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Background

Along with a B.S. in Mechanical Engineering and an M.B.A. in Finance and Marketing, Mr. Richard Rambacher is a registered professional engineer in Ohio, Kentucky, Nebraska, Illinois, Indiana, Michigan, West Virginia, Texas, Pennsylvania, New York, and Florida.

He has over 50 years of experience in design, engineering, procurement, engineering management, project and construction management, mechanical systems design and evaluation, scheduling, cost estimating, budget control, implementing quality and control procedures, contract management, and financing of capital projects. He has managed over 100 new construction and renovated capital projects. Projects included the installation of presses, screw machines, and forging equipment.

Mr. Rambacher has been responsible for managing a $60 million manufacturing operation, as well as having hands-on experience with the design, procurement, and inspection of over 50 construction projects ranging from heavy industrial to light commercial facilities. He has tested heating, ventilating, and air conditioning (HVAC) systems for airflow and system performance and the testing of industrial environments for noise and airborne contaminant exposure. He has also provided expert witness reports for a variety of Occupational Safety and Health Administration (OSHA) related cases. Electrical Testing Labs (ETL) and Underwriters Laboratory (UL), as well as code officials when disputes or questions arose, was something Mr. Rambacher has done on many occasions. Mr. Rambacher managed a team that prepared submittal packages for ETL testing. He had settled over a dozen insurance claims and legal disputes through mediation or arbitration. Mr. Rambacher has inspected boilers, furnaces, refractory linings, pumps, fireplace inserts, shredding machinery, hot water heaters, HVAC systems, plumbing and piping system failures, and PEX piping systems. He also has experience investigating gas explosions, scalding injuries, damage from faulty piping, and losses as a result of code violations.

While employed by Mestek and Engineered Air, Mr. Rambacher was involved in at least six asset purchases of companies. Three of the acquisitions were while employed at Mestek, one was Temprite, a company that was located in Canada and then relocated to Dallas, Texas, and the other was L. J. Wing, a New Jersey company that was relocated to Dallas, Texas. Both of these companies were involved in manufacturing equipment with fans of all types. Finally, there was Airfan, which was also eventually relocated to Dallas, Texas. Airfan was a manufacturer of centrifugal fans. At the time, Mr. Rambacher was Vice-President of Operations for Mestek. As Managing Partner and President of Engineered Air, there were three other companies where Mr. Rambacher was the signer on the purchase agreements that were eventually executed. The executed agreements included

M&I in Portland, Oregon; Tri-Med in Indianapolis, Indiana; Nesbitt in Cleveland, Ohio; and others. There were at least another dozen companies where documents were reviewed in preparation for asset purchase agreements but were never finalized for a variety of reasons.

Professional Engagements

- **Mechanical Systems – Odor Control**
  - Sewer Design Projects – Pinellas County, FL (2010-2016), Designed mechanical systems for four major sewer projects for the Pinellas County Utilities Department.
  - Jackson County Medical Examiner – Jackson County, FL (2010-2016), Designed mechanical systems for existing morgue.

- **Mechanical Systems – Water and Wastewater**
  - Northeast Ohio Regional Sewer District – Cleveland, OH (2000-2016), Completed five mechanical system projects to support sewer systems. All of these systems required design of explosion-proof systems.
  - Virginia Beach Public Utilities – Virginia Beach, VA (2000-2016), Design mechanical equipment systems for utility facilities.
  - Lift Stations (over 20) – Florida and Texas (2010-2016), Designed lift station systems for a number of municipalities in Florida and Texas.
  - Casino Design – Joliet, IL (2006), Provided design for casino odor and smoke removal system.

- **Mechanical Systems – Food Processing**
  - Packaged Meal Food Preparation Project – Nationwide (2000-2016), Designed 10 air handling systems for large airline catering company food preparation facilities located around the country.
  - Slaughterhouse Project – Kansas (2000), Designed ventilation system for slaughterhouse for major meatpacking company.

- **Mechanical Systems – Natural Gas and Propane Systems**
  - As a consulting engineer, designed propane systems for residential use at an apartment complex.
  - Provided design for HVAC equipment for propane systems as stand-by for military installations. These systems had natural gas and propane burners. As part of the design, we provided a series of 500-gallon tanks that were piped in parallel. Systems were at Fort Carson.
  - Involved in the design and evaluation of gas systems for wastewater treatment plants.
  - Designed and installed propane fill system for forklifts at Mestek in Dallas, Texas.

- **Mechanical Systems – Institutional and Commercial**
  - Manufacturing Projects – U.S., Canada, Mexico (1980-1985), Designed over 100 manufacturing facilities ranging in size from 30,000 square feet to 150,000 square feet. Plants incorporated a range of mechanical manufacturing systems from screw machines to CNC systems.
  - Grocery Store Project – St. Louis, MO (1985-1991), Designed custom air conditioning units for large Midwest grocery store chain, including heat recovery and hot-gas reheat coils and refrigeration units.
  - Heat Pumps – various locations (2004-2016), Designed large tonnage water source heat pumps for colleges, municipal facilities, and industrial users.
  - Variable Refrigerant Flow Systems (2019-Present), Analyzed over a dozen VRF systems for failures related to design, installation, and equipment design.
  - Data Centers – various locations (2006-2015), Designed systems using chilled water and direct expansion cooling for data centers in Chicago, California, and Oregon.

- Clean Rooms – various locations (2008-2015), Designed interstitial air handlers, fan filter units, and make-up air units for Class 1 through Class 100 rooms.
- Heat Treat Separators – Inspected separators for failures that might have caused a fire in Michigan. While employed previously by a Canadian company was exposed to operation of oil field equipment, including separators to remove water from the oil.
- Dust Collection Systems – Designed and provided fan systems for sand and metal shavings and other materials. Also provided start-up and testing services for the systems. Work was performed in Ohio, Indiana, and Minnesota.

- **Noise Analysis**
  - Evaluation of sound levels from HVAC units that were in the speech interference frequencies.
  - Testing of octave bands to determine source of noise in HVAC systems.
  - Peak noise testing.
  - OSHA testing of sound levels in the workplace and testimony at Federal hearing.
  - Noise testing at industrial facilities to determine compliance with OSHA standards.
  - Testing fire alarm systems to determine if audible alarm was adequate for warning occupants.
  - Testing of ambient NC levels in cleanroom facilities.

- **Carbon Monoxide (CO) Investigations**
  - Investigated CO poisoning in condo from gas appliances.
  - Inspection of CO poisoning in hotel room.
  - Analysis of occupant death in residence from high CO levels.

- **Mechanical Systems – Penal Facilities**
  - Leavenworth Federal Penitentiary – Design new air conditioning system for remodeled area for high-security prisoners. Design included new cells and common areas.
  - Calipatria State Prison in California – In 1992 designed and manufactured HVAC equipment for prisoner housing.
  - Texas Prisons – Designed and manufactured HVAC units for several prisons for Texas Department of Criminal Justice (TDCJ).
  - Grafton Correctional Facility – Provided mechanical design for juvenile offenders. Designed the HVAC in the mid 1980s.

- **Mechanical Systems – Zoos**
  - Zoo Exhibit Project – Kansas City, MO (2003-2003), Provided design and manufacturing expertise for the design of refrigeration system for polar bears and penguins at the Kansas City Zoo.
  - Dallas Zoo – Dallas, TX (2005-2006), Designed the mechanical systems to support a tropical environment for butterflies.
  - Cleveland Metroparks Zoo – Cleveland, OH (2007-2008), Designed temperature control system for species of toads from South America.

- **Mechanical Systems – Aviation**
  - Aircraft Manufacturing Project – Wichita, KS (2002-2003), Handled cost estimates for construction of ventilation system for major aircraft manufacturer's airplane part paint facility.
  - Aircraft Facility Project – Wichita, KS (2005-2013), Designed ventilation systems for a general aviation aircraft manufacturing company.

- **Commercial**
  - Real-Estate Development – Shawnee, KS (2010-2016), Acted as owner's representative for 80-acre real estate development that involved the construction of two 170,000-square-foot buildings, as well as site development for five more 170,000-square-foot buildings. Negotiated contracts, purchased the land, and hired the contractors.

- **Other**
  - $20 Million Manufacturing Facility – Responsibilities included capital equipment budgeting, design, and costing of each unit manufactured; training of the sales staff; and settling all insurance claims and legal disputes.

Forensic Engagements

- **Mechanical System – Commercial**
  - Newark, OH (2018), After major freeze weather event, evaluated three-story cause and origin of frozen plumbing and sprinkler systems in the historic Basket Building.
  - Grand Rapids, MI (2018), Evaluated cooling tower failure of a 5-star hotel to determine origin and cause of malfunction.
  - Delphos, OH (2018), Evaluated origin and cause of tile floor separation from concrete at major hotel to determine if water intrusion facilitated event.
  - Columbus, OH (2017), Assessed damages to mechanical systems in elevator shaft from flooding of high-rise structure.
  - West Mifflin, PA (2017), Investigated mechanical system failure.

- **Mechanical Systems – Manufacturing and Chemical**
  - Detroit, MI (2018), Evaluated thermal oxidizer system for cause and origin of coking in the heat exchanger tubes of a 200,000-square-foot graphics manufacturing facility.
  - West Virginia (2018), Evaluated mechanical system failure of large foundry.
  - Michigan (2017), Analyzed ammonia refrigeration system failure at food processing plant.
  - Pennsylvania (2017), Evaluated cause of shopping cart welds failing while in use by customer at a grocery store.

- **Mechanical Systems – Water and Wastewater Treatment**
  - Kilauea, HI (2018), Performed site inspections for deficiencies in ventilation system.
  - Mililani, HI (2018), Performed site inspections to assess vibrations on deep well pumps at water treatment plant.

- **Explosion Investigations – Natural Gas and Propane**
  - South Dakota (2018), Investigation into an explosion in a slaughterhouse.
  - Detroit, Michigan (2019), Investigated an explosion at a wastewater treatment plant.
  - Propane explosions and fire equipment evaluations at various facilities from 2017 through 2023.
  - In 2020, investigated a propane fire and explosion at a manufacturing facility in Indiana.

- **Product Testing – Destructive and Nondestructive Assessments**
  - Various locations, Propane fires and explosions (2017-2018), Evaluated stand-alone ice makers to determine if leaks cause by mechanical system or operator error.

- Various Locations (2017-2018), Evaluated plumbing fitting failures of all kinds to determine if scald incidents were because of an issue related to mechanical system malfunction or operator error.

- **Facilities Design and Layout**
  - Various locations (2017-2022), Reviewed building plans for code compliance in regard to layout for ADA, egress, and meeting design requirements.
  - Pennsylvania (2018), Review of code compliance with sliding doors in medical office building.
  - Denver (2022), Review of claims arising from changes to facility layouts for production and employee facilities.
  - Alabama (2021-2022), Review of design drawings as the building inspector (AHJ) for a multi-million-dollar building. Examined over 20 progress reports.

Professional Experience

- **Rimkus** **2017 – Present**
  - MEP Senior Practice Leader
    Responsible for investigating and evaluating industrial, commercial, and residential buildings for failures and performance issues associated with mechanical, electrical, and plumbing (MEP) systems. Provides fact-finding, analysis, and design review for HVAC, mechanical, and plumbing defect and failure investigations in single-family residences, commercial, hospital, educational, manufacturing, and industrial facilities. Performs cause and origin analyses for system and equipment failures, including boilers and boiler explosions, valve failures, and piping failures associated with fittings and defective installations.

- **Engineered Air** **1991 – 2016 (retired)**
  - President – De Soto Manufacturing Facility
    Executive providing leadership and direction that doubled sales and profitability. Had complete profit and loss responsibility, as well as direct involvement with engineering, sales, accounting, human resources, and costing. During this time, there were several new products developed and three major acquisitions. During this time, the company was restructured from a corporation to a limited liability limited partnership, resulting in significant tax savings. A captive insurance company was also set-up that resulted in additional tax benefits. Restructured health care benefits to a self-insured system and reduced costs by 20%. Worked on several acquisitions and part of team responsible for reviewing financial statements, inventory valuation, and determining if there was a fit with the corporate culture. As the president was involved with the purchase and installation of presses, shears, notchers, and coil handling equipment. Also reviewed safety procedures and practices for new equipment. Purchased Amada, Niagara, and Aida and Bliss.

  - National Sales Manager – De Soto Manufacturing Facility
    Responsible for technical training, hiring, and development of salesforce. Introduced new acquisitions to sales team and customers while adding 12 new offices, 30 new employees, and $15 million in revenue. Joined the County Economic Research Institute as a board member. Presented at ASHRAE as a guest speaker and supported new product development.

  - Kansas Sales Manager – Lenexa Sales Office
    Provided system design expertise to consultants and owners as to what type of system would be most efficient and cost-effective. Worked on large design-build systems for Boeing, Northeast Ohio Regional Sewer District, and PPG in Michigan. Handled cost estimates for each project and negotiated final contract with purchaser. Designed the tropical environment for butterflies in the Dallas Zoo, as well as the humidity

and temperature control for toads from South America. Handled cost estimates for each project and negotiated final contract with purchaser.

- Senior Salesman – Lenexa Sales Office
  Consulted with mechanical designers to layout, price, and specify mechanical systems for schools, hospitals, and all types of industrial facilities. Called on professional engineers to determine scope of project and completion time and completed additional training in system acoustics and methods of energy usage evaluation.

- **Mestek, Inc.** **1985 – 1991**
  - Vice President Operations – Applied Air Division, Dallas, TX
    Senior executive responsible for all aspects of the operation of a $20 million manufacturing facility. Responsibilities included capital equipment budgeting, design, and costing of each unit manufactured; the training of the sales staff; and settling all insurance claims and legal disputes, including union grievances. Worked on acquisitions and product development. While at Mestek, we purchased Wing, Airfan, and Temprite and moved their production equipment, including fan manufacturing equipment, presses, and shears into existing facilities. This included Bliss, Sutherland, and Komatsu presses.

  - Product Manager – Applied Air Division, Dallas, TX
    Responsible for all aspects of product development, including ETL testing, design, patent infringement analysis, marketing, and pricing. Developed and provided training sessions for outside vendors and outside salesmen. Spoke at several ASHRAE functions and an American Society of Plumbing Engineers seminar on condensate drain systems for high-efficiency units. Developed a service department and trained field service technicians. Introduced new products, including indirect-fired heating units using prop fans and cooling coils. Some systems were chilled water and some were direct expansion (DX).

- **Parker-Hannifin** **1980 – 1985**
  - Corporate Construction Manager
    In-house consultant responsible for executing new construction projects in the U.S., Canada, and Mexico. Completed over 50 construction projects of various sizes and handled all contracts, scheduling, and procurement. Performed site inspections and approved all payments to contractors and vendors. Assisted in the analysis of all new construction projects, determined schedule, and provided for equipment layout and installation. Developed new systems for heating and cooling large industrial facilities, including the first use of high-volume ductless air turnover systems for cooling and dehumidification. Designed facilities for screw machines, furnaces, milling machines, forges, presses, and refrigeration components. Analyzed the cost of capital projects for the automotive division, aerospace manufacturing, and international manufacturing operations, which included the purchase of screw machines, presses, and forging equipment.

  - Corporate Energy Manager
    In-house consultant responsible for utility usage and rate analysis at over 150 facilities in North America and renegotiated rates structures with local utilities and local municipalities. Handled contracts for the direct purchase of natural gas and electricity. Approved all energy-saving projects for the corporation and designed a cogeneration system and emergency standby system. Redesigned the corporation's standards for lighting and space heating and cooling. Did budget reviews and assessed correctness of all change orders and site questions.

- **R&F Associates, Inc.** **1977 – 1980**
  - Owner
    Consultant for a wide variety of HVAC design projects, including several foundries in cases involving OSHA citations and fines. Worked with legal counsel in preparing reports and documentation to reduce or eliminate fines. Primary area of expertise was sound control in heavy manufacturing facilities. Designed systems for schools, churches, apartment buildings, hotels, malls, and office buildings. Did a substantial amount of working in dust collection systems and process ventilation systems in steel mills and foundries. Did expert work for American Spun Steel, Forest City Foundry, Crucible Steel Casting, and others by doing field dust exposure testing and designing systems to reduce exposure. Was a member of the American Foundrymens Association and worked on design and testing of dust collection systems.

- **Schmidt and Associates, Inc.** **1975 – 1977**
  - Lead Mechanical Engineer
    Consultant responsible for design and field testing of dust collection systems and various ventilation systems in heavy industrial applications. Worked for Ford Motor Company in the engine plant and casting plant. Designed the boiler room system for the facility and the control system. Worked on boiler and dust collection systems for facilities in Ohio, Michigan, and Kentucky. Traveled to construction sites to evaluate the acceptability of the contractor's installation. Developed piping schematics and control diagrams for boiler feed systems and central station air handlers.

- **Osborn Engineering, Inc.** **1972 – 1975**
  - Lead Mechanical Engineer
    Consultant responsible for the design of rubber manufacturing facilities in North and South America for B.F. Goodrich, Goodyear, and General Tire. Handled all the process piping and ventilation plant-wide on over 20 projects. Checked shop drawings and then made sure through field inspection that equipment was installed as specified. Besides rubber manufacturing, was involved with HVAC, plumbing, and fire protection design on university classrooms, central boiler plants, and water treatment facilities. Responsible for teaching and training new hires in the department.

- **Kretch and Associates, Inc.** **1969 – 1972**
  - Mechanical Engineer
    Consultant involved with the design of plumbing, fire protection, and HVAC systems for all types of facilities. This included high-rise apartments and condominiums, office buildings, dormitories, light industrial manufacturing plants, and municipal buildings. Responsible for meeting schedules and reviewing specifications.

Education and Certifications

- **Mechanical Engineering, B.S.:** Cleveland State University (1977)
- **Finance & Marketing, M.B.A.:** Cleveland State University (1982)
- **Registered Professional Engineer:** Ohio, Kentucky, Nebraska, Illinois, Indiana, Michigan, West Virginia, Texas, Pennsylvania, New York, and Florida
- **Certified Energy Manager**
- **EPA 608 Universal License**
- **ESCO Certified for Basic Refrigeration**

Continuing Education

- **P.E.:** Annual coursework associated with maintaining professional engineering licenses.

Publications

- **"How To Do HVAC Commissioning in Healthcare Facilities."** Building Operating Management, Sept. 2018
- **"HVAC Basics."** (Instructor) 16-Week CEU Course, Johnson County Community College, 2016
- **"What Makes a Contract?"** (Instructor) CEU Class, 2010
- **"Air Conditioning Unit Considerations in High Humidity Locations."** (Presentation) ASHRAE Technical Sessions, 2005-2012
- **"Acoustics in Rooftop Air Handlers."** (Presentation) ASHRAE Technical Sessions, 2001-2011
- **"Dedicated Outdoor Air Systems Unit Design Considerations."** (Presentation) ASHRAE Meeting Guest Speaker, 1998-2010
- **"Odor Control Using Ionized Oxygen"** ASHRAE, 2003
- **"Subrogation Opportunities with Sump Pump Installations."** National Association of Subrogation Professionals (Presentation), Nov. 2018