

TECHNOLOGIC LINE FOR FLY ASH TRANSPORT UNDERGROUND AND CONSTRUCTION OF SEALING AND PROTECTIVE RIB TYPE TZOZ

Use and description:

This technologic line has been designed and constructed for preparation of the filling mixtures underground and piping system for transporting them up to the place of using them using the filling hoses and further into the large volume bags for the construction of sealing and protective ribs TZOZ (hereinafter only TZOZ) in area working face – sectional haulage drift. This technology enables to construct the TZOZ using mixing and pumping set located just underground on the related even for a few extraction sections.

Technology for TZOZ construction:

- Transport of mixture components (hereinafter only TVS) from mine surface facilities to underground mixing and pumping set in mine cars or using other transport system according to employer's requirement. Components as for example fly- ash, cement etc. are used.
- Mixing the filling mixture in the mixing set ensuring the prescribed volume concentration $C_v = 0,40 \div 0,55$. Mixing water and also water for the piping transport is fed from the mine water distribution system.
- The prepared mixture is discharged from the mixing set into pump set type KTX and transported in piping to the place of using it, e.g. just for filling it into the installed large volume bags.
- After filling the given number of bags, the cleaning plug is inserted into the piping downstream the pump KTX, by which the resting mixture is pushed out using pressure air and so the piping system is cleaned.
- After removal of the cleaning plug through the catching piece on the end of the piping system the operation of the TZOZ line is finished.

Main technologic equipment of the mine underground level mixing and pumping set:

- Mixing set for using underground – product of the KOEXPRO OSTRAVA, a.s. company
- Belt or scraper conveyor (according to inclination) – usual type, small output
- Side discharge tippler – product of the KOEXPRO OSTRAVA, a.s. company
- Pumping set type KTX (e.g. screw sets KTX 80, KTX 100, KTX 125 or piston set KTX 150, KTX 200) – products of the KOEXPRO OSTRAVA, a.s. company
- Auxiliary equipment for handling the filling mixture components and other materials (lifting, lowering in area of the mixing and pumping set)
- Transport piping equipped with a piece for inserting the cleaning plug and with a piece for the catching and withdrawal of the cleaning plug
- Hoses equipped with jet for filling the large volume bags
- Large volume bags, types and dimensions depending on the conditions in an area of construction, seam thickness or according to other employer's requirements.

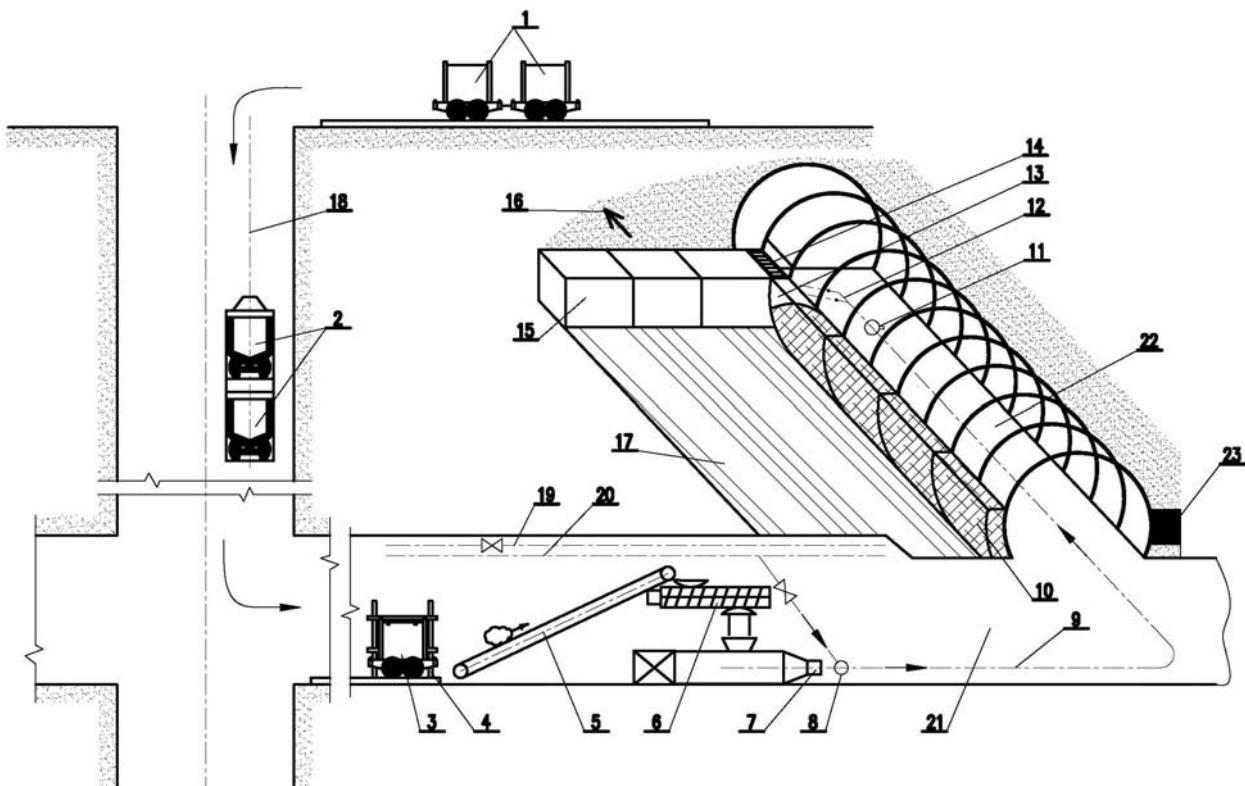
Before the actual construction of the TZOZ rib it is necessary to work out the design, including the calculation of the hydraulic transport parameters.

All activities necessary for the technologic line design end implementation are ensured by the KOEXPRO OSTRAVA, a.s. company.

Characteristics (Example):

Max. rise – according to the pump used (screw or piston one)	m	20 / 200
Max. transport distance – according to the pump used (screw or piston one)	m	200 / 3 000
Max. output of the mine level or sectional mixing and pumping set	$m^3 \cdot h^{-1}$	10 ÷ 15
Mixture volume concentration for piping transport	C_v	0.4 ÷ 0.55
Filling mixture density	$t \cdot m^{-3}$	1.45 ÷ 1.7
Transport piping ID (DN)	mm	100
Pressure air distribution underground	MPa	0.4 ÷ 0.6

The technologic line equipments have been designed and constructed as the equipment group I (mine), category M2 according to the Directive 94/9/EC of the European Parliament and the Council and meets the requirements for using in areas "dangerous atmospheric conditions 2" according to EN 1127-2 on condition that all national regulations are fulfilled by the employer.

**Legend to offer:****Technologic line for the fly ash transport underground and for construction of the sealing and protective rib type TZOZ**

1. Transport of the mixture components (KVS) in mine cars aboveground to the shaft
2. Transport of KVS in the mine cars in the shaft
3. Discharging of the KVS from the mine cars in area of the mixing plant on the mine level or in mine section
4. Side discharge tippler
5. Belt or scraper conveyor
6. Mixing set
7. Screw pump KOEXPRO KTX80 (KTX 100, KTX 125), or piston pump KTX 150 (KTX 200)
8. Piece for inserting the cleaning (pushing) plug into the piping system item 9
9. Transport piping
10. Sectional large volume bags filled with KVS in area "working face- haulage drift", measures against the strata pressure in working face caved ground
11. Cleaning plug catching piece
12. Jets for filling the bags from transport piping
13. Sectional large volume bag ready for filling
14. Mine steel arch in area "working face – haulage drift"
15. Extraction complex (support, extraction combine, hydraulic props, plough etc.)
16. Working face progress direction in extracted seam
17. Caving area
18. Hoist rope
19. Mine water distribution piping
20. Mine compressed air distribution piping
21. Level or sectional mixing station in the cross cut
22. Sectional drift with piping for mixture transport
23. Seam ready for extraction using the existing drift