# EXOLINE® OIL STOP

## WATERFRONT TOURIST AND COMMUNITY AREAS

### OIL CONTAMINATION OF PORT PROMENADES AND PUBLIC SPACES

***Rapid cleanup, reduced slip hazard, and environmentally considerate intervention***

**FIELD-PROVEN TECHNIQUE**

70-85% oil removal effectiveness
Multiple thin rounds > one thick layer
Environmental safety certified

**Exoline Ltd.**
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# EXECUTIVE SUMMARY

**Waterfront public spaces face critical oil contamination risks from vessel operations, creating immediate public safety hazards. Traditional cleanup methods take 4-8 hours and leave residual slipperiness. The Exoline ROOT BRUSH SCRUBBING METHOD delivers 70-85% oil removal in under 2 hours with zero water pollution.**

## ☑ ROOT BRUSH METHOD - FIELD-VALIDATED TECHNIQUE

- 6-STEP PROCESS: Prep → Scrub → Layer → Mist → Monitor → Remove
- EFFECTIVENESS: 70-85% oil removal (vs. 50-70% simple spreading)
- TECHNIQUE: Force powder into concrete pores where oil hides
- TIMING: 3 thin rounds (1kg each) > 1 thick round (3kg)

# 2. ROOT BRUSH SCRUBBING METHOD

**✓ PROVEN FIELD TECHNIQUE**
This method achieves DEEPER penetration into concrete pores where oil hides, providing approximately 30–50% higher oil removal efficiency compared to simple surface spreading, based on controlled field observations.

## STEP 1: Preparation (If Standing Oil Present)

- If pooled oil/puddles visible: Pre-absorb with sand/sawdust/paper towels FIRST
- Goal: Remove free-flowing oil, leave only the 'greasy stain' on surface
- Why: Exoline works best on absorbed oil in pores, NOT floating oil

## STEP 2: Dry Application + VIGOROUS SCRUBBING ☆

### THE KEY STEP

1. Equipment: Stiff deck brush or root brush (nylon bristles sufficient - wire NOT needed)
2. Exoline dosage: 1-2 kg/m² for FIRST round (light layer)
3. Application: Scatter powder evenly over DRY concrete
4. ☆ SCRUB HARD: Use brush to FORCE powder into concrete pores (2-3 minutes per m²)
5. Circular scrubbing motion: Work powder deep into surface texture
6. Dwell time: 20-40 minutes (let chemistry work)

### WHY SCRUBBING IS CRITICAL:

- Oil doesn't just sit on surface - it PENETRATES into concrete pores (up to 2-5 mm deep)
- Simple spreading only treats SURFACE oil → leaves residual slipperiness
- Scrubbing forces Exoline into the same pores where oil accumulates, enabling substantially improved removal compared to surface-only application.
- First round 'opens up' and loosens contamination, subsequent rounds extract from depth

## STEP 3: Layered Application (Multiple Rounds)

### Round 1:

- Scatter 1-2 kg/m² + scrub 3-5 minutes
- Let work 20-40 minutes
- Visual check: Powder darkens (oil absorption), may clump slightly

### Round 2:

- Scatter ANOTHER 1-2 kg/m² over first layer
- Scrub again 2-3 minutes
- Let work 1-2 hours (or longer for heavy contamination)

### Round 3 (if needed for stubborn stains):

- Thinner layer: 0.5-1 kg/m²
- Light scrubbing
- Can leave overnight for maximum extraction

**WHY MULTIPLE THIN ROUNDS > ONE THICK LAYER**

- **3 thin rounds (1 kg each) = 70-85% oil removal**
- 1 thick round (3 kg total) = 40-60% oil removal

*Reason: Progressive extraction pulls oil from deeper layers that single application cannot reach.*

## STEP 4: Optional Water Mist (Advanced Technique)

**⚠ CRITICAL: 'MIST' NOT 'SOAK'**

- After scrubbing: VERY LIGHT water mist (1-2 spray pump squirts per m²)
- Just enough to activate $CaO_2$ oxygen release
- **NOT soak powder**

**IF TOO WET:**

- Powder clumps
- Doesn't penetrate pores
- Loses effectiveness

*IDEAL: Powder feels slightly damp but still free-flowing*

## STEP 5: Completion Indicators

**You know it's working when:**

- ✓ Powder 'fattens up' - becomes heavier, darker in color
- ✓ Slight clumping (but NOT wet/muddy)
- ✓ NO oily sheen visible on concrete surface
- ✓ Tactile test: Run hand over surface → feels DRY, slightly gritty (not slippery)

## STEP 6: Removal & Cleanup

7. Best: Industrial wet/dry vacuum (HEPA filter recommended)
8. Alternative: Stiff push broom + dustpan
9. Disposal: Saturated powder typically classified according to local waste regulations; non-hazardous classification may apply subject to testing and authority approval.
10. Final wipe (optional): Damp mop to remove fine dust residue

# ⚠ 3 COMMON MISTAKES TO AVOID

## MISTAKE 1: Too Thick Too Fast

✗ One heavy application (4-5 kg/m²)

✓ **Three thin rounds (1.5 kg/m² × 3)**

*Result: Thick layer is 30-40% LESS effective*

## MISTAKE 2: Insufficient Dwell Time

❌ Sweeping up after 10 minutes

✅ **Minimum 20-40 minutes per round**

*Result: Oil still in pores, will re-emerge within hours*

## MISTAKE 3: Pressure Washing Too Soon

❌ High-pressure water within 24 hours

✅ **Wait 48 hours, or use low-pressure rinse only**

*Result: Water pressure drives oil BACK into concrete*

# RECOMMENDED DOSAGES (PER ROUND)

| Oil Severity | Round 1 | Round 2 | Round 3 (if needed) | TOTAL |
|---|---|---|---|---|
| Light stain (old drips) | 1 kg/m² | 1 kg/m² | 0.5 kg/m² | 2.5 kg/m² |
| Medium slick (recent) | 1.5 kg/m² | 1.5 kg/m² | 1 kg/m² | 4 kg/m² |
| Heavy/industrial oil | 2 kg/m² | 2 kg/m² | 1 kg/m² | 5 kg/m² |

### EXAMPLE: 5 m² Oil Slick on Promenade (ROOT BRUSH METHOD)

*Scenario: Medium diesel slick on concrete promenade*

**Exoline required: 5 m² × 2.5 kg/m² (average over 3 rounds) = 12.5 kg total**

**Timeline:**

- Round 1: Scatter 7.5 kg + scrub 15 min + wait 30 min = 45 min
- Round 2: Scatter 5 kg + scrub 10 min + wait 1 hour = 1 hr 10 min
- Removal: Vacuum or sweep 15 min

### TOTAL TIME:

- Active work: 40 minutes
- Dwell time: 90 minutes
- **TOTAL: 2 hours 10 minutes (includes dwell time)**

**Reopening: Area may be reopened after cleanup once surface dryness and slip resistance have been visually and physically verified.**

**Cost: 12.5 kg × £3/kg = £37.50 (vs. £150-£300 professional crew)**

# EFFECTIVENESS COMPARISON

| Method | Oil Removal | Time | Cost/m² |
|---|---|---|---|
| Root brush (3 rounds) | 70-85% | 2 hrs | £7-£8 |
| Simple spreading (1 round) | 50-70% | 45 min | £6-£9 |
| Professional crew | 60-80% | 4-8 hrs | £15-£30 |

**Conclusion: Root brush method provides a favorable balance between effectiveness, speed, and cost compared to alternative approaches.**

# 4. IMPORTANT ASSUMPTIONS AND LIMITATIONS

**This case study presents technical performance data based on laboratory testing, field trials, and real-world applications. While the ROOT BRUSH METHOD has demonstrated consistent 70-85% effectiveness across multiple sites, actual results may vary depending on site-specific factors.**

## Data Sources and Validation

| Data Type | Validation Status | Confidence Level |
|---|---|---|
| Root brush effectiveness | 50+ field applications verified | High (90-95%) |
| Slip coefficient restoration | Laboratory tested (BS 7976-2:2002) | High (>95%) |
| Oil absorption capacity | Laboratory verified, field-confirmed | High (90-95%) |
| Cleanup time estimates | Based on field measurements | High (85-95%) |
| Economic calculations | Current UK market prices (2025) | Medium (70-80%) |
| Biodegradation rates | Laboratory conditions, may vary | Medium-High (75-85%) |

## Site-Specific Factors

- Surface type and texture: Porous surfaces absorb more oil, affecting dosage
- Oil characteristics: Light oils (diesel) respond faster than heavy oils (gear oil)
- Weather conditions: Apply during dry weather when possible
- Surface temperature: Optimal 10-30°C; cold (<5°C) slows absorption
- Spill age: Fresh spills (<4 hours) clean faster than weathered (>24 hours)
- Scrubbing intensity: Proper technique critical - 2-3 min/m² vigorous scrubbing

## Performance Disclaimers

### ⚠ IMPORTANT NOTICE

- Effectiveness (70-85%) assumes PROPER scrubbing technique. Simple spreading = 50-70%.
- Multiple thin rounds are CRITICAL. One thick layer reduces effectiveness by 30-40%.
- Dwell time minimum 20-40 minutes per round. Shorter times = oil re-emergence.
- Water mist must be LIGHT (1-2 squirts/m²). Over-wetting reduces effectiveness.
- Field validation recommended before adopting as standard protocol.

## Liability and Professional Advice

This case study is provided for informational purposes only and does not constitute professional health & safety, environmental, or legal advice. Exoline Ltd. makes no warranties regarding the applicability of this information to specific spill scenarios.

Local authorities should engage qualified consultants before implementing any oil spill response protocol. The ROOT BRUSH METHOD requires proper training for optimal effectiveness. Exoline Ltd. is not liable for decisions made without proper site-specific assessment and staff training.

# 5. TECHNICAL DATA & CONTACT

**Physical properties:**

| Property | Value |
|---|---|
| Appearance | White powder |
| Density | 2.2-2.4 g/cm³ |
| Specific surface area | 15.97 m²/g (hydrophobic) |
| Oil absorption | 0.3-0.5 kg oil / kg Exoline |
| pH value | 11.6 (powder), neutralized on wet surfaces |

**Application dosages (ROOT BRUSH METHOD):**

| Oil Severity | Total Dosage (3 rounds) | Coverage |
|---|---|---|
| Light stain | 2.5 kg/m² | 1 kg covers 0.4 m² |
| Medium slick | 4 kg/m² | 1 kg covers 0.25 m² |
| Heavy/industrial | 5 kg/m² | 1 kg covers 0.2 m² |

**UK Regulatory Approvals:**

✅ Environment Agency – No wastewater discharge permit typically required when used as a dry application, subject to local authority confirmation.

✅ HSE – Suitable for workplace use when handled in accordance with standard COSHH risk assessment procedures

✅ Water Framework Directive – Application approach aligned with the objectives of the directive, subject to site-specific assessment.

## Contact & Municipal Support

**Exoline Ltd.**

*Public Safety Environmental Solutions*

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### MUNICIPAL SERVICES:

• ROOT BRUSH METHOD training (2-hour certification)
• Free site assessment for local authorities
• Emergency response kits available

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