2 Policies and Required Considerations in the Pavement Design Process

2.1 General Policy (GP) Statements
2.2 Policy on Selecting the Correct AKFPD Design Procedure
2.3 Policy on Base Course Stabilization
2.4 Policy on Life Cycle Cost Analysis

2.1 General Policy (GP) Statements

GP-1 Prepare a pavement design analysis for all highway projects requiring pavement construction, reconstruction, rehabilitation or resurfacing on arterials and interstates. (See Section 2.2.4 for non-highway designs)

GP-2 The pavement design method presented in this manual is the standard for flexible highway pavement designs for the Alaska DOT&PF.

GP-3 The regional preconstruction engineer is responsible for the final pavement design.

GP-4 If cost-effective, design pavement structures such that no seasonal load restrictions are needed.

GP-5, GP-6 and GP-7 refer to construction, reconstruction, and rehabilitation projects.

GP-5 For projects with design average annual daily traffic (AADTs) volumes ≥ 10,000 without curb and gutter:

- Use Alaska Renewable Pavement (see Section 7.4.3).
- Use a 15-year design life for both the fatigue failure criterion and the functional failure criterion (see Section 4.3.2).

GP-6 For projects with AADTs < 10,000 without curb and gutter and for projects with AADTs < 5,000 with curb and gutter:

- Use no less than one layer of binder course, asphalt-treated base, or other stabilized base (see Section 7.4).
- Use a 15-year design life for both the fatigue failure criterion and the functional failure criterion (see Section 4.3.2).

GP-7 For projects with AADTs > 5,000 with curb and gutter:

- Use Alaska Renewable Pavement (see Section 7.4.3).
- Use a 30-year design life for the fatigue failure, (TAI equation, see Section 4.3.2).
- Use a 15-year analysis period for the functional failure analysis (Per Ullidtz equation, see Section 4.3.2).

GP-8 The minimum design life of resurfacing projects using the Alaska Renewable Pavement will be not less than 15 years for both fatigue life and functional failure.

GP-9 Surface treatments may be used if any of the following conditions are met:

- AADT < 1,000.

- Life-cycle cost analysis supports their use.
- Unstable foundations underlie more than 60% of the project.
- Approved by the regional preconstruction engineer.

GP-10 On arterials and interstates, use 2.0 inches as the minimum thickness of asphalt concrete for new pavement designs or pavement designs that involve complete replacement of the old asphalt concrete layer.

GP-11 Use 1.5 inches as the minimum thickness of new asphalt concrete overlay placed on an existing layer of asphalt concrete, or two times the maximum aggregate size, whichever is greater.

GP-12 Designs utilizing the AKFPD software will be performed by personnel (DOT&PF staff or consultant) trained in its use.

GP-13 In case of reconstruction or resurfacing of a paved roadway, consider recycling or reusing the existing asphalt concrete material in the new structure.

GP-14 Use hard aggregate in the wearing surface of high-volume roadways (AADT per lane in the construction year ≥ 5,000), exhibiting studded-tire wear. Hard aggregate is defined as an aggregate with a Nordic Abrasion Value (ATM 312) of 8.0% or less.

Hard aggregate may also be used in the wearing course when the “AADT per lane” is lower than 5,000, if there is a history of pavement rutting due to studded tire wear or when repaving an existing wearing course that incorporates hard aggregate.

Hard aggregate is not required for: temporary paving, or if it is expected to be replaced within five years, or where the roadway is underlain with unstable foundation, or where it can be demonstrated that studded tire abrasion is not a significant cause of rutting.

2.2 Policy on Selecting the Correct AKFPD Design Procedure

2.2.1 For Designing New Highway Pavements with ESALs < 1.0 Million

The excess fines method **may be used** for designing flexible highway pavement structures if:

1. The flexible surfacing material is composed of a standard form of asphalt concrete (no inclusions of unusual aggregate types or modified asphalt cements), and
2. The P_{200} content of all non-surfacing materials within the pavement structure falls within limits allowable by the excess fines design method.

The mechanistic method **may be used** for design work or for checking excess fines designs if the project’s available materials meet criteria 1 and 2 listed above.

The mechanistic method **must be used** if the project’s available materials do not meet criteria 1 and 2 listed above, or if the pavement structure incorporates one or more stabilized base course layers.

2.2.2 For Designing New Highway Pavements with ESALs > 1.0 Million

Use the mechanistic method.

2.2.3 For Designing Overlays of Existing Highway Pavements

Use the mechanistic method.

1. Do not overlay existing pavements if more than 80% of fatigue life of the existing pavement is exhausted (the AKFPD program determines this mechanistically based on historical traffic).
2. Do not overlay extensively cracked pavements, typically 20% or more of the surface cracked. Assume that all cracks in the existing pavement will reappear in the overlay within two years after the overlay is placed.

2.2.4 For Non-Highway Pavement Designs

Either the excess fines method, mechanistic method or other method approved by the regional preconstruction engineer may be used for designing flexible non-highway pavement structures, regardless of design vehicle type and/or available materials. These types of pavement structures can include asphalt sidewalks, paths, and parking/staging areas. For aviation pavement design on federally funded projects, use FAA's latest version of FAARFIELD software and its accompanying Advisory Circular 150/5320-6 series.(8)

2.3 Policy on Base Course Stabilization

It is the Department's policy to use stabilized bases on roadway construction, reconstruction, and rehabilitation projects where cost-effective.

In developing flexible pavement designs incorporating stabilized bases, refer to policies GP5, 6 and 7 in Section 2.1. In addition, use the following:

1. *Alaska's Soil Stabilization Manual, 2014 Update*, Report No. 60392(9), and
2. The definition of stabilized layers as found in Section 7.4 of this manual.

Exceptions to this policy are as follows:

Projects exempted in writing by the regional preconstruction engineer. Rationale for an exemption may include:

- Projects with a low AADT.
- Areas underlain by unstable foundations such as ice-rich permafrost, where settlement results in frequent maintenance.
- Projects for which a stabilized base will not provide a cost-effective improvement in the pavement performance, reduced maintenance, or reduced future rehabilitation costs through a comprehensive life-cycle cost analysis. The analysis period of the life-cycle cost analysis shall be 35 years.
- Projects where matching existing, adjacent pavement, such as adding passing or turning lanes, pullouts, or short stretches.
- Roadways designed on behalf of agencies other than DOT&PF.

2.4 Policy on Life-Cycle Cost Analysis

Life-cycle cost analysis (LCCA) is a method to compare costs of alternative design over time. Concepts of engineering economics are used to calculate the net present value of costs for each of the alternatives being considered, including not only first cost but also any preservation, rehabilitation, and reconstruction costs over the analysis period. Accurate LCCA requires a good understanding of all significant cost differences between the alternatives being evaluated.

LCCA should be considered when evaluating alternative pavement designs, especially on exceptionally large projects or projects with significantly different pavement alternatives, in which the incremental costs between alternatives can be accurately forecast. LCCA of pavement design alternatives may be required on certain projects, as directed by the regional preconstruction engineer.

Many factors impact the selection of a design strategy, including safety, local needs, available materials, environmental concerns, and appearance. Economic considerations are but one of the factors in such a decision. The method outlined in Chapter 8 provides a rational, straightforward means for analyzing the initial and future costs of pavement construction. Some social, safety or political issues may not be quantifiable according to the standard economic analysis concepts presented in the LCCA chapter. Such issues may nevertheless weigh heavily – even critically – on selecting a pavement design alternative.