

Bored Injection Piles ERT (RIT, FORST, ERST) - Structures for Ensuring Slope Stability

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ABSTRACT

The problem of increasing the bearing capacity of foundations is always an urgent task in modern geotechnical construction. It is of particular importance when building on slopes cut by ravines. As a rule, construction on slope surfaces due to the discharge of filtration flows in the form of springs is always a problematic measure. Hydrogeological processes often bring rugged surfaces intended for the construction of objects into an unstable state, leading them to landslides. Thus, the safe erection of buildings and structures in such areas is always accompanied by the simultaneous erection of retaining buried building structures. The most competitive retaining structures are monolithic reinforced concrete corner retaining walls erected on bored piles and fixed with ground anchors. The article gives examples of the use of ERT bored piles (RIT, FORST, ERST) and ERT ground anchors.

Keywords: Retaining Recessed Structures, Geotechnical Construction, EDT Electric Discharge Technology, EDT Bored Pile, Monolithic Reinforced Concrete Grillage

Modern capital construction for the most part is confined to areas heavily crossed by ravines and slopes [1-3]. As a rule, such construction sites are characterized and classified as unstable due to the fact that filtration flows are unloaded on their inclined surfaces. When static equilibrium is disturbed, filtration processes on slopes in most geotechnical cases lead to flooding of construction pits, water saturation of engineering-geological elements that make up engineering-geological sections of the foundations of built-up objects [4-7]. In the case of a qualified approach to the engineering preparation of the construction site in such conditions, it is possible to avoid negative factors. So, for example, in modern geotechnical practice, ERT (RIT, FORST, ERST) bored injection piles are widely used as buried structures [8,9]. Their use in combination with ground anchors makes it possible to ensure the stability of slopes including corner monolithic reinforced concrete retaining walls in their joint static work [10-12]. The article under consideration presents a number of successfully completed geotechnical objects on slopes in various regions of the Middle Volga region, carried out with the direct participation of the authors of the article.

Object Number 1: Monolithic reinforced concrete corner retaining wall as a recessed retaining structure on piles of bored-injection ERT (RIT, FORST, ERST) on the slope of the Oka congress in the city of N. Novgorod. The support was erected in connection with the expansion towards the slope of the right-side bank of the Oka River of two-way traffic into a one-way road. In connection with the placement of one strip directly on the slope, it became necessary to install four corner monolithic reinforced concrete retaining walls (see Figure 1a) on EDT bored-injection piles (Figure 1b). The architectural elegance of the retaining walls can be observed from Komsomolskaya Square. All four retaining walls at their tops pour into one inclined straight line. Reliable operation of retaining walls indicates the correct choice of technical solution.

Object Number 2: Ribbon pile field of ERT (RIT, FORST, ERST) drilled piles united by a monolithic reinforced concrete grillage as a buried retaining structure along Pozharskaya Street in Nizhny Novgorod (see Figure 2 a and 2 b). The need to erect such a building structure was caused in connection with the construction of a five-story hotel "Moscow". It should be noted that initially there was a project for a pile field of bored piles with a diameter of $d = 630.0$ mm. Due to the impossibility of the tightness of the construction site, it was decided to switch

to ERT bored injection piles (RIT, FORST, ERST). The hotel was commissioned more than five years ago and no one has any questions about the reliable operation of the retaining wall.

Object number 3: Recessed retaining reinforced concrete structures using ERT bored piles (RIT, FORST, ERST), ERT ground anchors and monolithic reinforced concrete corner retaining walls in the city of Cheboksary (see Figure 3). The need to design and install monolithic reinforced concrete corner retaining walls together with ERT bored piles (RIT, FORST, ERST) and ERT ground anchors arose in connection with horizontal movements of the leaning slope and deformations of the objects erected on it. Initially, the project of retaining

structures of bored piles with a diameter of $d = 630.0$ mm was carried out in one row with the installation of a monolithic reinforced concrete strapping belt. When analyzing the causes of deformations, several flaws were revealed. Firstly, a single-row pile arrangement was used as buried structures, which is not acceptable from the point of view of maintaining the rigidity of the structure. Secondly, it is arranged only at the base of the slope. It was necessary to arrange the retaining building structures on the top of the slope. Thus, the use of ERT borehole piles (RIT, FORST, ERST) and ERT ground anchors in combination with monolithic reinforced concrete corner retaining walls at the site made it possible to ensure trouble-free operation of the leaning slope.

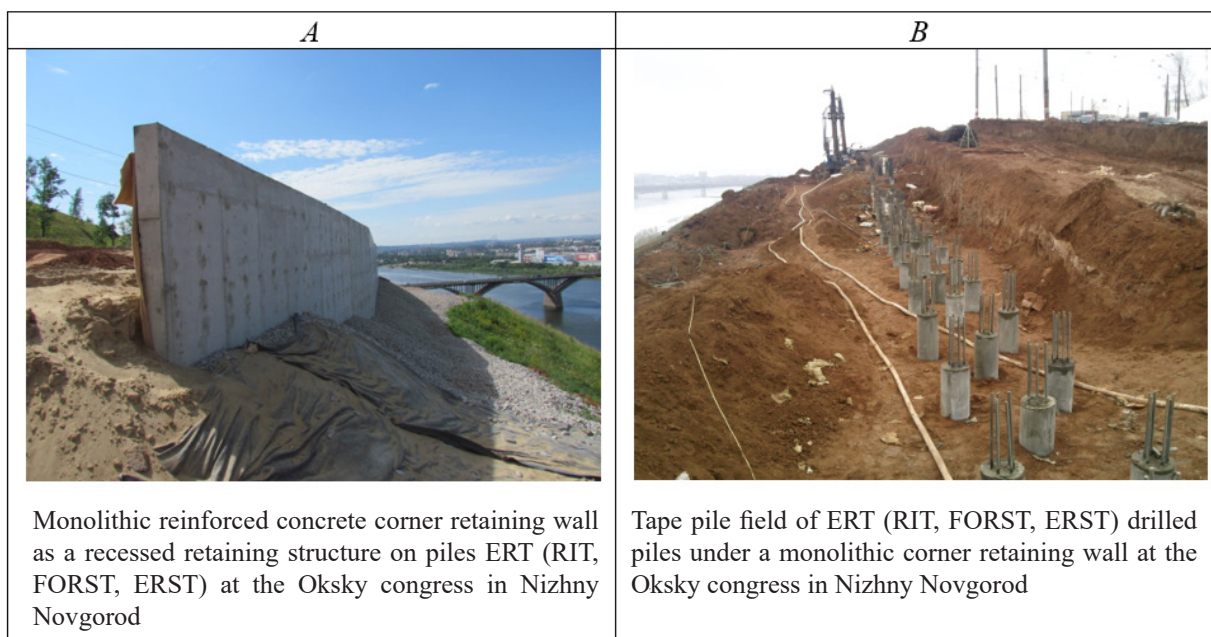


Figure 1: A monolithic reinforced concrete corner retaining wall as a recessed retaining structure on ERT (RIT, FORST, ERST) bored injection piles on the slope of the Oka congress in the city of N. Novgorod

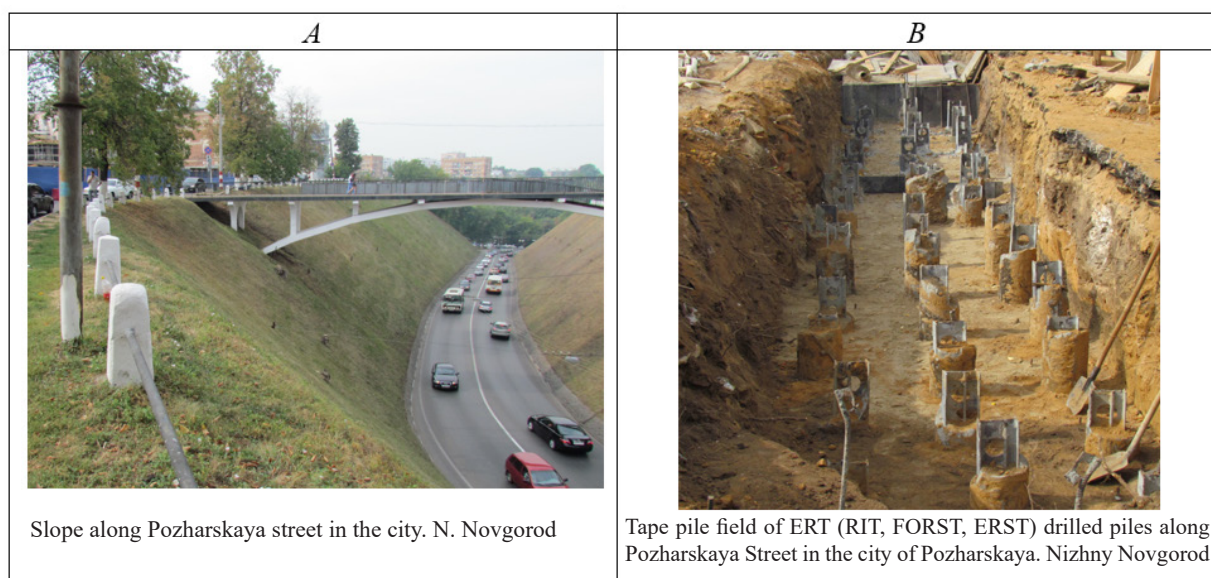


Figure 2: Ribbon pile field of ERT (RIT, FORST, ERST) drilled piles along Pozharskaya Street in the city. Nizhny Novgorod



Figure 3: Recessed retaining reinforced concrete structures using ERT bored piles (RIT, FORST, ERST), ERT ground anchors and monolithic reinforced concrete corner retaining walls in the city. Cheboksary

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