# OCS UTILITY BARGE "MISS PENNIE" and MULTICAT "MISS BEE"

# TECHNICAL and PROJECT APPLICATION INFORMATION

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## 1.0 INTRODUCTION

This document provides technical details and typical project application information for OCS marine assets the Utility barge UB-O1 " Miss Pennie" and the Multicat Anchor Handler " Miss Bee".

These vessels have been conceived, designed and constructed to fill a niche market in the marine construction market primarily addressing near shore pipelines installed in relative shallow water and the need for Pre-trenching, Pipe lay, Backfill , Post Trenching and miscellaneous support work in areas that are not readily accessible to conventional equipment.

The vessels have been constructed based on detailed knowledge of the constraints faced during marine construction operations and complement the range of portable equipment already available in the OCS inventory enabling OCS to take on projects on a " One stop shop" basis with no significant reliance on 3rd parties including design engineering (where necessary), construction support engineering and construction management.

Offshore Construction Specialists (OCS) was formed in 2007 from a core group of experienced marine construction engineers with an extensive track record working with major contractors. The company has grown steadily since incorporation and now employs approximately 60 personnel (of whom over 30 are civil/structural and mechanical engineers) with the head office at 36 Kian Teck Road, Singapore and satellite offices in Bangalore, India and Batam, Indonesia. OCS engineers and technicians work hand in hand to ensure all projects are properly engineered and approached in an operationally practical manner.

The company provides construction management, engineering and strategic support equipment services primarily to the offshore oil and gas sector focusing on the installation of pipelines, platforms, tanker moorings and related facilities. In addition to engineering, OCS also provides services for pipeline installation & burial, free span corrections pipeline pre-commissioning & drying, flexible flow line and umbilical installation.

Services are provided on a standalone basis to asset operators or on a subcontract basis to major contractors.

## 2.0 UB-01 "MISS PENNIE"/ MULTICAT "MISS BEE" GENERAL TECHNICAL CAPABILITIES

The UB-01 "Miss Pennie has been conceived based around a basic design that enables the vessel to be configured to different operating modes without significant effort.

The different operational modes considered are:

i) Pipeline pre-trenching or general trenching work.
ii) Pipe lay Operations.
iii) Pipeline Post Trenching.
iv) Miscellaneous Marine Construction support work.

The attendant Multicat "Miss Bee" is designed to perform shallow water anchor handling for the "Miss Pennie" and provide other general support services. Her extreme shallow draft, anchor handling winch / A frame and knuckle boom crane make her an extremely complementary vessel for the Miss Pennie with the two vessels working in tandem on shallow water projects.

In general, clients will be pleasantly surprised at the standard of equipment available on the UB 01. For most vessels of this type support the support facilities are of a temporary nature but in the case of this vessel these facilities are incorporated as permanent features. This has been made possible because the whole spread has been conceived, designed and built from the keel up.

OCS has designed and built the vessel with a primary configuration capable of being easily adapted to the selected mode of operations without significant effort.

OCS operates in-house long boom 90 tonne excavators for pre-trenching operations and a full suite of pipe lay equipment including a tension machine and stinger plus post trenching pumps and jet sleds that can be added to the vessel where these applications are required.

The robust 10 tonne mooring winches are air powered with large pressurised receiver tanks in the below deck machinery space providing an ample supply of air to power the winches.

The 60 tonne (DAF 2.0) stern A frame can be installed to support the stinger for pipe lay or the jet sled for post trenching or for special purpose applications.

In short with the UB 01 Miss Pennie and Multicat Miss Bee clients have access to a vessel spread that is capable of operating to a high level of efficiency in minimum water depths on a multiplicity of different applications.

## 3.0 UB-01 BASE CONFIGURATION

The basic configuration of the barge incorporates the features that are essential (or at least highly desirable) in each of the designated operating modes.

### i) Hull Design and Structural Features

- Basic Dimensions : 160 ft x 45 ft x 10 ft ( 48.8 m x 13.7 m x 3.28 m)
- Hull and side shell strengthening on Keel and Sides for Grounding (16 mm plate)
- Deck strengthening to accommodate 90 tonne excavators for Pre-trenching and Crawler cranes up to

250 tonne for support lifting work and anchor handling etc.
- Specific Strengthening for Davit points for pipe lifting.
- Stern strengthening for Stinger, A frame, and other stern attachments.
- Integrated spud well structures.
- Integrated pad eyes to enable barge to be lifted by HLV or derrick crane with all equipment on board.
- Integrated water and air piping to distribute feed water and air for post trenching and utility applications.
- Large below deck machinery space to accommodate air receivers and mooring winches.
- Welding machines and cutting equipment included as part of the barge inventory.

ii) **Deck Timbers**

Heavy duty deck timbering is provided where required to facilitate tracking of excavators and crane.

iii) **Air and Water Distribution Systems**

The "Miss Pennie" uses large volumes of air to power the mooring winches and other support systems. Two large 22 m3 air receivers located in the below deck machinery room are charged using large 1080 cfm x 350 psi two stage air compressors. Pressure regulators distribute the air at the desired pressure to the mooring system, post trenching air lifts, air driven ballast pumps etc.

Integrated water distribution pipe work makes it possible to control the large volumes of water used in water jetting without taking up unnecessary deck space.

iv) **Mooring System and Spud Piles**

8 x 10 ton air driven mooring winches each with a capacity for 1000 metres of 1 1/8" ( 28 mm) wire rope are located in the below deck machinery room. The winches can be configured to drive an eight (8) point mooring system with two (2) fairleads located at each corner. In addition the starboard winches can be configured to control two 18-metre spud piles when the barge is used for pre-trenching or for mooring in tight areas where shallow water restricts anchoring options.

The mooring system is equipped with centralised control and load cells. A central panel is provided in the above deck control room.

Note that in congested marine complexes where existing subsea pipelines make anchoring difficult then high strength dynamax fibre anchor lines can be utilised on the winches in lieu of wire rope.

v) **Ballast Tanks**

Ballast tanks are located at the side of the vessel for use with trimming where required.

vi) **Fresh Water and Fuel Storage**

Below deck Freshwater and Diesel fuel tanks are provided with liquid transfer pumps. Diesel day tanks are also provided.

vii) **Control Tower and Office Accommodation**

Control tower and office for field personnel are provided including messing facilities.

viii) **Power Generation**

Barge switchboard for 500 Kva of input power at 50 Hz.

ix) **Pedestal Crane**

Pedestal crane with 32 tonne – metre capacity.

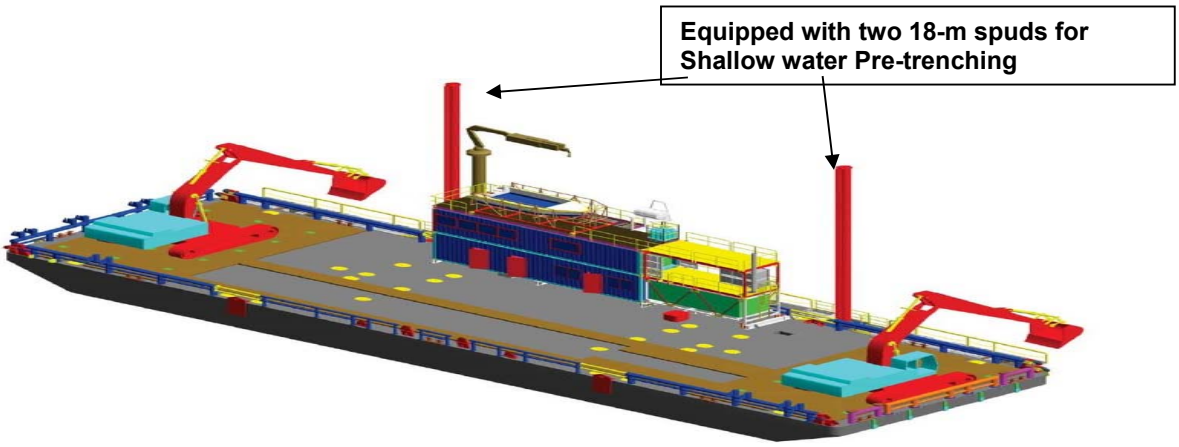
x) **Dive Support Boat**

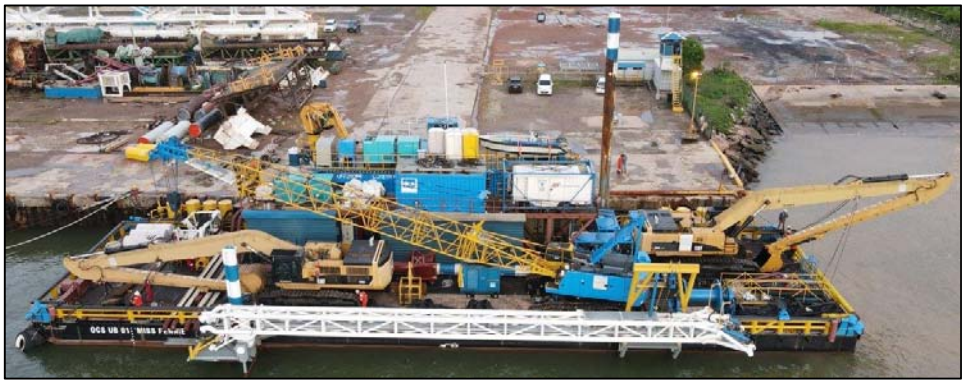
A twin engine dive support vessel is provided with the barge as part of the base inventory.


**GENERAL VIEW OF MISS PENNIE CONFIGURED FOR PIPELAY**

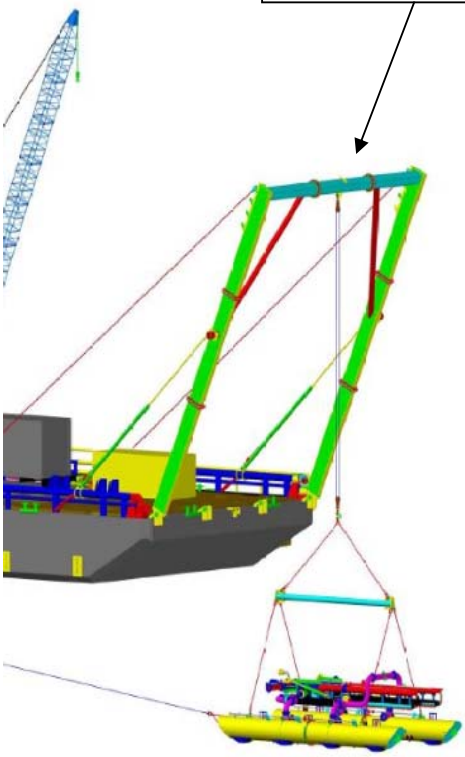
## 4.0 UB-01 PRE-TRENCHING

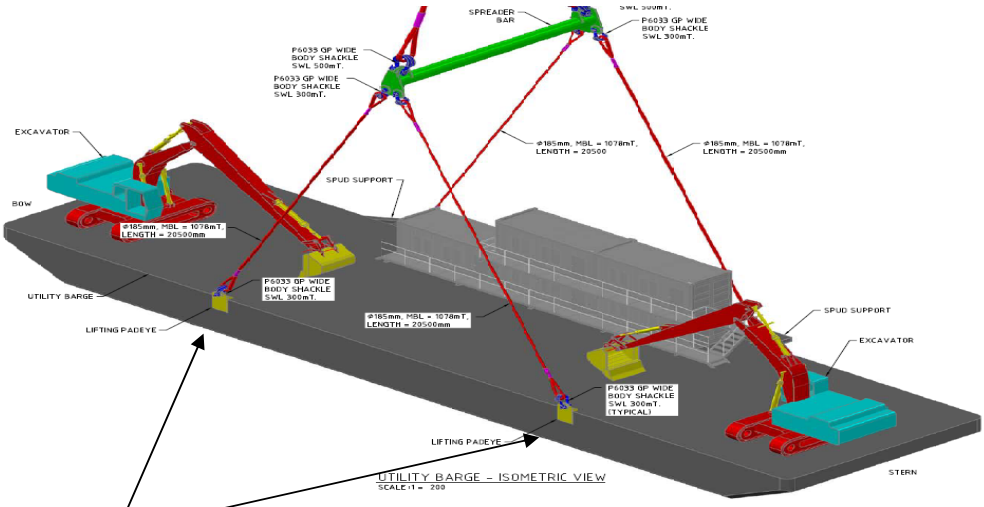
For pre-trenching the UB-01 operates with the mooring system rigged to two x 18.0 metre spud piles controlled x 4 part handling blocks located on the starboard side of the vessel.
OCS operates in-house equipment consisting of two (2) units of long arm CAT 390 excavators with 2.0 cubic metre buckets and at a down reach of 17 metres below the barge deck and also an amphibious excavator CAT 320 with a long boom with a down reach of 9m below the carriage.



**60 tonne Stern A frame**






**Equipped with lifting pad eyes for transport by heavy lift vessels**


**OCS IN-HOUSE CAT 390 LONG REACH EXCAVATORS**

OCS prequalification document for pipeline shore approaches can be referenced for further information.

## 5.0 UB-01 PIPELAY

The UB01 capacity for pipe lay needs to be assessed on a case by case basis. The pipe handling equipment, tension machine and stinger can be upgraded for heavier pipe as required. For pipe lay the 60 tonne stern A frame is installed and the OCS stinger is suspended from the A frame and a portable pipe ramp is installed.

The following is a list of key equipment items owned in house by OCS to support pipe lay operations :

- 15 tonne tension machine.
- Ladder Stinger.
- 60 tonne stern A frame.
- Portable pipe ramp and rollers with 3 welding stations and one field joint station.
- Ready rack and line up station.
- A & R Winch.
- Air Diving system.
- 90 ton Deck Crawler Crane.
- In-house survey and positioning equipment.

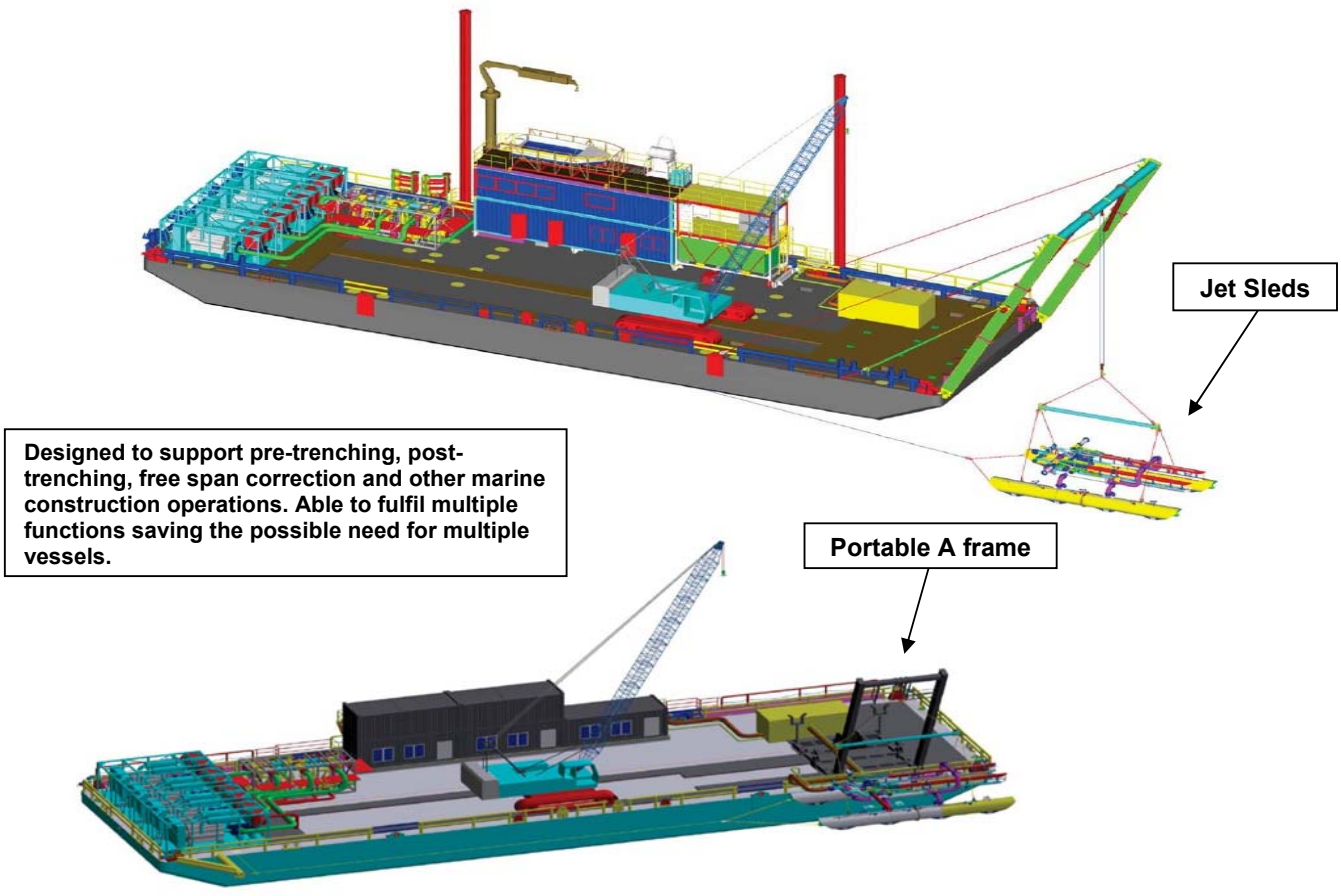
## 6.0 UB-01 POST TRENCHING

The UB01 has been designed with specific features for post trenching. The 8 point mooring with centralized control can be used with the well proven OCS suite of post trenching equipment. Integrated pipe work is included with the vessel to facilitate hook up of jetting and airlifting systems.

The following is a list of key equipment items owned in house by OCS to support post trenching operations:

- 90 tonne deck crane
- 60 tonne stern A frame
- High volume feed pumps.
- High Volume pressure pumps.
- Large volumes of compressed air
- Well proven pontoon and pipe riding jet sleds.
- Air Diving system.

OCS pre-qualification document for post trenching can be referenced for further information.



## 7.0 UB-01 UTILITY APPLICATIONS

Other possible applications for the UB-01 include:

- Installation of pipeline crossings.
- Installation of Mooring or Plem piles.
- Installation of subsea facilities using stern A frame.
- Hook up/demolition support on existing platforms.

## 8.0 OCS MULTICAT MISS BEE

The OCS Multicat Miss Bee has been designed to complement the operations of the Miss Pennie and is designed to handle anchors in shallow water. The vessel is twin engine and equipped with a knuckle boom crane, anchor handling winch and A frame.

Engine Specification: 2 x 380 HP Iveco Engines.
Anchor Handling: 15 ton winch and a frame.
Knuckle Boom: 22 ton-metres
Operating Draft: 1.5 metres.

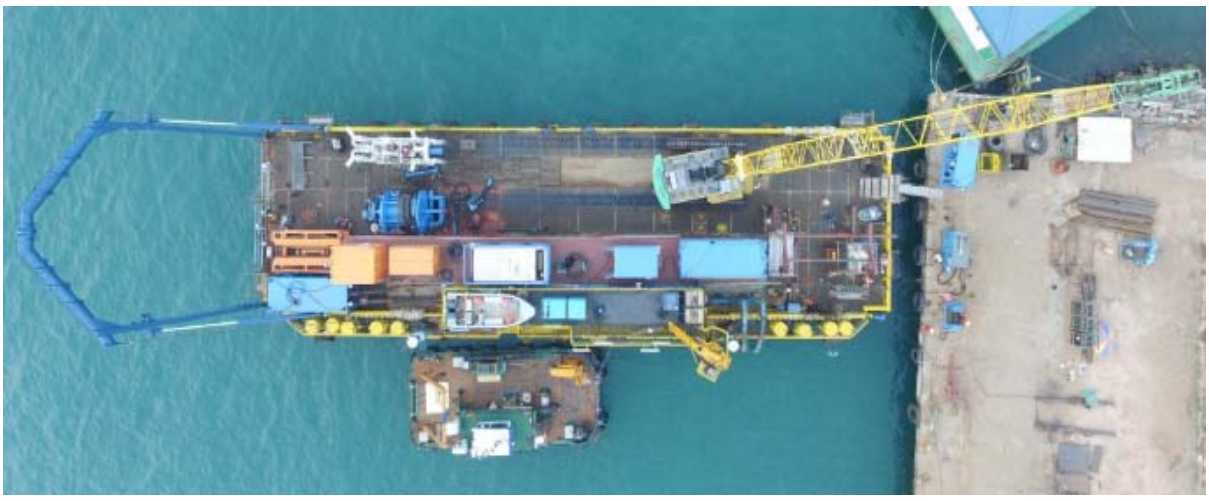
**MISS BEE MOORED ON STARBOARD SIDE OF MISS PENNIE**

## 9.0 APPENDICES

9.1 Photo log of UB-01 Miss Pennie
9.2 Photo log of Multicat Miss Bee

## 9.1 Photo log of UB-01 Miss Pennie

**MISS PENNIE / MISS BEE FROM STARBOARD QUARTER**



**AERIAL PHOTO OF MISS PENNIE / MISS BEE**

**MISS PENNIE FROM STERN**

**MISS PENNIE FROM PORT SIDE**

## 9.2 Photo log of Multicat Miss Bee


**MISS BEE FROM PORTSIDE**

**MISS BEE FROM BOW**

**MISS BEE A FRAME TEST**


**MISS BEE KNUCKLE BOOM CRANE TEST**