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Surface techniques

- draining the methane from a virgin seam prior to mining as well as drainage of gob areas by means of boreholes drilled from the surface up to a mining depth of 500 – 600 m.
- (+) gob drainage is independent of coal extraction.
- (+) there is no necessity of laying a pipeline underground.
- (+) the amount of drilling required is decreased and the efficiency is high.
- (-) Roof control may become difficult during extraction.

1. Vertical boreholes into virgin coal seam

- Vertical boreholes (less than 250 mm diameter) are drilled into the virgin coal seam.
- The holes are cased and water in the seam pumped off when methane flows out of the coal.
- The effectiveness of the gas flow into the borehole depends on the seam permeability and the pressure of the gas.
- The initial production is normally at lower rates.

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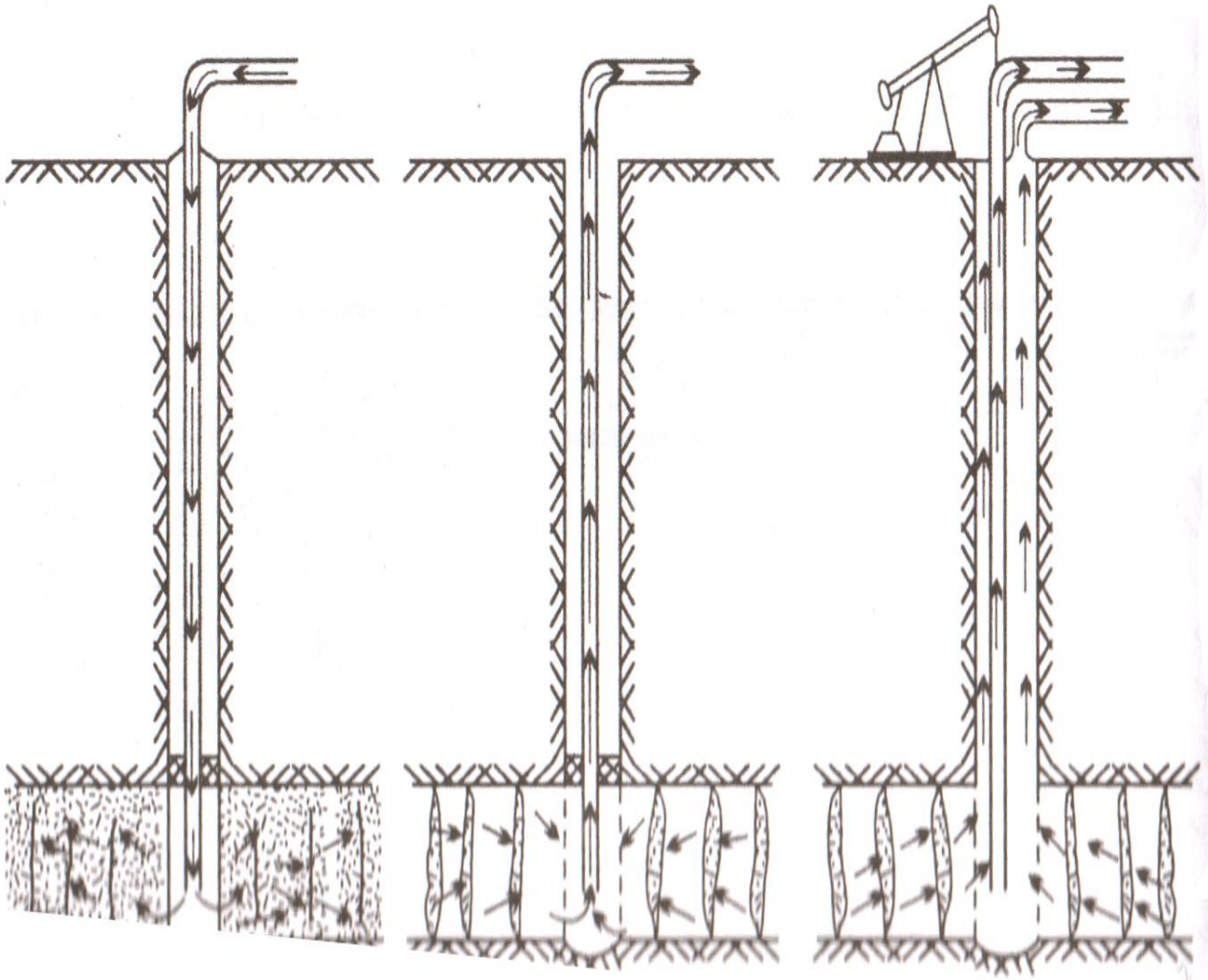

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- However, by hydraulic stimulation of the coal seam, the naturally occurring fractures in the coal seam are enlarged and extended beyond the borehole by hydraulic pressure and injection of gelled sand bearing water through perforations in the casing.
- When water is pumped out, the sand props open the fractures thus increase the permeability.
- After stimulation, the drainage is increased several fold.
- (+) The drainage can be carried out long before mining takes place.
- (-) It may cause roof problems during mining due to roof damage.
- (-) The cost per borehole can be high in difficult terrain.
- (-) The large quantities of water are required before drainage can start.

2. Slant boreholes into virgin coal seam

- method combines the features of horizontal drainage holes and vertical boreholes from the surface.
- Slant holes are drilled from the surface by intentionally deflecting them to intersect the seam at a suitable angle and to continue in the coal parallel to the bedding plane thereby maximising the natural vertical fracture system of the coal seam.

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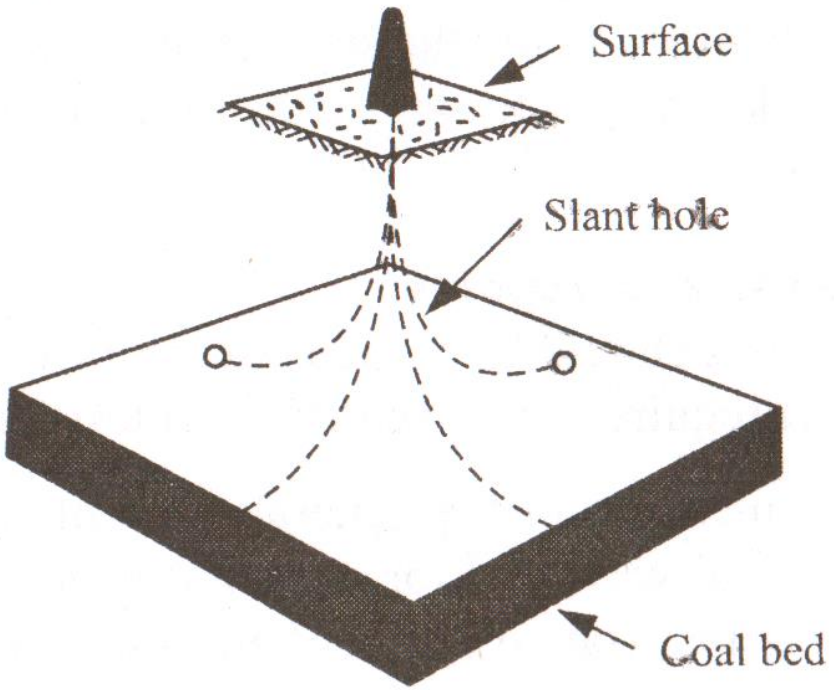

- An one vertical hole can be used for several slant holes.
- (-) This technique poses problems of bit control and borehole surveying as well as of de-watering.

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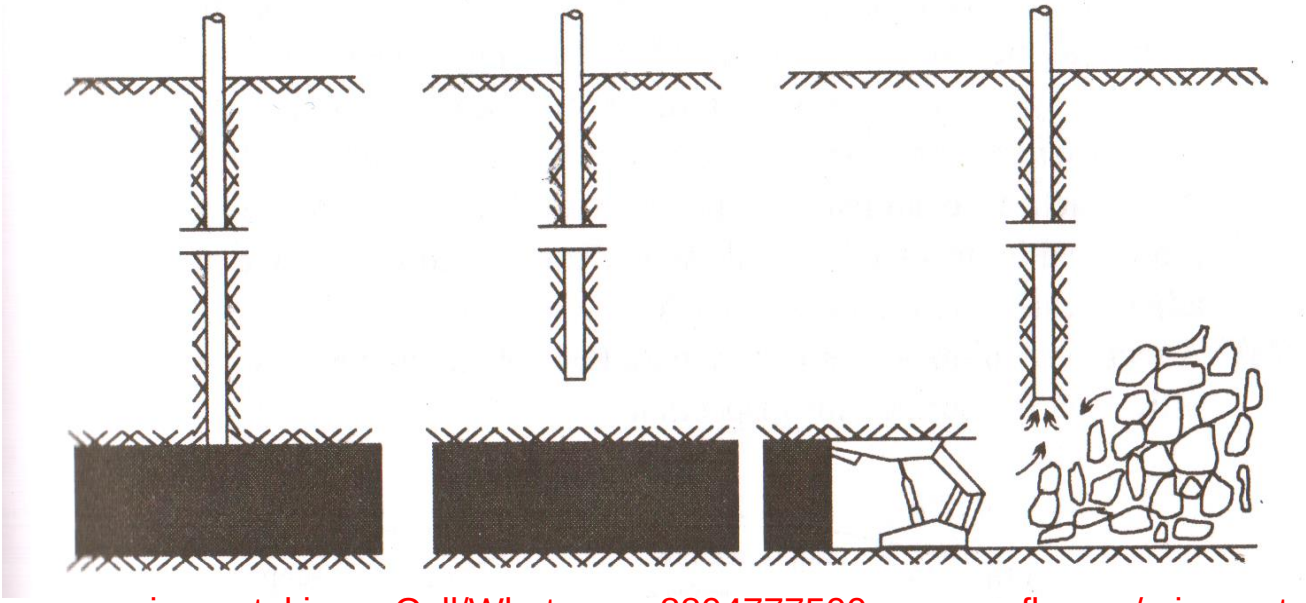
3. Vertical boreholes into gob areas

- This technique has varying degree of success in the USA and USSR coal mines.
- The holes are drilled ahead of mining to intersect the seam or terminate in the immediate roof above the coal seam.
- The bottom 30 to 80 m of the cased hole is slotted or perforated to allow the hole to stay open when the roof caves.
- A large quantity of methane can be removed this way and the methane emission in underground is reduced by more than 50 %.
- This method can be economical in shallow mines.



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