

CASE STUDY

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Wastewater Pumping Station

OWNER:

Municipal Wastewater
Treatment System

FACILITY LOCATION:

Ontario

EQUIPMENT NAME:

Force Mains

CONCLUSIONS

Fiberglass-Reinforced Plastic (FRP) repair was successfully designed and installed to replace corroded steel piping in wastewater service without interruption of service.

BACKGROUND

As part of a large collection system, the client operates and maintains a number of wastewater pumping stations throughout a populated city in Ontario. UTComp was requested to inspect and assess the integrity of a certain pumping station's force mains. Steel force mains used to transfer wastewater from the pumps were inspected by ultrasonic thickness measurement, and found to be corroded internally and externally, with low remaining thickness posing an immediate risk of loss of containment. These

large force mains were vital in transferring wastewater to the treatment system and could not be placed out of service long enough for a replacement. No shutdown could possibly be scheduled in the near future.

The City began investigating options to repair the corroded force mains while leaving the force mains in service. After considering several repair options, it settled on using UTComp® to design and oversee FRP repair of the corroded force mains.



Corrosion of exposed steel.

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SOLUTION

A UTComp® Engineer visited the site to perform an initial site assessment and gather information on the layout and dimensions of the corroded force mains. The FRP repair was designed on the assumption that the corroded steel pipe would ultimately fail, and fluid containment and structural strength would be supplied solely by the FRP repair with no contribution from the underlying steel.

The repair was designed with no surface preparation of the corroded steel to avoid accelerating the reduction of the thickness causing a potential breach. The corroded pipe was treated as a laminating mold rather than as a bonding substrate. The surfaces of the adjacent concrete at the wall penetration and the butterfly valve and intact piping upstream were prepared for bonding to the new FRP laminate.

UTComp® prepared design calculations and drawings, supervised the successful installation of the repair, and inspected the repair in several stages.

At the time of this writing, the final stage of repair has not been completed, but the repair has been in service without failure for approximately 15 months.



Applying FRP stages.



First stage has been applied. When cured, this stage provided a sound surface over pipe and concrete to support lamination.

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Installation of laminate on the force main pipe and valve