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A new approach to a reinforced earth wall

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ABSTRACT: As the reinforced earth wall is constructed with step by step backfill compaction method, the accumulative horizontal deformation is inevitable. To reduce the horizontal deformation, an isolated-reinforced earth wall method was newly developed . This wall is constructed first with reinforcements, non-woven geotextiles and back-fill only, and then facing blocks are installed after horizontal deformation of reinforced earth is fully occurred. Based on field test results, it is found the reduction in horizontal displacement is significant in the case of the isolated-reinforced earth wall system. This system gives structurally safe, efficient, and cost effective method for reinforced earth wall construction.

1 INTRODUCTION

In a convenient reinforced earth retaining wall, there is a horizontal displacement due to its construction method; step-by-step compacted backfill and facing-connected reinforcement method(Nakajima et al., 1996). By this technical background, an accumulative horizontal deformation of facing panels for segmental reinforced earth walls is induced as the wall was getting higher and can not be adjusted without dismantlement. For the purpose of preventing the horizontal deformation of a reinforced earth wall face from backfill compaction, an isolated-reinforced earth wall system was developed by isolating the facing blocks from backfill materials(E&S eng., 1999). Fig. 1 shows the flow chart for the development of KOESWall.

This separated construction method is called isolated reinforced earth wall system (named KOES-Wall system). In this system, only the reinforced earth is constructed first. And then facing blocks are installed after the horizontal deformation in the reinforced earth is occurred completely. Thus the displacement induced from the compaction of backfill makes no effect to the facing blocks.

2 CONSTRUCTIONS & FIELD INSTRUMENTATIONS

A test wall was constructed on October, 1998 in Whasung, Kyunggi-Do, about 30 km south of Seoul. This wall was constructed to extend the site for the precast concrete manufacturing facilities. Total height and length of the constructed reinforced wall are 7.2 m and 53.2 m, respectively.

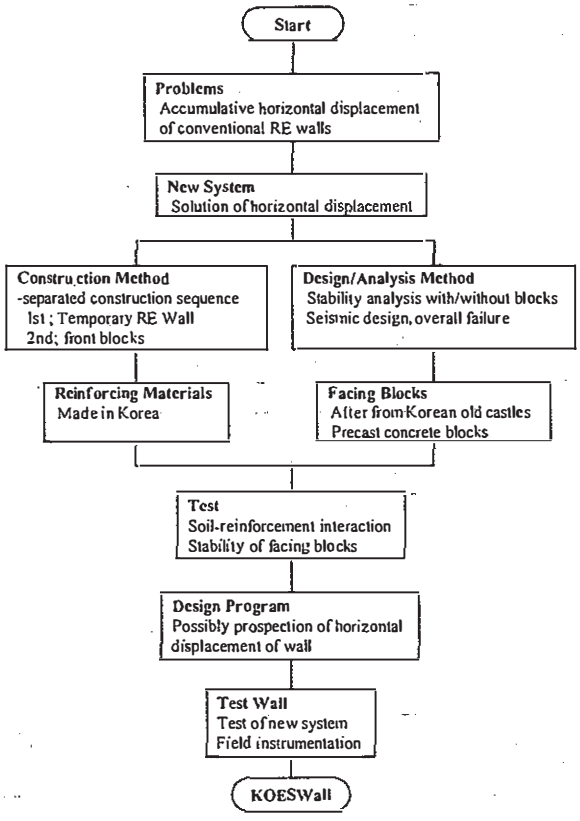

Figure 1. Flow chart for the development of KOESWall

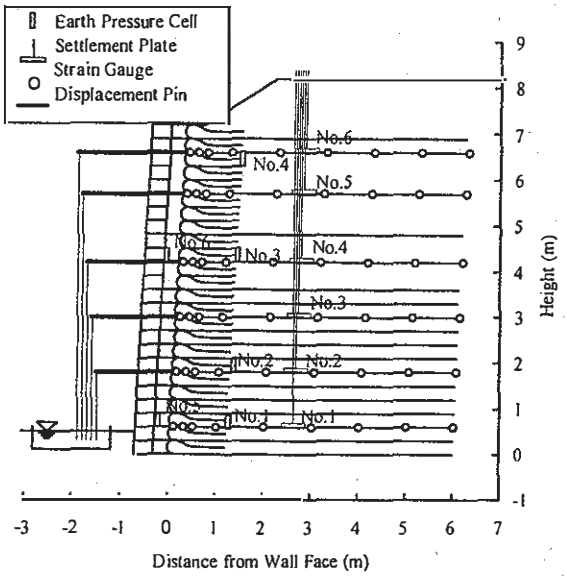

Figure 2. Cross section of Test Wall

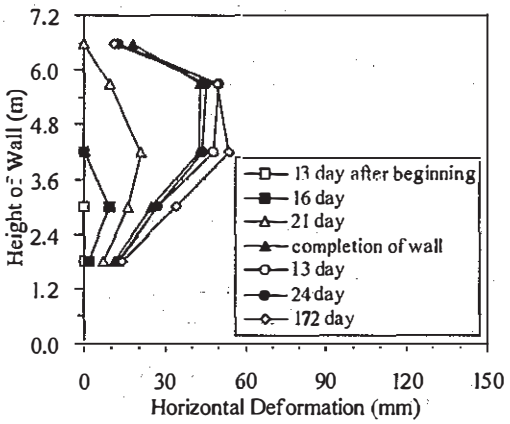

Figure 3. The horizontal displacement of test wall

Table 1. Cases of KOESWall

Location	Height (m)	Length (m)
Whasung, Kyunggido	7.2	53
Keumbung St., Daejeon	9.2	88
St. of Nat'l Cemetery, Daejeon	7.5	235
Goonpo-Dangdong Housing Area	10.2	380

The horizontal displacements were measured at five different layers. Displacement pin was used for the measurement (Fig. 2). Fig. 3 is shown the horizontal displacement of the wall at the locations of 0.3 m from the main body of wall facing. The wall height of 4 5.8 m gives the maximum horizontal displacement for both cases. About 80% of horizontal displacement was occurred at the time of completion of main body, before the installation of facing blocks. This means that only 20% of horizontal displacement was occurred after installation of facing modular block.

After the successful field istrumentation of the test wall, there were several cases of KOESWall construction in Korea (Table 1.).

3 PROSPECTION OF KOESWALL

3.1 *Technical & Economical Effects*

Due to this newly developed isolated earth wall system(KOESWall), the accumulated horizontal displacement from backfilling makes no effect to the facing blocks. Thus the KOESWall has a fine view front wall.

3.2 *Application to the Temporary Wall*

The KOESWall is constructed with reinforced embankment in the first construction stage. And modular facing blocks are installed as a second construction stage. Therefore the KOESWall without facing block is also using as a temporary wall. In this case the maximum economical effect of KOESWall is possible because of saving blocks.

REFERENCES

E&S Engineering Co., Ltd. 1999. Technical note for KOES-Wall system.

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