



# POSOW

Preparedness for Oil-polluted

Shoreline cleanup and

Oiled Wildlife interventions

# Oiled Shoreline Cleanup Cleanup techniques



POSOW is a project co-financed by EU under the Civil Protection Financial Instrument developed in cooperation with ISPRA, Cedre, Sea Alarm and CPMR and coordinated By REMPEC a regional Centre of the Barcelona Convention

# Before the oil reaches the coastline



Recovery of marine litters and debris strewn across the beach to:

- facilitate initial cleanup operations
- reduce the volume of oiled materials
- reduce the cost of waste treatment



# Some principles



- No “magic” or universal cure ...only basic principles for cleaning
  - Adapt and test techniques and equipment
- Health and Safety is a priority
  - Training and briefing of volunteers
- Respect the environment
  - No spreading of oil
  - No techniques more hazardous than the oil





# Two phases of cleanup

## Phase 1 = initial cleanup:

Removal of accumulations of oil and heavily polluted materials to limit spreading of oil and impact



## Phase 2 = final cleanup:

Removal of residual oil to enable re-opening of affected uses and activities and to help the environment recover a normal functioning



➤ Accept residual oil

# Techniques

## Phase 1

| Sites              |             | Exposure | Leave alone | Skimming Pumping | Mechanical collection | Manual recovery | Mechanical screening | Flushing | Flooding | Nets |
|--------------------|-------------|----------|-------------|------------------|-----------------------|-----------------|----------------------|----------|----------|------|
| Harbour facilities | Quoy        | +        | +           | +                | +                     | +               | +                    | +        | +        | +    |
|                    |             | -        | +           | +                | +                     | +               | +                    | +        | +        | +    |
| Harbour facilities | Riprap      | +        | +           | +                | +                     | +               | +                    | +        | +        | +    |
|                    |             | -        | +           | +                | +                     | +               | +                    | +        | +        | +    |
| Rocks              | Cliff       | +        | +           | +                | +                     | +               | +                    | +        | +        | +    |
|                    |             | -        | +           | +                | +                     | +               | +                    | +        | +        | +    |
|                    |             | +        | +           | +                | +                     | +               | +                    | +        | +        | +    |
| Rocks              | Reef flat   | +        | +           | +                | +                     | +               | +                    | +        | +        | +    |
|                    |             | -        | +           | +                | +                     | +               | +                    | +        | +        | +    |
| Rocks              | Boulders    | +        | +           | +                | +                     | +               | +                    | +        | +        | +    |
|                    |             | -        | +           | +                | +                     | +               | +                    | +        | +        | +    |
| Beach              | Shingle     | +        | +           | +                | +                     | +               | +                    | +        | +        | +    |
|                    |             | -        | +           | +                | +                     | +               | +                    | +        | +        | +    |
|                    |             | +        | +           | +                | +                     | +               | +                    | +        | +        | +    |
| Beach              | Coarse sand | +        | +           | +                | +                     | +               | +                    | +        | +        | +    |
|                    |             | -        | +           | +                | +                     | +               | +                    | +        | +        | +    |
| Beach              | Fine sand   | +        | +           | +                | +                     | +               | +                    | +        | +        | +    |
|                    |             | -        | +           | +                | +                     | +               | +                    | +        | +        | +    |
| Marsh              |             | +        | +           | +                | +                     | +               | +                    | +        | +        | +    |

A lot of techniques available

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Adapted to each phase and to the substrate

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## Phase 2

| Sites              |             | Exposure | Manuel recovery | Low pressure flushing | Mechanical screening | Hot water high pressure | Concrete mixer | Recovery of effuents |
|--------------------|-------------|----------|-----------------|-----------------------|----------------------|-------------------------|----------------|----------------------|
| Harbour facilities | Quoy        | +        | +               | +                     | +                    | +                       | +              | +                    |
|                    |             | -        | +               | +                     | +                    | +                       | +              | +                    |
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|                    |             | -        | +               | +                     | +                    | +                       | +              | +                    |
| Rocks              | Cliff       | +        | +               | +                     | +                    | +                       | +              | +                    |
|                    |             | -        | +               | +                     | +                    | +                       | +              | +                    |
|                    |             | +        | +               | +                     | +                    | +                       | +              | +                    |
| Rocks              | Reef flat   | +        | +               | +                     | +                    | +                       | +              | +                    |
|                    |             | -        | +               | +                     | +                    | +                       | +              | +                    |
| Rocks              | Boulders    | +        | +               | +                     | +                    | +                       | +              | +                    |
|                    |             | -        | +               | +                     | +                    | +                       | +              | +                    |
| Beach              | Shingle     | +        | +               | +                     | +                    | +                       | +              | +                    |
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|                    |             | -        | +               | +                     | +                    | +                       | +              | +                    |
| Marsh              |             | +        | +               | +                     | +                    | +                       | +              | +                    |

Focus on those which can be implemented by volunteers





# Selection of 11 Techniques

- Pumping of floating oil
- Use of protection nets
- Manual cleanup
- Mechanical collection
- Use of sorbents
- Low pressure water jets
- Mechanical screening
- Manual sieving
- Pebbles cleanup: cages, wheelbarrow
- Pebbles cleanup: concrete mixer
- High pressure washing



# Pumping of floating oil



- Pumping bulk oil on water's edge or on the beach
- After containment, by pumps, skimmers, vacuum system
- Separate oil, water and debris to reduce waste
- Not efficient on very viscous oil
- Only in accessible and good bearing capacity sites





# Use of protection nets



- Use of fine mesh nets to capture clusters of oil
- Mooring of one end with big bag above the half tide line
- Check the nets and remove when oiled or damaged by sea
- Use on sticky / viscous oil, less efficient on light oil
- Make sure that oiled nets treatment and disposal are possible
- Less manpower than manual collection



# Manual cleanup



Removal by hand of oil and debris

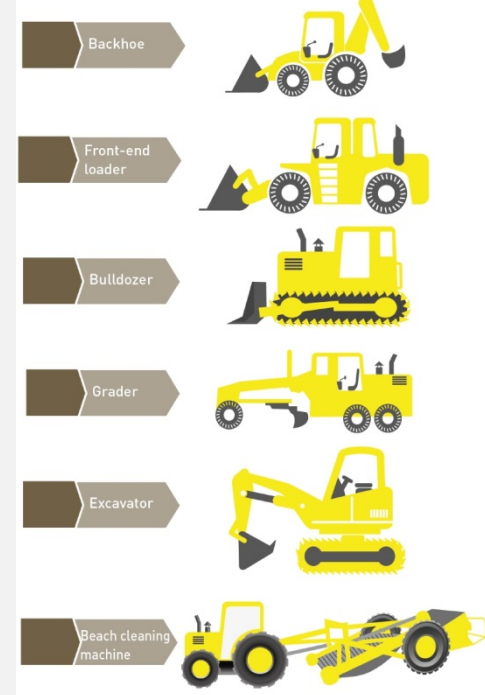
Highly selective technique but needs a lot of manpower

Possible help by mechanical equipment for oil transfer

Divide operators among 3 functions: collection / placing in waste containers / disposal and rotate the teams

Do not remove excessive quantities of sediments and do not over-fill bins

# Mechanical collection



Use of earthmoving equipment for oil collection

For heavy pollution and very viscous oil

Only in accessible and good bearing capacity sites

Less selective than manual cleanup

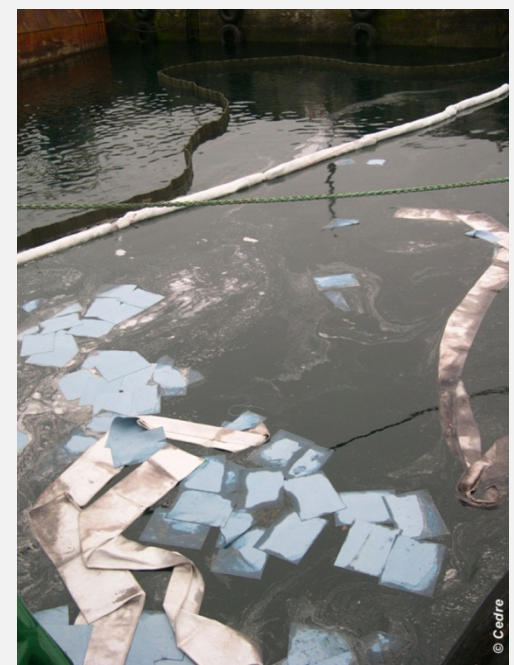
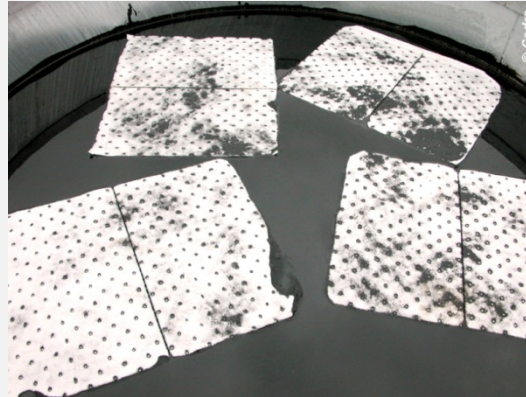
Can mix oil and sediments

Briefing and training of the driver

Safety



# Use of sorbents



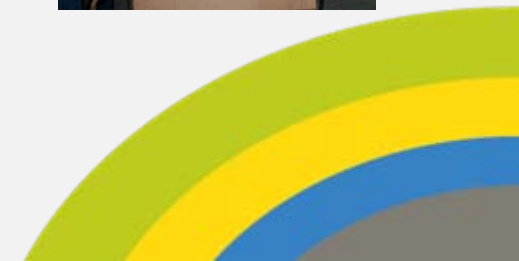
Solid products designed for oil absorption, available in different forms: bulk, sheets, rolls, pillows, booms, mops

Flexible use, on limited quantities of oil :

- Recover floating oil
- Wipe oiled rocks, structures or equipment
- Protect a surface



Recover and treat all sorbents used





# Low pressure water jets

## Flooding / Flushing



Remove / Dislodge / Displace oil to a collect point

High flow and low pressure water jets:

Perforated pipes, fire hoses, Venturi hoses

Use seawater and collect all the effluents

Divide operators among 3 functions: water hoses (2/hose), pumps, effluents recovery and rotate the teams

# Low pressure water jets Equipment

Water transfer pump



Fire hoses  
Venturi hoses





# Mechanical screening



Use of beach cleaning machines

Screening of sand with separation of elements larger than the size of the mesh which are dropped into a receptacle

Exclusively on dry sand polluted by viscous oil or oiled debris

Only in accessible and good bearing capacity sites

Importance of the driver's experience





# Mechanical screening: Selectivity



YES

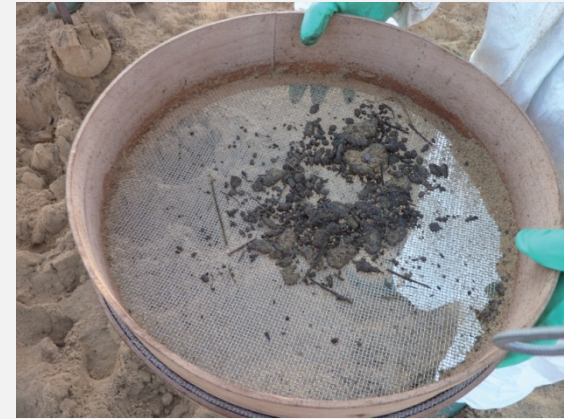


NO





# Manual sieving



Final stage of beach cleanup

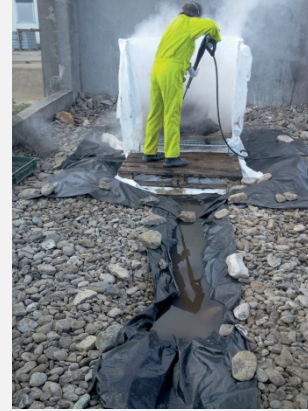
When mechanical screeners cannot be used:

- Too little pieces of tar (go through the mesh of machine)
- No access for mechanical means
- Site too sensitive (dunes...)

Very slow / Intensive labour



# Pebbles cleanup



Cleanup of pebbles in their position is not efficient: it is impossible to wash all the surfaces

Necessity to put the pebbles in oyster bags, wheelbarrows, cages... to be able to around them

Cleanup with high pressure cleaner and hot water

Use of seawater and effluents recovery





# Pebbles cleanup in concrete mixer



- “Pebbles washing machine” used in situ or ex situ
- Adapt the size of the concrete mixer to the volume of pebbles
- Use of seawater and recover effluents
- Let it work 15-20 minutes (test)
- Possibility to use an approved washing agent
- At the end, return the pebbles to their location



# High pressure washing



Final stage of man-made structures cleanup

High pressure and hot water (test)

Possibility to use an approved washing agent

Use seawater and recover effluents

Rotate operators : washing, water supply, recovery

PPE (goggles, mask, overall, oilskins, gloves)



# Other techniques (high skilled teams)



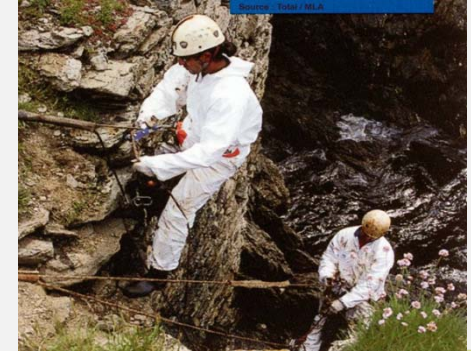
Oleophilic drums



Botanical operations



**Surfwashing:** Pushing polluted sediment down the beach in the surf zone (mid-tide)  
Recover the released oil (nets)



Climbers



# Conclusion

Priority = **Safety**:

Worksite organisation

Team management and training

PPE



**Mitigating the adverse ecological effects** of the response:

Minimizing removal of sediment

Minimizing pollution transfer

Minimizing ecological impact

Key principles and techniques but **adaptation** to each situation







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