TBT CLEAN - Development of an integrated approach for the removal of tributyltin (TBT) from waterways and harbours: prevention, treatment and reuse of TBT contaminated sediments
LIFE02 ENV/B/000341

Project description

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Project description:

Background

Tributyltin (TBT) is an aggressive biocide that has been used in anti-fouling ship paints since the 1970s. The toxicity of TBT prevents the growth of algae, barnacles and other marine organisms on ship hulls. However, TBT leaches from the paint and enters the marine environment. TBT accumulates in sediments, especially in areas with a high density of ship movements such as harbours and ports. From 1 January 2003, the use of TBT in anti-fouling systems on ships was banned, following a decision taken by the International Maritime Organisation (IMO) and Commission Directive 2002/62/EC of 9 July 2002 on organostannic compounds. In order to prevent desorption from sediments reintroducing TBT into the marine environment, effective removal and treatment methods for TBT contaminated sediments need to be implemented. This project aims at demonstrating an integrated approach to eliminating TBT from the marine environment that includes prevention, removal, treatment and finally reuse.

Objectives

The overall objectives of the project was to provide an integrated solution for the permanent removal of TBT from waterways near harbours and inland ship repair yards. Specific objectives included the following: • assess the environmental impact of TBT alternatives already available; • evaluate TBT release from
sediments to aquatic environments during dredging operations; • test on a
pilot-scale several treatment technologies for TBT contaminated sediments; •
identify possibilities for reuse of treated sediments. The following specific
results were obtained: • a list of environmentally friendly alternatives to TBT in
anti-fouling systems; • the presentation of dredging conditions minimizing TBT
release from sediments; • an integrated treatment technology for TBT
contaminated sediments, according to the BATNEEC principle; • re-use
possibilities for treated sediments.

Results

Comprehensive evaluation was provided regarding the different existing
alternatives for anti-fouling paints containing TBT. For each of these alternatives
the environmental impact is discussed. This evaluation showed that
environmental friendly anti-fouling paints exist and are under development.
Another conclusion of the TBT Clean Project is that the extent of TBT release
during dredging activities is mainly determined by local harbour conditions (pH,
T° and salinity). Environmental conditions during dredging are more important
than the dredging technique. Therefore, dredging of highly-contaminated
sediments in the Port of Antwerp should be performed during winter time and
when pH of the water is below 8.0. A new dredging time schedule now
dramatically diminishes TBT release in the docks. A recommendation could be
given to other ports that dredging activities in areas with high TBT
concentrations be limited to certain periods. The reference scenario in Flanders
and many other (European) regions for dredged TBT contaminated sediments is
de-watering and dumping in landfills, which cannot be seen as a sustainable
solution. The evaluation of the different treatment techniques and the
cost-benefit analysis showed that there exist other environmental friendly
alternatives that are able to cope with the TBT contamination. Especially,
bio-remediation and thermal treatment are seen as promising techniques. Given
that there was no standard for the re-use or application of sediment on land,
geo-technical and chemical requirements were developed. Chemical criteria were
developed by VITO, the Flemish Institute for Technological Research, in
accordance with Flemish legislation on re-use of soil and treated mineral waste
for construction purposes. The study can be considered as a general framework
to be used to quantify effects on organisms, health, and environment. This basis
document can also be used to fix limits and standards for reuse of sediments in
different conditions. For the port authorities, this is a good framework for
discussion with Flemish authorities. It could also serve as a base for development
of a European regulatory framework for quality assessment as regards
organization in sediments with respect to their reuse on land. Following an
ex-post follow-up report carried out by the LIFE external monitoring team in
March 2005, it was learnt that the Port Authority has decided to undertake
further study into building a mechanical water extraction installation at an
estimated cost of EUR 65 million. The installation, Amoras, from the Dutch for
‘Antwerp mechanical water extraction and sludge recycling and utilisation’,
should be operational by the end of 2008. The project for mechanical
de-watering of dredged material is carried out in consultation with the Flemish
Government. When evaluating suitable treatment techniques, the outcome of the
TBT Clean project will be taken into consideration. If legislation will allow
recycled sediments to be reused for dykes, then prospects will be very
encouraging for the Port of Antwerp considering the limited number, cost and size of dumping sites in Antwerp.

Environmental issues addressed:

Themes

Risk management - Site rehabilitation - Decontamination
Services & Commerce - Transportation - Storage
Habitats - Marine

Keywords

marine pollution, harbour, decontamination

Natura 2000 sites

Not applicable

Beneficiaries:

Coordinator
Type of organisation
Description

Gemeentelijk Havenbedrijf Antwerpen
Local authority
Second only to Rotterdam in Europe, the Port of Antwerp is one of the world's largest ports with some 16,000 ships calling each year. The port has a surface area of over 13,000 hectares, to the north of Antwerp city centre. There are 150 km of berths, about half of which are suitable for deep draught ships.

Partners

DEME Environmental Contractors (DEC) n.v.
Environmental Research Center (ERC) n.v.
Envisan n.v. APEC - Antwerp Port Consultancy n.v.
### Administrative data:

- **Project reference**: LIFE02 ENV/B/000341
- **Duration**: 01-OCT-2002 to 01-JAN -2005
- **Total budget**: 3,222,366.09 €
- **EU contribution**: 1,335,495.00 €
- **Project location**: Vlaams Gewest(België - Belgique)

### Read more:

- **CD-ROM**
  - Title: "TBT Clean - The Integrated Approach"
- **Project web site**
  - [Website of the project](#)
- **Publication: Layman report**
  - Title: "Development of an integrated approach for the removal of tributyltin (TBT) from waterways and harbors: Prevention, treatment and reuse of TBT contaminated sediments"
  - Year: 2004
  - No of pages: 10

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