

PCASE 7.0.6 - 7.0.7 Version Updates

General	
Bug Fixes	New/Altered Functionalities
<ul style="list-style-type: none"> • Added logic to the import process to skip importing extrapolated distresses if the corresponding inspection UID already exists in the target database, and to skip importing distresses if the corresponding sample UID is already in the target database. • Corrected an issue with the validation warning blink effect setting in default preferences, which was being applied when turned off. • Updated schema to address a query issue for APE/LEEP results that caused empty AGL and Passes in user-defined reports. Also fixed an error in the query update SQL. • Corrected an issue with databases failing to open, which was caused by a variable rename that had not propagated from the EMS repository to the PCASE repository. • Fixed an issue with load values not displaying for traffic patterns within the Traffic form for Design and evaluation. • Turned off broadcast of selections from FWD Manager and DCP forms to prevent an issue with section selection changing after either form was opened. • Changed vehicle property name to match revised interface to fix an issue with the Traffic form vehicle column coming up empty. • Fixed an issue with the evaluation field on the PCASE Data Assignment tool being blank when there were existing evaluations within the database. • Fixed an issue with the GPS Device option not being available in user preferences if no database is open. • Corrected a problem in user-defined reports that was caused by choosing the same field twice when using the query tool to subset report results. 	<ul style="list-style-type: none"> • Changed the layout for the evaluation default preferences form. • Implemented a PCASE database verification tool item that cleans up orphaned NDT records, if integrity rules are missing. • Added an "empty" option to the list of weather and frost station options, to allow users the ability to revert the state/country on the project/evaluation manager. • Added a user preference for controlling traffic mode to the evaluation defaults and initialized new APE/LEEP layer models to use it. • Modified logic to allow two aggregate subbase layers in Design and Evaluation. • Modified logic to better support PCASE User Defined Reports. • Enabled the ability to select inventory/ad hoc sections that are not included in an evaluation from all assignment trees in DCP and FWD Manager. • Added PCASE user-defined reports numeric fields to formatting cache and PMT so that numeric formatting now matches between the UI and report. Also fixed a field name typo in the queries. • Implemented a new user preference for calculating ACR/PCR. • Added Export functionality to the Traffic form. • Enhanced movement of ad-hoc section data using the PCASE Data Assignment tool <ul style="list-style-type: none"> ○ Implemented different matching algorithm ○ Re-enabled the failure of full optimization ○ Added multiple iterations through name matching with weaker criteria each time ○ Added warnings in the information field ○ Added setting/editing of Selected flag ○ Added code to prevent selection of <non> destination

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<ul style="list-style-type: none">• Fixed behavior on single-section movement for PCASE data assignment.• Corrected an issue with sorting/grouping items on the Evaluation checklist.• Fixed an issue with vehicle-specific conditions causing duplicate condition entries on the Tree Date Selector.• Fixed an import issue in the schema machinery that was causing the bond type value to not come through during the import process.• Added units update for Default PCC Flex Strength label to fix an issue with the units label reverting back to English after changing to Metric units.• Added code to delete existing PCASE conditions before adding new ones to the conditions table to address an issue with values not being deleted on recalculate.	<ul style="list-style-type: none">○ Cleaned up code and added comments○ Added logic to include empty network/branches in destination○ Added length defense code from branch/section ID and branch name○ Updated location code to avoid creating multiple branches of the same use• Implemented logic to use PID in imported 2.09 data to determine branch use upon import into PCASE 7.• Made ACR, PCR and ACR/PCR available in user-defined reports<ul style="list-style-type: none">○ Added result conditions for ACR and PCR and added query updates for UD reports○ Added code to support ACR and PCR○ Fixed an issue with PCASE values not displaying○ Added new PMT DLLs to support ACR and PCR in UD reports○ Collapsed all UDR query updates into a single update class• Disabled frost/freezing season options when warm weather stations are selected; Modified logic so that when a weather station with no freezing season is selected, the Consider Frost checkbox is disabled and a message is displayed.• Changed default values and restriction for modulus values on AC Stabilized Base and Stabilized Subbase layers.• Changed modulus range for AC overlay. Added a default preference for AC Overlay for Design and APE. Removed AC Overlay, Stabilized Base, and Stabilized Subbase from the moduli default preference form for APE.
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Design	
Bug Fixes	New/Altered Functionalities
<ul style="list-style-type: none"> • Fixed an issue with the controlling vehicle name and load label at the bottom of the form not updating properly when switching between layer models. • Added a new field on layers for Bond type UID and switched to using it instead of the old Bond field, to fix an issue where selecting multiple seasons for LED resulted in an empty Bond value for PCC layers. • Changed traffic display logic to use equivalent passes from the controlling traffic for CBR/K designs, to fix an issue with incorrect equivalent passes being displayed for non-controlling vehicles in the design report when multiple layer models used the same traffic pattern. • Fixed an issue with the validation warning icon not being displayed for the New layer model button in new design projects. • Fixed a Wander Width display issue that was occurring with newly created LED designs. • Changed a test to fix an issue with the Copy button on the Design project manager being unresponsive. • Modified logic to pass the specified Service to the Fortran code to fix an issue with incorrect RSS and LSFP thicknesses on a Navy design. • Fixed a bug in parameters being passed to the Fortran code that was causing unusually low default CBR values for unsurfaced layers in newly created designs. • Fixed the shoulder design calculation to resolve a run-time error that was occurring when attempting to calculate thicknesses. Also updated the compaction design test cases, due to new thickness results. • Added a defense to Design view model code against empty layer models to 	<ul style="list-style-type: none"> • Changed the logic for coloring the preferred frost solution to better display thickness values. Also cleaned up view model routines for disabling selection of material types. • Changed Percent Steel values to be displayed two digits after the decimal in Design. • Integrated design sensitivity analysis • Changed logic so that a 0 natural subgrade k-value is now allowed for Design layer models. Also added logic to require at least one layer with a positive k-value. • Added a call to effective-k calculation when the k-value is changed within the Design layer model grid. Moved the call to effective-k calculation before the thickness calculation from the GUI to domain layer. • Added support for reinforced concrete in LE design <ul style="list-style-type: none"> ○ Made the Percent Steel field visible on the GUI for rigid LE and passed values through to C# ○ Added new PercentSteel field to LED analysis structure and set it for calculation • Made it so Design sensitivity analysis can handle multiple layers of the same type. Also addressed an issue with an interim approach to colors in the view model layer. Modified logic for excluding non-compute layers from results for flexible. • Removed a rule that restricted the material types for AC overlay PCC LE designs. • Cleaned up modified subgrade and stabilized subgrade material types <ul style="list-style-type: none"> ○ Changed display of material types in layer add/change form to include equivalency factor value when its greater than 1.0 ○ Changed logic to make equivalency factor for stabilized layer types always displayed, even if it's 1.0

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<p>resolve a run-time error that was occurring after opening the Design form in a newly created database.</p> <ul style="list-style-type: none">• Resolved an issue with project lists not restricting design projects upon startup.• Changed logic for unsurfaced designs so that cohesive subgrades have a minimum of 90% instead of 95% compaction.• Added a defense to prevent an exception that was occurring when attempting to import a layer model in Design. Also added additional defenses against layer models with blank layers that resulted from the error.• Fixed an improper call to the flexible ESALs routine in Design and switched the Fortran call for ESAL estimation to a different routine to address a delay that was occurring, prior to roadway layer model creation.• Added tests to the Design layer model dirty machinery so that changes to drainage parameters do not affect layer models with no drainage layers.• Fixed an issue in the Design project manager that was causing the precipitation state to not track the state that was selected for frost consideration.• Fixed Cb and Cr text boxes to notify interested parties when a value has changed.• Fixed a null reference that occurred when running sensitivity analysis.• Fixed an indexing error that was crashing when attempting to create a layer model using Air Force Medium traffic.• Fixed property changed events for analyze/compute and material type in Design to correct an issue with the layer model compute flag.• Repaired an issue with Design frost analysis that was caused by Metric unit values being passes to the Fortran code instead of English units.	<ul style="list-style-type: none">○ Corrected subbase equivalency factor for PCC Stab-SC, SM• Hid the subgrade category on the traffic form for LE designs.• Increased the maximum allowable k-value in APE and Design to 555.• Added a check to the Design report to avoid showing k-value/effective-k for layers where those values are not meaningful.• Made RSS and LSFP natural subgrade thickness hidden in Design.• Added correlated modulus/flex strength to the Design sensitivity analysis chart. Also added support for Metric Units.• Added logic so that the Design layer type list opens collapsed by default.• Made the design new layer model form sizeable so that long traffic pattern names are visible.• Made CBR value restrictions for AC Stabilized Base and Stabilized Subbase layers based on material type.• Changed acceptable modulus range and default modulus for Stabilized Subgrade in LED.• Hid modulus for AC overlay layer on AC over PCC LE designs.• Added calculation of subgrade thickness when a bedrock layer is added to a structure.
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<ul style="list-style-type: none"> • Added new properties to the design layerset VM for subgrade preparation depth for LE designs. Also modified calculation routine to set the value and modified the GUI to display it. • Corrected the Equivalency Factor for Econcrete/Lean Concrete material type on PCC Stabilized Base layers. • Changed visibility of Poisson's ratio, so that it is no longer visible/editable for partially bonded overlay layers in Design. • Resolved an issue with the pass-to-coverage ratio that was causing different results for unsurfaced runways. • Fixed a Units bug in the rigid sensitivity analysis calculation. • Corrected an issue with the ESALs column not being displayed for road designs, when the Save Layout feature was used with an airfield design selected. • Added code to remove commas and other separators from the vehicle table column names to resolve an issue with vehicles not displayed on the Damage chart. • Corrected routine that converts bond type unique ID to bond value. 	
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APE and LEEP	
Bug Fixes	New/Altered Functionalities
<ul style="list-style-type: none"> • Disabled the layer model delete button for historical evaluations. Also disabled the Select and Calculate button on the Evaluation Checklist for evaluations set to historical. • Fixed a section refresh issue on the Evaluation Checklist. • Added tests to defend against empty project after delete to fix an exception that was occurring in the Evaluation Manager. • Changed logic to match pass levels for either total passes or evaluation passes 	<ul style="list-style-type: none"> • Added the ability to run the Mixed Traffic AGL-PCN report for analysis results that use individual traffic patterns with only one vehicle. • Added a button that explains the thaw-weakened period on the Evaluation Manager. Also adjusted the form layout so that when the error icon is displayed, it is no longer obscured. • Added new logic so that when an APC section is added to an evaluation or created for an evaluation, two layer models are now created -- one rigid model (AC

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<p>to cover both current state (total passes) or prior state, to fix a failure that was occurring while attempting to run the 14-Group AGL report when the Air Force 14 Groups pattern was used in an analysis.</p> <ul style="list-style-type: none">• Changed Evaluation Results report formatting for PCN values to match what is shown in the GUI.• Changed the requirement for rigid to be AC over PCC or PCC instead of isPCC to fix an issue in which deleting the Base layer in APE/LEEP was changing pavement analysis to flexible. Modified logic for determining the type of layer model after a changed to make AC over PCC Base Slab structures remain rigid.• Added logic to hide flexural strength, modulus, and Poisson's ratio for non-rigid layers on the Evaluation Results report. Also added rounding for effective-k values displayed in the report.• Changed SCI in the Hybrid Traffic report so that it uses the overlay SCI, to fix an issue where the Last SCI values were not populating correctly.• Corrected the layer type names for Stabilized Base and HQ Stabilized Base within the moduli default preferences.• Added a routine to avoid redrawing the APE/LEEP layer model grid each time section selection changes to prevent flashing and repositioning of the grid.• Corrected an issue with the Mission critical aircraft load not being saved after a change in APE or LEEP, which was causing the load to revert back to the max load after rerunning an analysis.• Added code to evaluation checklist to reload FDR list if an FDR that it doesn't have is selected.• Corrected an evaluation layer model grid issue, which was caused by an error in the conversion logic for bond type UID.	<p>overlay on a PCC base slab) and one flexible model (AC overlay on a PCC Stab Base).</p> <ul style="list-style-type: none">○ Refactored methods to prepare for the new logic○ Set the pavement analysis type to read-only for both structure types○ Made some corrections to the logic and did some renaming <ul style="list-style-type: none">• Modified the ISR report to include PAVER sections with a PCI even if there are no PCASE results. Also fixed an issue that was causing sections to be missed and not reported in branch.• Added a Critical Aircraft column to the ISR report to display the controlling aircraft for analyzed sections, when applicable.• Expanded the ability to delete ad hoc sections in evaluation<ul style="list-style-type: none">○ Added logic to give users the option to delete an ad-hoc FDR when they delete its last layer model○ Got rid of duplicate "Assign to Section" form in NDT and switched to using the version in pc07UIcommonWES for both NDT and DCP○ Added a button to the Assign Sections window to delete ad-hoc sections and added logic to only enable it if the ad-section is not assigned to anything• Changed the default C_b value to 0.8 for newly created/added sections.• Added a default preference option that allows users to pre-define Cb and Cr values for newly created evaluations/sections, or when an inventory section has a PCI = 100 and is added to an evaluation.• Made effective-k hidden for geotextile layers within the Evaluation Results report.• Changed the order of Hybrid Traffic report results to be sorted by branch ID then section ID. Also changed the Projected Traffic tab so that the sections for a pattern are ordered.
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<ul style="list-style-type: none">• Addressed a problem with the GUI sending the wrong pass level for traffic area D<ul style="list-style-type: none">○ Added code to engineering wrappers to multiply design/evaluation passes for traffic area D by 100○ Added test cases for traffic area D and changed test cases to make sure mixed traffic selects the controlling vehicle○ Added code to the C# wrapper to adjust mixed traffic results as is done with the Fortran code, then restored code that adjusts area D passes before calling the engineering calculation• Corrected an issue with the logic that permits layers to be moved above or below other layers in a structure.• Fixed a refresh issue that was preventing results to be shown after using batch calculation.• Resolved an issue with material type not being set for PCC partially bonded layers upon import.• Fixed a bug that resulted in controlling traffic changes on the traffic form, when the traffic area was changed while "calculate controlling" was selected.• Added logic to prevent refreshing the layer model grid unless a hybrid model is added. Also updated the refresh logic to maintain collapsed status of tree nodes.• Corrected a refresh issue on batch recalculate that was caused by the results grid not being notified of changes.• Fixed logic for default percent damage in the thaw period, so that it defaults to 25% if there is no preference value set.• Removed an invalid condition from the code that calculates the controlling vehicle to fix an issue with the controlling vehicle not being shown for calculated imported designs.• Corrected logic to address section surface changing on evaluation copy.	<ul style="list-style-type: none">• Added a merged row at the bottom of the ISR report to display a message that states, "Critical aircraft is defined in Appendix D."• Implemented a new ACR/PCR-ACN/PCN comparison report.• Implemented ACR/PCR based reports, which are available for selection in evaluation reports when ACR PCR analysis results exist.• Added an event to refresh layer models after batch calculation to ensure that additional calculated models are automatically available in APE/LEEP.• Modified the load reduction information icon messages within the results grid for traffic areas C and D.• Added a "Percent damage occurring in thaw period" user preference for evaluation. The value is applied to new evaluations and existing evaluations the first time an analysis is performed. The setting can be overridden on the Evaluation Manager, when frost is turned on.• Changed the location and text of evaluation column information buttons for evaluation results.• Modified wording for info bubbles on Allowable Passes and Allowable Gross Load in evaluation results columns. Also added code to reduce allowable passes to 1% in traffic area D.• Modified logic for determining traffic area on ad-hoc sections and added rules to handle special cases.• Added logic to save selection of the controlling vehicle for the Hybrid Traffic report when an analysis is rerun.• Implemented a new sort order for the Hybrid results report.• Made it so FASSI values are now displayed one digit after the decimal. Also hid FASSI when the value is 0.• Added logic to prevent PCC overlays from being selected as the Surface layer for rigid structures and handled the case for when
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<p>Added code to reset surface type on imported inspections with incorrect surface type, Modified import to change the constructed surface on construction inspections to match the section surface when the construction inspection is the only inspection being imported.</p>	<p>an overlay is already selected as the surface layer.</p> <ul style="list-style-type: none"> • Hid frost overlay calculation results.
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APE	
Bug Fixes	New/Altered Functionalities
<ul style="list-style-type: none"> • Fixed a glitch in the creation of pseudo-structures for layer models with Subbase layers, but no Base layer, that was occurring when viewing layer details. • Corrected adjustment of the controlling layer index from the Fortran code to resolve an issue with the controlling layer not being flagged in results after running an analysis. • Fixed a stack overflow error when adding a layer, that was caused by a mistranslation of a method override in the CategoryBase class. • Set DCP imported layers with no CBR value to the default value upon import into APE. 	<ul style="list-style-type: none"> • Allowed changes to CBR for stabilized surfaces and bases in APE and enforced default value range restrictions. • Modified the CBR range restrictions for unsurfaced unbound/crushed aggregate material types.

LEEP and FWD	
Bug Fixes	New/Altered Functionalities
<ul style="list-style-type: none"> • Added logic to set the Bond type UID when a layer type is changed in LEEP and modified the layer model grid to make the Bond property read-only for PCC layers. • Added logic to switch layer's analysis mode after changing the "Use Backcalculation" option in LEEP. • Modified layer thickness validation for LEEP to not check subgrade thickness if using YULEA for analysis and there is no bedrock layer. • Fixed an import issue that resulted in "Use Backcalculation" being turned off when the imported 2.09 database had backcalculated data. 	<ul style="list-style-type: none"> • Added the ability to run batch backcalculation <ul style="list-style-type: none"> ○ Modified batch calculation selection form to support backcalculation and added a button to the Evaluation Checklist ○ Modified logic used for identifying sections for inclusion in batch backcalculation ○ Moved logic from the GUI grid helper to a new view model class for batch calculation ○ Moved the controller for batch calculation to the view model layer ○ Added routines for executing batch backcalculation

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<ul style="list-style-type: none">• Moved logic for invalid basins to address an issue with some sections not being calculated during batch backcalculation.• Modified logic to correct issues with wrong pass level in traffic area D<ul style="list-style-type: none">○ Implemented a revised way to get load and passes for evaluation○ Added fields for LEEP output of analysis load/passes and modified results code to use them○ Changed APE helpers to write results with analysis passes returned from engineering code• Fixed a bug in the backcalculation results wrapper that was causing the Basin results form to not show when the upper limit was hit.	<ul style="list-style-type: none">○ Switched off call to C# engineering after merging from Fortran conversion to get the new backcalculation structure○ Modified backcalculation routines to handle progress counts better○ Fixed an issue with saving results• Modified logic in the following ways to address an issue for basins with deflections not decreasing in FWD Manager<ul style="list-style-type: none">○ Added a check for decreasing status when a file is imported and added a dialog when any are found with options to import anyway, import only decreasing basins, or skip the import for the file with decreasing deflections○ When basins are selected automatically/manually the non-decreasing basins are not saved and a message is given when selected manually○ Basins sent to the Fortran code are checked for decreasing and not sent• Moved the AGL reduction message from APE calculation helper to the shared APE/LEEP base class so that the message is now displayed in LEEP, when applicable.• Modified validators so that seed modulus cannot be equal to min or max modulus for LEEP analysis. Also changed domain logic so that if minimum is set to a value above the seed modulus, seed modulus is increased.• Adjusted the basin results form so that backcalculated moduli are visible by default.• Modified seed modulus validation logic to allow the it to be equal to the minimum or maximum modulus.
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DCP	
Bug Fixes	New/Altered Functionalities
<ul style="list-style-type: none"> • Added code to fix an issue with DCP import from 2.09 data that was causing the imported data to not populate properly. • Fixed a bug that was causing rounded layer model CBR values to not be saved, which was caused by layers snapping to the nearest value every time they were loaded. • Changed hard coded property names to fix an issue with DCP layer model/material types not populating upon layer model creation. Also cleaned up code and renamed to coding standards. • Made it so DCP now checks layer model's unmeasurable layers when the layer model is loaded and not just when the surface layer changes. Fixed an issue with statistics not clearing irrelevant data. • Fixed an issue with unsurfaced layers with empty space above the test causing Base to be returned instead of Subbase. Also fixed some issues with the unknown layer resolution. • Added additional calls to clear strength values on "unmeasurable" layers (PCC) to fix a bug that occurred when layer thicknesses were manually edited. • Fixed a difference in controlling passes for rigid models between LEEP and the traffic pattern form. • Made LEEP controlling traffic calculation use First Crack criteria, regardless of the layer model setting. 	<ul style="list-style-type: none"> • Modified formatting for total depth on the DCP Data report so that units now correspond to user selected values. • Changed the default unsurfaced layer model structure in DCP so that the second layer is automatically set to Subbase. • Changed the default layer model structure in DCP to populate a Subbase layer instead of Select Fill. • Modified logic for 85th percentile calculation option and added a 15% percentile option for DCP measures. Made the values interpolated and made the 15th percentile option match Army requirements. • Modified logic for modulus below 0, so that when a DCP layer model is imported into APE, the default modulus and flexural strength are applied. • Modified bond setting logic for layer model grid. • Implemented logic that allow users to turn off "Surface" criteria flag in LEEP for specific situations, which required modifying the routines that ensure the surface flag is set.

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Vehicles	
Bug Fixes	New/Altered Functionalities
<ul style="list-style-type: none"> • Addressed some ACN differences between the C# code and Fortran code <ul style="list-style-type: none"> ○ Copied ACN calculation code from EngineeringCalculation to EngineeringModule including all subsidiary functions ○ Completed migrating the ACN/ACR calculation to the EngineeringModule • Fixed multiple bugs in the Vehicle Editor <ul style="list-style-type: none"> ○ Repaired an error state for standard vehicles ○ Removed extraneous "AllowChanges" on VM to fix enabled state problems ○ Fixed a unit change issue by propogating to the vehicle view model ○ Moved pc07DWStandaloneData to domain layer where it belongs as part of vehicle cleanup ○ Added new servers for PCASE project ○ Updated pc07DW with new UI server names • Resolved an issue with strange rigid ACN values in the ACN/ACR chart for specific vehicles <ul style="list-style-type: none"> ○ Added a wrapper for the new Fortran routines for calculating ACN curves and made the debug report use them ○ Fixed an issue with units • Fixed a bug in EMS where units conversion logic was not properly handling negative exponents, which resulted in incorrect slope for English units. • Fixed an issue with the list of custom vehicles available for export not being restricted properly in the Vehicle Editor. • Fixed bad conversions in the wrapper call for pass to coverage ratio to fix an issue with incorrect values on the Vehicle Editor. 	<ul style="list-style-type: none"> • Increased precision of low ACN/ACR values. Also changed display of linear ACN to display values with more decimal places. Changed display of weights to 3 digits after the decimal. Changed key used for row cache to use 3 digits for load. • Removed code that collapsed ACN to a single line for specific vehicles when using the ACN/ACR chart. • Updated vehicle database. • Implemented caching and interpolation for ACRs <ul style="list-style-type: none"> ○ Added caching using SQLite ○ Wrote cache for 14 Group vehicles ○ Added defenses against vehicle UID and missing/invalid ACR cache ○ Modified form so that the list on the left always has more multi-select options • Simplified the Pass/Coverage form for aircraft, so that the displayed values for areas B, Cand D are grouped together. • Enabled ACN/ACR Charts form to run a report for curves. • Changed Army Class III traffic pattern pass level for CH-47.

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<ul style="list-style-type: none">• Updated vehicles.xml and ACR cache to correct some discrepancies for updated vehicles.	
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