

Industrial Infrastructure Consolidated Division

All-welded-type and directly-buried three-way valve

1. All-welded-type and directly-buried three-way valve installed in the branch line of town gas

Osaka gas Co., Ltd. and Kubota developed "All-welded-type and directly-buried three-way valve " which is installed at the diverging point of the medium pressure lines of the buried pipeline for town gas.

First , we started the sale of the valves with nominal dia.200 mm earlier.

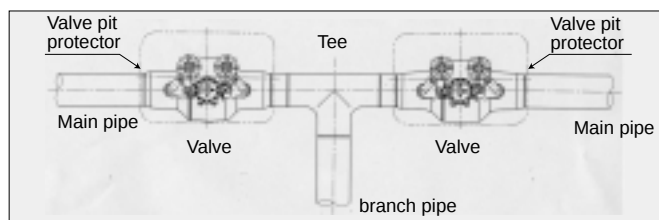
At present, two conventional(two-way) valves are installed near the diverging point of main line.Town gas is supplied the customers through the branch pipe.These two-way valves are mainly operated in case of the extended line construction,such as connecting branch pipe with the main line. We can substitute a three-way valve for two conventional valves, because a three-way valve can selectively shut off the left or right port.

We can reduce 20 to 30% of equipment cost (valve and protector), and reduce 50% of construction and management cost, by substituting a three-way valve for two conventional valves.

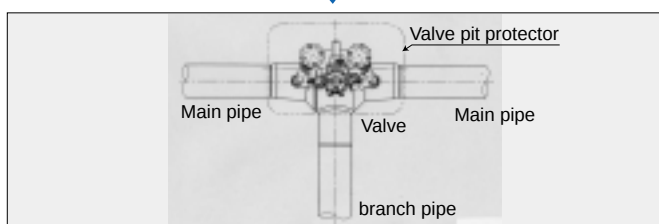
2. Features

The volume and mass of the valves can be reduced largely, and resources are saved, because a three-way valve can perform the function of two conventional valves installed in the main line.

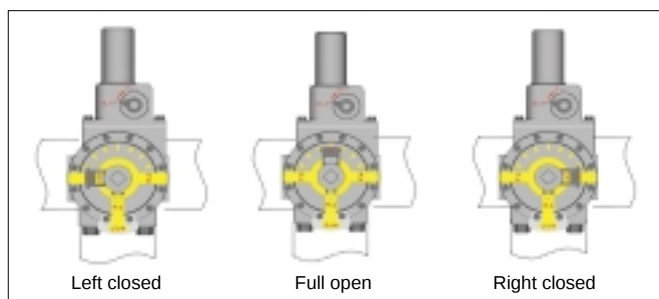
- (1) Product manufacturing energy can be saved compared with the manufacturing of two conventional valves.
- (2) Equipment, construction and management cost of valve installation, and maintenance cost of the equipment can be reduced compared with two conventional valves. And it contributes to the cost down of town gas suppliers.
- (3) When we switch the flow of gas at diverging point, it is possible for us to operate one valve instead of two valves in conventional system. Position lock mechanism is installed in the valve actuator to prevent us from mis-operation.



Installation of two conventional two-way valves at the diverging point



Substitution of a three-way valve for two conventional(two-way) valves



Valve actuator with position lock mechanism



A three-way valve with 200mm nominal diameter

Jacking trough pipe

Trough pipes are installed across the banks of the rivers for water intake from the rivers, and for effluent of gathered rain-water on the opposite side of the bank to the river. They are pipe structure and also part of bank. Open cut method was utilized to install the trough pipes before, cutting the bank and constructing concrete culvert. In open cut method, the construction cost was often high because of cutting the bank, installation of double sheet piles for waterproofness, and long period of time of construction.

So we at Kubota developed the jacking method of trough pipes, in which above operations are not necessary. We hardly affect environment, and can save labor at construc-

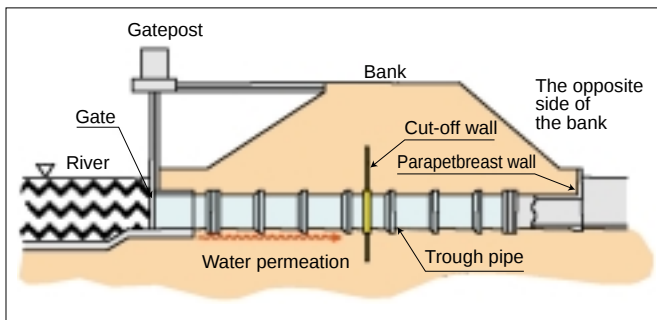
tion site, because we can construct trough pipes and cut-off wall by jacking method without cutting the bank.

1. Jacking method of trough pipe

Ductile iron pipe is used for trough pipe. Trough pipe and cut-off wall are in one body. Cut-off wall spreads out from trough pipe jacked. This cut-off wall has the same impermeability as that of sheet pile which is used as the cut-off wall in the open cut method. So we can construct trough pipes whose performance is as the same as that of concrete culverts in conventional open cut method.

2. Features

- (1) We hardly affect environment because the bank is not openly cut.
- (2) When the river rises, we need not worry about submergence during construction, so safety can be improved.
- (3) No detours are necessary for the road on the bank during construction.
- (4) Ten to fifty percent of the construction cost can be reduced.
- (5) In this method, we can do the construction in about four months, comparing it with open cut method which takes two years.
- (6) Ductile iron trough pipes can easily obey subsidence of the bank.
- (7) Cut-off wall and ductile iron trough pipe are in one body, so water permeation can be completely shut down.



The structure of trough pipe

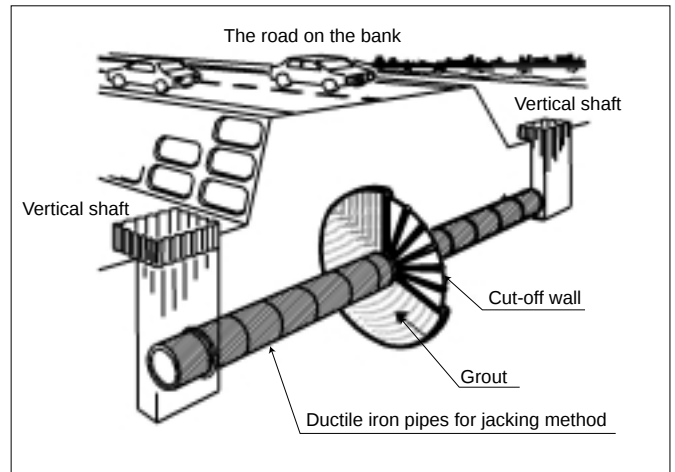


Illustration of jacking trough pipes



Appearance of cut-off wall



Constructed cut-off wall (in an experimental pit)

Potassium titanate "TXAX"

TXAX is high functional plate-shaped potassium titanate with excellent friction performance. It is mainly used for the base material of automobile brake pad. And it is plate-shaped multi-crystal produced using Kubota's original melting method and loosening method. Its thickness is about fifty times as large as that of other fiber produced using other synthesis method. And TXAX is safe for humans, receiving the safety certificate

■ The properties of TXAX

Products	TXAX-MA	TXAX-A	Other company's fiber
Synthesis method	Melting method	Melting method	—
Shape (μm)	Plate-shaped Width:13 Length:65	Plate-shaped Width:30 Length:150	Needle-shaped Diameter:0.4 Length:10
Density (g / cm ³)	0.2	0.5	0.1
Specific surface area (m ² / g)	1.5	0.8	7

of Environmental Protection Agency of the U.S.

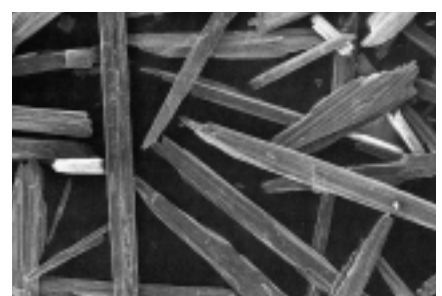
According as the green procurement becomes popular globally, "TXAX-MA" as well as conventional "TXAX-A" have been just adopted as automobile brake pad material in not only Japan but also the U.S.



TXAX-MA



Brake pad



Enlarged image of TXAX