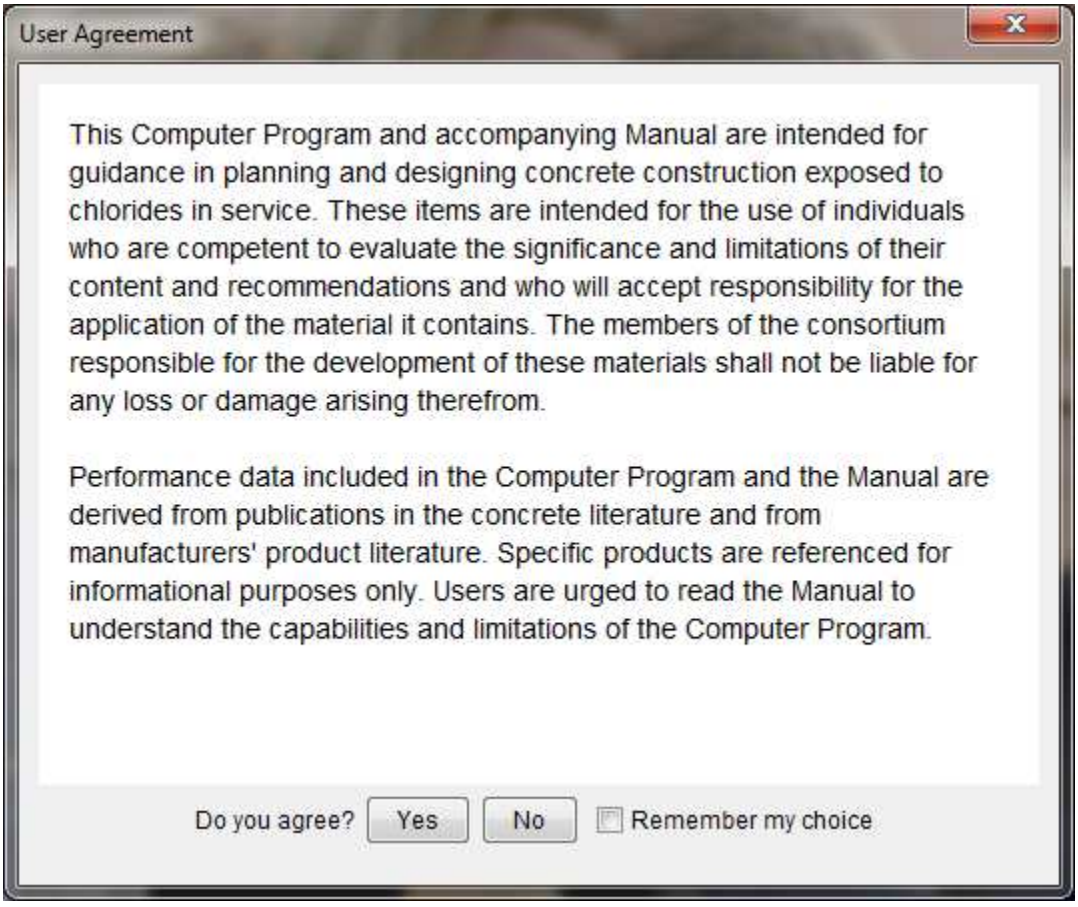
LIFE-365 SERVICE LIFE PREDICTION MODEL FOR CONCRETE STRUCTURES
BASIC INPUT INSTRUCTIONS

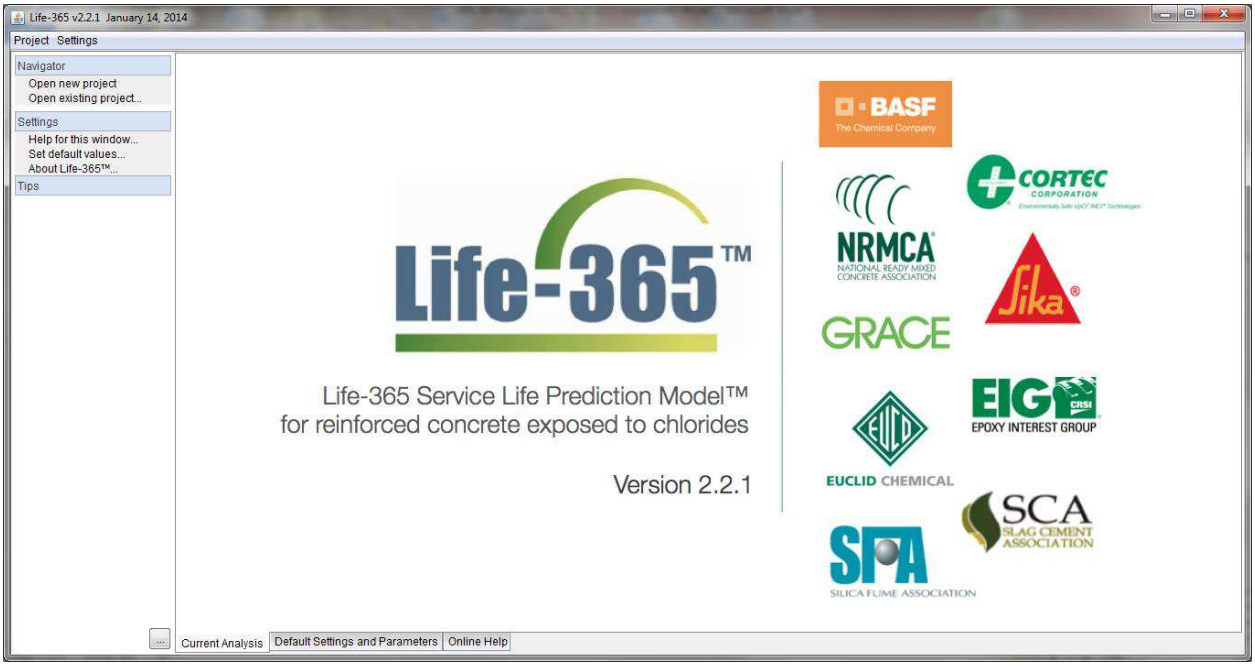
LIFE-365 is a model that allows designers and specifiers to input values for various concrete mix designs, type of reinforcement used, CNI (calcium nitrite) and other additives, as well as for sealers and waterproofing agents, to obtain a service life prediction for their structure. Unfortunately, MCIs have not been included as direct inputs in the first versions of the model. The model does allow user defined inputs, and this is where you can insert values and show the benefits of using Cortec's MCI products. To use LIFE-365 (and MCI admixtures in the model), you simply follow these instructions:

1) Go to Programs, Find and Open LIFE-365 V2.2.1. If you do not have the most current version of LIFE-365, you can download it from www.LIFE-365.org.

2) The following screen will pop up on your computer. Click "yes" to open and use the model.



3) The program will open and display this screen:



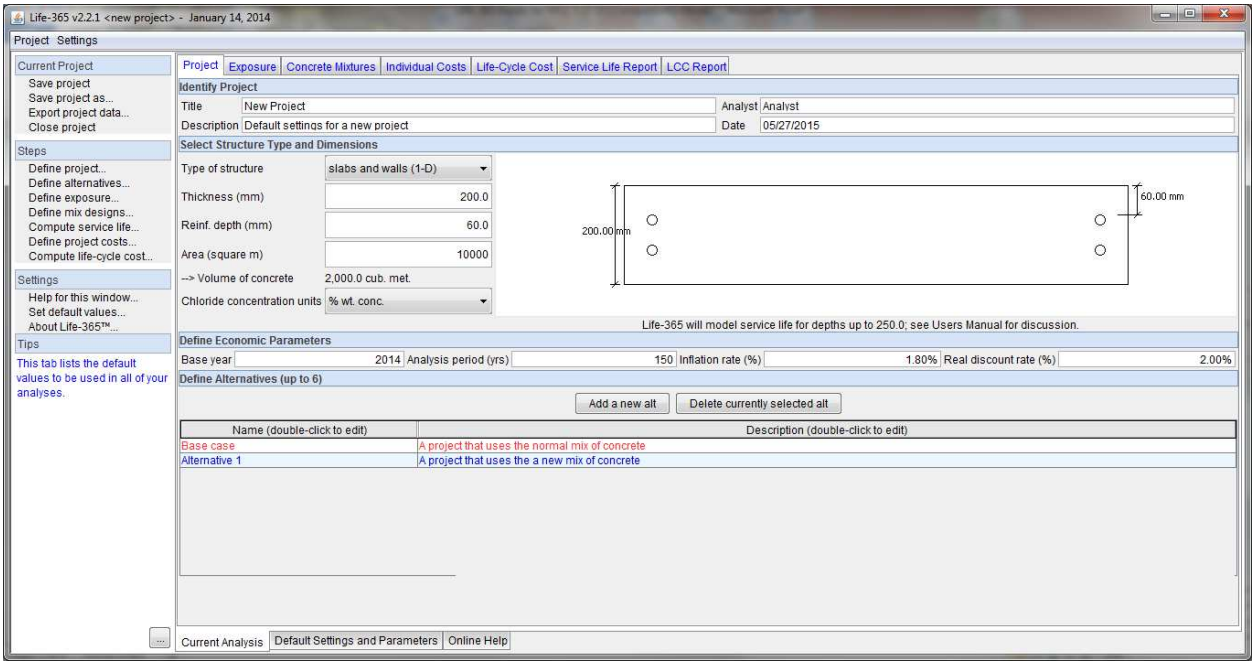
4) You can click on “Settings” next to the Project Tab, and then select “Default Settings and Parameters” to change the default values in the model (i.e. from metric to US units, default location, etc.).

a) Do this before opening a new project – if you do after starting a project you will have to close and re-start.

b) Once settings are as you need them, Fill in the Project details including Title, Analyst, Description, Date.

5) Click on “Project” in the top left corner of the screen, and then select “New”.

6) The following page will open.



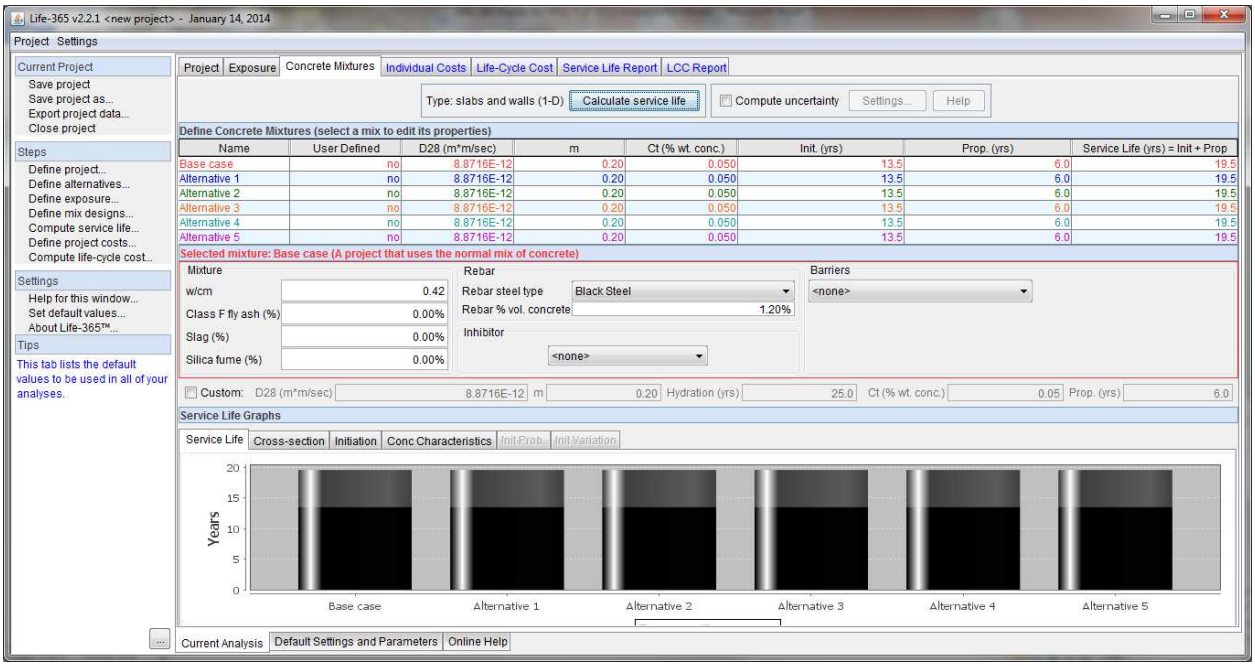
7) Fill in project details in top section that includes Title, Analyst, Description, as well as the project parameters - type of structure, thickness, depth of reinforcement (cover), etc. The box that says "Analysis Period (yrs)" is where you put in your desired service life of the structure. Default value is 75 years, you can increase/decrease depending on project requirements. You can change the settings for the inflation rate and real discount value if you feel they are different than the default parameters.

9) The bottom section is where you "Define Alternatives" of the project – There are only two there to start - a "Base Case" option and "Alternative 1" option. You can double click within these areas to change the titles and descriptions. You can click the "Add Alternative" button to add up to a total of six scenarios for evaluation.

10) At a minimum, we suggest running a base case and a "MCI" alternative.

11) Once alternatives are listed, click on the "Exposure" tab which appears just right of the project tab at the top of the screen. This is where you will input the location of your project (if in Canada or the USA), or you will need to select a Canadian or USA location with similar weather and exposure conditions to your project area. Alternatively, you can take the time to input all weather and exposure conditions for your area as a "user defined" exposure.

12) Once location is determined, click on the tab to the right of "Exposure" called "Concrete Mixtures". You will see this screen.



Before you make changes, the alternatives are going to appear to have the same initiation, propagation, and service life times. You will need to change the parameters for each alternative to get the proper information.

a) Click on the "base case" line and then begin to change all mix design parameters to those that your base case will have. Do not add any inhibitor admixtures at this time – use the alternatives for comparing them.
b) After the base case scenario is entered, click on the "Calculate Service Life" button at the top of the page. You will see that the Base Case now appears to have a different life than the rest of the alternatives.
c) Repeat steps 1 & 2 for each alternative, by clicking on the name of the alternative you wish to enter next.
d) Make sure to include inhibitor, membranes, sealer, different reinforcing options as appropriate for each alternative.
e) To do an option using MCI (as it is NOT included in the drop down inhibitor list), run scenario the same as instructions listed above first, but do NOT select an inhibitor option.
f) After you have clicked "Calculate Service Life" on the MCI option, go back and click on the box in the middle section that says "Custom". It will allow you to then change the input parameters needed to evaluate MCI.
g) Change the C_t to 0.18%.
h) Change the propagation period (Prop. (yrs)) value. According to ASTM G109 testing, MCI admixtures slow corrosion rates by 5-13 times compared to a control. We suggest using a conservative value of 5 times reduction and inputting a value of 30 years (Base Case value is 6 years, multiply that by 5 as it will take 5 times longer to

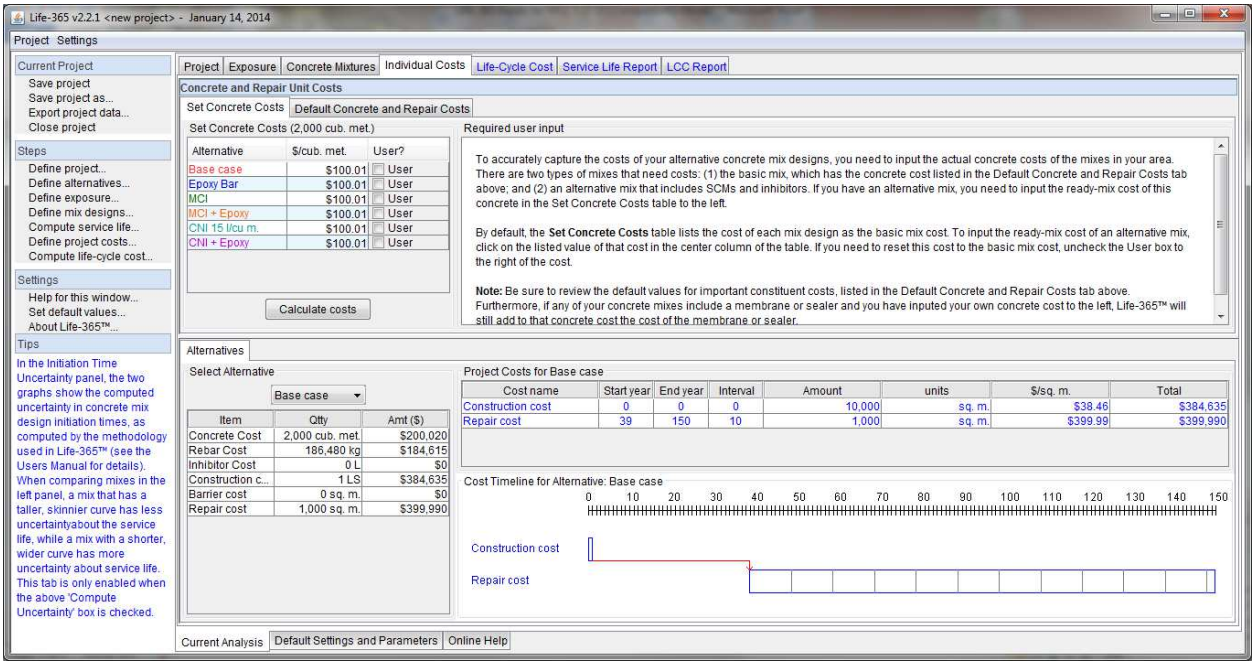
have damage if MCI is keeping rates low = 30 years). If the scenario includes epoxy coated steel, we suggest changing the propagation period to 44 years (Epoxy Coated Steel has a propagation value of 20 years in the model, which is 14 years more than the control – so we take our original 30 year suggestion for MCI and add an additional 14 years to it for the epoxy coated steel = 44 years).

i) MCI does not change the D_{28}, m, or hydration values, so they should remain as the numbers already appearing in the boxes.

j) Once the custom C_t and Prop (yrs) input values have been entered, hit the "Calculate Service Life" button one more time.

k) You can use the alternatives to compare various scenarios of your project.

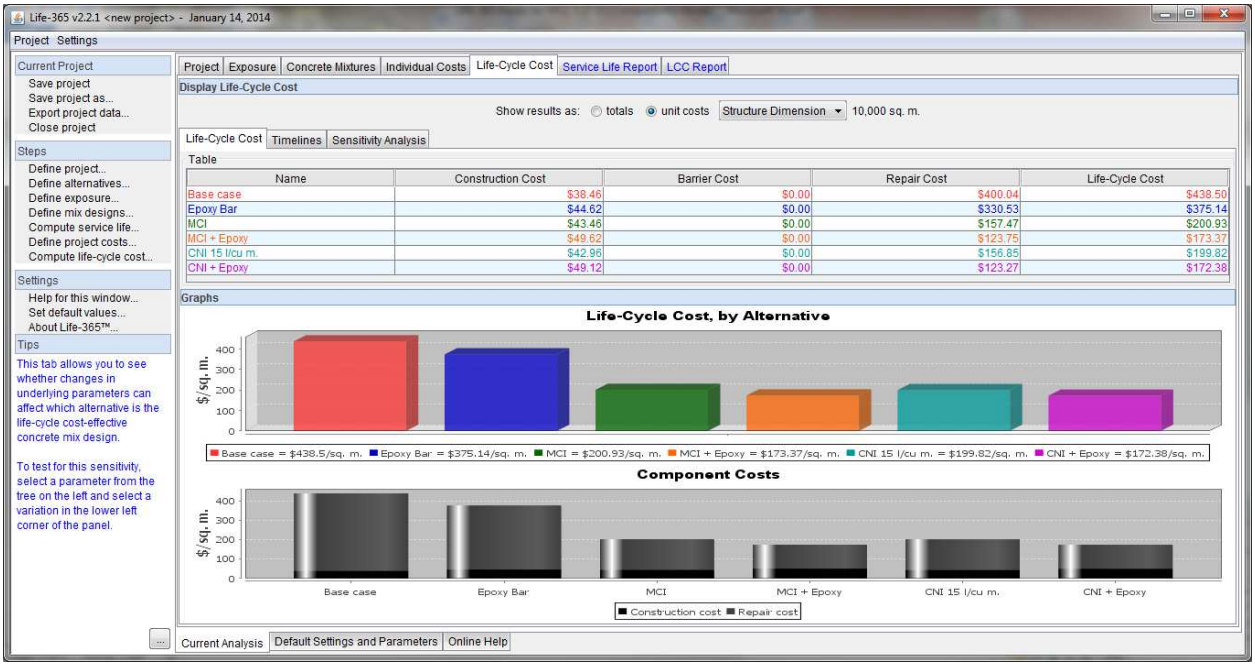
13) After all alternatives have been entered, click on the "Individual Costs" tab which is just to the right of the "Concrete Mixtures" tab. Your screen will look like this:



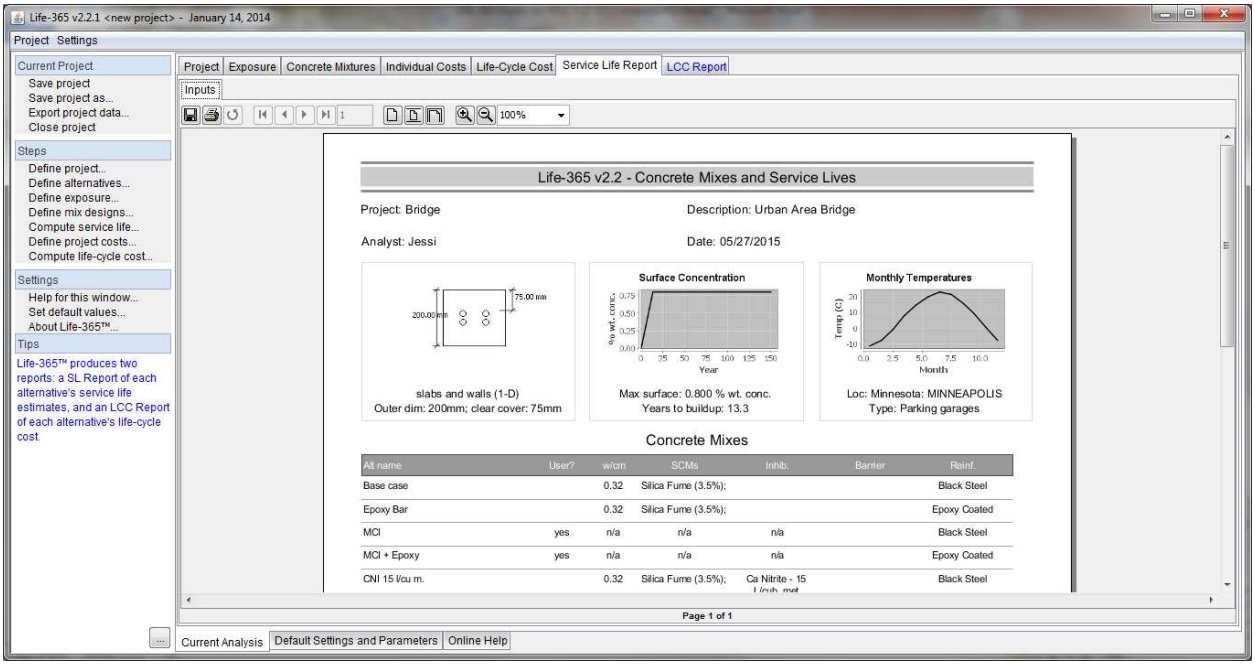
14) On any scenarios that used MCI, you will need to add the cost of the MCI into the base mix price. Do this by clicking on the alternative name(s) that used MCI and adding the cost into the $/sq ft or $/cu meter box. For instance, base case cost per cubic meter is $100.01, you would change that to $125.01 (I estimated a cost of $25/cubic meter for MCI – add whatever cost MCI is in your area to the base cost).

15) Once you have updated the MCI cost, hit the button that says "Calculate Costs".

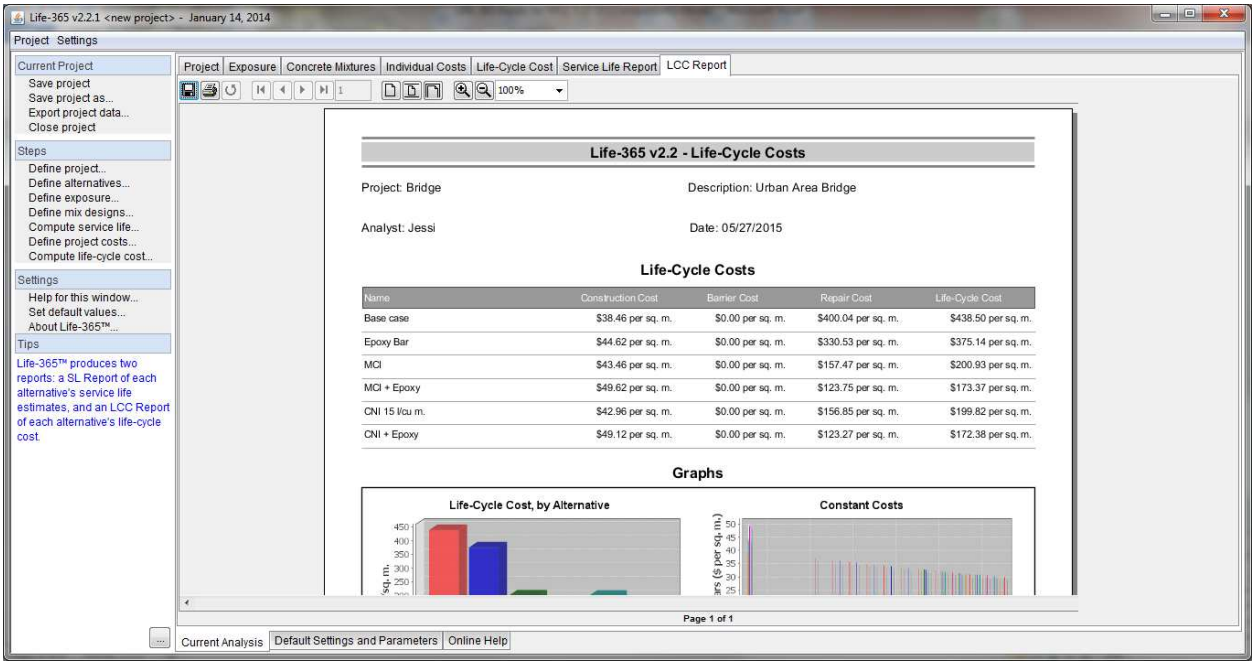
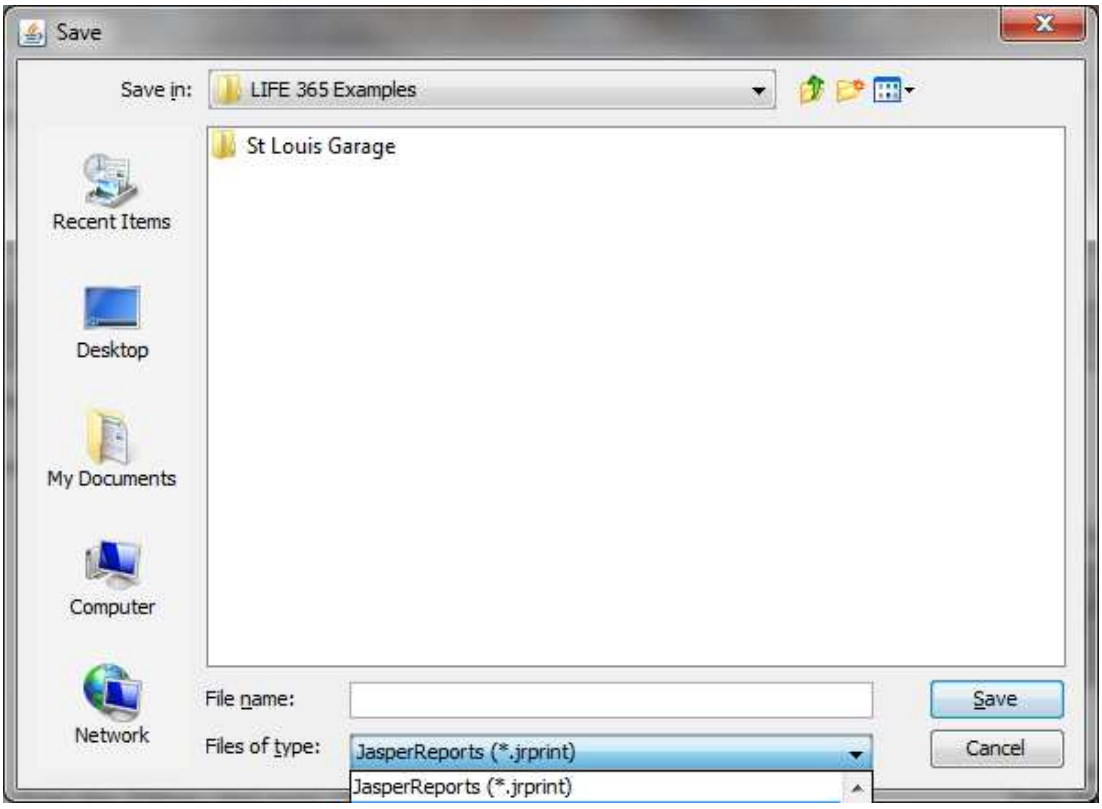
16) You have now finished inputing all data necessary. You can click on the tab "Life-Cycle Cost" to get the following information:



17) Click on the “Service Life Report” tab to see:



18) Click on “LCC Report” tab to see:



19) The “Service Life Report” and “LCC Report” can be saved or printed for future use. If Saving, make sure to change it to a PDF file type from Jasper Reports so you can open and view it on any computer, not just in LIFE 365.