EVALUATION OF FLORIDA vs. MARYLAND

(References keyed to Annotated Bibliography)

A review of AIA publication titled:

Selecting Architects and Engineers for Public Building Projects: An Analysis and Comparison of the Maryland and Florida Systems [1]

AIA FINDINGS

General. The AIA publication reviewed herein is a 95-page paper comparing the AE selection processes of Maryland and Florida between 1975 and 1983. Florida used a qualifications-based selection (QBS) process, and Maryland used a "best value" selection process weighing both qualifications and price. The AIA paper states that both state's user agencies were pleased with their respective systems and that the Maryland agencies did not agree with the report's conclusion that the Florida's QBS system was superior to Maryland's "best-value" selection system.

This AIA document is important to address because it was used to influence legislation to change Maryland to a QBS form of AE selection [73]. The AIA report aggregates the AE and construction costs over a nine-year period, from 1975 to 1983, for Maryland, and over a similar period for Florida. In addition, a separate four-year period from 1980 to 1983 was evaluated for the Florida University construction program.

AIA Findings. The AIA comparison parameter is *AE selection cost*, calculated according to *Equation 1*, below.

Equation 1) *AE selection cost = AE Fee + Administrative costs + Preparation of Programs + Delay*

The results from *Equation 1* are tabularized and *AE selection cost as a percent of construction* is calculated. The report results are presented in Table 1, below.

Table 1: AE Selection Costs

ITEM	Maryland (GSA)	Florida(GSA)	Florida (Univ.)
AE Fee	$ 22,365,000	$ 55,336,000	$ 13,696,000
+ Administrative costs	$ 3,212,000	$ 3,216,000	$ 269,000
+ Preparation of Programs	$ 776,000	$ 0	$ 0
= Subtotal	$ 26,353,000	$ 58,552,000	$ 13,965,000
+ Delay	$ 41,026,000	$ 0	$ 0
= AE Selection Costs	$ 67,379,000	$ 58,552,000	$ 13,965,000
Total Construction Costs	$518,000,000	$875,000,000	$191,09,3000
AE Selection Costs (percent of total construction)	*13.0%*	*6.7%*	*7.3%*

Based on *AE selection costs as a percent of construction*, the report concludes that Florida's AE selection cost as 6.7% to 7.3% of construction is superior to Maryland's 13%, imputing that QBS yields superior results to non-QBS AE selection procedures. However, if the *delay* cost imputed by the AIA report is ignored (for the moment), then the outcome would be reversed, as presented in Table 2, below.

Table 2: AE Selection Costs (sans delay)

ITEM	Maryland (GSA)	Florida(GSA)	Florida (Univ.)
= AE Selection Costs (sans delay)	$ 26,353,000	$ 58,552,000	$ 13,965,000
Total Construction Costs	$518,000,000	$875,000,000	$191,09,3000
AE Selection Costs (sans delay) (percent of total construction)	*5.1%*	*6.7%*	*7.3%*

For the case presented in Table 2, Maryland's 5.1% is better than Florida's 6.7% to 7.3%. Since so much rides on the imputed *delay* cost for Maryland, it may be instructive to evaluate how *delay* is imputed in the report.

DELAY COST

Imputing Delay. The AIA report imputes a design *delay* time by finding that Maryland completed design of a construction contract an average of 9.9 months later than Florida, measured from the point in time that budgets were approved to the time that design is complete. The project performance times of various phases of Maryland and Florida determined in the report are presented in Table 3, below.

Table 3: Average Execution Time (months)

Project Phase	MARYLAND(GSA)	FLORIDA(GSA)	DELAY
Planning (budget submittal to approval)	11	9	(not counted)
Program Development	6	4	2
AE Selection process	5	2	3
Design	20	16	4
Construction	18	14	(not counted)
TOTAL	60	45	9

The 9 months of total design delay from the above table is more precisely adjusted to a value of 9.9 months on page 20 of the report.

Imputing delay cost. The 9.9 months of delay in the design process from above is input to Equation 2) below to arrive at a delay cost as follows.

Equation 2) Delay cost = (average delay time) x (average rate of inflation) x (construction costs)

= (9.9 months) x (0.8% inflation/month) x ($518, million)

= $41,026,000

It should be noted that the imputed delay cost of $41,026,000 is one-and-a-half times larger than the $26,353000 aggregated actual design cost reported for Maryland.

EVALUATION

Accepting the data presented in the report, and the determination of performance times at face value, five questions remain to be evaluated:

1) Is 9.9 months of "*delay*" in a four to five year government project cycle meaningful?
2) Is the aggregation of project costs in historic dollars appropriate?
3) Is the *delay* cost appropriately calculated?
4) Is the *delay* cost, if appropriate, a legitimate *design* cost?
5) Are the report's findings statistically valid?

Meaningful delay. In order for *delay* to be meaningful, comparable projects in Maryland and Florida should be compared. For example, a hospital is much more elaborate to design and build than an office building, and would be expected to take considerable more time in the design and in the construction. Insufficient data is presented in the report to properly assess whether comparable projects are compared between Maryland and Florida.

Aggregation of project costs. To properly aggregate the price of construction or design over a period of years with high inflation, the effects of inflation must be removed by restating the value of each contract in the same base year, e.g., 1990 dollars [52, 56, 61]. The report sums contract prices of 174 construction contracts issued over nine years (1975 to

1983) in *historic* dollar amounts, and does not convert the project costs to a common year base. Estimating manuals such as RS Means [51] offer tables and charts to facilitate such conversion. For example, assume Project A and Project B are each estimated to cost $1 million if initiated in 1 Jan 1985. If Project A were to begin on time, and project B were to be delayed one year, the price of project B would eventually be restated in terms of deflated 1986 dollars. Project A would cost $_{85}$1 million and Project B would cost $_{86}$1.05 million, assuming a constant 5% inflation rate. But both project A and project B would still cost $_{85}$1 million in 1985 dollars.

Delay costs appropriately calculated. There are three cases where delay in the design process might occur and cause a real project cost impact. The impact of delay is different for each case. A fourth case is discussed, which is the inflation delay claimed in the report. These four cases are presented in Table 4, below.

Table 4: Delay Cost Cases

Case	Description	Operator	Impact
1	Commercial projects	Time value of money	Profit stream
2	Government projects	Cost-Benefit ratio	Benefit
3	Awarded construction contracts	Completion delay	Construction cost
4	Design delay cost	Inflation	(questionable)

Commercial projects. A delay in completing design might have an adverse economic effect on a *commercial* project, where the *time-value-of-money* is a consideration in calculating potential *profit* streams. In fact, the decision to implement a commercial project is usually based on whether sufficient after-tax profits would be generated in a reasonable time [38]. The measure is usually whether the calculated rate of

return on investment capital meets or exceeds a predetermined value[38]. In time periods where inflation is a significant factor, the *real* rate of return would be of interest, which can be determined from the Fisher[36] equation (Equation 3, below).

Equation 3) $(1+i) = (1+r) \times (1+\rho)$, where r = *real rate of interest,* ρ = *rate of inflation, and* i = *nominal or contract rate of interest.*

The entire process for a commercial project may be measured in weeks. None of the projects in the report were commercial projects, and the report did not claim or address any *time-value-of-money* concerns.

Government projects. Government projects generally are not based on commercial economic considerations. Government projects are most often justified economically using a *cost-benefit ratio* approach, where dollar values are assumed for intangible and tangible social benefits assumed over the estimated useful life of the project. The value of assumed social benefits is often dependent on the density of human populations to be served by the project. The process of identifying and planning potential worthwhile public projects is rather long, often measured in years. Separate annual budget cycles often occur for planning, design, and construction. Many government projects are initiated in the planning phase because of political considerations, then may remain in the planning cycle for years until a benefit-cost ratio of 1.0 or greater is achieved, usually due to an increase in population density in the project area of consideration. Proposed projects that eventually attain a benefit-cost ratio of one or greater are then eligible for inclusion in the next annual budget cycle for design. The decision to include a project in the budget for design and/or construction may also depend on the availability of public funds, which can result in otherwise worthwhile projects

being deferred. Cost-benefit analysis generally does not factor in the effects of inflation. No *cost-benefit* impact is claimed or addressed in the report.

Awarded construction contracts. Delay impact on awarded construction contracts may occur due to a delay in the design process, especially on fast-track projects, where design and construction overlap. Such delay costs occur because the construction contractor may have to stop work because of the lack of sufficient design, resulting in idle labor or equipment standing by, and/or extended overheads. Delay costs due to inflation may even occur if the delay is long enough, and the contractor had not adequately planned for it. Generally, however, construction contractors are expected to factor inflation into their original bids, and are not separately compensated for delay costs attributable to inflation, except in rare cases on multiple-year contracts with inflation-adjustment clauses. The report did not address or claim any delay impact attributable to construction delay of an awarded contract.

Inflation as a cost factor. The report assumes that if the average construction contract for Maryland would have been awarded 9.9 months earlier it would have been priced lower by the amount of inflation. There is no argument with this assumption. In fact, it is common to adjust a project cost estimate for the effects of inflation when a significant time lapse occurs between the creation of the cost estimate and the award date of a contract. However, such inflationary price growth is merely a reflection of the falling purchasing power of currency, and not a real project cost growth for the following reasons:

1) Inflation is purely a monetary phenomenon [36, 56, 61]. That is, currency does not hold a constant value over time--its value changes over time due to inflation. A dollar spent in 1980 is not the same value as a dollar spent in 1981. Thus contracts awarded in one year are not directly comparable to contracts awarded in another year. The buying power of the dollar decreases at the rate of inflation, but in true inflation, the buyer's dollar income eventually adjusts upward to compensate. Specifically, it can be argued that the tax revenues of the state will increase because of inflation [56, 61].

2) To properly compare or aggregate the value of contracts issued in different time periods, the contract amounts should be stated in the same base year, e.g., 1980 dollars. When this is done, the effect of inflation on currency is removed, and the contract amounts are directly comparable and can be meaningfully aggregated.

3) As commodity prices rise due to inflation, individual, corporate and government incomes and revenues also rise to compensate, although temporary disparities occur. The negative side of inflation is that currency owners suffer permanent losses due to depreciated value of the currency they possess. The positive side of inflation is that borrowers enjoy permanent gains by the reduced value of their loan balances and monthly payments. Government at the federal, state and local levels tend to be net borrowers, and thus net beneficiaries of inflation. Government revenues tend to rise because their tax structures are largely based on percentage rates (e.g., sales taxes, income taxes, etc.) [36, 56, 61]

Delay as a design cost. Even if the delay cost due to inflation were accepted as legitimate, it would be a *construction* cost growth, not a *design* cost growth. There would be no justification for including such costs as part of the design process. In fact, the price

increase due to inflation for the delay would automatically reflect in higher construction prices, and the design prices would be scarcely affected.

Statistical validity. The report does not address or perform any statistical process ruling out random chance as an alternative explanation of the performance differences between Maryland and Florida. Furthermore, legislative remedies should require that causality be established. No statistical process is performed or presented in the report that would infer causality.

SUMMARY

Earlier in this evaluation, five questions were asked. Below is a summary of the evaluation for each question.

Question 1. Is 9.9 months of "delay" in a four to five year government project cycle meaningful?

Delay in design completion is generally not as meaningful for government projects as it is for commercial projects. An exception could exist for emergency projects, or revenue-producing projects such as publicly-funded sports stadiums and convention centers, but no such exception is claimed in the report. Moreover, comparable project types are required in order to compare design performance times. It can not be determined from the data reported whether project types are comparable.

Question 2. Is the aggregation of project costs in historic dollars over the study period appropriate?

Before costs are aggregated over multiple years, individual components should first be re-stated in a common-year base. The report errs in aggregating historic dollar amounts.

Question 3. Is the delay cost appropriately calculated?

Inflation is not a valid cost factor for calculating "delay" costs. The report errs in assigning a delay cost for inflation.

Question 4. Is the delay cost, if appropriate, a legitimate design cost?

Even if inflation-generated delay costs were accepted as calculated in the report, they would be increased *construction* costs, not increased *design* cost. The report errs by the inclusion of delay as a *design* cost.

Question 5. Are the report's findings statistically valid?

No statistical analysis is performed ruling out random chance as an alternative explanation or establishing a causal inference.

CONCLUSIONS

Imputing a *design* cost for the inflation of *construction* prices caused by perceived delays in awarding construction contracts is improper. Moreover, such inflation effects on construction pricing must be removed in order to properly aggregate construction costs over a nine-year time span of the report study.

When the effect of inflation is removed from the comparison of Maryland and Florida's design process, the result is opposite of the result reported in the study. Maryland's design cost of 5.1% of construction then compares favorably to Florida's 6.9% (GSA) or 7.3%(Univ.). In fact, with inflation removed, Florida's design cost is 35% to 43% higher than Maryland's. Therefore, the report's findings must be considered inconclusive.