



### FACTS AT A GLANCE

**Company:** On Line Design & Engineering Ltd., England

**Website:** [www.olderdesign.co.uk](http://www.olderdesign.co.uk)

**Description:** On Line Design & Engineering Ltd., established in 1982, provides engineering and management services nationwide in the United Kingdom in Petrochemical, Oil & Gas, Pharmaceutical, and General Engineering Industries.

**Employees:** 450 +

**Industry:** Petrochemical, Oil & Gas, Pharmaceutical and General Engineering

**Country:** England

### PRODUCTS USED:

- CAESAR II®
- NozzlePRO™
- PV Elite®

### KEY BENEFITS:

- Ability to execute in-depth piping and nozzle analysis in-house.
- Fast and accurate piping analysis solution to broaden service offering.
- Trustworthy and precise piping system modeling.

## ON LINE DESIGN & ENGINEERING ENSURES COMPLIANCE WITH SITE STANDARDS AND CONTINUED PLANT OPERATION USING CAESAR II® AND NOZZLEPRO™

Engineering and management systems provider uses Intergraph® tools for in-depth nozzle and piping analysis to ensure site safety

### IDENTIFYING GOALS

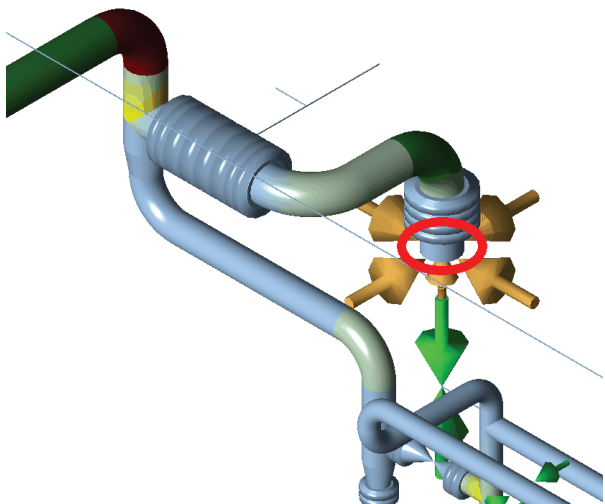


On Line Design & Engineering Ltd. provides engineering expertise to the piping and process industry and works closely with leading owner operators in the petrochemical industry. The company was employed to search for possible solutions to maintain piping system operations within a major oil refinery after fitness for service measurements revealed potential problems. During an inspection phase, a nozzle connection to a critical item of equipment (shell and tube heat exchanger) was found to be corroded. The plant owners were concerned that the remaining thickness to safely retain the fluid during operation was non-compliant with the site schedules and safety standards.

The owner operator wanted to avoid replacing the nozzle as this could be a time-consuming and potentially very costly due to the necessary system downtime. To avoid a plant outage, On Line Design & Engineering needed to implement a fitness for service solution that enabled the heat exchanger and piping to safely remain in operation.

### OVERCOMING CHALLENGES

CAESAR II was used to create a model of the entire piping system, including a connection from a tower to the heat exchanger nozzle. The main objective was to avoid any costly shutdowns and to have a better understanding of the current state of the piping system. Initial modeling and analysis combined with a site inspection proved the whole system to be very sensitive to the stiffness values of nozzle connections and certain pipe supports. The challenge was to accurately calculate the stiffnesses of critical components at and close to the nozzle. This was of most significance in calculating accurate loads and stresses.



## REALIZING RESULTS

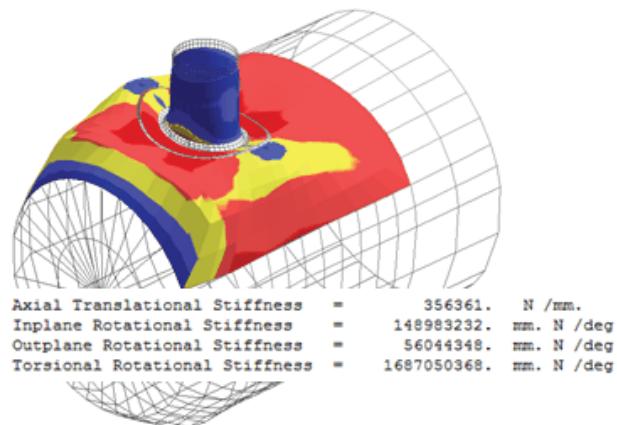
On Line Design & Engineering implemented CAESAR II for qualification of piping systems in accordance with appropriate design codes to ensure compliance with site and industry standards. NozzlePRO supplemented the solution by carrying out local finite element analysis on pipe components, included on the pipe checks.

Using CAESAR II and NozzlePRO, On Line Design & Engineering found that the piping system in question was safe since the loads produced on the equipment nozzle using the more refined and accurate model were lower than the owner operator originally believed. The analysis showed that the nozzle connection was still compliant with site and industry standards, enabling the owner operator to avoid an unnecessary nozzle exchange and an unproductive and lengthy shutdown of the system.

## MOVING FORWARD

Prior to using CAESAR II and NozzlePRO, On Line Design & Engineering outsourced such complex engineering projects to other third-party organizations because they require a high degree of accuracy and speed of analysis. Outsourcing was not only more expensive, but it also meant that control over project timescales and completion was much more difficult. It also prevented the development of engineering expertise, a vital component in selling its services.

The successful implementation of CAESAR II and NozzlePRO on this project provided On Line Design & Engineering with expertise to expand its solution offerings to similar in-depth projects in the future. The company is planning to further train its employees in Intergraph solutions and has already invested in FEATools™ to further facilitate more accurate analysis. The aim is to prevent unnecessary piping system modifications while ensuring compliance with site and national standards.



## ABOUT INTERGRAPH

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