

## Chairman's foreword and report on the 27th and 28th EMSAGG Advisory Group meeting held in Istanbul, Turkey and London, UK

At the 28th EMSAGG Advisory Group meeting in London it was decided to re-issue the latest Bulletin to provide an update on the conference and a summary of the London Gateway seminar. As this was the focus of the discussion during the meeting and for the activities over the next year.

The conference will be held in Ostende on 20–21 June 2012. EMSAGG welcomes the submission of abstracts from colleagues interested in presenting at the conference. We are also looking for sponsorship for the conference and further detail on the packages available can be found on the website:

[www.ciria.com/emsagg/conference\\_2012.htm](http://www.ciria.com/emsagg/conference_2012.htm)

The previous EMSAGG Advisory Group meeting was held at Bogazici University in Istanbul, Turkey on 12 May 2011. The day saw a busy agenda with discussions of the 2011 autumn EMSAGG Learning Seminar and also of the next EMSAGG Conference.

EMSAGG has had two interesting learning seminars that saw exciting programmes with presentations offered by EMSAGG members and also from several guest speakers. In this bulletin, we have included the key points from both days.

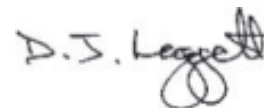
### In this issue:

- EMSAGG 2012 Conference, the crossroads for new marine sand and gravel developments
- EMSAGG autumn 2011 Learning Seminar, London Gateway
- EMSAGG spring 2011 Learning Seminar, Turkish Chamber of Shipping, Istanbul
- European Marine Observation and Data Network (EMODNET), Cees Laban
- CIRIA update: C584 *Coastal and marine environmental site guide*
- EMSAGG membership opportunity.

I would like to thank the speakers for their contributions and also Istanbul Dredgers Cooperative and the Turkish Chamber of Shipping for hosting the Turkish seminar and London Gateway for hosting the September seminar.

I hope you will find the articles included of interest. If you have any ideas for articles and/or questions, please contact the EMSAGG secretariat on email:

[emsagg@ciria.org](mailto:emsagg@ciria.org)



**Daniel Leggett**

Chairman, EMSAGG



## EMSAGG 2012 Conference, the crossroads for new marine sand and gravel developments 20–21 June 2012, Ostende, Belgium

The 4th EMSAGG conference will take place on 20–21 June 2012 at Thermae Palace, Ostende, Belgium. The conference builds on the success of the three previous conferences delivered by EMSAGG. The last conference was held in Rome in 2009 and attracted delegates from across Europe including Belgium, Netherlands, France, Germany, Italy, Turkey and the United Kingdom.

EMSAGG has facilitated information and knowledge sharing in the industry since 1998. It identifies and disseminates developments and information that is needed and enables wider interest groups to participate in knowledge sharing and discussion of these issues. The benefits of being involved include the improved communication and understanding of the latest developments and issues in the industry as well as opportunities to network with influential policy and decision makers.

We are particularly looking for abstracts that provide an overview of what is occurring across Europe especially relating to the themes highlighted here:

**Day 1** of the conference will include an exciting program with presentations delivered by leading international experts. We are inviting abstracts to cover the current themes for day:

- new topics and information in marine sand and gravel
- legislation and planning
- demand and supply
- supporting data across Europe marine, sand and gravel planning
- acceptance of use of different forms
- innovations in treatment
- areas of sea level rise – the consequences and implementation.

**Day 2** will include a tour around Ostende to three different sites.

### Call for abstracts

EMSAGG welcomes the submission of abstracts from colleagues interested in presenting at the conference. The abstracts should reflect the listed themes and be about 200 words. From the submitted abstracts, the Conference steering group will select a number of entries and then notify the authors to provide a one page summary paper (around 500 words) and presentation.

### Key dates

- submission of abstract by authors, Friday 11 November 2011
- notification of acceptance, Wednesday 21 December 2011
- submission of full paper, Friday 16 March 2012

To download the template please click [here](#).

We look forward to receiving your abstracts. Should you have any questions about the above, require related information or to submit your abstract please contact Louise Clarke on: +44 (0) 20 7549 3300 or email: [louise.clarke@ciria.org](mailto:louise.clarke@ciria.org)

### Sponsorship

Sponsorship packages have been developed providing different benefits depending on the level of contribution. In addition, there are other opportunities for promotion and marketing at the event – details are provided in the sponsorship pack ([click here to download](#)).

Sponsorship of EMSAGG conference will provide opportunities to:

- demonstrate your commitment in marine sand and gravel developments
- position your organisation at the forefront in marine sand and gravel developments
- showcase and demonstrate your work to delegates across the industry
- raise your organisation's profile in the industry through brand recognition
- network and influence key decision and policy makers
- engage with delegates to develop and build contacts
- obtain free tickets to the conference, reception and site visit.

For further information on the sponsorship opportunities please [click here](#). For additional information or any queries, please contact Louise Clarke on: +44 (0) 20 7549 3300 or email: [louise.clarke@ciria.org](mailto:louise.clarke@ciria.org) or Nipa Patel: [nipa.patel@ciria.org](mailto:nipa.patel@ciria.org)

### Target audience for the conference

The conference aims to draw together stakeholders from across the industry including:

- dredging organisations
- European Government departments and agencies
- regulators
- economists

- resource planners
- environmental bodies
- academic as well as research bodies.

## EMSAGG Learning Seminar and site visit: London Gateway, 1 September 2011

### Gillian Waddams, CIRIA, gives a summary of the seminar

Louise Clarke, CIRIA, provided an overview of the EMSAGG network including the aims of the organisation and benefits of membership. There was a reminder about the call for papers for the conference in June 2012. Louise then introduced the seminar speakers.

All speakers covered wide ranging aspects of the development including the environmental precautions being put in place, each presentation in summarised here.



Figure 1 Dredged hydraulic fill

### Welcome by Simon Moore, the London Gateway

Simon Moore, gave an introduction to the project and addressed key points such as why the project is being undertaken and how the site was selected. The project, being undertaken by DP World, will create 36 000 jobs once the site is complete and will earn the UK up to £3bn.

Currently in the UK the locations of key population centres do not correlate to the distribution centres. The locations of the distribution centres was highlighted on the map and none exist within Greater London. London Gateway will address this by location the distribution centre next to the port bringing goods closer to customers.

The planned distribution centre is an important feature of the project and it is intended to make the distribution of goods around the UK more efficient. The port's location and the construction of the railway will enable up to 140 000 tonnes of CO<sub>2</sub> to be taken off London's roads as well as reducing congestion and wear and tear on the roads caused by lorries.

Dredging is being carried out 100 km into the North Sea. The channel is being dredged to ensure that the largest ships which are in use today can be accommodated at London Gateway.

During the work 300 000 animals have been translocated to nearby areas including a local farm. A video was then played explaining the development in more detail.

### An overview of the engineering of the London Gateway project, David Lind, London Gateway

David Lind, the Marine Manager of London Gateway built on the previous talk by describing further aspects of the project. These include the fact that the site is larger than the City of London and will accommodate 8 rail sidings to allow goods to be moved from the distribution warehouses to retail centres.

Access to the port is tidal but there is a large tidal window so there will only be short periods at low tide when larger ships cannot visit the port. David explained that there are several monitoring buoys at different locations along the channel. The results are reviewed by Dredging International, the Environment Agency, Natural England, CEFAS and other regulators.

Archaeology is another factor being considered during construction. There are a number of shipwrecks in the area. Some have been removed by the Port of London Authority (PLA) while others are protected by an Archaeological Exclusion Zone.

Large quantities of the dredged material is being reused on site, as approved by the Environment Agency. It was also noted that some is being sold.

Extensive environmental modelling and monitoring has been carried out as described in the presentations given by John Baugh and David Middlemiss, HR Wallingford, Richard Newell and Lindsay Seiderer Marine Ecological Surveys and Daniel Leggett Dredging International UK.

Although the development has destroyed an area of mudflat this is mitigated by the creation of another mudflat twice the area of the original. The target is to attract up to 8000 wading birds to this new mudflat. The new mud flat already has fish present and will start to attract birds. Great Crested Newt habitat has been created as well as wildlife corridors to link habitats and tunnels under roads for wildlife access.

The site is protected from flooding up to 10 m, and the building platforms for the distribution warehouses will be raised by 2 m to provide additional flood protection.

The channel is self scouring so very little maintenance dredging will be required, this helps to keep the flood risk low.



Figure 2 *Vibro compaction machine*

### Set up and modelling work for the London Gateway project, John Baugh, HR Wallingford

John Baugh discussed the modelling in detail. LiDAR monitoring is currently underway to see whether the predicted effects have been reflected in reality. So far the monitoring shows that the modelling has been accurate though perhaps some are slightly over estimates.

During the presentation John showed that most of the dredging was being completed in the Yantlet channel and then in small designated areas in the North Sea. The scope of the investigations includes baseline studies, prediction of effect of scheme and amelioration.

Dredging releases fines into the river ecosystem. The predicted areas of accretion have been modelled and were shown in John's presentation slides.

John provided a summary of the long-term change explaining that the main area of change is predicted to be Mucking Flats – over a period of 7–12 years and up to 1 m of accretion will occur. It was also noted that:

- growth of Blyth Sands is predicted to reduce from 7.2ha/year to 5.8ha/year after completion of the port
- no significant changes to the morphology of intertidal areas are predicted elsewhere
- increased accumulation in the subtidal area at the mouth of Holehaven Creek is predicted.

A monitoring programme has been agreed.

### Monitoring and protection of marine resources, Richard Newell, Richard Newell Associates and Dr Lindsay Seiderer, Marine Ecological Surveys Ltd

Richard Newell focussed on the wildlife monitoring programme in his presentation. A key point was that as there is so much annual and seasonal variation within the Thames Estuary any monitoring must be over a long-term period to provide meaningful results.

Usually there is a low level of food available for birds in winter so the extra mudflat habitat mentioned by David Lind will be highly beneficial to birds.

The Environmental Advisory Group for the London Gateway project meets regularly to hear reports from DP World on all species and habitats present around the development.

The biological resources of the lower Thames estuary are very rich both in numbers (biomass) and biodiversity. They essentially comprise two main components:

- the fish and surface dwelling animals like crabs and shrimps (epifauna)
- the animals that burrow within the deposits (infauna)

We now know that the lower Thames estuary continues to support a wide range of economically important fish species and invertebrates.

- the distribution of invertebrates along the estuary controls the type of fish species that occur. Brown shrimp, above all, form the most important component of the food supply for resident and migratory fish species
- juveniles of many fish species of economic significance occur in the estuary, and some of these exploit the shallow waters of the mudflats when the tide is full
- there is a regular seasonal variation in the fish communities, against which the impact of dredging and other activities of may need to be assessed.

The communities that live within the deposits are very stable. They show little inter annual or seasonal variability and the type of community varies with deposit type. Finally there is no evidence of impact of dredging and reclamation outside the dredge area.

The communities on the mudflats are a principal food resource for internationally significant wading bird populations. Those on Mucking Flats adjacent to the London Gateway Port are at a maximum in the summer but are significantly depleted in late Spring, partly as a result of grazing by wildfowl.



Figure 3 Aerial view of the proposed port and logistics centre

### Environmental management and monitoring of dredging and reclamation, Daniel Leggett, Dredging International UK and EMSAGG Chair

Daniel Leggett provided further insight into the monitoring in particular water quality.

A system known as ‘redline’ monitoring is used, this involves real time data monitoring so that action can be taken immediately if warning levels are reached.

Daniel explained how the dredgers are using this system. The buoys along the channel feed data back so that when pre set limits of sediment in the water are being approached the dredging crew can be contacted and directed to move to a different area. To emphasise the effectiveness of this approach – out of 100 000 hours of dredging time the monitoring threshold was exceeded for 65 hours.

Further studies of the site demonstrate that dredging has caused no significant effects to the local environment. In fact, as mentioned above, at times the modelling predicts that effects to be greater than they have turned out to be. This raises the potential for some aspects of monitoring to be scoped out if results demonstrate that there are no effects from particular activities.

Following the presentations there was some enthusiastic discussion chaired by Marcus Pearson of the topics raised and the opportunity for delegates to ask questions. This was followed by lunch and networking which was sponsored by Dredging International. After lunch DP World

provided a tour of the site where Marcus provided further details of activities on the site.

## EMSAGG spring 2011 Learning Seminar, Turkish Chamber of Shipping, Istanbul

The spring 2011 EMSAGG seminar took place on the 13 May 2011 at the Turkish Chamber of Shipping and was hosted by Istanbul Dredgers Cooperative. It provided delegates with an understanding of the latest work by EMSAGG, especially focusing on permitting, engineering and geological aspects of marine sand and gravel.

The presentations provided an international view on the use of marine sands and gravel, demonstrating different projects, approaches and technologies. Brief summaries of the five presentations are included as follows.

### Engineering use of marine sand in coastal projects – the American and global experience, Bob Dean, University of Florida

Bob Dean, a guest speaker from the University of Florida, provided the seminar with an American and global perspective on the use of marine sand in coastal projects.

The global demand for marine sands was outlined including its use in construction, manufacturing and beach nourishment. There is a large demand for marine sands and gravel and the global consumption was 640 million m<sup>3</sup> in 1998. However, there are still concerns over the use of marine sands including the environmental effects both offshore and onshore. For example:

- offshore: corals, fish, reefs etc
- onshore: increase in and/or redistribution of wave energy.

Beach nourishment is a practice that is used as an erosion remedial measure and is the placement of large quantities of good quality sand on the beach to advance the shoreline seaward. The advantages of this approach include reducing storm damage, restoring habitats, recreation, correcting previous poor management practices and the potential to increase the value of property.

During the presentation Bob highlighted examples from Florida and the approaches to beach nourishment. Further details were given on beach profiles and the effects of sediment characteristics. It was explained that ideally compatible sand would be used but this may not be economically viable.

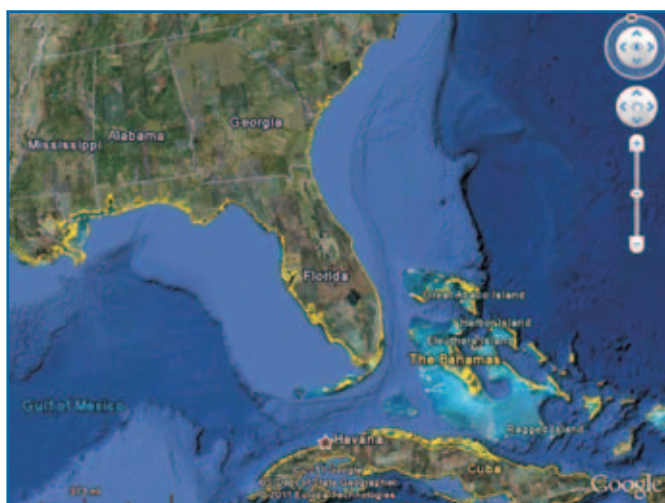


Figure 4 Aerial view of Florida



Figure 5 Beach nourishment in Palm Beach, Florida

In summary sediment size characteristics affect the performance of beach nourishment in two ways:

- 1 Through the beach profiles.
- 2 Through the rate of alongshore sediment transport.

Also, the percentage of fines (< 64 microns) is limited to five per cent. Colour is a secondary factor in most cases for beach nourishment.

### Best practice criteria for marine dredging to minimise impacts on coastal erosion, Emre Otay, Bogazici University, Turkey

Emre Otay from Bogazici University explained the use of marine dredging in Turkey and how to minimise the impacts on coastal erosion. The findings that were presented were based on experimental and numerical studies by Demir (2002 and 2004) and Samancı (2005) at Boğaziçi University.

In Turkey reinforced concrete is the primary construction material where approximately 30 per cent of concrete mix is sand. In Istanbul the demand for sand is 10 million m<sup>3</sup> per year with about 10 per cent of this dredged from offshore.

Emre provided the context of dredging explaining that dredging in the Black Sea was allowed at 3 NM offshore (corresponds to about 70 m and deeper) and beyond. This was before scientific studies demonstrated that dredging at these depths is not feasible. There are a few licensed sites in the Istanbul region for dredging at 1 NM offshore at 20–25 m water depths. The project sites included Kilyos beach where they are carrying out a dredging operation with a clam shell dredger. The following field measures have been taken to provide more data for the project:

- profile measurements
- shoreline measurements
- bathymetry measurements
- sediment sampling
- wave and current measurements.

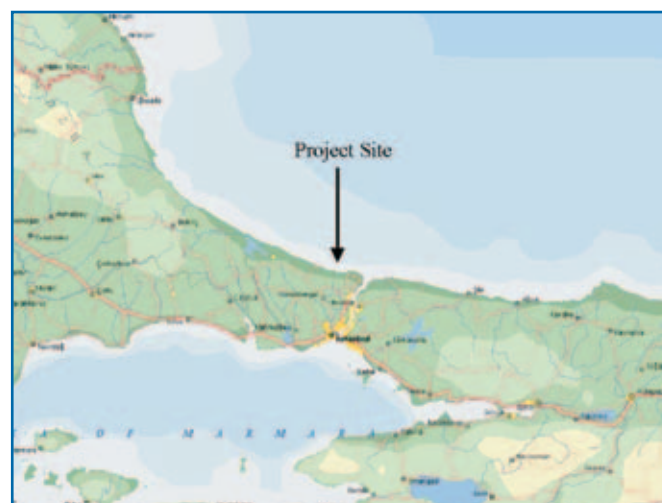


Figure 6 Project site at Kilyos Beach

These measurements highlighted the direct and indirect effects of the dredge holes.

Direct effects:

- cross-shore profile equilibration
- cross-shore sediment transport fills the hole
- net loss of beach.

Indirect effects:

- wave transformation across the pit
- perturbations in longshore current field
- longshore sediment transport
- deformation in shoreline shape.

During the presentation the closure depth concept was discussed highlighting that sediment movement decreases with increasing water depth. Emre explained the effects of shoreline response to wave refraction and diffraction. Offshore dredging may affect the shoreline through the direct effect of net beach loss and indirect effect of changing the shape of the shoreline. Both of these effects are related to water depth and not to distance. Regulations should be based on water depth rather than distance offshore. At 20 m water depth, sediment activity at the seabed is less than 10 per cent.



**Figure 7 Clam shell dredging**

The research provided the following good practice criteria to minimise the erosion effects of dredging pits on adjacent shoreline:

- dredge offshore of the closure depth
- dredge in narrow and long trenches parallel to shore
- avoid sharp slopes at longshore ends of the pit
- one large pit is better than many smaller pits.

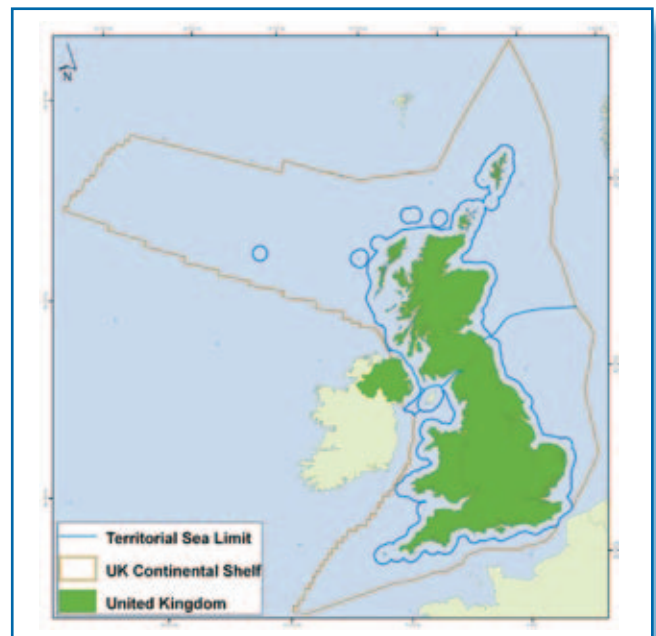
Finally it was noted that after this study, the Turkish legislation has changed the criteria for dredging in the Black Sea from minimum distance offshore (3 NM) to minimum depth of water (20 m).

### **The administrative, economic and licensing framework: developments in marine sand and gravel supply and the role of The Crown Estate, Ian Selby, Crown Estate, UK**

Ian Selby from the Crown Estates described the role of The Crown Estate in the development of marine sand and gravel supply. The presentation looked at the business context, roles and responsibilities, production volumes, uses and markets, and recent and future developments.

The presentation highlighted the business case explaining that there has been over 100 years of activity and since 1950 900 million tonnes of sand and gravel has been extracted. This is around 20–25 tonnes per year. This supply of sand and gravel has been used in concrete products, coastal defences and fill (ports, reclamation, energy development).

In the UK it is a mature sector that is dominated by multinational companies. The Crown Estate are large landowners in the UK who own 17 250 km of foreshore, which is about 55 per cent of the foreshore in the UK. They also have the responsibility for the territorial seabed (out to 12 NM) and the rights to explore and use the natural resources of the continental shelf out to 200 NM (excluding hydrocarbons). Also, The Crown Estate has the rights to lease areas for the generation of renewable energy within the UK's Renewable Energy Zone and rights to lease areas for CCS/gas storage.



**Figure 8 The continental shelf and territorial seabed around the UK**

As landlords they grant licences and leases, but they are not regulators and do not give permissions for activities. Their marine estate comprises:

- renewable energy – wind, wave, tidal
- marine minerals – sand, gravel, potash
- carbon capture and gas storage
- coastal – marinas and moorings etc
- aquaculture
- cables and pipelines.

There is increasing intensity in the dredging regions and markets. The markets are well established and are not constrained by resources but rather are influenced by supply, including alternative sources, demand, dredging capacity and licences.

Ian outlined the future issues as:

- business change – cost reduction and improvement in environmental performance
- efficiency and carbon improvement – ships and licences
- process re-engineering – wharves
- knowledge, revised regulation, mineral and marine spatial planning – environmental research
- uses (construction, coastal defence, reclamation) – climate change and environmental performance standards and procurement.

**Carbon case study:** aggregate carbon is about five to 10 per cent of concrete carbon. The majority (>75 per cent) of this comes from ships. Carbon savings can be achieved if vessels reduce their speed power. The effect in shallow water is even larger. Developing technology can help to achieve savings.

Pressures on the marine environment are increasing. The current legislation at a European level relates to mineral planning including EU minerals strategy and the Marine Policy Statement. Other legislation in the UK is the Marine Bill, the Aggregates Levy and those relating to spatial planning including the blending protection of assets. There is a five year programme for spatial planning that supports activities and environmental conservation.

The Crown Estates are at the forefront in sustainable management and provide world class outputs. There is the need for continuous improvement as progress continues to affect practices and improve environmental performance. They also deliver high value across the marine community maximising returns for a diverse, healthy and productive sea, and improving industry's environmental performance.

In conclusion, there will be drastic changes in offshore dredging for the next decade or two that will contrast with the past two decades. The business will continue to grow slightly and will become more efficient at delivering supplies and substituting some depleted land-based sources.

### State of the art in search and mapping of marine sand and gravel – experiences in the North Sea and abroad, Cees Laban, Marine Sampling Holland and Fedor Meulenkamp, Boskalis

Cees Laban and Fedor Meulenkamp provide an overview of mapping of marine sand and gravel. They discussed

the context and history of mapping, explaining the latest technology and methods.

The objectives of early seabed mapping included fisheries, mineral resources and scientific interest. The presentation demonstrated different types of maps that were developed in the early part of the 20th century.

In the 1970s mapping programmes changed to mainly seabed sediment maps. In recent years there has been a greater demand from the end users for more accurate and deeper measurements as well as geotechnical information regarding the seafloor.

The users of the geological information include:

- foundation of windmill parks (seabed mobility)
- electricity transport cables
- oil and gas exploration and exploitation platforms
- sub marine pipe lines, and cables
- shipping routes (widening, deepening)
- coastal extensions, artificial islands
- sand and gravel extraction (landfill, beach nourishment, industrial use)
- fisheries (habitat)
- protected marine areas.

The presentation explained the methods of searching for, and mapping of, marine sand and gravel for reclamation and dredging purposes. This included identifying the most suitable borrow areas, determining the physical properties and controlled dredging and quality control.

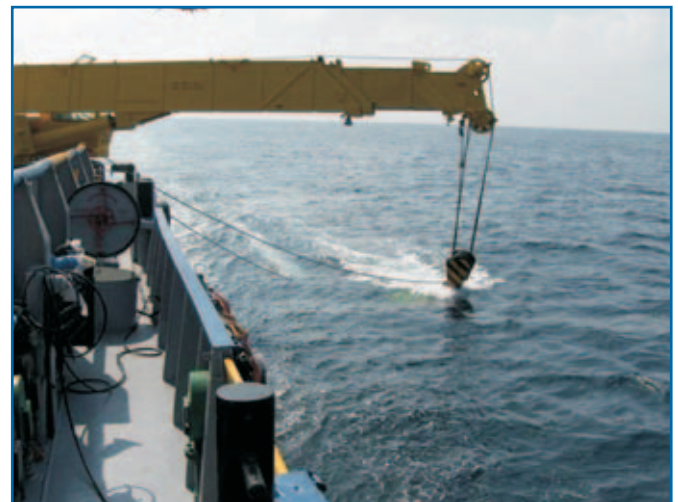


Figure 9 Searching the most suitable borrow areas

The future state of the art search and mapping was discussed and EMODNET was introduced. The EU has adopted a new Maritime Policy, which includes the Marine Strategy Framework Directive (MSFD) aiming for sustainable management and development of the marine

environment in Europe. The roadmap provides an overview of the main data and information service categories to be covered. The Marine Strategy Framework Directive aims to achieve environmentally healthy marine waters by 2020. EMODNET will provide data for that purpose.

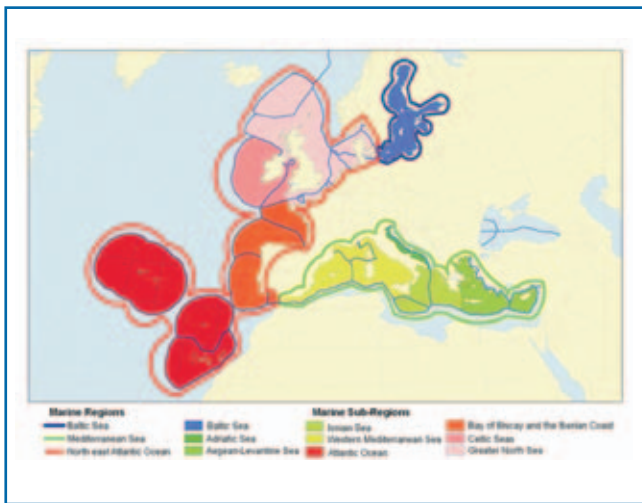


Figure 10 EMODNET roadmap

The overall objective is to create pilots to migrate fragmented and inaccessible marine data into interoperable, continuous and publicly available data streams for complete maritime basins. This includes:

- superficial sediment maps and sedimentation rates
- sea bottom geology (age, composition, origin)
- coastal erosion and accretion
- internet portals.

### Marmaray project, Dr. Zeynep Buket, Avrasya Consult

Dr Zeynep Buket a guest speaker from Avrasya Consult provided an overview of the Marmaray project in Turkey. This major infrastructure project with a budget of about US \$3bn is to upgrade the commuter rail network in Istanbul connecting Halkali on the European side with Gebze on the Asian side. The project started in 2004 and has a nine year programme.

The total length of the Marmaray Project is about 77 km. The immersed tunnel section is around 1.4 km, bored tunnels are about 12.2 km and the rest of the alignment is at grade sections.

The Marmaray project is divided into three main parts and being implemented as three separate contracts. The first contract is the Bosphorus Crossing, called contract BC1 and will connect the existing commuter lines at each side of the Bosphorus (shown as a white line on Figure 11). The

length of the line is around 13.5 km. Almost 90 per cent of the alignment is tunnel. Within the scope of BC1, four new stations will be constructed. These are Kazlıçeşme station, which is at-grade station and three underground stations: Yenikapı, Sirkeci and Üsküdar Stations.

The second contract is the commuter rails, called contract CR1 (red line on Figure 11). Within the scope of CR1 the existing commuter rail system will be upgraded.

The contract includes all civil works, track works, depots and workshops and the electro-mechanical works from Halkali to Yedikule and from Sogutlucemesme to Gebze. Within this contract there is also the scope for a third track (T3). This part of the track will be constructed to provide bi-directional operation for the intercity train and freight trains using passing loops.

The third contract (CR2) includes the procurement of the rolling stock where 44 10-car trains will be purchased.

The Marmaray project will:

- create a long-term solution to transportation problems of Istanbul
- have a capacity of 75 000 passengers per hour per direction
- reduce the effects of car traffic in the old city
- reduce congestion on the existing bridges
- connect the railway from Europe to Asia and visa versa
- be an environmentally healthy project
- decrease pollution in Istanbul, decrease CO<sub>2</sub> release
- decrease travel time for more than one million people every day.

BC1 is a challenging project because the immersed tunnel is the deepest in the world and it has been constructed on the strait where there is heavy sea traffic. The sea current is very strong at Bosphorus and can reach five knots. Also IMT has been constructed at a place where serious earthquake events are expected.

On the European side, especially Kazlıçeşme and Yenikapı station areas, soil conditions are poorer than in the other sections of the project. At the immersed tunnel alignment there are marine deposits that need soil improvement at some locations. Most of the tunnel boring operations on the Asian side have been conducted through rocky soil conditions.

The station excavation will be conducted in rocky soil conditions at about -55 m. Soil above the rock layer is water bearing sandy layers. Changes in the ground water table during NATM operations may cause immediate settlements at sandy levels. To prevent this occurrence some precautions will be taken such as grouting for granular soil layers.



**Figure 11 Marmaray project**

The distance between the alignment of the immersed tunnel and the north Anatolian fault is about 20 km. For this reason, the risks of earthquake have been considered deeply in the design of this project. Before construction, all kinds of geological, geotechnical and geophysical investigations have been carried out along the alignment, and the data obtained from these investigations has been used in the design. The immersed tunnel has been designed considering a 7.5 moment magnitude earthquake.

Dredging works at the bottom of Bosphorus for immersed tube elements have been carried out using the Kanyu grab dredger. It was dispatched from Japan and has a 4000 ps capacity, with a grab of 27.5 m, 3.90 t, stone crushing bar, 50 t, and depth of 85 m. The contractor followed and executed all provisions and regulations that include the protection of marine life and the ecological environment in the Bosphorus Strait.

In the contract, activities that substantially increase turbidity, such as dredging and backfilling were permitted from 15 March to 15 June only in water travelling southwards (upper level current regime) and 1 September to 15 November only because the turbidity does not affect more than half of the surface width of the waterway.

However, a continuous monitoring program for the cyclic fish migration has been carried out and as per the permits obtained from Ministry of Agriculture and the Eylül University, the dredging activities continued during these dates.

During the dredging works at the bottom of Bosphorus, two kinds of excavated material have been obtained. Open grab is used during the excavation. Most of the material is uncontaminated and this material has been disposed to the Çınarcık Pit having 1000 m depth. This deep pit is the extension of North Anatolian Fault in Marmara Sea.

For the contaminated soil, closed grab has been used. All contaminated material have been disposed and protected at Pendik (Kurtköy).

Finally further details of the construction of the four stations were provided:

- 1 Üsküdar Station (cut-and-cover).
- 2 Sirkeci Station (NATM tunnel).
- 3 Yenikapı Station (cut-and-cover).
- 4 Kazlıçeşme Station (at grade).



**Figure 12 During the dredging**

All presentations are available from the EMSAGG website at: [www.ciria.org/EMSAGG](http://www.ciria.org/EMSAGG)

## European Marine Observation and Data Network (EMODNET), Cees Laban

### Why EMODNET?

Rapid increases in human uses of marine resources and the effects of climate change are making the European shelf and coastal seas more susceptible to natural hazards, more exposed to and threatened by pollution, and could potentially result in depletion of resources of economic importance to Member States.

Conflicts between commerce, recreation, development, environmental protection, and the management of living resources are becoming increasingly contentious and politically charged. So it is important that current limitations are overcome to rapidly monitor indicative parameters and provide predictions of change.

Some necessary data are available, but have been captured over many years. However, responsibility for collecting data in Europe's seas and oceans is shared between a fragmented patchwork of regional, national, public and private organisations for various purposes. As a result, many valuable datasets are inaccessible. These datasets need to be unlocked and made easily accessible so that they can be used in new ways.

Also, there are huge gaps in data and observation provision, either because the necessary measurements have not been made or because observing networks are inadequate. The variability of the sea surface is evident from images captured from space, but there is huge physical, biological and chemical variability below the surface that is largely unobserved. These gaps should be filled.

## What is EMODNET?

EMODNET will be a network of existing and developing European observation systems, linked by a data management structure covering all European coastal waters, shelf seas and surrounding ocean basins, accessible to everyone.

EMODNET will provide the link between observations in different European waters and European environmental information, which can then be assessed by scientists and the general public. This will create a large number of marine services in the field of monitoring, forecasting and marine safety.

EMODNET will provide an end-to-end system linking the modules "sensors and platforms", "surveys", "communication systems", "data management" and "information tools". Depending on the specific tasks and problems in the different regions, there may be differences in details on the application of strategies and methods.

The main tasks in EMODNET will be to:

- build on and integrate the combined *in situ* and remote sensing of open ocean, shelf seas and coastal observation systems
- harmonise different methodologies and strategies for data management under common protocols, data formats and quality control
- ensure that data can be consistently distributed for

user applications including regional data interpretation, environmental assessments and modelling.

Four service contracts were launched for creating pilot components:

Lot 1 – Hydrographic data

Lot 2 – Marine geological data

Lot 3 – Chemical data

Lot 4 – Biological data.

## EMODNET Marine Geological data

A consortium consisting of the national geological surveys of the UK, Ireland, France, Belgium, The Netherlands, Germany, Denmark, Norway, Sweden, Finland, Estonia, Latvia, Lithuania and Poland are working together to deliver the requirements of EC Tender MARE/2008/03. The geological surveys of Europe provide an existing network, through the Association of European Geological Surveys (EuroGeoSurveys), which aims to deliver marine geological information solutions to decision makers in European Government and industry, as well as providing baseline information for academic research. The contract between the EC and the EMODNET Geology project partners was signed on 16 July 2009.

The geology data available include:

- seabed sediments
- seafloor geology
- boundaries and faults
- rates of coastal erosion or accumulation
- geological events (submarine slides, earthquakes etc)
- minerals.

An interim report has been produced and is available to download from: [www.emodnet-geology.eu/](http://www.emodnet-geology.eu/)

## EMODNET Hydrographic data

The Hydrographic portal has been developed with the main purpose to allow the download of data products for further analysis by users. Also to make it available for combination with data products from other portals including the other portals developed as part of the EMODNET preparatory actions for marine biology, marine chemistry, marine geology and marine habitats. The portal also provides a data discovery and access service to identify and request access to hydrographic survey data that are managed by a range of organisations and that are at the basis of the digital bathymetry products.

The portal of hydrography provides hydrographic data collated for several sea regions in Europe:

- the Greater North Sea, including the Kattegat and stretches of water such as Fair Isle, Cromarty, Forth, Forties, Dover, Wight, and Portland
- the English Channel and Celtic Seas
- Western Mediterranean, the Ionian Sea and the Central Mediterranean Sea
- Iberian Coast and Bay of Biscay (Atlantic Ocean)
- Adriatic Sea (Mediterranean)
- Aegean – Levantine Sea (Mediterranean).

Users have access to the following geographical information system layers:

- water depth in gridded form over whole of maritime basin on a grid of at least quarter a minute of longitude and latitude
- water depth in vector form with isobaths at a scale of at least 1:1 million
- depth profiles along track lines
- coastlines
- underwater features – wrecks, seabed obstructions etc.

The portal development started in June 2009. EMODNET Hydrography is co-ordinated by MARIS, and includes 10 partners, and 12 associated partners.

Operational services and hydrographic data products for all maritime basins are available to users at:

[www.emodnet-hydrography.eu/content/content.asp?menu=0310000\\_000000](http://www.emodnet-hydrography.eu/content/content.asp?menu=0310000_000000)

[www.emodnet-hydrography.eu/content/content.asp?menu=0040000\\_000000](http://www.emodnet-hydrography.eu/content/content.asp?menu=0040000_000000)

### EMODNET Chemical data

EMODNET Chemical pilot is focused on the marine data groups of chemicals required for monitoring the Marine Strategy Directive:

- 1 Synthetic compounds (ie pesticides, antifoulants, pharmaceuticals).
- 2 Heavy metals.
- 3 Radionuclides.
- 4 Fertilisers and other nitrogen- and phosphorus-rich substances.
- 5 Organic matter (eg from sewers or mariculture).
- 6 Hydrocarbons including oil pollution.

It concerns the following geographical regions: Greater North Sea, Mediterranean Sea, and the Black Sea.

EMODNET Chemical pilot is co-ordinated by OGS and involves 25 partners from SeaDataNet network of NODC's. The contract has a duration of three years starting from June 2009.

Interim reports are available at:

[www.emodnet-chemistry.eu/portal/portal/emodnet/Reports+made+to+the+EU](http://www.emodnet-chemistry.eu/portal/portal/emodnet/Reports+made+to+the+EU)

### EMODNET Biological data

The EMODNET Biology website provides information on the progress of the biological preparatory action and gives access to the marine biological data portal and metadata catalogue. The portal is built on the European Ocean Biogeographic Information System (EurOBIS). The main objective was the development of an online marine biological data portal allowing the access and download of marine biological data across Europe.

The biological data portal aims to visualise and distribute fragmented marine biological data for complete maritime basins. To be accessible both for specialists and for non specialist, the system is developed to be intuitive and easy to use. The architecture of the system, partly based on EurOBIS, is developed to meet the final objective of EMODNET, which is to become an integrated and inter-operable network of systems of European marine observations and data communications.

EMODNET Biology is co-ordinated by the Belgium VLIZ and includes nine partners.

The final report of EMODNET Biology is available at:

<http://bio.emodnet.eu/documents/func-startdown/40/>

### CIRIA update: C584 Coastal and marine environmental site guide

In 2003 CIRIA published its *Coastal and marine environmental site guide* (C584) and the associated pocket book *Coastal and marine environmental pocket book* (C594), to provide good practice guidance on environmental issues once a project has reached its construction stage.

The focus of this guide was to provide practical advice for supervisors, managers and



Figure 13 C584 Coastal and marine site guide

engineers working in the coastal and marine environment on how to control effects potentially arising from construction works. While this guide has been recognised to contain useful information, there is a need to update the content following recent and forthcoming changes in legislation and good practice since the first edition was published.

The objectives of updating the site guide and associated pocket book would be to provide up-to-date, practical guidance for environmental managers, project managers and site operatives working on the coast or at sea, on how to deliver sustainable construction on site by effectively managing a range of environmental issues.

The project would help construction companies operating in the coastal and marine environment to:

- keep up-to-date with relevant environmental legal requirements and associated best practice checklists and case study examples
- communicate the benefits of environmental good practice internally and through their supply chain, through the published guidance. This could form part of site inductions or other training courses
- improve their environmental performance by providing an easily accessible reference resource for use on site to minimise environmental effects (including in emergency situations).

For further information and to get involved with the project, contact Gillian Wadams, CIRIA, on email: [gillian.wadams@ciria.org](mailto:gillian.wadams@ciria.org)

## EMSAGG membership opportunity

Established in 1998 by European professionals, EMSAGG is an independent body that draws together stakeholders from across industry, including dredging organisations, European Government departments and agencies, regulators, economists, resource planners, environmental bodies and academia as well as research bodies. EMSAGG provides a forum for the exchange of ideas and learning across Europe.

Marine sand and gravel continues to make an important contribution to the development of European economies, with demand expanding for numerous end uses. Planning to meet future demand, by ensuring long-term resources are available and responsibly managed, is an important factor towards achieving sustainable development at a European level. To address the potential for increased demand of marine sand and gravel around Europe, techniques for the investigation, development and management of marine sand and gravel require continuous improvement. EMSAGG:

- helps identify developments and information needs for the marine sand and gravel constituents, concerning all aspects of the industry
- enables exchange of information on, and experiences of, the research, licensing, execution and monitoring relating to the extraction and use of marine sand and gravel throughout Europe
- allows wider interest groups, such as clients, government, regulators, planners, economists and environmentalists to share information and discuss the issues – particularly at a European level. Improved communication and understanding of the issues will be of benefit to all involved in marine sand and gravel
- facilitates information and knowledge sharing visits to European countries, to discuss developments and information needs concerning sand and gravel and to identify specific EMSAGG initiatives
- disseminates information to public and private marine sand and gravel stakeholders through bi-annual meetings, its bulletins, the web and its popular conference.

## EMSAGG's activities

- meets formally twice a year to discuss innovation and developments within the industry
- produces a bi-annual bulletin including articles highlighting work of interest to its contacts and the latest information from across the industry
- organises a popular information sharing conference every three years
- has a website hosted by CIRIA that includes downloadable bulletins, conference reports and papers, details of members, details of relevant CIRIA publications, projects and proposals, and also useful links to industry stakeholders.

## Why join EMSAGG?

There are many benefits of being a member of EMSAGG, including:

- network and develop contacts throughout the marine aggregate and related industries, linking with suppliers, regulators, users and leading research organisations
- keep ahead and become part of a forum for the rapid exchange of information relevant to marine aggregates and improve access to current research, best practice and case studies
- raise the profile of your organisation and its role in an international forum

- take advantage of opportunities to guide and participate in future international research and cross-industry initiatives.

We would be delighted to hear from you. To discuss membership opportunities, please contact the EMSAGG Secretariat at: [emsagg@ciria.org](mailto:emsagg@ciria.org)



Figure 14 EMSAGG bulletin



Figure 15 EMSAGG Conference 2009