



Serving the Pulp & Paper industry with consulting engineering and inspection in composite materials applications for since 1976 ❖

ABOUT FSE

Fiberglass Structural Engineering, Inc. (FSE) is an internationally known consulting engineering firm specializing exclusively in the structural engineering, inspection and testing of FRP industrial equipment and piping for corrosive service. We are the largest known FRP consulting firm in North America, and have been providing integrated services to pulp and paper companies, major A/E firms, municipalities and government entities since 1976. (FSE pulp & paper Client List available upon request).

FRP in Pulp & Paper



Fiberglass Reinforced Plastic

- ❖ Storage Tanks
- ❖ Stock, Filtrate & Effluent Piping
- ❖ Upflow/Downflow Tubes and Towers
- ❖ Absorption Towers
- ❖ Process Vessels
- ❖ Filtration Tanks
- ❖ Washer Drums

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- ❖ FRP Specific Engineering Design and Specifications
 - ❖ Preventive Maintenance Inspection
 - ❖ Quality Assurance 3rd-Party Inspection for new installations

FSE CONSULTING SERVICES

FSE provides four basic service groups for FRP equipment and piping:

1. Complete Original Design Engineering, Specification and Fabrication Drawing Packages. Standard Specifications & Guidelines. Pipe System Stress Analysis.
2. Quality Assurance Inspection Services for fabrication and installation.
3. Visual and On-Line Preventive Maintenance Inspection and Evaluation.
4. Failure Investigation and Forensic Testing Services.

Through a combination of these services, FSE can function as a qualified independent design and inspection consultant - giving the Owner, A/E agent, EPC or process equipment company the ability to control critical design, fabrication and quality issues, which result in longest service life and lowest maintenance costs for FRP equipment and piping.



EQUIPMENT

Pulp mill FRP equipment for which FSE has provided Preventive Maintenance Inspection, Engineering Design, Submittal Review and Quality Assurance Inspection services include the following:

- Chlorine dioxide generators, & associated piping.
- Chlorine dioxide solution storage tanks.
- Sodium chlorate mixing and storage tanks.
- C/D and D stage reaction upflow & downflow towers.
- Washer drums, vats, exhaust hoods, gas ducting & scrubbers.
- Absorption towers.
- Spent acid and dump tanks.
- Tail gas scrubbers.
- C/D and D stage filtrate tanks.
- Stock and filtrate piping
- Effluent sewer piping

BENEFITS OF PREVENTIVE MAINTENANCE INSPECTION

The most significant benefits of qualified, regular FRP preventive maintenance inspections are the minimization of unexpected failures, and the ability to trend degradation of fiberglass equipment and piping over time so that future repair and replacement budgets can be predicted. Using the same inspection company annually is good practice, because long term familiarity with the equipment and piping is very valuable in detecting significant changes in the condition of the equipment.



REFERENCES

Please feel free to call the following pulp and paper references regarding FSE services provided:

- ♦ Russell Counts, Weyerhaeuser Company – Johnsonburg, PA (814) 965.6224
- ♦ Daniel Meadows or Woody Hern, International Paper – Texarkana, TX (903) 796.1475
- ♦ Jeff Brown, Georgia-Pacific – Corporate (404) 652.4615
- ♦ Charlie McIntyre (251) 246.8365, or Ron Pugh (251) 246.8347 Boise Cascade – Jackson, AL
- ♦ Gerry Avery, Weyerhaeuser – Grande Prairie Operations (780) 539.8068
- ♦ Harry Wilson, CanFor - Howe Sound Pulp and Paper Ltd. (604) 884.2381
- ♦ Gordon Matson, Celgar Pulp (250) 365.4121

FRP-SPECIALIZATION IS KEY TO QUALITY AND RELIABILITY



ENGINEERING

Pulp mills often consider having the EPC or equipment supplier be responsible for the design of new FRP equipment or piping. In situations like this, the manufacturing is usually subcontracted to an FRP fabricator, along with the FRP design responsibility. This approach can often lead to significant quality problems, which can easily be avoided with a true independent engineering design and specification. Compromised quality and structural integrity can result when the FRP fabricator is allowed to make engineering and manufacturing judgments, which often benefit the

fabricator. Owner control of this critical process is best-accomplished using qualified independent design and specification, such as is available through FSE.

THIRD-PARTY QUALITY ASSURANCE INSPECTION

FSE Engineering and Quality Assurance (QA) Inspection consulting services are described by the attachments in the enclosed packet. We would be pleased to provide you with a detailed scope and price proposal for original engineering design and specification, or for design submittal review services. FSE can also provide full third-party QA inspection services for the fabrication and installation of any new or modified FRP equipment and piping planned for your facility.

We would be pleased to discuss with you any upcoming capital projects or preventive maintenance inspections involving FRP in your facility. If you have any questions regarding our services or would like to request a proposal, please don't hesitate to contact FSE. We look forward to the opportunity of working with you.

FIBERGLASS STRUCTURAL ENGINEERING, INC.