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## NO 6 NAPHTHA CRACKING PLANT OFF-SHORE INDUSTRIAL ZONES TAIWAN



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**300,000 tonnes of galvanized steel has been used in this industry development**

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- Formosa Plastics Group
- Taiwan Galvanizers Association

Petrochemicals in their various forms are represented in a wide range of industry, domestic and luxury goods such as clothing, containers, decorative products, toys, vehicles, building materials and many other utility items. In addition to traditional plastics and fibre, petrochemicals have become an important component of electronics, aerospace and other high technology industries.

The rationale for this industry development in Taiwan arose from the land scarcity, dense population and the need for an economic vehicle to accommodate these characteristics.

In this respect petrochemicals matched the available resources well as it offered accelerated employment growth and value added product opportunities, while occupying relatively little land.

Initially however an acute shortage of basic petrochemicals in Taiwan had impeded development of this logical downstream activity.

To this end a major petrochemical plant was designed by the Formosa Plastics Group and a search for a suitable site undertaken. After wide community debate the project was located in Yunlin County on a vast land reclamation site on the west coast of Taiwan.

This vast project has had a major impact on Taiwan's development and has been called "the locomotive of national economic growth."

### **Location – "Head of the windstorm and end of the water flow"**

The Mailiao and Haifong zones that hold No 6 Cracking Plant extend from the Chuoshui River estuary, nearly 8km north on the coast and approximately 4km seaward, with large areas of the site below sea level for much of the time.

Design included geological considerations and strengthening for the security and safety of the refinery foundations.

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### Service Environment

The atmospheric conditions are affected by the north east monsoon winds for six months of the year which made land reclamation engineering a most difficult undertaking.

Taiwan has been the subject of a corrosion survey by the Industrial Technology Research Institute (ITRI) and the national Tsing Hua University, where it was established that the coastal zone referred to rated more severe than the C5 zone within ISO 14713 1999, being influenced by the peculiar topography and resulting climate of the Taiwan Strait.

Wind farm structures on site are further evidence of the magnitude of onshore winds with attendant salinity and hostile corrosive influence.

In this context heavy duty galvanizing was predominantly employed on the project.

### Elements of the development

#### Mailiao Port

This will be Taiwan's deepest port with a median depth of 24 metres taking vessels up to 260,000 tonnes and 60 million tons of cargo per annum.

The port will also better serve the surrounding and developing region.

#### Independent Power Plant

Five generating units will provide up to 600,000kw of electricity with arrangement to also contribute to Taiwan's national power grid.

#### Oil Refining

The refinery unit will have a capacity of 21 million tons of crude oil per annum or 450,000 barrels per day and will produce 3,840,000 tons of naphtha exclusively for in-house plants.

#### Naphtha Cracking Plant

The two naphtha plants will have combined annual output of 1.35 million tons of ethylene rising to 1.7 million tons to meet the demand for petrochemicals to develop new product opportunities.

#### Co-Generation Plant

This unit provides electricity, steam, hyperpure and industrial water, nitrogen, oxygen and compressed air for use throughout the plants. A further 500 T/H boiler is being installed to guarantee the supply of steam.

#### Machinery Shop & Boiler Shop

This facility provides for the manufacturing and installation of reactors, towers, pressure vessels and tanks, and the latest 600mw independent power unit construction.

#### Water Fabrication Plant

This plant is owned jointly by Formosa Plastics, Asia-Pacific Investment and Komatsu Electronics of Japan and produces 8 inch wafers with annual output of 2.4 million pieces. The plant is ISO 14001 approved.

#### Formosa Asahi Spandex Co Ltd

This company is a joint venture of Formosa Plastics and Asahi Kasei and now produces 10,000mt of polytetramethylene glycol (PTMG).

#### Naphtha Cracking Project Phase 3

Construction projects to expand No 1 & 2 have continued including a plasma display plant, ethylene glycol plant and styrene monomer plant.

This work is proceeding in tandem with development of 18 phase 1 and phase 2 petrochemical and co-generation plants.





### **Environment Protection**

In this major industrial development environmental protection and pollution control have rated an equal emphasis with economics.

International input by leading academic consultants and engineers will be monitored by the Environmental Protection Authority to ensure compliance with relevant Standards.

### **Public Responsibility**

Plans are underway to contribute to the associated community needs and to raise quality of life in terms of recreation, medical services, transport, culture and welfare in general.

Formosa Plastics aims to contribute to this improvement and to build a model industrial park in Yunlin's offshore zones that embrace these principles.

### **New Town in Mailiao**

Given the progress of the No 6 Cracking Plant, influence on the local community will include an advance in living standards from the building of this township.

Yunlin County Government has put in train a 3000 hectare new town development for the region.

This will provide not only for residential and health amenities but also inter-industry commerce, technology links, improved logistics and balanced regional development.

### **Summary**

Seldom does a project provide so much support for an entire national economy.

Concept, planning and execution have been to world's best standards carried out in the face of enormous difficulties.

Critical match of workforce capabilities with its industrious culture has put in place a strong foundation for future development.

### **Statistics**

- Total reclamation area 2601 hectares
- Piles of 4.5 million metres
- Concrete 6.4 million m<sup>3</sup>
- Piping 3000km
- Increase from 38% to 92% in Taiwan's self sufficiency in basic petrochemicals
- Total project cost: Stages 1, 2 & 3 NT\$542 billion
- Tonnes of steel galvanized: 300,000