

Mechanical Treatment of Sand Beaches Historical Library Report

API TECHNICAL REPORT 1151-4

JUNE 2016

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Suggested revisions are invited and should be submitted to the Director of Marine and Security, API, 1220 L Street, NW, Washington, DC 20005.

Executive Summary

The American Petroleum Institute (API) completed a multiphase study to evaluate and improve the state-of-the-art for mechanical treatment of spilled oil deposited on sand beaches. The overall study was conducted in phases, which included:

- *Improvements for the Mechanized Cleanup of Oiled Sand Beaches (Phase 1—Final Report)*, API Technical Report 1151-1, September 2013
- *Manual of Practice for the Use of Mechanized Cleanup Tactics on Oiled Sand Beaches (Phase 2 Report)*, API Technical Report 1151-3, in prep.

This report describes the third phase of this program, the Mechanical Treatment Library, which is intended to locate, digitize, and make as much of the relevant pre-digital age institutional knowledge involving mechanical cleanup tactics for sand beaches available to the response industry or other interested parties.

The library is provided in simple MS Excel spreadsheet and MS Access database formats, which are described in this report.

Contents

Executive Summary	v
Contents	vii
1 Introduction and Objectives.....	1
2 Use of the Library	1
Acknowledgements	5

List of Figures

Figure 2.1 Screenshot of Mechanical Treatment Library (MS Excel Version).....	3
Figure 2.2 Screenshot of Mechanical Treatment Library (MS Access Version).....	4

List of Tables

Table 2.1 Document Information Provided in the Library	2
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Mechanical Treatment of Sand Beaches Historical Library Report

1 Introduction and Objectives

This report describes the Mechanical Treatment Library, which represents part of a multiphase study conducted by the American Petroleum Institute (API) to improve the mechanized treatment of spilled oil on sand beaches.

Phase 1 of the API program evaluated the current state-of-the-art and developed recommendations for improvements to current technology and equipment in a report:

- *Improvements for the Mechanized Cleanup of Oiled Sand Beaches (Phase 1—Final Report)*, API Technical Report 1151-1, September 2013.

Phase 2 of the program resulted in the preparation of a Manual of Practice:

- *Manual of Practice for the Use of Mechanized Cleanup Tactics on Oiled Sand Beaches (Phase 2 Report)*, API Technical Report 1151-3, in prep.

Phase 3 of the program follows on from one of the conclusions of the earlier phases that mechanical cleanup equipment and tactics, in general, has not changed significantly in the last 40 plus years. Many field observations, field tests, and evaluations conducted in the 1960s and onwards remain valid, and associated documents are of potential use to current responders. However, older published information and reports are pre-digital age, often out of print, or their sources obscure. This Phase 3 project is intended to locate, digitize, and make as much of the relevant pre-digital age institutional knowledge involving mechanical cleanup tactics for sand beaches available to the response industry or other interested parties. This study involved:

- Data acquisition
- Preparation of a library with links to documents, where available
- Provision of digital (scanned) copies of documents unavailable online (if approved).

2 Use of the Library

The Mechanical Treatment Library is available as both an excel spreadsheet and an access database, and contains 45 documents. The library provides relevant information for each document (see Table 2.1), which may be searched using the table filters, for example to search for a particular document type, or tactic, or (in excel) “Find and Select” for a particular word or phrase. Screenshots of the libraries are provided in Figures 2.1 and 2.2.

If a document is available online, either for free or for purchase, a link is provided in the “Available” column. Approval has been sought from the authors of unavailable documents to include a copy of those documents in the library. Documents for which approval has been obtained shall be scanned and the electronic PDF copies shall be provided to API.

Once published, this library (including links) shall be made available and maintained at:
www.mechanicalbeachtreatment.com

Table 2.1—Document Information Provided in the Library

Title	Description	Options
ID	Library ID Number	1–45
Available	Links to documents available online, or documents for which approval has been acquired to copy	<ul style="list-style-type: none"> • Available for free • Available for purchase • Request from Environment Canada (link provided) • Link to document
Year	Year published or written	1968–2011
Lead Author	Lead author of the document	—
For	Who or what the document was written for	e.g. for a specific organization or conference
Title	Document Title	—
Type	Document Type	<ul style="list-style-type: none"> • Catalogue • Guidance • Manual • Oil Spill (report/paper) • Review • Standard • Study
Tactic	Tactic(s) described in the document	<ul style="list-style-type: none"> • Mechanical Removal • Mixing • Multiple (tactics) • Sediment Washing • Waste Management
Volume	Volume of the relevant conference proceedings in which the document was published	
Issue	Issue of the relevant conference proceedings in which the document was published	
Pages	Page number within a document or total number of pages	
Other Authors	Other authors of the document	2 nd to 8 th Author

ID	Available	Year	Lead Author	For	Title	Type	Tactic	Volume	Issue	Page	2nd Auth	3rd Auth	4th Auth
1	Approved	1968	Castle, R.W.	Woodward-Clyde	Observations of the Amoco Cadiz Oil Spill - Unpublished Report	Oil Spill	Multiple	-	-	-	Foget, C.R.	-	-
2	Free	1969	Lampi, H.J.	International Oil Spill Conference	Beach Cleanup	Review	Multiple	1969	-	229-231	Rhodes, R.L.	-	-
3		1970	Owens, E.H.	Department of Energy, Mines and Resources, Ottawa	Geological Aspects of the Beach Restoration Programme in Chedabucto Bay, Nova Scotia	Oil Spill	Mechanical Removal	-	-	109pp	-	-	-
4		1970	MacKay, J.W.	Department of Public Works, Halifax, NS	Beach Restoration Report (for Arrow spill, Nova Scotia)	Oil Spill	Mechanical Removal	-	-	-	-	-	-
5		1970	URS Research Company	Department of the Interior	Evaluation of Selected Earthmoving Equipment for the Restoration of Oil- Contaminated Beaches	Review	Mechanical Removal	-	-	174pp	-	-	-
6		1970	URS Research Company	Department of the Interior	Preliminary Operations Planning Manual for the Restoration of Oil- Contaminated Beaches	Manual	Mechanical Removal	-	-	53pp	-	-	-
7	Free	1971	Owens, E.H.	Energy, Mines and Resources, Canada	The Restoration of Beaches Contaminated by Oil in Chedabucto Bay, Nova Scotia	Oil Spill	Multiple	-	-	83	-	-	-
8		1971	Gumt, G.D.	Joint Conference on Protection and Control of Oil	Froth Flotation Cleanup of Oil-Contaminated Beaches	Study	Sediment Washing	-	-	523-531	Meloy, T.P.	-	-
9	Free	1971	Jeffery, P.G.	International Oil Spill Conference	The Development of Test Procedures for the Assessment of Efficiency in Beach Cleaning	Study	Multiple	1971	1	357-360	-	-	-
10	Free	1971	Mikolaj, P.G.	International Oil Spill Conference	A Hot-Water Fluidization Process for Cleaning Oil-Contaminated Beach Sand	Study	Sediment Washing	1971	1	533-533	Curran, E.J.	-	-
11	Free	1971	Sartor, J.D.	International Oil Spill Conference	Evaluation of Selected Earthmoving Equipment for the Restoration of Oil-Contaminated Beaches	Study	Mechanical Removal	1971	1	505-522	Foget, C.R.	-	-
12	Free	1972	Gumt, G.D.	U.S. EPA	Restoration of Beaches Contaminated By Oil	Guidance	Multiple	-	-	-	-	-	-
13	Free	1973	Betts, W.E.	International Oil Spill Conference	Cleanup of Inland Spills	Review	Multiple	1973	-	549-558	-	-	-
14	Free	1973	Der, J.J.	International Oil Spill Conference	Quantitative Evaluation of Mechanical Oil Spill Cleanup Devices	Study	Multiple	1973	-	627-622	Graham, D.J.	-	-
15	Free	1975	Der, J.J.	International Oil Spill Conference	Oil Contaminated Beach Cleanup	Review	Multiple	1975	-	431-436	-	-	-
16	Free	1979	Foget, C.R.	U.S. EPA	Manual of Practice for Protection and Cleanup of Shorelines, Vol. 1 Decision Guide	Manual	Multiple	-	-	-	Schrier, E.	Cramer, M.	Castle, R.
17	Free	1979	Foget, C.R.	U.S. EPA	Manual of Practice for Protection and Cleanup of Shorelines, Vol. 2. Implementation Guide	Manual	Multiple	-	-	-	Schrier, E.	Cramer, M.	Castle, R.
18	Purchase	1980	Russell, L.T.	IOPPEC	Mechanical Recovery of Oil from Recreational Beaches	Review	Mechanical Removal	1980	-	93-119	Carson, V.M.	Mackay, C.D.M.	-
19	Approved	1980	CEDRE	-	Effectiveness and Costs of Beach Cleanup Techniques and Waste Disposal	Review	Multiple	-	-	-	-	-	-
20		1981	Tramier, B	CONCAWE	A Field Guide to Coastal Oil Spill Control and Clean-Up Techniques	Guidance	Multiple	-	-	112pp	Aston, G.H.R.	Durrieu, M.	Lepain, A.
21	Approved	1982	Warren Spring Laboratory	Department of the Environment (UK)	Oil Spill Cleanup of the Coastline - A Technical Manual	Manual	Multiple	-	-	-	-	-	-
22		1983	Beginon, L.R.	CONCAWE	A Field Guide to Inland Oil Spill Clean-up Techniques	Guidance	Multiple	-	-	104pp	Godjen, H.	Lilie, R.H.	Aston, G.H.R.
23	Free	1983	Pasquet, R.	International Oil Spill Conference	New Developments in Beach Clean-up Techniques	Review	Multiple	1983	-	279-282	Denis, J.	-	-
24	Free	1983	Morris, P.R.	International Oil Spill Conference	The Warren Spring Laboratory Beach Material Washing Plant for shoreline Cleanup	Review	Sediment Washing	1983	-	283-290	Tookej, D.	Walsh, T.	-
25	Approved	1984	Denis, J.	CEDRE	New Developments in Beach Clean-up Techniques	Review	Mechanical Removal	-	-	-	Pasquet, R.	-	-
26	Approved	1984	Robson, W.	-	Shoreline Clean-up Operations on Galveston Island Resulting from the Alvenus Spill	Oil Spill	Mechanical Removal	-	-	-	-	-	-
27		1984	S.L. Ross	COOSRA	An Engineering Study of Mechanical Shoreline Cleanup Systems for Oil Spills in Canada	Study	Mechanical Removal	-	-	165pp	-	-	-
28		1985	API	-	Oil Spill Response: Options for Minimizing Adverse Ecological Impacts	Guidance	Multiple	-	-	98pp	-	-	-
29	Free	1987	Miller, J.A.	International Oil Spill Conference	Beach Agitation for Crude Oil Removal from Intertidal Beach Sediments	Oil Spill	Mixing	-	-	85-90	-	-	-
30	Purchase	Various	ITOPF	-	Response to Marine Oil Spills	Guidance	Multiple	-	-	-	-	-	-
31	Free	1992	NOAA	-	Shoreline Countermeasures Manual for Temperate Coastal Environments	Guidance	Multiple	-	-	-	-	-	-
32	Free	1993	Benson, R.L.	International Oil Spill Conference	A Mechanized Approach to Beach Cleanup in Saudi Arabia	Oil Spill	Mixing	-	-	123-126	LeGore, R.S.	Pascoe, D.	-
33		1994	Owens, E.H.	Environment Canada	Canadian Coastal Environments, Shoreline Processes and Oil Spill Cleanup	Review	Multiple	-	-	327pp	-	-	-
34	Free	1995	API	-	Options for Minimizing Adverse Environmental Impacts of Freshwater Response	Guidance	Multiple	-	-	-	-	-	-
35	Approved	1995	Taylor, E.	MSRC	Beach Protection and Cleaning Equipment and Techniques for Oil Spill Response	Guidance	Multiple	-	-	360pp	Owens, E.H.	Belore, R.	Buist, I.
36		1995	Owens, E.H.	Environment Canada	Field Guide for the Protection and Cleanup of Oiled Shorelines	Guidance	Multiple	-	-	114pp	-	-	-
37		1996	Owens, E.H.	Environment Canada	Field Guide for the Protection and Cleanup of Oiled Arctic Shorelines	Guidance	Multiple	-	-	213pp	-	-	-
38		1996	Owens, E.H.	Environment Canada	Field Guide for the Protection and Cleanup of Great Lakes Oiled Shorelines	Guidance	Multiple	-	-	21pp	-	-	-
39	Purchase	2001	API	-	Environmental Considerations for Marine Oil Spill Response	Guidance	Multiple	-	-	322pp	-	-	-
40	Purchase	2009	ASTM	-	Standard Guide for Describing Shoreline Response Techniques (F2204)	Standard	Multiple	-	-	-	-	-	-
41	Free	2010	NOAA	-	Characteristic Coastal Habitats: Choosing Spill Response Alternatives	Guidance	Multiple	-	-	-	-	-	-
42	Free	2010	NOAA	-	Characteristics of Response Strategies: A Guide For Spill Response Planning in Marine Environments	Guidance	Multiple	-	-	-	-	-	-
43	Request	2010	Owens, E.H.	Environment Canada	A Field Guide to Oil Spill Response on Marine Shorelines	Guidance	Multiple	-	-	223 pp	Sergy, G.A.	-	-
44	Purchase	2011	CEDRE	-	Guidance on Waste Management during A Shoreline Pollution Incident - Operational Guidelines	Guidance	Waste Management	-	-	-	-	-	-
45	Purchase	multiple	SL Ross	-	World Catalogue of Oil Spill Equipment	Catalogue	Multiple	-	-	-	-	-	-

Figure 2.1—Screenshot of Mechanical Treatment Library (MS Excel Version)

Mechanical Library																		
ID	Available	Year	Lead Author	For	Title	Type	Tactic	Volume	Issue	Pages	2nd Author	3rd Author	4th Author					
1		1968	Castle, R.W.	Woodward-Clyde	Observations of the Amoco Cadiz Oil Spill - Unpublished Report	Oil Spill Review	Multiple	-	-	-	Foget, C.R.	-	-					
2	Free	1969	Lamp'l, H.J.	International Oil Spill Conference	Beach Cleanup	Oil Spill Review	Multiple	1969	-	229-231	Rhodes, R.L.	-	-					
3		1970	Owens, E.H.	Department of Energy, Mines and	Geological Aspects of the Beach Restoration Programme in Chedabucto Bay	Oil Spill	Mechanical Removal	-	-	109pp	-	-	-					
4		1970	MacKay, J.W.	Department of Public Works, Halifax	Beach Restoration Report (for Arrow spill, Nova Scotia)	Oil Spill	Mechanical Removal	-	-	-	-	-	-					
5		1970	URS Research Company	Department of the Interior	Evaluation of Selected Earthmoving Equipment for the Restoration of Oil-Contaminated Beaches	Review	Mechanical Removal	-	-	174pp	-	-	-					
6		1970	URS Research Company	Department of the Interior	Preliminary Operations Planning Manual for the Restoration of Oil-Contaminated Beaches	Manual	Mechanical Removal	-	-	53pp	-	-	-					
7		1971	Gumtz, G.D.	Joint Conference on Protection and Removal of Oil-Contaminated Beaches	Study	Sediment Washing	-	-	523-531	Meloy, T.P.	-	-						
8	Free	1971	Owens, E.H.	Energy, Mines and Resources, Canada	The Restoration of Beaches Contaminated by Oil in Chedabucto Bay	Oil Spill	Multiple	-	-	83pp	-	-	-					
9	Free	1971	Jeffery, P.G.	International Oil Spill Conference	The Development of Test Procedures for the Assessment of Efficacy of Beach Cleaning Techniques	Study	Multiple	1971	1	357-360	-	-	-					
10	Free	1971	Mikolaj, P.G.	International Oil Spill Conference	A Hot-Water Fluidization Process for Cleaning Oil-Contaminated Beaches	Study	Sediment Washing	1971	1	533-539	Curran, E.J.	-	-					
11	Free	1971	Sartor, J.D.	International Oil Spill Conference	Evaluation of Selected Earthmoving Equipment for the Restoration of Oil-Contaminated Beaches	Study	Mechanical Removal	1971	1	505-522	Foget, C.R.	-	-					
12	Free	1972	Gumtz, G.D.	U.S. EPA	Restoration of Beaches Contaminated By Oil	Guidance	Multiple	-	-	-	-	-	-					
13	Free	1973	Betts, W.E.	International Oil Spill Conference	Cleanup of Inland Spills	Review	Multiple	1973	-	549-558	-	-	-					
14	Free	1973	Der, J.J.	International Oil Spill Conference	Quantitative Evaluation of Mechanical Oil Spill Cleanup Devices	Study	Multiple	1973	-	627-622	Graham, D.J.	-	-					
15	Free	1975	Der, J.J.	International Oil Spill Conference	Oil Contaminated Beach Cleanup	Review	Multiple	1975	-	431-436	-	-	-					
16	Free	1979	Foget, C.R.	U.S. EPA	Manual of Practice for Protection and Cleanup of Shorelines, Vol. 1	Manual	Multiple	-	-	-	Schrier, E.	Cramer, M.	Castle, R.					
17	Free	1979	Foget, C.R.	U.S. EPA	Manual of Practice for Protection and Cleanup of Shorelines, Vol 2.	Manual	Multiple	-	-	-	Schrier, E.	Cramer, M.	Castle, R.					
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19		1980	CEDRE	-	Effectiveness and Costs of Beach Clean-up Techniques and Waste Disposal	Review	Multiple	-	-	-	-	-	-					
20		1981	Tramier, B	CONCAWE	A Field Guide to Coastal Oil Spill Control and Clean-Up Techniques	Guidance	Multiple	-	-	112pp	Aston, G.H.R.	Durrieu, M.	Lepain, A.					
21		1982	Warren Spring Laboratory	Department of the Environment	Oil Spill Cleanup of the Coastline - A Technical Manual	Manual	Multiple	-	-	-	-	-	-					
22		1983	Beynon, L.R.	CONCAWE	A Field Guide to Inland Oil Spill Clean-up Techniques	Guidance	Multiple	-	-	104pp	Godjen, II.	Lilie, R.II.	Aston, G.II.R.					
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24	Free	1983	Morris, P.R.	International Oil Spill Conference	The Warren Spring Laboratory Beach Material Washing Plant for Oil Spills	Review	Sediment Washing	1983	-	283-290	Tooley, D.	Walsh, T.	-					
25		1984	Denis, J.	CEDRE	New Developments in Beach Clean-up Techniques	Review	Mechanical Removal	-	-	-	Pasquet, R.	-	-					
26		1984	Robson, W.	-	Shoreline Clean-up Operations on Galveston Island Resulting from Oil Spills	Guidance	Mechanical Removal	-	-	-	-	-	-					
27		1984	S.L. Ross	COOSRA	An Engineering Study of Mechanical Shoreline Cleanup Systems for Oil Spills	Study	Mechanical Removal	-	-	165pp	-	-	-					
28		1985	API	-	Oil Spill Response: Options for Minimizing Adverse Ecological Impacts	Guidance	Multiple	-	-	98pp	-	-	-					
29	Free	1987	Miller, J.A.	International Oil Spill Conference	Beach Agitation for Crude Oil Removal from Intertidal Beach Sediments	Oil Spill	Mixing	-	-	85-90	-	-	-					
30	Purchase	Various	ITOPF	-	Response to Marine Oil Spills	Guidance	Multiple	-	-	-	-	-	-					
31	Free	1992	NOAA	-	Shoreline Countermeasures Manual for Temperate Coastal Environments	Guidance	Multiple	-	-	-	-	-	-					
32	Free	1993	Benson, R.L.	International Oil Spill Conference	A Mechanized Approach to Beach Cleanup in Saudi Arabia	Oil Spill	Mixing	-	-	123-126	LeGore, R.S.	Pascoe, D.	-					
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34	Free	1995	API	-	Options for Minimizing Adverse Environmental Impacts of Freshwater Oil Spills	Guidance	Multiple	-	-	-	-	-	-					
35		1995	Taylor, E.	MSRC	Beach Protection and Cleaning Equipment and Techniques for Oil Spills	Guidance	Multiple	-	-	360pp	Owens, E.H.	Belore, R.	Buist, I.					
36		1995	Owens, E.H.	Environment Canada	Field Guide for the Protection and Cleanup of Oiled Shorelines	Guidance	Multiple	-	-	114pp	-	-	-					
37		1996	Owens, E.H.	Environment Canada	Field Guide for the Protection and Cleanup of Oiled Arctic Shorelines	Guidance	Multiple	-	-	213pp	-	-	-					
38		1996	Owens, E.H.	Environment Canada	Field Guide for the Protection and Cleanup of Great Lakes Oiled Shorelines	Guidance	Multiple	-	-	211pp	-	-	-					
39	Purchase	2001	API	-	Environmental Considerations for Marine Oil Spill Response	Guidance	Multiple	-	-	322pp	-	-	-					
40	Purchase	2009	ASTM	-	Standard Guide for Describing Shoreline Response Techniques (F27.1-09)	Standard	Multiple	-	-	-	-	-	-					
41	Free	2010	NOAA	-	Characteristic Coastal Habitats: Choosing Spill Response Alternatives	Guidance	Multiple	-	-	-	-	-	-					
42	Free	2010	NOAA	-	Characteristics of Response Strategies: A Guide For Spill Response	Guidance	Multiple	-	-	-	-	-	-					
43		2010	Owens, E.H.	Environment Canada	A Field Guide to Oil Spill Response on Marine Shorelines	Guidance	Multiple	-	-	223 pp	Sergy, G.A.	-	-					
44	Purchase	2011	CEDRE	-	Guidance on Waste Management during A Shoreline Pollution Incident	Waste Management	Multiple	-	-	-	-	-	-					
45	Purchase	SL Ross	-	-	World Catalogue of Oil Spill Equipment	Catalogue	Multiple	-	-	-	-	-	-					

Figure 2.2—Screenshot of Mechanical Treatment Library (MS Access Version)

Acknowledgements

The Mechanical Treatment of Sand Beaches Library and this report were prepared by Helen Dubach (Owens Coastal Consultants), Ed Owens (Owens Coastal Consultants), and Bob Castle (RCE Inc.).



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