August 15, 2002

Mr. Pal Choudry
Research and Technology
Transfer Engineer
Federal Highway Administration
Illinois Division
3250 Executive Park Drive
Springfield, IL 62703

Subject: Quarterly progress in the project DTFH61-02-X-00029 between June 02-August 02, 2002

Dear Mr. Choudry:

Since its initiation in March 2002, progress has been made in the FHWA research study entitled "Investigation of Aggregate Shape Effects on Hot Mix Performance Using An Image Analysis Approach," on several tasks. This is a 2-year pool-funded research project having as the participants the following States: Alabama, Georgia, Indiana, Minnesota, Mississippi, Missouri, Montana, and South Carolina, and the Central Federal Lands and Highways Division. This letter is intended to provide information on the quarterly research progress to the FHWA project administrator and the project monitor, the FHWA Illinois Division, for the period of June 02-August 02, 2002.

Enclosed you will find a progress chart detailing various tasks to be accomplished and the corresponding timelines scheduled for the successful completion of the project. Progress will be described based on the individual tasks as indicated in the chart. The aggregates to be evaluated in the project include: (i) samples from the National Center for Asphalt Technology (NCAT) Pavement Test Track study and (ii) representative aggregate samples from the participating States and the Central Federal Lands and Highways Division.

Among all the coarse aggregates received from the NCAT test track sections, 14 different aggregate materials were identified by name and their properties as eligible (light colored) for image analysis. The research team has already finished testing these NCAT coarse aggregate samples using the University of Illinois Aggregate Image Analyzer (UIAIA) system in accordance with the individual Task schedule given in Table 1. Depending on the average sizes and gradation results, anywhere from 300 to 2500 particles were selected for testing to establish a representative bag sample for each material. For materials having mainly smaller particles, a larger number of particles was typically needed to have anywhere from half a kilogram to 2 kilograms of aggregate by weight. Each aggregate sample was processed through the UIAIA system at least twice to verify the repeatability of the results. Only two of the samples had slightly darker particles, which could not be properly detected by the cameras and had to be removed for image processing purposes. In the end, all the front, side, and top camera images of the particles in a bag sample will be used to determine the following imaging based indices; volume and

weight (using specific gravities), flat and elongated ratio, a quantifiable angularity index, particle size gradation analysis chart, and quantifiable surface texture index.

A material request letter dated Mach 14th was sent out to each participating State and the Central Federal Lands and Highways Division requesting 3 types of coarse aggregate materials (greater than No. 4 sieve with a top size of 1 to 1.5 inches) for making hot mix asphalt (HMA): *(1) 100% crushed, (2) uncrushed gravel (if ever used for HMA application in the State), and (3) partially crushed (possibly a blend of the 100% crushed and uncrushed) aggregates*. In addition, for all three coarse aggregate materials, the following were also requested: (1) required amounts of *asphalt binder*, *fine aggregate*, and *mineral filler* to be used for making laboratory HMA mixes that are representative of those typically constructed in that State and (2) information on the corresponding *asphalt mix designs*.

So far, we have received materials from the Central Federal Lands and Highways Division and all the participating states except Montana. Just recently, Montana DOT also indicated that they are in the process of collecting and shipping their materials to the University of Illinois. Therefore, materials from Montana should arrive soon. The following is a summary list of so far what has been received from the participating States and the Central Federal Lands and Highways Division.

State	Number of Asphalt Mixes	Number of Different Coarse Aggregate for UIAIA Image Analysis	Mix Design Sheet(s) Included?
Alabama	0 (NCAT mixes)	6	(NCAT mix designs)
Georgia	1	3	No
Indiana	1	1	No
Minnesota	2	6	Yes
Mississippi	1 or 2 (not clear)	2	Yes
Missouri	3	9	Yes
Montana	0	0	No
South Carolina	unknown	6	No
Central Federal Lands and Highways Division	2	6	Yes
	Total	39	

As shown in the above summary, there are still materials and information missing for a large number of asphalt mixes and mix designs. The research activities in the next quarter will therefore primarily focus on obtaining all the missing information and materials from the participating States. Especially, the help and cooperation of the participating States will be sought out in this matter, which will be essential for the success of this research. In the meantime, testing using the UIAIA of the listed 39 aggregate materials has already started and will be conducted according to the individual Task schedule given in Table 1.

Again, I am very excited to have the opportunity to work with all the participants in this pooled fund study. I am also happy to tell you that we are on time with the scheduled tasks and making good progress in the project. Should you have any questions, you can always contact me at (217) 333-8637 or send e-mail to tutumlue@uiuc.edu.

Sincerely,

Erol Tutumluer, Ph.D.
Associate Professor of Civil Engineering

Timetable for the Pooled Fund Study on
"Investigation of Aggregate Shape Effects on Hot Mix Performance Using An Image Analysis Approach"

Task to Perform	Year 1				M Year 2			Report
	2002 March	2002 May	2002 August	2002 Nov.	2003 March	2003 May	2003 August	2003 Nov.
Phase 1		**Image Analysis**						
Acquisition of NCAT[1] Aggregates								
Acquisition of Aggregate Samples From Participating States								
Testing of NCAT Samples w/UI-AIA[2]								
Testing of Participating State Aggregate Samples with UI-AIA								
Image Processing for Shape Indices								
Phase 2					**Asphalt Mix Study**			
Preparation and Laboratory Testing of Asphalt Samples								
NCAT Performance Data Collection								
Laboratory and Field Data Analysis								
Report Preparation								

M : Proposed meeting schedule to discuss research progress and results

[1]: National Center for Asphalt Technology pavement test track facility

[2]: University of Illinois Aggregate Image Analyzer