

## Construction Sequences of Diaphragm Wall

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### Abstract

As the Saudi Arabia seeing a rapid growth in the direction of infrastructure development, deep underground structures getting more and more importance. To build an underground structure while the neighboring structure undamaged, the diaphragm wall is constructed. A diaphragm wall is constructed using a narrow trench excavated in ground and supported by an engineered fluid (typically a bentonite mud) until the mud is replaced by the permanent material. Generally diaphragm walls are made from reinforced concrete, though unreinforced walls can also be used.

### Objectives

- To recognize the problems arises during deep excavation and construction
- To differentiate the various walls for excavations
- To acquaintance with the construction sequences of the Diaphragm Walls
- To demonstrate the skills of a good Geotechnical Engineer.

### Construction Sequences (Pictorial)

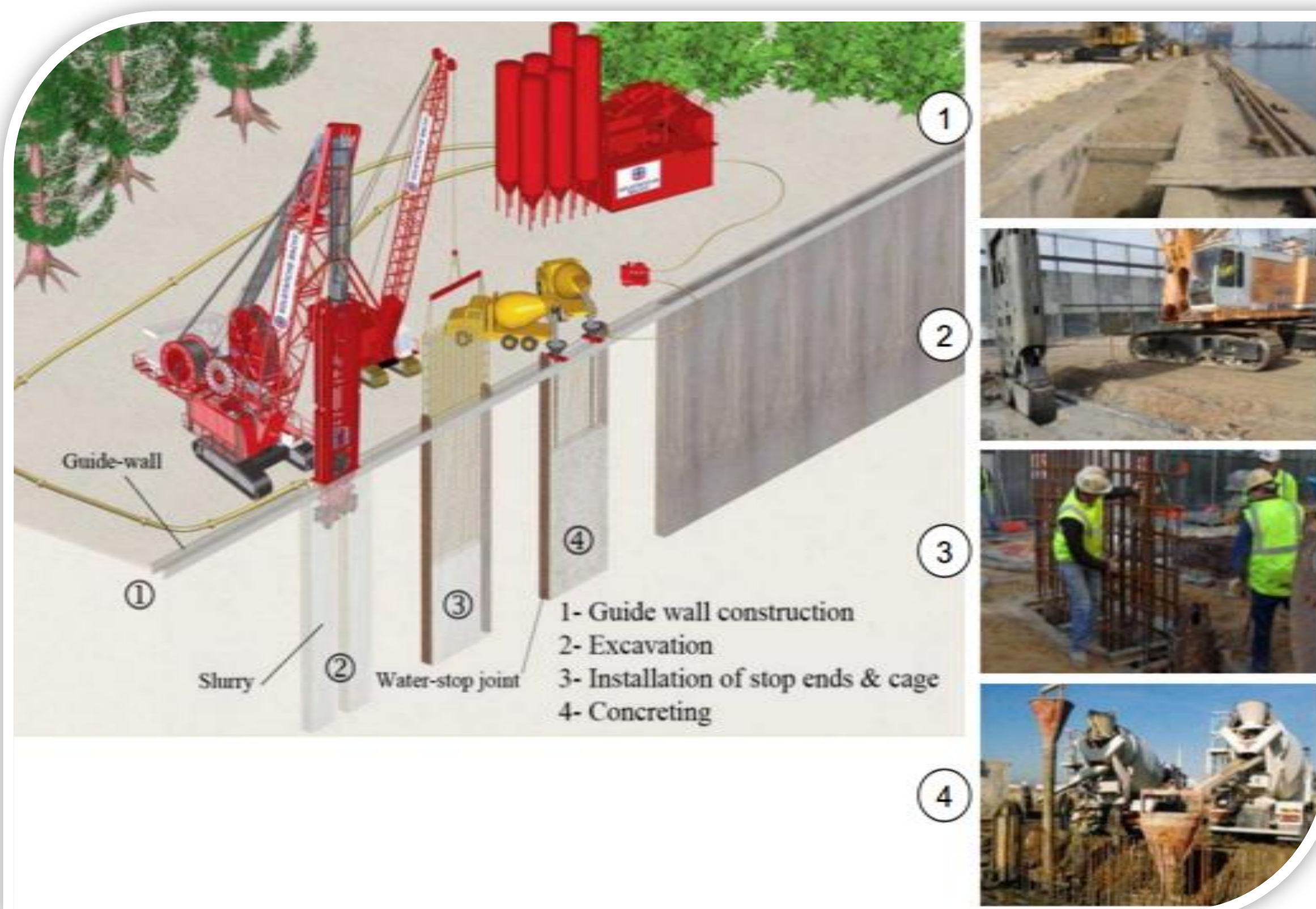


Fig. 1: Guide Walls, Trench Excavation, Reinforcement, Concreting

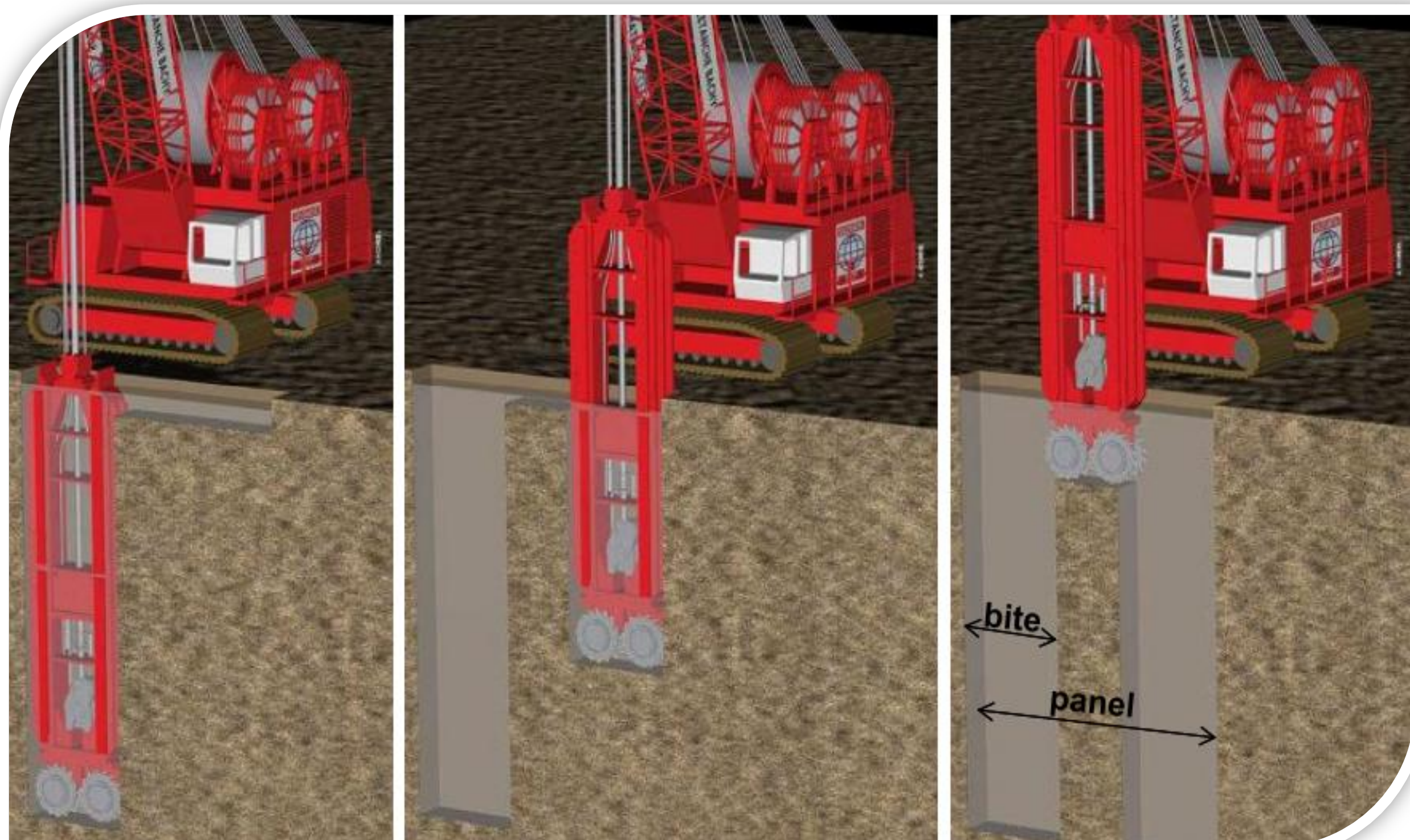


Fig. 2: Joining for the diaphragm wall panel

### Construction Sequences (Steps)

1. Guide wall installation for diaphragm walls
2. Pre-excavation for diaphragm wall installation
3. Primary panel excavation for diaphragm wall construction
4. Slurry cleaning and de-sanding for diaphragm wall construction
5. Joint construction methods for diaphragm wall construction
6. Reinforcement cage lowering and concrete tremieing
7. Secondary panel excavation for diaphragm wall construction

### Significance to the Kingdom

As the Kingdom is heading to achieve Vision 2030, lot of infrastructure development work has to be carried out. This poster presentation will give a boost to the knowledge of the engineers who are involved in deep excavation and construction, especially in the built up area. The construction sequences of diaphragm wall, therefore, are very much important for the geotechnical engineers.

### Main Uses and Advantages

Diaphragm wall is a continuous wall constructed in ground in to facilitate certain construction activities, such as:

- As a retaining wall
- As a cut-off provision to support deep excavation
- As the final wall for basement or other underground structure (e.g. tunnel and shaft)
- As a separating structure between major underground facilities
- As a form of foundation (barrette pile – rectangular pile)

Major advantages of diaphragm wall are listed below.

- Can be used as permanent structural wall
- Water retainable
- Can be installed to deeper depths and for load bearing element
- Less temporary propping needed
- Can be applied for top-down construction method
- Rigid structure so that ground movement induced by basement excavation is less than other flexible retaining wall
- Vibration and noise generated from installation of diaphragm wall is less than other methods

### Bibliography

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2. <http://www.diaphragmwallconstruction.com/ConstructionSequence.aspx>
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