

Use of Screening Tools for Preliminary Determination of the Significance of Pollutant Sources

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The IAQM issues Position Statements on matters that could affect the way in which Members carry out their professional tasks and on air quality topics and issues where the IAQM can provide a unique perspective from which to give a professional opinion.



Introduction

A screening tool is a simple method of calculation which enables a preliminary conclusion to be drawn on whether the contribution of one or more sources of pollution is insignificant or potentially significant based on simple data input. Where a contribution is potentially significant, a more detailed assessment may then be necessary in order to reach a robust conclusion on significance.

The issue

By making some simplifications in input data and in describing complex atmospheric processes, screening tools are useful for estimating impacts in some situations. To be robust, the use of a screening tool should be precautionary and the results should be conservative/pessimistic. However, it may not be clear whether a tool is in fact precautionary in a particular scenario or for all pollutants, and a tool may not be precautionary in every scenario and for every pollutant. By using a tool without a clear understanding of the limitations, there is no guarantee that the results are pessimistic and the outcomes from a screening tool may be invalid. There is evidence that screening tools are sometimes being used inappropriately i.e. outside the scope for which they were developed. Tools may be out of date, withdrawn, unsupported, or used without sufficient understanding or consideration of the inherent assumptions and limitations of the tool. In some cases there is a greater reliance on the output of screening tools than on that of more detailed analysis of the same scenario. The issue is relevant to both those outside the air quality profession who use the tools to inform their decision making, and those in the industry who are using information without careful consideration of the limitations of the methods.

Simple versus detailed assessment

The IAQM planning guidance recommends the need for either simple or detailed assessment depending on the circumstances. Screening tools can be considered to be a simple assessment. The significance of the impacts estimated from screening tools should be assessed using the IAQM planning guidance. If the screening does not result in the impact being insignificant, then further consideration is necessary and progression to a detailed assessment may be required. Detailed assessments typically include the use of computer-based dispersion models, Computational Fluid Dynamics (CFD) models, wind tunnel models or models which explicitly account for varying meteorological conditions at a reasonable temporal resolution and the behaviour of varying emissions and dispersion. These models may also be used for screening using simple input data before a more complex approach based on detailed input parameters is taken; many of the arguments presented here may also apply to this type of screening.

Examples of screening tools

There are many screening tools available to air quality professionals. These include the 'D1' stack height guidance, Environment Agency screening tools formerly known as 'H1', the DMRB air quality spreadsheet and LAQM screening tools. Most screening tools have been developed for specific situations or use in certain circumstances. Understanding the purpose of and evidence behind each tool can inform a judgement as to where it may be used appropriately. As an example, the 'D1' stack height calculations were derived based on ground level short-term SO₂ concentrations due to stack emissions and consider the 98th percentile of 15-minute mean concentrations. A stack height based on 'D1' calculations for a single, isolated stack, far away from buildings or elevated receptors, applied to pollutants and averaging periods for which it is designed may well be appropriate. However, actual situations are rarely that simple and added complexities may result in the D1 stack height being either significantly too low or too high.

Requirements for using a screening tool

Users of screening tools should ensure that any screening tool that they use is well documented, including relevant references, so that interested parties can see how the calculation has been constructed, the conditions under which the tool is designed to be used, some tests of the tool and examples of situations for which the model has been evaluated. In addition, users should ensure that the organisation that developed the tool continues to "own" it. For example, if a tool is no longer either published or used by its developer, then it may no longer be appropriate to use it. This is because new research may confound assumptions in a tool and invalidate previous justifications for its use. The tool may still be appropriate even if no longer supported by the developer, providing its use is justified by the user in the write up.

When to use a screening tool

References to screening tools exist in guidance, but this is not sufficient to guarantee that the use of a particular screening tool is justified. The choice of a screening tool should instead be justified by professional judgement and experience. Any person or organisation specifying that a particular tool be used should be aware of its scope and reliability. Where a detailed assessment has been completed the subsequent use of a screening tool is unlikely to be appropriate and should not override the conclusions of the detailed assessment.

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IAQM's position on this issue

- Screening tools should only be used to reach a conclusion in an assessment where circumstances justify this approach.
- Users of screening tools (including members of the IAQM) should possess a detailed understanding of a screening tool's underlying assumptions before using it and acknowledge its limitations in any works published or relied upon.
- Users without this understanding and those outside the air quality industry should seek advice from a competent professional.
- Where output from a more advanced alternative is available, for example from detailed dispersion modelling, this should supersede outcomes from screening tools.

Ultimately, users should ensure they have enough information to judge whether or not a tool is appropriate for each application, particularly if it has been developed for one purpose (e.g. for LAQM) and is being used for another (e.g. in development control).

About the Institute of Air Quality Management (IAQM)

The IAQM aims to be the authoritative voice for air quality by maintaining, enhancing and promoting the highest standards of working practices in the field and for the professional development of those who undertake this work. Membership of the IAQM is mainly drawn from practising air quality professionals working within the fields of air quality science, air quality assessment and air quality management.

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