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WATER PERMEABLE PIPE FOR WASHING OUT UNDERGROUND POLLUTION

Kazuyo Yoneda[0], Shinichi Tamura[0], Masamitsu Moriyama[3], Yoshinori Nishino[0], Kazuki Nakamura[2], Takio Shimosakon[2], Kyohei Shimada[4], Rong Long Wan[4], Kozo Okazaki[4]

[1]NBL Co., Ltd, Japan
Orai-minami5-37, Izumisano City Osaka, Japan
email:yoneda@nbl.ac, web page: http://nbl.ac/en/
[2]Kinki University &CHN Co., Ltd.
[3]Osaka Institute of Technology
[4]University of Fukui

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Summary. *We are going to develop a method of washing out underground pollution by using water permissible pipes developed by us and pouring/draining water. This method is effective even there exist already buildings on the ground. To visualize underground pollution directly or especially underground water which can work as the solvent of pollutant to be washed out, we have developed electrical impedance tomography (EIT) for underground. By quantifying underground water, we can quantify/control the purifying process. Some of the experimental results show its feasibility.*

1 WATER PERMEABLE PIPE

We, NBL Co., have developed water permeable pipe as shown in Fig.1, which is produced from scraped FRP by our unique CW (Centrifugal Winding) method [1].

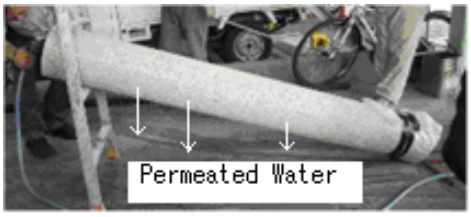


Fig.1 Water permeable pipe.
φ:0.2-2m, Length: 2-6m.

2 WASHING OUT UNDERGROUND POLLUTION

Soil washing method by flowing water is effective to purify the polluted soil which includes chemicals not purified by microorganism in the natural circulation. Surfactant, oxidation flocculant, and adhesion agent etc to wash pollution chemicals out or settle them afterward are used together. Fig.2 shows a cross section of the process of purifying polluted underground soil with the water-permeable pipes. The water containing agents effective to the

pollution is permeated into the soil. Then it is pumped up to the ground. The pollutant flowed out is injected into deep underground.

3 ANALYSIS OF UNDERGROUND POLLUTION

It may be the best way to use EIT (Electrical Impedance Tomography) to visualize the underground since it can be applied by only inserting electrodes into the underground. However, the direct visualization of pollution by the EIT may be difficult, since there are various kinds of pollutions/chemicals of especially small amount of. Therefore, it is important to combine the water flow control and analysis of flowed out materials.

We did a small size of EIT experiment and shown that it is possible to visualize the underground even some building exists and difficult to insert the electrode in the center of the land (Fig.3). We can see that the poured water was depicted well using smoothing filter, though the resolution power is only 12 points. Experiments showed the feasibility of the EIT for the underground.

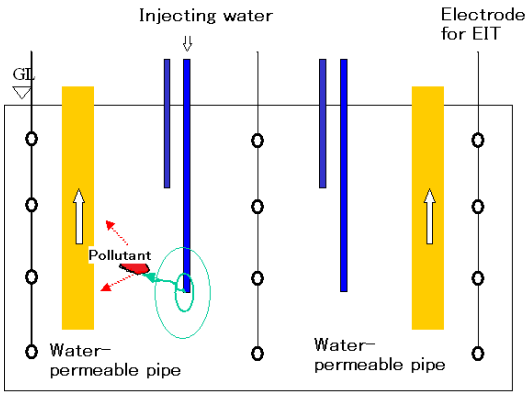
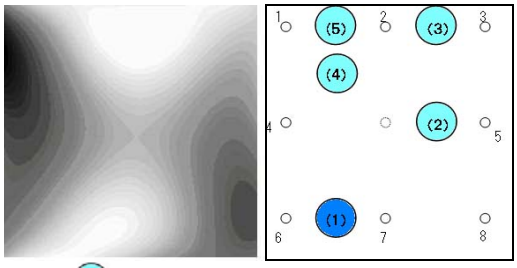


Fig.2 Distribution analysis of pollution by injecting proving water from various positions



0.5 ml of water is poured

2.0 ml of water is poured

Fig.3 Reconstructed EIT (left) of the poured water (right). White means low impedance (much water)

4 CONCLUSIONS

We have developed a water permissible pipe. It has a possibility to be applied to pollution purification by washing out the underground. In this process, EIT (Electrical Impedance Tomography) can visualize the underground especially water distribution. Then, we can analyze the pollutant contents/quantity by analyzing the washed out material quantitatively by the proving water and therefore can make washed out planning how much and how long the washed out should be done.

REFERENCES

[1] Toshiharu Iwatani, Masaki Nishino, Yoshinori Nishino, Yasuhiro Iguchi, Takio Shimosakon, Shinichi Tamura, *Design method of API high pressure FRP pipe*, 13th European Conference on Composite materials No.107, Stockholm, Sweden (June2-5,2008).