Unique Group

Buoyancy Solutions

APPLICATION NOTE

Use of Buoyancy for Installation of HDPE Intake / Outfall Pipe, and Towers

Buoyancy & Ballast

www.uniquegroup.com

APPLICATION NOTE

Introduction

Use of Buoyancy for Installation of HDPE Intake / Outfall Pipe, and Towers

Introduction

+ **Every year, Unique Seaflex gets involved in supplying our Mono Buoyancy Units for more and more HDPE pipeline projects around the world.**

Because HDPE pipe is intrinsically buoyant, and offers more than enough reserve buoyancy to support the concrete collars when the ends are capped, it may not always be apparent that the use of additional buoyancy units can be a vital part of this process when it comes to the easy positioning and joining of multiple pipe strings. So underneath we provide an illustrated guide to this process.

Unique Seaflex have more than 20 years' experience of supplying inflatable buoyancy solutions for offshore engineering projects – most notably where pipeline crosses shore, either afloat or pulled along the bottom.

Our experience of such projects is vast, and allows us to not only supply industry leading buoyancy bags with all necessary accessories but also to work with our clients from design engineering stage to optimize the specification of the buoyancy and the rigging as well as to jointly develop the methods to ensure the most efficient use of our equipment within the project.

If required, we can also provide BOSIET-ticketed technicians to assist with the correct and most efficient use of our equipment on the project.

Our client list is long, and within it you will find many of the most prominent names in offshore contracting.

All our bags are designed and manufactured in full compliance with IMCA D-016 guidelines, and those units we can drop-test come with type test certificates proving that they meet the required 5:1 factor of safety. Within our rental pool, all bags are inspected, tested and recertified between each and every job, and each bag comes with it's own logbook demonstrating that servicing regime and also providing full traceability down to component level for our customers' peace of mind.

Overview

+ Further on within this application note you will find some schematic drawings to demonstrate how Seaflex bags can be rigged, deployed and then vented and retrieved after touchdown.

Seaflex bags are suitable for use on projects where the pipe is being pulled into shore or pulled out from shore, floated into shore or floated out from shore. They are suitable for use through cofferdams on the shore or to assist with positioning on HDD projects. They are used on conventional rigid oil and gas pipe, as well as on HDPE intake and outfall pipes. They can be rigged to accommodate piggy-back arrangements. They can be secured to pass through a stinger without risk of fouling.

We also offer the patented Kraken system of continuous buoyancy with low profile, particularly suited to ultra-shallow work such as through swamps.

In short, there are not many pipeline landing projects for which Seaflex buoyancy is not suitable.

In terms of attachment, the preferred method is the use of simple choked round slings, but if these cannot be fitted at a joint recess and abrasion is a concern (ie in the event of a bottom pull) then clients have simply used steel bands to fit a d-ring or similar to the top of the pipe, onto which our buoyancy units can then easily be shackled.

Each project will have its own set of parameters and its own ideal solution in terms of rigging the bag and in terms of how best to fill and then vent the bags – and Seaflex are able to consult with the client to agree the best solution for the specific combination of pipe, location and intended method.

Unique Group

E. buoyancyballast@uniquegroup.com
W. www.uniquegroup.com

APPLICATION NOTE

The Process

Use of Buoyancy for Installation of HDPE Intake / Outfall Pipe, and Towers

The Pipelaying Process

+ Construct string of HDPE pipe ashore complete with concrete collars every few metres.
+ Cap off both ends with blanking flanges.
+ Roll / pull string into water until just floating.
+ Install MBUs to collars – as below.
+ Tow to site – i.e. the end of the previously installed string.
+ Flood pipe by opening water inlet on the offshore blanking flange until it starts to submerge.
+ Bleed air out of the upper vent valve on the shore-end to control the flooding of the pipe.
+ Complete string sinks until it is 'caught' mid water on the MBUs connected above the collars (orpipe; shore-end) with webbing slings at pre-determined lengths.
+ Position the string as close to the last string as possible before venting the MBU's at the shoreend allowing it to gently rest on the seabed.
+ Continue venting all bags until the string is positioned on the seabed.
+ Remove blanking flanges.
+ Increase the length of the MBUs' connecting webbing slings such that, when a small amount of air is puffed into each MBU it rises to just below the surface of the water.
+ Fully inflate all MBUs to just lift the string clear of the seabed, so making it easy for the tirfors to assist with the connection to the previous string.
+ When connection is made, deflate and remove the bags for use with the next string.

Capped-off HDPE pipe, fitted with deflated Mono Buoyancy Units.


HDPE pipe is manoeuvred to the end of the previous string, where the MBUs are inflated before the pipe is flooded.


Second String Sinking.

Unique Group

E. buoyancyballast@uniquegroup.com
W. www.uniquegroup.com

APPLICATION NOTE

The Process

Use of Buoyancy for Installation of HDPE Intake / Outfall Pipe, and Towers

The Tower Sinking Process

+ Seaflex buoyancy can also be used for the floating out and final positioning of Intake Towers on such projects.

  Typically large concrete structures of varying sizes but weighing up to 100 tons, these towers are often towed out and sunk into deeper water. The challenge is to as far as possible control the sinking process such that the tower will not plummet directly to the seabed, and such that the final position can be controlled for easy mating.

  For this type of application, two rows of Seaflex Fully Enclosed Single Attachment (FESA) bags have previously been fitted to such towers. Throughout the towing process, the tower is supported by a bottom tier of bags on relatively short strops. At the installation location, an upper tier of bags is inflated,these bags are attached to the tower via longer strops. The air is then vented from the lower tier of bags which causes the tower to sink down the water column until a few metres above the seabed – at which stage it is caught on the longer strops by the FESA bags at or near the surface. The tower can then easily be moved into final position before air is vented from the top tier of bags to see it sink into final position.

Sinking of Intake Tower (note submerged lower tier of buoys as upper tier is inflated)

Unique Group

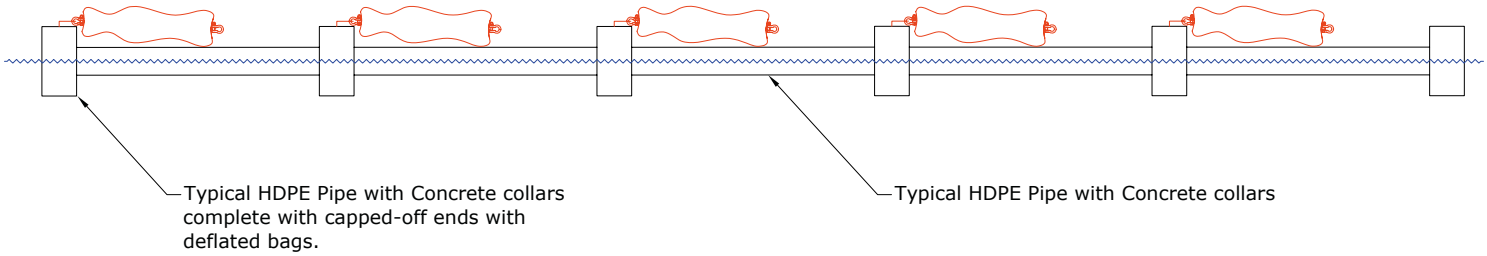
E. buoyancyballast@uniquegroup.com
W. www.uniquegroup.com

APPLICATION NOTE

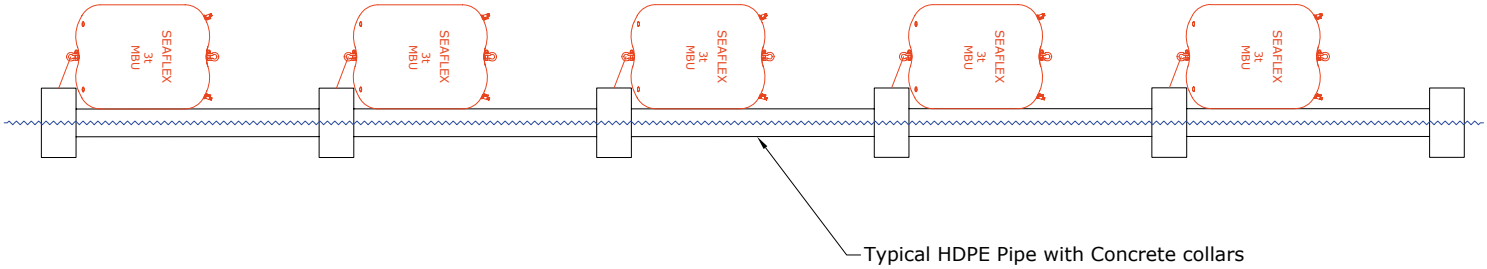
Process Technical Representation

Use of Buoyancy for Installation of HDPE Intake / Outfall Pipe, and Towers

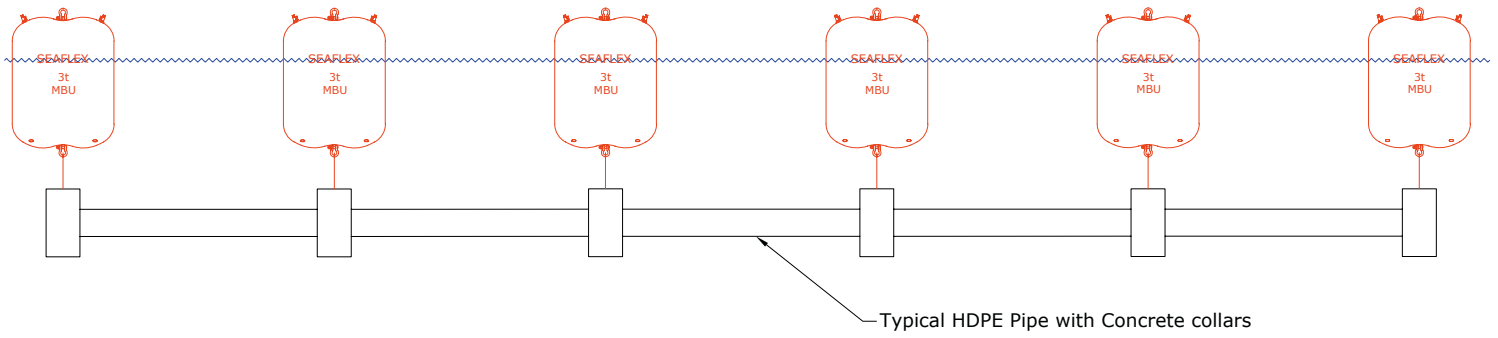
PHASE 1:- HDPE String capped with blanking flanges enters water, deflated MBU's attached to collars.



PHASE 2:- Tow to site, then inflate MBU's prior to flooding of the pipe.



PHASE 3:- Flood pipe via inlet on offshore flange, control bleeding via shore vent valve, MBU's "catch" pipe mid-water.



Unique Group

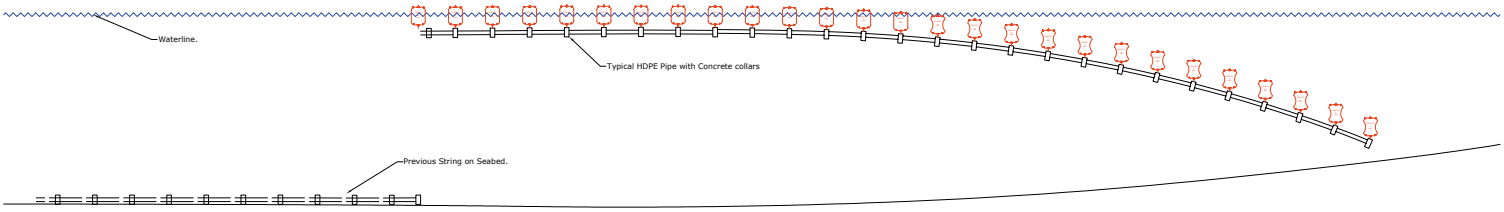
E. buoyancyballast@uniquegroup.com
W. www.uniquegroup.com

APPLICATION NOTE

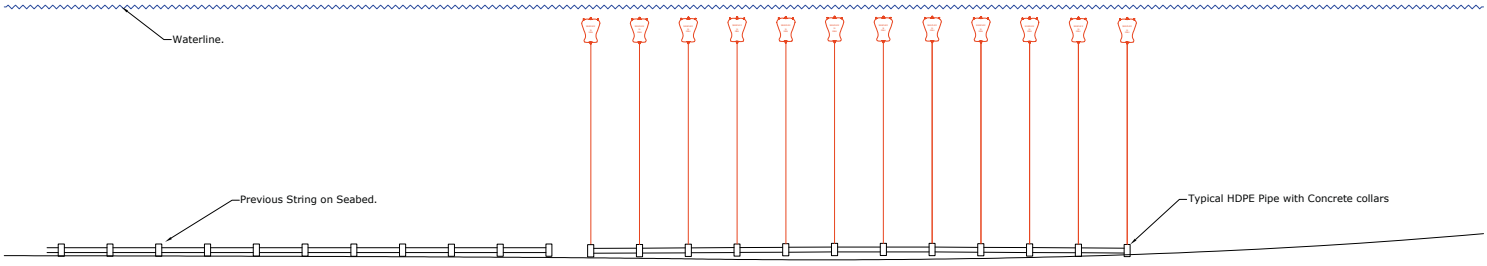
Process Technical Representation

Use of Buoyancy for Installation of HDPE Intake / Outfall Pipe, and Towers

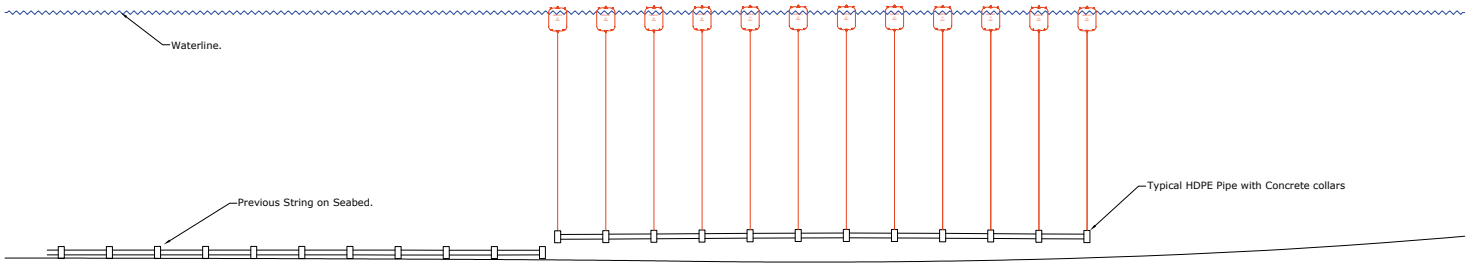
PHASE 4:- Position String as close as possible to previous string, vent MBU's from shore-end to rest gently on seabed.



PHASE 5:- Increase length of connection slings so that a small puff of air takes each MBU to just under the surface.



PHASE 6:- Fully inflate all MBU's, trifors can then position for easy conenction to next string. Deflate and remove all MBU's.



Unique Group

E. buoyancyballast@uniquegroup.com
W. www.uniquegroup.com

APPLICATION NOTE

Project References

Selected References in Flexible Buoyancy Globally

Date	Client	Project/Description
March 2016 V	alentine Maritime	Inflatable Buoyancy Units for HAIL project, Abu Dhabi
February 2016	Bumi Armada M	ono Buoyancy Units for Filanovsky Pipeline Work, Russia
November 2015 T	echnip Paris	Inflatable Buoyancy Units for Moho Nord Shore Pull - Congo
August 2015	Sapura Kencara TLO	Inflatable Buoyancy Units for Thai Binh Pipeline Installation - Vietnam
July 2015 N	estoil	Air Lift Bags for Oil Pipeline Lift and Repositioning - Nigeria
July 2015	Gareloch Support Services	Inflatable Buoyancy Units for HDPE Pipeline Installation - Scotland
July 2015 T	echnip Norge	Air Lift Bags for Various Subsea Works – Norway
June 2015	Sigur Ros (Petronas)	Mono Buoyancy Units for Jacket Tow-Out Contingency - Turkmenistan
May 2015	Acciona	Mono Buoyancy Units for La Chira HDPE Pipeline Installation - Peru
March 2015 B	oskalis	Mono Buoyancy Units for Shah Deniz Pull Wire - Azerbaijan
January 2015	Azevedo Engineering	Inflatable Buoyancy Units for Pipeline Intervention - Brazil
December 2014 P	etrobras	Mono Buoyancy Units for Various Tie-In Operations - Brazil
August 2014	DEME	Mono Buoyancy Units for Various Works - Ghana
July 2014	Harkland A	ir Lift Bags for Diving Works - UK
June 2014 S	ubsea7	Air Lift Bags for Diving Works - Nigeria
May 2014	Allseas	Mono / Inflatable Buoyancy Units for Wheatstone Pipeline -Australia
March 2014	Saipem Russia	Inflatable Buoyancy Units for Filanovsky Pipeline Installation - Russia
February 2014 O	AS M	ono Buoyancy Units and Bungs for Pile Installation - Uruguay
December 2013	Saipem France	Mono Buoyancy Units for CRX Pipeline Intervention - Congo
July 2013	Siemens	Water-filled Inflatable Buoyancy Units for Platform Ballasting - Denmark
June 2013 T	ideway	Mono Buoyancy Units for Pull Wire Installation - Venezuela
May 2013	NPCC M	ono Buoyancy Units for Oil Pipeline Installation – Abu Dhabi
April 2013 W	est African Ventures M	ono Buoyancy Units for Pipeline Installation Buoyancy – Nigeria
February 2013	Leighton Offshore	Mono Buoyancy Units for Oil Pipeline Installation – Malaysia
November 2012	McDermott Offshore	Mono Buoyancy Units for Macedon Gas Pipeline Installation - Australia
August 2012 R	JG Construction	Mono Buoyancy Units for Outfall Installation - Canada
August 2012	Clough Offshore	Mono Buoyancy Units for Gas Pipeline Installation - Australia
June 2012	Lundin Offshore	Air Lift Bags to disconnect FPSO - Tunisia
March 2012	Boskalis Offshore	Mono Buoyancy units for Nordstream Pulling Wire Installation - Russia
January 2012	SiCIM	Mono Buoyancy Units for Twin Pipeline River Crossing - Columbia
December 2011	Hallin Marine	Air Lift Bags for Barge Salvage – Singapore
November 2011 B	ouygues	Inflatable Buoyancy Units for Work Platform Float Out – France
August 2011	Prodive Monaco	Air Lift Bags for Trawler Salvage – France
August 2011	Saipem France	Inflatable Buoyancy Units for Pipeline Installation Buoyancy - Angola
July 2011 V	isser & Smit S	eaSerpent Cable Installation Buoyancy – UK
July 2011 S	ubsea7 France	Air Lift Bags and Mono Buoyancy Units for Subsea Works – Angola
May 2011	Caldive Pte	Mono Buoyancy Units for Pipeline Installation Buoyancy – Australia
February 2011 I	ndian High Commission	Inflatable Buoyancy Units for Frigate Salvage – India
November 2010 J	an der Nul M	ono Buoyancy Units for South Riding Oil Pipeline Installation – Bahamas
November 2010	Bibby Offshore	Air Lift bags for Subsea Works – Scotland
August 2010 B	am Nuttal	Air Lift Bags for Container Recovery – Scotland
July 2010	Allseas Engineering	Mono Buoyancy Units for Gas Pipeline Installation - Trinidad
July 2010 C	TC Marine	SeaSerpent Cable Installation Buoyancy – UK
July 2010 S	piecapag	Mono Buoyancy Units for Soyo LNG 3 Gas Pipeline Installations – Angola
June 2010	Arbeit Kaiserschleuse	Inflatable Buoyancy Units & WaterLoad Bags - Lock Gate - Germany
March 2010 P	etroleum Marine Services	Inflatable Buoyancy Units for Steel Pipeline Installation – Egypt
Sept 2009 U	MC International	Air Lift Bags for Drydock Draft Reduction – Ireland
Sept 2009	Plasticos P'ductos Aquaticos M	ono Buoyancy Units for HDPE Water Intake Installation – Spain
March 2009 A	cergy	Mono Buoyancy Units for Mexilhao Oil Pipeline Installation – Brazil

Unique Group

E. buoyancyballast@uniquegroup.com
W. www.uniquegroup.com

Unique Group

Buoyancy & Ballast

Local presence worldwide

UNIQUE GROUP OFFICES

MIDDLE EAST

UAE

Unique Group FZC
Sharjah
T. +971 6 5130333
E. uaesales@uniquegroup.com

QATAR

Unique System Tr & Eng WLL
Doha
T. +974 44147079
E. qatarsales@uniquegroup.com

SAUDI ARABIA

Muraba Alsahra Trading LLC
Riyadh and Al Khobar
T. +966 13 802 0614
E. ksasales@uniquegroup.com

ASIA PACIFIC

SINGAPORE

Unique System (SEA) Pte Ltd
Singapore
T. +65 6542 1800
E. fareastsales@uniquegroup.com

INDIA

Unique Hydrographic Systems Pvt Ltd
Navi Mumbai and Vadodara
T. +91 22 27619939/40/41/75
E. indiasales@uniquegroup.com

AUSTRALIA

PERTH

Unique Subsea Australia Pty Ltd
Perth Airport Park
T. +61 418 205 212
E. aussales@uniquegroup.com

QUEENSLAND

Unique Subsea Australia Pty Ltd
Pinkenba, Queensland
T. +61 418 205 212
E. aussales@uniquegroup.com

USA

CENTRAL

Unique System Inc
Houston, Texas
T. +1 713 937 6193
E. usasales@uniquegroup.com

EAST COAST

Water Weights Inc
Suwanee, Georgia
T. +1 678 730 4180
E. buoyancyballast@uniquegroup.com

WEST COAST

Water Weights Inc
Montclair, California
T. +1 909 626 8316
E. buoyancyballast@uniquegroup.com

AFRICA

SOUTH AFRICA

Unique Hydra (Pty) Ltd
Cape Town
T. +27 21 835 7900
E. sasales@uniquegroup.com

NIGERIA

Unique Charkin System Ltd
Port Harcourt
T. +234 908 5659444
E. nigeriasales@uniquegroup.com

EUROPE

UK

Unique Seaflex Ltd
Cowes, Isle of Wight
T. +44 1983 290 525
E. buoyancyballast@uniquegroup.com

Unique System (UK) Ltd
Water Weights Ltd
Aberdeen, Scotland
T. +44 1224 723 742
E. uksales@uniquegroup.com

NETHERLANDS

Unique System BV
T. +31 850 513 700

Water Weights BV
T. +31 850 513 750
Werkendam
E. info.wwnl@uniquegroup.com

Unique Group's Buoyancy & Ballast products are available for hire or purchase from more than 20 other worldwide locations via our network of independent partners. Please contact us for more details.