

## **Draft Technical Annex: A review of urban dispersion modelling**

Our understanding of urban dispersion modelling and the techniques for modelling atmospheric dispersion in urban environments are continually developing and evolving. This review should pull together such understanding and techniques in a manner which clearly demonstrates the current position of urban dispersion modelling and scope for future advances and further work. The review should identify relevant modelling approaches and the relative merits of these different modelling approaches (which could include a set of scenarios on the basis of which the merits of modelling approaches could be gauged).

A literature review should be performed to identify a range of modelling approaches, which should include:

- Network type approaches.  
For example a 'street network' approach to dispersion modelling in an urban environment, whereby generic blocks and street intersections are considered (as opposed to a detailed consideration of the streets and buildings in a specific city)
- Parameterised scheme.  
Ranging from rules of thumb through simple 'urban' models e.g., just using roughness length to models such as UDM as found in HPAC and ARGOS, QUIC-URB, etc.
- Fast CFD type approaches (only if suitable for use in emergency response e.g. run times of minutes rather than hours)

For all approaches identified consideration should be given to the applicability of the model to different situations. In particular, it would be useful to identify situations where the model works well and where it can not be applied and to identify the 'tipping point' between the two. Focus should be paid to where each approach could be developed further and utilised (e.g. when giving advice regarding public health).

Such a review should only consider dispersion from localised, discreet sources released over relatively short periods (of the order of a few hours or less), in an urban environment, together with appropriate air flow and meteorology. Consideration of the spatial and temporal applicability should be made including the horizontal spatial scales (Street Canyon - 10's m, Neighbourhood - 100's m, City scale 1000's m or greater); the environment (urban and/or suburban); and the vertical extent (ground level and urban canopy and/or entire boundary layer). Further consideration should be made to the type of release, passive and/or releases characterised by buoyancy/momentum.

In addition a qualitative assessment of the 'use-ability' of the model should be undertaken, considering the extent to which the model is user friendly, the data requirements of the model, and accessibility and availability of such models.

This review should focus on the advances in urban dispersion modelling since ADMLC funded a CERC review of dispersion modelling from accidental releases in urban areas in 2002 ([http://admlc.org.uk/documents/ADMLC20023\\_000.pdf](http://admlc.org.uk/documents/ADMLC20023_000.pdf)).

All of the above should exclude dense gases. The consideration of dense gases would be an extension to the work, as agreed with ADMLC, and would need to consider a different range of models.