

Advances in Artificial Island Construction Technology in Beach-shallow Sea of China

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ABSTRACT:

The paper introduces the technical and structural developments of artificial islands construction in the oilfields of China beach-shallow sea areas in the past 20 years. The results indicate that artificial islands tend to develop to be the offshore structure as multi-purpose, (e.g. drilling, oil production, offloading, water injection etc.), high standard, high safety, variable as costal circumstances and geological conditions, diversity in structures, decreasing in maintenance cost, disassembly, removal and/or re-usable conveniently after service ended etc. Combined with different environmental and natural conditions, the paper also describes selection aspects of various alternatives for constructing artificial island in coastal and shallow water areas. A variety of matters need to be considered in artificial island construction and employment have been emphatically discussed in order to improve construction quality, deduce the project cost, shorten working time at sea and prevent circumstances pollution. Several typical design, construction and operation of artificial islands in Liaohe and Dagang Oilfields are chosen as the study cases, such as their structure shape, comprehensive function, soft groundwork, construction technology and safety precautions etc.

KEY WORDS: artificial island; beach and shallow area; construction technique; quality management.

INTRODUCTION

It is more and more important to develop oil and gas in ocean and beach-shallow sea areas because the energy resources have become increasingly exhausted on land. However, due to the tidewater and its awful influence in beach areas, the barge can hardly position close to the target of oil well site. It is proved by practice that constructing road into the sea and artificial island is a feasible method to exploit oil and gas along the coast. Artificial islands have been constructed along with the development of petroleum exploration and production for more than 90 years. On an artificial island, people can live and work in the same as on land, even actually on the sea; so they can do their job adequately for oil and gas resources exploration. It is clear that by means of artificial islands, to carry through drilling and oil extraction is of many

advantages both technologically and economically. A lot of real construction projects and existent common uses all over the world have approved that artificial islands have been used as a chief means of oil and gas development in beach-shallow sea areas because of the following benefits:

- Changing the drilling and oil extraction operation from on the sea to on land, avoiding the serious attach or even disaster by sea environment;
- Reducing the operation risk, easy to establish safety surroundings and logistics sustaining qualification;
- Convenient for linking up between every working procedure, especially for those anaphase busywork procedure;
- The gathering pipeline on artificial islands can be easily combined with main pipeline on land;
- In favor of environment protection, because waste oil, sewage and castoffs can be treated with conveniently.

In a word, the construction of artificial island has been always paid attention by owner of oilfield and research institute along the Bohai bay coast in China. Actually, the leading research and construction of artificial island in China coast areas have been aimed at oil exploitation in the past 25 years. Every oilfield once brought forward and actualized different artificial island project based on their practical instance of oil extraction and the beach-shallow sea conditions.

Generally speaking, construction of artificial island needs higher investment and is of higher risk; therefore the following requirements must be satisfied:

- The designing scheme of artificial island should be on the safe side, adopting advanced technology, economical practicability and protecting environment. These four points are the main requirements.
- All national and international law and code involved ocean security and environmental protection must be abided.
- The designing scheme of artificial island should meet the needs of not only drilling and oil extraction, but also disassembly and/or moving after the island running down.
- When an artificial island designing scheme achieved, the scheme should be submitted to the national bureau of shipping inspection for censorship.
- It is regarded that some principles should be followed when