



## ECOMEDPORT WEBINAR

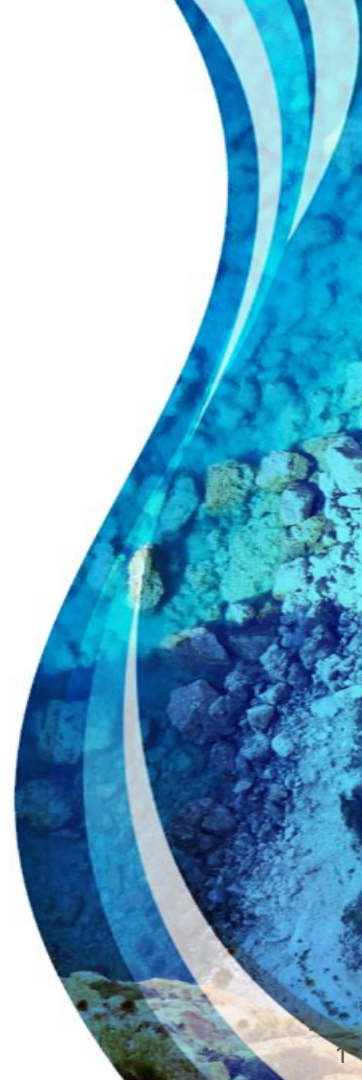
Organized by INSTM

Tunisia 6th July 2020, 10:30 AM - 12:00 AM

# Possible application of the ejector technology in Tunisian harbours: a preliminary assessment

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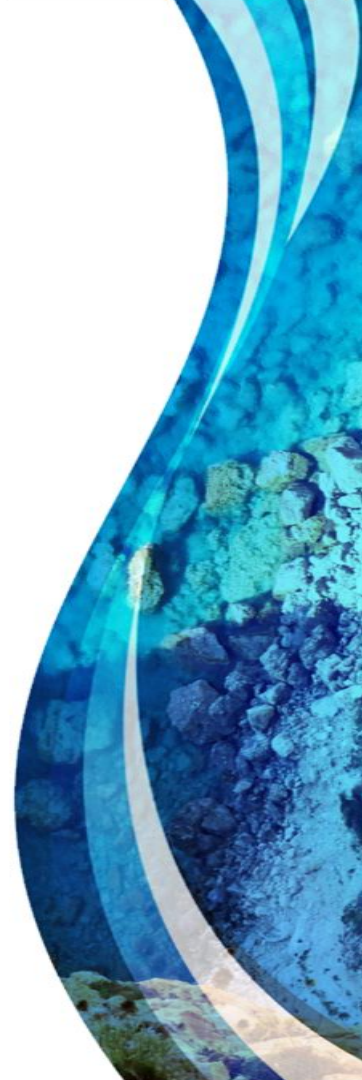
## AGENDA

### SITE DESCRIPTION: RELEVANT INFORMATION FOR EJECTORS PLANT DESIGN

### HOUMT SOUK HARBOUR FRAMEWORK

### WHICH APPLICATIONS FOR THE EJECTORS TECHNOLOGY IN HOUMT SOUK HARBOUR?

### CONCLUSIONS





## RELEVANT INFORMATION FOR EJECTORS PLANT DESIGN

## ECOMEDPORT

General information about port/harbour framework:

- Description of the activities (industry, fisheries, recreative boating, tourism, ...);
- Ownership (public/private);
- Size of the port (square meters of protected water body, number of boats, number/meters of docks, ...);
- Medium navigation depth (also desired);
- Detailed map in DWG or other format, if available.



## RELEVANT INFORMATION FOR EJECTORS PLANT DESIGN

Data about chemical-physical characteristics of the sediment to be handled.

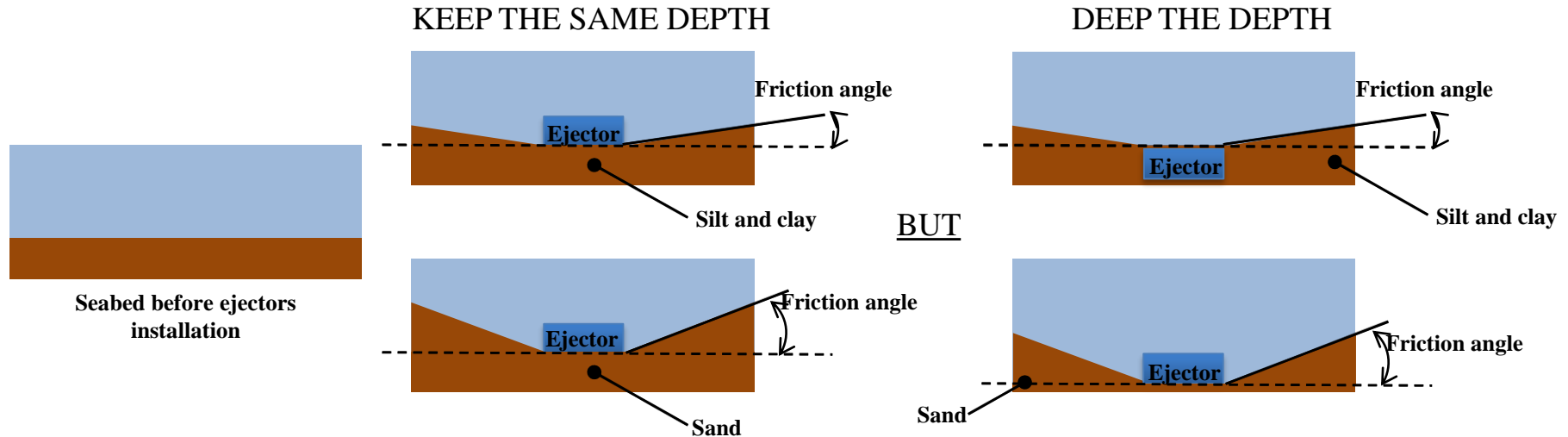
The relevant data are:

- **Granulometry** (i.e. % of sand, clay, silt in the sediment),
- Presence of contaminants/pollutants.

# RELEVANT INFORMATION FOR EJECTORS PLANT DESIGN

## ECOMEDPORT

Why sediment characterization is so relevant? EXAMPLE:





## RELEVANT INFORMATION FOR EJECTORS PLANT DESIGN

## ECOMEDPORT

Include data from the last 5-10 years (taken from bathymetries if available or taken from other sources) about **how water depth changes over time**.

Sediment dynamic knowledge is crucial because the ejectors aim to put the sediment back on the good route to be transported away from the area affected by accumulation.



## RELEVANT INFORMATION FOR EJECTORS PLANT DESIGN

## ECOMEDPORT

Include data from the last 5-10 years about **dredging or propeller movement operations** carried out in the area, including quantity of sediment handled, period of dredging, area of operation (i.e. port inlet, specific docks, ...), dredged sediment destination (i.e. landfill, beach nourishment), dredging cost.

Year	Operation: Dredging or propeller movement	Area	Sediment handled (m <sup>3</sup> or tons)	Duration (n° of days)	Cost

What about **permit/authorization**?



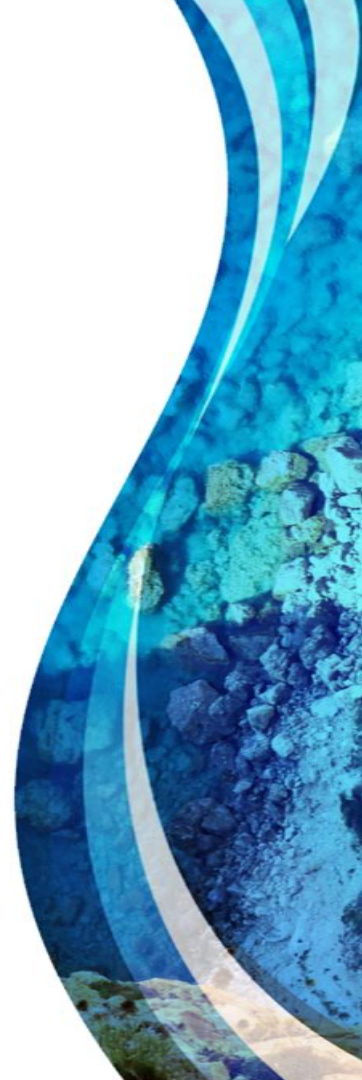
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# HOUMT SOUK HARBOUR FRAMEWORK

## ECOMEDPORT





## HOUMT SOUK HARBOUR FRAMEWORK

### ECOMEDPORT



Built in 1948.

Renewed in 1981 and 2005.

Fishery port (under APIP, public): 690 units.

Marina (private).

Sediment: **70-90% sand**, 10-30% silt and clay.

The areas that suffer from sediment accumulation are located in the **entrance of the port** and also inside, close to the docks.



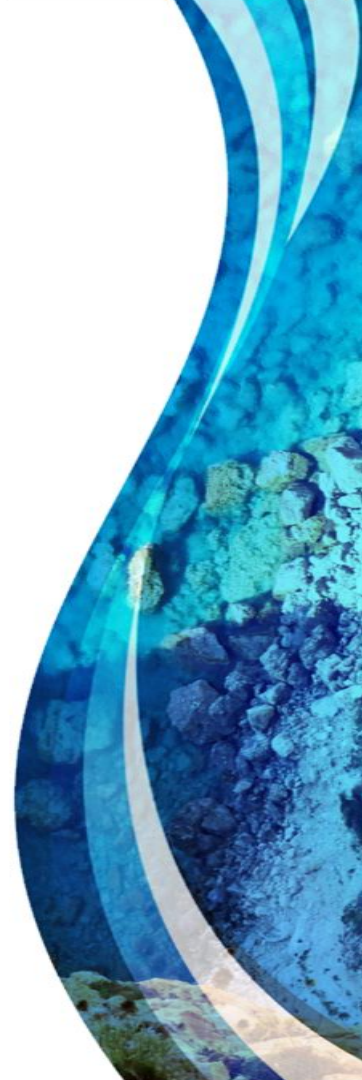
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# WHICH APPLICATIONS FOR THE EJECTORS TECHNOLOGY IN HOUMT SOUK HARBOUR?

## ECOMEDPORT



Areas with sediment accumulation risk (to be confirmed)

# WHICH APPLICATIONS FOR THE EJECTORS TECHNOLOGY IN HOUMT SOUK HARBOUR?

## ECOMEDPORT

### 1. Port entrance

There is an “artificial” channel, visible from the satellite map (white dotted lines) which as some interference very close to the port entrance.



Area directly influenced by 5 ejectors  
(About 35 m x 100 m)

Discharge direction would be identified on the basis of the analysis of sediments dynamic at port entrance.





# WHICH APPLICATIONS FOR THE EJECTORS TECHNOLOGY IN HOUMT SOUK HARBOUR?

## ECOMEDPORT



### 2. Docks inside the port



Area directly influenced by 5 ejectors  
(Length of about 100 m)

Discharge area to be identified (it could be a small depositing site).



# WHICH APPLICATIONS FOR THE EJECTORS TECHNOLOGY IN HOUMT SOUK HARBOUR?

## ECOMEDPORT



### 3. Towing basin



Area directly influenced by 2 ejectors  
(Length of about 35 m)

Discharge area to be identified (it could  
be a small depositing site).

## EXAMPLES OF APPLICATION



## ECOMEDPORT

Let's talk about MONEY!

Costs difficult to estimate with rough data – many variables can affect ejectors plant cost:

1. Number of ejectors (more pipes, more pumps, everything “bigger”);
2. Discharge distance to be covered (the higher the distance, the higher the power needed at the ejector);
3. Electric supply available? (i.e. one ejector with a 60 m discharge pipeline needs about 3 kW at maximum rate);
4. Find a location for the pumping/filtering cabin;

...

A **preliminary feasibility study** is needed to reduce the **uncertainty**...



## EXAMPLES OF APPLICATION



## ECOMEDPORT

Let's talk about MONEY!

... but we can say (more or less):

#PLANT	EJECTORS	DISCHARGE LENGTH	MEAN POWER	MEAN ENERGY	PLANT COST (**)
1. PORT ENTRANCE	5	about 60 m	40 kW	130 MWh/year	0.5 Mil €
2. DOCK (*)	5	---	---	---	---
3. TOWING BASIN (*)	2	---	---	---	---

(\*) really difficult to estimate

(\*\*) order of magnitude, by considering **“Italian” costs**:  $\pm 50\%$  error



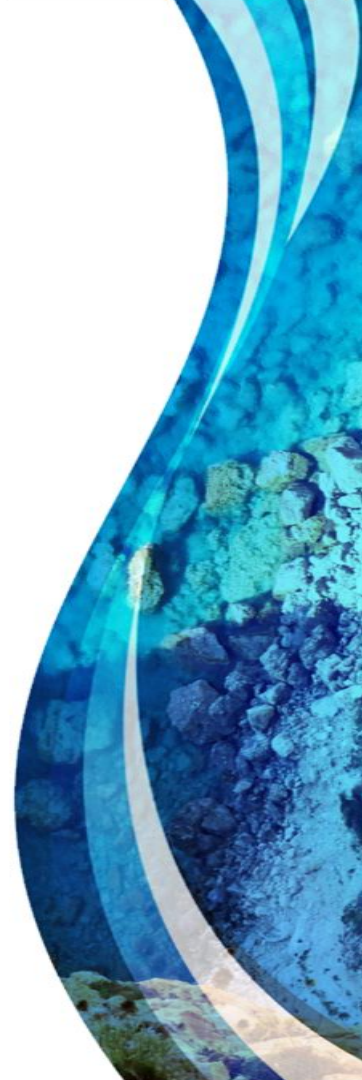
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## CONCLUSIONS

The ejectors plant technology have a **great replication potential** in the area of Houmt Souk harbour.

More information are needed to better identify size of **critical areas**. More information about **sediment characteristics** and **accumulation dynamic** are also needed to optimize plant design (i.e. number of ejectors).

ECOMEDPORT start-up action aims to complete a **feasibility study** for ejectors plant replication in Tunisia: next steps are i) to select one or more critical areas and ii) to preliminary design one or more systems.

Very interesting: **economic framework conditions** can be optimal for the technology since dredging cost is relatively high (7 €/m<sup>3</sup>, comparable with Italian costs), while electricity (about 8 €/MWh) and manpower costs are very low if compared with Italy.



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Thank you for your attention

