Caving of the seam roof into the working area of the mining-out face is frequently observed during the working of the Kemerovo seam at the Promyshlenskaya colliery of the Kuzbassugol' group of mines. The caving takes the form of spillage of rock fragments. In the sector being worked the Kemerovo seam has the following characteristics. The depth is 70-100 m; the main roof is sandstone of medium hardness and has a fissured structure and a low strength. The immediate roof is of carbonaceous argillite and is 0.3-0.8 m thick; it is very unstable, readily caved, and separated from the main roof by coal bands 0.3-0.5 m thick. The floor is of siltstone and has a tendency to heave. The seam dip is 8-23°, the thickness is 3.8-4.2 m. The seam has a complex structure and contains bands of siltstone, carbonaceous argillite, or sandstone. The hypsometry of the seam is erratic. The extractable thickness is 3.0-3.5 m. In consequence, not all the total thickness is extracted, an upper band of coal, 0.3-1.2 m thick, being left.

The roof is generally caved as the sections are extended, sometimes immediately after the cutter-loader has passed, but less frequently ahead of the latter. Caving begins almost immediately with spillage out of the coal band and rocks of both the immediate and main roofs. All this caved rock is in the form of highly disintegrated, loose mass.

Fig. 1. Scheme of dome formation in mechanized longwalls.

This loose mass, in the form of a cone, fills the area under the support sections (Fig. 1). Immediately after small amounts (3-5 m³) have come down, spillage continues until the whole of the free area is filled or until large rock fragments (1200 x 900 x 600 mm) cover the hole between the working face and the canopy. If the conveyor is operating, it is filled with rock along its entire length, the chain jams, and the conveyor is halted or breakage of the chain occurs.

Spillage-type caving may be divided into three types with respect to the methods of cessation of dome development.

The first method is when a dome with a stable (to a specific degree) arch is formed in the seam roof. Figure 1 shows the shape of the dome and its mean dimensions.

The second method is when the hole between the working face and the canopy of the support, relatively narrow in comparison with the length of the dome, is blocked up by large rock fragments, preventing any further emergence of fines.

The third method is when the apex of the cone of disintegrated rocks reaches the canopy of the support, covers the hole, and crumbling is temporarily halted; this is possible only when the conveyor is halted. In this case the maximum amount of spilled-out rock reaches 30-40 m³.

Spilling-out of roof rock is halted by means of a forepoling of timber crossbeams, fixed on tie beams, one end of which is driven into the face and the other into the canopy of the support. Elimination of the consequences of such falls of roof material is difficult and unavoidable and involves dangers to the workers.