

## Client



## Location

Abdul Aziz Tunnel (Saudi Arabia)

## Application

Road Tunnel Monitoring

## Problem

The Abdul Aziz tunnel connects Jeddah city to the holy city of Mecca. Located 70 km from Jeddah, Mecca witnesses millions of Muslims every year during September month to perform Hajj (their pilgrimage). The tunnel gets densely crowded with vehicles due to this inrush, causing a rampant increase in vehicular pollution, particularly in  $\text{NO}_x$  and  $\text{CO}$  levels.

The concentrated pollution within the closed tunnels substantially affects the travellers' respiratory health. Ventilating fans installed within the tunnels dilute the concentrations of the pollutants. Regulating the operation of these fans is critical which depends on breach of the concentration threshold. Having a real-time monitoring system can help in evaluating time to switch on the exhaust fans to dissipate the pollutants out.

Thus, the authorities needed to monitor the pollution level to mitigate its adverse effect on the travellers' health.

## Oizom Solution

Oizom helped STCS to install Polludrone throughout the tunnel to monitor the pollutants emitted from the vehicles crossing the tunnel. Polludrone captures all vehicular emissions like:

- Particulate Matters (like  $\text{PM}_{2.5}$ ,  $\text{PM}_{10}$ ),
- Gaseous Contaminants (like  $\text{CO}$ ,  $\text{CO}_2$ ,  $\text{SO}_x$ ,  $\text{NO}_x$ , TVOCs etc.) along with
- Meteorological Parameters (like noise pollution, temperature, humidity, ambient pressure, etc.).

The data is transferred through the cloud platform to be analyzed at Oizom Terminal. All the acquired data is analyzed separately to give their trend analysis over time. Data analysis can help in identifying the major pollutant being emitted and take corrective steps towards its reduction. Controlling mechanisms can be devised through real-time monitoring to regulate the traffic inside the tunnel for keeping the pollution within confined limits.



## Impact

Polludrone helped the authorities to analyze the vehicular pollution trend. The real-time data helped to detect the peak pollution hours to control traffic in the tunnel during those hours. During the peak hours when the pollution crosses the threshold, the tunnel can be closed for a while to ventilate the pollutants. This ventilation control can be regulated by adjusting the tunnel fans to exhaust the pollutants out for reducing the exposure.

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