Mine Ventilation – An overview

. . . . The Past Two Hundred Years

17th century, "facing air"
using stoppings

1760, "coursing system" (J. Spedding) –
which means that the air was then made to travel the whole mine, both workings and worked-out sections, so preventing the build-up of methane in the Whitehaven mines

1810, "Air Splitting" (John Buddle) –
using compound system of ventilation. This allowed the working of the panel system of mining and resulted, together with improved furnaces at shaft bottoms, in greater airflow underground, which led to our present unit ventilation systems

19th Century –
chemically identifying the constituents of the air in coal mines, but the use of this knowledge did not immediately improve coal mine safety. Whereas at the same time, the demand in coal required the workings to extend into deeper, gassier seams further from the airshafts – many mine explosions were reported

1813, The Sunderland Society; 1839, The South Shield Committee, and two committees were created due to public demand to inquire into mine safety

1850, the first Coal Mines Act passing through Parliament, requiring the establishment of the Mines Inspectorate; to scientifically educate and improve the status of mining engineers similarly to that of the then military and civil engineers

1854, Theory of Mine Ventilation (J. J. Atkinson from North of England) – it was not understood by mining engineers of the day

1862, "era of fans" –
after Atkinson and Dickenson traveling on the continent, saw many large ventilating machines, including centrifugal fans. underground furnaces were replaced

1862, the "double-shaft" system –
after the Hartley disaster. This system, together with mechanical fans, resulted in much greater airflow and more extensive workings underground

1882, publications on small, fast-running fans (Chesterfield Institute)

1918, much authoritative research laid the foundations of the modern vent technology – "The Control of Atmospheric Conditions in Hot and Deep Mines" (Cadman, 1919); "Ventilation of Mines" (Hay, 1923); Also, the revision of \( H = R Q^2 \) (Douglas Hay) and development of pressure survey techniques

1949, J. Bromilow introduced firedamp drainage from Germany

1951, F. B. Hinsley, "Father of Modern Mine Ventilation" developed the thermodynamic approach and techniques of using analogue computer to calculate more accurately mine ventilation network

1959, "Systematic Ventilation Planning" (Bryan) and "Mine Monitoring" were developed after the Cambrian Colliery explosion
1960s, –
   Greuer, McPherson, and Wang – network theory and digital computer applications
1970s, –
   ventilation monitoring and mini-computer applications
1908s, –
   personal computers
1990s, –
   mine ventilation automation

The Next 15 Years . . .

1. Respirable dust
2. Diesel Particulate Matters (DPM) emission standards for underground mines
3. Ventilation monitoring and automation
4. Methane drainage
5. Heat
6. More sophisticated ventilation planning
7. New airflow systems