

Single-layer armouring

List of References by CLI and its partners: **Artelia EE (Sogreah Consultants)**
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Project N°	SINGLE LAYER ARMOUR TECHNIQUE Projects	Type of unit ACCROPODE™: ACC ACCROPODE™ II : ACC II CORE-LOC™: CL ECOPODE™: ECO	Unit size used (m3)	Year	Water depth h(m)
335	Oman - Upgrading of Sohar Port Breakwaters. Large multipurpose port on the main shipping road. CORE-LOC™ technology is applied on the sea side. The upgrading of the Port was undertaken with around 1000 CORE-LOC™ units placed. Port location is Sohar City.	CL	1.6 / 3	2017	0
332	Oman – Duqm Fishery Harbour. Part of the outstanding Duqm development project. The port is located in Duqm. The main breakwater is 2.1 km long and the secondary breakwater is 1.1 km long.	CL	1 / 2 / 3 / 5 / 6	2017	-9
330	Kuwait – Doha Desalination plant. The project is located north of Kuwait City and includes the construction of a reverse osmosis (RO) seawater desalination plant. At the sea side, it was decided to use CORE-LOC™ blocks as a solution to protect the project against the wave's attack.	CL	1	2017	0.57
327	Kuwait – Al-Zour LNG Import Terminal 2.5km long protection with CORE-LOC™ blocks, of a reclamation area hosting eight LNG tanks. The LNG supplies from the facility will feed the power plants in Kuwait, enabling them to generate enough electricity to meet the energy demand during peak times.	CL	1 / 2	2018	8
322	Qatar - Halul Island - The project consists in the coastal protection of Halul Island. Sea defense for an Oil & Gas island. The project includes 150m long and 180 m long stretches of the shore protected by CORE-LOC™ armour units.	CL	2.4	2017	4.3
316	Pakistan – New Offshore coal import jetty for coal-fired power plant – HUB. The aim of the New offshore coal import jetty Project is to develop the power up to 1320 MW Coal fired power. The offshore part of the project is protected by a breakwater protected with CORE-LOC™ blocks.	CL	2.9 / 4.6 / 6.5 / 7.9	2017	7.0
308	Kuwait – Al Zour New Refinery Package # 5 - The project is located in the south of Kuwait next to MEW Power Plant. Mina Al-Zour. Kuwait. The project consists in the construction of rubble mound breakwater and sea defence for a small boat harbour and a land reclamation area that are part of the larger Al Zour New Refinery project	CL	1	2016	6
307	Ivory Coast – Vridi - Expansion of Port d' Abidjan. Modification of the Vridi Channel entrance groynes. Groynes covered on both sides with CORE-LOC™ units. The main groyne is 350 m long and the secondary groyne is 130m long.	CL	3.9 / 6.2	2016 - 2017	-13

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305	India – Thengapattinam Phase III - Fishing Harbour. The project consists in expanding and modernizing the existing fishing harbor. The project is protected with two breakwaters protected with CORE-LOC™ blocks laying on a seabed at -7.5 m and rising at +4 m on the crest.	CL	2 / 3 / 3.9 / 5	2015	7.5
304	Oman – Nabur Liwa - Fishing Port located at 220km north of Muscat composed of two breakwaters protected with CORE-LOC™ artificial blocks. The main breakwater. 865m long is laying on a seabed at -4.4m and rising at +7 m on the crest. The lee breakwater. 658m long is laying on a seabed at -3.0 m and rising at +7 m on the crest.	CL	1 / 1.3 / 1.5	2015	4.4
303	Iraq – AL Faw - The Al Faw Gand Port is located in the south of Iraq in Basrah and is the only access to the sea for Iraq. The Project consists in the construction of 15.8 km of breakwaters with three (3) roundheads. Part of the length is protected with CORE-LOC™ units.	CL	1.4 / 3	2015	8
301	E.A.U – Das Island – West Platform Reclamation	CL	5	2015	6
300	Oman – Mussanah Fishing Harbour - Fishing Port located at 100km north of Muscat composed of two breakwaters protected with CORE-LOC™ artificial blocks. The main breakwater. 854m long is laying on a seabed at -3.7m and rising at +6.80m on the crest. The lee breakwater. 773m long is laying on a seabed at -3.0 m and rising at +6.80 m on the crest.	CL	1 / 1.4 / 1.5	2015	3.7
294	Saudi Arabia - Shuqaiq Thermal Power Plant project is one of the largest scale power plant construction in that area. The offshore part of the project was protected by the CORE-LOC™ blocks from a level -6.0 at the toe line up to + 5.80 on the crest.	CL	1.5 / 2.5	2014	6
291	UAE - Fujairah NB Expansion - The project consists of the extension of the main breakwater of the Naval base located 15km North of Fujairah city. The length of the extension is 360.0.0m long and the seabed depth variable from -12.0.0m to -14.0.0m.	CL	3 / 5	2014	8
284	UAE – IGD E1 Das island west platform reclamation - Land reclamation works called west platform made with dredged material and protected by natural and artificial armour layer such CORE-LOC™ units.	CL	5	2015	7
283	Kuwait - Az Zour North IWPP (Independent Water and Power Producer) – Construction of breakwater protection for North IWPP project located 70km south of Kuwait city. The revetment is 700.0.0m long and situated at approximately -3.0.0m deep (variable).	CL	1	2014	4

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279	Oman – Barka Fishery Harbour - Construction of a fishing port. located 65km North-West of Muscat. involving two breakwaters of 800.0.0m long each. The seabed depth is variable from -2.0.0m to -5.0.0m.	CL	1.3 / 1.5	2013	5
278	India - Colachel II - Fishery Harbour – Expansion and modernization of the existing fishing harbour. The harbour is protected with two breakwaters protected with CORE-LOC™ blocks of 2.0 ; 2.4; 3.0 and 3.9 m ³ .	CL	2 / 2.4 / 3.9 / 5	2013	9
276	Colombia - Cerrejon II - P40 Phase 1 Expansion Project – Marine Works and Structures – Building of a 500.0.0m long causeway protected by 2.0.0m ³ and 3.0.0m ³ CORE-LOC™ units on the last 150.0.0m. Built to protect the carbon ship loader installed on the causeway.	CL	2 / 3	2013	3
273	Saudi Arabia - Jeddah South Thermal Power Plant – Situated on the coast of the red Sea. South Jeddah Thermal Power Plant project is one of the largest scale power plant construction in the Kingdom. The offshore part of the project is protected by the CORE-LOC™ blocks from a level -7.15 m at the toe line raising up to + 4.44 m on the crest	CL	1 / 2.5	2014	7.15
272	Brazil - ACU II - Breakwater Armouring Açu Commercial Port at Sao Jao da Barra. north of Rio do Janeiro – New Port constructed offshore in 14.0.0m waterdepth and protected by caissons and CORE-LOC™ units of 3.9 m3 and 5.0m3	CL	3.9 / 5	2013	14
268	UAE – Hamriyah WIO. Sharjah – Seawater intake and outfall structures. The new breakwaters are about 500.0.0m long. protected with 2.0m ³ (trunk) and 2.4.m ³ (heads) CORE-LOC™ units	CL	2 / 2.4	2013	7
260	Oman – Taqah Fishery Harbour – New fishery harbour located in Dhofar region 50 kms East of Salalah. The two breakwaters are about 2 km long in total and protected with five CORE-LOC™ sizes	CL	1.4 / 3 / 3.9	2012	6.5
259	Colombia – Cerrejon Causeway P40 phase 1 Construction of a 500 lm shore to support a coal conveyor for coal loading	CL	2 / 3	2012	3.5
257	Oman – Sidab Coast Guard Facilities New coastguard harbour located 8 kms North west of Muscat.	CL	5 / 6.5	2012	9.5
255	Oman – Wave Muscat armouring Offshore breakwater protecting the entire coastal resort area. Additional production of CORE-LOC™ units to complete the southern end armouring of the breakwater	CL	5 / 6.5	2012	10.6
253	UAE – Abu Dhabi – Braka nuclear power plant - 15 kms long revetments to protect intake and discharge channels and a large reclamation area	CL	1.4 / 2	2011	4

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250	Saudi Arabia - Rabigh - Power Plant N°2 Breakwater protection in front of a coral reef in the Red Sea	CL	2	2011	5
246	Oman – Hallaniyat – 600 ml harbour breakwater to protect mooring facilities on an island located 150 kms North-East of Salalah	CL	2 / 3	2011	9
239	Pakistan – New deep water container terminal in Karachi - Marine protection works include two CORE-LOC™ armoured breakwaters: Manora (870 ml) and Oyster (2800 ml) and improvement of the existing Keamari groin	CL	2.4 / 6.2 / 8.5	2010	17
237	India - Thengapatinam Fishery harbour Phase I & II : located on the south west coast of India (Tamil Nadu state. kanyakumari district)	CL	2 / 3 / 3.9 / 5	2010	11
234	Bahamas – Ragged Island – Gun point harbor - Multipurpose harbour for a small island 300 kms southeast of Nassau. Two breakwaters of 300 m long armoured with CORE-LOC™	CL	2.5	2011	6.5
233	Brazil – Açú Commercial port at sao Jao da Barra. north of Rio do Janeiro - New port constructed offshore in 14 m water depth – “L” shape breakwater. over 2 km long protected with CORE-LOC™ units	CL	3.9 / 5	2010	15.8
232	UAE – Das Island IGD - Extension of the existing gas facilities on Das Island. off Abu Dhabi coast - The breakwater located in front of the Northern quay wall is 400 m long and protected with CORE-LOC™ units of greater sizes – A smaller 1.4 m³ CORE-LOC™ size is used for adjacent coastal protection	CL	1.4 / 5 / 11	2010	14
227	Oman – Bait Al Barakah - New port protected with two breakwaters - The main one is 1100 m long and the lee breakwater is 800 m long both partially armoured with CORE-LOC™ units	CL	1.3 / 3 / 5 / 5.5	2009	9
225	Oman – Suwaiq - New marine facilities in Batinah region of Suwaiq. north coast of Muscat - Two breakwaters: 910 m long on the East and 740 m long on the West	CL	1.4 / 1.75 / 2.4	2009	7
220	India – Colachel - New fishing port in Tamil Nadu State- Kanyakumari District - Main breakwater (500 ml) and lee breakwater (100 ml) armoured with CORE-LOC™	CL	2 / 2.4 / 3 / 3.9	2009	10
219	Oman – Asian Beach Games 2010 Marina near Muscat protected by two breakwaters - 850.0.0ml total length	CL	1.4 / 2	2009	6.7
215	Oman – Hasik Ramp Construction -Construction of a temporary ramp for landing craft in the southern part of Oman	CL	2	2008	5.9
213	Sri Lanka – Colombo – Major western extension of the existing container port. involving construction of a 3500 m long breakwater armoured with CORE-LOC™ units	CL	8.5	2008	20

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209	Australia – Cape Preston – New materials offloading facility (M.O.F.) for iron ore export. north west of Australia	CL	3.9 / 6.2 / 8.5 / 11	2009	20
206	Oman – Seeb – New fishery harbour located near the airport north of Muscat – 2 breakwaters armoured with CORE-LOC™ units	CL	1.3 / 1.75 / 2 / 2.4	2008	12.5
205	Oman - Muttrah corniche - Repair of a 120 m dolos stretch using CORE LOC™ units along Al Bahri road	CL	3.9	2008	-
202	Oman - Barr Al Jissah Resort and SPA - Repair of a rock armoured breakwater following Gonu cyclone using CORE LOC™ units along a 250 m stretch (breakwater) and 50 m (revetment)	CL	1.4	2008	8.5
201	Saudi Arabia - Marafiq IWPP Industrial project near Jubail - Breakwater and seawater intake channel - protection over 500 m	CL	0.7	2008	3.5
197	Oman - Al Duqum port and dry dock complex - New port at Duqum about 500 kms south of Muscat - Main and lee breakwaters (2.6 and 2.4 km respectively)	CL	3 / 8.5	2007	19
191	India - Pawas bay export facility - 600 ml new breakwater for a private export port on the west coast of Maharashtra	CL	5 / 6.2	2007	15
190	Oman - Wave muscat - About 1 km -long offshore breakwater located west of Muscat to protect a recreational resort development	CL	5 / 6.5	2007	10.6
189	France - Fos Cavaou gas terminal - Extension of the roundhead of the breakwater protecting the gas terminal N°4 at the industrial bulk port of Fos near Marseilles	CL	2	2007	9.2
186	Oman - Shannah ferry harbour - Protection of new mooring facilities for ferry vessels by an offshore breakwater in Al Wusta region	CL	1.5	2007	8.7
184	South Korea - Busan Geoje fixed-link project - Protection of the deepest part of the immersed tunnel section	CL	5	2007	28
183	United Kingdom - Newbiggin Bay - Coastal protection- Construction of a 200 m long detached breakwater into Newbiggin bay located in Wansbeck district	CL	3.9	2007	8.6
182	Oman - Sohar industrial port extension (phase 3) - Fishing harbour construction north of the existing port involving a new breakwater and revetments protected with new and re-used CORE-LOC™ units	CL	1 / 1.5 (re-used) / 3 (new)	2006	9.4
181	UAE (Sharjah) – Hamriyah free zone harbour – 1500 m long revetment protecting reclaimed land on the west side of the existing port	CL	2	2006	9.4
180	UAE (Sharjah) – Layyah harbour – 500 m long revetment protecting reclaimed land on the west of the port	CL	2	2006	7.4

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174	Chile - Puerto de Arica - Rehabilitation of a Tetrapod breakwater on the northern part of the country	CL	5	2005	12
173	Barbados - West Indies-New coast guard harbour north of Bridgetown on the western coast of Barbados - Armour protection of the 200.0.0m long jetty	CL	2.4 / 3	2005	6.5
172	Argentina - La Plata port - rehabilitation of training walls - protection of the eastern breakwater	CL	0.9 / 1.4	2005	2
171	Argentina - Camarones - Construction of a new fishing quay protected by a 300 m long curved breakwater	CL	2.4 / 5 / 6.2	2005	8
167	Chile – Coastal protection at San Vicente	CL	0.8	2005	3
164	UAE - Khor Fakkan - Construction of two new breakwaters to expand the container port	CL	3.9 / 5	2004	19
163	Kuwait – Island of Umm Al Maradem-New service harbour - Armouring of the 500.0.0m long main eastern breakwater	CL	1.4 / 2.4 / 5	2004	5
162	Oman – Construction of two new breakwaters for the Sohar fishery harbour	CL	1.3 / 1.6 / 2	2004	3
161	Argentina - Quequen - Rehabilitation of the existing breakwater and construction of 500 m long new breakwater	CL	3.9 / 5 / 6.2 / 8.5 / 11	2004	11
160	Eire - Kilkeel - Construction of a rubble mound against an existing vertical pier	CL	2.4 / 3.9	2004	2
158	Qatar – Halul island industrial port extension-Protection of the new 250.0.0m long eastern breakwater	CL	1.4 / 2.4	2003	10
155	Egypt - Idku LNG Terminal - New offshore breakwater of 900.0.0m long.	CL	6.2 / 11	2003	12
153	Oman – Sohar seawater intake – End protection of the south breakwater	CL	3	2003	5
152	Italy – Gela offshore terminal phase II-New constructor selected for the rehabilitation works of the remaining casting and whole placement to protect the seaside of the existing vertical breakwater	CL	3.9 / 5	2003	13
150	Qatar - Ras Laffan seawater intake. Construction of two new breakwaters	CL	1.4 / 2.4	2002	6
147	UAE – Fujairah - new naval base south of Ormuz straits - Protection of the two new breakwaters	CL	3 / 5	2002	14
146	Chile – Mejillones – Located on Chile's northern coast - Protection along terminal 1 general cargo (multi purpose and containers)	CL	0.8	2002	14
143	Oman – Al Ashkharah fishery harbour - 100 Kms south of Muscat – Protection of the new breakwater	CL	1.5 / 3 / 4.5 / 5.5	2002	6
141	Qatar - Halul industrial port extension of a Gulf Island located 80 kms east of Doha - Protection of the main breakwater	CL	0.7 / 1.4 / 2.4	2001	11
137	Oman – Saham new fishery harbour – Protection of the new breakwaters	CL	1.3 / 2	2001	5

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127	Italy - Gela Port - Refurbishment of the main caisson breakwater	CL	3.9 / 5	2000	13
120	Oman - Sohar new industrial port - 6Kms of new breakwaters	CL	0.5 / 1 / 1.6 / 3	1999	16
117	Eire - Tory Island supply Harbour on an Island north of Ireland - Rehabilitation of the main breakwater	CL	5	1999	7.5
102	Oman - Khaboura offshore pier 150Kms north of Muscat	CL	3	1997	6.5
101	Oman - Dalkut fishing port near Yemen border	CL	6.75 / 9	1997	8