HORIZON 2020

Automated System for Total Fouling Removal of Heat Exchangers

Informe

Información del proyecto

ShellSideJet

Identificador del acuerdo de subvención: 805767

Sitio web del proyecto 🔀

DOI 10.3030/805767

Proyecto cerrado

Fecha de la firma de la CE 7 Febrero 2018

Fecha de inicio 1 Marzo 2018 **Fecha de finalización** 29 Febrero 2020 **Financiado con arreglo a** SOCIETAL CHALLENGES - Secure, clean and efficient energy

Coste total € 1 723 387,50

Aportación de la UE € 1 206 371,25

Coordinado por TUBE TECH INTERNATIONAL LIMITED

Periodic Reporting for period 2 - ShellSideJet (Automated System for Total Fouling Removal of Heat Exchangers)

Período documentado: 2019-03-01 hasta 2020-02-29

Resumen del contexto y de los objetivos generales del proyecto

In Oil & Gas, fouling, i.e. deposition of unwanted materials on heat transfer surfaces, is a notorious problem with severe effects on refinery economics, energy efficiency and carbon footprint. The total

heat exchanger fouling costs were shown to exceed US\$4.4 billion annually for industrialised countries.

ShellSideJet is an innovative cleaning technology carefully engineered for fouling removal, enabling an unmatched 98% fouling removal. This keeps heat exchangers free from fouling; enabling considerable financial savings for the refinery operators. ShellSideJet is poised to have a tremendous impact in both economic and environmental terms. It will enable the oil refining industry to reduce operational costs by while reducing CO2 emissions by per year.

During the ShellSideJet project, we target to enhance our current system's automation capabilities, allowing our operators to deploy ShellSideJet in a robotic mode. The project is broken down into the following technical and commercial objectives:

- To optimize the system's mechanical design
- To refine the system's remote control graphical user interface
- To validate the final product in an industrial environment
- To perform market replication activities through customer trials
- To perform pre-launch operations
- To communicate the ShellSideJet system to the industry
- To finalise our commercialisation plan

Trabajo realizado desde el comienzo del proyecto hasta el final del período abarcado por el informe y los principales resultados hasta la fecha

In Period 2 we have performed and achieved the following:

- 1. Validated the final product in industrial environment
- 2. Produced application guidelines
- 3. Performed customer trials
- 4. Performed pre-launch operations
- 5. Communicated to the industry about ShellSideJet
- 6. Increased further protection of the technology

Avances que van más allá del estado de la técnica e impacto potencial esperado (incluida la repercusión socioeconómica y las implicaciones sociales más amplias del proyecto hasta la fecha)

Common fouling removal practice includes taking the heat exchangers off-line and removing the tube bundle from the shell to clean the tubes. Fouling removal techniques are broadly classified in two categories, chemical and mechanical cleaning. Chemical cleaning is attempts to dissolve the fouling deposits by means of a chemical reaction with a specially engineered cleaning fluid. The potential for corrosion damage to the tubes themselves, the need for special handling of hazardous chemicals and the use of a complex procedure greatly limit the application of chemical cleaning techniques to 2%-5%

of worldwide heat exchangers. Mechanical cleaning is the most widespread technique employed by the industry. In this approach, the deposits are removed by means of high-pressure water and steam deployed by lances and water guns. Currently, most of the global cleaning, revert to hand held water jet cleaning systems where human operators handle a water gun that blasts water at a pressure of 10,000 psi and volumes of 10 gallons per minute. This kind of manual water jetting involves a high number of injuries (the pressure required to penetrate the surface of the skin is just 100 psi two orders of magnitude less than the industry standard for cleaning).

In an attempt to enhance the safety levels of the water blast cleaning personnel, a number of automated bundle blasting systems have emerged. These systems are remotely operated so that the personnel can stay at a safe distance from the water jet. These systems are highly expensive, and they are still limited with respect to fouling removal.

Available water blasting systems can only remove fouling from the external part of the bundle leaving the internal part of the shell uncleaned achieving a maximum of 50% clean. In contrast with state-of-the-art systems that blast water from the outside of the bundle, ShellSideJet is able to clean deep inside the exchanger.

During ShellSideJet, we target to enhance our current system's automation capabilities, allowing our operators to deploy ShellJeTT in a robotic mode. ShellSideJet is poised to have a tremendous impact in both economic and environmental terms; it will enable the oil refining industry to reduce operational costs by \$2.46bn per year while reducing CO2 emissions by thousands of tonnes per year. Over a 5-year period after ShellSideJet's market launch we aim to increase our revenue and generate jobs. In Period 2, we have successfully validated ShellSideJet and demonstrated the system to industry.



ShellSideJet Logo

Última actualización: 11 Agosto 2020

Permalink: https://cordis.europa.eu/project/id/805767/reporting/es