RECORD OF SESSIONS DISCUSSIONS

Session B: International Collaboration (Joe Mahoney JM, Al Bush AB – *Chair*)			
Name	**Comment/Question**	**Name**	**Answer/Comment**
RL	• Interpretation of data could use some comment/input from other areas.	JM	• This is at the heart of the operation and would be welcomed, but is difficult to accommodate.
RF	• Prediction of response and modelling is also important.		
BC	• HVS testing is not just about failing the pavement. Needs to be some agreement on what HVS testing is trying to achieve.		
FH	Need to focus thinking. • Look at Force Project in Europe in early '90's; • Investigate current overlaps that could be coordinated; • Understand that role-players and focus changes over time. Therefore, the findings from HVS testing and the support of the findings need to be disseminated and discussed regularly.	JM	• The alliance should focus on what can be shared and contributed to the group as a whole.
FH	• The goal of the collaboration is to find cost-effective ways of sharing information related to HVS testing. • Significant findings should be synthesised. • The matrix is a good starting point.	JM	• We should try to populate the matrix which is achievable as an input to identifying bigger collaborative initiatives.
ES	• Start with the matrix to see overlaps and gaps to identify future programmes. • Strategic plan for HVS testing needs to be developed. Input will come from strategic plans for long-term and short-term goals which will give a basis for collaboration.		
AT	• Start with a list of all HVS tests done in SA (400+), with basic information in a matrix form. Expand the list to include all HVS's throughout the world to allow collaboration.		
LS	• Need to define the classification parameters within the matrix. • Need to identify someone to consolidate the information.		
AT	• If all users could populate the website, it could be accessed by all.		
NC	• The website approach would be the cheaper option.		
ES	• A format of all required information with extensive comment was included in previous minutes. • Combine this table for all areas worldwide.		
FH	• Great task to compile the final document. Use as many launch pads as possible to see what overlaps and gaps there are. • Do not start from scratch – use existing information.		
NC	• Need indication of plans from each group.		
BC	• There needs to be consistency with regard to data gathered.	JM	• All data collection is specific to each user's needs and will need to be adjusted slightly to achieve consistency.
SO	• A common understanding is needed related to the use of the HVS.	JM	• This is only necessary for jointly-investigated projects/topics. • Different instrumentation may be used to gather the same measurement parameter for specific tests. The method of data captures needs to be clearly documented to develop a common understanding of interpretation of the data.
BC	• Each country and its testing programme is unique and will not have specific areas of overlap.		
FH	• 2 ways of expanding the matrix, horizontal & vertical. • Topics need to be sub-divide to identify the gaps and overlaps. This will identify clusters of main fields and sub-fields.		
AT	• Use the current website VKE is creating for Gautrans and adapt for this purpose	ES	• Agreed

LdP	• How does the Alliance link into the current TRB structures?	JM	• Under the TRB structure, sub-committees can be created which could use a venue at the annual TRB meeting for discussions. If the Alliance becomes a sub-committee at TRB, it will need to submit an annual report to the TRB Committee.
NC	• It would be a sub-committee of HVS users.	JM	• Cannot be a closed forum.
BC	• The sub-committee would be open to TRB delegates.	JM	• Alliance represented and give an update of activities.

Session C: Feedback on last year HVS activities and future program (Reed Freeman RF - *Chair*)			
Name	**Comment/Question**	**Name**	**Answer/Comment**
California Pavement Research Centre – Carl Monismith/Nick Coetzee			
ES	• Has the Table given at the workshop of 7 & 8 October 2002 been updated?	NC	• New strategic document now available on the website: o LdP will get website address; o ES to send NC an e-mail for an update of the Table.
VTT/VTI – Leif Wiman & Niclas Odermatt			
AT	• Density of crushed stone during construction appears to be a problem to its performance.	NO	• This has been considered.
CRREL – Vince Janoo			
MdB	• What were the failure criteria?	VJ	• Failure criteria 12.5mm rut.
RF	• Are tyre pressures the same?	VJ	• Yes.
		VJ	• Results to be included as part of AASHTO design guide.
FN	• Did you measure suction as well as moisture content?	VJ	• Tried, but unsuccessful.
AT	• Was TENSAR used to evaluate black bases?	VJ	• No, granular bases.
ES	• Could you please supply a of publications/titles?	VJ	• Will e-mail titles.
NO	• If using synthetic grades, consider European experience.		
WES – Al Bush & Reed Freeman			
AT	• Have you tried Hyson Cells for sand stabilisation?	RF	• Done a lot of work with sand grids, but the process is slow. Only used as a fall-back.
FN	• A lot of information on gravel pavements is available in the form of TRH20.		• FN to give RF references.
Florida DOT – Bouzid Choubane			
AT	• Lazer position – how does it read?	BC	• The frame moves with the lazer attached. Run the profile and measure, then go back to testing.
FH	• How do you determine the ageing of the material and does it take into account the initial ageing?	BC	• Started testing as soon as construction is complete. • The initial viscosity of the binder is determined and the viscosity is them measured at the end of the test to give an indication of ageing.
FH	• Is the modified and unmodified rut progression relative to the same benchmark?	BC	• No, it is not relative. Any defect will show. The initial profile and measurements are removed to show the ruts.
RL	• Are the profiles averages or absolute?	BC	• Absolute.
VJ	• Did the 1" and 2" step make a difference?	BC	• Yes, it made a difference. Some areas were deeper than others.
FH	• Did you monitor at what level the rutting took place?	BC	• Mostly in upper two inches. In unmodified – 40% humps. • Rutting initially occurred in the beginning of the test.
Gauteng DOT/CSIR – Benoit Verhaeghe & Hechter Theyse			
VJ	• Are all the needs being addressed?	BV	• Projects are being discussed by the APT Steering Committee in SA and prioritised. Funding should not be an issue.
Gauteng DOT/CSIR – Benoit Verhaeghe & Hechter Theyse			
AT	• G2 Foamed bitumen treated base resilient modulus at 40kN wheel load give different values?	HT	• The initial resilient modulus for the different tests started at different values.
BC	• Why 7 days curing? • Did the binder age and how does this relate to real life?	HT	• 7 day period was arbitrarily chosen. • Some results available on recovered binder after ageing, based on PE experiment. • Report is available.
MdB	• What were the values of the in situ moisture contents?	HT	• Initial moisture content in the base layer was 3 – 4%. • No shear failures. High shear strength. Changes in moisture content with times were not measured.

FRIDAY, 17TH OCTOBER 2003

Session D: Instrumentation and Data Collection Issues (Vince Janoo VJ , Louw du Plessis LdP – *Chair*)			
Name	**Comment/Question**	**Name**	**Answer/Comment**
		VJ	Prepare ahead: • Make sure data collection is flexible. • Establish how much, and the type of instrumentation is required for a specific test. • The instrumentation used should give confidence to the data collected.
ES	• Are you using the strain and stress gauges for comparison with back calculated stresses and strains? • Are measurements 3 dimensional?	VJ RF NC	• Stresses and deflections are all measured. The prediction of stresses using back calculations was not good. However, measured comparisons with the FWD were good and there is confidence with the results obtained from the gauges. • This is consistent with results from Denmark.
FN	• What type of moisture sensors are used?	VJ	• Moisture sensors – Campbell 2 and 3 prong; Bitel – round probe. In any of these the back calculation of the moisture should still be calibrated with the actual moisture content of the soil.
BC	• How is instrumentation selected for specific tests?	VJ	• Through experience with the gauges. • Try to instrument within the test window at several depths. • Use the HVS to validate instrumentation under controlled conditions. • Not using HVS to come up with parameters for a model. • Be careful about over-instrumentation.
ES	• What is the cost of moisture sensors?	VJ	• Between US$250 and 300 and work with standard data logger. • Campbell provides a whole system
FH	• What is the methodology used for locating gauges in soil or asphalt? o Guidelines on range of disturbance? o Guidelines for setting up instruments? o Asphalt gauge position?	VJ	• Take core barrel, put stress gauge in and put same amount of soil back. • Put asphalt gauges at the bottom of the layer.
FN	• CSIR report on instrumentation of test sections is available.		
FH	• Any problems with temperature?	VJ	• Cold sand asphalt and hot asphalt on top.
RF	• Any experience of gauge placement and size of gauge? • Study of various pressure cells?	VJ	• Minroad did work on pressure cells – built pressure chamber with flexible membrane and created a calibration. • Looked at Dynatest, Nottingham and Coolite pressure cells and ran calibrations. At peak values, any will work. • Transient response are the Dynatest gauges. • Geocon pressure cells – 2 to 9 inch. Used 9 inch and pressure measurements within 10%. Use 4 inch pressure cells in sub-grade.
BC	• Do you obtain horizontal pressure measurement?	VJ	• Yes, 1 per cell.
NC	• A paper is available from the Danish Technical Institute.		
FN	• When using suction sensors, certain pavements showed strong temperature induced suction during the daily cycle.		
LW	• Number of readings?	VJ	• 3 repetitions and unidirectional reading. 1st is lower than 2nd and 3rd.
WS	• Documentation is available for CSIR testing programmes, most of which is captured in the HVS3 manual. Other information is available from Tunnicliff: Geotechnical Instrumentation.		
ES	• At what speed are measurements taken?	VJ RF	• CRREL – 12km/h max speed measurement at trafficking load, unidirectional. Constant tyre pressure checked daily. • COE – log cycle. Collect data at trafficking speed. Surface deflection sensitive to speed in asphalt
SO	• What is the strategy related to speed?	VJ	• Must be covered by test plan. • Have a hypothesis to prove or disprove through the test programme.

FH	• Circular ATB09 – stay as close to the guidelines as possible. Transfer from one condition to another. • In measuring at speed, do you get electrical interference?	VJ LdP	• Depends on gauges which are sensitive to the noise such as the coils, but can be calibrated out with a filter into the system. Filter cleans the signal. • Optical cables get rid of a lot of noise
		NC LdP RF VJ	• Manufacturer of the machine based the control system on military vehicle and software is available. • Basic information is currently captured by the on-board computer. • The estimate and actual related well. • Look at data as soon as it comes out, during maintenance.
BC	• Age and then ice down. How?	HT FH	• Be careful of making HVS a simulating tool. Cannot simulate the environment. Use the HVS as a modelling tool. Keep the variables constant. Simulation happens at a later date when doing modelling. • Differ. How do you package environmental effects?
VJ	• Simulate ageing of asphalt?	FH	• Issue: Is a stiffer asphalt the same as an aged asphalt being stiff from the beginning?
		VJ	• Uniformity and use of instrumentation: should not all use the same instrumentation, but use what you feel confident with.
ES	• Must have a quality assurance system and protocols. All necessary calibrations and checks are done.	VJ RF VJ	• Yes, different protocols for each instrument. • Depends on the gauge and may not be necessary. • Re-use pressure cells, but check again. Calibrate the coil gauges and check the seals.
LS HT	• Important to identify the different instrumentation and calibrate/comparative studies done with the various machines. • Make action plan on how to take it forward. • Spreadsheet to circulate and get input from owners. • Data collection – set up a standard battery of tests to collect materials data.	LdP MdB LdP	• Create a task force. • Create a framework/spreadsheet. • Bullets (add/delete) which will form a framework.
		BC	• Important not to over-instrument.
FH	• Is the range of the strain gauge a problem?	BC RF	• Don't know, had a problem. Keep adjusting. • Also had a problem. Don't know why.
ES	• Do you develop a proper experimental design, including instrumentation requirements for all tests? • Would like documentation. • Protocol for checking of tests, calibration, etc.	BC	• Yes, a proper experimental design is developed, but use minimum instrumentation. • Testing randomly selected. • Will provide documentation. • Protocol for thermocoupling available. More important to address this issue first. Check data every day, and maintain for 30 min each day.
AT	• Have MDDs been used?	BC	• MDDs have been bought, but waiting for SA to install.
LS	• We need to understand what everyone is doing first in terms of their testing protocols.		• Preconstruction/retrofit • Collaborative effort o Common Database • Basic information • Skeleton matrix • Types of instruments o Moisture o Deflections o Deformations o Strains o Stress / pressure o Pore pressure o Suction o Temperature o Weather data • Innovation
NC	• Do you want to look at the data or the results?	BC VJ	• May not be practical to share the raw data. • Focus on interpreted results, but not exclude other options. • Discuss common structure for results.

			• Data or Results o Template for research results; o Exchange of reports; o Communication. • Sub-committee required.
LS	• Action plan required.		• RF will drive the instrumentation and results task group with input from: o BC; o NO; o AC; o NC; o VJ; • TOR: o Use FH synthesis as a starting point; o Extend instrumentation type used; o Need to be added to the synthesis: • Moisture; • Deflections; • Deformations; • Strains; • Stress / pressure; • Pore pressure; • Suction; • Temperature; • Weather data. • Make recommendation on potential areas of collaboration.
JM LS	• RF will need to understand the workings from other countries to make sense of it all. • Can provide a template. Develop in parallel (separate item). • Broad knowledge of agencies – pavement practices. • Will give a bigger picture. • Include dictionary of terminology.	VJ	• JM will check if he can make the synthesis available for the listed members.
		LdP ES	• Test objectives drive the instrumentation programme. • Can be short term objectives. Must also look at long-term objectives.
FL	• Revisit the protocol given by VJ.	LdP FH	• VJ will provide the draft protocol on field testing for real life performance. The task group selected at the previous workshop will work on the document. NC to be added to the Task Group. TG to get comments back to VJ by end January 2004. Pull in the Gautrans LTPP protocol. VJ will consolidate all comments as a discussion document for the Alliance before the next meeting for discussion at the next meeting. • Use info from synthesis and from other groups.

Session E: Evaluation and Quantification of HVS Test Benefits (Leif Wiman LW, Niclas Odermatt NO – *Chair*)			
Name	**Comment/Question**	**Name**	**Answer/Comment**
VJ	• Will the report be available that Fritz Jooste is working on? • Will software be available?	ES LS ES	• Will only be available by end March 2004. • Waiting to see what the methodology is first before taking it further. • Must debate the inception report first before looking at a duplication in other countries. • Routine exercise for all HVS projects.
NC	• Caltrans project report – "Assessing the economic benefits …" on TRC website. FJ should make use of the document.	LS	• Issue: standardising around the approach. As a starting point, the document would be very helpful.
FJ	Four-point outline: • Four quadrants to be quantified o Cost and benefit of doing the research; o Cost of not doing the research. • Gather information that is transparent and defendable. • Distil the information into a quantifiable figure. • Look at the way that HVS tests are being formulated.	NO	• The South African "benefits" report will be circulated to the ExCo for comments after April 2004.
FJ	• It was agreed that money is not the ideal unit to express the benefits in. • Will have a benefit description for a politically-friendly unit as well as an economic description.		
FH	• Have you a method of taking into account subsequent research?	FJ	• Don't have an answer. This has been discussed at length and will look at the period. Economist will give guidelines.
FN	• After 34 years of HVS testing in SA, there should be a book of pavement testing.	MdB	• There are many theses and PhD's written on the subject.
VJ	• Better model – how do you sell to funding agencies – how much money do you save them? How do you quantify?	SO	• Eg: Pavement saving for given loading.
HT	• Urgency for delivery of solutions from HVS. Should not be seen as competition, but a long-term goal. Does not preclude short-term goals.		
NC/BC	• Short-term objectives fit into the long-term goals.	SO	• All should do little bits which contribute to the big picture. Things should not be repeated.
RL	• Long-term strategic planning. Authorities will only fund if they know what they will get for it.	NC	• Caltrans as an example.
FH	• Texas drafted a long-term strategic vision, starting with light, introductory work. This plan had four main goals, which are primarily still the same, filling with small "gems" as they fit into the big picture. • Politicians queried the long-term goal – competition for funding has changed. • In SA competition is great. Need a sound, basic process which will be bought into by economists, etc. • Must have a long-term strategy. • The more that can be quantified, the better.		
ES	• Are strategic plans available?	FH NC	• Texas: Available on the website. • Caltrans: just updated and approved by Steering Committee.
HT	• Translate long-term plan/benefits and short-term deliverables into a package to sell to politicians.		
ES	• In 1994, old machines – no strategic plan.	FH	• Perceptions that "we have arrived".
BC	• Florida has a strategic plan for circulation to ExCo.		

Final Session: The Way Forward (Elzbieta Sadzik ES – *Chair*)			
Name	**Comment/Question**	**Name**	**Answer/Comment**
LdP	• Does the Exco need to approve attendance of guests as Alliance meetings?	ES	• No.
LS	• Matrices developed by the various Task Groups should be circulated to members for completion.		
	• Possible venues for next meeting: o South Africa; o Florida; o Decide on venue by May/June 2004.		
	• Duration: 3 days – could be changed to 2 days, if necessary.		
	• Possible date: Wednesday, 8th to Friday, 10th September 2004 if SA. • In Florida, before APT conference 26th September 2004.		
	Items for discussion: • APT vs LTPP; • Benefits; • Implementation and training; • Construction effects; • Performance evaluation of tests (rut and deflection measurements – differences between the different equipment).		
	Format for meeting: • Feedback from HVS users – general at the beginning.		