

Appendix T - Abutment Load Transfer

The magnitude of abutment load transferred to mine workings adjacent to a gob area depends on the mechanical characteristics of the gob, the mechanical characteristics of the strata, and the extraction geometry (e.g. width, height, and overburden depth). Unfortunately, the mechanics of caving strata is not well established in the mining literature. Predictions of abutment loads and load distribution often rely on empirical relationships derived from field data or rules of thumb based on experience or theory. For example, one rule of thumb suggests that abutment loads would be anticipated at distance up to about one panel width away regardless of depth. Another relates the distance to overburden depth:

$$W_s = 9.3\sqrt{h}$$

where W_s = width of the side abutment (or influenced zone), feet
h = overburden depth, feet

Experience has shown that these approaches provide useful insight. However, predictions of magnitude and distribution become much more reliable when they are based on mine-specific measurements and observations.

Between June 1995 and January 1996, Neil & Associates (NAA) conducted field studies in the 6th Right yield-abutment gateroad system at Crandall Canyon Mine. This study provided data on ground behavior including information relative to abutment stress transfer. Measurements indicated that stress changes due to abutment loading could be detected at a distance of more than 280 feet ahead of the advancing longwall face. Similarly, changes were measured adjacent to the extracted panel (side abutment loads) more than 170 feet away. These measurements were made at a location beneath 1,100 feet of overburden.