THE CHALLENGE

Cooling in cogeneration plays a key role, as in this type of plant, the heat contained in the engine exhaust fumes is recovered in a recovery boiler, producing steam which is used in a steam turbine to produce more energy.

The high-temperature cooling circuit of the engine is recovered in heat exchangers, and the recovered heat is used directly in the industry associated with the CHP plant.

Installing a new condensing steam turbine is the expansion centrepiece of a cogeneration plant in Cartagena de Indias, in which a new cooling system is key to this ambitious project.

The expansion of the CHP plant is based on the use of surplus thermal capacity to produce steam at right conditions and to install a new condensing steam turbine producing 2.5 MWe. The recovery boilers or HRSG send superheated steam to the turbine where it expands and reaches condensation.

The cooling tower must dissipate heat from the following circuits/equipment:

- Steam turbine condenser.
- Steam turbine closed cooling circuit.

The cooling equipment and its circuits operate continuously under process conditions that change according to climatic conditions and steam demand. In addition, electricity consumption is optimised, noise impact is minimised and anti-corrosion materials are used, as the plant is located close to the sea.

SOLUTION

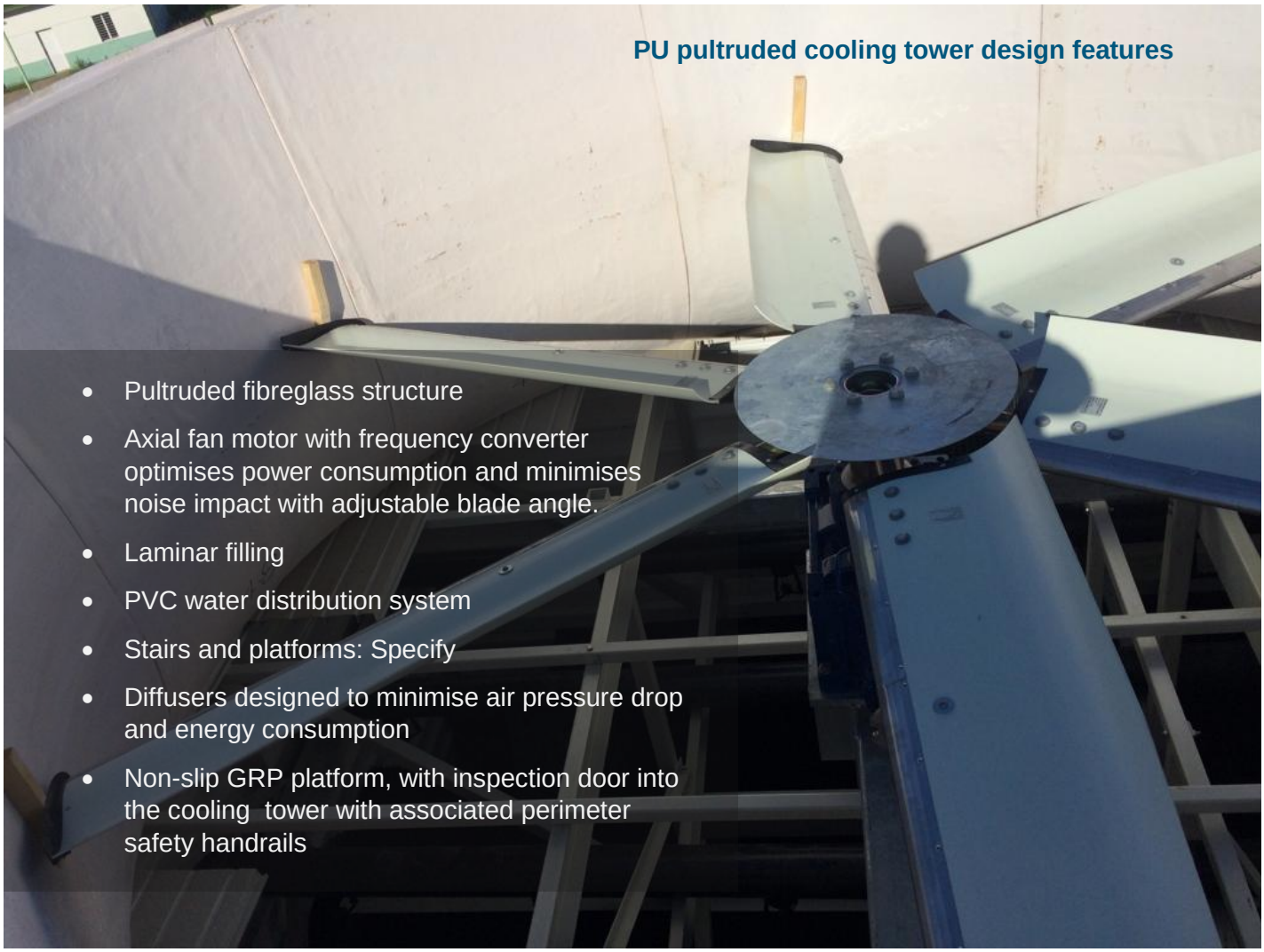
In conjunction with the engineering company carrying out the plant expansion project, TORRAVAL designed and supplied an evaporative cooling tower. The field erected cooling tower is a counter-flow induced draught unit, consisting of a single cell, with capacity to be extended according to plant's needs.

RESULT

Requirements set out lead to the design of a cooling tower model PU. This cooling equipment is based on pultruded FRP profiles.

Air is extracted in counterflow to water to be cooled which drips through laminar filling inside the cooling tower. This water enters through the main piping, flows through distribution pipes until it reaches the atomisers, where it is evenly distributed in form of small droplets over the fill. From there, water is cooled and precipitates into the water collection pool of the cooling equipment.

El aire se extrae en contracorriente hacia el agua a enfriar que gotea por el relleno laminar de la torre de refrigeración. Este agua entra por la tubería principal, fluye a través de las tuberías de distribución hasta llegar a los pulverizadores, donde se distribuye uniformemente en forma de pequeñas gotas sobre el relleno. Desde allí, el agua va enfriándose y gotea hacia la piscina de recogida de agua del equipo de enfriamiento.



PU pultruded cooling tower design features

- Pultruded fibreglass structure
- Axial fan motor with frequency converter optimises power consumption and minimises noise impact with adjustable blade angle.
- Laminar filling
- PVC water distribution system
- Stairs and platforms: Specify
- Diffusers designed to minimise air pressure drop and energy consumption
- Non-slip GRP platform, with inspection door into the cooling tower with associated perimeter safety handrails

ADVANTAGES FOR CUSTOMER

- Anticorrosive materials guaranteeing equipment durability.
- Secure access to all internal components
- Ease in maintenance and cleaning tasks
- Optimised energy consumption

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