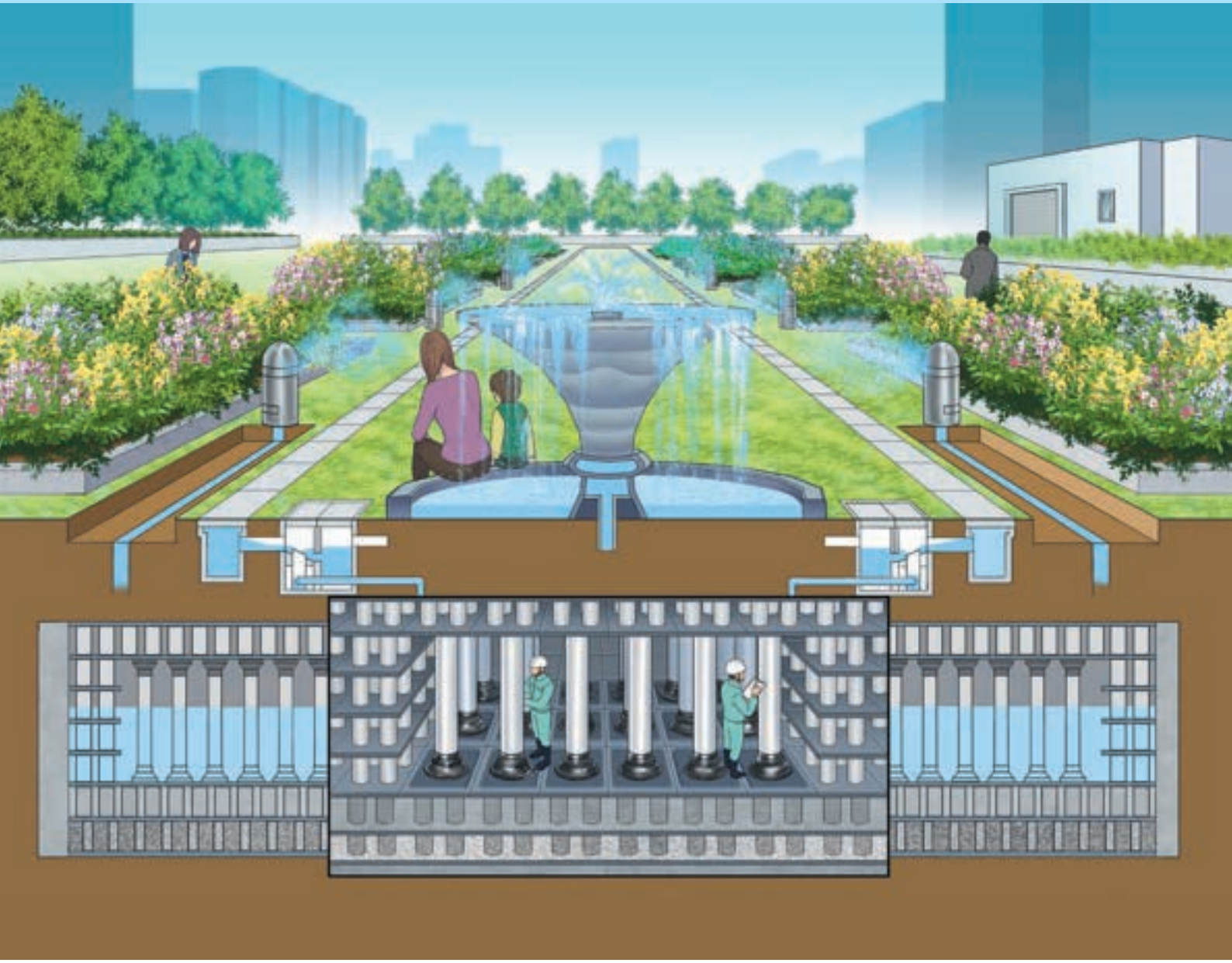
Solving the global water problems by adopting on-site water storage system

Aqua Palace Universal Water Storage System



Totetsu Manufacturing, Co., Ltd.

Achievements for the JICA in supporting the Rainwater Harvesting Project.

(JICA : Japan International Cooperation Agency)

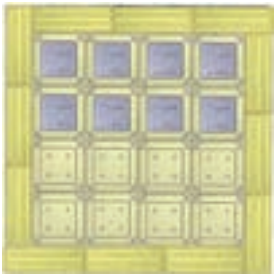
The universal (UN) water storage system was finally completed along with improvements made based on the performance and experience of that time.

Please look at 11P for details.

About Universal (UN) Water Storage System

The universal (UN) water storage system is a system consisting of **the Aqua Palace storage material** and **the leave-in-place UN form system**.

Aqua Palace

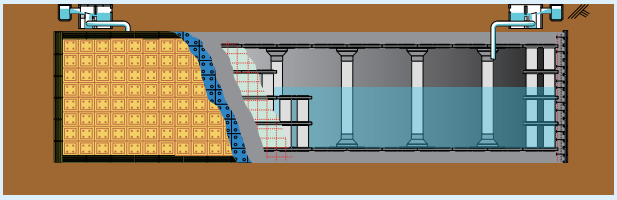


Although on the aforementioned JICA project, the method of brick laying was adopted as a remaining formwork during concrete placement. After that, UN form was newly developed and completed.

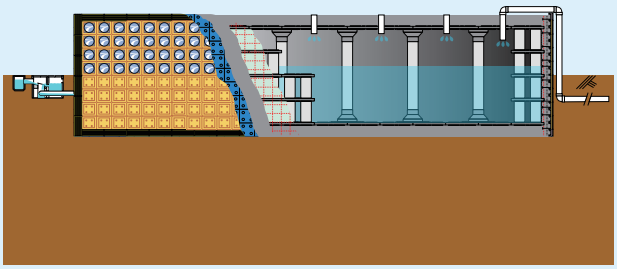
UN Form

There are four possible types that can be built with this system

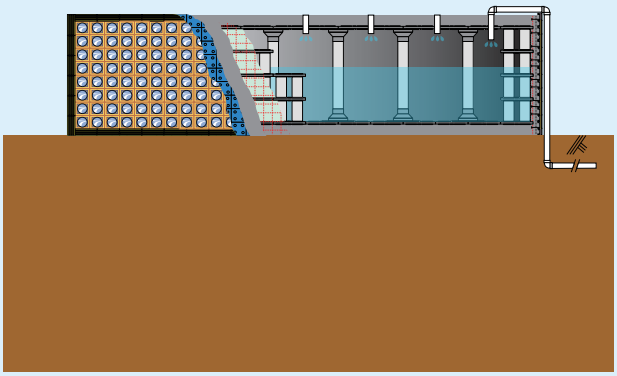
(A) Underground burial type



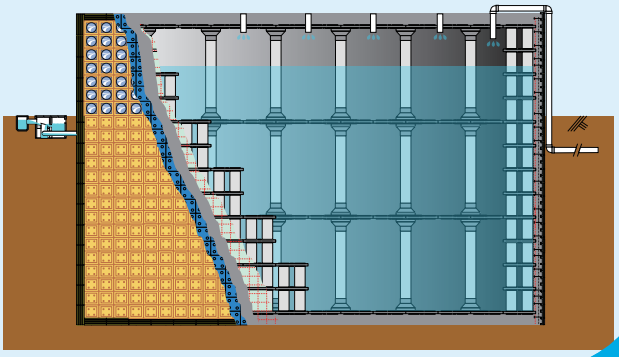
(B) Half-underground type



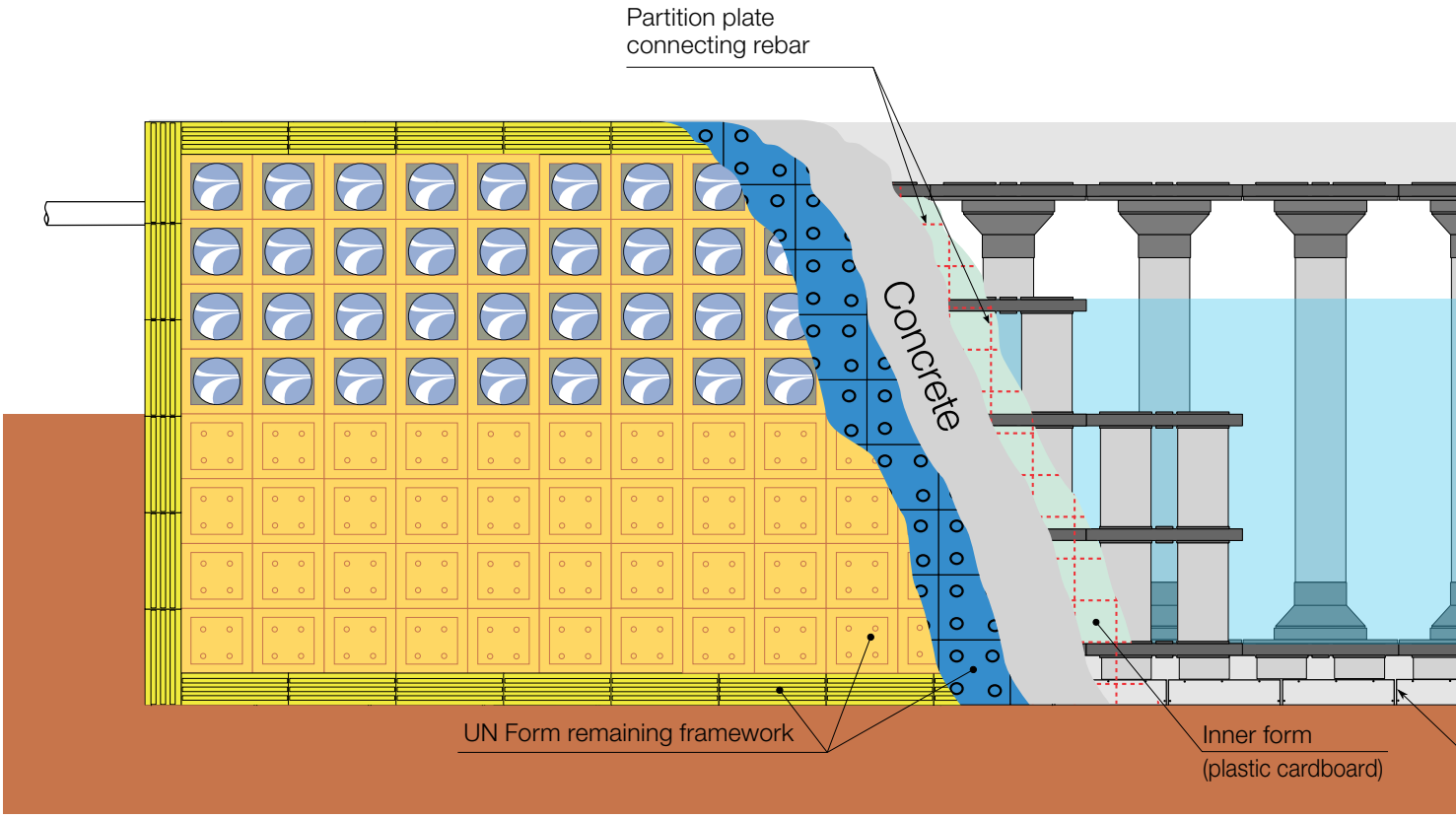
(C) Above-ground type



(D) Deep half-underground type



Basic Structure (Using the half-underground type as an



Aqua Palace Storage Material

Aqua Palace component ~~used for UN water storage system~~

Partition plate(s)

By joining at the horizontal direction, it gets integrated and becomes a single structure ultimately creating the same plane.

AD spacer

It is used to set up the stability of the main PVC pipes.

Attachment

By putting it between the partition plates and the AD spacers, it gets integrated and becomes a single structure.

Main SP pipes (PVC pipes)

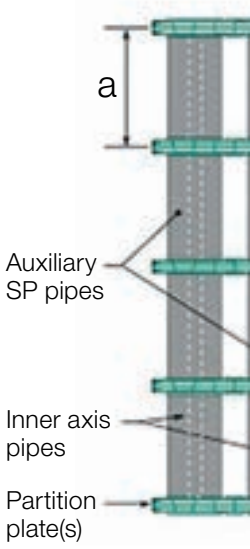
In principle, use VU200 (JIS or JIS standard equivalent). However, in the case of construction with T-6 or less, the recycling and reuse of pipes are also adopted.

Auxiliary SP pipe (same as above)

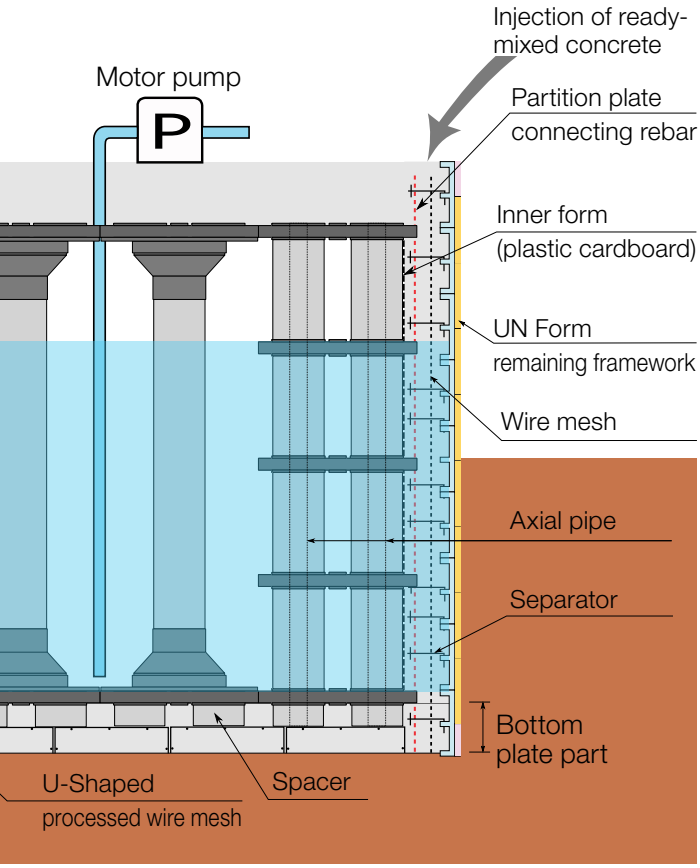
Use of PVC recycling and reusing pipe with Φ125~250

Inner Axis Pipe (same as above)

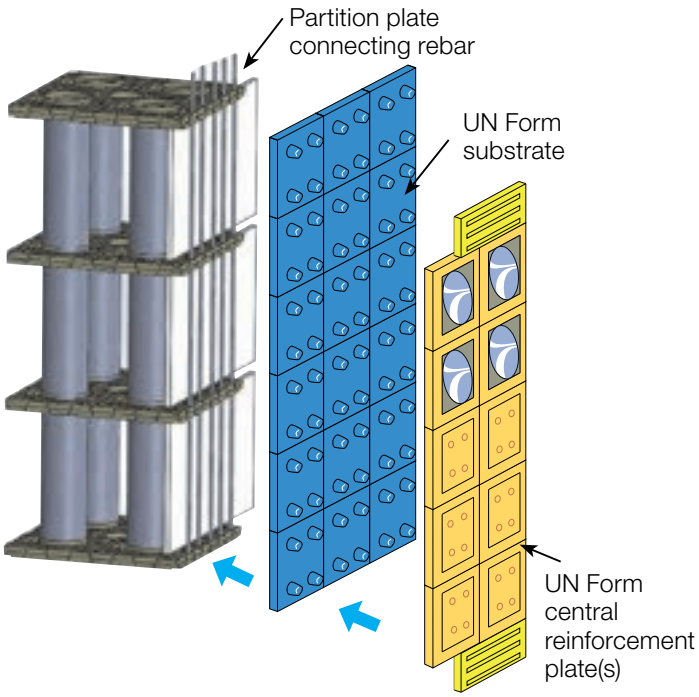
Use of PVC recycling and reusing pipe with Φ50~100

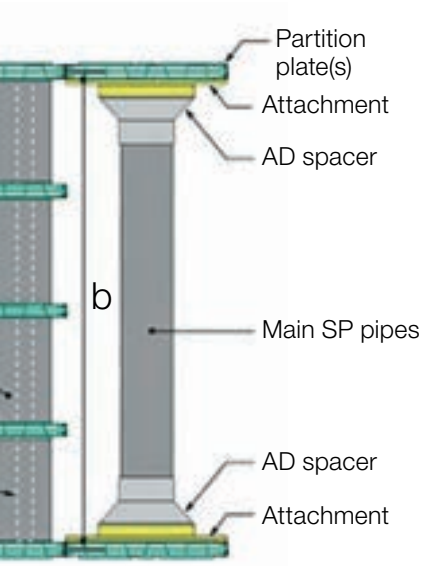


example to show the basic structure of UN water storage system.)



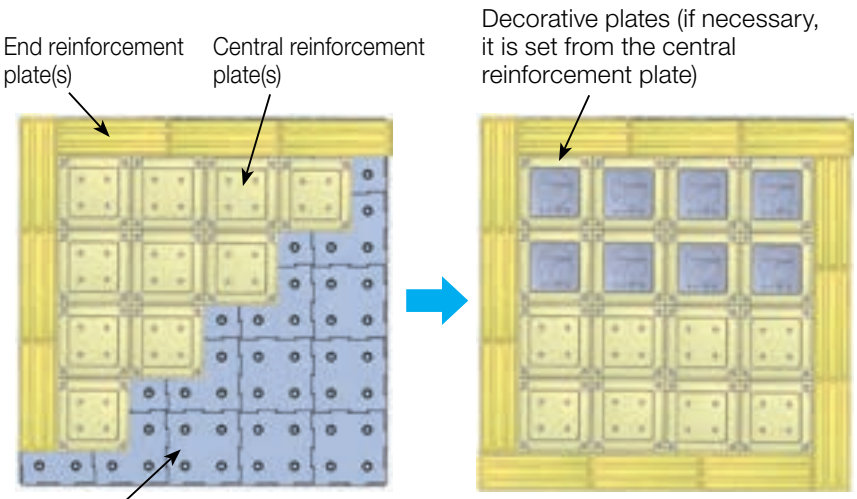
Placement Relationship between Aqua Palace Perimeter & UN Form





In principle, partition plates should be laid out at regular intervals with 50cm or less for the section a, and with 2m or less for the section b.

Remaining formwork UN Form

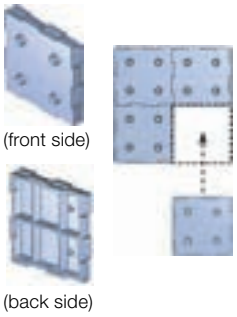


Substrate
On the back of the substrate, there is a hole where a separator can be set above the partition plates, so after being bridged with partition plate connecting rebar, ready-mixed concrete will be injected in.

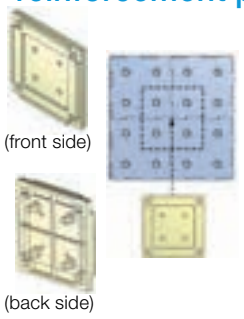
Characteristics

1 Although the perimeter of the UN water storage tank was formed as a concrete wall, adopting the “Leave-in-place UN form system” streamlines the process, which shortened the construction period and saved costs dramatically.

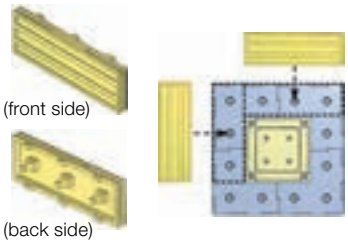
① Substrate



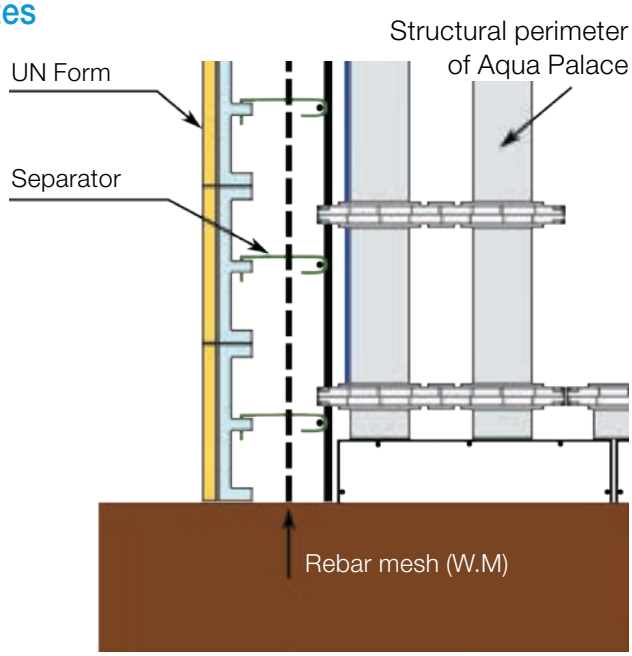
② Center reinforcement plates



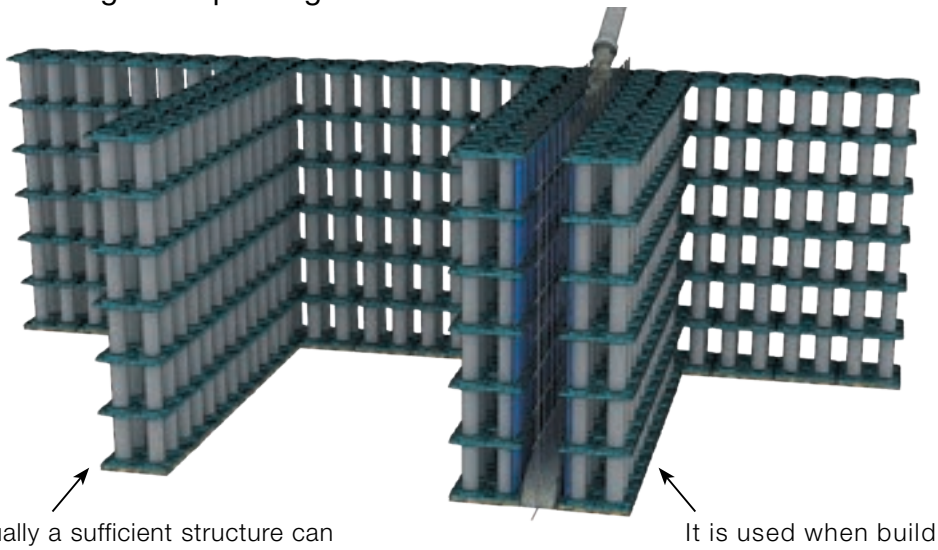
③ End reinforcement plate(s)



Joining together the Aqua Palace



2 Aqua Palace storage material has a necessary supporting function role for placing the ready-mixed concrete, which is an indispensable step in concrete wall formation, and can easily form partition walls. This makes it possible to construct concrete reservoirs of any size, including the super-large cases.



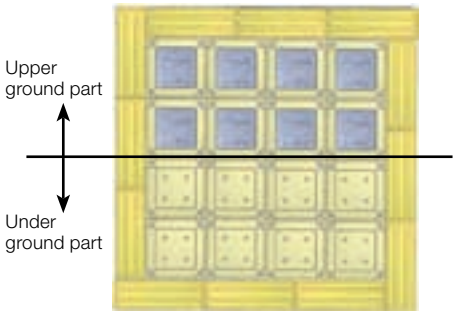
Usually a sufficient structure can be built with only partition walls without having to place concrete.

It is used when building an especially large storage tank or when there will be a special heavy load at the top of the tank.

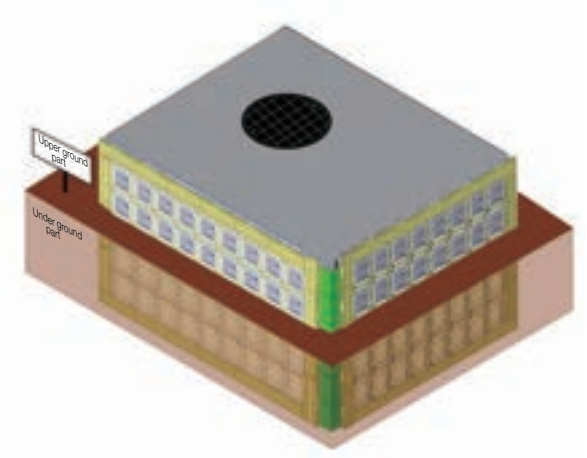
# of This System

3 UN form not only exhibits the function as a remaining formwork, it is also possible to finish the perimeter surface to a wall with an aesthetic appearance. This function enables half-underground and above-ground type construction with the same construction method as underground construction.

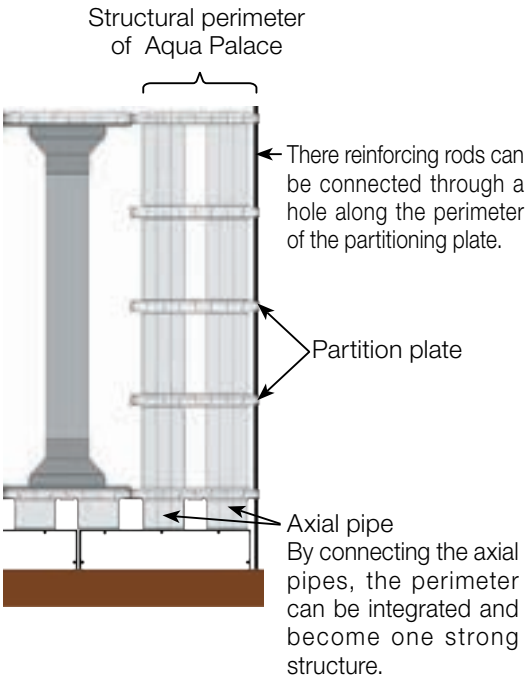
Wall Decoration Effect of UN Form

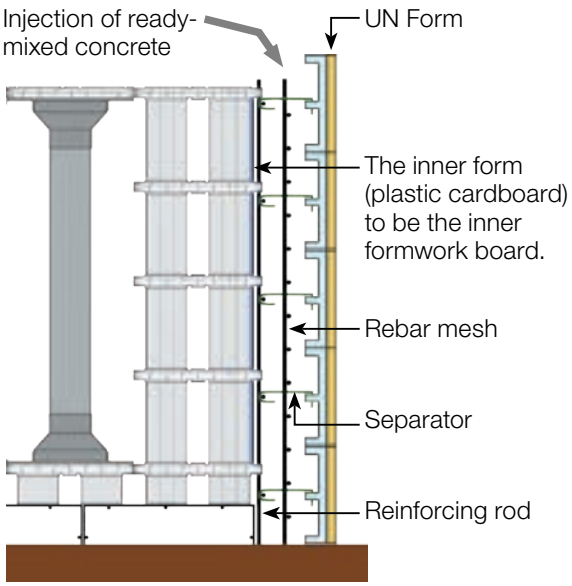


A decorative board was set for parts of the UN form that were exposed to make the outer surface decorated.



4 Aqua Palace storage material, as a structural material itself, has been found to have excellent functions in terms of pressure resistance and earthquake resistance by experiments and verification of structural calculations. By combining with concrete structure, it became a more robust storage system.

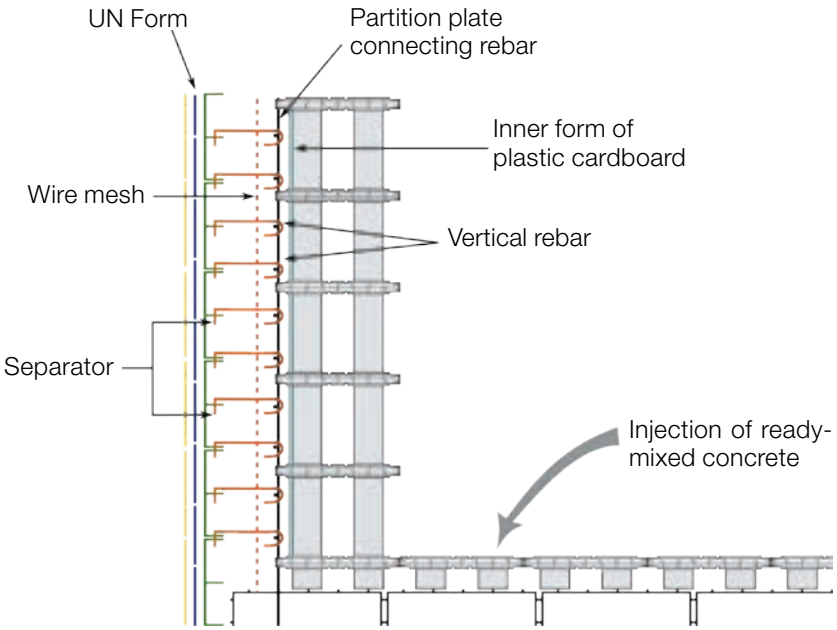




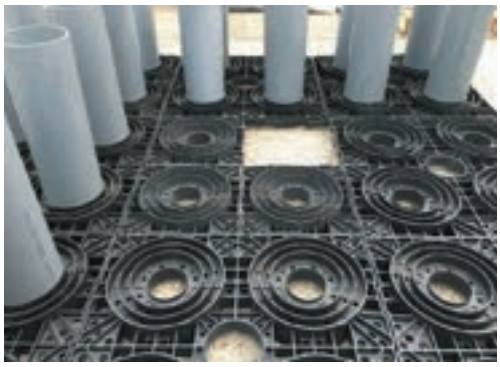
By connecting the reinforcing rods along the perimeter to the partition plates and injecting ready-mixed concrete, it allows the main structure of the Aqua Palace and concrete wall to be smoothly formed and a UN storage tank with a strong structure is constructed.

5

Reservoirs for collecting rainwater are expected to be completely waterproof, especially without leak. With this method, one can cast concrete continuously from the foundation (concrete) to the sidewall portion (concrete) and then to the crown of the levee without causing a cold joint. As a result, we can construct a completely waterproof tank without a junction.



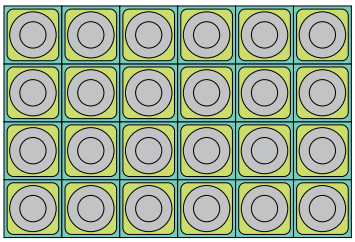
In order of injecting ready-mixed concrete, first the charging port provided on the partition plate of the bottom plate surface, and when the bottom plate portion under the partition plate becomes full, it moves to the side surface portion.

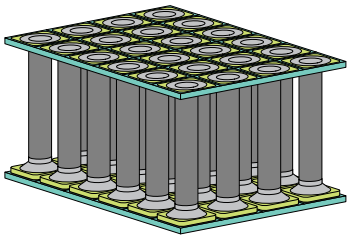


6

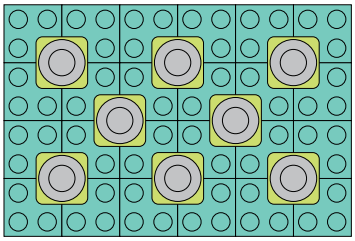
For the construction method of the Aqua Palace that constitutes the UN water storage system, depending on the purpose of installation, it is possible to increase or decrease the number of main SP pipes (PVC pipes) used. This avoids over-construction and makes it possible to construct a highly economical storage structure that meets the purpose of use.

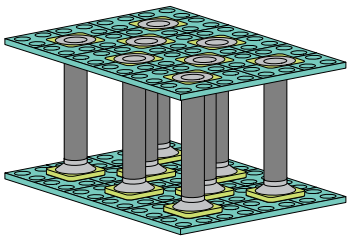
【With T-25 or more】



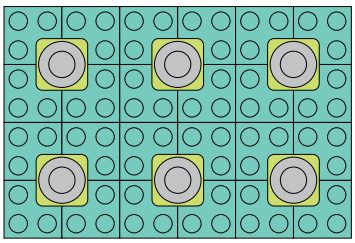


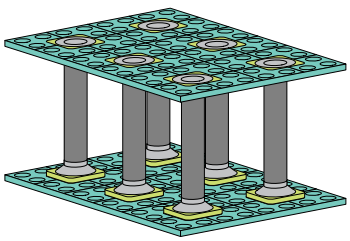
【Equivalent to T-16】
On average, mixed concrete is poured in for every 3 dividers (1/3).





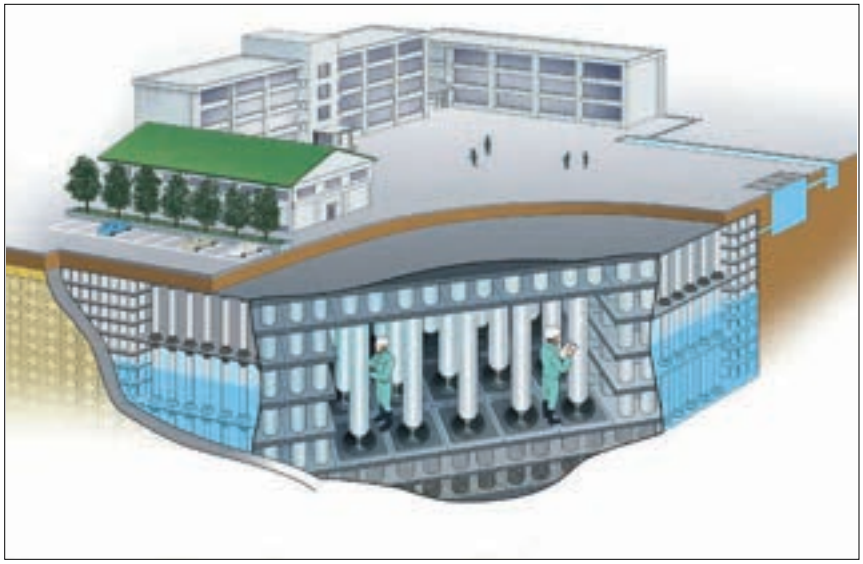
【Equivalent to T-6】
On average, mixed concrete is poured in for every 4 dividers (1/4).





Construction Case and Marketability

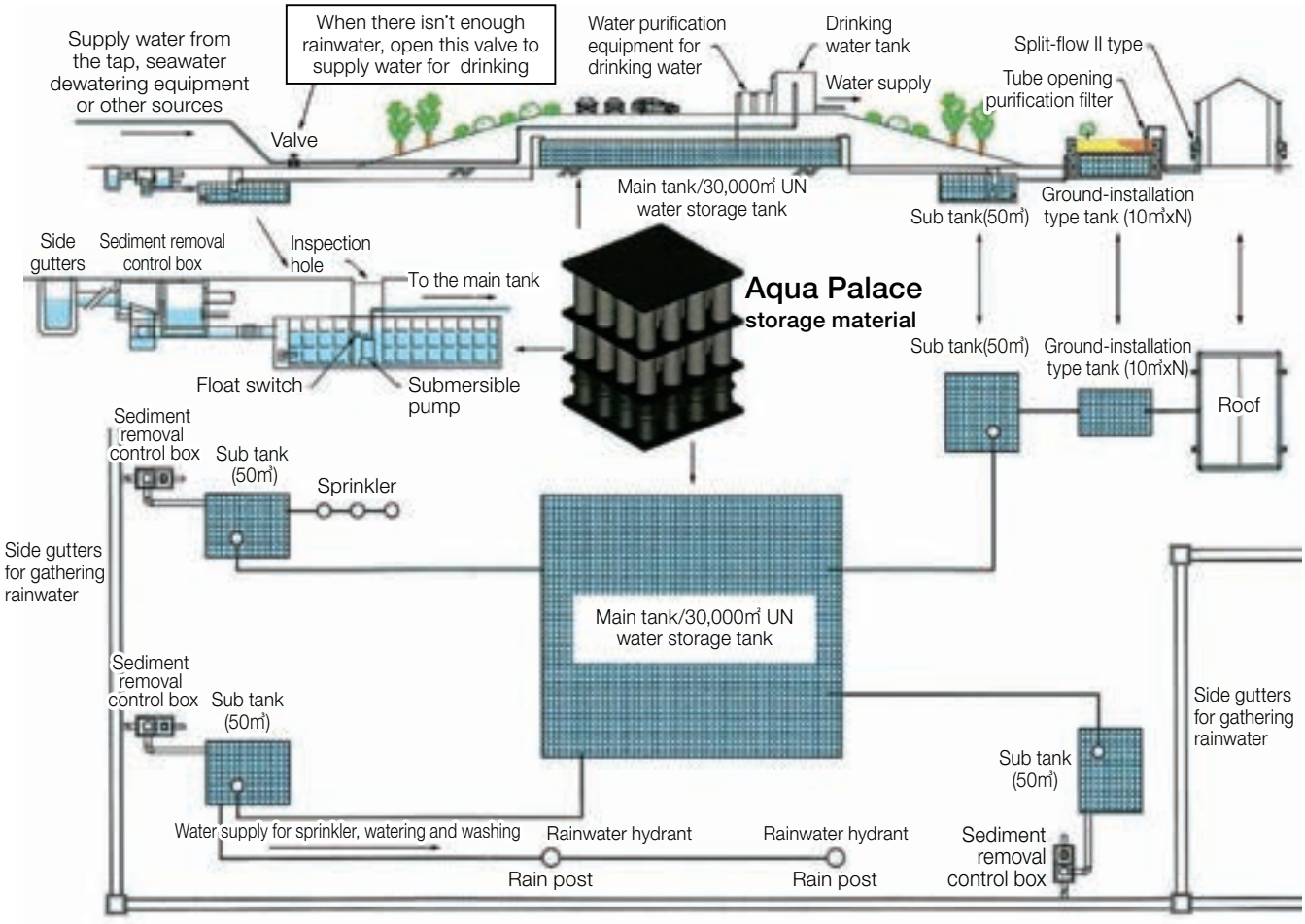
1 **Underground storage type for large-scale underground storage tank system**



2 **Half-underground storage type for large-scale underground storage tank system**

3 **Small-scale half-underground or above-ground type UN water storage system**

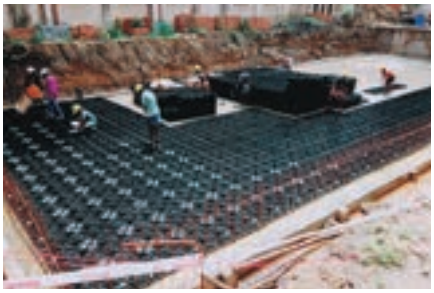
❹ City construction with promoting rainwater utilization

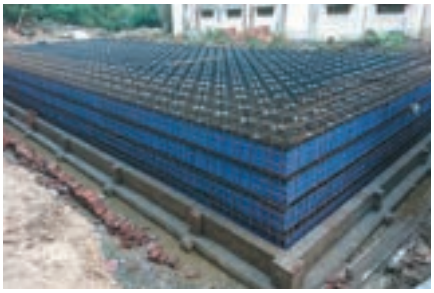


Applications of the UN System

Securing a domestic water supply for each region
Preparing for disasters and emergencies
Using as a fire-fighting water supply
Preventing the beginning of spreading of forest fires
Urban flood prevention and groundwater cultivation
Securing industrial water and agricultural water

UN Underground Storage System Constructed for the JICA in supporting the Rainwater Harvesting Project.





1 Start the installation of Aqua Palace partition plates

2 The SP main pipes are erected in the central part.

3 Install inner form plastic cardboards

4 Bricks (outer formwork) pile construction

5 Completion of concrete placement

6 The upper area is ready to be used as a parking lot

Location of Water Storage Facilities	PWD Taramani campus in Chennai City, Tamil Nadu, India (Completed in December 2017)
Specifications	・Water storage capacity of about 628.8㎥ ・Void retention rate of about 95% ・Pressure resistance equivalent to T-25 load capacity (automotive load) ・Construction with groundwater level at 2.5m ・Possible for person to get inside and do maintenance ・Planning to use stored rainwater for everyday uses such as toilet use and drinking water ・The upper area can be used as a parking lot

● Tokyo

● Chennai

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Agency

※The specifications and other parameters in this catalog are subject to change due to new developments or improvements.

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