

Dynamic Simulation Modelling

Dynamic Simulation Modelling (DSM) packages use actual building geometry, details of construction materials, HVAC design strategies (including renewables), solar gain, occupancy data and hourly (or even sub-hourly) weather data to enable the performance of the building to be modelled for a wide range of purposes, from design development through to Building Regulations compliance. The 'performance' of the building can be quantified in a number of different ways, including energy consumption, peak summer time temperatures and the adequacy of 'passive' engineering solutions, such as thermal mass, solar shading and natural ventilation.

DSM packages therefore offer a way of assessing how a building might perform and the impact of making modifications to the design all through the design process. For instance, at the initial stages of a project, a simple model can be produced to inform key architectural or servicing decisions. As the design becomes more developed, so the model can be refined to monitor compliance with the Building Regulations and fine-tune the scheme as a whole.

DSM packages therefore have many advantages as a design tool over compliance only 'steady state' software such as iSBEM which can only usefully assess compliance with the Building Regulations and are not appropriate as a design tool. However, DSM packages should be used appropriately and with caution, particularly where 'automated' control of systems is assumed.

As with any model using weather data and anticipated occupant behaviour, a DSM package is not able to provide a guarantee of future performance, but instead can be used to compare alternative designs and/or other buildings on a regulated, like for like basis.

For building design purposes, a number of packages can be used. However, where the packages need also to provide Building Regulations compliance, only accredited software can be used. A list of approved software can be found through the Building Energy Calculation Software Approval Scheme. Refer to the weblink below.

Key Issues

- DSM allows dynamic aspects of a buildings performance to be modelled and compared
- DSM offers a more refined analysis of energy consumption over similar 'steady state' software
- DSM software can allow design strategies and building compliance to be assessed relatively quickly, depending on the scale and complexity of the building and accuracy required.
- Problems can occur when switching models between different software versions
- DSM training is essential – as with any software package DSM can suffer from "Rubbish In, Rubbish Out".
- Only accredited software packages can be used for Building Regulations Compliance.
- Only accredited Energy Assessors are able to produce the final compliance certificate for Building Regulations and EPC purposes.

Web links

<http://www.ukreg-accreditation.org/ND-ApprovedSoftware.php>
http://www.modbs.co.uk/news/fullstory.php/aid/8615/Dynamically_achieving_Part_L_compliance.html
<http://www.iesve.com/UK-ROI>
<http://www.edsl.net/main/>
<http://www.bentley.com/en-US/Products/Building+Analysis+and+Design/Building-Performance.htm>

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