PAVEMENT TYPE SELECTION MANUAL

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FLORIDA DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT OFFICE
605 SUWANNEE STREET, M.S. 70
TALLAHASSEE, FLORIDA 32399-0450

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UPDATES TO THIS MANUAL WILL BE ANNOUNCED ON PAVEMENT MANAGEMENT WEB SITE.

ADDRESS:http://www11.myflorida.com/pavementmanagement

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Bruce Dietrich, P.E.
State Pavement Design Engineer

PAVEMENT TYPE SELECTION MANUAL

CHAPTER 1

INTRODUCTION

1.1 PURPOSE

The objective of this manual is to provide a Pavement Design Engineer with sufficient information so that the necessary input data can be developed and proper engineering principles applied to develop a Pavement Type Selection Report. This manual addresses methods to properly develop an analysis and the computations necessary for the selection process.

1.2 AUTHORITY

Section 334.044(2), Florida Statues

1.3 SCOPE

The principle users of this manual are the District Pavement Design Engineers and District Design Engineers.

1.4 GENERAL

Chapter 334 of the Florida Statues, known as the Florida Transportation Code, establishes the responsibilities of the state, counties, and municipalities for the planning and development of the transportation systems serving the people of the State of Florida, with the objective of assuring development of an integrated, balanced statewide system.

The Code's purpose is to protect the safety and general welfare of the people of the State and to preserve and improve all transportation facilities in Florida. Under Section 334.044, the Code sets forth the powers and duties of the Department of Transportation to develop and adopt uniform minimum standards and criteria for the design, construction, maintenance, and operation of public roads.

The standards in this manual represent minimum requirements which must be met for pavement type selection of FDOT projects unless approved variances are obtained in accordance with procedures outlined in the Plans Preparation Manual, Topic No. 625-000-005.

Pavement type selection is primarily a matter of sound application of acceptable engineering criteria and standards. While the standards contained in this manual provide a basis for uniform practice for typical pavement type selection situations, precise rules which would apply to all possible situations are impossible to give.

1.5 PAVEMENT TYPE SELECTION MANUAL ORGANIZATION AND REVISIONS

1.5.1 BACKGROUND

The manual is published as a revision to the January 1, 1999 manual.

1.5.2 REFERENCES

The design procedures incorporated in this document are based on the 1993 American Association of State Highway and Transportation Officials (AASHTO) Guide for Design of Pavement Structures plus numerous National Council on Highway Research Projects (NCHRP), Transportation Research Board (TRB), and Federal Highway Administration (FHWA) publications.

The specifics addressed in this manual have been tailored to Florida conditions, materials, and policy.

1.5.3 FLORIDA CONDITIONS

A number of coefficients and variables are specified in this manual. They should be considered as standard values for typical Florida projects. There may be instances where a variance from the values would be appropriate. In these instances, the Pavement Design Engineer will stay within the bounds established by the basic AASHTO Design Guide, justify the variance, and document the actions in the Pavement Type Selection File. Some variables are still under study and revised values will be published from time to time.

1.5.4 APPENDICES

Included with this manual are 3 appendices:

Appendix	Contents
A	Pavement Type Selection Quality Control Plan
B	1993 AASHTO Guide For Design Of Pavement Structures, Appendix B, Pavement Type Selection
C	Pavement Type Selection Report Example and Discussion

1.6 DISTRIBUTION

This document is distributed through the Maps and Publications Section.

Manuals may be purchased from:

Florida Department of Transportation
Map and Publication Sales
Mail Station 12
605 Suwannee Street
Tallahassee, FL 32399-0450

Telephone (850) 414-4050
FAX (850) 414-4915
http//www11.myflorida.com/mapsandpublications

Contact the above office for latest price information. Authorized Florida Department Of Transportation personnel may obtain the manual from the above office at no charge with the appropriate cost center information.

1.7 PROCEDURE FOR REVISIONS AND UPDATES

Comments and suggestions for changes to the manual are solicited and can be submitted by writing to the address below:

Florida Department Of Transportation
Pavement Management Office
605 Suwannee Street, M.S. 70
Tallahassee, Florida
32399-0450

Each idea or suggestion received will be reviewed by appropriate Pavement Design staff in a timely manner. Items warranting immediate change will be made with the approval of the State Pavement Design Engineer in the form of a Pavement Design Bulletin.

Pavement Design Bulletins for the Pavement Type Selection Manual are numbered and distributed to

District Pavement Design Engineers. Pavement Design Bulletins have a maximum life of two hundred seventy (270) days. Within this time period either an official manual revision will be distributed or the Pavement Design Bulletin will become void.

Proposed revisions are distributed in draft form to the District Pavement Design Engineers and District Design Engineers. The District Pavement Design Engineer coordinates the review of the proposed revisions with other affected district offices. The goal is to obtain a majority opinion before revisions are made.

All revisions and updates will be coordinated with the Organization and Procedures Office prior to implementation to ensure conformance with and incorporation into the Departments standard operating system.

The final revisions and addenda will be distributed to District Pavement Design Engineers and copies provided to Maps and Publications. The date of the latest revision will be posted on the Pavement Management Office Internet Web Page with information on ordering copies from Maps and Publications.

http//www11.myflorida.com/mapsandpublications

TRAINING AND FORMS

None required.

CHAPTER 2

GENERAL INFORMATION

2.1 FEDERAL POLICY

The Federal Highway Administration's rule on Pavement Management Systems requires the Florida Department of Transportation to design pavements in a cost effective manner with engineering and economic considerations given to alternative base and surface materials.

The Department has adopted the AASHTO Pavement Type Selection Guidelines published as Appendix B, of the 1993 AASHTO Guide For The Design Of Pavement Structures.

2.2 CANDIDATE PROJECTS

This procedure is to be used to develop analysis for the pavement type selection of new construction projects and reconstruction projects where work includes a modification to the base or subbase materials.

When a two lane road is to be converted to four lanes plus a median, the project will be treated as new construction.

2.3 PAVEMENT TYPE SELECTION REPORT EXCEPTIONS

Where a lane is to be tied to an existing roadway and the same pavement type is to be used, a memo to the file documenting the decision will be satisfactory and will serve as the analysis and report. Any projects less than one mile will also not require pavement type selection documentation.

2.4 REPORTS

All reports will be developed using information provided by the Flexible Pavement Design Manual (Document No. 625-010-002) and the Rigid Pavement Design Manual (Document No. 625-010-006).

A district wide Pavement Type Selection Report will be prepared and updated at least annually by the District Design Office on each applicable major typical section type and significant cost differential area in the district.

The individual project pavement type selection decisions will be made by the District Design Engineer, or as otherwise assigned by the District Secretary. The decision can be based on the annual report or by a project specific report, if appropriate.

A careful review of each applicable project should be made to determine if the annual district wide Pavement Type Selection Report is adequate for that project.

A reference to the appropriate report will be made a part of applicable project files.

2.5 REVIEWS

The annual analysis and any project specific reports should be reviewed by the District Construction Engineer.

The Pavement Type Selection decision will again be reviewed by Design at the time the pavement is to be designed to determine if any overriding factors have changed sufficiently to warrant reconsideration. A letter to the Project Design File documenting this review is adequate.

CHAPTER 3

SUPPLEMENTARY CONSIDERATIONS

3.1 MINIMUM REQUIREMENTS

The report will address, as a minimum, all of the Principal Factors given in Appendix B of the 1993 AASHTO Guide plus the following Supplementary Considerations.

A copy of the report will be made a part of or referenced by each applicable project file.

3.2 PRINCIPLE FACTORS

The following supplementary considerations to the 1993 AASHTO Design Guide, Appendix B include the following Principle Factors.

3.2.1 SOIL CHARACTERISTICS

The availability of permeable Special Select Soils as required by Standard Index 505 should be reflected in the cost estimate for rigid pavements as well as any special drainage requirements that may be dictated by available materials for any type of pavement. The District Materials Engineer should be consulted in this analysis.

3.2.2 WEATHER

No special considerations have been noted in Florida except for concern of high rainfall conditions.

3.2.3 CONSTRUCTION CONSIDERATIONS

Special consideration should be given to features such as a high water table and shallow ditches.

3.2.4 RECYCLING

The Department has successfully recycled both flexible and rigid pavements.

3.2.5 COST COMPARISON

A analysis period of 40 years will be used with the Present Worth or the Equivalent Uniform Annual Cost analysis techniques.

3.3 SECONDARY FACTORS

The following supplementary considerations to the 1993 AASHTO Design Guide, Appendix B include the following Secondary Factors.

3.3.1 PERFORMANCE OF SIMILAR PAVEMENTS IN THE AREA

Care must be taken to insure that there is a high degree of similarity in soils, pavement structure, drainage, traffic, etc. and not just a superficial similarity.

CHAPTER 4

ECONOMIC ANALYSIS

4.1 PAVEMENT SYSTEM

This portion of the pavement type selection analysis will be performed in accordance with the procedures published in the July 1990 Life Cycle Analysis for Transportation Projects developed by the Office Of Value Engineering.

4.2 BASE DATA

The following base data can be used unless the district chooses to select and thoroughly document an alternative scenario.

4.2.1 TIME PERIODS

The following time periods will be used as a basis of computations:

- The Analysis Period will be 40 years.

- The Initial Pavement Design will be 20 years. This is based on using standard design techniques and the best available data for soils, traffic, material properties, etc. The same design reliability level will be used for each pavement type design.

4.2.2 REHABILITATION STRATEGIES

For cost analysis, use the following future rehabilitation strategies in Table 4.1. The district may want to thoroughly study and document another scenario.

These scenarios are not intended to indicate the exact future rehabilitation designs, but rather to reflect reasonable strategies and quantities for estimating life cycle cost.

The rehabilitation time intervals are based on the Florida Pavement databases, with engineering consideration given to pavement design methods and materials.

TABLE 4.1
FUTURE REHABILITATION STRATEGIES

Concrete Pavement

Rehab Period	Urban Arterial	Rural Arterial and Limited Access
20 year	CPR (3% Slab Replacement)	CPR (3% Slab Replacement)
30 year	CPR (5% Slab Replacement)	Crack, Seat and overlay ARMI 4” (100 mm) Str. AC and FC

Asphalt Pavement

Rehab Period	Urban Arterial	Rural Arterial	Limited Access
14 year	Mill 2”(50 mm) Resf.1”(30 mm) Str. AC and DGFC	Mill 2”(50 mm) Resf.3”(80 mm) Str. AC and FC	Mill 3”(80 mm) Resf.4”(100 mm) Str. AC and OGFC
28 year	Mill 2”(50 mm) Resf.1”(30 mm) Str. AC and DGFC	Mill 2”(50 mm) Resf.3”(80 mm) Str. AC and FC	Mill 3”(80 mm) Resf.4”(100 mm) Str. AC and OGFC

Where:

CPR - Concrete Pavement Rehabilitation
ARMI - Asphalt Rubber Membrane Interlayer
Str. AC - Structural Asphaltic Concrete
DGFC - Dense Graded Friction Course
OGFC - Open Graded Friction Course
FC - Friction Course (appropriate for facility)

4.2.3 DESIGN AND COST ASSUMPTIONS

The following design and cost assumptions apply when using these or any other rehabilitation strategies.

- A discount rate of 5% will be used.
- The cost of shoulder construction and rehabilitation will be considered in the economic analysis.
- Salvage value, remaining life and maintenance costs will not be considered.
- User costs will not be considered.

4.2.4 FLEXIBLE PAVEMENT ASSUMPTIONS

The following flexible pavement assumptions apply when using these or any other rehabilitation strategies.

- Milling will remove cracked pavement and an ARMI will not be required.

4.2.5 RIGID PAVEMENT ASSUMPTIONS

The following rigid pavement assumptions apply when using these or any other rehabilitation strategies. Concrete Pavement Rehabilitation will include the following:

- Slab Replacement
- Cleaning and Resealing the Joints
- Routing and Sealing Random Cracks
- Spall Repair
- Grinding

4.3. EXCEPTIONS

When the design engineer deviates from the future rehabilitation strategies provided, an adequate data base must be provided from the District Pavement Management Section.

A pavement history of both types of pavements (flexible and rigid) must be provided in the appendix of the report. This report can be based on system type roads (ie. Interstate history only for an Interstate Pavement analysis).

Engineering considerations must also be given for improvements in design procedures and specifications from the historical pavements (ie. for example, improvements in rut resistance for flexible pavements and drainage for rigid pavements)

APPENDIX A

PAVEMENT TYPE SELECTION QUALITY CONTROL PLAN

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A.1 QUALITY CONTROL PLAN

All Pavement Type Selection Reports will be reviewed independently for accuracy and correctness. The following quality control plan is provided as a guideline.

A.2 DEFINITIONS

The following definitions are used throughout this section.

Quality

Conformance to policies, procedures, standards, guidelines and above all, good engineering practice.

Quality Assurance

Consists of all planned and systematic actions necessary to provide adequate confidence that a design, structure, system, or component will perform satisfactorily and conform with project requirements.

Quality assurance involves establishing project related policies, procedures, standards, training, guidelines, and systems necessary to produce quality.

Quality Control

This is the checking and review of designs and plans for compliance with policies, procedures, standards, guidelines and good engineering practice.

A.3 RESPONSIBILITY

The district offices are responsible for Quality Control. Quality Assurance is the role of the Central Office.

A.4 PAVEMENT TYPE SELECTION REPORTS

Pavement Type Selection Reports will be developed in accordance with the Pavement Type Selection Manual (Document No. 625-010-005). Supporting data will be included in the report file.

A.4.1 MINIMUM REQUIREMENTS

The Pavement Type Selection Report as a minimum will include the following items:

- Typical section types and geographical cost locations if different than the district boundary.
- Unit price and quantities per centerline mile used in estimates.
- Summary
- Information Sources

A.4.2 DISTRIBUTION

In addition to retaining the original documentation in the District Design Office, one copy of the approved annual Pavement Type Selection Report with supporting documentation will be transmitted to the State Pavement Design Engineer each year.

Central Office approval of the Pavement Type Selection Report is not required. Pavement Type Selection Reports will be monitored and periodically reviewed, in detail, for quality assurance and for purposes of identifying and improving design policies, procedures, standards and guidelines.

For Federal Aid Projects not covered by Certification Acceptance, two copies of the current approved Pavement Type Selection Report and one copy of the supporting documentation, will be forwarded directly to the appropriate Federal Highway Administration (FHWA) District Engineer for FHWA concurrence.

The District will deal directly with the FHWA to resolve any questions. Central Office Pavement Management will be available for assistance if requested by the District or FHWA. The FHWA will return directly to the District one copy of the summary sheet with signature denoting concurrence. This copy will be filed in the District Project Design file.

A.4.3 REVISIONS

Changes made subsequent to formal distribution will require that a revision letter to the report be prepared, a copy of which shall be signed and sealed, distributed, and filed for permanent record in the report file.

Minor changes may be noted in type or ink on the original Pavement Type Selection Report with the responsible Professional Engineer's initials and the date of change. A copy of the revised original should then be signed, dated, sealed and filed for permanent record.

Major changes may require that a complete new Pavement Type Selection Report be prepared and processed, in which case it shall note that it supersedes a previous report.

A.4.4 DOCUMENTATION

The rational for selection should be clearly documented in the Pavement Type Selection Report.

The reports do not need to be lengthy or overly verbose. Rather, they should focus on reasonable cost estimates and a concise presentation of the analysis.

On projects where the policy is deviated from (ie. Research projects), the reasons should be clearly documented in the Pavement Design Package.

A.5 DISTRICT QUALITY CONTROL

The quality control process will include three activities:

- The checking and review of annual Pavement Type Selection Reports for compliance with policies, procedures, standards, guidelines and good engineering practice.

- The checking and review of individual project determinations of annual report applicability.

- Documentation of the Quality Control Process.

The Quality Control Process will be carried out by an independent qualified Professional Engineer. As a minimum, the documentation will consist of a copy of the Quality Control Checklist filed with the annual Pavement Type Selection Report, or a Pavement Type Selection Applicability Quality Control File maintained by project number order consisting of:

- A copy of a memo referencing the annual report that it is applicable to this project or a copy of the signed and sealed project specific Pavement Type Selection Report.
- A copy of the Quality Control Checklist signed by the Quality Control Engineer.

A sample checklist is attached.

A.6 QUALITY ASSURANCE REVIEWS

The State Pavement Design Engineer will be responsible for conducting and/or coordinating all pavement related Quality Assurance activities within each District. A Quality Assurance review of District Pavement Type Selection activities will generally be conducted annually.

PAVEMENT TYPE SELECTION APPLICABILITY
QUALITY CONTROL CHECKLIST

Finan. Proj. ID. ___________ Federal Aid No.__________

State Rd.No. _______________ County _________________

Flexible Pavement Design Review	Satisfactory Yes/No
Pavement Type Selection Applicability Review . . .	_____
Pavement Type Selection Summary (if annual report not applicable	_____
Project Location and Description	_____
Coordination with Other Offices.	_____

Comments

QC by _____________________ Date ___________________

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APPENDIX B

1993 AASHTO GUIDE FOR THE DESIGN OF PAVEMENT STRUCTURES, APPENDIX B, PAVEMENT TYPE SELECTION

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APPENDIX B
PAVEMENT TYPE SELECTION GUIDELINES

B.1 GENERAL

The highway engineer or administrator does not have at his disposal an absolute or undisputable method for determining the type of pavement which should be selected for a given set of conditions. However, the selection of pavement type should be an integral part of any pavement management program.

The selection of pavement type is not an exact science, but one in which the highway engineer or administrator must make a judgement on many varying factors such as traffic, soils, weather, materials, construction, maintenance, and environment. The pavement type selection may be dictated by an overriding consideration for one or more of these factors.

The selection process may be facilitated by comparison of alternate structural designs for one or more pavement types using theoretical or empirically derived methods. However, such methods are not so precise as to guarantee a certain level of performance from any one alternate or comparable service for all alternates.

Also, comparative cost estimates can be applied to alternate pavement designs to aid in the decision making process. The cost for the service of the pavement would include not only the initial cost but also subsequent cost to maintain the service level desired. It should be recognized that such procedures are not precise since reliable data for maintenance, subsequent stages for construction, or corrective work and salvage value are not always available, and it is usually necessary to project costs to some future point in time. Also, economic analysis are generally altruistic in that they do not consider the present or future financial capabilities of the contracting agency.

Even if structural design and cost comparative procedures were perfected, they would not by their nature encompass all factors which should be considered in pavement type determination. Such a determination should properly be one of professional engineering judgement based on the consideration and evaluation of all factors applicable to a given highway section.

The factors which may have some influence in the decision making process are discussed below. They are generally applicable to both new and reconstructed pavements.

One group includes those factors which may have major influence and may dictate the pavement type in some instances. Some of the major factors are also incorporated in the basic design procedures and influence the structural requirements of the pavement design or subgrade and embankment treatments. In such cases they are assigned an economic value for comparative purposes.

The second group includes those factors which have a lesser influence and are usually taken into account when there are no overriding considerations or one type is not clearly superior from an economic standpoint. A flow chart of pavement selection procedure incorporating the major and secondary factors is shown in Figure B.1.

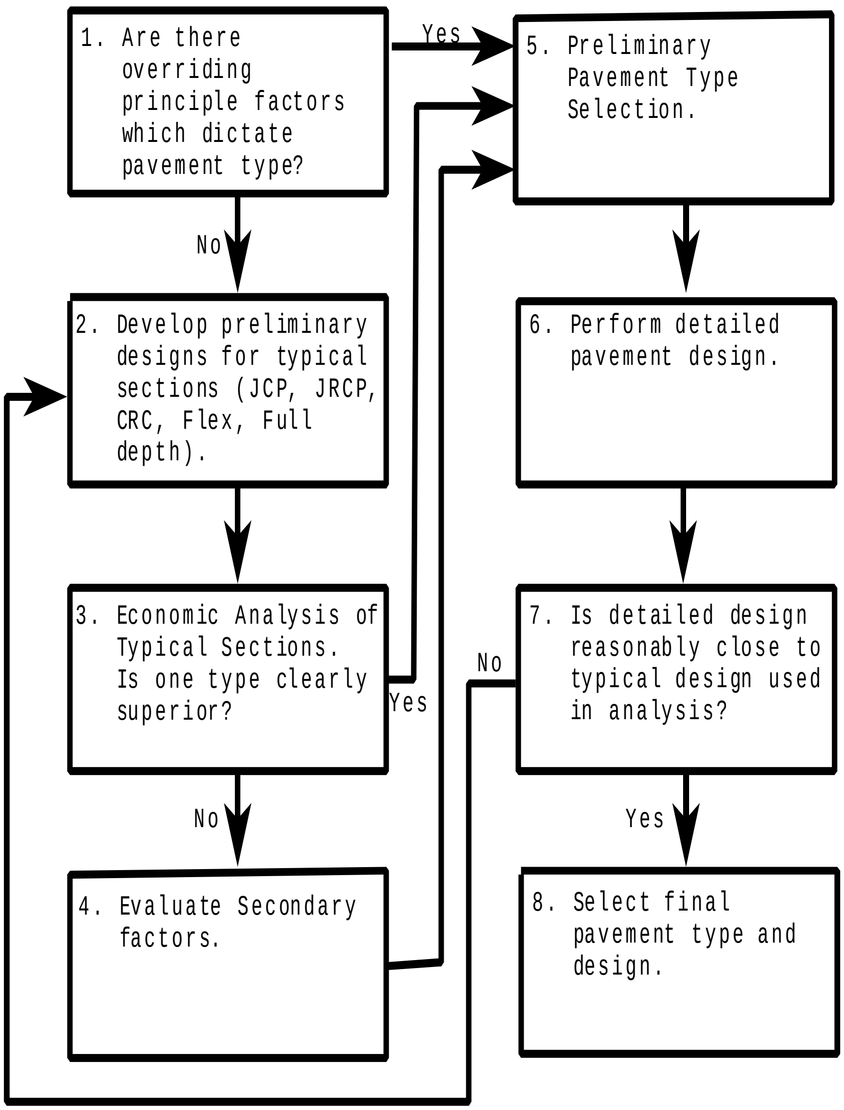
B.2 PRINCIPAL FACTORS

B.2.1 TRAFFIC

While the total volume of traffic affects the geometric requirements of the highway, the percentage of commercial traffic and frequency of heavy load applications generally have the major effect on the structural design of the pavement.

Traffic forecasts for design purposes have generally projected normal growth in the immediate corridor with an appropriate allowance for changes in land use and potential commercial and industrial development. However, experience over the past several decades has shown that the construction of new major highway facilities diverts large amounts of heavy traffic form other routes in a broad traffic corridor.

FIGURE B.1
PAVEMENT TYPE SELECTION PROCESS



This, coupled with a decline the quantity of railroad services, has resulted in a considerable underestimation of traffic growth, particularly commercial traffic. Also, the future availability and cost of motor fuels could result in increased legal loads to which pavement structures could be subjected during their design period.

For these reasons, pavement designs for major facilities should incorporate an appropriate margin of safety in the traffic factor. Agencies may choose to establish minimum structural requirements for all alternate pavement types to ensure adequate performance and service life for major facilities. Alternate strategies, or combinations of initial design, rehabilitation and maintenance, can be developed to provide equivalent service over a given period of time although the initial designs are not equivalent.

For heavily traveled facilities in congested locations, the need to minimize the disruptions and hazards to traffic may dictate the selection of those strategies having long initial service life with little maintenance or rehabilitation regardless of relative economics.

B.2.2 SOILS CHARACTERISTICS

The load-carrying capability of a native soil, which forms the subgrade for the pavement structure, is of paramount importance in pavement performance. Even in given limited areas the inherent qualities of such native soils are far from uniform, and they are further subjected to variations by the influence of weather.

The characteristics of native soils not only directly affect the pavement structure design but may, in certain cases, dictate the type of pavement economically justified for a given location. As an example, problem soils that change volume with time frequently require stage construction to provide an acceptable riding surface.

B.2.3 WEATHER

Weather affects subgrade as well as the pavement wearing course. The amount of rainfall, snow and ice, and frost penetration will seasonally influence the bearing capacity of subgrade materials.

Moisture, freezing and thawing, and winter clearing operations will affect pavement wearing surfaces as to performance and maintenance costs. The surfaces, in turn, will have some effect on the ease of winter clearing operations due to differences in thermal absorption or to the ability of the pavement to resist damage from snow and ice control equipment or materials.

In drawing upon the performances record of pavements elsewhere, it is most important to take into consideration the conditions pertaining to the particular climatic belt.

B.2.4 CONSTRUCTION CONSIDERATIONS

Stage construction of the pavement structure may dictate the type of pavement selected. Other considerations such as speed of construction, accommodating traffic during construction, ease of replacement, anticipated future widening, seasons of the year when construction must be accomplished, and perhaps others may have a strong influence on paving type selections in specific cases.

B.2.5 RECYCLING

The opportunity to recycle material from an existing pavement structure or other sources may dictate the use of one pavement type. Future recycling opportunities may also be considered.

B.2.6 COST COMPARISON

Where there are no overriding factors and several alternate pavement types would serve satisfactorily, cost comparison can be used to assist in determining pavement type.

Unavoidably, there will be instances where financial circumstances are such as to make first costs the dominate factor in selection, even though higher maintenance or repair costs may be involved at a later date. Where circumstances permit, a more realistic measure is cost on the basis of service life or service rendered by a pavement structure. Such costs should include the initial construction cost, the cost of subsequent stages or corrective work, anticipated life, maintenance costs, and salvage value.

Costs to road users during periods of reconstruction or maintenance operations are also appropriate for consideration. Although pavement structures are based on an initial design period, few are abandoned at the end of that period and continue to serve as part of future pavement structure. For this reason, the analysis period should be of sufficient duration to include a representative reconstruction of all pavement types.

B.3 SECONDARY FACTORS

B.3.1 PERFORMANCE OF SIMILAR PAVEMENTS IN THE AREA

To a large degree, the experience and judgment of the highway engineer is based on the performance of pavements in the immediate area of his jurisdiction. Past performance is a valuable guide, provided there is good correlation between conditions and service requirements between the reference pavements and the designs under study.

Caution must be urged against reliance on short term performance records, and on those long term records of pavements which may have been subjected to much lighter loadings for a large portion of their present life. The need for periodic reanalysis of performance is apparent.

B.3.2 ADJACENT EXISTING PAVEMENTS

Provided there is no radical change in conditions, the choice of paving type on highway may be influenced by adjacent existing sections which have given adequate service. The resultant continuity of pavement type will also simplify maintenance operations.

B.3.3 CONSERVATION OF MATERIALS AND ENERGY

Pavement selection may be influenced by the pavement type which contains less of a scarce critical material or the type whose material production, transportation, and placement requires less energy consumption.

B.3.4 AVAILABILITY OF LOCAL MATERIALS OR CONTRACTOR CAPABILITIES

The availability and adaptability of local material may influence the selection of pavement type. Also, the availability of commercially produced mixes and the equipment capabilities of area contractors may influence the selection of pavement type, particularly on small projects.

B.3.5 TRAFFIC SAFETY

The particular characteristics of wearing course surface, the need for delineation through pavement and shoulder contrast, reflectivity under highway lighting, and the maintenance of a nonskid surface as affected by the available materials may each influence the paving type selection in specific locations.

B.3.6 INCORPORATION OF EXPERIMENTAL FEATURES

In some instances, the performance of material or design concepts must be determined by field testing under actual construction, environmental, or traffic conditions. Where the material or concept is adaptable to only one paving type, the incorporation of such experimental features may dictate pavement type selection.

B.3.7 STIMULATION OF COMPETITION

It is desirable that monopoly situations be avoided, and that improvement in products and methods be encouraged through continued and healthy competition among industries involved in the production of paving materials.

Where alternative pavement designs have comparable initial cost, including the attendant costs of earthwork, drainage facilities, and other appurtenances, and provide comparable service life of life-cycle cost, the highway agency may elect to take alternate bids to stimulate competition and obtain lower prices. If this procedure is used, it is essential that good engineering practices and product improvement are not abandoned for the purpose of making cost more competitive.

Where several materials will adequately serve as a component within the pavement structure, such as a subbase or base course, contractors should be permitted the option of using any of the approved materials.

B.3.8 MUNICIPAL PREFERENCE, PARTICIPATING LOCAL GOVERNMENT PREFERENCE AND RECOGNITION OF LOCAL INDUSTRY

While these considerations seem outside the realm of the highway engineer they cannot always be ignored by the highway administrator, especially if all other factors involved are indecisive as to the pavement type.

B.4 CONCLUSION

In the foregoing, there have been listed and discussed those factors and considerations which influence, to various degrees, the determination of paving types. This has brought to the fore the need, in certain areas, for the development of basic information that is not available at present. It has also served to point out, in general, that conditions are so variable and influences sufficiently different from locality to necessitate a study of individual projects in most instances.

APPENDIX C

PAVEMENT TYPE SELECTION REPORT EXAMPLE

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SAMPLE MEMORANDUM (and discussion)

From: Preparer

To: District Design Engineer

Subject: Pavement Type Selection
Project or Typical Section Description

The following information has been developed in order to evaluate the type of pavement most appropriate for this typical section and area or project. The report follows the outline given in Appendix B of the 1993 AASHTO Guide for the Design of Pavement Structures.

Principal Factors

Traffic: Most of the time this will not be a determining factor. But, if this is a heavily trafficked project and a long initial service life is desired, for instance an urban freeway, and there has been good experience with one pavement type or the other, this could be an overriding factor. Otherwise, the memo would state that either type of pavement could be constructed satisfactorily.

Soils: Because of the requirement to place select materials beneath all pavement types, soil is normally not an overall determining factor. However, the availability of permeable special select soils is important for the selection of the type of embankment and drainage typical section for rigid pavements and should be evaluated with input from the District Materials Engineer. This could be a determining factor, but it probably is more properly reflected in the economic analysis.

Weather: This will probably not be an overriding factor in Florida. The memo should say that either pavement type could be constructed satisfactorily.

Construction: An overriding factor could occur here. If stage construction (pavement thickness or number of lanes) is planned due to funding or some other constraint, it may dictate that one or the other pavement type may be selected. Maintenance of traffic, now and in the future and constructability may or may not justify being considered an overriding factor, but also could indicate a preference.

Recycling: Florida has successfully recycled both AC and PCC. This in itself will probably not be a determining factor, but could be reflected in the ecomnomic analysis. For instance a reconstruction project could in itself be a potential source of construction material. If recycling is a part of the plan, there should be reasonable assurance that the materials will meet the applicable specifications.

Cost: Most pavement type selection reports will include an economic analysis. It is highly recommended that the standard, FHWA approved procedures be followed. The economic analysis should be an attachment and a summary of the results included in the memo report at this point.

If a conclusion has been reached based on the Principal Factors, a recommendation on pavement type can be made at this point. If necessary, a discussion of Secondary Factors can also be made.

Secondary Factors

Performance of Similar Pavements: In some instances this could almost be an overriding factor, especially if the experience has been bad for some reason that can not be overcome through proper design.

Adjacent Pavements: In order to avoid a checkerboard of pavement types, or to minimize future maintenance difficulties, a preference for a particular pavement type may be warranted. This could occur where you have a project between existing roadways or where you are adding lanes, for instance, going from two lanes to four lanes and median.

The next several factors; conservation of materials and enrgy, local materials, contractors capabilities, can be discussed, but are probably just as well reflected in the economic analysis. It is not necessary to discuss every secondary factor.

Traffic Safety: This could be a factor at some specific sites where time or space is limited or some unique condition exists.

Experimental Features: This could be an overriding factor, especially if the entire project is an experiment. In this case a Pavement Type Selection Report is probably unnecessary. A brief memo to the file describing the project and recommendation for research, with signature approval by the District Design Engineer should be sufficient.
Stimulation of Competition: This is a policy issue that could be addressed by a District Secretary. If it is

desireable, it could be an overriding factor.

Local Preference: This could be an overriding issue if the FDOT is going to turn the road over to a local government following construction.

Recommendation: Based on the above, it is recommended that (concrete/asphalt) be used in the construction of this project. The economic analysis will be reviewed again after the pavement design is completed.

Approved: District Design Engineer, PE   Date:_______

PAVEMENT TYPE SELECTION

ECONOMIC ANALYSIS

COMPUTATION SHEET

	COST		P/F		PRESENT WORTH
PCC					
Initial	______________	*	(1.00000)	=	______________
20 yr.	______________	*	(0.37689)	=	______________
30 YR.	______________	*	(0.23138)	=	______________
	Total Present Worth			=	______________
AC					
Initial	______________	*	(1.00000)	=	______________
14 yr.	______________	*	(0.50507)	=	______________
28 yr.	______________	*	(0.25509)	=	______________
	Total Present Worth			=	______________

Costs should be calculated in present day dollars.

Discount rate used is 5%.