

THE ZOLLVEREIN COAL MINE INDUSTRIAL COMPLEX

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Engineering geological conditions and problems:

Geology

Carboniferous rocks are the essential geologic element in the subsoil of the city. They originated approx. 300 Mio. years ago in the Paleozoic age consisting of about 2.500 m of claystones, siltstones and sandstones with intercalated beds of bituminous coal. With the onset of orogenesis towards the end of the Carboniferous, deposition ceased and the rocks were subsequently broken, folded, and faulted into numerous grabens and horsts. Carboniferous beds crop out in the southern city area and along both sides of the river Ruhr. To the north they are overlain by increasingly thick (in the north part of the city about 100 m) Mesozoic (Cretaceous) rocks. Loose rocks of the last glacial intervals of the Quarternary, sand, gravel, loess, and glacial till, are widespread, reaching thicknesses of up to 20 m. The topmost layers over the largest part of the city consist of loess loam, passing into sandy loess towards the north.

Building ground

Due to their high load carrying capacity the Upper Carboniferous rocks, cropping out in the southern city area, are an excellent ground for all types of buildings. Here coal mining ceased a long time ago. However, above still existant mining cavities (galleries) or shafts subsiding ground may pose a problem for construction works so that specific foundation ground examinations have to be carried out.

The predominantly silty clay or silty fine sand deposits of loess, or sandy and loamy loess, till or solifluction debris are, however, characterized by low load carrying capacities. Within these soft cohesive sediments adequate foundation designs are necessary.

Along the Berne river valley and locally other valley areas with high ground water table organogenic intercalations occur within the younger flood plain deposits which are unsuitable for structural loads. Widespread fillings in the Essen city area consisting of coal rock wall, building debris, waste material, sludge, industrial cinder, chemical waste etc., require specific examinations prior to construction works. Influences of a high ground water table are to be expected especially along the Berne valley.

The Zollverein is situated in the north-east of the city. Subsoil problems have not been known up to now.



Zollverein Coal Mine Industrial Complex - total view



Zollverein shaft tower

Other information:

The Zollverein Mine in Essen was the biggest and most modern coal-mining complex in the world. The two Bauhaus-inspired architects Fritz Schupp and Martin Kremmer, who designed every last detail of the twinaxis industrial complex to harmonise in accordance with the principles of symmetry and geometry, created a unique model complex in Zollverein Schacht XII. Since then, the site has been developed into an industrial monument of international importance with a lively arts centre.

References on studies already performed:

Source: Geologischer Dienst Nordrhein-Westfalen.