

A470 Pentrebach to Cefn Coed Contract 1 – Mine Stabilisation

Employer	-	Welsh Office
Engineer	-	Rendel Palmer and Tritton
Value	-	£ 7,380,000
Completion	-	June 1995

The contract to stabilise shallow mine workings along the route of the proposed A470 extension between Pentrebach and Swansea Road, Merthyr Tydfil was the largest mine stabilisation contract of its type then let in the U.K.

The work involved extensive site clearance and preparation of working areas, followed by drilling and grouting 26 separate seams of coal and ironstone workings in grids designed to provide a perimeter barrier to each seam or working, followed by infilling of the treatment areas between completed perimeter barriers. Drilling depths varied up to 40m max. below ground level. 10,000 drill holes were required amounting to 300,000m of drilling. Up to 18 drilling rigs were on site at any time.

The contract neatly divided itself into two separate areas by access and layout considerations; a southern area (ch. 1400-2350) and a northern area (ch. 3150-4650). Treatment work commenced in the southern area first.

Drilling the grout stabilisation holes was carried out by hydraulically operated rotary percussive drilling equipment mounted on tracked excavator carrier equipped to undertake both the vertical and angled holes required. Initially, the overburden (clays, fills, sands, gravels etc) overlying the site was cased off using an 88.9mm steel casing to prevent hole collapse. A 70mm hole was then drilled to the depth of the seam to be treated. Once the seam / working was confirmed, the drill string was withdrawn and a 50mm diameter grout tube installed to the base of the hole.



Drilling, followed by grout injection, was carried out in a strict sequence for each grid due to the steeply dipping seams. The southern perimeter of each grid constructed first followed by east and west perimeter and then infill holes to the full extent of the grid.



Clean mains water was used as the flushing medium to remove cuttings from drill holes. Water was delivered to drilling rigs via a temporary 6" diameter pressurised main running the full length of the site.

Returned flushing water was collected and returned to a treatment facility prior to discharging to the sewer. This method of drilling / flushing ensured optimum production with minimal nuisance.

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Due to the scale of the grouting operation and to avoid the difficulties which can arise in the delivery, handling and mixing of large quantities of pulverised fuel ash (PFA) and cement, grout batching compounds were positioned centrally to the two areas ensuring complete control over the operation

Grout was mixed in a computer controlled continuous mixing plant and pumped via static high output concrete pumps to secondary combined agitation / pumping units situated at the treatment areas. Grout was pumped from these secondary units to the treatment grid and injected under pressure into the grout holes until each hole was filled. Grouting was carried out in an agreed sequence in order that strict monitoring could be undertaken. Between 4 and 6 high output grout pumps were used to cope with the quantity of grout injected.



The grout mixing and pumping operation was designed to cater for up to 1500 tonnes (dry material) of grout per day.

The secondary agitator / pump units were specially designed and built 'in house' for this contract.

Extensive monitoring was carried out during the course of the work to ensure minimal nuisance and impact e.g. monitoring of site noise levels, checking boreholes for methane generation, monitoring sewers and watercourses for grout ingress etc.

