# ADMS-Roads

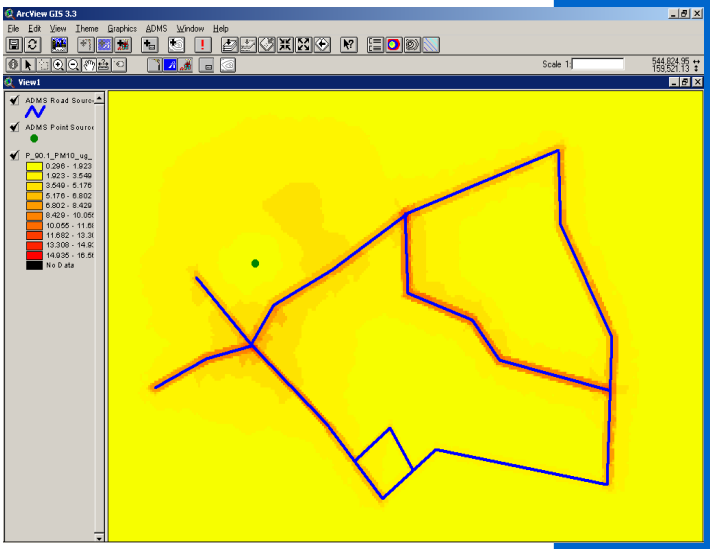
## Atmospheric Dispersion Modelling System for small road networks

## ADMS-Roads..

- Is a comprehensive tool for investigating air pollution due to small networks of roads and industrial sites
- Can be used to investigate the effect on air quality of various traffic management schemes
- Is able to calculate road emissions from traffic flow and speed data entered by the user
- Models the effect of traffic - induced turbulence and street canyons on concentrations
- Uses a chemistry model to calculate $NO_2$ concentrations
- Has links to ArcGIS and MapInfo

## Sources Modelled

ADMS-Roads models the full range of sources that may be important in calculating air quality around small networks of roads: over 7000 road links (150 road sources each with up to 50 vertices), and up to 3 point, 3 line, 4 area and 25 volume industrial sources.



***Example concentration contours created using ADMS-Roads displayed in ArcGIS***

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# Technical Specification

## Road sources

ADMS-Roads models roads as line sources with additional features. For example:

- When there are relatively tall buildings on both sides of the road, a '**street canyon**' is formed. ADMS-Roads models the increased concentrations within the canyon due to the additional recirculation.
- As traffic volumes and speeds increase on a road, there is a non-linear increase in the mixing of the emissions generated by the vehicles. ADMS-Roads accounts for this **vehicle-induced turbulence** by adjusting the lateral turbulence term used in the dispersion calculations.
- Ground-level concentrations downwind of **noise barriers** are lower than those in the absence of a barrier, because the barrier effectively raises the source height. The effect of noise barriers can be included in an ADMS-Roads model run.

## Road source emissions

As well as being able to calculate emissions directly from traffic flow and speed data entered via the interface, ADMS-Roads can model user-defined emissions for each road source. These emissions data may be imported directly from the EMissions Inventory Toolkit, EMIT (www.cerc.co.uk/software/emit.htm), or calculated externally and imported into the model using a combination of Microsoft Excel and Access.

## Time varying emissions

It is important to account for the diurnal variations in traffic flows, as these have a significant effect on the vehicle emissions modelled. ADMS-Roads allows users to enter up to 50 sets of diurnal profiles (one profile each for weekday, Saturdays and Sundays). Seasonal variations in traffic flow may be modelled with up to 50 monthly profiles.

## Complex terrain

In hilly regions where there are slopes of up to 1 in 3, ADMS-Roads models the effect of local topography and roughness on the mean flow field. As the dispersion of pollutants is driven by the airflow, the changes in flow field lead to changes in pollutant concentrations.

## Chemistry

The chemical reactions of $NO_X$, $NO_2$ and Ozone are of particular importance when modelling the dispersion of emissions from road traffic, as the reactions take place over a relatively short time period. ADMS-Roads includes a chemistry module that can be used if appropriate background data are available.

## Modelling Scenarios and Future Years

In most cases, ADMS-Roads is first used to model the emissions from a 'base case scenario', that is, data (emissions, met, background etc) are used to produce results that can be verified against locally monitored data from a recent previous year or the current year. Once the base case scenario has been verified, it is possible to investigate different scenarios, for example:

### *Impact of major developments*

An emissions inventory is compiled using the best available estimates representing the situation after the development. ADMS-Roads allows many "What If?" scenarios to be tried out, predicting concentrations at key receptors or across a wider area.

### *Future years*

The majority of air quality limits are objectives for future years. These scenarios can be modelled in ADMS-Roads using the DMRB emission factors for future years, future predictions from EMIT, or the user's own estimate. Likely changes in traffic flows, fleet compositions and background concentrations can also be included in the future scenarios.

### *Traffic Management Schemes*

If the predictions for future years indicate that concentrations of certain pollutants are likely to exceed the objectives, it is usual to consider traffic management and emission reduction scenarios. The effect on air quality of introducing such measures can be investigated using ADMS-Roads. EMIT can be used for investigating the effect on emissions.

## Use of ADMS-Roads

ADMS-Roads is used by consultancy firms throughout the UK and abroad to model the air quality impact of existing and planned road networks. Results from the model are regularly submitted as part of planning applications to local authorities.

## ADMS-Roads Extra

For more complex networks of roads, a version of the model is available that includes 600 road sources (each with 50 vertices). ADMS-Roads Extra also allows users to model the effect of buildings on dispersion of emissions from industrial sources.

## Prices

For an up-to-date price list, please visit the CERC website http://www.cerc.co.uk/environmental-software/prices.php

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