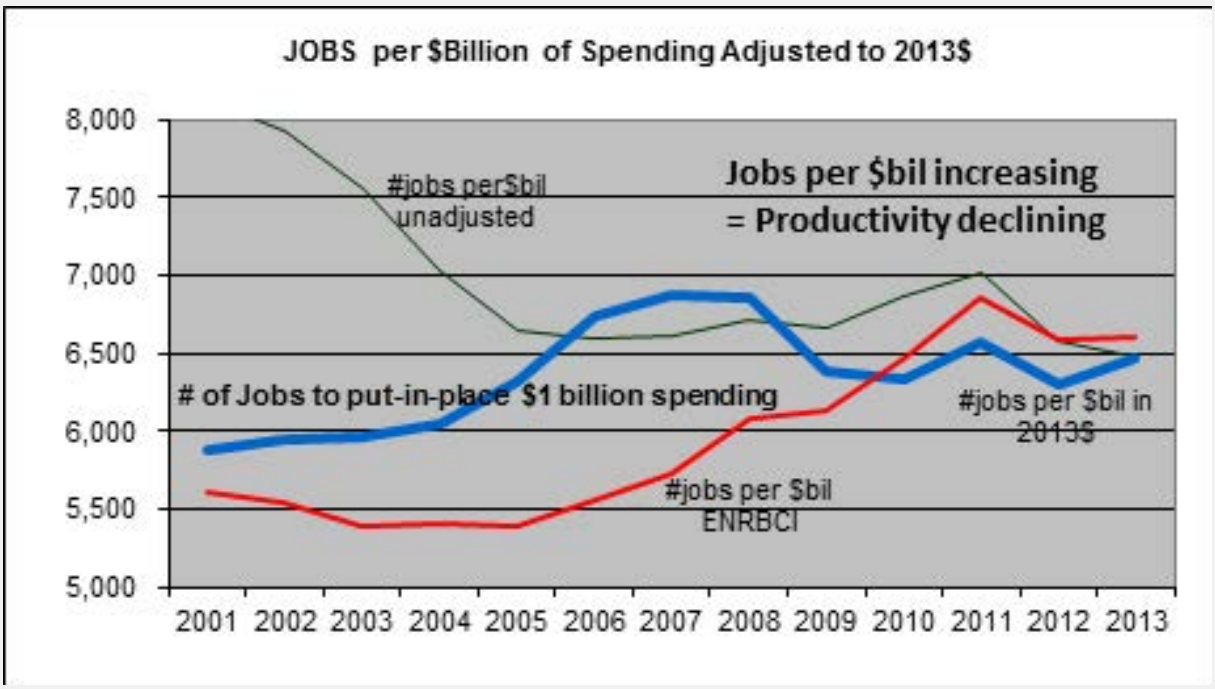
A long-term trend in productivity can be found by comparing the annual inflation adjusted volume to the annual average workforce. Volume is not given, but we have developed volume in a previous section by adjusting spending for inflation. Productivity is a measure of units volume per worker, not dollars put in place per worker. The inflation adjustment gives total spending in constant dollars rather than current dollars and allows a comparison to unit volume. Therefore the following productivity analysis is based on put-in-place revenues, inflation adjusted to constant 2013 dollars, compared to actual manpower at average man hours.

Of equal importance is the use of proper indices. An index adjusting for both inflation and margins must be used. Spending must be adjusted to eliminate changes due to material costs, wages and margin fluctuation. Also, since the building type makeup and worker wages are so different, indexes must be developed separately for residential, nonresidential buildings and infrastructure construction. Numerous industry indices were referenced for input, from which the indices used in this analysis were developed independently.

In Figure 11, a line is plotted for the number of jobs per $1 billion “unadjusted.” The “unadjusted” line seems to indicate the number of jobs supported by $1 billion dollars of spending declined from 2002 to 2006. That incorrect result is what we would get if using unadjusted dollars without considering inflation. The unadjusted analysis is missing the dollar volume of work put in place that represents work dollar value, not work unit volume. Also shown in Figure 9 is a line plotting number of jobs if spending were indexed solely using the ENRBCI, the most common construction cost index. Since that index does not account for fluctuating margins, it also produces an incorrect result.

The thick blue line in Figure 9 shows the only accurate result.

FIGURE 9: JOBS PER $BILLION 2001-2013 IN CONSTANT 2013$



From 2002 to 2007, there was huge growth in the dollar value of work put in place, but the after-inflation change in volume put in place was less. The number of workers needed to put in place $1 billion (adjusted) spending increased. Productivity decreased during that period when spending and jobs were on the rapid growth trend. Spending has a strong influence on hiring, but its influence can sometimes be without regard to volume. If spending is increasing rapidly, but mostly due to inflation, volume may not be increasing and the need to add rapidly to the workforce may not be entirely warranted.

From 2002 through 2005, $1 billion of spending supported between 6,000 and 6,500 jobs. By the peak activity in 2006-2007, it required nearly 7,000 jobs to put-in-place $1 billion in spending, (less volume per employee). Productivity declined to its lowest point in 2007. But growth in new work volume reversed, and by 2010, productivity increases were so significant that $1 billion of spending supported only 6,300 jobs. Today $1 billion in spending supports about 6,500 jobs.

Keep in mind these are national averages. In a location where the city cost index is 1.2, it would take $1.2 billion in spending to support 6,500 jobs and in a location where the city cost index is 0.85, only $850 million in spending would support 6,500 jobs. That means that an average revenue put-in-place of $155,000 supports one job, but it can range from $125,000 to $200,000 per job due to variations in location.

When spending and jobs are on the decline, and with diminished workload providing no other options, workers and management find ways to improve out of necessity. But at some point, longer hours and additional work burden causes productivity to decline. Also, a return to volume growth results in an easing of performance. It appears the trend began to reverse in 2010. After two years of work output increases, the work output reversed and finally declined in 2011.

As workload begins to increase in coming years, net productivity gains will decline somewhat. This net affect cannot go unaddressed. The results of productivity declines are either decreased total output (if workforce remains constant) or increased workforce needed (if total workload remains constant). Realistically, I would expect that over the next few years, during each year that work volume increases, we will experience some slight erosion from the productivity gains.

JOBS BASED ON VOLUME, NOT REVENUE

Contractor fees are often determined as a percentage of revenue. However, workload volume is used for planning the size of the workforce. It is valuable to know from the past several years of data how many employees were required to accomplish the workload volume. From the viewpoint of workforce determination, we should not be concerned with the value of the revenue, only the volume of the work. It is not uncommon to see early estimates of staff requirements based on a percentage of revenue. That is a false representation and cannot be accurately relied upon to project staff, unless revenue is first converted to volume.

As an example:

> *At the 2008 peak of construction cost, a building cost $12 million and took 100 men per year to build. In 2010 that same building potentially cost as little as $10 million to build, 20% less. Did it take 20% fewer men per year to build it? No, certainly not. That would be the fallacy of trying to determine jobs needed based on unadjusted revenue.*
>
> *The building has not changed, only its cost has changed. It still has the same amount of steel and concrete, brick, windows, pipe and wire. Using revenue as a basis, we might be led to think we need 20% fewer workers. However, there is a need to base workers on inflation adjusted volume and productivity, not simply on direct annual revenue.*

WORKFORCE EXPANSION

Twice in the last 30 years, once starting in 2005, the workforce grew by more than 35,000 jobs per month for a year. Both times the average growth dropped considerably afterwards. The most rapid sustained expansion in the workforce during the last 30 years was the period from mid-2003 to mid-2006. In that 36-month period, the construction labor workforce expanded by 1,000,000 jobs or 15%. Therefore, during the strongest period of jobs expansion in the last 30 years, the workforce grew by only 15% over 3 years, an average of 28,000 jobs per month. It is significant that while spending during that 36-month span increased 12%, inflation-adjusted volume increased by less than 6%. This was during a period when construction volume reached the all-time peak. Such a rapid workforce expansion during a period of a high level of spending led to measurably significant lost productivity.

Even if we could realize a similar rate of growth, which was associated with a high rate of economic expansion, it would take six years to recover more than two million lost jobs. At this accelerated rate the workforce would not return to previous levels before 2018. That is a very unlikely scenario, since it would require uninterrupted elevated economic expansion. It is highly unlikely we will see the workforce return to previous levels within six years. However, if we do experience uninterrupted economic expansion at this level for the next six years, productivity is going to decline, potentially erasing most or all of the gains realized in the last few years. In this scenario jobs growth will begin to outpace volume growth.

The rate of employment growth may be a valid concern for the following reason. If spending and jobs are to remain balanced and return to normal, then both the rate of expansion in construction spending and the rate of growth in the workforce needs to be approximately equal in the coming years. If the rate of spending growth exceeds a normal the rate of growth, it will produce an extremely active market, there will be worker shortages, and productivity will drop. When that occurs, it leads to rapidly increasing prices and elevated margins.

HOW MANY JOBS GET CREATED BY CONSTRUCTION?

Here are some details regarding how many jobs get created for every dollar spent on construction. For further reference, see “Jobs and Unemployment” and “Jobs/Productivity”.

- Historical averages (adjusted for inflation) since year 2000 show the number of direct construction jobs supported by $1 billion in construction spending varies from 6,000 to 7,000 jobs. That calculates to one job for every $145,000 to $165,000 (in 2013 dollars) spent on construction, or if you prefer, 6.0 to 7.0 jobs per $1,000,000 spent. Direct construction jobs include all AEC, but not, for instance, lumber or steel mill product manufacturing.

- The importance of correcting for inflation cannot be understated. A rate of $140,000 to $160,000 (in 2013 dollars) per job, at 3.5% inflation, five years ago was $120,000 to $135,000 and five years from now will require $166,000 to $190,000 to support one job. The long term historical average for construction inflation is 3.5%, but it can vary considerably in any given year.
- In part, the wide variation in the number of jobs created is a result of productivity. In times of increasing work volume activity, productivity declines. In times of decreasing activity, productivity climbs. In 2009, the worst decline in construction activity in my historical records, productivity increased by an average 8%. Because productivity increased, it took fewer workers to put in place the same volume of work. The net result is that $1 billion in spending supported far less jobs than previous years.
- As work volume starts to increase over the next few years, expect productivity to decline. There are many reasons why this will occur, among them: working longer hours until new workers are brought on; working more days; crowding the work area; hiring less qualified workers; and acclimating new workers to the crew.
- The fact is productivity and work volume is inextricably tied and is cyclical. If work volume continues to grow for the next five years, I'd expect in that time we would lose our current productivity advantage.
- The type of work also affects the number of jobs supported, with higher cost buildings supporting fewer jobs than lower cost buildings. For example, $1 billion of life sciences or hospital projects supports fewer workers than $1 billion of residential or general commercial projects, because the materials costs are considerably higher and therefore a greater percentage of the total cost is allocated to materials.

There are several studies available, one by the federal government and one by the AGC, that tell us for every construction job, there are three additional jobs created in the economy. So while $1 billion of building construction creates approximately 7,000 direct construction jobs, overall it generates approximately 28,000 jobs in the economy.

BEHIND THE HEADLINES

TOTAL 2013 CONSTRUCTION SPENDING UP 5%

In constant inflation adjusted dollars, total 2013 spending did not reach 1993 spending. Inflation adjusted construction spending reached a peak and remained almost level from 1999 through 2006. Current volume is still 22% below that peak level of spending. We would need to exceed the volume growth rate of each of the four best years in the last 20 years to reach that peak level before 2018. In 2013, construction volume increased by only 0.4%.

JANUARY CONSTRUCTION SPENDING INCREASES 9.3%

Don't let a year over year 9.3% increase in January construction spending fool you. January 2014 spending versus January 2013 spending grew by 9.3% not because 2014 was exceptional but because January 2013 spending was well below par. In fact, the first quarter of 2013 dropped more than 4% below the average of spending in the last quarter of 2012. So all of the first quarter of 2014 is compared to a poor start in 2013. Since January 2012, the growth rate in construction spending averaged only +6.5% per year.

UNEMPLOYMENT INCREASES IN JANUARY

Don't be alarmed that January unemployment increased from 12.3 to 12.8%. The unemployment rate goes up every January and often also in February, whether jobs go up or down. We added more than 50,000 construction jobs in January, but the number of workers returning to the workforce seeking jobs exceeded the number of new jobs, therefore the unemployment rate increased.

CONSTRUCTION JOBS UP BY 88,000 YEAR-TO-DATE 2014

When we see job increases, it always seems like a good sign. But total labor must also take into consideration hours worked. Total labor (jobs times hours worked) for the last four months has not changed from the previous four months. There has been no real labor growth since November. The total hours worked for the four months from December through March is the same as the hours worked from August through November.

SOME SIGNS AHEAD

The following reports can be accessed by clicking on the *hyperlinks* provided.

Architectural Billings Index (ABI) measures monthly work on the boards in architectural firms. It is a 9- to 12-month leading indicator to construction. Index values above 50 show increasing billing revenues and below 50 indicates declining revenues. After 13 consecutive months being positive, the ABI Institutional Index has been negative for the last six months. The Commercial Index has dipped into negative territory only three times in the last 18 months.

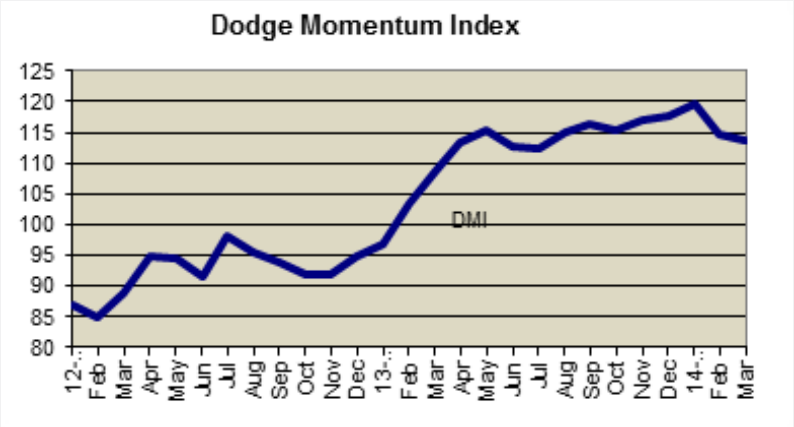
Associated Builders and Contractors Construction Backlog Indicator (CBI) is a quarterly forward-looking economic indicator reflecting the amount of work that will be performed by commercial and industrial contractors in the months ahead. The CBI is measured in months of backlog and reflects the amount of construction work under contract, but not yet completed.

Charts and Graphs for Q4 2013 show all of 2013 strongly above 2012. The 4th quarter 2013 CBI at 8.3 months is the third consecutive quarter above 8.2, a four-year high. Both infrastructure and heavy industrial were near a peak in mid-2012, but both have been declining since then. Commercial and institutional backlog, now at an all-time high of 8.9 months, has risen gradually every quarter since Q1 2012. The index was created in Q1 2009, so there is no comparison to pre-recession workload.

Dodge Momentum Index (DMI) is a monthly measure of nonresidential projects in planning, excluding manufacturing and infrastructure. It is a leading indicator of specific nonresidential construction spending by approximately 12 months. The momentum index increased for six consecutive months through May 2013. It bumped up and down, peaking in January 2014 but has since receded back to last April.

FIGURE 10: DODGE MOMENTUM INDEX

The DMI had strong upward movement in early 2013 but then settled into a more narrow range. The institutional index has been dropping since September. The commercial index shows stronger upward movement. The index shows the strongest correlation in the commercial sector at a nine month lag and the institutional sector, with a strong correlation at a 15-month lag.



AIA Consensus First Half 2014 Construction Forecast is a semi-annual survey of construction economists' projections for future spending. Posted on the *AIA economics page*, the First Half 2014 report of average expectations for nonresidential construction shows expected growth of 8.0% for 2014. The greatest expected growth is for the commercial and office construction sectors.

AGC Worker Shortage Survey released September 4, 2013, found that 74% of responding firms are having a difficult time finding qualified craft workers. *Survey Analysis Summary* The most difficult positions to fill are carpenters, equipment operators and laborers. Fifty-three percent are having a hard time filling professional positions – especially project supervisors, estimators and engineers. *2013 Worker Shortage Survey National Results*

AGC 2014 Construction Hiring and Business Outlook published in January indicates contractors are more optimistic than they have been since the recession began. It highlights that contractors expect markets to grow but also that contractors expect it will be more difficult to hire qualified workers. See *survey results here.*

Engineering News Record 2013 4th Quarterly Cost Report shows general purpose and material cost indices up on average about 2 to 2.5% year over year. However, selling price indices are up on average 4%. The difference between these indices is increased margins.

FMI First Quarter 2014 Nonresidential Construction Index (NRCI) is now 64.9, up substantially from last quarter and well up from all of 2013. The NCRI is a report based on a survey of opinions submitted by nonresidential construction executives. The NCRI declined in Q4 2013 but has strongly rebounded.

FMI Construction Outlook 1st Quarter 2014 Report predicts residential construction will increase 14% in 2014, office construction 2%, commercial construction 7%, educational 3% and healthcare construction 2%. No market sectors are expected to decline.

REED Construction Data tracks construction spending monthly and revises the outlook for 2014 and 2015 accordingly. REED is currently predicting 10% spending growth in 2014 and 11% growth in 2015. The only major sector that Reed predicts a decline in is educational. Reed predicts 13% and 12% increases for office and commercial.

See also *REED Forecast for Nonresidential Buildings.*

McGraw Hill Construction report on Green Building says by 2015, half of all nonresidential building will be Green. From 2008 to 2011, the share of educational Green building went from 15% to 45%. Only 10% of building cost and function is operational. Green investment is also social, improving the environment for employees.

Institute for Supply Management (ISM) Report on Business - Manufacturing Report for March released April 1, 2014, shows the national Purchasing Manager's Index (PMI) currently at 53.7. PMI values above 50 indicate expansion in the manufacturing sector. The PMI dropped below 50 in November 2012 for the first time in 40 months indicating a manufacturing contraction. Since then it has remained at or above 50 every month. PMI values above 42.5 indicate overall GDP economic expansion. The PMI indicates overall GDP economic expansion for 58 consecutive months.

ISM Non-Manufacturing Index (NMI) report for March, released April 2, 2014, is a better indicator of activity in the construction industry than the ISM Manufacturing report. The NMI measures economic activity in 13 industries (including construction) not covered in the manufacturing sector. The March NMI is 53.1, above 50 for 51 consecutive months, indicating continued economic growth. Construction reported growth in business activity.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PRODUCER PRICE INDEX

When the cost to the supplier goes up, it almost always gets immediately passed along in full to the consumer. When the cost to the supplier goes down, the savings trickle down to the consumer very slowly.

The U. S. Census Bureau Producer Price Index (PPI) data for January indicates the PPI for construction materials increased 0.7% in the month and 0.8% year over year. The largest increases of the year almost always occur early in the year with the fourth quarter often negative.

The January 2014 PPI for Material Inputs to All Construction:

- Increased 0.7% in the month, increased 1.4% over 3 months, and is up 0.8% in 12 months

The January 2014 PPI for Material Inputs to Nonresidential Construction:

- Increased 0.7% in the month, increased 1.3% over 3 months, and is up 0.4%in 12 months

Items UP the most in price:

- Diesel Fuel, Gypsum products, Aluminum and Hot Rolled Bars Plates and Structural Shapes

Items DOWN the most in price:

- Fabricated Structural Steel, Fabricated bar, Joists and Rebar and Asphalt Roofing

TABLE 11: BLS PPI MATERIALS FEBRUARY 2014

US CONSTRUCTION PRODUCER PRICE INDEXES - FEB 2014						
Materials PPI	Percent Change Versus to Feb 2014 from			annual for 12 months 2013 last yr	12 months 2012	12 months 2011
	Jan-14 1 month	Nov-13 3 months	Feb-13 12 month			
Summary						
Inputs to ALL Construction	0.7	1.4	0.8	1.3	1.4	5.2
Inputs to Nonresidential	0.7	1.3	0.4	1.0	0.9	5.7
Commodities						
Cement	-0.8	1.1	2.8	5.0	2.9	-1.8
Iron & Steel Scrap	-3.5	7.2	13.0	8.2	-15.6	8.7
Manufactured Materials						
Diesel Fuel	4.4	5.4	-6.0	-0.9	2.1	20.0
Asphalt Paving	-0.1	0.6	1.6	1.0	4.5	8.4
Asphalt Roofing/Coatings	-0.3	-1.2	-0.8	-1.0	-0.3	4.2
Ready Mix Concrete	1.3	2.5	4.2	2.5	2.6	0.5
Concrete Block & Brick	1.0	1.9	3.9	2.2	1.5	1.1
Precast Conc Products	0.1	0.5	2.3	1.7	2.4	2.9
Building Brick	1.0	0.9	2.6	1.5	-2.6	-2.6
Copper & Brass Mill Shapes	-1.5	0.7	-6.8	-6.1	1.5	-9.3
Aluminum Mill Shapes	4.1	4.3	-1.4	-4.6	-1.9	0.6
HR Bars Plt & Strct Shapes	0.1	3.6	2.7	-1.6	-9.7	13.2
Steel Pipe and Tube	0.1	0.5	-0.3	-5.1	-6.1	13.7
Fab. Structural Steel	-1.4	-2.3	0.2	1.8	1.6	3.8
Fab. Bar, Joists and Rebar	-0.6	-0.5	0.4	1.0	2.6	1.6
Gypsum Products	4.1	13.7	11.6	16.1	14.1	-1.6
Insulation Materials	-1.7	-0.2	3.8	7.9	5.4	5.4
Lumber and Plywood	1.5	1.7	-2.4	9.7	11.1	-0.7
Sheet Metal Products	1.3	0.9	-0.6	-1.8	-1.3	3.7
All data not seasonally adjusted						
Source: Producer Price Index. Bureau of Labor Statistics						

The relative impact of cost changes for several materials is a function of how much the material is used within a typical building. For example, for a typical nonresidential building:

- 10% increase in gypsum wallboard material increases typical project cost by 0.05% to 0.08%.
- 10% increase in copper material increases typical project cost by 0.20% to 0.60%.
- 10% increase in concrete material increases typical project cost by 0.20% to 0.60%.
- 10% increase in structural steel material increases typical project cost by 0.50% to 1.00%.

The PPI for construction materials gives us an indication whether costs for material inputs are going up or down. The PPI tracks producers' cost to supply finished products. This tells us if contractors are paying more or less for materials and generally indicates what to expect in the trend for inflation.

UNDERSTAND PPI TRENDS TO HELP INTERPRET THE DATA.

- 60% of the time the highest increase of the year in the PPI is in Q1
- 90% of the time the highest increase of the year is in the first six months.
- 75% of the time two-thirds of the annual increase occurs in the first six months.
- **In 20 years the highest increase for the year has never been in Q4**
- 60% of the time the lowest increase of the year is in Q4
- **50% of the time Q4 is negative, yet in 22 years the PPI was negative only twice**

So when we see monthly news reports from the industry exclaiming "PPI is up strong for Q1" or "PPI dropped in the 4th Qtr.", it helps to have an understanding that this may not be unusual at all and instead may be the norm.


74,376
119,399
1,424
1,500
1,885
124,777
1,854
122,753
1,113
1,122
337,250
(73,448)
(132)
16,794
3,785
1,124
338,666
(72,348)
(41)

MATERIAL PRICE MOVEMENT

Cost for material inputs to all construction materials increased 1.1% in the last 12 months. Cost for material inputs to nonresidential construction increased 1.0% in the last 12 months.

TABLE 12: BLS PPI MARKETS MARCH 2014

US CONSTRUCTION PRODUCER PRICE INDEXES - MAR 2014						
Materials PPI	Percent Change Versus to Mar 2014 from			annual for 12 months 2013	12 months 2012	12 months 2011
	Feb-14 1 month	Dec-13 3 months	Mar-13 12 month	last yr		
Inputs to ALL Construction	0.5	1.8	1.1	1.3	1.4	5.2
Inputs to Nonresidential	0.4	1.6	1.0	1.0	0.9	5.7
Inputs to Commercial	0.5	1.5	1.1	1.0	1.2	4.9
Inputs to Industrial	0.4	1.3	0.9	0.8	0.8	5.2
Inputs to Hghwy/Hvy Engr	0.5	1.8	0.9	0.9	0.8	6.1
Inputs to Residential	0.5	1.9	1.5	1.6	2.0	4.8
All data not seasonally adjusted Data Source: Producer Price Index. Bureau of Labor Statistics						

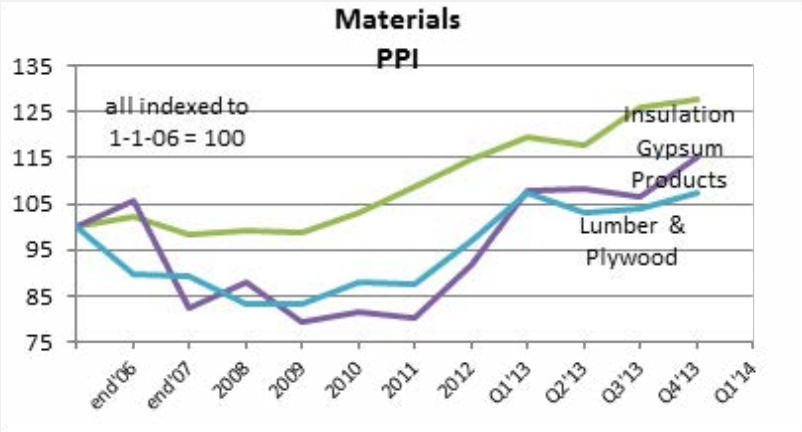
In the last three years, costs for gypsum products increased 30%; ready-mix concrete increased 6%; asphalt paving increased 14%; fabricated structural steel increased 7%; copper decreased 14%. Steel pipe and tube cost decreased 5% in 2013 after being up nearly 30% in the previous three years. This extreme variability means individual trades assessment requires individual material index data.

Gypsum, lumber and plywood and insulation are driven primarily by residential markets. In January 2013, the PPI for gypsum products increased 12% and in February another 4.4%. CertainTeed announced intent to raise insulation prices by 10% to 12% last June, and we saw insulation prices climb 7% in the Q3 2013. In January 2014, gypsum products price increased 7%.

Materials to watch over the next three to six months are gypsum +, lumber +, plywood +, ready mix concrete +, reinforcing bar +, and copper +. Only structural steel is expected to decline.

FIGURE 11: MATERIALS PPI INDEX GYPSUM LUMBER INSULATION 2006-2013

Random Lengths, a lumber industry newsletter, recently reported the composite price index for 15 key framing lumber prices at 384, down 12% from an eight-year high in April 2013, but fairly steady for the last 6 months. 70% of lumber demand is driven by residential housing.



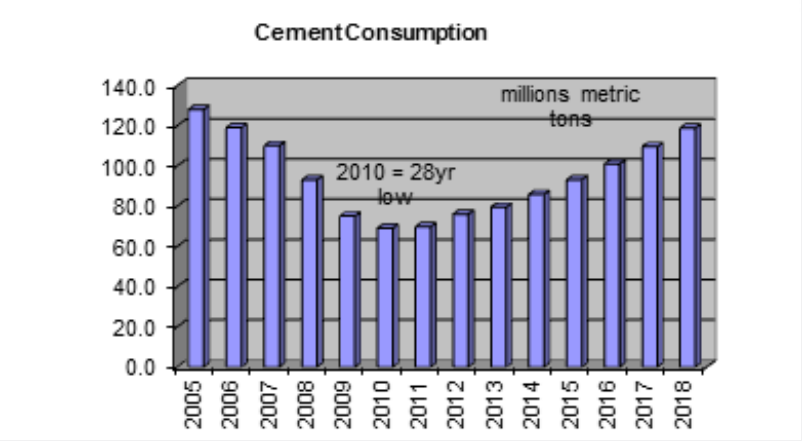
CEMENT / CONCRETE / ASPHALT

Portland Cement Association (PCA) reports the volume of cement demand as an indicator of economic activity. It is a reliable coincident indicator. PCA reported an 8.9% rise in consumption in 2012 and consumption grew 4.5% in 2013. 2014 is projected to grow by 8.1%.

Nearly two-thirds of U.S. cement consumption occurs in the six months between May and October. Rising consumption and prices leading into summer can lead to large shifts in demand and seasonal pricing and is not an indicator of long-term growth but only reflects periodic seasonal fluctuating consumption rates. Look at total annual volumes for trends.

FIGURE 12: CEMENT CONSUMPTION 2005-2018

For 2010 and 2011, cement consumption decreased 46% from peak 2008. At the start of 2013, PCA predicted consumption for 2013 would grow 8%. PCA revised data shows 2013 was only 4.5% growth over 2012. 2014 growth is projected at 8.1%. PCA projects consumption by 2018 will be 119mmt. That will require 5 years of 8.5% growth.



Cement prices increased 3.4% in 2012, after dropping four years in a row. Cement prices increased 5.0% in 2013. Cement prices are advancing steadily as residential construction improves. They will begin to climb more when other commercial construction improves over coming months.

FIGURE 13: MATERIALS PPI INDEX CEMENT CONCRETE ASPHALT 2006-2013

Ready Mix Concrete price increased 2.5% for 2013 plus another 1.2% already this January.

Global Insight predicts cement prices will rise only 4.6% in 2014 and 5.0% in 2015.

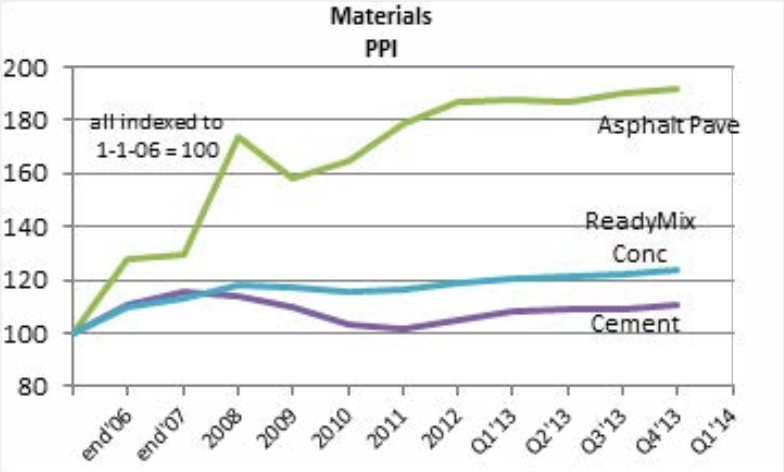
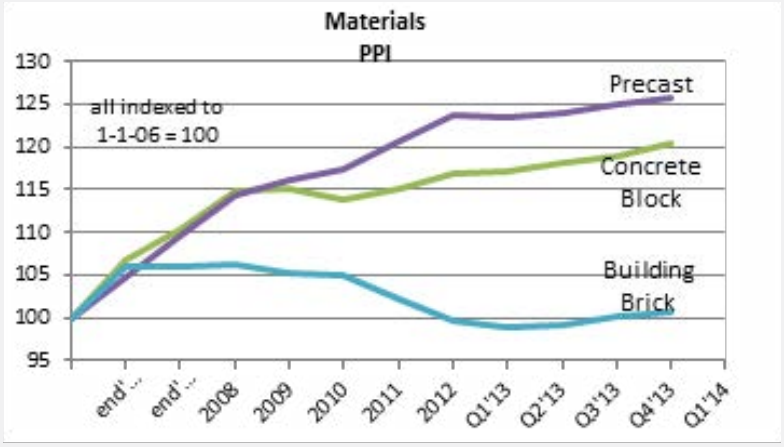


FIGURE 14: MATERIALS PPI INDEX BRICK BLOCK PRECAST 2006-2013

Concrete block and brick increased on 2.2% in 2013. But already in early 2014 cost is up another 1%.

Precast product prices have moved up less than 3% in the last two years.



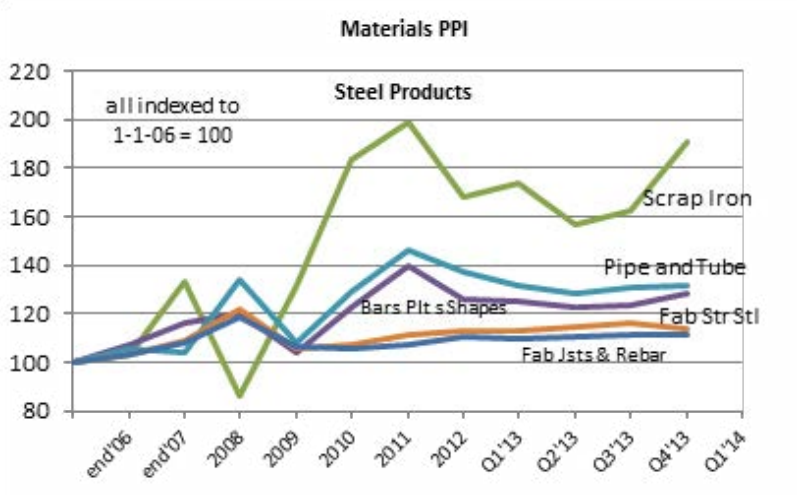
STRUCTURAL STEEL

The construction industry is the largest consumer of steel products worldwide. Approximately 100 million tons of steel is produced annually in the United States. More than 40 million tons of that is delivered to the construction industry. The next largest industries combined (automotive, equipment and machinery) do not consume as much steel as construction.

Structural steel is the most used structural framing material in the United States, with a 58% of market share for nonresidential and multistory residential buildings, based on square footage built. The next closest framing material, concrete, holds only 21% market share.

FIGURE 15: MATERIALS PPI INDEX IRON AND STEEL PRODUCTS 2006-2013

Figure 15 charts steel mill products' *PPI beginning in January 2006. The rapid rise in 2008 mirrors the rapid acceleration in bid pricing to the peak in Q3-Q4 2008, and the precipitous fall from that peak. By mid-2009, the mill price had experienced a 40% decline, retreating to a 2004 low. Today the PPI for pipe, tube, bars and plates has recovered all of those losses, but not fabricated structural, joists or rebar.*



The American Iron and Steel Institute reports steel production capacity utilization currently at76% as of March 15, 2014. This is up only 0.1% from last year but is still below the post-recession high of 79% in March 2012. Most of the increase in capacity utilization is not due to increased production but is due to a drop in total capacity from closing steelmaking facilities. In the first quarter of 2013, U.S. steel mills cut output by nearly 8%.

Steel demand in 2013 was flat from 2012. Early in 2013 economic analysis indicated that there was over-capacity in steel production. This did prove to be true, and it helped cause steel prices to fall or remain flat in 2013.

ENR's First Quarterly Cost Report 2014 states that wide flange steel increased 0.5% last month and reinforcing bars increased 0.9%; however, both are still down over the last year.

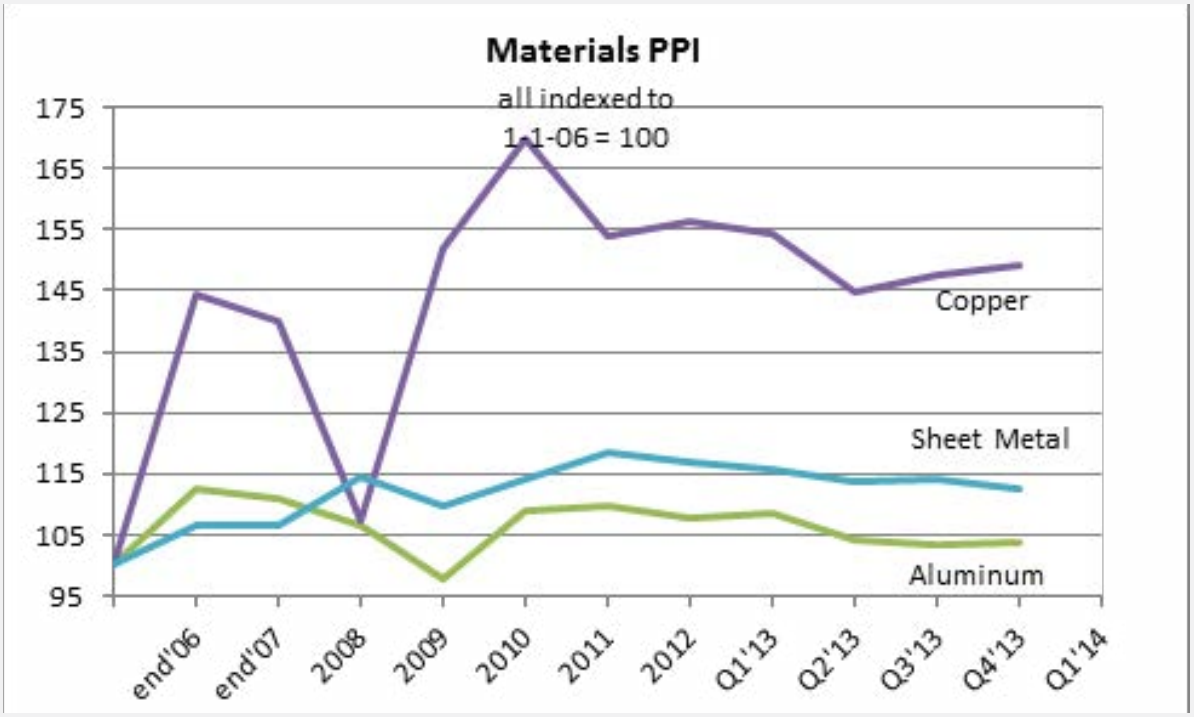
Structural steel is very much dependent on recycled steel. Structural steel is made 90% from scrap steel. Scrap prices increased 13% in the last year.

COPPER/ALUMINUM

Copper material prices hit an all-time high of $4.60/lb. in February 2011, up 25% from October 2010. By September 2011, the price dropped back to $3.10/lb. The price in November 2012 was $3.50/lb., about equal with where it was in November 2011.

Copper recently has been fluctuating near $3.00/lb., almost 20% below the January 2013 price of $3.70/lb. During that same period, the PPI for copper and brass mill shapes is down only 5%.

FIGURE 16: MATERIALS PPI INDEX ALUMINUM COPPER SHEET METAL 2006-2013



WHAT MAKES COPPER SO IMPORTANT TO WATCH?

Copper is a leading economic indicator that has rarely (if ever) failed to indicate the direction of world economies. When copper rises in price, world economies are leading into expansion. When copper drops in price, a decline in world economies very quickly follows. Copper prices and the U.S. workforce move almost perfectly together. Also, because copper is so widely used in buildings, and manufacturing facilities must be built to see a big increase in production, copper demand is an excellent predictor of industrial production 12 months out.

Click here to view Copper price charts on metalprices.com.

What drives copper prices up or down? Unlike some other metals, it is not speculation. Quite often it is demand. Increasing demand equals increasing prices. When demand wanes, prices drop.

WHAT EFFECTS DO COPPER PRICE CHANGES HAVE ON THE COST OF OUR PROJECTS?

Roughly speaking, copper material is about:

- 10% of an electrical contract or 1% of cost of project
- 5% of an HVAC contract or 0.6% of cost of project
- 10% of a plumbing contract or 0.3% of cost of project

So, for an average project, copper material can represent approximately 2% of the total cost of the project. Therefore, a 10% increase in the cost of copper will increase the cost of a project by 0.2%.

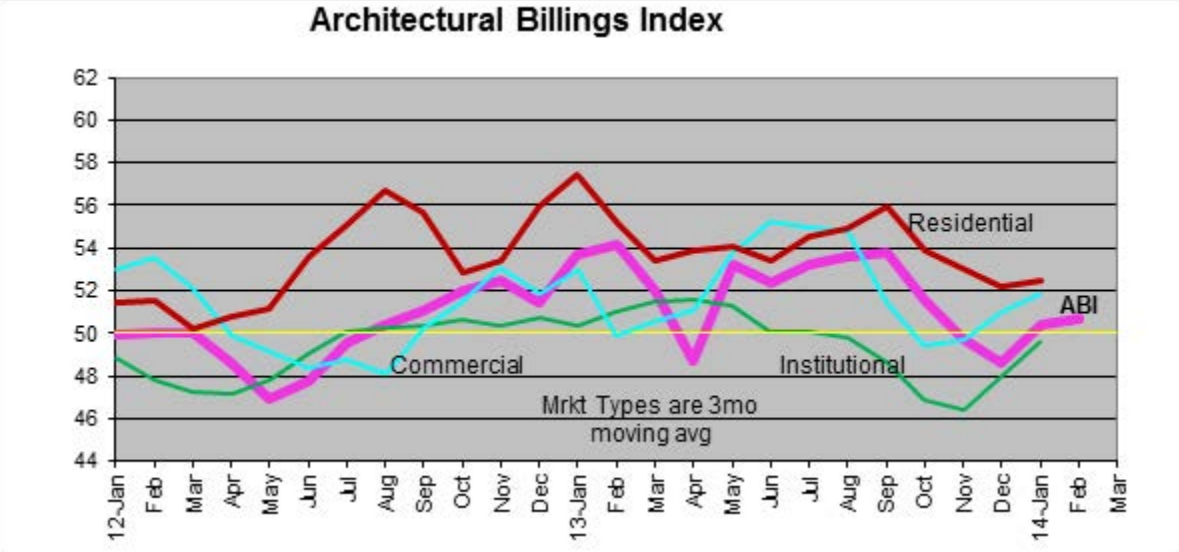
There are exceptions. For example, if copper is 2% of the total cost of the typical project, it is probably 4% to 5% of total cost on a heavy mechanical/electrical project, such as a data center. So a 10% increase in the cost of copper increases the total cost of a data center by 0.4% to 0.5%. For a copper roof, material is 65% of total cost and can represent ~1% of typical project cost.

ARCHITECTURAL BILLINGS INDEX

Architectural Billings Index (ABI) readings above 50 indicate more architectural firms reporting increasing billings than firms reporting decreasing billings.

The ABI is primarily a nonresidential indicator. Residential design projects account for only about 15% of the total index. Office buildings, hotels, shopping centers, banks, warehouses, manufacturing plants and other commercial properties represent 35-40% of the index. Institutional buildings account for 45-50% of the index. Typically, institutional facilities are the last nonresidential building sector to recover from a downturn.

FIGURE 17: ARCHITECTURAL BILLINGS INDEX ABI 2012-2014



The Architectural Billings Index (ABI) is a leading indicator for nonresidential work 9-12 months out. Index values below 50 indicate declining workload. Index values above 50 indicate increasing workload. Index values remaining consistently below 50 indicate there will be a decrease in construction spending 9 to 12 months later.

The 2012 drop in the ABI from March through June predicted nonresidential work would be down through Q4 2012 into Q1 2013 with recovery starting in Q2 2013. Institutional billings were declining from January 2011 to June 2012, and commercial work declined from April to August 2012. So we expected spending in Q1 and Q2 2013 to be down and it was down. We may see another brief slowdown in spending during Q1 2014.

CONSUMER INFLATION/ DEFLATION

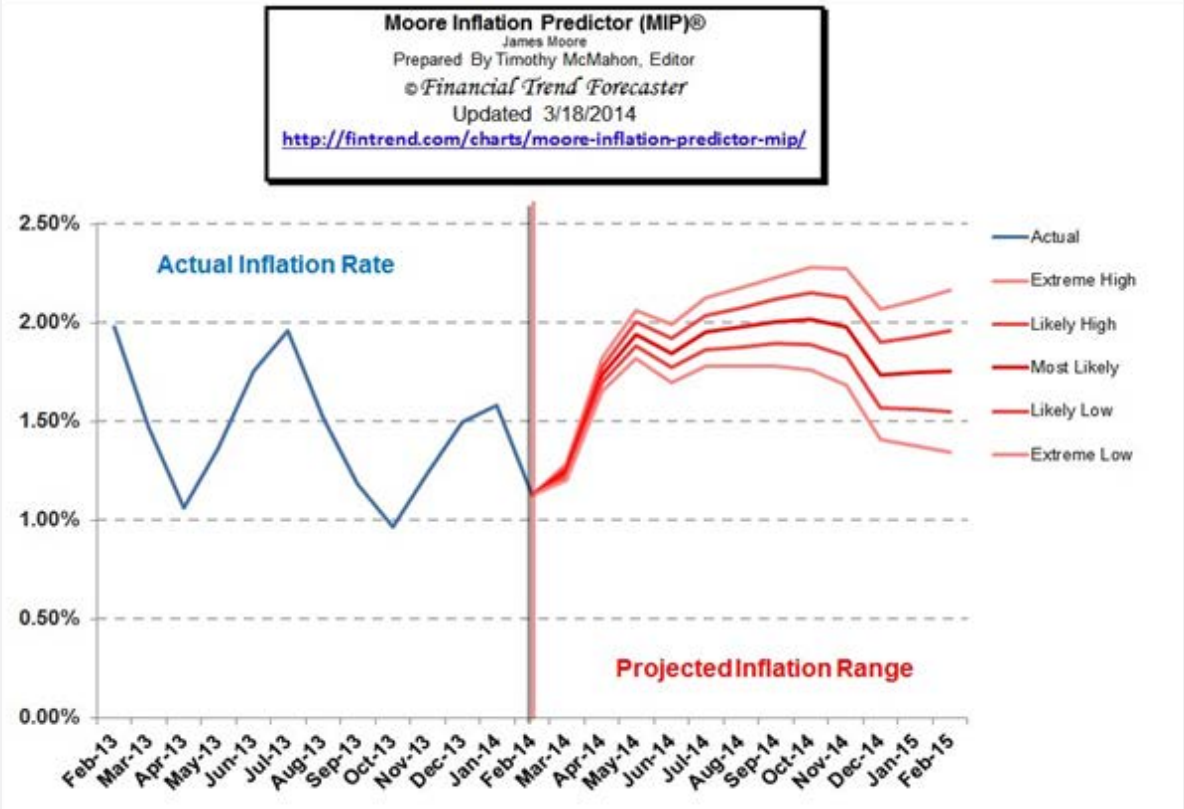
The Moore Inflation Predictor© (MIP) is a highly accurate graphical representation of the future direction of the inflation rate. It has a 97%+ accuracy rate forecasting inflation rate direction & turning points and over 90% of the time the inflation rate falls within the projected “likely” range.

Based on the current forecast, by mid-year 2014, consumer inflation should be near 2.0%, but by year end may be back below 2%.

Being a mathematical forecast, the MIP has no way to factor in the massive monetary expansion, actions by China to remove “reserve status” from the U.S. dollar, natural disasters, stock market crashes, etc. until it starts showing up in the current numbers, so we must be alert for these type of events. Remember, it takes 1 to 2 years for monetary stimulus to result in inflation, depending on the money multiplier and other factors.

A review of long-term inflation data shows there are seasonal aspects of inflation with some fairly consistent trends. It appears that the majority of inflation occurs in the first half of the year and then moderates for the second half. Since 2001, there have been eight deflationary fourth quarters and only three inflationary fourth quarters, even though the overall trend is inflationary.

FIGURE 18 - MOORE INFLATION PREDICTOR CONSUMER INFLATION 2013-2014



(MIP chart used by permission, Tim McMahon, Editor, Financial Trend Forecaster www.fintrend.com)

The MIP predicted the period from April 2013 through February 2014 almost exactly as it actually occurred.

It is still possible that several years of stimulus and easy money policy may eventually lead to strong inflation. There are some analysts that question if that will occur. In the worst case scenario, a year from now we could potentially see inflation range between 4% and 5%. The MIP does not project 4% to 5% inflation at any time within the next 12 months but predicts 12 months from now we will be near 2%. In a more tempered extreme outlook for next year, we might expect inflation to range between 2.5% and 3.5%.

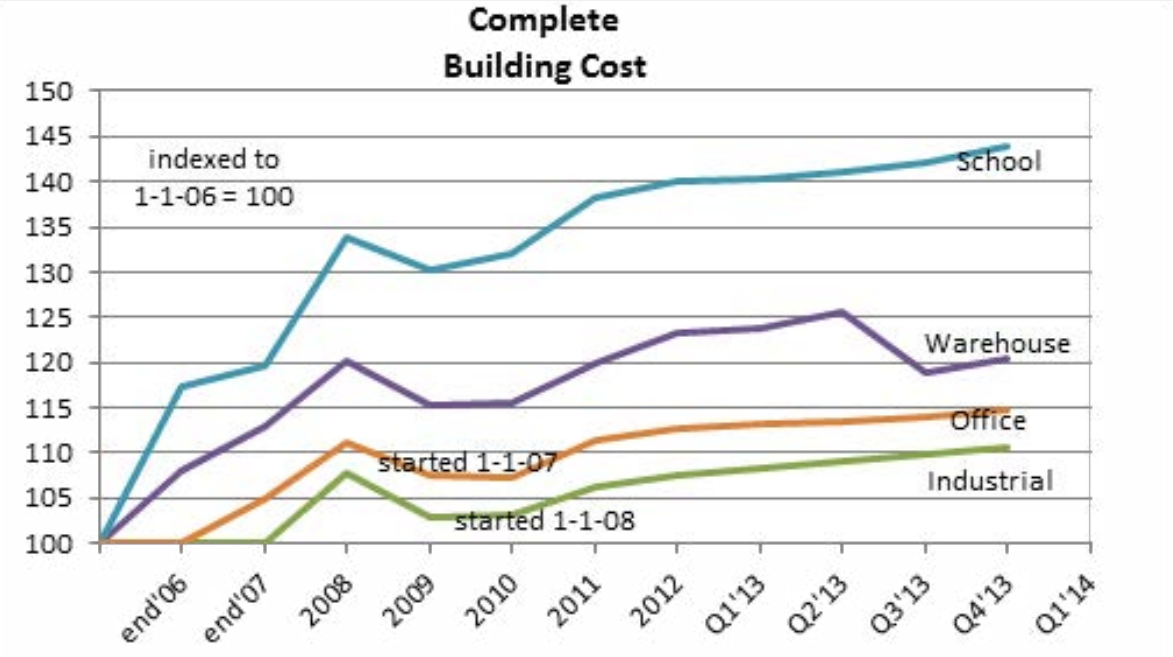
Keep in mind, construction inflation is historically much higher than consumer inflation.

CONSTRUCTION INFLATION

Construction inflation, based on several decades of trends, is approximately double consumer inflation. From mid-2009 to late 2011, that long term trend did not hold up. During that period, construction inflation/deflation was primarily influenced by depressed bid margins, which had been driven lower due to diminished work volume. Over the last 12 months, that has changed. Work volume has increased and short term construction inflation has increased now to more than double consumer inflation. If consumer inflation reacts to money policies by accelerating, and if it holds true that long-term trends eventually return to the norm, we may soon be experiencing rapid acceleration in construction inflation.

The U.S. Construction Producer Price Index tables for Buildings Complete, which includes the cost complete as charged by the builder, actually represents the true inflation cost of buildings.

FIGURE 19: COMPLETE BUILDING COST INDEX BY BUILDING TYPE 2006-2013



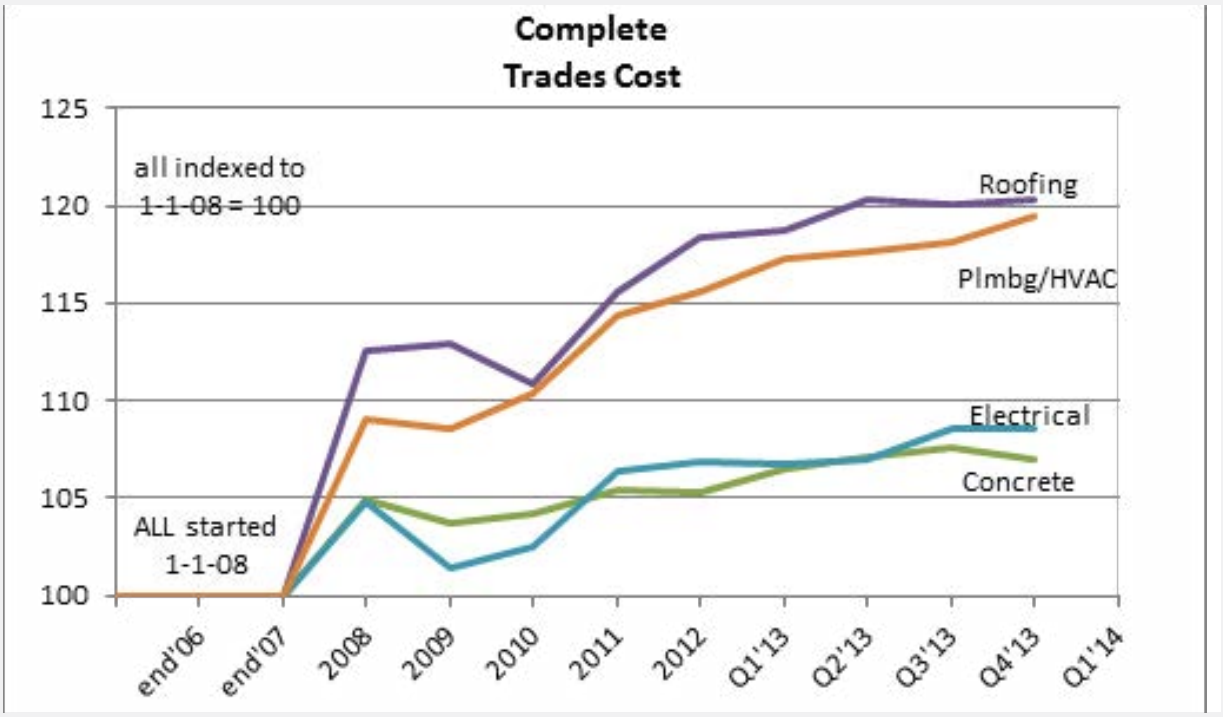
Nonresidential buildings cost inflation, as depicted by PPI Completed Buildings data, shows 2013 building cost inflation from 2.8% to 4.1%. Trades data inflation ranges from 1.5 to 4% for 2013. Another industry measure shows nonresidential building total cost inflation for 2013 over 4% for the year. Price indices for new housing indicate new residential construction inflation is currently closer to 8% to 10% per year.

Buildings' total prices, including margins, increased over the last year. We are predicting construction volume will continue to increase in coming months and that will continue to support increasing margins and therefore buildings' total construction (final cost) inflation will outpace construction labor and materials inflation.

Expect nonresidential construction cost inflation to remain above 4% for several years.

These average values, useful for adjusting whole building costs, cannot be considered to adjust a unique contract type. Construction inflation with a historical average range from 3% to 8% would not be accurate to adjust asphalt paving or shingles. Asphalt products increased 10% in 2005 and 2006 and 20% in both 2008 and 2009.

FIGURE 20: COMPLETE TRADES COST INDEX BY TRADE 2006-2013



ENR BUILDING COST INDEX

The April 2014 Engineering News Record 20 Cities Average Building Cost Index (ENR-BCI) is 5357, up 0.6% year to date and up 1.9% year over year. St. Louis and San Francisco show a much higher than average inflation rate. Atlanta, Baltimore, Chicago and Cincinnati are all below the average inflation rate.

The ENR-BCI index increased 3.7% in 2010, 2.8% in 2011, 1.9% in 2012 and 2.2% in 2013.

The ENR-BCI is one of the most well-known and most widely used building cost indices. However, its long-term strengths can also be weaknesses, particularly in times of fluctuating selling prices because:

- *It is made up of a small shopping basket of labor and materials. Therefore, it is not always the best representation of all building types, which can vary considerably in composition.*
- *That shopping basket includes no representation for any mechanical, electrical or plumbing items, which can comprise 30%-50% of the cost of the building. In many cases the shopping basket comprises less than 20% of the building cost.*
- *Building materials differ widely in rate and timing of cost growth and can dramatically affect the cost of projects. In 2009 while structural steel products declined in price by 10% to 15%, copper products increased in price by 40%.*
- *ENR-BCI does not take into consideration bid prices, so it often does not represent the final cost of buildings. Bid prices are referred to as Selling Price, and this is not included in the ENR-BCI. Selling prices show increased or reduced margin bids due to market activity.*

TABLE 13: ENR BUILDING COST INDEX HISTORY

ENR'S BUILDING COST INDEX HISTORY (2000-2011)													
Base = 1913=100	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Avg
2000	3503	3523	3536	3534	3558	3553	3545	3546	3539	3547	3541	3548	3539
2001	3545	3536	3541	3541	3547	3572	3625	3605	3597	3602	3596	3577	3574
2002	3581	3581	3597	3583	3612	3624	3652	3648	3655	3651	3654	3640	3623
2003	3648	3655	3649	3652	3660	3677	3683	3712	3717	3745	3765	3757	3693
2004	3767	3802	3859	3908	3956	3996	4013	4027	4102	4129	4128	4123	3984
2005	4112	4116	4127	4168	4189	4195	4197	4210	4242	4265	4312	4329	4205
2006	4335	4337	4330	4335	4331	4340	4356	4359	4375	4431	4462	4441	4369
2007	4432	4432	4411	4416	4475	4471	4493	4512	4533	4535	4558	4556	4485
2008	4557	4556	4571	4574*	4599	4640	4723	4733	4827	4867	4847	4797	4691
2009	4782	4765	4767	4761	4773	4771	4762	4768	4764	4762	4757	4795	4769
2010	4800	4812	4811	4816	4858	4888	4910	4905	4910	4947	4968	4974	4884
2011	4969	5007	5010	5028	5035	5059	5074	5091	5098	5104	5113	5115	5059
2012	5115	5122	5144	5150	5167	5170	5184	5204	5195	5203	5213	5210	5174
2013	5226	5246	5249	5257	5272	5286	5281	5277	5285	5308	5317	5326	5278
2014	5324	5321	5336	5357									

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Using known historical projects to get an idea of cost of future projects is common practice. Time indices give us the means to move project costs from some point in time in the past to current time. A common method of indexing project cost from some point in time in the past to the current time is by using the ENR-BCI. Divide the current index value by the index value from the midpoint of construction of the historical reference project. That factor allows us to adjust cost from the past to today.

Since the complete procedure requires that we move cost out to the midpoint of construction, we must complete the process by applying anticipated inflation factors on today's cost to move that out to the future project midpoint. Inflation factors, referred to as escalation, are addressed elsewhere in this report.

There were several monthly declines in the ENR index from late 2008 through early 2010, but the annual average has gone up every year for 70 years. More importantly, from Q2 2008 through much of 2011, during the only recent period of true deflation, the ENR-BCI would indicate a 10% cost increase! The actual final cost of buildings, documented by several reliable measures, from Q2 2008 through Q4 2010 went down by anywhere from 8% to 13%.

The ENR-BCI will give a good representation of growth when construction activity growth is fairly constant without steep up and down swings. During constant growth periods, contractors'

margins are relatively even and unchanged, and the yearly change in the index values of even a small basket of materials and labor costs can be representative of the growth in the cost of buildings.

Whenever we have very active periods or very depressed periods of construction activity, contractor selling prices rise or fall accordingly and since it does not track selling price, the ENR-BCI, cannot reflect accurately what effect selling price had on the cost of buildings during those periods. Nonetheless, the ENR-BCI is often relied upon as an indicator of cost movement over time.

We've just gone through a period of three to four years during which margins were first inflated and then deeply depressed, transitioning dramatically from peak to trough. If you rely solely on the ENR-BCI to index the cost of buildings from, during, or across that period of time, you may end up with indexed cost results that are grossly in error. If you were to select a time period between Q2 2008 and today, you could be overstating the future cost of a building by approximately 15% to 20%. You must at the very least take into consideration the selling price of buildings, past and present.

Selling prices are not captured in the ENR Index. For a procedure to adjust for actual selling prices see the Indexing – Addressing the Fluctuation in Margins section of this report, and refer to Figure 23: Escalation Growth vs. Margin Cost. This is particularly important for those of you using conceptual cost modeling tools such as the Gilbane CostAdvisor.


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INDEXING BY LOCATION CITY INDICES

Equally important as indexing for time is The process of indexing for location. The practice of using historical projects, regardless of location, to get an idea of cost of future projects is quite common. Not only must we move project costs over time, but also we must move location. City indices provide the means to move project costs from one location to another.

Suppose our historical project was built in Phoenix and we wish to determine the cost of a similar project built in Boston.

Assume

- project cost as built = $10,000,000
- Boston index = 120
- Phoenix index = 90

Move costs to Boston from Phoenix;

Divide “To” city by “From” city

Multiply original cost by factor.

- Boston / Phoenix = 120/90 = 1.33x
- $10,000,000 x 1.33 = $13,300,000.

Through this example, you can see the danger of simply using unadjusted project costs from one location to determine costs in another location. Without adjusting for differences in cost due to location, it is possible to over- or under- state project costs by substantial amounts.

ENR provides city indices for 20 major metropolitan cities. RS Means annually updates tables for hundreds of cities. The chart here lists 40 major cities from highest to lowest RS Means index. The ENR index is shown for those available.

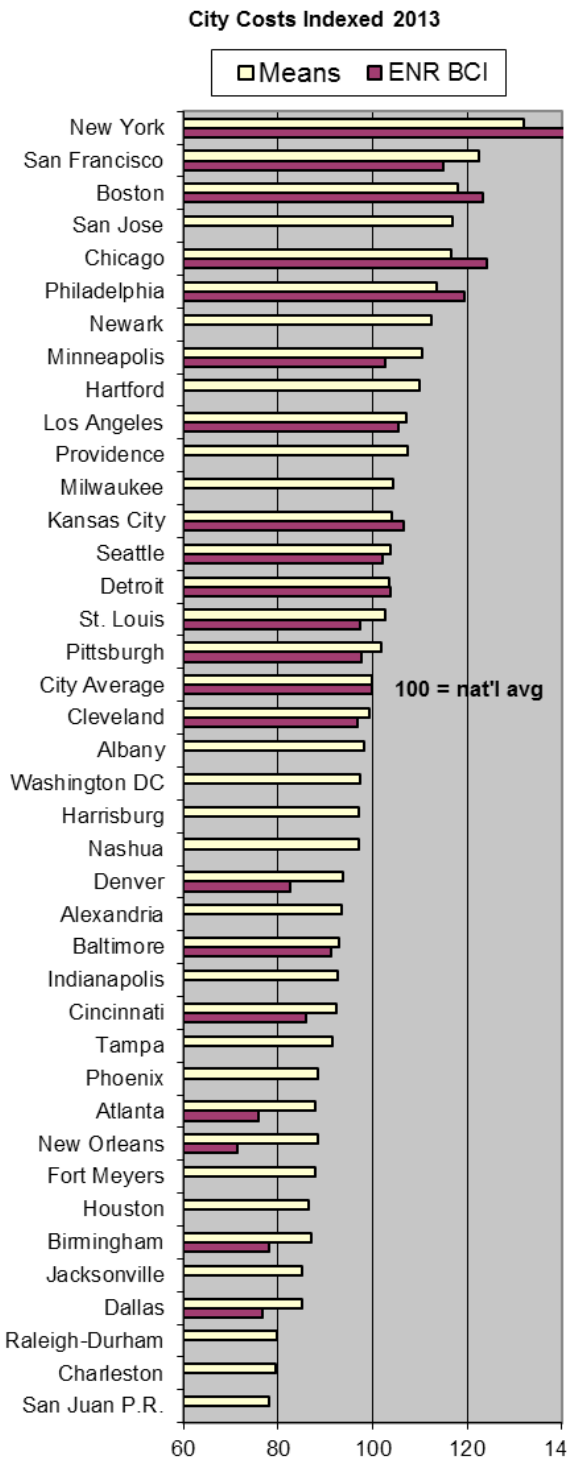

FIGURE 21: CITY LOCATION COST INDEX 2013


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SELLING PRICE

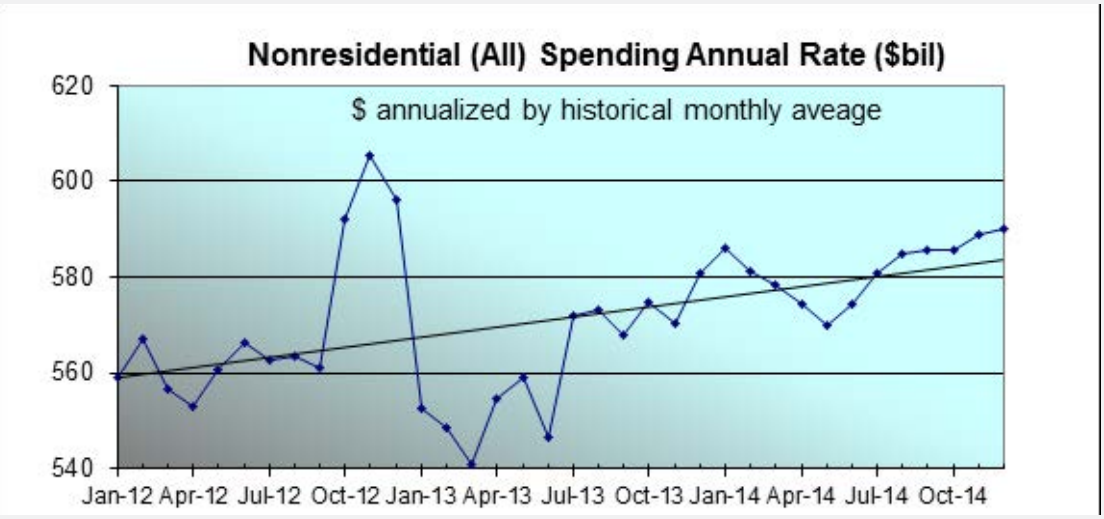
Selling price is the total price at which a contractor is willing to bid to win a project, even if that selling price eliminates all profit from the bid.

Few inflation or material/labor cost predictors address the issue of bidders lowering margins to win work and hence lowering what is known as selling price. Selling price is dramatically affected by economic conditions such as market volume and contractor booked revenue. When market volume is low, contractor's margin, or selling price, comes down. As business volume picks up, and once contractors secure more work, even if material prices stay low, contractors begin to increase their selling price.

Selling prices are still depressed, and it will take time before workload volumes increase to a point that contractors see a return to normal margins. Nearly 75% of contractors lowered margins in 2010 bids. More than 75% kept margins the same in 2011 or lowered them even more. In 2012 we saw margins increasing. The AGC Business Outlook survey for 2014 indicates optimism at a post-recession high. That will lead to increased margins.

We are currently in a growth period as reflected in monthly construction spending. The monthly rate of spending, although it took a significant drop in Q1 2013, returned right back to the normal trend line in Q4 2013. Residential markets are projected to grow by approximately 15% each year for the next several years. Although it may be several years before building market activity returns to pre-recession levels, there is clear and strong evidence the rate of activity is increasing.

FIGURE 22: NONRESIDENTIAL (ALL) SPENDING RATE OF GROWTH 2012-2014



Contractors need to recover the cost for all expenses that affect their cost to build. Any cost not recovered is taken as a reduction to margin or reduced selling price. Cost recovered over and above expenses raises selling price and is a growth to margins.

- On average, labor cost represents approximately 40% of building cost.
- On average, materials cost represents approximately 50% of building cost.
- Equipment and contractor services represent 10% of building cost
- Margins are applied on all 100% of building costs.

Labor wage cost growth is generally 2% to 3% per year. The labor wage cost long-term average is 3%. Labor demand and changes in labor productivity either increases or decreases total labor cost. In growth periods, labor demand tends to increase wages and productivity generally declines, increasing overall labor cost.

Materials cost growth is tracked by several reports such as the PPI. Materials costs fluctuate widely, but in general, in times of higher demand material prices go up.

Equipment and services have the least effect on overall project cost. Contractor efficiencies or unusual project conditions may vary this cost.

Margins represent contractor overhead and profit. Selling price includes contractor margins and is market activity dependent. Competition will cause project bid margins to move lower. Increasing volume will allow margins to move higher.

- ***If labor wage costs go up by 3%, cost to project = +1.2%***
- ***If productivity decreases by 2%, cost to project = +0.8%***
- ***If material costs go up by 5%, cost to project = +2.5%***
- ***If services costs go up by 5%, cost to project = +0.5%***
- ***If margin increases by 1%, cost to project = +1%***

During a period of low volume and competitive pricing (assuming no room for margins to move lower) margins are not increasing. During a period of margin recovery, anticipate a 1% to 1.5% annual increase to margins until margins fully recover.

When we see substantial growth in the volume of projects coming to bid, the need to keep margins reduced will diminish and margins will return to normal. There is no room left for depressed market activity to move margins lower. Expect margins to increase slowly over time.

Margins vary considerably by market and activity within individual markets.

MARGINS INCREASING OR DECREASING?

Indices like the PPI MTRLS deal only with materials costs or prices charged at the producer level. They do not include delivery, equipment, installation, or markups, nor do they reflect the cost of services provided by the general contractor or construction manager.

Total project cost encompasses all of these other costs. Whole Buildings Completed PPI doesn't give us any details about the retail price of the materials used, but it does include all of the contractors costs incurred for delivery, labor for installation and markups on the final product delivered to the consumer, the building owner.

The PPI for construction materials IS NOT an indicator of construction inflation. It is missing the selling price. In 2010, the PPI for construction inputs was up 5.3% but the selling price was flat. In 2009, PPI for inputs was flat but construction inflation as measured by cost of buildings decreased 8% to 10%.

For several years, we have had many construction firms competing for a very low volume of new work. Construction spending, adjusted for inflation to get real volume, in 2011 and 2012 reached a 20-year low. There was little work available for bidders forcing contractors to remain extremely competitive. As a result, contractors had been unable to pass on all cost increases to the owner. This had the effect of keeping selling price low, reducing both contractors and producers margins. In some cases margins may be reduced to a loss just to get work.

I EXPECT WHOLE BUILDING COSTS TO RISE AND REMAIN ABOVE MATERIAL/LABOR INFLATION AS LONG AS WORK VOLUME CONTINUES TO INCREASE.

TABLE 14: BLS PPI COMPLETED BUILDINGS 2011-2013

US CONSTRUCTION PRODUCER PRICE INDEXES - FEB 2014			
BUILDINGS COMPLETED Whole Building Cost	annual for 12 months 2013	12 months 2012	12 months 2011
Inputs to Nonresidential	1.0	0.9	5.7
New Industrial Bldg	4.1	1.4	3.1
New Warehouse Bldg	2.9	2.6	3.7
New School Bldg	3.4	1.2	4.8
New Office Bldg	2.8	1.2	3.8
except inputs, includes labor, material overhead and profit			
Source: Producer Price Index. Bureau of Labor Statistics			

To analyze the trend in margin movement we need to combine data from several inputs. Spending data and jobs data provides what we need to determine productivity. Producer Price Index (PPI) gives the cost of materials from the producer, but not the cost the contractor charges for the material. Whole building cost gives us the price charged by the contractor to the client, the total cost for all labor, materials, equipment, overhead and profit.

Compare all these and we can determine the difference between the costs to the contractor and what the contractor charges. That difference is the margin added to get the selling price.

TABLE 15: MARGINS COMPLETED 2011-2013

US CONSTRUCTION PRODUCER PRICE INDEXES - FEB 2014			
MARGINS COMPLETED Whole Building Cost	annual for 12 months 2013	12 months 2012	12 months 2011
New Industrial Bldg	1.60	1.71	-1.19
New Warehouse Bldg	0.40	2.91	-0.59
New School Bldg	0.90	1.51	0.51
New Office Bldg	0.30	1.51	-0.49
(-) margins decreasing (+) margins increasing			
All data adjusted for inflation			
Source: Producer Price Index. Bureau of Labor Statistics			

From 2009 through most of 2011, the trend had been increasing materials costs that were difficult to pass on to the consumer. From the client's perspective, building costs were not increasing as much as material costs. From the perspective of manufacturers, suppliers and constructors, costs were increasing but were being absorbed by a reduction to margins. In effect, this kept selling price to end users well below the level of material cost inflation, but also

considerably reduced the profitability of all producers, suppliers and builders.

In 2012 we saw the return to margin growth. Margins moved up and down in 2013 but finished the year positive. Growth in margins in 2014 will be similar to or exceed 2013.

Indicators are pointing to growth signs and that will eventually lead to a more normal bidding environment. That in turn will allow builders to pass along ever greater percentages of cost increases.

The flow of projects coming to bid during the coming months will strongly influence the cost movement of the bids. If the volume of projects coming to bid decreases, overall construction business will remain depressed and bids will remain low, strongly influenced by depressed margins. When we see a continued increase in the volume of projects coming to bid, the need to keep margins reduced will diminish and margins will continue a return to normal.

ENR, in its Fourth Quarterly Cost Report released December 30, 2013, published two Selling Price indices, 3.6% and 4.7%. The rate of increase in these indices for each quarter in 2013 was the fastest rate of growth since the recession started.

Worcester
North
High School
NORTH
POLAR BEARS
136
SAFETY IS MY PRIORITY
City of Worcester Gilbane
Gilbane
Gilbane
Excellence
EB(375)
SN(200)
OPEN
CLASSROOM

INDEXING – ADDRESSING THE FLUCTUATION IN MARGINS

We often look at the cost of previously built buildings as a historical guide for what to expect in the future. Escalation indices allow us to move the cost of buildings over time. City indices allow us to move for location. To index accurately, we need to review margin and productivity movement to determine what effect they might have on current cost compared to current index.

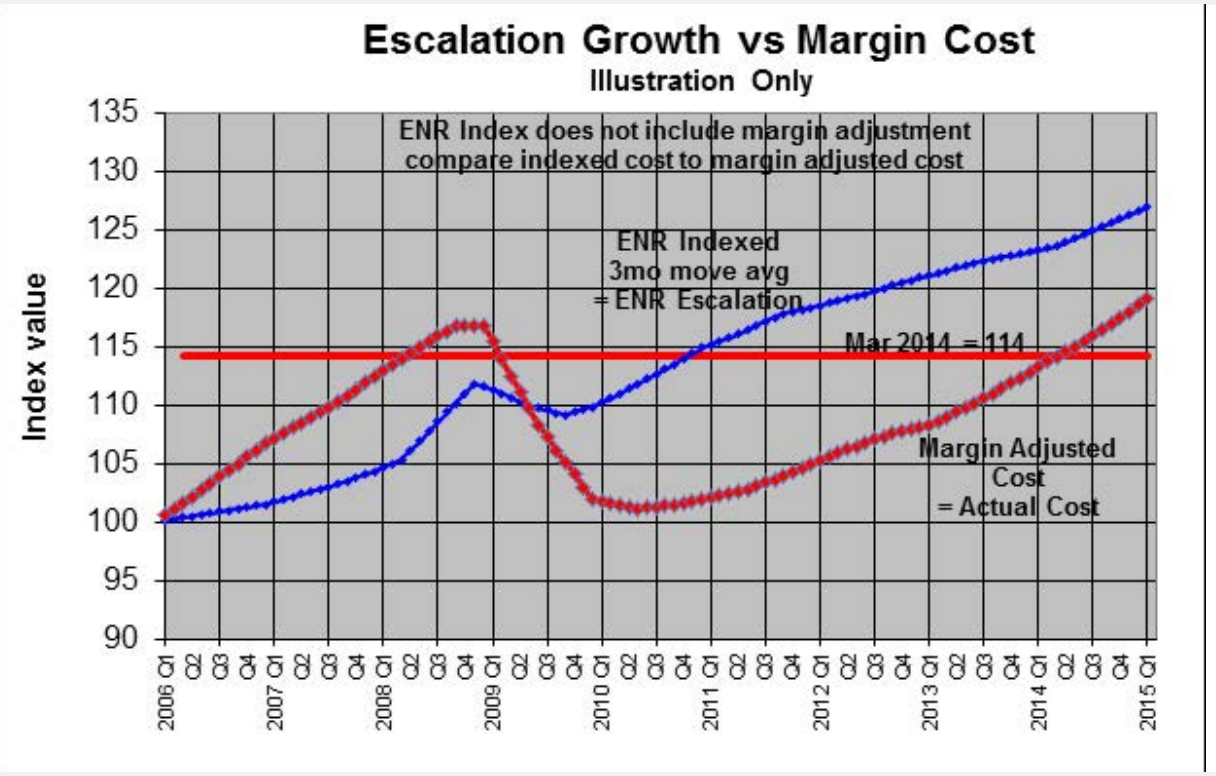
For 2009 and continuing through 2010, project bids came in 10% to 20% under normal budget estimating. Average costs of buildings from Q2 2008 through Q4 2010 fell by 13% to 15%. However, normal indices increased by 4% during that time. Normal indices will not account for all changes in individual material costs, wages, productivity changes and margin fluctuations.

Standard labor and material index tables will not address the inflection points in this unusual time period, nor will standard labor and material inflation factors address productivity or margin fluctuation. Figure 26, “Escalation Growth vs. Margin Cost”, illustrates this unusual period and provides a means to properly account for these unusual occurrences.

In Figure 23, the blue line indicates ENR BCI actual values through April 2014 and predicted escalation ranging from 2.5% up to 3.5% over the next two years. The plotted values are three-month moving averages to smooth out the line. The red line indicates Contractor Bid Price Movement or Adjusted Margin Cost representative of bids received.

Very low margin cost in mid-2010 reflects contractor bids at low cost to secure a portion of a dramatically reduced amount of available work. Predicted future cost shows long term cost growth which accounts for both normal labor/material escalation equal to escalation outlined above and a very slow but steady 0.5% per quarter recovery of margins over the next few years.

FIGURE 23: ESCALATION GROWTH VS. ACTUAL MARGIN COST 2006-2014



HOW TO USE FIGURE 23

- If your project is not previously indexed using ENRBCI, reference only the Margin index (red line).
- Pick the date for midpoint of the historical reference project.
- At that date, draw a vertical line so it passes through both curves.
- Now pick today's date.
- At that date, draw a vertical line so it passes through both curves.
- Record the ENR Index at the historical reference date and today
- Record the Margin Cost Index at the historical reference date and today.
- Subtract historical ENR index from today's ENR index. Label that value A
- Subtract historical Margin index from today's Margin index. Label that value B
- Pay attention to sign (+ or -).
- The difference between the movement due to the ENR index and the Margin Cost Index is the needed correction factor. Use the differences from the ENR Index (A) and the Margin Index (B) to develop an adjustment factor for your project. Since baseline is 100, all factors are the same as percentages.
- B minus A = Margin Adjustment factor. Pay attention to signs (+ or -).
- CostAdvisor users can record the Margin Adjustment value determined here into the Similarity Adjustment factor field. Treat all system indexing and future escalation as you would normally.

COSTADVISOR USERS MUST BE PARTICULARLY VIGILANT OF THIS POTENTIAL ESCALATION/INDEXING ISSUE.

If you are preparing an estimate using historical data input, or you are using CostAdvisor to conceptualize a future project budget several years out from now, AND if selecting any historical project with a cost midpoint occurring wherever the red margin line varies from the blue ENR INDEX line, you should consider applying a percentage adjustment to the baseline cost to adjust for the difference (or some portion of the difference) between the two indices. The goal is to correct for any margin over/under compared to how the ENR index would have moved the costs. Then you can carry a normal prediction for future escalation.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ESCALATION – WHAT SHOULD WE CARRY?

We tend to think of escalation as one simple value. An estimator typically prepares a budget in today's dollars, but then must escalate the total estimate to the midpoint of the project construction schedule. Escalation must account for all anticipated differences from today's cost to future cost. As explained in prior sections, when determining escalation there is more going on than just picking a simple value.

TO MOVE COSTS FROM TODAY'S DOLLARS INTO THE FUTURE, WE MUST ACCOUNT FOR THE CUMULATIVE EFFECT OF:

- Market Activity
- Labor wage rate changes
- Productivity changes
- Materials cost changes
- Equipment cost changes
- Margins fluctuations

The following escalation recommendations are based on the previous analysis of anticipated market activity, labor and material cost movement, productivity expectations and anticipated margin movement.

Activity, material cost increases, and margins have all been increasing more rapidly in residential markets. This will remain the case for the next few years. In all cases, future escalation in residential markets should be taken at the high end of the ranges stated here.

2013 is the perfect example of how an uneven recovery results in localized escalation. Activity by location had far more effect on localized escalation rates than anything else. In Providence, where construction activity is at a trickle, escalation was very low, well below 3%. In Boston, only 45 miles away, one of the most active metropolitan markets this year in the United States, escalation in some instances is in the 8% to 10% range. Market activity was the primary driver of cost escalation. In some areas, labor shortages are already driving up labor cost. As evidence of the uneven recovery, Rhode Island and Georgia have recovered less than 10% of the construction jobs lost since the recession began. Houston and Boston have recovered more than 65% of the jobs lost.

TOTAL ESCALATION FOR 2014 = 3% TO 7%

Assume a greater rate of growth in activity than 2013, which allows passing along all potentially inflationary labor and material costs and increasing margins 1% to 2%.

Looking out to 2014, we expect construction activity growth in all sectors except infrastructure heavy engineering and a continuation toward a return to normal margins. Pent-up demand, particularly in the public sector, may force a higher rate of activity. Residential construction, still trying to fill several years shortfall, will continue strong. Inflationary pressures may push the rate of material cost increases higher than the 2013 rate. All material cost increases from the manufacturer through the supplier may be passed along to the owner. Growing work volume will have the effect of reducing productivity. Contractors may increase margins 1% to 2%.

It's difficult to reach any conclusion that total costs within the year would not be escalated to at least 4% to 7% over the previous year. An assumption that escalation growth would be less requires that market activity does not continue to grow. With the exception of heavy engineering, expectations are that 2014 total construction will increase 8% from 2013. Extremely active markets could easily exceed this range by 2% to 3%.

TOTAL ESCALATION FOR 2015 AND 2016 = 5% TO 8%

Assume an even greater rate of growth in activity than 2014 which allows passing along all potentially inflationary labor and material costs and increasing margins 1% to 2%.

We can expect construction activity growth in all sectors. Pent up demand, particularly in the public sector, may result in a higher rate of activity. Residential construction will continue strong for several more years. Material cost increases will result in higher inflation. All material cost increases from the manufacturer through the supplier may be passed along to the owner. Labor shortages may be significant resulting in much higher labor retention costs. Contractors will have freedom to increase margins.

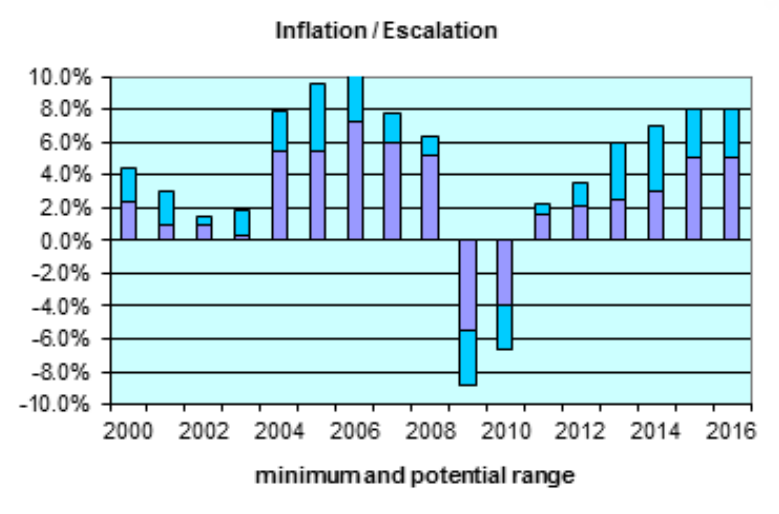
We do not have detailed projections to rely on for 2015 or 2016. However, the general consensus of construction economists is growth in spending of 8% to 11% for both 2015 and 2016. Since the US Census began keeping construction spending records in 1993, we have reached a rate of spending growth over 10% per year only twice and only three other years have exceeded 9% per year growth. Average spending growth is 7% per year (not including 2008 through 2011 when spending declined 35%). In years when spending growth exceeded 10%, escalation was 9% to 11%. From 2000 through 2006, escalation averaged 6.5%.

We may potentially see escalation similar to the growth years of 2005 through 2007 when (for nonresidential buildings) spending grew 43% and escalation averaged 9% per year for three years. All leading indicators point to continued growth for the next few years.

For each year above, consider your market. If you are in a market area or sector that has expectations of a huge volume of work that may start within a narrow window of time, then market pricing can turn rapidly for you. For example, construction spending in Boston increased 37% in the last year, nearly four times the national average. In this specific condition, it would be reasonable to assume annual future (beyond 2015) escalation at 5% to 8% as a conservative approach in a rapidly growing market. All labor and material cost will get passed along and margins will increase more rapidly. If markets follow the same pattern as 2004 through 2006, 8% escalation may not be enough.

FIGURE 24: INFLATION / ESCALATION MINIMUM AND POTENTIAL 2000-2016

Prior to economic expansion and then downturn, long term escalation averaged 3.5% for 20 years. I do not see any scenario which has us return to that long-term average at least for several years beyond the above noted predictions. ***Potential inflationary periods, declining productivity and even slight continued margin growth for several years lead me to recommend a minimum long term escalation beyond 2016 of no less than 4%.***



ABOUT THIS REPORT

Gilbane Inc. is a full service construction and real estate development company, composed of Gilbane Building Company and Gilbane Development Company. The company (www.gilbaneco.com) is one of the nation's largest construction and program managers providing a full slate of facilities related services for clients in education, healthcare, life sciences, mission critical, corporate, sports and recreation, criminal justice, public and aviation markets. Gilbane has more than 50 offices worldwide, with its corporate office located in Providence, Rhode Island. The information in this report is not specific to any one region.

Author Ed Zarenski, a 40-year construction veteran and a member of the Gilbane team for 35 years, is an estimating executive who has managed multi-million dollar project budgeting, owner capital plan cost control, value engineering and life cycle cost analysis. He compiles economic information and provides data analysis and opinion for this quarterly report.

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DATA SOURCES

- American Institute of Architects – www.aia.org/practicing/economics/index.htm
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