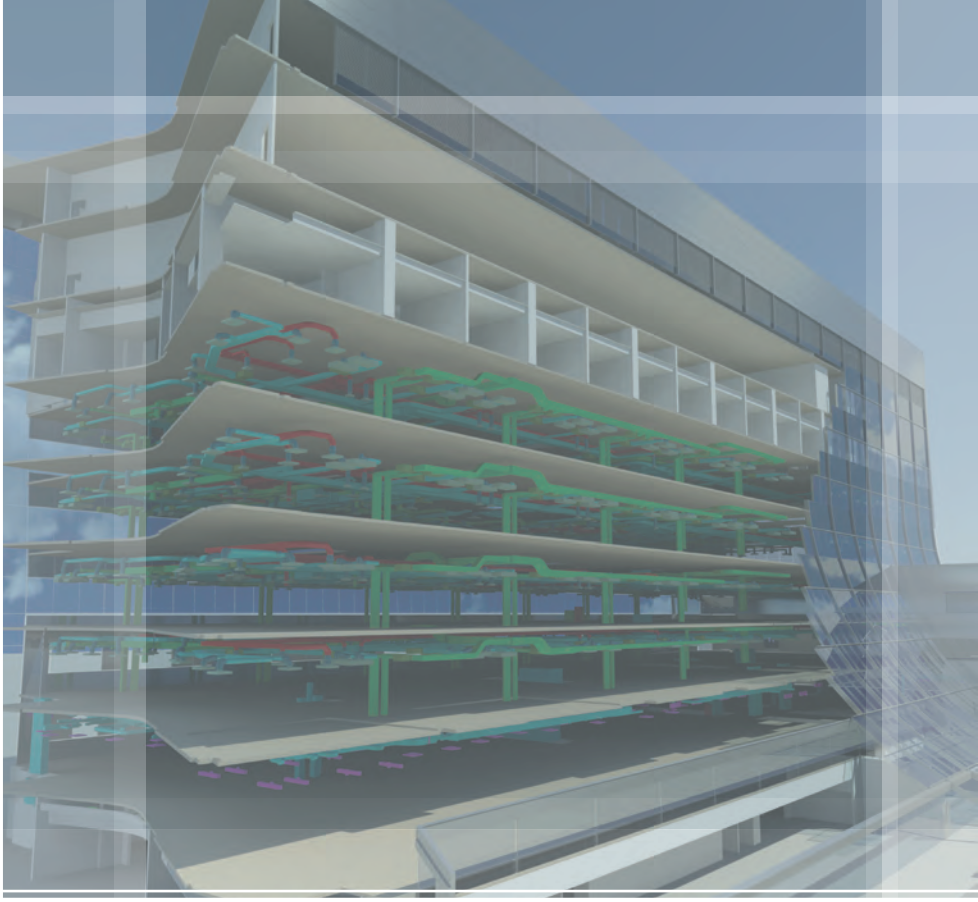

CONSTRUCTION ECONOMICS

MARKET CONDITIONS IN CONSTRUCTION

Gilbane Building Company

DECEMBER 2013

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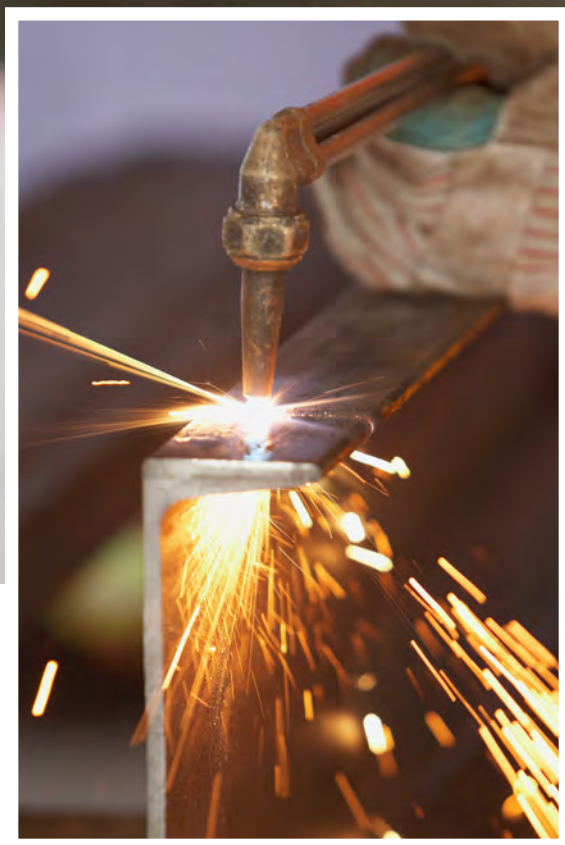
TABLES AND FIGURES

DATA INCLUDED IN THIS REPORT:

- ☐ Construction Spending (Put-In-Place) through October – released December 2, 2013
- ☐ Construction Starts through October, released November 20, 2013
- ☐ Construction Jobs through mid-November released December 6, 2013
- ☐ Producer Price Index Tables through October released November 21, 2013
- ☐ Producer Price Index Historical Graphs through September (3rd quarter) 2013
- ☐ Architectural Billings Index through October released November 20, 2013
- ☐ Dodge Momentum Index through October released November 20, 2013
- ☐ Consumer Inflation Index through October released November 20, 2013



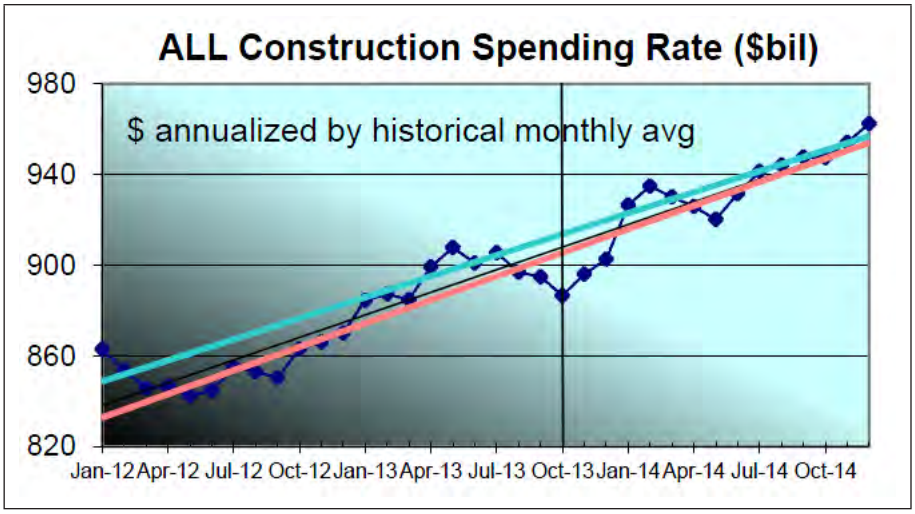
SUMMARY

CONSTRUCTION GROWTH LOOKING UP:

- Construction spending for 2013 will finish the year 5% higher than 2012. All of the growth will be attributed to residential construction. (See Table 2)
- The Architecture Billings Index (ABI) dropped below 50 in April, briefly indicating declining workload. Through September, we've seen five more months of growth, a good leading indicator for future new construction work. In October we've just had another drop, but not below 50, indicating slower gains rather than declines. See Figure B.
- ENR published selling price data for 2013 that shows contractors adding to their margins.

Figure A

Total spending of ALL types of construction will grow just under 5% year over year from 2012 to 2013. We started the year at an annual rate of spending near $880 billion and finish at a rate of $900 billion. We experienced a Q1-Q2 2013 slowdown, but expect future growth. The Dodge Momentum Index, a leading indicator, is up 20%+ since January 2013, indicating growth in 2014.



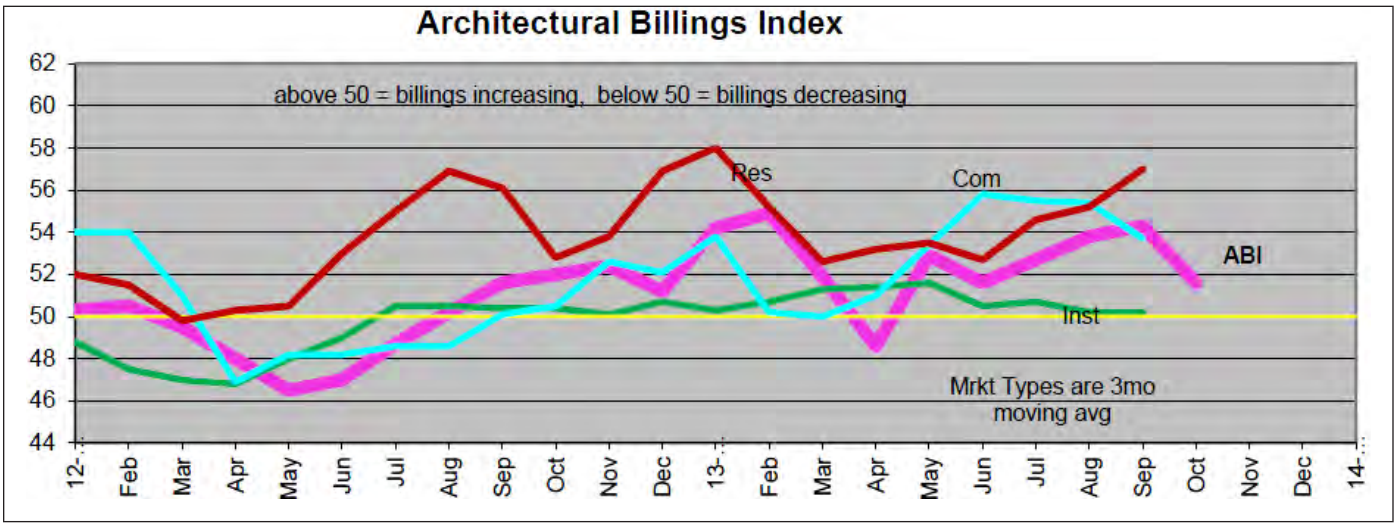
SOME ECONOMIC FACTORS ARE STILL NEGATIVE:

- The monthly rate of spending for nonbuilding infrastructure may climb from September through January, but then may decline by 10% through 2014.
- An anticipated decline in spending from February to May 2014 is influenced only mildly by a slight dip in nonresidential buildings and a flattening in residential but is influenced strongly by a steep decline in nonbuilding infrastructure spending.
- The construction workforce is still 25% below the peak. It will take a minimum of four more years to return to peak 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.

IMPACT OF RECENT EVENTS:

- FMI's Third Quarter 2013 Construction Outlook Report mentions a few reasons why spending is not rapidly increasing: the decline in public construction as sequestration continues; lenders are still tight with lending criteria and consumers are still cautious about increasing debt load, and that includes the consumers' share of public debt.
- Comments regarding the outlook for economic stimulus have recently caused interest rates to increase rapidly. Lending criteria is still tight and borrowers are cautious about taking on new debt. Rates will continue to rise and borrowing costs will add potential cost to future funding of projects. The cheapest time to build is now behind us.
- Construction jobs growth has slowed. Jobs grew by 90,000 in the 1st half of 2013, but have grown by only 33,000 since June.

Figure B



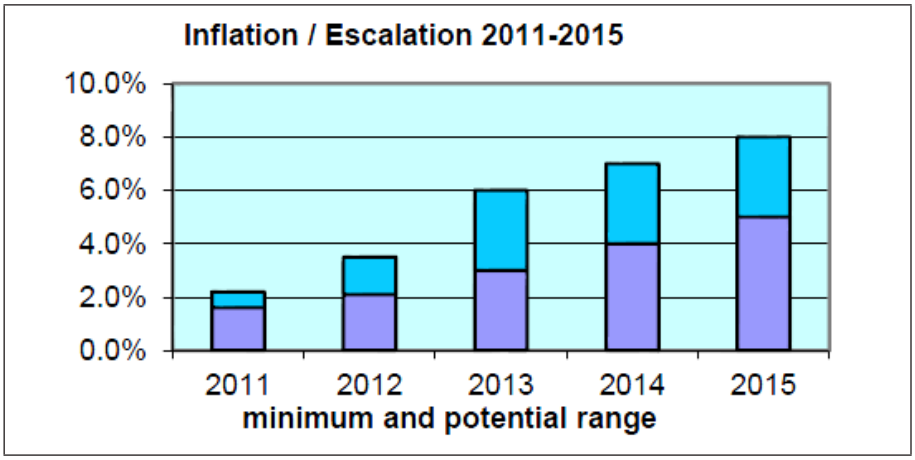
THE IMPACTS OF GROWTH:

- 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.
- 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 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.

Figure C

Future escalation, in order to capture increasing margins, will be higher than normal labor & 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 6% for 2013
4% to 7% for 2014 and
5% to 8% for 2015



SUPPORTED BY OVERALL POSITIVE GROWTH TRENDS FOR YEAR 2013, I EXPECT MARGINS AND OVERALL ESCALATION TO CLIMB MORE RAPIDLY THAN WE HAVE SEEN IN 5 YEARS.

Nonresidential buildings construction slowed in the first five months but is expected to increase substantially in the last few months of 2013. We will see a decline in nonbuilding infrastructure extend completely through 2014. Residential work will remain extremely active. Once growth in nonresidential construction picks up, and both residential and nonresidential are active, we will begin to see more significant 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. Even moderate growth in activity will allow contractors to pass along more material costs and increase margins. When activity picks up in all sectors, escalation will begin to advance rapidly.

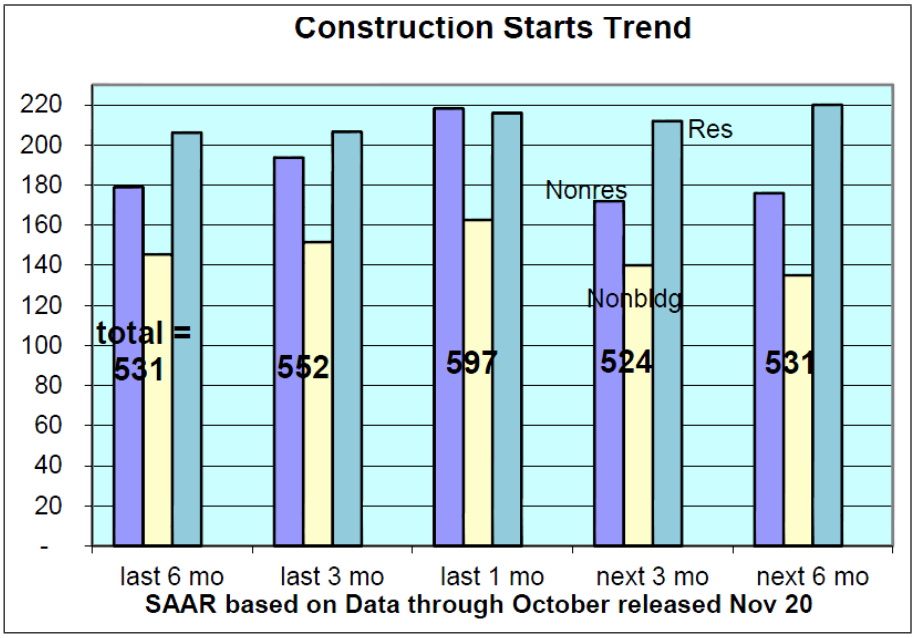
CONSTRUCTION STARTS

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%. Over the last five years, the nonbuilding data has varied by more than 25% from month to month more than one third of the time. This causes unusual peaks and valleys in the data. One way to look at the data is to calculate forecasts based on the latest month, last three months and last six months. One month data is often too volatile to predict the year, but shows the current monthly trend; three-month moving average trends smooth out the data and give a better near-term prediction; and six-month trends flatten the data even more and helps show the change from six months to the more current three months.

Figure 1

Nonbuilding starts have been the most erratic over time, varying by as much as 60% from average, so short term trends are often skewed. In October, nonresidential buildings starts were 35% above average, so the "last one month" trend bar is dramatically skewed.

Nonresidential buildings new starts were nearly flat since March 2012 and then shot up unexpectedly in December. Since then there have been a few dips, but September and October starts are very strong, which looks good for future spending.



EXPECTATIONS FOR 2014 BASED ON MCGRAW HILL CONSTRUCTION STARTS DATA:

- New construction starts are expected to increase approximately 5% in 2013, upward movement influenced mostly by residential starts. Gilbane predicts growth of 6% for 2014.
- Nonresidential buildings starts seasonally adjusted annual rate averaged $129 billion in Q1 2012 and grew to an average of $147 billion in Q1 2013. We should finish 2013 with a rate near $180 billion, and a total new starts for the year of $165 billion.
- Nonbuilding infrastructure starts averaged $153 billion in Q1 2012 and fell to $127 billion in both Q4 2012 and Q1 2013. We should finish 2013 with a rate near $140 billion. I expect 2013 nonbuilding infrastructure starts will decline 15% from 2012.
- From Q1 2011 to Q1 2013, the rate of new residential starts has grown from $120 billion to $200 billion - 67% growth. Starts have been over $200 billion for eight of the last nine months. I expect 2013 residential starts will grow to a rate of $220 billion by year end and the total for the year will be $208 billion - 24% growth from 2012.

- McGraw Hill predicted total construction starts would increase 5.7% in 2013. With the latest data through October, starts should actually finish 2013 up by 4.7%
- McGraw Hill predicted volatile electric utility infrastructure starts would be down 30% in 2013. They were actually down more than 50%.
- McGraw Hill predicted nonresidential commercial building starts would be up 12% in 2013. They were actually up 15%.

Table 1

TOTAL CONSTRUCTION STARTS					Gilbane	Gilbane	MHC
	Actual	Actual	Actual	Actual	Prelim	Forecast	Forecast
	2009	2010	2011	2012	2013	2014	2014
Nonresidential Buildings	167,955	161,194	165,048	159,299	165,270	177,573	176,700
		-4.0%	2.4%	-3.5%	3.7%	7.4%	8.2%
Residential Buildings	111,851	121,155	126,299	167,287	208,096	236,385	254,200
		8.3%	4.2%	32.5%	24.4%	13.6%	22.5%
Nonbuilding Construction	141,899	148,088	147,851	161,043	137,697	128,471	124,400
		4.4%	-0.2%	8.9%	-14.5%	-6.7%	-9.4%
Total Construction	**421,705**	**430,437**	**439,198**	**487,629**	**511,063**	**542,429**	**555,300**
percent change yoy		**2.1%**	**2.0%**	**11.0%**	**4.8%**	**6.1%**	**9.3%**

dollars in millions

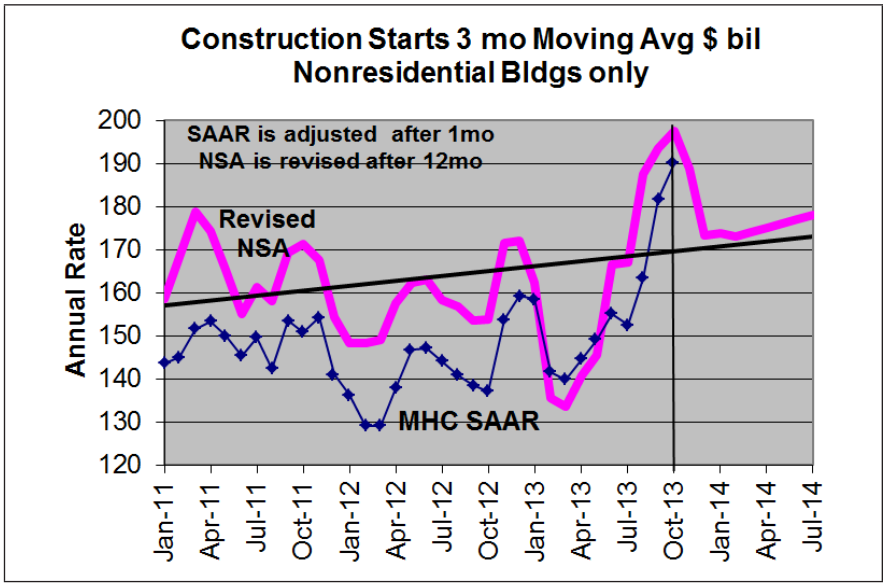
includes McGraw Hill data released November 20, 2013

Prelim 2013 based on actual data through October

In the last 12 months, housing permits growth averaged +2.5% per quarter. The previous 12 months permits growth averaged +8% per quarter. This may flatten new starts for residential construction well below McGraw Hill Outlook.

Figure 2

The bulk of nonresidential buildings starts that will be spent in early 2013 started in the 15 months prior. The 3-month moving average starts hit a multi-year low in January-February 2012. Those low starts may be the reason for below average spending in March and April 2013. In February-April 2013 starts went even lower. I expect this to depress spending in Q1-Q2 2014. See Figure 7.
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.

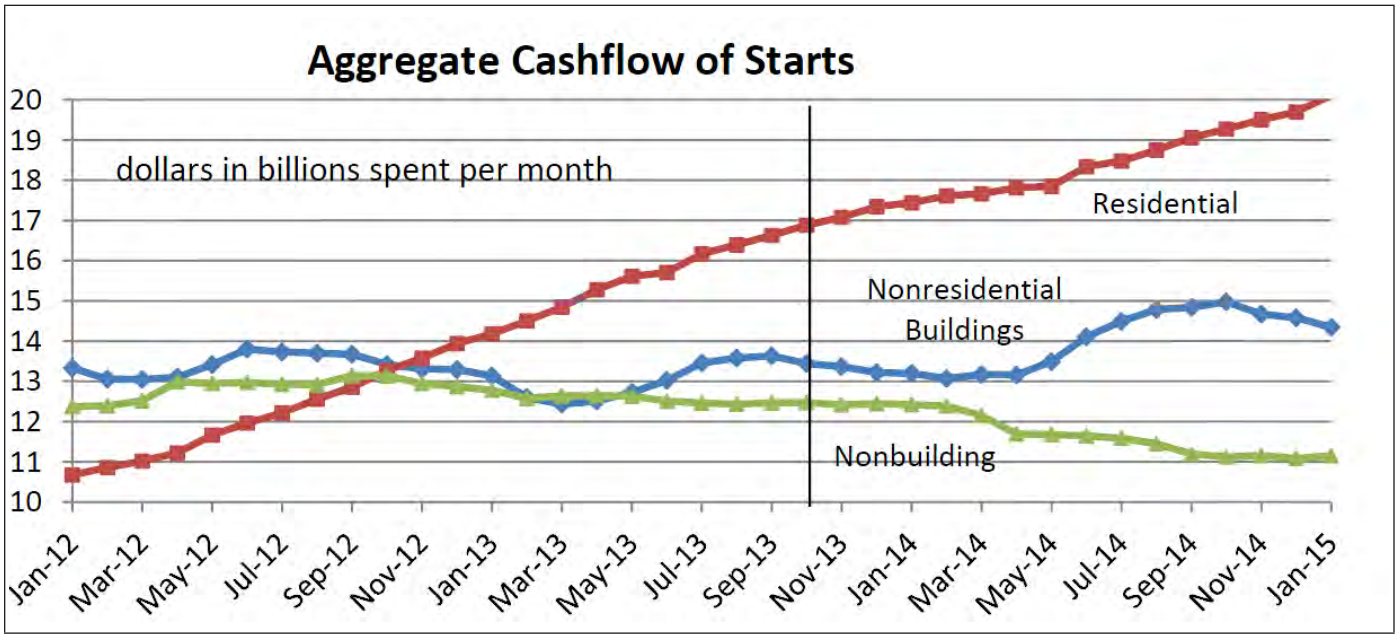


MHC Construction Starts can act like a leading indicator. Even though not all construction projects are captured in the starts data (only about 50% is captured), we have more than enough data to develop cash flows over time that will show the expected direction in construction spending activity. Starting 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 time over the expected duration from start to finish. Generally, project durations can range from six to nine months for small projects and up to 24 to 30 months for very large projects. Project duration and cash flow begin in the month the data gets posted.

Figure 3



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 spending for nonbuilding infrastructure work. This decline clearly is 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 the middle of 2014.

CONSTRUCTION SPENDING

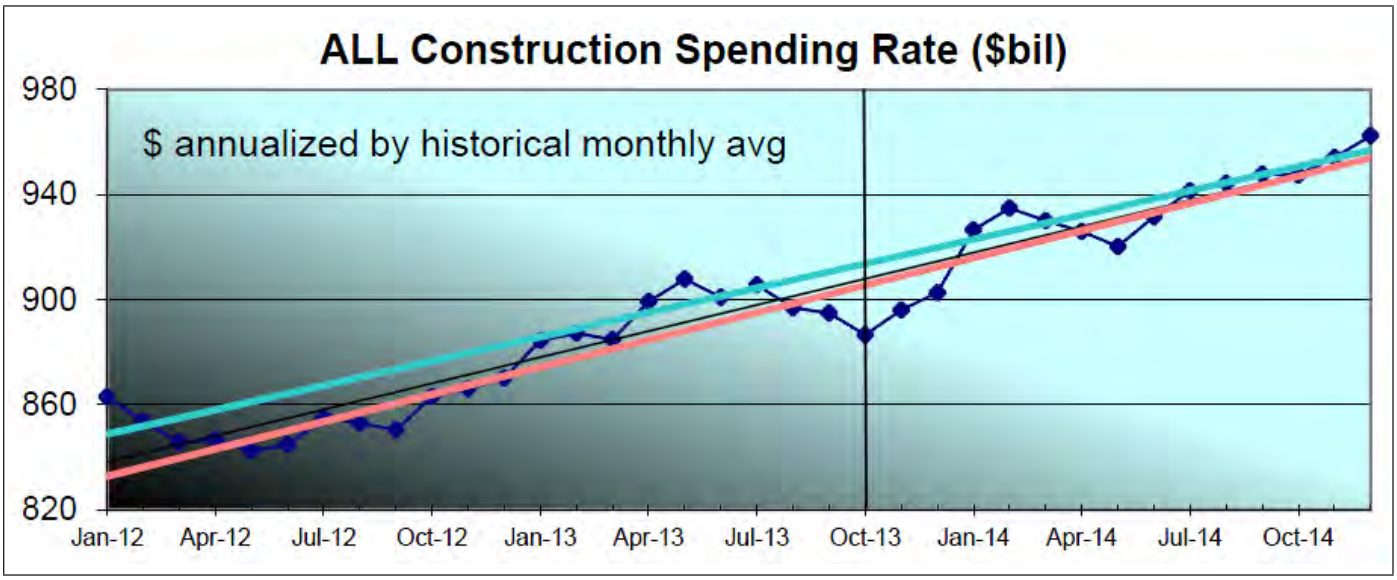
TOTAL SPENDING FOR ALL TYPES OF CONSTRUCTION IN 2013 WILL REACH $896 BILLION, UP 4.9% YEAR OVER YEAR FROM 2012.

IN Q1 2012 THE MONTHLY RATE OF SPENDING WAS $824 BILLION AND FOR Q4 2012 IT REACHED $905 BILLION. FOR THE FIRST FIVE MONTHS OF 2013, THE MONTHLY RATE OF SPENDING WAS $879 BILLION WITH MAY AT $881 BILLION. WE SHOULD FINISH 2013 WITH A MONTHLY RATE OF SPENDING NEAR $940 BILLION.

If we experience a growth rate after October as predicted, we may reach a growth rate of 7% year over year. Even if we fall to the low end trend line in 2014, we should experience no less than a 4% growth rate.

Construction spending for 2013 will be pushed higher by growth in residential construction, resulting in an annual growth rate near 20%. I anticipate residential spending will increase by 19% in 2013.

Figure 4



Both nonresidential buildings and nonresidential infrastructure spending are below 2012 levels. The rate of spending decreased from an average of $586 billion in Q4 2012 to $550 billion in the first five months of 2013. Nonresidential infrastructure spending hit an all-time high in Q4 2012. Since then it has dropped off more than 10%.

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 $284 billion in May. The rate of spending will remain near $300 Billion until second quarter 2014.

Table 2

U.S. Total Construction Spending Summary

totals in billions current U.S. dollars

	Actual						Prelim	Forecast
	2007	2008	2009	2010	2011	2012	2013	2014
Nonresidential Bldgs	403.7	438.0	375.5	290.2	282.8	299.1	294.7	309.0
% change year over year	18.9%	8.5%	-14.3%	-22.7%	-2.6%	5.7%	-1.5%	4.9%
Nonbuilding Hvy Engr	248.3	271.8	273.3	265.1	249.7	273.4	266.5	258.0
	19.4%	9.5%	0.6%	-3.0%	-5.8%	9.5%	-2.5%	-3.2%
Residential	500.3	357.7	254.3	248.9	245.6	282.0	335.0	372.0
	-19.3%	-28.5%	-28.9%	-2.1%	-1.3%	14.8%	18.8%	11.0%
Total	1152.3	1067.5	903.1	804.2	778.1	854.5	896.2	939.0
	-1.3%	-7.4%	-15.4%	-11.0%	-3.2%	9.8%	4.9%	4.8%

Residential includes new, remodeling, renovation and replacement work.

Source: U.S. Census Bureau, Department of Commerce.

Actual Spending data through October 2013

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).

A comparison of most recent projections is shown in Table 3. Gilbane projections are compared to Reed Construction, FMI and Associated Builders and Contractors (ABC).

Reed Forecast FMI Forecast ABC Forecast AIA Midyear Consensus Forecast

Table 3

Spending Predictions Comparisons

	2012	2012	2012	2012	**2013**	2013	2013	2013	**2014**	2014	2014	2014
	Gilbane	Reed	FMI	ABC	**Gilbane**	Reed	FMI	ABC	**Gilbane**	Reed	FMI	ABC
Residential	**282**	287	287		**335**	338	338		**372**	379	380	
Nonresidential Buildings	**299**	299	298	299	**295**	293	295	283	**309**	306	307	298
Nonbuilding	**273**	272	272	271	**266**	264	277	300	**258**	278	290	325
TOTAL Nonres	**572**	571	570	570	**561**	557	572	583	**567**	584	597	623
TOTAL ALL	**854**	**858**	**857**		**896**	**895**	**910**		**939**	**963**	**977**	

FMI data 9/13/2013 3rd Qtr Construction Outlook report

Reed data 9/26/2013 report

ABC data 11/20/2013 report and AIA Consensus midyear report

FMI Transportation and Communication moved from Buildings to Nonbuilding

ABC Religious, Public Safety and Amusement/Recreation from AIA Midyear Consensus to get Nonres Bldgs

Gilbane, Reed and FMI projections agree within 1% for both 2013 and 2014 residential and nonresidential buildings spending. For 2014, the widest differences are in nonbuilding infrastructure spending, where we range from $258 billion to $290 billion, a variance of 12%.

ABC 2014 projections vary by 3% to 4% for buildings and by 12% to 26% for nonbuildings.

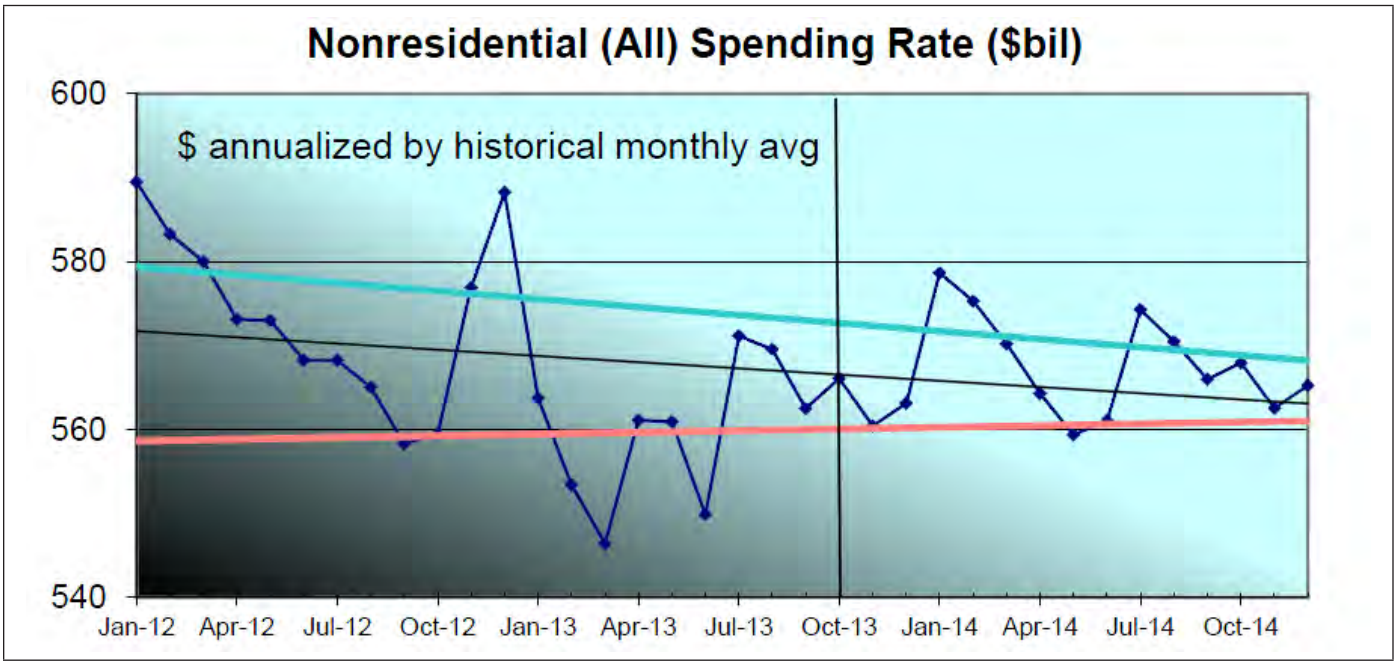
Nonresidential Construction Spending

TOTAL SPENDING FOR ALL NONRESIDENTIAL CONSTRUCTION IN 2013 WILL REACH $562 BILLION, DOWN 2% YEAR OVER YEAR FROM 2012.

The AIA Architectural Billings Index for commercial and institutional buildings shows a dip that spanned from Q1 through Q2 2012. That dip resulted in a drop in nonresidential building starts from January through April 2013. In addition, the cash flow of previous jobs reflected in MHC starts data resulted in lower spending in Q1 and Q2 2013. Figures 5 and 6 show the drop in spending bottomed out between March and June 2013.

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

Figure 5

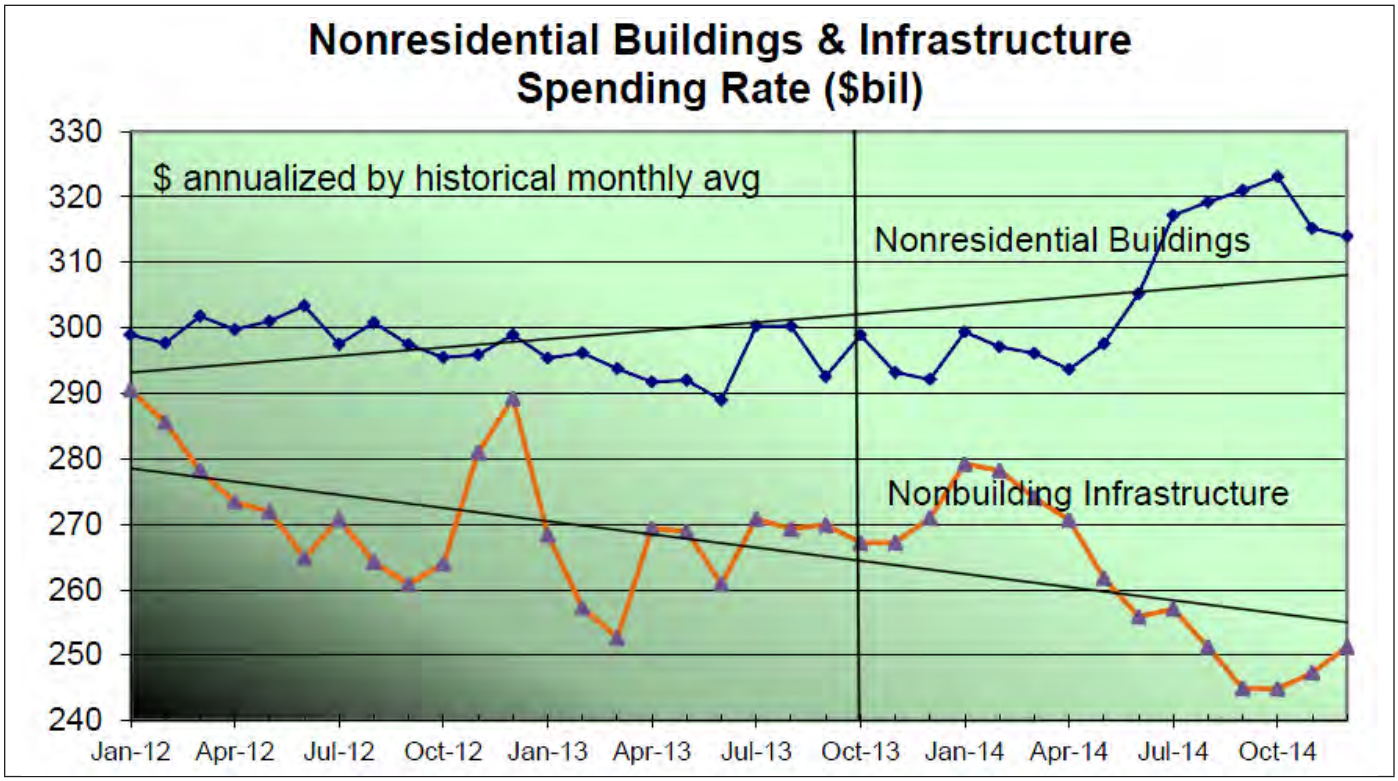


NONRESIDENTIAL CONSTRUCTION CONSISTS OF TWO MAIN CATEGORIES:

- nonresidential buildings
- nonbuilding infrastructure projects

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 nonbuilding work is public work.

Figure 6



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 monthly starts will be felt in 2014. The decrease in new starts will result in a decline in 2014 infrastructure spending.

Nonresidential Buildings Spending

TOTAL SPENDING FOR NONRESIDENTIAL BUILDINGS CONSTRUCTION IN 2013 WILL REACH $295 BILLION, DOWN SLIGHTLY FROM 2012. I PREDICT 2014 SPENDING WILL REACH $309 BILLION, UP 4.9% FROM 2013.

FOR ALL OF 2012, THE MONTHLY RATE OF SPENDING WAS $299 BILLION +/- 0.3%. FOR THE FIRST SIX MONTHS OF 2013, THE MONTHLY RATE OF SPENDING DECLINED, HITTING A LOW IN JUNE OF $289 BILLION. SINCE THEN, THE AVERAGE HAS RETURNED TO $298 BILLION. WE WILL EXPERIENCE SOME UP AND DOWN MOVEMENT THROUGH APRIL, AND BY Q3 2014, THE RATE OF SPENDING WILL BE OVER $320 BILLION.

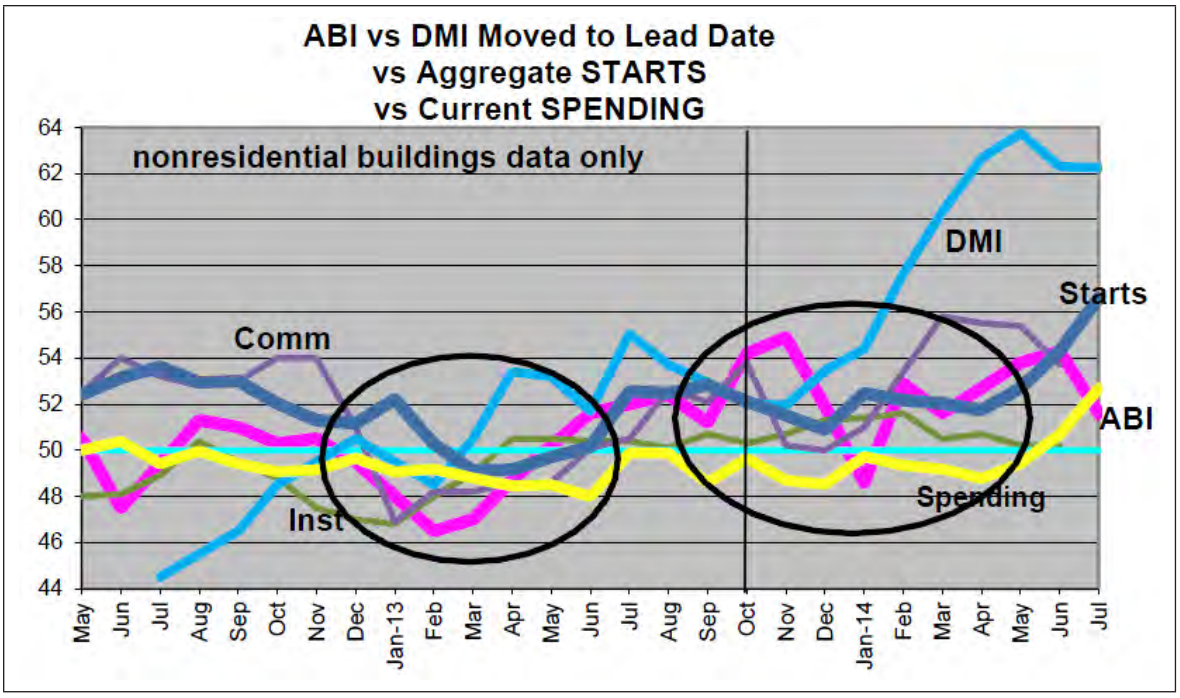
The FMI Third Quarter Construction Outlook report projects 2014 nonresidential buildings spending will reach $307 billion, an increase of 4.1% over 2013.

The Reed Construction Data September Forecast report projects 2014 nonresidential buildings spending of $306 billion, growth of 4.4%.

Figure 7 shows an overlay created by moving leading indicators forward by each of their appropriate lead times to present time. The ABI is a nonresidential indicator for work 9-12 months out. Along with the composite ABI, the commercial and institutional ABI indices are shown. The cash flow of MHC nonresidential starts over the expected duration of the project type was developed in the Starts section of this report and captures cumulative cash flow. The Dodge Momentum Index (DMI) is roughly a 12-month leading indicator of nonresidential work.

On this overlay, I've plotted my monthly spending prediction, which seems to correlate well over the months shown. As expected, we did indeed experience a dip in nonresidential buildings spending from February to June 2013. Currently, indicators point to a six month period of moderate up and down fluctuation, followed by a period of sustained growth through year end.

Figure 7



Healthcare and education, the major institutional sectors, represent 23% of all nonresidential construction and ±40% of nonresidential "buildings" spending. Both peaked in 2008, with education 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 4.

Table 4

U.S. Total Construction Spending
totals in billions current U.S. dollars

			Actual				Prelim	Forecast
	2007	2008	2009	2010	2011	2012	2013	2014
Education	96.8	104.9	103.2	88.6	84.3	84.8	79.3	80.5
% change year over year	14.0%	8.4%	-1.6%	-14.1%	-4.8%	0.6%	-6.5%	1.5%
Healthcare	43.8	46.9	44.8	38.7	39.7	40.6	40.8	43.6
	13.8%	7.1%	-4.4%	-13.6%	2.4%	2.4%	0.5%	6.8%
Commercial	89.7	86.2	54.1	39.5	43.6	47.2	49.0	51.5
	16.9%	-3.9%	-37.3%	-27.0%	10.4%	8.2%	4.0%	5.0%
Office	65.3	68.6	51.9	37.9	34.6	36.5	36.5	39.0
	20.4%	5.1%	-24.3%	-27.1%	-8.5%	5.2%	0.0%	7.0%
Total	295.5	306.6	254.0	204.6	202.2	209.1	205.6	214.6
	16.2%	3.7%	-17.1%	-19.4%	-1.2%	3.4%	-1.6%	4.4%

Source: U.S. Census Bureau, Department of Commerce.
includes public and private
Actual Spending data through October 2013
Forecast 2014 = Gilbane

TOTAL SPENDING FOR EDUCATION BUILDINGS CONSTRUCTION IN 2013 WILL REACH ONLY $79 BILLION, DOWN -6.5% YEAR OVER YEAR FROM 2012. I PREDICT 2014 SPENDING WILL REACH $80.5 BILLION, UP ONLY 1.5% FROM 2013.

K-12 projects are often municipally-funded (public spending) and municipalities lag behind 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 article published in the New York Times, 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 WILL REACH $41 BILLION, UP ONLY 0.5% YEAR OVER YEAR FROM 2012. I PREDICT 2014 SPENDING WILL REACH $43.6 BILLION, UP 6.8% FROM 2013.

TOTAL SPENDING FOR COMMERCIAL BUILDINGS CONSTRUCTION IN 2013 WILL REACH $49 BILLION, UP 4.0% YEAR OVER YEAR FROM 2012. I PREDICT 2014 SPENDING WILL REACH $51.5 BILLION, UP 5.0% FROM 2013.

TOTAL SPENDING FOR OFFICE BUILDINGS CONSTRUCTION IN 2013 WILL REACH $36.5 BILLION, NO CHANGE FROM 2012. I PREDICT 2014 SPENDING WILL REACH $39 BILLION, UP 7% FROM 2013.

Year to date spending on:

- public education buildings is down 8.5% from the same period last year
- public healthcare buildings is nearly even with last year.
- public commercial work is down 23%
- public office buildings is down 26%
- private education is up less than 1%
- private healthcare is down 3.8%
- private commercial buildings is up 5.6%
- private office buildings is up 7%.

THE GILBANE DECEMBER CONSTRUCTION ECONOMIC REPORT PROJECTS 2014 SPENDING OF +1.5% EDUCATION; +6.8% HEALTHCARE: +5% COMMERCIAL; +7% OFFICE.

The FMI Third Quarter Construction Outlook report projects 2014 spending of

+4% education; +6% healthcare: +5% commercial; +4% office.

The Reed Construction Data September Forecast report projects 2014 spending at

-1.3% education; +7.4% healthcare: +4.5% commercial; +7% office.

The ABC 2014 Economic Forecast projects 2014 spending at

+2.1% education; +6.7% healthcare: +5.3% commercial; +1.1% office.

Public/Private

Total construction can be split into public and private spending.

The largest public construction markets are highway and education. 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.

Table 5

U.S. Total Construction Spending
totals in billions current U.S. dollars

	Actual						Prelim	Forecast
	2007	2008	2009	2010	2011	2012	2013	2014
Private	863.4	758.8	588.1	500.5	494.7	578.8	622.3	670.5
% change year over year	-5.3%	-12.1%	-22.5%	-14.9%	-1.2%	17.0%	7.5%	7.7%
Private Residential	493.2	350.2	245.6	238.6	244.1	280.2	328.8	357.6
Private Nonresdntial	370.2	408.6	342.5	261.8	250.5	298.6	293.5	312.9
Public	288.9	308.7	315.0	303.7	283.4	275.7	273.8	268.5
	13.1%	6.9%	2.0%	-3.6%	-6.7%	-2.7%	-0.7%	-1.9%
Total	1152.3	1067.5	903.1	804.2	778.1	854.5	896.2	939.0
	-1.3%	-7.4%	-15.4%	-11.0%	-3.2%	9.8%	4.9%	4.8%

Source: U.S. Census Bureau, Department of Commerce.
Actual Spending data through October 2013
Forecast 2014 = Gilbane

Public spending in 2012 was down 2.7%, but private spending was up 17%.

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 WILL BE $274 BILLION, DOWN 0.7% YEAR OVER YEAR FROM 2012. I PREDICT 2014 SPENDING WILL DROP TO $268 BILLION, DOWN 1.9% FROM 2013.

TOTAL PRIVATE CONSTRUCTION SPENDING IN 2013 WILL BE $622 BILLION, AN INCREASE OF 7.5% YEAR OVER YEAR FROM 2012 BUT STILL MORE THAN 30% BELOW THE PEAK ACHIEVED IN 2006. I PREDICT 2014 SPENDING WILL CLIMB TO $670 BILLION, UP 7.7% FROM 2013. THE MONTHLY RATE OF SPENDING WILL CLIMB STEADILY THROUGHOUT THE YEAR TO END 20% HIGHER.

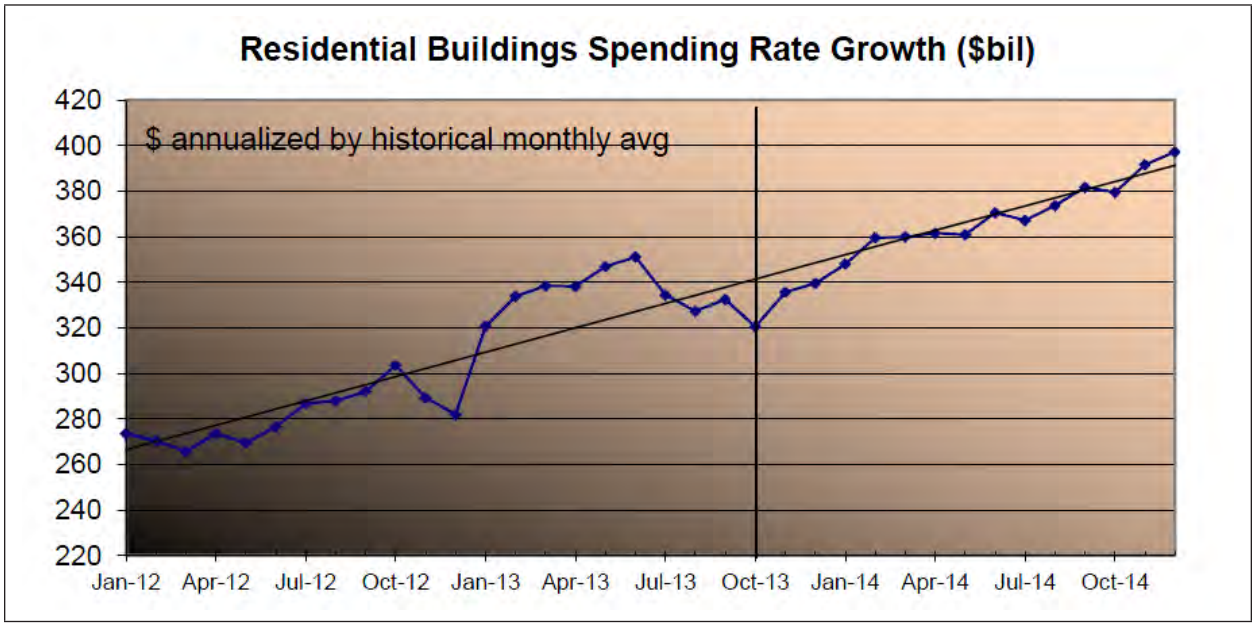
Private construction is predominantly residential with 97% of all residential work private, constituting just over half of all private work. (A historical note: in 2005-2006, residential work constituted 70% of all private work and more than half of all construction spending. Over the previous three years, residential comprised just less than 50% of private work and only 30% of all construction. For 2013 residential work constitutes 54% of private spending and 37% 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 2013 WILL REACH $335 BILLION, UP 19% YEAR OVER YEAR FROM 2012. RESIDENTIAL CONSTRUCTION WILL ACCOUNT FOR ALL CONSTRUCTION SPENDING GROWTH IN 2013. I PREDICT 2014 SPENDING WILL INCREASE TO $372 BILLION, UP 11% FROM 2013.

IN Q1 2012, THE MONTHLY RATE OF SPENDING WAS $270 BILLION AND IN Q4 2012 IT HAD REACHED $300 BILLION, A GROWTH OF 11%. WE STARTED THE FIRST QUARTER OF 2013 WITH A MONTHLY RATE OF SPENDING AVERAGING $330 BILLION AND REACHED $350 BILLION BY JUNE, BUT THE RATE HAS SINCE DROPPED BACK TO $330 BILLION. WE SHOULD SEE 2014 SPENDING RATES START AT $350 BILLION AND GROW TO $390 BILLION.

Figure 8



In 2012 780,000 new housing units were started, 535,000 or 69% were single family units and 245,000 or 31% were multifamily units. That was growth of 172,000 units over 2011.

NUMEROUS ORGANIZATIONS AND ECONOMISTS PROVIDE PROJECTIONS FOR FUTURE GROWTH IN RESIDENTIAL CONSTRUCTION. ONE MAJOR STUDY PROVIDES DATA FROM NINE AGENCIES PREDICTING NEW HOUSING STARTS.

In the most recent update posted by Reed Construction Data released in September 2013, new starts predictions for 2013 range from 920,000 to 980,000, and volume growth of 140,000 up to a high of 200,000 new units over 2012. The consensus average is 950,000, and volume growth of 170,000 units, 22% over 2012. This is down from earlier projections.

New starts predictions for 2014 range from 1,040,000 to 1,510,000, and volume growth of 120,000 up to 530,000 new units over 2013. The consensus average is 1,220,000 new units, and volume growth of 270,000 units, 28% increase over 2013.

THE AVERAGE ANNUAL RATE OF NEW HOUSING STARTS FOR THE FIRST EIGHT MONTHS OF 2013 THROUGH AUGUST IS 907,000 NEW UNITS. WE WILL REACH 920,000 UNITS FOR 2013, IF THE REMAINING 4 MONTHS AVERAGE 950,000 PER MONTH, HOWEVER, THE AVERAGE FOR THE LAST FIVE MONTHS HAS BEEN ONLY 876,000.

For seven quarters (through the end of 2012) permits growth averaged +7.3% per quarter. For the last three quarters all in 2013, housing permits growth averaged less than 1% per quarter. In the near future starts may remain lower than the peak months of 2013.

I PREDICT NEW HOUSING STARTS FOR 2013 WILL TOTAL 920,000 UNITS OR SLIGHTLY LESS, A TOTAL GROWTH OF NO MORE THAN 140,000 OVER 2012. I PREDICT NEW HOUSING STARTS FOR 2014 WILL RANGE BETWEEN 1,060,000 AND 1,100,000 NEW UNITS, WITH GROWTH BETWEEN 140,000 AND 180,000 NEW UNITS.

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 that fastest growth in 2012. To reach 170,000 new additional units in 2013 over 2012, we would need to experience a second consecutive year equal to the best year ever recorded.

Inflation must be factored out to see volume growth. In the last 20 years, residential construction "volume" has reached 10% annual growth only 3 times; 13% in 1994, 10% in 1996 and 10% in 2012. 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, for 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 included "ALL" construction, residential, nonresidential and heavy engineering, so it is not a realistic target.

We actually started a total of 780,000 new residential units in 2012, 170,000 more than 2011. We may potentially add 140,000 to 150,000 more new starts in 2013. To add 200,000 units in 2013 would mean the residential construction workforce would need to grow at an extremely fast clip of approximately 25,000-30,000 jobs per month in 2013. That has not been the case. Then to add another 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. Imagine growing just one sector at that rate!

Labor demand would be so great 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 even in boom times the workforce doesn't expand that fast.

MY MORE CONSERVATIVE PROJECTION IS FOR NEW HOME STARTS GROWTH RATES NEAR 18% PER YEAR FOR 2013 AND BETWEEN 15% AND 19% FOR 2014. THAT STILL HAS THE WORKFORCE EXPANDING RAPIDLY, BUT AT A REALISTIC RATE. MY MORE MODERATE PROJECTIONS ARE WELL BELOW THE JOINT CENTER FOR HOUSING STUDIES CONSENSUS ESTIMATES.

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 things are going to continue to grow more active in the next few years. Just watch how fast it grows back.

INFLATION ADJUSTED VOLUME

Spending is typically reported in unadjusted dollars, and total revenue in current dollars. This 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. 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 6 adjusts Total Construction Spending for construction inflation and the changes in margin costs over the last six years. All dollars in this analysis are adjusted to 2013 equivalent dollars. The rate of inflation each year is determined individually for nonresidential buildings, nonbuilding heavy engineering, and residential.

Table 6

U.S. Total Construction Spending
totals in billions U.S. dollars ADJUSTED to 2013 $

			Actual				Prelim	Forecast
	2007	2008	2009	2010	2011	2012	2013	2014
Nonresidential Bldgs	399.8	413.9	375.5	313.0	298.8	308.0	294.7	297.1
% change year over year	10.9%	3.5%	-9.3%	-16.6%	-4.6%	3.1%	-4.3%	0.8%
Nonbuilding Hvy Engr	272.2	285.6	292.0	291.7	265.8	284.3	266.5	245.7
	8.4%	4.9%	2.2%	-0.1%	-8.9%	7.0%	-6.3%	-7.8%
Residential	436.9	351.2	274.7	267.1	270.2	301.8	335.0	344.4
	-17.7%	-19.6%	-21.8%	-2.8%	1.2%	11.7%	11.0%	2.8%
Total	1108.9	1050.7	942.2	871.9	834.7	894.2	896.2	887.3
	-2.9%	-5.3%	-10.3%	-7.5%	-4.3%	7.1%	0.2%	-1.0%

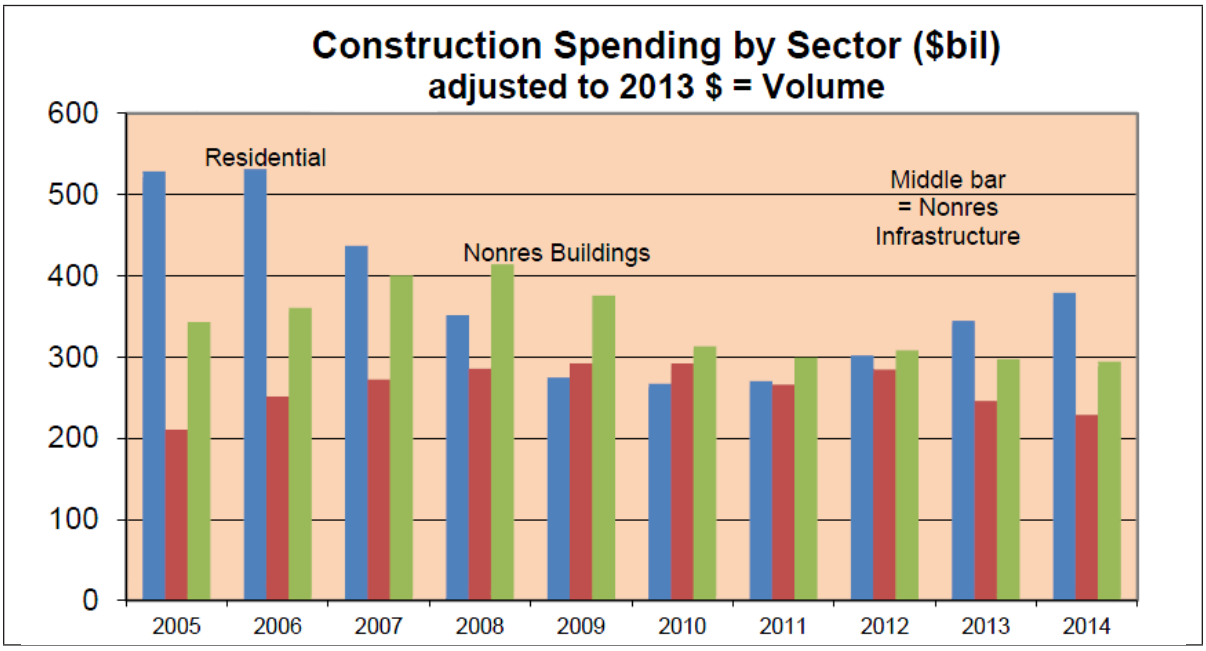
Residential includes new, remodeling, renovation and replacement work.
Source $ Data: U.S. Census Bureau, Department of Commerce.
Indices references: Gilbane Margin Index, NAHB New Home Price Index, BLS Residential PPI inputs
see Escalation Growth vs Margin Cost for GBCo inflation/deflation adjusted margin cost

2012 SHOWS 9.8% INCREASE IN REVENUE OVER 2011, BUT ONLY A 7.1% INCREASE IN VOLUME AS COMPARED TO 2011 AFTER ADJUSTING FOR INFLATION.

2013 REVENUE WILL INCREASE BY 4.9%, BUT 2013 VOLUME WILL INCREASE BY ONLY 0.2% AFTER INFLATION COMPARED TO 2012. ESSENTIALLY, THERE HAS BEEN NO VOLUME GROWTH IN 2013.

WE EXPECT A 4.8% REVENUE GROWTH IN 2014, BUT DUE TO RAPIDLY INCREASING ESCALATION THAT WILL BE INSUFFICIENT TO PRODUCE ANY VOLUME GROWTH. ACTUALLY, 2014 MAY SHOW A VOLUME DECLINE.

Figure 9



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.

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 has 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 7 - BLS June 2013 Construction Employment All Employees

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	6554	6453	6291	6149	6103	6008	5928	5851	5785	5724	5693	5650	6016
2010	5581	5522	5542	5554	5527	5512	5497	5519	5499	5501	5497	5468	5518
2011	5435	5478	5485	5497	5524	5530	5547	5546	5583	5576	5577	5612	5533
2012	5629	5644	5640	5636	5615	5622	5627	5630	5633	5649	5673	5711	5642
2013	5735	5783	5799	5792	5791	5801	5804	5805	5822	5834	5851		5802

Table 7 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 occurs, so the November report data released December 6th represents the period from October 13th through November 16th , 35 days. The October data spans September 15th through October 12th, 28 days. For any given month the reliability of the 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 is less than +/- 100,000 and the trend is important.

Employment shows the number of people actively working. The construction workforce includes 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.

THE LATEST NOVEMBER 2013 DATA SHOWS THERE ARE 5.85 MILLION JOBS WITH 8.6% UNEMPLOYMENT. THEREFORE, THE CURRENT WORKFORCE TOTALS JUST OVER 6.4 MILLION. WE HAVE GAINED 178,000 JOBS OVER THE LAST 12 MONTHS AND 140,000 JOBS YEAR TO DATE. JOBS GROWTH IS AVERAGING 14,000 TO 15,000 JOBS PER MONTH.

The total construction workforce is currently less 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.

The workforce peaked between 2006 and 2008 at near 8.4 million, approximately 7.7 million working and 700,000 unemployed. By August 2011, the workforce dropped to a 15-year low near 6.4 million. After dropping below 6.4 million in Q3 2012 and again in Q3 2013, we are still just back at a total workforce of 6.4 million.

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

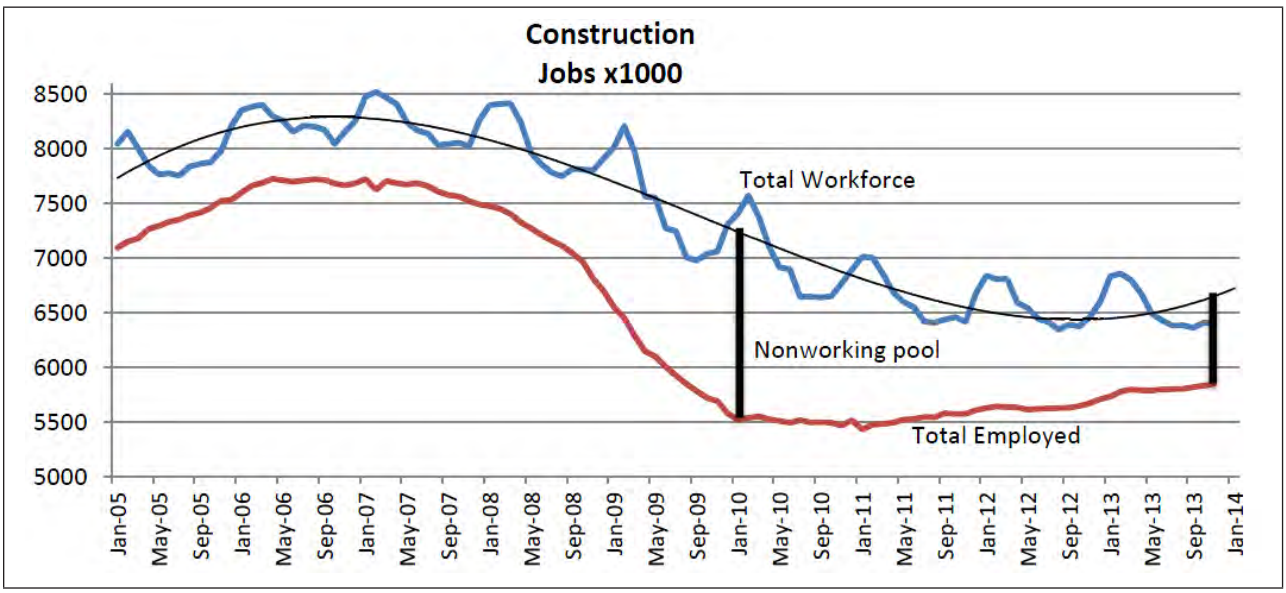
FROM FEBRUARY 2010 TO NOVEMBER 2013 WE'VE GAINED JUST OVER 300,000 JOBS BUT THE UNEMPLOYMENT TOTAL DROPPED BY ABOUT 1.5 MILLION. THEREFORE, IN THE LAST 45 MONTHS, ALTHOUGH WE'VE GAINED OVER 300,000 JOBS, IN THAT TIME WE'VE LOST A TOTAL OF 1.2 MILLION CONSTRUCTION WORKERS FROM THE TOTAL WORKFORCE.

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.

For the long term, if we are to see construction work volume grow back even close to previous levels, we need the workforce to expand in tandem. Just 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 need 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 10 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 10



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 1980, jobs grown at more than 35,000/month for a full year only two 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." As the workload dwindled, 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, the construction 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 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 National Association of Home Builders (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 113,000 FOR SEPTEMBER. THIS IS THE NINTH CONSECUTIVE MONTH THAT THE NUMBER OF OPEN POSITIONS IS OVER 100,000 (JULY WAS 99,000) AND THE FIRST TIME SINCE 2007 THAT THIS HAS OCCURRED.

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. 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 Q4 2013

Manpower figures measure the percentage of firms planning to hire, minus the percentage of firms planning to lay off, and report the "net" percentage hiring outlook. The overall national employment (all jobs) picture is positive for Q4 2013 with a projected net +13% of firms planning to hire. Employers have had a positive outlook for 16 consecutive quarters. 18% of employers surveyed expect to add to their workforce.

The construction industry sector anticipates a considerable increase in hiring in Q4 2013 in the Northeast, Midwest and West. Manpower reports hiring in the construction industry for Q4 2013 anticipated at a net +5%. 15% of construction firms in the Midwest, Northeast and South expect to add to their workforce, and 17% in the West.

JOBS/PRODUCTIVITY

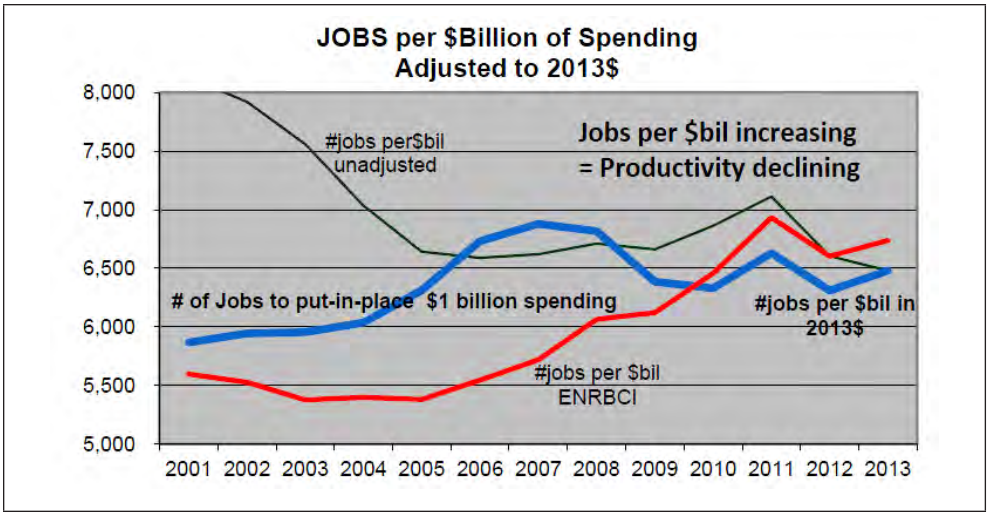
A long-term trend in productivity can be found by comparing the annual inflation adjusted volume to the annual average workforce. Volume is not given, but we have developed volume in a previous section by adjusting spending for inflation. Productivity is a measure of units volume per worker, not dollars 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 that dollar volume of work put in place which represents work dollar value, not work unit volume. Also shown in Figure 11 is a line plotting number of jobs if spending were indexed solely using the ENR-BCI, 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 11 shows the only accurate result.

Figure 11



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, out of necessity, workers and management find ways to improve. 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, for each year work that 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 peak of construction cost, a building cost $12 million and took 100 men per year to build. Today, that same building could potentially cost as little as $10 million to build. Does 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. What is significant is 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 2017. 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 need 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 decrease. 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, 5 years ago was $120,000 to $135,000 and 5 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%.
- The wide variation in the number of jobs created in part 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 in 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 healthcare 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.

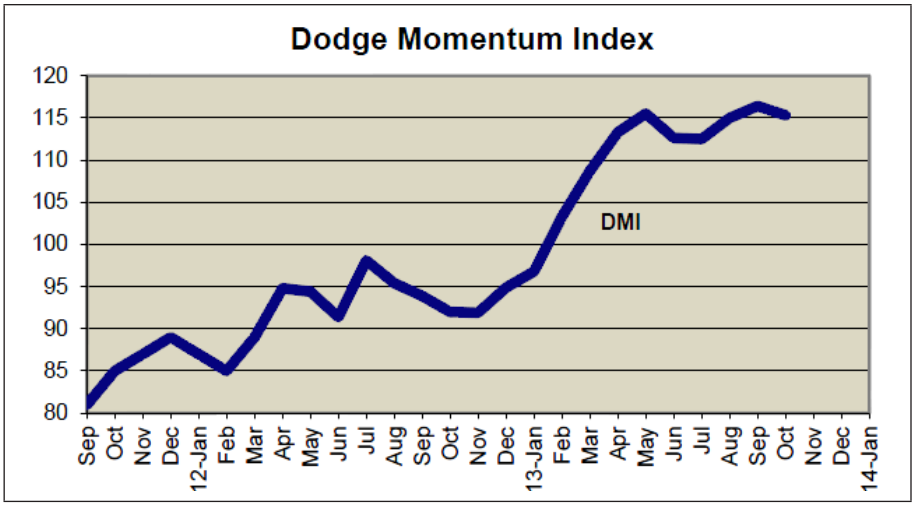
SOME SIGNS AHEAD

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

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. It has remained near that high since.

Figure 12

The DMI had been moving upward from mid-2011 through July 2012. It moved down slightly in August, September and again in October. Commercial is down more while institutional is up, but that upward move is driven by healthcare and not by education building. The index shows the strongest correlation in the commercial sector at a nine month lag and the institutional sector, with still a strong correlation, at a 15-month lag.



Architectural Billings Index (ABI) measures monthly work on the boards in architectural firms. It is a 9- to 12-month leading indicator to construction. The ABI Commercial construction index shows work volume growing stronger the last 5 months. The commercial and institutional indices show positive growth for the last 13 months and 15 months respectively. **Architectural Billings Index (ABI) for October** is the 14th month of positive growth in the last 15 months, with only April 2013 dipping below positive.

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. The Q3 2013 CBI remained near the Q2 2013 four-year high of 8.2 months. Current projection is for nonresidential construction spending to accelerate after Q1 2014. **Charts and Graphs for Q3 2013** show all of 2013 strongly above 2012. Infrastructure backlog is decreasing, now at just over 7 months compared to 10 months in Q2 2012. Heavy industrial decreased from 6.7 in Q3 2012 to 4.4 months now. Commercial and institutional sectors have risen gradually every month since Q1 2012 and now stand at 8.2 months.

AIA Consensus Second Half 2013 Construction Forecast is a semi-annual survey of construction economists' projections for future spending. Posted on the **AIA economics page** the second half 2013 report average of expectations for nonresidential construction shows the largest expected growth of 8.6% in commercial construction, down from the 10.2% average in the previous report.

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. 53% are having difficulty filling professional positions – especially project supervisors, estimators and engineers. **2013 Worker Shortage Survey National Results**

Engineering News Record 2013 3rd 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.

Fails Management Institute (FMI) Fourth quarter 2013 Nonresidential Construction Index (NRCI) is now 57.4, down from the previous three quarters. The NCRI is a report based on a survey of opinions submitted by nonresidential construction executives. The NCRI had reached a 5-year high of 59.8 in Q2 2012, then receded to near 55 for Q3 and Q4 2012. It had been climbing the last three quarters but has now dropped. FMI states,"the slight drop in the NCRI this quarter is (likely) due to owners continuing to act with an abundance of caution along with the banks that help finance their projects."

FMI's 3rd Quarter 2013 Construction Outlook, The FMI report predicts residential construction will increase 18% in 2013, office construction decrease 2%, commercial construction increase 2%, education decrease 4% and healthcare construction decrease 1%. All market sectors are expected to grow 4% to 6% in 2014.

McGraw Hill Construction report on Green Building says that 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 building users.

Institute for Supply Management (ISM) Report on Business - Manufacturing Report for November released December 2, 2013, shows the national Purchasing Manager's Index (PMI) for November at 57.3%. 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. It dropped below 50% for a second time in May 2014. Since then, it has increased every month. PMI values above 42.5% indicate overall GDP economic expansion. The PMI indicates overall GDP economic expansion for 54 consecutive months.

ISM Non-Manufacturing Index (NMI) report for October released December 5, 2013, is a better indicator of activity in the construction industry. The NMI measures economic activity in 13 industries (including construction) not covered in the manufacturing sector. In the report released December 4, the NMI for November is 53.9%, above 50% for 47 consecutive months, indicating continued economic growth. Construction reported contraction in both October and November. However, for October, construction reported increased backlog.

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 trickles down to the consumer very slowly.

The U. S. Census Bureau Producer Price Index (PPI) data for May (released on June 13) indicates the PPI for construction materials had no increase in May. The PPI for construction materials increased 1.3% in February, the highest rate in 22 months. The year-to-date price increase is 2%, but the largest increases of the year almost always occur early in the year with the fourth quarter often negative.

THE OCTOBER 2013 PPI FOR MATERIAL INPUTS TO ALL CONSTRUCTION:

- decreased 0.5% in the month, had no change over 3 months, and is up 0.6% over the past 12 months

THE OCTOBER 2013 PPI FOR MATERIAL INPUTS TO NONRESIDENTIAL CONSTRUCTION:

- decreased 0.5% in the month, decreased -0.1% over 3 months, and shows no change over the past 12 months

Table 8

US Construction Producer Price Indexes - Oct 2013

Materials	Percent Change Versus			annual for		
PPI	to Oct 2013 from			12 months	12 months	12 months
	Sep-13	Jul-13	Oct-12	2012	2011	2010
	1 month	3 months	12 month	last yr		
Summary						
Inputs to ALL Construction	-0.5	0.0	0.6	1.4	5.2	5.3
Inputs to Nonresidential	-0.5	-0.1	0.0	0.9	5.7	4.0
Commodities						
Cement	0.6	0.4	5.3	2.9	-1.8	-6.0
Iron & Steel Scrap	0.0	-2.4	8.4	-15.6	8.7	38.9
Manufactured Materials						
Diesel Fuel	-2.6	2.0	-9.4	2.1	20.0	26.4
Asphalt Paving	-0.3	0.7	1.2	4.5	8.4	4.4
Asphalt Roofing/Coatings	-1.6	-2.4	0.6	-0.3	4.2	1.9
Ready Mix Concrete	0.2	0.1	3.4	2.6	0.5	-1.2
Concrete Block & Brick	-0.3	-0.4	1.9	1.5	1.1	-1.1
Precast Conc Products	0.1	0.3	1.6	2.4	2.9	1.0
Building Brick	0.1	0.6	0.6	-2.6	-2.6	-0.3
Copper & Brass Mill Shapes	0.0	4.3	-7.5	1.5	-9.3	11.8
Aluminum Mill Shapes	-0.7	-0.9	-5.0	-1.9	0.6	11.6
HR Bars Plt & Strct Shapes	-0.1	0.8	-2.3	-9.7	13.2	18.4
Steel Pipe and Tube	-0.3	0.7	-4.5	-6.1	13.7	19.6
Fab. Structural Steel	0.6	0.8	2.8	1.6	3.8	1.9
Fab. Bar, Joists and Rebar	0.4	0.7	1.4	2.6	1.6	-0.3
Gypsum Products	-0.8	-0.8	15.6	14.1	-1.6	3.2
Insulation Materials	-1.6	4.4	7.7	5.4	5.4	4.6
Lumber and Plywood	1.9	4.7	14.5	11.1	-0.7	5.7
Sheet Metal Products	0.0	0.6	-1.1	-1.3	3.7	4.0

All data not seasonally adjusted

Source: Producer Price Index. Bureau of Labor Statistics

THE PPI FOR ITEMS THAT CHANGED THE MOST:

- Diesel fuel prices decreased 2.6% this month, decreased 9.9% in a year.
- Lumber and Plywood, up 1.9% for the month, up 14.5% in a year.
- Gypsum products although down -0.8% this month are still up 15.6% in a year.
- Copper shapes are up 4.3% in three months but still down 7.5% in a year.
- Concrete items are down slightly for the month but up 2.5% to 3.5% in a year.
- HR bars plates & shapes are down 2.3% in a year but fabricated structural steel is up 2.8%.

The relative implication 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.

BUT YOU NEED TO KNOW A BIT ABOUT 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 24 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 24 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.

MATERIAL PRICE MOVEMENT

The overall PPI for October 2013 shows costs for all construction materials up 0.6% in the last 12 months. Costs for material inputs to nonresidential construction are flat in the last 12 months.

Table 9

US Construction Producer Price Indexes - Oct 2013						
Markets Inputs PPI	Percent Change Versus to Oct 2013 from			annual for 12 months	12 months	12 months
	Sep-13	Jul-13	Oct-12	2012	2011	2010
	1 month	3 months	12 month	last yr		
Inputs to ALL Construction	-0.5	0.0	0.6	1.4	5.2	5.3
Inputs to Nonresidential	-0.5	-0.1	0.0	0.9	5.7	4.0
Inputs to Commercial	-0.4	0.0	0.6	1.2	4.9	NA
Inputs to Industrial	-0.5	-0.1	0.0	0.8	5.2	NA
Inputs to Hghwy/Hvy Engr	-0.7	-0.2	-0.3	0.8	6.1	NA
Inputs to Residential	-0.4	0.1	1.2	2.0	4.8	4.3
All data not seasonally adjusted						
Data Source: Producer Price Index. Bureau of Labor Statistics						

Hidden within this current report is the fact that cost for inputs to all construction and nonresidential construction in 2013 have risen 1.8% and 1.7% respectively year to date. Almost all of that occurred in January and February, which does not appear in either the one-month or the three-month values. The 12-month values are being reduced by negative data from last year. For the same reason, inputs to residential construction are up 1.8% year to date.

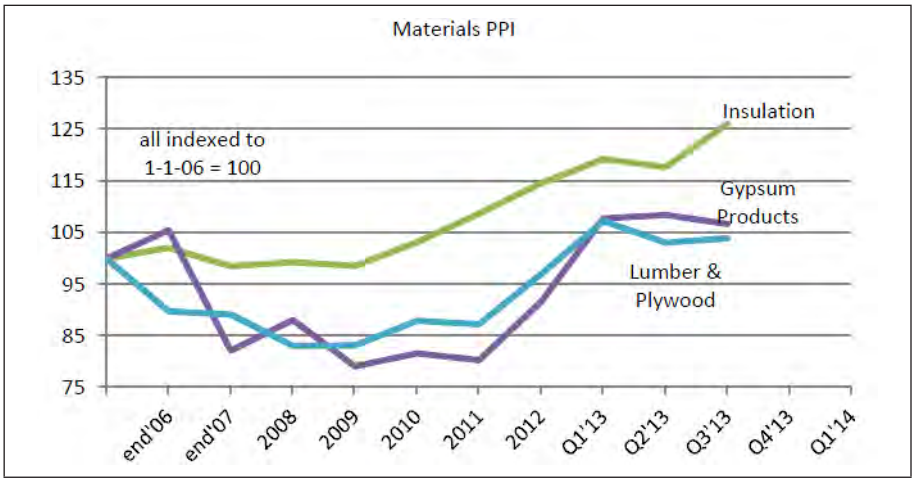
In the last three years, ready-mix concrete cost is up between 5% and 6%. Asphalt paving cost is up 15%. Steel pipe and tube is moderating down 5% this year after being up nearly 30% in the previous three years. Fabricated structural steel is up less than 9% in three years. This extreme variability means 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% in June, and we saw insulation prices climb 7% in the 3rd quarter. Lumber prices just off of an eight-year high in April, settled back somewhat in May, but recovered almost 3% in the last three months.

Materials to watch over the next three to six months are ready mix concrete +, reinforcing bar +, copper + and structural steel –.

Figure 13

Random Lengths, a lumber industry newsletter, recently reported the composite price index for 15 key framing lumber prices dropping 25% since reaching an eight-year high in April. That will show up in the PPI chart next quarter. 70% of lumber demand is driven by residential housing.



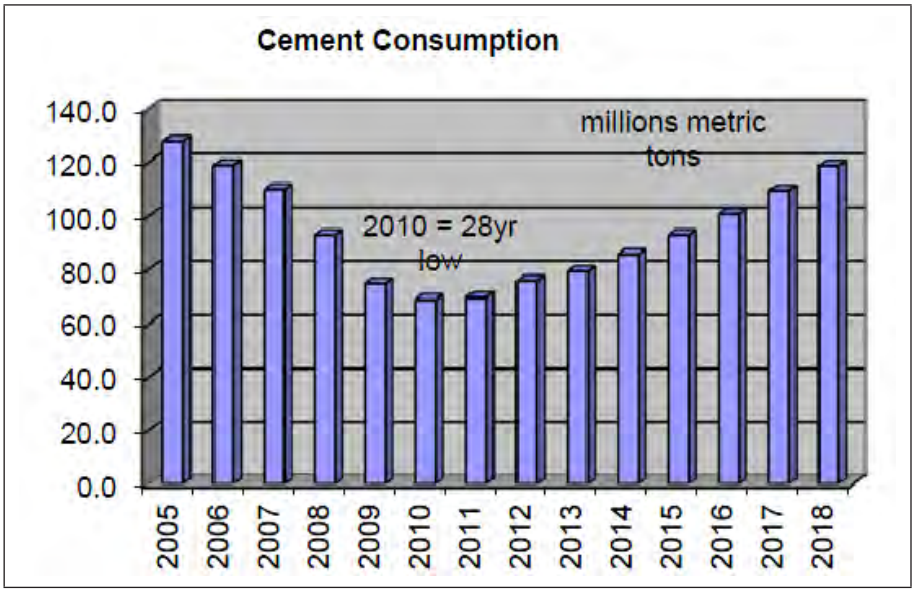
Cement / Concrete / Asphalt

Portland Cement Association (PCA) reports the volume of cement demand as an indicator of economic activity. It is a reliable coincident indicator. PCA in February released a final tally of an 8.9% rise in consumption for 2012. Current 2013 estimate is growth of 4.5% over 2012. 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 14

For 2010 and 2011, cement consumption was down 46% from peak 2008. At the start of 2013, PCA predicted consumption for 2013 would grow 8%. PCA latest revised data estimates 2013 will show 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 are up 5.3% since last October. Cement prices are advancing steadily as residential construction improves. They will begin to climb more when other commercial construction improves over coming months. However, Global Insight predicts cement prices will rise only 4.4% in 2014.

Ready Mix Concrete price is up 3.4% since last October.

Precast products have increased 1.6% since last October.

Figure 15

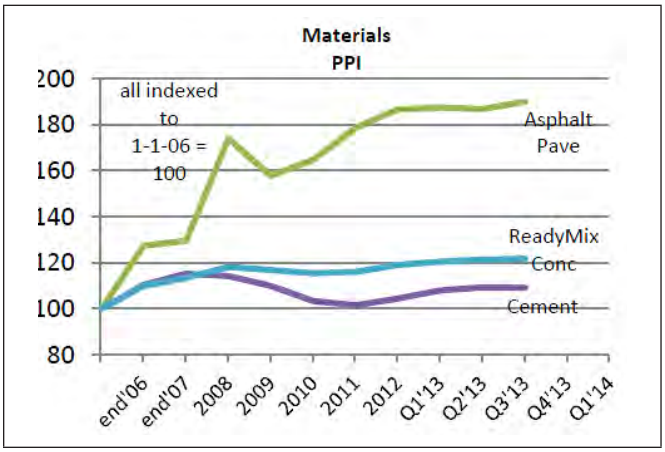
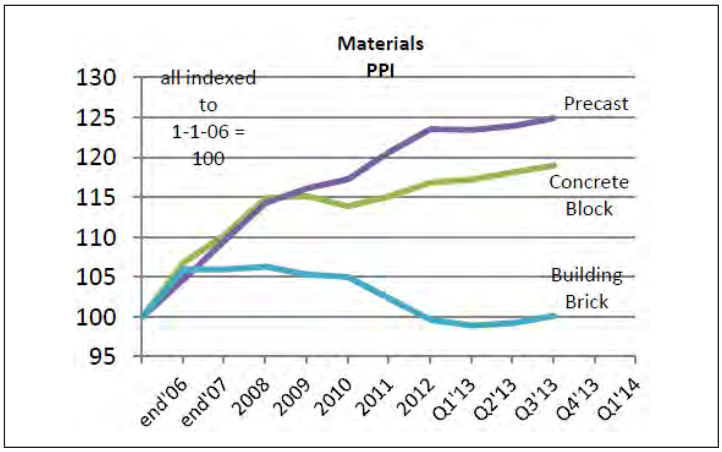


Figure 16



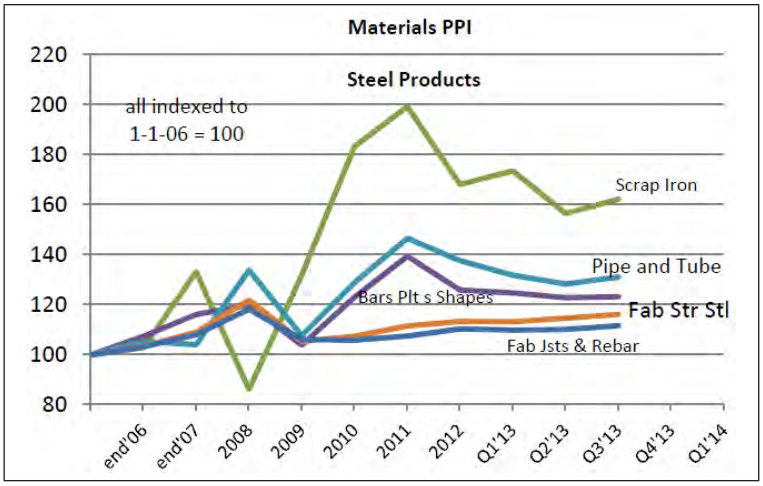
Structural Steel

The construction industry represents 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, automotive, equipment and machinery, combined 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 17

Figure 17 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 Fab Str Steel, Joists or rebar.



The American Iron and Steel Institute reports steel production capacity utilization currently at 76% as of December 7, 2013. Year-to-date capacity utilization is 77%. This is up 5% since November 2012 but still below the post-recession high of 79% in March 2012. Most of the increase in capacity utilization is due to a drop in total capacity from closing steelmaking facilities, not because production increased. In the first quarter of 2013, U.S. steel mills cut output by nearly 8%.

Demand was strong during the last few months of 2012, but demand has slowed and it will slow more for the next few months. Early in 2013 economic analysis indicated there was over-capacity in steel production. This did prove to be true, and it help cause steel prices to fall or remain flat in 2013. The outlook for steel prices is to remain range bound in 2013.

In Q1 2011, the freight onboard (FOB) mill price for wide flange products reached $925/ton, a 30 month high. With only minor fluctuation, it soon dropped to a fairly constant price of $865/ton that held through June 2012. By August 2012 wide flange pricing hit a 24-month low at $765/ton. Published mill prices FOB for core sizes of wide flange beams have remained at $765/ton since May 2013. However, delivered discounts have ranged from $40 to $50.

ENR's Second Quarterly 2013 Cost Report indicates wide flange has been increasing and is up 3% since November. They also report rebar prices up 3% since February.

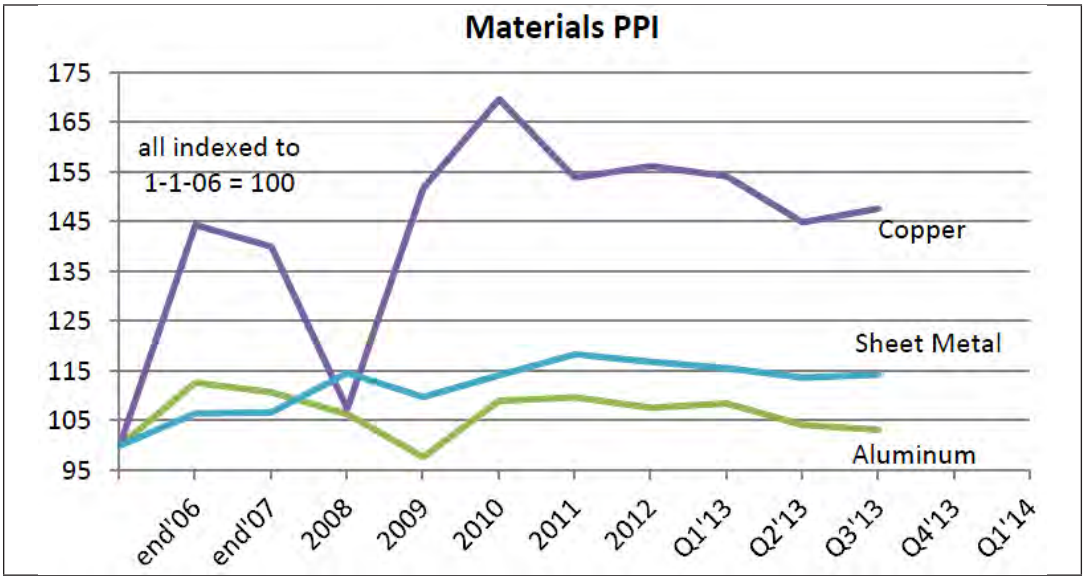
Structural steel is very much dependent on recycled steel. Structural steel is made 90% from scrap steel. Scrap prices are down 18% in the last year.

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 $3.20/lb., a drop of about 15% from the January 2013 high of $3.70/lb. Alcoa reports expected 2013 growth of 4% to 5% in demand for building construction related aluminum products.

Figure 18



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 precedes and 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 = increasing prices. When demand wanes, prices drop.

WHAT EFFECT 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

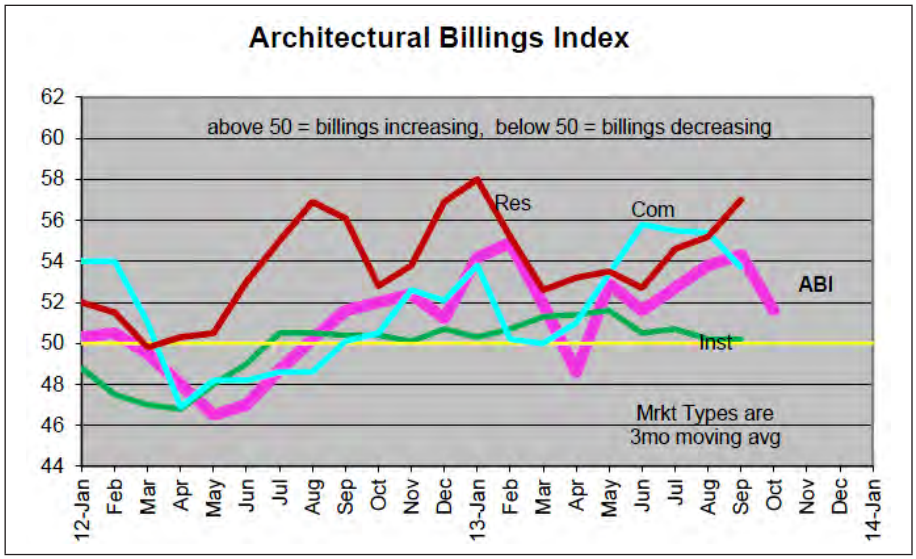
Architectural Billings Index (ABI) readings above 50 indicate more architectural firms reporting increasing billings than firms reporting decreasing billings.

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 19

The ABI is a leading indicator of construction spending 9 to 12 months out. Index values consistently below 50 indicate there will be a decrease in construction spending 9 to 12 months later.

The 2012 drop from February-March into May-June signaled a Q4 2012-Q1 2013 slow-down in spending which did occur. We may see another brief spending slowdown in Q1 2014.



The Architectural Billings Index, a leading indicator for nonresidential work 9-12 months out, predicted nonresidential work would be down through Q1 2013 with recovery starting in Q2 2013. Index below 50 indicates declining workload. Institutional billings were declining from January 2011 to June 2012, commercial work 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 slowdown in spending during Q1 2014.

CONSUMER INFLATION / DEFLATION

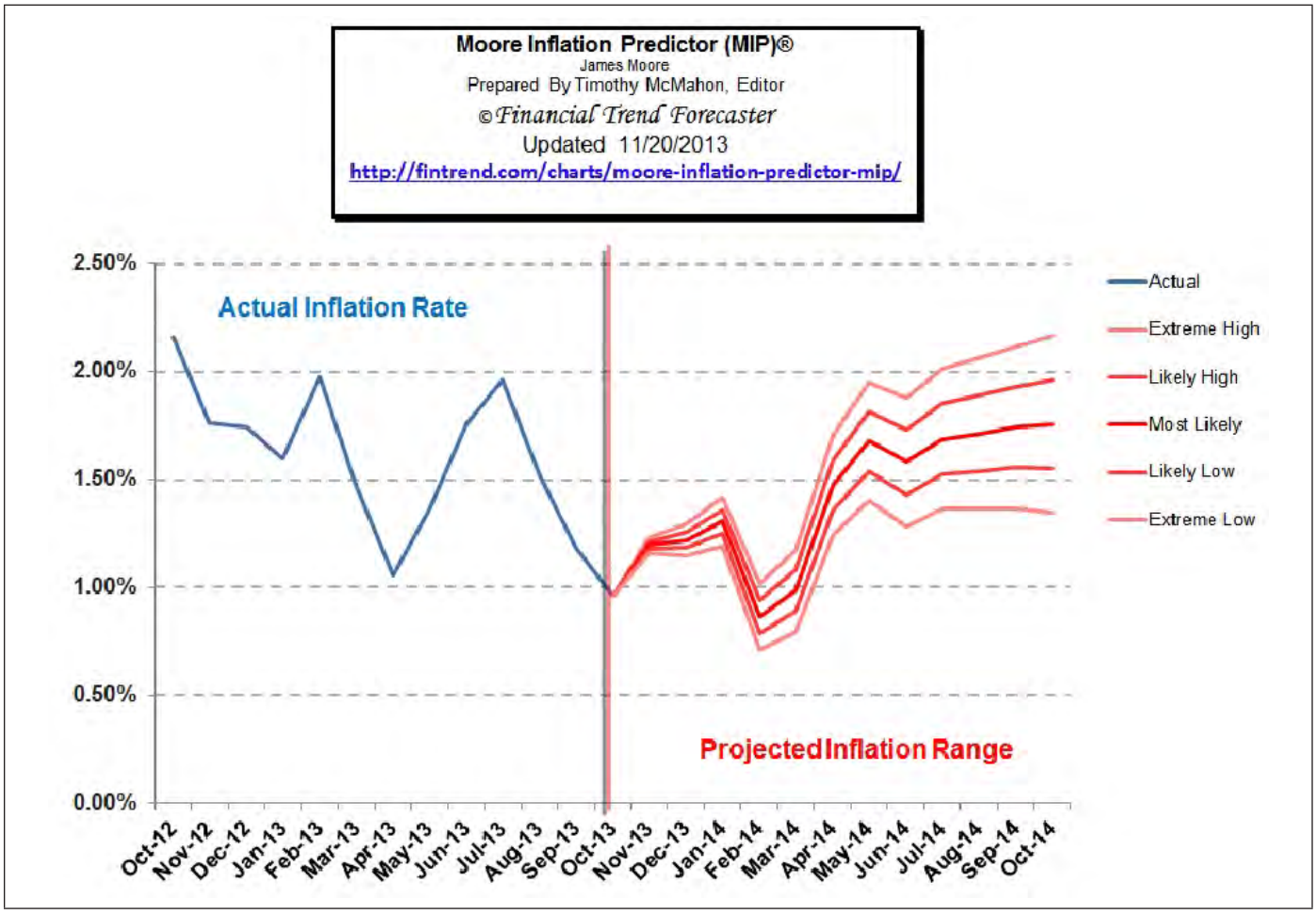
The Moore Inflation Predictor© (MIP) is a highly accurate graphical representation of the future direction of the inflation rate. It has a 97%+ accuracy rate forecasting inflation rate direction and turning points and over 90% of the time the inflation rate falls within the projected "likely" range.

For January, the annual inflation rate went down to 1.59%, not because we experienced deflation in January, but because January 2013 replaced January 2012 in the mix of the 12 months counted and January last year was at a higher monthly rate. Based on the current forecast, by mid-year 2013, consumer inflation should climb near 2.5%, 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 annual trend is inflationary.

Figure 20 - Current Consumer Inflation Rate Forecast for the next 12 months



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

The MIP predicted the period from April 2013 through October 2013 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.

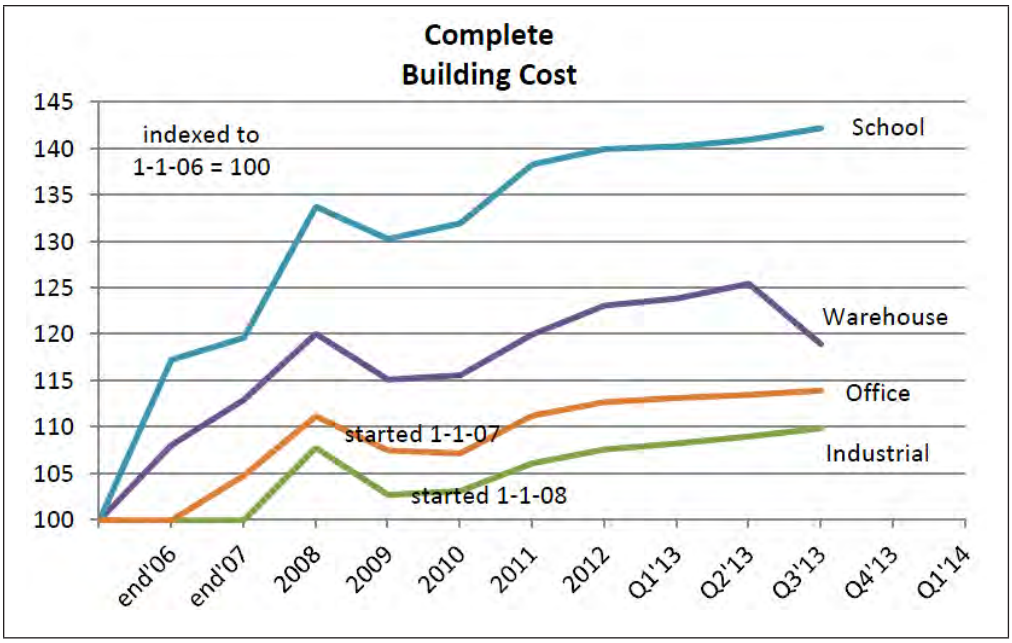
CONSTRUCTION INFLATION

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.

Nonresidential buildings total construction cost inflation, as depicted in Figure 21, PPI Complete Building Cost and Figure 22 Complete Trades Cost is currently ranging from 2% to 4% through October, an annual rate from 2.4% to 4.8% per year. Another industry measure shows nonresidential building total cost inflation for the first three quarters of 2013 at 3.5%, an annual rate of 4.7%. Price indices for new housing indicate new residential construction inflation is currently closer to 10% per year.

Figure 21

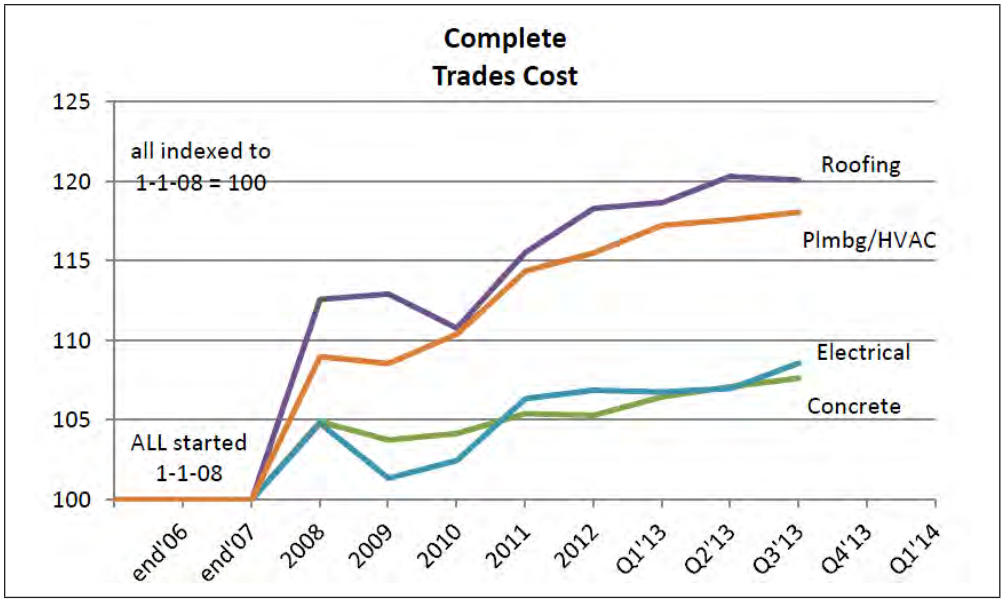


Buildings total prices including margins increased over the last year. We are predicting construction volume will continue to increase in coming months and that will continue to support increasing margins and therefore buildings total construction (final cost) inflation will outpace construction labor 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% per year in 2005 and 2006 and 20% per year in 2008 and 2009.

Figure 22



ENR BUILDING COST INDEX

The November 2013 Engineering News Record 20 Cities Average Building Cost Index (ENR-BCI) is 5317, up 2.1% year to date and up 2.0% year over year. Boston, Cleveland, Minneapolis and Pittsburg all show year-over-year growth slightly higher than the 20 Cities Average. St. Louis and San Francisco show a much higher growth rate.

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

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 10

ENR's Building Cost Index History (2000-2011)													
1913=100	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL AVERAGE
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		
Data reprinted by permission Engineering News-Record - ENR.com													

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 in the section titled: "Escalation – What Should We Carry".

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%.

Since December 2010, while the ENR Index has increased by only 7%, the cost of most buildings has increased on average by 9%.

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 the ENR-BCI, since it does not track selling price, cannot reflect accurately what affect 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 significantly 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 the graph Escalation Growth vs. Margin Cost. This is particularly important for those of you using conceptual cost modeling tools such as Gilbane's CostAdvisor.

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

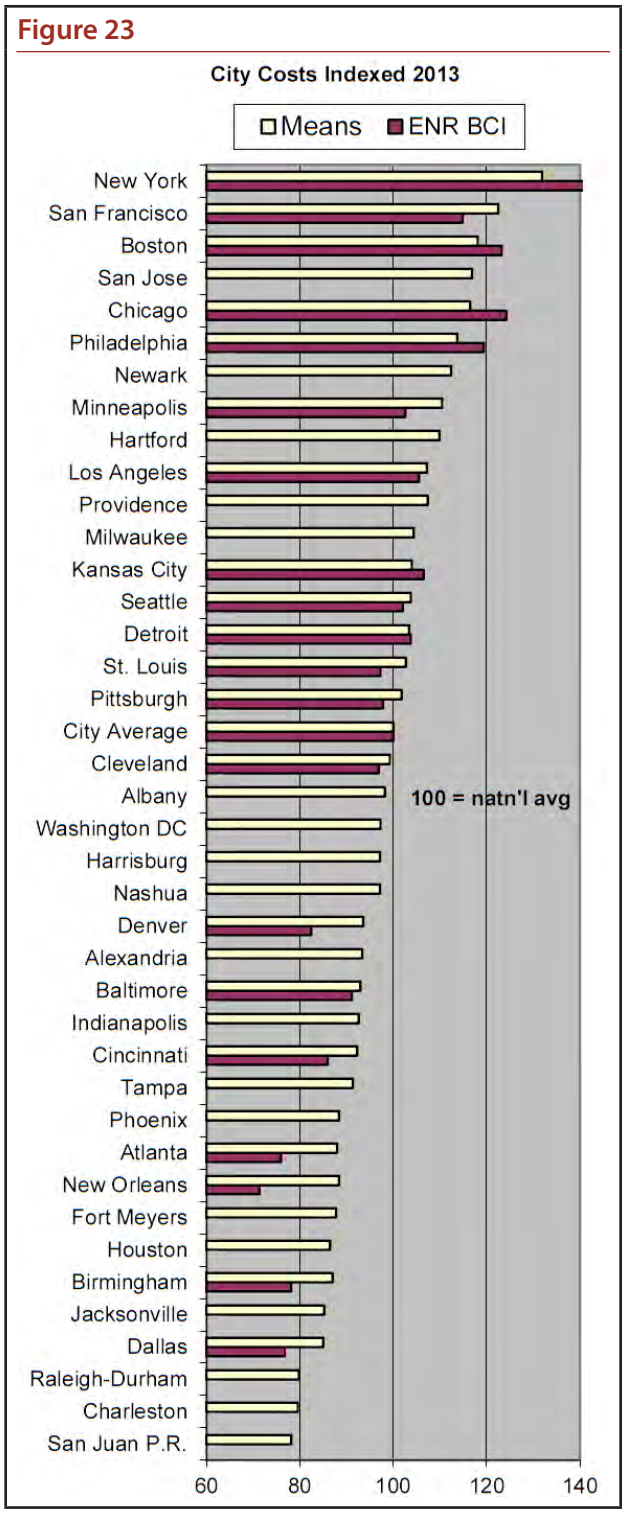
MULTIPLY ORIGINAL COST BY FACTOR.

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

You can see by this example 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 understate 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 23



SELLING PRICE

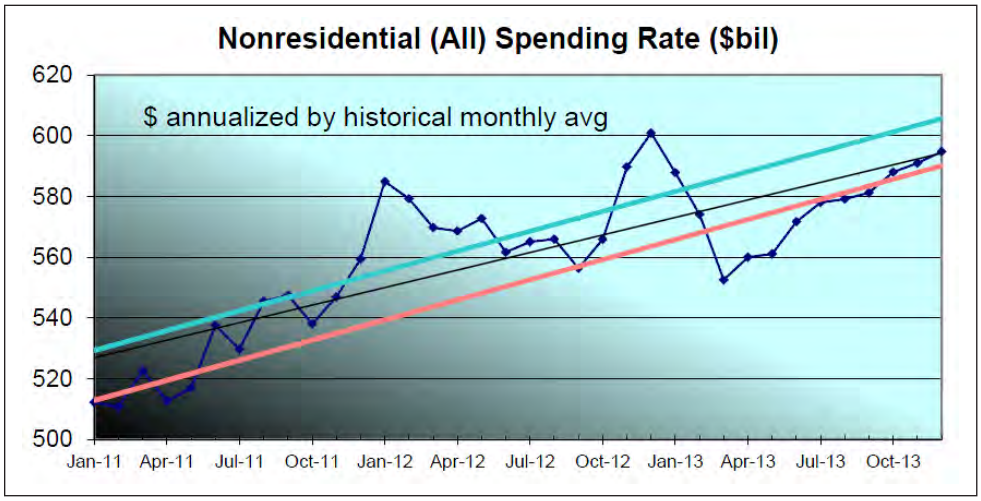
Selling price is the total price at which a contractor is willing to bid to win a project, even if that selling price eliminates all profit from the bid.

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, contractors' 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 2013 indicates 28% of firms expect to increase margins. We might expect that rate to be doubled for residential work.

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% per 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 24



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.

- Labor cost represents on average approximately 40% of building cost.
- Materials cost represents on average approximately 50% of building cost.
- Equipment and contractor services represent 10% of building cost
- Margins are applied on 100% of building costs.

Labor wage cost growth is generally 2% to 3% per year. The labor wage cost long-term average is 3%. Changes in labor productivity either increase or decrease total labor cost. In growth periods, 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 1% to 1.5% per year increase to margins until margins are fully recovered.

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 materials 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 GC or CM.

Total project cost encompasses all of these other costs. Trade Contractor PPI and Whole Building PPI doesn't give us any detail 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 was down 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.

Table 11

US Construction Producer Price Indexes - Oct 2013

Markets Inputs PPI	Percent Change Versus to Oct 2013 from Sep-13 1 month	Jul-13 3 months	Oct-12 12 month	Annual for 12 months 2012 last yr	12 months 2011	12 months 2010
Inputs to ALL Construction	-0.5	0.0	0.6	1.4	5.2	5.3
Inputs to Nonresidential	-0.5	-0.1	0.0	0.9	5.7	4.0
Inputs to Commercial	-0.4	0.0	0.6	1.2	4.9	NA
Inputs to Industrial	-0.5	-0.1	0.0	0.8	5.2	NA
Inputs to Hghwy/Hvy Engr	-0.7	-0.2	-0.3	0.8	6.1	NA
Inputs to Residential	-0.4	0.1	1.2	2.0	4.8	4.3

All data not seasonally adjusted

Data Source: Producer Price Index. Bureau of Labor Statistics

Compare the cost inputs in Table 11 to the completed costs for buildings in Table 12. Prices for completed buildings are up year-over-year on average about 3%.

Table 12

US Construction Producer Price Indexes - Oct 2013

Buildings Completed whole building cost	Percent Change Versus to Oct 2013 from Sep-13 1 month	Jul-13 3 months	Oct-12 12 month	annual for 12 months 2012 last yr	12 months 2011	12 months 2010
Inputs to Nonresidential	-0.5	-0.1	0.0	0.9	5.7	4.0
New Industrial Bldg	1.8	2.0	4.0	1.4	2.9	0.4
New Warehouse Bldg	-0.1	-0.4	2.0	2.6	3.8	0.4
New School Bldg	1.6	1.8	2.9	1.2	4.8	1.3
New Office Bldg	1.5	1.4	2.7	1.3	3.8	-0.3
New Health Care Bldg	1.0	1.7	3.1	-0.5	NA	NA

except inputs, includes labor, material overhead and profit

All data not seasonally adjusted

Source: Producer Price Index. Bureau of Labor Statistics

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

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.

Contractors have all taken a considerable hit to margins over the last three years. In 2012, we saw the return to margin growth. 2013 has moved up and down, but still remains positive year to date. 2013 growth will be similar to 2012.

Table 13

US Construction Producer Price Indexes - Oct 2013

MARGINS Completed whole building cost	Percent Change Versus to Oct 2013 from Sep-13 1 month	Jul-13 3 months	Oct-12 12 month	annual for 12 months 2012 last yr	12 months 2011	12 months 2010
New Industrial Bldg	1.88	1.60	2.30	1.35	-2.15	-2.65
New Warehouse Bldg	-0.02	-0.80	0.30	2.55	-1.25	-2.65
New School Bldg	1.68	1.40	1.20	1.15	-0.25	-1.75
New Office Bldg	1.58	1.00	1.00	1.25	-1.25	-3.35

(-) 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 the 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.

We see in 2012 data the strongest evidence since 2009 that contractors were able to increase margins and pass along material cost increases.

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 most recent months show margin increases may be accelerating.**

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 Third Quarterly Cost Report released September 30, published two Selling Price indices, 3.6% and 4.3%. Both of these indices increased each of the last two quarters, indicating a current growth rate that may take both indices even higher.

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 also direct our attention to the baseline project cost upon which future escalation is applied and where that baseline cost stands with respect to normal baseline indices. Also, we need to review margin and productivity movement to determine what effect they might have on current cost compared to current index.

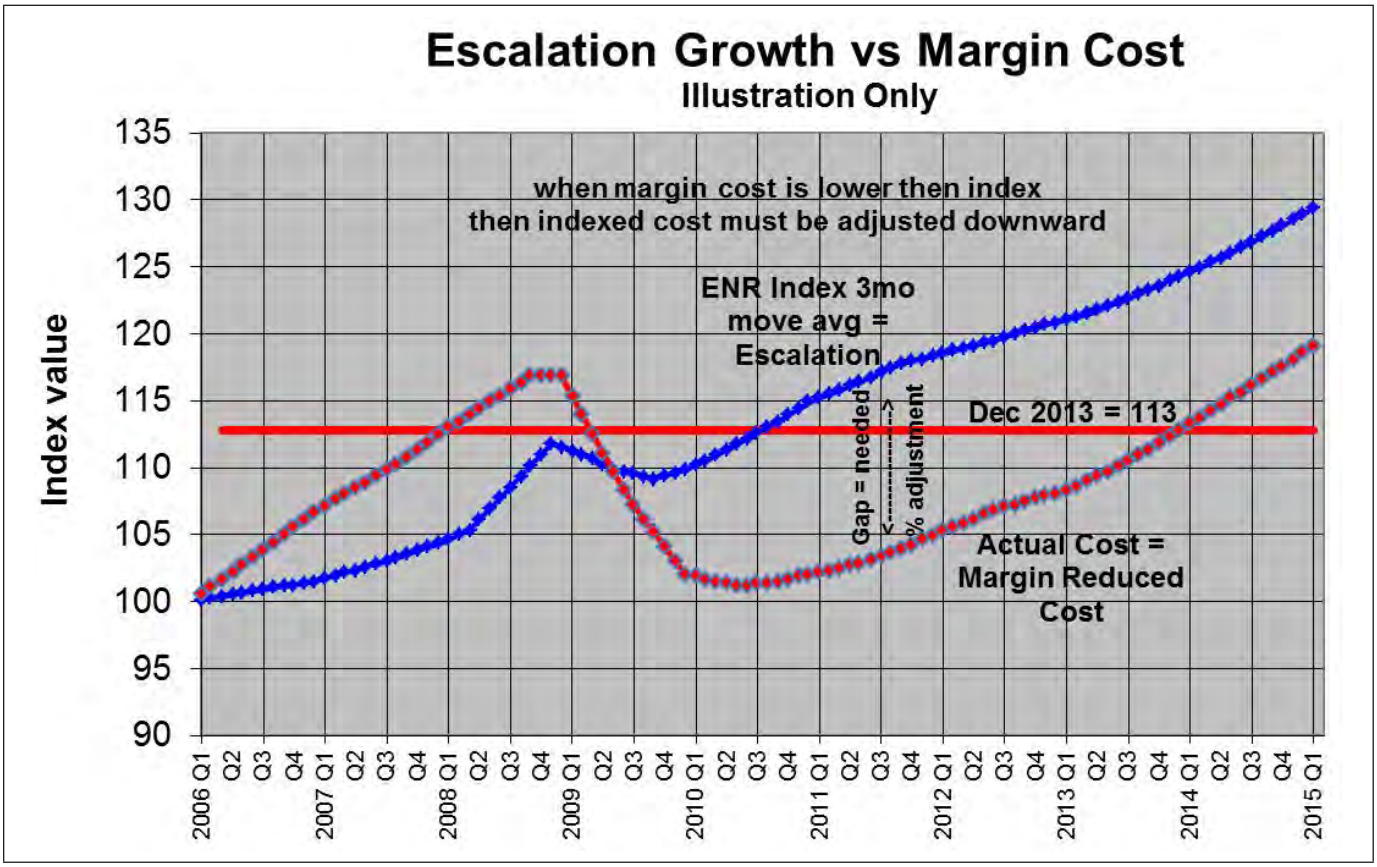
For all of 2009 and continuing through 2010, project bids came in at 10% to 20% under normal budget estimating. Average costs of buildings from Q2 2008 through Q4 2010 fell by 13% to 15%. However, normal indices increased by 4% during that time. Normal indices will not account for all changes in individual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

The Blue line indicates ENR-BCI actual values through November 2013 and predicted escalation ranging from 3% to 6% over the next two years, increasing at a rate of 0.5% per quarter. The plotted values are three month moving average to smooth out the line.

The Red line indicates Contractor Bid Price Movement or Reduced Margin Cost representative of bids received. Very low margin cost in mid-2010 reflects contractor bids at low cost to secure 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 25



HOW TO USE THE ABOVE GRAPH:

- If your project is not previously Indexed using ENR-BCI, 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 carry a normal prediction for future escalation.

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 AFFECT 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.

Total Escalation for 2013 = 3% to 6%

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 is likely under 3%. In Boston, only 45 miles away and one of the most active metropolitan markets this year in the United States, escalation in some instances is in the 8% to 10% range. Expect material cost inflation to continue to accelerate slowly. But market activity will be the primary driver of cost escalation. An anticipated slowdown in nonresidential work in the early part of the year muted the overall average escalation rate for 2013. Residential work will remain very active and you should expect escalation near or above the high end of the range. Once growth in nonresidential picks up and both residential and nonresidential are active, we may begin to see significant labor shortages and productivity losses.

Total Escalation for 2014 = 4% to 7%

In 2014, 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 towards 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 = 5% to 8%

In 2015, 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 do not have detailed projections to rely on for 2015. 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.

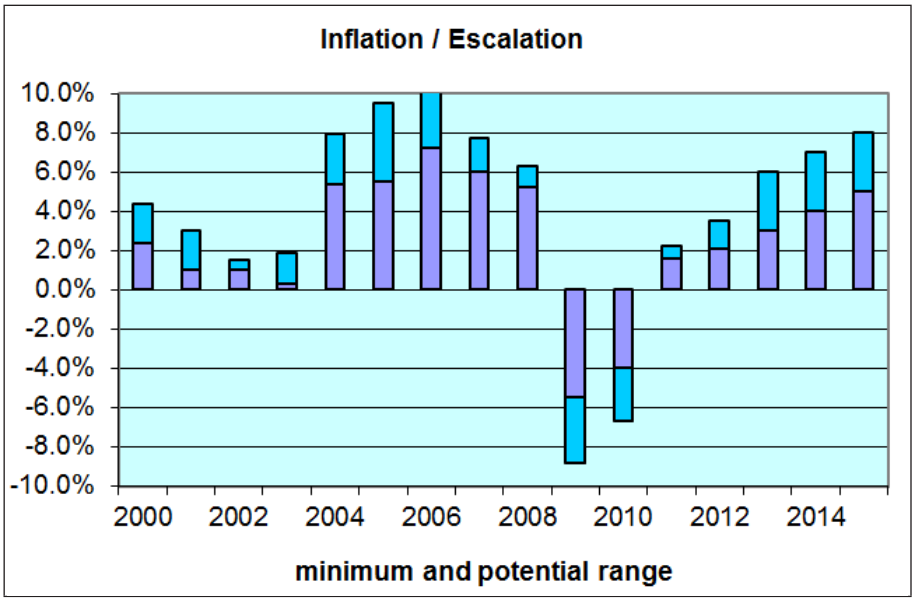
We may potentially see escalation similar to the growth years of 2005 through 2007 when escalation averaged 9% per year for three years. An assumption that escalation growth cannot reach those levels must also assume market activity will not continue to grow. All leading indicators point to continued growth. The rate of actual construction in 2012 and 2013 from the growth in starts each year was +8% per year. That is greater than the boom years of 2004 through 2008 and it is expected to accelerate. The Dodge Momentum Index increased 7% in the latest quarter versus one year ago, for most work has a 9- to 15-month lead time to start of construction, followed by a 12- to 24-month construction period. Bernie Markstein, Chief Economist for Reed Construction, predicts 2015 spending will be 10.6% higher than 2014. Ken Simonson, AGC Chief Economist, predicts 2014-2017 construction spending to increase 6% to 10% per year.

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 5% annual future (beyond

2015) escalation as a conservative approach in a rapidly growing market. All labor and material cost will get passed along and margins will increase more rapidly. Let's not forget that building construction real cost escalation was 8% to 10% in 2006 and 7% to 8% in 2008.

Figure 26

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 2015 of no less than 4%.



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Author Ed Zarenski, a 40-year construction veteran and a member of the Gilbane team for more than 33 years, is an Estimating Executive who has managed multimillion 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:

Among countless news articles, these sources are used for data in this report

- American Institute of Architects – www.aia.org/practicing/economics/index.htm
- American Iron and Steel Institute - steel.org
- American Recycler - americanrecycler.com
- Associated Builders and Contractors - abc.org
- Associated General Contractors of America - agc.org
- Bloomberg L.P. Financial News - Bloomberg.com
- Bureau of Labor Statistics - Stats.BLS.gov
- Construction Industry Round Table – www.cirt.org
- Data Digest – agc.org/datadigest
- Economic Cycle Research Institute businesscycle.com
- Energy Information Administration - Eia.doe.gov
- Engineering News Record - ENR.com
- Financial Times - FT.com
- Financial Trend Forecaster - Fintrend.com
- FMI Management Consulting - FMINET.com
- IHS Global Insight - ihs.com
- Institute for Supply Management - ism.ws
- International Iron and Steel Institute - Worldsteel.org
- McGraw Hill – Dodge – construction.com/about-us/press
- Metal Miner - agmetalminer.com
- Metal Prices – metalprices.com
- Producer Price Indexes - bls.gov/ppi/
- Reed Construction Data - reedconstructiondata.com
- RS Means - rsmeans.reedconstructiondata.com
- U.S. Census Bureau - census.gov