

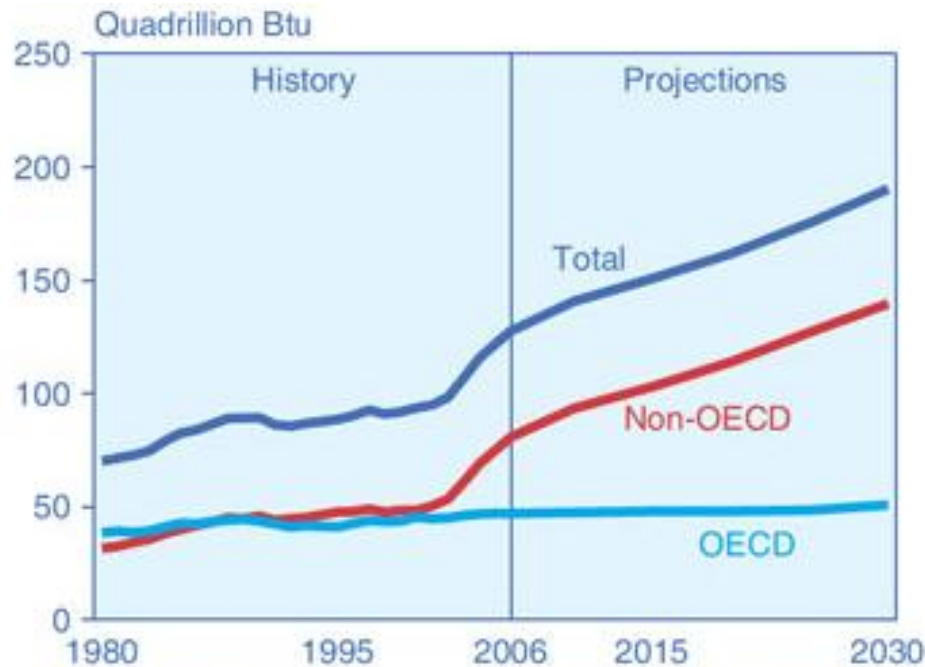
High Speed Production of Large Coal, to Facilitate Easier and More Effective Cleaning

by

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World use of coal will grow



Sources: **History:** Energy Information Administration (EIA), *International Energy Annual 2006* (June-December 2008), web site www.eia.doe.gov/iea. **Projections:** EIA, *World Energy Projections Plus* (2009).

The recent British Wicks Report projects that global coal demand will almost double to 7 billion tonnes in the next 11 years, since it is the only viable fuel for many nations of the world.

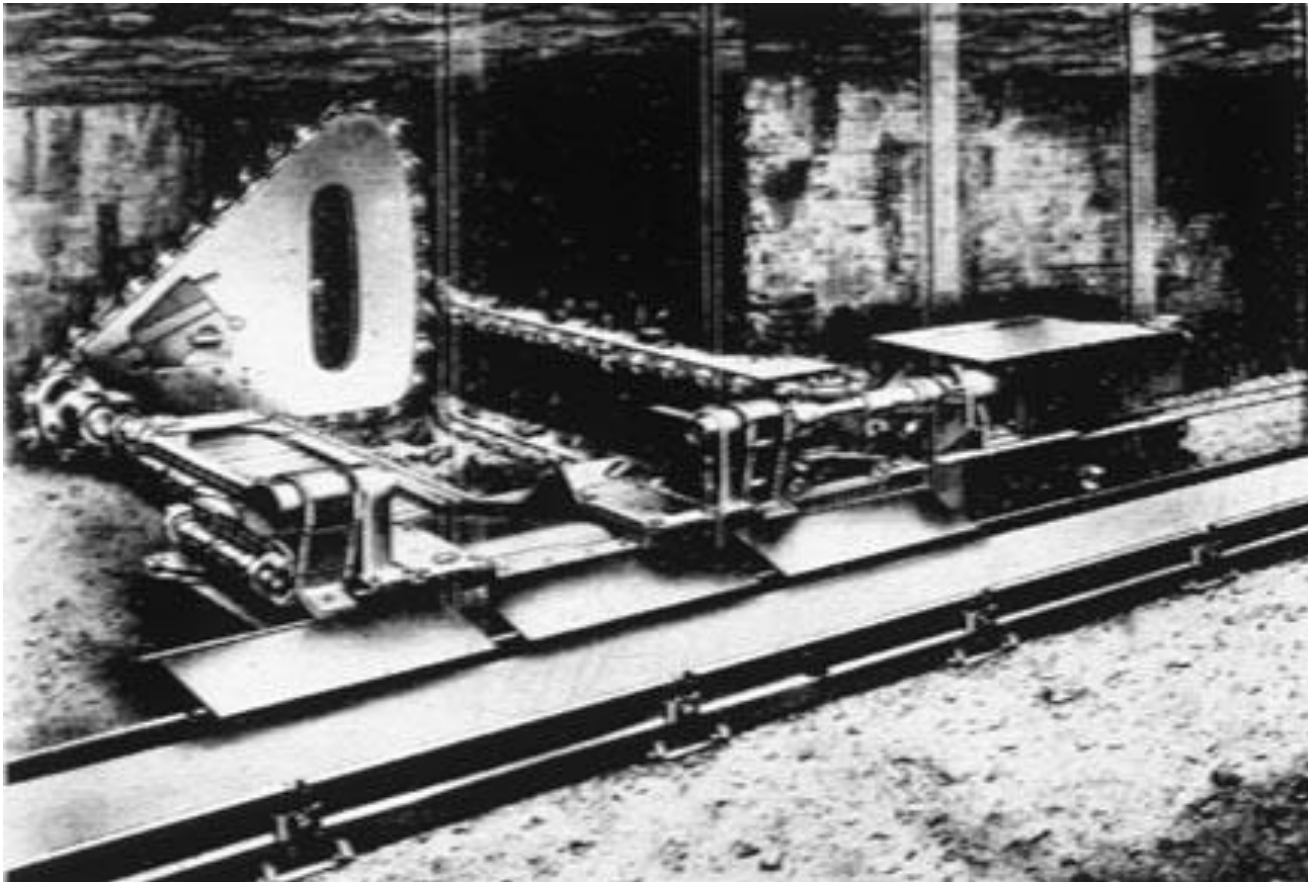
But we must find ways of mining coal more efficiently in thinner seams.

In the past mining machines have not looked to energy production costs, as they were low

- *Most mining machines grind coal from the solid*
- *This produces lots of dust, and fine coal, which is neither efficient nor particularly safe.*



Earlier machines worked, as manual mining does, by only cutting part of the face



The Meco Moore machine used cutting bars to cut at the bottom middle and back of the coal and the remaining coal fell under its own weight and could be loaded onto a conveyor.

In looking for new technology we were preceded by Polish Research

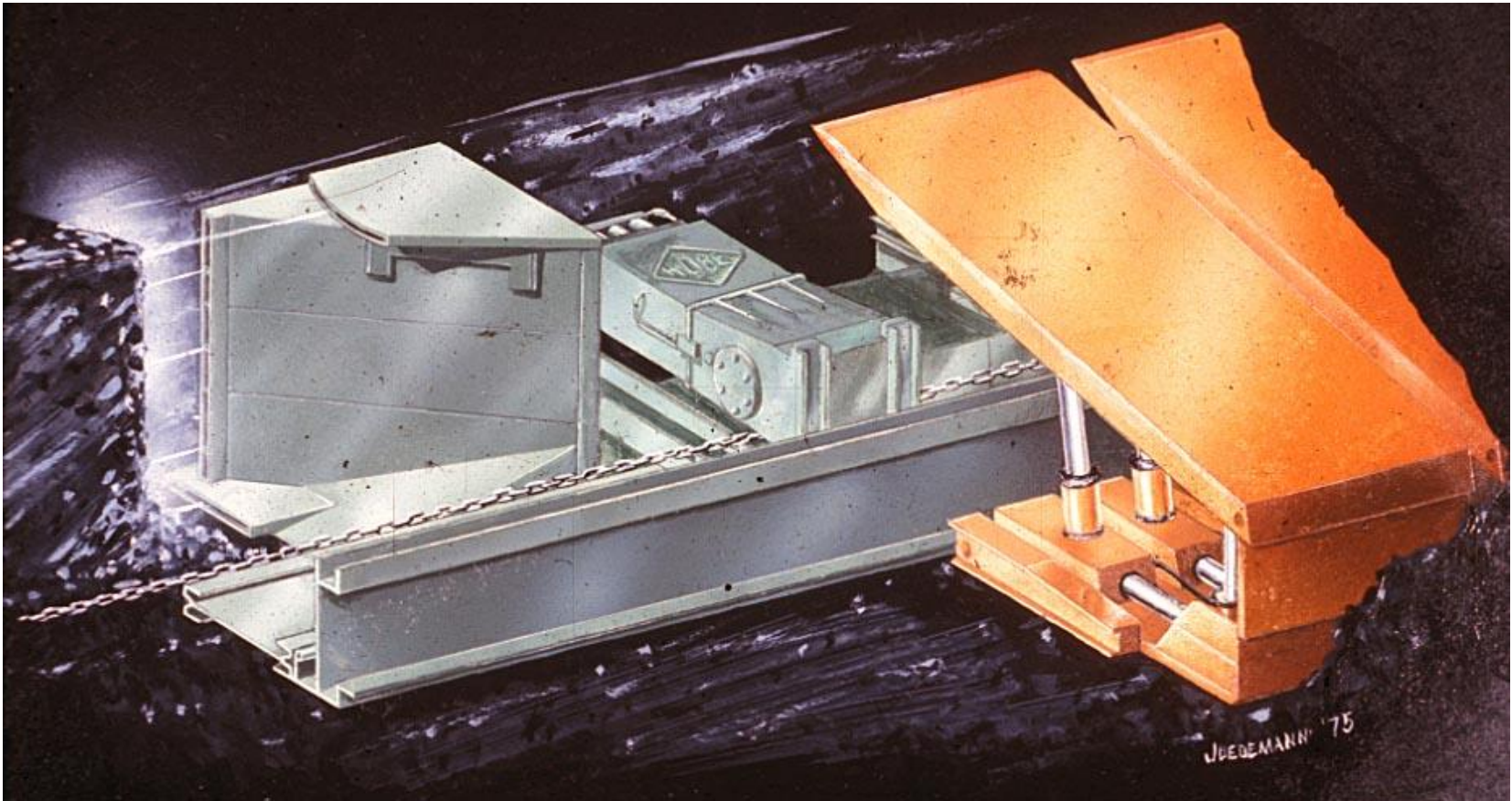
The use of high- pressure waterjets on a coal plow was first suggested by:

Duczmal M, Perek J and Wojtal W in “Experience with the logwall face set for hydraulic cutting of coal at Rymer Colliery,” presented at the

Symposium on Hydraulic Transport of Coal Underground and at the Surface, Katowice, Poland, October 1966.

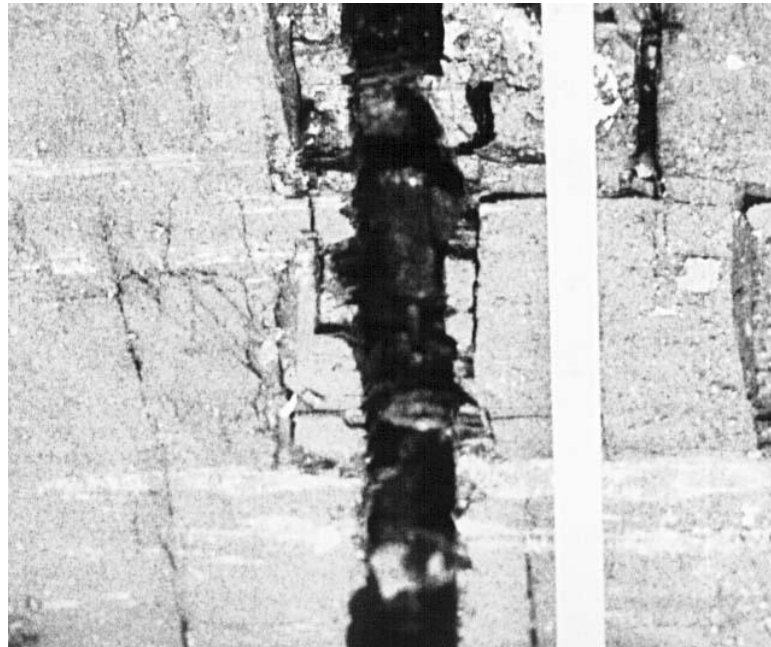
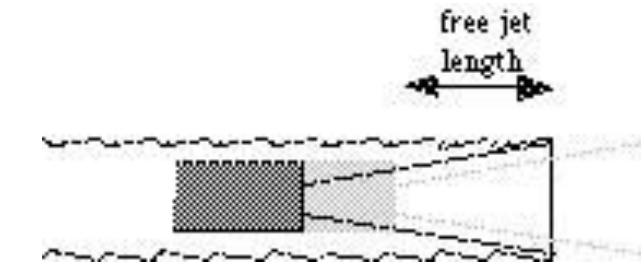
But we did not find out about the paper until we came to Poland first in 1978.

The MO S&T Hydro-miner was designed to use waterjets to make the same sort of cuts



Oscillating waterjets cut at the top, bottom and back of the coal to break out a column

It used a dual jet to cut a deep slot ahead of the plow



Tests of an initial design were carried out on the surface in northern Missouri



**And because of the jet infusion and cutting
there is no dust or risk of gas ignition**

Loads measured on the support pins and haulage rope for various speeds and depths of cut.

Run Number	Depth of Cut (ft)	Speed (ft/min)	Face Pin Load(lb)	Goaf Pin Load(lb)	Haulage Rope Load(lb)
55	2.0	10	7,060	470	10,270
61	2.0	5	4,750	2,080	11,840
63	2.0	5	4,490	3,920	12,400
62	2.0	1	2,610	3,060	9,780
51	1.5	1	2,850	780	9,720
36	2.5	1	2,550	710	not available

These results are averaged data from readings taken over a period of time during the course of the run.

A second generation machine was built



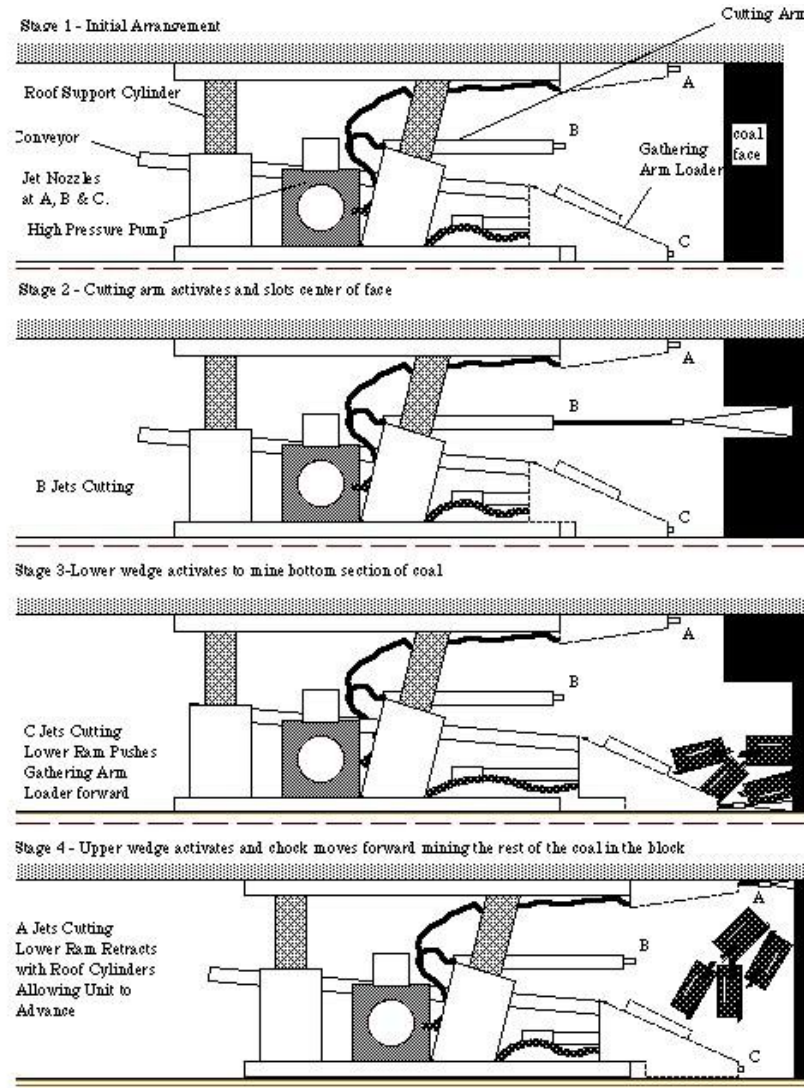
Though we learned the importance of wedge and clearance angles

The method was tried underground



Tests at the Lohberg mine in Germany showed that the coal was mined fast, and relatively inexpensively. But the world market for the machines at the time was too small.

We tried the same idea in room and pillar



We built a prototype

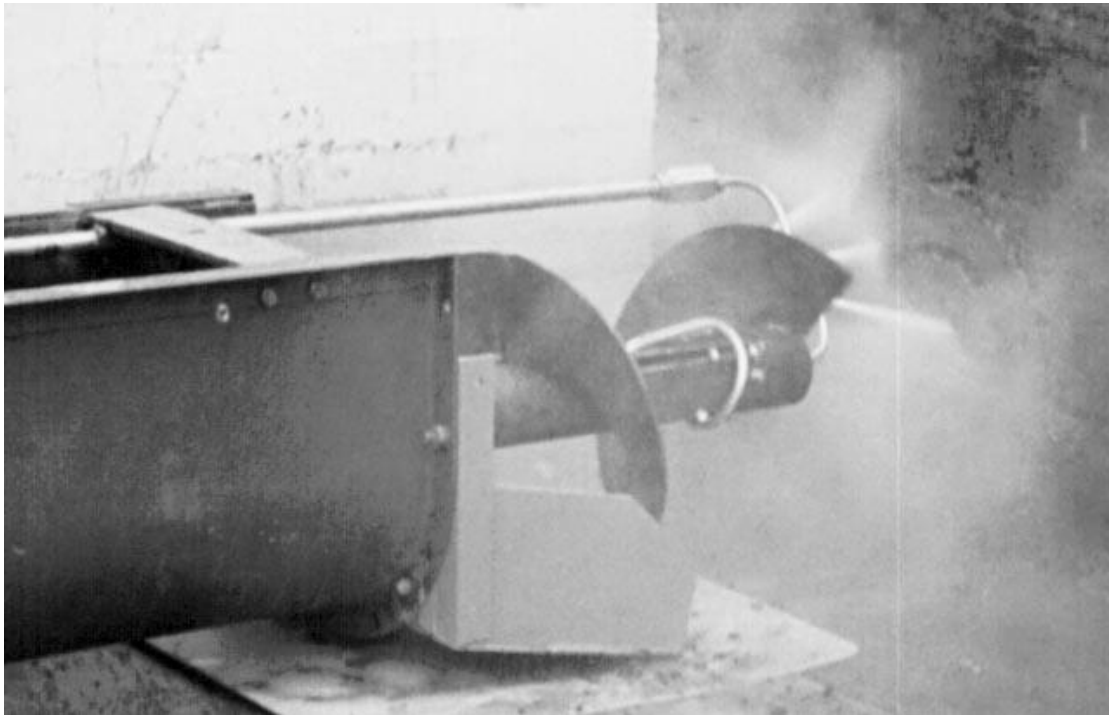


But the end of the Energy Crisis came

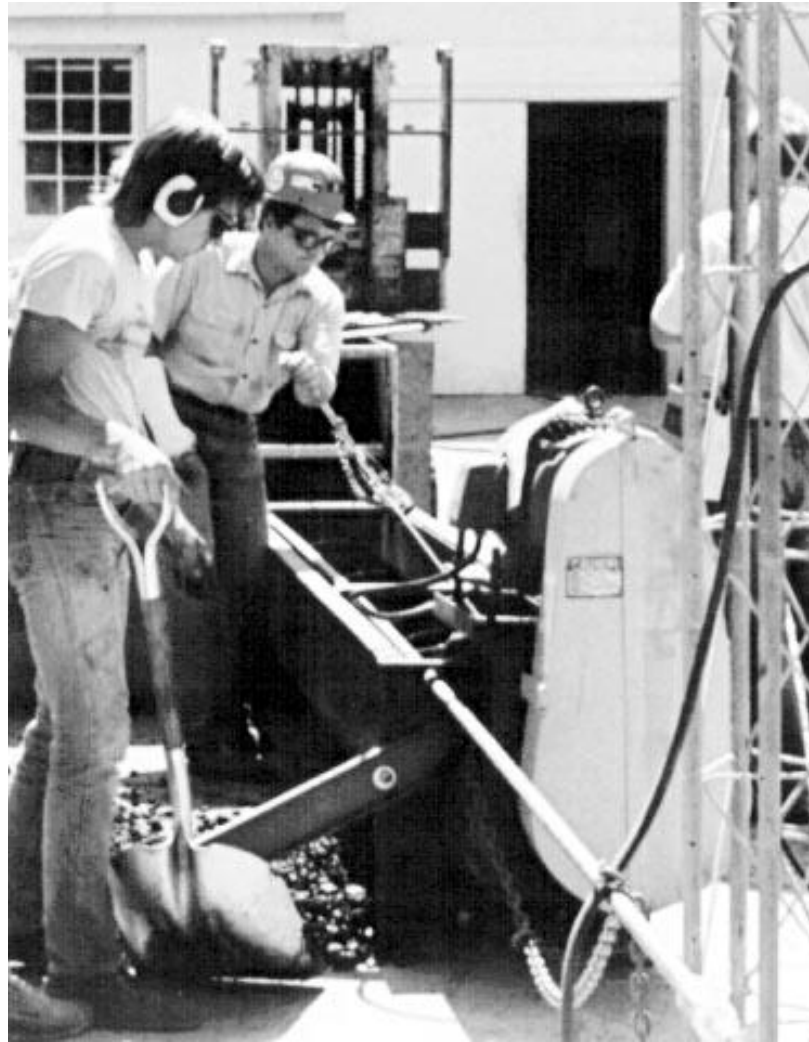
There are other ways to break the rib



The jets cut ribs that the auger easily breaks



And you don't need a lot of force to move it forward (note the broken arm)



Acknowledgments

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