



GRUPO CARBOMECC



UNDERGROUND WORK

COAL AND METAL MINING

CIVIL WORKS



has its origins in the late 80s, with the work being developed in the coal mining in Spain. Originally the supply of equipment for the development of mechanized work from the company **EMCOR**, along with miners to advance Galleries well with shearers and AUTOMARCHANTES for the Exploitation of coal deposits was achieved.

But the mining companies for which these facilities were proposing were the problem of ignorance of its management and operation. That is why, in addition to supplying the equipment the first company operation GROUP CARBOMECH, **SATRA** was founded, whose business focuses on the preparation of Infrastructure Mining, incorporating qualified personnel in the operation of Miners.

Progress in such preparatory work with Minador were much higher than those that were obtained with the traditional advance by drilling and blasting hand hammers, occasionally yields multiplied by six, so that rapidly increases the number of contracts. This creates great confidence in mining companies starting to demand more varied services (prospecting drilling work indoors, inclined planes running in excess of 40° slopes, ventilation shafts for communication at different levels, ...), by so the second of the Group companies, **GEOSA** is based.

Likewise, it continues to offer higher level of mechanization Mining and especially the exploitation of Longwall layers, thus resulting **CARBOMECH**, which greatly increases analogous productions hitherto obtained.

In the year 1997 it is awarded to **CARBOMECH** the preparation and operation of one of the largest underground coal deposits in Colombia, where higher yields per inner achieved in South America in the field of coal were achieved.

From the year 2000 it saw a step further, taking advantage of the high technical and operational qualifications obtained in previous years in mining and expanded its activity Civil Works, in the execution of drilling and greenhouses, and later also cover tunnels sector any section.

Following are roughly the companies in our GROUP



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CIVIL AND MINNERY INFRASTRUCTURES.

- Galleries and slopes.
- Underground caverns.
- Excavation, bolting and grouting of vertical pits.
- Wide section galleries opened with tunnel boring machines (TBM).
- Hydraulic and auxiliary galleries,
- Railway, subway and roadways tunnels
- Vertical and inclined pits done by conventional methods.

COAL SEAMS EXPLOITATION.

- Vertical layers exploitation (more than 70°) by advancing with a miner and subsequently layer soutirage



CIVIL WORKS

- 300.000 m horizontal **coal layers** with miners.
- 75.000 m galleries and **tunnels** n rock with miners and jumbos.

COAL AND METAL MINING

- 10.000 m **inclined coal** layers (up to 16°) with miners.
- 9.000 m inclined coal layers (up to 40°) with drilling and explosives.
- 2.000 m of **vertical pits**.



COAL EXPLOITATION BY LONGWALL METHODS

- Coal exploitation.
- Integral mechanization.
- Expertise acquired during more than 25 years working underground.
- Long wall equipment such as shearers, panzer and self-carrying support units.
- Coal extraction from layers of 1 to 4 m width.

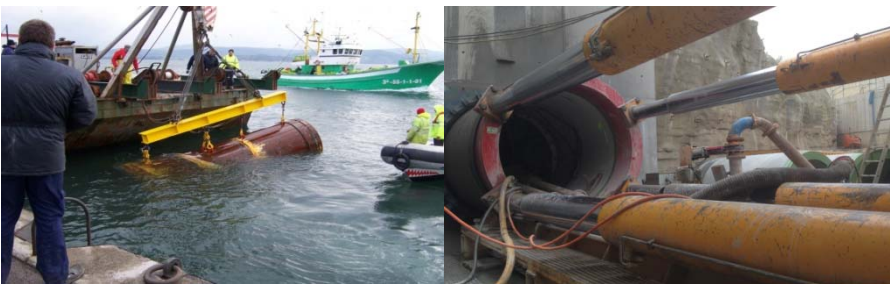


- Up to 45° layer mechanization with self-carrying shields.
- Setting and exploitation of one of the biggest coal fields in Colombia. (1998).
- Realization of all infrastructure.
- Up to **14,000m** in galleries already executed.
- Supply of all necessary means.
- Up to **800,000 ton** extracted annually in just one field.



MICROTUNNELLING – PIPE JACKING - CLOSED SHIELD

- Closed shield drilling.
- Microtunnelling - Pipe Jacking.
- Drilling by technical Raise-Boring.
- Inclined planes and vertical shafts.



Purpose of our Works

- Waste water collectors
- Supply tunnel
- Services galleries
- Submarine outfall
- Drainage Works in linear works
- Steps under highways, railways

Experience, Productivity y Efficiency

- Over **40.000 m** of pipe jacking works executed.
- **5** microtunnelling **equipment** HERRENKNECHT AVN.
- Diameter , from 600 mm to 2.000 mm.
- Productivity **6.000 a 8.000 m/year**.
- Integrated Quality and Environment System (ISO).



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