

PCASE 7.0.4 - 7.0.5 Version Updates

General	
Bug Fixes	New/Altered Functionalities
<ul style="list-style-type: none"> • Searched for and removed use of Form.Closing and Form.Closed events. • Corrected an issue that was causing an assertion failure when changing 2.09 compatibility mode options in APE, LEEP or Design. • Made corrections to address Evaluation test cases failures. • Modified import logic to prevent creation of inspection dates that correspond to PCASE 2.09 evaluation dates. • Addressed an issue that was occurring when attempting to change user data folders. • Updated licenses to include the C1FlexViewer to prevent a message that was displaying when attempting to run the ISM-Images Report and DCP Report. • Fixed some static code analysis issues found in the 7.0.5 pre-release version and fixed a file separator static code analysis issue. • Modified the Default Traffic Pattern field in evaluation preferences so that the field is fully visible when the form is resized. • Fixed the View Images for Section option in the GIS right button click menu for GIS maps, which was unresponsive. • Repaired an issue with the Enterprise Summary Report that was causing the Calculate button to fail to output data. • Modified the Advanced Installer due to an issue with the ArcShapeFileNetDLL version number not updating, which resulted in the installer artificially installing as a higher version. 	<ul style="list-style-type: none"> • Completed conversion of SMS04AddInUI to C#. • Moved the location of "standard" PCASE data to c:\ProgramData\PCASE regardless of user data directory location. • Developed a method for generating evaluation charts. • Implemented the ability to import PCI inspection data from 2.09 databases including; samples, distresses, sample conditions, and extrapolated distresses. • Changed "PAVER/PCASE Defaults" to "Defaults" in the Preferences menu. • Changed the partial bond value to 0.9995 and confirmed that test results were still passing. • Changed the flexural strength value that is passed to the Fortran routine for calculating the controlling vehicle for rigid pavement from 750 psi to 650 psi. • Changed the modulus limits for stabilized subgrade layers to 70,000-1,000,000 psi and set the default modulus to the same as that of stabilized subbase layers for new layer models.

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Design	
Bug Fixes	New/Altered Functionalities
<ul style="list-style-type: none"> Resolved an issue with slightly different overlay calculation results after recalculating C_b and C_r values. Corrected metric units in the K and Effective K column headers within the Design report. Changed failing unsurfaced Design test cases to match P7 tool output. Reworked the Zoom functionality within the Design Damage form to fix odd behavior. Corrected an issue with computed thickness values being displayed with too many digits after the decimal in the Design report. Changed Design layer model grid validation logic while using Metric units to round the thickness to the nearest mm before checking the minimum thickness to correct an error that was being triggered. Also changed the minimum thickness comparison to use the same number of digits as are displayed in the GUI. Fixed an issue where an imported traffic pattern from APE/LEEP to Design was allowing selection of a controlling vehicle within the Traffic form. Added missing Design Thickness column header units for the rigid non-frost version of the Design report. Corrected an issue in the Design Traffic form that was causing the wrong surface category to be displayed. Addressed some Inefficiencies in calculating the controlling vehicle for unsurfaced roads in Design. Reduced some inefficiencies that were occurring when CBR or material type were changed for unsurfaced road layer models in Design. Added logic to remove redundant "project is set" cascades that were causing an exception to be thrown after 	<ul style="list-style-type: none"> Added logic to highlight the correct compaction table results based on subgrade material and the selected Service. Changed the enable capability for the up/down arrows on the Design layer model grid, so that it no longer requires selecting the entire row to become enabled when moving layers. Added the ability for the compaction table window to be resized. Implemented suggestions for the Design form appearance to help users identify areas of the form easier: 1) Left-justified all subject area titles and put these labels in all caps. 2) Added a border around Design Properties and Layer Model sections and adjusted headers to be more consistent. Changed the title of the form that is launched when the Rename button below the list of available designs is selected. Replaced the Damage chart in Design with a C1 Flex Chart. Changed display of cumulative curve so that other curves are visible and adjusted colors used in the damage graph series and changed the series addition so that they appear in max damage order. Modified logic to make vehicles and seasons added in order of decreasing max damage. Changed the upper bound on the Y-axis so that it ends at the last significant value. Hid the AASHTO ESALS column in the Design layer models grid. Changed the k and effective-k Design layer model grid column headers using Metric units to Mpa/m. Made requested changes to returned CBR for unsurfaced/MAT designs: 1) Modified the result field for required CBR of unsurfaced layers. 2) Added .Net wrapper for the new Fortran routine. 3) Changed the unsurfaced top layer evaluation to use the new wrapper to validate CBR. 4)

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<p>deleting a project and opening the Stresses/Strains form in the subsequent project.</p>	<p>Removed resetting of CBR logic. 5) Added code to restrict the minimum CBR value below the Mat layer. 6) Implemented new logic for layers underneath Mat layers by adding a helper object and using it in all CBR validators allowed under a Mat layer. 7) Added logic that adds the minimum required CBR upon layer model creation.</p> <ul style="list-style-type: none">• Unified both Design report buttons by creating a new form that allows selection of designs to add to the report.• Modified the error message displayed in the Design layer model grid for when unsurfaced CBR values exceed the criteria (> 100).• Implemented an Estimated AASHTO ESALs form and made the following changes: 1) Modified calculate behavior so that when the form is initially opened, the value is automatically calculated and the Calculate button is disabled. If value changes within the form affect the calculation, the Estimated AASHTO ESALs value clears and the Calculate button becomes enabled. 2) Made it so Drainage layers are treated as Subbase layers, PCC Prestressed Concrete layers as Surface layers, and PCC Roller Compacted layers as Surface layers. 3) Changed the default values for Reliability and Decrease in Delta PSI. 4) Added a row to display the Subgrade layer and associated Modulus or k-value. 5) Moved the Structural Number column to between the Layer Coefficients and Modulus columns. 6) Added a Totals row for flexible layer models to display total thicknesses and structural number. 7) Removed the Load Transfer Coefficient column and added a numeric field above the grid -- applied a range of 2.2-4.5 and made the default value 3.2.• Modified the out-of-bounds error message for when traffic exceeds Design criteria.• Changed the "Calculate needed" tooltip text for the Design Calculate Thicknesses button.
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	<ul style="list-style-type: none"> • Changed parameter names and ranges on the AASHTO ESALs form to include subscripts for Reliability, Overall Standard Deviation, Design Serviceability Loss, Design Structural Number, Load Transfer Coefficient, and Drainage Coefficient. • Changed the routine for Separation layer minimum thickness from 4" to 6" for weak subgrade layer CBRs. • Moved the New layer model button icon used for workflow guidance to the left of the button, previously it overlapped the Import layer model button.
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APE and LEEP	
Bug Fixes	New/Altered Functionalities
<ul style="list-style-type: none"> • Added a checkmark to the Comments button to signify when a comment is present. • Added a parameter as to whether to add the default traffic pattern when creating an evaluation project and set it to false when an evaluation is being copied, to prevent an issue with default traffic being copied twice. • Corrected an issue with APE/LEEP section selection changing after opening, not making changes, and then closing the Evaluation Manager form. • Corrected an issue in which the controlling vehicle was not being calculated properly while using Calculate Controlling Vehicle mode. • Fixed a bug that was preventing creation of ad hoc sections. • Fixed an issue in which the Inspection/Analysis tab controls in the APE or LEEP Section tab were enabled while an evaluation was set to historic mode. • Corrected a notification issue that occurred when the traffic pattern in the Evaluation Manager was changed. • Fixed a bug in the Evaluation Checklist section properties form's 	<ul style="list-style-type: none"> • Added logic to prevent copying of deleted sections during evaluation copy process. • Added a visual indicator to the PCN results column that flags when tire pressure has changed due to thin pavement or condition. • Set a default Service for historic evaluations that is derived from the default preference, to prevent a blank Service field with imported historic evaluations. • Added property names for the C_b, C_r and PCI text boxes in the LEEP and APE Inspection/Analysis sub-tab, as well as the % Load distress and SCI fields to make the validation messages more meaningful. • Made the ISR report available for evaluations that include frost consideration. • Made the following requested changes for displaying ACN and PCN values in APE and LEEP: if the resultant ACN and PCN are both less than 10, both values are displayed with a single digit after the decimal point, otherwise both values are displayed as whole numbers. These changes also apply to the Evaluation Results and Mixed Traffic AGL-PCN report. • Added a message to the PCASE Reports window that displays when the ISR report is selected; the message reminds users to

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<p>Inspection/Analysis tab that was causing the controls to be un-editable.</p> <ul style="list-style-type: none">• Corrected a few issues with the Evaluation Results report: 1) The 14-Group AGL reports were not working properly due to vehicle name changes. 2) Results in the report were not being sorted in the same manner as in the APE and LEEP forms when using 14-Group for analyses.• Fixed an unhandled exception that was occurring after selecting the info buttons within the 209 Compatibility settings form.• Modified historic evaluation copy logic so that when a historic 2.09 evaluation is copied, the default traffic pattern within the Evaluation Manager is set to the first copied pattern in the evaluation. Also added a default Design Air Temperature for cases where copied evaluations have no climate data set.• Corrected some issues with the Import/Export Evaluation Data function within the Evaluation Checklist; the traffic area was not being set when sections were added to an evaluation and traffic area updates were being falsely reported. In addition, some layer properties that were in exported layer models failed to import.• Fixed an issue with adding a subset of sections to a new evaluation using the Query Tool. Also, changed the info messages that display after sections are added/not added to an evaluation using the Evaluation Checklist to more accurately reflect the result.• Protected against a race condition that was occurring after a specific sequence of steps that involved exporting/importing a database, then attempting to add sections using the Evaluation Checklist.• Fixed an issue that was causing Branch Use differences to not be reported after the "Refresh Section Properties" function	<p>refresh section properties if PCI data has been changed.</p> <ul style="list-style-type: none">• Added logic to set the layer model traffic pattern in copied evaluations to the default pattern (set in preferences), when Traffic is not selected within the copy evaluation form.• Changed how Mission Critical ACN is calculated for rigid structures and updated the GUI to show the Mission ACN result within a new column in the results grid instead of on the Traffic tab.
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<p>was initiated within the Evaluation Checklist. Also, fixed an issue that was causing the Runway Branch Use to be set for all imported sections in historic evaluations, despite their defined Branch Uses in the pavement inventory form.</p> <ul style="list-style-type: none"> Modified logic for displaying the Condition within the Evaluation Results report; it was previously displaying zero regardless of the section's actual PCI value. 	
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APE	
Bug Fixes	New/Altered Functionalities
<ul style="list-style-type: none"> Removed rounding from the inch to millimeter routine to correct a small difference in overlay thicknesses shown in APE vs. the Mixed Traffic report. Added missing units for K and Computed Eff. K column headers in the APE Evaluation Results report. Corrected an issue with the Show Details form in APE that was causing 80-CBR Base layers to display a 0 Base thickness value. 	<ul style="list-style-type: none"> Made the ACN column values in the Evaluation Results report formatted the same as the values displayed in the APE analysis results grid. Completed implementation of the Standard Pavement form in APE and made several requested changes.

LEEP and FWD	
Bug Fixes	New/Altered Functionalities
<ul style="list-style-type: none"> Corrected issues with basin not honoring selection when switching back to stiffness chart in the basin selection form. Modified logic to fix a bug in which PCN values in the LEEP results grid were displaying too many digits after the decimal. Fixed an exception that was being thrown after selecting the Set 5 Day Mean button within the LEEP form or Evaluation Manager, due to a time zone discrepancy. Fixed a .dat file import issue in the FWD Manager that was throwing an exception because the data was not being properly saved to disk. 	<ul style="list-style-type: none"> Made the design air temperature control on the LEEP form read-only. Also added a version of the control to the Evaluation Manager and set it to read-only unless there is no weather station selected; in which case the default temperature is set to 72 degrees and is user-editable. Changed the column headers in the Detailed Basin Results form to be more descriptive by separating results into three sections; Representative Basin Results, Convergence Results, and Layer Moduli Results. Modified FWD file assignment logic as follows; on detection of NDT files in use, ignore basins with no modulus calculated. This occurs when users visit the LEEP

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<ul style="list-style-type: none">• Fixed a crash that was occurring with single sensor drops in LWD files, due to logic in the representative basin logic which required at least 2 sensors.• Added YULEA copies of backcalculation test cases with current results and cleaned up some result comparison code to prevent erroneous results.• Modified logic for exclusion of layers being passed to the Fortran code from LEEP so that Bedrock layers are included when using YULEA mode.• Implemented logic in LEEP to recalculate AC modulus based on temperature when the load frequency is changed by users. Also added helper notifications so that GUI elements are properly updated.• Fixed a layer type test that should have excluded the bedrock layer during backcalculation, to prevent an assertion failure that occurred when attempting to apply backcalculation changes.• Fixed odd behavior and results that occurred when Calculate Controlling in the Traffic tab was used.• Addressed some issues with corrupted NDT data in a specific database: 1) Fixed an issue that was causing station import to fail due to a constraint violation. 2) Added code to properly link the copied station/drops. 3) Implemented a progress bar to display messages while copying NDT data. 4) Added a defense against a null reference in the Basin Results form. 5) Added additional code to copy sensor locations when duplicating NDT files.• Fixed a display issue with the chart in the Select Basins form.• Fixed a selection issue with imported 2.09 data in the Select Basins form that was causing the number of selected basins to not match the subset of selected basins in the LEEP form.	<p>form without running backcalculation. When users unassign a file in use they are now asked to confirm the un-assignment and the action is allowed to occur. Armored the Detailed Basin Results form to allow missing basins. When the Detailed Basin Results page is displayed, any missing basin data is detected and users are informed of what will not display correctly (sensor offset and mean measurements). Changed delete/unassign FWD test logic so that existing LEEP calculation records are removed instead of just notifying users with a message.</p> <ul style="list-style-type: none">• Implemented a yellow warning icon for "barely exceeding" RMSE parameters that is displayed when the exceeded parameter is only off by 2% in the Basin Results form.• Explicitly set a sort for drops in FWD files with drops listed out of order to correct an issue with Drop Series being displayed out of order in the FWD Manager.• Implemented logic to compute the CBR or k-value for LEEP layer models, prior to initiating the controlling traffic calculation.
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<ul style="list-style-type: none"> • Implemented caching of basin values instead of using SQL execution to prevent a slow-down in LEEP that was occurring when changing states of assigned basins. • Fixed an issue with the Show Basin Results button not being displayed after applying backcalculation changes within the LEEP form. • Corrected an issue with incorrect backcalculation iteration results when using the Total Percent Error option. • Fixed an issue with which cells were being highlighted according to the test date within the 5 day mean form accessible through the LEEP form. • Fixed an issue with the Default Representative Basin Selection Method in Backcalculation and Thaw Modulus Reduction Method default preferences not being saved or properly set for LEEP evaluations. • Fixed an issue with bedrock layers not persisting after being added to LEEP layer models during evaluation copy. 	
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DCP	
Bug Fixes	New/Altered Functionalities
<ul style="list-style-type: none"> • Applied a fix for non-measurable DCP layers being initially created with CBR > -1. • Modified DCP logic to handle the fact that .dcp files do not include a 0 blow reading, this change results in the starting depth no longer beginning at 0. 	<ul style="list-style-type: none"> • Added the insert/remove readings button to make removing tests from the blows/readings grid more user-friendly.

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Vehicles	
Bug Fixes	New/Altered Functionalities
<ul style="list-style-type: none"> • Fixed a bug in the ACN/ACR Charts form that was causing the surface type ACN values to display incorrectly when launched from the Traffic form. • Restored and reattached image resources for missing Chart accessibility button labels in the Vehicle Editor, which were lost during a conversion. • Fixed some form layout issues within the Vehicle Editor that were a side-effect of another implementation. • Fixed an issue with custom vehicle import which was caused by the fact that custom vehicles are only read upon program start-up; added code that attempts to read up new custom vehicles after the database has been opened. Also added a few items to the list of characters from the UID that do not go into the vehicle name. • Extended the right margin of the Vehicle Editor form to make the error icon which displays next to the Close button fully visible. • Added a missing line in the constructor for the rename vehicle dialog, which was not showing the original vehicle name in the Vehicle Editor. • Fixed an issue with inputted mirrored values within the Tires grid of the Vehicle Editor that was preventing the value change to be reflected for the opposing tire. 	<ul style="list-style-type: none"> • Modified the Choose Vehicles form for ACN/ACR Charts to support extending the ability to generate a giant ACN spreadsheet for normal users. • Modified ACN calculator logic to allow input of load values which exceed the bounds enforced within the chart and corrected the chart line intersection check. • Changed formatting of values in the Vehicle Editor report to match the GUI and fixed tire ordering so that it is according to tire number and added a Tire Number column to the report. Also made formatting of Metric units position the same as English units. • Added a new calculated column (Tire Load at Vehicle Max. Wt.) to the Tires grid within the Vehicle Editor form. Also changed formatting so that the Tires grid and report matched and added the new column to the report. Fixed an issue with the column headers in the report. • Changed logic for calculating Percent Load on Main Gear to accommodate cases in which some vehicles have no nose gear flagged within the Vehicle Editor. • Updated out-of-date text associated with updating standard vehicles in the program. • Made updates to the vehicles and standard traffic patterns XMLs.

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Engineering Module	
Bug Fixes	New/Altered Functionalities
<ul style="list-style-type: none"> • Changed unsurfaced and mat design code to give credit to the design of stabilized subgrades for both design and evaluation procedures (flexible, unsurfaced, and mats). • Corrected the LSFP design calculation to account for cases where extra thickness needs to be added to a subbase layer (per criteria). • Corrected routine that calculates the effective-k (current procedure) for values of k greater than 300 pci. There are no curves above k=300 pci, so interpolation was needed above this range. Also changed the interpolation of effective-k values curves to properly account for the logarithm scale on the effective-k axis (ERDC/GSL TR-12-20). • Corrected LEEP issue calculating AGLs when checking the asphalt strain criteria. Sometimes the asphalt criteria is not controlled and it was going to the maximum number of iterations. Also reduced the maximum number of iterations from 100 to 50. When calculating overlays, a check was added for when the asphalt cumulative damage is less than 1.0 and the subgrade controls. In this case, there is no need to continue increasing the asphalt layer thickness from the value already calculated from the subgrade criteria. • Corrected issue where the asphalt overlays ID's were not properly identified in design using the layered elastic methodology. ID's were added to account for AC/AC, AC/PCC, and AC shoulders (composite pavements). • Corrected implementation of the application equivalency factors in the design of flexible pavements with stabilized bases. • Fixed issue in the layered elastic design of flexible pavements where the asphalt 	<ul style="list-style-type: none"> • Changed implementation of layer equivalency factors for both unsurfaced and mat pavements to match implementation in PCASE209. Both Design and Evaluation (APE) are impacted by this change. • Updated unsurfaced design to couple the minimum surface CBR requirement with the required thickness to protect the subgrade. • Exposed routine to calculate the required CBR under the layer under mats. • Exposed routines to calculate the equivalent single wheel load (ESWL) as a function of depth and the alpha-factors in support of the automatic generation of design and evaluation charts. • Updated treatment of thaw-affected layers in LEEP. Only the moduli of those layers touched by the frost line will be modified by the modulus reduction factors. • The interface condition factor between a PCC layer and its layer below was changed for partially bonded from IC=0.997 to IC=0.9995. This value was deemed to more closely match results from WESPAVE in PCASE 2.09. • The resulting flexible pavement thicknesses of the reduced subgrade strength (RSS) analysis where internally equated to those of the normal analysis period when the CBR entered by the user was less than the FASSI value establish by criteria. This was changed to return the actual RSS thicknesses. The selection of the recommended pavement structure (Normal, RSS, or LSFP) is done on the GUI. • The routine to calculate the effective-k in PCASE 7.0.4 added an "interpolated" curve for "k on subgrade" equal to 400 pci located halfway between the 300-pci curve and the top value of 500 pci. This was not quite right because the abscissa in Figure

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<p>cumulative damage was not returned when the cumulative damage was less than 1.0.</p> <ul style="list-style-type: none">• In flexible, unsurfaced, and mat pavement designs: Corrected the implementation of equivalency factors when some of the layers are set to manual. Now any layer with insufficient thickness of cover above an interface will be adjusted to satisfy the thickness requirement.• Made correction to unsurfaced design to properly calculate pseudo-thickness of top layer when it is set to manual.	<p>8-1 is on a logarithmic scale. The 400 pci curve is also not part of Figure 8-1 of UFC 3-260-02, so PCASE 2.09 interpolated effective-k values above 300 pci based on Figure 8-1 as is. This resulted in slight differences between PCASE 2.09 and PCASE 7.0.4. The effective-k routine in PCASE 7.0.5 was changed to match the routine used in PCASE 2.09. There will still be some differences between PCASE 2.09 and PCASE 7.0.5 because the latter will calculate the effective-k on a layer-by-layer basis, while PCASE 2.09 will sum up all the unbound layers and then calculate the effective-k. The screen shots on Page 12 demonstrate this point.</p>
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UFC 3-260-02
30 June 2001

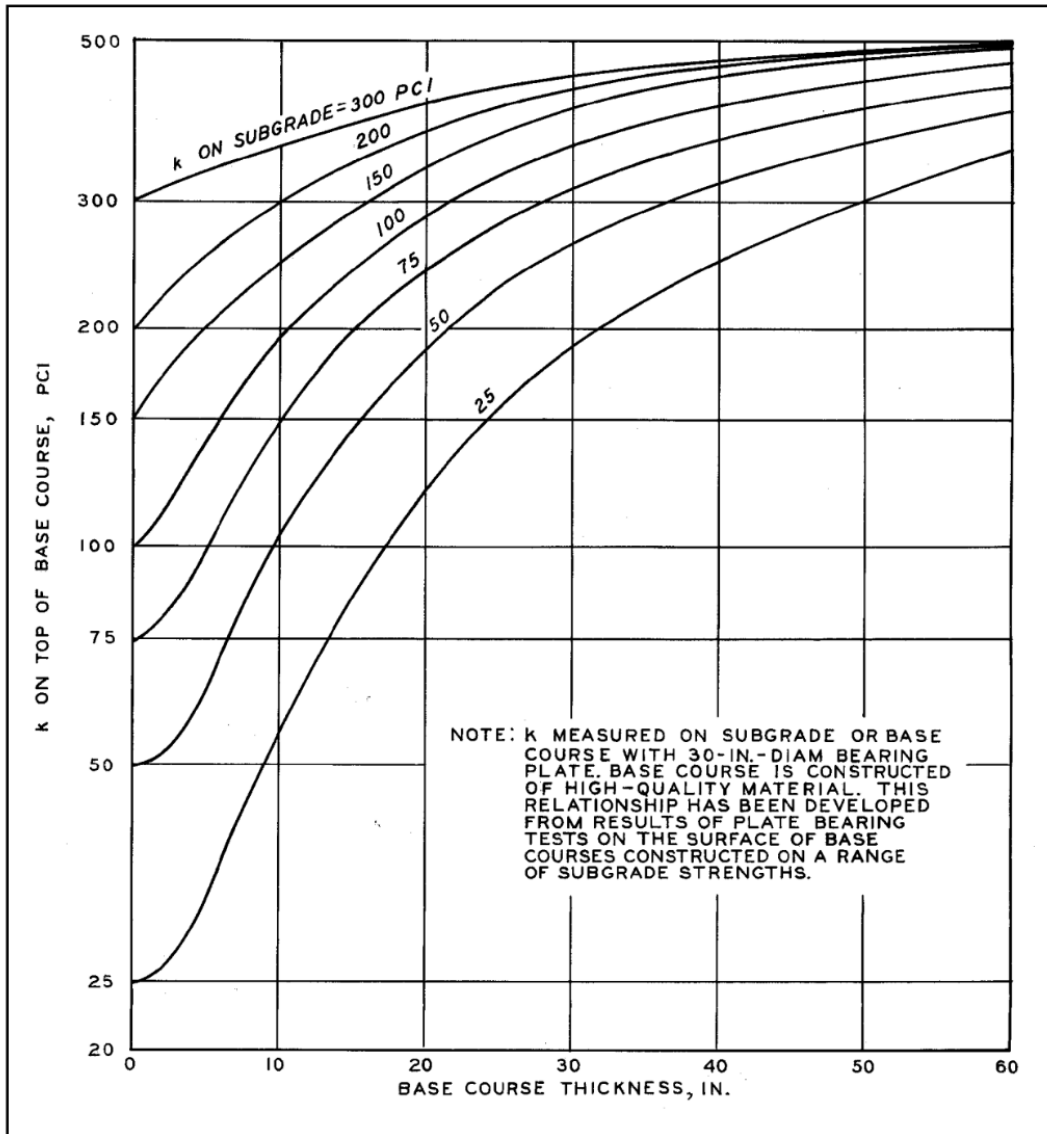


Figure 8-1. Effect of base-course thickness on modulus of soil reaction for nonfrost conditions

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PCASE 7.0.5 Engineering Release 1 2022-10-31

PROJECT: Elmendorf (11/11/2022)

DESIGN: Main Apron, Pavement Use: Arfield, Drainage Layer Thickness: 4 in

LAYER MODELS (in Main Apron)

Layer Model Name	Layer Model Type	Analysis Type	Traffic Pattern	Traffic Area	Season Set	Compaction Traffic Class	Wander Width (in.)	Failure SCI
Copy of Rigid Apron with Drainage	Rigid	K	AIR FORCE MEDIUM Copy	Traffic Area B	All Year	Air Force Medium Arfield	140.00	N/A
Rigid Apron with Drainage	Rigid	K	AIR FORCE MEDIUM Copy	Traffic Area B	All Year	Air Force Medium Arfield	140.00	N/A

PCC Surface Layer Properties: % Steel: 0.0, Load Transfer: 25

LAYERS (in Copy of Rigid Apron with Drainage)

Depth of Frost: 33 in.

Layer Type	Material Type	Flex. Strength (psi)	K (pci)	Eff. K (pci)	Frost Code	Moisture Content %	Dry Unit Weight (lb/ft³)	Compute	Non-Frost Design Thickness (in)	Min. Thickness (in)	Reduced Subgrade Strength (psi)	Limited Subgrade Frost Penetration (in)
Portland Cement	Portland Cem.	650		383	NFS	0	145		13.00	6.00	17.56	13.00
Subbase	Unbound Ag.			357	NFS	5	135		22.00	4.50	22.00	47.00
Natural Subgrade	Cohesionless		200		F2	10	120				0.00	0.00

PCASE 2.09.08 released May 2021

PCASE Design Models

Designs	Analysis Type	Depth of Foot (in)	Seasons	Traffic	Description	SCI	Wander (in)
1TORLEX	CBR	0.00	ANNUAL	AIR FORCE		0.00	70.00
TC140	CBR	44.00	ANNUAL	AXLE FLEX		0.00	33.25
TC01	CBR	0.00	ANNUAL	UNSURFACED		0.00	70.00
REPAIR	K	94.00	ANNUAL	CTF		0.00	70.00

Multiple Design Buttons: Material Cost

TEST STRATEGIES

Layer Type	Material Type	Frost Code	Flex. Strength (psi)	Analysis	Non-Frost Design Thickness (in)	Reduced Subgrade Strength (psi)	Limited Subgrade Frost Penetration (in)	SCI	Wander (in)
Subbase	N/A	N/A	0	Manual	4.00	4.00	4.00	0.00	0.00
Separation	N/A	N/A	0	Manual	18.00	18.00	42.82	0.00	0.00
Natural Subgrade	Cohesionless	F2	200	0	0.00	0.00	0.00	0.00	200.00

Layer Details: View Alternatives | Sensitivity | Subgrade Prep | Reports | Save and Calculate | Exit

PCASE 7.0.5 Engineering Release 1 2022-10-31

PROJECT: Elmendorf (11/11/2022)

DESIGN: Main Apron, Pavement Use: Arfield, Drainage Layer Thickness: 4 in

LAYER MODELS (in Main Apron)

Layer Model Name	Layer Model Type	Analysis Type	Traffic Pattern	Traffic Area	Season Set	Compaction Traffic Class	Wander Width (in.)	Failure SCI
Copy of Rigid Apron with Drainage	Rigid	K	AIR FORCE MEDIUM Copy	Traffic Area B	All Year	Air Force Medium Arfield	140.00	N/A
Rigid Apron with Drainage	Rigid	K	AIR FORCE MEDIUM Copy	Traffic Area B	All Year	Air Force Medium Arfield	140.00	N/A

PCC Surface Layer Properties: % Steel: 0.0, Load Transfer: 25

LAYERS (in Rigid Apron with Drainage)

Depth of Frost: 34 in.

Layer Type	Material Type	Flex. Strength (psi)	K (pci)	Eff. K (pci)	Frost Code	Moisture Content %	Dry Unit Weight (lb/ft³)	Compute	Non-Frost Design Thickness (in)	Min. Thickness (in)	Reduced Subgrade Strength (psi)	Limited Subgrade Frost Penetration (in)	Modulus (psi)	Poisson's Ratio
Portland Cement	Portland Cem.	650		368	NFS	0	145		13.18	6.00	17.56	13.18	4,000,000	0.15
Drainage	Unbound Ag.			357	NFS	5	130		4.00	4.00	4.00	4.00		
Separation	Unbound Ag.			357	NFS	8	130		18.00	4.00	18.00	42.82		
Natural Subgrade	Cohesionless		200		F2	10	120				0.00	0.00		

PCASE 7.0.5 Traffic Mo.

C:\MSI\PROGRAM FILES\USER DATA\EVALUATION_MODULE