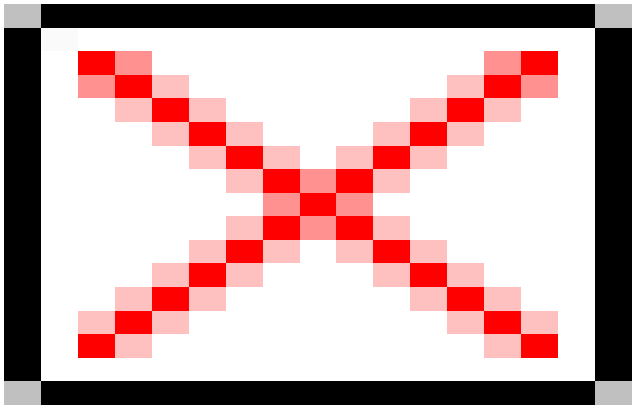
IMDC
Coastal infrastructures
Location:
Belgium
Client:
Flemish Government, Coastal Division



**Project Contact Information**

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# Integrated Masterplan for Flanders Coastal Safety

Although Belgium has a limited length of coast (65 km), each kilometre is optimally used.  Many residential areas, industrial zones, tourism, recreation and important nature reserves are present. To balance the needs of these interest groups, at present and in the future, all of them have to be involved intensively. Without losing grip of the overall concept, special attention has to be given to coastal safety. Due to climate changes (e.g. rising of the sea level, extreme storms, increased wave energy) and continuing developments, protection against coastal flooding will become increasingly difficult.

The project includes the following topics:

1. Safety assessment: control of the actual coastal protection level:
   A methodology for the control of the coastal protection (dykes, dunes, beaches, harbours) has been established. Application to a 1000 and 4000 year storm event and this for current and future (2050) hydraulic conditions.
2. Flood risk calculations:
   Flood risk maps for the present and future (2050) situation have been produced as a base for the Social Cost Benefit Analysis (4)
3. Solutions and alternatives:
   Different measures and alternatives to reduce present and future flooding and flood risks are being worked out. Protection against 1.000 and 4.000 year storm events, as well as the possibilities towards a differentiated protection level will be identified by combining various ?soft? and ?hard? protection measures.
4. Social Cost Benefit Analysis (SCBA):
   The different solutions have been evaluated in a Social Cost Benefit Analysis. Costs and benefit along with possible side effects of all solutions are inventoried, quantified and evaluated to result in optimal safety levels along the Flemish coastline and the best combination of safety measures for protection against erosion and coastal flooding.
5. Environmental Impact Assessment (EIA):
   The necessity of an Environmental Impact Assessment will be investigated on two levels: the global master plan along the entire coastline and local plans, which are extracted from the global plan. Possible compensation measures are also worked out.  This action has a strong interconnection with the SCBA.
6. Legal framework:

The present legislation is being evaluated to define possible gaps and needs for changes. The need for a safety decree on the Flemish coastal defence is also being studied.

7. Master plan
   Two actions have been undertaken:
   Comparison and analysis of existing master plans in partner countries of the Safecoast project;
   The set-up of a master plan for Flanders
8. Risk Management
   The possible risks that may occur during the implementation of the safety measures proposed in the master plan are being analysed (budget, timing,?).
9. Contribution EU-project Chain of Safety
   Continuous technical and scientific support has been provided to the Coastal Division for the EU-project: Chain of Safety.
10. Communication
    During the entire study different communication moments and products are developed: articles / brochures / leaflets / information sessions / public inquiry / ?

Within the project team IMDC is responsible for the overall coordination of the project, the safety assessment, the definition of the measures and alternatives and the contribution to EU-projects (Chain of Safety and Safecoast).

**Safety Assessment**

During the safety assessment the dune retreat during a severe storm is estimated in order to identify possible damage of buildings and dunes or, worse, the complete failure of a dune ridge, with consequential flooding of the hinterland.

Beach erosion and wave overtopping are calculated. The overtopping discharge can cause damage to buildings or even a complete dike failure.

The geotechnical stability of all the dikes along the Belgian coast have been checked.

For harbours, the penetration of waves is modelled and the overtopping over the quays and the stability of the lock-doors has been calculated.

**Measures and alternatives**

For unsafe dikes alternative solutions have been worked out, including different beach nourishments schemes, fixed and mobile storm return walls, changes of the dike structure to reduce wave overtopping, groins and breakwaters, ? For each solution both the investment and the maintenance costs have been estimated. Maintenance costs are calculated, e.a. by means of morphological models. For harbours storm return walls are the most likely solution. However the reduction of wave penetration using a modified harbour entrance and storm flood barrier are evaluated.