

Agenda
TRB Subcommittee AFD40(2)
APT International Alliance
Monday, January 11, 2009, 7:30 pm – 9:30 pm
Marriott Balcony B

Subcommittee Scope: *In the Fall of 2004, the TRB Committee on Full-Scale and Accelerated Pavement Testing (AFD40) decided to create a new subcommittee designated as AFD40(2) for the purpose of promoting, facilitating and documenting both formal and informal cooperation within the global APT community. The inaugural meeting for the new subcommittee was held during TRB week on January 10th, 2005 in Washington, DC. The initial charter period for the group was 3 years; however, it was decided to extend the charter in January of 2008 to enable the International Alliance subcommittee to continue to function as the cooperative interaction mechanism within AFD40.*

1. Welcome & Call to Order

2. Introductions

- a. Louw du Plessis as co-chair
- b. Everyone in attendance

3. Approval of 2009 Meeting Minutes

- a. Scope of membership
- b. Meeting time management

4. Attendee Updates – In order to provide for more productive work time in the AFD40 full committee meeting, status reports on our respective APT research programs are now provided in the AFD40(2) APT International Alliance subcommittee meeting. The only way to ensure that everyone has time to talk within the 2-hour subcommittee time slot is by planning in advance. In consideration of web input solicited from subcommittee members and friends, one representative from each facility and users' group(s) in attendance will be provided with up to 10 minutes to speak. This time limitation will be strictly enforced. Slides may be shown if provided to the subcommittee chairman before the meeting is called to order. Time will be short, and it is likely that no meeting time will be available for those who did not request a slot beforehand.

- a. NCAT Pavement Test Track – Buzz Powell
- b. MLS Users' Group – Fred Hugo or nominee
- c. CEDEX Test Track – Angel Mateos
- d. National Airport Pavement Test Facility, FAA WJHTC – Gordon Hayhoe
- e. CSIR, South Africa – Louw du Plessis
- f. ATREL / University of Illinois – Imad Al-Qadi / Jeff Roesler
- g. Louisiana DOTD Pavement Research Facility – George E. Crosby
- h. UC Pavement Research Center – John Harvey
- i. HVSIA – Louw du Plessis
- j. US Army ERDC – Haley Bell
- k. Florida DOT HVS – Bouzid Choubane
- l. CAPT – Nelson Gibson
- m. FHWA's PTF – Nelson Gibson

5. Other Business

- a. Generic mechanism for sharing strain data
- b. Relationship between longitudinal and transverse strains as a function of pavement thickness

6. Adjourn

Agenda
TRB Subcommittee AFD40(2)
APT International Alliance
Wednesday, January 14, 2009, 4:30 pm – 6:00 pm
Marriott McKinley

Subcommittee Scope: *In the Fall of 2004, the TRB Committee on Full-Scale and Accelerated Pavement Testing (AFD40) decided to create a new subcommittee designated as AFD40(2) for the purpose of promoting, facilitating and documenting both formal and informal cooperation within the global APT community. The inaugural meeting for the new subcommittee was held during TRB week on January 10th, 2005 in Washington, DC. The initial charter period for the group was 3 years; however, it was decided to extend the charter in January of 2008 to enable the International Alliance subcommittee to continue to function as the cooperative interaction mechanism within AFD40.*

7. Welcome & Call to Order

8. Introductions

- a. Everyone in attendance (16)
- b. Louw du Plessis as new co-chair

9. Approval of 2008 Meeting Minutes – The minutes were approved with no discussion.

10. CAPT Update – Nelson Gibson presented 3 options for the continuation of the Consortium of Accelerated Pavement Testers:

- a. Transfer the CAPT pooled fund to a state.
- b. FHWA continues to host the CAPT with the creation of a task order for technical support. Ideally, a task order would be developed to support travel to either an early summer or spring meeting.
- c. A new RFP is developed and the pooled fund process would begin anew.

Ben Worel requested a conference call to develop a plan of action, and Nelson agreed to put it together before the end of the month of January, 2009. The URL for the existing CAPT pooled fund is <http://www.pooledfund.org/projectdetails.asp?id=358&status=4>.

11. Attendee Updates – A representative from each APT program in attendance was provided with an opportunity to update attendees on their research activities. Presenters were asked to limit their updates to 10 minutes in length, and they were encouraged to use slides. The following information was either provided during the meeting or thereafter via follow up emails (in alphabetical order by facility name):

- a. An update on the Air Force Research Laboratory at Tyndall AFB, Florida was provided by Michael Hammons (Michael.Hammons@tyndall.af.mil). They operate two load carts: 1) a single wheel F-15E load cart with a wheel load of up to 32,500 lbs, and 2) a C-17 load cart with a 6-wheel bogey capable of loads up to 295,000 lbs. These load carts are manually operated by a driver and use actual aircraft wheels and tires to apply the accelerated loads to the pavement. Test articles are constructed in experimental pavement test pads with carefully constructed foundation layers. Loading schema include typical aircraft wander patterns. In the past year, these load carts have been used to apply simulated aircraft loads to a number of experimental rapid runway repair materials and techniques in both rigid and flexible pavements as well as military airfield matting. Measurements made during the experiments have included active instrumentation

to record strain and soil pressure as well as passive measurements (rod and level and straightedge) to measure permanent deformation. In some experiments, heavyweight deflectometer measurements have been made at regular intervals to characterize changes in load transfer across rigid pavement joints. The results of these experiments are being used to select optimal repair methods and technologies and as an integral part of Department of Defense acquisition programs to select the next generation of lightweight aircraft matting. Strain and pressure measurements are being used to validate analytical models.

- b. Mike Moffatt (michael.moffatt@arrb.com.au) provided an update on the Australian ALF program. In the last 12 months the ALF in Australia has completed the loading of four crushed rock pavements as a means of validating their laboratory repeated load triaxial test procedure. ALF testing has demonstrated changes need to be made to those test procedures. A new multi-axle assembly has been constructed and fitted to ALF to enable study of the different pavement wear rates on a typical Australian crushed rock highway pavement. The assembly allows loading with (half) single, tandem and tri-axes. Commissioning of the assembly is nearing completion and trafficking will commence shortly.
- c. Dave Jones (djjones@ucdavis.edu) provided an update on Caltrans' HVS testing program. During 2008, one HVS operated full time on the Caltrans/UC Pavement Research Center (UCPRC) warm-mix asphalt (WMA) study. No testing was carried out with the second HVS. The WMA study is a multi-phase APT, laboratory and LTPP study. Three WMA technologies are being assessed against conventional HMA. Phase 1 involved an APT rutting study at elevated temperatures, and a laboratory study on specimens cut from the test track. Laboratory tests included shear, wet and dry beam fatigue, Hamburg Wheel Track, and Tensile Strength Retained. This phase was completed in June 2008. Phase 2 of the study, which is currently in progress, includes an assessment of moisture sensitivity using the HVS (repeat of the Phase 1 test plan, but with presoaking of the section and constant flow of water over the section during HVS testing) and a repeat of the Phase 1 laboratory study experimental design on specimens prepared in the laboratory using the same aggregates and binder that were used in the test track. Controlled pilot studies are also being monitored on in-service pavements in the state. One report has been completed to date, detailing the test track location and construction, Phase 1 HVS testing, Phase 1 laboratory testing, and interim recommendations. The report is currently under review by Caltrans and will be posted on the UCPRC website when approved by Caltrans. Planned testing in 2009 includes completion of Phase 2 of the WMA study, start of Phase 3 of the WMA study (warm-mix rubberized asphalt), and HVS testing on a composite pavement (asphalt on portland cement concrete), which is part of the SHRP R21 study.
- d. Angel Mateos (Angel.Mateos@cedex.es) indicated that the last CEDEX test on subgrade testing is almost finished: five of the six sections are failed; one section (120 mm asphalt concrete on 300 mm cement-stabilized) has not yet failed. The load may need to be increased to finish the test within a reasonable time. Up to now results show very little contribution from the deepest layers of the subgrade, under the capping layer. Currently, the Spanish catalogue for subgrades considers very thick layers that do not seem to be necessary. Data from this test is being used in collaboration with Per Ullidtz and UCPRC, in order to calibrate the CALME model for the tested sections. At this moment they are preparing the next test and several alternatives are being considered; one of them is a fourth test on subgrades and another one is focused on asphalt concrete mixture specifications. There is a

need to find the optimum combination of asphalt quality versus asphalt thickness. To date, data seems to indicate that they could considerably reduce thickness with very little increment of bitumen content. Problems with construction were pointed out for the second alternative during the meeting, since placing less than 20 meters in length does not seem to be reliable.

- e. Gregers Hildebrand (ghb@vd.dk) indicated the Danish Road Testing Machine is no longer active. It has been mothballed for 6 or 7 years.
- f. An update on European HVS activities for 2008 was provided by by Leif Wiman (leif.g.wiman@vti.se). Accelerated load testing with the HVS machine has been performed as a part of the European project, SPENS, “Sustainable Pavements for European New member States”. The SPENS project started in the autumn of 2006 and will be finished in the autumn of 2009. During 2008 tests have been carried out in Slovenia and Poland concerning evaluation of materials for road upgrading. Three tests were carried out in Slovenia with different kind of upgrading treatments with and without binder layer (test sections 1 and 2), different thicknesses of binder layer (test sections 3 and 4) and with and without steel net reinforcement at the bottom of the AC-layer (test sections 5 and 6). In Poland two tests were carried out with High Modulus Asphalt (test sections 7 and 8 and test sections 9 and 10). Two test structures were loaded in the same test setup in each of these 5 tests. The evaluation of the test results is ongoing (Jan 2009).
- g. Jamie Greene (James.Greene@dot.state.fl.us) provided an update on the status of FDOT’s HVS program. In the current study, FDOT is attempting to induce top-down cracking. Three test sections have been artificially aged using FDOT's Accelerated Pavement Aging System (APAS). The first attempt proved unsuccessful, so the water table was raised incrementally to see if bottom-up cracking could be initiated. After the water table was placed directly below the base, bottom-up cracking was observed. Testing has begun on the second test section. If top-down cracking is not observed, the water table will again be raised in an attempt to generate bottom-up cracking. A study of four different tire types including conventional dual tires, two single new generation wide-base tires, and a single conventional wide-base tire was recently completed. Initial observations indicate that the new generation wide-base tires generated similar rut depths as the dual tires. Tire contact area and vertical deformation at various combinations of inflation pressure and load were also collected. At least four new experiments are planned for the upcoming year. These experiments will include a continuation of top-down cracking/aging research, a study to determine if an ARMI layer contributes to rutting and crack resistance (this experiment will consist of overlays constructed on flexible and rigid pavements), validation/confirmation of the MEPDG bottom-up cracking predictions, and a validation of recent laboratory DASR research with primary emphasis on the level of rut resistance provided by varying gradations.
- h. Fred Hugo (fhugo@sun.ac.za) provided a status report on members of the MMLS Users’ Group. Ongoing programs at EMPA in Switzerland are studying the ability of MMLS technology to induce damage similar to actual traffic, cold recycling and fine particle abrasion, and parameter calibration. In South Africa, ITT is conducting HMA comparative studies and the application of the rutting protocol (www.sabita.co.za). In the United States, PTI at Penn State is studying the effect of binder course on HMA overlay performance, wear on pavement markings, and geogrids in pavement structures. NCSU is using their MMLS to study chip seal design and construction. New programs are being started at Tongji Univ Shanghai and CRILP - Shenyang-China as well as at BAsT in Germany.

- i. Ben Worel (Ben.Worel@dot.state.mn.us) provided a status report on MnROAD (<http://www.dot.state.mn.us/mnroad/index.html>). Owned and operated by the Minnesota DOT, the second phase of MnROAD was designed and built around the needs of active research partners developed with the help of the TERRA research board. Both the I-94 Mainline (ML) and Low Volume Road (LVR) were reconstructed over the last three years to support the many local and national research studies. They welcome more participants in both these studies and other related or non-related studies using the data collected. Phase II construction efforts in 2007 included 3 LVR Cells Acid Modified, 3 LVR Cells Fly Ash Full Depth Reclamation, 2 Farm Loop Cells Implements of Husbandry, and 2 ML Cells PCC Surface Characteristics. Rehabilitation in 2008 included 8 LVR and 16 ML Test Cells, which are supporting the active studies. This construction consisted of 17 HMA mixes, 6 asphalt binders and many types of surface textures. A SHRP-II Composite Pavement Study is planned for 2009. This consists of 2 HMA/PCC & 2 PCC/PCC mainline cells. The project is funded by seven pooled funds and twelve research projects. Current pooled funds consist of timing preventive maintenance for environmental aging, low temperature cracking, thermally insulated concrete pavements, effect of farm equipment on pavement performance, recycled unbound materials, PCC rehabilitation, and whitetopping design. Current research projects consist of emulsion-stabilized full-depth reclamation, high carbon fly ash base stabilization, pervious concrete, permeable pavement cold region performance, pervious concrete wearing course overlays, PPA-modified asphalt, HMA surface characteristics, high performance concrete pavement, unbonded concrete overlays, PCC surface characteristics, RAP, and taconite aggregates in pavement applications.
- j. Buzz Powell (buzz@auburn.edu) reported that trucking operations were completed for the 2006 research cycle at the NCAT Pavement Test Track (www.pavetrack.com) in December of 2008 with the application of 10 million ESALs. Experiments completed in the third research cycle include a high RAP content surface mix study using an array of binder grades, long term warm mix asphalt (WMA) surface mix performance, the effect of low QC voids on mix rutting performance, a validation study of energy ratio methodology for the prevention of surface cracking, perpetual pavements on soft subgrades, several different mechanistic-empirical validation/calibration studies on stiff subgrades with different bases and non-perpetual buildups, development of a new multi-temperature strain threshold theory for perpetual pavement designs, drainability and noise performance of permeable surface mixes containing both gravel and stone (including a section placed with a twin layer paver), long term performance of SMA mix containing high LA abrasion loss aggregates, lower gyration level Superpave mix designs, long term performance of coarse versus fine aggregate blends, and the effectiveness of rich bottom layers at preventing reflective cracking in jointed pavement overlays. The Track will be rebuilt to facilitate the fourth research cycle in the spring and early summer of 2009. In addition to state specific test sections, a fully instrumented multi-state Group Experiment will include full depth high RAP content mixes, both foamed and additized WMA, and the structural contribution of permeable surfaces. Private sector participation will be much more significant in the next research cycle. The pooled fund advertisement for the 2009 NCAT Pavement Test Track can be viewed at <http://www.pooledfund.org/projectdetails.asp?id=1232&status=1>.
- k. An update on the Ohio University Accelerated Pavement Test Facility (APTF) was provided by Roger Green (Roger.Green@dot.state.oh.us). A performance assessment of WMA mixes placed on field test sections constructed on SR 541 in eastern Ohio was recently completed. Mixes containing Aspha-min, Sasobit, and Evotherm were hauled from the plant to SR 541 and the APRF for construction. Control sections constructed with standard ODOT HMA were included on SR 541

and in the APTF. The WMA sections in the APTF were constructed on an instrumented (displacement, strain and pressure) "perpetual pavement" buildup similar to that constructed on the Ohio US 30 perpetual pavement test site (16" HMA). Three thinner sections (15" HMA, 14" HMA, and 13" HMA) were also constructed in the APTF, instrumented, and tested at various temperatures to determine if our perpetual pavement design procedure is conservative. The draft final report for this research has been submitted and is currently under review. The final report should be posted on the ODOT website (<http://www2.dot.state.oh.us/research/default.asp>) within 4 months. Sections are currently being allowed to "rest" and may be used in the future to evaluate damage recovery.

- I. During the subcommittee meeting, updates were also provided for LCPC, Kansas, Louisiana, ERDC, FHWA and CSIR; however, no written summaries were available for inclusion in the minutes. Interested parties are referred to the AFD40 web (<http://www3.uta.edu/faculty/sroman/AFD40/>) for additional information on these programs. Program specific information can be found at the following URLs:

1. French LCPC - <http://www.lcpc.fr/en/presentation/moyens/manege/index.dml>;
2. Louisiana PRF - http://www.ltrc.lsu.edu/research_alf.html;
3. FHWA PTF - <http://www.fhwa.dot.gov/pavement/utwweb/facilit.cfm>.
4. CSIR HVS-
http://www.csir.co.za/Built_environment/Infrastructure_engineering/apt.html.

12. Other Business – No enough time was provided for all attendees to have an equal opportunity to share their research. This was unfortunate not only because we all benefit from the experiences of others, but because the subcommittee provides a good opportunity for attendees to seek solutions to problems they are experiencing that may have already been solved by other APT researchers. The subcommittee chairmen and AFD40 committee chair will solicit input in September of 2009 from those who plan to attend the 2010 meeting in order to ensure that ample time and structure is provided for all attendees to have equal opportunity to share and learn. Partially because of this time limitation, discussion at the close of the meeting focused on who should be allowed to actively participate in subcommittee business. This issue will be addressed by the AFD40 committee chair in the upcoming review of the Triennial Strategic Plan

13. Adjourn – The meeting was adjourned, but it was obvious that more discussion on defining the scope of membership was needed.