

# Who Can Benefit From CSE's Analytical Modeling Capabilities?...

CSE's knowledge and experience using CFD can be used by companies of different functions in the oil and gas industry:

- Equipment Suppliers
- Oil and Gas Producers
- Transportation
- Environmental
- Safety
- Material Suppliers

## Applications...

Combustion Science & Engineering can apply its CFD and other analytical modeling capabilities to the following:

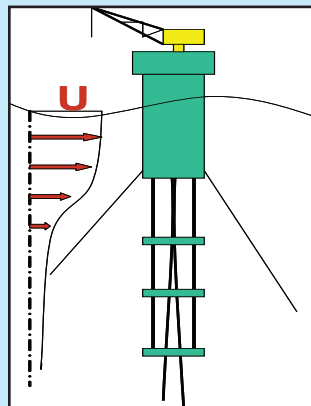
- Gas Dispersion and Fire Modeling
- Fire and Explosion Safety Analysis
- Environmental Affects
- Oil and Gas Pipe Erosion
- LNG Vaporization
- Offshore Facilities
- Fueling Stations
- Oil and Gas Refineries
- Oil Recovery Systems
- Flares
- Plant Safety
- Riser VIV & VIM
- Pollution Control
- Pollution Prediction
- Pumps
- Storage

Pipe Explosions

## Benefits...

When CSE applies its experience using CFD to issues of the oil and gas industry, benefits include:

- Extended Machine Part Life
- Fuel Savings
- Decreased Pollution Levels
- Reduced Maintenance Cost
- Reduced Shutdowns
- Higher Efficiency
- Increased Plant Safety
- More Accurate Understanding of Cause and Origin Explosions
- Reduced Pipe Erosion
- Reduced requirement for Physical Testing



*Effect of sheared current on truss spar.*



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**CFD Engineering Services**  
for the Oil and Gas Industry



## About You...

**Do you have product reliability or performance problems** that you haven't been able to solve with your current tools?

**Do you need to perform CFD modeling**, but don't have enough in-house capability or experience to perform the required analyses?

**Do you use CFD software**, but can't get the type of results you need to improve your products and understand product failures, or understand the cause/origin of fire/safety explosions?

**Do you want to improve the effectiveness of the testing** you are performing to develop your products and understand product failures?

## About Us...

**Combustion Science & Engineering, Inc. (CSE)**, a Maryland-based company, offers its domestic and international clients many years of engineering experience, utilizing a variety of CFD, chemistry and plant analysis software programs to model very complex fluid mechanics, heat transfer, combustion, and chemically reacting industrial products and processes. CSE employs engineers with Ph.D. and MS degrees in mechanical, chemical, aeronautical and fire protection engineering that have significant industrial experience using analytical tools to design and perform failure analysis on our customer's products.

## How CSE Can Help You...

CSE has extensive experience using multiple commercial CFD and plant analysis software packages for both its small business and its large corporate clients.

### CFD Solvers

STAR-CD  
CFX  
Fluent  
FDS  
AcuSolve

### Post Processing

Enight

### Miscellaneous

Cantera  
Chemkin  
Gate Cycle

### Grid Generation

ICEMCFD  
ANSA



*Storage Tank Fire*

Clients who have private, in-house CFD programs are still able to benefit from CSE's experience. In conjunction with these commercial and in-house packages, CSE has developed its own in-house tools to provide faster and more detailed results and solutions.

Successful integration of CFD into the design process is achieved through detailed, comprehensive and accurate application of this technology. CSE has developed an understanding of how to get the most out of any CFD analysis through our unique combination of industrial design experience coupled with our thorough understanding of CFD solvers and modeling technology. CSE utilizes the best available mesh generators, solvers and post processing software to generate the highest quality results and then extracts the maximum information from these results in a format easily understood and utilized by the customer.

*Spar Configuration Analysis*

