

March 2011

# Estimating T O D A Y

AMERICAN SOCIETY OF PROFESSIONAL ESTIMATORS

**Continuing  
Education  
Through  
ASPE's  
Online  
Classes**

**Model-based  
Quantity Takeoff &  
Estimate Validation**

How To Estimate The Cost Of:

**Fabricating  
An Offshore  
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ISSUE

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# Estimating T O D A Y

March 2011



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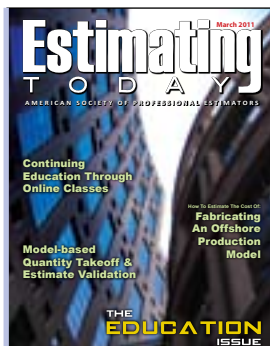
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\*cover picture: Vancouver Public Library

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# Estimating T O D A Y

March 2011

*Estimating Today* is the official publication of the American Society of Professional Estimators. It is the policy of the Society that all materials submitted for publication become the property of the Society and may or may not be published, in whole or in part, at the discretion of the editor.

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Send submissions to  
Patsy Smith, Editor  
Society Business Office

Advertising  
Send all advertising  
inquiries to:

615.316.9200 (O)  
615.316.9800 (F)



Business Office  
Patsy M. Smith  
Director of Administration  
psmith@aspenational.org

American Society of  
Professional Estimators  
2525 Perimeter Place Drive  
Suite 103  
Nashville, TN 37214  
615.316.9200 (Phone)  
888.378.6283 (Toll Free)  
615.316.9800 (Fax)  
www.ASPEnational.org

Design & Layout  
Corey M. Seaborn

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# CONTACT US...



**PATSY M. SMITH**  
Director of Administration  
psmith@aspenational.org

- Society Management
- Human Resource
- Convention Planning
- Website

**KAREN HINEN, CAE, IOM**  
Executive Director  
khinen@aspenational.org

- Chapter Development
- Tradeshows
- Advertising
- Marketing

**TANYA GRAHAM**  
tanya@aspenational.org

- Certification Program (CPE)
- Certification Accreditation
- GEK & DST Testing

**TINA COOKE**  
tina@aspenational.org

- On-Line Classes
- ASPE Merchandise Orders
- Bookkeeper

**COREY M. SEABORN**  
corey@aspenational.org

- Publications
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### BIM Standards continued from February

The recent design progress in BIM has been remarkable. More and more projects are being designed with BIM software. As we know, several Federal and State agencies across the country are starting to require certain projects to be designed in BIM. Some agencies may require 100% BIM capability or others may want BIM to be used after a particular size or proposed cost threshold is met. The big picture of BIM technological application can be seen at conventions and meetings like Ecobuild America. Almost everything at the Ecobuild America product and software development exhibition area was geared to BIM and green friendly sustainable design.

Our effort to integrate estimating quantity takeoff to respond to BIM models is progressing. As we mentioned last month, two seminars were presented to document the progress and direction that the work groups of the buildingSmartalliance have achieved. We are now reorganizing for the next level of discussions and research to further achieve a common goal of global interoperability with BIM.

For example, we as an industry need to agree on what is an item or an assembly and what standards are to be applied. What measurement rules do all we agree to use. And as we pointed out in our presentation, what definitions do we all agree to use for the various Levels of Development (LOD's). This year we should have an industry approval of the definitions by ballot for the LOD agreement. Hopefully definitions and standards will follow suite.

Those attending the workshops at both presentations, Quantity Takeoff Information Exchange and Standards for Cost Estimating in BIM, were very interested in moving the process along. Everyone acknowledged that standards for interoperable QTO for 5D are way behind 3D and design. With no agreement as to the definitions the producers of BIM models may use any item or assembly identity that is handy. A foundation produced with various disconnected lines in BIM model cannot be quantified as an assembly. If we don't catch up soon, estimating will then be forced to use whatever definition happens to be in the model and QTO will suffer. Manual QTO from 2D copies of BIM models is not a step forward.

seppmarkk@gmail.com

Your Industry Awareness Committee



# Message from the President

**B. Keith Jones, CPE | ASPE National President**

I get asked a lot, "What are the benefits of belonging to ASPE?" In my last article I discussed the Standards Committee which over the years has performed a great task of compiling the Standard Estimating Practice publication. This edition of Estimating Today is dedicated to "Education". The involvement of the Society in education was one of the things that impressed me most about ASPE when I first joined.

The Education Committee, along with the Standards and Certification Committees, comprise the three ASPE technical committees. Each committee has at least one person from each of our five regions located across the United States. I would like to discuss items located under the "Education Tab" on, <http://www.aspenational.org>, our ASPE national website below.

**1. Scholarships** - We currently have a national special committee set-up specifically for distributing scholarships on a national level. Many additional scholarships are also distributed on a chapter level. I encourage all those members, and non-members, going to college in a construction

related field to contact our scholarship committees and see if you qualify to submit for a scholarship and then apply. The current chairperson for the national scholarship committee is Paulette Rutlen, CPE, who is also our immediate past president. Again, there is a committee member from each of the five national regions and one member from the Education Committee for coordination. All members of the national scholarship committee are listed on page 11 of our Membership Directory. Each year the Board of Trustees tries to allocate any additional operating funds to the national reserve and scholarship funds. Last years' recipient of ASPE's national scholarship was Phillip Strawn, California State University, Chico, California.

**2. Estimating Academy** - The Education Committee has been extremely successful with their estimating academies at our national convention and at various locations in association with the Associated General Contractors. We are working to have some combined activities this summer in Nashville with convention and estimating academy attendees. The education committee is always

looking for new topics and presenters for the estimating academy.

**3. On-line Classes** - ASPE offers an extensive list of on-line educational classes. Below is a sample of the classes available from April 11, 2011 to June 18, 2011. Please see our web site for additional dates and classes.

- 103** *Construction Blueprint Reading*
- 106** *Estimating and Bidding 2*
- 107** *Construction Materials and Processes*
- 201S** *Leadership and Motivation*
- 203P** *Construction Problem Solving & Decision Making*
- 206T** *Cost Awareness and Production Control*
- 301** *Fundamentals of Green Building design and Construction*
- 304** *Green Building Commissioning*

**4. Certificate in Construction Estimating** - Many people are familiar with ASPE's Certification program, but are not aware that we offer a simplified "Certificate in Construction Estimating". The Certificate in Construction Estimating is not to be confused with the CPE program, but does offer a quicker process to confirm estimating skills. In

order to qualify for the certificate you will need to pass five of six designated on-line classes.

**5. Chapter Assistance** - I strongly recommend that all chapter presidents and education and program chairs, look at the chapter assistance tab on the national website.

The Education Committee is in the unique position of overseeing many successful education programs provided by ASPE chapters across the country. See the list of monthly meeting suggestions. There are also free fundraising activities to be used to strengthen the finances of local chapters and to provide a resource for chapter scholarship programs. I also encourage chapters to submit their chapter programs or fundraisers to the Education Committee for possible inclusion to the lists on our website.

I also want to thank everyone who is a member of one of our national committees. These members give large amounts of their time to help improve the Society and the construction industry. ■



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**From the Desk of:** *Karen Hinen, CAE, IOM | Executive Director*

# World of Concrete

The World of Concrete expo, held on Jan. 18-21 in Las Vegas was a successful show for ASPE. Our booth was located with construction software vendors in the Center Hall near the entrance. Traffic was very good. More importantly, those who stopped at the ASPE booth were genuinely interested in finding out more about the American Society of Professional Estimators and how important our members are to the construction industry.

Some visitors were estimators who were unaware of the Society and were very interested in becoming members. Others knew about us from our LinkedIn Groups, and some were taking back information for their in-house estimators. We had a very large volume of people interested in the CPE designation from owners and estimators.

Overall attendance was down due to the sluggish economy and exhibit space closely matched the percentage drop in WOC attendance. With CONEXPO-CON/AGG right around the corner, some exhibitors chose to skip World of Concrete in favor of the larger expo to be held in March this year. ASPE plans to be at CONEXPO-CON/AGG, so look for our booth if you are attending. We would love to have you stop by and see us.

Most attendees and exhibitors seemed to agree that the industry, which had a 20.7% jobless rate in December 2010, is poised for slight growth through 2013. They expect new construction investments to be very small in 2011 and 2012 due to the economy.

In fact, Portland Cement Association's Chief Economist, Ed Sullivan stated that "This is a construction-focused recession" and "Economic growth will not become strong enough to generate more robust job gains in the short term, translating into a longer-than-expected recovery period." In line with what our ASPE members are telling us, Sullivan explained that "the critical issue is confidence in lending and spending."

There are no surprises here. This is what our members have been sharing with us for some time. We heard this at the Construction Users Roundtable as well. The only difference seems to be that the expectation for recovery has stretched out to 2013. No one expected the construction industry to boomerang back. However, there does seem to be a growing agreement that the "bleeding" has slowed and possibly stopped. Now we can begin the healing process.



Our special thanks to the many volunteers who helped us man the booth. Pictured are (from left to right) Terry Barnes, CPE, Bernie Santiago and Mary Fisher.

ASPE is seeing some new hiring, an increase in job postings and more inquiries from employers with positions that need filling. Don't forget to check the ASPE Employment Center frequently and keep your resume up-to-date.

Once again, a BIG thank you to the many volunteers who manned the ASPE booth. They shared valuable insight into membership benefits and the overall value the professional estimator with all those who stopped by the booth. Thank you to Jim Oberndorfer and the Marketing Committee for helping

to coordinate the volunteers. Those manning the booth were Terry Barnes, CPE, Mary Fisher, David Hoyt, Charles Munroe, FCPE, Jim Oberndorfer and Bernie Santiago. A special get well wish goes to Glen Beckstead, who was injured in a traffic accident while traveling from Salt Lake City to Las Vegas to help as a volunteer. Glen, we wish you a speedy recovery. ■

*Karen P. Hinen*

ASPE thanks the following Annual Sponsors for their on-going support of ASPE programs.

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# Members and Estimating Professionals Experience Continuing Education Through ASPE's Online Courses

by Frank E. Young, FCPE | ASPE National Education Committee - Southwest Representative | member of San Diego Chapter 4

As a member of the National Education Technical Committee, I was again asked to write an article for this year's feature issue of "Estimating Today" on Education. While the central theme of this treatise still addresses continuing education, the focus will be to highlight ASPE's online courses offered in association with Bob George, CPE, and constructionclasses.com. In reviewing the previous year's commentary, I found several important points that bear repeating for the reader's benefit. These remarks will appear in the final paragraph(s). However, this message will also discuss opinions about continuing education as expressed by educational leaders from coast-to-coast, suggest some sage advice about choosing the best construction continuing education courses, and reveal how one of ASPE's fine member-firms values continuing education for its employees as well as for its overall success in the marketplace.

The President of Bergen Community College in New Jersey, G. Jeremiah Ryan, has said that the School of Continuing Education plays an important role in their overall mission by providing opportunities for lifelong learning to the surrounding community.

It represents a vital conduit to reach students of all ages, socio-economic backgrounds, and interests. Those individuals may also opt to take a variety of online courses rather than seeking to gain knowledge in a traditional

classroom setting. Sandra Sroka, Assistant Dean for the School of Continuing Education, emphasizes that the core values which undergird their mission remain dedicated to providing educational excellence, innovation, and outstanding corporate training. Their institution looks for ways to create and implement a new workforce curriculum to assure that students will be job-ready in this ongoing climate of employment uncertainty. Bergen Community College continues to strive to achieve their goals by offering high quality education to a diverse population and becoming a pathway to realize individuals' ambitions and accomplishments.

The University of Southern California, located in Los Angeles, expresses its mission in a similar manner. By developing new programs in continuing education and lifelong learning, they seek to meet the unique educational needs of working adults and others interested in the ongoing pursuit of knowledge in the 21st century. President C. L. "Max" Nikias has placed the Office of Continuing Education and Summer Programs as the cornerstone to USC's renewed commitment to offer the highest quality of instruction and expertise to students in the area. Their mission concentrates on the following objectives:

- *Expose leaders in all fields to new developments and inspire them to greater achievements in their diverse professions*
- *Broaden access to higher*

*education and extend the University's reach through relevant, skills-based programming in the community*

- *Engage the USC family in new areas of study that will facilitate their transition into new careers*

That community of students is eager to add to their existing skills and expand their horizons in traditional classroom settings or via the virtual world of the Internet.

The Federal Government's Office of Personnel Management is responsible for policy leadership for government training and development under the Government Employees Training Act and various Executive Orders from the President. Marjorie L. Budd states that even with advances in technology, we are still dependent on labor to meet the long-term competitive challenges of a rapidly changing world market. Training is critical in expanding productivity and economic growth. The need for skilled workers who can solve problems, adapt to changes in technology, and communicate effectively across all boundaries remains a priority for this nation. She offers the following comparative statistic to illustrate this point – Japan and Germany invest as much as 10% of payroll on training, while the United States lags far behind at under 2%. The best companies collectively spend a larger percentage on training and have discovered that their investment pays huge dividends to

the bottom line.

I was recently looking at one of our fine member-firm's website, and came across a folder entitled Sundt Careers that presents a commendable perspective about the importance of continuing education. Under the heading "Expand Your Knowledge, Grow Your Career," the following statement reinforces their strategy:

"At Sundt, we know that having the most skilled and engaged team is essential to success, which is why we created one of the best training, development and continuing education programs in the construction industry. With access to a wide variety of company-provided courses, Sundt employees can get the skills and tools they need to grow in their careers."

In the paragraph entitled "We Encourage Our Employees to Grow," one finds further evidence of that commitment:

"We place an importance on learning and expect our employees to actively seek new opportunities and apply new knowledge and skills in their work each day.

Part of this career development process is a semi-annual Individual Development Plan designed to help employees and their supervisors identify performance goals, career interests and aspirations along with specific training and development needs and goals."

It is clear why Sundt Construction continues to step forward in their

support of ASPE's educational programs by providing outstanding speakers for cutting edge topics of interest to our members and others in the construction community.

A.C. Gaddis recorded these observations for wiseGEEK.com on the subject of "How Do I Choose the Best Construction Continuing Education Courses?"

"If you work in construction, you may think that you don't need continuing education, but construction continuing education is vital for maintaining your license (in some states) and staying competitive in your field.

You can find quality continuing education classes online, at technical schools, professional training centers or through unions and professional organizations if you take the time to research your

continuing education options.

To choose the best construction continuing education courses, some things to consider include your schedule, the reason you are taking the courses, and whether you want to take the classes online or in a classroom.

Online courses offer flexible hours and allow you to work at your own pace; they are a good way to expand your knowledge of new construction technologies, green building techniques, or design trends.

Classroom instruction at technical schools becomes good choices for subjects such as architectural design and construction management.

Organizations for construction professionals can be a valuable resource for helping you to choose

the best continuing education program. Courses are offered in their own facilities as well as part of professional conferences where you can learn about new technologies and construction trends.

The most valuable resource for finding quality continuing education in your field is your coworkers, your boss or other professional peers. Ask the construction professionals you work with about their continuing education experiences. No one will fault you for wanting to further your career."

The American Society of Professional Estimators, at both the national and local level, continues to focus on its mission to provide quality educational opportunities for its members and for the construction industry. The online classes grant access to a

wealth of knowledge and subject matter, with hands-on instruction by experts in their respective fields of endeavor. Self-paced classes for Introduction to Construction Estimating and Essential Construction Math can start anytime during the calendar year.

In general, classes run from mid January to late March, early April to mid June, late June to early September, and mid September to mid November. Construction Blueprint Reading and Construction Materials and Processes can be taken in each of the above quarters. Nine other courses are offered in two of the quarters, while the remaining eight courses must be completed in the specific designated quarter. The four recently added classes on Green Building may be of particular interest to those students desirous

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of seeking LEED accreditation. A Certificate in Construction Estimating is awarded to those individuals who successfully finish the classes in Introduction to Construction Estimating, Essential Construction Math, Construction Blueprint Reading, Estimating & Bidding I and II, and Construction Materials and Processes. If you desire more information about the online courses, please visit ASPE's national website at [www.aspenational.org](http://www.aspenational.org). In the "Frequently Asked Questions" section, prospective students can download a demonstration course to get a taste of what's involved in this program.

In closing, I want to share one of the paragraphs from last year's article for "Estimating Today."

Tough times require us to become more productive to deal with the competition, or allow us the chance to retool in preparation for the next cycle of better economic conditions. For professional estimators, this process can involve honing our current capabilities or acquiring additional skill sets in order to maintain our employment status or seek new career paths in the industry. Individuals desirous of achieving personal growth related to their occupational goals have several avenues to consider including the following options:

- *Continuing education programs*
- *Reading trade journals*
- *Researching information on the Internet*
- *Company sponsored or industry webinars*
- *Attending trade shows and seminars*
- *Networking with their peers to communicate common concerns and interests*

Whether you are personally looking to change your career, advance in your current position, or pursue other professional interests, continuing education programs can meet your needs and enrich your life. ■

## The Value of Membership

by Monty Everson, CPE | National Membership Committee Chair | member of Denver Chapter 5

Most member based organizations during the economic downturn in the past few years have suffered a decline in membership. The construction industry has been hit especially hard, including ASPE dues, memberships, and sponsorships are some of the easiest things for companies to delete from their budgets. When sales and revenues decline and overhead and fixed costs remain constant, companies are forced to make hard decisions, including staff reductions. There are many reasons for keeping an ASPE membership, when you consider the value.

Participating and being active in any organization can provide valuable exposure and networking opportunities. You can build on existing business relationships, and meet and get to know new potential clients. The cost of annual membership is far less than the cost of a single print advertisement in a newspaper, magazine, or industry publication, and most would agree it can more effective. When your name and company is listed in the ASPE print directory and on their website, which is included in the membership fee, it is valuable advertising. I have been an ASPE member for over ten years, and I have received many calls through

the years from contractors outside of our area who were bidding projects in our area. Partnerships have been formed, and business for our company has been the result many times.

Most of us belong to our own industry organizations, where we spend time with other companies who perform the same work in our related fields. ASPE is an organization where general contractors, subcontractors, and suppliers are all members at an equal level. It is truly a unique organization in the construction industry. When I originally joined ASPE, my primary reason for joining was to meet some new general contractors that we did not have any relationships with. This goal was achieved many times and the annual membership fee has provided a good return on investment through the years.

When I was our chapter's president a few years ago, we hit a goal of 100 members. We were in better economic times then, so recruiting new members and retaining existing members was much easier than it is today. Our objective was to balance the blend of general contractors, sub contractors, and suppliers. We targeted companies who did not have members and were

fairly successful. When a business finds out they are not a member of an organization where most of their competitors are, it often provides them an incentive to join. If you never invite someone to join, they may not know ASPE exists.

In our last column, we focused on member retention and developing a plan to keep your members. Once you have a member, they have to see value or you will lose them. As the article mentioned, there are several tools available on the ASPE Website for you to use. If you have not had time to check them out, it is definitely worth your time to do so. Your chapter and your members will benefit from the resources that are available to you.

The Membership Committee is here as a resource to all the Chapters and their members. If you have any ideas, success stories, or lessons learned, please forward them to [monty.everson@jedunn.com](mailto:monty.everson@jedunn.com), so that we can share those winning strategies with everyone. ■



### ASPE National Membership Committee

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**HOW TO:**

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# **FABRICATING AN OFFSHORE PRODUCTION MODULE**

submitted by Cody Guidry, CPE

Cody Guidry is an offshore fabrication estimator in Houma, Louisiana. His career began in 2003 as an assistant project manager for Gulf Island, LLC located in Houma, Louisiana. That same year he transferred into the estimating department, where he remained for several years. In 2006 he became employed by J. Ray McDermott, located in Amelia, Louisiana, and worked there as an estimator for a short time. In 2007 he returned to Gulf Island, LLC and worked in the scheduling and planning department for less than a year. He then transferred back into the estimating department and is currently still there. He is an active member of ASPE Chapter 9 of New Orleans. He is a graduate of Nicholls State University with a B.S. degree in Manufacturing Engineering Technology.

- 1) Introduction
- 2) Types and Methods of Measurements
- 3) Specific Factors that may affect Take-off & Pricing
- 4) Overview of Labor, Material, Equipment, and Mark-Up
- 5) Special Risk Considerations
- 6) Ratios and Analysis
- 7) Additional Pertinent Information
- 8) Sample Plans
- 9) Sample Take-Off and Pricing
- 10) Glossary of Terms

## 1. INTRODUCTION

The intention of this paper is to provide a general understanding of how a typical estimate of an offshore production module is performed. The general purpose of an offshore production module is to drill wells in the ocean, lake, or on land and extract the oil and/or natural gas from the well. The equipment systems on the module then process the extracted fluids and either ship or pipe those fluids to the shore. Production modules are set on platforms which can be any of the following types:

Fixed Platform (FP), Complainant Tower (CP), Sea Star (SStar), Floating Production System (FPS), Tension Leg Platform (TLP), Subsea System (SS), or Spar Platform (SP). Below is a sketch of the different platforms used in offshore drilling.

The production module and platform are built separately and integrated either onshore or shipped on barges offshore and integrated on site. Production modules range from a few short tons to over 8000 short tons depending on the location and intended usage. Due to size and the facility in which the modules are fabricated, the majority of the work is completed outside where it is subject to the natural elements.

### Main CSI (2004) Division

- Division 05 Structural Steel

### Main CSI (2004) Subdivision

- Subdivision 05 12 00 Structural Steel Framing

### Brief Description

This paper will discuss the scope of estimating including the following:

- The Types and Methods of Measurement
- The Specific Factors to Consider in the Takeoff and Pricing
- An Overview of Labor, Material, Equipment, Indirect cost, and Mark-up
- Special Risk Consideration
- Ratios and Analysis
- Additional Pertinent Information
- Sample Plans
- Sample Takeoff and Pricing

There are several units of measurement that are used on a production module, some of which include square feet, linear feet, each, tonnage, or pounds. Some of the specific factors to consider when providing a takeoff and pricing are project size, unit conversion, and completeness of the information provided. An overview of how labor rates are broken down and calculated, how material is quoted, equipment cost philosophy of different companies, and percentages of mark-up will be discussed. Special risks to consider are project size, the time of year the project will take place, the final location of the platform, and the facility's current workload. Examples of ratios and analysis that have been developed over the years such as man-hours per ton, man-hours per square foot, and material cost will also be discussed. The paper will conclude with some additional pertinent information explaining some differences in the oil industry from other industries along with some sample plans, a sample takeoff, and pricing sheets.

In the oil industry, the majority of the proposals submitted are private solicitations. One of the first bid requirements a fabrication contractor typically goes through is a pre-qualification process with the oil company or consultants before that contractor can provide a proposal. Some companies have pre-qualifications for each project while others have yearly or occasional pre-qualifications. This process consists of providing technical information including past experience, facility capabilities, safety statistics and procedures, quality control procedures, facility tours, and a question and answer discussion. Following approval, the contractor is now cleared to receive request for quotations from the company or consultant. Once the contractor's proposal is submitted, the project selection process consists of evaluation of cost, schedule, and facilities. Many times the company narrows down the bid list to two (2) to three (3) contractors. From there, negotiations take place with the contractors for a period where one (1) contractor is awarded the project. The lowest price doesn't always receive the contract. Many other aspects of the proposal are considered before the project is awarded.

## 2. TYPES AND METHODS OF MEASUREMENTS

Before beginning the quantity takeoff, the estimator must thoroughly read through the bid documents to get a good understanding of the total scope of work. Bid documents can differ from company to company but consists of instructions to bidder, scope of work, bid forms, contract, project specifications, and drawings. It is a good idea to read through the bid documents at least twice while making notes before performing the takeoff. Once you have a good understanding of the project you can perform the takeoff.

Quantity takeoff is the process of breaking down the drawings and summarizing the components as line items. These line items provide a description and the unit of measure. Items are commonly grouped together and are measured using different units. Flat plate, steel grating, fiberglass grating, and paint are measured in square feet. Structural beams, structural piping, and process piping are measured in linear feet. Pipe fittings such as tees, 90 degree elbows, 45 degree elbows, nipples, and reducers are measure in each. A concern when estimating material is drop or waste. Most companies request neat weight in their proposal which means the weight used is the installed weight and not the purchased weight. A brief description of each will follow.

### Flat Plate

Flat plate is measured by square feet and thickness and is used to fabricate deck plate, roll deck leg sections, roll larger diagonal and horizontal braces, gussets, padeyes, hatch covers, rings, and stiffeners. In larger offshore production module projects, plate can be used to fabricate girder beams since larger pre-manufactured beams are not available. Drop for flat plate varies with the component fabricated and could range from a small percentage to fifty (50) plus percent on an item like a ring. Typical material grades used for flat plate are A36, API 2H Grade 50, and A572.

### Structural and Process Pipe

Structural pipe is measured by footage, diameter, and thickness and is used to fabricate diagonal braces, horizontal braces, deck framing, boat landing framing, boat landing cleats, deck coaming, and handrails. Drop for structural pipe also varies with the component being fabricated but is usually minimal. The drop ranges from zero percent (0%) to five percent (5%). Structural piping is usually always a form of carbon steel.

Process pipe or Interconnecting Piping (ICP) is measured by footage and diameter. It is also measured by schedule and is used on the offshore platform to move liquid or gases from one location to another. This type of piping is connected using fittings such as elbows, reducers, and flanges. Process piping is risky to estimate due to the fact that most of the time you are bidding on a system that is still in the design phase. Depending on the details available drop can range from five percent (5%) to over fifty percent (50%) under extreme uncertainty. Process piping uses carbon, stainless, copper nickel, titanium, PVC, and fiberglass.

### Structural Beam / Shapes

Structural beams and shapes are measured in linear foot, size, and shape. They are used in the deck and miscellaneous framing portions of a project. The shapes available are wide flange, I beam, and T beam. Secondary shapes like channel, angle and square tubing are also available. Drop is very small in beams and shapes and range from zero percent (0%) to three percent (3%). The reason for the smaller percentage of drop is because the length of the drop can sometimes be spliced together minimizing waste. The material ranges from mild carbon steel to higher strength carbon steels.

### Steel and Fiberglass Grating

Both steel and fiberglass grating are measured in square footage, bar width and thickness, and spacing of the bars. Steel grating is galvanized and is attached to the platform by welding so no additional hardware is usually needed. On the other hand, fiberglass

is attached using various hardware and depends on the design. The drop used for grating is minimal and ranges from one percent (1%) to six percent (6%).

### Paint

Paint is measured in square footage, number of coats, and mils (thickness). Not all items are painted on an offshore platform and sometimes more than one system is used. As a result, special attention must be given to specifications in order to determine what components are painted and what paint systems are used. The coating systems differ depending on the area where the particular component is located, the temperature in which they are exposed to, and are based on the company specifications. The waste for paint is consistent from project to project so a cost is built into both the material and labor rate and are minimal.

### Pipe Fittings and Valves

Pipe fittings are measured per each, type, and size and are used to connect process piping. Some of the types of fittings used are elbows (45 and 90 degree), concentric and eccentric reducers, nipples, and tees. These fittings can be threaded or welded to the piping. Pipe valves are also measured per each, type, and size and are used in line to regulate the flow of liquids and gases by closing, opening, or partially obstructing the flow. Valves can be made of many different materials and range from low pressure to very high pressure ratings. There are high risks involved in the takeoff of pipe fittings and valves for the same reason as piping. Many times during the bidding phase not all of the information is available so quite a few assumptions must be made. The drop used here usually mirror the factors used in the process piping.

Once a takeoff is complete, it then needs to be reviewed by someone different to check for any errors. Many times in larger companies, the takeoff is performed by someone other than the estimator. If this is the case, the quantity surveyor will meet with the estimator in order explain the takeoff before the estimator moves on to the estimate.

## 3. SPECIFIC FACTORS THAT MAY AFFECT TAKE-OFF & PRICING

The quantity takeoff process is a very important step in producing a quality, accurate project estimate. This is what both the labor and material cost are primarily based upon and any errors here will affect the pricing in a negative way. There are many things to consider when performing a quantity takeoff, such as the size of the project, unit conversion, and completeness of the bid documents.

### Project Size

The size of the project is a factor that needs to be considered during the quantity takeoff process. Large projects will involve a large quantity of material to be taken off which allows for an increased chance of error during this process. Many times large projects will involve more people performing different component takeoffs. When all the information is combined, items can be looked over and unintentionally eliminated in the transfer process. Also in larger projects, steel can be ordered from mills which will contribute to lower cost because of the large quantity of steel that is ordered. Mills have certain limits on quantities that can be ordered. On smaller projects mill orders are not available so material must be ordered from steel distributors which will cause higher material cost.

### Unit Conversion

Unit conversion on a project can be an area of special concern. When a project contains any unfamiliar units, these units need to be converted to a unit that the estimator is familiar with. This increases the possibility of error if the units are converted incorrectly and/or numbers are rounded off. Not only do these units need to be converted for the takeoff process, but they also need to be converted back once the proposal is ready to submit to the customer. Accuracy of unit conversion is a must given the impact any mistakes made could have on the takeoff and pricing process.

### Completeness of the Information Provided

The last factor to consider during the takeoff process is the completeness of the information provided by the customer. This certainly varies within the different industries but within the offshore industry a complete design is hard to come by during the bid proposal stage. Many times the project is not completely designed when it is released for bid. This makes the takeoff process more difficult because many times assumptions need to be made. Some projects are in the infant stages of design and takeoffs are not an option. When this occurs typically unit rates are provided based on similar previous projects. In some cases the customer will provide components and quantities in order to evaluate all companies on an even playing field.

Any of these above factors need to be considered during the takeoff process and adjustments need to be made in order to compensate accordingly.

### 4. OVERVIEW OF LABOR, MATERIAL, EQUIPMENT, AND MARK-UP

On completion of the quantity takeoff the project estimate is prepared. The estimate includes calculating manhours, acquiring material cost, outlining what equipment will be utilized and the cost of the equipment, and deciding what percentage of mark-up will be used.

#### Labor

In the offshore fabrication industry there are many different skilled crafts involved within a project, such as welders, fitters, riggers, painters and helpers, along with different skill levels such as 1st class, 2nd class, and leaderman. However, a composite labor rate is established periodically and is used along with the manhours to calculate the labor cost per manhour for the proposal. The composite labor rate is established using the direct labor cost, fixed manufacturing cost, and the variable overhead. The direct labor cost is the cost for the hourly production workers and is typically driven by the top pay. The fixed manufacturing cost includes the cost to run the facility, depreciation, land improvements, and fixed

salaries of the estimators, project managers, buyers, and purchasing managers. The variable overhead fluctuates during the year and includes the cost of office and welding supplies, maintenance and repairs of the facility, payroll taxes, workman's compensation insurance, health insurance, and bonuses. Manhours are calculated by breaking down the platform into components (deck legs, grating, framing, and braces) and multiplying their weights by established production rates. These production rates are developed over the years by compiling production history within the respective company. Once all the manhours are calculated, those hours are then multiplied by the composite labor rate which add up to the final labor cost.

#### Material

Material goes through a quantity takeoff process and is grouped by component, size, and grade. Once all material is accounted for and sorted, three (3) quotes are usually acquired for each item. The lowest quotes are not always used. Sometimes delivery is more important than prices and the company with the quicker delivery time is used. Since the steel industry is volatile material is always priced on a per job basis.

#### Equipment

Equipment used to perform each project is charged to overhead and is factored in with the composite labor rate excluding larger cranes. When the larger cranes are used they are charged a usage rate per hour, day, or month. The larger cranes are usually only used for major lifts like large equipment lifts and deck level floats. Some companies do not charge equipment cost to their overhead and use either their own rates or the industry standard rates for each individual piece of equipment used on the project. If the latter is used the estimator must outline what equipment will be utilized during the project and the duration for which it will be utilized. An equipment cost is then calculated for the project.

#### Mark-Up

Once all labor, material, and equipment costs are calculated mark-up or profit is added. Materials and equipment used on

projects are marked-up anywhere from zero percent (0%) to twenty-five (25%) percent depending on the steel market volatility, length of the project, accuracy of quantity takeoff, and completeness of the bid documents. Labor costs are marked up in the zero percent (0%) to twenty-five (25%) percent range and depend on the time of year, competition, complexity of project, and length of project.

### 5. SPECIAL RISK CONSIDERATION

There are many different special risks that need to be considered when estimating work for the offshore industry. Some of these special risks include the size of the project, the time of year, the final location of project, and current facility workload.

#### Project Size

The size of a project can affect the overall cost of a project. A large scale project can involve a much higher risk due to its complexity. The coordination on a large proposal involves more people, material, and labor. This leads to the increased risk of items being missed or overlooked. That can have a substantial cost impact on the proposal. Larger projects also require a larger workforce and the availability and cost of subcontract labor can cause an increase in the risk.

#### The Time of Year

The time of year the project will be fabricated has a small impact on the bid itself but still needs to be taken into consideration. Depending on an estimator's geographical location these impacts may vary. In South Louisiana, South Texas, and other coastal areas, hurricane season is a time when production days are sometimes lost but are hard to predict. Extreme heat or cold and rain can cause a decrease in productivity and need to be accounted for within a proposal. Typically a factor is calculated based on that year's predictions and used for the months the project would be completed during. Hurricane factors are calculated by using the number of hurricanes predicted



multiplied by the predicted percentage that one will hit the facility multiplied by average lost days per hurricane. It is not an exact science but is sufficient for estimating purposes.

### The Final Location of the Platform

The final location of the platform is also a risk factor. Certain areas such as the North Sea and off the coast of Nova Scotia have more stringent specifications and special material testing which increases the project risk. Due to those specifications and testing, the availability of certain material can have a negative impact on the schedule and the special testing required on the material can increase the cost of that material.

### The Current Workload

The last risk consideration is the current workload of the company and is often overlooked. This can also cause a negative impact on the schedule if the facility becomes overbooked. Each fabrication facility has established maximum manhours it can work per day, week, month, and year. The established capacity is based on the number of production workers it currently has, the availability of subcontractor workers if an increase in workforce is needed, the available shop space, yard space, and equipment available. All fabrication facilities have limits and once those limits are exceeded some or all current fabrication schedules will be affected. Special risk considerations are sometimes tough to assess but become easier with experience.

## 6. RATIOS & ANALYSIS

Companies have built production platforms for many years and during those years have developed both component rates as well as overall rates that are used to check the project estimate. Even though the overall cost to build platforms has increased over the years, the labor production rates have remained fairly the same except for the improvements to technology that have been made. Some improvements include automated cutting tables and welders, and as a result small adjustments to those affected component

rates have been made. Components are usually separated line by line and each rate is compared to the benchmarks developed within the company. Components like deck plate, gussets, padeyes, handrails, deck legs, and piping are measured by manhours per ton. Other components like grating, paint, and insulation are measured by manhours per square foot. Material costs are measured dollar per ton. Each line item is checked against the company's established rates. If the item is in line with the rates it is assumed to be correct and the next item is checked. If the item is out of line with the rates then the deviation is investigated and a decision is made to proceed with the current rates or correct the error. Once all items have been checked individually, the overall rates are checked. If the overall rates are in line then the project cost is accepted. If the overall cost is not acceptable then the information is collected and analyzed to try and justify the deviation. Issues that can cause higher than acceptable rates are the diameter and length of deck legs; the diameter, schedule, and/or material grade of process piping and the size and framing method used for the platform, among other things. Once the estimates are reviewed and all justifications are accepted, the bid along with all other technical information is proposed to the customer for their review.

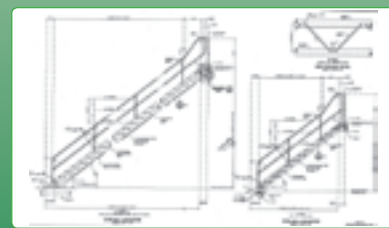
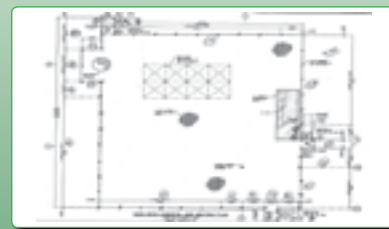
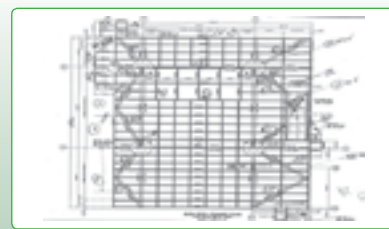
## 7. ADDITIONAL PERTINENT INFORMATION

For the majority of projects, the company accepting proposals also requests technical information to be submitted along with the estimate. This technical information includes a project schedule, manpower histograms, the contractor's facility information, project execution plan, insurance certificates, financial information, and safety and quality procedures. There are no real guidelines so the customer can request any information it deems necessary to assist in selecting the best contractor for the project. In the offshore oil industry the contractor with the lowest bid is not necessarily the contractor that will be awarded the project. Many other items are considered, such as the contractor's ability to perform the work properly, experience in similar

projects, the company's financial state, availability of facilities, and its safety philosophy and record. Safety is one of the major issues when deciding to award a project to a contractor. One or two major safety incidents can hurt the company's reputation and cause that contractor to lose work. A company's safety history and policies are reviewed before it is awarded a contract.

## 8. SAMPLE PLANS

The sample plans used for this sample estimate are from a past project. Due to the large number of drawings on this project, only project overviews along with a few detailed drawings are provided. The takeoff method was completed by using a scale and taking off material per each hard copy drawing.



*Sample Plans and Sample TakeOff & Pricing Sheets are available online.*

## 9. SAMPLE TAKEOFF & PRICING SHEETS

Quantities taken off have been consolidated down per component on the pricing sheet due to the large number of sizes and details. The pricing sheets are broken down into thirteen (13) different subcategories. They are as follows:

- Description – describes the component on a line item basis
- Weight – summarizes the weight of the component in tons
- Bid Manhours – summarizes the manhours calculated per line
- Manhour per ton – divides the manhours by the tonnage for analysis
- Dollar per hour – labor composite rate including a built-in profit
- Labor cost – calculated by multiplying the manhours by labor dollar rate
- Material cost – based on the quotation from the material suppliers
- Outside services - non-destructive testing, machining of parts, hot dip galva-

nized, and any other cost associated with work done by an outside facility

- Bid total cost – total cost of labor, material, and outside services excluding profit
- Profit – profit on the material used
- Selling price – total cost of labor, material, outside services, and profit
- Dollar per ton – selling price divided by the tonnage

Following the summary pricing sheets are a few pages of the detailed takeoff. Again, due to the large number of components and information only a few examples are shown.

Once the contractor's proposal has been submitted to the company the time frame to receiving feedback varies from company to company and project to project. On smaller projects award time is as little as a few days. On larger projects project award time can range from a few weeks to 6 months or more. Also on larger projects the contractor and

company may meet several times prior to award in order to discuss the proposal and reevaluate the contractor's facilities. Once the company feels comfortable with the contractor's ability to perform the work and the price is acceptable, the contract is awarded and the work commences.

## 10. GLOSSARY OF TERMS

**Drop:** Is considered the material that is wasted once an item is fabricated

**Roll Deck Leg Sections:** The process of taking purchased flat plate and passing it through a roller forming a cylindrical column used for deck legs

**Neat Weight:** Is the installed weight of a component excluding waste

**PVC:** Polyvinylchloride

**Mill:** An industrial plant for manufacturing steel

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# Model-based Quantity Takeoff and Estimate Validation

Paul Martin, LEED® AP | Sr. Estimator - HerreroBoldt | ASPE National Education Committee - Northwest Rep. | member of Sacramento Ch. 11  
Hung Nguyen, PhD | Virtual Design and Construction Specialist - HerreroBoldt

What are challenges that estimators face when a commitment has been made to use, to rely on, and create “trust” of a fully coordinated three-dimensional construction model, which will be used for extracting quantities, and a detailed costing tool that parallels the traditional detailed construction cost estimate?

This article is a reflection of profound estimating concepts and their interrelation necessity to the modeling team’s methodology. We will also share our discoveries to the question: How important is the estimator’s involvement and where is the balance point of collaboration between the modeling and estimating teams?

## Current State of the Industry

Construction estimators are certainly living in an exciting time. As a profession we find ourselves in the midst of adjusting our traditional approach, thought process, techniques and quantity analyses. To stay on the cutting edge and remain competitive, an estimator must embrace the wonderful technology boom of Building Information Modeling (BIM) including model-based takeoff and estimating. BIM and associated technologies are quickly becoming the next step in the evolution of the estimating process. The estimating community as a whole is discovering how estimators work in a collaborative atmosphere with modeling team. Because of the need to stay competitive in the industry, it is essential that this new technology is utilized to its

fullest potential by the estimator. BIM allows estimators to be faster, leaner while increasing quality. This evolving technology offers the estimator a “real-time” conduit to a project’s development of design and function and their associated cost impacts through the entire design process.

The estimating profession is faced with an ever growing reality that utilization of dimensional models (3D, 4D and 5D) by the estimator is now here. BIM was primarily used between architects, engineers, subcontractors and general contractors as a collaboration tool for clash detection. Estimators were not specifically involved in the process. Most estimators looked at the model for reference but had minimal input in the actual building of the model. That was likely because the project was probably already priced. Although estimators had respect and appreciation for a fully coordinated model for construction, we still thought “I told you how much the project is, it’s up to the operations team to make all of the parts and pieces fit together”. Then at some point in the evolution of BIM, estimators started hearing things like “Soon we will just need to push a button from the model and a magnificent estimate will be produced”. I’m sure estimators remember hearing those words for the first time and possibly thinking “wow...maybe I need to look for another profession because an estimator, as I knew it, was going to become obsolete”. The reality of course is the estimating profession is moving closer to full integration of this new technology.



Figure 1. Cathedral Hill Hospital Project  
(rendering image courtesy of Smith Group)

Furthermore it is becoming quite evident that estimators are vital in the process because of complicated quantity extraction and complex cost analysis required for an accurate project cost.

Estimators, for the most part, have a strong protective attitude when it comes to preparing pricing. We price what we know and discover what we don’t know. We put the estimate together with the confident conclusion of an accurate forecast of what a project will cost, we hope. Estimators can passionately defend their estimates from tough scrutiny because the estimator knows their estimate very well. They understand the relevant cost drivers, the required subjective line items which include individuality and style as the

result of the interpretation of the data (or lack of data). In essence the estimator understands their estimate because of the personal interaction in creating it. If the model is to be considered a trusted estimating tool it will require the estimator to understand the data points and cost drivers that make up the model to the same comprehension as the traditional detailed construction estimate.

BIM is an accepted norm for clash detection and is well on its way to becoming a trusted conceptual estimating tool. However conceptual estimating by its very nature is a “big picture” cost assessment early in a project. Conceptual estimates are typically based on large bits of information and are not usually

as complex or as sophisticated as a construction estimate. Because of the comprehensive nature of the construction estimate the challenge our profession faces is as the model matures through its course of design, will it reflect all relevant costs as defined in the traditional detailed estimate? Can the model function as the trusted and established project cost estimate?

HerreroBoldt is doing remarkable work in embracing the new technology and its full integration into estimating. It is important to note that many other companies are also doing great work on this subject as well. It is a pleasure to share our experience with Model-base quantity extraction and model-based estimating integration on a 16 story, acute care hospital project being built by HerreroBoldt.

### Project Background

Cathedral Hill Hospital (CHH) is a new Acute Care and Women's and Children's hospital in San Francisco, California. It is a part of the California Pacific Medical Center (CPMC), an affiliate of Sutter Health. The 925,000 BGSF hospital will have 555 patient beds and the total project budget is approximately \$1.7 billion. The hospital will have 16 Stories and 2.5 Stories Underground Parking. The current design effort of CHH began in 2007 and construction will begin in 2011. At the time of this publication, the project has received incremental approval from OSHPD and is awaiting entitlements approval from the City of San Francisco.

Sutter Health, one of northern California's largest health-care providers, has shown a commitment to lean practices as a design and construction philosophy to execute its major capital projects. It translated lean ideas into an organizational philosophy based on "Five Big Ideas": (1) collaborate - really collaborate, (2) increase relatedness, (3) projects as a network of commitments, (4) tightly couple learning with action, and (5) optimize the whole. Sutter, the architect, and the GC formed an Integrated Project Delivery Team

to facilitate design, construction, and commissioning of the Project. The IPD team includes the owner, architect, consultants, GC/CM, and trade partners (subcontractors). The IPD team is organized into cluster groups. Cluster groups are the organizational units for all phases of project delivery and members of clusters are physically co-located in a shared office space. Cluster groups are cross-functional teams of facility stakeholders, designers, and contractors. Cluster groups for this project include: structural, MEP (mechanical, electrical, and plumbing), exterior skin, interiors, technology, virtual design and construction, equipment, vertical transportation, and production. Oversight to the multiple cluster groups is provided by a group of executive representatives from all major stakeholders called the "Core Group". The Core Group meets on a weekly basis and continuously monitor the team's progress and priorities.

To support lean thinking, the CPMC team developed its own relational contract called the Integrated Form of Agreement for Lean Project Delivery (IFOA). The IFOA created the contractual and financial framework to facilitate the effective collaboration of the owner, architects, engineers, specialty contractors, and supply chain members. According to this

agreement, all costs such as labor, overhead, materials, and purchased equipment will be reimbursed at actual cost. The profits of Architect, major design consultants, CM/GC and Trade Partner are generally converted to a lump sum, in which portion is deferred to a shared risk pool. The shared at risk pool is paid to IPD team members if the project cost is less than or equal to the Estimated Maximum Price (EMP) (aka. allowable cost). If the project cost exceeds the EMP, the at-risk pool will be used to repay the owner for the difference. With this arrangement, Sutter has removed all but a small quantified amount of risk from the project for IPD team members. This freedom allows the team members to collaborate and focus their effort in maximizing overall value of the project instead of trying to optimize their own operations. During the design phase, team collaboration efforts were orchestrated through a Target Value Design process where weekly cost estimates are produced to reflect changes in program and design. That increases the need for rapid quantity and cost updates from an evolving design. The IPD atmosphere creates an atmosphere for Estimators, VDC staff and designers, to explore and learn from each others role.

### The Collaboration Process between

### Estimators, VDC Staff and Designers at the Cathedral Hill Hospital Project

The National Building Information Standard project committee defines Building Information Model (BIM) as "a digital representation of physical and functional characteristics of a facility." The production of BIM for the construction of a project involves an integrated multi-disciplinary model which encompasses building geometry, spatial relationships, quantities and properties of building components. The Virtual Design and Construction (VDC) staff manages the model from the pre-construction phase through commissioning phase in order to assist project management coordinate space and analyze the model-based schedules, logistics, takeoffs and estimates. In regard to the quantity takeoff and estimating, the VDC staff acts as a conduit to bridge estimators and modelers in order to ensure the models can serve estimating purposes.

During design development, the IPD team performed most of the design work using 3D modeling applications such as Autodesk Revit and 3D CAD. Key issues for the hesitation of using of model-based quantity takeoff as identified from interviews with trade partners were (1) 3D models were not configured to provide quantities in a format and level of detail that match the estimator's expectation, and (2) cost estimators lacked trust in model quantities and did not have the tools or training needed to perform model-based quantity takeoff. In a conventional project, a limited communication channel exists between estimators and modelers. However, these issues can potentially be mitigated by providing training to cost estimators and having modelers and cost estimators work together to ensure that quantity outputs

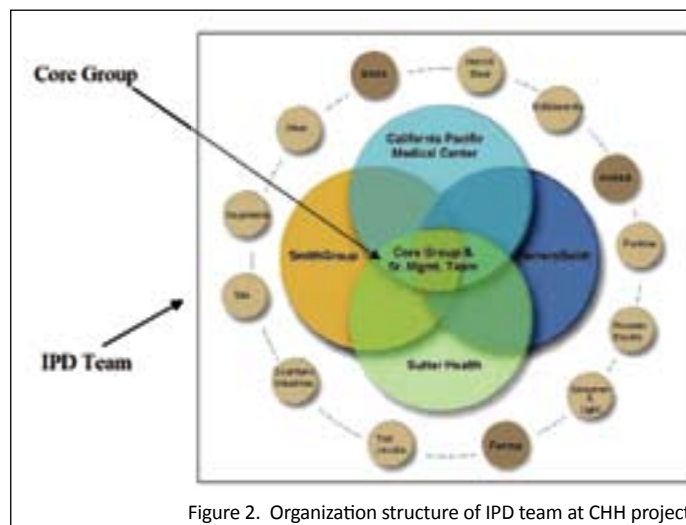


Figure 2. Organization structure of IPD team at CHH project

continued on page 25

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- 302 LEED for New Construction: Applying the Guidelines
- 304 Green Building Commissioning
- 305 Building Green Buildings: The Contractor's Perspective



Contact Tina Cooke  
615.316.9200  
[tina@aspenational.org](mailto:tina@aspenational.org)



## Randall Russell, CPE National Education Committee Southeast Representative

Randall Russell, CPE

Baldwin and Shell Construction Company  
Rogers, AR

Years in the Construction Industry: 16

Number of Years with Baldwin and Shell: 6

B.S. in Construction Management,  
Oklahoma State University

Certified Professional Estimator

National Education Technical Committee  
Southeast Rep. (ASPE)

Chapter #79, Razorback – Vice President

Randall Russell started in the construction industry by sweeping sawdust off the floors of his grandfather's cabinet shop at the age of fourteen. Among other things, his grandfather was adamant that he learn the many uses of a framing square and a slide rule when laying out work as a carpenter. He spent the next four years working as a carpenter building custom cabinets and spiral stair cases with little more than these tools, which laid a firm foundation for his understanding of arithmetic, geometry, and trigonometry without the use of a calculator. After graduating with honors from Southside High School in Fort Smith, Arkansas, he attended Oklahoma State University

on an academic scholarship. While attending OSU, he was a starting player years on the university's rugby team. He graduated with honors with a Bachelor of Science in Construction Management in 1999.

Upon graduation, he began working as a field superintendant for a site work and heavy highway contractor in Fort Smith. He quickly moved on to the ranks of estimator in the commercial building industry. He is currently the Chief Estimator of the Northwest Arkansas Division for Baldwin and Shell Construction Company, a general contractor based in Little Rock, AR. Randall has been with Baldwin and Shell Construction Company since 2005, when he was hired as the estimator for the Northwest Arkansas office.

Randall achieved the status of Certified Professional Estimator in 2007. He is also a charter member of the Razorback Chapter, No. 79. He has served as chapter vice president and certification chair, as well as representing the southeast region on the National Education Technical Committee.

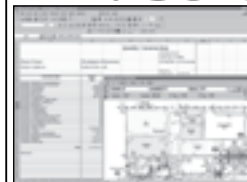
In his personal life, Randall is an accomplished musician, having started playing instruments at the age of five. He still occasionally plays in with bands as a guitarist, pianist, and organist. He also enjoys keeping touch with his older brother, Col. Chris Russell, USAF, especially during football season, as he is

a graduate of the University of Oklahoma. He is involved in building and restoring classic cars and motorcycles, and enjoys attending car shows and drag races. He has two children and resides in Fayetteville, AR. ■

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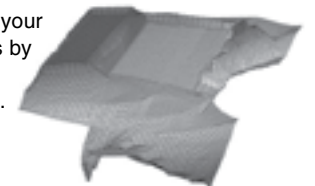
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*The ASPE would like to extend a warm welcome to our newest Members & congratulate our new Certified Professional Estimators!*

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January 2011

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Golden Gate	2	Timothy N. Baker
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Denver	5	Kyle B. Zentz
Arizona	6	Arnold C. Petter
Arizona	6	Chad Buck
Arizona	6	Albert Kachekian
Sacramento	11	Pete J. Sasso
Sacramento	11	Mary Wallers
Atlanta	14	Kent M. Farley
Atlanta	14	James S. Stroud
Baltimore	21	Rory S. Fracasse
Baltimore	21	Jason L. Hershey
Rio Grande	40	Miguel A. Jaime
Tampa Bay	48	Nicci Perone
Gold Coast	49	James P. Ginopoulos
Orlando	50	William W. Martin
Orlando	50	Michael L. Smith
Orlando	50	Orrie Feitsma
Inland Empire	68	Steven M. Mock
Inland Empire	68	Dave A. Volcansek
Las Vegas	72	Jordan A. Brown
Brew City	78	Ryan E. Hastings
SW-MAL	90	Phillip N. Baker

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MEMBER	CH. NO.	CH. NAME
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Robert Smith, CPE	43	Dallas/Ft. Worth
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continued from page 21

from a 3D model are usable by cost estimators. The VDC staff help close the gap and help the estimator understand the modeling process and help designers understand estimating needs. This resolution proved to work successfully when we created a communication channel between modelers and estimators and implemented a model vs. manual takeoff validation process, as described in Figure 3.

**The Collaboration Process**

The IPD allows a close collaboration between the estimator, the VDC staff, and the designer. This collaboration helps the estimator to understand how the model is built, the data contained in the model, and limitations of the modeling application in quantity takeoff. At the same time, it helps the VDC staff and the designer to understand estimating needs and formats so that they can specify names and assemblies of model objects for estimating purposes.

The process starts with collaboration between estimators, VDC staff, and designers. The estimator specifies formats of quantity needed for the estimate, i.e. curtain wall areas classified by location (North, West, East, South, Courtyard, Drive Through, etc.). The VDC staff works with designers to identify if additional data should be included in the model so that the quantity would come out at the estimator's desired format. In the curtain wall example, the designer added a parameter that contains location data for each curtain wall unit and then fills in data while modeling.

Since BIM contains dimensions and characteristics of design elements, it has the potential for object quantities to be generated automatically. However, default dimensional data from BIM may not always provide the needed values for the estimator to calculate detailed cost items. Therefore, a modeling standard should be in place to make sure that the data exported from the model is appropriate for the

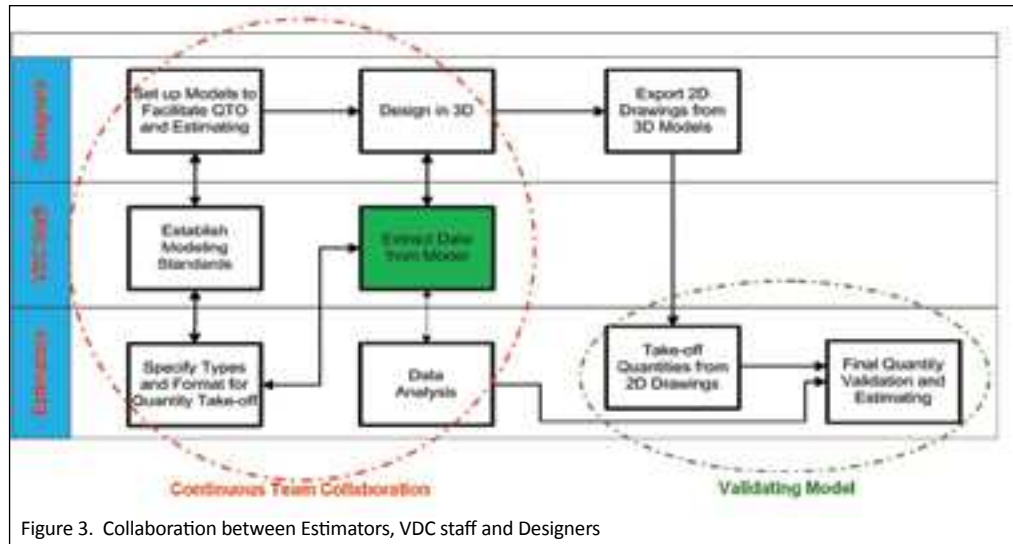


Figure 3. Collaboration between Estimators, VDC staff and Designers

estimating purpose. At CHH, we use the following modeling for quantity takeoff principles to guide the modeling process: (1) Using detailed descriptions, standardized family and name; (2) Maintaining a 'clean' model that has no floating object and no duplication; (3) Dividing objects according to construction sequence (i.e. wall, slab, exterior panel); (4) Adding parameters that help segregate quantities for estimating, such as: level, elevation, construction zone; (5) Avoid using generic models which have no dimensional data. The VDC staff coordinates with both designers and estimators to make sure that data exported from the model serves the need of the estimator. When the estimator needs quantity takeoff for certain items he will work with a VDC staff to extract that quantity from

the 3D model. The estimator then performs an analysis of the extracted quantity to make sure that it is correct and usable for quantity validation and estimating purposes. This collaboration helps the estimator understand what is and what is not in the model as well as the limitations of modeling applications. For a certain types of quantity calculations quantity that are not practical to extract from the model, the estimator can use 2D drawing for quantity takeoff.

**Validating Model**

To validate the accuracy of the model quantity, we performed both model-based takeoff and 2D takeoff in some portions of the building and compared results. Figure 4 presents examples of those comparisons. In most of the cases, we found a significant difference

between quantities during the first round of comparison. Various reasons may contribute to the quantity discrepancy such as errors in takeoffs from 2D drawings (i.e. drawing interpretation), errors in model takeoffs (i.e. incomplete model or objects with no geometry data), the inclusion/exclusion of waste factors or openings, or even comparing difference versions of model/drawings. The validation process helps the estimator identify those errors and align quantities from manual and model takeoffs thus he can build trust in the model quantity. When we performed a second round of comparison after validation we often observed a large reduction in quantity discrepancy between manual and model takeoffs.

As an example in Figure 4, we found a 4.3% difference in the

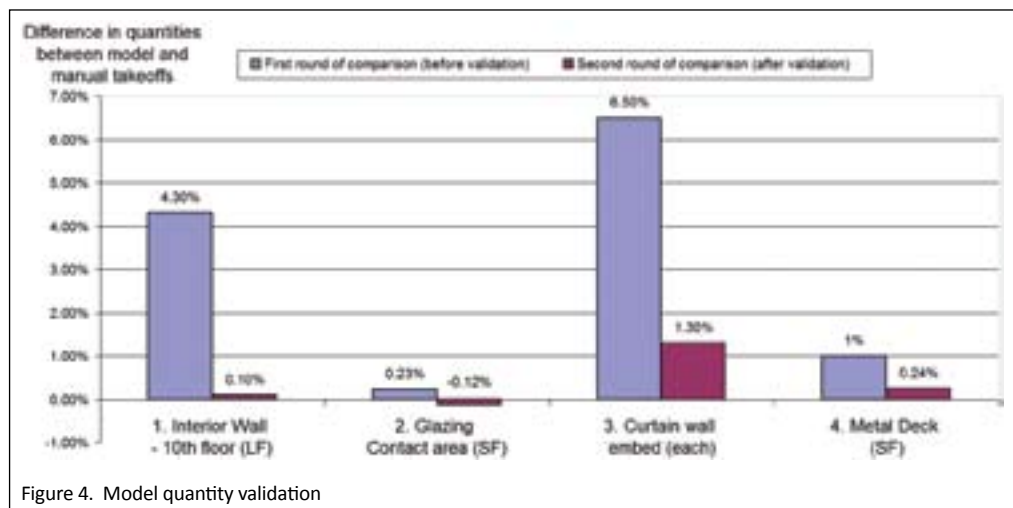


Figure 4. Model quantity validation

>>>

quantity of interior wall on the 10th floor in our first round of comparing quantities between model and manual takeoffs. Through investigating the quantity discrepancy we discovered a large difference in the quantity of wall type 0A6 (352 LF from OnScreen Takeoff versus 722 LF from the model takeoff). As shown in Figure 5, while performing a wall takeoff it is typical for one to include 2.6 LF (highlighted in yellow) as the length of the 0A6 as shown on the 2D drawing. However, when looking at a 3D view in the model (Figure 6), the actual length of the 0A6 wall was 9 LF. Around 60 similar instances of this error on the 10th floor added up to make 4.2% difference in the total quantity.

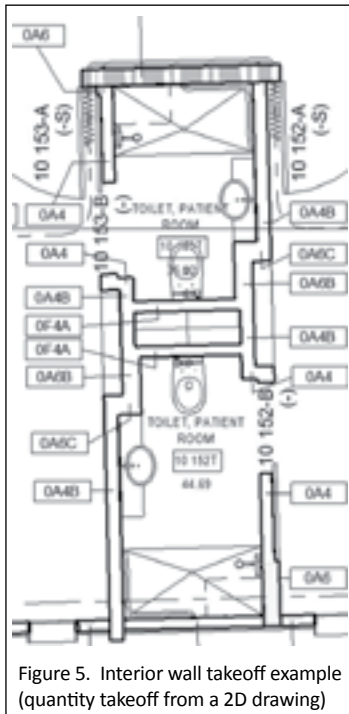


Figure 5. Interior wall takeoff example (quantity takeoff from a 2D drawing)

After adjusting the manual takeoff quantity by adding 370 LF to the wall type 0A6 quantity, the difference between manual and model takeoff reduce to 0.1%.

**Model Visual Quantity Verifications Helps Understand the State of the Model**

Verification of quantities through visual aids are a key component to the maturity of the model certainly if the model will be transitioning to construction costs. A very effective way to help confirm quantities is the ability to work with the VDC staff and create layers of data that will produce a relevant visual aid. These aids are used in tandem with manual takeoff, providing backward logic checks (confirmation from other related quantities) and data summary reports from the model. Figure 7 (left) is an example of utilizing the model to help verify a “high level” check of metal panel quantity on the east elevation. In the other example in Figure 7 (right) a visual aid is used to help understand tube steel quantities behind the metal panels. Another advantage to the estimator is the ability to see each trade’s responsibility through a color coded filter as illustrated in Figure 8. Due to the size and complexity of the CHH project, visual aids have been a valuable tool and help the team understand the current state of the model while helping mitigate possible risks posed to the estimate.

**How Does the Estimator Gain Trust in the Evolving Model?**

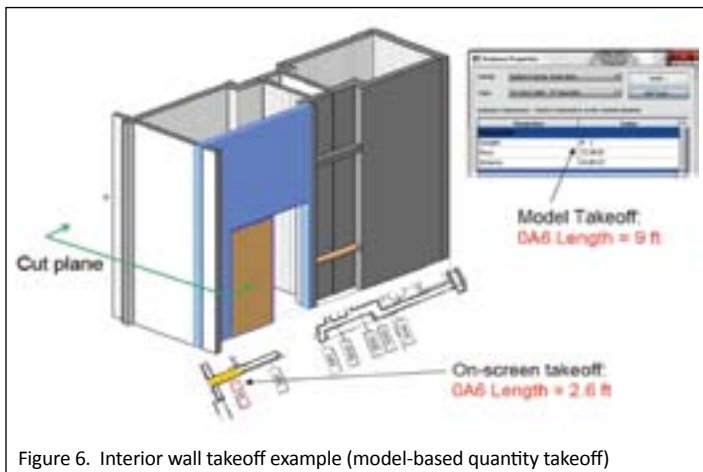


Figure 6. Interior wall takeoff example (model-based quantity takeoff)

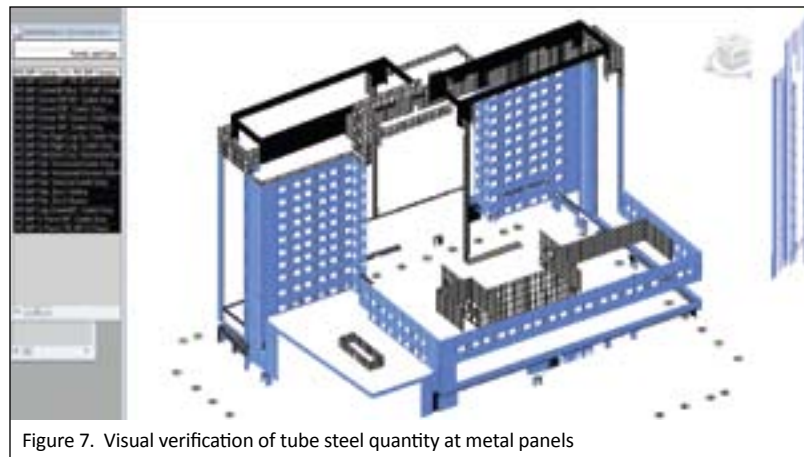


Figure 7. Visual verification of tube steel quantity at metal panels

As the model progresses the team will be utilizing the model’s capabilities for quantity extraction for comparative analysis. Trusting the model through spot check and manual quantity cross checks is also an important step in the trust building factor. In the Cathedral Hill Project using quantities from the model and verifying those quantities through proper analysis was a huge benefit to the efficiency of the estimator. Furthermore it was informing the team in “real time”. Although it is important to note that because of the massive size of the project and the extent of which very complex quantity data was needed for accurate validations, we did not consider the model data to be absolute until that portion of the data was (1) understood and (2) was verified. The verification process was a collaboration between estimators and VDC staff.

The master project estimate is a valuable tool used by the entire IPD

team because of detail break outs, quantity break outs, subjective costs and format which make up the project cost. These factors contribute to an estimate that the team can trust. It’s format allows the team to understand all of the components that make up the costs. “Trust” is a common denominator needed for the master project estimate and the model which is being used for pricing validation in our Target Value Design process.

Some important questions that are imperative to address are: How are we going to hold the model to the same high standards and expectations as the traditional project estimate? As the model becomes more complex and begins to represent a realistic forecast of not only the building components; but also the forecast project cost, what are the checks and balances that are being used to confirm its completeness as compared to the master estimate? How are we going to trust the model?

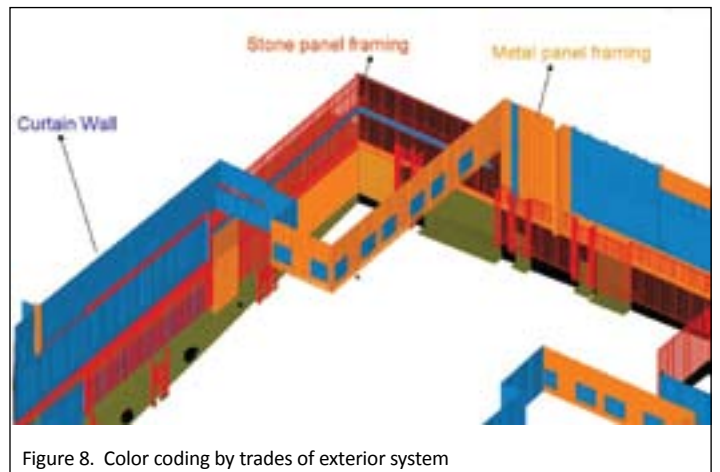
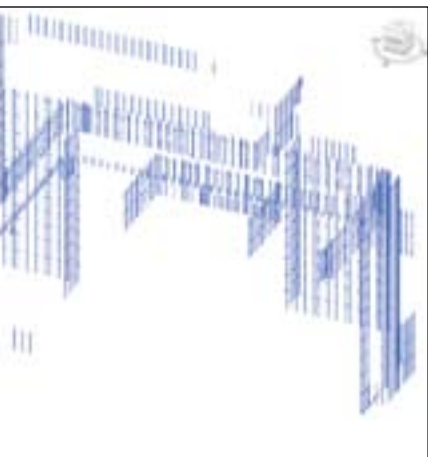


Figure 8. Color coding by trades of exterior system



As mentioned earlier estimators by nature are suspicious of agreeing and stamping their approval to a process that is not fully understood. The following example (Figure 9) is a method that creates a path to an understood and trusted model by the estimator and the VDC staff.

The Master Estimate is made up of components that equal the accurate predicted cost of the project. This is considered to be a traditional estimate approach. The Master Estimate is in a trusted state because the line items which make up the estimate are easily understood. More over the traditional estimate contains all cost items deemed relevant to the accumulative cost. On the other hand the model is a compilation of what is modeled and what is not modeled at any given moment in time. This means that the model does not necessarily reflect the true cost of the project furthermore this means that the model is in a constant state of

change and should be closely monitored by the VDC staff and the Estimator to understand the models maturity and its current level of a fully trusted state. It is typical for the model, even if in a mature state, not to include all data points required for a complete cost. Simply put, some things may not yet be included in the model nor possibly ever will be placed in the model. (i.e. allowances and other subjective costs).

In Figure 9 below, we use three categories to understand the maturity level of the cost model. They are: Model, Subjectives, and Master Estimate. The model is considered to be in a trusted state when the following formula is true:

$$\text{Total cost in the Model} + \text{Total cost in the Subjectives} = \text{Total cost in the Master Estimate}$$

**Model:** The model is made up of a tremendous amount of data. Some of these data points are relevant to cost and some are not. The items that are pertinent to cost are grouped logically together in cost driver groups. A cost driver is a parameter that has a predominant effect on system cost, for example, the square footage of stone panel can be a cost driver for the exterior stone system. The allocation of cost from the main estimate to the model will focus on the cost drivers, not the miscellaneous items. For example, costs of materials (such as brackets, bolts... which are miscellaneous items and are not modeled versus stone panels which are modeled) and costs of installation (labor, equipment) will

be allocated as required to allow for accurate production versus material tracking of stone panel in the model. The items in cost driver groups are relevant parameters that are required for the product and / or system being estimated.

**Subjectives:** The Subjective category are cost items that are captured in the master estimate but are not yet in the model or will never be included in the model. The subjective cost is the bridge between model cost and Estimated cost.

**Master Estimate:** The Master Estimate includes all costs for the project and is the baseline cost estimate. It is used to validate the model and to determine the models trust factor and reliability to the actual construction cost.

Furthermore each individual cost line item if in the Model or in Subjectives should be accounted for in the Master Estimate. Conversely every cost line item in the Main Estimate should be accounted for in either the Model or in Subjectives. The model transformation to an “actual cost” model must be a methodical and planned movement. Data points and cost drivers that make up the model need to be fully understood by the estimator to allow for conformation that the model is in sync and is approaching the same quality and expectations as the trusted master project estimate.

### The Path to Trusting the Model in Parallel with the Construction Estimate

With collaboration between the VDC staff and the Estimator the model will make a transition into a trusted state. At that state, there is a collective understanding of “what is” and “what is not” being represented in the model. Typically once the construction project estimate is completed and in its trusted state it becomes a static document. On the other hand, after the model reaches a 100% trusted state, therefore in balance with the main estimate, it can mature even further than the traditional construction estimate. The model

then becomes an accurate tool for cost forecasting and production controls that the IPD team can trust with a high level of confidence. The model can become a life-cycle estimate tool that will be relevant for the entire project duration.

The Project Estimate’s maturity and trust development as compared to the Model Development’s are out of sync early in the design. The trusted state gap does not converge until the construction document phase of the time line. The lag time in early design phases should not be considered an acceptable industry norm. Through early and effective collaboration between the estimator and the VDC staff the lag time of the model development can be marginally improved. This of course will provide a greater efficiency for real-time cost analysis and other desired feedback.

In the case of CHH, the estimate used for validations is at a higher level of costing detail than the developing model. Typically large projects such as CHH requires a complex estimate which are a compilation of costs structured and driven by quantities and subjective cost factors which represent an accurate cost of the project. The estimated costs of the project, for the most part, are quantity driven. Although, at first, the project estimate may have more relevant and complete details reflecting the most accurate project cost prediction; it is certainly common for the model to mature and grow into a more reliable pricing tool. However, earned trust in the data generated from the model is key to success. In Figure 10 the point of intersection of lines (Model Transition to a Trusted State) represents the point in time which the estimator and VDC staff have a high confidence / trust in the model. Furthermore at this point an estimator would have a mutual and equal trust between the model and the project estimate.

### Benefits of Utilizing and Trusting the Model

Table 1 shows a comparison of man hours spent on performing

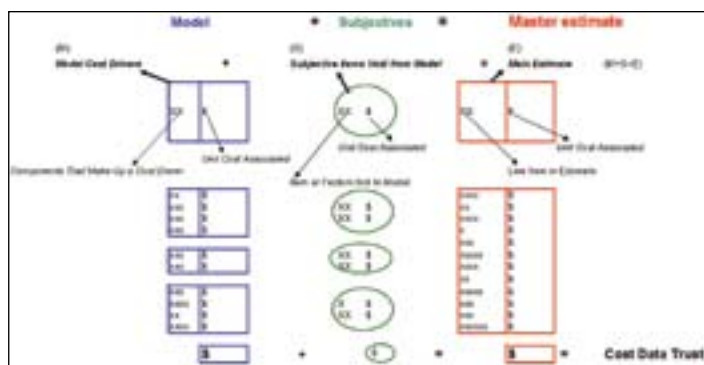


Figure 9. Model Conversion-Interrelation with the established Main Estimate to build a trusted cost model “Similar to the Reverse Engineering Concept”. The goal is to create a model that is trusted to the same degree as the traditional Master Estimate.

quantity takeoffs using Onscreen Takeoff versus model-based takeoffs. Total time required for quantity takeoffs was reduced by more than 75% in all case studies. As an example, Structural Cluster was a pioneer in using the model-based quantity takeoff to inform structural design. The Structural Cluster was responsible for designing and detailing the foundation and structural steel systems for the project. It included Herrick Steel (Structural Steel Contractor), Pankow Builders (Concrete Contractor), Pacific Erectors (Metal Deck Contractor), Degenkolb (Structural Engineer), and HerreroBoldt (CM/GC). Herrick Steel was one of the first Trade Partners to establish a model-based quantity takeoff process to extract material quantities from the structural engineer's design model. Their successful use of model-based quantity takeoff helped reduce its cost estimate turnaround time significantly. Originally, it took Herrick Steel three weeks with 240 man-hours to manually perform quantity take-off for the entire CHH structural steel system. After putting a model-based quantity takeoff process in place, it took only 8 man-hours to perform both the quantity take-off and the cost update as shown in the first line item in Table 1. To achieve this efficiency, Herrick Steel's cost estimator worked with a Degenkolb Engineer's Autodesk Revit modeler to create built-in material schedules in Autodesk Revit Structure so that when exporting these material schedules to Microsoft Excel the format would match that of Herrick's cost estimating standard. As a result, when Degenkolb published its design model weekly on Thursday afternoons, Herrick could extract updated quantities to its standard cost estimating spreadsheet, check, and then provide a cost update for the structural steel system to the Target Value Design team by the end of Friday.

In the traditional context, preparing a detailed quantity takeoff and cost estimate requires extensive

Table 1. Time savings using model-based quantity takeoff

Examples	Manual QTO (man hours)	Model QTO (man hours)*	Difference
1. Structural Steel	240	8	- 96%
2. Glazing - Contact areas	8	2	- 75%
3. Curtain wall embeds	2	0.25	- 88%
4. Metal Deck: - First time - Second time	40 12	2 0.5	- 95% - 96%
5. Interior Wall: - 10th floor - Entire building	6 80	1 4	- 83% - 95%

work hours. Consequently, cost estimates are performed after each key design phase and during the bidding process, leaving gaps were project costs can grow out of control. In Target Value Design, estimating must progress simultaneously as design develops, that requires a quick turnaround in quantity takeoff and estimating in order to provide cost feedback to inform design. When the model is properly set up and the model quantity is validated, the model-based quantity takeoff process can be efficient and accurate as it reduces the need for manual measuring from two-dimensional drawings. This efficiency allowed estimators to spend less time doing quantity takeoff and have more time for pricing, analysis and value engineering. The model also allows design changes to be quantified instantly resulting in faster cost feedback to inform design. The quantity validation process brought estimators of the General Contractor and Trade Partners on the same page and it helped explain quantity discrepancy.

With a high level of flexibility of the model in classifying and grouping quantities according to construction locations, construction sequence, product size, etc., a trusted model will not only facilitate estimating but also provide factual data needed for production planning, cost controls and cost forecasting during construction.

### Lessons Learned and Conclusions

It is crucial to form

collaboration between estimators, VDC, and designers during early design phases. This collaboration allows estimators to understand modeling process, and at the same time allows designers to understand estimating needs. For estimators, it is important to understand limitations of model-based quantity takeoff, to be aware of scope gaps between subcontractors/trade partners, and to know what is not modeled in order to factor it into the estimate as subjective allowances.

The conventional estimating techniques, which rely on two-dimensional drawing measurements, have potential for ambiguity, inefficiency and error. Model-based quantity takeoff and estimator's collaboration with modelers remove the ambiguity and potential inconsistencies in project quantities estimations. Quantities can be derived directly from a model, and linked to a project cost database to inform project cost planning and control. Model-based quantity takeoff can reduce the need for traditional laborious and error prone manual quantity takeoffs, which increase estimates' accuracy and estimators' productivity.

It should be understood that efficient and relevant manual takeoffs are likely required in early design phases. These manual takeoffs are used as a strategic process for identifying model data gaps and verifying accuracy and trust of the model. With lessons learned the team's need for strategic manual takeoff will continually re-adjust to perhaps a lesser degree.

In this article, we reflected on our experience in the general contractor perspective. Subcontractors and Trade Partners approach to an estimate might be slightly different than that of the general contractor. These differences should be recognized early on in the process to be accurately aligned before the model reaches a state where these needed alignments become too difficult to adjust. ■

Hung Nguyen is a Virtual Design and Construction Specialist for Herrero Contractors Inc. He is currently working for HerreroBoldt (a partnership between Herrero Contractors and The Boldt Company) at the Cathedral Hill Hospital Project. In this position, he works with the Integrated Project Delivery team to implement construction process simulation, model-based scheduling, model-based quantity takeoff and estimating.

Mr. Nguyen received a PhD degree from the University of California at Berkeley, his doctoral research focused on lean construction, target value design, integration of product, process and cost, and model-based cost estimating. In 2008 he completed the Management of Technology program at Hass Business School, Berkeley. In 2004 he was awarded a Master of Science/Engineering in Construction Management and Value Management from the University of Leeds, United Kingdom.

Paul Martin is a senior estimator for Herrero Contractors, Inc., a General Contractor based in San Francisco, CA. He is also a LEED-accredited professional through the USGBC. Mr. Martin serves on the National Education Technical Committee of the American Society of Professional Estimators (ASPE). He teaches Construction Estimating and Bidding at the University California Davis Extension. He also holds a chair on the UC Davis Extension Estimating Certificate Advisory Board.

Mr. Martin is currently the Sr. Estimator for the Cathedral Hill Hospital Project; a \$1.7 billion (project cost) acute care hospital in San Francisco. Mr. Martin has more than 15 years of construction estimating experience ranging from healthcare, hotels, parking structures and public works projects.

# CHAPTER MEETINGS

STATE BY STATE.  
CHAPTER BY CHAPTER.  
FELLOWSHIP.



## ARIZONA

### Arizona Ch. 6

**Where:** Doubletree Guest Suites  
320 44th St., Phoenix  
**Date:** 2nd Tues. of the Month  
**Time:** 5:30pm Social Hour • 6:30pm  
Dinner Meeting  
**Contact:** Tom Mayer: 602.272.3600  
tom@magnumcompanies.net

### Old Pueblo Ch. 53

**Where:** El Parador Restaurant  
**Date:** 1st Wednesday of month  
**Time:** 5:30pm Social • 6pm Dinner •  
6:45pm Program  
**Contact:** Matt Brogen, CPE  
520.750.6500 • mlbrogen@sundt.com

## ARKANSAS

### Arkansas Ch. 33

**Where:** TBD  
**Date:** 3rd Fri. of Month  
**Time:** 12:00 Noon  
**Contact:** John Wilson 501.842.3866  
• s3wilson@yahoo.com

### Razorback Ch. 79

**Where:** Varies - see website  
**Date:** 2nd Fri. of month • August - May  
**Time:** 11:30am to 1pm Lunch & Learn  
**Contact:** Jon Pahl 479.636.5380 •  
jon.pahl@nabholz.com

## CALIFORNIA

### Los Angeles Ch. 1

**Where:** The Barkley Restaurant: 1400  
Huntington Dr., South Pasadena  
**Date:** 4th Wed. of Month Jan.-Oct.  
**Time:** 6pm Social • 7pm Dinner •  
7:45pm Program  
**Contact:** John Swartz 213.637.9146  
johncarlswartz@yahoo.com

### Golden Gate Ch. 2

**Where:** Alternate monthly:  
East Bay - Francesco's, Oakland &  
San Francisco - Sinbad's Pier 2  
**Date:** 3rd Wednesday of each month  
**Time:** 6:30pm Social • 7:15pm Dinner  
• 7:30pm Program  
**Contact:** Douglas Bibby, CPE  
510-525-9499 • bibby@jps.net

### Orange County Ch. 3

**Where:** The Hastings Room at Ayres  
Hotel - 325 Bristol St., Costa Mesa  
**Date:** 2nd Wed. of Month  
**Time:** 5:30pm Social • 6:15pm Dinner  
• 7pm Program  
**Contact:** Dan Schottlander, CPE  
949.476.3365 • dan.schottlander@  
aecom.com

### San Diego Ch. 4

**Where:** The Butcher Shop Steakhouse,  
5255 Kearny Villa Rd., San Diego  
**Date:** 3rd Tues. of Month  
**Time:** 5:30pm Social Hour • 6:30pm  
Dinner • 7pm Program  
**Contact:** Michael Moyers, CPE  
858.737.7316 • michael.moyers@  
bestinteriors.net

### Sacramento Ch. 11

**Where:** Rancho Cordova City Hall,  
2729 Prospect Park, Rancho Cordova  
**Date:** 2nd Fri. of Month Sept. - June  
**Time:** 11:30am Lunch • 12:15pm -  
1:15pm Program  
**Contact:** Jennifer Farrell 916.504.4070  
• jfarrell@hotmail.com

### Santa Clara Valley Ch. 55

**Where:** Martani's  
**Date:** 4th Tuesday of Month  
**Time:** 6pm Social • 7pm Dinner •  
7:30pm Program  
**Contact:** Kevin Fennimore, CPE  
831.684.0451 • kfinc@ix.netcom.com

### Inland Empire Ch. 68

**Where:** TAPS Fish House & Brewery,  
2745 Lakeshore Dr., Corona  
**Date:** 3rd Thursday of Month  
**Time:** 5:30pm Social • 6:30pm Dinner  
• 7pm Program  
**Contact:** Danielle Leyva  
951.317.7691 • dleyva@mack5.com

## COLORADO

### Denver Ch. 5

**Where:** Red Lion Hotel, 4040 Quebec St.  
**Date:** 2nd Tues of Month Sept. - May  
**Time:** 5pm Social • 6pm Dinner •  
7pm Program  
**Contact:** Heather Boulanger  
303.659.7861 • heather@rollingplains.com

## CONNECTICUT

### Nutmeg Ch. 60

**Where:** Confetti's Restaurant, 393  
Farmington Ave., Rt. 10, Plainville, CT  
**Date:** 2nd Wed. of month  
**Time:** 6pm Social • 6:30pm Dinner •  
7pm Program  
**Contact:** Ed Colon 860.828-2513

### Yankee Ch. 15

**Meeting Info:** TBD - Contact Chapter  
for info: 203.876.8331

## DELAWARE

### Delaware Ch. 75

**Where:** Hilton Hotel & Conference  
Center, Newark  
**Date:** Wednesday  
**Time:** 5:30pm Social Hour • 6:30pm  
Dinner • 7:30pm Program  
**Contact:** Lou Liberti 610.240.4441 •  
liberti@norwdco.com

## DISTRICT OF COLUMBIA

### Greater DC Ch. 23

**Where:** Pepco Energy Services, 1300  
N. 17th St, Suite 1600, Arlington, VA  
**Date:** 3rd Wed. of Ea. month except  
June, July & August  
**Time:** 6pm Program  
**Contact:** Tom Lang, CPE 703.253.1760  
• tlang@pepcoenergy.com

## FLORIDA

### Tampa Bay Ch. 48

**Where:** Crazy Buffet, 2702 N. Dale  
Mabry Hwy., Tampa  
**Date:** 3rd Thurs. of month except  
July & August  
**Time:** 6pm Social • 6:45pm Dinner •  
7:30pm Program  
**Contact:** Debra Witter 863.686.6163  
• dwitter@payneair.com

### Gold Coast Ch. 49

**Where:** Tropical Acres Steakhouse,  
2500 Griffin Road, Ft. Lauderdale  
**Date:** 3rd Tues. of month except June,  
July & December  
**Time:** 5:30pm Social • 6:15pm Dinner  
• 6:30pm Program  
**Contact:** Stacey Miller 954.975.4304  
• stacey@aspechapter49.com

### Central Florida (Orlando) Ch. 50

**Where:** Announced in E-mailings one  
week prior to meeting  
**Date:** 2nd Weds. of month  
**Time:** 6pm Social • 6:45pm Dinner •  
7:30pm Program  
**Contact:** Danny Chadwick 407.618.7482  
• dkchadwick@bellsouth.net

## GEORGIA

### Atlanta Ch. 14

**Where:** Cross Creek Café, 1221  
Cross Creek Parkway, Atlanta  
**Date:** 3rd Thurs. of month  
**Time:** 11:30am Social • 12pm Lunch  
& Program  
**Contact:** LaTarsha Bailey 404.609.9006  
• lbailey@palaciocollaborative.com

## ILLINOIS

### Chicago Ch. 7

**Where:** Anyway's Restaurant & Pub,  
5 East Roosevelt Rd, Oakbrook Terrace  
**Date:** 3rd Thurs. of month, excluding  
the summer, Nov. & Dec.  
**Time:** 5:30pm Social Hour • 6:30pm  
Dinner • 7pm Program  
**Contact:** Marvin Fitzwater II, CPE  
630.678.0808 • mfitzwater@csos.com

## INDIANA

### Central Indiana Ch. 59

**Where:** Varies each month  
**Date:** 3rd Thurs. of month  
**Time:** 5:30pm Social • 6pm Dinner •  
7pm Program  
**Contact:** Keith Parker 317.787.5746  
• keithparker@circlebco.com

### Old Fort Ch. 65

**Where:** Elks Lodge No.155, 4935  
Hillegas Rd., Fort Wayne, IN 46818  
**Date:** 3rd Thurs. of Month except  
Dec., May, June & Aug.  
**Time:** 11:15am to 1pm Program  
**Contact:** Todd Poinsett 260.489.7555  
tpoinsett@wagner-meinert.com

## IOWA

### Quad City Ch. 71

**Where:** Steeplegate Inn, 100 W. 76th  
St., Davenport  
**Date:** 4th Tuesday of Month except  
June, July, August, December  
**Time:** 5:30pm Social • 6:30pm Dinner  
• 7:00pm Program  
**Contact:** Dave Furness 563-386-5151  
dfurness@treiberconstruction.com

### Greater Des Moines Ch. 73

**Where:** Various Locations  
**Date:** 3rd Thurs. of Month  
**Time:** 5:30pm Social • 6:30pm Dinner  
• 7:30pm Program  
**Contact:** Steve Watrous 515-264-0782

## LOUISIANA

### New Orleans Ch. 9

**Where:** Don's Seafood Hut, 4801  
Veterans Memorial Blvd., Metairie  
**Date:** 2nd Wed. of month  
**Time:** 6pm  
**Contact:** Vic Lamastus, CPE  
504.495.9782 • dlamastus@charter.com

## MAINE

### Maine Ch. 37

**Where:** Varies - see website  
**Date:** 1st Wed. of month: Oct., Dec,  
Feb, Apr & June  
**Time:** 5pm Social • 6pm Dinner  
• 7pm Program  
**Contact:** John Brockington, CPE  
207.874.2323 x115 • jbrockington@  
pizzagalli.com

## MARYLAND

### Baltimore Ch. 21

**Where:** TBD - see website  
**Date:** 2nd Thurs. of month except  
December, July & August  
**Time:** 6pm Social • 7:30pm Dinner  
• 7pm Program  
**Contact:** Shana Opdyke 410.458.0289  
• sopdyke@geostructures.com

## MASSACHUSETTS

### Boston, Ch. 25

**Where:** Varies  
**Date:** Last Thurs. of Month  
**Time:** 6pm Social • 6:30pm Dinner •  
7pm Program  
**Contact:** Barbara Connolly  
617.878.4876 • bconnolly@walshbroth-  
ers.com

## MICHIGAN

### Detroit Ch. 17

**Where:** Barton Malow Company,  
26500 American Drive, Southfield  
**Date:** 2nd Thurs. of month (Sept-June)  
**Time:** 5:30pm Dinner • 6pm Program  
**Contact:** Gary Tamanini 248.436.5212  
• gary.tamanini@bartonmalow.com

### Western Michigan Ch. 70

**Where:** Location Varies  
**Date:** 3rd Thurs. of Month  
**Time:** Varies - Lunch or Dinner  
**Contact:** Elizabeth Bovard  
616.949.8650 • elizabeth@grbx.com

## MINNESOTA

### Viking Ch. 39

**Where:** TBD - Varies  
**Date:** 3rd Thurs. of month  
**Time:** 5:30pm - 8pm Social / Dinner  
/ Program  
**Contact:** Richard Schwarzinger, CPE  
763.522.2100 • rich.schwarzinger@  
mortenson.com

# U P C O M I N G CHAPTER MEETINGS

## MISSISSIPPI

### Magnolia Ch. 81

Where: Farm Bureau Grill, Trustmark Park, Pearl, MS

Date: 3rd Fri. of month

Time: 11:30am - 1pm Lunch & Program

Contact: Sid Newell 601.922.9164

• [snewell@commfloorinc.com](mailto:snewell@commfloorinc.com)

## MISSOURI

### St. Louis Metro Ch. 19

Where: The Original Pancake House, Chesterfield, MO

Date: Typically 4th Friday of month

Time: 7am Social • 8am Breakfast

• 7:30am Program

Contact: Brad Davis 314.781.7005

• [bradd@musicconstruction.com](mailto:bradd@musicconstruction.com)

### Heartland Ch. 32

Where: Prime Wood Grill 100 E. 20th St., Kansas City, MO

Date: 3rd Tues. of month Sept - May

Time: 5:30pm Social • 6pm Dinner •

6:30pm Program

Contact: Kelly Smith 816.292.8671

• [kelly.jarman@edunn.com](mailto:kelly.jarman@edunn.com)

## NEBRASKA

### Great Plains Ch. 35

Where: Grisanti's Italian Restaurant 10875 W Dodge Rd, Omaha

Date: 2nd Wed of the month

Time: 11:30am Lunch • 11:45am Program

Contact: Chris Ahrenholtz, CPE

402.522.6016 • [ahrenholtz@gmail.com](mailto:ahrenholtz@gmail.com)

## NEVADA

### Reno Ch. 12

Where: Atlantis Hotel & Casino, Reno

Date: 2nd Wed. of month

Time: 5pm Social • 6pm Dinner •

7pm Program

Contact: Donna Koepp 775.355.8500

• [dkeopp@clarksullivan.com](mailto:dkeopp@clarksullivan.com)

### Las Vegas Ch. 72

Where: Desert Pines Golf Club

Date: 2nd Thurs. of month

Time: 5:30pm Social • 6pm Dinner •

6:45pm Program

Contact: Chuck James 702.455.5895 •

[wj@co.clark.nv.us](mailto:wj@co.clark.nv.us)

## NEW JERSEY

### Garden State Ch.26

Where: Pal's Cabin, 285 West Prospect Ave., West Orange

Date: 4th Tues. of month

Time: 6pm Social • 7pm Dinner

Contact: Jeff Senholzi 570.476.6907

• [CostNav@ptd.net](mailto:CostNav@ptd.net)

## NEW MEXICO

### Roadrunner Ch. 47

Where: Fiesta's, 4400 Carlisle NE, Albuquerque

Date: 1st Wed of month

Time: 5:30pm Social • 6pm Dinner •

6:30pm Program

Contact: Glynette Hale, CPE

505.823.4449 • [ghaleyes@msn.com](mailto:ghaleyes@msn.com)

## NEW YORK

### New York City Ch. 10

Where: Stuart-Lynn Consultants, 180 Varick St., 12th Floor, New York, NY

Date: 1st Tues. of March, June, Sept. & Nov.

Time: 6pm - 8pm Program

Contact: Peter Wellstood 914.235.5650

• [imagineering@verizon.net](mailto:imagineering@verizon.net)

### Empire State Ch. 42

Where: Butcher Block Restaurant, Central Ave., Albany

Date: 3rd Wed. of Month Sept, Nov., Feb. & April

Time: 6pm Social • 6:30pm Dinner •

7:30pm Program

Contact: TBD

### Western NY Ch. 77

Where: John Hallenbeck, CPE

585.464.4600 x5456 • [john.hallenbeck@wegmans.com](mailto:john.hallenbeck@wegmans.com)

## NORTH CAROLINA

### Charlotte

- Chapter in Development

Info: email [psmith@aspenational.org](mailto:psmith@aspenational.org)

## OHIO

### Buckeye Ch. 27

Where: Carolyn Van Paeppegem, LEED AP • 614.223.2124

• [cvanpaeppegem@shp.com](mailto:cvanpaeppegem@shp.com)

### Northeastern OH Ch. 28

Where: Dimitri's Restaurant 1830 Snow Road, Parma

Date: 3rd Tues. of month except Jul., Aug. & Sept.

Time: 5:45pm Social • 6:15pm Dinner •

7:15pm Program

Contact: Lew Heifner 216.619.1700

• [lheifner@pcscmservices.com](mailto:lheifner@pcscmservices.com)

### Southwestern OH Ch. 38

Where: Houston Inn Restaurant Mason, Ohio

Date: Thursday

Time: 5:30pm Social • 6:30pm Dinner •

7:15 Program

Contact: Sherry Malott 513.528.4285

• [smalott@advancedcaulking.com](mailto:smalott@advancedcaulking.com)

## OKLAHOMA

### Oklahoma City Ch. 80

Where: The Sportsman Club, 4001 NW 39th, Oklahoma City

Date: 2nd Thurs. of month

Time: 5:30pm Social • 6pm Dinner •

6:30pm Program

Contact: Phillip Brandt 405.254.1050

• [pbrandt@manhattanconstruction.com](mailto:pbrandt@manhattanconstruction.com)

## OREGON

### Columbia-Pacific Ch. 54

Where: University Place - 310 SW Lincoln St., Portland

Date: 3rd Tues. of month except Dec.

Time: 5:30pm Social • 6:15pm Dinner •

6:45pm Program

Contact: Curt Kolar, CPE

503.962.8840 • [kolarc@trimet.org](mailto:kolarc@trimet.org)

## PENNSYLVANIA

### Greater LeHigh Valley Ch. 41

Where: Fogelsville Holiday Inn, Rt 100 S.

Date: 3rd Weds of Month

Time: 5:30pm Social • 6pm Dinner

Contact: Eric Scheler, Sr., CPE 610.625.1700 • [escheler@verizon.net](mailto:escheler@verizon.net)

### Philadelphia Ch. 61

Where: Double Tree Hotel, 640 W. Germantown Pike, Plymouth Meeting

Date: 3rd Wed. of month

Time: 5:30pm Social - 6:30pm Dinner/Program (3 course meal)

Contact: Karla Wursthorn, CPE

610.649.0400 • [kwursthorn@tward.com](mailto:kwursthorn@tward.com)

### Three Rivers - Pittsburg Ch. 44

Where: Varies

Date: TBD

Time: PM - Dinner provided

Contact: Scott Koontz 412.392.2525

x120 • [skoontz@ryconinc.com](mailto:skoontz@ryconinc.com)

### Central PA Ch. 76

Where: TBD

Date: 2nd Wed. of Month

Time: 6pm Social • 6:30pm Dinner & Program

Contact: David Rodney, CPE

717.657.0909 • [drodney@quandel.com](mailto:drodney@quandel.com)

## RHODE ISLAND

### Southern New England Ch. 31

Where: TBD

Date: 2nd Wed. of Month

Time: 6pm Social • 6:30pm Dinner & Program

Contact: David Rodney, CPE

717.657.0909 • [drodney@quandel.com](mailto:drodney@quandel.com)

## TENNESSEE

### Middle Tennessee Ch. 34

Where: AGC of Middle TN or Adventure Science Center

Date: 1st Fri. of Month

Time: 11am Social • 11:30am Lunch •

12pm Program

Contact: Ricky Sanford: 615.206.6809

• [ricky.sanford@rogersgroupinc.com](mailto:ricky.sanford@rogersgroupinc.com)

### Memphis Ch. 62

Where: Fresh Slices, 6600 Stage Road, Suite 106, Bartlett

Date: 1st Wed. of month

Time: 11:30am - 1pm

Contact: Brian Wirth, CPE

901.372.9600 • [bwirth@flintco.com](mailto:bwirth@flintco.com)

### Eastern Tennessee (Knoxville) Ch. 56

Contact SBO [psmith@aspenational.org](mailto:psmith@aspenational.org)

## TEXAS

### Dallas/Fort Worth Ch. 43

Where: TEXO Conference Center, 11111 Stemmons Freeway, Dallas

Date: 3rd Thurs. of each month

Time: 5:30pm Social • 6pm Dinner •

6:30pm Program

Contact: Charlie Rachui, CPE

972.243.7674 • [crachui@schwob.com](mailto:crachui@schwob.com)

### Rio Grande Ch. 40

Where: Jaxson's Restaurant, 1125 Airways Blvd, El Paso

Date: 1st Thurs. of each month

Time: 5:30pm Board Meeting -

6:30pm Membership Meeting

Contact: Ricardo Escobar-Garcia:

915.532.8081 • [ricardo@foretco.com](mailto:ricardo@foretco.com)

### Houston Ch. 18

Where: Spagetti Westens, 1608 N. Shepherd, Houston, TX

Date: 2nd Mon. of month

Time: 6pm Dinner - 7pm Program

Contact: Adrian Ramos, CPE

832.526.5677

### San Antonio Ch. 57

Where: Mohammad Sadi:

210.248.2415 • [mohammad.sadi@westonsolutions.com](mailto:mohammad.sadi@westonsolutions.com)

westonsolutions.com

### UTAH

### Salt Lake City Ch. 51

Where: Mountainlands Plan Room, 583 West 3560 South, Salt Lake City

Date: 3rd Thursday of Month

Time: 5:30pm Dinner • 6pm Program

Contact: James Coutts: 801.476.0202

[james@gardnerengineering.net](mailto:james@gardnerengineering.net)

## VIRGINIA

### Richmond

- Chapter in Development

Info: [psmith@aspenational.org](mailto:psmith@aspenational.org)

## WASHINGTON

### Puget Sound Ch. 45

Where: Rock Salt Restaurant

Date: 3rd Wed. of Month

Time: 5:30pm Social • 6:15pm Dinner •

6:45pm Program

Contact: [info@aspepugetsound.org](mailto:info@aspepugetsound.org)

## WISCONSIN

### Packerland Ch. 66

Where: Liberty Hall, Kimberly, WI

Date: 1st Thurs. after the 1st Wed. of the Month

Time: 5:30pm Social Hour - 6pm

Dinner & Meeting

Contact: Larry Petron: 920.969.7004

### Brew City Ch. 78

Where: Charcoal Grill & Rotisserie, 15375 W. Greenfield Ave, New Berlin

Date: 2nd Tuesday of Month

Time: 5:30pm Social - 6pm Dinner

Contact: Scott Riemer: 414.831.1274



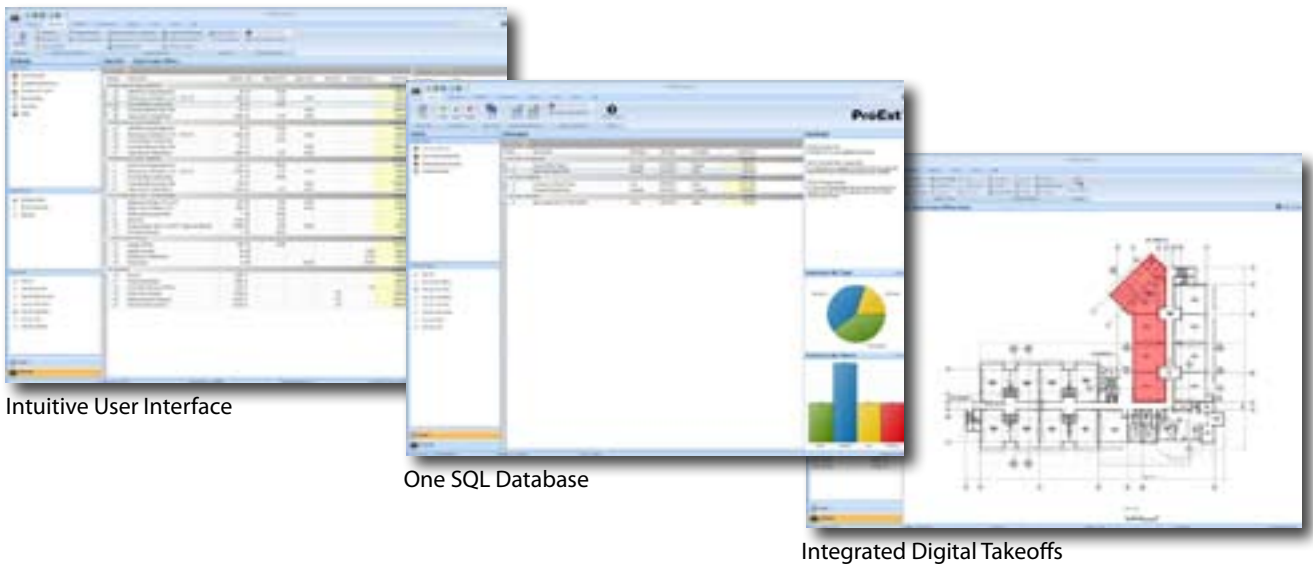
All Chapter Meetings are on a monthly basis unless otherwise noted.  
If you do not see a Chapter Meeting listing in your state/area call 615.316.9200.  
Chapter Presidents should contact the SBO with any updates needed.



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