Hobas Pipe Case Histories

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Abstract

Hobas centrifugal cast fiberglass reinforced polymer mortar (CCFRPM) pipes have passed their 20 year history in the USA and have been used on some of the biggest and most demanding sewer projects in this country. With over 2500 projects supplied, it is difficult to pick a case history or two that represents the scope of the applications that these pipes have seen. With that said, two series of projects, the Trinity River Authority (TRA) West Fork System and the Charleston Deep Tunnels Replacement, best demonstrate the Hobas products' range, versatility and superior performance.

1 Introduction

Before launching straight into the case histories, some introductory and background information regarding Hobas pipes and Hobas Pipe USA may be useful.

2 Background

Hobas CCFRPM pipes are manufactured by computer controlled, centrifugal casting in diameters of 18" to 110" in 20' sections. The pipes are constructed using thermoset resins, fiberglass reinforcements and aggregates (mostly sand and sometimes calcium carbonate). The composite wall is non-homogeneous as the glass fibers are concentrated primarily near the exterior and interior surfaces much like double-cage RCP. The pipes are used in a wide range of services, but mostly sanitary sewers. Both gravity and pressure pipes can be economically produced by varying the amount of the fiberglass reinforcements. Several leak-free gasket-sealed joints are available as well as many mitered and molded fittings. The pipes are installed by many methods including open cut, slip lining, jacking, micro tunneling, and utility tunneling (2-pass) and above ground. Nearly 5,000,000' have been delivered in the USA since the mid-1980's and over 9000 miles worldwide from ~20 factories since 1960. The pipes provide many benefits including 100+ year life, leak-free performance, high flow capacity, easy & economical installation and simple & fast field length adjustments.

Case Histories

In our twenty plus year history, Hobas Pipe USA has delivered pipes to over 2500 projects, which have a wide range of diameters, service conditions and installation methods. To best demonstrate this product versatility, two project series were chosen for this brief paper: the TRA West Fork Interceptor Relief Sewers and the Charleston SC Wastewater Tunnels Replacement.

TRA West Fork Interceptor Relief Sewers

This new series of sanitary sewer interceptors replaces and upsizes the original gravity sewers built in the early 1960's. These lines serve Grand Prarie and Irving, TX (and surrounding areas) delivering their flows to the Central Wastewater Treatment Plant. Six segments built from 2001 to 2006 have all used Hobas pipes. Material alternates included

only RCP with 360 degree PVC lining or CCFRPM pipes. Installation has been mostly by open cut, but has also included slip lining, 2-pass tunneling and an aerial.

The six projects constructed to date are WF-G Phases 1 & 2, WF-11A, WF-1 Phases 1 & 2 and EF-1. Four different project design firms prepared the plans & specs including: Turner, Collie & Braden (2), Lopez-Garcia (2), Freese & Nichols and Alan Plummer & Associates. Installing general contractors included Oscar Renda (3), Johnson Brothers, BRH Garver and Archer Western.

Over 70% of the footage is 104" or 110", although other diameters were used including 36", 60", 72", 78", 84", 90" and 96". The buried pipes have a cover depth range of 5' to 35'. Various stone gradations were used for the pipe zone backfill surround, although in some instances, the imported material only extended up to 70% of diameter. Hobas tee base manholes with fiberglass risers were used for all standard structures. Buried pipes were checked for vertical deflection (<5% requirement) no sooner than 30 days after full cover. One project included an 84" aerial section with 20' spans. On another, an existing 96" line was sliplined with 90" pipes. Finally, all lines were leak tested by either infiltration or individual joint air using a portable tester. The completed system is leak-free! The sum of these projects includes over 58,000' of Hobas CCFRPM pipes with an average diameter of 102".

Why were Hobas pipes chosen? Both the owner and the installers had their reasons. For TRA, the driving factors were the 100+ year service life and the maintenance-free, leak-free performance. Installers preferred Hobas because of superior service, responsive field / technical support and product quality. Perhaps more critical was a lower installed cost, which was achieved by lighter weight, longer sections which resulted in fewer joints and less expensive equipment. Further, these features allowed installation rates up to 600' per day on the largest pipes. Finally, if problems occurred, Hobas pipes are frequently repairable, in-place, without excavation, again reducing costs.

Charleston SC Wastewater Tunnels Replacement

The original tunnels, constructed in the late 1960's, 120' deep in Marl rock, suffered severe hydrogen sulfide corrosion creating the need for replacement. The tunnel system is critical since it conveys all of the Charleston peninsula sewage to the Plum Island WWTP.

The four new tunnels, Harbor, Ashley River, Cooper River and Daniel Island, all built since 2001 (some still under construction), have all used Hobas pipes. The alternative pipe material was ductile iron CL200 with Protecto 401 Ceramic epoxy liner. The new tunnels, also constructed in the same rock strata and at approximately the same depth as the originals, are all 2-pass construction with steel ring beam & wooden lagging primary liners and cellular grout filled annulus'. The pressure class 100 Hobas pipes, designed for 120' internal and external head, are mostly 48" & 54" (80%), but also include 20", 30" and 36" diameters. Fittings required are a combination of fiberglass and stainless steel.

The Harbor Tunnel was designed by Jordan, Jones & Goulding and the other three tunnels were all designed by Black & Veatch. Affholder (division of Insituform Technologies) was the installing general contractor for all of the tunnels.

Affholder constructed ~20 shafts to build the four tunnel projects. The primary liners ranged from 6' to 8' diameter. The Hobas liner pipes were carried into the tunnels, placed on wooden blocks and assembled. Restraints to fix position prior to annulus grouting were steel arches (~ 90 degree). The tunnel pipes were connected to the surface collection

system by solid piping. Upon completion, joints 36” and larger were air tested using a portable machine. Lines 30” and smaller were line air tested. Additionally, the Harbor Tunnel was filled with water and all lines are subject to 115’ external head. Again, the finished system is leak-free! In total, these four tunnels are comprised of over 51,000’ of Hobas CCFRPM pipes with an average diameter of 48”.

Why were Hobas pipes chosen? It’s a familiar story for the owner, Charleston Public Works. Prime reasons are the 100+ years service life and the maintenance-free, leak-free performance. For Affholder, lower installed cost, achieved due to lighter weight, ease of field adjustments, joint consistency, product versatility and a competitive price, was instrumental. Additionally, field support, engineering / technical support, pipe availability and consistent product quality were other important considerations.

3 Summary

Hobas CCFRPM pipes are a very versatile product. They are suitable for many corrosive services, available in diameters from 18” to 110” and for both gravity and pressure applications. Additionally, Hobas pipes may be installed by a variety of methods including open cut, sliplining, jacking, microtunneling, utility tunneling (2-pass) and above ground. Further, due to their inherent corrosion resistance, Hobas pipes will have a long, maintenance-free service life.

Perhaps more importantly, Hobas pipes help solve problems like corrosion, leakage and flow capacity (hydraulics). And, all of this is delivered at a competitive price, sometimes the lowest, and nearly always with the lowest installed cost. Having been used on many of the most demanding applications over the last twenty years, Hobas CCFRPM pipes have proven they are the Premier Sewer Pipe.