

Scott Wilson Pavement Engineering

Research striving for perfect practice

Scott Wilson Pavement Engineering has grown rapidly in pace with developments in asphalt technology, specialising in transferring research into practice.

Technological advances during two decades of pavement engineering have been greatly enhanced by the link between research and practice provided by Scott Wilson Pavement Engineering (SWPE). The consultant has grown rapidly in recent years, in step with the pavement industry's burgeoning demand for innovation and knowledge from close ties with academia. Following a 40% expansion in 2002, SWPE now numbers 80 employees

with offices in Nottingham and Kuala Lumpur.

The University of Nottingham and consultant Scott Wilson formed SWPE in 1985 to provide a closer link between the highways sector and pavement researchers. Significant research projects were being carried out at Nottingham University at this time and SWPE provided the means to make the new knowledge available to highway engineers.

SWPE's range of services has continued to expand ever since as the company has introduced new testing and investigation techniques at important times in the development of asphalt technology. Such work is continuing. SWPE is currently engaged in projects that are likely to advance the future economic and technical performance of pavements.

"We believe SWPE is unique in the way it integrates pavement research, site investigation, laboratory testing and consultancy services," says Professor Stephen Brown of Nottingham University's School of Civil Engineering and 15% stakeholder in SWPE. The remaining SWPE ownership is held by Scott Wilson (70%) and the university (15%).

According to SWPE Director Robert Armitage, the results of significant pavement research were beginning to accumulate at Nottingham University at the time of SWPE's inception. This included the Nottingham Analytical Pavement Design

Method, which the university had developed, based on the concept of modelling pavements as layered elastic structures.

The new design method used early pavement analysis software to give critical strain values for the design of new roads. This led to 'back-analysis' of deflections measured with a Falling Weight Deflectometer (FWD) – using procedures also developed at Nottingham University – to obtain data on the in situ condition of asphalt pavements.

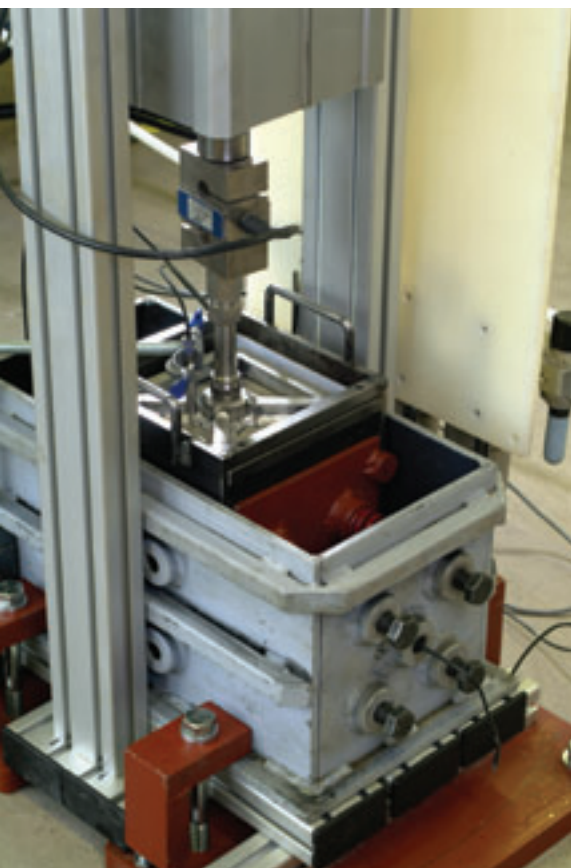
"This work formed the basis of how modern roads are designed and assessed," says Armitage. "It came at a time when the highway industry was just beginning to seriously consider the task of measuring and extending the longevity and performance of the motorway and trunk road network."

SWPE originally consisted of two engineering graduates and a technician employed under a Scott Wilson general manager. The company grew and by the early 1990s SWPE had brought together results of research to produce Volume 7 of the Highways Agency's Design Manual for Roads & Bridges.

Use of FWD measurement became more widespread in the 1990s as SWPE proved the technique to be applicable to rigid as well as flexible pavements. Procedures were also established for FWD assessment of joint load transfer, which contributed to the development of the 'crack and seat' method of reconstructing concrete carriageways.

"We were now feeding knowledge back to the university, identifying areas where

SWPE has developed the NAT Springbox for characterising stiffness and deformation resistance of unbound and weakly bound materials.





SWPE has transferred research into practice which now forms the basis of modern road design and assessment.

further research was needed,” says Armitage. “One important unknown was distribution of stiffness within multi-layered bituminous pavements.”

This problem was overcome when the university developed the Nottingham Asphalt Tester (NAT), which is now standard equipment for measurement of stiffness for

highways industry, Bitutest resulted in NAT based tests for deformation resistance, fatigue cracking and durability.

Such tests have played an important role in the development of performance based specifications, providing the potential for an increase in the use of recycled and secondary aggregates.

“We are working towards a unified design code where pavement thicknesses are likely to be based on different classes of foundation.” Robert Armitage

mixture development, specification, compliance testing and evaluation. SWPE was one of the first organisations to take delivery of a NAT and the company now has four, each with different capabilities.

SWPE has been involved in several important industry-wide research projects, including Bitutest between 1992 and 1995. Funded jointly by Government and the



Asphalt testing is a key aspect of SWPE's expertise.

“Recycling and sustainability are currently big issues for pavement engineers. We have recently been awarded two consultancy contracts by WRAP (Waste & Resources Action Programme) aimed at encouraging greater use of recycled and secondary aggregates and we are in the final stages of developing the NAT Springbox. This characterises stiffness and deformation resistance of unbound and weakly bound materials,” says Armitage.

The need for the NAT Springbox was identified during SWPE's research for the Highways Agency (HA) to develop a performance based specification for capping and subgrade – work that is also leading to the development of foundation classes.

“Performance based specifications provide opportunity for better use of material resources, whether they be unbound,

stabilised in situ or mixed at plant with a binder. However, the current pavement design approach does not allow a reduction in bound layer thickness if a stronger foundation is obtained,” explains Armitage.

“We are working with the HA and TRL towards a unified design code where pavement thicknesses are likely to be based on different classes of foundation. The NAT Springbox enables such materials to be characterised in the laboratory and since most UK highway laboratories already have NAT's they will not need to re-equip with new test devices.”

According to Brown, as a consultancy SWPE now provides a wide variety of different pavement services and acts as a catalyst to help the transfer of research into practice. “The company links with the academic community in several different ways and feeds back information on what further research is needed to assist overall building of knowledge,” he says.

The most recent example is the company's involvement in rail trackbed work, which has assisted Nottingham University in winning a significant portfolio of research on ballast. “We are already looking to the future when asphalt trackbeds may help to provide low maintenance, long life options for our railways,” adds Armitage.

email hotline: info@modernasphalts.com