

PAVEMENT TYPE SELECTION

FDOT RULE MAKING

Comments by: Jamshid Armaghani, Ph.D., P.E.

I. COMMENTS ON CURRENT PTS MANUAL

1. Item 1.5 of the PTS manual is designed to stimulate healthy competition among the two industries. This would benefit the taxpayers, the Department and industry. It is our hope that the new rules will set the necessary parameters for a fair competition toward a two pavement system.
2. Several unnecessary limitations and exceptions are imbedded in Items 2.2 and 2.3 of the PTS that exclude the consideration of concrete pavements in majority of cases. The PTS is limited to new pavements and reconstruction that involves modification to base/subbase material. This is an implicit exclusion of concrete overlays of asphalt (Whitetopping) option. Also, PTS is not required for friction course resurfacing. This is a more frequent recurrence on the interstate system with substantial cost to the Department. Any resurfacing project should qualify for PTS. A third case is Lane widening. This type of project should also be a candidate for PTS, since road widening is a result of significant increase in traffic load and volume that in many cases can't be well predicted. Concrete pavement options need to be considered in PTS including overlays on existing lanes and full depth in the additional lane.
3. The designs are not equivalent as concluded by Dr. Darter in his independent evaluation report of current PTS manual. The Department designs asphalt and concrete pavements for 20 years prior to first maintenance. Asphalt pavements are resurfaced at or less than 14 years. Concrete pavements outlast their design life by at least 7 to 10 years prior to requiring the first rehabilitation. Obviously there is an imbalance that must be rectified under the new Rules.
4. Concrete pavements which are designed according to the current FDOT's conservative design outperform the 20-year design life by at least 7 to 10 years prior to any planned rehabilitation. Yet current PTS assumes that the first rehabilitation is at 20 years and the second at 30 years. The second rehabilitation event occurs in less time than the second asphalt resurfacing cycle of 14 years. Dr. Darter acknowledged this shortcoming in the PTS. The MEPDG is the best tool to predict the first Rehabilitation event, since there are

not many examples of paving projects designed according to the improved FDOT design procedures since the mid 1980s.

5. Table 4.1 should specify percent area of concrete to be replaced as a ratio of the total area of the pavement rather than percent slab replacement. For example, the rehabilitation of I-75 in the Tampa area assumes 2.8% of the slabs are to be removed. In fact only 1.7% of the total pavement area of the project will be replaced. Of the replaced area 80% of the replaced sections are in the joint areas to fix minor spalls at joints. Area of replaced concrete would a true representation of the quantities and costs in the LCCA.
6. The option of crack and seat and overlay must be removed from Table 4.1. No such treatment has been used in modern concrete paving projects. There is no justification for this treatment at a time where the new MEPDG is used and significant advances in pavement structure and joint details have taken place.
7. The issue of salvage value has to be revisited in the PTS for concrete pavement. There is residual life to concrete as an in-place layer. Salvage value has to be determined for both pavements. Dr. Darter acknowledged this fact.
8. The PTS does not account for the damage to asphalt between the second resurfacing event at 28 years and the 40 year (end of LCCA period). The asphalt at the age of 40 has almost reached its deficient stage. Resurfacing cost for the third cycle has to be included and prorated for 12 years.
9. User Costs in the current PTS are not reliable or realistic. They were not derived from Florida projects. A research has to be initiated with participation of contractors to establish more realistic delay costs and lane closure days.
10. The LCCA period of 40 years is an arbitrary time period. Pavements in many states are now being designed for a 50-year life. The new PTS should allow the flexibility to deviate up or down from the 40-year LCCA period. Some strategic long-life pavements need to be analyzed for a 50-year cycle similar to most bridges and tunnels. Dr. Darter pointed out this issue in his report.

II. PROPOSALS FOR NEW PTS RULES

1. A Rule is needed to set the time period very early in the planning cycle to perform the initial PTS and set another time in the planning process to perform verification to confirm or change the initial pavement type selection.
2. Certain sections of the interstate, state roads, busy urban highways, SIS as well as ramps and connectors to major interchanges are more suited for concrete. These sections can be characterized by the huge ESAL or truck counts; the need for less frequent maintenance and lane closures; or by the fact that they can perform without maintenance for much longer period of time as feeder-connectors to interchanges with similar design life. District 2 has wisely acknowledged the use of concrete in approaches, ramps and feeder connectors leading to interchanges. A Rule need to be established that sets criteria for PTS exceptions for concrete in above mentioned cases similar to exceptions given for the asphalt pavements.
3. A Rule is needed to address the secondary factors that can have significant impact on performance/resurfacing life of some pavements. One important factor is the uncertainty in future truck growth in some state roads and interstate sections. This issue is even more important now with the recent legislation to raise the truck weight limit to 88,000 lb that has a high potential for shortening the resurfacing cycle on some state roads. The Rule would address design options with different materials.
4. A Rule is needed to establish the criteria and selection of projects for alternate bid projects. Alternate bidding must be considered in the PTS for projects where both pavement types appear to be viable options. The criteria and selection of the projects should not give undo advantage to one pavement over the other. The Rule would include requirement for industry review and comments at early project selection and planning stages, and include a process for resolution of any variations proposed by industry to the FDOT design and LCCA. Also, the 11-13-2008 FHWA memorandum on alternate bids need to be incorporated in the Rule.
5. A Rule is needed to require the use of MEPDG for both concrete and asphalt pavements based on equivalent design life. The rules would allow, if the designer chooses, for more than 20-year design life for concrete pavement. It would also allow industry review of pavement designs, and set a formal process for resolution

of any industry comments and suggestions. This Rule for design would be incorporated as part of the new PTS and LCCA process.

6. Estimates of costs for concrete paving items have been inaccurate and in most cases grossly conservative. The main reason is that very few concrete pavements are planned. The few concrete pavements that are planned are small in size or are combined with major structures such as bridges or additions to rehabilitation projects. Bid costs are naturally higher in such projects and do not represent large, straight-line interstate concrete pavements. As more and larger concrete projects are specified the paving costs would better reflect expected costs. In the interim, a Rule is needed to establish a process for obtaining best possible cost information to for LCCA purposes. The information source can be a combination of data from the FDOT Estimates Office, communication with contractors, costs in neighboring states, and cost calculation based on analysis of prevailing material and labor costs.
7. According to PTS and for purposes of Life cycle analysis, all asphalt pavements are resurfaced at 14 years, irrespective of the traffic category or roadway classification (Interstate, state roads and secondary roads). A Rule is needed to establish how to determine the resurfacing cycle in years for the three categories of pavements, namely, Interstate/Turnpike, State roads, and secondary roads. The Rule would specify the consideration of weighted average years for the last full resurfacing cycle for projects in the Department's PMS.
8. There is no accountability in the PTS for asphalt pavements that become deficient prior to carrying the predicted design ESALs up to the year that they become deficient. The PTS simply prescribe one rehabilitation strategy (Table 1.4) that applies to all pavements irrespective of their performance and assumes that this treatment will last another 14 years regardless of present performance. A Rule is needed to address pavements that fail prematurely, and consider this fact in the PTS rather than assuming a standard 14 year resurfacing cycle.
9. A Rule is needed to identify all indirect bid items used in asphalt resurfacing and concrete rehabilitation projects. The Rule would specify the source of information and a method to calculate the total cost of indirect items and how to consider these costs in the LCCA. Cost of design, Inspection and testing services would also be included in the list of indirect items.

10. A Rule is needed to determine the year of the first concrete pavement rehabilitation event based on MEPDG analysis rather than the information in Table 4.1. The information in Table 4.1 related to first and second rehabilitation of concrete pavement is outdated and is not a representative of modern concrete pavements that are properly designed according to recent FDOT design methods and MEPDG.
11. A Rule is needed to allow the Engineer the flexibility to deviate from the 40 year LCCA period, as well as scenarios, values and rehabilitation strategies set in Table 4.1. The Rule would also allow the selection a specific pavement type with proper and well documented justifications. The rule would stipulate criteria needed for any deviations.
12. A Rule is needed for industry review of PTS reports and set a formal process on how to resolve objections and protests to PTS report findings.

Respectfully Submitted by:

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