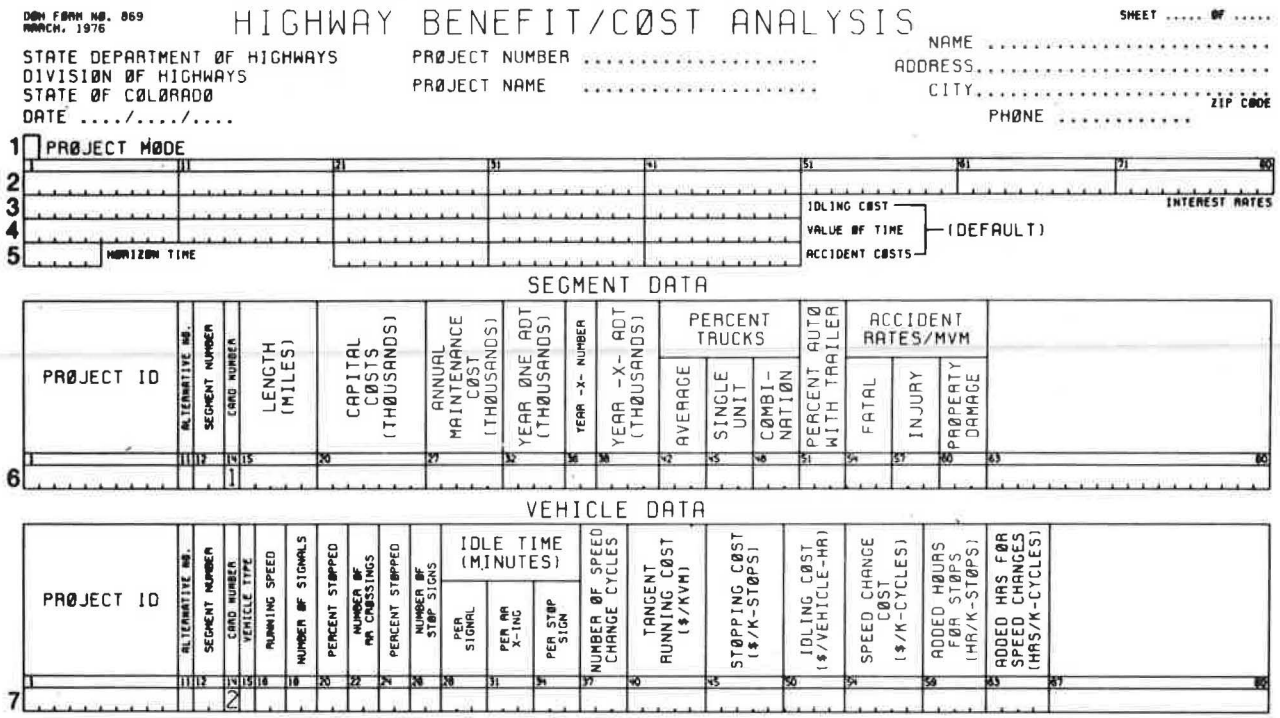
Figure 3. Input variables for HYBENCO program.



REFINEMENT OF THE PROGRAM

The Colorado Department of Highways plans to include the factor cost tables in the HYBENCO computer program. In addition, calculations of additional time for stopping and idling will be performed by the HYBENCO model. The final revision in the model will eliminate vehicle speed input. Instead, the HYBENCO program will calculate necessary speeds, given information on vehicle type, degree of curvature, grade, and ratio of volume to capacity. These changes will substantially simplify the present program.

REFERENCES

1. FHWA/UMTA Major Urban Transportation Investment. Federal Register, Vol. 43, No. 236, Dec. 7, 1978, pp. 57478-57487.
2. D. G. Andersen, D. A. Curry, and R. J. Rozdena. User Benefit Analysis for Highway and Bus Transit Improvements: Part 1—Research Report. Stanford Research Institute, Menlo Park, CA, Oct. 1975.

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Benefit-Cost Analysis Based on the 1977 AASHTO Procedures

Douglas S. McLeod and Richard E. Adair

The benefit-cost analysis performed for FL-426A, a new highway facility in Florida, is described. The analysis was completed in general accordance with the American Association of State Highway and Transportation Officials (AASHTO) publication, A Manual on User Benefit Analysis of Highway and Bus-Transit Improvements. The project, the analysis procedures, deviations from the AASHTO methodology, the analysis results, and suggested improvements to the AASHTO procedures are examined. A network approach was used for the benefit-cost analysis of this new facility, which has partial access control. A summary of the analysis appeared in the project's 1978 final negative declaration, an environmental impact document. Thus, it was one of the first benefit-cost analyses modeled after AASHTO procedures to appear in an environmental impact document approved by the Federal Highway Administration. It is concluded that, although the AASHTO procedures need to be computerized and their results are subject to wide variability among users, they are useful in determining the economic desirability of major highway improvements.

This paper presents a case study of a benefit-cost analysis for a 6.9-km (4.3-mile) segment of FL-426A. The study is generally based on the American Association of State Highway and Transportation Officials (AASHTO)

publication, A Manual on User Benefit Analysis of Highway and Bus-Transit Improvements (1), hereafter referred to as the AASHTO manual. The purpose of the analysis, which was based on a "willingness-to-pay" approach that is consistent with the philosophy of the AASHTO manual, was to determine the economic desirability of the highway project by investigating whether its user benefits exceeded its implementation and maintenance costs. The results of the benefit-cost analysis appeared in a 1978 final negative declaration (2), an environmental impact document approved by the Federal Highway Administration (FHWA). It was thus one of the first benefit-cost analyses generally based on the procedures of the AASHTO manual to appear in an FHWA-approved environmental impact document.

This paper describes the highway project, the analysis procedures, deviations from the methodology of the AASHTO manual, the analysis results, and suggested improvements to the manual's procedures. In part, this paper is intended to meet one of the urgent further research needs identified by the manual—the need for a state transportation agency to apply, test, and refine the procedures through actual use (1, p. 176).

PROJECT DESCRIPTION

FL-426A is a proposed four-lane, partial-control-of-access, major arterial route to be located in Orange and Seminole Counties (see Figure 1). This geographic area is the fastest-growing section of the Orlando standard metropolitan statistical area (SMSA), which in turn is one of the fastest-growing SMSAs in the nation. Based on projected traffic variations, the project study area was delimited by FL-438 to the south, US-441 (FL-500) to the west, FL-436 to the north, and I-4 (or FL-400) to the east (see Figure 2). In the environmental impact document, four alternative "build" corridors—A, A-1, B, and B-1—and the "no-build" concept were selected for study (Figure 2). All five alternatives were evaluated equally in the project's environmental impact document and benefit-cost analysis, but in the interest of brevity this case study concentrates on the analysis of the selected corridor—corridor A—and the no-build alternative.

The 2.9-km (1.8-mile) section of FL-426A from FL-431 to I-4 is scheduled for construction by the Florida Department of Transportation (DOT) during FY 1980/81. The 4-km (2.5-mile) section from US-441 to FL-431 and interchanges at US-441 and FL-431 are not scheduled for construction until after 1985.

ANALYSIS PROCEDURES

The methodology recommended in the AASHTO manual consists of eight major steps (1, p. 11):

1. Update of user cost factors,
2. Selection of the discount rate and other economic features,
3. Description of project characteristics and estimation of project costs,
4. Calculation of unit user costs,
5. Calculation of user benefits,
6. Conversion of user benefits to annual user benefits,
7. Estimation of residual value, and
8. Determination of present values and the economic desirability of the project.

Because of variations in the availability of data and the interrelationship of the analysis steps, the FL-426A benefit-cost analysis did not proceed in the exact order given above. For instance, much of step 3 and the first part of step 2 (selecting the discount rate) preceded step 1. These variations, however, were not significant and did not change the analysis results. For ease of understanding, the analysis steps are presented here as if they exactly followed the order given in the AASHTO manual.

Update of User Cost Factors

The AASHTO manual's base values for user cost were established in January 1975. The latest price levels available at the time of the analysis were for October 1976 (3). By using the manual's updating procedure (1, p. 124), the appropriate value-of-time multiplier was determined to be 1.110. The running-cost multiplier was obtained from the manual's composite updating formula (1, p. 137), and the resulting multiplier was 1.134. It was not necessary to update accident costs and discomfort and inconvenience costs.

Selection of Economic Features

Instead of using a 4-5 percent discount rate as recommended by the AASHTO manual (1, p. 15), the Florida DOT uses a 7 percent discount rate. The 7 percent rate was chosen primarily because of its perceived validity and its greater acceptability to outside reviewers.

Unit values of time and vehicle running values, accident values, and discomfort and inconvenience values were determined next. The January 1975 base value of time used for passenger cars was $3/vehicle-h. When updated by the 1.110 value-of-time multiplier, the October 1976 unit value of time became $3.33/vehicle-h. Running costs were updated by using the 1.134 running-cost multiplier. National Safety Council (NSC) 1976 accident cost values of $125 000/fatality, $4700/nonfatal disabling injury, and $700/property damage accident (4) were used. In urban settings, the 1976 Florida DOT discomfort and inconvenience values based on roadway operating conditions were $0/vehicle-h for levels of service A, B, and C, $0.10/vehicle-h for level of service D, $0.25/vehicle-h for level of service E, and $0.50/vehicle-h for level of service F. There is considerable debate concerning the values to be used in benefit-cost analyses for travel time, accidents, and discomfort and inconvenience, the last being the least recognized as a valid input. Although much of the benefit-cost literature does not support a willingness-to-pay approach, the AASHTO manual recommends its use (1, p. 154), and the Florida DOT believes it to be the best approach in evaluating road-user benefits against highway costs. Values of travel time are well documented, but the appropriate value to be used for this project was not certain. Since the 1975 travel-time value of $3/vehicle-h is acceptable to Florida DOT decision makers, it was used as a base value. NSC accident values are in widespread use throughout the United States and, more specifically, are used throughout the Florida DOT in safety decision making. The use of discomfort and inconvenience values based on roadway operating conditions is accepted by the Florida DOT.

A 20-year analysis period was chosen: 1980-2000. A 20-year analysis period is typically used by the Florida DOT to evaluate major highway projects. Because the Orlando Urban Area Transportation Study was under FHWA "conditionally certified" status at the time of this benefit-cost analysis, a special process had to be undertaken to obtain acceptable traffic projections through the year 2000. In order to use the 20-year analysis period and for purposes of simplicity, it was assumed that construction of the whole project would be completed by 1980 (as stated earlier, none of the project will actually be completed

anywhere near that date). The same analysis period and assumed construction completion date were also used in all other impact analyses within the environmental impact document. The study years actually used were 1981 and 2000; however, costs were converted to 1978 dollars.

Description of Project Characteristics and Estimation of Costs

Road segments in the highway network that were affected by the selection of an alternative were selected on the basis of changes in their average annual daily traffic (AADT) or average daily traffic (ADT) for a given year. Each of the four alternative corridors had 29 affected road segments, which constituted the highway network. The no-build concept consisted of 23 road segments within its network. As stated above, AADT levels were obtained from the Orlando Urban Area Transportation Study. Because of variations in the study's computer-run traffic assignments, AADT levels were adjusted as warranted to balance traffic assignments. Traffic parameters, such as the percentage of AADT that consists of trucks, were also obtained. Daily roadway capacities were derived from the 1965 Highway Capacity Manual (5). For an example, see Figure 3, which shows the year 2000 ADT levels and daily capacities of the network roads

Figure 1. Location of FL-426A project area.

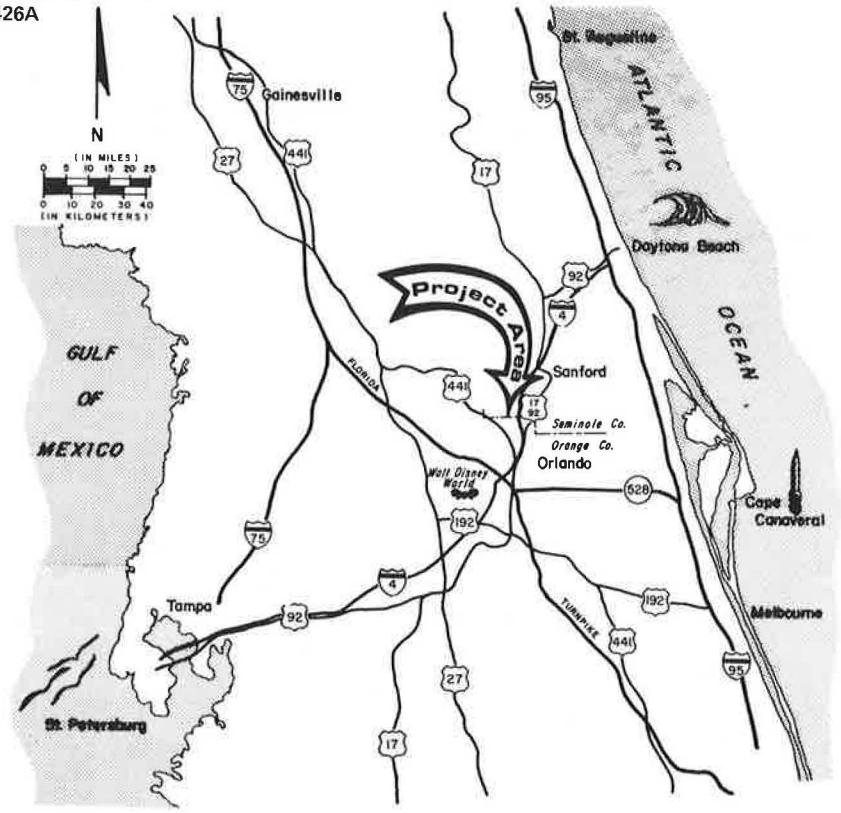
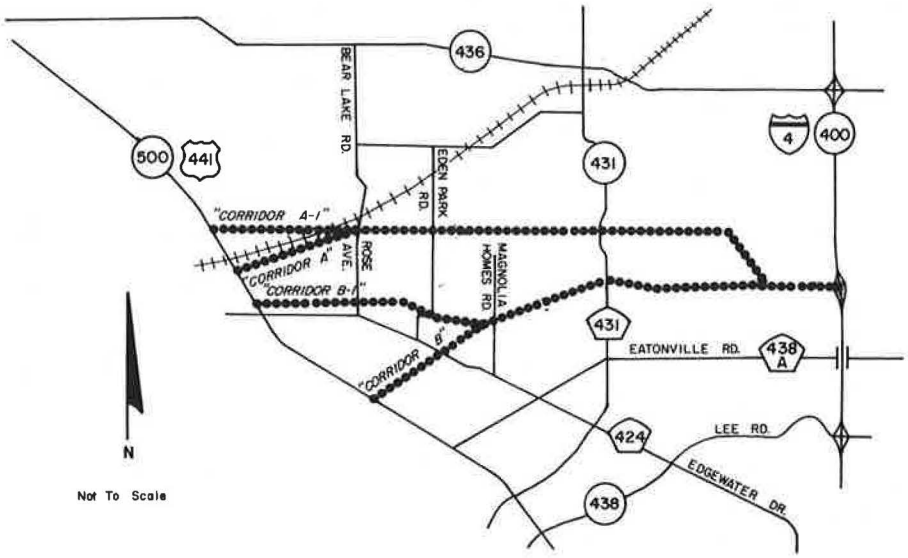


Figure 2. Alternative corridors.



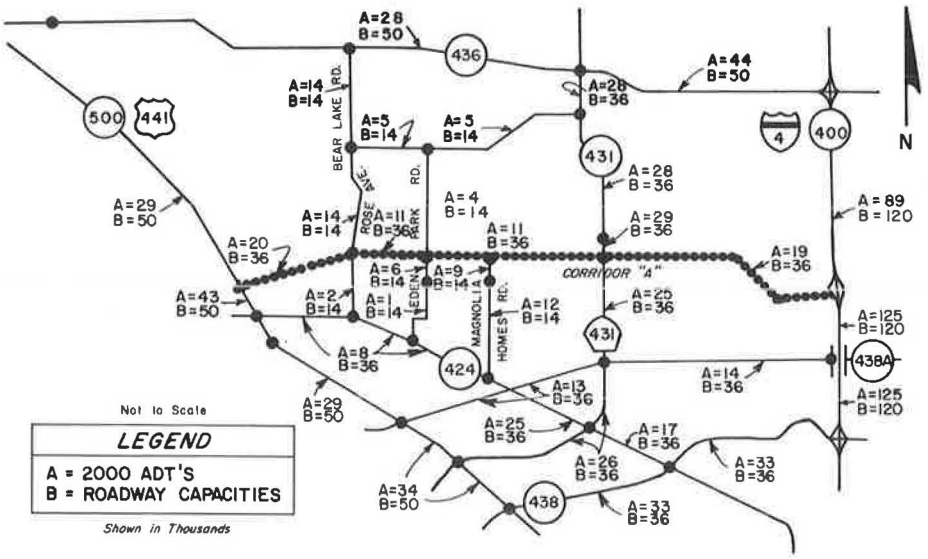


Figure 3. Year 2000 ADT levels and daily capacities of roads affected by corridor A.

Table 1. Net highway cost information for corridor A.

Highway Cost Classification	Year(s) Costs to Be Incurred	Present Worth Factor for Single Amount	Net 1978 Cost Estimate ($)	1978 Net Present Worth Cost ($)
Preliminary engineering	1978	1.0	134 000	134 000
Right-of-way	1980	0.8734	1 781 000	1 556 000
Construction	1980	0.8734	5 880 000	5 136 000
Maintenance	1981-2000	8.6479[a]	27 850	241 000
Total				7 067 000

[a]Uniform series present worth factor (10.594) times single-amount present worth factor (0.8163).

affected by corridor A implementation.

Four highway cost classifications were used: preliminary engineering, right-of-way, construction, and maintenance. The highway cost classifications given in the AASHTO manual (1, p. 37)—advance planning, preliminary engineering, and final design—were grouped together as "preliminary engineering". Operational costs were considered insignificant. Net highway cost information for corridor A is given in Table 1.

Calculation of Unit User Costs

Daily and two-way traffic volumes were used throughout the analysis to calculate basic section costs. Average running speeds were computed by using Florida DOT equations developed in the Fifth District and derived from the Highway Capacity Manual. Road surfaces were assumed to be level, and additional running costs attributable to curves were considered insignificant. Travel time, level tangent running costs, and speed-change costs for all network road segments were calculated by using the basic-section-cost nomographs given in the AASHTO manual (1, pp. 50-62). Basic section costs were also adjusted to account for the truck mix in the traffic stream by using conversion factors (1, p. 42).

Historical accident and severity rates were obtained for all of the affected network roads for which the Florida DOT had accident data. It was assumed that the remaining roads had the same accident rates as state primary roads with similar design and location characteristics. For all roads projected to be upgraded during the 20-year analysis period, accident rates were lowered by 10 percent to reflect adherence to the latest design standards. Accident cost values per 1000 vehicle miles were then calculated for all affected network road segments (since this analysis was based on U.S. customary units of distance, no SI equivalents are given).

For simplicity and to make the network analysis manageable, section transition and intersection delay costs were not considered. Level of service F traffic conditions were handled in a general way by redistributing excess traffic demand over parallel routes. Bus user costs were considered insignificant.

Calculation of User Benefits and Conversion to Annual Benefits

Daily network user costs for the five alternatives were calculated and then converted to yearly costs for the years 1981 and 2000. An excerpt from the worksheet used in the analysis for Corridor A year 2000 user costs is shown in Figure 4. Subsequent calculations of user benefits are addressed in the final step of the process.

Estimation of Residual Value

Estimating residual value is the next step in the AASHTO manual methodology. However, the Florida DOT excludes it from consideration in its analyses. The Florida DOT decision was based on the relatively small residual values obtained and the desire to simplify benefit-cost analyses.

Determination of Present Values and Economic Desirability of Project

User costs for the 20-year analysis period for each alternative were calculated by using the present worth factor (1, p. 31). Each respective corridor's user costs were then subtracted from the no-build user costs to de-

termine user benefits for each corridor, as given below:

Corridor	User Benefits ($)
A	23 579 000
A-1	18 005 000
B	8 355 000
B-1	14 255 000

Then the net present values for the four alternative corridors were computed by subtracting the respective net highway costs from the user benefits. These results are given below:

Corridor	Net Present Value ($)	Benefit/Cost Ratio
A	16 512 000	$23 579 000 ÷ $7 067 000 = 3.3
A-1	10 313 000	$18 005 000 ÷ $7 692 000 = 2.3
B	580 000	$8 355 000 ÷ $7 775 000 = 1.1
B-1	7 190 000	$14 255 000 ÷ $7 065 000 = 2.0

It can be seen above that corridor A had the greatest net present value. The Florida DOT uses benefit-cost ratio instead of net present value for benefit-cost-analysis presentations primarily because the lay person is more familiar with the former. As the table above shows, corridor A also had the greatest benefit-cost ratio. Thus, by either method, corridor A was the most economically desirable alternative.

PROJECT RESULTS

As stated above, corridor A had the greatest economic desirability of the build alternatives. It was also the corridor alternative selected for implementation. The environmental impact document for the project stressed that a benefit-cost analysis that involved only road user benefits and highway costs was merely one criterion in the approval of a project alternative. Strangely, for a new major highway route, corridors A and A-1 had only minimal adverse nonuser economic, social, and environmental effects. In fact, community and environmental interests endorsed corridor A or A-1. Thus, since virtually all factors pointed to the approval of one of the A corridors over one of the B corridors and the no-build alternative, the relative importance of the benefit-cost analysis in the overall decision-making process or in the choice of one of the A corridors is hard to determine. However, the benefit-cost analysis did play a significant role in the process of selecting either corridor A or A-1. Since the nonuser economic, social, and environmental impacts of the two corridors were generally the same, the only major factors left for evaluation were road user benefits and highway costs. Both of these factors, as well as the combination of the two, clearly indicated a preference for corridor A. It is difficult to determine whether the decision to implement corridor A was primarily a result of the benefit-cost analysis as a whole or whether one of its two major components had a greater influence. Nevertheless, the benefit-cost analysis did clearly point to the desirability of corridor A over corridor A-1 and provided a sound economic and engineering justification for the decision.

Figure 4. Portion of worksheet for corridor A year 2000 user costs.

Road Segment	Travel Time (h/1000 vehicle miles)	Updated Value of Travel Time/1000 Vehicle Miles (column 2 x $3.33/h)	Value of Discomfort and Inconvenience/ 1000 Vehicle Miles (column 2 x level-of-service values)	Updated Tangent Running Cost/1000 Vehicle Miles	Updated Speed-Change Running Cost/ 1000 Vehicle Miles	Accident Costs/1000 Vehicle Miles	Time and Running Cost/1000 Vehicle Miles (columns 3 + 5 + 6)	Adjusted Vehicle-Mix Time and Running Cost/1000 Vehicle Miles (column 8 x vehicle-mix factors)	Road Segment User Cost/1000 Vehicle Miles (columns 4 + 7 + 9)	Road Segment Length (miles)	Road Segment User Cost/1000 Vehicle Miles (columns 10 x 11)	ADT (thousands of vehicles)	Annual Road Segment User Costs (columns 12 x 13 x 365 days)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	33.0	$109.89	$ 3.30	$79.38	$5.99	$38.52	$195.26	$206.39	$248.21	1.90	$471.60	43.8	$ 7,539,000
2	27.0	$ 89.91	$ 0.00	$80.51	$3.74	$38.52	$174.16	$184.09	$222.61	3.95	$879.31	27.6	$ 8,858,000
3	21.5	$ 71.60	$ 0.00	$83.92	$5.04	$ 3.62	$160.56	$170.19	$173.81	2.25	$391.07	89.0	$12,704,000
4	37.0	$123.21	$18.50	$78.81	$15.65	$ 3.62	$217.67	$230.73	$252.85	1.80	$455.13	124.7	$20,715,000
5	37.0	$123.21	$ 9.25	$78.81	$6.33	$25.87	$208.35	$220.23	$255.35	1.80	$459.63	33.4	$ 5,603,000
...	...	...	...	...	...	...	...	...	...	...	...	...	...
25	25.5	$ 84.92	$ 2.55	$80.51	$5.78	$21.79	$171.21	$180.97	$205.31	0.60	$123.19	42.5	$ 1,911,000
26	21.5	$ 71.60	$ 0.00	$83.92	$4.01	$21.79	$159.53	$166.62	$188.41	1.40	$263.77	29.4	$ 2,831,000
27	22.0	$ 73.26	$ 0.00	$82.78	$4.55	$21.79	$160.59	$169.74	$191.53	1.40	$268.14	33.6	$ 3,288,000
28	22.0	$ 73.26	$ 0.00	$82.78	$2.11	$23.42	$158.15	$167.16	$190.58	1.70	$323.99	11.2	$ 1,324,000
29	25.5	$ 84.92	$ 0.00	$80.51	$3.74	$23.42	$169.17	$178.81	$202.23	0.70	$141.56	19.8	$ 1,023,000
											TOTAL NETWORK USER COSTS	=	$96,398,000

SENSITIVITY ANALYSIS OF INPUT DATA

In the project benefit-cost analysis, the user cost components were not isolated and a sensitivity analysis of the input data was not conducted. This was not done at the time of the analysis primarily because of the additional computational time required. However, the Florida DOT has recently computerized much of the AASHTO manual's methodology, which makes it possible to separate the user cost components and to perform sensitivity analyses with ease (6). Computerized results for the no-build alternative and corridor A user costs obtained by using the input data described in this paper are given in Table 2. The table indicates that savings in travel time produced the greatest proportion of benefits, followed by savings in vehicle running, discomfort and inconvenience, and accident costs. It should be noted that the total corridor A benefits from the computerized model ($22 236 000) varied by approximately 6 percent from the hand-calculated value ($23 579 000).

Corridor A net present values, which are a result of variations in the various input data, are given in Table 3. As the table indicates, net present values for corridor A are positive for every variation in the sensitivity analysis. Thus, for all the variations analyzed, implementation of corridor A is economically desirable.

EVALUATION OF AASHTO MANUAL METHODOLOGY

The AASHTO manual can assist economic analysts in evaluating the economic benefits and costs of highway projects that affect a highway network. However, two major drawbacks limit its effectiveness: the amount of hand calculations required to perform analyses and the probable numerical inconsistency of the results obtained by different analysts.

For the FL-426A benefit-cost analysis, a minimum of 10 000 hand calculations were done. At least 75 percent of the calculations were recalculations as a result of changes in input data, computational errors, and routine checks. Even with substantial review and checking of calculations, the FL-426A benefit-cost analysis was not free of errors. Fortunately, none of the errors discovered since the approval of corridor A would substantially alter the basic conclusion that implementation of corridor A would be economically desirable. Nevertheless, the usefulness and accuracy of the AASHTO manual methodology are lessened because of its reliance on a great number of hand calculations. The need to computerize the methodology to handle routine calculations is important and is recognized in the manual (1, p. 176). The Florida DOT has begun that task and has reached the point where all the analysis procedures used on the FL-426A project are incorporated into a computer program.

The second limitation of the AASHTO manual is the wide variability in results when different economic analysts use the methodology. Although the manual provides useful examples to illustrate various aspects of the methodology, it provides no specific guidelines for the various types of projects, and the examples are replete with simplifying assumptions. Specifically, although the manual gives an example of network effects analysis (1, p. 89), it does not provide guidelines for which simplifying assumptions are and are not desirable. Thus, by implication, the AASHTO manual allows the economic analyst great flexibility in selecting what the analyst feels are the most appropriate factors to be considered in analysis of a project. However, because the economic analyst is allowed this flexibility, considerable variations in numerical results will occur among analysts, especially as projects increase in size and scope.

It is recognized that benefit-cost analyses are not as exact as most other engineering analyses and that a step-by-step procedure to cover all situations is not practical or even desirable. The analyst must be given some flexibility in determining the appropriateness of inputs in benefit-cost studies. Nevertheless, the guidelines provided in the AASHTO manual appear to be too broad to generate reasonable uniformity of results. More specific guidelines for each type of project should be provided.

On major highway projects, the Florida DOT has provided and is continuing to provide its employees more definitive guidelines. Most of these guidelines follow the procedures of the AASHTO manual; however, as this paper has shown, some procedures are simplifications and others are not in accordance with those given in the manual.

Aside from the input values and simplifications pre-

Table 2. User costs for no-build alternative and corridor A and resulting corridor A benefits.

User Cost Component	User Costs ($)		Corridor A User Benefits	
	No-Build	Corridor A	Amount ($)	Percent
Travel time	291 153 000	277 862 000	13 291 000	59.8
Vehicle running	294 692 000	290 266 000	4 426 000	19.9
Discomfort and inconvenience	6 731 000	3 974 000	2 757 000	12.4
Accidents	62 262 000	60 500 000	1 762 000	7.9
Total	654 838 000	632 602 000	22 236 000	100.0

Table 3. Sensitivity analysis of major input values and resulting effects on net present value of corridor A.

Case	Discount Rate (%)	Travel Time Value ($/h)	Discomfort and Inconvenience Value[a] ($)	Accident Values[b]	1978 Present Worth of Residual Value ($)	Corridor A Net Present Value ($)
1	7	3.33	0.00-0.50	NSC	0	15 170 000
2	4	3.33	0.00-0.50	NSC	0	22 711 000
3	10	3.33	0.00-0.50	NSC	0	10 043 000
4	7	1.11	0.00-0.50	NSC	0	6 309 000
5	7	0.00	0.00-0.50	NSC	0	1 879 000
6	7	3.33	0.00	NSC	0	12 413 000
7	7	3.33	0.00-0.50	Manual	0	14 220 000
8	7	3.33	0.00-0.50	0	0	13 408 000
9	7	3.33	0.00-0.50	NSC	503 000	15 673 000

[a] Discomfort and inconvenience values are $0.00/vehicle-h for levels of service A, B, and C; $0.10/vehicle-h for level of service D; $0.25/vehicle-h for level of service E; and $0.50/vehicle-h for level of service F.
[b] NSC accident values are given earlier in this paper. Manual values are for road segments in a suburban location (1, p. 67).

viously referred to in this paper, with which we generally concur, we offer two other suggestions as a result of the FL-426A analysis:

1. The nomographs [primarily on pages 50-61 (1)] are too small to obtain reasonably accurate values. If benefit-cost analyses are conducted by hand, the nomographs should be enlarged significantly.
2. The calculation of a present worth factor for a stream of benefits (1, p. 31) should perhaps be changed to a present worth factor for a stream of costs involving a specific user cost component. For instance, when the sensitivity analysis for value of travel time for the FL-426A project was initially conducted, it was noted that changing that value changed the other user benefits as well as the total benefit over the 20-year study period. This occurred because the benefit received from reduced travel time did not grow at the same rate as the total user benefits and the recommended present-worth-factor formula recommended in the AASHTO manual is based solely on total yearly user benefits. It should be noted, however, that the manual does caution the use of the factor, although not for the reason stated above (1, p. 32).

In conclusion, the Florida DOT feels that the AASHTO manual is useful in conducting highway network benefit-cost analyses. When the methodology is computerized and there is greater standardization of underlying assumptions, the manual will become a more useful tool for decision makers.

REFERENCES

1. A Manual on User Benefit Analysis of Highway and Bus-Transit Improvements. AASHTO, Washington, DC, 1978, 189 pp.
2. State Project Numbers 75011-1502, 75011-1516, 77002-1501: Final Negative Declaration. Florida Department of Transportation, Tallahassee, 1978, 85 pp.
3. Bureau of Labor Statistics. CPI Detailed Report. U.S. Government Printing Office, Oct. 1976.
4. Estimating the Costs of Accidents. National Safety Council, Chicago, Traffic Safety Memo 113, July 1977.
5. Highway Capacity Manual. HRB, Special Rept. 87, 1965.
6. Benefit/Cost User's Manual. Florida Department of Transportation, Tallahassee, draft, 1979, 20 pp.

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Reducing Urban Blight: A Reconnaissance of Current Highway Experiences

Arthur Politano and Florence Mills

An exploratory study of highway improvements and the mitigation of adjacent urban blight in central business districts, undertaken as background for a more extensive study mandated by Congress in 1978, is described. Some 73 cities had undertaken or were undertaking a total of 80 highway-related projects to mitigate blight, but only material from 36 projects was complete enough to analyze further. The majority of the cited causes of blight stem from characteristics of the area where the highway is located rather than from characteristics of the highway itself. A wide variety of measures to overcome blight have been implemented or proposed, including (a) coordination of highway projects with urban renewal plans and the construction of community facilities, (b) construction of expressways and parking facilities, and (c) transportation system management measures, automobile-restricted zones, and construction of pedestrian or bicycle facilities. Specific cause-effect relations could not be determined, but causes of blight and associated mitigative measures are identified. The extensive use of highway projects in combination with urban renewal measures suggests that institutional and procedural problems are significant issues. The results of the preliminary analysis have provided a basis for a more detailed field analysis of eight case-study cities, which will be incorporated in a report to Congress that is due in November 1980.

On November 6, 1978, Congress passed the Surface Transportation Assistance Act of 1978. The law mandated the Secretary of Transportation to "conduct a study of the potential for reducing urban blight adjacent to federal-aid primary and Interstate highways located in central business districts." The Federal Highway Administration (FHWA) was given primary responsibility for conducting the study. Section 159 of the act describes the content of the study, which is to include the following:

1. Description of adverse effects on land adjacent to federal-aid primary and Interstate highways;
2. Description of mitigative measures;
3. Estimates of potential increases in the value of adjacent land;
4. Contribution to various aspects of urban life, such as employment or recreational opportunity; and
5. Financial proposals.

The report to Congress will be based on case studies now being conducted under contract. To provide a basis for selecting the case-study sites and to consolidate knowledge on the mitigation of urban blight near highways, FHWA has conducted through its field offices a reconnaissance of current experience that was deliberately limited to readily available information and published planning reports. This paper is based on the reports received as a result of the FHWA reconnaissance effort.

Most of the information available concerned the first two items required for the congressional report, and the analysis is limited to those two areas. The con-