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Incline Prevention Reinforcement Structure–Controlling Building Incline

Won Song Rim[1], Song In Chol[1]*

[1]*Architectural Science and Research Centre, Pyongyang University of Architecture*

Abstract. By chance facto (disasters, botchery operation) Incline Prevention Reinforcement Structure–Controlling Building Incline is to prevent Building incline when Building incline is measured after Building construction is finished, And is also to prevent Building incline when designs Building. It setted the Incline Prevention Reinforcement plate and pile on building which leans due to plate irregularly distributed sagging to control the deviation, so the range of deviation is under permissible value and it makes building cost save and Building date shortening.

Keyword: building, incline, prevention, reinforcement structure

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1 Introduction

When Building Incline is exceed the tolerable limits by chance facto (disasters , botchery operation), Incline Prevention Reinforcement Structure can be located in the environment of building to ensure stability of building. Incline Prevention Reinforcement Structure–Controlling Building Incline contains Reinforcement Pile and Reinforcement Foundation Plate. The primary cause of building incline is as follows.

First, It is not to distribute geological survey bore to good account, or because of refer to geological data of abutting buildings is not to estimate geology condition of land for building. Second, If irregularly distributed character of geology bedding is not calculated, you can not dispose of base in stage of building design and construction rationally. So irregularly depression of base is happened [1].

Third, according to irregularity of load distribution in plane configuration of building the center of gravity of building and geometric center of foundation is decentrated each other, so off-center load is not considered infection to base. In various countries of the world, many methods of

*Corresponding author at: Taedonggang Dong, Taedonggang District, Pyongyang, DPRK

E-mail address: heavenlake_hana@163.com

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Incline Prevention Reinforcement Structure and Controlling Building Incline apply to building conditions. There are high pressure water injection method, base stress dissolution method, injection of grout method, etc. [2].

In this thesis we can firmly ensure normal use and structural stability of building with preventing deflection of building using Incline Prevention Reinforcement Structure (Incline Prevention Reinforcement Pile, Incline Prevention Foundation Plate) [3], when foresee that deflection exceed admissible value according to deflection occurrence by irregularly depression in building under construction or completion building by external agent [4] (geological survey, design, construction, use, etc).

2 Incline Prevention Reinforcement Pile

If Incline direction can be foreseed, Incline Prevention Reinforcement Pile can be located in the environment which is foreseed incline [5]. And if Incline direction can not be foreseed, Incline Prevention Reinforcement Pile can be located around building [6]. Incline Prevention Reinforcement Pile is located as parallel with building border line in shorter distance than foundation wall height [7]. Then, Incline Prevention Reinforcement Pile is located on extension of Foundation wall [8]. Percentage of reinforcement of Incline Prevention Reinforcement Pile is more than 0.5%, strength grade of pile is more than C20. Incline Prevention Reinforcement Pile to locate before settlement of building finished must be frictional pile. And Incline Prevention Reinforcement Pile to prevent incline from chance facto must be bearing pile.

The count of Incline Prevention Reinforcement Pile is decided as following.

$$n \geq \frac{e(F_k + G_k)}{R_a\left(\frac{B}{2} - b_1\right)} \qquad (1)$$

$$e = e_x + 0.005h_1$$

$$e_x = \frac{M_{sk}}{F_k + G_k}$$

Where

h_1 - The height from the foundation base to the center of the building

B - The length of building (or breadth)

A - The count of pile which is located in one side of building length

b_1 - The distance from the edge of building to Incline Prevention Reinforcement Pile

R_a - The bearing capacity of Incline Prevention Reinforcement Pile

M_{sk} - Under load effect basic combination, the moment which provides in foundation base.

F_k - Under load effect basic combination, the load which provides in the top of foundation

G_k - The weight of foundation

If decided count of pile is less than the count of foundation base, Incline Prevention Reinforcement Pile must be located in each foundation wall [9]. Otherwise, more than 2 count of pile may be located in the one foundation wall. Incline Prevention Reinforcement Pile must be connected by using girt [10], the height of girt must be more than 0.5m, the breadth of girt must be more than pile diameter. And strength grade of girt must be more than C25, percentage must be more than 1%. On the girt extend foundation wall joining wall must be emplaced, if bearing capacity is insufficiency, the foundation wall must be reinforced [11]. Figure 1 shows computational scheme to decide the count of Incline Prevention Reinforcement Pile. Then Figure 2 shows detail of Incline Prevention Foundation Pile.

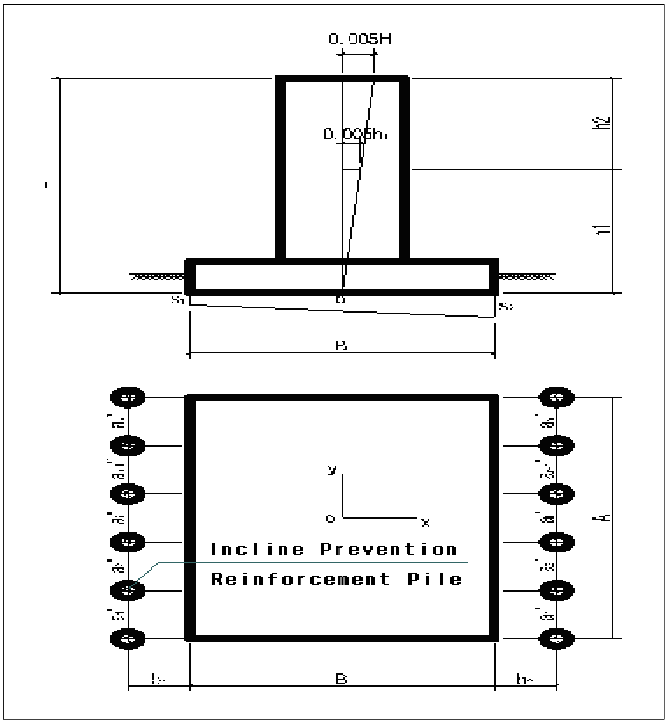

Figure 1 Computational scheme to decide the count of Incline Prevention Reinforcement Pile.

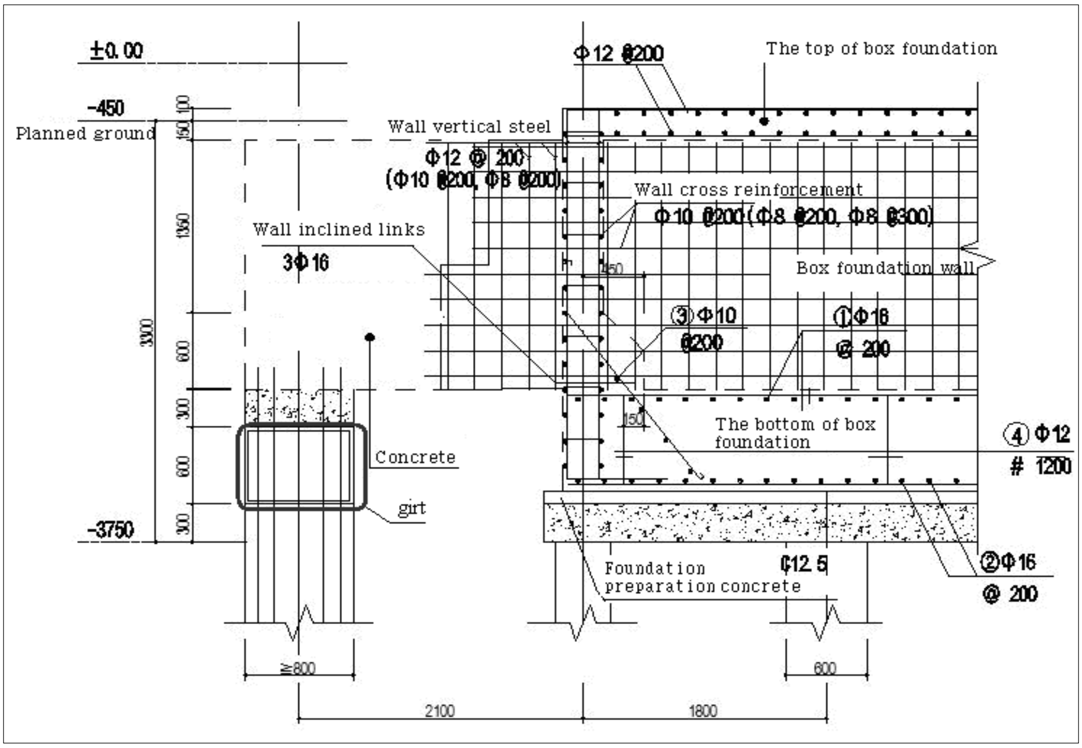

Figure 2 Incline Prevention Reinforcement Pile connected detail drawing

3 Incline Prevention Reinforcement Foundation Plate

Length direction of Incline Prevention Reinforcement Foundation Plate must be plumb to wide line of foundation wall axis, breadth of Incline Prevention Reinforcement Foundation Plate must be decided less than the height of foundation wall height [12].

The area of Incline Prevention Reinforcement Foundation Plate is decided as following.

$$A \geq \frac{e(F_k + G_k)}{R\left(\frac{B}{2} - b_1\right)} \quad (2)$$

$$e = e_x + 0.005h_1$$

$$e_x = \frac{M_{sk}}{F_k + G_k}$$

Where

h_1 - The height from the foundation base to the center of the building

B - The length of building (or breadth)

A - The area of foundation plate which is located in one side of building length

b_1 - The distance from the edge of building to the center of Incline Prevention Reinforcement Foundation Plate

R - The bearing capacity of base

M_{sk} - Under load effect basic combination, the moment which provides in foundation base.

F_k - Under load effect basic combination, the load which provides in the top of foundation

G_k - The weight of foundation

If decided area of foundation plate is less, foundation plate must be located in the middle of every two bays.

Otherwise, foundation plate may be designed in combination with Incline Prevention Reinforcement Pile [13].

The thickness of Incline Prevention Reinforcement Foundation Plate must be satisfied conditions of strong-plate ($l_0 \leq (0.75 \sim 1.0)L$), and strength grade of foundation plate must be more than C20, percentage must be more than 1%. On the girt extend foundation wall joining wall must be emplaced, if bearing capacity is insufficiency, the foundation wall must be reinforced [14] [15]. Figure 3 shows computational scheme to decide the area of Incline Prevention Foundation Plate. Figure 4 shows detail of Incline Prevention Foundation Plate.

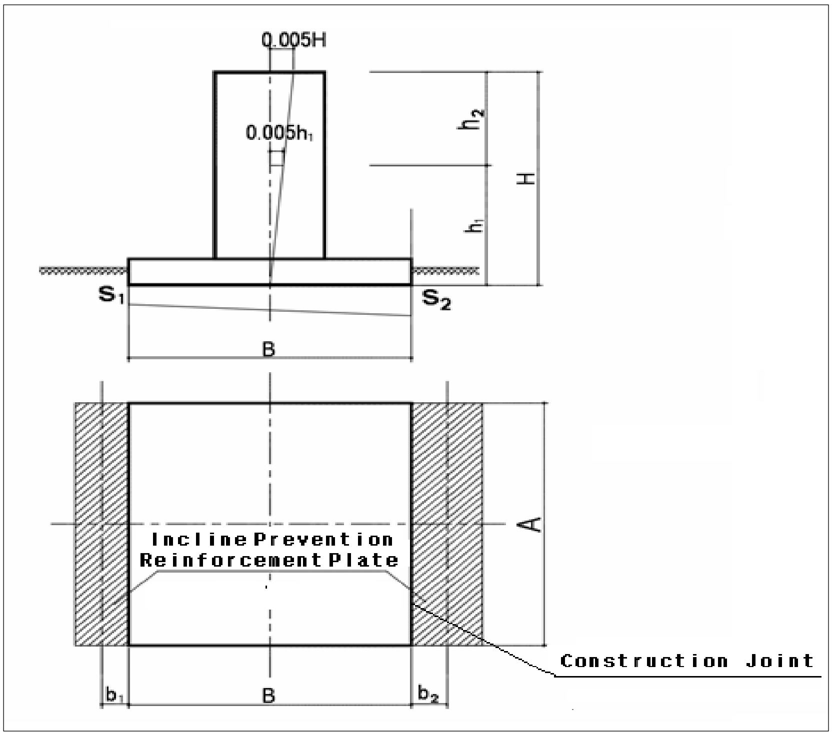

Figure 3 computational scheme to decide the area of Incline Prevention Foundation Plate.

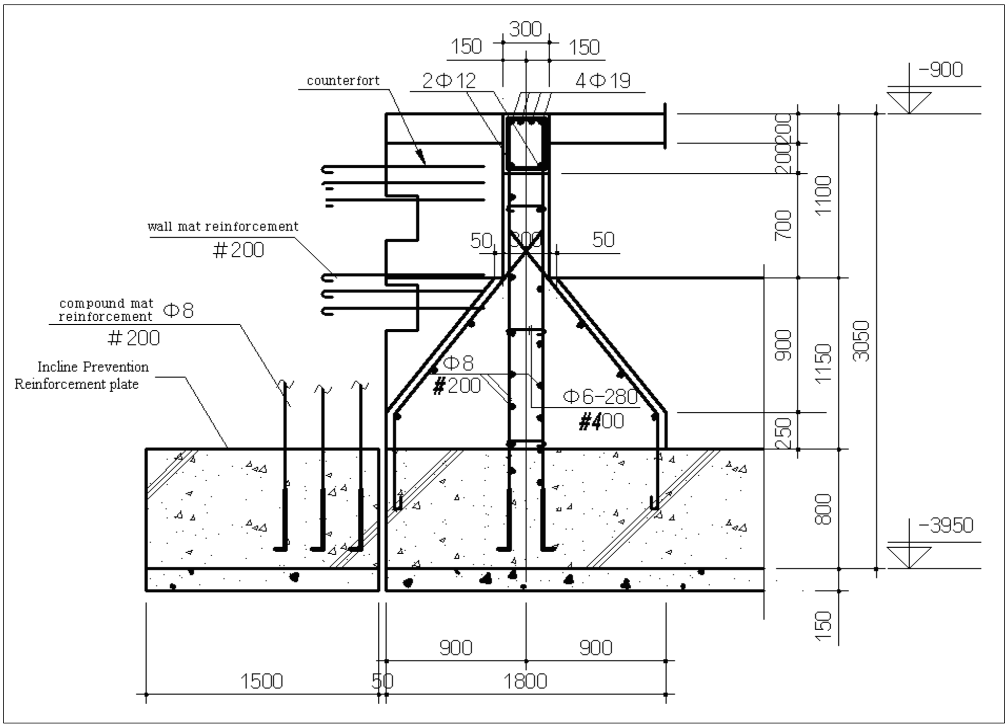

Figure 4 The detail drawing of Incline Prevention Reinforcement plate

4 Conclusions

It setted the Incline Prevention Reinforcement plate and pile on building which leans due to plate irregularly distributed sagging to control the deviation, so the range of deviation is under permissible value and it makes building cost save and building date shortening.

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