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Carolina-South Atlantic Chapter

CaSA News



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President's Message



Heather Denny

As the CaSA year is wrapping up and my term as President ends, let's look back on our successes. This year, we decided to combine several events which brought fewer but more impactful events.

The year started with a sold out educational event, the Monoclonal Antibody Symposium hosted by the Young Professionals. Then we kicked into high gear with our first ever Oktoberfest to bring together members, committees and drive to get more members involved and engaged. We had a great night with great weather, food, music and over 150 in attendance. That evening we also awarded the first ever Jane Brown Scholarship. What a great way to honor someone that has given so much to our community and support the future of the industry.

In November, we joined with the larger ISPE organization and held a Therapeutic Monday during a training session. This was a great way to connect CaSA members with members from around the country. I believe some people had the opportunity to catch up with friends they had not seen in years.

December brought our largest turn out ever for the Automation Forum planned by the Education Committee. The generosity of our members was seen in the mountain of toys brought to support Toys for Tots.

At the turn of the year, plans were underway for what turned out to be the largest Technology Conference yet. With the infusion of the Leadership Symposium, there was programming for professionals at all levels on a range of topics from technical to developmental.

After rescheduling due to winter weather, Billiards and Brews was another successful Young Professionals event.

The weather cooperated on May 18th and we were able to play on two courses for the 21st Annual Golf Tournament at Prestonwood Country Club again this year. Thanks to all who came out to enjoy golf and networking, the CaSA Chapter was able to make a second donation to the Me Fine Foundation. Our first donation was at the Technology Conference and our donations have made a difference to the Me Fine Foundation this year.

While we may be ending the Board-year, we are not done yet. Things have been heating up in Georgia with several Therapeutic Thursdays and on June 18th, we hosted our first Education Event in Atlanta. This was a big step in providing programming to more of the region that the ISPE CaSA Chapter serves.

Double Bonus
When You Join ISPE
TODAY!

(See page 6 for more details)

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There are many people I would like to acknowledge for their efforts in bringing exceptional programs and events to our membership. I have had the opportunity to work with a fantastic board full of energy and excitement; Lisa Kerner, Bruce Craven, Wendy Haines, Mike Putnam, Terence Morrison, Ben Hund, Chip Chappell, Ken Ewan, Jamie Sigmon, Jim Hubbard, David Smith, John Marr, LeAnna Pearson, and Rich Stanfield. A special thanks to Matt Gilson who has guided me through my tenure on the executive board and paved the way for what I consider a successful year. Thank you also to the many committee members and sponsors, for without you none of this would be possible. Finally, thank you to Penney, Anita and all of the staff who work behind the scenes to make things happen.

Rich asked all the board members to write about our experience on the board, what we have gotten out of our terms and why others would want to get engaged. Thinking back to my first involvement on the Membership and Networking committee, working on the golf tournament and casino night, the word that comes to mind is relationships. Throughout the years that have followed, each position has given me the opportunity to build a greater network and deeper relationships with those around me. There have been several instances where I had a specific business need and reached out to that network. More importantly those relationships have transcended into friendships. These are friendships that I will take with me and a network that I will continue to work with professionally.

The resources are there, use them.

Heather Denny

President, ISPE CaSA Chapter

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Membership Corner

2015 Tech Conference

By Jamie Sigmon, Young Professionals Committee Chair

The Tech Conference is one of my favorite events that the Carolina South Atlantic (CaSA) chapter holds. It has all the elements of a big, multi-day industry conference for a fraction of the time and cost. From the education sessions, to the exhibition hall, and the many opportunities for networking, the Tech Conference is a must attend event for industry professionals in the Southeast region and beyond.

Volunteers are an important factor in the success of such an event. Not only did the Tech Conference Committee dedicate a great deal of time and effort into making the April 11th show a success, young professionals and students from CaSA set aside time out of their busy schedules to serve at the conference. Jennifer Parks, committee member for CaSA Young Professionals, recruited and coordinated student and young professional volunteers to serve at the conference. These volunteers were responsible for greeting attendees and exhibitors at the registration booth and assisting speakers in the education sessions. The total volunteer count was over 60 and included students from Campbell, NC Central, Meredith, NC State, UNC, and ECU. Young professional volunteers represented IPS, Biogen, Novartis, Fujifilm Diosynth, CRB, ValSource, and more.

I attended both morning and afternoon Facilities of the Future education sessions. The morning session was given by

Ron Malone (Sr. Principal Scientist, Novartis Vaccines), Scott Hinshaw (Process Engineer II, Novartis Vaccines), and Jim Nadlonek (Pharmaceutical Operations Specialist, Bausch & Strobel). The session covered design to delivery of the single-use clinical scale filling system at Novartis Vaccines' Holly Springs facility. For someone such as myself with no experience in drug product manufacturing, this session was an excellent introduction to these operations and the available technologies for clinical filling and lyophilization in a single use environment. The afternoon session featured three speakers. Mark Butler (Sr. VP, IPS) presented on the vision of International Leadership Forum defining Facilities of the Future, Clark Byrum (President, Biologics Modular) discussed a new BARDA-led program targeting rapid deployment Ebola response, and Erich Bozenhardt (Process Group Lead, IPS) covered a case study on the new facility paradigm around advanced biomanufacturing.

The casino themed reception was a hit for conference attendees. Food, gambling, and networking were the perfect combination to close out the conference. What a great way to engage with other attendees and exhibitors! I lost all of my poker chips at the blackjack table, but I had a lot of fun and made some new connections in the process, so it was a big win! 🍀

22nd Annual ISPE-CaSA Life Sciences Technology Conference

BOARD OF DIRECTORS 2014-2015



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Mike Putnam, Technology Conference
Rich Stanfield, Newsletter

Education Corner

ISPE CaSA Education Roadshow & Therapeutic Thursday

By ISPE CaSA Education Committee

The ISPE-CaSA Education Committee and Partners hosted an Education event and Therapeutic Thursday in Atlanta on Thursday, June 18. Of the six exhibitors and 48 attendees, there were 16 attendees that are not currently members of ISPE. There is much interest in ISPE events in Atlanta – so much interest that Mr. Tim Howard, ISPE National Secretary, announced that the 2016 Annual Meeting will be held at the Marriott Marquis, in Atlanta from 18-21 September, 2016.

Mr. James Cage, Automation Solutions Integrator, presented “A Cloud that You Control - How Platform Virtualization can shorten projects and deliver savings throughout the life cycle of your systems”. James discussed how Platform Virtualization - the use of virtual PCs and network devices - can radically change how control systems are designed, implemented, tested, and deployed in the field. Virtual systems, when designed and implemented correctly, help protect users from hardware obsolescence, improve system availability, and increase cyber-security. This is particularly useful in highly regulated industries, where documentation and tight change control are critical to success. But, without a good understanding of the technology, costs can actually be higher than for conventional systems. Attendees had the opportunity to learn when to deploy virtual systems, how to realize the most savings, and what systems should NOT be virtual.

Mr. Eric Collier, Validation Scientist, Commissioning Agents, Inc., presented “Compliance Management - The Most Overlooked MES ROI”. Eric presented a discussion of the continuing struggle that regulated manufacturers face while striving for hard returns on their investment to justify the implementation

of Manufacturing Execution Systems (MES). Since these systems are an integral part of the manufacturing operation, the traditional hard return ROIs for these systems have focused on optimizing manufacturing costs and production. This session was an overview of Manufacturing Execution Systems and how they provide the ultimate Return On Investment of compliance management to meet manufacturers' critical regulatory requirements.

Thank you to our volunteer speakers:

James Cage is an automation solution consultant. He has served clients in a variety of process industries for more than 24 years as a product manager, consultant, and engineer. You may have seen James at a Honeywell Users Group, as the host of the “Slick Trick” application sessions.

Eric Collier has more than 20 years experience in software application development, project management, computer system validation, and information system management. He also has more than 12 years of direct Pharma/Biotech/Medical Device experience. In the area of MES, Eric has developed interfaces between ERP and LIMS systems for use of powder in a formulation process and for process yield calculations, developed interfaces between the ERP and PIMS to automate process orders and eliminate shop-floor SAP keying, developed an electronic batch reporting system for DeltaV, and refreshed the plant data collection/process data historian, specifically. He holds a Bachelor of Science degree in Computer Science with a concentration on Programming Languages.

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Membership Corner

\$40 DISCOUNT NOW AVAILABLE FOR NEW INDUSTRY MEMBERSHIPS!

By Terence Morrison, P.E., CAP, LEED AP BD+C, ISA 84 SFS

\$40 DISCOUNT NOW AVAILABLE FOR NEW INDUSTRY MEMBERSHIPS! Applications can be made online at www.ispe.org/join, click on Join Now under Industry Membership, and enter CASA2015 in the promotion code box. Please remember ISPE's Refer-A-Friend Program! Earn one free month of membership for every friend you refer. All the details are available at <http://www.ispe.org/membership-referral-program>

Join ISPE by 30 July 2015 and you will get a Double Bonus

worth \$685. Your bonus includes a free copy of Good Engineering Practice (pdf version), a \$435 value, and a \$250 conference discount certificate. [Get more details](#) or join today using promo code BONUSLINK.

This discount is not applicable to Students, Young Professionals, Academics, and Regulatory Authority/Government as these all hold discounted memberships already.

If you have any question about ISPE or the CaSA Chapter, please contact me at membership@ispecasa.org. ▲

Welcome New Members

New Members who joined April 10, 2015 through June 2, 2015

Alisha Diggs
Angela Koen
Kumuditha Ratnayake
Christianna Van Dalsen
Brian R. Philbeck
Devin A. Romero
Eddie S. Taylor
Jixian Hong
Julian R. Warren
Paden Skinner
Patrick T. Kelly

Rob Perry
Shane Ernst
Todd E. Nowokunski
Wesley Webster
William N. Frederick
Linda Sauvagere-Myers
Melyssa Minto
Shari Wilkins Tia
J. Joyce Nhieu
Bui Thad Alsop

Tomasz Lewczyk
Alayna Robst
Alexandra R. Ridall
Annie T. Melton
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ISPE wants YOU! That's why we have put together a custom-
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1 Good Engineering Practice - ISPE Good Practice Guide

Both a primer and master reference, this 169-page ISPE best seller covers
the complete lifecycle of engineering from concept to retirement. It
provides advice on good engineering practices, explains underlying
technical principles and suggests solutions in areas where no single answer
is correct and where several outcomes may be possible. The Guide
divides activity into three sections:

- Project Engineering including infrastructure, organization, value analysis,
planning and monitoring, design review and handover
- Common Practices including standards and procedures, documentation
practices, change management and innovation and continuous
improvement
- Operation and Maintenance including engineering manuals and records,
breakdown maintenance, internal audit and equipment decommissioning
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- **Online Discussion Forums** – Ask questions, explore solutions and share your knowledge with colleagues around the world.
- **Affiliate and Chapter Meetings** – Expand contacts, deepen relationships, share best practices with professional counterparts in your own backyard.
- **Networking** – Broaden your reach around the globe at ISPE's international conferences, training courses and Annual Meetings.
- **Savings** – Save on knowledge- and skill-building Member discounts on ISPE's education and training courses as well as a vast array of publications. These include its highly prized *Baseline®* and *Good Practice Guides* containing the collective knowledge of leading thinkers on manufacturing best practices, regulatory compliance and international trends.



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Membership Corner

Membership Experiences

My Experience with ISPE

By Jim Hubbard, Chair, ISPE CaSA Education Committee

As a newcomer to North Carolina, the pharma industry, and ISPE, I have felt very welcomed by the ISPE Board team members. The personal relationships are a large part of my positive experience in my first year on the board. I feel very passionate about developing quality events for the paying members of ISPE and how the members perceive the value they receive for their membership fee. I also think it's our responsibility to participate and support associations like ISPE that are an integral part of the industry. This year's ISPE-CaSA team has worked very hard to bring extremely beneficial content and relationship building events to our members. The quality of the events is a true testament to how committed the team is to our members. It's been a real pleasure to be a part of that team.

My Experience with ISPE

*By Terence Morrison, P.E., CAP, LEED AP BD+C, ISA 84 SFS
Chair, ISPE CaSA Membership Development Committee*

The opportunity to serve on the 2014-2015 ISPE Casa board as your membership development chair has been a fun and enriching experience. I take personal pride in seeing the growth in chapter membership and the membership continue to provide a valuable service to the life sciences community. This year has been marked with successes of recurring

programs, such as Therapeutic Thursdays and the Life Sciences Technology Conference. The chapter also forged new ground with a renewed focus on education, continued growth of the young professional groups, and targeted events in Georgia. The professional and personal connections I continue to make are the most valued benefit I receive as a member of the ISPE CASA chapter. I would highly recommend for anyone to get involved in a committee today and get the most from your chapter dues!

My Experience with ISPE

By Rich Stanfield, Chair, ISPE CaSA Newsletter Committee

Serving as your Newsletter Committee Chair for the past year has been a fun, hectic and enriching experience. It is amazing to me to see how many people put as much into volunteering for the local Chapter of the ISPE as they do in their day-to-day employment. The teamwork, coordination, communication and friendliness in every endeavor is incredible. It has been refreshing and rewarding to work with so many professional, friendly and approachable individuals that make up the great team serving our Chapter. I urge everyone to volunteer for a committee. Once you understand what is needed within your committee, volunteer for co-chair or chair of the committee! I promise that you won't regret it.



CaSA COMMITTEES 2014-2015

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Networking

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Technology Conference

Mike Putnam
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Newsletter

Rich Stanfield
rich.stanfield@cagents.com

Membership Corner

ISPE CaSA - A Young Professional's Perspective by Jacqueline Vitarbo

By Jacqueline Vitarbo

When I was asked to recap my experience as a volunteer at this year's Life Sciences Tech Show for the upcoming newsletter, I knew that the event wasn't the only thing I wanted to write about. The most difficult thing about this request was narrowing down the long list of wonderful things that I have to say about ISPE CaSA. I joined the organization as a student this past February and can honestly say that I have never met such a large group of kind, helpful and fun(!) individuals. My hope in writing this article is to provide an honest description of my short, yet fulfilling tenure as both a student and young professional ISPE CaSA member.

I first learned about ISPE in my Molecular Biology & Biotechnology class at Meredith College as we were fortunate enough to have a professor who often spoke about professional development. There had been previous attempts to get an ISPE chapter started at Meredith; however, the students trying to initiate the process often graduated before it could be completed. I expressed interest in the organization that semester and was put in contact with a very bright and motivated sophomore who had already started working on getting the chapter established. Once the paperwork was mostly complete, we reached out to the ISPE student affairs committee and were enthusiastically welcomed; it was at this point that I realized I now had the opportunity to get to know some truly amazing people.

We met two individuals from student affairs to get the paperwork in order and set up our first meeting at Meredith to spread the word about our new on-campus organization. On the day of the meeting several current ISPE members drove out to Meredith and spoke to the students about what ISPE is, and why it's an organization worth joining. They shared information about their backgrounds, why they got involved, and how the organization had contributed to their personal and professional lives. My club co-founder and I were both pleasantly surprised and appreciative of the fact that so many people would drive out to our little school after a long day of work. After the event we quickly met our membership quota and officially became a student chapter; none of this would have been possible without the willingness of so many people to take the time to come share their stories with us. When I witnessed the dedication of so many members, I knew that I was getting involved with something great.

One of the very first events I attended was the Annual Life Sciences and Tech Show this past March. I had the opportunity to present my research at the ISPE CaSA Poster Competition that was held the evening prior to the Tech Show, as well as to volunteer at the main event. The experience was both fun and rewarding; it allowed me the chance to share my work with a diverse audience, volunteer with other students, learn more about the various aspects of industry and to have a genuinely good time. The other students and I enjoyed walking around to the various vendor displays, learning about different companies and meeting new people from all over.

Other highlights included the opportunity to attend seminars such as the Student/ Young Professional Career Development session, as well as hearing various speakers. The keynote speaker in particular, Vice President of Pharmaceutical Operations & Technology at Biogen, John Cox, was truly inspiring. He spoke in depth about Biogen's strategy for success in our increasingly changing global environment, explaining how the company would continue to address increasing areas of unmet need in relation to neurological, autoimmune and hematologic disorders. Most importantly, these efforts would be made while remaining dedicated to the patient-centered approach the company is known for. I left the room that afternoon thinking about how I'd love to work for a company like that - one with those types of values, doing that type of work.

Since the technology show, I have attended many other events, such as monthly Therapeutic Thursdays, volunteered at the Triangle SciTech Expo, and taken private company tours. When I applied to my first jobs in industry, I received overwhelming support from various members; people I had only just met offered to send my resume directly to hiring managers, e-mailed me with advice and support before interviews, and even called me the morning of the most important interview I'd ever been on to help calm me down!

I suppose that at this point, it's fairly obvious that I have nothing but good things to say about the Carolina-South Atlantic Chapter of ISPE and about the organization as a whole. I was recently asked to join the Education Committee, and am looking forward to having the chance to work with some more wonderful people (definitely check out the upcoming ISPE-CaSA Education Roadshow!). I hope to continue to meet potential members, especially students, and encourage them to experience it for themselves. My advice to anyone considering joining, would be to quit hesitating and get involved! This organization is the best way to meet people from all over who are more than happy to tell you about what they do, how they got there, and if it's what you want, to encourage you to pursue your own career as a member of ISPE.

Jacqueline Vitarbo holds a BA in International Studies and a BS in Biology from Meredith College. She is currently employed at Biogen as a Manufacturing Associate in LSM Cell Culture, is an ISPE-CaSA Young Professional and Education Committee member. 🏠



**Carolina-South
Atlantic Chapter**



CALL FOR PARTNERSHIPS

from

ISPE-CaSA Education Committee

Fall 2015-Spring 2016

In the past, support from our industry partners has been crucial for the success of ISPE-CaSA Chapter's Education Committee events. To assure the future success of our Education activities, having the ongoing support from our industry partners is extremely important. The past education events have provided our local community with a bandwidth of knowledge shared among our peers. To continue the outstanding training provided by this program, the Education Committee is offering an opportunity for you to become a valued partner of the Education Committee for the 2015-16 programmatic year. Think of this opportunity as not just a one-time "sponsorship," but as an on-going **partnership** that recognizes your organization as a key component to the education forum for our ISPE-CaSA members, non-members, young professionals, and students.

There are many benefits for becoming a partner. Here are a few to mention:

- **Networking** opportunities
- **Marketing** your company through advertising visibility at Chapter Education Events
- **Influencing** young professionals, peers, and students
- **Community Outreach** to generously support the people and companies of our biotechnology community

Our committee is comprised of volunteers who work tirelessly to orchestrate low-cost, and often, free educational events on topics of direct relevance to the pharmaceutical industry. We rely almost exclusively on partners for funding these events. We have a variety of partnership opportunities and hope that you might consider one of the options below:

Partnership Opportunities

Your commitment includes three education events during the 2015-16 programmatic year:

- **PLATINUM Level** - \$2000, 2 available - Top tier marketing and most visibility - company name/logo used on all event marketing, 3 opportunities to provide speaker/topic for an event (subject matter and speaker to be approved by Education Committee), includes one exhibitor table for each event
- **GOLD Level** - \$1000, 4 available, second tier marketing - company name/logo used on all event marketing, one opportunity to provide speaker/topic for an event (subject matter and speaker to be approved by Education Committee), includes one exhibitor table for each event
- **SILVER Level** - \$500, 5 available, third tier marketing - company name/logo used on all event marketing (reduced font size compared to Platinum and Gold), exhibitor table for one event
- **BRONZE Level** - \$250, 10 available, fourth tier marketing - company name only used on all event marketing (reduced font size compared to Platinum, Gold, Silver, and Bronze)

(Please use the form on the reverse to secure your choice of Partnership Level.)



**Carolina-South
Atlantic Chapter**

CALL FOR PARTNERSHIPS

from

ISPE-CaSA Education Committee

Fall 2015-Spring 2016

Please select your Partnership Level below and submit with your payment to ISPE-CaSA. Partnership levels are based on First Come, First Served and are limited per year.

Partnership Opportunities

Your commitment includes three education events during the 2015-16 programmatic year:

- ☐ **PLATINUM Level** - \$2000, 2 available - Top tier marketing and most visibility - company name/logo used on all event marketing, 3 opportunities to provide speaker/topic for an event (subject matter and speaker to be approved by Education Committee), includes one exhibitor table for each event
- ☐ **GOLD Level** - \$1000, 4 available, second tier marketing - company name/logo used on all event marketing, one opportunity to provide speaker/topic for an event (subject matter and speaker to be approved by Education Committee), includes one exhibitor table for each event
- ☐ **SILVER Level** - \$500, 5 available, third tier marketing - company name/logo used on all event marketing (reduced font size compared to Platinum and Gold), exhibitor table for one event
- ☐ **BRONZE Level** - \$250, 10 available, fourth tier marketing - company name only used on all event marketing (reduced font size compared to Platinum, Gold, and Silver)

(Note: Any sponsor giveaways must be pre-approved by ISPE-CaSA prior to the event.)

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TOTAL BUILDING COMMISSIONING

Building commissioning provides owners and designers increased assurance that buildings will perform as expected.

*by Rita Seraderian, PE, FPCI, LEED AP,
James T. Morrissey, and Michael Amstadt*

Building commissioning is quickly becoming a key component in green codes and standards, and a requirement of owners who are concerned that their high-performance buildings perform as designed. High-performance design principles have gained traction in the design community and among owners for their ability to enhance the service life of facilities and reduce life-cycle costs. There is an increased recognition of the importance of ensuring that building systems, glazing, and superstructure are delivering on the designer's assumptions.

The U.S. Environmental Protection Agency (EPA) defines the importance of building commissioning to them: "In many ways, commissioning is similar to a 'test run' or 'systems check.' It tests, verifies, and fine-tunes the performance of key building systems so that the highest levels of performance are achieved. Correctly implemented, commissioning is extremely cost-effective, and should improve the building delivery process, increase systems reliability, improve energy performance, ensure good indoor environmental quality, and improve operation and maintenance of the facility."¹

One critical aspect of the commissioning process is the need to begin it during schematic design. Early involvement of the commissioning agent aids the design professional in developing the Owner's Project Requirements (OPR), the subsequent design team Basis of Design (BOD) and the beginning of the Operations & Maintenance (O&M) Systems Manual. These tools are vital elements in the commissioning process, and if their development is delayed until the construction documents (CD) phase, the commissioning process may have to be modified to fit the design, resulting in the loss of performance improvement critiques during CD development, and a reduced ability to effectively track system quality after construction.

The basic goals of building commissioning are best defined in the Whole Building Design Guide (WBDG), a website developed by the National Institute of Building Sciences:

According to WBDG, the goals of commissioning are to:²

1. Define and document requirements clearly at the outset of each phase and update through the process;
2. Verify and document compliance at each completion level;
3. Establish and document commissioning process tasks for subsequent phase delivery team members;
4. Deliver buildings and construction projects that meet the owner's needs, at the time of completion;
5. Verify that operation and maintenance personnel and occupants are properly trained; and

6. Maintain facility performance across its life cycle.

The Commissioning Authority (CxA) can be contracted by any one of the stakeholders, such as the owner, facilities manager, design team, construction manager, or even the contractor. The commissioning services can include new construction or renovations. Even existing facilities can be scoped for fundamental, enhanced, or total building commissioning. Guidelines for the commissioning process can be specified by American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE), National Environmental Balancing Bureau (NEBB), or the Building Commissioning Association (BCA), or a selection of many other organizations.

Commissioning and LEED

As for LEED®, fundamental commissioning is a base requirement, and therefore does not add any points to the total required for certification. The minimum requirements of systems to be commissioned only include energy-consuming components of the mechanical systems HVAC, lighting controls, and domestic hot water systems. Enhanced commissioning provides three points toward LEED certification and consists of fundamental commissioning with the design phase and warranty phase tacked on to the commissioning scope. The design phase commissioning work includes two design reviews, at 60% and 95% completion of construction documents, and either preparing or reviewing the design professional's commissioning specifications. Reviewing the OPR and BoD is also required. The warranty phase includes facilities personnel training, review of systems manuals, an 11-month inspection after occupancy, and possibly seasonal testing.

There is much more to commissioning. It is important to make sure everything that operates within a building, and protects it from damage, protects its occupants from harm, is designed and installed properly, and works as intended. Some additional systems or components which should be considered for commissioning include: power distribution, emergency power, life safety, communications, domestic water supply, fire suppression, conveying systems, and the building envelope. With manufacturing, healthcare, and laboratory facilities, additional systems and equipment might also include clean steam, medical gasses, laboratory gasses, purified water, fume hoods, isolation rooms, incinerators, and process equipment. This is called Total Building Commissioning (TBC).

Envelope Commissioning

A number of factors are leading owners, designers, and construction professionals to adopt building envelope commissioning. These factors include: the growing complexity of building envelope design, increasing numbers of different construction materials, shrinking schedules, increasingly stringent performance demands, and the need to construct energy-efficient buildings. Building envelope commissioning is a means to ensure that the building envelope is constructed to meet the design intent, expected service life, and code requirements, as well as to aid in the prevention of complications that otherwise might arise during the construction process. It involves a number of different components, such as opaque walls, roof, windows, curtain walls, foundation, caulking, acoustics, air, vapor, moisture, and thermal barriers. There needs to be communication starting at the design development phase, to establish the owner's performance requirement for each component. During the design phase, the commissioning agent reviews the design and specifications to confirm that all pieces are included and all trade scopes are clearly and fully defined. During the construction phase, submittals are reviewed for conformity with the design documents and installations are inspected periodically to confirm adherence with the design and approved submittals, as well as standard construction practices.

The testing phase involves prescribed test procedures to verify the envelope's ability to meet the design requirements related to water penetration, thermal resistance, humidity, and air barrier requirements. These tests typically include timed roof flooding, water pressure applications, building pressurization, and infrared thermography—all of which should be written into the specifications and witnessed by the commissioning agent. In some cases, commissioning may continue beyond project completion. Envelope commissioning will then be able to facilitate and ensure that the required communication, coordination, testing, verification, and documentation results in the delivery of a building envelope that performs as specified, as designed, and within budget.

As for testing, the most effective tool used in the commissioning process is the infrared camera. With a building pressurized and a sufficient temperature differential, infrared thermography (IRT) can detect opening in the buildings enclosure and thermal bridges. Wet sub-materials, such as roof insulation or masonry back-up, can also be detected with IRT, indicating leaks in the superstructure.

Air barrier testing is now required for all new federal buildings with an allowable air leakage of 0.25 CFM per SF of building surface at 75 pa (30" wc). Once the building construction is completed, the testing team is scheduled for a nighttime operation. The general contractor seals all designed openings (door jambs, dryer vents, etc.) with tape. The building is pressurized with mobile fans incrementally up to the 75 pa limit. Differential pressure readings are taken across a door opening. With the data collected and the building surface area provided, the air leakage rate can be calculated. This is normally done with a software package. During pressurization, IRT is performed on the outside of the building, including the roof. The process is then reversed for depressurization with the data recorded in similar manner. The IRT is performed on the inside of the building as well.

In many cases, however, commissioning is not considered until

a project reaches the construction phase. While still valuable, implementing commissioning after construction begins will be less effective than comprehensive commissioning, which starts at the predesign phase, because there is less opportunity to organize and plan ahead.

The objectives of the building envelope-commissioning process are driven by building type, expected life cycles, geographic location, climatic considerations, desired energy efficiency, budgetary constraints, and tolerance for leakage, all of which may vary considerably among projects. While the commissioning goals and benefits are common, the precise tasks comprising the commissioning process will differ from project to project.

One of the best performing envelope systems in this test are precast concrete panels, due to their low permeability, continuous insulation, and thermal mass. Like any exterior wall system, however, the design professional must take care to carefully detail flashing and sealant joints, and utilize the commissioning agent to confirm that they are installed properly. The advantage of precast concrete sandwich walls over other systems, such as glass curtain walls or metal panels, is that precast envelopes require far fewer joints than these other systems. While IRT testing does not address the integrity of the vapor barrier or thermal barrier, the integrity of these systems can be measured with temperature and humidity mapping while the building HVAC is providing climate control.

Building envelope commissioning is a rapidly growing AEC project management practice because of its benefits. Commissioning of the building envelope helps to ensure that all of the building systems are working properly and efficiently, protected from undesirable outside elements, and that indoor environment is maintained as intended.

Commissioning Standards

The Commissioning Industry is being driven by several organizations, each with their own guidelines and standards. Several of the key players in this process are ASHRAE's Guideline 0-2005, NEBB's Procedural Standards for Whole Building Systems Commissioning, BCA's New Construction Building Commissioning Best Practices, LEED® and the National Institute of Building Sciences (NIBS) Guideline 3-2012, Building Enclosure Commissioning Process. Most commissioning documents either reference ASHRAE Guideline 0-2005 or roughly align with it. This also aligns with the LEED® certification program since LEED® v2009 for both Fundamental Cx (EAp1) and Enhanced Cx (EAc3) reference ASHRAE Guideline 0-2005. Also to standardize the commissioning process, ASHRAE is in the final stages in the development of Standard 202 – Commissioning Process for Building and Systems, which defines the minimum efforts to meet the needs of commissioning. With Standard 202 providing minimum requirements, Guideline 0-2005 is the best practice document for defining building commissioning.

1. U.S. Environmental Protection Agency (EPA), "Commissioning." Last modified July 07, 2012. Accessed July 11, 2013. <http://www.epa.gov/iaq/schoolsdesign/commissioning.html>.
2. National Institute of Building Sciences, "Building Commissioning." Last modified June 11, 2012. Accessed July 11, 2013. <http://www.wbdg.org/project/buildingcomm.php>.

To learn more about building commissioning, design professionals and owners may want to access these resources:

1. General Services Administration (GSA) Building Commissioning Guide:

<http://www.wbdg.org/ccb/GSAMAN/buildingcommissioningguide.pdf>
<http://www.gsa.gov/portal/category/21064>

2. The Whole Building Design Guide (WBDG) Building Commissioning section:

<http://www.wbdg.org/project/buildingcomm.php>



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