New GOP Flare Package for Kuwait Petroleum Europoort

In March 2013, Escher Process Modules (Escher) received the order for the GOP Flare replacement for Kuwait Petroleum Europoort (KPE). The GOP Flare is part of the Q8 refinery in the Europoort Area in Rotterdam. The flare replacement was scheduled to be finished before the Turn Around (TA) that KPE started in October 2013. This means that the scheduling of the project was critical and required a joint effort by KPE (as the end user), Jacobs (as the EPC contractor) and Escher to complete the project and start-up the new flare before the Turn Around.

A flare system as described in this article consists of a flare stack and a flare tip with pipes that feed gas to the stack. Flaring is a controlled way of burning excess refinery gas in the oil & gas exploration, production and processing. Escher designed, fabricated and delivered the flare stack and flare tip for this system.

Overview

The new GOP flare had to replace the existing flare on the KPE refinery. To minimise the building time, Escher was requested to install the flare on the existing water seal drum and make use of the original foundations where possible. In addition to the design and delivery of the flare, Escher was also responsible for the installation work on site, including the strict HSE requirements that apply to a petrochemical location.

The design of the flare package included the following items:

- Total height of 90 meters, supported by a total of 12 guy wires divided into four levels.
- A 48" diameter flare stack constructed of low temperature carbon steel, with internal and external thermal sprayed aluminum (TSA) coating.
- A new flare tip constructed of Inconel 625 to withstand the high temperatures during the design life of the tip.
- Steam-assisted design for the flare tip to guarantee smokeless combustion.
- Compliance with the latest Eurocodes.
- Ladders and platforms.
- Inspection of existing facilities (water seal drum and foundations) to ensure they could withstand the loads of the new flare.

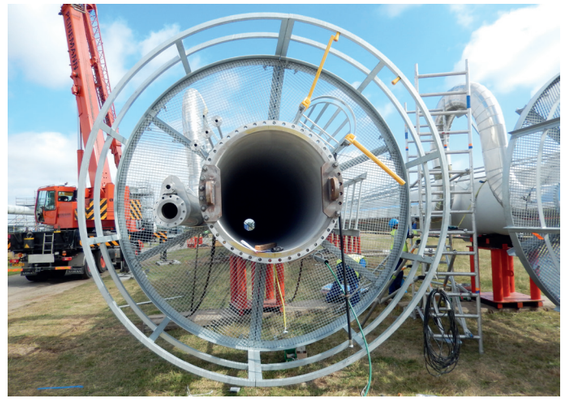
Design

Escher completed the structural design of the flare stack together with Iv-Consult. To minimise the time required on site for the flare's installation, this design was optimised for constructability. The stack was designed for maximum construction in the workshop. This meant that no welding or other "hot" work would be required on site, which has a positive impact on the safety risks of the work and the quality of the fabrication. Prior to the actual installation, the flare stack would be completely assembled in two sections. All assembly works for the stack sections were done on the ground with the stack in a horizontal position. By doing this, the work at height was minimised, which further reduced the safety risks. And finally, all bolted connections that had to be completed at high levels were accessible from platforms. As a result, no work from a lifted platform or with rope access was required.

For the flare tip, Escher designed a steam-assisted flare tip with over 60 steam nozzles. The tip was also equipped with three pilot burners. These burners will be ignited by Flame Front Generation, from the existing FFG panel that was being revamped by KPE.

Installation

On the 23rd of August, all parts of the new Flare Stack were delivered on site and the assembly of the stack sections started. In parallel the works on the existing piping started to connect the new gas and steam lines. The stack sections were completed 1.5 weeks later and on the 2nd of September the first section of the flare was lifted and installed, with the second section and the tip following on the 4th of September. The installation was executed without any problem and the heavy lifting activities were reduced to only three days.



Assembly of the stack sections

After an additional week required for installation of the piping, cabling and a new platform at the base of the stack, the flare was handed to KPE and Jacobs for a final inspection. After that, the ignition of the new flare from the existing ignition panel was successfully tested and the flare was ready for operation.

Lifting of the first section of the stack

Koen de Lange
Project Manager, Escher Process Modules