

ENVIRONMENTAL REPORT

Dunkirk-Port

2017



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 **DunkERQUE**
PORT



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INTRODUCTION

a) The port of Dunkirk

The Port of Dunkirk is a State-owned industrial and commercial establishment. It is located 40 kilometres from Dover in England, 10 kilometres from the Belgian border, near the city of Lille and in the centre of the Brussels-London-Paris triangle. It comprises an onshore area of 7,000 ha and a marine area of 38,000 ha. Extending along 17 km, the onshore port district consists of two ports: the older Eastern Port, and Western Port which dates from the expansion in the 1970s. Each port has an outer harbour that allows it to berth large ships with draughts of 14.2 m in the Eastern Port, and 22 m in the Western Port.

The Eastern Port and the Central Port are formed of many docks and channels, some of which are only accessible via locks. It is also connected to the waterway network by the Bourbourg canal and the wide-gauge canal. Finally, it is the outlet of inland canals for the wateringues¹ whose purpose is to discharge inland water during flooding. The notable feature of the Central Port is that it hosts most of the industrial businesses installed on Dunkirk-Port's land. These include major multinationals such as Arcelor Mittal, Versalis, TOTAL, etc, as well as many terminals designed for the transport of bulk cargoes including grain. This makes it the part of the port with the highest number of high-risk sites, with several of the industries in this sector being subject to the SEVESO Directive. Eastern Port docks are specialised in handling general cargoes loaded on board conventional ships: copper, pipes, wood and manufactured products. All the dry-docking activities are carried out here, for both merchant ships and pleasure craft. Today there is not enough available land in this sector to allow the planning of any major economic development.

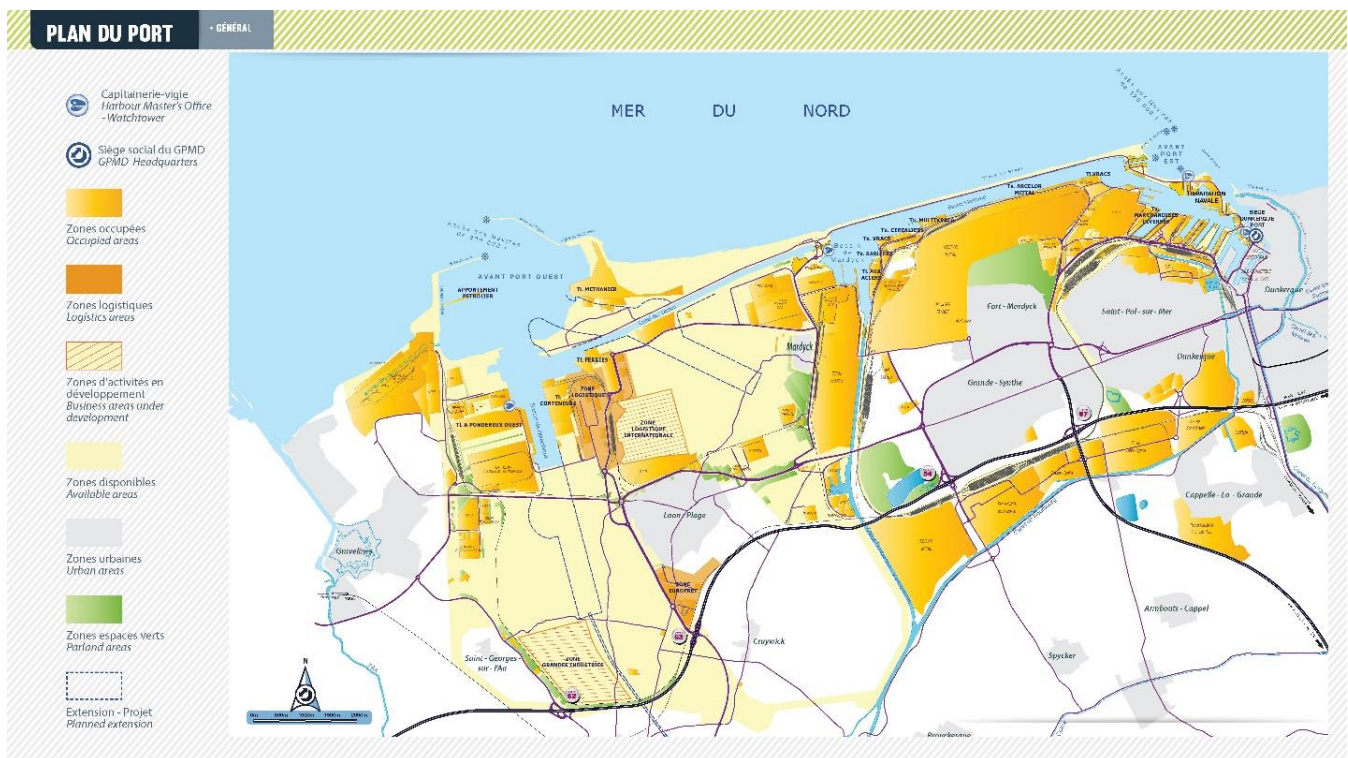


Figure 1 : Map of Dunkirk-Port

In both configuration and purpose, the Western Port is simpler than the Eastern Port, having two main docks and a channel connecting to the Eastern Port via a system of locks. It has no direct access to the waterway network.

¹ Wateringue or watergang: Drainage structure or ditch created to drain fens, wetlands or floodplains below high water level.

The Western Port offers direct access to the sea and allows fast calls for the world's largest container carriers, ore carriers and all RoRo vessels. This makes Dunkirk-Port the second-largest French port for trade with Great Britain. And finally, since 2016 the LNG terminal has accommodated ships carrying Liquefied Natural Gas (LNG). The particular feature of the Western Port is its land reserves of 3,000 ha which offer real opportunities for development and thus for economic growth. In addition, as this part of Dunkirk-Port is less industrialised, it presents fewer constraints in terms of technological risks.

b) The Port's missions and activities

As happened in most European ports, following the Ports Reform of 2008, France's major sea ports took on the duties of "Landlord Ports" by refocusing their missions on activities of strategic coordination involving a great variety of players, both local and from outside the port's territory.

Thus, with the adoption of the law of 4 July 2008, the role of Dunkirk-Port, as a State-owned establishment, has changed from that of an operator to that of a planner and developer, with sustainable development of the port district as its goal. Each of the French major sea ports carries out the missions defined in Article L. 5312-2 of the Transport Code, and in particular the following:

- development, operation and maintenance of shipping access channels and port infrastructures;
- development and management of its district (industrial and logistics areas);
- **management and preservation of the natural areas which it owns;**
- promotion of the rail and waterway links available;
- development and management of the industrial or logistics areas related to the port's activity;
- actions contributing to the general promotion of the port.

The port's governance was also modified by the formation of the Development Board and the Board of Trustees (Paragraph 1.3.a).

c) Environmental issues

All the port's missions and the activities generated by the Dunkirk port sector induce a number of constraints, besides the economic considerations in terms of added value and employment. Although affected by human activity, the port district is still the scene of many environmental issues, including ecological issues. Alongside industry and commercial maritime traffic, the port of Dunkirk has several outstanding natural areas in its territory and a remarkable degree of biodiversity, with many protected species on its shoreline.

Besides biodiversity and ecological continuity, the quality of surface water is also a major issue, particularly as regards the targets for good chemical and ecological status laid down in the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD). This issue concerns both the watergangs, ditches and canals which run through the port's onshore district, and the transitional water (harbour water) and coastal water. The quality of the sediment, which is related to the quality of the surface water, is a significant issue for a port such as Dunkirk in light of the volumes of sediment dredged (maintenance and works dredging) and managed every year, whether at sea or on land.



Figure 2 : The Estern port

Similarly, natural and technological risks are very important issues in view of the different parts of the port's territory that are covered by the Natural Risk Prevention Plan (NRPP) and the Technological Risk Prevention Plan (TRPP). Seawater flooding and inland flooding are among the greatest natural risks. As concerns technological risks, all the risks inherent in the presence of SEVESO-controlled industries must be considered.

Finally, quality of life, especially air quality and noise, odour and aesthetic nuisance, is also an issue that must be addressed in the port district, given the immediate proximity of the towns of Gravelines, Mardyck, Saint Pol sur Mer, Grande-Synthe and Dunkirk.

d) Environmental commitment

The environmental policy of the port of Dunkirk is currently based on three strategic documents (2014-2018 Strategic Plan², PA2D³ and QSE Policy⁴) which contribute to the port's commitment to reduce the impacts of its activities on the environment, as well as to reduce its carbon footprint.

Based on its [Strategic Plan](#) which sets out the road map for the five years from 2014 to 2018, the ambitions of the port of Dunkirk are fourfold:

- The **Northern French Port** aspect involves reconquering Dunkirk's natural hinterland in the container sector, developing secure and temperature-controlled logistics, and optimising consolidated transport.
- The **Gateway Port** aspect is aimed at strengthening the position of GPMD as a redistribution port for solid bulks and shortsea shipping, setting up an LNG provisioning complex on the Strait of Dover, the Channel and the North Sea, and developing links with inland multimodal platforms.
- The **Partner Port** aspect commits the economic and social operators of Dunkirk's port community to mobilise for the development of new types of traffic; it also involves maintaining existing partnerships to increase added value in logistics and industrial development, emphasising the value of the port's heritage and culture, and managing the natural areas of the Côte d'Opale.

² The 2014-2018 Strategic Plan is available online on the Dunkirk-Port website:

<http://www.Dunkirk-port.fr/index.php?cmpref=41388&lang=fr&module=media&action=Display>

³ The PA2D is available online on the Dunkirk-Port website:

<http://www.Dunkirk-port.fr/index.php?cmpref=49654&lang=fr&module=media&action=Display>

⁴ The QSE Policy is available online on the Dunkirk-Port website:

<http://www.Dunkirk-port.fr/fr/iso9001/politique-qualite.html>

- The ***Sustainable Port*** aspect involves continuing to make sustainability an integral feature of its development strategy, in particular by promoting the circular economy and reinforcing risk control. Sustainability must also become part of the port's everyday activities, reflected in ecologically responsible attitudes and behaviour on the part of each individual.

Aware of the challenges associated with its activities, GPMD has also undertaken the drafting of a [Sustainable Development and Action Plan](#) (PA2D) through a strategy of participatory governance, alongside many partners in the area. The PA2D has now been approved, and provides the framework for scheduled implementation of the 2014-2018 Strategic Plan in the field of sustainable development. It consolidates all the actions undertaken and now reflects the policy, objectives and implementation of sustainable development in the port's growth and activities. In particular it is intended to ensure consistency between the various regional or local planning documents.

The dynamic that began with the drafting of this PA2D, which was approved by the Board of Trustees on 21 March 2014, has resulted in the implementation of a programme of 26 operational measures based on five strategic guidelines:

- ***To establish a green, socially responsible port economy*** by making ecological attractiveness, risk control and the principles of green industry the essential criteria for reinforcing the image of a modern and exemplary port. This ambition is related to the quality and environmental procedures already in progress (ISO 9001 certification for the management of maritime and waterway traffic, progressive implementation of ISO 14001 and environmentally responsible action plans in accordance with the "Model State" approach), so helping to improve the quality of life.
- ***To adapt to climate change and encourage the reduction of industrial emissions*** in a global, national or local context of combatting global warming, by adapting industrial and port developments, managing risks and encouraging the reduction of emissions in the Dunkirk area.
- ***To implement a sustainable port strategy*** by improving the existing railway network, participating in the restructuring of the waterway network, promoting the expansion of the hinterland and the complementarity of regional and cross-border ports, and giving priority to traffic consolidation and modal switchover.
- ***To preserve the natural environment and landscapes in port development*** by implementing the port's Natural Heritage Master Plan (SDPN) and the Natural Environment Master Plan (PGEN), and protecting the landscaping values of an industrial area.
- ***To make Dunkirk a sustainable port city*** by continuing to develop an exemplary industrial and port platform, coordinating urban and port policies in favour of sustainable action and development based on the circular economy, fostering the culture of port governance and stressing the value of the port's heritage and culture.



Figure 3 : ecological developments at the western port

Dunkirk-port's sustainable development policy is reflected in a multi-annual action plan, based on a vision for the development of the industrial port area ("ZIP") over the medium and long term as set out in the port's Natural Heritage Master Plan (SDPN) and expressed in an outline of the zoning and use of the areas of the ZIP which goes beyond the term of the current 2014-2018 Strategic Plan. Through the interrelation of the ecological and economic issues in the port it has been possible to build a long-term vision of the development of the ZIP, optimising the use of land. The SDPN is covered by a "good practice fact sheet"⁵.

Associated with relevant assessment indicators, the action programme will evolve to ensure sustainable development of the port area. Each action of the programme brings together the partners concerned by the subject in an adapted working group. In addition, the overall progress of the PA2D action programme is monitored by a technical committee made up of members of Dunkirk-port's Development Board, so making it possible to pursue the dynamic of partnership and governance initiated by the drafting of the PA2D.

Alongside the PA2D and fully in line with it, GPMD has for many years been engaged in a process of continuous improvement of **Quality Safety and Environment** (QSE), which resulted in the award of ISO 9001 certification in 2009 for the handling of maritime and waterway traffic. The management's policy for handling maritime and waterway traffic is broken down into goals for each process, interacting with each other, to ensure that we can meet our client's expectations in compliance with regulations.

In accordance with ISO recommendations, the pilot of each process has listed the risks associated with their activity. During annual reviews they report on the risks and the means put in place to control them, as well as an analysis of the indicators used.

These principles and values of our management system are implemented in the field and within the scope of ISO 9001 certification, as well as in many services provided by GPMD outside its scope. In this respect, the port of Dunkirk is working towards the gradual implementation of ISO 14001.

⁵ The SDPN is available online on the Dunkirk-Port website:

http://www.Dunkirk-port.fr/publicmedia/original/131/25/fr/Dunkirk-Port_Conserver_Biodiversite.pdf

<http://www.Dunkirk-port.fr/fr/capitainerie/developpement-durable-Dunkirk-port.html>

Alongside this approach, the port of Dunkirk is continuing with its commitment to provide information and communications, particularly on social and environmental actions.

e) The PERS of Dunkirk-Port

Numerous transverse initiatives have been put in place to improve the environmental performance of the port and the industrial area. The use of the Self Diagnostic Method (SDM) served to confirm this undertaking and led to the conclusion that the port of Dunkirk *"demonstrates all the components of an international standard of environmental management [...]"*. The SDM also showed that the environmental management system was well positioned for obtaining the targeted certifications of the PERS and ISO 14001:2004 standards.



Figure 4 : SDM results

Carrying out the Port Environmental Review System (PERS) also helps to link together the many initiatives put in place by Dunkirk-Port in the field of environmental performance. These are already formalised in the form of a strong environmental management system that meets the requirements of the PERS, the purpose of which is to help ports to implement an environmental management programme in compliance with ESPO recommendations.

This report therefore presents the way in which the port of Dunkirk complies with the requirements of the PERS. These requirements are as follows:

- 1.1 Environmental Policy
- 1.2 Significant environmental aspects and legal requirements
- 1.3 Responsibilities and resources
- 1.4 Analysis of compliance
- 1.5 Environmental report
- 1.6 Good practice

1.1 ENVIRONMENTAL POLICY

The statement of the environmental policy is a declaration of intent and of the public policies of the port authority in relation to its overall environmental performance. It provides a framework for the setting of its environmental goals and targets. This policy does not replace the QSE policy already in place at Dunkirk-Port but is a more detailed description of its environmental aspect. Its aim is to ensure the consistency and integration of Dunkirk-Port's environmental management initiatives (2014-2018 Strategic Plan, PA2D and QSE Policy).



DUNKERQUE PORT

ENVIRONMENTAL POLICY

The industrial port district of Dunkirk is a multi-faceted area and the scene of many environmental challenges relating to the preservation of biodiversity, the quality of water and sediment, technological and natural risks and air quality, in a context of climate change. As a developer and manager of land, Dunkirk-Port wants to contribute to the sustainable development of its activities and demonstrate its ability to implement an effective environmental policy in order to control and reduce the impacts and effects associated with its operations on the environment.

Through the actions already undertaken in the framework of the PA2D, the Strategic Plan and the QSE Policy, Dunkirk-Port's environmental policy is based on the following guidelines:

- To develop the district in consultation with stakeholders and in line with the environmental issues identified;
- To make Dunkirk a sustainable port city by coordinating the development policies of the city and the port and stressing the value of the port culture;
- To promote the development of the circular economy in the area through targeted partnerships;
- To comply with regulations and monitor changes in regulations.
- To limit the pollution caused by port and industrial activities by adapted processes and an optimised monitoring programme;
- To encourage clients, suppliers, the businesses based in the port district and maritime transport operators to follow good environmental practices;
- To protect and manage the port's biodiversity, and encourage ecological continuity with adjoining districts;
- To organise the acquisition and reinforcement of skills and knowledge relating to the environment in the daily work of port staff;
- To follow a policy of continuous improvement and transparency in the framework of strict environmental reporting.



Stéphane Raison

CEO,
Dunkirk

1.2 REGISTER OF ENVIRONMENTAL ASPECTS. LEGAL REQUIREMENTS AND PERFORMANCE INDICATORS

The port district is home to many activities which, in view of their interactions with the natural environment, are governed by French and European regulations. Efficient management of environmental performance requires a thorough knowledge of the environmental aspects which concern the port's activities, products and services.

In this respect, the identification of regulatory requirements is of paramount importance in the port's environmental management system.

a) Significant environmental aspects

As part of its continuous improvement process, Dunkirk-Port has made an environmental analysis of its activities across its district. An internal procedure integrated in the port's management system resulted in a list of 258 environmental aspects related to the activities identified. They concern dredging, the storage of hazardous materials, energy consumption, etc. The places, activities and environmental impacts of each environmental aspect are defined. A raw score is applied according to their frequency of occurrence and their seriousness. This raw score is weighted by integrating an index for control of the environmental aspect. This is quantified on the basis of the human, technological and organisational resources used to reduce the risks. The result of this analysis provides an indication of the residual criticality, categorised according to its significance. If this criticality exceeds a score of 60 points, the environmental aspect is considered as significant (see Scoring Method below):



Criticality of Environmental Analysis: explanations

Weighted index	1	2	3	4
Frequency* appearance of aspect	Never or exceptional: Once a year or less	Rare: Once a month or less	Occasional – Frequent: Once a week or less	Routine – Continuous: More than once a week or every day
Severity of impact As the receiving environment WATER is very sensitive, the severity level is squared in case of impact	Low: GPMD image not affected No visual nuisance to landscape No consequence for fauna and flora Non-hazardous products, biodegradable <i>within one month</i> (see technical data sheets) Low or recycled consumption, non- depletable resource, safeguarded resource (recycled paper)	Average: Plant and animal species threatened Complaints by third parties Non-hazardous products, biodegradable <i>within one year</i> (see technical data sheets) Noise nuisance not persistent and below regulatory thresholds Energy consumption Waves Neutral gases (see SDS)	High: Real threats to plant and animal species Complaints by third parties Hazardous products (pictogram + SDS) Non-hazardous products but biodegradable <i>in more than one year</i> Noise nuisance not persistent and above regulatory thresholds Energy consumption wasted and inappropriate practices Dangerous or possibly dangerous gases (see SDS)	Disastrous: Complete destruction of plant and animal species (100%) Loss of human life GPMD image harmed in the media (newspapers, TV, etc) Criminal, civil and administrative sanctions Use of depleted and vulnerable resource
Weighted index Control	1	3	5	7
Control including regulatory compliance	Total control: Effective, adapted and appropriate (in place and operational): Means of control implemented sustainably No malfunction identified Trained personnel Activity compliant	Control in progress: Satisfactory: Means of control currently being implemented	Insufficient control: Insufficient: Means of control must be supplemented and improved	No control: No means in existence Means known and not implemented Activity non-compliant

*Likelihood of appearance of environmental impact

Results	Significance	Meaning
Between 1 and 30	Low	Not a priority, but can be improved.
Between 31 and 60	Average	Correction could already produce positive effects, but is not a priority. Need for monitoring (aspect).
Between 61 and 190	High	Must be addressed and included in the action plan.
Above 190	Severe	Priority, to be included in an action plan and corrected as soon as possible.

01/01/2016

Figure 5 : Scoring method

This means that an activity having a strong environmental impact according to the *frequency and seriousness* criteria may be allocated a low or average level of significance in terms of criticality in view of the means implemented to limit the risks. Thus, dredging operations do not appear as significant in the environmental analysis because the process for managing the potential environmental impacts and effects is well controlled under the Dredging Master Plan⁶ (SDD) which the GPMD has followed since 2010. It is one of the strong components of the environmental and sustainable development policy developed by Dunkirk-Port to ensure the successful coexistence of industry, town planning and the marine environment. It sets the environmental objectives, and defines and schedules the action plan to be followed for monitoring and control of the quality of sediment and water. In particular it recommends the implementation of solutions for onshore management and recycling of "undumpable" sediment, the details of which are set out in a good practice fact sheet.

The environmental analysis register is in the form of an Excel file that can be consulted on the premises of Dunkirk-Port. This is reviewed at least once a year, depending on changes in context, activities and actions carried out.

By means of this methodology, 35 Significant Environmental Aspects (SEAs) have been identified and are shown in the table below. They are divided between the seven main activities specific to Dunkirk-Port or present on its territory:

- Operations (rail networks, structures, footbridges, cranes, dry and wet docks)
- Maintenance (maintenance of equipment, quays, dikes, sewerage, buildings, car fleet, workshops, roads and utilities)
- Activities related to maritime and waterway traffic
- Developments (Works)
- Commercial, industrial and logistics activities
- Leisure activities (public, pleasure boating, hunting, etc)
- All activities

The actions defined in relation to these significant environmental aspects are integrated in the management programme approved by the port's Management.

⁶ The Dredging Master Plan is available online on the Dunkirk-Port website
<http://www.Dunkirk-port.fr/fr/capitainerie/developpement-durable-Dunkirk-port.html>

Significant environmental aspect	Environmental impact	Person responsible for managing environmental aspect	Regulatory and other requirements	Reference documents
Operations (railway lines, structures, footbridges, cranes, dry and wet docks)				
Dispersion of pollutants (seepage of oil, grease, etc)	Use of resources Water, Soil Marine and land biodiversity Landscape and quality of life Waste	EOO		Operating procedure PAD.MO.8408
Management of hazardous and non-hazardous waste: production and sorting	Water, Soil Marine and land biodiversity Landscape and quality of life Waste	EOO/ACSI/ANI	Environment Code	Benchmark PAD.REF.1602 Benchmark PAD.REF.1603 Operating procedure PAD.MO.1601 Waste collection and treatment plan
Maintenance (maintenance of equipment, quays, dikes, sewerage, buildings, car fleet, workshops, roads and utilities)				
Dispersion of pollutants (seepage of oil, grease, etc)	Use of resources Water, Soil Marine and land biodiversity Landscape and quality of life Waste	EOO/ANI		Operating procedure PAD.MO.8408
Discharge of rainwater from the port district into the natural environment	Water, Soil, Sediment Marine and land biodiversity Landscape and quality of life Health/infectious products Waste	ANI	GPMD Prefectural decrees Tender file - Water quality targets	Sewerage Master Plan
Discharge of cleaning water from structures (locks)	Water, Soil Marine biodiversity Landscape and quality of life Health/infectious products Waste	EOO/ANI	GPMD Prefectural decrees Tender file - Water quality targets	Sewerage Master Plan
Management of hazardous and non-hazardous waste: production and sorting	Water, Soil Marine and land biodiversity Landscape and quality of life Waste	EOO/ACSI/ANI	Environment Code	Benchmark PAD.REF.1602 Benchmark PAD.REF.1603 Operating procedure PAD.MO.1601 Waste collection and treatment plan
Management of floating macrowaste in port docks	Water, Sediment Marine biodiversity Landscape and quality of life Health/infectious products Waste	ANI	Environment Code	

Significant environmental aspect	Environmental impact	Person responsible for managing environmental aspect	Regulatory and other requirements	Reference documents
Non-compliance with instructions for storage of chemicals that may harm the environment	Water, Soil, Sediment Marine and land biodiversity Landscape and quality of life Health/infectious products	ANI		PAD.MO.1217
Activities related to maritime and waterway traffic				
Environmental incident: spillage of any product into the natural environment	Air, Water, Soil, Sediment Marine and land biodiversity Landscape and quality of life Health/infectious products Waste	Harbour Master's Office /ANI	Environment Code	Operating procedure PAD.MO.8408 Port Pollution Control Plan
Operations of fumigation, disinfection and disinfection of ships' grain cargoes	Air, Water, Soil, Sediment Noise/vibration Marine and land biodiversity Health/infectious products Waste	Harbour Master's Office		
Consumption of fuels during navigation, manoeuvres and calls	Energy			
Atmospheric releases (PM, SOx, NOx, etc) and greenhouse gas emissions during navigation and manoeuvres	Air Landscape and quality of life Health/infectious products			
Atmospheric releases (PM, SOx, NOx, etc) and greenhouse gas emissions during calls	Air Landscape and quality of life Health/infectious products			
Management of hazardous solid waste, including used distress rockets	Water, Soil, Sediment Marine biodiversity Landscape and quality of life Waste	Harbour Master's Office /ANI	Environment Code	Benchmark PAD.REF.1602 Benchmark PAD.REF.1603 Operating procedure PAD.MO.1601 Ship waste collection and treatment plan
Management of non-hazardous solid and liquid waste	Water, Soil, Sediment Marine biodiversity Landscape and quality of life Waste	Harbour Master's Office /ANI	Environment Code	Benchmark PAD.REF.1602 Benchmark PAD.REF.1603 Operating procedure PAD.MO.1601 Ship waste collection and treatment plan
Management of cargo residues (solid/liquid)	Water, Soil, Sediment Marine biodiversity Landscape and quality of life	Harbour Master's Office /ANI		Benchmark PAD.REF.1602 Benchmark PAD.REF.1603 Operating procedure PAD.MO.1601

Significant environmental aspect	Environmental impact	Person responsible for managing environmental aspect	Regulatory and other requirements	Reference documents
	Waste			Ships' waste collection and treatment plan
Accidental spillage of hydrocarbons during bunkering operations	Air, Water, Sols, Sediment Marine and land biodiversity Landscape and quality of life Waste	Harbour Master's Office /ANI		Operating procedure PAD.MO.8408 Port Pollution Control Plan
Handling of powdery products – Dispersion of airborne products and dust	Air, Water, Soil, Sediment Marine biodiversity Landscape and quality of life Waste	Harbour Master's Office		
Transit of hazardous substances (maritime, waterway)	Air, Water, Soil, Sediment Marine and land biodiversity Landscape and quality of life Waste	Harbour Master's Office		Computerised management of hazardous goods (TIMAD software)
Deliberate environmental damage: littering, fly-tipping; failure to observe MARPOL points	Air, Water, Soil Marine and land biodiversity Landscape and quality of life Health/infectious products	Harbour Master's Office/ANI	Environment Code	Benchmark PAD.REF.1605
Ship repair (sandblasting, painting)	Air, Water, Sediment Marine biodiversity Landscape and quality of life Waste	Harbour Master's Office/EOO	GPMD Prefectural decrees Tender file - Water quality targets	Sewerage Master Plan Emission agreements
Spatial developments (Works)				
Management of hazardous and non-hazardous waste	Water, Soil Marine and land biodiversity Landscape and quality of life Waste	AMO/CR/ANI/ME	GPMD Prefectural decrees Environment Code	Benchmark PAD.REF.1602 Benchmark PAD.REF.1603 Operating procedure PAD.MO.1601
Non-compliance with instructions for storage of chemicals that may harm the environment	Water, Soil, Sediment Marine and land biodiversity Landscape and quality of life Health/infectious products	AMO/CR/ANI		
Atmospheric emissions and airborne dust	Air, Water, Soil, Sediment Marine and land biodiversity Landscape and quality of life	AMO/CR/ANI/ME	GPMD Prefectural decrees Environment Code	
Commercial, industrial and logistics activities				

Significant environmental aspect	Environmental impact	Person responsible for managing environmental aspect	Regulatory and other requirements	Reference documents
Environmental incident: spillage of any product into the natural environment	Air, Water, Soil, Sediment Marine and land biodiversity Landscape and quality of life Health/infectious products Waste	Harbour Master's Office/ANI	Port Police regulations ICPE regulations	Operating procedure PAD.MO.8408 Port Pollution Control Plan
Release of effluents into the natural environment by industrial and commercial sites in operation	Water, Soil, Sediment, Air, Marine and land biodiversity Landscape and quality of life Health/infectious products	Harbour Master's Office/ANI/ME	ICPE regulations	Sewerage Master Plan (SDA) Emission agreements Safety Instruction PAD.CNS.1201
Contamination of soil on industrial and commercial sites in operation	Water, Soil Landscape and quality of life Health/infectious products	DLI/ME	Temporary Occupancy Contracts Port Police regulations ICPE regulations	
Airborne dust from bulk storage of industrial and commercial sites in operation	Air, Water, Soil, Sediment Marine and land biodiversity Landscape and quality of life		Environment Code ICPE regulations	
Transit of hazardous substances (road, rail)	Air, Water, Soil, Sediment Marine and land biodiversity Landscape and quality of life Waste	Harbour Master's Office/VFP		
Deliberate environmental damage: littering, fly-tipping	Air, Water, Soil Marine and land biodiversity Landscape and quality of life Health/infectious products	Harbour Master's Office/AN		
Noise nuisances due to operation of site	Noise, Vibration, Marine and land biodiversity Landscape and quality of life			
Leisure activities (public, pleasure boating, hunting, etc)				
Environmental incident: spillage of any product into the natural environment	Air, Water, Soil, Sediment Marine and land biodiversity Landscape and quality of life Health/infectious products Waste	Harbour Master's Office/ANI		Operating procedure PAD.MO.8408 Port Pollution Control Plan

Significant environmental aspect	Environmental impact	Person responsible for managing environmental aspect	Regulatory and other requirements	Reference documents
Repair and maintenance of pleasure boats	Water, Sediment Marine biodiversity Landscape and quality of life Waste	Harbour Master's Office/ANI/EOO		Sewerage Master Plan (SDA) Emission agreements
All activities				
Road, rail, maritime and waterway traffic, including pilotage, boatage and towage	Energy Air, Water Soil Noise/vibration Marine and land biodiversity Landscape and quality of life	DP/VFP/Harbour Master's Office		PAD.PRO.8201-8208
Cargo leaks (fuels, fluids, etc) from the various transport modes	Use of resources Air, Water Soil, Sediment Marine and land biodiversity Landscape and quality of life Waste	Harbour Master's Office/ANI		Operating procedure PAD.MO.8408 Port Pollution Control Plan

Table 1 : Significant Environmental Aspects - SEAs

b) Regulatory monitoring

After drafting the SDM, Dunkirk-Port wished to extend the scope of its legislative monitoring to include all environmental topics. The initialisation of the regulatory benchmark served first of all to identify the regulatory texts and requirements applicable to the activities of Dunkirk-Port in environmental terms.

The regulatory benchmark is the main medium enabling the site to assess its compliance with the applicable regulations. It only contains the texts for which a compliance assessment is necessary, which are:

- European regulations and transpositions of directives
- The Environment Code
- Laws
- Implementation orders
- Ministerial decrees
- Local texts or those specific to the establishment such as Prefectural authorisations, municipal decrees (local planning regulations "PLU", land use map "POS"), etc

The initialisation of the regulatory benchmark therefore involved identifying the list of applicable regulatory texts and, for each of these texts, defining the applicable requirements in the field of the environment.

On this basis 1637 regulatory articles were identified, excluding Dunkirk-Port's Prefectural decrees. The regulatory benchmark is updated every quarter through regulatory monitoring.

A tool for management of monitoring and assessment of compliance, the HSE Compliance service, is used to implement the regulatory monitoring. This allows consultation, retrieval and updating of the regulatory benchmark and regulatory monitoring (see excerpt below).

RÉFÉRENTIEL ▲	THÈME ▲▼	SOUS-THÈME ▲▼	ETAT DE CONFORMITÉ ▲▼	DÉFINITION DE LA NON-CONFORMITÉ ▲▼	NOMBRE D'ITEMS ▲▼	NOMBRE DE PLAN(S) ▲▼	NOMBRE À ENJEUX ▲▼
Environnement / Environment	Déchets / Waste	Prescriptions générales / General requirements (Déchets / Waste)	Conforme		9	0	
Environnement / Environment	Déchets / Waste	Prescriptions générales / General requirements (Déchets / Waste)	Non concerné		4	0	
Environnement / Environment	Déchets / Waste	Acceptation des déchets / Waste acceptance (Déchets / Waste)	A vérifier		7	0	
Environnement / Environment	Déchets / Waste	Acceptation des déchets / Waste acceptance (Déchets / Waste)	Non concerné		4	0	
Environnement / Environment	Déchets / Waste	Déchets dangereux / Hazardous waste (Déchets / Waste)	Non concerné		1	0	
Environnement / Environment	Déchets / Waste	Déchets dangereux / Hazardous waste (Déchets / Waste)	Conforme		3	0	
Environnement / Environment	Déchets / Waste	Déchets dangereux / Hazardous waste (Déchets / Waste)	Non conforme		1	0	
Environnement / Environment	Déchets / Waste	Huiles usagées / Waste oils (Déchets / Waste)	Conforme		2	0	
Environnement / Environment	Déchets / Waste	Huiles usagées / Waste oils (Déchets / Waste)	A vérifier		2	0	
Environnement / Environment	Déchets / Waste	Déchets de papier, de métal, de plastique, de verre et de... (Déchets / Waste)	A vérifier		6	0	
Environnement / Environment	Déchets / Waste	Déchets d'emballages / Packaging waste (Déchets / Waste)	Conforme		4	0	

Figure 6 : screenshot of the compliance analysis tool

c) Performance indicators

Knowledge of the environmental issues is an indispensable prerequisite of reporting. This tracking, which takes the form of indicators, allows a better grasp of the evolution of the port's environmental performance and an assessment of the effectiveness of the actions carried out. This work of assembling data is carried out by Dunkirk-Port and formatted in the form of a PA2D status chart. This contains nearly 150 indicators serving to measure the environmental effects of the port's operations, the port's efforts to control or reduce these effects, and the quality of the port environment. For each of these indicators, a contact person is appointed to facilitate feedback.

This status chart, which is updated annually as part of the PA2D review, can be consulted on the premises of Dunkirk-Port. An excerpt is given below:

Environmental effects

	Status in 2016
Volume of undumpable sediment dredged (in m ³)	70,060
Number of infringement records and/or formal notices for pollution involving ships in commercial operation, during provisioning or when moored	01
Tonnes of CO ² equivalent per year emitted (assessment of greenhouse gas emissions)	1,193

Environmental efforts

Number of new emission agreements signed	02
Waterway volumes handled on GPMD territory (in Millions of tonnes)	2.80
Number of information and awareness campaigns on GPMD's Sustainable Development and Environment policy	46
Progress of PA2D in %	71
Number of environmental events organised or supported ("Matinales" - Sustainability Mornings, "Semaines de la Mer" - Sea Discovery Weeks, etc)	19
Number of simplified comparative inspections (VSC) of port structures	27

Quality of environment

Water: I2EC biotic index	27
Air: Percentage of good and very good air quality indices	78%
Dust: Number of days of nuisance due to dustfall in the Western Port	06
Biodiversity: Ecobalance index for port district (number of points (TBM Environnement, 2015), initial status assessment 2011)	21,374

Table 2 : excerpt of PA2D indicators status chart

1.3 DOCUMENTED RESPONSIBILITIES AND RESOURCES RELATING TO ENVIRONMENTAL ASPECTS

a) Organisation of Dunkirk-Port

Dunkirk-Port is directed by the Executive Committee which is formed of three people and chaired by the Chief Executive officer who is appointed by decree. This body's decisions are collegial in accordance with the law: "The executive committee directs the establishment and is responsible for its administration. To this end it is vested with the broadest powers to act in all circumstances in the name of the major sea port". However, its chair has sole authority to manage the staff, which means that he has the capacity of employer.

The organisation of Dunkirk-Port is shown in the diagram below:

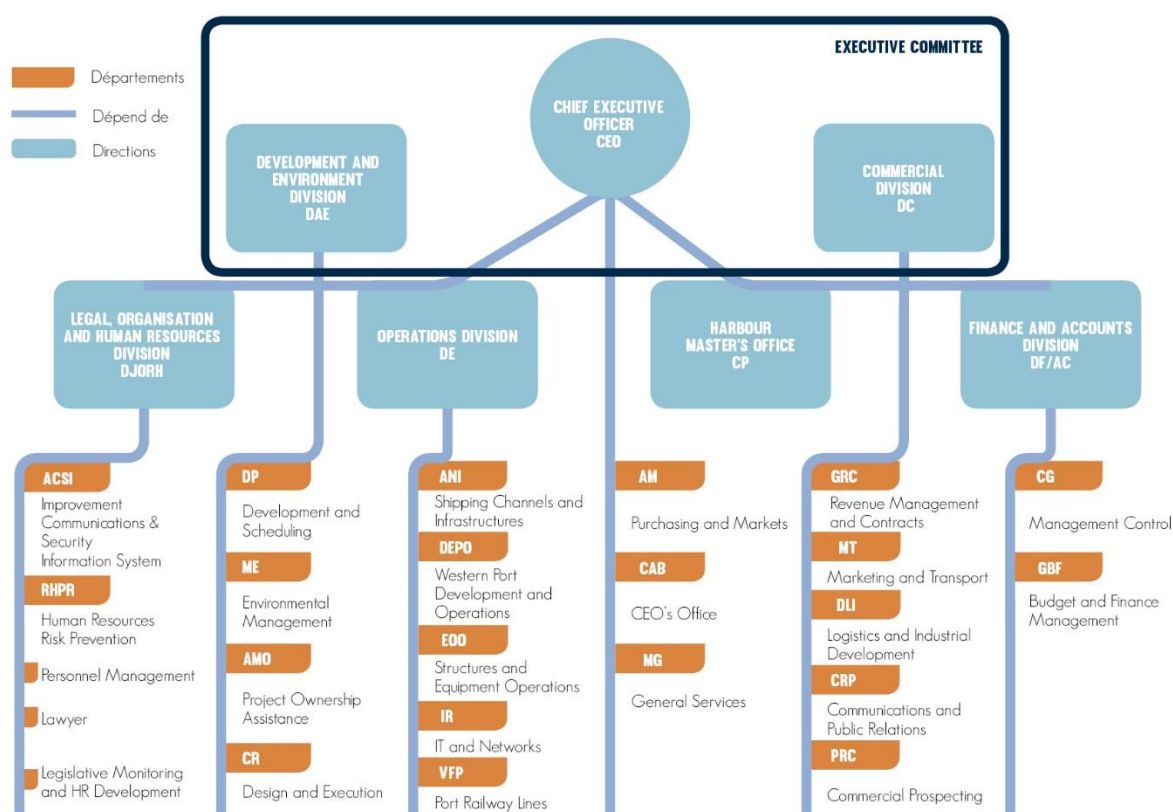


Figure 7 : The organisation of Dunkirk-Port

Fine-tuned in line with the initiatives undertaken, such as the PA2D, the Strategic Plan and the QSE Policy, this internal organisation has proved appropriate for the environmental management of the port area.

Alongside this, and following on from the 2008 ports reform, the organisation of Dunkirk-Port is based on strong governance involving many local players within two bodies, the Board of Trustees and the Development Board, which are also supported by an audit committee. These governing bodies are composed of government representatives, delegate of local and regional authorities, executive representatives, and qualified persons who intervene in the decisions of the establishment. Note that this entire organisation is placed under the control of the government, and of two ministers in particular. The diagram below shows the port's system of governance:

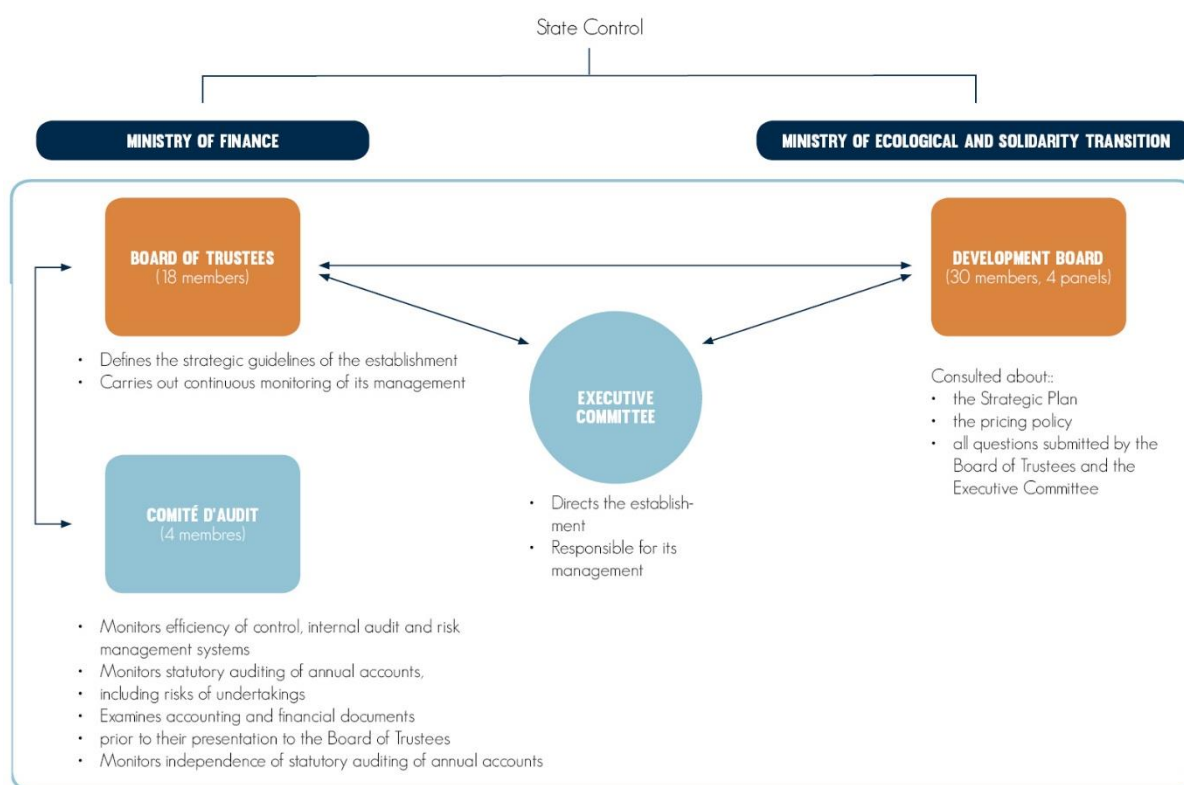


Figure 8 : Dunkirk-Port's system of governance

b) Environmental roles and responsibilities

The resources, roles, responsibilities and powers are defined in the port's internal process "**Management of Human Resources**" that is available for consultation on the premises of GPMD (Ref PCS.6001). The purpose of this document is to ensure that, the company has the appropriate human resources with the required skills to accomplish its missions, in compliance with legal obligations.

This process is carried out through skills mapping based on job descriptions. The job descriptions include the objectives and rationale, key skills, technical skills and organisational skills, and in every case the concept of a Safety, Security and Environment attitude and behaviour. The roles and responsibilities are defined by means of diagrams included in each operating method integrated in the port's management system.

Activity	Dept	Position
Port operations (dredging)	ANI	Head of Shipping Channel and Infrastructures Department
Port operations (navigation)	CAP	Harbour Master
Port operations (terminals)	EOO	Head of Structures and Equipment Operations Department
Oversight of wharfs and piers	ANI	Infrastructure Maintenance Manager Maritime and waterway wharfs, Maritime and waterway piers, Fixed bridges
Site administration	RHPR	Head of Human Resources Department Risk Prevention

Scheduling	DP	Head of Development and Scheduling Department
Purchasing of supplies	AM	Head of Purchasing and Markets Department
Licences / Permits	DP	Design Office Manager
Quality management	ACSI	Head of Continuous Improvement and IT Security Department
Management of on-site contractors	DLI	Head of Logistics and Industrial Development Department
Emergency planning	CAP	Harbour Master
Waste management	ACSI	Environmental Quality Coordinator
Environmental management	ME	Head of Environmental Management Department
Management of environmental data	ME/ DP	Environmental Research Officer Geomatician / Geographic Information System
Assessment of soil pollution	ME	Environmental Research Officer
Monitoring of air quality	ME	Ecology and Communications Assistant
Energy and carbon footprint	ME	Sustainable Development Research Officer
Monitoring of water quality	ME	Environmental Research Officer
Noise management	ME	Ecology and Communications Assistant
Vehicle fleet management	EOO	Head of Structures and Equipment Operations Department
Port signage	DP	Design Office Manager
Maritime traffic management	CAP	Deputy Harbour Master
Control of natural and technological risks	DP	Design Office Manager
Environmental communication	ME	Ecology and Communications Assistant
Environmental coordination of worksites	ME	Environmental Research Officer
Monitoring of biodiversity	ME	Sustainable Development Research Officer
Regulatory monitoring	ME	Environmental Research Officer
Port security	CP	Security Manager

Table 3 : responsibilities of key personnel

c) Memberships & stakeholder management

Memberships in associations and interest groups Dunkerque-Port is a member of the following associations and societies as Agence Française de la Biodiversité, Agence de l'eau, Northlink port, CERDD, GEODE, Natura 2000 networks, AIVP, Chamber of Commerce and Industry, Forum des aires marines protégées....

Relevant stakeholders/stakeholder groups in Dunkirk-Port were identified in connection with the quality certification (ISO 90001) in an internal workshop with the involvement of experienced colleagues from Environmental and Quality Management, Harbour Master and Operation divisions, Development, Controlling and Finance departments. Owing to Dunkerque-ports' port management activities and the resulting broad field of business involving highly diverse duties, the number of relevant stakeholder groups that must be considered is high.

All the stakeholders and stakeholder groups identified by the internal working group with claims on Dunkirk-Port are given in the following list, checked and updated on a regular basis. The following overview shows the frequency or cycle of engagement with stakeholders and what form this usually takes. This register of "*interested parties*" which lists all the players who intervene in the port's activity is available for consultation on the premises of Dunkirk-Port. This table ensures correct integration of stakeholders' expectations and the port's obligations. The various groups pursue very different objectives and require Dunkirk-Port to take different approaches to exchange together: formal works meeting, newsletter, series of routine and ad-hoc meetings facilitate full information sharing.

In addition, to maintain customer contacts, Dunkirk-Port uses various means (meetings, working groups, workshops, events, trade fairs, and the like), to facilitate mutual information on optimum location specific offerings and solutions.

Finally, the website www.dunkerque-port.fr is open to the public. It contains extensive information on the port of Dunkerque and on its activities.

STAKEHOLDER GROUPS (NON-EXHAUSTIVE LIST)	STAKEHOLDER ENGAGEMENT	
	Frequency	Form
EMPLOYEES AND EXECUTIVE COMMISSION		
<i>Staff</i>	At least 1x/y	Meetings with the managing directors/annual performance review
<i>Board of trustees</i>	4x/y	Meetings with the managing directors
<i>Development board</i>	4x/y	Meetings with the managing directors
<i>Trade unions</i>	Regular	Meetings
<i>Chamber of labour</i>	Regular	Meetings
<i>Works council</i>	Regular	Meetings
AUTHORITIES		
<i>State government</i>	Regular	Project-specific working groups
<i>Environmental authorities</i>	Ongoing	Project-specific working groups
<i>State agencies</i>	4x/y	Meetings with the managing directors
<i>Local authorities</i>	Ongoing	Project-specific working groups
<i>Regional authority</i>	Ongoing	Project-specific working groups
SOCIETY		
<i>Press & media</i>	Regular	As required and project-specific
<i>Universities & Research institutes</i>	Ongoing	Project-specific working groups
<i>Port museum</i>	Rare	As required
<i>Non-governmental organizations (FNE, Adelfa, etc)</i>	Non-regular	As required Project-specific working groups
CUSTOMERS		

<i>Industry associations (CCI)</i>	Regular	Meetings
<i>Trade associations (</i>	Non-regular	As required
<i>Industries</i>	Non-regular	As required
<i>Fishermen trade (CRPMEM, Coopérative dunkerquoise, etc)</i>	Rare	As required
<i>Farmers chamber (CA, SAFER)</i>	Regular	Meetings
<i>Farmers</i>	Rare	As required
<i>Shippers</i>	Regular	As required
<i>Shipping agents</i>	Regular	Meetings
<i>Port service providers (RDF, SNCF, Europorte...)</i>	At least 1x/y	Meetings with the managing directors/annual performance review Project-specific working groups
<i>Hunters</i>	Regular	As required
REPRESENTATIVES OF OTHER PORTS		
<i>ESPO</i>	Rare	Meetings
<i>French port institution (GEODE, etc)</i>	Regular	Meetings
PARTNERS		
<i>Boatage operations</i>	At least 1x/y	Meetings with the managing directors/annual performance review Project-specific working groups
<i>Maritime pilots</i>	At least 1x/y	Meetings with the managing directors/annual performance review Project-specific working groups
<i>Towage services</i>	At least 1x/y	Meetings with the managing directors/annual performance review Project-specific working groups
SUPPLIERS		
<i>Construction firms</i>	Ongoing	Project-specific working groups
<i>Waste, material and energy suppliers</i>	Ongoing	Project-specific working groups
<i>Provider of studies, surveys and plans</i>	Ongoing	Project-specific working groups
PROVIDERS OF CAPITAL		
<i>Investment Bank</i>	Rare	As required
<i>European funds</i>	Rare	As required

Table 4 : extract from interested parties register

d) Resources

All the documentation relating to the management system is available on the **"SYMPAD"** internal computer application of our Intranet. The documentation is available to all the staff either via their workstation computer or via a shared computer which they can use. This documentation includes, in particular, the QSE Policy, the directors' meeting minutes and audit reports, the processes and operating methods⁷ and the Harbour Master's document management system for the maritime aspect.

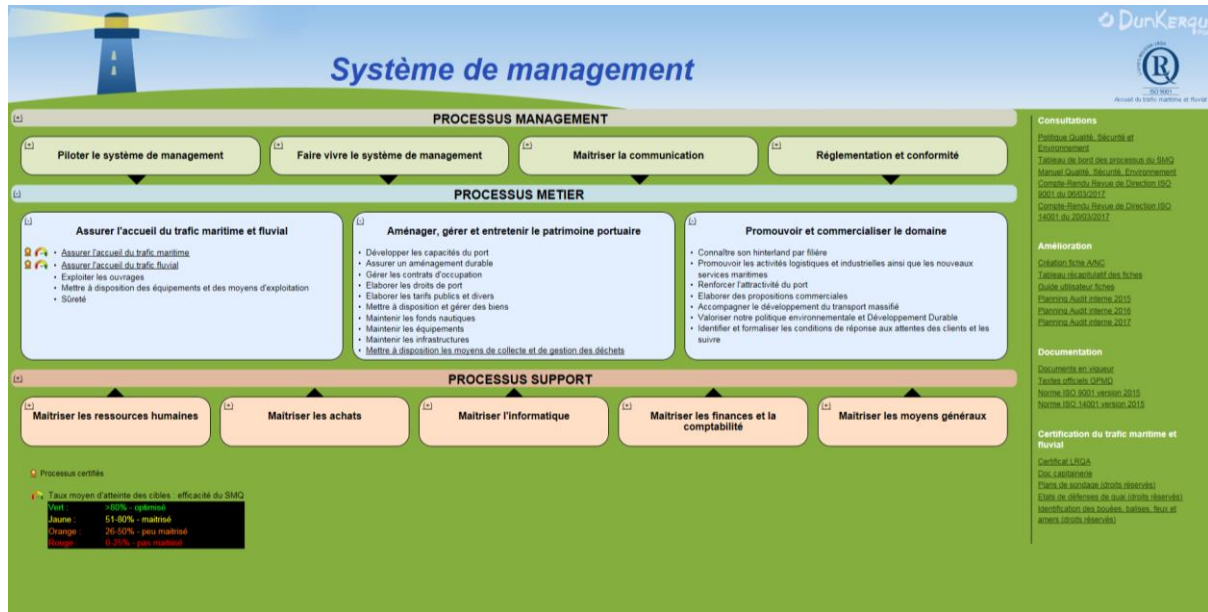


Figure 9 : screenshot of the "SYMPAD" tool

Similarly, the PA2D and its annual review can be viewed on the GPMD Intranet.

Finally, for precise identification of all the financial resources allocated by Dunkirk-Port to environmental management, a tool called **"green accounting"** is currently being deployed.

The purpose of this tool is to enable efficient and exhaustive reporting of the costs generated by environmental activities. Waste collection, maintenance of landscaped areas, sewerage, studies, etc, are now documented and visible by means of this tool.

On this basis, the cost of environmental management was approximately €600,000 in 2016. This figure is an indicator that will change because it does not include environment-related investments or certain activities such as dredging which could be included in this classification.

⁷ For example, the current documentation that can be viewed in SYMPAD on the operation of the management system comprises:

- PAD.PRO.1602 "Environmental analysis"
- PAD.REF.1002 "Regulatory monitoring benchmark"
- PAD.PRO.1601 "Assessment of compliance with environmental requirements"
- PAD.PRO.6003 "Management of training"
- PAD.PCS.6801 "Control of internal communications"
- PAD.PRO.1001 "Documentary control and control of management system records"
- PAD.PRO.1005 "Continuous improvement"
- PAD.LIS.1009 "Management system records"
- PAD.PRO.1002 "Internal audit procedure"

1.4 ANALYSIS OF COMPLIANCE WITH ENVIRONMENTAL POLICY AND LEGAL REQUIREMENTS

Dunkirk-Port must ensure that its environmental performance is compliant with legislation and with the port's environmental policy. The compliance analysis, however, must not end with a declaration of compliance for each legal requirement, but must provide information to identify the measures for improvement which are and will be necessary to maintain or restore compliance with legislation or other standards.



Figure 10 : Dunkirk-Port visit

a) Analysis of compliance with legal requirements

For the record, 1637 legal requirements (articles) have been identified, as well as the recommendations made in Prefectural decrees. As concerns the latter, reviews are conducted every year and the conclusions forwarded to the competent government departments for assessment of their compliance with recommendations.

In the framework of the QSE Policy, and to assist the port in its assessment of compliance with the requirements of regulatory benchmarks, a compliance assistance tool has been developed. This includes the subject, the status of the article, the date of the compliance assessment, the person responsible for the assessment, the results and the evidence. In addition, a list of all the regulatory requirements necessitating periodic inspections is shown in a specific status chart. This information allows an efficient definition of the regulatory periodic inspections to be carried out, as well as their schedules.

The complete compliance analysis is carried out over a period of three years.

Any non-conformity ascertained will then be integrated into the action plan. The appointment of a dedicated contact person, and the implementation of a system for monitoring the evolution of the action, facilitate the correction of non-conformities. Note that, as part of its management system, internal audits may be initiated to assess the compliance of the port's environmental performance. The list of internal auditors is available for consultation on the premises of Dunkirk-Port. The services of an outside service provider may also be enlisted for this type of assignment. Since 2014, internal and external audits have been carried out, the reports of which are available for consultation on the premises of Dunkirk-Port.

b) Analysis of compliance with environmental policy

The environmental policy of Dunkirk-Port is based on the 2014-2018 Strategic Plan, the PA2D and the QSE policy. This makes it possible to structure the port's undertakings in the field of environmental performance. Compliance with the environmental policy is examined through an analysis of the progress of these plans or programmes, which are each subject to an annual review.

In these documents, therefore, each action undertaken, including those set up in response to the guidelines of the environmental policy, is allocated a progress status score. This method serves to highlight the actions which will require particular attention in the coming years. On this basis, a road map is drawn up for the following year. This is submitted every year to the management and to the port's governing bodies for approval. The general PA2D status chart is shown below as an example of the action progress monitoring system. It is available for consultation on the premises of GPMD in the same way as the status charts of the 2014-2018 Strategic Plan and the QSE policy.

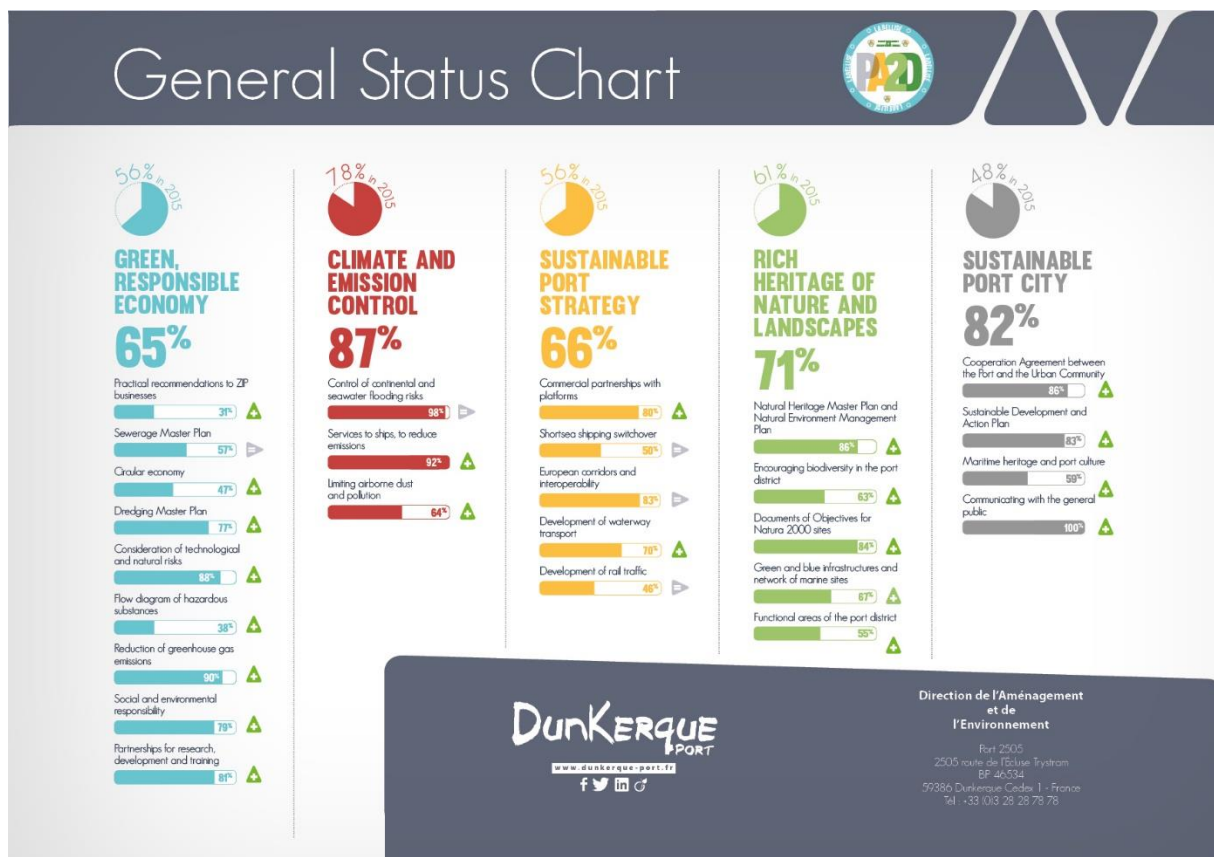


Figure 11 : General PA2D status Chart

c) Avenues of progress

As part of a policy of continuous improvement, Dunkirk-Port is working to identify avenues of progress to be followed in order to develop the port's environmental performance.

As already mentioned, these avenues of improvement are based on the progress review of actions, non-conformities, the evolution of SEAs and changes in regulations as well the general or local issues affecting the area at a given time. This iterative process is based on strong governance bringing together all the stakeholders, so that the government departments, local and regional authorities, associations, universities, etc, are all associated with the policies of Dunkirk-Port through meetings, workshops, committee meetings and conferences.

The operation of the port's environmental management system is set out below:

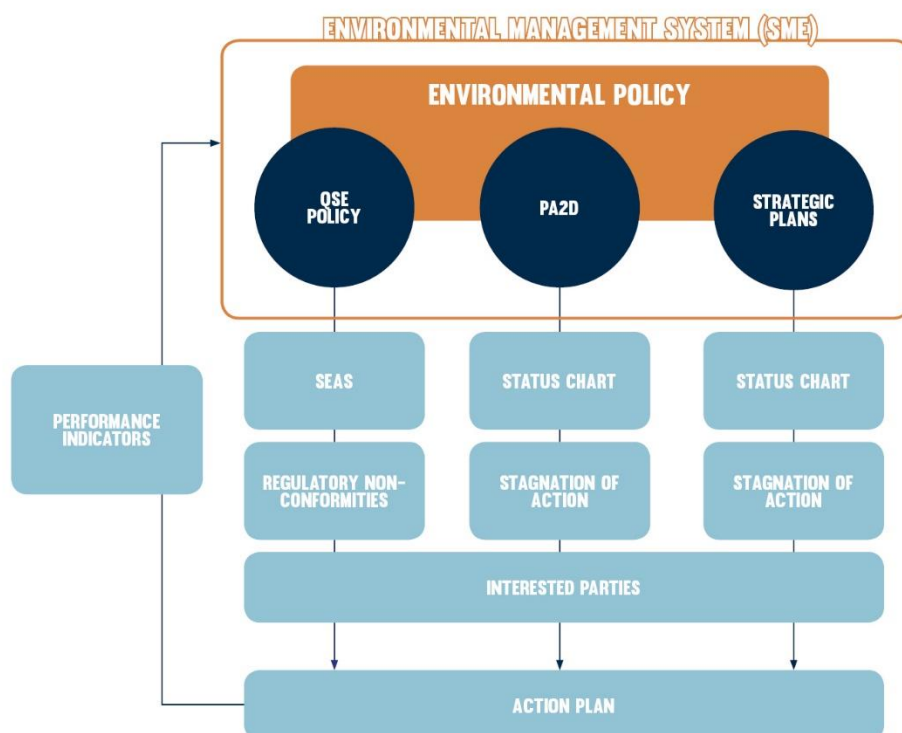


Figure 12 : Dunkirk-Port environnemental management system

As an example, the QSE policy roadmap for 2017 is shown below:



Figure 13 : QSE policy roadmap for 2017

1.5 SUSTAINABILITY DEVELOPMENT REPORT

In the framework of the PA2D, Dunkirk-Port conducts this type of information campaign through a report on the actions undertaken to promote sustainable development of the port district. This document, called the Sustainable Development Report, presents a review of the year elapsed, supported by a large number of performance indicators on all the environmental aspects relating to the port's activities. It is also supplemented by a road map for the coming years contributing to the continuous improvement of its policy, in particular in respect of the current situation and changing regulations. After analysis, this document will be completed from 2018 to meet PERS objectives in terms of reporting as well as in issue frequency (annual).



Figure 14 : Front page of the 2016 Sustainable Development Report

The 2016 Sustainable Development report is accessible to everyone and can be downloaded free (in french) from the Dunkirk-Port website at the following address:

<http://www.Dunkirk-port.fr/index.php?cmpref=49916&lang=fr&module=media&action=Display>

In addition, at least three times a year the “Sustainable Development Days” are organised by the port of Dunkirk, bringing many players together to discuss topical subjects covered by the PA2D of Dunkirk's port and city. Fully in line with the governance put in place under the PA2D, these events guarantee effective consultation between Dunkirk-Port and its partners. They take the form of plenary discussions during the morning and continue in the afternoon with a field visit specific to the subject under discussion⁸. These events, real tools for reporting, allow the public to appraise and comment on the progress of the port's undertakings for the environment and the development of its district.

⁸ A report on the latest Sustainable Development Days is available at <http://www.Dunkirk-port.fr/fr/capitainerie/developpement-durable-Dunkirk-port.html>



Figure 15 : About 80 people gathered during the last “Sustainable Development Days” in October 2017

1.6 EXAMPLES OF GOOD PRACTICE

In the framework of the PA2D, Dunkirk-Port follows a proactive policy in favour of sustainable development of the port district. Since its launch in 2014, and even before then, many actions have emerged that have made Dunkirk an exemplary port nationally. Among many examples of this are the dredging and recycling of undumpable sediment, the management of biodiversity in the port's green and blue infrastructure, the recycling of materials as part of the circular economy, adapting to climate change, and improving the quality of the air.

These topical subjects, forming an integral part of the ESPO's environmental priorities, are the subject of special attention by Dunkirk-Port in light of the issues which they raise.



Figure 16 : ESPO's environmental priorities

The rest of this document contains a glossary of data sheets giving significant actions implemented by Dunkirk-Port in order to address the environmental aspects associated with the activities and businesses on its land.

Adapting to climate change Re-sanding of the Alliés Breakwater beach



1. Project description / Description du projet

Context

Situated between the Eastern Pier of the port of Dunkirk and the sea wall of Malo-les-Bains, the Alliés Breakwater separates the sea from the outlet canal, the only point of discharge into the sea of the water from the canal system draining the Flemish plain. This "key" Class B protective structure protects Dunkirk and its surrounding towns and villages against flooding of the area by overflow of the drainage ditches and seawater flooding in a context of climate change. In view of the strategic value of the structure, the partial ruins due to the storms in 1949 and 1953, recent deterioration and the vulnerability of protected inland areas, the government appointed Grand Port Maritime de Dunkirk (GPMD) to carry out a project to reinforce the Alliés dike in order to provide better protection from exposure to storm swells.

Procedure

The preliminary studies served to characterise the morphodynamics of the site and led to the recommendation of a flexible solution of massive re-sanding (1,500,000 m³) at the foot of the breakwater in order to dissipate the swells that were likely to damage the structure. This solution, which falls within the current strategy of sustainable management of the

	<p>coastline, should also serve to supply the adjacent beaches in respect of the local hydrodynamics in place.</p> <p>In agreement with the government departments, GPMD carried out repair and reinforcement works in two phases. The first phase took place in December 2011, with the dumping of 300,000 m³ of sand next to the structure, raising the level of the beach to +5m CD to form a wearing course pending the main tranche of the works. The second phase, which took place in the spring of 2014, involved the spreading of 1,200,000 m³ of sand and the structural repair of the breakwater.</p> <p>The materials were lifted using a Trailing Suction Dredger in the borrow areas defined in the Prefectural authorisation pursuant to the Water Law dated 4 October 2013.</p> <p>The materials were transported by the Trailing Suction Dredger and then discharged on to the beach by a flexible pipe from the dredger. Finally, the materials moved were reshaped by earthmoving machinery on the beach.</p> <p>Since the execution of the works in 2014, the reconstituted beach has been monitored in partnership with the Littoral Côte d'Opale University under an industrial research thesis agreement ("CIFRE"). These monitoring operations make it possible to observe changes in the profile of the beach and plan subsequent reinforcement works. Measures to reduce nuisance (windbreak nets, planting of grasses, etc) have been put in place to limit the amount of windblown sand on the breakwaters, which are intended as tourist sites.</p> <p>These developments are of value locally, regionally and nationally because, at the time, this was the first resanding of this magnitude to be carried out in France.</p> <p>This first large-scale operation may subsequently be repeated on other sites if the need arises. In this respect, at the same time GPMD is working on the definition of Plans for Management of the Sedimentation Units of its Coastline (UG4) and the adjacent coastlines (UG3 and 5) in order to manage them efficiently. Beach re-sanding operations will be necessary in this respect in a context of rising sea levels and adaptation to climate change.</p>
Timescale	The beach re-sanding works took place in 2011 and 2014. Additional works to reinforce the structure will be carried out in the summer of 2017. Monitoring operations are carried out periodically as part of the thesis.
Cost	The works were funded by credits from the ERDF and the State. The total cost of re-sanding is approximately 5 million Euros.
2. Environmental aspects concerned	
Sediment, water, land and marine biodiversity, marine habitats, air.	
3. Operators concerned	
DREAL Hauts de France (Regional Department of the Environment, Development and Housing) CEREMA (Centre for Research and Expertise on Risks, Environment, Mobility and Development) ULCO (Littoral Côte d'Opale University) Engineering firms (IDRA, DHI, GEODUNES)	
4. Documentation	
GPMD internal reference documents: 2014-2018 Strategic Plan - 2014 Sustainable Development and Action Plan (PA2D) – 2014 Dredging Master Plan (SDD) - 2012 Operational Dredging Management Plan (PGOM) – 2015 UG4 Management Plan (in progress)	
Website	

Dunkirk-Port (<http://www.Dunkirk-port.fr/>)

Publications

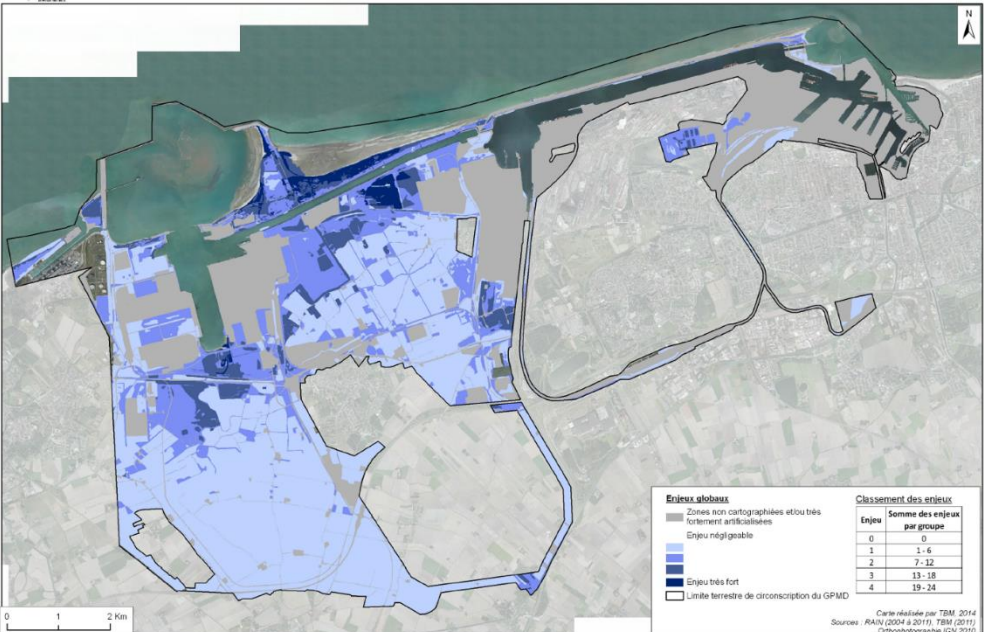
Adrien Cartier, Antoine Tresca, Nicholas Grunnet, Bertrand Michard, Nicolas Forain, Thomas Vial
[Confortement d'un ouvrage de prévention des inondations et des submersions marines: l'exemple de la digue des Alliés à Dunkirk](#) (*Reinforcing a structure for protection against continental and seawater flooding: the example of the Alliés Breakwater in Dunkirk*) (pp. 641-648)

Natural Heritage Master Plan

ETAT D'AVANCEMENT DU SDPN ET COHÉRENCE AVEC LA TRAME VERTE ET BLEUE D'AGGLOMÉRATION



BIODIVERSITY COMPENSATORY MEASURE



1. Project description / Description du projet	
Context	The LNG Terminal project in 2008 provided the opportunity of drawing up an inventory of the fauna, flora and habitats throughout the Western Port area. This inventory informed the Port on the ecological issues at stake on its territory. So, in the framework of its PA2D, GPMD drew up a Natural Heritage Master Plan (SDPN), representing a full-scale green and blue infrastructure for the whole port district, a strategic tool designed for the structuring and planning of actions to preserve and enhance the natural environments of the port's territory.
Procedure	<p>The Fauna, Flora and Habitat Inventory of 2008, reinforced by the one of 2011, revealed that most of the area consists of unused land with little ecological value. By contrast, there are some small areas of significant ecological interest which are not interconnected. The aims of the SDPN were therefore to preserve the natural heritage in <i>nature enclaves</i> (biodiversity hubs), and reinforce the functionalities by <i>ecological corridors</i>, in an iterative approach of anticipating future development projects and preferential siting of their future compensatory measures. The policy was drawn up jointly with the area's operators and is fully integrated in the green and blue corridor of the Dunkirk area.</p> <p>Finally, each of these newly created nature enclaves and corridors is subject to a multi-annual management plan for optimum deployment of the biodiversity. Monitoring of fauna and flora is organised with local environmental associations.</p> <p>In the framework of the SDPN, the inventories were updated in 2015-2016 at the broader scale of the district. All these data have been organised in a SIG database.</p>
Timescale	<p>2017: Natural Port Environment Management Plan (PGEN)</p> <p>2017: First Ecobalance Review (2016-2011).</p>
Cost	<p>Cost of inventories</p> <p>Cost of plans for management of the port's natural areas</p> <p>No subsidies</p> <p>ERDF funding for the Barreau de Saint-Georges corridor</p>
2. Environmental aspects concerned	
<p>Biodiversity</p> <p>Governance</p> <p>Community integration</p>	
3. Operators concerned	
<p>Dunkirk Urban Community</p> <p>Dunkirk Town Planning Agency (AGUR)</p> <p>Local environmental associations (ADELFA; CPIE Flandre Maritime (<i>Permanent Environmental Initiatives Centre</i>); GON (Ornithology and Nature Association; GOELAND)</p> <p>Hauts de France Region</p> <p>DREAL Hauts de France</p>	
4. Documentation	
<p>GPMD internal reference documents:</p> <p>SDPN, 2011</p> <p>Concilier la biodiversité (<i>Reconciling Biodiversity</i>), 2011</p> <p>Nature in Ports, 2016 – ESPO Award</p> <p>Website: Dunkirk-Port (http://www.Dunkirk-port.fr/)</p>	

Environmental coordination



1. Project description / Description du projet

Context

Since the LNG terminal project in the 2010s, Grand Port Maritime de Dunkirk has routinely carried out environmental coordination for its port development works, to verify correct consideration of the environmental issues and fulfilment of the environmental undertakings made concerning the works.

Procedure

The different steps required for the inclusion of the "environment" aspect in a project are:

- Preliminary studies (surveys, inventories, definition of issues at stake and constraints, definition of undertakings, etc).
- Defining the environmental context in the tender file: drafting of a General Environmental Coordination Plan setting out in detail the environmental requirements for worksites and the procedures for quality control and expected results (issues at stake, training, introductory booklet, etc).
- Analysis of applicants' proposals.
- The Environmental Assurance Plan defining the undertakings and method of organisation of contractors in terms of the environmental issues.
- Monitoring of works and of implementation of the Environment Assurance Plan through environmental inspections (worksite visits, attendance at meetings, reports on damage to the environment) and the creation of an environmental coordination log to record the observance of sensitive areas, displacement of species, and monitoring of waste management on the worksite.

Timescale	Tendering and works phases
Cost	€25,000 ex-VAT per year
2. Environmental aspects concerned	
All aspects: Water, air, soil, natural environment, waste	
3. Operators concerned	
GPMD, Contractors	
4. Documentation	
Website Research report Publications Brochures	

Ship waste management



MARPOL POINT



MARPOL POINT



LIQUID WASTE COLLECTION

1. Project description / Description du projet

Context

The port has set up a policy for shared management of ship waste, through a ship waste collection and treatment plan approved by Prefectural decree on 5 August 2015. In accordance with the provisions of the MARPOL Convention, the port of Dunkirk has all the equipment necessary for collecting operational waste and cargo residues (solid and liquid) from ships.

Procedure

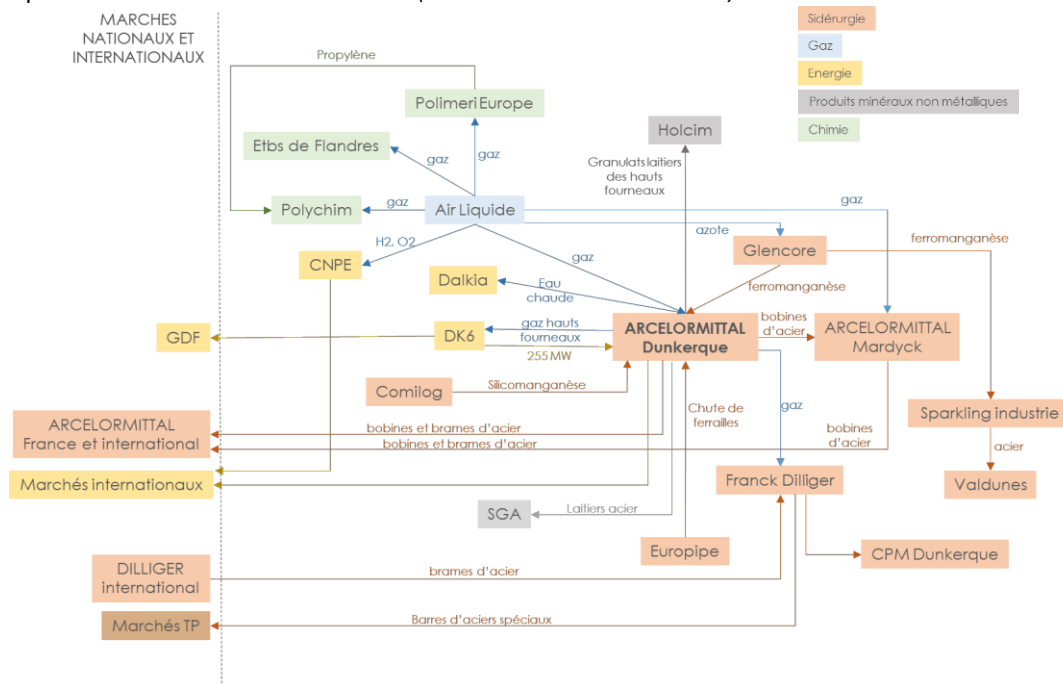
The waste produced by ships consists of oily waste, harmful liquid substances (chemicals), wastewater and miscellaneous waste (soot, detergents, paints, sweepings, plastics, dunnage, shoring, lining materials, packaging, cloths, glass, food waste and so on).

Fixed skips are available for ships' solid waste, with selective sorting (MARPOL points). Liquid waste is collected at the request of the ship's agent by truck or barge. Collection is done by accredited companies.

Timescale	-
Cost	-
2. Environmental aspects concerned	
Water, Waste	
3. Operators concerned	
GPMD/Harbour Master's Office, ships' agents, ships, waste collectors	
4. Documentation	
Website: http://www.Dunkirk-port.fr/index.php?cmpref=41101&lang=fr&module=media&action=Display	

Green industry and circular economy

Excerpt from Dunkirk Industrial Relations (AGUR 2015 - Toile Industrielle®)



1. Project description / Description du projet

Context

The first practices in the field of green industry in the Dunkirk area began long ago, under the leadership of the port-based steel manufacturer ArcelorMittal, in response to constraints of the production process.

However, most of the synergies between companies, also known as "industrial symbiosis", were put in place in the 1990s to comply with increasingly stringent environmental regulations, particularly in terms of atmospheric releases.

This led to the launch of a full-scale green industry project in 2000 because industrial firms saw it as highly significant. A body responsible for promoting green industry, the ECOPAL association ("Economy and Ecology, Partners in Local Action") was formed, reflecting the local stakeholders' intention to promote green industry and development in the labour market.

Over the years this association has facilitated the creation of an industrial exchange network, by focusing its efforts on synergies for sharing, reinforcing exchanges of information between the environment departments of large firms and SMEs. In 2007 the ECOPAL association made an inventory of industrial product flows (water, energy, raw materials, waste, by-products, etc) with the aim of listing them, quantifying them and entering them into a database, and subsequently highlighting the synergies possible between different firms. The inventory of industrial product flows also revealed the potential means of pooling incoming flows, outgoing flows, equipment and services. The study led to the creation of a full-scale decision-making tool, helping to multiply inter-industry product flows. Produced by the Flandre Dunkirk Town Planning Agency (AGUR), the "Toile Industrielle" (*Industrial Relations Network*) shows the dynamic system of relationships and contacts between companies and suggests possible partnerships for the setup of an environmental and resource network.

Procedure	<p>In the Dunkirk area, the main flows involve industrial firms, most of them based in the port district. This means that the port is home not only to the historical part but also to the densest part of local green industry.</p> <p>As part of its mission to develop and manage industrial areas, the port of Dunkirk promotes this dynamic and encourages new industrial firms wishing to set up in the port to join this virtual system which is a vital component of the circular economy. Thus, in addition to the successful examples achieved by Arcelor and its partners in the past (heating network, generation of electricity from blast-furnace gas, recycling of slag, etc), new opportunities have emerged as a result of the port's commitment. There are many examples of this:</p> <ul style="list-style-type: none"> • The ECOCEM Group, currently setting up in the port of Dunkirk, which operates according to this principle of circular economy by recycling a secondary material from steelmaking and preserving natural resources. ECOCEM is Europe's largest independent producer of environmentally-friendly cement, ECOCEM ground slag. This material is produced by converting granulated blast-furnace slag. It is used in many applications: cement-substitute concretes, cement screeds, and hydraulic road binders, to name but a few. A cement containing 70% of ECOCEM cement produces approximately 2½ times less CO₂ emissions per m³ of concrete than a conventional cement. • Dunkirk LNG, the operator of Dunkirk's LNG Terminal, which has deployed an original solution to regasify the LNG arriving in tankers in liquid form at a temperature of -160°C. The idea is to recover some of the warm water discharged by the nearby Gravelines nuclear power plant to raise the temperature of the LNG. This water, initially drawn at sea to cool the installations of the nuclear power plant, is discharged after regasification of the LNG, at its original temperature, into the LNG terminal dock, near where it was drawn. To implement this innovation, an underwater tunnel 5 kilometres long has been dug at a depth of 50 metres under the sea to connect the gas terminal to the Gravelines plant. Ultimately, the benefits are twofold: for both the water resource and the climate. In fact, this solution will prevent the release of up to 500,000 tonnes of CO₂ a year into the atmosphere. • The company INDAVER, whose setup is scheduled for the end of 2018 and which will recycle production residues and residual chlorine in order to recover the chlorine in the form of hydrochloric acid and recycle the energy produced. ECOPHOS, a producer of food-grade phosphates and a neighbour of INDAVER, will be able to use this hydrochloric acid in its production process. Instead of transporting this raw material, INDAVER will deliver the hydrochloric acid directly to the factory by a pipeline. The energy produced by INDAVER during the treatment process will also be delivered by pipeline to a nearby company for reuse. <p>Seen as a whole, the port district now represents the most successful experiment in green industry in France as regards industrial exchange in a dynamic of circular economy.</p>
Timescale	Term of the 2014-2018 Strategic Plan
Cost	-

2. Environmental aspects concerned

Air, climate change, natural resources

3. Operators concerned

AGUR

ECOPAL

Dunkirk Urban Community

Industries of the Dunkirk area (Arcelor Mittal, ECOCEM, ECOPHOS, INDAVER, Dunkirk-LNG, etc)

4. Documentation

GPMD internal reference documents:

2014-2018 Strategic Plan - 2014

Sustainable Development and Action Plan (PA2D) – 2014

Website

Dunkirk-Port (<http://www.Dunkirk-port.fr/>)

INDAVER (<http://www.indaver.be/fr/news-media/detail-focus/indachlorR-une-solution-durable-pour-des-residus-chlores-a-Dunkirk/>)

ECOCEM (<http://www.ecocem.fr/wp-content/uploads/2014/05/ecocem-ecologie-industrielle.pdf>)

Dunkirk LNG (<https://www.edf.fr/groupe-edf/producteur-industriel/carte-des-implantations/terminal-Dunkirk-Lng/presentation>)

Governance and community integration



1. Project description / Description du projet

Context

The port district is part of Dunkirk Urban Community which has a population of nearly 200,000 in 20 towns and villages. The activity generated by the port district certainly creates economic gain, especially in terms of employment and added value, but the proximity of certain installations to residential areas can cause nuisances for residents in the vicinity. To consolidate existing links with the local authorities and the residents of Dunkirk and its area, the port of Dunkirk has initiated a number of actions to encourage strong governance at Dunkirk city scale as well as better community integration of the port's activities. This policy is reflected in the 2014-2018 Strategic Plan and the Sustainable Development and Action Plan (PA2D) of the Port of Dunkirk.

Procedure

Governance

Since 2008, the year of the ports reform, the Urban Community and Grand Port Maritime de Dunkirk have structured and reinforced their partnership to promote the sustainable development of the area. DUC is a major partner of the port, fully committed and strongly involved in the design and implementation of the PA2D. A new partnership agreement, structured around the three working guidelines of economic development, environmental problems and regional dynamic, was signed in November 2016 to reinforce the commitment of both parties to the vitality of the area.

Community integration

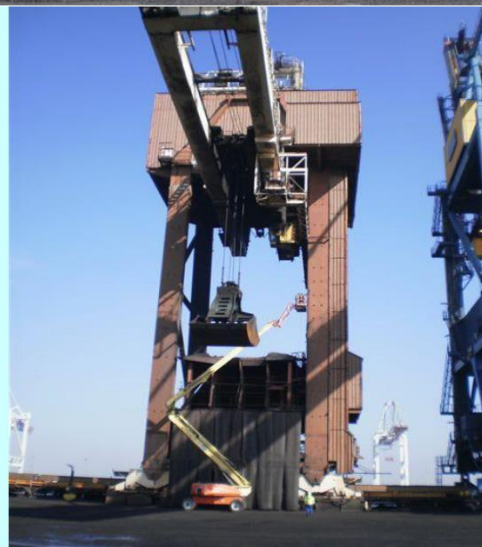
To help Dunkirk's residents to appreciate the value of the port culture, Dunkirk-Port initiates many actions to encourage better community integration of the industrial port area (ZIP). For example, as well as the Sustainability Days, many events are organised for

	the public every year: visits to the port, nature workshops and exhibitions, with the support of the Port Museum or CPIE Flandre Maritime. In addition, following on from these initiatives and in partnership with DUC, the Port Museum, the Learning Centre, AGUR and local associations, work was begun in 2016 to develop the concept of the Port Centre in Dunkirk. This clear policy of openness on the part of the port was recognised at the 2016 ESPO Awards, when Dunkirk-Port was one of the five finalists of this competition which rewards European ports working towards better community integration of their districts.
Timescale	2016-2020 Agreement Community integration: 2014-2020
Cost	-
<h2>2. Environmental aspects concerned</h2>	
<p>The agreement signed between the Urban Community and Grand Port Maritime de Dunkirk has a broad environmental scope: management of the port's natural environments, quality of marine environment, air quality, etc.</p> <p>The principle of community integration is based mainly on the human environment of GPMD.</p>	
<h2>3. Operators concerned</h2>	
<p>Dunkirk Urban Community Dunkirk Town Planning Agency (AGUR) Port Museum Learning Centre Local environmental associations (e.g. ADELFA)</p>	
<h2>4. Documentation</h2>	
<p>GPMD internal reference documents: 2014-2018 Strategic Plan - 2014 Sustainable Development and Action Plan (PA2D) – 2014 DUC-GPMD Agreement 2016-2020 Nature in Ports 2016 – ESPO Award</p> <p>Website Dunkirk-Port (http://www.Dunkirk-port.fr/) Press releases DUC Agreement http://www.Dunkirk-port.fr/fr/presse/actualites/2016-11-28-cooperation-renforcee-cud-Dunkirk-port-fr-48284.html</p>	

Control of airborne dust in the Western Port bulk terminal



Installation of spray booms
at base of gantries



1. Project description / Description du projet

Context

Due to its activity of handling and storage of ore and coal, the bulk terminal of Dunkirk's Western Port generates airborne dust and causes nuisance for the environment and local residents.

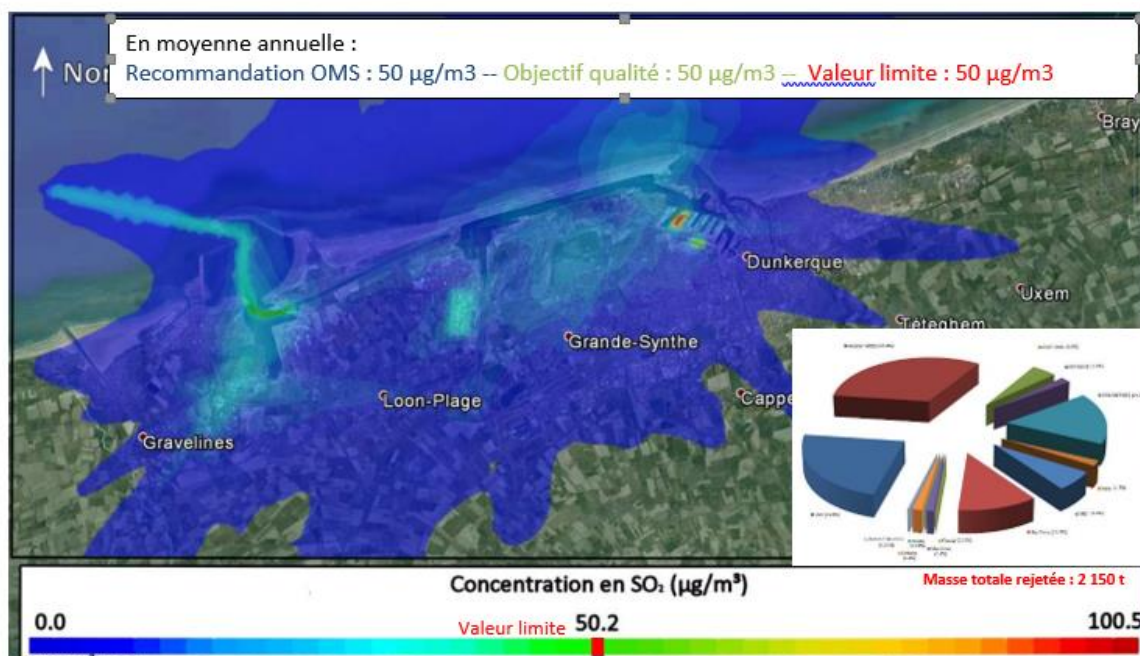
On the one hand, for more than ten years, many systems have been put in place at the bulk terminal to reduce its dust emissions.

On the other hand, GPMD and the terminal operator, in collaboration with the State and other industrial firms of the Western Port, have set up a network for the monitoring of settleable particulates composed of four sensors, to address this problem of airborne dust and complaints from nearby residents affected by this nuisance.

Procedure	<p>The bulk terminal operator SEABULK has put in place many measures to reduce the quantities of airborne dust:</p> <ul style="list-style-type: none"> - The discharge and loading gantries are equipped with dust-suppression systems; - Unless this is proved to be technically impossible, the installations for handling, transfer and transport of powder products are equipped with hooding and suppression systems to reduce airborne dust, and in particular: <ul style="list-style-type: none"> o The conveyor ramps are equipped with dust-suppression systems and hooded. o The wagon loading towers are hooded. o Trucks loaded with powder products are tarped before they leave the site. If they only drive inside the site, the products transported are wetted. o The conveyors are equipped with windbreak devices unless this is technically impossible. o The bucket-wheel stackers are equipped with dust-suppression systems. The speed of vehicles carrying powder products is limited to 20 km/hr. o A wagon level-capping system prevents bulk products from being loaded higher than the top of the wagons. - A system for spraying stock and some of the traffic areas is in place in all the storage yards and comprises a network of 196 masts, each equipped with a water cannon. These cannons are arranged along the storage yards and are controlled remotely by computer. The sprayers are placed at the top of the masts and have a range of 45 metres to suppress fine fractions of coal and ore. The cannons for spraying stock and roadways are managed remotely by computer with pre-set cycles (ten cycles) and modified as required; in addition, the water cannons can be managed individually to allow shutdown or forced operation for specific areas. - In case of long-term storage, the heaps of ore and coal concerned are lacquered. - Planted areas: A 50-metre strip around the installations (north, west and south sides) is landscaped; the outer part of these landscaped areas is planted with shrubs over a width of at least 3 metres. In all, more than 3,000 shrubs have been planted since 2003. The planting was supplemented in 2008 by a row of standard trees along the west frontage of the site. This frontage is located in the north-east part, where the winds blow towards the nearest residential buildings. These arrangements help to limit airborne dust in the north-east sector. - Measurements of the settleable and suspended particulates of the atmospheric emissions are carried out continuously and recorded (three automatic, continuous, settleable particulate measuring devices are installed at the property boundary). These instruments, with automatic real-time control, enable the operator to identify any drift and put in place any corrective action needed.
Timescale	Systems put in place gradually since 2005
Cost	-
2. Environmental aspects concerned	
Air, nuisance to local residents	
3. Operators concerned	
GPMD, SEABULK, DREAL, Sub-Prefecture, other industrial firms of the Western Port (BEFESA, RIO TINTO, COMILOG)	
4. Documentation	
Website: http://portouestdk.poussieres.info/	

Air quality - Modelling of emissions

Résultats de modélisation pour le SO₂, Toutes sources d'émissions confondues



1. Project description / Description du projet

Context

The history and geographic location of port and city have made Dunkirk an essential link in the European energy network, due to the number and size of the facilities on its territory for the generation, import, consumption and transformation of energy. Industry, maritime traffic, road traffic, and the high density of the urban population induce high levels of atmospheric pollutants. Although the regulatory thresholds are not exceeded across the city, 12 episodes of pollution were recorded in 2015, over a total duration of 24 days, by ATMO Hauts de France (Air Quality Monitoring Association).

To produce accurate data on the pollutant concentrations in the district and identify those responsible for the emissions, the port of Dunkirk conducted a modelling study of pollutant emissions in 2015-2016.

Procedure

Alongside the monitoring activity of ATMO Hauts de France, this study provides a detailed view of the concentrations of atmospheric pollutants across the ZIP. Nearly 35 regulated and non-regulated substances have been analysed in this way. The conclusions of this report are encouraging; the regulatory thresholds are observed throughout the port district and the trend has now been downward for several years.

This approach follows a series of studies carried out by the SPPPI (Permanent Secretariat for the Prevention of Industrial Pollution) in the 2000s which had identical goals but which have recently not been renewed. For this reason a maximum number of polluters has been considered in order to obtain results that are as close as possible to the actual situation in the field as recorded by the ATMO monitoring network. The innovative feature of this study is the inclusion of ships' emissions which had never been taken into account, despite a non-negligible contribution in the area investigated.

This modelling study of the dispersion of atmospheric pollutants represents a key first step for the port of Dunkirk in gaining knowledge and monitoring the emissions generated by

	<p>the port's activity. An emerging partnership with ATMO Hauts de France, dating from the beginning of 2017, will underpin this view and serve to initiate a structured approach for the reduction of emissions in the port district.</p> <p>Many actions are under way for this purpose, particularly with industrial firms as part of the circular economy approach. An LNG bunkering project is also being studied to allow the provisioning of ships using this more environmentally-friendly fuel, as well as a shore power project for container carriers. These actions also form part of Dunkirk Urban Community's Regional Air, Climate and Energy Plan (PACET).</p>
Timescale	Study carried out in 2015-2016 to be supplemented in 2017-2018 together with ATMO Hauts de France.
Cost	€28,000 for the modelling study
2. Environmental aspects concerned	
Air	
3. Operators concerned	
ATMO Hauts de France Dunkirk Urban Community	
4. Documentation	
GPMD internal reference documents: 2014-2018 Strategic Plan - 2014 Sustainable Development and Action Plan (PA2D) – 2014 Modelling study on dispersion of atmospheric pollutants - 2016 Website Dunkirk-Port (http://www.Dunkirk-port.fr/)	

Sustainable management of rainwater in the Eastern Port of Dunkirk



1. Project description / Description du projet

Context

Grand Port Maritime de Dunkirk drew up a Sewerage Master Plan (SDA) in 2010, to define the actions which the Port must carry out to bring the port sewerage networks into compliance and set the targets to be achieved in terms of discharge.

With the Dredging Master Plan, its aim is to improve the quality of the aquatic environments and particularly the quality of the harbour water, in line with the quality targets set in the Water Framework Directive (WFD) and the Water Management and Development Master Plan (SDAGE).

The action plan comprises several separate sections aiming to reduce the sources of pollution in transitional waters and therefore in coastal waters. These actions include:

- Separation of the wastewater discharge pipes from the sewerage network managing rainwater;
- The use of non-collective systems for wastewater treatment;
- The management of rainwater by infiltration into the soil (percolation trenches) wherever possible rather than by discharge into the natural environment (Docks or watergangs);
- The setup of emission agreements with the industrial firms present in the port district.

Procedure	<p>Grand Port Maritime de Dunkirk has thus brought sustainable management of rainwater into the Docks sector in the Eastern Port of Dunkirk. This area of 60 ha had 51 discharge points into the port docks.</p> <p>The Port of Dunkirk had to choose an adapted solution because of constraints specific to the sector: the need for treatment before discharge into the natural environment, large impermeable surface area with small gradient, subsoil formed of various materials, backfill and groundwater close to the surface between 1.5 and 2 m), storage of fines and granular materials (risk of clogging of gullies) with the associated handling and movement.</p> <p>Faced with these constraints, and to respond to the regulatory requirements, Grand Port Maritime de Dunkirk issued a competitive-dialogue call for tenders to enable it to sign a contract without imposing the required technical solution at the outset.</p> <p>The technical solution chosen consists in combining "trench" storage and a percolation platform. The rainwater collected in this way (from roofs and traffic ways) percolates between the joints of porphyry paving (non-porous). The structures are designed to percolate 10 mm of rainfall in less than 24 hours. Above this quantity, the low gradient of the site and the large surface areas allow storage of the excess water in very small depths (a few centimetres) and without disruption to the port's activity.</p> <p>The benefits of this solution are:</p> <ul style="list-style-type: none"> • Economic gain: the total cost is half that of a "drainpipe only" solution and treatment before discharge • Number of discharge points reduced from 51 to 18 with pre-treatment by lamellar clarifiers • Limited maintenance: surface sweeping of sand joints once or twice a year to ensure continued permeability • Reduction of environmental footprint with recovery of paving blocks on site • Project compliant with the SDAGE which recommends percolation
Timescale	Developments completed and operational
Cost	€50,000 ex-VAT per hectare treated (2013)
2. Environmental aspects concerned	
Water Sediment	
3. Operators concerned	
GPMD, Artois Picardie Water Agency, Groupement Lyonnaise des Eaux/SOGEA	
4. Documentation	
<p>Website: http://www.Dunkirk-port.fr/fr/presse/actualites/2015-12-15-programme-pluriannuel-d-actions-2014-2016-entre-Dunkirk-port-et-l-agence-de-l-eau-artois-picardie-fr-42171.html</p> <p>Publications:</p> <ul style="list-style-type: none"> • "Techniques alternatives en territoire portuaire" (<i>Alternative techniques in the port area</i>), Antoine Pierrot, Lyonnaise des Eaux; • Fiche de cas n°7, boîte à outils des techniques Alternatives (<i>Case study 7, Alternative Techniques Toolbox</i>), ADOPTA 	

Recycling of undumpable dredging silt



1. Project description / Description du projet

Context

The Port of Dunkirk needs to maintain the necessary draughts for shipping in all its docks. For this purpose it was granted a ten-year dredging permit, renewed in 2012, by Prefectural Order. Rigorous analyses have shown that in a few inland docks, the dredging operations encountered sediment (silt) with a level of contamination above the regulatory thresholds in force (heavy metals, TBT, HAP and PCB) that allow them to be returned to the aquatic environment. To compensate for the impossibility of dumping this sediment, GPMD has implemented solutions for onshore management and recycling of so-called "undumpable" sediment after a precise definition of the contaminated sectors identified. This approach, begun in 2009, is part of a circular economy dynamic, replacing the systematic dumping of these materials which are considered as waste.

Procedure

The Port of Dunkirk has developed a treatment platform of 6 hectares, operating on the principle of natural dehydration, that can handle 60,000 m³ of silt per storage campaign.

	<p>This site, built in 2006, is currently governed by an ICPE order (2016). The purpose of this structure is the stabilisation and drying-out of silt (reduction of biotoxicity, water content and salt content).</p> <p>The operating principle is based on a silt dredging campaign inside the inland docks and comprises several successive phases:</p> <p>Phase 1: Discharge of dredged materials into the three settling basins followed by natural settling of the sediment. Drainage of settling water into a dedicated basin by means of a system of sluices. The water from the settling basin is discharged into the natural environment after analyses;</p> <p>Phase 2: Natural dehydration by evaporation;</p> <p>Phase 3: Mechanical dehydration using machinery (turnover in the form of windrows);</p> <p>Phase 4: Transfer to three sectors for recycling.</p> <p>The total duration of the drying-out phase is 8 months. After treatment on the platform the silt, previously waste, is recycled in three tried and tested sectors and one currently under study:</p> <ul style="list-style-type: none"> • Ecodesign landscaping (1 tranche per year), which contributes to the creation of a nature enclave within the port's green and blue corridor • Roadbuilding (subgrade) • Concrete blocks for sea defence • Aggregate (in progress as part of a research programme conducted by ECOSED) <p>Ecodesign landscaping thus comprises 92% of undumpable sediment, roadbuilding nearly 25% and concrete blocks approximately 13%.</p> <p>All these applications have been executed under Prefectural decrees and have undergone a health risk analysis. This has enabled the port, with its partners, to demonstrate the technical and administrative feasibility of re-using undumpable sediment under acceptable, controlled environmental conditions.</p>
Timescale	First campaign started in 2009 and continuing until 2018 (when the 2014-2018 Strategic Plan will be updated).
Cost	3.04 M€ investment over the term of the 2014-2018 Strategic Plan
2. Environmental aspects concerned	
<p>The undumpable silt treatment plant has a permanent, direct, overall positive impact as it allows the recycling of polluted silt (waste) as well as the protection of the marine environment (water, biodiversity, habitats) which is kept clean by means of these operations.</p>	
3. Operators concerned	
<p>Hauts de France Region Mines de Douai (<i>Higher Institute of Engineering</i>) Water Agency ... Chaire ECOSED (http://ecosed.ur.mines-douai.fr/fr/acceuil/) Sédimatériaux (http://www.sedilab.com/)</p>	
4. Documentation	
<p>GPMD internal reference documents: 2014-2018 Strategic Plan - 2014 Sustainable Development and Action Plan (PA2D) – 2014 Dredging Master Plan (SDD) - 2012 Operational Dredging Management Plan (PGOM) - 2015</p> <p>Websites</p>	

Chaire ECOSED (<http://ecosed.ur.mines-douai.fr/fr/acceuil/>)

Sédimatériaux (<http://www.sedilab.com/>)

Dunkirk-Port (<http://www.Dunkirk-port.fr/>)

Publications

Sofie Herman, Daphné Glaser, Alain Pieters, Pascal Gregoire, Christophe Priez, Didier Desmoulin, David Guglielmetti [Cinq ans de valorisation des sédiments contaminés extraits du Port de Dunkirk \(France\)](#) (*Five years of recycling polluted sediment from the Port of Dunkirk, France*) (pp. 987-998)

Brochure (<http://www.Dunkirk-port.fr/index.php?cmpref=49656&lang=fr&module=media&action=Display>)



Dunkirk-Port

2505 route de l'Écluse Trystram, BP
46534, 59386 Dunkirk Cedex 1
France

