



Diaphragm walls are underground structural elements commonly used as retention systems and permanent foundation walls. They can also be used as groundwater barriers.

The primary advantage of a diaphragm wall over a secant wall is the reduced number of joints in the wall which ultimately improves the walls water tightness. Diaphragm walls tend to be used for retaining very deep excavations as they can be designed to take very high structural loads.

// EQUIPMENT

Diaphragm walls are excavated using various types of grabs either rope hung on crawler cranes or Kelly mounted on bespoke piling rigs. The jaws on the grabs can be either mechanical or hydraulically operated. The excavation

process is carried out under a support fluid which exerts hydraulic pressure against the trench walls and prevents collapse of the sides.

Generally within the United Kingdom diaphragm walls are constructed with mechanical or hydraulic grabs in most soils and very weak rocks. Diaphragm walls that are required to be installed in very hard ground, very dense sands or strong rock can be excavated using a hydromill system.



We are experienced in carrying out complex operations on restricted urban sites and were responsible for installing diaphragm walls at Heathrow T2B and in low headroom in the redevelopment of Westminster Station.

// CONSTRUCTION SEQUENCE

A diaphragm wall is generally constructed in a series of discrete panels typically ranging in length from 3m to 7m. Depths of diaphragm walls vary depending on the application and the specified requirements, but typically they can range from a few meters to tens of meters. The width of the wall can vary from 600mm to 1800mm, again depending on the application.

Once a panel is excavated and the support fluid cleaned the required stopends are installed. The stopend produces a defined profiled joint to the next panel and is also used to install a water bar if required. The number of stop ends used in each panel depends on the construction sequence.

The next stage of the process is to install a pre-fabricated reinforcement cage and concrete the panel. The concrete is poured in one continuous operation through one or more tremie pipes (depending on panel size) that initially extend to the bottom of the trench. As the concrete level rises within the panel the tremie pipes are progressively shortened, however the discharge end of the tremie pipe always remains embedded in the fresh concrete.

After completion of a primary panel the adjacent running panel is excavated and the stopend removed to reveal the profiled joint and water bar. The reinforcement cage is then installed and the panel concreted in the usual manner.

The construction sequence then continues with a combination of primary, running and closing panels. Closing panels are used to complete a series of panels and because they are constructed between two previously constructed panels they require no stopend.



// FOR FURTHER INFORMATION CONTACT:

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