StruSoft
Structural Design Software

IEA-BESTEST
VIP+ 5.1
Structural Design Software in Europe AB
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Introduction
The program VIP+ ver 5.1 was tested against the BESTEST constructed by IEA group 12B/21C. Only the cases 600-990 was tested because of little or no divergence against the other softwares.

2.5.1.2
VIP+

VIP+ is intended for calculation of energy demand for heating and cooling. It contains sophisticated calculation modules for heat storage, air infiltration, solar energy; transmission through ground, heat pumps, floor heating etc. All needed for an accurate result.

The program works dynamically with time step of one hour.

This test only comprises heat storage and influence of solar radiation and shading.

For a more detailed description se http://vip.strusoft.com

Modifications of calculations during the test
All the internal heat delivers originally as convective heat. The VP_NORM.STD file was modified during the test so that this ratio can be changed into so 60 % was delivered as radiation.

The outside film coefficient is originally 15 W/m2K. The value was during the test set to 26 W/m2K according to specifications.

2.5.1.3
Building model
The buildings was entered into VIP+ basically as it is described in the test instructions with some exceptions explained below.

Infiltration
Since infiltration is not calculated in the test but assumed we changed building part to have a infiltration factor = 0 and a ventilation of 0.41 ACH. This is a weakness in the test. If the model is unable to calculate infiltration, there is little chance to make economical calculation about changes of technical systems. Especially in windy places.

Windows
For windows we used the double pane shading coefficient = 69.62% as our factor. For total and direct radiation.

Exterior and internal surface coefficient
VP_NORM.STD was edited to adjust the exterior surface coefficient to 29.3 W/m2K from14 W/m2K (this is our normal value and is default in the program) and internal surface coefficient to 3 W/m2K from 4 W/m2K.

The exterior surface coefficient in the test is also assumed that the wind speed is the same on all surfaces at the same time this is seldom the case in the real world.

Ground Coupling
We have assumed that the floor is laid on drained gravel and sand on top of clay.

Internal heat gain
The VP_NORM.STD was also changed to give the amount of 60% radiation and 40% convective internal heat.

2.5.1.5
Result
During the whole test period from our initial calculation through internal review VIP+ result did not significally differ from the other programs. Therefore we did not perform the optitional diagnostic cases. VIP+ is the extreme in some cases like cooling heating 900, 910, 920 but the results is very close to other results. We believe that this is because of a incorrect way of translating window factors. When we compare the difference in energy consumptions between light and heavy construction some programs are showing a much bigger difference than our practical experience tell us.

2.5.1.6
Summary

The BESTEST is a valuable tools that probes your program in steps and compares every step with other programs. This makes BESTEST fairly objective since you can analyze how your software responds to basic changes in a buildings.

The test have one flaw. The test does not give any clue how the software handle infiltration.