

## Pipe and Fluid Systems Engineering Consolidated Division

### The horizontal pump gate "Pump da-mon" realize energy saving and low environmental load.

Damage by flood is serious in urban area recently, due to expanding impermeable area by macadamization, and many numbers of concentrated heavy rains. However flood control projects are behind, since it take many years to implement the projects which cover wide area along big river basins, and which require master plan, feasibility study, detailed design and construction.

We, Kubota, have developed a horizon-

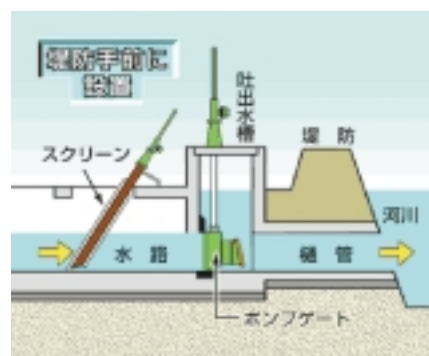


tal pump gate installed in channel for flood control to solve above problem and trouble of continual flood in some towns.

Small area or nothing is necessary for pump station because this pump gate is installed in channel, decreasing environmental load. We contribute to environment-friendly social development with a watchword of "Comfortable society constructed by technology."

#### 1. "Pump da-mon"

Kubota's pump gate "Pump da-mon", consisting of a submersible pump and a gate, is a compact pumping equipment for rainwater effluent, which can be installed in the middle of a relatively small channel. "Pump da-mon" has been already installed and operated



with good reputation, at more than ten sites, since they were put on sale in fiscal year 2000.

#### 2. Characteristics

(1) The size is small because of horizontal submersible pump structure in which a pump and an electric motor are united into one.

(2) A permanent magnet synchronous motor with compacting size and high efficiency, and a high efficiency impeller are adopted, for saving energy.

(3) The size is small because a flap valve and a pump are united into one.

(4) Operation is easier by a flood detector.

(5) Maintenance is also easy by a casing liner and a stainless steel impeller.



Installation site

### UPVC Foam Core Pipes using recycled material

We have developed "UPVC (Unplasticized Poly Vinyl Chloride) for core pipes using recycled material" by using recycled polyvinyl chloride pipes and so on as material, to contribute realizing resource-recycling-oriented society.

These products are used for drainage pipes in the buildings, being accepted by Urban Development Corporation and so on.

It is expected that they are used in many

buildings from now on, because they appeared in "Common specifications on machinery equipment construction (fiscal 2001 edition)" compiled by Ministry of Land, Infrastructure and Transport.

We at Kubota have installed the manufacturing equipments in Odawara Plant to cope with increasing demand, to raise recycling rate of waste polyvinyl chloride pipes.

We, manufactures of polyvinyl chloride pipes including Kubota, are promoting construction of a nationwide collection system regarding waste polyvinyl chloride pipes, aiming at establishment of collection station one or more per prefecture by the end of fiscal 2001.

We are also aiming at 80% of material recycling rate, promoting this collection system and recycled products sale, by the end of fiscal 2005.

1. Structure

This product consists of three layers, namely inside and outside layers made of new polyvinyl chloride material, and intermediate layer made of recycled material as shown in Fig.1.

This product contributes to saving resources because new material is needed one third or less compared with conventional products.

(See Fig.2 Comparison of amount of polyvinyl chloride material used )

2. Characteristics

- (1) Various kinds of conventional fittings can be used because of the same dimension as conventional pipes.
- (2) Weather resistance, chemical resistance and hydraulic characteristics are also the same as conventional pipes because virgin pvc material is used in inside and outside layers.
- (3) High rigidity is expected with a little material.
- (4) Transportation and assembling are easy because of light weight.
- (5) Condensation decreases because of heat insulating effect of foaming layer.
- (6) Heat expansion and contraction of pipes decrease because thermal expansion coefficient is low.

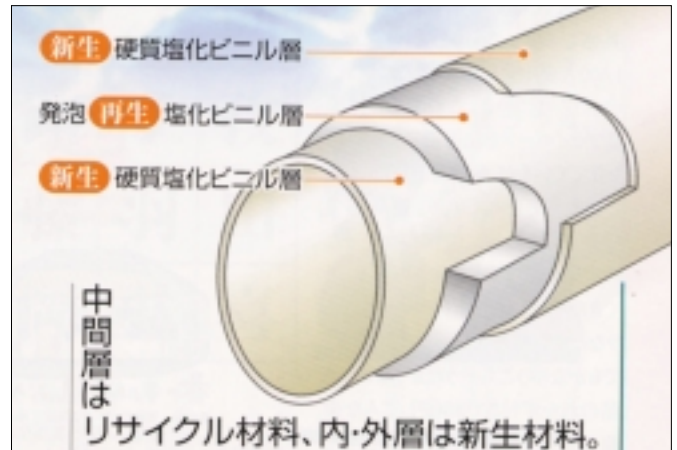


Fig.1 Structure of UPVC foam core pipes using recycled material

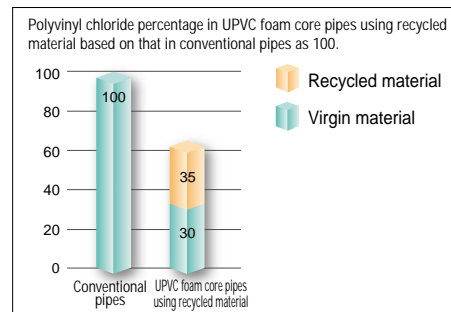


Fig.2 Comparison of amount of polyvinyl chloride virgin material used

**Floating type compact purification system**

We have developed floating type compact water purification system for small rivers and reservoirs.

It is not necessary to construct a conventional water purification plant on the bank, and maintenance work is easier than conventional type.



Name of equipment : Floating water purification system with charcoal circulation  
 Treatment amount : 1440m<sup>3</sup>/day/unit  
 Number of equipments installed : 3

Purification system : Charcoal circulation purification system. Raw water in reservoir is pumped up into the system, which purifies raw water by oxidizing decomposition, utilizing microbe activities adhering to charcoal in the system, of organic substances.

**An example of water quality measurement results (year 2001)**

Month measured	January	March	April	May	June
Water temperature (°C)	10.0	10.5	19.0	22.8	27.3
COD (mg/l)	29	27	50	27	27
Total nitrogen (mg/l)	3.78	2.48	3.50	1.56	1.96
Total phosphorus (mg/l)	0.314	0.225	0.336	0.050	0.101
Chlorophyll (mg/m <sup>3</sup> )	150	121	146	98.2	75.7

→ Purification equipment started operation May 1.