Domestic Scan Proposal Form

AASHTO is now soliciting proposals for the **US Domestic Scan Program** (NCHRP Panel 20-68A).

Selected scan topics will be investigated by one of three ways: (type 1) site visits to three to six locations for approximately a two week period or less, by webinar; (type 2) peer exchange; or (type 3) conducted by a group of eight to 12 transportation professionals with expertise in the selected topic area. Proposed topics should meet the following criteria:

- Address an important and timely need for information by transportation agencies;
- Are of interest to a broad national spectrum of people and agencies;
- Are complex and also "hands-on," meaning they lend themselves particularly well to exploration through on-site visits; and
- Are sufficiently focused that the tour participants are able to investigate and understand key issues in the limited time available on the tour.

Before submitting your proposal it is highly recommended that you read **What Makes a Good Scan Topic Proposal http://www.domesticscan.org/what-makes-a-good-scan-topic-proposal**

This form is designed to collect the full length of your proposal. Sections requiring essays have unlimited space for you to use. Contact information has some limited text. ***Click on the highlighted boxes to advance to the area where you need to complete information.***

Proposals should be returned no later than date list on NCHRP website.

IMPORTANT NOTE on How to save your document: ***LastNameFirst Initial, underscore_Organization Acronym _CY2021***
Saved Document Name Example: NgetheP_AASHTO_CY2021
If you have more than one, add a number after first initial: NgetheP1_AASHTO_CY2021

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Date of submission
11/5/2021

☐Please **check** this box if your proposal has been endorsed or is being requested through an AASHTO Committee.
List the AASHTO Committee(s) that endorsed this proposal: Click or tap here to enter text.

Title of Proposed Scan:Best Practices for Design and Construction of Pavements with Recycled Materials

Problem Statement (What topic is to be examined? What drives the need for the scan? Why now?)

Public funding, such as California's Senate Bill 1 (SB1), has recently placed renewed emphasis on the repair of deteriorating highways. At the same time, the importance of sustainability within infrastructure design and construction has rapidly increased in the past decade. An opportunity now exists to maintain and rehabilitate roadway structures with novel methods that consume less nonrenewable materials, recycle demolition waste, and lower carbon emissions. Thus, an investigation into the best practices for designing and constructing pavements with recycled materials is proposed.

Although some emerging techniques, such as cold in-place recycling (CIR), have already been performed, their sustainability benefits are often communicated in a qualitative manner. For example, CIR is known to reduce vehicle emissions due to reduced transportation of hauling, but the actual reduction in carbon emissions is typically not analyzed. This scan is expected to collect and discuss the life cycle assessment (LCA) methods used by state DOTs as a parameter for quantifying sustainability benefits (e.g., carbon emissions, global warming potential) into a pavement maintenance or rehabilitation strategy.

Scan Scope (What specific subject areas are to be examined? Which cities and states might be visited? Which agencies/organizations (including specific departments or types of staff if applicable)?

The proposed scan scope focuses on reviewing and discussing best practices used to develop and implement pavement designs that incorporate recycled materials. For example, asphalt concrete incorporating recycled materials includes but is not limited to cold in-place recycling (CIR) and hot in-place recycling (HIR) which processes reclaimed asphalt pavement (RAP) directly into newly placed pavement. For portland cement concrete, recycled concrete aggregate (RCA) has been incorporated into new concrete pavement. Specific areas for discussion are expected to include motivation for incorporating recycling into a project, engineering difficulties encountered, material testing and mix design modifications with recycled components, contractor difficulties with recycling methods, cost comparisons between conventional and unconventional solutions, and long-term performance of the pavement after construction. In addition, understanding the life cycle assessment methods that have been used by transportation engineers would be of interest due to its novel implementation during design.

Pavement engineers who recommend recycling strategies for a project are expected to be valuable contributors to this scan, especially those from state DOTs that have already completed pavement projects with recycled materials. The cities and states where these engineers reside would be good candidates for visitation, as the current condition of pavement with recycled materials can be observed and discussions with engineers who designed and managed during the project may be possible. For example, Caltrans recently completed a CIR project in a rural, coastal environment in the San Francisco Bay Area. This may serve as a good location for a field visit because the current condition of the pavement can be observed, visitors can understand how the rural location of the project became a factor in the decision to utilize a recycling strategy, and visitors and Caltrans engineers can discuss details and experiences from the project.

Anticipated Scan Results (What key information is to be gained? What information is to be shared after the scan? Who would the audience be for this information?)

Several important benefits will be realized from the scan results. Readers will be introduced to the different recycling methods that have been practiced, the difficulties and challenges associated with using recycled materials in an unconventional pavement design, recycled material properties, mix designs, cost savings, and quantified sustainability benefits derived from life cycle assessments. The disseminated information will provide engineers, contractors, and other stakeholders valuable insights to guide the decision-making process for potentially adopting a recycled materials strategy for a pavement repair project.

Benefits Expected (Including potential impacts on current technology or procedures) The primary benefit from this scan is that transportation engineers will become more knowledgeable of successful design and construction methods that utilize recycled materials into pavements, the cost benefits, and the sustainability benefits. The consolidation of varied project results from multiple DOTs and organizations into a single scan study may result in reduced initial work hours needed to investigate the implementation of unconventional pavement repair solutions. From the scan results, investigation of the serviceability performance of pavement materials with recycled content may be impactful on the decision of whether a conventional or a recycled material pavement repair solution is most economical as a maintenance or rehabilitation strategy for a project. For example, pavements with recycled materials that do not perform well compared to conventional asphalt pavements may require more maintenance and result in greater overall costs during service life. In addition, use of life cycle assessments to quantify sustainability benefits may become an additional factor that is considered by design and engineering teams prior to finalizing a decision to proceed with a pavement repair solution that incorporates recycled materials.