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Re-thinking traditional construction processes: Accelerated channel construction

Patrick Bischof, Prof. Dr. Walter Kaufmann

Institute of Structural Engineering, ETH Zurich, Switzerland

Primo De Zanet

DSE systems AG, Maseltrangen, Switzerland

Contact: bischof@ibk.baug.ethz.ch

Abstract

For the first time in Zurich, rectangular precast concrete elements were used for constructing man size sewers in open trenches by realising the projects "Riedtlistrasse" and "Moränenstrasse". Thanks to an innovative mounting system developed by DSE systems, the precise mounting of one element took no longer than 15 minutes on a previously prepared lean concrete surface. Thus, the use of precast elements allowed a substantial reduction of construction time in comparison to the traditionally built sewers with cast in-place concrete. The concept of the construction process was developed at an early project state in creative and innovative teams consisting of engineers, precast contractor, and owner/ client. Working together at such an early stage of the project was crucial for finding innovative solutions that fit all requirements. These innovative solutions enabled the setting of new milestones in Zurich sewer construction.

Keywords: sewer construction; precast elements; mounting system.

1 Introduction

In Switzerland, man-size (retention) sewers are traditionally constructed with cast in-place concrete for open trench sites and, occasionally, by pipe-jacking/ microtunneling with precast concrete elements. However, cast in-place construction is slow (casting and hardening of concrete, in-situ construction of abrasion-resistant coating of sole area with dry weather flow) and causes excessive traffic disruptions in urban areas. Pipe-jacking/ microtunneling solutions are limited in terms of geometry, soil conditions, and connection of existing pipes. Furthermore, the in-situ produced internal coatings (usually stoneware) have a shorter lifetime the construction itself and, therefore, require regular maintenance.

In order to overcome the limitations of the traditional cast in-place construction by using precast concrete elements, a new, innovative mounting system was recently developed. For the first time in Zurich, rectangular precast concrete elements were used for constructing man size sewers in open trenches by realising the projects "Riedtlistrasse" (constructed 2013 to 2014, 280 m long, maximum internal cross section: h_i = 2.0 m, b_i = 1.6 m, see Figure 1, left) and "Moränenstrasse" (constructed 2014 to 2015, 140 m long, internal cross section: h_i = 2.46 m, b_i =

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