

Anti-Corrosion coatings in a ships hold

Rotterdam

10th - 12th October 2006

The marine environment is one of the harshest sectors for the coatings industry. Salt water corrodes steel at an alarming rate if not properly protected, as a ships hull is generally at the same temperature as the water it floats in, condensation will gather on the cold surfaces when tanks are empty.

Keeping control of the corrosion is a constant battle, one tried & tested method of protecting the steel is to paint it. This prevents both sea water & tank contents from contact with the steel, thereby reducing the potential for corrosion



The "Discovery" ready to sail

The problem

Air always contains a percentage of humidity (water locked within). This percentage can be as low as 20% or as high as 99.99%.

The ships hull is generally the same temperature as the water, and is always much colder than the outside air. The humidity in the air condenses on the cold surfaces of the ships hold and condensation forms.

The presence of moisture on the steel prevents the protective layers of paint from adhering correctly and means the painted surface will fail inspection and often leads to de-bonding at some point in the coatings lifetime. The ships steel holds need to be dried prior to painting or a minimum temperature required for material application. Current traditional methods are slow, expensive and cumbersome, Dryair offers a cost & time effective alternative, with minimum plant and deck space required.

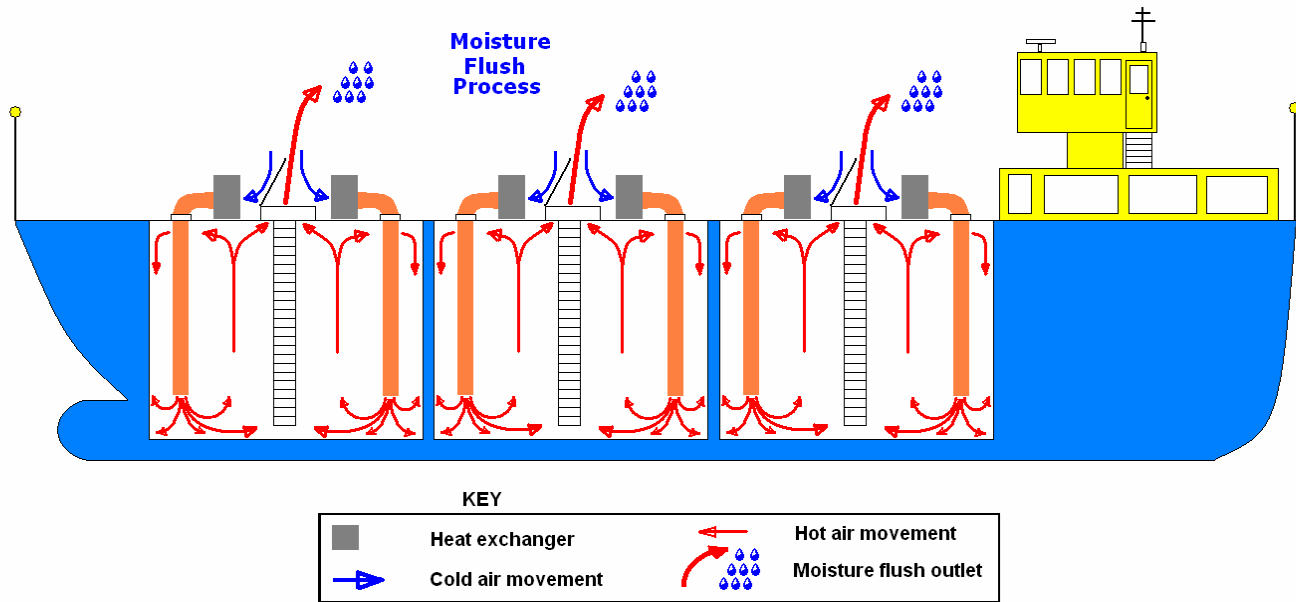
The Solution

A system is needed that can rapidly dry the wet steel and prevent condensation from re-forming whilst allowing comfortable conditions for the contractor to work in.

The Dryair "moisture flush" system fulfils those requirements.

The Dryair unit can be mobile or can be lifted onto a deck with a light crane.

Once in position the Dryair 180-EU unit can power six 25 kw heat exchangers each producing 1500 m³ of hot dry air every hour.



Each Dryair heat exchanger pushes 1500 m³ of hot dry air into the hold creating a positive pressure. The positive pressure ensures that no cold humid air may enter the hold. The hot air has an enormous capacity to hold water, fully circulating continually around the hold, absorbing the condensation off all the surfaces and raising the temperature to 2 °C above dew-point (the temperature which condenses moisture out of the air). As the air gathers up free moisture it rises with natural & driven convection vertically, venting from the hold on a continuing basis, the Dryair system will also provide fixed or varying temperatures if so required.



A PHE 25 heat exchanger creating heat & positive pressure

The Dryair trailer arrived in Rotterdam on the morning of the 10th October. It took less than an hour to deploy the heat exchanging equipment into two wet holds. Each hold contained 400m³ of wet air. One Dryair heat exchanger was used per hold, as each exchanger generates 1500 m³ of hot dry air, the air in the hold was replenished 3.75 times every hour. A remote management system (RMS) was used to control the hot air.

The RMS has two remote **sensors**, each one sensing the temperature & humidity (RH) of the air in the hold. One sensor was placed near a top corner of the hold whilst the other was placed near a lower corner to gain a mean average of the air's condition.

After ten minutes of heat, readings were taken. At this point we had gained control of the humidity and had reduced the RH from 80% down to 40%. (existing systems are taking a whole day to achieve this)

Over the next hour we reduced the RH to 20% and raised the temperature of the steel from 6 °C to 16 °C, two degrees above dew-point. This ensured that further condensation could not take place.

The RMS system was programmed to maintain the RH at 35%, this allowed a comfortable environment for the painters to work in and ensured the paint would cure quickly and evenly.

At 12 o'clock, inspectors found a minor problem with a previously painted ship which was due to sail at 5 o'clock. The protective coating in two of the holds was found to be below specified requirements. Therefore it would need to be repainted before the ship could sail and the holds used for commercial gain.

The holds were soaking wet and had 10 mm of standing water in the bottoms. To re-paint would involve drying, and drying using traditional equipment was not an option as this would take three days and would have a major knock on cost to the contractor

Dryair was asked to provide a **solution**.



The "Julia Sara" nearing completion

Two heat exchangers were positioned on this ship, each one ducting air into the holds from above. As on the previous ship, RMS probes were placed at two points in the hold.

After one hour, the RH had been reduced to below 60%, the top of the holds had dried and the defective areas were ready for re-coating.

At 4 o'clock the holds had been painted, the Dryair system had accelerated the paints curing process and could now be removed.

At 5 o'clock the job had been completed, all equipment had been removed and the ship slipped from its mooring on time.

There was no additional cost to the coating company and there was no loss of earnings for the ship operator. All parties agreed, a job well done, in record time, with major costs savings for all concerned.

The previous system used by the contractor took a full team all day to install and required very expensive lifting equipment, couple this with the time and energy savings (which were extremely large to say the least). It took up large amounts of deck space and had to be removed by cranes and a full team of men (see testimonial by Harry Cornet of Cornet services on the next page.)

Testimonials from:-

Harry Cornet of Cornet Marietieme Coatings BV,
Werkendam, The Netherlands, Tel 00 31 65340 3481

Eddie Roos of RZB Holdings BV,
Rotterdam, Tel. 00 31 6536 31441.

Dutch

Test naar behoren uitgevoerd.

Luchtvochtigheid was snel op peil.

Kosten laag.

Vooraf bij Julia Sara omdat deze tank echt nat was.

Binnen enkele uren was de tank droog.

Hopende u hiermede van voldoende info te hebben voorzien.

Mvrg Harry Cornet
Cornet Marietieme Coatings BV

English

Tests performed to satisfaction

Required air Humidity was reached quickly

Costs were low.

Especially on the Julia Sara because that tank was really wet.

Within hours the tank was dry.

Trust to have been of service herewith