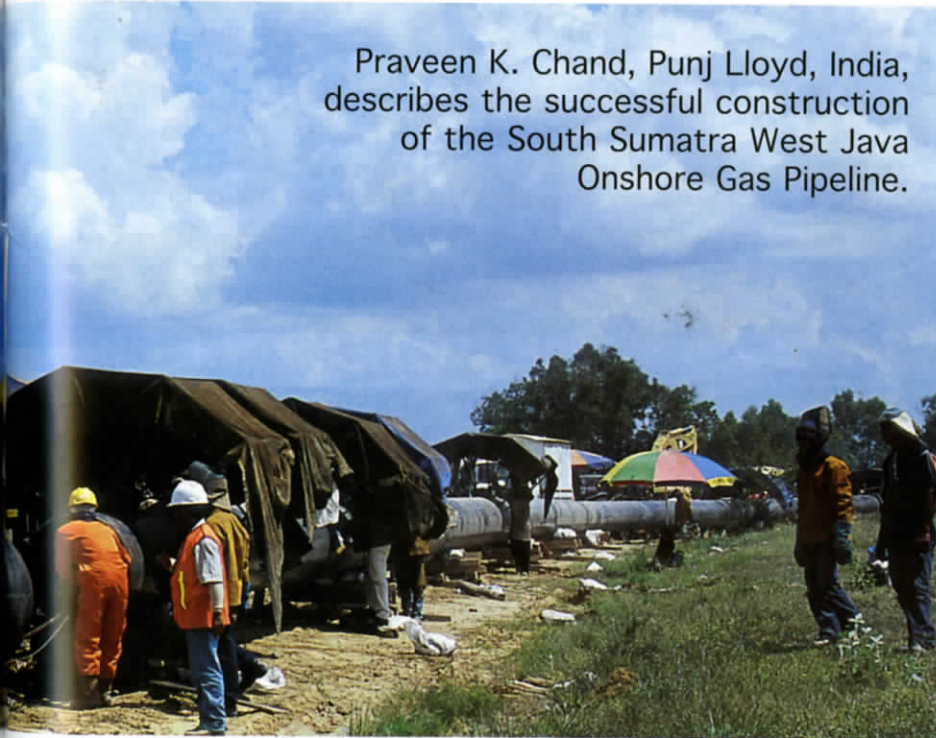


Laying pipelines in the marshes of Indonesia





Praveen K. Chand, Punj Lloyd, India, describes the successful construction of the South Sumatra West Java Onshore Gas Pipeline.



Punj Lloyd's association with Indonesia began in 1993, when Punj Lloyd was awarded its first pipeline contract from the State-owned oil and gas company Pertamina, who greatly appreciated Punj Lloyd's feat of completing the project ahead of schedule.

Punj Lloyd was the only Indian company to venture in the hydrocarbon sector in Indonesia during the early 1990s. Over the subsequent years, Punj Lloyd successfully executed challenging projects in the region and emerged as a powerful and reliable EPC player in the sector. At a time of severe economic crisis in the country in 1996, when many international companies relocated themselves, Punj Lloyd was committed to continue its operations in Indonesia.

Punj Lloyd provides engineering, procurement, construction and installation



(EPCI) solutions to clients worldwide. With experience in offshore and onshore pipelines, cryogenic, and storage tanks and terminals, process plants, offshore platforms, power and infrastructure projects, Punj Lloyd offers a large portfolio of services. A list of prestigious repeat-clients including TOTAL, Pertamina and PT Perusahaan Gas Negara, is a testimony to reliable performance.

In October 2005, Punj Lloyd, in consortium with its Indonesian subsidiary, PT Punj Lloyd Indonesia was awarded a repeat EPC contract for South Sumatra West Java Onshore Gas Pipeline (SSWJ - II) by PT Perusahaan Gas Negara (PGN). This repeat order was a result of its excellent track record in execution of complex projects.

Scope of work

The scope of work included the engineering, procurement and construction of 28 in. diameter gas pipeline from



Figure 1. Horizontal directional drilling at site.



Figure 2. Pipeline lowering.

Pertamina gas receiving station to Pagardewa station, 268 km of 32 in. diameter gas pipeline and 24 core fibre-optic cable from Pagardewa station to Labuhan Maringgai, complete with cathodic protection system, civil, mechanical and piping work associated with nine sectionalising valve stations and five future connections. This also included the design and supply of six launchers/receivers. The pipeline route was challenging as it passed through rubber, palm, pineapple, sugar cane and paddy fields besides 7 km of swampy land.

Preparing the ground

Mobilising the resources to meet the tight schedule was the first challenge. The pipes were received at Palembang Port. Public holidays and heavy rains were not deterrents in successfully establishing the pipe receiving yard, besides mobilising equipment and experienced manpower.

A route alignment survey was done as a part of detailed engineering. Punj Lloyd completed the survey in time, and carried out verification surveys at a later stage.

The planning team decided to double the number of spreads from two to four in consideration of the slow progress due to heavy rains, inaccessible slushy ROW conditions, non availability of continuous ROW, difficult terrain and sub-soil conditions and logistical problems, hence the number of spreads doubled to four covering KP0 - KP73 by Spread I, KP73 - KP132 by Spread II, KP132 - KP210 by Spread III and KP210 - KP272 by Spread IV.

Treading ahead

Four camps, manned by resident construction managers, were established. Earth moving equipment were deployed in large numbers including 28 dozers, 85 excavators and 10 graders for ROW clearing. Some 200 flat bed trailers were used to transport the coated line pipes to the intermediary pipe dumping yards. Some 255 welders welded 23 400 joints; 18 cranes, four vacuum lifts and 36 sidebooms were deployed; in addition, 200 light vehicles and more than 50 buses for 2400 workers were used.

Some 18 500 pipe strings, 19 000 welded joints and 230 km of trenching, lowering and backfilling were completed. There were 11 crossings executed by HDD method with a total drilled length of 7000 m. The longest HDD was 1235 m long, by Punj Lloyd's own HDD Rig. Also, 21 Augur Thrust Borings were constructed. Among the many swamp sections covered, the longest was around 1900 m long, achieved by the conventional push-pull method between KP267 and KP266.

Large swamp sections of 1400 m at KP35 had a river flowing in the middle of it. The entire pipeline was hydrostatically tested in five sections (KP0 - KP4, KP4 - KP93, KP93 - KP170, KP170 - KP196 and KP196 - KP272) with the longest section of 89 km and of 105 m elevation difference.

Touching the mark on time

The drying of the 32 in. diameter pipeline was carried out in two parts - from KP4 to KP170/Terbanggi Besar by vacuum drying



Figure 3. Pipeline lowering at elevation.



Figure 4. Pipeline welding in progress.



Figure 5. Pipe string along ROW through paddy fields.

and KP170-KP272/ Labuhan Maringgai by superheated air parallel to the first section. Approximately 216 000 m³ nitrogen was transported from West Java (Cilegaon) to Labuhan Maringgai by tankers through ferry for successful commissioning of the pipeline in March 2007.

Large equipment base

Punj Lloyd's commitment to establish a presence in the region has resulted in continued investment in construction and amphibious equipment. Our equipment yard at Sungaipurun overhauls and repairs equipment and includes a jetty for small ships and barges. The strategic location of the Sungaipurun equipment yard at Mahakam Delta ensures smooth transportation of equipment by road as well as barge to sites within a short period of time. Punj Lloyd's large fleet of equipment includes pipelaying equipment, amphibious offshore equipment, automatic welding machines, horizontal directional drilling rigs, barges, swamp excavators, heavy construction equipment, concrete pavers, piling rigs, mobile and crawler cranes ranging from 8 – 1200 t, stone crushing plants, etc.

Safety at its best

At Punj Lloyd, safety is a way of life. The safety and welfare of our workers is key to all our projects. PT Punj Lloyd Indonesia conducted awareness camps on work-related accidents and ill health, focusing on safety procedures, personnel protective equipment training, first aid and providing welfare activities during their free time. Safety during construction is a major focus area, as the work involved is dangerous and includes working at height, excavation work, and using heavy equipment, among others. To promote safety at sites, all employees who maintain highly safety standards were duly awarded with certificates of appreciation and recognition.

Sometimes working through the populated villages and towns is a logistical challenge, both for men and machines. Challenges like inaccessibility of islands and protecting environmentally sensitive mangrove forests have been successfully overcome by the Punj Lloyd team. The company also actively contributes towards community development by helping the locals. Keeping the concerns of the local community in mind, the farmers were allowed to continue paddy farming until August 2006 by constructing padded earth roads within the ROW, made of 150 000 m³ of imported dry soil. Soon, nearly 200 km of ROW was covered with more than 150 major and minor rivers.

Punj Lloyd Indonesia has executed projects, overcoming language barriers and cultural differences, due to its policy of recruiting locals. Interacting and working with the locals gave the company valuable insight into the Indonesian work culture. PT Punj Lloyd Indonesia has created a permanent bank of trained local personnel, which is a valuable asset to us and we have deployed them at our sites worldwide. With strengths like experienced professionals and an amphibious equipment base, Punj Lloyd's growth trajectory in Indonesia knows no bounds. **WP**