AIChE

The Catalyst

PITTSBURGH CHAPTER
AMERICAN INSTITUTE OF CHEMICAL ENGINEERS

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October 2005

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OCTOBER MEETING NOTICE

Using Root Cause Analysis to Avoid the Blame Game

Where: **Bravo! Cucina Italiana** (Italian Kitchen)
211 Summit Park Drive
Pittsburgh, PA 15275
412-809-9115

When: Wednesday, October 19, 2005

Time:
5:30 PM Registration and Networking
6:00 PM Dinner
7:00 PM Technical Presentation

Menu: *Please select one of the entrees below. All meals include choice of Caesar, House or Chopped salad, and dessert.*

- **Roasted Pork Tenderloins** - *served with mushroom Marsala sauce, roasted vegetables and Tuscan mashed potatoes.*
- **Tilapia** – *wood-grilled and topped with lump crab, served with roasted vegetables and crispy potatoes.*
- **Penne Mediterranean** – *penne pasta with spinach, sun-dried tomatoes, pine nuts, olive oil and Feta cheese.*

Cost:
$27.00 Members
$24.00 Students / Unemployed Members
$29.00 Non-members

RSVP NO LATER THAN
FRIDAY OCTOBER 14, 2005

TO: Mr. Gary Hall, Vice-Chair
Phone: 412-963-0303, ext. 236
E-mail: gary.hall@sauereisen.com

Your RSVP must include: **Name, Company Name, Menu Choice, Email Address, and Phone Number.**

PLEASE PAY AT DOOR

CANCELLATIONS: If you must cancel your meeting reservation, please do so no later than 48 hours prior to the meeting. Otherwise, you will be invoiced for the cost of your meal.

~ About the Presentation ~

Root Cause Analysis is an advanced problem solving tool that is extremely useful, for example, in solving Quality problems. The presentation is a broad survey of some often-utilized tools in uncovering the root causes of problems. Particular attention will be paid to the use of "trees" in analyzing causes linked to effects. Some management objectives and philosophy for use will be mentioned as well as approaches to corrective actions.

Dr. Ted Spickler is Manager of Advanced Performance for Bayer Material Sciences. In this capacity Ted focuses on and promotes Continuous Improvement, offering advanced tool training such as Root Cause Analysis, and monitoring the handling of customer complaints. Ted has just recently completed Six Sigma Black Belt training from the American Society for Quality. His doctorate in Educational Psychology from West Virginia University was in the area of statistical analysis.

Ted joined Bayer Corporation in 1985 as a computer systems administrator for the Polyurethane Quality Assurance department at the New Martinsville, WV site. While there, he taught statistics at Wheeling Jesuit University and managed the Laboratory Information Management Computer System. In a later assignment at Bayer corporate headquarters in Pittsburgh, Ted promoted a community outreach program called "Making Science Make Sense." He led an educational reform movement in the northern panhandle of West Virginia that won a $1.86 million dollar NSF grant and helped bring in a $6 million dollar NSF grant for Charleston, SC schools. Prior to joining Bayer, Ted was an Associate Professor of Physics and Physics Department Chair at West Liberty State College, WV.

Dr. Paul Bowman will help present the topic. Paul is the U.S. lead of a global quality initiative at Bayer Material Science. He has specialized in root cause analysis, product/process variation reduction, statistical process control, and quality improvement programs. He also collaborates with Ted Spickler on developing and delivering root cause analysis training for Bayer.

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LETTER FROM THE CHAIR

Dear Members,

September's meeting at Zambelli Internationale in New Castle was one of the best attended since I've joined AIChE. Many thanks to Cindy Ambuster, Ron Whetli and Bill Gallentine of Zambelli for hosting us. This tour has been an objective of this Section for several years so, thanks to Gary Hall for bringing it to fruition.

On Saturday October 22nd, we'll have our first outreach event of the year at the Carnegie Science Center for National Chemistry Week (NCW). We have a long standing tradition of making superballs for National Engineer's Week and with NCW's theme "The Joys of Toys", we'll be making superballs on the 22nd. I encourage you to volunteer your time if only a couple hours because it is a fun day. Please contact Nancy Hirko if you can help.

Our Section is trying to organize a Young Professional's group to increase membership in the 20 to 30 year old range. This group will meet separately from the monthly Section meetings. Additional information will be presented in a future issue of *The Catalyst*.

I look forward to seeing all of you at the "Root Cause Analysis" presentation on October 19th.

Best wishes,

David Missenda
AIChE Pittsburgh – Section Chair

MONTHLY MEETING

CONTINUED FROM PAGE 1

His doctorate in Chemical Engineering is from Carnegie Mellon University. Paul joined Bayer in 2000 and he has worked in a variety of technical areas in the polymer industry including Process R&D, Manufacturing Process Support, and Urethane Applications Development & Technical Service.

Prior to Bayer, Paul began his career working for Olin Corporation in the Advanced Materials Division at New Haven, CT. In 1992, he joined ARCO Chemical Co. in South Charleston, WV which was acquired by Lyondell in 1998, and then sold to Bayer Corporation in 2000.

DRIVING DIRECTIONS TO THE RESTAURANT:

Bravo! Cucina Italiana
211 Summit Park Drive
Pittsburgh, PA 15275
412-809-9115

From Downtown Pittsburgh:

Take I-279 South through the Fort Pitt Tunnel toward the Airport. I-279 becomes US-22 W/US-30 W, then PA-60 N. Take Exit #1 toward Robinson Town Centre Blvd. Take the ramp toward THE POINTE. At the traffic light turn left onto Summit Park Dr. Continue straight past two more traffic lights and a stop sign. Restaurant is on the right at the next traffic light.

From the North:

Take I-79 South to PA-60 N/Steubenville Pike via Exit #60B toward Airport/Moon Run. Merge onto PA-60 N to Airport and bear right to ramp toward THE POINTE. At the traffic light turn left onto Summit Park Dr. Continue straight past two more traffic lights and a stop sign. Restaurant is on the right at the next traffic light.

From the South:

Take I-79 North to Exit #59B toward the Airport on US-22 W/US-30 W, then PA-60 N. Take Exit #1 toward Robinson Town Centre Blvd. Take the ramp toward THE POINTE. At the traffic light turn left onto Summit Park Dr. Continue straight past two more traffic lights and a stop sign. Restaurant is on the right at the next traffic light.

From the East:

Take I-376 West to I-279 South through Fort Pitt Tunnel toward the Airport. I-279 becomes US-22 W/US-30 W, then PA-60 N. Take Exit #1 toward Robinson Town Centre Blvd. Take the ramp toward THE POINTE. At the traffic light turn left onto Summit Park Dr. Continue straight past two more traffic lights and a stop sign. Restaurant is on the right at the next traffic light.

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MONTHLY MEETING

CONTINUED FROM PAGE 2

From the West:

Take US-22 E/US-30 E toward the Airport. Merge onto PA-60 N. Take Exit #1 toward Robinson Town Centre Blvd. Take the ramp toward THE POINTE. At the traffic light turn left onto Summit Park Dr. Continue straight past two more traffic lights and a stop sign. Restaurant is on the right at the next traffic light.

MEMBERSHIP CORNER

We are constantly updating our local membership database. Please send all change of address notifications to the Membership Chair:

Holly Gray
Michael Baker Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108
hgray@mbakercorp.com

If you have not already done so, please verify your updated e-mail address with us so that you will continue to receive monthly newsletters! Thank you.

Please sign me up for the local Pittsburgh Section of AIChE

Name _____

Company _____

Address _____

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Residence Phone _____

Email _____

Annual Dues are $16.00. Make check payable to "AIChE Pittsburgh Section" and send to the Treasurer:

Leigh Anne Wacker
AIChE Treasurer
337 Quail Run Road
Venetia, PA 15367

WANTED! VOLUNTEERS FOR NATIONAL CHEMISTRY WEEK 2005

Our Pittsburgh section will be sponsoring a table at the Carnegie Science Center in celebration of National Chemistry Week 2005. Volunteers are needed to help staff the table on Saturday, October 22nd (yes – it's also Pitt's homecoming again!!). The theme this year is "The Joy of Toys" and our superball making fits the theme perfectly so we will be making "bouncy balls"!!
If anyone is interested in interacting with the public and especially children, call me at 412-826-3636 or e-mail nhirko@air-comp.com. I sure could use the help!!

Nancy Hirko
Science Center Events

NEWSLETTER DEADLINE

THE DEADLINE FOR THE NOVEMBER NEWSLETTER IS MONDAY, OCTOBER 10, 2005.

Please submit information to:
E.G. Klein
724-796-3128
eg.klein@giccusa.com

AICHE NATIONAL NEWS

AIChE Annual Meeting Packed with 17 topical conferences and over 600 sessions and special events, the 2005 AIChE Annual Meeting, Oct 30-Nov 4, Cincinnati, OH, will cover everything from advances in fundamentals, to the newest developments in emerging technologies including bioengineering, nanotechnology, and sustainability. Join more than 4,000 engineers and scientists from around the world. For program, registration, and details, visit: www.aiche.org/annual

Hurricane Katrina Response Many members, companies, and engineering societies are assisting in the Hurricane Katrina relief effort and in rebuilding the area. Find information on engineering community efforts and for members in areas impacted by Katrina at www.aiche.org/Katrina.

Wanted: Your Bright Ideas for AIChE Energy Forum Your ideas are wanted at the AIChE Forum on Energy Challenges Sunday, October 30, 3:30-5:00 PM, Cincinnati. All are invited. Please email and tell us what you think AIChE's role is in addressing complex technical, sociological, economic and environmental issues of energy production, usage, and conservation. Please send your opinions, suggestions, and questions by October 21 to energy @aiche.org. For more information on the energy forum, see: www.aiche.org/new/energy/forum.htm

ROOT CAUSE ANALYSIS FOR BEGINNERS

Root cause analysis (RCA) is a process designed for use in investigating and categorizing the root causes of events with safety, health, environmental, quality, reliability and production impacts. The term "event" is used to generically identify occurrences that produce or have the potential to produce these types of consequences.

Simply stated, RCA is a tool designed to help identify not only *what* and *how* an event occurred, but also *why* it happened. Only when investigators are able to determine why an event or failure occurred will they be able to specify workable corrective measures that prevent future events of the type observed.

Understanding why an event occurred is the key to developing effective recommendations. Imagine an occurrence during which an operator is instructed to close valve A; instead, the operator closes valve B. The typical investigation would probably conclude operator error was the cause.

This is an accurate description of what happened and how it happened. However, if the analysts stop here, they have not probed deeply enough to understand the reasons for the mistake. Therefore, they do not know what to do to prevent it from occurring again.

In the case of the operator who turned the wrong valve, we are likely to see recommendations such as retrain the operator on the procedure, remind all operators to be alert when manipulating valves or emphasize to all personnel that careful attention to the job should be maintained at all times. Such recommendations do little to prevent future occurrences.

Generally, mistakes do not just happen but can be traced to some well-defined causes. In the case of the valve error, we might ask, "Was the procedure confusing? Were the valves clearly labeled? Was the operator familiar with this particular task?"

The answers to these and other questions will help determine why the error took place and what the organization can do to prevent recurrence. In the case of the valve error, example recommendations might include revising the procedure or performing procedure validation to ensure references to valves match the valve labels found in the field.

Identifying root causes is the key to preventing similar recurrences. An added benefit of an effective RCA is that, over time, the root causes identified across the population of occurrences can be used to target major opportunities for improvement.

If, for example, a significant number of analyses point to procurement inadequacies, then resources can be focused on improvement of this management system. Trending of root causes allows development of systematic improvements and assessment of the impact of corrective programs.

Definition. Although there is substantial debate on the definition of root cause, we use the following:

1. Root causes are specific underlying causes.
2. Root causes are those that can reasonably be identified.
3. Root causes are those management has control to fix.
4. Root causes are those for which effective recommendations for preventing recurrences can be generated.

Root causes are underlying causes. The investigator's goal should be to identify specific underlying causes. The more specific the investigator can be about why an event occurred, the easier it will be to arrive at recommendations that will prevent recurrence.

Root causes are those that can reasonably be identified. Occurrence investigations must be cost beneficial. It is not practical to keep valuable manpower occupied indefinitely searching for the root causes of occurrences. Structured RCA helps analysts get the most out of the time they have invested in the investigation.

Root causes are those over which management has control. Analysts should avoid using general cause classifications such as operator error, equipment failure or external factor. Such causes are not specific enough to allow management to make effective changes. Management needs to know exactly why a failure occurred before action can be taken to prevent recurrence.

We must also identify a root cause that management can influence. Identifying "severe weather" as the root cause of parts not being delivered on time to customers is not appropriate. Severe weather is not controlled by management.

Root causes are those for which effective recommendations can be generated. Recommendations should directly address the root causes identified during the investigation. If the analysts arrive at vague recommendations such as, "Improve adherence to written policies and procedures," then they probably have not found a basic and specific enough cause and need to expend more effort in the analysis process.

Four Major Steps. The RCA is a four-step process involving the following:
1. Data collection.
2. Causal factor charting.
3. Root cause identification.
4. Recommendation generation and implementation.

Step one—Data collection. The first step in the analysis is to gather data. Without complete information and an understanding of the event, the causal factors and root causes associated with the event cannot be identified. The majority of time spent analyzing an event is spent in gathering data.

Step two—Causal factor charting. Causal factor charting provides a structure for investigators to organize and analyze the information gathered during the investigation and identify gaps and deficiencies in knowledge as the investigation progresses. The causal factor chart is simply a sequence diagram with logic tests that describes the events leading up to an occurrence, plus the conditions surrounding these events.

ROOT CAUSE ANALYSIS FOR BEGINNERS

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Preparation of the causal factor chart should begin as soon as investigators start to collect information about the occurrence. They begin with a skeleton chart that is modified as more relevant facts are uncovered. The causal factor chart should drive the data collection process by identifying data needs.

Data collection continues until the investigators are satisfied with the thoroughness of the chart (and hence are satisfied with the thoroughness of the investigation). When the entire occurrence has been charted out, the investigators are in a good position to identify the major contributors to the incident, called causal factors. Causal factors are those contributors (human errors and component failures) that, if eliminated, would have either prevented the occurrence or reduced its severity.

In many traditional analyses, the most visible causal factor is given all the attention. Rarely, however, is there just one causal factor; events are usually the result of a combination of contributors. When only one obvious causal factor is addressed, the list of recommendations will likely not be complete. Consequently, the occurrence may repeat itself because the organization did not learn all that it could from the event.

Step three—Root cause identification. After all the causal factors have been identified, the investigators begin root cause identification. This step involves the use of a decision diagram called the Root Cause Map to identify the underlying reason or reasons for each causal factor.

The map structures the reasoning process of the investigators by helping them answer questions about why particular causal factors exist or occurred. The identification of root causes helps the investigator determine the reasons the event occurred so the problems surrounding the occurrence can be addressed.

Step four—Recommendation generation and implementation. The next step is the generation of recommendations. Following identification of the root causes for a particular causal factor, achievable recommendations for preventing its recurrence are then generated.

The root cause analyst is often not responsible for the implementation of recommendations generated by the analysis. However, if the recommendations are not implemented, the effort expended in performing the analysis is wasted. In addition, the events that triggered the analysis should be expected to recur. Organizations need to ensure that recommendations are tracked to completion.

The analyst must be willing to probe the data first to determine *what* happened during the occurrence, second to describe *how* it happened, and third to understand *why*.

Source: www.asq.org/pub/qualityprogress/past/0704

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Please contact E.G. Klein at eg.klein@giccusa.com or 724-796-3128 for more information.

ENGINEERING MENTORS

Volunteers are needed as mentors for the Pittsburgh Regional Future City Competition!

The Engineers' Society of Western PA (ESWP) is the coordinating sponsor for the Pittsburgh Regional Future City Competition. Our AIChE Pittsburgh Section has historically had many of our members volunteer for this event. The Future City Competition asks middle school students to create - first on computer and then in large, three-dimensional models - their visions of the city of tomorrow.

The Pittsburgh Regional Competition will be held at the Carnegie Music Hall, on ***Saturday, January 21, 2006.*** The Future City Competition is a national program sponsored by the engineering community to promote technological literacy and engineering to middle school students.

This year we are expecting to have about 40 to 45 schools registered. For more information on becoming an engineer mentor or for volunteering for the 2006 Future City Competition, please contact Janet Henke at 412-237-1640, or register online at: www.futurecitypittsburgh.org/futcityvolunteer_form.htm

SAVE THE DATE!
ESWP 125TH ANNIVERSARY DINNER

This is a very special year for the Engineers' Society of Western Pennsylvania (ESWP) because we recognize our 125th Anniversary as an organization. Officially chartered on January 6, 1880, we are one of the longest continually operating organizations of its type in the country.

In the early years, our members included steel industrialist, Andrew Carnegie, ALCOA co-founder, Alfred E. Hunt, and renowned bridge engineer, John Roebling. They were instrumental in the development of the steel, iron, coal, and glass industries. They played key roles in eradicating typhoid from our water supply, smoke and pollution from our skyline, and flooding in our business district.

Today, ESWP has over 800 members representing nearly 500 companies in Western Pennsylvania. Accordingly, we plan to celebrate our historic anniversary by increasing our mission in several ways over the next three years.

A commemorative dinner is being planned for ***October 26, 2005*** at the David L. Lawrence Convention Center. We are honored to announce that Rick Sebak of WQED will serve as Master of Ceremonies, and our keynote speaker will be noted author and historian, David McCullough.

For more information, please visit the ESWP website at www.eswp.com or contact David Teorsky at 412-261-0710.

AIChE Pittsburgh Section
2005-2006 Officers

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2005-2006 Monthly Meeting Schedule

Date	Topic	Location
October 19, 2005	Root Cause Analysis Presentation	Robinson Township, PA
November 9, 2005	Duraloy Technologies Plant Tour	Scottdale, PA
January 19, 2006	Joint Meeting with AWMA	Penn Brewery - Pittsburgh
February, 2006	Annual Student Night	University of Pittsburgh - Oakland
March, 2006	Technical Presentation	TBA
April, 2006	Plant Tour	TBA
May, 2006	Last Meeting of the Year	TBA

Mark your calendars!

For the Following Dates:

October 19, 2005	Monthly Meeting	Root Cause Analysis Presentation
October 22, 2005	Outreach Event	National Chemistry Week – "The Joys of Toys" at the Carnegie Science Center
October 26, 2005	ESWP Event	125th Anniversary – Commemorative Dinner at the David L. Lawrence Convention Center
November 9, 2005	Monthly Meeting	Duraloy Technologies Plant Tour

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