LIFECYCLE COST ANALYSIS WITH THE CPA PROGRAM
HOW CONCRETE CAN SAVE YOU MONEY

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As a promoter of ready mixed concrete, I am often asked by owners and developers "Why should I use concrete on my projects?" or "What economic benefit can I get from the use of concrete over asphalt?"

Simply put, concrete saves money by having a much lower lifecycle cost than any other pavement on the market. In fact, with the prices of oil and liquid asphalt on the rise, concrete even competes with initial costs on many projects.

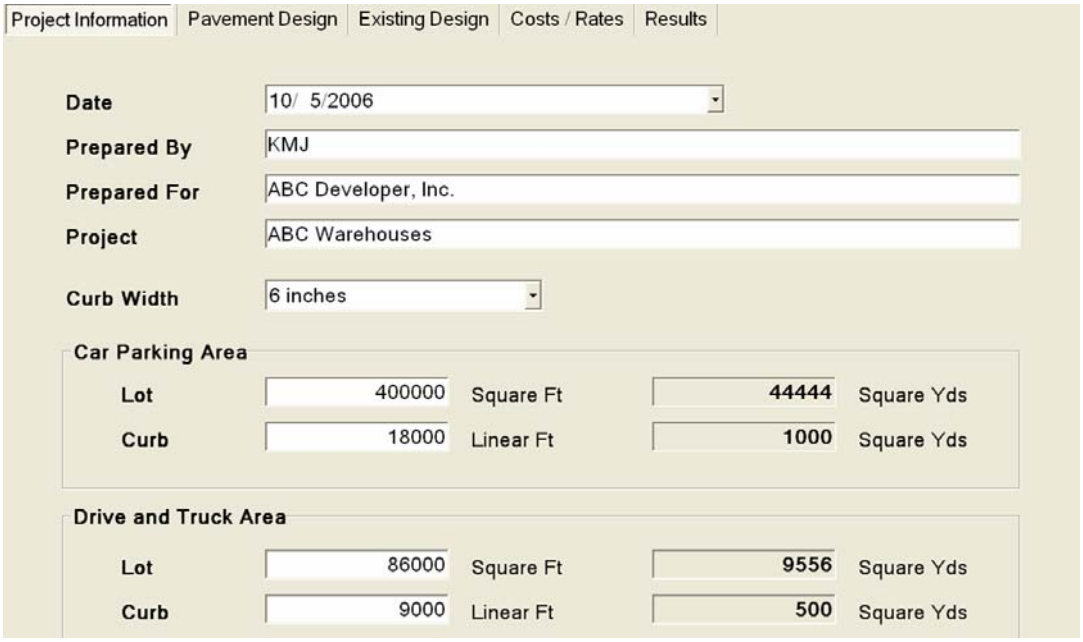
So how can a promoter prove this point?

An excellent tool at our disposal is the *Concrete Pavement Analyst* (CPA) software issued by the National Ready Mixed Concrete Association (NRMCA). With this tool, along with a site plan and a proposed pavement section, the owner can see what the true costs are for paving in either concrete or asphalt. The program is easy to use and the output charts and graphs deliver the message clearly.

Here is an example of the software in action for a project in New Jersey. The names and locations have been changed, but the quantities, pavement sections, and pricing are real as of the time of this analysis.

The first page asks for basic project information such as square footages of pavement, linear feet of curb, and general descriptions of the project, as shown in Figure 1.

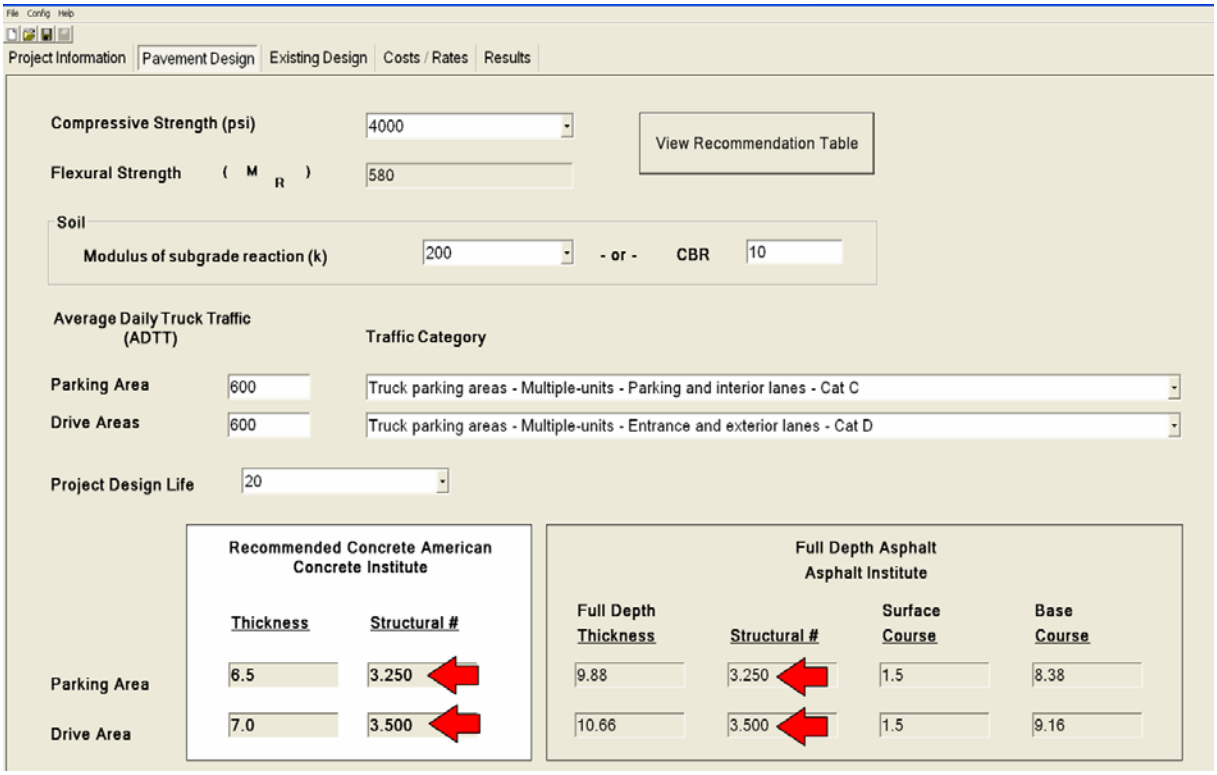
FIGURE 1 – PROJECT INFORMATION



The second page will require a detailed knowledge of the operation at the proposed facility. The design professional will need to supply the concrete strength specifications for compressive strength, as well as the geotechnical information on the soils stability in either California Bearing Ratio (CBR) or Modulus of Subgrade Reaction (k). In addition, the average daily truck traffic (ADTT) and truck types will need to be input.

The program will use this information for the pavement design. CPA designs the pavement in BOTH concrete and asphalt sections using the American Concrete Institute (ACI) and Asphalt Institute (AI) design methods. The results are displayed at the bottom of Figure 2.

FIGURE 2 – PAVEMENT DESIGN

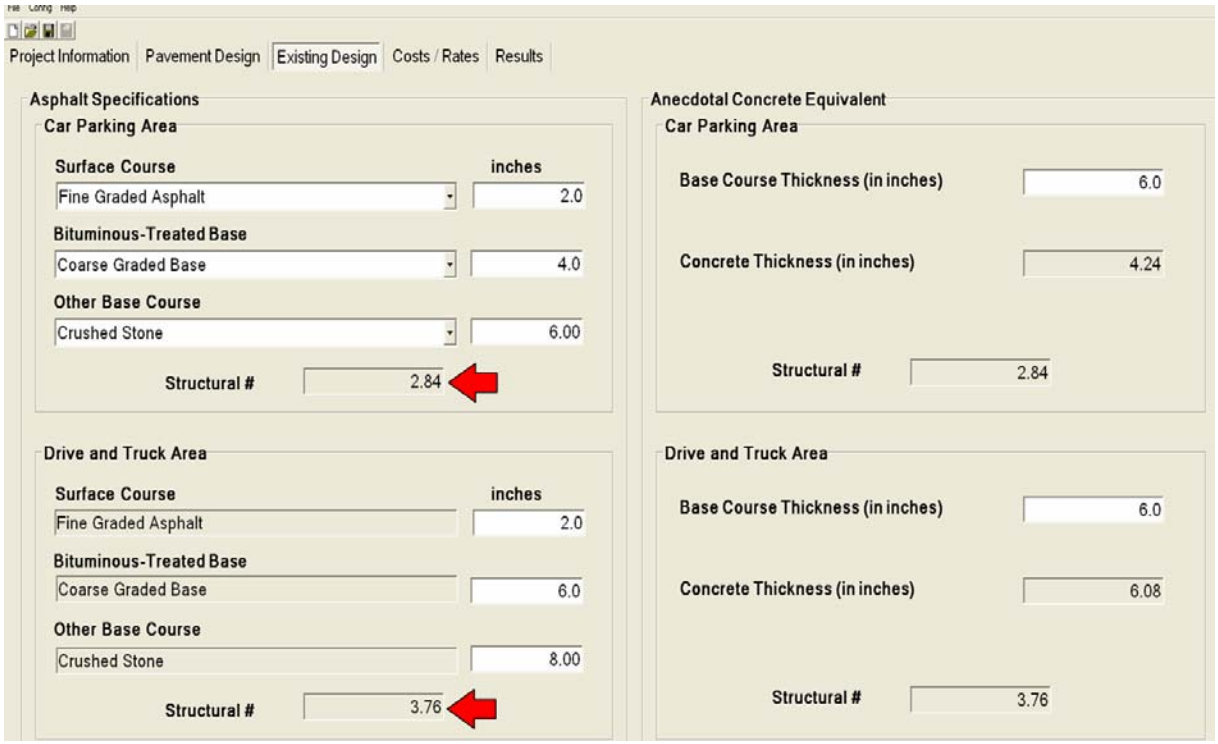


Note the structural number listed for both pavement sections. This number represents a strength equivalent of differing materials. As shown in Figure 2, for the example project given, 7" of concrete is equivalent to 10.66" of asphalt.

The next page of the CPA software is interesting. This is where one can compare the existing design to what the industry recommends. Too often, a standard municipal pavement section is proposed without regard to the actual structural needs of a project. This can lead to failures. Without going any further, this tool can show the owner whether their proposed pavement section is within design standards.

Figure 3 shows what the owner of this project or the design professional proposes to use as an asphalt section.

FIGURE 3 – EXISTING DESIGN



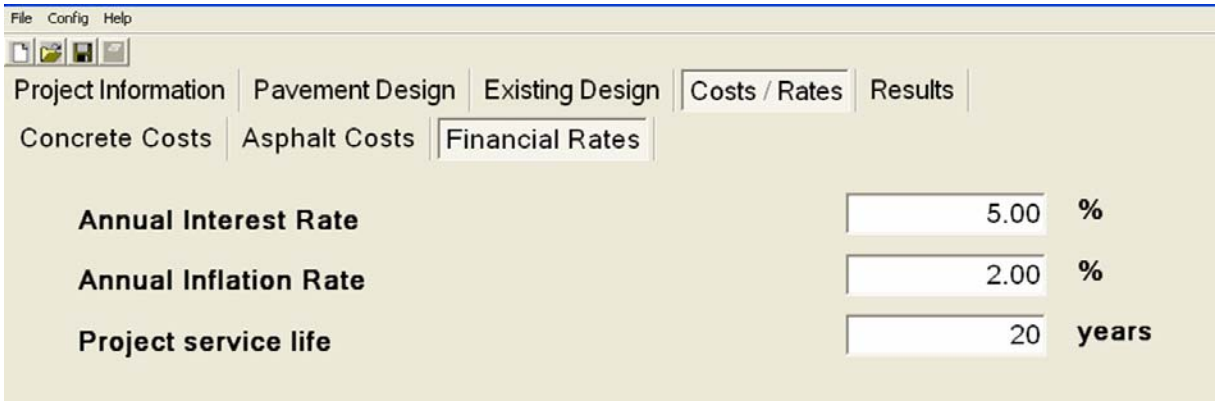
This owner proposed using 6" of asphalt over 6" of stone in his car parking areas and 8" of asphalt over 8" of stone in his drive and truck areas.

Now compare the structural numbers of the proposed design in Figure 3 with the structural numbers of the industry designs in Figure 2. As shown in Figure 2, the car parking areas need a structural number of 3.25 while the drive and truck areas need 3.5. As shown in Figure 3, the car park areas are under-designed at 2.84 while the truck park areas are overdesigned at 3.76. At this point, the owner can make a decision to make appropriate changes to the proposed pavement section prior to continuing this analysis.

Once the pavement section is finalized, the lifecycle cost analysis can proceed.

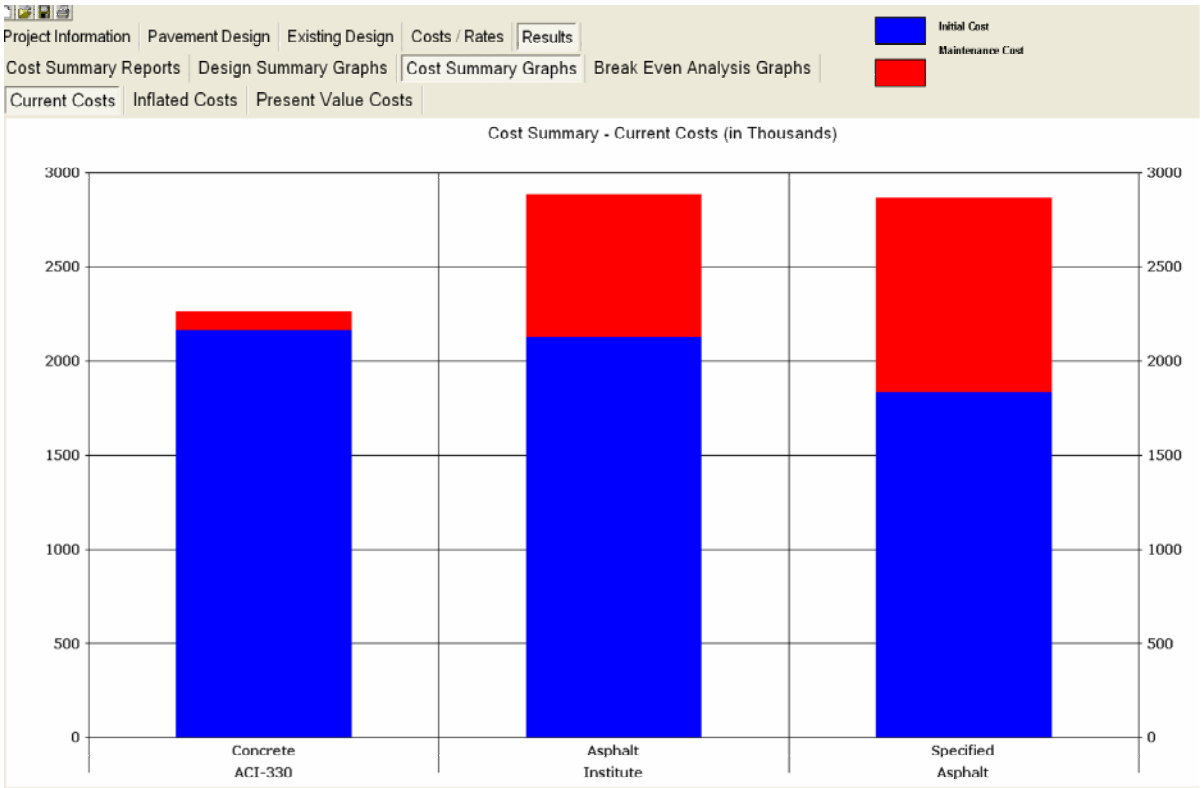
First, the pricing of each pavement section must be input. The prices can be acquired through various means, such as historical bid tabs (available through your local Department of Transportation's websites), contractor inquiries, and R.S. Means cost information. The program asks for such items as concrete price per cubic yard, finishing per square foot, asphalt price per ton, delivered and placed, aggregate base and excavation costs, lighting costs per light standard, and maintenance costs for each proposed pavement. In addition, there is a page, as shown in Figure 4, that asks for financial data such as interest and inflation rates.

FIGURE 4 - FINANCIAL RATES



The results are calculated and presented to the user in either tabular or graphical formats. In addition, one can view the results in either Current Costs, Inflated Costs or Present Value Costs.

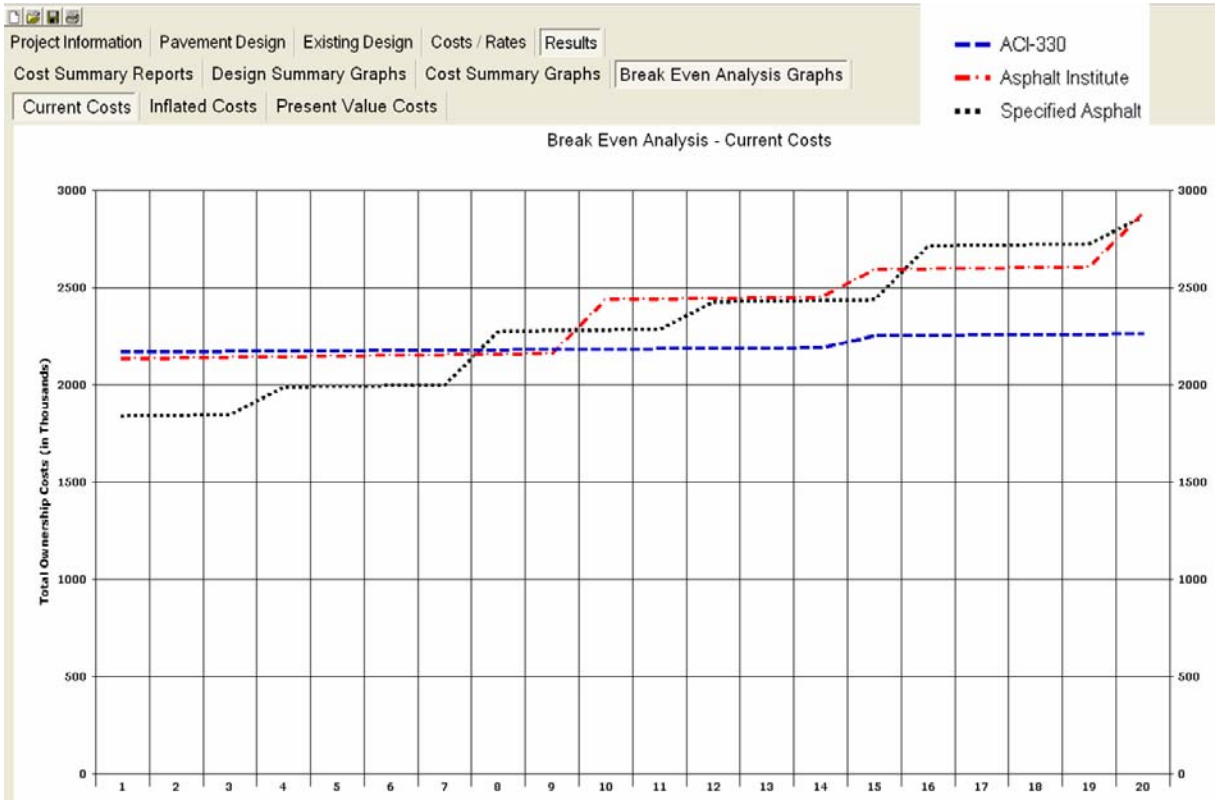
FIGURE 5 – COST SUMMARY GRAPH – CURRENT COSTS



For our example, we will look at the Current Costs. Using $60 per ton for asphalt in place and $85 per cubic yard for concrete, plus a cost for finishing, Figure 5 shows that the ACI and AI recommended section will have a negligible difference in initial costs while the owner's recommended section will have a slightly lower initial cost. However, when adding in maintenance costs over a 20 year lifecycle, one can easily see that this owner will save money, and in this case hundreds of thousands of dollars, by using concrete.

The other answer the owner will seek is at what point will he break even? Figure 6 shows that sometime between years 8 and 9 is the break-even point, and that concrete will be a cost savings from that time on through year 20.

FIGURE 6 – BREAK EVEN GRAPH



For this particular project, the cost savings were so significant to the owner that all the paving on the project was flipped from asphalt to concrete, resulting in over 9,000 yards of concrete being added to this project. In addition, this project was only Phase 1 of a three phased plan. In total, over 30,000 yards of concrete were placed instead of asphalt as a result of using the CPA software.

For more information on obtaining or using the CPA software, contact your local promotional partner or the NRMCA at www.nrmca.org.

For additional information, please contact:

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