Questions & Answers

FHWA PMEUG Software Training Webinar #6

| Training Topic | Question | Response  (Note: Shaded cells reflect responses given in the webinar, while unshaded cells contain responses prepared following the webinar) |
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| General | I would like to know if you will provide the slides and if you will grant certificates of attendance to the webinar. | Yes. The PowerPoint slides, webinar recording, poll question results, and this Q&A document will be posted on the TPF-5(305) Pooled Fund website within a couple weeks of the webinar. We will also issue PDH certificates for those interested in receiving them. |
| Long-life pavements are high risk, so personally, I feel like the design component actually matters much less than the other variables - materials, construction, climate, traffic changes, or other unknown conditions (such as new deicers that cause undo harm). Even if a designer “over designs” the pavement, ultimately, there is no safeguard against all these other issues. Still, I see the value of these pavements, but it's very hard to control for these issues. | Linda Pierce: I would concur that long-life pavements in general are a high risk since, as noted, there are a number of performance impacts beyond the designer’s control (e.g., climate, changes in truck count, changes in legal load limits, overloads). Long-life pavements are also not intended, nor affordable, for every single road type/classification. Many agencies have applied these design types to the higher trafficked roadways where minimizing life cycle costs, minimizing environmental impacts, and inconveniencing the traveling public are critical.  Julie Vandenboscche: You are correct in that the design component to achieve the extended life will not be significant. Regarding the durability of the materials, the use of long-life dowel bars will ensure premature failures do not occur. There are also specifications available to ensure a durable concrete mixture with a low permeability and a proper entrained air system. There could be an argument made for using these specifications for all pavements from both a sustainability and life-cycle-cost perspective. |
| There will be a workshop in TRB “Pavement Foundations: 100-yr Design Considerations.” | Thank you. That is correct. Workshop 1058 is scheduled for 1:30-4:30 pm Eastern on Sunday January 7, 2024. |
| Topic #1—Long-Life Asphalt Renewal Design of Existing Flexible Pavement | How does lime treatment differ from lime stabilization? | Stabilization typically is a “more” engineered material with strength requirements. Modification, on the other hand, is mostly focused on drying a soil in order to provide a stable construction platform. |
| Would you select a different load level for segmentation if you have a thicker or thinner pavement? | On the Segmentation Sensors Selection tab, all load levels can be plotted, so the load-deflection relationship is clear to see. For thicker pavements, segmentation at a higher load level may be more obvious. For the webinar example, here’s the plot for the highest and lowest applied load. |
| Does BCT work with metric unit? We were unable to unload FWD file, F20 format. | Yes. Per the BcT User Manual:  *The BcT is designed to analyze data in both US customary and SI units. The BcT selects the appropriate units for all variables in different modules based on the data in the input file. No user input is necessary to assign units for any of the variables. However, the units for the thickness data file must match the units for the FWD deflection file (US customary or SI units). The BcT follows one system of units throughout the execution process, so it is not possible to use an input file that has data with mixed units (e.g., sensor spacing in inches and deflection values in microns).* |
| What is a "Stiff Layer" | Examples of a stiff layer include bedrock, glacial till, saturated layer, high water table, or other hard and impenetrable layer (boring drill driven to “refusal”) below the subgrade. Depending on the condition, stiff layer modulus values can range from 500,000 psi (highly fractured and weathered bedrock) to 1,000,000 psi (solid, massive and continuous bedrock). Stiff layers deeper than about 40 ft have little or no influence on the backcalculated layer moduli. |
| It's unclear what selecting "Has Stiff Layer" specifically does - could you further explain? | By selecting “Has Stiff Layer” automatically adds a layer to the pavement structure with recommended values for Poisson’s ratio, mean modulus, and sets this layer as a stiff layer. See FHWA-HRT-16-011 for additional information related to backcalculation and the influence of a stiff layer. |
| If the "Stiff layer" is a subgrade bedrock or shale layer, then why not simply call it just that? It seems unclear as it is. Maybe I'm in the minority here, but "stiff layer" is an unclear terminology to me. At the very least, it seems like this needs to be added in the interface for further details. Understandably this is an ARA issue, so I'll bring it up with them. | See previous responses. |
| Do you enter the backcalculated modulus directly in Pavement ME or do you do an adjustment to lab values prior to entering it in Pavement ME? | Backcalculated layer moduli from the BcT tool are adjusted to laboratory conditions within PMED. Table 8 of the MEPDG Manual of Practice lists the adjustment factors (aka C-values) that are used to convert the backcalculated modulus to a laboratory-based modulus, for a given layer type and layer position within the pavement structure. |
| It looks like in Year 1 the Fatigue + Reflective cracking went from 0 to 10%. Is that reasonable? | Due to the existing conditions, the prediction of reflective cracking in Year 1 can certainly occur. Reflection cracking can initiate and propagate during the first cold season following overlay placement. This would certainly be the case with thinner overlays. |
| Can you explain why the AC total bottom-up+ reflective cracking shows 15% within one year? | See previous response. |
| Why does the amount of cracking go up after milling where there will be thicker overlay (i.e., thicker new asphalt layer)? | See previous response. |
| Can you now use the cement-treated base options? | Although chemically stabilized layers are an option, it appears they are inactive in v3.0 (i.e., you can select them but not insert them into the pavement structure). |
| VDOT's use of 50% reliability for FDR was to match FDR results pretty much with 1993 results since the version VDOT uses does not have the semi rigid option and VDOT did not know how to model FDR pavement. So, that was pretty much a workaround (no solid rational there). VDOT was waiting on guidance from AASHTO on how to accurately model FDR. | Thank you for your comment. |
| In the FDR example, what could be the reason(s) for the reflective cracking jump between years 5 and 15? | Environmental impacts can cause the steep but somewhat gradual increase in reflection cracking from Year 5 to Year 15. |
| The reduction of fatigue cracking for FDR exclusively comes from the reduction of reliability (from 95% to 50%). We can get similar results for other options if a reliability of 50% is chosen. | Thank you for your comment. |
| Does the AC rehab option comprise the user-defined LTE assignment option for existing fatigue cracking in existing asphalt layer? | Under Design Properties/Rehabilitation, a user-defined LTE assignment was not applied in these examples. PMED default values were used based on severity of cracking. |
| Topic #2—Long-Life Concrete Renewal Design of Existing Flexible Pavement | From which traffic we can think about a long-life concrete overlay? | All traffic levels are appropriate. With lower traffic levels, a short-slab bonded concrete overlay can be a more economical option. When traffic levels are lower, it is suggested that both a concrete overlay and a short-slab overlay design be performed and the most economical design of the two then be selected. |
| Have any long-life pavement renewal studies been done using precast concrete pavement systems? | Essentially all precast slabs are long life. You should always get over 40 years of life when using precast. The slabs are cast and cured under ideal conditions and even though they are reinforced, the added benefit of the reinforcement is not even accounted for in the design process. |
| What's your thoughts on grinding the faulting area when there are issues, instead of increasing thickness? | You are absolutely correct. Faulting should not be addressed by increasing the slab thickness. The current design procedure overestimates the amount of faulting that develops for doweled pavements. If you have corrosion-resistant bars (epoxy-coatings that have not been compromised or long-life dowel bar materials), faulting will not be a concern. If your agency tends to experience faulting, then grinding is the best way to address it. Faulting cannot be prevented by increasing the slab thickness. |