

APPLICATION OF A LATEST-MODEL GROUND WATER FLOW METER

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1. GENERAL INSTRUCTIONS

Ground water plays an important role for civil works and underground environment. Asano Taiseikiso Engineering Co.,Ltd. (ATK) had developed a Ground Water Flow Meter (hereafter GWF Meter) applicable for a-single-borehole with 75mm diameter in 1980's (Kawanishi et al. 1986 [1]). The GWF meter has been used in many occasions, such as determination of a ground water direction and velocity to identify a possible pollution sources and to simulate the future dispersion, to find out a possible water pathway causing collapse of deep excavation or unintended seepage under river dykes or dam bodies. As its applicable cases have increased in wide field, downsizing for 50 mm diameter of PVC was the next challenge (Kawahara and Goto 2019 [2]).

2. APPLICATION FOR VIETNAMESE PVC

The latest model was verified for PVC pipes widely used in Japan, A structure of PVC pipes, such as interval and shape of slits however vary country by country. Therefore, the verification process is necessary for each different PVC. In this paper, Vietnam-made PVC pipe was tested in the laboratory to compare water velocities between the value by a flow rate, true velocity, and a measured value by the GWF Meter.

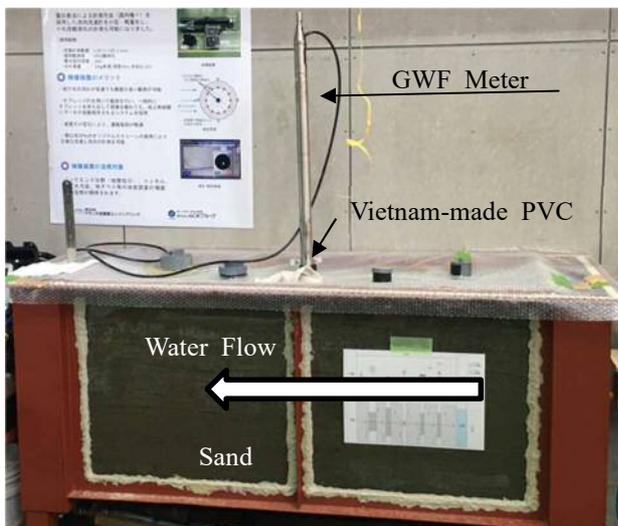


Figure 1. Laboratory Testing

The result of the laboratory testing was summarized in Figure 2 as the correlation graph between the true velocity and the measured value. The two values are highly correlated in the range of 8×10^{-2} and 1×10^{-5} cm/sec. Therefore, the GWF Meter is applicable for the Vietnamese PVC pipes even though they have different structure in terms of slit shape and interval.

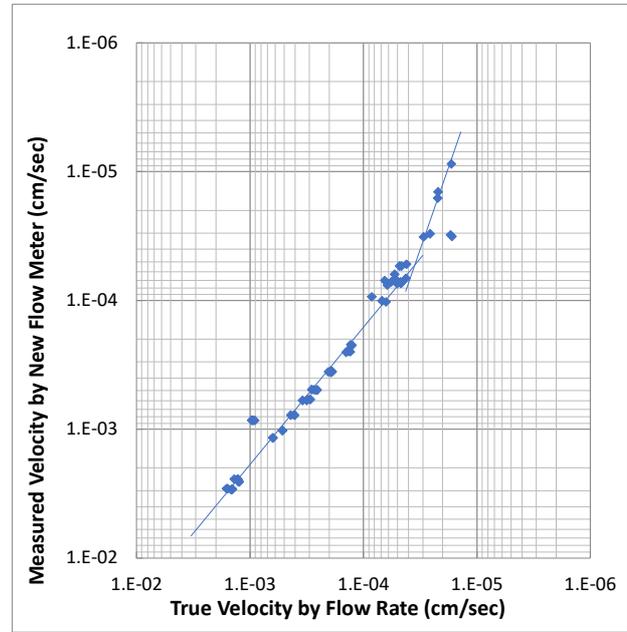


Figure 2. Correlation between True Velocity and Measured Velocity

2. Application for Pond Leakage Prevention

There is a historically significant pond in Japan where the water level is going down year by year possibly due to water leakage from somewhere around the pond. GWF Meter was employed to identify the direction and the velocity of the groundwater around the pond at four points.

The result shows that groundwater is flowing toward an old canal line which was filled up by soil in the past to develop a residential zone in the neighboring area. And the old canal is considered as the main cause of the pond leakage. A countermeasure of the sheet pile installation across the old canal is being planned to prevent the further leakage.

3. CONCLUSIONS

The laboratory testing verifies that the GWF Meter is applicable for the Vietnamese PVC pipes. The field application in Japan shows that the GWF Meter is useful to solve a water leakage problem of ponds and lakes.

REFERENCES

- [1] Kawanishi, M. & Komatsuda, S. & Hirata, Y. Proceeding of 30th Conference on Hydraulic Engineering, , Japanese Society of Civil Engineering, JSCE,1986, pp337-342.
- [2] Kawahara, S. & Goto, Geotechnical Engineering Magazine,,JGS,2019 pp34-35