References

Lightening of the viaduct’s structure



Uponor involvement

- Weholite pipes SN2 DN 600-800 mm, sections from 406 to 676 mm long, total - 886 m

Lightening of the viaduct’s structure by Weholite

The decision to use plastic pipes to lighten the viaduct’s structure, was a pioneering one.

In 2006, increasing traffic problems in Grudziądz, in north-central Poland, led the local authorities to approve a project of the Diameter Route designed to link the southern and northern part of the city. Innovative use of polyethylene pipes in the construction of a viaduct for a key collector road not only helped to lighten its structure but also lowered project cost.

Project Facts:

Location	Completion
Grudziądz, Poland	2007
Vrsta objekta	Product systems
Transportation	Tailor made constructions
Project Type	
New building	

Partners

Investor:
City of Grudziądz

Contractor:
Mosty Łódź S.A

The Diameter Route project, financed from the European Regional Development Fund and municipal funds, and estimated at almost 24 million euro, is the largest investment in the city's history. One of the principal objectives of the three-stage venture is to limit traffic density by redirecting transit traffic to the outskirts of the city. Local authorities hope the investment will not only limit existing inconveniencies to residents and drivers passing through Grudziądz but also stimulate the region's economic growth.

First stage of the project, expected to conclude in the first quarter of 2008, includes the construction of a three-kilometre section of the diameter route, which, together with the simultaneously built collector road, will form a bypass around the city centre. According to the project, the collector road starts out at an intersection of national roads No.16 and 55, located just outside the city centre. The 260-metre viaduct, designed to link the existing intersection with the currently-built collector road, was constructed using PE Weholite pipes, manufactured and delivered by Uponor Infra (former KWH Pipe). Overseeing the construction was Mosty Łódź S.A., a contractor responsible for the total of bridge works in the investment.

The decision to use plastic pipes to lighten the viaduct's structure, was a pioneering one. Until recently, engineering designers relied on steel pipes as their component of choice in similar projects. As noted by Mr. Wojciech Fedorońko, vice-president of Mosty Łódź, steel pipes are not only significantly heavier than plastic pipes but also susceptible to damage from chemicals and adverse environmental factors. Weholite pipes provided the perfect answer to the challenges of the project: lightweight, air-tight, extremely durable and easy to install, they not only successfully relieved the viaduct's structure but also put an end to problem of corrosion.

Uponor Infra manufactured and delivered to the construction site almost 900 m of PE-HD Weholite pipes, with ring stiffness class of SN2 and size of DN 600-800 mm. The length of the pipe sections, ranging from 406 to 676 mm, was customized at the KWH Pipe plant to match exactly the dimensions of viaduct's spans and reinforcement structure. Pipes were also fitted with stub pipes (condensates drainage system), which were cut to size at the installation site according to customer specifications.

After prerequisite construction work on the viaduct was completed, the pipes were sealed, hoisted by crane and placed between reinforcement bars of the viaduct's spans. The pipes were then secured with additional reinforcement, to prevent ejection by uplift force during the pumping of concrete. Pumping concrete grout into the spans constituted the final stage of the installation. According to the contractor overseeing the project, everything went smoothly and according to plan.

The lightening of the viaduct's structure, extended service-life due to exceptional qualities of polyethylene and problem-free installation were not the only advantages resulting from applying plastic pipes in the discussed project. As the volume of air in the pipes totalled 430 m^3, which constituted almost 14% of the volume of the ferro-concrete structure, savings were made in the use of concrete grout and reinforcing steel, which lowered overall project cost.

Considering the above, one can safely say plastic pipes will continue to grow in popularity when it comes to similar investments in the future, while emergence of new applications in road construction, and other sectors, is just a matter of time.

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Telefon +381641852299
E-mail
podrskakupcima.bfs@georgfischer.com
W prod.uponor.com