Randy Clarksean, Ph.D., P.E., CFEI, CVFI, CFII
Mechanical Engineer
344 2nd Street SE
Perham, MN 56573
randy.clarksean@gmail.com
1.218.371.1967 (c)

Relevant Technical Experience

- ***Fire and Explosion Investigator***
- ***Expert in failure analysis of systems***
- ***Heat transfer and fluid mechanics expert***

Failure Analysis / Forensics Type Projects

- **Inadvertent Discharge of Foam Fire Suppression System** (~$3M)
  - Scene investigation and documentation
  - System testing and sensor evaluation
- **Fire in Semi-Tractor Garage** (USD $1M+ loss)
  - Fire cause and origin investigation
  - Arc mapping, video review, facility examination
- **Fire in Laundry and Storage Facility** (USD $5M+ loss)
  - Fire cause and origin investigation
  - Video review, fire scene investigation
  - Investigate potential issues with fire protection system
- **Fire and ammonia release** for ammonia refrigeration system (USD $5-8M+ loss)
  - Investigated fire source at refrigeration facility
  - Ammonia release also occurred
- **Inadvertent sprinkler discharged** (>USD $100K)
  - Investigated failure of sprinkler head
- **Investigation of Solar Thermal Plant** (USD $20M+)
  - Examined floating pipe scenario in thermal storage tank
- **Investigated Gas Turbine Loss** (USD Unknown)
  - Reviewed metallurgical data
  - Examined Operational data
  - Participated in fault tree review
- **Consulting Expert - Large Fire Tube Boiler Facility**
  - Reviewed design, commissioning and failures
  - Provided technical guidance to legal team
- **Investigation of Solar Energy System Collapse** (USD $50M+)
  - Ongoing, structural failure of support structure
- **Investigation of Mold and Moisture Damage** - Residential (USD > $700K)
  - Improper maintenance and setup for HVAC system
- **Fires in Hospital Facilities** (several facilities)
  - Battery backup fires – ***lithium ion batteries***
- **Small Garage Fire** (~ $40K)
  - Cause and origin within garage
  - Product exam to determine fire cause (electrical)
- **Investigation of HVAC system** (USD $1M+ loss)
  - Performance and installation issues (***potato storage***).
  - Improper control system design

    - **Improper overall system design** (competing controllers, improper sizing)
    - Infant mortality of compressors
- **Operating Loss in Fire Tube Boiler System** (USD $5M+ in loss claims)
    - Six 1000 HP fire tube boiler facility to provide process steam for large facility
    - Investigation relating to system design, water quality, operations.
    - $70M+ dollar facility which failed 9 months into operations. Claims for $5M+ in renovations and design changes.
- **Grain Bin Failures** (several investigations)
    - Assisted in review of opposing expert's report
    - Assessed failure mechanism of collapsed structure (bad weld)
    - Assessed reasons for structural failure of structure that failed and fell
- **Collapse of concrete silo for coal storage** (USD $20-30M+ loss)
    - South Korean loss site
    - Investigated potential for **dust explosion**
- **Propane boiler explosion** (< USD $500K)
    - Backup fuel supply (dual system for natural gas and propane) of propane led to boiler explosion
    - Evaluated safety aspects of design (single point failure led to failure).
- **Explosion in Residential Structure**
    - Multiphase investigation of natural gas system
- **Submarine pipeline failure** ($30M+ loss)
    - Pipeline used for power plant cooling water inlet and outlet
    - Investigated reasons why pipeline floated and failed
    - Rough seas and **design calculation assumptions (flow related)**
- **Mining equipment collapse** ($35M+ loss)
    - Collapse of a stacker reclaimer used at a steel mill for movement of iron ore pellets
    - Structural collapse, modified PLC control systems, motor controllers
    - Failed due to **lack of electromechanical safety system**
- **Inadvertent ignition for natural gas boiler**
    - Failure of electronic valve/ignition units
- **Residential Fire Loss** (small USD ~$40K)
    - Investigated potential product failure that caused the fire
- **Frozen sprinkler system** (>USD $300K)
    - Investigated and documented loss associated with frozen sprinkler system
- **Turbine blade failure analysis** (USD $5M+ loss)
    - Turbine blade **design and materials related issues**.
- **Natural gas skid failure** (personal injury)
    - System removes "oil" from natural gas prior to entering utility scale natural gas turbine
    - Safety system failure led to oil release and natural gas release
    - **Single point failure and system design issues**