

HELP NATURE STAY IN CONTROL

We have the passion to make it happen!

- Jonas Png and Jason Yeo, winners of Greenwave Environment Competition 2009 -

Our group won the first prize in the Tertiary Level Competition in 2009 for our innovative project entitled "Use of Recycled Plastics in Building Materials." Besides the S\$10,000 cash prize, we were also offered a one-month internship with Shell Australia / North West Shelf Shipping Services Company (NWSSSC).

Upon arrival at Shell Australia, we were introduced to Captain John Evans (Fleet Manager), Captain Bob Moss (Superintendent) and Mr Keith Hoffman (Ship Superintendent) as well as to all the other staff members.



From left : Superintendent, Captain Bob Moss; Student Interns, Mr Jason Yeo & Mr Jonas Png; Fleet Manager, Captain John Evans; Ship Superintendent, Mr Keith Hoffman.

The ships in NWSSSC are used to carry liquefied natural gas (LNG) as well as oil, petroleum and chemicals. These ships transport LNG to countries such as China, Japan and Korea, which are their main and long-time customers. The ships would also undergo maintenance and upgrading work at Sembawang Shipyard under the FCC arrangement.

We learnt that before LNG is transported on board the ship, the containers are first cooled to sub-zero temperatures. The compressed LNG is then transferred on board. This is to allow more LNG to be loaded into the tanks and thus increase the volume capacity, since compressed LNG has volume about 600 times smaller than its original volume. We also found that the ships run on steam turbines to save costs; methane is combusted and no poisonous gases are produced. The combusted methane can be burned off to produce energy, which helps to operate the ships.

We were given a ship cargo manual as reference, which helps us to understand the ships and their equipment better. We learnt about the use of various types of valve, indicator and piping for different applications. Most NWSSSC ships have four spherical tanks which allow the storage of LNG, water, oil and other fuels.



NWSSSC's LNG (in the foreground) and Karratha Gas Plant (in the background).

NWSSSC has a gas plant located 1260 km north of Perth, known as Karratha Gas Plant. We travelled to this plant in a 2-hour journey by plane. Karratha is a land full of natural resources. Many oil plants and mining industries are built there. Apart from tapping its natural resources, the various industrial joint ventures in Karratha e.g. NWSSSC in collaboration with other petroleum companies, strive to preserve its natural habitat for wildlife such as kangaroos, monkeys, birds and dolphins. In Karratha Gas Plant, we had the opportunity to visit a LNG ship. It was stationed there for maintenance and also for refilling of cargo. We had the privilege to speak to the Captain, First Mate, First Engineer and other crew members on board. Their primary objective is to achieve a zero accident rate; in fact, safety is always of utmost importance on board the ship.

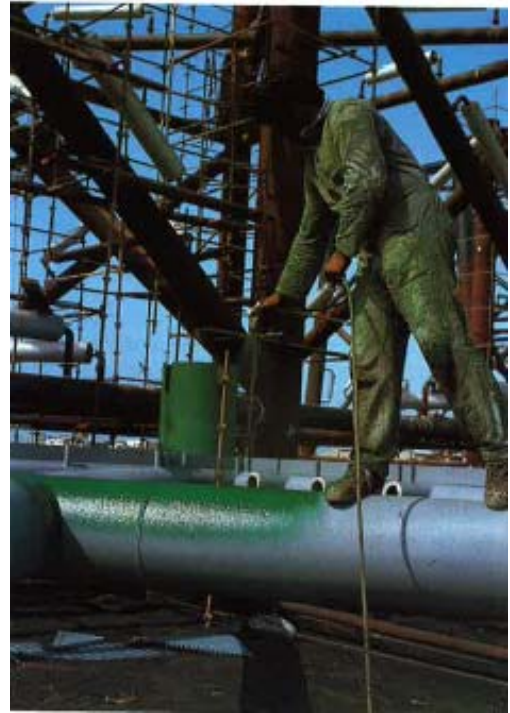
On other occasions, we helped one of the Superintendents, Captain Tom Doherty in his project on the vapour recovery system of volatile organic compounds (VOCs) in a ship which transports oil and chemicals. It is interesting to know that VOCs can be controlled using three methods, namely by condensation, absorption and carbon vacuum regenerated adsorption. It is important to recover VOCs after the loading of cargo, as this will minimize global warming and also prevent the formation of pollutants such as nitrogen oxide in the atmosphere.

Besides work and environmental safety, we also learnt about some mechanical and engineering aspects on board the ship. The valves, pressure gauges and level sensors are important components of the ship. Without them, the transportation of fuels such as LNG into the cargo membrane cannot be successful. Thus, frequent checks and maintenance by engineers are crucial. For instance, we were taught by the engineers to operate an apparatus called the dead weight tester (DWT). This equipment is used to check whether a pressure gauge on board is still in good condition.

We noted that ships are prone to different types of corrosion as they are mainly made from steels and constantly exposed to marine environment. Protective coatings are applied to the ship structure so as to protect it from potential corrosion by seawater and also to prolong the life of the ship. Painting of the ship is also an important part of maintenance, not only for the colour but also to protect the structure of the ship from corrosion such as rust. Maintaining the ship is vital because without maintenance, the life of the ship cannot be prolonged and it will look unsightly. Ship hulls are also coated with paints that prevent bacteria or marine growth on them.



Protective coatings applied to ship structure



Spraying of paint on the ship

To sum it up, we truly appreciate the opportunity to be interns at Shell Australia / NWSSSC. We have learnt about teamwork and communication skills which are vital for our future endeavours. The Superintendents, Captain Bob Moss and Captain Tom Doherty as well as the Ship Superintendent, Mr Keith Hoffman helped us gain in-depth knowledge about the work and environmental safety, engineering aspects and technical skills on board the ships. The Fleet Manager, Captain John Evans, taught us effective management skills and how to be a good manager in future. We would like to express our heartiest thanks to Shell and Sembawang Shipyard for this invaluable internship.

Article contributed by Mr Jonas Png (team leader) and Mr Jason Yeo from Temasek Polytechnic, top prize winning team at the Tertiary Level category.