1 Results of Hydration Simulation

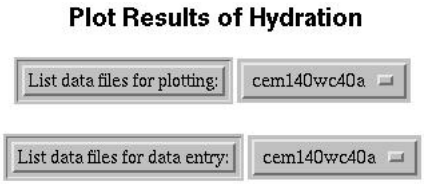

Figure 1: Pull-down menus to select a hydrated system for either plotting properties or entering experimental data.

This option is used both to plot the different predicted properties and to enter experimental data for comparison against the predicted values. Upon making this selection, a form is displayed with two pull-down menus to select a specific system for which either (1) to list the available plots or (2) to enter a set of experimental data, as shown in Figure 1. The form is submitted by clicking the left button in either row ("List data files for plotting" or "List data files for data entry").

Upon submission of the form, a second form, containing a table of the various options available either for plotting or data entry, is displayed (see Figure 2 for an example of a portion the table returned in the case of plotting).

Plot Selection Form

Case: cem140wc40a

Create All Plots Include data: Strength prefactor: 95 MPa Strength exponent: 2.6	Plot Type	Number of Cycles	Pozz. CSH Conversion	Heat Transfer Mode	Curing	Initial Temperature
Create Plot	adiabatic heat signature	100	off	isothermal	saturated	20
Create Plot	adiabatic heat signature	2000	off	isothermal	saturated	20
Create Plot	adiabatic heat signature	2001	off	isothermal	saturated	20
Create Plot	chemical shrinkage	100	off	isothermal	saturated	20

Figure 2: Top portion of table for plotting hydration properties.

With this table, in the case of plotting, the user can select to create all available plots for a given system, or simply to create a single plot of interest. In all cases, the user can elect to include the experimental data (when available) on the plot. Typically, the computer model data is plotted using blue squares connected by a blue line, while the experimental data is shown as discrete red diamond-shaped points. The plot is typically labelled with the name of the datafile from which it was created.

In Version 1.1 of VCCTL, the following plots are available (when the appropriate data have been created during a hydration run):

heat signature:	system temperature vs. computed hydration time (not very interesting for hydration under isothermal conditions)
chemical shrinkage:	chemical shrinkage (ml/g cement) vs. computed hydration time (h)
hydration:	degree of hydration (mass basis) vs. computed hydration time
heat release:	cumulative heat release (kJ/kg cement) vs. computed hydration time
compressive strength:	estimated compressive strength (MPa) vs. computed hydration time. The user must provide a pre-factor to be used in the calculation of compressive strength based on Power's gel-space ratio theory [1]
capillary pore percolation:	connected capillary porosity vs. either total porosity or computed hydration time
solids percolation:	connected "total solids" vs. either computed hydration time or degree of hydration

To enter experimental data corresponding to a specific system, the user has the option of (1) downloading the data into the VCCTL from a datafile **located on the client computer** or (2) entering the data manually. In the latter case, the VCCTL will provide a fill-in table with two columns corresponding to the values to be plotted on the x-axis and y-axis, respectively. For example, to enter data for adiabatic heat signature, the user would have to enter the time-temperature results into this table and then simply submit the form (using the "Copy data" button above the data entry table) to store this data file for later access during plotting. Always, when experimental data have been entered, the user has the option of including the data file, or omitting it, in the associated plot of simulation results.

References

[1] H.F.W. Taylor. *Cement Chemistry.* Thomas Telford, London, second edition, 1997.