

LIGHTWEIGHT MOBILE OFFSHORE PRODUCTION UNIT (MINI-MOPU)

A Relocatable, Low Cost, Self-Installing Production Platform

Mini-MOPU Solution

The ICON Mini-MOPU is a relocatable self-installing offshore production platform. It is designed for low cost delivery and installation. It suits relocation due to its jackup-like design.

Unlike traditional buoyant MOPU's the platform does not have in-built buoyancy or a permanent in-built jacking system. The installation method eliminates this need. The result is a significantly lighter and lower cost structure which does not need to be designed to float or have expensive permanent jacking systems.

The benefit is a lower total cost solution, and a significantly lower cost per unit for multi-platform field developments. The installation hardware is rented or used multiple times, thereby reducing the unit cost and CAPEX.

Topsides Specification

The salient topside features include:

- ▶ Up to 2,000 tonnes of modules in 4 module bays (each 25m x 15m);
- ▶ The system is designed for jack-up rig drilling: with the well-bay location allowing for multiple rig types.
- ▶ Crane, helideck, flare as can be included as required.
- ▶ Boat landing is installed using the platform crane.
- ▶ Up to 16 well slots using tensioned conductors.

Structure Specifications

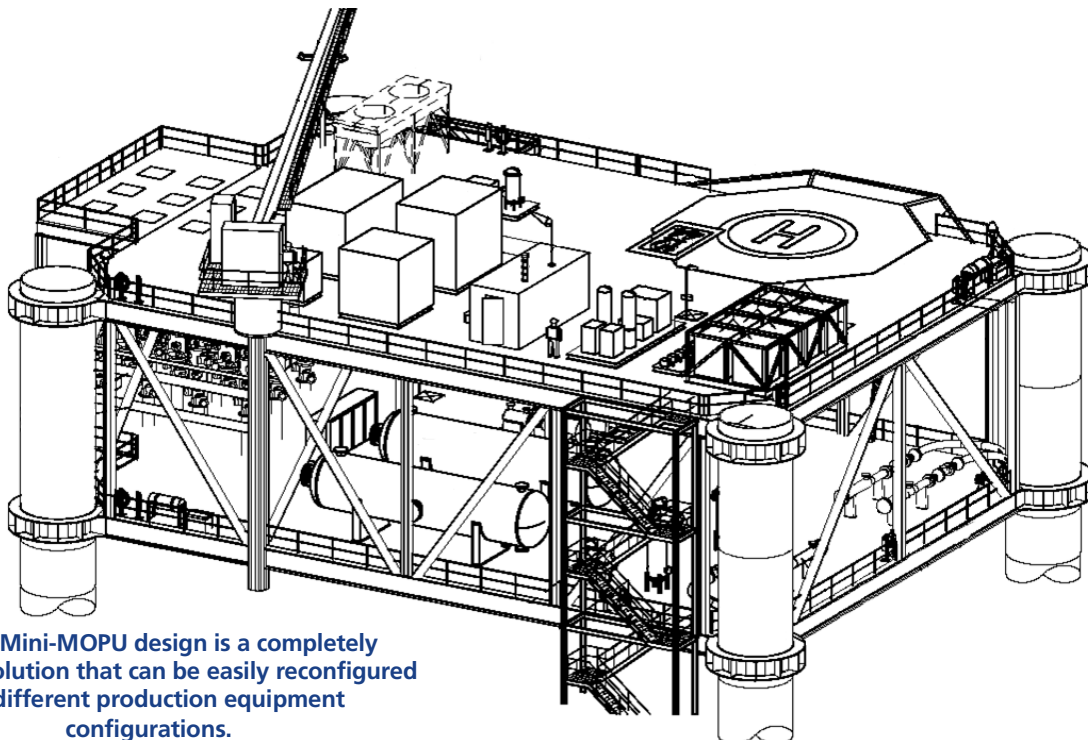
General structure specifications are as follows:

- ▶ Water Depth: Currently designed for water depths to 45m however the depth range can be extended depending on the wave height and foundation conditions.
- ▶ Environment: Designed for most Asia Pacific locations
- ▶ Foundation: Suitable for soft clay/silt, firm clay, sand or rock. Suction piles, driven piles or drilled piles can be used.

Unique Features

ICON's Mini-MPOU solution has many unique features including:

- ▶ The primary structure can be fabricated while removable modules are being designed and built.
- ▶ The well bay design allows well handover to a more permanent fixed production platform and redeployment of the Mini-MOPU if desired.
- ▶ No permanent buoyancy required, eliminating expensive permanent hull and associated marine hardware.
- ▶ Removable Jacking system, able to be redeployed on multiple Mini-MOPU's.
- ▶ Three Different Foundation Solutions available: suction piles, driven piles & drilled piles.



ICON's Mini-MOPU design is a completely modular solution that can be easily reconfigured for different production equipment configurations.

Installation Features

Installation features of ICON's Mini-MOPU include:

Transport

- ▶ Can use 250 ft barge to transport mini-MOPU to site.
- ▶ Load out onto the barge is generally by skidding or via trailers.
- ▶ The platform legs are installed onto the Mini-MOPU after load out, depending on fab site capacity.

Site Installation (Refer sequence images below)

- ▶ The Mini-MOPU is towed to site with the legs in the up position.
- ▶ The legs are then lowered and the structure jacked up to clear of barge.
- ▶ Jack-up continues until the platform is in the top position. Legs are individually jacked to accommodate uneven seabed and uneven penetration rates.
- ▶ Foundation system installation varies depending on soil types. Pre or post installed piles or suction piles can be used
- ▶ The boat landing is installed by platform crane.
- ▶ Minimal hookup and commissioning is required

Competing Concepts

Early concepts of self-installing MOPU platforms have been based on using traditional jackup rig technology. Unfortunately these designs come with high up front capital cost due to the hull and permanent jacking systems. Leased systems are common to mitigate the high up front capex, however this often causes higher overall project cost.

Once in place, the hull and jacking systems of traditional MOPU's is redundant for years, which is not good use of

the capital involved. The jacking systems often deteriorate and need significant refurbishment upon MOPU removal.

MOAB designs are also governed by the need to float and be stable under tow and the associated certification / classification is expensive and often high risk.

ICON has assisted many operators with MOAB and MOPU developments and has installed the associated wellhead support structures (refer our previous projects pages on our www site). While this work remains one of ICON's core businesses, the insights learnt from these projects about the high costs of the MOPU have lead ICON to develop our Mini-MOPU solution. Our field experience and execution track record has given us a unique insight into the issues associated with competing designs, and in many cases the mini-MOPU delivers very significant field development cost savings.

Drill ACE or similar 'jacked hull' type, self-installing platforms have also been plagued by cost over-runs and high capex due to the cost of the permanent hull, and towing stability risks. Difficulties with rig approach, deck space impacted by central leg, and difficulties in adjusting verticality of the platforms in the event of uneven seabed or uneven foundation penetration. The ICON Mini-MOPU addresses the downsides of the competing concepts

Complete Project Solution

ICON can offer a complete engineering and installation solution customised to your particular field. Alternatively we can also work with your preferred fabricator and process designer if there are project elements you would prefer to be undertaken by alternative preferred suppliers.

Installation Sequence - ICON's Self Installing Platform can be economically installed from a 250 ft barge (this image shows the suction pile foundation configuration)

