Getting the buy-in of all port users

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BIOGRAPHY

With a Master's degree in Biology and a Master's degree in Environmental Sciences from the University of Lund, Petra König has worked with environmental issues for nearly 20 years. At first within the municipal realm to later, take the role as a consultant at Atkins and at WSP. Today she is the environmental manager at Copenhagen Malmö Port.

Petra's work has included several EU-funded projects, implementing environmental management systems, obtaining environmental permits and developing environmentally sound strategies for different types of organizations. At present, she's also working with establishing an industrial symbiosis in Malmö's harbor area.

PAPER

Port reception facility (PRF) for waste water in the Port of Copenhagen

The Port of Copenhagen is the largest cruise port in Northern Europe. It's the home port for a majority of cruise lines. The port has four quays for cruise ships and can accommodate up to 10 cruise ships simultaneously.

Fig 1. The four quays for cruise ships in the Port of Copenhagen

The cruise figures for Copenhagen have steadily increased through the years and an increasing percentage of the cruise ships choose to deposit waste water when calling on the port.

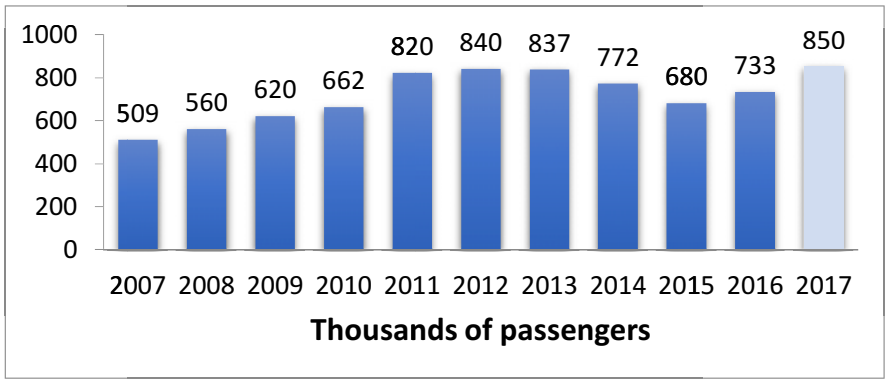

Fig 2. The number of passengers aboard cruise ships calling on Port of Copenhagen during the years 2007-2017.

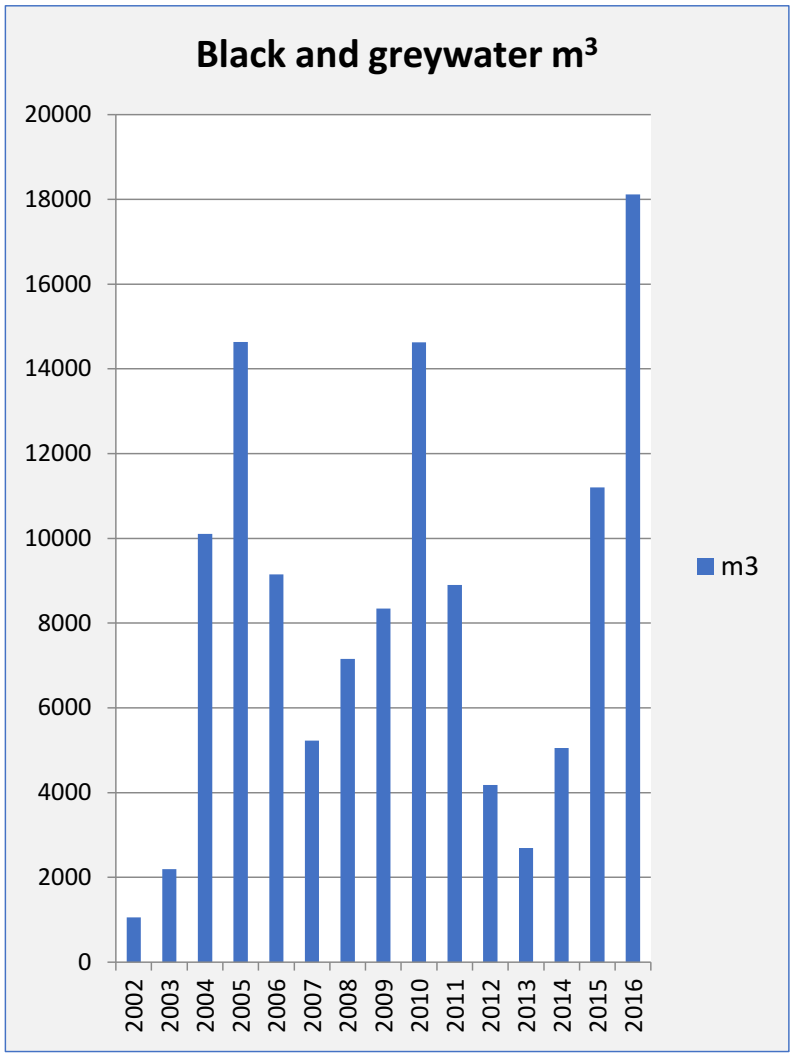

Fig 3. The amounts of waste water received (m3) in the Port of Copenhagen.

Although there is a certain fluctuation, 2016 can be considered a signal of what is to come. It coincides with CLIA's recommendations and we have no reason to believe that the trend will change.

Tab 1. Percentage of cruise ships that chose to use the Port of Copenhagen's facilities.

Year	M^3 per ship	Number of discharges	Number of cruise calls	% who used facilities
2010	378	38	308	12
2011	297	30	370	8
2012	189	22	375	6
-	-	-	-	-
2016	199	91	309	28

Three of the port's quays are older and there's at present no room for on site sewage facilities. Trucks are therefore used. Oceankaj however, was inaugurated in 2014 and the design of Oceankaj was customized with a reception facility for waste water.

When looking at the figures for Oceankaj alone, the trend is obvious again, more and more cruise ships use our facilities and the total volume of black and grey water is increasing. The volume has gone from 1.400 m3 to 10.743 m^3 in three years.

Oceankaj 2014	Oceankaj 2015	Oceankaj 2016
109 cruise calls	164 cruise calls	120 cruise calls
5 discharges (1.400 m^3)	15 discharges (7.200 m^3)	48 discharges (10.742 m^3)

The cruise ships pump waste water to the tank in the quay. In general approximately 100 m^3 per hour. The system can manage three cruise ships simultaneously. The capacity is up to 900 m^3/hour.

Fig 4. Cruise ship using port reception facility for waste water at Oceankaj in the Port of Copenhagen.

In the quay there are also tanks for collecting storm water. The water is used to flush the system once the cruise ship has stopped pumping.

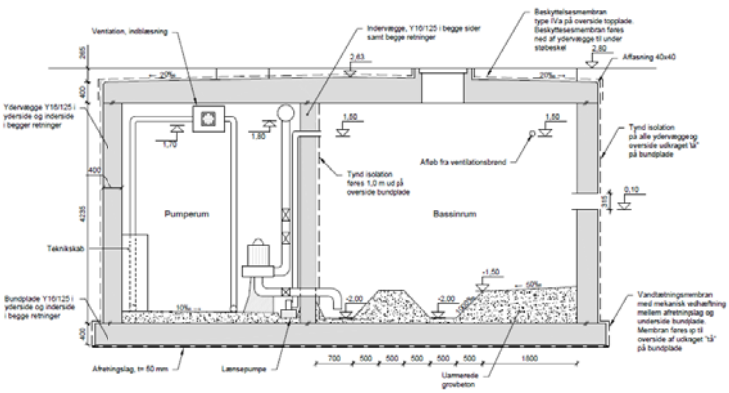

Fig 5. Underground tanks in the quay used for collecting storm water.

The reception facility in the quay Oceankaj is connected to the municipal sewage plant by a pipeline.

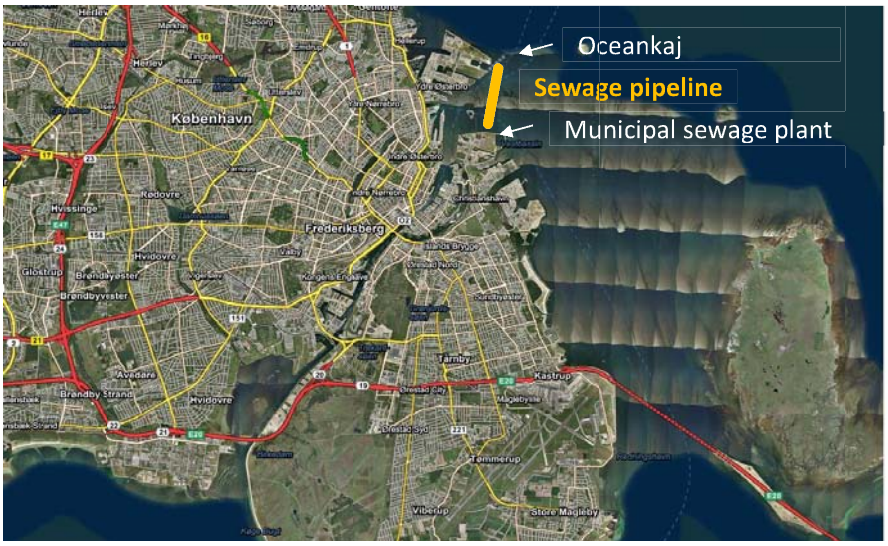

Fig 6. Pipeline connecting Oceankaj and the municipal sewage treatment plant.