

2. The Development of Air Purification System using the Electrostatic Precipitator for Tunnelling

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In order to improve the air purification system in the tunnel construction, we developed the track mounted electrostatic precipitator. This was developed by making full use of technologies which has been cultivated in the tunnel ventilation facilities, and processing air flow rate is big with 2,000m³/min, but the size is so small that it can be mounted on a 4 ton track.

As a result of applying in actual tunnelling site, dust concentration was decreased to 1.0~2.0mg/m³ when the electrostatic precipitator was used compared with 3.5~4.0mg/m³ when it was not used in the concrete spraying work.

By using this electrostatic precipitator, it was confirmed to be possible under the desired value of dust guideline determined in the public welfare Ministry of Labor.

And, it was confirmed that efficiency of dust collection had reached about 90% at processing wind velocity 9m/sec on the electrostatic precipitator.

Dust concentration, wind direction and wind velocity results of estimation by the air flow analysis agreed with the measurement results approximately, and it was proven that this prediction method was useful, when effective tunnelling ventilation and dust collection system are planned.

Key words: mountain tunnel, the electrostatic precipitator, tunnelling ventilation, the dust countermeasure