

INSTITUTION OF MECHANICAL ENGINEERS HONG KONG BRANCH  
TECHNICAL VISIT TO HONGKONG UNITED DOCKYARDS ON 15/2/2014



IMechE delegates before HUD's "United" floating dock (Paul W.C. Chan)

**General**

Every day, vessels from around the world berth and unberth the container terminals in Kwai Chung, generating great wealth for Hong Kong. The vessels cannot manoeuvre in the container port basin without the assistance of the tug boats, and when they break-down they need to be repaired swiftly in order to return to voyage as soon as possible. To stay seaworthy, every five (5) years they must pass the mandatory Special Survey required by the classification society. The maritime activities of Hong Kong are supported by the Hongkong United Dockyards Limited (HUD Group), one of the principle shipyards in the territory, which 26 members of Institution of Mechanical Engineers (IMechE) visited in the morning of 15 February 2014 and learnt how it contributes to the maritime activities of Hong Kong.



Hongkong United Dockyards Limited (W.H. Tsang)

works for industrial machinery and equipment, the Division also provides yard services for industrial and heavy engineering projects such as the assembly of tunnel boring machine, whereas its Land Engineering renders turn-key solutions to mechanical facilities at the customer's site. For instance, an ammonia stripping plant in West New Territories Landfill of Hong Kong is retrofitted by the Engineering Division of HUD.

### **Floating Dock "United"**

"United" is a Singapore-built floating dock with lifting capacity of 40,000 tonnes. Built in 1995, it is capable of docking vessels up to 300 m length overall by 38 m breadth extreme, and 8.5 m draft. It equips with a travelling crane of 70 and 30 tonnes lifting capacity at the starboard and port side respectively, together with four (4) dock arms of length 20 m and maximum working capacity 600 kg each. Its location is secured by 30 anchor cables attached to the hull, and its buoyancy is controlled by the 28 ballast tanks and eight (8) ballast pumps. Thanks to its closeness to shore, it is powered by electricity supplied by a dedicated CLP sub-station through underwater power cable, whereas the three (3) diesel generators on-board provide emergency electricity when required.

HUD Group is Hong Kong's leading provider of ship repair, harbour towage and salvage services. Formed in 1973, HUD is an equal share joint venture of the Swire Pacific and Hutchison Whampoa, which Taikoo Dockyard and Engineering Company and Hongkong and Whampoa Dock Company were founded in 1908 and 1863 respectively. Under HUD Group are Engineering Division and Salvage and Towage Division, with approximately 220 employees each.

### **Engineering Division**

The Engineering Division under HUD Group provides ship repair in terms of regular docking and emergency repair. Being a major contractor for steelwork, mechanical and electrical engineering



Tunnel boring machine assembly supported by HUD (W.H. Tsang)



“United” floating dock (W.H. Tsang)

It takes three (3) to four (4) hours to berth a vessel into “United” in general, where grit-blasting, protective coating and engineering works, such as propeller and tail shaft removal, are undertaken. The floating dock “United” itself, being classified as a vessel, is also subject to survey similar to class renewal requirement for other ocean-going vessels. Additionally, imposed by its classification society Lloyd’s Register, weld and wall thickness inspections across the hull is performed once every two (2) years. Over the 2012 to 2013 period, “United” consumed 600 tonnes of steel plate to Class requirement.

### **Workshops**

The electrical works housed in Electrical Workshop encompasses the overhaul and maintenance (O&M) of motors used onshore and offshore as well as electrical



Electric motor coils rewound in HUD Electrical Workshop (Benny C.Y. Sit)

engineering works, such as switchboard reparation. Inside the air-conditioned workshop, the motors are disassembled for re-conditioned. The coils are rewound and balanced, and then soaked in insulation varnish and baked in computer-controlled electric oven for ten (10) hours. HUD benefits from receiving large heavy-duty motors by sea, enabling it to perform O&M of motors from the industry, such as the power station on Lamma Island.

In addition to the Electrical Workshop, the Machine Shop and Steel Workshop were visited.

### **Salvage and Towage Division**

HUD operates a fleet of 14 modern tugs with average age younger than 7 years, under Salvage and Towage Division (S&T), providing escort, berthing and unberthing services to all types of vessels. The 24 hour service renders it over 55 % market share in Hong Kong and is one of the largest tug operators in Hong Kong. The Operation Department commands and controls the tug boats for the job assignments and navigating speeds through the Operation Room. The Operation control room fitted with a large wall mounted display showing the tugs and assignments details. The operation controllers deploy the tugs base on the displayed information. With the help of an AIS system equipped in the control room and the direct linked system to Marine Department's Vessel Traffic System, the controllers are able to monitor the marine traffics, real time, in various areas of Hong Kong waters, thus allow them to deploy the tugs and execute the assignments efficiently.



HUD Salvage & Towage Division's Operation Centre (Benny C.Y. Sit)

In addition to the service in Hong Kong water, from Tap Shek Kok to Tolo Harbour, the company performs special assignments, such as ocean towages, offshore support services and salvage services as required. Moreover, S&T is contracted to provide sea-based transport for the waste management service provider SITA and SWM. The refuse collected in the city is packed into dedicated containers which are transported to the North East New Territories Landfill by sea, and the proprietary container vessels are operated by S&T. HUD's tug boats are refuelled at the adjacent terminal of Shell on Tsing Yi Island.

## Tug Boat “Taikoo”



Tug boat “Taikoo” (W.H. Tsang)

A highlight of the visit was board HUD’s flag-ship tug boat “Taikoo”. Built by Cheoy Lee shipyard in Doumen, Zhuhai in 2012, “Taikoo” is one (1) of the four (4) 5,000 horse power (hp) tug boats under HUD, there are total eight (8) units of such powerful



Starboard side main engine with fire-fighter pump inside “Taikoo” (W.H. Tsang)

tugs serving the Hong Kong market. From top to bottom decks, it comprises Control Room, Living Compartment and Engine Room. The tug is manned up by Eight (8) to nine (9) crew, as situation required, comprising Captain (with class I ocean going Master licence), Chief Officer, First Engineer, Second Engineer, Chef, other ranks and ratings and is ever ready to sail in a very short interval to response to any emergency case.

Inside the Navigation Control Room at the Bridge deck, the one-man operated console controls the manoeuvre and radio communication of the tug boat. One deck below is the Living Compartment where the kitchen and mess room are located. The Engine Room at the bottom, houses the Silent Room where the Engineers sit and control panels for each engine and propeller unit are installed.

Outside the Silent Room are the two (2) sets of NIIGATA-made main engines on port and starboard side in parallel, and a YANMAR-made diesel generator in between. The starboard side main engine connects to a fire-fighting pump which delivers 1,200 m<sup>3</sup> per hour of water. NIIGATA supplied the entire package of power-train, comprising main engine, gearbox, 360 degree azimuthing Z-drive units and the associated hydraulic controls, which is operated by the shaft power of the main engine.



NIIGATA-made 360 degree azimuthing Z-drive unit (above) and the associated hydraulic controls (bottom) inside “Taikoo” (W.H. Tsang)

### **Remarks**

The port is indispensable to the prosperity of Hong Kong, to which safe, swift, reliable and efficient operation HUD has tremendous contribution by the outstanding docking and tug boat services rendered round the clock in all weather. IMechE members in Hong Kong were privileged to appreciate first-hand its operations and particularly the engineering of tug boats.

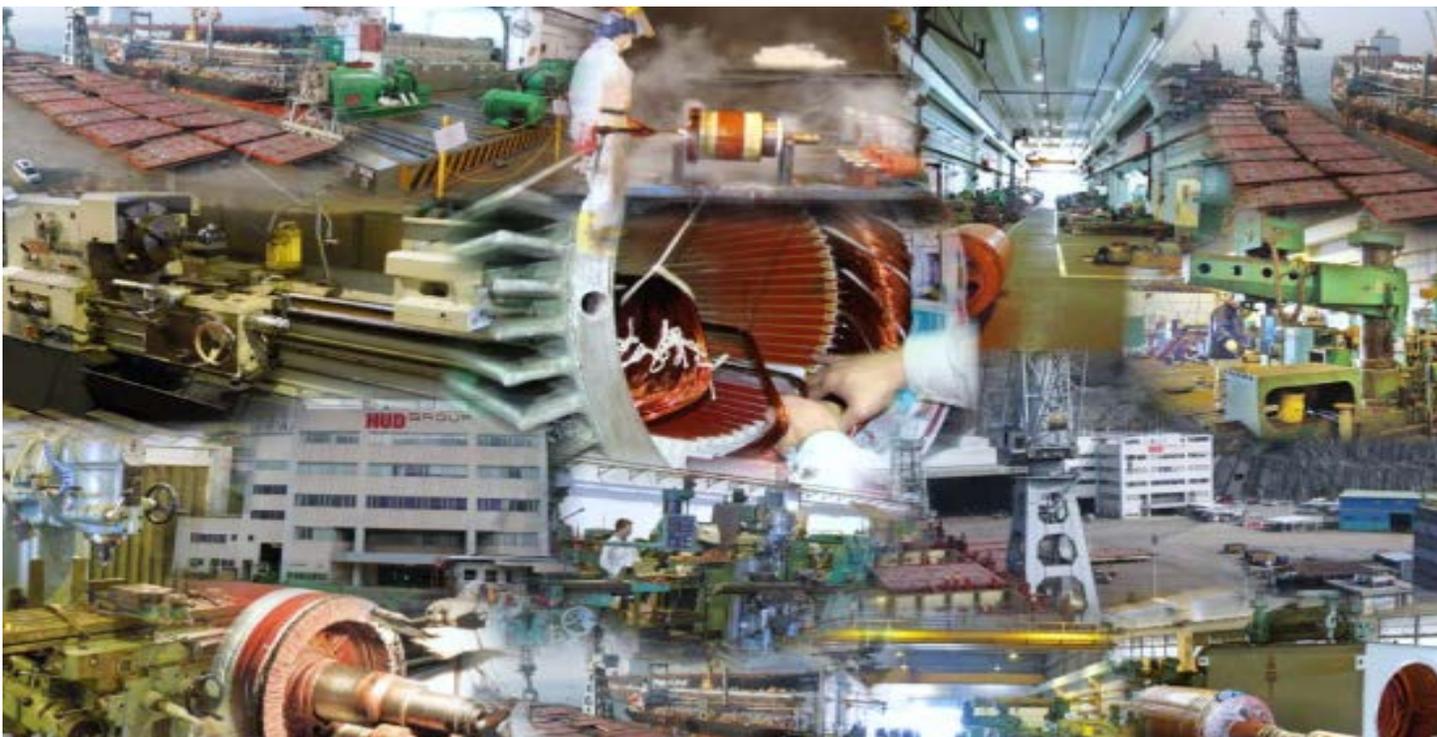
IMechE Hong Kong Branch thanks HUD for organising the informative and inspiring technical visit.

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Encl.: Event Poster and HUD brochure

WHT

Photographs were taken by Mr. Paul W.C. Chan, Mr. Benny C.Y. Sit and Mr. W.H. Tsang with permission to use. Copyright reserved.



**Hongkong United Dockyards Ltd (HUD)**, a joint venture between two of Asia's largest listed conglomerates, Hutchison

Whampoa and Swire Pacific, is Hong Kong's leading provider of ship repair, harbour towage and salvage services. HUD is also a major contractor for steelwork, mechanical and electrical engineering work for industrial machinery and equipment.

Our members will have a chance to visit the yard, to know their facilities and to understand the history of maritime services in Hong Kong.

**IMechE Hong Kong Branch**  
Activity Sub-Committee  
CPD group

**Date: 15<sup>th</sup> February, 2014.**  
**Time: 08:45am – 12:30pm**

## **TECHNICAL VISIT to Hongkong United Dockyards Ltd (HUD)**

**Gathering time and venue: 08:45am**  
**Gather outside the previous Romantic**  
**Hotel near the Kowloon Tong MTR**  
**Station**

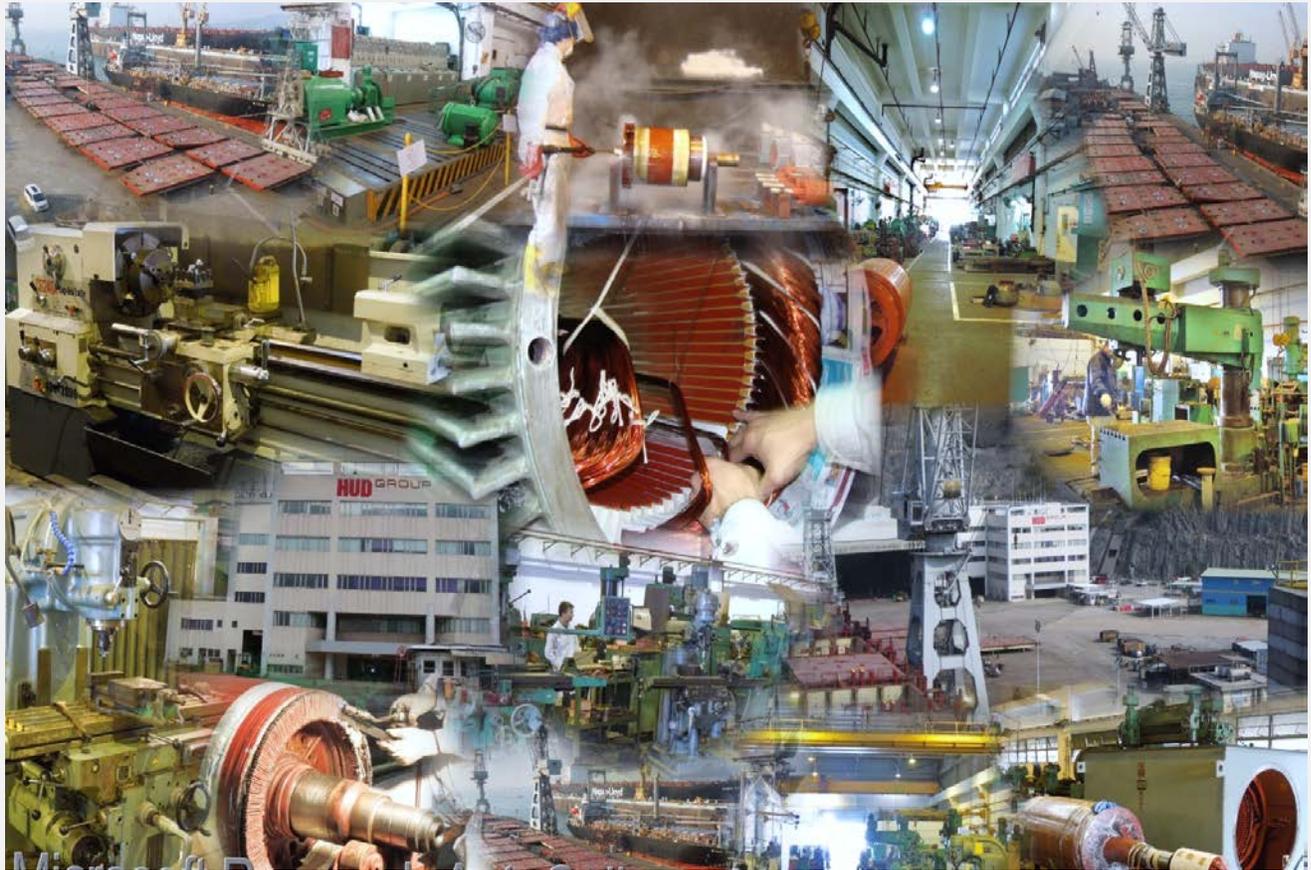
Free of charge for IMechE Members.  
Number of participants is limited to 20 on  
first-come-first-served basis with priority  
given to IMechE members.

For more information please contact:  
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*~ 8,000 m<sup>2</sup> Fully-equipped Workshops*

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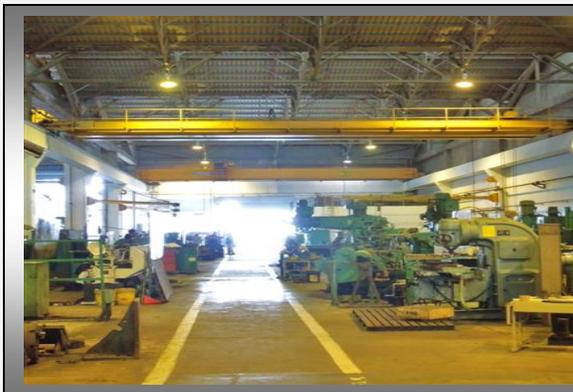
**Engineering Services – 24 hours Hotline: (852) 5338 2696**

*Engineering Manager*  
Tel. (852) 2431 2713 (office)  
(852) 5338 2696 (mobile)

*Commercial Manager*  
Tel. (852) 2431 2514 (office)  
(852) 6219 7302 (mobile)

## Steel Workshop

- Large steel construction fabrication area
- 4 overhead cranes up to 30 tonnes
- 1,000 tonnes load steel plate rolling machine
- Flanging machine
- Hydraulic press machine up to 400 tonnes load
- Profile and straight line flame cutting
- Automatic column and boom welding machine
- MIG, TIG welding, plasma cutter



## Machine Shop

- 4 overhead cranes up to 50 tonnes
- Lathes up to 14.5m x 2m dia.
- Horizontal boring and milling up to 8.2m x 3.8m
- Vertical boring up to 2.7m dia x 1.2m
- Medium and small machines of many types

## Electrical Workshop

- 2 overhead cranes up to 10 tonnes
- Air-conditioned room for DC/AC motor rewinds
- Baking oven up to 4m x 3.5m x 3.5m
- VPI system up to 1.3m/1.5m
- Balancing machine up to 10000kg/max. length 4.3m
- Load testing and high voltage testing equipment, etc.
- Coil winding machine up to 1.6m dia x 3m
- Portable equipment for site balancing work



## **HUD General Engineering Services Ltd.**

**TYTL 108RP, Sai Tso Wan Road, Tsing Yi Island, New Territories, Hong Kong.**

**Tel.: (852) 2431 2828 Fax (852) 2433 6955 Email: [hudges@hud.com.hk](mailto:hudges@hud.com.hk) Website: [www.hud.com.hk](http://www.hud.com.hk)**

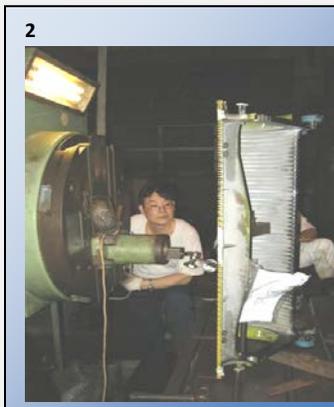
## Structural Fabrication:

1. Large fabrication work area
2. Steel plate shaping by hydraulic press machine
3. Steel structure repair work



## Machining and Mechanical:

1. Large diameter shaft machining
2. Alignment checking on boring machine
3. Valve seat grinding



## HUD Group

*Provides expertise in Engineering Services to meet the requirement of the clients specifications with our excellent facilities, reliable workmanship, on time delivery, and competitive pricing offering clients a "One Stop" cost effective solutions for multidiscipline projects.*

*Our facilities with both excellent road and waterway accessibility to Hong Kong and the region offers 50,000m<sup>2</sup> open lay down area, 8,000m<sup>2</sup> fully equipped workshops, 400m of usable quayside supported by 2 x 50T travelling cranes and 2 x 20T cranes.*

*Our experienced and highly skilled workforce offer 24hr, 7day service support from well- equipped structural fabrication, machine, electrical workshops and industrial protective coatings.*

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## Electrical Work:



1. Air-conditioned winding room
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3. Rewinding transformers, LV & HV motors



## Industrial Protective Coatings:



*HUD has over a century of experience on the preparation, handling and application of protective coating for operations in harsh environments.*

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