

Overview

Maintenance and rehabilitation of pavements become increasingly important as road systems grow and mature, and fewer new roads and streets are built. As road and street systems grow, maintenance and rehabilitation also become more complex and difficult to manage and finance because new pavements often deteriorate at widely differing rates depending on traffic, environment, materials, design, construction, and other factors. Some of the factors cannot be or are difficult to control, or are imperfectly understood. Maintenance and rehabilitation of the present network of roads and streets in the United States will require more engineering attention and increasingly larger proportions of the budgets of public agencies responsible for roads and streets for some time into the future.

This symposium was organized to provide authoritative information and useful current research findings to engineers and researchers in important areas of pavement maintenance and rehabilitation using bituminous materials. The several papers describe procedures for detecting and repairing defects in pavements and materials for repairing defects in pavements. Also covered are rehabilitation methods and equipment for evaluating the safety and structural adequacy of pavements, and design of improvements to satisfy current and future service requirements.

Of interest to all engineers responsible for maintenance of road systems is Chong and Phang's concise description of the Ontario Ministry of Transportation and Communications "Pavement Maintenance Guidelines" including distress classification methodology and procedures leading to the most cost-effective treatment. They also stress the need for more research on materials and ways for improving the effectiveness of sealing pavement cracks.

Deen et al provide information of particular interest and value to design engineers and researchers in a summary of a method developed through extensive research in Kentucky to evaluate the structural adequacy of asphalt concrete pavements before designing overlays. The procedures utilize elastic theory and dynamic pavement deflection measurements and have been simplified to the extent that overlay thickness requirements can be determined from a design nomograph. The authors have also used their procedures with dynamic deflection data obtained directly on subgrades, dense-graded aggregates, pozzolanic bases, full-depth asphalt concrete, and on portland cement concrete pavements, but these applications are considered experimental and subject to further study.

Useful information needed for safety considerations is provided by Balmer et al who address the measurement of friction deterioration on curves, ramps, intersections and other transitional areas, and the various remedial procedures to improve frictional characteristics.

Two papers present information of interest to all agencies using or considering use of various materials to reduce reflection cracking in asphalt concrete overlays. Knight and Hoffman describe the performance of seven different types of heavy duty membranes placed over portland cement concrete pavement joints at a site in Pennsylvania before placing of an asphalt concrete overlay. After two freezing seasons, they observed differences in the performance of the different types of membranes and found that the membranes as a whole were retarding reflection cracking. However, the cost/benefits of the membranes are still undetermined from their experiments. Rowlett and Uffner describe the performance of an asphalt polymer/glass fiber reinforcement system in 150 field trials in 21 states and concluded the system was effective in minimizing reflection cracking in asphalt overlays. As with the Knight and Hoffman experiments in Pennsylvania, the long-term cost effectiveness asphalt polymer/glass fiber system remains to be determined. The asphalt polymer/glass fiber system was also included among the several membranes evaluated by Knight and Hoffman.

Of particular interest to engineers and agencies using or conducting research on asphalt cold-mix recycling for pavement rehabilitation are Tia and Wood's experiments with the gyratory testing machine for evaluating cold-recycled asphalt paving mixtures. They conclude that the gyratory stability index and the gyratory elasto-plastic index determined in the fixed roller mode can be used to detect unstable mixtures when the binder content is too high. Their conclusions are based on correlations of gyratory testing machine results with several other commonly used mechanical test properties but were not correlated with the field performance of cold recycled mixtures.

Much information is presented in the papers of the symposium that is useful to agencies facing unprecedented pavement maintenance and rehabilitation demands. The symposium papers also identify many areas of pavement maintenance and rehabilitation where research and development should be continued or increased. It is evident that there is need and opportunity for many innovations in cost-effective materials, equipment, design, construction, and management systems for the maintenance and rehabilitation of pavements.

Bernard F. Kallas

The Asphalt Institute, College Park, MD
20740; symposium chairman and editor.