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Building Information Modeling - Coming of Age?

The benefits BIM (Building Information Modeling) offers would appear to be compelling, yet the construction industry has with notable but isolated exceptions rejected BIM in favour of traditional practices.

In BIM design information is stored electronically as interconnected objects (door, window, slab etc) rather than the abstract lines we have become familiar with in CAD (Computer Aided Design). The approach allows sophisticated analysis such as clash-detection which can quickly reveal problems between the routing of M&E services and the building structure. BIM can also allow the performance of a building, for example energy performance, to be simulated before construction commences.

After a decade, it appears that the industry is beginning to embrace BIM. In 2007 the General Services Administration (GSA) in the U.S. made the use of BIM a requirement on all major projects receiving significant public funding.

Government has played a similar lead role in northern European countries such as Finland, where Senate Properties, a government owned organization which manages, develops and lets public buildings such as universities, offices, and government buildings implemented BIM Requirements in October 2007.

In Singapore, the CORENET e-PLAN Check system (COConstruction Real Estate NETWORK, launched by Singapore's Ministry of National Development) provides automated compliance checking against building codes for schemes designed using BIM.

A second wave?

In the U.K. there is no government policy specifically targeted at the adoption of BIM, this may be a key reason why adoption has been slower in the U.K. than elsewhere. BIM was used at Heathrow T5 where it has been reported that it helped shave 5% off project costs (£210million), but such

examples of U.K. BIM projects are rare. This may now be changing.

Faithful+Gould are receiving enquiries from clients, architects and contractors about our BIM capability. In an age of globalization, firms who have invested in BIM to comply with requirements in a local market appear to now be exporting the approach to both sectors and locations where the use of BIM is not a specific requirement.

What does BIM mean for Estimating and Managing Costs?

BIM provides cost professionals including Quantity Surveyors (QS) with a greater degree of automation in the process of Quantity Take-Off (QTO). This means that the impact of design changes can be modeled more swiftly than in a CAD environment and that a range of design scenarios can be costed. As with CAD, the experience of the cost professional is called upon to correctly analyze these design quantities and relate them to the client's project objectives.

Using BIM, Faithful+Gould are able to more closely integrate our cost management service into the wider project team, providing advice on the impact of design changes which would previously not have been manageable. The cost professional, armed with BIM tools is able to contribute to overall efficiency savings for the project.

Collaboration within the supply chain is essential for the benefits of better co-ordination which BIM offers to be realised. This means a shift in culture and working practices. Process and cultural aspects of BIM implementation are more significant to success than technology (although the technology must work effectively). Faithful+Gould recognise this and have been working as part of the BuildingSmart Alliance to define information standards to allow the effective exchange of cost information in a BIM environment. The adoption of these standards can drive efficiency into the BIM/QTO process by helping to ensure that information is shared in the right format and in a form which is recognised and can be easily worked with by all parties.

"BIM is a great example of how Faithful+Gould are delivering innovative solutions with collaboration at the heart" commented Adrian Malone, Faithful+Gould's Head of Commercial Research.

International Construction Cost Index

The latest index values reflect changes in relative inflation—construction inflation relative to the base country—and fluctuations of currency exchange rates. Parity values change as relative inflation changes. Inflation is not the major driver in how the index changes. Exchange rate fluctuations are often the significant factor for changes to the index value.

Inflation is generally low reflecting the current economic downturn with many countries reported modest construction cost increases for the past year. However, about one third reported decreasing costs or no change in costs. The average inflation was 1.2 percent with Mexico reporting an 11 percent increase in costs and Russia reporting a 13 percent decrease in costs. The relative change to the U.S. was +4.5 percent.

The currency market remains variable, but the U.S. Dollar has shown a general rising trend since last year so the index values are lower. With the exception of China, Japan and the UAE, the U.S. Dollar appreciated against the currencies of the countries included in our comparison since March 2008. The Polish Zloty had the largest depreciation, 37.8 percent, and the Chinese Yuan had the largest appreciation, 2.5 percent. The Euro depreciated about 16 percent during the year.

The interaction between relative inflation and exchange rate determine the magnitude of the index value change. A closer look a several countries shows how the two rates interact to change the index value. First, a quick review of the U.S. since it is the index base. Amid a recession that is causing significant declines in construction output and employment, the U.S. reported a drop in construction prices of about 3 percent between the March 2008 and March 2009 surveys.

The recession in Great Britain is having similar impact on the construction industry. Construction prices dropped about 4.5 percent with more severe declines expected for the 2009 calendar year. Relative inflation was about -1.5 percent. Combine relative inflation with the Pound's depreciation of over 28 percent and the index fell nearly 30 percent over the last year.

The global economic crisis slowed the rapidly growing construction market in China. Construction price inflation was 3 percent for our reporting period. In relative inflation terms, prices in China rose over 6 percent. Relative inflation considered with a slight appreciation of the Yuan produces about a 9 percent increase in the index.

India reported over 5 percent construction inflation for the 12 month period—inflation relative to the U.S. of over +8 percent. The Rupee depreciated about 23 percent. Relative inflation counteracts some of the currency depreciation, so the index value declined about 16 percent.

Singapore provides a similar offset between relative inflation and currency valuation. In this smaller economy, prices rose over 7 percent producing an increase in relative inflation of over 10 percent. The Singapore Dollar depreciated over 9 percent so the index value increased less than 1 percent.

ABOUT THE PARITY/INDEX

International indexes use exchange rates since indexes measure relative price differences between locations or times in a common currency. Parity comparisons remove exchange rates from consideration and present a comparison using national currencies. Parity provides a measure of construction value. It changes with relative construction inflation, not exchange rates. It measures the rate of currency conversion that equalizes purchasing between currencies.

We publish comparisons based on a 13,900 square meter (150,000 square foot), single story owner-occupied manufacturing facility with a significant office component. Prices collected are trade contractors' in-place prices, including labor, material, equipment, overhead and profit. Pricing in-place rates, rather than basic construction inputs (material, labor and equipment), inherently measures differences in productivity, and to some extent differences in market and bidding conditions.

Any cost comparison has limitations. A model building approach will not include design differences for local regulatory and code requirements, seismic design guidelines, design styles and climate influences. Our comparison excludes factors such as these since they are difficult to determine using a model building approach. However, they can have a significant affect on cost.

The table shows parity ranges and an index based on the average parity. We show ranges, as there is nothing definitive about any international construction cost comparison. The U.S. (Chicago) is the base location for comparison in the table. Index calculations use March 2009 exchange rates. The projections of construction price inflation are April to April. Taxes shown are mostly Value Added Taxes (VAT) or Goods and Services Taxes (GST), which we exclude from the parity/index values since in some instances they may be reimbursable. Sales taxes applied only to materials are included (e.g., U.S.) since they are not reimbursable. The first quarter of 2000 is the base period (100.0). Locations with n/a were added after our base period.

A document containing supplementary information about the model building, the survey methodology and use of the parity/index is at fgould.com. The document also has an extended listing of the historic price change.

Information Sources

In addition to the Faithful+Gould and Atkins employees worldwide, we gratefully acknowledge the assistance of the following companies for providing information for use in International Construction Intelligence:

Padghams, Australia; AT•P, Austria; BoPro, Belgium; ProjectGlobal Ltda., Brazil; Hanscomb, Ltd., Canada; Savant International, Czech Republic, Poland and Russia; Cammisar Consulting, Germany; KKZ Consultants, Greece; PAE Design and Facility Management, Japan; IGG, Netherlands; PUBM Quantity Surveyor (WM) Sdn Bhd, Malaysia; AS Byggnalyse, Norway; Aconsa y Asociados Consultores, Mexico; Watts and Partners, Spain; AB Byggnalys, Sweden; Comcon Services (Thailand) Co., Ltd, Thailand.



International Construction Cost Index

5 MOST EXPENSIVE 2009

5 LEAST EXPENSIVE 2009

Rank 2009	Rank 2008	Country	Index Value	Rank 2009	Rank 2008	Country	Index Value
1	3	Switzerland	147.1	25	25	Brazil	67.6
2	4	Finland	140.0	26	26	Mexico	63.0
3	5	Germany	138.0	27	27	China	61.4
4	1	Norway	135.6	28	28	Malaysia	50.9
5	6	France	134.7	29	29	India	36.6

For comparison purposes, 2009 non-reporting countries are excluded from the 2008 ranking.

DOWNLOAD FULL REPORT

The complete parity/index tables and accompanying notes and instructions are available for download as a PDF file.

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Infrastructure at the Forefront

The U.S. infrastructure is arguably the most extensive in the world and, after years of technological development and construction, has become a tangible asset improving the quality of life for the nation's population. Most facilities and structures comprising U.S. infrastructure were built as a series of separate and distinct projects by federal, state, and local agencies, as well as by independent authorities and private corporations. Because many of the investments were made in earlier decades and because there was little coordination between the agencies involved, the U.S. infrastructure is aging, inefficient, and inadequate. The average condition rating for U.S. infrastructure is 'D,' meaning urgent action is required, according to the American Society of Civil Engineers (ASCE) 2009 infrastructure report card. At its most extreme, neglect can turn catastrophic, as in the collapse of New Orleans' levees in the wake of Hurricane Katrina in 2005.

The ASCE released infrastructure report cards in 2005 and 2009. From a 2005 estimate of USD 1.6 trillion to update infrastructure, the 2009 figure escalated to an estimated USD 2.2 trillion, and that figure represents monies needed in just the next five years to return assets to safe, operable standards. The cost of not updating, engineers warn, might be measured in human lives.

Infrastructure 2008, a report co-published by the Urban Land Institute and Ernst and Young, says the United States is headed toward decline, and needs to wake up to the dire state of its infrastructure. The report estimates that the U.S. has at least a USD 170 billion annual funding gap in addition to its outmoded land use and infrastructure models. America is heading for a crisis in the next 10 years if nothing is done, warns the report.

The USD 787 billion American Recovery and Reinvestment Act (ARRA) provides funding for infrastructure construction worth about USD 577 billion. According to the Association of General Contractors (AGC) only about USD140 billion is construction spending. They break down the funding as follows:

Program	Value (billions)
Transportation Infrastructure	49.3
Clean Water Infrastructure	7.4
Water Resources	6.2
Environmental Cleanup	7.8
Buildings Infrastructure	29.6
Energy and Technology	29.8
Other	43.5

The ARRA funding is a start toward improving aging infrastructure, but the funding need is still immense. The funding also raises interesting questions about whether the government can sustain the funding levels required.

Clean water is a small part of the ARRA (USD 7.4 billion). Long-term estimates of wastewater infrastructure needs are significant—USD 330 billion over 20 years for wastewater treatment plants and collection systems to maintain water quality standards, according to the Association of Metropolitan Sewerage Agencies and the Water Environment Federation.

Two distinct challenges facing U.S. infrastructure projects, according to Faithful+Gould Vice President Nick Harney, who heads the Infrastructure sector, are the limited way in which projects are procured and effective prioritization in terms of investment. Stimulus funding provided via the ARRA will certainly ramp-up infrastructure projects in the U.S., but states seeking this funding are required to respond quickly. We have already made significant progress in the infrastructure market through providing comprehensive consultancy to a number of major U.S. water sector clients.

"We will see more projects developed via design-build because of time constraints," said Harney. *"Using this approach, municipalities could get into construction for most capital projects in as quickly as 120 days from notice to proceed. In addition, asset management is essential to prioritize projects and help clients determine where their money will provide the most value."*