

# Haglid Engineering & Associates, Inc.<sup>®</sup>

Where Engineering and Architecture

Come Together Synergistically



## CURRICULUM VITAE

**KLAS C. HAGLID, P.E., R.A., CEM, Fellow NAFE of NSPE, D-IBFES**

**New York Area Office:**

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Hillsdale, New Jersey 07642

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**Licensed as a Professional Engineer or Registered Architect in the following States:**

California Professional Engineer License Number:	39393
Connecticut Professional Engineer License Number:	23339
Delaware Professional Engineer License Number:	8842
Hawaii Professional Engineer License Number:	8166
New Hampshire Professional Engineer License Number:	13787
New Jersey Professional Engineer License Number:	40184
New Jersey Registered Architect License Number:	18115
New York Professional Engineer License Number:	080150
Pennsylvania Professional Engineer License Number:	PE-049727-E
National Council of Examiners for Engineering and Surveying Record Holder Number:	19754

**NOTE: No representation that Haglid Engineering and Associates, Inc. has been retained for work on a project without a written agreement is permitted.**

## PROFESSIONAL AND EDUCATIONAL EXPERIENCE

**Haglid Engineers & Associates, Inc.** - 80 Broadway Avenue, Hillsdale, New Jersey 07642  
1995 to Present, President

- Forensic engineering services for structural and mechanical building systems, industrial and chemical plant failures.
- Building due diligence, inspection and design services for commercial and residential buildings.
- General civil, electrical, structural and mechanical engineering.
- Energy usage analysis for hotels, schools, and other large commercial buildings, including load calculations for equipment and chiller sizing.
- Scientific analysis of chemical failures and product failures.
- Chemical and gas exposures and poisonings.

**Building Performance Equipment, Inc.** - 80 Broadway Avenue, Hillsdale, New Jersey 07642  
1998 to Present, President

- Manufacturing and sales management expertise in the areas of Energy Recovery and Energy Efficient Systems. Manufacturing high-efficiency energy recovery systems.
- IAQ and Ventilation design services for industrial, commercial, and residential buildings.
- Consult and provide manufacturing support through patented and proprietary technologies.

**Trane Company - Honolulu Office**, Honolulu, Hawaii, 96817  
- **Philadelphia Office**, King of Prussia, Pennsylvania 19406  
1994 - 1996, Senior Controls Specialist & Manager, Specialty Products Group

- Designed and managed installation and use of computer control systems for large-scale hotels and industrial applications.
- Troubleshoot and solved unique or complex air conditioning problems and resolved disputes between contractors and other consultants.
- Performed diagnostics on existing systems and designed refrigeration and oil control system solutions.
- Projected and modeled energy usage for hotels and performed load calculations for correct equipment and chiller sizing.

**Berkley Engineering & Equipment Company, Honolulu, Hawaii, 96812**

1991 - 1994, Senior Applications Engineer/Group Manager, Instruments Division

- Consulted with engineers in client companies to ensure proper instrument installation and optimum application of a wide variety of analytical and process control equipment.
- Managed group of engineers, service technicians, and service managers to have projects bid, managed, and built on-budget and ahead of schedule.
- Engineered, specified, installed, and maintained Carbon Monoxide and other gas monitoring systems for commercial and industrial applications.
- Analyzed client needs and requirements for instrumentation and mechanical systems, prepared price quotes and project management for appropriate process systems.

**E.I. Du Pont De Nemours & Company Central Research and Development**

Wilmington, Delaware 1985, 1982 - 1991, Research Associate

- Designed and supervised construction of high-pressure reactors (over 40,000 psi) to meet specifications of a wide variety of hazardous and high-pressure chemical reactions and steam systems.
- Served as Safety Chairman for our division in Central Research and Development. Directed and created safety-awareness programs that produced a year with no on-the-job injuries.
- Provided testing and evaluation of failure conditions to avoid real-world critical failure of plant operations.
- Involved with a wide variety of chemistry and research that created numerous patents.
- Provided forensic engineering for plant operations worldwide.
- Designed, built, and repaired a wide variety of high-pressure compressors and equipment to meet all types of extreme and failure-mode testing conditions.
- Designed a control system to monitor and maintain several chemical reactors under extreme thermodynamic conditions.
- Tested several hundred chemical process failures per year, leading to broad chemical industry experience.
- Demonstrated ability to work safely with chemical reactions that involved toxic and explosive gases, explosions or process failures. Typically, we tested chemical processes that could not be safely tested anywhere else as a service of Central Research for the rest of the DuPont Company.

**Drexel University, Philadelphia, Pennsylvania 19104**

**Bachelor of Science in Mechanical Engineering**

Honors:

- Successfully completed Fundamentals of Engineering Exam
- Successfully completed Principles and Practice of Engineering Exam
- Student taught Statics or Introductory Structural Engineering Course
- Student taught Engineering Communications Course
- Presented thesis to Senate Faculty on Advanced Structural Failure Mechanics
- Received Drexel's 2008 Service to the Profession of Mechanical Engineering Award
- Presented Drexel's 2009 Special Distinction Award to Dr. Xiang Wang

## **PROFESSIONAL HONORS**

Fellow – National Academy of Forensic Engineers a Charter Affinity Group of the National Society of Professional Engineers

Fellow – Drexel University Philanthropy Journal 2010

Paul Harris Fellow – Rotary International

EBIE Award, Existing Building Emmy – USGBC and Urban Green Building Council, June 2012

ASHRAE Distinguished Service Award, June 24, 2009

Drexel University - Service to the Profession Award, May 3, 2008

Yale University Honorarium

Author – 2011 ASHRAE Handbook – Chapter 37 – Owning and Operating Costs

Author – 2019 ASHRAE Handbook – Chapter 38 – Owning and Operating Costs and PACE (Property Assessment for Clean Energy) Financial Analysis

Top 10 Most Sustainable – Sustainable Industries National Sustainability Award 2010

## **PROFESSIONAL MEMBERSHIPS**

International Board of Forensic Engineering Sciences, Board Certified Diplomat  
President and Former Vice President of Policies and Procedures

American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE)

ASHRAE SPC 133, Voting Member

ASHRAE Standard 189.1

GPC 32P - Sustainable, High Performance Operations & Maintenance  
Voting Member, Contributing, Co-Author

ASHRAE Distinguished Service Award

Technical Committee 5.5 - Air-To-Air Energy Recovery  
Former Chairman/Voting Member, Former Vice Chairman

Technical Committee 7.6 - System Energy Utilization - Voting Member

American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE)  
Continued

Technical Committee 7.8 - Owning and Operating Costs of Commercial Buildings  
Former Chairman, Voting Member & Former Program Manager, Vice Chairman and  
Secretary, Subcommittee Handbook Chairman

ASHRAE Standard 84-1991R

Reviewed draft of ASHRAE Standard 84-1991R and provided engineering details for  
efficiency calculations.

Delaware Society of Professional Engineers, Examining Committee, Former Voting Member

Engineers and Architects of Hawaii, Former Vice President

Honolulu Society of Professional Engineers, Former Vice President

National Society of Professional Engineers, Member

National Academy of Forensic Engineers, Board Certified Diplomat in Forensic Engineering,  
Fellow Member, Past Executive Vice President

ASTM E2292-04 – Voting Member; Standard Guide for Field Investigation of Carbon monoxide  
Poisoning Incidents.

ASTM International, Former Voting Member

Board of Adjustment, Village of Ridgewood, Former Member & Chairman of Site Plan Committee

2004-T-TAC-TC07.08 Owning and Operating Costs, Former Chairman/Member

The Practicing Institute of Engineering, Inc., Board of Directors Member - Trustee.

## **SPEAKING ENGAGEMENTS & PUBLICATIONS**

### **2019 HVAC APPLICATIONS, ASHRAE Handbook**

Author of Chapter 38, “Owning and Operating Costs” in Building Operations and Management  
and Economic Analysis Techniques by ASHRAE.

**Engineering Standards for Forensic Application – 1<sup>st</sup> Edition**, Published 21<sup>st</sup> September 2018  
by Academic Press, Copyright 2019 Elsevier Inc, eBook ISBN: 9780128132418, Hardcover  
ISBN: 9780128132401, Contributing Chapter 7 - Carbon Monoxide, HVAC Standards, and  
Building Envelope Litigation. Author: Klas C. Haglid, P.E., R.A.

**ANSI/ASHRAE Standard 133-2015** Method of Testing Direct Evaporative Air Coolers,

Contributing Chapter Author: Klas C. Haglid, P.E., R.A. C.E.M.

**AEE – The Association of Energy Engineers, Online Journal Access, Energy Engineering, Issue: Volume 111, Number 5, Pages 51 – 79, August September 2014**

Achieving Net Zero with a 649,848-square-foot Industrial Complex

Klas C. Haglid of Building Performance Equipment, Inc. and Haglid Engineering & Associates, Inc.

**Abstract:**

The following is a comprehensive review of what works when designing for net zero. Typically, it is very difficult or nearly impossible to re-commission an historical, heavy-use industrial complex with a 1222-ton refrigeration plant to a net zero energy standard. The project was able to achieve net zero-energy standard or net power producing, on very hot summer days, even with a 1,222-ton refrigeration plant, by recovering thermal energy through avenues supplied by BPE along with a host of other energy reduction plans.

**Chapter 2-02 CO, Engineering Standards for Forensic Applications, to be published by ASTM, May 2014**

Chapter 2-02, HVAC Standards and Building Envelope Litigation. Author: Klas C. Haglid, P.E.

**World Energy Engineering Congress, Washington, DC, September 26, 2013**

Presented and Authored, “Achieving Net Zero with a 658,000-square-foot Industrial Complex.”

A detailed thermal analysis using IR to evaluate and detail energy reduction methods and then analyze the internal rate of return of the different methods to provide an overall project with an acceptable economic return on investment.

**ASHRAE – Manuscript Review**

“Critical Sensible and Latent Effectiveness for Membrane Energy Exchange (MEE) In Cold Climates.” To ensure satisfactory indoor environmental quality (IEQ) and energy efficient ventilation, heat-recovery ventilators (HRV) are widely employed in cold climates. In such climates, frosting is a significant challenge when applying HRV. It results in two major problems: reduction of heat and mass transfer and increased pressure drop. Existing frost-free solutions are auxiliary defrosting equipment and complicated control strategies, which generally consume extra energy or reduce thermal comfort. Due to the low outdoor air moisture content at low temperatures, mechanical ventilation also tends to reduce the indoor RH below recommended IEQ values.

Membrane energy exchangers (MEE) have been noted for promising HRV in hot and wet climates [1]. MME experiences are rarely described for cold climates in literature. This study proposes a theoretical calculation model for the frost formation limits in MEE based on the critical sensible effectiveness (CSE) and the critical latent effectiveness (CLE) to avoid frost. This model gives sensible and latent effectiveness limits so that frost formation is avoided in MEE theoretically. Therefore, the right membrane can be selected for the MEE and climate so that high energy efficiency and excellent IEQ are ensured simultaneously. In a conventional counter flow plate exchanger frost will occur in Oslo around 60 days per year. Under typical Oslo indoor winter

conditions (air temperature 23, relative humidity 40%), CLE and CSE are evaluated.

**NAFE – Manuscript Review**

Forensic Engineering Analysis of Heating Ventilation and Air Conditioning Systems: “Why HVAC Systems Fail, Evaluation of Issues and Techniques.”

**Buildings NY, Javits Center, New York, New York, May 3, 2012**

Speaking engagement on “Clearing the Air: the Importance of IEQ - Zero Energy Buildings.”  
Net Zero buildings are accomplished by doing Life Cycle costs along with practical experience.  
Net Zero does not have to mean sacrificing quality of life to be independent from the electric grid or not taking more out of the grid than you put back over a period of time.

**Bergen/Passaic Municipal Inspectors Assoc., Woodland Park, New Jersey, March 2012**

Speaking engagement on “Using ResCheck and ComCheck: New Codes and the Changing Building Environment.”

**Lorman Educational Services, “New Jersey’s Building Codes” February 16, 2012**

Publication and Speaking engagement on “Building Codes,” for Attorneys, Project Managers, Construction Managers, Presidents, Vice Presidents, Owners, Engineers, Architects, Developers, Building Inspectors, Facilities Managers, and House Officials.

**ASHRAE Guideline 32-2012, Sustainable, High-Performance Operations and Maintenance**

The purpose of this guideline is to provide guidance for optimizing the operation and maintenance of buildings in order to achieve the lowest economic and environmental life-cycle cost without sacrificing safety or functionality. Contributing Author: Klas C. Haglid, P.E., R.A., C.E.M.

**World Energy Engineering Congress, Chicago, Illinois, October 8-12-14, 2011**

Speaking engagement: “Two Net Zero Buildings, Two Different Climates: Hawaii & Block Island Case Studies.” Being Net Zero in Paradise is easy to achieve. Net Zero in the cold northeastern United States is much more difficult. Both locations have special challenges and some interesting results. Life-Cycle costs, along with practical experience and some photos from both projects, show that Net Zero does not have to mean sacrificing quality of life to be independent from the electric grid or not taking more out of the grid than you put back over a period of time.

**Chapter 2-02: CO, HVAC Standards, and Building Envelope Literature**

Author. This case study illustrates experimental techniques for producing evidence used as the basis of an expert opinion. This subject is a test to determine the integrity of a building envelope to eliminate carbon monoxide (CO). The effect of engineering experience is illustrated. Case studies show how standards and standard-based regulations regarding carbon monoxide litigation are presented.

**2011 HVAC APPLICATIONS, ASHRAE Handbook**

Author of Chapter 37, “Owning and Operating Costs” in Building Operations and Management by ASHRAE.

**O'Dell Training, Royal Hamilton Yacht Club, Ontario, Canada, February 8, 2010**

Presented a seminar, "Air-to-Air Energy Recovery," which focused on issues of ASHRAE 62.1 compliance and energy recovery. During the seminar, we examined three identical outdoor air HVAC systems located in four different areas of the country. Each location had a base system, a heat recovery system, and an enthalpy control system. Initially, a base system was installed in each location. A heat recovery system was added, and the change in heating and cooling loads was tested. Then the systems were revised with an enthalpy system. Again, the energy savings were tested and recorded. Infrared thermal analysis was used to explain and further evaluate the detailed thermal performance and characteristics of different HVAC components. At a national ASHRAE seminar session, this presentation was well received and peer reviewed.

**ASHRAE, Las Vegas, Nevada, January 26-February 1, 2011**

DOD Workshop: Tuesday, February 1, 2011, Presented, "When Zero Makes You a Hero."

Presented examples of buildings and facilities that create as much energy as they use, the benefits of aggressive energy efficiency, and the use of building forms and thermodynamics. The future of energy-efficient technologies was explored along with an overview of the history of ventilation.

**World Energy Engineering Congress, Washington, D.C., December 8-10, 2010**

Presented three times during the conference: The first presentation was on "Emerging New Technologies to Reduce Energy Consumption in the United States." The second presentation took place in the Expo Hall on "The New Fuel Efficiency," and the third was a full seminar on "The New Fuel Efficiency."

**Lorman Educational Services, "New Jersey's Rehabilitation Subcode N.J.A.C. 5:23-6", Teleconference hosted from Hillsdale, New Jersey, August 24, 2010**

Publication and Hosted a teleconference providing an understanding and overview of the benefits to the New Jersey Rehabilitation Subcode N.J.A.C. 5:23-6.

**Lorman Educational Services, "How to Meet Building Codes to Green Building Standards", Parsippany, New Jersey, February 24, 2010**

Publication and Speaking engagement on "How to Meet Building Codes and Building Green Standards." High Efficiency Green Building Design Guides were presented and discussed. Case studies for meeting the new building codes for energy efficiency, getting NJ Smart Starts Incentives, and actual green building case studies were reviewed.

**ASHRAE, Orlando, Florida, Sustainable, High Performance Operations & Maintenance - T-STDS-GPC 32 P, January 2010**

Contributing Author and Voting Member.

**Paramus Rotary Club, December 17, 2009**

Presentation on "High Efficiency Buildings and the Future of Energy Use."



**NJ Chapter of ASHRAE, December 1, 2009**

Presentation dealing with changes to 62.1, Ventilation and 90.1, Energy Codes. “How to improve EER and save energy with Energy Recovery.”

**AEE – Journal of the Association of Energy Engineers**, Vol. 106, No.4 2009 – Two Approaches to Using Energy Recovery to Improve Overall System Energy Efficiency Rating; Klas C. Haglid, P.E.

**World Energy Engineering Congress, Washington, D.C., November 4-6, 2009**

Publication and Speaking engagement and poster session: “School Retrofit for 100-Year-Old Building.”

**ASHRAE, October 2009, Manuscript Review, “Crystallization Limits of LiCl-Water and MgCl<sub>2</sub>-Water Salt Solutions as Operating Liquid Desiccant in the RAMME System.”**

Reviewed manuscript.

**Mississippi Hospital Assoc., Society for Healthcare Engineers, Annual Meeting, June 4, 2009**

“Introduction to Indoor Air Quality Standards”, “Understanding ASHRAE 52.1-2004”, “IAQ Effects on Energy Use Air-to-Air Heat Transfer Technologies.” Presented in Gulfport, Mississippi.

**Powell & Partners Architects, Oakland, California, March 31, 2009**

Speaking engagement performed through internet conference call presenting, “Two Approaches to Using Energy Recovery to Improve Over-All System Energy Efficiency Rating.”

**The Association of Energy Engineers, Long Island Chapter, Long Island, New York, October 27, 2008**

Speaking engagement at the Long Island Chapter of the Association of Energy Engineers presenting, “Three HVAC Systems and How to Improve Over-All System Energy Efficiency Rating With Air-to-Air Energy Recovery.”

**Lorman Educational Services, “HVAC Building Codes and Standards”, New Jersey, October 23, 2008.**

Publication and Speaking engagement on “HVAC Building Codes and Standards” for Attorneys, Project Managers, Construction Managers, Presidents, Vice Presidents, Owners, Engineers, Architects, Developers, Building Inspectors, Facilities Managers, and House Officials.

**World Energy Engineering Congress, “Improving Existing HVAC Equipment EER with Energy Recovery,” Washington, D.C., October 3, 2008**

Publication and Speaking engagement at the World Energy Engineering Congress presenting, “Three HVAC Systems and How to Improve Over-All System Energy Efficiency Rating With Air-to-Air Energy Recovery.”

**ASHRAE, Salt Lake City, Utah, Forum 7, “What Do People Want in a Design Guide for Air-to-Air Energy? June 2008**

This forum provided feedback to TC 5.5, Air-to-Air Energy Recovery, for use in deciding what is needed and would be found useful by ASHRAE members to help provide sustainable and ongoing

energy savings in commercial residential buildings.

**SPECS, Reinventing, Facilities Management, Dallas, Texas, “Ventilation: The V in hVac Got Flow?” March 2008,**

**Coauthor; Klas C. Haglid, P.E. –CEO - Building Performance Equipment Company, Inc.<sup>TM</sup> and Haglid Engineering Incorporated<sup>®</sup>. Coauthor; Carl Nottberg – Senior Vice President of Operations – US Maintenance, Coauthor; Wayne Barnes – Circuit City.**

An overview of air distribution systems within retail facilities, including air flow, dehumidification, make-up air, and exhaust fans and systems.

**Lorman Educational Services, HVAC Codes and Standards, New Jersey, January 9, 2008**

Publication and Speaking engagement on “HVAC Codes and Standards” for Attorneys, Project Managers, Construction Managers, Presidents, Vice Presidents, Owners, Engineers, Architects, Developers, Building Inspectors, Facilities Managers, and House Officials.

**ASHRAE, Two Approaches to Using Energy Recovery to Improve Overall System EER, January 2008**

Greater use of air-to-air heat exchangers for energy recovery from ventilation air is of increasing importance in green and sustainable buildings where improved IAQ and energy conservation are conflicting requirements. When used with properly sized HVAC equipment, HRV’s and ERV’s can enable the system to achieve an effective EER that is up to 30% higher than when using the equipment alone. Matching the effective system SHR to the conditioned space latent and sensible loads also leads to improved humidity control. This seminar addressed system concepts that remain underappreciated by the sustainable-design community.

**Lorman Educational Services, Building Codes in New Jersey, January 30, 2007**

Publication and Speaking engagement on “Building Codes in New Jersey” for Attorneys, Project Managers, Construction Managers, Presidents, Vice Presidents, Owners, Engineers, Architects, Developers, Building Inspectors, Facilities Managers, and House Officials.

**BOMA - Building Owners & Management Association, New Jersey, October 11, 2006**

Speaking Engagement and Presentation: “Sound Building Operations: Best Practices, Cost Savings Techniques, Technological Advancements.”

**ASHRAE - Summer Meeting, Quebec City, Canada, June 2006**

ASHRAE-SEMINAR 26: “Operational Performance Strategies for Energy Recovery Systems.” Speaking Engagement, Seminar, and Presentation on, “Using Fans without Dampers to Control Outdoor Air Intake In An Energy Recovery System: Does it Work?”

**NSPE - National Society of Professional Engineers, June 2006**

Review of article authored by Drew Peake, “Forensic Engineering of Indoor Air quality,” for the National Society of Professional Engineers.

**Lorman Educational Services, Indoor Air Quality, Energy Efficiency And Code Changes**

Publication and Speaking engagement on “Indoor Air Quality, Energy Efficiency, and Code Changes - How to Solve the Problems They Create,” for Architects, Engineers, and Legal continuing education credits.

**ASTM - WK2816, Mold Sampling Collection Standard**

As Task Force Leader, co-authored and reviewed ASTM method standards for collection of mold samples.

**International Association of Forensic Sciences (IAFS), Hong Kong, China, August 2005**

Co-Author of “Forensic Engineering Analysis of Passenger Vehicle A-Pillar Impact with Tractor-Trailer: Theoretical Approach.” The A-pillar was directly impacted by the flatbed of the trailer. This caused the A-pillar tripod, including the roof, to fail. The amount of static intrusion may be estimated from photogrammetry. The elastic deformation can be calculated from the observed plastic deformation. Add the dynamic elastic deformation to the static deformation and the total dynamic intrusion can be evaluated.

**Work Statement 2005 - 47 Unitary Equipment, ASHRAE Technical Committee 7.8**

Authored work statement for a proposal to acquire funding for and administration of Unitary Equipment for an interactive web-based Owning and Operating Cost Database for ASHRAE Technical Committee 7.8, Owning and Operating Costs.

**NAFE - National Academy of Forensic Engineers, July 2005, Chicago, Illinois**

Publication and Speaking Engagement and Presentation: “Forensic Evaluation of Mismanaged Renovation?” Presentation included advanced computer graphics to illustrate complicated delay claims and project renovation issues for a 1 million-square-foot renovation.

**The Society of Forensic Engineers and Scientists, Mendocino, California, April 2005**

Publication and Seminar regarding warning labels and vehicle speed.

**ASHRAE - Winter Meeting, Orlando, Florida, February 2005**

Publication and Speaking Engagement, Seminar, and Presentation, “Size Matters: Using Air-to-Air Energy Recovery to Meet the Humidity Control Requirements in ASHRAE Standard 62.1 Adden. X.”

**NAFE - National Academy of Forensic Engineers, San Diego, California, January 2005**

“Daubert Challenges to Forensic Engineers and Scientific Methodologies.”

**New York ASHRAE Chapter – High Performance Engineering, April 19, 2005**

Publication and Annual Spring Symposium and Professional Development Seminar in celebration of Earth Day 2005, Oswego, New York.

Presented, “Buildings that did Not Understand ANSI/ASHRAE Standard 62.”

**NAFE - National Academy of Forensic Engineers, San Diego, California, January 2005**

Publication and General Topics in Forensic Engineering.

**Department of Defense - Industrial Workshop, Orlando, Florida, February 2004**

Speaking engagement and presentation for U.S. Army Corps of Engineers, ERDC-CERL: “Dehumidification: Using Air-to-Air Energy Recovery to Meet the Humidity Control Requirements in ASHRAE Standard 62.1 Addendum X.”

**NSPE-National Society of Professional Engineers, Washington, DC, Annual Meeting 2004**

Presented paper: “Forensic Engineering Analysis of Carbon Monoxide Poisoning in a Residence.”

**ASHRAE - Winter Meeting, Anaheim, California**

Publication and Speaking Engagement, Seminar, and Presentation: “Using Air-to-Air Energy Recovery to Comply with 90.1 and Score with LEED.”

**ASHRAE Summer Convention, Nashville, Tennessee, 2004**

Publication and Speaking engagement and presentation: “Avoid Mold and Get Gold: Means of Controlling Humidity. Why *not* to Oversize an HVAC System.”

**ASHRAE Manuscript Review, October 25, 2004**

Reviewed: “Environmental Impacts of Air Conditioning Systems and the Possibility of Their Integration into Life Cycle Costs.”

**NAFE - National Academy of Forensic Engineers, Honolulu, Hawaii, July 2004**

“General Topics in Forensic Engineering.”

**Journal of the National Academy of Forensic Engineers, Vol. XXI No.1, June 2004**

Authored: “Forensic Investigation of Carbon Monoxide Poisoning in a Residence.”

**NSPE - National Society of Professional Engineers - Boston Massachusetts**

Peer review of National Journal Publications: “Forensic Engineering of Indoor Air Quality.”

**Department of Defense - Industrial Workshop, Gettysburg, Pennsylvania, February 2004**

Speaking engagement and presentation to U.S. Army Corps of Engineers ERDC-CERL: “Using Air-to-Air Energy Recovery for Industrial Process and Energy Optimization to Comply with 90.1 and Score with LEED.”

**NAFE - National Academy of Forensic Engineers, Washington, D.C., January 2004**

“Computer Skills for Forensic Engineers and Surveyors.”

**NAFE - National Academy of Forensic Engineers, Washington, D.C., January 2004**

“General Topics in Forensic Engineering.”

**ASHRAE Summer 2003 Convention, Kansas City, Kansas**

Speaking engagement and presentation: “The Building That Did Not Understand ASHRAE Standard 62-1999.” A technical analysis of building failure and solutions to indoor air quality issues.

**NAFE-National Academy of Forensic Engineers, San Antonio, Texas, July 2003**

“General Topics in Forensic Engineering.”

**ASHRAE Manuscript Review, May 21, 2003**

Reviewed: “Uncertainty-Based Quantitative Model for Assessing Risks in Existing Buildings.”

**NSPE-National Society of Professional Engineers, Washington, DC, Annual Meeting 2003**

Presented an article: "Forensic Investigation of Carbon Monoxide Poisoning in a Residence."

**Journal of the National Academy of Forensic Engineers, Vol. XIX No. 2, December 2002**

Authored: "Forensic Engineering Analysis of a Clean Room Failure."

**ASHRAE National Meeting, Atlanta, Georgia**

Reviewed publications for technical merit. Technical Paper Review No.: H-1807. "Economic Prediction of HVAC Systems at Different Design Stages."

**ASHRAE Winter Convention, Atlantic City, New Jersey, 2002**

Speaking engagement and open forum discussion with expert ASHRAE membership to discuss simulated versus real data for Owning and Operating Costs for Commercial Buildings.

**NAFE-National Academy of Forensic Engineers, Orlando, Florida, July 2002**

"General Topics in Forensic Engineering."

**NSPE-National Society of Professional Engineers, Orlando, Florida, Annual Meeting 2002**

Presented an article: "Forensic Engineering Analysis of a Clean Room Failure."

**NAFE - National Academy of Forensic Engineers, Los Angeles, California, January 2001**

Dinner Lecture on Chappaquiddick.

**NAFE - National Academy of Forensic Engineers, Los Angeles, California, January 2001**

"General Topics in Forensic Engineering."

**ASHRAE Annual Meeting 2000**

Provided forum moderation and discussion in exploring useful and relevant information about installed cost and energy costs as these topics pertain to ASHRAE membership.

**Drexel University, Philadelphia, Pennsylvania**

Co-authored Book: Mode I Fracture Toughness of Composite Materials, Haglid, K., Kuo-lig, L., Zabielski, V.: Senate Faculty, Drexel University. A detailed analysis of crack propagation and mechanics on the structural failure of several composite materials.

**Drexel University, Philadelphia, Pennsylvania**

Presentation: "Study of Mode I Fracture Toughness of Structural Composite Members."

**E.I. DuPont Company, Central Research, Wilmington, Delaware**

Hosted a seminar on the safe application of high-pressure gas fittings.

**E.I. DuPont Company, Central Research, Wilmington, Delaware**

Provided quarterly safety program seminars to promote safe workplace practices, specifically while working around high-pressure or experimental reactors.

**E.I. DuPont Company, Central Research, Wilmington, Delaware, July 1991**

Monthly Review: "New Routes to Nylon 7." Inventor Klas Haglid

### **Engineers and Architects of Hawaii**

Authored and presented an engineering evaluation on “Feasibilities of Modern Control Systems in Large Commercial Building and Hotels.”

### **Engineers and Architects of Hawaii**

Presentation for large commercial building owners on:

- \* Chiller Plant Optimization
- \* Energy Efficient Pumping Systems
- \* Air Systems Upgrades for Cost Effective Indoor Air Quality
- \* Lighting Retrofits and Controls

### **Drexel University**

Student taught statics (an analysis of structural systems).

Student taught graphic communications.

### **University of Hawaii**

Lectured several Occupational Safety and Health Courses, designed course material, and taught semester long courses.

## **PATENTS**

### **United States Patent Number: 6,176,305**

Inventor: Klas C. Haglid. Patent claim granted January 23, 2001.

Abstract: A ventilator system and method proven to greatly reduce the cost of operating commercial buildings, improve indoor air quality, and aid in the control of moisture. The system uses a microprocessor-based controller which is responsive to heat-recovery needs and the temperatures inside and outside of the enclosed space. Additional United States and International patents pending.

### **Canadian Patent Number: 2,428,409**

Inventor: Klas C. Haglid. Patent claim granted November 10, 2003.

Abstract: The ventilator system and method use a heat exchanger to selectively transfer heat between fresh outside air entering and exhaust air leaving an enclosed space whenever energy can be recovered from the exhaust air by doing so. The system uses a microprocessor-based controller which stores one or more profiles indicating the time-varying needs of the enclosed space for heating and cooling. The transfer of heat between the exhaust and fresh air is reduced or eliminated simply by reducing the speed of (or stopping) the exhaust air handler while the fresh air handler continues to run. An all-plastic, plate-type heat exchanger is used, together with an air handler, at the exhaust outlet of the heat exchanger. This mechanism pulls exhaust air through the heat exchanger to treat it with evaporative cooling.

**United States Patent Number: 6,983,788**

Inventor: Klas C. Haglid. Patent claim granted on January 10, 2006.

Abstract: The ventilating system includes evaporative cooling of the exhaust air before it enters a heat exchanger to cool fresh, incoming outside air. A suction fan pulls exhaust air through the heat exchanger and, in combination with a flow restrictor, reduces the pressure on the exhaust air, augmenting the evaporative cooling. The use of a pusher fan to force outside air through the heat exchanger ensures that any leakage in the heat exchanger results in outside air entering exhaust air and minimizing the chances of contamination caused by leaking exhaust air into the incoming fresh air. The heat exchanger is made economically by interleaving thick thermoplastic sheets that contain heat-forming cavities with thermoplastic sheets that hold separate gas-flow conduit structures, then securing the sheets together. Preferably, the heat-exchanger is an opposed-flow heat-exchanger that promotes improved heat-transfer efficiency.

**United States Patent Number: 7,231,967 B2**

Inventor: Klas C. Haglid. Patent claim granted on June 19, 2007.

Abstract: The ventilator system and method use a heat exchanger to selectively transfer heat between fresh outside air entering and exhaust air leaving an enclosed space whenever energy can be recovered from the exhaust air by doing so. The system uses a microprocessor-based controller which stores one or more profiles indicating the time-varying needs of the enclosed space for heating and cooling. The transfer of heat between the exhaust and fresh air is reduced or eliminated simply by reducing the speed of (or stopping) the exhaust air handler while the fresh air handler continues to run. An all-plastic, plate-type heat exchanger is used, together with an air handler, at the exhaust outlet of the heat exchanger. This mechanism pulls exhaust air through the heat exchanger to treat it with evaporative cooling.

**United States Patent Number: 7,334,629**

Inventor: Klas C. Haglid. Patent claim granted February 26, 2008.

Abstract: The ventilating system includes evaporative cooling of the exhaust air before it enters a heat exchanger to cool fresh, incoming outside air. A suction fan pulls exhaust air through the heat exchanger and, in combination with a flow restrictor, reduces the pressure on the exhaust air, augmenting the evaporative cooling. The use of a pusher fan to force outside air through the heat exchanger ensures that any leakage in the heat exchanger results in outside air entering exhaust air and minimizing the chances of contamination caused by leaking exhaust air into the incoming fresh air. The heat exchanger is made economically by interleaving thick thermoplastic sheets that contain heat-forming cavities with thermoplastic sheets that hold separate gas-flow conduit structures, then securing the sheets together. Preferably, the heat-exchanger is an opposed-flow heat-exchanger that promotes improved heat-transfer efficiency.

**United States Patent Number: 7,497,247**

Inventor: Klas C. Haglid. Patent claim granted March 3, 2009.

Abstract: The heat exchanger is made economically by using thermoplastic sheets with hollow tubes and spacers between the sheets. The edges of the sheets are fused together to form an integral housing. Preferably, the heat-exchanger is an opposed-flow heat-exchanger that promotes improved heat-transfer efficiency.

**United States Patent Number: 7,640,662**

Inventor: Klas C. Haglid. Patent claim granted January 5, 2010.

Abstract: The heat exchanger is made economically by interleaving thick thermoplastic sheets that contain heat-forming cavities with thermoplastic sheets that hold separate gas-flow conduit structures, then securing the sheets together. Preferably, the heat-exchanger is an opposed-flow heat-exchanger that promotes improved heat-transfer efficiency.

**Canadian Patent Number: 2,380,138**

Inventor: Klas C. Haglid. Patent claim granted September 14, 2010.

Abstract: The ventilating system includes evaporative cooling of the exhaust air before it enters a heat exchanger to cool fresh, incoming outside air. A suction fan pulls exhaust air through the heat exchanger and, in combination with a flow restrictor, reduces the pressure on the exhaust air, augmenting the evaporative cooling. The use of a pusher fan to force outside air through the heat exchanger ensures that any leakage in the heat exchanger results in outside air entering exhaust air and minimizing the chances of contamination caused by leaking exhaust air into the incoming fresh air. The heat exchanger is made economically by interleaving thick thermoplastic sheets that contain heat-forming cavities with thermoplastic sheets that hold separate gas-flow conduit structures, then securing the sheets together. Preferably, the heat-exchanger is an opposed-flow heat-exchanger that promotes improved heat-transfer efficiency.

**United States Patent Number: 8,162,042**

Inventor: Klas C. Haglid. Patent claim granted April 24, 2012.

Abstract: Condensate accumulating in the incoming outside air flow passages of a heat exchanger is fed back into the exhaust flow passage of the heat exchanger. This provides improved heat transfer in the heat exchanger and avoids having to drain the condensate from the heat exchanger. The heat exchanger includes a plastic multi-tube panel core and solid plastic housing with opposed-flow heat exchange and inlet-outlet extensions from only one side of the core.

**Ventilator System and Method - 289 Patent Claims Pending**

Abstract: The ventilator system and method use a heat exchanger to selectively transfer heat between fresh outside air entering and exhaust air leaving an enclosed space whenever energy can be recovered from the exhaust air by doing so. The system uses a microprocessor-based controller which stores one or more profiles indicating the time-varying needs of the enclosed space for heating and cooling. The transfer of heat between the exhaust and fresh air is reduced or eliminated simply by reducing the speed of (or stopping) the exhaust air handler while the fresh air handler continues to run. An all-plastic, plate-type heat exchanger is used, together with an air handler, at the exhaust outlet of the heat exchanger. This mechanism pulls exhaust air through the heat exchanger to treat it with evaporative cooling.

**Ventilator System and Method - 91 Patent Claims Pending**

Abstract: The ventilator system and method use an isolating heat exchanger to selectively transfer heat between exhaust air leaving an enclosed space and outside air entering the enclosed space. The system operates in three basic modes under the control of a microprocessor-based controller, which is responsive to the temperatures inside and outside the enclosed space. In the heating mode, heat is transferred from the exhaust air to the outside air when the enclosed space requires heating. In the cooling mode, heat is transferred from the outside air to the exhaust air when the outside air temperature is higher than that in the enclosed space.



**United States Patent Number: 9,605,905**

Inventor: Klas C. Haglid. Patent claim granted March 28, 2017.

Abstract: The ventilating system includes evaporative cooling of the exhaust air before it enters a heat exchanger to cool fresh, incoming outside air. Air to Air energy recovery device improvements.

**United States Patent Number: 9,920,939**

Inventor: Klas C. Haglid. Patent claim granted March 20, 2018.

Abstract: This is a machine that can pull large amounts of drinking water from normal outside air. The dehumidifier uses an all-plastic air-to-air heat exchanger together with an integral chiller to cool the incoming air to remove water vapor, and then exchange heat with incoming air to cool the incoming air and re-heat the outgoing air.

**PARTIAL LISTING OF ENGAGEMENTS  
AND EXPERIENCE IN VARIOUS CATEGORIES**

**E.I. Du Pont Company, Central Research, Wilmington, Delaware**

Automated controls for chemical production plant manufacturing processes. Designed high-pressure systems to function safely under extreme operating conditions and failures. Provided design for fire suppression and explosion-proof containment for chemical reactors and support systems. Tested high-pressure reactions to failure and analyzed results to avoid failures in full-scale plants. Designed, built, and repaired compressors and tested a wide variety of refrigerants for material compatibility, absorption, and different test parameters.

**Atlantic Electric Company, Egg Harbor, New Jersey**

Provided general energy engineering and performance contracting engineering for the deregulated services branch of the Atlantic Electric Company. We provided energy analysis, general engineering support services, blueprinting, and project specifications, as well as profiled the performance of several hundred buildings and industrial sites over a period of several years. Evaluated numerous central steam systems for summertime peak savings using steam for cooling, absorption chillers, steam energy savings measures, and HVAC systems.

**Attorney General Office, State of Delaware**

Provided field inspections for multiple buildings, expert witness testimony in court under cross examination, and worked on several projects for the State of Delaware.

**Giants Stadium – Sales Center**

Provided architectural design and layout for a sales center for the new skyboxes in the new stadium. Provided structural, mechanical and full MEP for the project and construction supervision.

**TSA – Newark International Airport**

Provide architectural design, interior layout, MEP and HVAC design for a new TSA training and administration suite at the Newark International Airport.

**Honolulu Waste Water Treatment Plant, Oahu, Hawaii**

Provided controls and control panel for emergency pumping station. Developed monitoring equipment to profile flows through plant.

**Pacific Center of High Technology Research, Kona, Hawaii**

Provided design, performance analysis, and project management for plant-wide sensors, control panels, and controls for the Open Cycle Thermal Energy Conversion Process. This was an exotic, full-scale, cold-steam-driven electric power plant--the first large-scale plant in the world to successfully produce a net positive electric generation from warm and cold seawater.

**COMPA, Sibiu, Romania**

Sponsored by Eco Links, United States Department of Energy, this several-months-long energy engineer analysis involved a 3.2 million-square-foot manufacturing facility in Eastern Europe. The main heating and power plant used an extra-large central steam heating and power plant. The steam system was thermodynamically analyzed using stand-alone microprocessor-based temperature sensors and was optimized to save energy.

**210 Washington Square, Philadelphia, Pennsylvania**

Provided engineering for use of Trigen Central Steam Loop for steam-driven electrical generation and summertime cooling through the use of steam for absorption cooling and peak load demand reduction.

**City and County of Honolulu, Hawaii**

Designed and provided performance projections for a fresh and brackish water mixing station for Honolulu's Ala Wai Golf Course.

**Kailua Waste Water Treatment Plant, Kailua, Oahu, Hawaii**

Provided instrumentation, motor control center, and control diagrams for Phase III plant modifications. Designed main control panel for level and pump controls.

**Enterprise Group Development Corporation, Wayne, Pennsylvania**

HVAC load analysis and feasibility study for wintertime cooling using plate and frame heat exchanger instead of a chiller. Replaced existing chiller for better summertime performance.

**Halieva Pumping Station, Aiea, Oahu, Hawaii**

Provided VFD controls and flow sensors for pumping station control.

**Honolulu Wastewater Treatment Plant, Honolulu, Hawaii**

Engineered flow and volume measuring system to evaluate usage for 20 MGD wastewater treatment plant.

**Stone & Webster, Cherry Hill, New Jersey**

Energy engineering and performance contracting branch of the Stone & Webster Engineering Firm. We provided energy analysis and profiled performance of several options for NASA's Vehicle Assembly Facility and a U.S. Coast Guard Support Center.

**Episcopal Hospital, Philadelphia, Pennsylvania**

Provided building load analysis for HVAC systems and feasibility study for a lighting system upgrade. Provided performance contracting survey and financial per forma for a 10-year period.

**Ihilani Hotel, Oahu, Hawaii**

Solved a dispute between contractor, original mechanical engineer, and the owner. The specified chilled water control valve was not rated for the necessary design conditions. After this was replaced, the hotel functioned very well.

**Mauna Kea Beach Hotel, Kahala Coast, Hawaii**

Provided current operating design loads and evaluated different design feasibilities.

**Kaahumanu Mall, Maui, Hawaii**

Designed strip mall store, HVAC, fire protection, plumbing, and food-handling facilities.

**Sheraton Waikiki, Honolulu, Hawaii**

Verified current operating design loads and evaluated different design feasibilities.

**Boggs v. Eagle Steel**

Provided written report of probable cause for accident involving personal injury via use of a punch press machine.

**Johnston Atoll Island and Waste Disposal Facility, Pacific**

Provided controls, controls panel and incinerator actuator and isolation gate valve.

**Johnston Atoll Island and Waste Disposal Facility, Pacific**

Provided controls, dual HEPA ventilation system for medical facility on island.

**American Savings Bank, Aiea, Hawaii**

Provided design and engineering support for central computer facility's pre-action fire suppression system. Provided sprinkler field layout and all design parameters.

**Johnston Atoll Island and Waste Disposal Facility, Pacific**

Provided Selection and Central Chiller Equipment.

**Jackson Cross Company, Philadelphia, Pennsylvania**

Provided building load analysis for HVAC systems and feasibility studies for several facilities, including Liberty II, Rosen Bluth Travel and other commercial buildings.

**Franklin Mills, 1455 Franklin Mills Circle, Philadelphia, Pennsylvania**

Provided building load analysis for HVAC systems and feasibility study for lighting system retrofit.

**McHugh v. Novick**

Provided written report of probable cause for equipment failure involving commercial refrigeration equipment.

**Grandview Hospital, Sellersville, Pennsylvania**

HVAC load analysis and feasibility study for wintertime cooling using plate and frame heat exchanger instead of a chiller.

**The West Company, Lionville, Pennsylvania**

HVAC load analysis and financial study of electric load leveling using ice storage tanks and staged chiller in a facility-wide chilled water system.

**Network Personnel, Wilmington, Delaware**

Provided building load analysis for HVAC systems and feasibility study for the optimization and modification of existing system for better operation and temperature control.

**Tokai University, Honolulu, Hawaii**

Researched fire sprinkler design and provided an opinion on a materials and corrosion problem that solved an unusually high degree of material failure in this fire sprinkler system.

**Bethlehem Steel, Bethlehem, Pennsylvania**

Provided building load analysis for HVAC systems and feasibility study for the optimization and modification of the existing system to support better operation and temperature control. The building complex was over 1 million square feet with comprehensive and complicated building and site mechanical systems.

**Yale University, New Hampshire, Connecticut**

Received Honorarium for round table discussion of facilities Capital Replacement Cost Study for 12,965,000 gross square feet of campus buildings.

**TEACHING EXPERIENCE**

**Bergen County Community College, Paramus, New Jersey 07652**

Adjunct Professor - taught and designed sustainability and green initiatives

CD 510 Weatherization Techniques

– Architectural and Engineering for High Performance Buildings

– Certificate in Green Pathways to Employment Program

– BPI Certified Course

CD 511 Understanding Alternative Energy

– Architectural and Engineering for Net Zero Buildings and Off Grid Energy

– Certificate in Green Pathways to Employment Program

– BPI Certified Course

CD 116 Energy and Sustainability for the Built Environment

Broad overview of fundamental and applied concepts of energy in the over context of the modern and built environment.

– Certificate in Green Pathways to Employment Program.

– BPI Certified Course for 16 CEU Credits.

**New Jersey Institute of Technology, University Heights, Newark, New Jersey 07102-1982**

Master's Degree and Ph.D. Programs, seminar on Environmental Problems Solving;

– Adjunct faculty member and panelist for Public & Private Rights & Remedies.

– Topic "World Trade Center Redevelopment Plan"

**Honolulu Community College, University of Hawaii, Honolulu, Hawaii 96822**

Adjunct Professor for the Department of Occupational Safety & Health

- Taught and designed **OSH-204**, a course covering industrial hygiene and safety. Involved the use of personal protection devices such as Scott Air Packs, CO Sensors, Gas Sensors, Light and Noise control and monitoring for work place safety.
- Taught and designed **OSH-208**, a course covering industrial hazardous waste generation, remediation, and treatment.

**Drexel University, Philadelphia, Pennsylvania 19104**

Undergraduate Student Teaching in Mechanical Engineering

- Student taught Statics, an Introductory Structural Engineering Course.
- Student taught Engineering Computer Graphics Communications Course.
- Completed Introduction to Personalized System of Instruction.
- Completed Course Series to Personalized System of Instruction.

**State of Hawaii School System**

- Organizer - Math counts, a program to develop potential young engineers and their interest in math.
- Judged and Tested Math Counts competition for Oahu Chapter Math Counts Competition.
- Judged and worked on a team to organize Hawaii State solar car competition, a state wide program that gives high school students the opportunity to design a solar-powered vehicle.

**PUBLIC SERVICE**

**ASHRAE - American Society of Heating, Refrigeration & Air Conditioning Engineers, Inc.**

- Former Chairman of National Technical Committee 5.5 - Air to Air Energy Recovery
- Former Chairman of National Technical Committee 7.8 - Owning and Operating Costs of Commercial Buildings
- Former Review Committee of Technical Committee 7.8 (Previously 1.8)
- Former Program Chairman of Technical Committee 7.8 (Previously 1.8)
- Former Vice Chairman and Secretary of Technical Committee 7.8 (Previously 1.8)
- Handbook Sub-Committee Chairman of Technical Committee 7.8 (Previously 1.8)
- ASHRAE Distinguished Service Award

**Delaware Society of Professional Engineers**

- Former Council Member for Examining Committee
- Evaluated Delaware Engineering Candidates and Corporate Certificates of Authorization

**Board of Zoning Variance, Village of Ridgewood, New Jersey**

- Former Board Member for review of zoning variance and case review
- Former Chairman and Board Member for subcommittee site approval

## COURSE WORK AND SEMINARS

- 2010 AEC Daily Corporation, Buffalo, New York.** Successful completion of “Rolling Door Products: Design Types.” (September 7, 2010)
- 2008 ASHRAE - Salt Lake City, Utah, Forum 7:** “What Do People Want in a Design Guide for Air-to-Air Energy Recovery?”
- 2007 NAFE - National Academy of Forensic Engineers, Denver, Colorado, July 28, 2007**  
Seminar: General Topics in Forensic Engineers.
- 2006 ASHRAE - Quebec City, Canada, Seminar 12:** “How Low Can You Go? Low-Energy Buildings through Integrated Design.”
- 2006 ASHRAE - Quebec City, Canada, Seminar 53:** “Fundamentals of Fan Systems.”
- 2005 ASTM, New Orleans, Louisiana, E30-05:** Engineering Standards
- 2005 American Academy of Forensic Sciences, New Orleans, Louisiana**  
“There is ‘Gold’ in Mold: Forensic Evaluation, Litigation and Litigation Issues in Mold and Indoor Air Pollutants Claims.”
- 2005 NAFE Forensic Engineering Seminar, San Diego, California**  
General Topics in Forensic Engineering
- 2002 11<sup>th</sup> Municipal Land Use Committee Symposium, Bergen County, New Jersey**  
Annual Review of Land Use Case Law and Legislation for Planning and Zoning Boards
- 2002 ASHRAE Winter Convention, Atlantic City, New Jersey**  
Future programs and handbook improvements for owning and operating costs of buildings.
- 2001 NAFE Forensic Engineering Seminar, Los Angeles, California**  
General Topics in Forensic Engineering
- 2001 NAFE Forensic Engineering Seminar, Los Angeles, California**  
Dinner Lecture on Chappaquiddick
- 2001 ASHRAE Summer Convention, Cincinnati, Ohio**  
Future programs and handbook improvements for owning and operating costs of buildings.
- 2001 ASHRAE National Convention, Atlanta Georgia**  
Future programs and discussion of Chapter updates and agenda.
- 2001 Schinnerer’s Understanding & Managing Risk, Pikesville, Maryland**  
Professional Development Hours: “The Construction Phase.”

- 2000 Trane Company, Wilmington, Delaware**  
Live Satellite Seminar in conjunction with U.S. DOE, ASHRAE/IESNA 90.1 - 1999,  
“Energy Standards for Buildings.”
- 2000 ASHRAE National Convention, Dallas, Texas**  
Seminar Speaker: “Owning and Operating Costs of Commercial Buildings, What Is  
Important to the Membership?”
- 1999 The Consulting Engineers Council of Delaware, Wilmington, Delaware**  
Professional Development Hours for Ethics in the Profession
- 1997 State of Delaware, Department of Administrative Services, Newark, Delaware**  
Commercial Energy Code Workshops
- 1996 Criterium Engineers National Conference, Atlanta, Georgia**  
Seminar: “Commercial Building Inspections”
- 1996 Criterium Engineers National Conference, San Antonio, Texas**  
Seminar: “Building Inspections”
- 1996 Leadtec Service, Wilmington, Delaware**  
Seminar: “Lead Hazards” (40 Hour Workshop)
- 1996 Trane Company, Nashville, Tennessee**  
Seminar: “Performance Agreement for Comfort from Trane” (40 Hour Workshop)
- 1995 United States Environmental Protection Agency, Burlington, New Jersey**  
Seminar: “Green Lights, Energy Efficient Building Systems” (24 Hour Workshop)
- 1995 Trane Company - Honolulu Office, Honolulu, Hawaii**  
Course Title: Refrigeration System Piping
- 1995 Criterium Engineers National Conference, San Antonio, Texas**  
Seminar: “Building Systems”
- 1995 Trane Company - Honolulu Office, Honolulu, Hawaii**  
Course Title: Variable Air Volume
- 1994 Trane Company - Honolulu Office, Honolulu, Hawaii**  
Course Title: Refrigeration System Components
- 1994 Trane Company - Honolulu Office, Honolulu, Hawaii**  
Course Title: Centrifugal Water Chillers
- 1994 Trane Company - Honolulu Office, Honolulu, Hawaii**  
Course Title: Air Conditioning Fans

- 1994 Trane Company - Honolulu Office, Honolulu, Hawaii**  
Course Title: The Refrigeration Cycle
- 1994 Trane Company - Honolulu Office, Honolulu, Hawaii**  
Course Title: Psychrometry
- 1993 Monitek Technologies, Inc., Hayward, California 94544**  
Course Title: Flow Monitoring Techniques
- 1992 Foxboro Company, Foxboro, Massachusetts**  
Course Title: Advanced Process Control
- 1987 E.I. DuPont De Nemours & Company, Experimental Station, Wilmington, Delaware**  
Course Title: Chemical Engineering Training Program (2 year program)
- 1987 E.I. DuPont De Nemours & Company, Experimental Station, Wilmington, Delaware**  
Seminar: "Work Place Safety"
- 1987 E.I. DuPont De Nemours & Company, Experimental Station, Wilmington, Delaware**  
Seminar: "Chemical Safety"
- 1987 E.I. DuPont De Nemours & Company, Experimental Station, Wilmington, Delaware**  
Seminar: "Laboratory Safety"
- 1986 De Nemours & Company, Experimental Station, Wilmington, Delaware**  
Course Title: Hazardous Material Safety
- 1985 De Nemours & Company, Experimental Station, Wilmington, Delaware**  
Course Title: Computer Process Control



## INTERESTS

### Sailing and Yacht Racing

Sailing all types of boats, from windsurfing to large sail boats

Race Official - 1992 Kenwood Cup

Silver Medal - 1994 State Aloha Games, Soling Yacht Racing Class

Gold Medal - 1994 United States Sailing Association, Hawaii Open Ocean Yacht Racing Series. Over 75 races over the full 1994 year.

### Scuba Diving

PADI - Open Water Certification

PADI - Deep Open Water Certification

PADI - Wreck Diving Certification

PADI - Rescue Diver Certification, Experienced with mixed Gas Diving

### Art and Creative Interests

Restoring old buildings and homes

#### Martial Arts

Taekwondo-Do Instructor

Isshin-Ryu Karate - Instructor

Hand Weapons Kata Competitions

Sword (Katana) Kata – Intermediate Class – Instructor: Professor Mertz 10<sup>th</sup> Dan

Black Belt Sword (Katana) Kata-Advanced Class-Instructor: Prof. Mertz 10<sup>th</sup> Dan

Oil Painting - Part of a multi-person oil painting show at USA First Riverfront Art Center