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BUILDING COMMUNITY

HDPE PIPE CONQUERS INDIA MOUNTAIN RANGE

Water Pipeline Named PPI Project of the Year

IRVING, Texas - The inherent character of high-density polyethylene (HDPE) pipe was the key to successfully laying a pipeline on a 14,000 foot-high mountain range in northern India. Using some 3,000 feet (942m) of 28-inch (710mm) OD solid wall HDPE pipe, Jain Irrigation Systems found that the HDPE pipe was a good solution to the challenges of transporting materials to a road-less jobsite, and the chilling temperatures that were as low as 14F (-10C) during installation.

Steep mountain slopes made installation of the water pipeline

almost impossible. HDPE pipe easily followed the terrain near the Himalaya Mountains.

The pipeline is being used to convey river runoff water from a diversion weir to the de-silting tanks for the 5MW Marhi Mini Hydel Power Plant at Manali, Himachal Pradesh, India. Near the Himalaya Mountains, Marhi is in a Zone V seismic area and has frequent earthquakes and landslides. Weather is also a factor. Temperatures in this area plummeted to a record low of -9 F (-23 C) in January 2011.

"With this extreme installation, Jain proved that HDPE pipe can be quickly installed even in inaccessible mountainous terrain," stated Tony Radoszewski, executive director of the PPI. "This project also shows the flexibility of HDPE pipe as it conforms to the slopes, and has a high degree of integrity that allows it to perform even in sub-zero temperatures. And what is even more remarkable, the entire pipeline was constructed in just 65 days. These are the reasons the PPI membership selected it as the project of the year for the Municipal and Industrial Division."

According to Narinder Gupta, chief operating officer and vice president, international business for Jain, using HDPE pipe was the only way the pipeline could be built. "In this mountain range, there are few roads; mostly paths. The workers had to carry all materials and machinery to the site. The HDPE pipe is lighter than metal or concrete pipe, which eased the construction and the strain on the crew. The flexibility of the HDPE pipe allowed the pipeline to follow the contours of the terrain without impeding the water flow rate, or affecting the integrity of the final assembled system. Fusing the pipe sections together provides a very strong and leak-free joint that will withstand freezing water and shifting topography."

The transportation of 20-foot (6m) long HDPE pipe sections and the fusion machine during installation was done with local labor. The entire pipeline was installed on the slopes of the mountain range, and due to some dense forests and steep slopes, the pipeline route was not easily accessible with some areas nearly impossible to gain a foothold and stand. Other regions were accessible only by helicopter.

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The cost of the project using HDPE pipe was $129,382 (USD). "If we used mild steel pipe for example," stated Gupta, "the cost would have been more than double, nearly $299,000 (USD). Additionally, the steel pipe would need an external coating and an internal lining to protect the pipe from corrosion. After few years of service life the steel pipe coating and lining would need partial or full replacement, adding to the maintenance cost and time. With the HDPE pipe there is no corrosion problem.

"A steel pipeline needs a wider trench at the bottom for welding and to align the pipe, again adding to the cost. Plus the extra digging of the larger trench disturbs more of the natural compaction of soil," he continued. "HDPE pipe, however, can be lowered into the trench after completing the fusion, which means a smaller trench can be dug with less disturbance to the soil so it remains compacted, providing a better surrounding for the pipe."

The ability of HDPE pipe to follow the contours of the land, have strong, leak-free, fused joints and be installed by a crew without heavy equipment was critical to the success of this project.

"The positive results from this project can be readily appreciated by any design engineer, public works official or contractor who has faced a difficult project," said Radoszewski. "The project clearly demonstrates the benefits and adaptability of HDPE pipe to adverse geo-climatic conditions without adding to the project's cost and time."

PPI's Executive Director, Tony Radoszewski (right) presents the Municipal & Industrial Division Project of the Year Award to Narinder Gupta, chief operating officer, Jain Irrigation Inc. for this river runoff diversion pipeline project at the Marhi Mini Hydel Power Plant in India.

For this project, Jain Irrigation calculated and identified some specific advantages of using HDPE pipe for transporting water required for the hydro power plant:

- Overall project cost was reduced 2.3 times.
- Labor cost was significantly reduced using HDPE pipe.
- HDPE pipe eliminated corrosion which further reduces maintenance costs and provides uninterrupted service throughout its long life.
- HDPE pipe can effectively sustain the water-freezing effects in sub-zero temperatures where water freezing effects may burst steel pipe.

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- In this Himalayan region (strongest seismic zone V) where earthquakes are very frequent, HDPE pipe flexibility and fused joints resist forces generated by earthquakes, seismic shifts and landslides.
- HDPE pipe has longer service life especially under such hostile geo-climatic environmental conditions.
- HDPE pipe is lighter in weight, needs less time for transportation and installation, which ultimately reduces the overall project time and cost.
- Availability of local labor for efficient transportation of pipes and equipments in hilly region is a major problem, and by use of lightweight HDPE pipe results in lesser demand for more labor.
- For HDPE pipe, no additional coating or lining is required, which ultimately results in reduced operational overheads during the short, medium and long term.

For additional information about this project, contact the Plastics Pipe Institute at www.plasticpipe.org.

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About PPI:

The Plastics Pipe Institute Inc. (PPI) is the major trade association representing all segments of the plastic pipe industry and is dedicated to promoting plastics as the material of choice for pipe applications. PPI is the premier technical, engineering and industry knowledge resource publishing data for use in development and design of plastic pipe systems. Additionally, PPI collaborates with industry organizations that set standards for manufacturing practices and installation methods.