There have been many cases of wall failure by bulging. This illustrates the importance of applying the curved surface envelope shear strength model. The potential causes of this type of wall failure are anticipated to be the cause of wall bulging. This illustrates the importance of applying the curved surface envelope shear strength model.

The problem of urban air pollution is felt worldwide and transcends national boundaries. Malaysia’s goal to be a fully industrialized country by 2020 has started impacting on the quality of air in major cities. The main objective of this study is to estimate the mortality risk attributed to air pollution in Klang Valley, Malaysia, based on a seven-year daily data from 2000 to 2006. The mortality data were reported by the Statistics Department. Two sets of data were provided by the Statistics Department: the daily level of five main pollutants, namely, particulate matter less than 10 g/m^3 (PM10), nitrogen dioxide (NO2), sulfur dioxide (SO2), ozone (O3) and carbon monoxide (CO). The short-term effects of pollutants on daily mortality counts were modeled according to the standard protocol used in the multicity study, the Public Health and Air Pollution in Asia (PAPA) project. Single and multi-pollutant models using Poisson regression with natural spline smoothers for time and weather variables were applied. The results showed significant risks of two pollutants related to natural mortality. In particular, 1-day lag PM10 level, 2-day lag O3 level and the average of O3 at lag0 and 2-day lag were significantly associated with natural mortality in the single pollutant model. These two air pollutants were then combined to construct the multi-pollutant models. The 2-day lag O3 level showed the strongest association with natural mortality after controlling for 1-day lag PM10 level in the multi-pollutant model. All pollutants in the single pollutant model, except for SO2, were found to be significantly associated with respiratory mortality. The highest RR was for the 3-day lag O3 level, followed by the 2-day lag NO2 level. Although none of the pollutants in the multi-pollutant models was found to be significant, O3 relatively has the strongest association with respiratory mortality. The findings on the association between mortality risks and air pollutants, particularly O3 and PM10, are consistent with those of similar studies worldwide. The ER estimates were found to be higher in respiratory mortality than in natural mortality. Also, O3 and PM10 were identified as the most harmful pollutants in Klang Valley. The findings of this study contribute substantially to literature in this particular area, while the results are important for improving regulatory process.

The properties related to this backfill material, including gradation curve, proctor curve and specific gravity are presented in this thesis. An anchor block attached to steel rod act as reinforcement were used in conjunction with the silica sand. The testing program has been designed to evaluate the soil-reinforcement interlock capacity by means of pullout testing. A few series of pullout tests were conducted on various water content of backfill material was designed by the author in order to perform real scale tests. The pullout tests were conducted on granular material, silica sand. The test data, including the vertical load, the pullout force and displacement, were collected. The applied vertical pressure were 50, 100, 200 and 300 kPa and the backfill material were varies from dry, 1%, 2%, 6%, 12% of water content as well as under the saturated condition. Prior to the pullout tests, the soil water characteristic curve were developed by the pressure plate extractor apparatus which gave a result of residual suction of 10 kPa. The variations of shear strength with relate to suction for saturated and unsaturated tested sand was developed in this study. The shear strength variation with respect to suction was found to be non-linear for the entire test which in accordance to the curved surface envelope soil shear strength model (CSSESM) of Ma, Noor and Anderson, 2006. Consolidated drained triaxial test were conducted on the soil specimens, both under saturated and unsaturated conditions with different moisture content of 1%, 2%, 6% and 12% which were adopted according the soil-water characteristics curve done in this study.