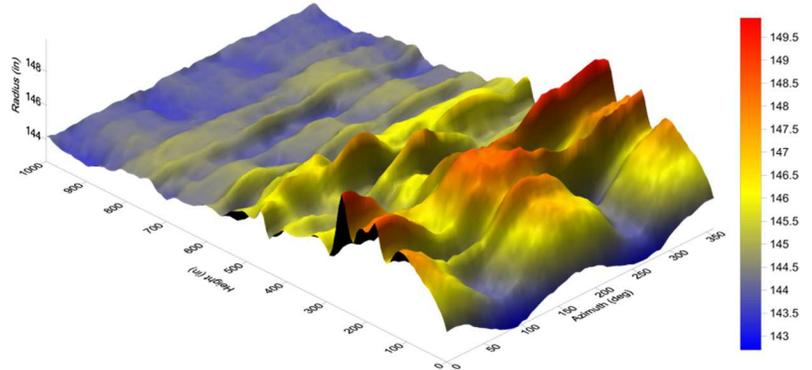


Houston Engineering Solutions (HES) is a consulting engineering company based in Houston that provides services in the areas of fitness-for-service, finite element analysis, and structural dynamics to clients around the world. The firm specializes in the analysis, assessment, repair, and life extension of coke drums.

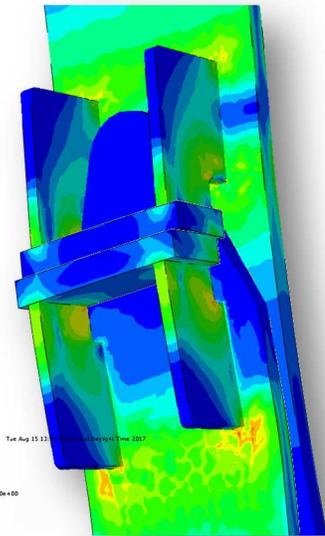
## Coke Drum Engineering Services

The assessment of coke drums is a highly-focused engineering specialty that requires a complete understanding of the design, maintenance, and operation of these unique refinery vessels. In addition, a thorough understanding of industry experience is needed to determine their fitness for continued service, their remaining economic life, their inspection requirements, and their need for long-term repairs. If long-term repairs are needed, a careful analysis is required to design a durable and cost-effective solution that does not cause undesirable distortions or unintended failures. The company's state-of-the-art coke drum services are provided to refineries and upgraders around the globe.



## Fitness-For-Service Assessment

Assessments of pressure equipment with in-service damage are high-risk engineering analyses that require specialized technical expertise, modeling experience, knowledge of applicable codes and standards, and powerful software. HES has the skills and tools necessary to perform reliable assessments to help operators make sound decisions in a timely manner.



## Finite Element Analysis

The accuracy of a finite element model is highly dependent on the characteristics of the model, such as analysis domain, material idealization, and selection of element types, shapes, and order. From an engineering standpoint, the most important factor in utilizing such models is the proper interpretation of results which requires practical experience as well as a profound understanding of theory. HES has decades of industry experience that helps design models that are both accurate and efficient for solving challenging engineering problems.

