Volume 1, Number 2 **Summer 1999**

Program Manager's Note

By **Juli Kobayashi**

We would like to thank all of you that responded to the Questionnaire that we had featured in the first issue of the Hawaiian Connections. We have updated your mailing addresses and are considering all your comments and suggestions.

The Hawaii LTAP was proud to host the LTAP Region 9 & 10 Meeting on June 3rd and 4th. We would like to thank those that participated and especially thank Kyle Oyasato with HDOT and Don Hamada with the City & County of Honolulu for the excellent tour of the traffic control centers. All our visitors were very impressed.

Summer is here and I will be out on maternity leave for a few weeks. Our staff will be here to assist you with your needs and any questions that you may have. Have a wonderful summer and looking forward to seeing you at one of our workshops.

INSIDE THIS ISSUE

Visit our website at:
www.eng.hawaii.edu/~hltap/

Director's Note

By **C.S. Papacostas**

This year, we organized the annual LTAP Region 9 & 10 meeting in Honolulu (see pg. 7). This was an excellent opportunity to hear about the implications of TEA-21 from Abe Wong of the Hawaii Division of FHWA, Kazu Hayashida and Pericles Manthos of the Hawaii DOT, and Gordon Lum of the Oahu Metropolitan Planning Organization. We also exchanged ideas and experiences with other LTAP centers, large and small, and were updated on the applied research sponsored by HDOT. Paula Mochida of the University of Hawaii described available "distance learning" technologies within Hawaii and Ray McCormick, National LTAP Administrator, offered valuable insights and agreed to share his thoughts with all (see pg. 8).

As promised, we have signed the first partnering agreement with the Hawaii Section of the Institute of Transportation Engineers and are looking forward to doing the same with other professional and industrial groups.

In May, I was invited to speak about our program at the 26th Annual Conference of the Hawaii Association of Public Works Officials that was held on Maui. Hopefully this marked the beginning of a long-term relationship.

Please pass this on to other interested parties in your office.

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Walter Lum's Rules of Thumb

Editor's Note: Walter Lum, consulting engineer, through many years of experience has developed quick and easy ways to solve complex problems. He has agreed to share his rules of thumb with us. This is the first article in this series.

A Pocket Seismograph: A Ball Point Pen

Why a Ball-Point Seismograph?

Often, damage claims arise whenever a dynamite blast goes off, or when pile driving is in progress or sometimes merely because of the noise from heavy equipment on a construction site. Just how much damage is caused by the construction operation? Here is a quick way to find out whether the claim may have merit or not:

- Take a ball point pen with a flat or concave end.
- Stand the pen up on end on a table or desktop.
- If the pen is still standing after a blast or during pile driving, most likely the damage to the structure where the pen is located will be nil.

Portable seismographs are used today to monitor potential vibration damage to structures near construction sites. A peak particle velocity of 2 in./sec. is more or less an accepted industry benchmark for damage to structures. If the seismograph records ground motion with a peak particle velocity of less than 2 in./sec. then one can assume that no damage to the structure will occur. Just what does a 2 in./sec. vibration feel like besides a squiggle or a numerical read out on a seismograph?

What does 2 in./sec. feel like?

To find out: Stand up a ball point pen on a level surface or a table top. Try to tip the pen over by banging on the table with your fist. The banging vibrations you will feel that are of more than 1 in./sec. but less than 2 in./sec. will tip the pen over.

Another experiment would be to slam the door to a room to try tipping the pen over. The noise and air pressure created could be disturbing to humans, but the vibrations could have little effect on the pen standing up on the table top.

The "falling pin" seismograph (developed in 1927 for quarry operators by Edward Rockwell, the Dean of Engineering at Rutgers University) measures particle velocities. Seismographs were not quite as portable then as they are today and the quarry operators needed some kind of instrument to guide their blasting activities. According to Dean Rockwell:

> *"During the early stages of our study……many expedients were tried, such as using very full glasses of water and by setting up regular pencils. In none of these cases did water spill from the glass nor did a pencil tip over during any of the blasts, which made us rather skeptical about claims that persons had been thrown out of chairs or dogs had been thrown clear across kitchen floors."*

The pencil experiment led up to the use of ¼ in. diameter steel pins from a few inches to fifteen inches in height which were very carefully made perfectly square on the ends and somewhat concave so as to insure absolute even bearing.

By relating kinetic energy to the work required to tip over a vertical pin, Dean Rockwell developed the equation:

$$\text{Velocity, } v = 13.9 * \frac{d}{\sqrt{h}} \; in./\sec.$$

This is the velocity such that the Kinetic Energy just equals the amount of work required to upset the pin.

Note that for a 12 in. high by ¼ in. pin, the velocity needed to tip the pin over would be 1 in./sec. For a 2 in./sec. velocity, the pin would be 3 inches in height.

continued on page 3

News From the Counties

White Asphalt??

By Richelle Suzuki, FHWA Hawaii Division

Okay, maybe it is not white, but gray. Have you been looking for a way to change the color of asphalt concrete? During a Pedestrian Road Show, sponsored by Peoples Advocacy for Trails Hawaii (PATH) and LTAP in Kailua-Kona, the Federal Highway Administration (FHWA) and the Hawaii County, Department of Public Works were challenged by the community to find a product to change the color of the asphalt shoulder on Alii Drive.

After doing some research, we were left with four choices: paint, paint with sand, tennis court paint, and Asphacolor. Ashpacolor was chosen because it was estimated to be cheaper than tennis court paint while paint and paint with sand has been found to become slippery when wet.

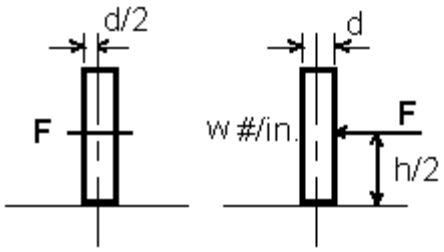
Asphacolor is a product that can be applied over an existing Asphalt Concrete(AC) pavement or added to the AC during construction. Asphacolor comes in a variety of colors. Thanks to Jas W. Glover, we were able to test three colors in their parking lot: red, green and sandstone. Sandstone was chosen because it showed the best contrast against the black AC.

The Contractor, Grace Pacific, and subcontractor Jas W. Glover laid the Asphacolor in March on the shoulder of Alii Drive. Using a pickup truck, a flatbed truck, and squeegees, the subcontractor was able to color approximately 6000 ft^2 of AC shoulder. Initially, the color was like fresh Portland Cement Concrete, however it became a darker gray as it dried. The cost was approximately $1.90 per ft^2 which included the cost for equipment, labor, and traffic control. The cost should decrease for larger projects where the Asphacolor can be machine applied and also for projects where traffic control is not required.

All parties involved in this project are satisfied with the product. It was easy to construct and met the needs of the public. Some issues remain to be resolved, such as maintenance, durability, and how to keep the color a light gray.

If you are interested in more information, please feel free to contract Ben Ishii with the Hawaii County Department of Public Works at (808)961-8327, Dennis Yokomizo with Jas W. Glover at (808)935-0871, Ann Peterson with PATH at (808)326-9495, Jason Jones with Asphacolor at (800)258-7679, or Richelle Suzuki with FHWA at (808)541-2700 x 311.

A Pocket Seismograph, continued from page 2.



*Work = Avg. Force * Distance*

$$\frac{F}{2} * \frac{d}{2} = F\frac{d}{4} = \frac{wd^2}{4}$$

Overturning Moment

$$F * \frac{h}{2} = wh * \frac{d}{2}$$

$$F = wd$$

Kinetic Energy = Work

$$\frac{Wv^2}{2g} = \frac{whv^2}{2g} = \frac{wd^2}{4}$$

$$v^2 = \frac{gd^2}{2h}, g = 32.2\ ft/\sec = 386.4\ in/\sec$$

$$v = \frac{13.9d}{\sqrt{h}}\ in/\sec$$

Non-Point Source Pollution Control

(exerpts from website http://www.epa.gov/owm/sw2.htm)

Editor's Note:
From Fact Sheet 2.1 issued by EPA in April 1999 (EPA 833-F-99-003). Based on Proposed Rule and subject to change upon publication of the Final Rule in November 1999.

The proposed Storm Water Phase II rule, signed on December 15, 1997 and published in the Federal Register on January 9, 1998, proposed expanding the National Pollutant Discharge Elimination System (NPDES) to cover all municipal separate storm sewer systems (MS4s) within urbanized areas as well as construction sites that disturb 1 to 5 acres. Phase I of the NPDES storm water program already covers large and medium municipalities, major industrial facilities, and construction sites that disturb 5 or more acres. The Phase II rule also proposed to conditionally exclude from the NPDES storm water program, industrial facilities that have "no exposure" of industrial activities to storm water, thereby reducing application of the program to many industrial activities currently covered by the program that have no industrial storm water discharges. The final rule will be issued this fall.

EPA has reached an agreement with the Natural Resource Defense Council (NRDC). As part of the extension agreement EPA will also do the following:

1. Develop a "model" permit, with stakeholder input, within a year following the final rule.

2. Compile a menu of BMPs, with stakeholder input, by October 27,2000.

3. Provide for peer review of the menu of BMPs, with possible revisions to the menu, within 6 months following 10/27/00.

4. Develop guidance on the development of measurable goals, within a year following the issuance of the menu.

Who would be affected?
Public owners or operators of regulated small municipal separate storm sewer systems (MS4s).

What is an MS4?
An MS4 is not meant to refer to municipally-owned storm sewer systems only. Owners or operators of MS4s would be State and Federal departments of transportation in cities, towns, counties, universities, local sewer districts, hospitals, military bases and prisons. Also, an MS4 is not necessarily merely a system of underground pipes. It also can include roads with drainage systems, gutters and ditches.

What is a small MS4?
Any MS4 that is not already covered by the existing Phase I storm water program.

How should a small MS4 be designated as regulated?
A small MS4 could be designated as a regulated small MS4 in one of three ways:

1. Automatic Nationwide Designation if located within the boundaries of a Bureau of the Census-defined "urbanized area," based on the latest decennial Census. Once designated, if will not subsequently be waived.

2. Potential Designation by the NPDES Permitting Authority (Required Evaluation) based on the following designation criteria on a watershed or other local basis:

- Discharge to sensitive waters
- High population Density
- High Growth or growth potential
- Contiguity to UA
- Significant contributor of pollutants to waters of the United States.
- Ineffective control of water quality concerns by other programs.

3. Potential Designation by the NPDES Permitting Authority if any small MS4 located outside of an urbanized area contributes substantially to the storm water pollutant loadings of a physically interconnected MS4 regulated by the NPDES storm water program.

Multiple Jurisdictions in the Same Urbanized Area?
For example, a city that is located within a UA and operates its own small MS4 would be designated alongside the State's department of transportation (DOT) and the county's DOT if the State and county own or operate roads that are within the borders of a city. All three entities would be responsible for developing a storm water management program for the portion of their respective MS4s within the city limits. In such a case, the permittees would be strongly encouraged to work together to form a unified storm water management program.

Who would be responsible if the small MS4 owner/ operator lacks the necessary legal authority?
Some regulated small MS4s may lack the necessary legal authority to implement one or more of the required minimum control measures. For example, a local government that is a small MS4 operator may be in a State that does not have an enabling statute that allows local regulatory control of construction site runoff into the sewer system. In such cases, the NPDES permitting authority would be responsible for implementation of the particular measure. Another example is a State DOT that may not have the legal authority to require and enforce controls on illicit discharges into its system. Since the regulated portion of a DOT system would likely run through the area of, or connect to, another small MS4. As co-permittees, they could form a shared program in which each permittee is responsible for activities that are within their individual legal authorities.

Staff News

Welcome new HLTAP student assistants!

Grad Assistant: Matt Nakamoto

Matt Nakamoto is currently a graduate student at the University of Hawaii at Manoa. He completed his undergraduate study last semester in Civil Engineering. Currently, Matt is also writing a menu-driven program, which will convert database files into GIS maps. This software, when completed, will aid the Statewide Transportation Planning agency (Matt's other place of Employment) when working on the Oahu Model Development Project.

Summer Student Assistant: Grant Yasui

Grant Yasui is currently a senior at Creighton University located in scenic Omaha, Nebraska. Grant is a Biology major and aside from assisting the staff in the LTAP office or attending summer sessoion courses, is seeking admission to any medical school that is willing to accept him. When not working hard in the classroom or in the office, Grant enjoys the outdoors by hiking, fishing and golfing...did I mention golfing?

Hawaii DOT
Research Results

Liquefaction in Calcareous (Coral) Sand

by Peter Nicholson, University of Hawaii

Soil liquefaction has been a leading cause of damage due to seismic events around the world. It has been assessed in preliminary studies as a major threat, should a major seismic event occur in Hawaii near urban regions of the state (such as Hilo, Kahului, and Honolulu) where significant deposits of loose sand are found.

In response to a heightened awareness of earthquake hazards in the Hawaiian Islands, along with a lack of good understanding of the engineering characteristics and field performances of calcareous soil types found in the tropical Hawaiian environment, we are conducting research sponsored by the Hawaii Department of Transportation and the Federal Highways Administration, at the University of Hawaii at Manoa. This work will assist in more accurately evaluating the engineering materials environment. It will also provide design tools for practicing engineers.

The most common and generally accepted methods used in practice to identify the liquefaction potential of soil deposits involve laboratory testing of soil samples obtained from locations of concern. Test results are correlated with in-situ field penetration tests to estimate or anticipate field behavior.

Unfortunately, most published correlations are based on silica-based terrigeneous soils. Using them to evaluate calcareous sands is questionable.

Our work is filling that void of data so that engineering property and response evaluations can be made with higher confidence. The research includes conventional scale static and dynamic testing of calcareous sand at varied densities and degrees of “light cementation” over a range of confining stresses and large-scale penetration tests on silica and calcareous sand specimens. The results of the testing will be used in formulating new penetration correlations for application to calcareous sand over a range of test variables representative of typically encountered engineering parameters.

As part of the three year research project, a large-scale calibration testing chamber facility has been designed and constructed to accommodate a full-scale field cone penetrometer. This apparatus may be further modified to accommodate various other field investigation testing equipment. The calibration chamber, which is capable of holding specimens up to 40 inches in diameter and 4 ft. tall, is housed in the laboratories of the Department of Civil Engineering at the University of Hawaii at Manoa. This equipment is designed to accommodate the testing of virtually any soil type with grain sizes up to coarse gravel. Soil specimens may be prepared under a choice of placement (compaction) conditions including layering and sedimentation. With some modifications, this equipment would also be able to apply an assortment of initial anisotropic stress conditions to represent specific field and site conditions.

Nicholson and PhD candidate Brennon Morioka at the testing chamber.

The testing chamber is the first of its kind in the state for performing large-scale testing incorporating actual field testing equipment on full gradations of natural and fill soils. In addition to testing for liquefaction evaluation, testing with this facility can also be utilized for research on determining static foundation design loads, bearing capacity, and evaluation of a variety of other static and dynamic soil properties.

Annual Region 9 and 10 meeting

June 3 & 4, 1999 @ Ilikai Hotel, Hawaii

***Above Left*: Ray McCormick discusses federal policies.** *Ablve Center: Maria Ardila-Coulson (Nevada LTAP) speaking about technology transfer techniques. Above Right: UH Graduate Student Devin Nakayama presents research results on soil creep.*

Left: Counterclockwise - Erica Martinez (Arizona LTAP), Gary Choy (Hawaii DOT), Juli Kobayashi (Hawaii LTAP), Richelle Suzuiki (FHWA, Hawaii)

Left: Kyle Oyasato (H3 Tunnels) shows the exploratory tunnel.

From National Headquarters...

By Raymond McCormick, P.E.
National LTAP Program Administrator

I am writing this note to express my appreciation to the Hawaii Local Technical Assistance Program for its commitment to serving Hawaii's transportation community. I am especially proud of the Hawaii LTAP because in 1990 I helped get the original program started at the Office of Technology Transfer and Economic Development. From the beginning, it was obvious that the program was well received by the transportation community. The program, now located at the University of Hawaii Civil Engineering Department continues to provide an outstanding service to the community.

The transportation community in Hawaii is fortunate to have as its LTAP Director, C.S. Papacostas (Costas). He has dedicated many years to the field of transportation, at both the local and national level. I can think of no better person for the job. Juli Kobayashi, as pregnant as she is, continues to be a major force in the program. I applaud the efforts of both individuals for providing the technology transfer services to the transportation community. In addition Gary Choy, from the Hawaii DOT has been instrumental in providing stability for this program through a major relocation and management shift; his efforts have been outstanding. The FHWA Division Office representative, Ms. Richelle Suzuki has also been a determining factor in the continuation of this program. These four folks have formed a team that is dedicated to the training and technology transfer efforts of the transportation community in Hawaii. All of their customers should be very proud of this team of dedicated individuals. They have truly exceeded the customers' expectations.

I have had a chance to review the first issue of "Hawaiian Connections" and I must say that it is a terrific publication. I look forward to reading the next issue. It was especially pleasing to see the article written by Steven Fong of the Hawaii Division office. I encourage everyone to share this type of information. One thing about technology transfer is that we all learn from each other. Costas has mentioned to me that perhaps in future issues of the newsletter, something called a "better mousetrap" will be included. This will be a terrific way for everyone to share their solutions to problems. I look forward to reading these. This is exactly the type of information that can lead to tremendous savings in dollars for the local governments.

I encourage all of the Hawaii LTAP Customers to support this valuable program. One way that you can provide support is through providing feedback to the center on how the training that they have provided may have helped improve the way you do your job. The benefits of technology transfer and training are hard to measure. Through success stories as a result of the training that is provided, we are able to place a value on the efforts of our centers. This information is used each year when we at the FHWA prepare funding requests to Congress. So please keep the center in mind even after you receive training.

My compliments on an outstanding start to the new center - thanks for allowing me to attend the Region Nine and Ten meeting, and I look forward to visiting the center again in the future.

Superpave

Software Nears Release!!!

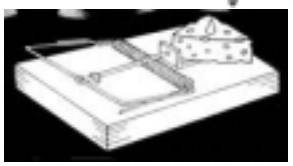
The Federal Highway Administration announced that version 2.0 of the Superpave volumetric mix design software is to be released this summer. The new software runs under the Windows/NT operating systems and contains five modules:

* Volumetric mix design
* Field quality control (QC)
* Field quality assurance (QA)
* Binder classification
* Test data entry

For more information, contact Katherine Petros at FHWA:

Ph: 415-744-0652
fax: 415-744-2620
e-mail: katherine.petros@fhwa.dot.gov.

Better Mousetrap?



Have you or one of your co-workers built a better mouse trap recently? a modified gadget? an improved way to do a job?

Please let us know about it. The best entries will be featured in a future issue of Hawaiian Connections.

Your name and phone number:

_____

Inventor's name and phone:

_____

Invention:_____

Please fax this form to 956-8851

For Your Information...

by Gary Choy, Research Engineer, Hawaii DOT

Editor's Note: In this issue we feature the activities of the Materials Testing and Research Branch, Highways Division, Department of Transportation.

Located at 2530 Likelike Highway on Oahu, the Materials Testing and Research Branch is comprised of an administrative staff and three sections:

- The Compliance Testing Section includes:
  - Physical Testing Unit
  - Chemical Testing Unit
  - Service & Development Unit
- The Soils Engineering & Pavement Design Section includes:
  - A Field Exploration Unit
  - Laboratory & Office Engineering Unit
- The Material Quality Assurance Section includes:
  - The Bituminous & Structural Material Unit
  - The Concrete & Concrete Product Unit

The branch has a staff of 38 people that includes 3 administrative personnel, 14 engineers and 21 engineering technicians.

What Do We Do?

- We plan, develop, implement, and manage statewide programs for
  - Testing
  - Quality assurance
  - Research and development
  - Technology transfer
  - Geotechnical engineering and pavement Design
  - Training and certification of material technicians and field inspectors in materials quality assurance
  - Special engineering studies

- We Provide technical and consultative services relating to
  - Materials
  - Foundation
  - Pavements
  - Environmental quality (highway traffic noise)

- We test, accept, and certify all test equipment and materials incorporated into all transportation facilities.

- We conduct geotechnical engineering studies based on field borings, laboratory tests and engineering analyses for the evaluation and design of pavements, structural foundations and soil stability.

- We manage applied engineering research and development programs.

- We provide technical assistance, inspections and testing services for construction, maintenance and other related fields.

- We participate in activities of national organizations (such as TRB and AASHTO) engaged in research, technology transfer, material specifications & testing, quality assurance, etc. (TRB, AASHTO, etc.).

On-Going Activities

The branch

- Conducts materials sampling, testing and certification to ensure materials placed in highway projects are in compliance with the project's plans and specifications

- Provides asphalt and concrete plant inspections.

- Conducts sub-surface exploration, soils testing and analyses for foundation, slope stabilization and pavement designs.

- Performs and conducts traffic and construction noise monitoring, traffic noise modeling and noise abatement analyses.

- Conducts pavement serviceability surveys on all of the State's highways.

- Conducts and manages the applied research program. Some recently supported applied research projects include:
  1. Development of a herbicide manual for controlling vegetation in the State R/W.
  2. Determining the Long Term Creep Effects of Tropical Soils
  3. Use of Soil Admixtures for Soil Stabilization
  4. Investigation of the Effects of Limited Ramp Closure on the H-1 Freeway.
  5. Effects of Corrosion Inhibitors on Reinforcement Bars in Marine Environment.

Other activities of continuing interest include:

1. Evaluating cost-saving of light guidance tubes
2. Testing and evaluating a pilot "Superpave" project using performance grade (PG) binder design
3. Implementing and evaluating the incentive/disincentive contract requirements relating to pavement smoothness as part of a national initiative
4. Converting to the recently-released FHWA Traffic Noise Model (TNM);
5. Utilizing life cycle cost analysis in pavement design;
6. Supporting technology transfer via the Hawaii Local Technical Assistance Program (HLTAP).

Upcoming Workshops & Activities

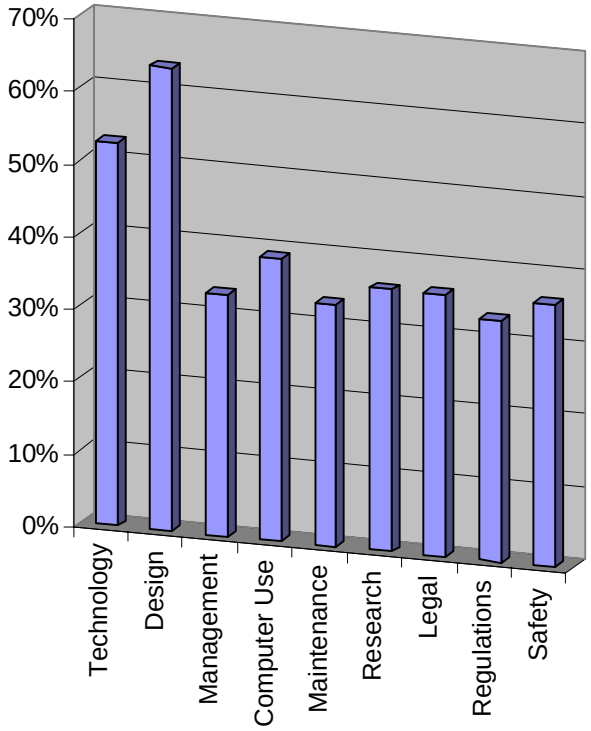
WORKSHOP	DATE
Hazardous Bridge Coatings: design and Management of Maintenance and Removal Operations	October 12-15, 1999
HEC-RAS, River Analysis System	November 15-19, 1999
Introduction to Highway Hydraulics	TBD

READER RESPONSE...

Thank you for all the responses to the spring newsletter questionaire! Your input will help Hawaii LTAP to improve the Newsletter to better suit your needs.

Our new questionnaire is located on page 11. We would appreciate your continued response!

Which types of articles would you like to see more of?



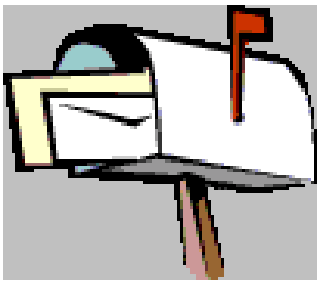
Free Publications from Past Workshops

1. T-123: Pavemnt Smoothness
2. T-127: Milling and Recyclings
3. T-130: Longitudinal Joints: Problems and Solutions
4. T-134: Temperature Segregation/Temperature Differential Damage

For free copies (while supplies last) please call (808) 956-9006.

We Need Your Feedback

Member Info...



Would you like to remain on our LTAP mailing list? Yes___ No___
Would you like to receive LTAP workshop notices? Yes___ No___
Would you like to receive our quartely LTAP newsletter? Yes___ No___

If you answered yes, please help us by filling in the following information:

Name:_____
Company/Organization:_____
Address:_____
City:_____ State:_____ Zip:_____

AASHTO Mailing List Notice!!!

If you want to be placed on AASHTO's mailing list, please let us know. It is our policy not to release our mailing lists without your consent.

☐ Yes, place me on the List

Short Questionnaire:

1. **How often do you read our newsletter?** Never___ Occasionally___ Often___
2. **Which newsletter sections do you find useful?** Articles___ Workshop Schedule___ Training Materials___
3. **On which subjects would you like to see more articles on?** Technology___ Design___ Maintenance___ Research___ Safety___ Management___ Computer Use___ Legal___ Regulations___
4. **How many LTAP workshops have you attended?** _____
5. **How useful were these workshops?** Very useful ___ Moderately Useful___ Not Useful___
6. **Comments**_____

_____

_____

Please fax this form to Juli Kobayashi at (808) 956-8851 or mail to:

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Hawaii LTAP is a cooperative program of the Department of Civil Engineering, University of Hawaii, the Hawaii Department of Transportation, Highway Division, State of Hawaii and the U.S. Department of Transportation Federal Highway Administration, Hawaii. The LTAP program is to provide technical assistance and training programs to local transportation related agencies and companies in order to assist these organizations in providing cost-effective improvements for the nation's highways, roads and bridges. Our office is located at:

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