

Inside, Outside Rehabilitation of Metal Water Culverts

French Guiana is a vast region of some 83,500 km². The heritage of the water culverts over the national road network consists of over 850 constructions in all sizes (width x height ranging from 700 x 500 mm to 4000 x 3000 mm). About 380 of these are circular or steel arch constructions, the remaining are made of concrete. They are basically located in forest areas and in wet territory and were installed during the 70s and 80s. Today these culverts are at the end of their product life cycle.



After a collapse of structures in 2004, the Ministry of Equipment & Transportation decided to secure the most critical ones. One third of the steel constructions (corrugated galvanized steel culverts) and a number of concrete culverts had visible defects. Nearly half of these culverts were in poor condition and required full rehabilitation as soon as possible.



The tender issued by the technicians allowed the bidders free choice of techniques and products. The requirements concerning performance were mainly to cover the structural

integrity and to secure environmental and hydraulic performance. The technical solutions had to meet different criteria such as:

- Disruption of the road traffic kept at a minimum
- Compatibility with extreme tropical weather conditions
- Keeping or increasing hydraulic capacity
- Corrosion resistance (stream water with a pH value within 3 and 6.5 due to humic acid)
- Abrasion resistance to sand
- Resistance to heavy traffic loads (72 ton lorries)
- Compatibility with surrounding environmental and geological conditions



Different rehabilitation techniques were evaluated, such as reinforcement by high performance in-situ concrete lining or by continuous lining with cured-in-place plastic pipe. These solutions were not selected due to the poor condition of the host pipes. In addition, some contractors also proposed open cut solutions with cheap locally produced concrete pipes, steel cylinder concrete pipes and cheap TW PE pipes. Finally, after an analytical comparison, the following technical solutions proposed by HOBAS® and the contractor DLE were chosen from all submissions:

Inside rehabilitation techniques:

- for the 10 deepest structures (over 4 m) or in sections with the greatest traffic: pipes are relined with GRP NC Line® One-Piece Panels (mainly in the shape of arches with cross sections from 1660/1260 mm to 3200/2050 mm) and CC-GRP Pipes

HOBAS France SAS

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with an outer diameter ranging from 600 to 1100 mm with GRP non protruding sleeves.



mastered with HOBAS CC-GRP Tailor Made Solutions. The French Ministry's technicians are satisfied with their choice and plan to include HOBAS in the upcoming tender to renew the remaining damaged culverts.

Outside rehabilitation techniques:

- 5 structures renewed by CC-GRP Jacking Pipes DN 1000/1099 SN 40000 and DN 1200/1229 SN 32000 in line with the structures which were dismantled during the installation
- Regarding the 96 other structures: damaged culverts were excavated and replaced with CC-GRP Pipes PN 1, SN 10000 with DN 600 to DN 1700.

9.2 million Euro have already been invested in this operation and it should be completed by the end of 2008. The project highlights the benefits of the cost-effective HOBAS Rehabilitation Solutions for a safe and fast installation without disturbing nature or disrupting road traffic.

All involved companies and authorities are pleased with the result of the project. Challenges at different stages were

Overview	
Year of Construction	2005 – 2006
Duration of Construction	2 years
Pressure Class	PN 1
Diameter	OD 600 - 1229 NC Line® Ø 1660/1260 – 3200/2050
Stiffness Class	SN 10000 - 40000
Application	rehabilitation, CC-GRP Pipes, NC Line®
Client	Ministry of Equipment and Transportation
Contractor	DLE Devin Lemarchand Environnement from Eiffage Group
Advantages	Compatibility with extreme tropical weather conditions, corrosion resistance (humic acid), resistance to heavy traffic loads

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