Your program committee would like to invite you and your company to the 2013 Annual Conference this year held in Corpus Christi, Texas. This is our third time to hold our meeting in this wonderful city located southwest of Houston on the Corpus Bay.

With its sparkling expanses of windwashed beaches, Corpus Christi is a city full of heritage and culture with many interesting things to see and do. Along with the outstanding location we have a great program lined up for you. We have a full offering of information, education, and an opportunity to participate in some of the global testing work on standards and codes. We believe it is our responsibility to make sure what we have to offer you can share with others at your company. As a non-profit technical organization, we are charged by our mission to bring you the most timely and latest information in the industry.

We have 30 papers being presented in a concurrent format on Monday and Tuesday. Water Treating will have one session and P&T and ES&M will have the other. We hope you find our attempt to add more technical papers to our program beneficial.

We will offer an extended time for committee work. In past winter meetings we had only a very short amount of time set aside to do the committee work. This year we have allowed much more time to do the work so important to the CTI. Please refer to the CTI news for times and committee work to be done.

The Table Top Exhibits on Tuesday from 4:00p – 8:30p will consist of 40+ top vendors from all the standing committees ready to support your questions with good qualified answers.

On Wednesday from 8:00a – Noon the Education Program Session will cover Cooling Tower Thermal Performance - Current Knowledge in Theory and in Practice

If you don't attend any other cooling tower related meeting or conference this year, you don't want to miss this. The CTI program committee has put together a program that will offer the best opportunity to inform, educate and expand your knowledge about this industry. We hope you can compare to tell all of your members we have to offer you. A great location, outstanding food, entertainment, and a conference that will give back to the membership what you want... "information"

I, Paul Nelson, Phil Kizer, Helen Cera, and John Lichtie, your program committee, invite and welcome you to the 2013 Annual Conference. See you on the beach in Corpus Christi, Texas.

Brandon Rees
CTI Program Chairman

- We are very close to selecting a dedicated Certification Administrator to oversee the Thermal Certification and Multiagency Testing programs.
- CTI has finalized our agreement with Eurovent and we are receiving income as a result of our thermal testing standards being employed across the globe. The Eurovent/CTI Licensing Agreement was no easy task to complete. I want to thank all of the manufacturers for their hard work with the finalized document.
- Withdrawing Retiring BOD members Dennis Shen and Raul Castillo. Due to a recent change in job responsibilities at Ascend Performance Materials, I have reluctantly accepted Dennis’s request to withdraw from his remaining term on the CTI Board, and other committee involvement. As everyone is aware, Dennis has been an invaluable and longtime contributor to our association, while serving in a variety of positions, including several BOD stints and as President of CTI. Raul has been an active CTI member for 35+ years, and has been most helpful in serving on the BOD.
- Withdrawal/Retiring BOD members Dennis Shen and Raul Castillo. Due to a recent change in job responsibilities at Ascend Performance Materials, I have reluctantly accepted Dennis’s request to withdraw from his remaining term on the CTI Board, and other committee involvement. As everyone is aware, Dennis has been an invaluable and longtime contributor to our association, while serving in a variety of positions, including several BOD stints and as President of CTI. Raul has been an active CTI member for 35+ years, and has been most helpful in serving on the BOD.
- Newly nominated BOD members. Our outgoing board members Frank Foster of Tower Performance Inc., Don Zelek of Brembo Industries and Dennis Shen of Ascend Performance Materials submitted candidate nominations for a three year BOD term, beginning with the February 2013 board meeting. The CTI board members elected to nominate the following individuals for 2013-2015 BOD term: Natasha Jones, Bechtel Corp (Owner Operator), Steve Chaloupka, Amurilo Gear Company (Supplier) and Billy Childress, Aggreko Cooling Tower Services (Manufacturer).
- The CTI general membership will soon vote to accept these nominees to serve on our BOD for the 2013-2015 term. Congratulations to each of these nominees, and we look forward to their active participation subsequent to membership approval.
- CTI is financially sound and operating within our 2012 budget.
Swifter CTX Series

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Swifter
Message From The President... continued from page 1

Just prior to the fall BOD meeting Tom Bugler (Long Range Planning) and Ken Mortensen (Policies and Procedures Committee) chairs held discussions to update/streamline the CTI Operations manual. As a result of these meetings it was recommended to combine long range planning and Business development into a single committee. Also thanks to Jess Seawell for developing a detailed scope for the past president’s council as an advisory group to the CTI President and the Board.

Vicky Manser and her administrative team should be commended for their diligent efforts in keeping CTI operating smoothly on a day to day basis. My job and those of our three standing committees is made much easier as a result of their support.

Finally, as you can see from our full schedule of papers and exhibitors at the upcoming annual meeting, Corpus Christi in February 2013 will be an event to further benchmark CTI as the global leader that our organization has achieved via the dedication of all of our members and member companies.

See you in Corpus Christi in February,

Respectfully submitted,
Jack Bland, CTI President, 2012-2013

Owner Operator Session
Tuesday, February 5, 2013, Nueces Ballroom B
12:00p - 2:00p - (lunch included)

Come and join Frank Michell, Chairperson for the Owner/Operator Council with the Cooling Technology Institute (CTI) at the CTI Annual Technical Conference in Corpus Christi, Texas. The Council is comprised of owner/operators that are responsible for cooling towers, associated equipment and/or water treating of the cooling systems at their facilities. This is an opportunity to talk with others about issues they have with their peers as well as to establish strong relationships with suppliers and manufacturers that are active in the CTI.

There are several high quality presentations, seminar and panel discussion content planned for the Annual Conference given by recognized experts in the cooling technology field. Owner/Operators are encouraged to participate in the various Standards and Code Committee meetings held in conjunction with the Conference.

This year we are going to have presentations during the Owner/Operator Session on available CTI Codes and Standards that have been published under responsibility of the CTI Performance & Technology, Engineering Standards & Maintenance and Water Treating Committees. Following the Committee Chair presentations, we will go into a round table discussion among ourselves (no suppliers or manufacturers present) with lunch provided to talk about issues you may be having with your cooling systems and any lessons learned when correcting problems you have had.

2013 Education Seminar
Wednesday, February 6, 2013
8:00a - Noon

Cooling Tower Thermal Performance
Current Knowledge in Theory and in Practice

CTI ToolKit Software - User Advantages

Presenting information pertaining to the CTI ToolKit Software will be Rich Aull. Rich’s presentation will cover the legacy and an overview; the four tabbed applications (Psychrometric Calculator; Merkel Number Calculator; The Demand Curve Application; Mechanical Draft Tower Performance Analyzer), will give practical examples, will make comparisons to other commercially available tower rating software and give the cost and availability of the software.

Rich Aull is Director of Engineering at Brentwood Industries with 33 years experience in the cooling tower industry. Rich got his start in the cooling tower industry with Research Cottrell’s Hamon Cooling Tower Division in 1979. With Brentwood for the last 20 years, he is currently responsible for product development, testing, application engineering and sales support. Rich is active in the Cooling Technology Institute (CTI) as the Software Publishing Task Group Chair, Vice Chair of the Performance and Technology (P&T) and Multi-Agency committees. He has published technical papers and conducted seminars on a variety of cooling tower topics for the Cooling Technology Institute, Electric Power Research Institute and American Society of Mechanical Engineers.

Rich received his B.S. & M.S. Degrees in Mechanical Engineering from the New Jersey Institute of Technology and is a registered Professional Engineer in the States of New Jersey & Pennsylvania.

Test Preparation and Execution

This presentation is given by Jared Medlen. He will discuss test preparation, the importance of PTG-156, test measurements, preparing for a test day and the test execution itself. Jared graduated from Tennessee Tech in 2008 with a B.S. in Mechanical Engineering with a concentration in energy systems. He has a back ground in HVAC systems design and implementation.

Jared is a Performance Engineer at McHale where he leads the technical responsibilities within the CTI program. He is also well versed in power plant and power plant component testing, instrumentation, data collection, and data analysis. Jared has a key interest in heat rejection.

Cooling Tower Basics

The purpose of Paul Lindahl’s presentation is to provide an overview of the basics of cooling tower technology. Some of the topics he will be covering will be: how they work; types and configurations; and design considerations.

Paul Lindahl is Director, Market Development, for the SPX Thermal Equipment & Services Segment. Paul has worked in various roles starting with Marley as an engineer-in-training in 1968. He is a past President of CTI, a permanent member of the Past Presidents Council, and has been active in many CTI Roles since 1982. Paul is currently involved in multiple CTI committees. He is also active in multiple ASHRAE roles, is on the Board of Directors of the Air-conditioning, Heating and Refrigeration Institute (AHRI), and has committee roles with Eurowet Certification, ASME and other organizations.

Cooling Tower Particulate Matter & EPA Regulations

Presenting information pertaining to the Particulate Matter & EPA Regulations will be Ken Hennon. Ken’s presentation will cover Principle of CTI Method (ATC-140); Test Preparations; General Measurement Parameters; Operational & Environmental Requirements; Test Biases and Mitigation and Factors Contributing to Drift Control.

Ken Hennon, P.E. is the Business Leader at Clean Air Engineering, Inc. and an active member of CTI and ASME. He has authored several CTI, EPRI, and AWMA papers addressing cooling tower related issues with an emphasis on cooling tower emissions.

Ken currently serves as the committee chairman for the CTI Drift Emissions test code (ATC-140) and is the chairman of the CTI Performance and Technology Committee. Ken holds a BS in Petroleum Engineering from the University of Missouri-Rolla and a MS in Environmental Engineering from the University of Tennessee. Ken is a licensed engineer in the State of Tennessee.
New **CTI** Members for 2012

- Alstom Mexican S.A. de C.V. (O/O)
- AP Tech Group, Inc
- Astha Amarillo Gear Pvt Ltd
- Brad Buecker
- Bullock, Logan & Associates
- Canara Engineers Pvt Ltd
- Champion Technologies, Inc.
- Changzhou Hanf Cooling Equipment Co., Ltd
- Cool Tech Energy Water Treatment
- Eco Tower Co., Ltd
- Energy Options, Inc
- Energy Options, Inc
- Essential Power LLC
- Exelon Generation
- Exelon Nuclear
- Industrial Mexicana, S.A. de C.V.
- Irish Cooling Towers Ltd
- G.S.M. S.p.A.
- Green Partners Industry Co., Ltd
- GS Cooling Towers and Components
- Hamon Australia Pty Ltd
- Hansen Industrial Gearboxes (USA)
- Jiangsu Huannqiuosheng Environmental Tech-Development Co., Ltd
- Natalie Klaverkamp
- Koolaqua Towers Pvt Ltd
- Lonza Inc.
- MAINA Organizzazione, S.p.A.
- (PT) Mastranico Sunyadaya
- Nutech Systems
- Premier Engineers & Industries
- Promanex Water Services
- QualiChem, Inc.
- Surin Ramsingh
- Reductores de Mexico, S.A.
- Southwest Cooling Tower, Inc
- ST Cooling Towers
- Steam Engineering, Inc.
- Techco Industrial Co., Ltd
- Teng Kwang Industries Sdn Bhd
- TGWT Clean Technologies, Inc
- Total Tower Solutions, Inc.
- Trulear Water Management
- Volgoprompolimer LLC

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**Water Treating Panel Discussion**

**Monday, February 4, 2013 from 2:00p - 3:30p**

**Cooling Water Treatment in an Age of Sustainability**

This panel discussion will present topics that have become increasingly important to industrial and institutional markets, such as how an owner might best choose a well-performing program that has minimal environmental impact, from low water usage to the use of non-chemical/physical devices, while achieving municipal credits, maintaining proper health standards, and being economically feasible. Criteria for success and program verification will be especially noted.

**Panelists are:**

**Dr. Janet Stout, Director of Special Pathogens Laboratory**

Dr. Stout received her BS in Biology from Clarion State College, Clarion, Pennsylvania; and her Masters and PhD degrees in Microbiology from the University of Pittsburgh. She is currently the Director of the Special Pathogens Laboratory in Pittsburgh, PA and an Associate Professor in the Department of Civil and Environmental Engineering University of Pittsburgh. Dr. Stout elucidated the link between the presence of Legionella bacteria in hospital water systems and hospital-acquired Legionnaires’ disease. Dr. Stout has authored more than 80 peer review papers and book chapters on the environmental microbiology and epidemiology of Legionnaires’ disease. She has been instrumental in the development of methods and strategies for the prevention of infections due to Legionella and other waterborne pathogens.

Dr. Stout is a member of the American Society for Microbiology, the Association for Professionals in Infection Control, and the American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE).
the CTI Multi-Agency Tower Performance Test Program and provide comparisons of the actual operating performance of a specific tower installation to the design performance. By providing such information on a specific tower installation, the CTI Multi-Agency Testing Program stands in contrast to the CTI Cooling Tower Certification Program which certifies all models of a specific manufacturer’s line of cooling towers perform in accordance with their published thermal ratings. To be licensed as a CTI Cooling Tower Performance Test Agency, the agency must pass a rigorous screening process and demonstrate a high level of technical expertise. Additionally, it must have a sufficient number of test instruments, all meeting rigid requirements for accuracy and calibration. Once licensed, the Test Agencies for both thermal and drift testing must operate in full compliance with the provisions of the CTI License Agreements and Testing Manuals which were developed by a panel of testing experts specifically for this program. Included in these requirements are strict guidelines regarding conflict of interest to insure CTI Tests are conducted in a fair, unbiased manner.

Freedman Associates
Robert Cunningham, Arthur Freedman Associates

Bob earned a BS in Chemistry, and an MBA from the University of Pittsburgh, and he is a Licensed Professional Engineer in CA. He is also a NACE Certified Corrosion Specialist, and he is certified by USDA to develop, apply, and oversee HACCP plans, which insure the safety of our food products. Bob has long term experience successfully developing and applying water treatment programs across the entire breadth of industry and his background includes product development laboratory, product management, marketing management, field service, sales and sales management. He successfully started and operated Chemisis, Inc., a regional water management firm specializing in refinery, steel making, food manufacture, and HVAC systems. Bob is currently a Vice President and Consultant at Arthur Freedman Associates, Inc., where he consults internationally on problems associated with domestic and industrial water preparation plants, boilers and steam plants, open and closed cooling water systems, process water systems, refinery process chemicals, and waste water treatment programs. In addition, Bob provides litigation support in a variety of actions, as well as custom training programs for facility engineers and managers, as well as water treatment service personnel. Prior to this position, Bob held numerous staff and field positions with several major suppliers of water treatment chemicals and services. He has been working continuously in the water treatment industry since 1962. He has had the opportunity to work closely with and learn from many of the luminaries of our industry, and his career has spanned almost the entire development of the modern water treatment industry, allowing him to bring experience as well as a unique perspective to problem resolution.

Robert Cunningham, Arthur Freedman Associates

Cooling Technology Institute Licensed Testing Agencies

For nearly thirty years, the Cooling Technology Institute has provided a truly independent, third party, thermal performance testing service to the cooling tower industry. In 1995, the CTI also began providing an independent, third party, drift performance testing service as well. Both these services are administered through the CTI Multi-Agency Tower Performance Test Program and provide comparisons of the actual operating performance of a specific tower installation to the design performance. By providing such information on a specific tower installation, the CTI Multi-Agency Testing Program stands in contrast to the CTI Cooling Tower Certification Program which certifies all models of a specific manufacturer’s line of cooling towers perform in accordance with their published thermal ratings. To be licensed as a CTI Cooling Tower Performance Test Agency, the agency must pass a rigorous screening process and demonstrate a high level of technical expertise. Additionally, it must have a sufficient number of test instruments, all meeting rigid requirements for accuracy and calibration. Once licensed, the Test Agencies for both thermal and drift testing must operate in full compliance with the provisions of the CTI License Agreements and Testing Manuals which were developed by a panel of testing experts specifically for this program. Included in these requirements are strict guidelines regarding conflict of interest to insure CTI Tests are conducted in a fair, unbiased manner.

Licensed CTI Thermal Testing Agencies

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<th>Agency Name</th>
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<td>A,B</td>
<td>Clean Air Engineering</td>
<td>Kenneth Hennon</td>
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<td>Cooling Tower Technologies Pty Ltd</td>
<td>Ronald Bartee</td>
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* Type A license is for the use of mercury in glass thermometers typically used for small towers.

Licensed CTI Drift Testing Agencies

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We the members of the Cooling Technology Institute (CTI), when acting on behalf of CTI, its members and the industry, will always abide by:

• Behaving with honesty, trustworthiness, and in good faith in representing and performing duties for the betterment of the CTI.

• Always striving to provide the best and most up to date technological information so CTI remains current with industry standards, specifications, guidelines and recommended practices for the benefit of both our members and our industry.

• Insuring that all official works, statements and/or actions on behalf of CTI are so noted as official property of the CTI. All non-official works, statements and/or actions will be clearly recognized as not of CTI and are of personal opinion.

• Avoiding damaging or critical actions with other CTI members that might be personally hurtful or degrading to their employer.

• Exposing existing or past conflicts and rectifying these conflicts in an expedient manner to the best possible solution for all parties involved.

• Holding fellow CTI members in the highest regard of respect and admiration.

August 29, 2006
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We are known for providing dynamic solutions resulting in quality advantages and competitive pricing. Providing excellent customer service is our #1 priority. It’s what keeps our customers coming back.

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Attend the Committee Meeting of Your Choice
February 4-6, 2013

Engineering Standards and Maintenance

Ken Mortensen - SPX Cooling Technologies
Bill Howard - Cooling Tower Depot, Inc., Chair
James F. Blake, Jr. - American Lightning Protection

CAll FOR
PAPeRs
2014 Annual Conference
February 2-6, 2014
Hilton Houston North
Houston, Texas

The following schedule will begin the process for papers presented at the 2014 Annual Conference:

2013
May 10: Deadline for Abstracts
June 21: Authors Notified by Program Chair
Aug 9: Copy of the first draft must be sent to CTI office for review
Nov 8: Final draft, based on review comments and slides due in the CTI office

Abstract Forms can be obtained by contacting the CTI office at 281.583.4087 or email: vmanser@cti.org

CALL FOR PAPERS
I. Call to Order
II. Acknowledgement of Attendees
III. Old Business - Active Task Groups:
   • ATC-105 Thermal Test - Rich Harrison, Chair
   • STD-146 Flow Measurement, David Wheeler, Chair
   • ATC-128 Sound - Jean-Pierre Libert, Chair
   • STD-201 Certification - Frank Michell, Chair and Trevor Hegg, Co-Chair
   • STD-202 Publication Standard - Paul Lindahl, Chair
   • PTG-156 Preparation for an Official CTI Thermal Performance Plume Abatement, or Drift Emission Test - Ken Hennon, Chair
   • PFM-143 Recommended Practice for Airflow Testing of Cooling Towers - Paul Nelissen
IV. New Business

Press Release
Contact: Chairman, CTI Multi-Agency Testing Committee
Houston, Texas 2-November-2012
Cooling Technology Institute, PO Box 73383, Houston, Texas 77273 - The Cooling Technology Institute announces its annual invitation for interested thermal testing agencies to apply for potential Licensing as CTI Thermal Testing Agencies. CTI provides an independent third party thermal testing program to serve the industry. Interested agencies are required to declare their interest by March 1, 2013, at the CTI address listed.
The 2013 CTI Annual

© Again this year the Technical Sessions will run simultaneously between

Sunday, February 3, 2013

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<th>Time</th>
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<tr>
<td>7:00a - 11:00a</td>
<td>Service Registration and Paper Sales, Foyer</td>
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<td>7:00a - 9:00a</td>
<td>Speakers’ Breakfast, Photo Session &amp; Prep Room, Laguna Madre</td>
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<td>7:30a -</td>
<td>President’s Address - Jack Bland, Nueces Ballroom A</td>
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<td>7:40a -</td>
<td>Long Range Planning - Paul Lindahl, Nueces Ballroom A</td>
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<td>7:50a -</td>
<td>Eurowest Update - Paul Lindahl, Nueces Ballroom A</td>
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<td>8:00a -</td>
<td>Multi Agencies Report - Mark Shaw, Nueces Ballroom A</td>
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<td>Certification Report - Tom Weast, Nueces Ballroom A</td>
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Monday, February 4, 2013

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<td>8:30a - 9:00a</td>
<td>Nueces B Ballroom (ES&amp;M and P&amp;T Sessions)</td>
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<tr>
<td>9:00a - 9:30a</td>
<td>Nueces A Ballrooms (Water Treating)</td>
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Nueces B Ballroom (ES&M and P&T Sessions)

TP13-01

Fire Protection in FRP Cooling Towers

James L. Baker, Composite Cooling Solutions, LP

Jim was born in Tulsa, Oklahoma graduating from Northern Oklahoma College in 1976 with an Associate of Science degree in Engineering, attended Tulsa University’s School of Engineering night school from 1984-1989 and received a BS in Human Resource Management from Oklahoma Wesleyan College in 1991. He has authored and presented numerous technical papers at CTI, EPRVI, and local organizations. He presently resides in Fort Worth where he is Vice President with Composite Cooling Solutions, LP.

There is a misconception throughout the Power, Process, and HVAC industries that cooling towers are basically resistant to fire because they are by nature wet. This technical paper will explain in detail the facts about fires in cooling towers. It will address and clarify terminology, such as fire retardant vs. flame spread, and other misconceptions and misinterpretations. After terminology is defined, this paper will address Factory Mutual (FM) Approval and the costs and advantages of this program. We will define FM and present the strict program that has to be completed to gain this accreditation. The paper will discuss how FM Approval results in savings in insurance premiums. This paper will also review the many standards that govern all types of fire protection systems and testing procedures. Some of these standards are: EM-119, Testing Procedures; MFA-13, Sprinkler Installations; NFPA-214, Sprinkler/Firewalls; CFI Chapter 12, Fire Protection; and NFPA-251, Testing of Materials Procedures.

9:00a - 9:30a

TP13-02

Should I Use a Chemical Treatment Program for My Tower or a Physical Device?

Robert J. Cunningham, Arthur Freedman Associates

Bob earned a BS in Chemistry, and an MBA from the University of Pittsburgh, and is a Licensed Professional Engineer in CA. He is also a NACE Certified Corrosion Specialist, and is certified by USDA to develop, apply, and oversee HACCP plans, which insure the safety of our food products. Bob has long term experience successfully developing and applying water treatment programs across the entire breadth of the industry and his background includes product development laboratory, product management, marketing management, field service, sales and sales management.

He successfully started and operated Chemists, Inc., a regional water management firm specializing in refining, steel making, food manufacture, and HVAC systems. Bob is currently a Vice President and Consultant at Arthur Freedman Associates, Inc., where he consults internationally on problems associated with domestic and industrial water preparation plants, boilers and steam plants, open and closed cooling water systems, process water systems, refinery process chemicals, and waste water treatment programs. In addition, Bob provides litigation support in a variety of actions, as well as custom training programs for facility engineers and managers, as well as water treatment service personnel. Prior to this position, Bob held numerous staff and field positions with several major suppliers of water treatment chemicals and services. He has been working continuously in the water treatment industry since 1962. He has had the opportunity to work closely with and learn from many of the luminaries of our industry, and his career has spanned almost the entire development of the modern water treatment industry, allowing him to bring experience as well as a unique perspective to problem resolution.

The appeal of non-chemical treatment alternatives cannot be ignored by specifiers and users. With these “physical treatment” devices you can eliminate the reported disadvantages of handling and inventorying chemicals; reduce your environmental concern; and qualify for Leeds Credits. The only question is “Do they work?” The author presents his recommendations for the types of alternatives you need to make a good decision and provides case histories and documentation for the material presented.

9:00a - 9:30a

Nueces A Ballrooms (Water Treating)

TP13-03

Evaluation of the Effect of Damages of Drift Eliminators on Their Efficiency

Helene Troncin, EDF

Helene Troncin is an engineer graduated from the Polytechnic Institute of Grenoble in 1991. She joins the Basic Design Department of EDF, and becomes to be involved in questions of the cooling for the circuits. Her experience includes the cooling towers design, the qualification of the fill through its thermal performances and the problems of fouling.

To improve the planning of maintenance of the drift eliminators of its counter flow natural draft cooling towers, EDF decided to run two campaigns of tests: the first one focused on the effect of the mechanical deterioration of drift eliminators. Because of fouling issues due to the use of untreated raw water as make up, the second test was applied on eliminators with a layer of about 1.5 millimeter of fouling. For both tests, the CTI ATC-140 and NFPA-251, Testing of Materials Procedures.

9:00a - 9:30a

TP13-04

Good Practices in Cooling Towers: Comparison Between Industrial Audits

Salvador Avila Filho and Zara Marques Rodrigues De Jesus, Universidade Federal Da Bahia

ACADEMIC FORMATION: Chemical Engineer (UFBA), Petrochemical Process Specialist (Petrobras), CQE (ASQ), Organizational Consultant (UCSAL), Cleaner Technologies Matter (UFBA), Human and Operational Reliability Doctor (UFBA); EXPERIENCE: Engineer (production, process, environmental) at Chemical Industries; Manager at Plastic Industry; Clean Production Researcher at Fertilizer and Petrochemical Industry (UFBA); Water and Waste Auditor/Consultant (UFBA/SUDBI); Human-Operational Reliability and Risk Management Researcher (UFBA).

The integration of cooling towers with processes and wastewater indicates that a better performance in cooling systems gives benefits for whole production including thermal energy targets. The audit in cooling towers and systems combines thermal behavior analysis, mass/energy balances, field verifications, interviews, and procedures review. The goal of techniques is detecting restrictions to the use of entire capacity of the cooling tower. The comparison between cooling towers’ audit in chemical, metallurgical and petroleum industry shows potential to energy recovery by each technology. This paper presents: method that decrease energy and water losses; and guideline – good practices for cooling tower maintenance.

9:00a - 9:30a

continued on page 11
vacuum in conditions typically utilized in power or other process plant applications. The ability to test the heat exchanger with steam under vacuum rather than hot water makes it unique as well, and allows EVAPCO to optimize the Air Cooled Condenser design with unprecedented precision; giving particular attention to phenomena such as freezing, air leakage, impingement, flow acceleration, cooling tower efficiency, and water flow on the problems of specific power losses associated with Air Cooled Condensers. The EVAPCO Dry Cooling test laboratory cannot only test first stage (concurrent flow, R or condenser cell) or second stage flow (counter-flow, dephlegmatizer or reflux cell), in a 100% direct cooling configuration, but can be adapted to also test hybrid/parallel condensing systems.

10:00a - 10:30a

TP13-07 Microbial Corrosion on Metallic Surfaces
Karoline Bohlen, Colorado School of Mines
Karoline is an MS Candidate at Colorado School of Mines in the Geophysics Department. Not appreciating the prevalence of oil and gas industry influence in geophysics studies, she veered to a biogeochemistry focus. This was an easy way to tie her major together with her love of life in general and especially biological extremes. However, a future career in toxic bioremediation didn’t appease her passion for biogeochemistry and extremophile microbes, and she turned her focus to alternative energy.

After hearing a talk about developing the Raton Baquin geothermal potential to power up CBI operations there, Karoline gained a new appreciation for the oil and gas industry. She picked the Colorado Raton Basin to become familiar with the geothermal industry and made the Raton assessment her thesis topic. Karoline sees huge geothermal opportunities in Colorado, the US, and the entire world and has decided to become a geothermal proponent in all she does.

Infusing biogeochemistry into her current geothermal focus led to her paper discussing microbial impacts on water transport and cooling equipment.

The underlying conclusion to past studies on microbial corrosion is that it is a complex subject, still not yet well understood. It’s been found that many bacterial species can be part of the corrosion process, different metal surfaces show different progression of corrosion, and microbes can only inhibit corrosion of the metals. There is no consensus as to the role microbes can play; it is quoted from varying sources that microbial induced corrosion is involved in the range of 2% to 90% of problem. This paper summarizes the process and proposes a simple research approach.

10:30a - 11:00a

TP13-09 How Stripping Biofilm from the Cooling Water Loop Impacts Power Plant Production Output
Cem Candir and Tom Muenlinger, MIOX Corporation
Cem Candir is the Director of Business Development & Marketing for MIOX Corporation. Before joining MIOX, he worked for GE Water for 10 years and was responsible for global water treatment chemicals production including cooling water treatment chemicals and the integration of heritage water treatment equipment companies under the GE portfolio including Zenon, Osmotics, Jionics. He also led GE’s global footprint expansion and established chemical blending and membrane production plants in emerging markets including China and India. Cem holds a Bachelor of Science degree in Mechanical Engineering from Bogazici University in Istanbul, Turkey and an MBA Ion Marketing and Strategy from University of Minnesota - Carlson School of Management.

The operational relationship between the cooling tower’s cooling loop performance and power plant production load is vitally important. When condenser tube sheet fouling is present, the production load of the power plant is affected; especially if the power plant is operating at its peak capacity. It becomes a critical concern if biofilm, visible or not, is present in condenser tube sheets as even a small amount of biofilm has a significant impact on heat transfer efficiency. This paper presents the current challenge in power plant cooling loop treatment and case evidence where biofilm removal improved heat transfer efficiency resulting in increased power plant’s production load.

11:00a - 11:30a

TP13-11 Impact of Cooling Water Temperature on Plant Performance
Magose Abraham Eju, Nigeria Liquefied Natural Gas (NLNG)
Magose Abraham Eju holds a PhD Degree in Mechanical Engineering from the University of Strathclyde, Glasgow, UK and an MBA Degree in Project Management from the University of Technology Overett, Nigeria. His PhD Dissertation was on the topic, “Improving the Thermal Performance of Cooling Towers by Conditioning of Air”. He has over eighteen years of working experience in the oil and gas industry. Between 1991 and 1994, he worked with a multi-national marine company – Holt Leasing Marine - as a 3rd class marine engineer; having passed the required professional examinations and certified. Between September 1997 and June 1998 he worked as a freelance inspection engineer with a multi-national inspection company - SGS Inspection Company Limited. By July 1998, Kevin is Lead Consultant, Energy and Water Sustainability with Chem-Treat, Inc. He has a BS in Chemistry from Mississippi State University (1987). He has twenty-five (25) years’ experience in water treatment and specialty chemicals. Kevin has experience in chemical plants, pharmaceuticals, food and beverage, power, refining, high-purity water, light industrial and commercial and institutional systems. Areas of expertise include cooling systems, boilers, chemical cleaning and process related corrosion and scale inhibition.

This paper discusses techniques for online and offline cleaning of cooling towers including galvanized towers, to remove biological fouling and mineral deposits. The processes involve specialty chemicals and technical expertise.

10:30a - 11:00a

TP13-12 Water Reuse – As Time Goes by do the Less Attractive Approaches or Options Now Look More Attractive
Roy A. Holliday and Gary E. Greiger, GE Water & Process Technologies
Mr. Holliday has a total of 31 years of experience in water treatment, particularly Cooling Water Treatment, in a Technical capacity troubleshooting, program design and product development. He has worked eight (8) years in Power Stations for the UK Central Electricity Generating Board and three (3) years working for British Steel Tubes Division at a fully integrated Iron and Steel and Finishing Plant (tubes) at Corby, Northamptonshire, UK. Roy has 49 years with GE, responsibilities for UK, South East Asia, Europe, Middle East and Africa. He has been hired as a consultant by International Oil Corporations and Food and Beverage Industry Companies. He has written, presented and had published over 15 Technical Papers for various organizations and societies.

Reuse of lower quality waters as make-up water to Open Evaporative Cooling Water Systems has been implemented and practiced for several decades. The driving force was often “image”, lowering environmental impact, and or economic benefits (reduced operating costs). Pareto’s Principle was often followed if not strictly applied, the easiest, lowest cost to implement approaches were those most often implemented. With the passage of time, more stringent restrictions on permitted discharge consents and/or increased cost or reduced availability of good quality make-up water have emerged or developed in some parts of the world. This may have a significant impact upon the benefits and requirements of existing reuse applications and/or make the previously less attractive projects worth reconsidering. The additional requirements that current applications may require, more advanced techniques that may be used within reuse projects are discussed within this paper.

Don’t forget to sign up for Monday night’s dinner at the Texas State Aquarium. Information on page 16

continued on page 12
he joined a multi-national liquefied natural gas company – Nigeria LNG Limited where he still works today as a process engineer. During this period, he has worked in the UK – on secondment to Shell Exploration and Production Company– and in Malaysia – on secondment to Malaysia LNG Company. He has undergone / attended several professional technical / management training / conferences in Australia, Belgium, Holland, Malaysia, Nigeria, UK and USA during his working career. He also did some teaching at the University of Strathclyde, Glasgow, UK during the final year of his PhD study. He is currently an examiner for the Nigeria Society of Engineers.

Cooling water plays a very vital role in the performance of a plant in terms of the energy utilization / optimization, production and financial earnings (the bottom-line) of the business. The water temperature has the most impact on water-cooled plant, process or system and hence, its energy utilization, operating costs and/or savings. It is therefore important to get the cooling water at the right temperature to ensure optimal performance / efficiency of a plant. This paper uses a real-life problem that occurred at the Nigeria Liquefied Natural Gas plant as a case study to show how the performance of a cooling tower impacts the cooling water temperature and hence the overall performance of a water-cooled plant.

11:30a – Noon

TP13-17
Low-Speed Motor Experience
Martin Kubicek, FANS, A.s. and Jan Holl, DAC Motors, A.s.

Martin Kubicek is a Sales and Technical Manager of M/s F ANS, a.s., based in Prague, Martin Kubicek, FANS, A.s. and Jan Holl, DAC Motors, A.s. He has been working as a Sales and Technical Manager of F ANS since 2008. In 2004 he graduated as a Mechanical Engineer at Brno University of Technology and till 2008 he was working on his PhD degree at the same University and University of Malta. He began his career as an intern in NYSE, a.s. company and since that time he is working as a member of Asia and Africa company division. Since 2009, when subsidiary of FANS, a.s. in India named FANS ASIA Pvt Ltd has been established, he has been spending most of his time mainly in India to understand local market and client’s requirements.

This ends the Water Treating Papers for Monday’s program.

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**Group Luncheon - 12:15p - 1:45p**

**Corpus Christi Ballroom**

**2:00p - 3:30p**

Water Treating Panel Discussion, Nueces A

**3:00p - 4:00p**

**3:45p - 5:00p**

Technical Committee Meetings

- Engineering Standards & Maintenance, Laguna Madre
- Performance & Technology, Aransas
- Water Treating, Nueces A

**5:00p - 12:00a**

Hospitality Suite

(Bar Closes @ 9:30p) - Bayview

**6:00p - 10:00p**

Dinner at the Aquarium (information on page 16)
Most of the cooling towers used all around the world are operating by using of standard fan unit solution such as fan impeller, gear box, driving shaft and motor. As presented in the previous paper, the fan unit development in the cooling tower industry can be slow-running motor, which is directly coupled with fan impeller. This paper discusses slow-running motor experiences of one of the European cooling tower manufacturer.

3:00p - 3:30p

TPI13-19 Experimental Methods for Cooling Tower Research

Jan Cizek and Michal Stepnicky, Czech Technical University in Prague

Received his Electrical Engineering degree from TU Wien, in 2005 at Czech Technical University (CTU) in Prague, Faculty of Mechanical Engineering, Master’s daily studies, Engineering Mechanics and Mechatronics, 2010 CTI of Prague, Faculty of Mechanical Engineering, Doctoral daily studies Thermomechanics and Fluid Mechanics. At present he is with CTU in Prague, Faculty of Mechanical Engineering, co-operation on project, “optimizing cooling systems for the power industry” as part of the MIT scheme “TIP” research and development concerning possible applications of water recovery systems in cooling towers.

The laboratory of CTU in Prague has long been focused on research in the field of cooling technologies. Several experimental stands for evaporative and dry cooling have been built with a close collaboration with our partners from the commercial sphere. All of those stands can be run simultaneously in our laboratory, namely a measurement of the effectiveness of fills in the testing cell with usable dimensions of 1.5 x 1.5 x 4 meters, a measurement of nozzle characteristic, measurements of thermodynamic properties of active plate abatement systems, an interferometric (IPI) measurement of the efficiency of drift eliminators, or optical (PIV) measurements of velocity fields near the droplet eliminators and other cooling tower components.

3:30p - 4:00p

TPI13-21 Expedited Field Erected Cooling Tower Replacement/upgrade with Limited Site Access and Available Tow

Al Felzin, Linde Gas; Philip Poll, OBR Cooling Towers, Inc. and Casey Yurkovitch, GEA Heat Exchangers Inc.

Al Felizin graduated from the University of Delaware in 1972 with a BS in Chemistry. For the past 27 years Mr. Felizin has worked for Linde providing plant support, troubleshooting, retrofits, and upgrades for cooling water systems, piping and pressure vessels, and process equipment (coldboxes, brazed aluminum heat exchangers). He is responsible for Engineering Training. Mr. Felitin is well published having published and presented papers for NACE, CTI and CGA

An innovative replacement and upgrade of field erected cooling tower over an existing basin with limited site access. An aggressive construction schedule of eight weeks was followed with a limited total plant outage of three days. Cooling Tower performance was maximized including a decision mid project schedule to increase the tower footprint by approximately 25% without increasing the size of the existing cold water basin. Tower was completely stick built and erected two weeks ahead of schedule with zero safety incidents.

4:00p - 4:30p

TPI13-23 Direct Drive Motor Design – Improving Product Availability by Rationalizing Design Considerations

Robbie McElveen and Bill Martin, Baldor Electric Company

Robbie received a Bachelor of Science degree in Electrical Engineering in 1991 and a Master of Science degree in Electrical Engineering in 1995 from Clemson University in Clemson, SC. He joined Baldor Electric Company in 1995 and has experience in the design of both induction and PM synchronous motors. He is currently a Senior Development Engineer for Variable Speed and Specialty motors at Baldor Electric Company. He has authored six other CTI Papers The horsepower and speed required for a given fan depends on many factors, including maximum tip speed, blade design, blade pitch, and required CFM. There are an infinite number of HP/RPM/shaft combinations that could be requested from a direct drive motor manufacturer. With careful design, it is possible to create a “universal” motor that covers a wide range of requirements. This paper discusses characteristics that must be considered when designing a universal direct drive motor. Pros and cons of this approach will be discussed. Comparisons between a universal motor design and a more traditional motor design concept will be made.

This ends the ES&M and P&T Papers for Monday’s program.

2:00p - 3:30p Water Treating Panel Discussion, Nueces A

3:00p - 4:00p Break

3:45p - 5:00p Technical Committee Meetings

• Engineering Standards & Maintenance, Laguna Madre
• Performance & Technology, Aransas
• Water Treating, Nueces A

5:00p - 12:00a Hospitality Suite

(Bar Closes @ 9:30p) - Bayview

6:00p - 10:00p Dinner at the Aquarium (information on page 16)
TP13-26

Accurately Determining Drive Shaft Natural Frequencies
Duane Byerly, Rexnord Corporation

Duane Byerly works as a Senior Engineer for Rexnord Industries LLC. He has been involved with the design and development of advanced composite power transmission products for over 20 years. Most of his experience has been with engineering product improvements and advancement of the Addax cooling tower coupling. He has several patents related to power transmission components obtained from composite materials. Duane holds a BS and MS degrees in Engineering from the University of Nebraska-Lincoln. He is also a registered Mechanical Engineer in the state of Nebraska.

Mechanical drive equipment must be selected correctly and operate smoothly with no vibration. Drive shafts must be designed and manufactured with precision to prevent operation near a natural frequency. We have gotten more sophisticated in determining and controlling the natural frequency of drive shafts. As a user, you must be cautious of the supplier you choose for your drive system critical components. Not all manufacturers have a sufficient level of understanding; therefore, any supplier should provide you with the data to support the natural frequency values they publish.

8:30a - 9:00a

TP13-27

How Sensor Mounting Affects Measurement
David A. Corelli, IMI Sensors

David A. Corelli holds a Bachelor of Science degree in Systems Engineering from Wright State University and a Master of Science degree in Mechanical Engineering from The University of Alabama. He has over 38 years of experience in vibration analysis, instrumentation, and sensors. He has worked as a test engineer for the Air Force Avionics Laboratory; a field Engineer for Hewlett Packard, Entek Scientific, and IRD Mechatronics; and is currently the Director of Application Engineering for PCB Piezotronics. Mr. Corelli is a Category IV Vibration Analyst in accordance with ISO 18436-2 and is the President of the Vibration Institute.

Sensor mounting can significantly affect both overall vibration and FFT data. The paper shows the frequency response of various common mounting methods, such as stud, 2-rail magnet, and flat magnet measured under controlled laboratory conditions and correlates that with actual data collected on machinery in the field. It also shows the dramatic effect that mounting has on commonly used high frequency measurements such as Spike Energy and PeakVae that are used for early warning of bearing and gear faults.

9:00a - 9:30a

TP13-28

Performance Comparison Between Heller and ACC Cooling System Under Simultaneously Variation of Ambient Temperature and Wind Condition
Gholanreza Ghezelsheghi, Monenco Iran Consulting Engineers Company

Gholanreza Ghezelsheghi is Cooling Systems Lead Engineer in Monenco Iran Consulting Engineers Company. Monenco is a designer of different types of cooling systems (Air Cooled Condenser, Heller and Once-Through Cooling System). He graduated in 1999 with a Bachelor of Science in Power Plant Mechanical Engineering from Power and Water Industry University and completed a Master of Science in Mechanical Engineer at Tehran University in 2002. He is now responsible for concept, detail and basic design of cooling system. His research interest includes study of optimization, system security and environmental impacts on cooling system performance.

The biggest cooling system has been used in power plants. Wet cooling towers need a huge amount of makeup water, which due to a shortage of large water resources in most areas of the world and also due to increasing water resources' requirements, this type of cooling system could not be used. Instead of that, dry cooling system usage to have been increasing widely. The most famous types of dry cooling system are Heller and ACC (Air Cooled Condenser). These two types have different performance under environmental conditions (ambient temperature and wind speed or direction). By that reason, selection of the optimum system will be very significant. In this paper, the effect of ambient temperature and wind speed on Heller and ACC cooling system will be modeled simultaneously. The parameters which with a high impact on comparison are water supply temperature and cooling tower air mass flow rate will be power plant electricity generation (condenser pressure), electricity consumption in cooling system and water usage as deluge water in Heller cooling system. Based on the parameter the best choice will be selected. The procedure will be done as case study.

9:30a - 10:00a

TP13-29

FRP: Cooling Tower Structural Properties Evaluation
Ken Mortensen, SPX Cooling Technologies

Ken is presently the Manager of Research and Development for SPX Cooling Technologies. He has managed several engineering and operations departments responsible for water quality, material selection, and physical application criteria for cooling towers and components, as well as design, manufacture and servicing of water treatment equipment and installations. Ken graduated in 1977 with a BS in Chemical Engineering from Massachusetts Institute of Technology and completed an MBA at Rockhurst University in Kansas City, MO in 2000. He has authored technical papers, holds Patents for Fire-resistant Cooling Tower Design, Low-Fouling

9:30a - 10:00a

TP13-30

Largest Cross-Flow Built in North America Utilizes Innovative Design and Construction Techniques
Jim Baker, Composite Cooling Solutions, LP

Jim was born in Tulsa, Oklahoma graduating from Northern Oklahoma College in 1976 with an Associate of Science degree in Engineering, attended Tulsa University’s School of Engineering night school from 1984-1989 and received a BS in Human Resource Management from Oklahoma Wesleyan College in 1991. He has authored and presented numerous technical papers at CITI, EPRI, and local organizations. He presently resides in Fort Worth where he is Vice President with Composite Cooling Solutions, LP.

A 28-cell cross-flow cooling tower was added to the fleet of cooling towers at a major nuclear facility in the U.S.A. The purpose of this addition was to supplement the existing fleet to cool river water being discharged back into the river for environmental purposes. Because of the magnitude of the thermal design requirements, an innovative FRP structural design and a simplistic construction approach were utilized. This efforts resulted in the largest cross-flow constructed implementing the latest in thermal design and construction techniques. The tower was constructed safely and ahead of schedule testing at over 100% of the design capability required. The project was completed exclusively with Union Labor which performed outstanding. The plant’s capacity was increased and the environmental impact was all positive.

10:00a - 10:30a

TP13-31

Water Treating Papers for Tuesday

This ends the Water Treating Papers for Tuesday

Fills, and Fill Bonding Techniques and is a registered engineer in the state of Kansas. FRP material has been used for Cooling Tower Structure for over 20 years. Its properties are suitable for the wet cooling environment. This paper explores the history of use, properties testing supporting use, problem areas, and concludes with an overall evaluation of effectiveness.

10:30a - 11:00a

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THE 2013 CTI ANNUAL CONFERENCE PROGRAM continued

Wednesday, February 6, 2013

7:00a - 10:00a

Services

7:00a - 10:00a

Registration and Paper Sales, Foyer

7:00a - 5:00p -

Speakers’ Breakfast, Laguna Madre

7:00a - 8:00a -

Educational Seminar, Nueces A Ballroom - information on page 3

8:00a - 12:00p -

Lunch on your own

12:00p - 1:30p -

Technical Committee Meetings - (same rooms as Tuesday)

1:30p - 5:00p -

Services

2:00p - 3:00p -

Hospitality Suite (Bar closes @ 8:00p) - Bayview

5:00p - 8:00p -

Thursday, February 7, 2013

Thursday’s activities involve the Board of Directors and Committee Chairs only

7:30a - 8:15a

Board of Directors’ (includes Committee Chairs) Breakfast, Laguna Madre

8:30a - 2:00p

Board of Directors’ Meeting, Corpus Christi Ballroom A

Activities after the technical presentations on Tuesday, February 5, 2013

10:00a - 12:00p

Technical Committee Work
- Engineering Standards & Maintenance
  Laguna Madre
- Performance & Technology
  Matagorda
- Water Treating
  Nueces A

12:00p - 2:00p

Owner Operator Seminar
(w/box lunch)
Nueces B

12:00p - 2:00p

Lunch on your own

2:00p - 3:00p

Services

2:00p - 4:30p

Nueces A

4:00p - 8:30p

Table Top Exhibits & Hospitality Suite
(Bar Closes @ 9:30p)
Corpus Christi Ballrooms

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Moore Sets The Standard In Axial Flow Fans.

Since 1992, Moore fans has provided customers with high-efficiency, high-quality Axial Flow Fans for industries worldwide. Operating in air-cooled heat exchangers, cooling towers, and radiators, Moore fans keep liquid cool in refineries, power plants, process plants, gas compressors and limitless other industrial settings.

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- Robust Bearing Housing – For more than half a century, all Moore fan blades have been designed with a resilient blade mount, virtually eliminating any moment forces on the hub and shaft, improving durability and long-term operating conditions.
- Chord Width – Improve performance with fewer number blades for the same performance requirements, resulting in a lower overall cost.
- Blade Angle Adjustment – Blades are factory preset for specific performance conditions eliminating the need to set field installation.
- Wing Depth – Designed to operate in a reduced air ring depth.
- Adjustable Diameter – Designed to permit fan diameter adjustment by as much as +1 to +3.5 inches (8.89 mm) greatly opening installation.
- Ideal for Variable Speed – With Moore’s resilient bearing system, there are virtually no critical speeds to be avoided.
- Available Blades – Available in both odd and even number of blades, up to 6.
- Low Noise – Where noise levels are critical, combine Vortex tip, wider chord width and increased number of blades for maximum noise reduction.
- Strengthened Design – For engine driven and larger fan diameter applications from four to 24 feet.

Today Moore Fans has some 175,000 fans in operation around the world. And with sales offices in North America and in Europe, Moore Factory engineers and customer service representatives stand ready to help you analyze your air moving requirements, choose the right product, and provide reliable service and support before and after the sale.

For more information on the Class 10000 Fans, or any of the family of quality products from Moore fans call 669-376-3575 or visit us online at moorefans.com.
Dress Code for the Annual Conference is Business Casual

No Ties!

Going Scuba Diving?
No we’re going to the Texas State Aquarium
Monday, February 4, 2013
6:00p - 10:00p
$70/per person

There is nothing fishy about dinner tonight, just a good meal and a night at the Texas State Aquarium.
The dinner will be a Pasta/Salad Bar w/drinks (wine and beer) and dessert. After dinner the Aquarium will be opened for you to visit the Main Building and the Dolphin Bay at your own pace.

Make your plans to attend Future Meetings for CTI

July 7-10, 2013
Hilton Del Mar
San Diego, CA

February 2-6, 2014
Hilton Houston North
Houston, TX

July 13-16, 2014
Sheraton Steamboat
Steamboat Springs, CO

February 8-12, 2015
Sheraton New Orleans
New Orleans, LA

July 12-15, 2015
Tradewinds Island Resort
St. Pete Beach, FL
Seminar
Tuesday, February 5
2:00p - 4:30p
in the
Nueces A Ballroom

Dress code
for the
Annual
Conference is
Business Casual
No Ties!

Ask the EXPERT

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- Custom laminate fabrication and treating
- Fiberglass fan stacks and water distribution systems
- Non-skid fiberglass fan deck and hot water basins
- Corroplast FRP casing and louvers
- Fans, gears, drive shafts, motors, supports
- Flow control valves, nozzles, graminents
- Fill and drift eliminators
- Hardware, brace connectors, base anchors
- Replacement parts for all models and manufacturers
- Budget optimization and thermal upgrade studies
- Complete engineering services
- Reconstruction and thermal performance upgrades
- Maintenance and service contracts
- Emergency response and repair

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CTI

Cooling Tower Fan Drives
From Amarillo Gear Company

We could spend a lot of time using complicated specifications to try and convince you to buy our right angle fan drives. We would rather just give you straight and simple facts.

You get a better product...

Every design feature takes into account the extremely harsh conditions in which our fan drives operate. Consider the right one-piece gear housing, or the dual double-lipped seals on both the input and output shafts, the special epoxy paint system in any number of the other special design features. You can rest assured you are buying the best right angle fan drive available. And to back this up, we also can provide complete noise and vibration test data under full power and thrust loading. There's no unnecessary guessing with Amarillo Gear fan drives, only verifiable and predictable quality.

You get a better price...

Amarillo Gear Company fan drives are more than competitively priced. Over the long haul, their durable and efficient operation means that dollar for dollar, you get a greater value.

You get better service...

For 60-plus years, Amarillo Gear Company has been dedicated to providing superior service. Contact one of our sales engineers. You will get expert advice quick dependable service and innovative responses on jobs that have special requirements.

Amarillo Gear Company
P.O. Box 1789, Amarillo, Texas 79105
806-622-1273 FAX 806-622-3258
www.amarillogear.com

Straight Talk on Right Angles
1. Prominent Fluid Controls
2. French Creek Software
3. ChemTreat, Inc
4. Sauereisen
5. Polser FRP Panels Inc
6. Taylor Technologies
7. C.E. Shepherd Co.
8. Enduro Composites
9. Composite Cooling Solutions
10. EvapTech
11. Amarillo Gear Company
12. Brentwood Industries
13. Bedford Reinforced Plastics
14. Ashland Water Technologies
15. Rexnord Corporation
16. Aggreko
17. Baltimore Aircoil Company
18. Proco Products
19. Hudson Products Corporation
20. Cofimco
21. Rain for Rent
22. McBride & Associates
23. Hansen Industrial Gearboxes
24. Structural
25. Midwest Towers, Inc.
26. Strongwell
27. Dynamic Fabricators
28. Tower Tech, Inc.
29. Cooling Tower Resources
30. GE/AH Water Technologies
31. CleanAir Engineering
32. G&G Marine
33. IMI Sensors
34. Glocon
35. Special Pathogens Lab
36. BBI International
37. Cool Water Technologies
38. Resolite
39. Power Pipe and Tank, LLC
40. SPX Cooling Technologies
CTI Thanks The Following Sponsors For Their Contributions To The Hospitality Suites For 2013

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1. Amarillo Gear Company
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15. GEA Heat Exchangers, Inc.
16. Howden
17. Hudson Products Corporation
18. International Cooling Tower
19. Liang Chi Industry Co., Ltd
20. Lonza Inc.
21. MasterTech Services, Inc.
22. Midwest Towers, Inc.
23. Moore Fans LLC
24. Paharpur USA, Inc.
25. Precision Cooling Towers
26. Rexnord Corporation
27. C.E. Shepherd Co., LP
28. SPX Cooling Technologies, Inc.

Press Release
Contact: Chairman, CTI Multi-Agency Testing Committee
Houston, Texas 2-November-2012

Cooling Technology Institute, PO Box 73383, Houston, Texas 77273 - The Cooling Technology Institute announces its annual invitation for interested thermal testing agencies to apply for potential Licensing as CTI Thermal Testing Agencies. CTI provides an independent third party thermal testing program to service the industry. Interested agencies are required to declare their interest by March 1, 2013, at the CTI address listed.
Tower Performance, Inc. Announces New Sales Person.

Tower Performance, Inc. in Florham Park, NJ takes great pleasure in announcing our newest Sales person, Brent DeShong. Brent’s office is in Kansas City, MO and he will be responsible for cooling tower sales in the mid-America region. Tower Performance, Inc., a leader in the cooling tower industry, offers complete services such as new field-erected and prefabricated cooling towers, maintenance, repairs, upgrades and parts for all cooling tower types, models, and manufacturers.

He will report to the Tower Performance of Texas office in Houston, TX and can be contacted at bdeshong@towerperformance.com or 832-563-2627.
Cooling Technology Institute
Annual Conference, February 4-7, 2013

HOTEL INFORMATION
OMNI BAYFRONT, CORPUS CHRISTI, TEXAS
361.886.3554 (Code - 14500811103)
or CTI WEBSITE
Hotel Cut-Off Date - January 22, 2013
• CHECK-IN TIME IS 3:00PM • CHECK-OUT TIME IS 12:00PM
Standard Accommodations: Single - $139 / Double - $149

Earn PDH Credits while meeting and working with others in the industry.
(Information when you register)

Make your plans to attend
Future Meetings for CTI
July 7-10, 2013
Hilton Del Mar
San Diego, CA

February 2-6, 2014
Hilton Houston North
Houston, TX

July 13-16, 2014
Sheraton Steamboat
Steamboat Springs, CO

February 8-12, 2015
Sheraton New Orleans
New Orleans, LA

July 12-15, 2015
Tradewinds Island Resort
St. Pete Beach, FL

Earn PDH Credits while meeting and working with others in the industry.
(Information when you register)
What's New in Publications?

CTI's committees are working on a 5-year revision program for each of our Standards and Chapters by looking at each every 5-years and revising and reprinting those that need to be updated with new and better information and reprinting those that are correct as they stand. As you may realize with the number of Standards and Chapters that CTI has, this will take some time to have each completed and viewed on a 5-year rotation but our standing committees are well underway. Soon you will be seeing information printed in each Standard and Chapter located on the second page left hand corner that shows when it was revised and the year it will be reviewed again.

Our newest Standards are:

WTG-122 as of 02/2012: Guideline: Side Stream Filtration as an Aid to Cooling Tower Performance - The purpose of this guideline is to outline benefits to the operation of evaporative condensers and cooling towers, their components, and to the equipment and systems they support utilizing the most common sediment side stream filtration technologies. ...................................................... $10.00

ESG-123 as of 09/2012: Recommended Guidelines for Concrete Restoration and Repairs to Natural and Mechanical Draft Cooling Towers - Prior to installing reinforced concrete repairs at a Cooling Tower, it’s important to understand the deterioration mechanisms operating and how best to mitigate the damaging effects, before performing repairs and placing them into service... $15.00

Each standard and chapter is available through the CTI office. You can order them via the telephone or the internet and they are available to you electronically.

Sign up for the dinner at the Texas State Aquarium
Monday, February 4, 2013
6:00p - 10:00p
$70/per person
more info on page 16
Please type or print clearly all information. A separate form must be completed for each registrant. Photocopies of this form may be used.

1. **REGISTRATION INFORMATION:**
   - I was invited to the conference by: [If applicable give name of the person and their company responsible for your attendance]

<table>
<thead>
<tr>
<th>Aware of the conference after seeing (please check one):</th>
<th>Annual Conference News</th>
<th>First-time Attendee:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last Name: ___________________________</td>
<td>First Name: __________</td>
<td>Website: ____________</td>
</tr>
<tr>
<td>Company: _______________________________________</td>
<td>Address: _______________</td>
<td></td>
</tr>
<tr>
<td>City/State/Province: ___________________</td>
<td>Zip or Postal Code/Country:</td>
<td></td>
</tr>
<tr>
<td>Phone (Country Code/Area/Number) _______</td>
<td>Fax (Country Code/Area/Number) _______</td>
<td></td>
</tr>
<tr>
<td>Email: ___________________________________</td>
<td>(E-mail addresses are used for communicating conference updates, session pre-work and to send any other pertinent information)</td>
<td></td>
</tr>
</tbody>
</table>

**Badge Information** - First Name or Nickname (as you wish it to appear on your badge) __________________________

   - Spouse’s Name Only if they accompany you to the Conference: __________________________

2. **SPECIAL NEEDS:**
   - Dietary:  _____  Vegetarian
   - Physical:  _____  Please check here if you require special accommodations to participate and email a description of your needs by January 22, 2013 to vmanser@cti.org. We cannot guarantee we can accommodate your request but will do our best.

3. **IN CASE OF AN EMERGENCY DURING CONFERENCE, PLEASE CONTACT:**
   - Name (Please print clearly): ______________________________________
   - Daytime Phone: __________________________________________________
   - Evening Phone: _________________________________________________

4a. **REGISTRATION FEES:** (Full-conference or one-day registrants)

<table>
<thead>
<tr>
<th>Check Appropriate Category:</th>
<th>Early Bird Rate by: January 25, 2013</th>
<th>Conference Rate after: January 25, 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTI Member (Includes technical sessions Monday, Tuesday &amp; Wednesday)</td>
<td>$695</td>
<td>$795</td>
</tr>
<tr>
<td>Non-Member (Includes technical sessions Monday, Tuesday &amp; Wednesday)</td>
<td>$795</td>
<td>$895</td>
</tr>
<tr>
<td>One day (circle one)</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td>Exhibit Hall Pass Only</td>
<td>$35</td>
<td>$35</td>
</tr>
<tr>
<td>Speaker (one for each paper only)</td>
<td>N/C</td>
<td>N/C</td>
</tr>
<tr>
<td>Press (one attendee per company only)</td>
<td>N/C</td>
<td>N/C</td>
</tr>
<tr>
<td>Honorary Life Member</td>
<td>N/C</td>
<td>N/C</td>
</tr>
</tbody>
</table>

**Section 4a Subtotal US$: ______________________________

4b. **CONFERENCE EVENTS / OTHER FEES:** (Full-conference or one-day registrants)

<table>
<thead>
<tr>
<th>Check Appropriate Category:</th>
<th>Conference Rate:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional luncheon ticket(s), Monday, Feb 4, 2013 (for spouse/guest)</td>
<td>$30</td>
</tr>
<tr>
<td>Monday Night Dinner at the Texas State Aquarium (February 4, 2013)</td>
<td>$70</td>
</tr>
<tr>
<td>Set of Papers - Hard Copies</td>
<td>$150</td>
</tr>
<tr>
<td>Set of Papers - CD (with PDF file of each paper) Available after conference</td>
<td>$150</td>
</tr>
<tr>
<td>Mailing for papers and/or CD sent to Mexico and/or Canada</td>
<td>$10*</td>
</tr>
<tr>
<td>Mailing for papers and/or CD sent to all other countries</td>
<td>$15*</td>
</tr>
</tbody>
</table>

**Section 4b Subtotal US$: ______________________________

**Total Amount Due US$: ______________________________

4c. **CONFERENCE EVENTS** (Full-conference or one-day registrants)

   - I will attend the Water Treating Panel Discussion on Monday afternoon
   - I will attend the New Member Breakfast on Tuesday morning
   - I will attend the Owner/Operators’ Seminar on Tuesday noon
   - I will attend the ‘Ask the Expert’ Seminar on Tuesday afternoon
   - I will attend the Educational Seminar on Wednesday morning

5. **PAYMENT** (Please check one)

   - Enclosed is Check# __________ in the amount of US$ __________ (Please write the registrant’s name on the check)
   - Credit Card: Please Charge US$ __________ to the following credit card. [ ] Visa [ ] MasterCard [ ] AmEx

   Card# __________________________ Exp. Date __________________________ CVC Code: __________________________

   Cardholder’s Name: __________________________________________
   Cardholder’s Signature: __________________________

There will be a 15% charge on any credit card refund made - no exceptions!
Since 1957, our primary business has been innovation! We encourage inquiries for custom product solutions!

C. E. Shepherd Company, L.P.
2221 Canada Dry Street
Houston, TX 77023
Telephone: 713.924.4300
Fax: 713.928.2324
www.ceshepherd.com
sales@ceshepherd.com

Shepherd Standard high quality products for cooling towers include:

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- Drift Reduction Units
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Whether your project requires new construction or retrofit, standard products or custom solutions, Shepherd Tower Components are a perfect fit.