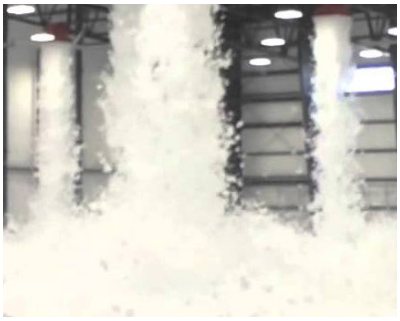
ENGINEERS CONSULTANTS DESIGNERS SURVEYORS

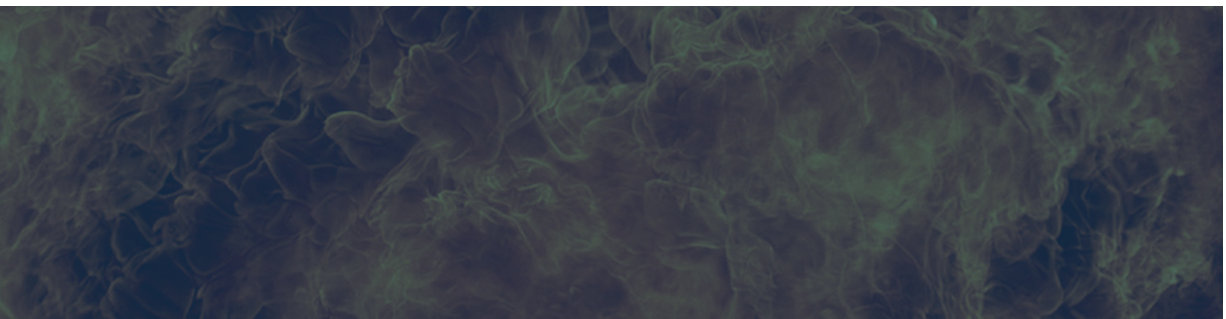


Fire Protection & Process Safety

Full Discipline Construction Engineering

GSE

Gulf States Engineering, Inc.



Design Services

Foam

Typically used for flammable and combustible liquids, foam fire suppression systems are comprised of three parts: foam concentrate, water, and air. These systems cool, separate, suppress, and smother the flame. GSE has many years of experience designing low expansion, high expansion, and deluge foam systems.

- Tank Farms
- Loading Facilities
- Warehouses
- Aircraft Hangars
- Petrochemical
- Oil and Gas
- Flammable Liquid Storage

Clean Agent

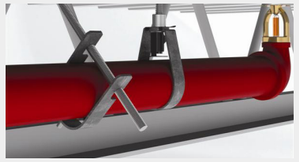
Typically used for computer or sensitive industrial processing equipment that cannot tolerate water or powder extinguishing agents. Inert gas fire suppression systems are a safe and natural way to extinguish a fire. GSE's fire protection engineers have designed various clean agent systems, including but not limited to halon systems.

- Electronic / Data Processing
- Computer / Control Rooms
- Pharmaceutical / Medical
- Libraries
- Military Installations
- Switch Rooms
- Archive Storage

Seismic Bracing

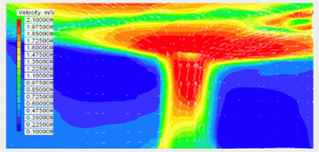
Bracing of fire protection systems is implemented to assure the system remains stable during a seismic event. Cable bracing is the most economical method to install due to low material and installation costs. Rigid bracing, consists of steel rods, pipes, or channels, is more expensive but preferred by some owners. GSE's structural engineers are experienced in designing bracing methods in accordance with the NFPA and IBC codes including UL-listed, and FM-approved solutions.

- Nuclear Facilities
- Military Installations
- Hospitals
- School



Performance based solutions

Performance Based Design emphasizes science, engineering, calculations, and modeling rather than prescriptive requirements that usually do not consider a project's unique characteristics. Evaluating several design scenarios allows the most cost effective design to be chosen without compromising fire safety. This method can be used to calculate safe separation distances between fuel packages and optimizing the placement of fire and smoke detectors to minimize detection times.



- Smoke Management
- Fire Modeling
- Code Evaluations
- Egress
- Probabilistic Analysis
- Deterministic Analysis

Process Safety

Process hazards analysis during design phase are critical to successful facility permitting, construction, and capital investment in the long term. Risk identification, analysis, reporting are supported by consequence evaluations and active prevention & mitigation measures utilizing proven technology. SIS system design and analysis per LOPA/ Risk Graph with Exida-certified CFSE expertise. CCPS, OSHA, API, and EPA guidelines govern both on- and off-shore installations, personnel, and property.

- PSM & RMP Program Support
- Quantitative Risk Analysis
- ALARP Assessment
- Layer of Protection Analysis
- Fire & Explosion Modeling
- Flame and Gas Detection Mapping
- HAZOP & HAZID
- Incident Investigation
- Failure Modes and Effects Analysis / SIS Desing & Validation
- Process Hazard Analysis
- Offshore Safety Case Studies

Sprinkler Systems

The most common of all the fire suppression systems are wet pipe sprinkler systems. These systems have the least number of components, therefore making them a simplistic, affordable, and reliable solution. Water is the best all-around medium for extinguishing most types of fire. GSE has the experience in design as well as performing hydraulic calculations for these types of systems.

- Commercial Buildings
- Industrial Facilities
- Multi Family Residential
- Restaurants

Mass Notification

Mass notification systems are the most effective method to alert a large number of people to an emergency condition. These systems can be standalone or part of a fire alarm system. Systems can include large voice, SMS, email, computer, phone, and LED signage notification. Typical alerts include weather, fire, active shooter, process upset conditions, or various other life threatening events.

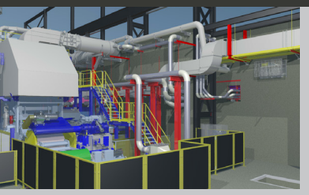
- Heavy Industrial Facilities
- Hazardous Locations
- Alternative Designs

Insurance Consulting

Insurance consultations typically consist of pre-meeting with owners and insurance companies to develop fire protection and/or life safety scope. GSE provides consulting services during insurance reviews and/or negotiation process to determine the most applicable methods for protecting a facility.

- High Rise Buildings
- Schools
- Industrial Facilities
- Military Installations
- Sporting Venues

Bilstein
Bowling Green, KY

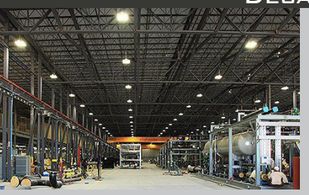


GSE provided full engineering services for Bilstein, a leading producer of high quality cold rolled steel. The new steel mill, Bilstein's first mill constructed outside of Germany, is equipped with many fire protection and life safety measures. Those measures include fire protection of steel processing vessels using hydrogen and methane under pressure and heat, detection technologies such as hazardous gas detection, LEL monitoring, and infrared detection, and suppression systems which include pre-action, deluge, wet pipe, hose stations, and fire extinguishers. Scope included fire alarm design detection, notification and interlocking. Life safety design scope consisted of Fire Department access, water supply for firefighting and code compliance for outdoor tanks with hazardous materials.

Shaw Air Force Base
Sumter, NC

GSE provided engineering design and inspection services for all life safety and passive fire protection systems throughout the project. These services included underground water supply, mass notification system fire sprinkler, standpipe systems and seismic protection. Project included Retrofitting fire protection in existing active Air Force Command Areas providing Command Support for Air Force efforts in the Middle East. Due to High Security issues, GSE provided on-site daily oversight of changes necessitated by unknown variables.

GE Facility
Decatur, AL



GSE provided fire protection design for mixing facility addition to existing manufacturing plant along with fire protection updates of interior and exterior flammable and combustible liquid storage tanks. Scope of work included tank protection, air aspirating detection, linear heat detection, fire alarm notification, foam water deluge, fire sprinkler, foam water monitor, fire hydrants, fire separation, fire proof testing and inspection.

Marquis Apartments
New Orleans, LA

This new 250-unit mixed income multi-family housing development includes three residential 5-story buildings, parking on the ground level, fitness room, swimming pool, clubhouse, playground, business office and a community/activities center with kitchen. Along with fire protection design, scope of work for this project included structural, mechanical, and electrical design. Scope of the fire protection design included active system, sprinkler, fire alarm, passive system, and life safety. The project was named by New Orleans Magazine as one of 2010's "Best Architecture" recipients.

Airbus Final Assembly Line
Mobile, AL

Partnering with The Austin Company, GSE designed Airbus's first assembly line in the Western Hemisphere. Along with fire protection design, GSE also provided structural, electrical, process and surveying. Fire Alarm design included detection, notification, HVAC smoke barrier control integration, and fire suppression supervision. Fire suppression included hose stations, wet pipe, dry pipe, fire modeling for sprinkler operation in high bay structure, and hazardous materials review and evaluation. This design was awarded Siemens Engineering Innovation Award. GSE retained a separate contract for delegated fire protection engineering which included hangar high expansion foam, fire sprinkler, and fixed foam water nozzles.

Airbus Military
Mobile, AL

Airbus Military enlisted GSE on two separate occasions to provide fire protection design. The preliminary project consisted of the addition of a 26,000 square foot hangar and office space. Exterior scope included water supply, underground utilities to building, and fire hydrants. Interior scope included fire sprinkler, high expansion foam, and hose stations for the hangar. Fire alarm system design consisted of releasing panels, detection and notification. Additional project consisted of an 8,000 square foot expansion to workshop and offices at component repair area. Scope included life safety design and modifications to sprinkler and alarm packages.

BAE Systems
Mobile, AL

GSE provided fire code compliance evaluation of all structures on this site. Upon preliminary evaluation, scope for the project included updating all non-compliant fire protection and life safety measures. Updates to fire suppression and water supply corrections, new code applications, wet and dry sprinklers, fire main and hydrant layout, fire alarm systems and egress corrections were all deemed necessary updates to the facility in order to be code compliant.

Duke Energy Nuclear Facilities
Various Locations

GSE provided clean agent, sprinkler, fire alarm systems and seismic support bracing for safety upgrades at several nuclear facilities operated by Duke Energy located in Georgia, South Carolina, North Carolina, Connecticut, Virginia, and Alabama. Built in response to new regulations by the US Nuclear Regulatory Commission in the aftermath of the Fukashima incident, the fire protection systems were installed in concrete domes designed to safely house vital equipment and remain protected against extreme weather, seismic, and blast conditions.

SERVICES

CIVIL
- Site Plan Development/Master Planning
- Paving, Grading & Drainage Design
- Stormwater Modeling
- Site Utilities
- Erosion Control/SWPPP
- SWPPP Compliance Inspections
- Roads/Transportation

SURVEY
- Boundary
- Construction Staking
- Elevation Certificate
- Roadway Layout
- Topographic
- Utilities
- Crane Alignment
- Control Surveying
- As-Builts
- Easements
- ALTA Survey
- 3D Scanning
- Laser Tracker Technology / Metrology

CONSTRUCTION SERVICES
- Environmental Permitting
- Construction Inspections
- Cost Estimating
- Program Management
- Construction Management
- Procurement

ELECTRICAL
- Medium Voltage
- Transformers
- Switch Gears
- Ductbank/Distribution
- Substation Layout
- Motors
- Grounding
- Low Voltage
- Panel boards
- MCC/Switch Boards
- Lighting
- Lightning Protection
- Data/Telecom
- Security
- Access Control
- PA Systems
- Wireless Access Points
- Fiber Optics
- Photovoltaics
- Power Studies
- Arc Flash
- Short Circuit
- OCPD Coordination

SPECIALTY
- Design-Build
- BIM
- LEED
- Fast-Track
- Site Selection

MECHANICAL
- HVAC Systems
- Plumbing
- Ventilation Systems
- Dust Collection
- Medical Gas
- Hazardous Exhaust Systems
- Paint Booths
- Fume Hoods
- Smoke Evacuation
- Stairwell Pressurization
- Clean Room Design
- Boiler System Design
- Conveyors/Material Handling
- Building Automation
- Energy Modeling

BUILDING
- General Arrangement
- Interior Design
- Life Safety

PROCESS/CHEMICAL
- Piping
- Instrumentation
- PFD
- P&ID
- Equipment Specification
- Pressure Vessels
- Stress Analysis

STRUCTURAL
- Deep Foundations
- Equipment Foundations
- Steel Framing
- Load Bearing Masonry
- Load Bearing Metal Stud
- Precast and Tilt-Up
- ICF (Insulated Concrete Forms)
- Concrete Restoration
- Forensic Analysis
- Historic Preservation
- Seismic Retrofit
- FEMA/Tornado/Wind Resistant Design
- Blast Design

FIRE PROTECTION
- Active System
- Sprinkler/Stand Pipe
- Fire Alarm
- Clean Agent
- Foam
- Passive System
- Life Safety
- Fire Ratings
- Performance Based Solutions
- Insurance/Underwriter Consultation
- Fire and Egress Modeling
- Smoke Management
- Fire Pumps/Water Supply
- Failure Analysis

ABOUT US

GSE
Gulf States Engineering, Inc.

Gulf States Engineering, Inc. (GSE) is a multidiscipline engineering firm with a wide variety of experience in heavy industrial, commercial, and government projects. GSE is an employee-owned consulting firm founded in 1998 staffing 90 highly experienced engineers and designers, most of whom have been with the company for over 10 years. The firm's staff includes planners, multi-disciplinary engineers (Structural, Civil, Mechanical, Chemical, Electrical, and Fire Protection), surveyors, and program/construction managers. GSE is headquartered in Mobile, AL and has regional offices located in Gulfport, MS and Nashville, TN.

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Licensed States

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