Request for Quotes

Evaluation of Reheating and Aging Adjustment Factor Concept for Using BMD in Quality Assurance

Deadline for Submissions: Friday March 27, 2026, 5 PM Pacific Time

Email a Letter of Interest, Including the Required Information, to Dr. Jhony Habbouche of the Asphalt Institute at: jhabbouche@asphaltinstitute.org

Acronyms

AAF = Aging Adjustment Factor
ASTM = American Society for Testing and Materials
BMD = Balanced Mix Design
CAPRI = Consortium for Asphalt Pavement Research and Implementation
COV = Coefficient of Variation
CT_{index} = Cracking Tolerance Index
NCAT = National Center for Asphalt Technology
NMAS = Nominal Maximum Aggregate Size
POP = Project Oversight Panel
QA = Quality Assurance
RAF = Reheating Adjustment Factor
RAP = reclaimed asphalt pavement
RAS = reclaimed asphalt shingles
RFQ = Request for Quote

Background

Balanced Mix Design (BMD) is increasingly being considered and implemented by highway agencies as part of asphalt mixture acceptance and quality assurance (QA) programs. When BMD tests are used for QA purposes, agencies must address practical challenges associated with sample handling, including reheating of plant-produced mixtures and the evaluation of mixture performance after long-term oven aging.

In many QA scenarios, reheating plant mix samples is unavoidable to allow for specimen fabrication and testing. While reheating has generally been shown to have a negligible effect on volumetric properties, multiple studies have demonstrated that reheating can significantly influence BMD performance test results, particularly for cracking and rutting resistance. Differences in aging that occur during reheating, compared to hot-compacted specimens prepared immediately after sampling, can lead to systematic bias in measured performance properties.

To ensure consistency and comparability of BMD test results across laboratories, standardized reheating procedures are needed. In addition, some contractors may elect to prepare hot-compacted specimens to obtain more rapid feedback on mixture quality during production. Because hot-compacted specimens experience reduced aging relative to reheated specimens, the resulting cracking and rutting test results may not be directly comparable to those obtained from reheated or long-term aged specimens.

To address these challenges, the concepts of a Reheating Adjustment Factor (RAF) and an Aging Adjustment Factor (AAF) have been proposed. The RAF is intended to relate BMD test results from hot-compacted specimens to those obtained from reheated specimens, while the AAF is intended to relate reheated specimen results to long-term aged specimen results, particularly for surface mixtures. These adjustment factors would be mix-specific and established using plant-produced mixture samples, recognizing that the binder used during mix design may differ from the binder used during production and that short-term laboratory aging procedures may not accurately simulate the aging that occurs during plant mix production.

If shown to be reliable, RAFs and AAFs could provide agencies with a practical framework to reduce QA testing turnaround times while maintaining meaningful performance-based acceptance using BMD tests.

Objective

The objective of this study is to evaluate the feasibility and reliability of the RAF and AAF concepts for asphalt mixtures during production. Specifically, the study seeks to determine whether mix-specific RAFs and AAFs established during the initial production of a mixture remain reasonably constant throughout a paving project.

The scope of this study will focus exclusively on cracking performance and will use the cracking performance indicator, cracking tolerance index (CT_{index}) determined from the IDEAL-CT test. The intent is to assess whether the CT_{index} measured on hot-compacted specimens can be used to reasonably predict corresponding results for reheated and long-term aged specimens through the application of established RAFs and AAFs. The reliability of these predictions will be evaluated by comparing estimated results obtained using the adjustment factors to measured results from reheated and long-term aged specimens.

Participation and Compensation

This experimental effort will be conducted through an open call for qualified organizations to perform the Reheating and Aging Adjustment Factors Experimental Plan, as described in the accompanying instructions. It is anticipated that eight to ten organizations, located in different regions of the United States, will participate. This multi-laboratory approach will enable evaluation of the RAF and AAF concepts across a range of binder sources, aggregate properties, and production practices. The experimental plan will be limited to ***dense-graded surface mixtures with nominal maximum aggregate sizes (NMAS) of 9.5 mm and/or 12.5 mm.***

Participating organizations will be required to provide mix design documentation, including virgin binder source and grade and the combined water absorption of the aggregate blend, to support interpretation of results and development of a comprehensive final report. Organizations may submit quotes for a single mix design or multiple mix designs; however, quotes must be submitted on a per-mix basis. Additional details regarding required documentation are provided below.

Organizations selected to participate in this project by the Consortium for Asphalt Pavement Research and Implementation (CAPRI) will invoice CAPRI for their work at the quoted price upon completion of all required tasks and following CAPRI's Project Oversight Panel's (POP's) formal review and approval of the submitted data.

Mandatory Pre-Selection Web Meeting

Each organization considering submission of a letter of interest must participate in a mandatory webinar to review the request for quote (RFQ) details and the experimental plan. Questions from prospective participating organizations regarding the experimental plan will be addressed during the webinar. The webinar will be held on Thursday March 5, 2026, at 11:30 am ET. To attend, please use the following link to access the webinar: https://auburn.zoom.us/j/81592876308.

The webinar will be recorded and made available to organizations unable to attend live. Such organizations may review the recorded webinar and submit follow-up questions via email. However, all organizations must confirm in their letter of interest that they have attended the live webinar or reviewed the recorded webinar in its entirety.

Compliance with Experimental Instructions

Organizations selected to conduct the experiments shall execute all tasks in strict accordance with the instructions provided in this document. Adherence to these instructions is critical to the validity of the experimental results. The work will require careful planning and preparation. The instructions listed below provide the required procedures and guidance. Failure to follow the instructions may result in invalidation of the experimental results and disqualification of the organization's invoice.

Personnel Safety and Liability

Participating organizations are solely responsible for ensuring the safety of their personnel involved in the experiment. CAPRI assumes no responsibility or liability for the safety of personnel engaged in this work.

Overview of Experimental Plan

This study will evaluate the feasibility and reliability of RAF and AAF for asphalt mixtures using BMD cracking performance testing. Participating organizations shall select a plant-produced asphalt mixture with a sufficiently long production run to allow sampling and testing on multiple production days.

The experimental program will focus exclusively on cracking performance using the IDEAL-CT test conducted in accordance with ASTM D8225. The cracking performance indicator CT_{index} shall be reported along with the complete raw dataset generated during testing.

Experimental Scope and General Requirements

Consistency in sampling procedures, material processing, and all laboratory activities, including specimen preparation and testing, shall be maintained throughout the entire production and evaluation period.

1. ***Mixture Selection and Sampling Period***
   - The participating organization shall select one (1) plant-produced dense-graded surface mixture with a NMAS of 9.5 mm or 12.5 mm with a total reclaimed asphalt pavement (RAP) content not to exceed 30 percent by weight of the total aggregate blend, and **NO** use of reclaimed asphalt shingles (RAS).
   - The mixture shall be produced over a sufficiently long production period to allow sampling and testing on a minimum of four (4) and up to ten (10) different production days.

- Sampling days are not required to be consecutive.
- If a new shipment of asphalt binder is introduced into the plant storage tank during the study period, the date of introduction shall be documented and reported. In addition, available asphalt binder supplier test data for shipments used in the production from which the mixture samples were obtained shall be submitted.

2. ***Specimen Sets and Conditioning Regimes***

   For each sampling day, three (3) sets of IDEAL-CT specimens shall be prepared and tested as follows:

   - ***Set 1 – Hot-Compacted Set:*** Specimens prepared immediately after sampling, prior to the mixture cooling below the laboratory compaction temperature.
   - ***Set 2 – Reheated Set:*** Specimens prepared after the mixture has cooled to room temperature and subsequently reheated to the compaction temperature. Reheating shall be performed using an agency-specific approved procedure or a procedure provided or approved by CAPRI's POP.
   - ***Set 3 – Aged Set:*** Specimens prepared after reheating the mixture and subjecting it to a long-term aging procedure. Aging shall be conducted using an agency-specific approved procedure or a procedure provided or approved by CAPRI POP. Upon completion of aging, specimens shall be compacted without allowing the mixture to cool.

3. ***Reheating and Aging Procedures***

   - Participating organizations shall document the reheating and aging procedures proposed for use.
   - CAPRI POP may provide standardized procedures or approve proposed procedures to promote consistency across participating laboratories. ***If needed***, participating laboratories shall refer to Appendix A for the recommended reheating procedure and Appendix B for the recommended long-term aging procedure.
   - The same oven shall be used for all reheating operations, and the same oven shall be used for all aging operations for a given mixture.
   - Trial specimens may be used to establish reheating and aging timing parameters; however, all reported results shall be based on specimens fabricated in accordance with the approved procedures.

Sampling, Specimen Fabrication, and Testing Procedures

1. ***Production Mixture Sampling***

   - A sufficient quantity of mixture shall be obtained from a single truckload to fabricate at least fifteen (15) acceptable IDEAL-CT specimens (five (5) acceptable IDEAL-CT specimens per set).
   - For each selected production day, mixture production data shall be reported, including asphalt binder content, volumetric properties, and aggregate gradation of

the produced mixture (conducted on the mixture samples used to compact specimens for the three sets on each sampling day in this experiment).

- The duration of silo storage prior to truck loading shall be recorded.
- Mixing and production temperatures shall be recorded and reported.
- Aggregate water absorption shall be documented and RAP content shall be reported.
- Performance test results generated during mix design, if available, shall be submitted for reference to support the evaluation of whether the selected mixture exhibits sufficient sensitivity in CT_{index} across reheated and aged conditions.
- All reheating and aging protocols used during mix design and production shall be documented and reported.

2. ***Specimen Preparation and Compaction***

- While the mixture remains hot, the loose mixture shall be split into portions sufficient to fabricate at least fifteen (15) acceptable IDEAL-CT specimens.

  N.B.: Please note that splitting the mixture into approximate weights sufficient to compact IDEAL-CT specimens **immediately after sampling** is **MANDATORY**. Sampling mixtures in buckets and subsequently reheating the buckets followed by splitting is **NOT permitted**, as this procedure would result in double reheating, which is prohibited in this study.

- The maximum specific gravity (G_{mm}) of the mixture shall be determined and reported for each IDEAL-CT specimen set, reflecting the production, conditioning, and handling conditions associated with that specific set.
- For a given specimen set, the required sample mass shall be estimated using the provided National Center for Asphalt Technology (NCAT) Excel worksheet to fabricate 150-mm-diameter by 62-mm-tall IDEAL-CT specimens at 7.0 ± 0.5% air voids, using the corresponding G_{mm} determined for that specific set.
- A minimum of five (5) specimens shall be fabricated within the tolerances of ASTM D8225 for each specimen set (Set 1, Set 2, and Set 3).
- All specimens for a given task shall be compacted using the same gyratory compactor.
- Efforts shall be made to ensure that oven residence times for any two specimens within the same set do not differ by more than one (1) hour.
- All mixtures designated for Set B and Set C shall be compacted within no more than one (1) week from the time of sampling. Specimens for Set A, Set B, and Set C shall be stored in an environmentally controlled area and tested within no more than two (2) weeks from the date of compaction. All specimens for a given set should be tested in a single day. Consistency in these durations across all specimen sets and participating laboratories is highly recommended. Proper and consistent labeling of all specimens is critical to ensure traceability and data integrity.

3. ***Air Void Verification***

  - After cooling to ambient laboratory temperature, dimensions (diameter and height) and air void content shall be determined and reported for all specimens.
  - Specimens not meeting the target measurements and air void range of 7.0 ± 0.5 percent shall be discarded and replaced.

4. ***IDEAL-CT Testing***

  - IDEAL-CT testing shall be conducted at 25°C in accordance with ASTM D8225.
  - Specimens shall be conditioned for a minimum of two (2) hours in either an environmental chamber or a water bath (in sealed bags), with the conditioning temperature stabilized at 25°C prior to specimen placement.
  - Testing shall proceed as soon as practicable following specimen verification (i.e., measurements in terms of diameter, height, and air voids).
  - The same load frame shall be used for testing all specimens associated with a given mixture.
  - Participating laboratories shall perform a quality check of the IDEAL-CT data generated using the attached data quality review sheet and in accordance with the guidance provided in Appendix C of this RFQ prior to data submission

Data Reporting

- For each sampling day, the organization shall report individual CT_{index} values for all three specimen sets along with the complete raw test data. The CT_{index} results within each specimen set **shall** exhibit a coefficient of variation (COV) less than or equal to the allowable single-laboratory precision estimate of 18.3 percent.
- RAF and AAF values will be calculated by CAPRI POP for data evaluation purposes. Participating organizations are not responsible for data analysis or interpretation.

Required Information in the Letter of Interest – Due Friday March 27, 2026, 5 PM PT

Organizations submitting a Letter of Interest shall provide the following information. Submissions that do not include all required items may be deemed non-responsive.

1. **Organization Information**
    - Organization name
    - Mailing address
    - Point of contact (name, title)
    - Email address and phone number
2. **Laboratory Information**
    - Address of the laboratory where specimen fabrication and testing will be performed
    - Description of laboratory accreditation(s), if applicable
    - Identification of any association or affiliation with asphalt production facilities; such association is desirable and should be described, if applicable
3. **Mixture Sampling Information**
    - Location where the mixture will be sampled (e.g., asphalt plant [directly from the silo or from the back of the truck], roadway, windrow, etc…)
    - A brief description of sampling procedure to be used.
    - Excess mixture from another project shall **NOT** be permitted for this study, as the reference mixture is based on specimens that are hot-compacted directly during production.
4. **Proposed Mixture Information**
    - Copy of the proposed mix design
    - NMAS (9.5 mm or 12.5 mm) (if not included in the mix design)
    - RAP content (not to exceed 30%) (if not included in the mix design)
    - Confirmation that RAS is not included
    - Virgin binder source and grade (if not included in the mix design)
    - Combined water absorption of the aggregate blend (if not included in the mix design)
5. **Production Information**
    - Anticipated production duration and number of sampling days proposed (minimum of four)
    - Planned approach for documenting binder changes, silo time, and production temperatures
6. **Laboratory Equipment and Facilities**
    - Type and capacity of ovens proposed for reheating and aging
    - Type of environmental chamber(s) or water bath(s) used for specimen conditioning
    - Identification of the gyratory compactor and IDEAL-CT testing frame to be used (confirmation that the same equipment will be used for all specimens for a given mixture)

7. **Proposed Procedures**

   - A detailed description of the proposed reheating procedures.
     If the participating laboratory elects to follow the procedure provided by the POP, the laboratory shall reference Appendix A and ***<u>strictly</u>*** adhere to the procedures described therein.
   - A detailed description of the proposed long-term aging procedure.
     If the participating laboratory elects to follow the procedure provided by the POP, the laboratory shall reference Appendix B and ***<u>strictly</u>*** adhere to the procedures described therein.
   - Description of specimen splitting, compaction, conditioning, and testing procedures.

8. **Personnel Qualifications**

   - Names and roles of all personnel involved in the experimental plan
   - Familiarity level for each individual with the IDEAL-CT test (unfamiliar, novice, experienced, expert)

9. **Schedule**

   - Proposed project schedule
   - Expected completion date (no later than **Friday October 30, 2026**)

10. **Pricing**

   - Fixed-price quote for the base scope of work covering four (4) sampling days
   - Unit price for <u>each</u> additional sampling day beyond the base scope (up to six additional sampling days on top of the base four sampling days). It should be remembered that for each sampling day, there will be 3 sets of 5 acceptable IDEAL-CT specimens per set (as per Set 1, 2, and 3).
   - Pricing shall be provided per mixture per sampling day beyond the minimum of 4 sampling days.

Fixed Price Quote ($) (for the minimum 4 sampling days)	Additional Sampling, <u>Cost per Day</u> ($)	Maximum Number of Sampling Days

Confidentiality and Anonymity

All participating organizations will remain anonymous, and all collected data will be treated as confidential. Participating organizations will be identified in all documentation and reporting using anonymized designations (e.g., Entity A, Entity B, Entity C, etc.).

Basic mixture information, including aggregate gradation, binder content, and IDEAL-CT results, will be reported and analyzed solely for the purposes of developing the final report and associated recommendations. No information identifying individual participating organizations will be disclosed.

Appendix A – Reheating Procedure

The participating laboratory may use its agency-specific reheating procedure, if available, subject to review and approval by the CAPRI POP. If no agency-specific reheating procedure is available or approved, the participating laboratory **shall strictly adhere** to the procedure described herein.

Reference: National Center for Asphalt Technology (NCAT)

Please note that splitting the mixture into individual pans with approximate weights sufficient to compact suitable IDEAL-CT specimens **must be performed immediately after sampling** the mixture for a given production day.

Splitting the mixture into samples of the desired mass shall be performed in accordance with AASHTO R 47-19, *Reducing Samples of Asphalt Mixtures to Testing Size*.

The mixtures shall be stored in the pans. Pans designated for **Sets 2 and 3** shall be accurately and clearly labeled, covered with aluminum foil, and stored in a temperature-controlled room.

A.1 Placement and Conditioning in Pans

a) Place split samples into metal pans and flatten the mixture to a uniform thickness to promote even conditioning.
   Pans shall be appropriately sized to achieve a uniform mixture thickness between 25 and 50 mm, consistent with AASHTO R 30 requirements.
   A 9 in. × 13 in. × 2 in. metal pan is suitable for individual 62-mm specimens.
b) All collected mixtures shall be split and placed into pans, even if all specimens will not be compacted on the same day. This practice prevents reheating the collected mixture a second time and minimizes additional aging. Samples not compacted on the same day may be labeled and stored in pans until needed.
   When reheating split samples, the maximum specific gravity (G_{mm}) shall be determined, as G_{mm} may change from production to reheating.

A.2 Reheating of Individual Specimens

For reheating individual specimens, set the oven to compaction temperature + 5°F and place no more than six (6) pans of mixture in the oven at one time.

a) Heating more than six pans simultaneously may result in uneven aging and shall be avoided. If more than six specimens are required, replace pans sequentially as specimens are removed for compaction. Monitor mixture temperature using a dial thermometer or temperature probe placed in the mixture.
b) Heating split pans to compaction temperature typically requires 0.75 to 1.5 hours, depending on mixture thickness.
c) If heating exceeds one hour, stir the mixture with a spatula to maintain uniform temperature.
d) Gyratory molds shall be placed in the oven at least 0.5 hours prior to compaction; multiple molds may be used to maintain adequate mold temperature.

A.3 Compaction

a) Once the mixture reaches the compaction temperature ±5°F, compact specimens to the desired height using height-control mode and the appropriate mass determined from trial specimens. Compaction shall be performed efficiently to minimize heat loss and prevent segregation.
b) Zero the mix transfer funnel on a scale prior to use.
c) Pour the mixture from the pan into the funnel in a single, continuous motion.
d) Stir the mixture in the funnel using a folding motion to ensure uniform distribution of all particle sizes.
e) Remove a gyratory mold from the oven and place bottom mold paper.
f) Transfer the mixture from the funnel into the mold in a single motion without shaking or stopping.
g) The mixture should slide freely; rolling aggregate indicates segregation.
h) Gently and quickly level the mixture surface without inducing segregation.
i) Place top mold paper.
j) Begin compaction according to the manufacturer's instructions for the specific gyratory compactor used.

Appendix B – Long-term Oven Aging Procedure

The participating laboratory may use its agency-specific long-term aging procedure, if available, subject to review and approval by the CAPRI POP. If no agency-specific long-term aging procedure is available, the participating laboratory shall strictly adhere to the procedure provided below.

Reference: Virginia Transportation Research Council (VTRC)

Following reheating of the mixture in accordance with **Appendix A – Reheating Procedure**, the loose asphalt mixture shall be subjected to long-term oven aging as follows:

- The mixture shall be conditioned in an oven at the specified compaction temperature for an additional duration of 2 hours after the mixture in the pans has reached the compaction temperature.
- This oven-aging duration, applied after reheating during production, is deemed suitable for evaluating the long-term performance characteristics of the selected mixtures.

Appendix C – IDEAL-CT Data Quality Check

The CAPRI POP will provide the participating organizations with an Excel-based template to perform the required quality checks on the IDEAL-CT data generated.

Reference: Habbouche, J., Boz, I., and Diefenderfer, B.K. Round Robin Testing Program for the Indirect Tensile Cracking test at Intermediate Temperature: Phase I. VTRC 22-R3. Virginia Transportation Research Council, Charlottesville, 2021. http://www.virginiadot.org/vtrc/main/online_reports/pdf/22-r3.pdf.

Compliant Data - An acceptable load-displacement curve will look like the example in Figure A1(a) and an acceptable displacement-time curve will look like that shown in Figure C1(b). These curves should be checked for each specimen as part of test quality control.

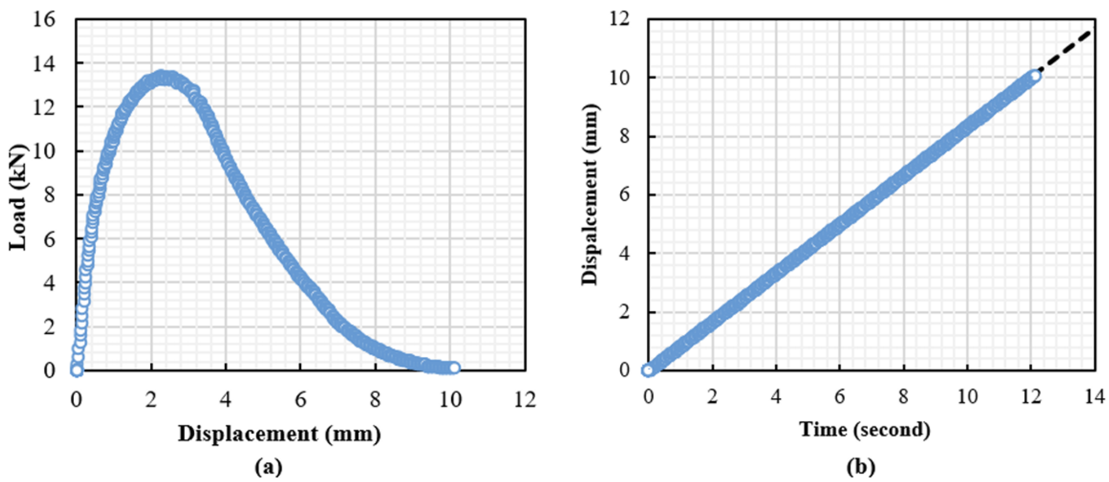

Figure C1. Example of a compliant (a) load-displacement curve and (b) displacement-time curve.

Non-Compliant Data - The load-displacement and displacement-time curves may not meet the test specification.

- Some load frames have a safety function limiting the ram travel that does not provide enough travel for the post-peak load to drop to 0.1kN or less during testing.
- Machine compliance may cause the rate of loading to change with increasing specimen resistance to loading.
- Improper LVDT setup, including misalignment, improper zeroing, or incorrect calibration, will affect displacement measurements.

Performing data quality checks will permit the identification of issues and allow for them to be addressed.

To identify non-compliant data, the time, load, and displacement measurements must be obtained from the testing software. The operator manual or equipment manufacturer may have to be consulted to determine the best way to extract the raw data file. The time, load, and displacement measurements can then be plotted using a spreadsheet and data quality can be assessed. If non-compliant data is found, the causes should be determined so that they can be addressed and resolved. A single occurrence of noncompliance may indicate an isolated or random event;

however, recurring events may be a sign of equipment issues, repetitive operator error, or other testing problems.

Examples of non-compliant data are shown in Figure C2.

- Figure C2 shows data from a test wherein the data acquisition was incorrectly set up, as the measured load should reach approximately 10 kN at its peak. The difference suggests that the load data shown are in U.S. units (lbf) instead of kN as labelled, whereas displacements are shown correctly in SI units (mm); the mixed units resulted in incorrect calculations of IDEAL-CT indices. In addition, the test terminated before the load dropped to 0.1 kN.
- Figure C3 shows a test with an error in displacement measurements; the LVDT may have slipped out of position or the range may need to be checked.
- Figure C4 displays a seating load applied at the beginning of the test and an LVDT error toward the end of the test. The test software should be configured to remove the seating load, and the LVDT installation and range should be checked.
- Another issue with the displacement measurement is shown in Figure C5. It appears that the LVDT may not have been installed or zeroed/initialized properly, so that measurements were not collected as the test started.
- Figure C6 presents a load-displacement curve that is in compliance with test requirements (except for early test termination) although the test was performed using a non-linear loading rate. This demonstrates why evaluating both the load-displacement and displacement-time data is important. If the loading rate is non-compliant, the equipment is not meeting the test requirements and may need troubleshooting or maintenance.

Ongoing data quality checks are important to implement with the use of performance testing. Non-compliance in test data can lead to incorrect CT_{index} values that do not describe the actual material behavior – resulting in unnecessary redesigns or rejected materials. The next step in addressing overall data quality is checking that test results fall within acceptable precision estimates.

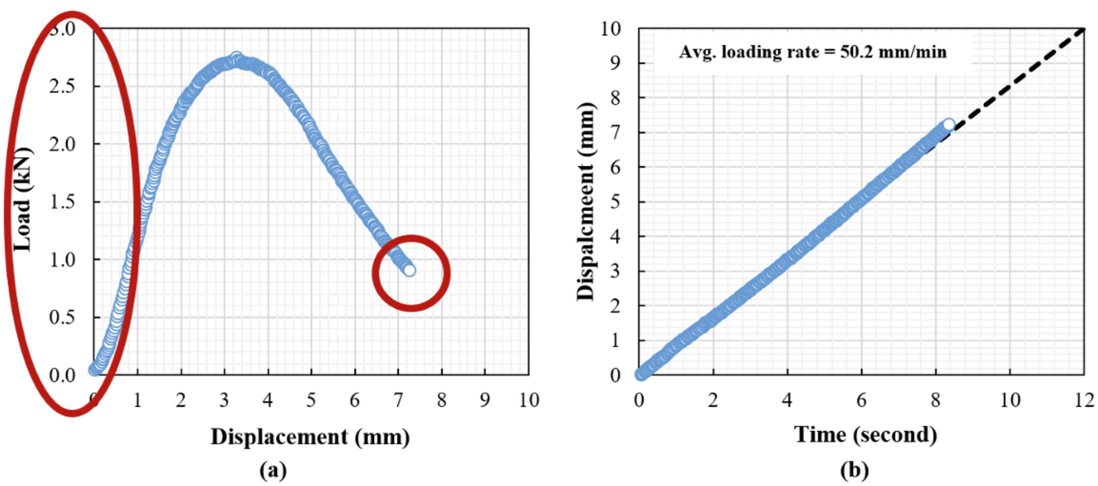

Figure C2. Examples of non-compliance with unexpected load magnitude, incorrect units, and premature termination of the test: (a) load-displacement curve; (b) displacement-time curve.

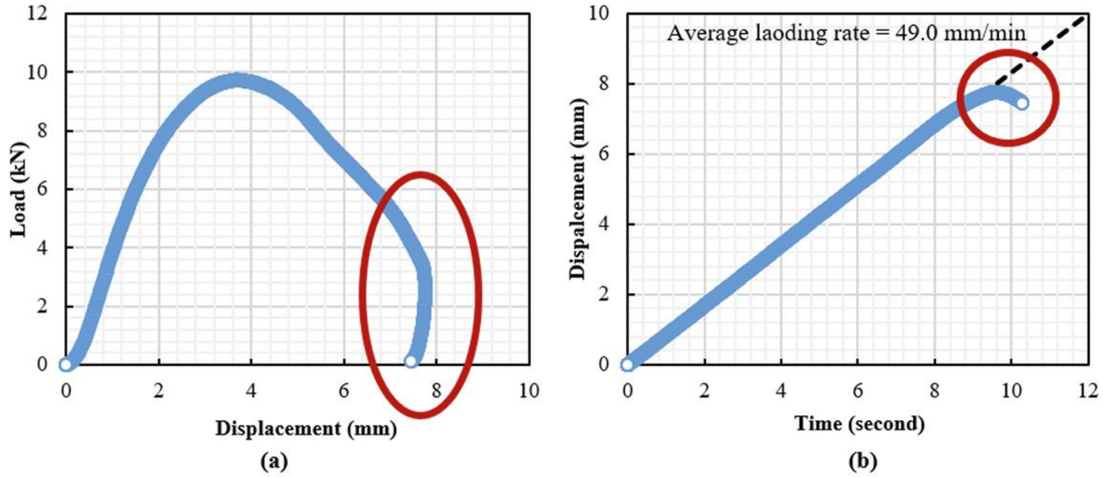

Figure C3. Examples of non-compliant data because linear variable differential transformer (LVDT) was out of position: (a) load-displacement curve; (b) displacement-time curve.

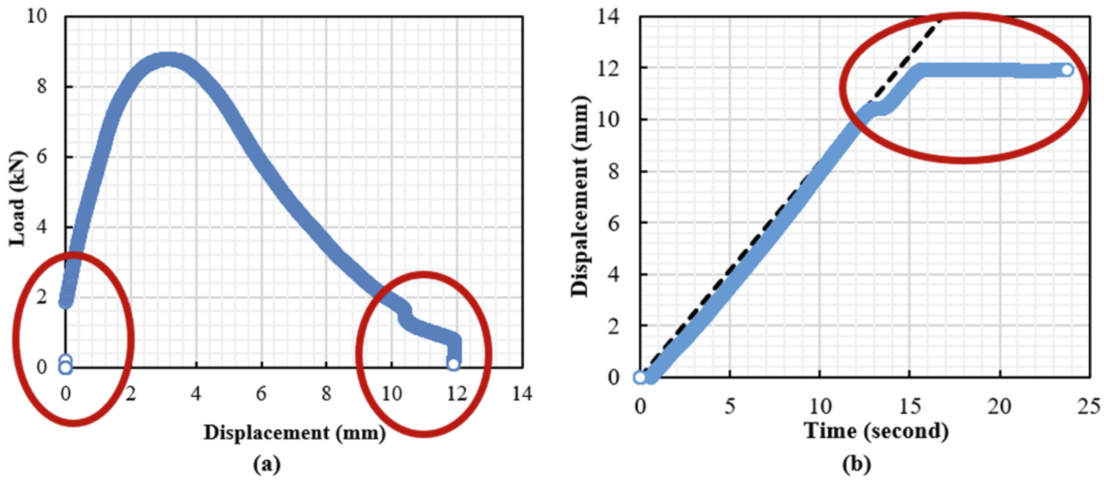

Figure C4. Example of non-compliant data because of seating load applied at beginning of test and a linear variable differential transformer (LVDT) error toward the end of the test: (a) load-displacement curve; (b) displacement-time curve.

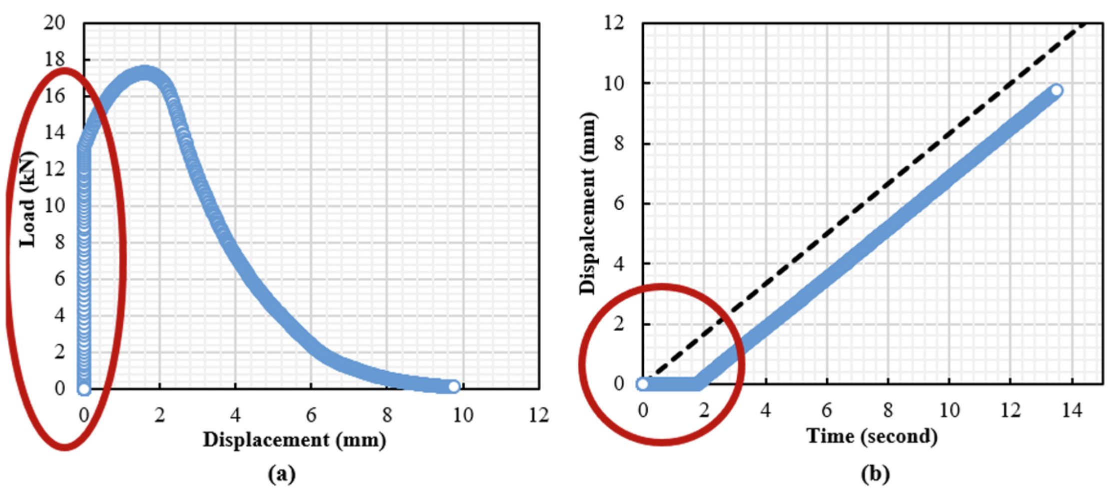

Figure C5. Example of non-compliant data because of improper initial installation of linear variable differential transformer (LVDT): (a) load-displacement curve; (b) displacement-time curve.

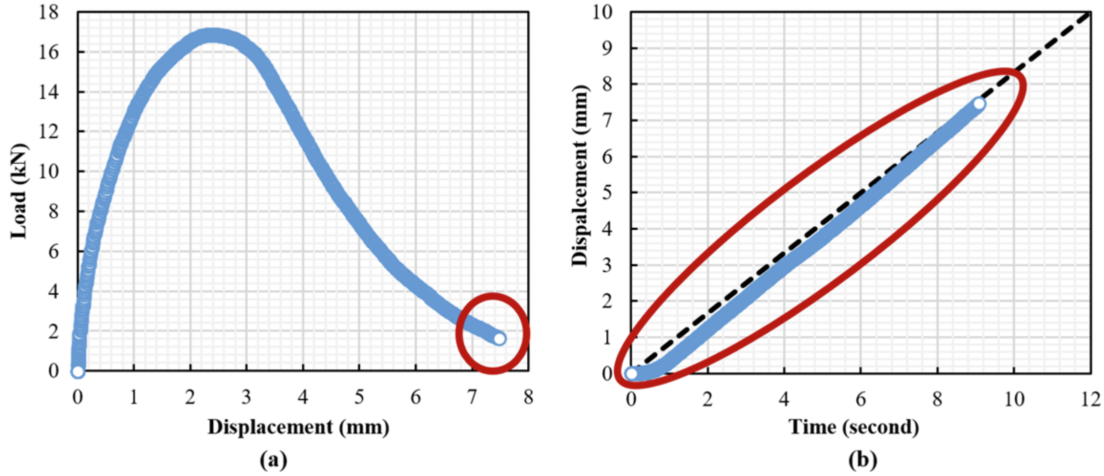

Figure C6. Example of non-compliant data: (a) load-displacement curve with load not reaching 0.1 kN at end of test; (b) displacement-time curve with rate less than specified and changes occurring during the test.

Appendix D – Step-By-Step Execution of this Experiment

Participating laboratories are encouraged to adhere to the step-by-step guidance below to ensure consistent and successful execution of the experiment.

D.1 Sampling on a Given Production Day

On each production day for a mixture approved by the POP:

- Obtain a sufficient quantity of mixture from a single, consistent sampling location (e.g., back of the truck, mixture deposited on the ground).
- The sampling location shall remain consistent across all production days.
- Transport sampled mixtures to the laboratory for processing.

D.2 Set A Specimens (As-Produced Condition)

- Homogenize and split the mixture immediately to fabricate a minimum of five (5) acceptable IDEAL-CT specimens. **Do not allow the mixture to cool down at all.**
    - It is recommended to prepare a minimum of two (2) additional specimens (total of seven) to account for potential rejection.
    - Place split samples into metal pans and flatten the mixture to a uniform thickness to promote even conditioning. Pans shall be appropriately sized to achieve a uniform mixture of thickness between 25 and 50 mm, consistent with AASHTO R 30 requirements. A 9 in. × 13 in. × 2 in. metal pan is suitable for individual 62-mm specimens.
- Obtain sufficient material to prepare two (2) G_{mm} samples.
- Determine and report G_{mm} for Set A (average of two replicates).
- Use the provided NCAT Excel worksheet to determine the required specimen mass to achieve 7.0 ± 0.5% air voids for 150-mm-diameter by 62-mm-tall IDEAL-CT specimens.
- Properly label all specimens.
- After cooling, store specimens in a controlled environment for no longer than two (2) weeks prior to testing.

D.3 Set B Specimens (Reheated Condition)

- Homogenize and split the mixture immediately to fabricate a minimum of five (5) acceptable IDEAL-CT specimens and store the material in suitable pans.
    - It is recommended to prepare a minimum of two (2) additional specimens (total of seven) to account for potential rejection.
    - Place split samples into metal pans and flatten the mixture to a uniform thickness to promote even conditioning. Pans shall be appropriately sized to achieve a uniform mixture of thickness between 25 and 50 mm, consistent with AASHTO R 30 requirements. A 9 in. × 13 in. × 2 in. metal pan is suitable for individual 62-mm specimens.
- Clearly label each pan and store it in a climate-controlled environment for no longer than one (1) week.
- Reheat the mixture in accordance with a previously submitted and approved reheating procedure, or follow the procedure recommended in "Appendix A – Reheating Procedure".

- Determine and report the corresponding G_{mm} after reheating.
- Use the provided NCAT Excel worksheet to determine the required specimen mass to achieve 7.0 ± 0.5% air voids for 150-mm-diameter by 62-mm-tall IDEAL-CT specimens.
- Properly label all specimens.
- After cooling, store specimens in a controlled environment for no longer than two (2) weeks prior to testing.

D.4 Set C Specimens (Reheated and Long-Term Aged Condition)

- Homogenize and split the mixture immediately to fabricate a minimum of five (5) acceptable IDEAL-CT specimens and store the material in suitable pans.
    - It is recommended to prepare a minimum of two (2) additional specimens (total of seven) to account for potential rejection.
    - Place split samples into metal pans and flatten the mixture to a uniform thickness to promote even conditioning. Pans shall be appropriately sized to achieve a uniform mixture of thickness between 25 and 50 mm, consistent with AASHTO R 30 requirements. A 9 in. × 13 in. × 2 in. metal pan is suitable for individual 62-mm specimens.
- Clearly label each pan and store it in a climate-controlled environment for no longer than one (1) week.
- Reheat the mixture in accordance with Appendix A – Reheating Procedure.
- Subject the reheated mixture to long-term oven aging in accordance with a previously submitted and approved long-term aging procedure, or follow the procedure recommended in Appendix B – Long-Term Oven Aging Procedure.
- Determine and report the corresponding G_{mm} after reheating **and** long-term aging.
- Use the provided NCAT Excel worksheet to determine the required specimen mass to achieve 7.0 ± 0.5% air voids for 150-mm-diameter by 62-mm-tall IDEAL-CT specimens.
- Properly label all specimens.
- After cooling, store specimens in a controlled environment for no longer than two (2) weeks prior to testing.

D.5 General Reporting Requirements

- For each production day, record and report basic aggregate gradation and volumetric properties.
- Any change in binder source or grade shall be documented and reported.
- IDEAL-CT results, including raw data files and processed results, shall be submitted.

Questions regarding execution of the experiment may be directed to Dr. Jhony Habbouche, Asphalt Institute.