



ASPHALT PUBLICATIONS

ASPHALT



PUBLICATIONS

Your guide to some of the world's best asphalt publications from key industry entities

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The **Australian Asphalt Pavement Association** was formed in 1969 as a non-profit organisation to promote the economic use of asphalt based on sound technical and commercial grounds.

Throughout its history, AAPA has maintained as its major objective the dissemination of technical knowledge aimed at continual improvement in asphalt technology. AAPA Members include manufacturers of asphalt and other bitumen bound products, State Road Authorities, Local Government, paving consultants, material suppliers, plant and machinery manufacturers, paving and sealing contractors and individuals interested in asphalt technology.



Austroads is the association of Australian and New Zealand road transport and traffic authorities. Its mission is to contribute to development and delivery of the Australasian transport vision by supporting safe and effective management and use of the road system, developing and promoting national practices and providing professional advice to member organisations and national and international bodies.

Austroads membership comprises the six Australian State and two Territory road transport and traffic authorities, the Commonwealth Dept. of Transport and Regional Development, the Australian Local Government Association and Transit NZ.



The Asphalt Institute is a US-based international, non profit association sponsored by members of the petroleum asphalt industry to serve both users and producers of asphalt materials through programs of engineering service, research and education. Membership is available to refiners of asphalt from crude petroleum; to processors manufacturing finished paving asphalts and/or non-paving asphalts but not starting from crude petroleum; and to companies working specifically with asphalt related raw material or asphalt additives.

The Asphalt Institute publishes a wide range of technical material, including manuals, research reports, specifications, technical bulletins and computer programs.



The **National Center for Asphalt Technology** (NCAT) provides a nationwide facility for research, education and information services for the Hot Mix Asphalt Industry. Based at Auburn University in Alabama, NCAT has produced an extensive list of technical reports and other publications in recent years.

Please note that AAPA no longer stocks or supplies NCAT publications. Their wide variety of reports are now available for purchase from the NCAT website at www.eng.auburn.edu/center/ncat/publications.html.



The **National Asphalt Pavement Association** (NAPA) is the only national trade association specifically representing the interests of America's leading Hot Mix Asphalt (HAM) producers and paving contractors.

NAPA provides its Membership with a wide range of services, including research and development programs, an aggressive marketing program, education and training programs for management and supervisory personnel, and a comprehensive publications service that provides technical and informational, marketing, environmental, safety and health, and educational/training materials.

For the paving materials specifier and user, NAPA provides technical and informational materials on the proper design, construction, maintenance, and rehabilitation of quality HMA pavements.



AAPA's Asphalt Publications List contains details of all publications on asphalt and related topics currently available from the Australian Asphalt Pavement Association (AAPA), Austroads and two U.S. organisations: the Asphalt Institute (AI) and the National Asphalt Pavement Association (NAPA). These publications may be obtained from AAPA – see back page for order form. Note: prices quoted do not include GST – orders within Australia are subject to an additional 10% for GST – see order form.

AAPA PUBLICATIONS

INTERNATIONAL CONFERENCE PAPERS

- ICP-94 PROCEEDINGS OF NINTH INTERNATIONAL ASPHALT CONFERENCE** (Surfers Paradise, 1994). Complete proceedings from the 1994 "Asphalt - World's best practice" Conference. Fully bound, 2-volume set. 55 papers; 475 pages. (\$20.00)
- ICP-97 PROCEEDINGS OF TENTH INTERNATIONAL FLEXIBLE PAVEMENTS CONFERENCE** (Perth, 1997). Complete proceedings from the 1997 "Our Flexible Future" Conference. Fully bound, over 400 pages. (\$20.00)
- ICP-2000 PROCEEDINGS OF ELEVENTH INTERNATIONAL FLEXIBLE PAVEMENTS CONFERENCE** (Sydney, 2000). Complete proceedings on CD-ROM from the 1st International "World of Flexible Pavements" Conference. 95 papers, fully searchable. (\$30.00)
- ICP-2003 PROCEEDINGS OF TWELFTH INTERNATIONAL FLEXIBLE PAVEMENTS CONFERENCE** (Melbourne, 2003). Complete proceedings in ring binder and/or CD-ROM from the 2003 "Best Value Pavements" Conference. 40 papers. (\$30.00)
- A 2-volume set, containing all papers presented in 2000 and 2003, is available for \$50.00 (postage paid).
- NEW**
- ICP-2009 PROCEEDINGS OF THE THIRTEENTH INTERNATIONAL FLEXIBLE PAVEMENTS CONFERENCE** (Surfers Paradise 2009). CD-ROM containing all the papers from the 2009 "Pavements for Today" Conference.

PAVEMENTS INDUSTRY CONFERENCE PAPERS

- PI-90 PROCEEDINGS OF 1990 PAVEMENTS INDUSTRY CONFERENCE** (Perth). Proceedings from the 1990 Members Conference. 14 papers in ring binder; (\$20.00)
- PI-92 PROCEEDINGS OF 1992 PAVEMENTS INDUSTRY CONFERENCE** (Launceston). Proceedings from "Choosing the Quality Path" Conference. 15 papers in ring binder; (\$20.00)
- PI-93 PROCEEDINGS OF 1993 PAVEMENTS INDUSTRY CONFERENCE** (Melbourne). Proceedings from the 1993 "Tradition, Trends & Technology" Conference. 16 papers in ring binder; (\$20.00)
- PI-95 PROCEEDINGS OF 1995 PAVEMENTS INDUSTRY CONFERENCE** (Glenelg). Proceedings from the 1995 "Staying on Top" Conference. 17 papers in ring binder; (\$20.00)
- PI-96 PROCEEDINGS OF 1996 PAVEMENTS INDUSTRY CONFERENCE** (Brighton-Le-Sands). Proceedings from the 1996 Conference. 29 papers in ring binder; (\$20.00)
- PI-98 PROCEEDINGS OF 1998 PAVEMENTS INDUSTRY CONFERENCE** (Surfers Paradise). Proceedings from "Focussing on Performance" Conference. 33 papers, ring binder; (\$20.00)
- PI-01 PROCEEDINGS OF 2001 PAVEMENTS INDUSTRY CONFERENCE** (Surfers Paradise). Proceedings from the "Seeking Improvements" Conference. 20 papers, ring binder; (\$20.00)
- PI-05 PROCEEDINGS OF 2005 PAVEMENTS INDUSTRY CONFERENCE** (Surfers Paradise). Proceedings from the "Flexible Pavements – Unplugged" Conference. 45 papers, ring binder plus CD-ROM with papers, slide presentations, sound files and photos. (\$50.00)
- PI-07 PROCEEDINGS OF 2007 PAVEMENTS INDUSTRY CONFERENCE** (Darling Harbour, Sydney). Proceedings from the "Innovation to Implementation" Conference. 29 papers, photos on CD-ROM. (\$75.00)

HS&E CONFERENCE PAPERS

- HSE-95 to HSE-06 PROCEEDINGS OF THE NATIONAL FLEXIBLE PAVEMENTS INDUSTRY CONFERENCES ON HEALTH, SAFETY & ENVIRONMENT.** Complete proceedings from the annual AAPA/AUSTROADS/BCA "Safety in Action" Conferences are available in ring binder format for \$20.00 each for the years 1995 to 2006. Approximately 18 papers in each proceedings.
- HSE-08 PROCEEDINGS OF THIRTEENTH NATIONAL FLEXIBLE PAVEMENTS INDUSTRY CONFERENCE ON HEALTH, SAFETY & ENVIRONMENT** (Melbourne 2008). Proceedings of the thirteenth annual AAPA/AUSTROADS/IPWEA/RNZ Conference. Includes Conference CD-ROM containing papers and slide presentations. (\$60.00)

HS&E GUIDES

INTRO AN INTRODUCTION TO HEALTH AND SAFETY IN THE FLEXIBLE PAVEMENT INDUSTRY.

A general introduction to some of the required conditions, advice and information necessary to create and maintain a safe and healthy workplace. 10 pages (\$10.00)

Guide No 1 GUIDE TO GOOD PRACTICE IN ASPHALT AND BITUMEN LABORATORIES.

Describes good practice in setting up and operating a laboratory for the design and testing of asphalt and bituminous products. Consistent with NATA and Standards Australia certification requirements. 10 pages (\$20.00)

Guide No 2 GUIDE TO SAFE WORK CLOTHING FOR OUTDOOR WORKERS IN THE ASPHALT INDUSTRY.

Describes the minimum safe work clothing requirements which should be observed by employees, supervisors and managers to ensure the health, safety and well-being of workers in the asphalt industry, especially those working outdoors. 8 pages (\$20.00)

Guide No 3 GUIDE TO SAFETY STATISTIC REPORTING IN THE FLEXIBLE PAVEMENTS INDUSTRY.

Designed to assist AAPA Member Company personnel in the compilation of monthly safety statistics, to ensure consistency and accuracy in collection and analysis of information relating to safety practices and procedures. 12 pages (\$20.00)

Guide No 4 GUIDE AND UPDATE ON THE AUSTRALIAN DANGEROUS GOODS CODE (ADG6)

Prepared to assist AAPA members to implement the requirements of the 6th edition of the Code, published in January 1998 and adopted into State Dangerous Goods legislation during that

year. Includes a Dangerous Goods Self Assessment example and Elevated Temperature placards. (\$20.00)

Guide No 5 GUIDE TO THE SAFE USE OF SBS. A guide to the best work practice and current state of knowledge for the manufacture, handling and use of polymer modified binders, specifically SBS Polymer. Prepared in 1995 and fully revised in 1998, based on the findings of the comprehensive SBS bitumen fume monitoring body. (\$20.00)

Guide No 6 GUIDE TO SAFE WORKING IN HEAT. Provides recommendations for working safely in heat, to be observed by employees, supervisors and managers to ensure the health, safety and well-being of workers within the asphalt and bituminous products industry, particularly those working outdoors. (\$20.00)

Guide No 7 GUIDE TO SAFE USE OF BITUMEN TRANSFER HOSES. This guide, the result of industry consultation and sharing of best practices, provides guidance on the design, construction and safe management of flexible hoses and couplings, and work practices used in the handling and transfer of hot bituminous products. (\$20.00)

Guide No 8 GUIDE FOR ENVIRONMENTAL MANAGEMENT WHEN SPRAYING BITUMINOUS MATERIALS. Developed in partnership with the Environmental Protection Authority (EPA) Victoria, this guide provides advice on avoiding pollution by minimising the risk of environmental damage arising from the wash-off of bituminous materials from road construction works during wet weather. It is designed to help operators reduce the environmental risks associated with priming in road construction.

MATERIALS

EMERGENCY PROCEDURE GUIDES (Pads of 20)

Covers both Class 3 (Flammable Liquid) and Class 9 (Dangerous Goods). \$10.00 per pad, with a 10% discount for 10 or more pads, plus postage of \$5.00 per order for 1-9 pads and \$10.00 per order for 10 or more pads.

BITUMEN BURNS TAGS These highly visible, durable orange tags are designed to be attached to victims of bitumen burns to provide emergency treatment instructions to doctors and other medical personnel. (Contact AAPA for pricing and availability).

ADVISORY NOTES

*Advisory Notes provide general information on a range of technical and operational issues.
Titles in **bold type** cover HS&E-related issues*

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| <ol style="list-style-type: none"> 1. Guide to the Use of Solvents for Asphalt Testing 2. Guide to Asphalt Mix Size Selection 3. Guide to Asphalt Mixes for Roundabouts 4. Guide to the Selection of Bitumen Grade for Surface Course Asphalt 5. Guide to Asphalt for Lightly Trafficked Streets 6. Guide to Test Procedures for Large Aggregate Asphalt Mixes by Modified Marshall Test 7. Guide to the Heating of Binders for Storage and Asphalt Manufacture 8. Guide to the Use of Large Stone Asphalt Mixes (replaced by No 18) 9. Asphalt Rutting and Stripping (replaced by No 19) | <ol style="list-style-type: none"> 10. Loading Hot Bitumen Products 11. Hazards Associated with the Disposal of Used Lubricating Oil in Bitumen 12. Safe Use of Truck-Mounted Aggregate Spreader Boxes 14. Summary of SBS Bitumen Fume Monitoring Project 15. Bituminous Surfacing for Intersections on Light & Medium Duty Flexible Pavements 16. Large Aggregate Mixes 17. Warm Mix Asphalt – a State-of-the-Art Review 18. Asphalt Segregation (replaces No 8) 19. Asphalt Moisture Sensitivity (replaces No 9) |
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IMPLEMENTATION GUIDES

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| <p>IG-1 OPEN GRADED ASPHALT DESIGN GUIDE. Supplements the Australian Provisional Guide for the Selection and Design of Asphalt Mixes by guiding users through the selection, design and application process for Open-Graded Asphalt mixes. Directed at inexperienced mix designers as well as experienced designers who are unfamiliar with the new Australian Provisional Design Method. 36 pp. (\$30.00)</p> <p>IG-2 COLD MIX GRANULAR MATERIALS DESIGN GUIDE. Prepared to assist designers and practitioners in the most effective use of cold mixed materials, predominantly using bituminous materials. The cold techniques described in this guide offer a wide range of economic solutions, varying from lightly modified or stabilised layers up to structural base and wearing course. 50 pp. (\$30.00)</p> <p>IG-3 ASPHALT PLANT PROCESS CONTROL GUIDE. Provides practical advice on the use of statistically based process control charts to assist asphalt producers to produce consistently high quality hot mix asphalt to meet the increasing demands of the roads industry. Applicable for both fixed and mobile plants. 34 pp. (\$30.00)</p> <p>IG-4 STONE MASTIC ASPHALT DESIGN GUIDE. The use of SMA as a surfacing for heavily trafficked roads is becoming more common in Australia and New Zealand. This guide has been prepared to supplement the Australian Provisional Guide for the Selection and Design of Asphalt Mixes by guiding users through the selection, design and application process for SMA mixes. 24 pp. (\$30.00).</p> | <p>IG-5 LIGHT DUTY ASPHALT PAVEMENTS. For engineers, architects and contractors involved in the planning, design and construction of light-duty flexible pavements incorporating asphalt layers. Includes tables of typical pavement thicknesses for a range of applications and a model specification suitable for small-scale works. 36 pp. (\$30.00)</p> <p>IG-6 SELECTION AND DESIGN OF FLEXIBLE PAVEMENTS. Provides assistance in the selection, specification and design of flexible road pavements for a variety of applications. Covers design, construction, performance and maintenance, sound long-term performance and low whole-of-life costs. Contains a number of charts of typical design thicknesses and compositions for a number of different types of flexible pavements. 68 pp. (\$30.00)</p> <p>IG-7 COMPARISON OF PAVEMENT ALTERNATIVES. Provides assistance with comparison of alternative pavement designs and complements Selection and Design of Flexible Pavements (IG-6). It provides information on both the quantifiable and non-quantifiable issues that impact on long term pavement performance and a methodology for quantifying whole-of-life costs. Also contains information on likely maintenance diaries and routine and periodic maintenance costs. 40 pp. (\$30.00)</p> <p>IG-8 ASPHALT MIX DESIGN. Provides a guide to the process of design and selection of an asphalt job mix, including the selection of appropriate design criteria and the selection and interpretation of testing to arrive at the most appropriate job mix for a particular application. 28 pages. (\$30.00)</p> |
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AAPA Publications

INFORMATION BOOKLETS

- IB-1 ASPHALT BASICS.** Designed to give the reader an introduction to six basic areas of asphalt technology: asphalt terms, uses, mix types, mix properties, selection of mix type and size, and equipment and processes used in asphalt paving. 12 pages. (\$15.00)
- IB-2 ASPHALT TERMS.** Recommended Terms for the Australian Asphalt Industry (Third Edition). Glossary of terms currently in use in asphalt production and placing and pavement design. Incorporates definitions from Australian Standard AS2734, as well as other Australian publications on asphalt. 20 pages. (\$15.00)
- IB-3 ASPHALT APPLICATIONS.** A mainly pictorial essay on the many uses of asphalt. Covers applications in transport, industry, science and sport, and shows why asphalt is considered to be the world's most versatile construction material. 16 pages. (\$15.00)
- IB-4 ASPHALT CONSTITUENTS.** This booklet provides a detailed basic reference to the materials that form the constituents of an asphalt mix. The materials, their sources and their properties are outlined along with the tests of their acceptability. 16 pages. (\$15.00)
- IB-5 ASPHALT PRODUCTION AND PLACING.** This booklet outlines the steps taken and equipment used in the three central asphalt processes of manufacture, laying and compaction, as asphalt is transformed from a manufactured material to a finished road pavement. 20 pages. (\$15.00)
- IB-6 ASPHALT RECYCLING.** This booklet covers the mechanical excavation of aged or deformed asphalt pavement and the optional retreatment of the recovered material by plant recycling and by in-situ hot and cold recycling methods. Equipment, plant and operating procedures are described. 16 pages. (\$15.00)
- IB-7 DRIVEWAYS, TENNIS COURTS & COLOURED ASPHALT.** Discusses the use of asphalt in driveways and tennis courts, and the many applications of coloured asphalt. Also contains sample specifications. 16 pages. (\$15.00)
- IB-8 SPRAYED SEAL BASICS.** This booklet covers the types of treatment, materials, selection of treatments and construction techniques for the application of sprayed seals. 8 pages. (\$15.00)
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AAPA LEARNING RESOURCES

WELL 1 LAYING THE GROUND RULES

Designed primarily for people from non-English speaking backgrounds who work in asphalt crews, this video is for use in conjunction with Laying the Ground Rules learning resource kit. *The 'Laying the Ground Rules' video is \$50.00 if purchased separately, or \$95.00 for the complete learning resource kit.*

WELL 2 PAVING THE WAY

A resource package designed to support employees in developing workplace communications and maths skills for day-to-day operations in the asphalt industry. Contains a User Guide, two CD-ROMs and a Workbook. *The 'Paving the Way' package is \$200.00. Substantial discounts are available to AAPA Members.*

WELL 3 SPRAYING BITUMEN SUCCESSFULLY

An AAPA-initiated resource, focussed on spray sealing, to help develop literacy and numeracy skills that underpin units in Certificate II & III in Civil Construction. Contains 2 interactive CD-ROMs and a workbook. *The 'Spraying Bitumen Successfully' package is \$200.00. Substantial discounts are available to AAPA Members.*

WELL 4 FOCUS ON FIRE SAFETY

An AAPA-initiated resource, focused on the selection and correct use of portable fire extinguishers, procedures for spraying during a "Fire Danger" period, use of Dangerous Goods Code signs relating to hot bitumen and cutback bitumen, and what to do if you happen to have a leaking LPG cylinder. *The "Focus on Fire Safety" package is \$200.00. Substantial discounts are available to AAPA Members.*

NEW

WELL 5 WORKING SAFELY WITH HOT BITUMEN

Working with potentially dangerous goods such as hot bituminous products in sprayed sealing and asphalt operations requires particular attention to interpreting and applying safe working requirements. Locating and understanding these requirements in a range of industry and work documents is critical for using safe working practices appropriately and responding promptly to emergency situations. The interactive CD-ROM resource package is designed to support employees in developing the language and literacy skills required to work safely with hot bituminous materials. *The 'Working Safely with Hot Bitumen' package is \$200.00. Substantial discounts are available to AAPA Members.*

HS&E 'PROTECT YOURSELF' VIDEOS

VIDEO/DVD 1 SUN & HEAT – PROTECT YOURSELF

Designed to raise employee awareness of the dangers of exposure to sun and heat, this popular seven-minute video demonstrates a variety of sun protection practices which should be followed by all outdoor workers to reduce exposure.

VIDEO/DVD 2 BURNS – LEAVE A LASTING IMPRESSION

Complements AAPA's 'Safe Handling of Bitumen' training course. Shows graphic images of the results of burns, scenes where dangers lurk, and corrective measures. Covers production facilities and on-site aspects of both spray sealing and hot mix asphaltting.

VIDEO/DVD 3 PHYSICAL INJURIES – YOUR BODY FOR LIFE

Complements AAPA's 'Preventing Physical Injuries' training course. Shows situations where injuries may occur in the field and at production sites. Warm-up and strengthening exercises are shown, as well as relief exercises and a guide to first-aid treatment for strains and sprains. *Videos/DVDs in the 'Protect Yourself' series are \$45.00 each, or all 3 for \$110.00.*

AAPA TECHNOLOGY PROGRAM (2004–2007) – PROJECT REPORTS

ASPHALT

Fundamental Properties

- 3 AF 1.1 A Preliminary Evaluation of the Effect of Mixture Variables on the Laboratory Fatigue Properties of Asphalt
- 3 AF 1.2 An Assessment of the Need to Incorporate Shift Factors for Predicting the Fatigue Life of Asphalt
- 3 AF 1.3 Full Depth Asphalt Pavement Fatigue: review of AFL trial data
- 3 AF 1.4 Asphalt Fatigue and Low Temperature Binder Properties

Accelerated Loading

- 3 ALF 1.1 An Evaluation of the Rut Resistant Properties of Asphalt Mixes under Accelerated Loading
- 3 ALF 4.2 Austroads/AAPA Sponsored Asphalt Fatigue Pilot Trial
- 3 ALF 4.3 Evaluation of the Field and Laboratory Fatigue Properties of Asphalt Mixes
- 3 ALF 5.1 Accelerated Loading of Pavements

Mix Design

- 3 AMD 4.1 Summary Reports on the Australian Provision Mix Design Guide – Report APRG 18
- 3 AMD 4.2 A Review of Evaluating Creep in Asphalt
- 3 AMD 4.3 Refusal Density of Asphalt Mixtures
- 3 AMD 4.4 Comparison of the Dynamic and Static Creep Trials
- 3 AMD 4.5 Asphalt Particle Orientation
- 3 AMD 4.6 Asphalt Gradings
- 3 AMD 4.7 Filler in Asphalt Mixes
- 3 AMD 4.8 Use of Stone Mastic Asphalt Mixtures in Road Pavement Maintenance and Construction

Precision of Testing

- 3 AF 4.1 Comparison of Fatigue Test Results: Report on a Research Project between PRS and University of California

Recycled Asphalt

- 3 RM 1.1 Summary Report on Project NT&E 9807, Utilisation of Recycled Asphalt

Construction Practices

- 3 APE 2.1 Asphalt Plant Process Control Guide
- 3 APE 2.2 High Pressure Permeability of Asphalt Pavements

SEALING

- 3 SAM 1.1 Austroads Sealing Projects 1998/99
- 3 SDM 1 Simulation of sprayer distributor performance

BINDERS

- 3 BAS 1.1 Austroads Binders Project 1998/99

Specification Issues

- 3 BAS 1.2 Austroads Specification for Multigrade Binders. APRG Document 99/34 (MA)

STABILISATION

- 3 ALF 3.1 The Performance of In-Situ Stabilised Marginal Sandstone Pavements

Pavement Design

- 3 PD 1.1 A 1997 Overview of Mechanistic Pavement Design
- 3 PD 1.2 Investigation of the AAPA Trial Residential Full Depth Asphalt Pavements
- 3 PD 1.3 Heavy Duty Flexible Pavements Performance (HeavyFlex)
- 3 PD 1.6 Heavy Duty Asphalt Pavement Performance Study (Stage 2)
- 3 IET 1 Review and Recommendation of Improvements to Australian Heavy Duty Flexible Pavement Design Practices

MISCELLANEOUS

- 3 IDEA 5.1 CSIRO Rheometer – direct measurement of rheological properties
- LLP1 Long Lasting Pavements – Improving Australia’s Heavy Duty Asphalt Pavements. AAPA International Seminar Series, invited Speaker: Mike Nunn, UK. September, 1998
- 04/01 Maintenance Diary for Life Cycle Costing
- 05/01 Intensive Course on Advanced Constitutive Modelling of Asphaltic Materials, University of Maryland, USA, January 2005
- 05/02 Overview of US Transportation Research Board (TRB) 84th Annual Meeting, Washington, DC, January 9-13, 2005
- 05/03 Pavement Surfacing Trial, Keilor Park Drive, Melbourne (1994) – Summary Report
- 05/04 International Seminar Series: Outcomes of 2004 Study Tour to USA and Long Lasting Asphalt Pavements – Summary Report

R&D ANNUAL REPORTS

First issued in 1988/89, these comprehensive reports are available for each year since.

PAVEMENT WORK TIPS

Pavement Work Tips are produced jointly by AAPA and AUSTRROADS. These single page handouts provide easy-to-digest information on various construction aspects, and should be of assistance to all practitioners. *Also available for downloading from the 'Publications' page (www.aapa.asn.au).*

1. **PRIMING & PRIMERSEALING.** Describes some problems and the correct techniques to be followed in priming and primersealing work.
2. **EMULSION HANDLING & STORAGE.** Gives some dos and don'ts for safe and proper handling and storage of bitumen emulsions.
3. **ASPHALT RIDING QUALITY.** Discusses some of the factors which affect riding quality, and how to ensure a smooth riding asphalt pavement.
4. **ASPHALT JOINTS.** Describes the techniques which should be used to construct smooth, strong and correctly shaped asphalt joints.
5. **COLD PLANING.** Covers the main uses and techniques involved in cold planing of pavement surfaces.
6. **POLYMER MODIFIED BINDERS.** Provides a handy reference to the selection of polymer modified binders in accordance with the APRG Framework Specification.
7. **TREATMENT OF BLEEDING OR FLUSHED SURFACES.** Practical remedial treatments for restoring texture to bleeding or flushed surfaces.
8. **TREATMENT OF CRACKS IN FLEXIBLE PAVEMENTS.** Advice on treating cracks in flexible pavements to stop or slow down deterioration and improve future surfacing treatments.
9. **PREPARING PAVEMENTS FOR RESEALING.** Explains how and when to correct a variety of pavement defects in order to ensure an effective resealing operation.
10. **ASPHALT PAVING WITH AUTOMATED LEVEL CONTROL.** Describes the selection and use of automated level controls for asphalt paving.
11. **SURFACE CHARACTERISTICS OF BITUMINOUS SURFACING.** Provides guidance on selection of bituminous surfacing in terms of surface and user performance characteristics.
12. **COMPACTION OF ASPHALT.** Guidance on estimating the amount of time available to achieve effective compaction under various conditions.
13. **TEMPERATURE CHARACTERISTICS OF BINDERS IN ASPHALT.** Outlines the influence of temperature and binder viscosity on handling properties of asphalt using different binders.
14. **SPRAYED SEAL CUTTING PRACTICE.** Provides a handy reference to the recommended practice for cutting spray sealing binders.
15. **ASPHALT STATISTICAL PROCESS CONTROL.** Provides a guide to the application of statistical process control charts to the manufacture of asphalt.
16. **REINSTATEMENT OF ROAD OPENINGS.** Provides general guidelines for the effective reinstatement of openings made in road pavements.
17. **AIR VOIDS IN ASPHALT.** Outlines the influence of air voids on the performance of dense graded asphalt mixes, and emphasises the importance of compaction in achieving intended service properties.
18. **SPRAYED SEALING – SELECTION OF INITIAL TREATMENTS.** Provides a guide to selection and use of either prime and seal, or primerseals, as initial treatments for flexible pavements.
19. **SPRAYED SEALING – SELECTING AGGREGATE SIZE.** A guide to selection of aggregate size for use in a range of sprayed seal treatment types.
20. **SPRAYED SEALING – JOINTS AND APPLICATION RATES.** Provides a guide to determining location of changes in application rates and positioning of joints in sprayed seals.
21. **SPRAYED SEALING – UNIFORMITY AND NEATNESS.** A guide to aspects of bitumen sprayer operation and work practices that lead to uniformity and neatness of sprayed seal work.
22. **SPRAYED SEALING – MINIMISING HANDWORK.** Provides a guide to planning of sprayed seal work to minimise handwork.
23. **SPRAYED SEALING – AGGREGATE PRECOATING.** Provides a guide to precoating of aggregates and use of adhesion agents in sprayed sealing work using hot bitumen and cutback bitumen binders.
24. **SPRAYED SEALING – ROLLING OF COVER AGGREGATE.** Provides a guide to rolling and compaction of cover aggregates used in sprayed sealing road works.
25. **GEOTEXTILE REINFORCED SPRAYED SEALS.** This issue provides a guide to the use of geotextile reinforced sprayed seals.
26. **ASPHALT HANDWORK.** Provides a guide to good practice in hand finishing in conjunction with paver spreading of asphalt
27. **SPRAYED SEALING – CUTTING BACK OF POLYMER MODIFIED BINDERS.** A guide to the use of cutter oils in hot PMB binders used in sprayed sealing work.
28. **SPRAYED SEALS – REMOVAL OF LOOSE AGGREGATE.** A guide to the removal of surplus aggregate from sprayed seals using brooming or suction cleaning.
29. **SPRAYED SEALS – DETERMINING SPRAYER FORWARD SPEED.** Guide to calculation of sprayer forward speed for correct binder application rates in sprayed seals.
30. **ASPHALT SHAPE CORRECTION.** A guide to improvement of pavement ride quality through asphalt shape correction and regulation.
31. **ASPHALT PAVING SPEED.** A guide to the calculation of paver forward speed for smooth continuous paving and matching roller capacity to ensure effective compaction.
32. **SPRAYED SEALS – A BRIEF DESCRIPTION.** A guide to some of the basic terms commonly used in describing sprayed seals in Australia and New Zealand.
33. **SPRAYED SEALS – SELECTION OF SPRAYING NOZZLES.** A guide to the use of bitumen spraying nozzles, and an introduction to the new Austroads identification standards.
34. **SPRAYED SEALS – CALIBRATION OF BITUMEN SPRAYERS.** A guide to the procedures for the calibration and national certification of bitumen sprayers.
35. **SPRAYED SEALS – SPRAYER CALIBRATION AND AGGREGATE APPLICATION RATES.** A guide to sprayer calibration and aggregate application for sprayed seals.
36. **SPRAYED SEALS – PRE-SPRAYING TO CORRECT SURFACE TEXTURE.** A guide to pre-spraying of road surfaces to compensate for variations in surface texture and binder application rates.
37. **CAPE SEALS.** A guide to the use of a combination treatment comprising a sprayed seal and slurry surfacing, referred to as a Cape Seal.
38. **SPRAYED SEALING – SURFACE ENRICHMENT.** Extending the life of sprayed seals by applying bituminous material to a sprayed seal surface to increase binder content.
39. **DUST LAYING.** Use of bitumen emulsion for dust laying on unsealed granular pavements to reduce dust nuisance, maintenance costs and loss of pavement material.
40. **SPRAYED SEALING – BINDER VOLUME CORRECTION.** A guide to the calculation of the volume of liquid bituminous binders relative to a standard temperature of 15°C.
41. **CORING OF ASPHALT PAVEMENTS.** A guide to equipment, site selection, safety and procedures for coring of asphalt pavements.
42. **NUCLEAR DENSITY TESTING OF ASPHALT PAVEMENTS.** A guide to the use of nuclear gauges for determination of density of asphalt pavements.
43. **SELECTION AND DESIGN OF PRIMERSEALS.** Practical guidelines to the design of primerseals.
44. **HIGH PRESSURE WATER RETEXTURING.** A guide to the retexturing of bituminous surfaces.
45. **SKIN PATCHING.** Used to waterproof or repair surface deficiencies of limited extent.
46. **ASPHALT COOLING RATES.** Supplementary cooling charts to Pavement Work Tip No. 12.
47. **SPRAYED SEALING OF DROUGHT -& SALT-AFFECTED PAVEMENTS.** Provides guidelines for the sprayed seal initial treatments in times of drought conditions or on salt-affected pavements.

AUSTROADS PUBLICATIONS

AGP-T 04B/07	Guide to Pavement Technology – Part 4B: Asphalt. (Supercedes AP-G66/02 – Asphalt Guide). 2007. \$169.60	AP-T 63/06	Asphalt Characterisation for Pavement Design. 2006. \$30.00
AGP-T 04D/06	Guide to Pavement Technology – Part 4D: Stabilised Materials. (Supercedes AP-60/98 – Guide to Stabilisation in Roadworks). 2006. \$56.60	AP-T 64/06	Asphalt Manufacture. 2006. \$40.00
AGP-T 01/05	Guide to Pavement Technology – Part 1: Introduction to Pavement Technology. 2005. \$40.00	AP-T 65/06	Asphalt Pavement. 2006. \$40.00
AP-T 44/97	Asphalt Recycling Guide. \$20.00	AP-T 66/06	Asphalt Recycling. 2006. \$30.00
AP-T 60/98	Guide to Stabilisation in Roadworks. \$40.00	AP-T 67/06	Maintenance of Asphalt Surfacing. 2006. \$30.00
AP-T 01/00	Austroads Provisional Specification for Multi-grade Binders. 2000. \$10.00	AP-T 68/06	Update of the Austroads Sprayed Seal Design Method. 2006. \$50.00
AP-T 02/00	Framework Specifications for Asphalt Recycling. 2000. \$30.00	AP-G 73/02	Guide to the Selection and Use of Bitumen Emulsions. 2002. \$40.00
AP-T 05/00	Polymer modified binder sprayed seal trials. 2000. \$30.00	AP-G 63/03	Guide to the Selection of Road Surfacing, 2nd edition, 2003. \$50.00
AP-T 18/02	Austroads Framework for Specifying Asphalt. 2002. \$30.00	AP-G 17/04	Pavement Design: A Guide to the Structural Design of Road Pavements – 2004. \$130.00
AP-T 36/06	Pavement Design for Light Traffic – A Supplement to Austroads Pavement Design Guide. 2006. \$30.00	AP-G 76/04	Sprayed Sealing Guide. 2004. \$80.00
AP-T 41/06	Specification Framework for Polymer Modified Binders & Multigrade Bitumens. 2006. \$30.00	AP-G 78/04	Pavement Rehabilitation – A Guide to the Design of Rehabilitation Treatments for Road Pavement. 2004. \$130.00
AP-T 42/06	Guide to the Selection and Use of Polymer Modified Binders & Multigrade Bitumens. 2006. \$40.00	AP-G 83/05	Guidelines for the Management of Road Surface Skid Resistance. 2005. \$75.00
AP-T 62/06	Introduction to Asphalt Mix Design. 2006. \$50.00	AP-G 41/08	Bituminous Materials Safety Guide. 2008. \$35.00
		AP-R 257/04	Austroads Asphalt Mix Design Implementation Workshops. 2004. \$30.00
		AP-R 256/04	Changes to the Austroads Mix Design Procedure to Incorporate Recycled Asphalt. 2004. \$30.00

ASPHALT INSTITUTE PUBLICATIONS

MANUALS

- SP-1 PERFORMANCE GRADED ASPHALT BINDER SPECIFICATION AND TESTING** (3rd Edition, 2003). The Superpave Binder manual describes the new Superpave asphalt binder specification and the tests that it uses to classify asphalt binders (pressure ageing, bending beam rheometer, dynamic shear rheometer, direct tension test, rolling thin film oven, and rotational viscometer). Superpave™ is a product of the Strategic Highway Research Program (SHRP) asphalt research. The relationships between the binder tests and pavement performance are described, and instruction is provided for asphalt binder selection in a pavement project's given environmental conditions. Fully illustrated; 62 pages, 15x22.5 cm. (\$55.00)
- SP-2 SUPERPAVE MIX DESIGN** (3rd Edition, 2001). The Superpave Mix Design manual presents the concepts and criteria involved with the Superpave asphalt mix design system. The Superpave aggregate tests and criteria are described, including aggregate consensus and source properties, the aggregate gradation control points and the restricted zone. A full Superpave mix design example is presented, including discussions of the design aggregate structure, mixture volumetrics, the Superpave gyratory compactor, and the selection of the design compaction level. Fully illustrated; 102 pages, 15x22.5 cm. (\$55.00)
- MS-1 THICKNESS DESIGN – ASPHALT PAVEMENTS FOR HIGHWAYS AND STREETS** (Ninth Edition, 1993). A scientific approach to pavement thickness design, rather than empirical. It represents a major effort on the part of Institute technical personnel and incorporates the findings of the world's leading experts in the field of pavement design. Included are 20 design charts covering both SI (metric) and U.S. customary methods of measurement. 22x28 cm and wirebound for ease of use on flat surfaces. 97 pages. (\$60.00)
- MS-2 MIX DESIGN METHODS FOR ASPHALT CONCRETE AND OTHER HOT-MIX TYPES** (Sixth Edition – 1993 printing). A practical guide to asphalt mix design (Marshall and Hveem) for engineers and students. Fully illustrated; paperback, 141 pages, 15x22.5 cm. (\$60.00)
- NEW MS-4 THE ASPHALT HANDBOOK** (Revised Seventh Edition). An essential asphalt publication. MS-4 is the Asphalt Institute's comprehensive manual on the use of asphalt. For 70 years, it has served the asphalt industry as the primary reference manual for contractors, engineers, consultants, specifiers and user agencies. The new, expanded edition of over 700 pages of text and illustrations showcases the advances in asphalt technology that have evolved since the 1989 edition of MS-4. New topics covered include: • Superpave Asphalt Binder, • Superpave Mix Design, • Stone Matrix Asphalt • Open Graded Friction Courses • Quality Control & Acceptance • Pavement Management • Rehabilitation of Concrete Pavements with HMA, 700 pages, 15x22.5 cm. (\$160.00)
- MS-5 INTRODUCTION TO ASPHALT** (Eighth Edition, 2001). Summary information relating to asphalts, uses, brief history, definitions, tests, and specifications. Fully illustrated; paperback, 74 pages, 15x22.5 cm. (\$40.00)
- MS-6 ASPHALT POCKETBOOK OF USEFUL INFORMATION** (Sixth Edition, 1994). Pocket-size data on unloading tank cars, temperature & volume corrections for asphalt materials, useful tables, and miscellaneous information. Paperback; 115 pages, 9x15 cm. (\$30.00)
- MS-10 SOILS MANUAL** (Fifth Edition, 1993). Data on general classification of soil and determination of strength values for design of asphalt pavement structures. Fully illustrated, paperback, 260 pages, 15x22.5 cm. (\$45.00)
- MS-11 THICKNESS DESIGN — ASPHALT PAVEMENTS FOR AIR CARRIER AIRPORTS** (Third Edition, 1987). Intended primarily for use by airfield design engineers, this manual is an engineering guide for design and construction of airport pavements serving aircraft of more than 270kN (60,000 lb.) gross. Presents a fundamental, rational design procedure that is approved on a case-by-case basis by FAA. Includes 141 illustrations and 13 tables. Spiral bound, 223 pages, 22x28 cm. (\$60.00)
- MS-12 ASPHALT IN HYDRAULICS** (Second Edition, 1979). Data for the guidance of those involved with the use of asphalt in the construction, maintenance and repair of reservoirs, dams, holding ponds, swimming pools, sanitary landfills and similar structures. Numerous photos and drawings: paperback, 68 pages, 22x28 cm. (\$30.00)
- MS-14 ASPHALT COLD-MIX MANUAL** (Third Edition, 1997). For use in preparing a specification for the analysis, design, and control of asphalt coldmix construction. Illustrated with photos: paperback 186 pages, 15x22.5 cm. (\$55.00)
- MS-15 DRAINAGE OF ASPHALT PAVEMENT STRUCTURES** (Second edition, 1984) The Asphalt Institute's definitive manual on drainage contains information on the subject as applicable to asphalt pavements for all purposes including: highways, roads, streets, parking areas and airfields. Fully illustrated; paperback, 118 pages, 15x22.5 cm. (\$40.00)
- MS-16 ASPHALT IN PAVEMENT MAINTENANCE** (Third Edition, 1997). Provides practical information on methods, equipment, and terminology for using asphalt to maintain all types of pavements. Topics addressed include important maintenance considerations, asphalt materials used in pavement maintenance, descriptions and causes of various distresses encountered in asphalt and concrete pavements, the proper maintenance procedures for repairing pavement distresses, and guidelines for designing stockpile pavement distresses. Numerous photos and drawings; paperback. 80 pages, 15x22.5 cm.(\$50.00)

- MS-17 ASPHALT OVERLAYS FOR HIGHWAY AND STREET REHABILITATION** (Third Edition, 2000). This new, revised edition has been developed to provide the state-of-the-practice for evaluating and designing asphalt overlays for both asphalt and concrete pavements. Emphasis has been placed on alternatives to combine sound pavement management principles, accurate distress identification, and a detailed structural analysis for an asphalt overlay design to carry the projected vehicular loading. This new edition has been rewritten to reflect changes in rehabilitation strategies that took root in the late 1980s and early 1990s. Chapter 1 has been written to capture the asphalt applications available to meet demands placed on an ageing national highway infrastructure. Chapters 6 and 10 on “Non-destructive Testing” and “Fractured Slab Technology” respectively have been added. Chapters 12, 13 and 14 have been developed as “Guide Specifications” for the more popular rehabilitation techniques for concrete pavement-Rubblization, Crack/Break and Seal, and Saw-Cut and Seal. Lastly, Chapter 15 on “Drainage” has been expanded to include the latest innovations using longitudinal edge drains and permeable bases for use in conjunction with rehabilitation of concrete pavements. 177 pages, many illustrations/tables, 22x28 cm. (\$110.00)
- MS-18 SAMPLING ASPHALT PRODUCTS FOR SPECIFICATIONS COMPLIANCE** (Second Edition, 1985). Guide to obtaining asphalt samples that show true nature and condition of the material. Methods for sampling asphalt from vehicle tanks, aboveground stationary tanks, railroad tanks at origin and destination. Contains guide for putting vehicle tanks in proper condition or loading asphalt products and stresses necessity for strict control procedures. Illustrated; 44 pages, 15x22.5 cm. (\$20.00)
- MS-19 A BASIC ASPHALT EMULSION MANUAL** (Third Edition). The Basic Asphalt Emulsion Manual is the industry’s key publication for explaining the general characteristics of asphalt emulsions and their uses. The Emulsion Manual will help you evaluate pavement systems for construction and maintenance, and will help you choose the emulsion that best fits your project’s specific conditions. This new manual has been completely updated and contains chapters on emulsion chemistry and manufacturing, storage and handling, sampling and testing, selecting the right emulsions, and miscellaneous emulsion applications. The Emulsion Manual contains precise information about when, where, and how emulsions should be used. Contains a glossary, bibliography, and other appendices; fully indexed and illustrated with photographic and line figures; paperback, 120 pages, 22x28 cm. (\$70.00)
- MS-20 ASPHALT HOT-MIX RECYCLING** (Second edition, 1986). A revised edition containing comprehensive data on hot-mix recycling of asphalt pavements including reasons for recycling, materials evaluation, recycling agents, design, plant production, construction and aggregate temperature determination. Illustrated, 52 pages. 15x23 cm. (\$25.00)
- MS-21 ASPHALT COLD-MIX RECYCLING** (First Edition, March 1983). Highlights methods of recycling deteriorated asphalt pavements and utilizing reclaimed asphalt and aggregate materials, using either emulsified asphalt or hot asphalt cement. Describes procedures for removing old pavements, storing and processing reclaimed material, and designing and constructing recycled pavements using both in place and central plant methods; 68 pages, 15x22.5 cm. (\$50.00)
- MS-22 CONSTRUCTION OF HOT-MIX ASPHALT PAVEMENTS** (Second Edition, 2002). A valuable guide and reference for persons involved in asphalt pavement construction. Originally prepared by the Asphalt Institute under contract to the U.S. Federal Highway Administration, the manual has been completely revised and updated. It describes the procedures necessary to properly construct quality asphalt pavement. New chapters have been added on Construction Project Management, Quality Control and Acceptance of Hot Mix Asphalt, and Segregation of Hot Mix Asphalt. Retained and updated are the chapters on Materials, Mix Design, Plant Operations, Placing Hot Mix Asphalt, and Compaction. 300 pages, 22x28 cm. (\$95.00)
- MS-23 THICKNESS DESIGN – ASPHALT PAVEMENTS FOR HEAVY WHEEL LOADS** (First Edition, 1986). Presenting a method for thickness design of asphalt pavements for heavy-duty vehicles such as log hauling trucks, dump-body haulers, fork-lift trucks, straddle carriers, rubber-tyred hoists and other vehicles having as few as four to as many as twelve or more tyres, Contains 23 illustrations and 13 tables. Spiral bound paperback, 76 pages, 22x28 cm. (\$50.00)
- NEW MS-24 MOISTURE SENSITIVITY** (First Edition 2007). The premiere guide for understanding the causes and treatment for moisture damage of HMA. If you test or specify material properties of hot mix asphalt, this manual will help you learn the causes of moisture damage and stripping, test methods to evaluate moisture damage potential, treatments to prevent moisture damage in HMA pavements. Written by a team of industry experts and Asphalt Institute staff, this new manual compliments AI’s MS-2 and SP-2 mix design manuals and covers: Chemistry of Asphalt Aggregate Interaction, Influence of Physical Properties on Moisture Sensitivity, Treatments and Best Practices, and construction Practices to Minimize Moisture Sensitivity. 48 pages, 15x22cm. (\$50.00)

Asphalt Institute Publications

EDUCATIONAL SERIES

- ES-2 VIBRATORY COMPACTION OF ASPHALT PAVING MIXTURES** (Second Edition). Contains clear, concise and simply-written information on several aspects of vibratory compaction. Illustrated with photos and drawings; 12 pages. (\$15.00)
- ES-7 SELECTION OF LOCAL AGGREGATES FOR HOT ASPHALT MIXTURES.** Information on natural aggregates sources, gravels, sands, aggregate evaluation, sizes and grading, cleanliness and suitability surface texture and shape, absorption, and affinity for asphalt; 8 pages. (\$15.00)
- ES-8 PAVING ASPHALT.** Contains a wide spectrum of concise and simply-written information on asphalt for paving purposes, including: composition and performance of asphalt, consistency measurements, grading systems of asphalt cements, temperature susceptibility, hardening and ageing, and selection of asphalt grade; 8 pages. (\$15.00)
- ES-9 FACTORS AFFECTING COMPACTION.** For the information of all concerned with asphalt paving operations. Contains concise but explicit explanations of the factors involved in compacting asphalt mixtures; includes illustrations, charts and tables providing guidance toward effective compaction and the construction of pavements that are problem-free and durable; 12 pages. (\$15.00)
- ES-10 CAUSE AND PREVENTION OF STRIPPING IN ASPHALT PAVEMENTS** (2nd Edition). Describes the phenomenon known as stripping, as applicable to asphalt pavements; explains the causes and suggests measures for minimising the occurrence and solving the problem; 8 pages. (\$10.00)
- ES-11 ASPHALT SURFACE TREATMENTS — SPECIFICATIONS.** Contains explicit information on specifications for single and multiple surface treatments with asphalt. Subject headings are: general requirements, materials, construction, and notes to the engineer, with sections on preparation of surfaces, equipment, sampling, testing methods, asphalt, mineral aggregate, application of asphalt primer, asphalt binder, traffic control and safety, measurement method, payment basis; 8 pages. (\$10.00)

- ES-12 ASPHALT SURFACE TREATMENTS — CONSTRUCTION TECHNIQUES.** Details all procedures necessary for asphalt surface treatments. The headings include: items to be considered, inspection of existing pavements, asphalt distributor, checking distributor speed, checking spreads, aggregate spreaders, rollers, power broom, auxiliary equipment, pavement preparation, surface treatment design, spraying the asphalt, aggregate spreading, rolling, traffic control, removing excess aggregate, multiple surface treatment, precautions, glossary, primes and road-oiling, distributor data, and reproduction of ASTM Method D 2995-79. Fully illustrated; 28 pages. (\$25.00)
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SPECIFICATIONS

- SS-3 CONSTRUCTION SPECIFICATIONS FOR ASPHALT CURBS & GUTTERS.** (Fourth Edition.) Covers materials, curb and gutter foundation, new housing areas, specifications for machine-laid hot plant-mix curbs. Illustrated; 16 pages. (\$25.00)
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ENGINEER'S REPORTS

- ER-215 QUANTIFYING THE EFFECTS OF POLYMER-MODIFIED ASPHALT FOR REDUCING PAVEMENT DISTRESS.** Designed for pavement specifiers and asphalt technologists, this study defines the advantages of polymer-modified asphalt (PMA) when used in a variety of climates and traffic conditions throughout North America. Comparative modified and unmodified sections at 84 controlled experimental sites across the U.S. and Canada were evaluated for rutting, fatigue cracking and transverse cracking. The report confirms a significant increase in pavement life, rutting resistance and prevention of thermal cracking associated with the application of PMA as compared to conventional hot mix asphalt. This detailed, in-depth Engineer's Report includes all related data and findings of the study. 60 pages. (\$80.00)

RESEARCH REPORTS

- RR-75-1A REPORT ON EMISSIONS FROM ASPHALT HOT-MIX** (1975). Summarises the favourable results of an Asphalt Institute study, involving specialised sampling and testing at asphalt plants in New Jersey and North Carolina, from which it was determined that there is no serious air pollution or employee health problem resulting from the use of petroleum-derived asphalt in hot mixes. 20 pages. (\$30.00)
- RR-78-1 DIFFERENCES BETWEEN PETROLEUM ASPHALT, COAL-TAR PITCH AND ROAD TAR** (1978). Written by V.P. Puzinauskas and L.W. Corbett, the report serves to identify the differences between materials quite often, and erroneously, considered as synonymous. They are shown to be different in both origin and chemical makeup. The objective of the report is better understanding of the materials and their engineering and industrial uses; 36 pages. (\$30.00)
- RR-79-1 ELASTIC AND FATIGUE BEHAVIOUR OF EMULSIFIED ASPHALT PAVING MIXES** (1979). Written by Bernard F. Kallas, this report's objective is the better understanding of the uses and potential of emulsified asphalt in paving mixes, and toward the advantages offered by emulsions in the use of local aggregates. Covered are previous research on the subject, an outline of the study that is the report's subject, and details of the tests pertinent to emulsions used in paving mixes. Illustrated; 64 pages. (\$35.00)
- RR-80-1 EXPOSURE OF PAVING WORKERS TO ASPHALT EMISSIONS** (1980). Written by V.P. Puzinauskas, the report is a comprehensive account of a study to evaluate the compositional characteristics of asphalt emissions, and to assess the level of workers' exposure to such emissions. The sites for initial sampling were paving construction projects; 16 pages (\$30.00)
- RR-80-2 PROPERTIES OF ASPHALT CEMENTS** (1980). Written by V.P. Puzinauskas, the report details the results of exhaustive testing of samples of asphalt cements furnished by 40 different manufacturers and representing asphalts produced in 78 refineries. A total of 211 samples of asphalt cements were received, 86 of which were selected for laboratory testing. Included were all currently-in-use viscosity and penetration grades specified by the various United States agencies; 72 pages. (\$35.00)
- RR-81-1 DESIGN TECHNIQUES TO MINIMISE LOW TEMPERATURE ASPHALT PAVEMENT TRANSVERSE CRACKING** (1981). A state-of-the-art report by a special committee organised by The Asphalt Institute. Includes such topics as: Low-temperature cracking, asphalt specifications, asphalt and mix stiffness in pavement design, design procedures, factors influencing cracking, mix stiffness at low temperatures, predicting pavement cracking temperatures. 76 pages. (\$35.00)
- RR-82-1 PROPERTIES OF ROOFING ASPHALTS** (1982). Written by V.P. Puzinauskas, this report details a comprehensive study of the properties of asphalts used by the roofing industry. The work was done in The Asphalt Institute laboratory. Considered valuable for persons engaged in the development of specifications and quality control procedures for the production of roofing materials; 14 tables, 24 figures, 102 pages. (\$35.00)
- RR-82-3 LOW-TEMPERATURE MECHANICAL PROPERTIES OF ASPHALT CONCRETE** (1982). Written by Bernard F. Kallas, details the results of a study to determine the influence of the several factors involved in low-temperature cracking of asphalt pavements. Included are details of the test equipment used in the study; the modulus and fracture strength of various asphalt concrete mixtures; predictions of low temperature cracking and nomograph-predicted cracking temperatures. 60 pages. (\$35.00)
- RR-83-1 DEFLECTION METHOD FOR DESIGNING ASPHALT CONCRETE OVERLAYS FOR ASPHALT PAVEMENTS** (Revised Edition, 1990). An updated version of the same title issued under the designation RR-69-3 by R. Ian Kingham. This report, revised by Robert N. Jester, contains a design procedure based on research carried out in The Asphalt Institute's Structural Design Research Program. Contains a computer program. 28 pages. (\$30.00)
- RR-84-2 FLEXIBLE PAVEMENT MIXTURE DESIGN USING RECLAIMED ASPHALT.** Provides essential information on the design of hot asphalt mixtures for recycling. Covers standard Marshall and Hveem test methods, and proposed mix-design criteria, also a sampling procedure and test method to determine the properties of salvaged binders. 190 pages. (\$40.00)

PAVEMENT DESIGN COMPUTER PROGRAMS

All A.I. pavement design computer programs fully support metric and US customary units of measurement.

CP-1 DAMA (1991 Revision). This program utilizes multi-layered elastic theory to analyse pavement structures for single- or dual-wheel load systems. The flexibility of the program permits the evaluation of highway pavements with up to five different layers using varying (monthly) material properties. Designed to run on IBM compatible computers. (\$125.00)

CP-2 HWLOAD (1991 Revision). This program is available to run the "Design Procedure for Multiple Wheel Loads". This is Chapter VII of the Asphalt Institute's Manual Series No. 23 (MS-23) *Thickness Design – Asphalt Pavement for Heavy Wheel Loads*. HWLOAD is designed for use on IBM compatible computers. (The MS-23 manual is not included in the CP-2 package and is sold separately.) (\$125.00)

CP-3 AIRPORT (1991 Revision). Airfield pavement thickness design and life-cycle cost analysis programs are included in the AIRPORT package. Pavement thickness design follows the solution sequences presented in *Thickness Design Asphalt Pavements for Air Carrier Airports*, Manual Series No. 11 (MS-11), and *Thickness Design – Asphalt Pavements for General Aviation Airports*, (IS-154). The LCCAIR life-cycle cost analysis program allows for comparing costs between various types of pavements and rehabilitation and maintenance options. Both programs are designed for use on IBM compatible computers. (MS-11 and IS-154 are not included in the CP-3 package and are sold separately.) (\$125.00)

CP-4 ASPHALT PAVEMENT THICKNESS DESIGN OF HIGHWAYS AND OVERLAYS (HWY) (2000 Version). Now in Windows on CD ROM. This pavement design program provides a computerized solution to the structural design of highways, streets, parking lots and overlays as found in The Asphalt Institute manuals, *Thickness Design – Asphalt Pavements for Highways and Streets* (MS-1) and *Asphalt Overlays for Highway and Street Rehabilitation* (MS-17). HWY has been reconfigured into an easy-to-use Windows format (manuals sold separately). (\$225.00)

CP-5 LIFE CYCLE COST ANALYSIS (1991 Revision). This computer program provides an efficient method to compare costs between various types of pavements and maintenance and rehabilitation options. LCCOST is adaptable to both SI (metric) and U.S. customary units of measurement. (\$125.00)

CP-6 COMPUTER-ASSISTED ASPHALT MIXTURE ANALYSIS (CAMA) (Version 2.0). CAMA includes all of the calculations of traditional mix design methods for asphalt concrete, analysing the laboratory mix design properties (% air voids, VMA, voids filled, stability [Marshall or Hveem], flow, unit weight, as well as effective film thickness and dust ratio) to aid in selecting the optimum asphalt content. A performance prediction model evaluates the performance of the design mix in the intended pavement structure. All the mix design plots are produced on screen and for printer. Designed to operate on IBM compatible computers. (\$125.00)

SW-1 THICKNESS DESIGN SOFTWARE. The Asphalt Institute's latest software offering is *SW-1 Asphalt Pavement Thickness Design Software* for Highways, Airports, Heavy Wheel Loads and other applications:

- A mechanistic-empirical pavement thickness design software based on familiar Asphalt Institute methods.
- An integrated pavement design suite for highways, streets, parking lots, airports, and industrial facilities supporting heavy wheel loads.
- Designed to run on common Microsoft Windows® operating systems including Windows XP.

The software is written in strict conformance to the Asphalt Institute *MS-1*, *MS-11*, *MS-17*, and *MS-23* manuals, and the new Windows-based user interface seamlessly integrates previous AI thickness design programs into a single, easy to use program.

SW-1 features improved data file handling and management, as well as an extensive context-sensitive HELP file that addresses common pavement design questions. A companion User's Guide with example problems is also included. (\$700.00.)

Try before you buy! A **free trial version** of the SW-1 software is available from: www.asphaltinstitute.org/thicknessdesignsw/

GENERAL INFORMATION

- IS-91 FULL-DEPTH ASPHALT PAVEMENTS FOR PARKING LOTS, SERVICE STATIONS AND DRIVEWAYS** (Fifth Edition, 1994). Points out advantages and gives design and construction information and model specifications. Illustrated with drawings. 16 pages. (\$10.00)
- IS-96 HOW TO DESIGN FULL-DEPTH ASPHALT PAVEMENTS FOR STREETS** (1988). Updated technology developed from multimillion-dollar AASHTO and WASHO road tests and other road experiments in U.S. and abroad. Illustrated with photos and drawings. 8 pages. (\$10.00)
- IS-137 HOT MIX ASPHALT FOR QUALITY RAILROAD & TRANSIT TRACKBEDS** (Third Edition, 2000). Tells how the use of asphalt pavement as sub-ballast can enable modern track construction to meet the strongest line and surface requirements of high-speed, special-car, high-wheel-load freight and passenger services. Illustrated: 10 pages. (\$10.00)
- IS-139 A SIMPLIFIED METHOD FOR THE DESIGN OF ASPHALT OVERLAYS FOR LIGHT TO MEDIUM TRAFFIC PAVEMENTS** (Second Edition, 1987). Gives guidelines for overlaying deteriorated road, street, and highway pavements of every kind and includes information for determining overlay thickness; four-page folder. (\$10.00)
- IS-147 ASPHALT PAVEMENT FOR ATHLETICS AND RECREATION** (1985). Pictures and describes how Full-Depth asphalt construction provides smooth, all-weather pavements for a variety of athletic and recreational uses. Numerous photos. 16 pages. (\$10.00)
- IS-154 THICKNESS DESIGN — ASPHALT PAVEMENTS FOR GENERAL AVIATION** (Third Edition, 1987). This publication, formerly titled Full Depth Asphalt Pavements for General Aviation, is a guide to the design and construction of asphalt pavements for airports intended to serve aircraft up to 270kN (60,000 lb.). Approved by FAA on a case-by-case basis for Light Aircraft. Contains tables, drawings, lists of aircraft and photos. 24 pages. (\$20.00)
- IS-168 TENDER MIXES: The Causes and Prevention** (1977). Written by Vaughn Marker, it deals with a problem of major concern to the asphalt paving industry; 8 pages. (\$10.00)
- IS-169 A PAVEMENT RATING SYSTEM FOR LOW VOLUME ASPHALT ROADS** (1994). Describes a rating system useful to persons and agencies responsible for maintaining roads and streets. Details the assignment of numerical values to types of pavement distress, taking into account the extent and seriousness of the defects. Contains a suggested pavement rating form and photographic illustrations of the various types of distress; 8 pages. (\$10.00)
- IS-174 CALCULATING PAVEMENT COSTS** (Second Edition, 1994). Offers a procedure for making rapid calculations to determine pavement costs per square yard; 20 pages. (\$20.00)
- IS-178 ALTERNATIVES IN PAVEMENT MAINTENANCE, REHABILITATION AND RECONSTRUCTION** (Second Edition, 1994). Provides basic information on the many alternatives, including the proper time to employ each and detailed example of a life-cycle cost analysis, which can assist in making optimum use of available funds. Charts and table included; 12 pages; (\$10.00)
- IS-180 SAFE STORAGE AND HANDLING OF HOT ASPHALT**. Designed to fill the need for information on safe procedures and the minimizing of hazards in handling hot asphalt. Contains a two-color representation of the Fire Triangle. 18 pages. (\$15.00)
- IS-181 ASPHALT PAVEMENT THICKNESS DESIGN** (Second Edition, 1991). A simplified and abridged version of the 1981 Edition of The Asphalt Institute's *Thickness Design* manual. Contains ten tables and information on traffic considerations, subgrade soils, pavement materials, thickness selection and compaction. 24 pages. (\$15.00)
- IS-186 ASPHALT USE IN WATER ENVIRONMENTS** (1991). State of the art research results continue to illustrate the inert qualities of hot-mix asphalt in water environments. Photos. 4 pages. (\$6.00)
- IS-187 MIXTURE CLASSIFICATION OF HOT-MIX ASPHALT**. A discussion of the types, characteristics, and applications of hot-mix asphalt mixtures. Illustrated. 4 pages. (\$6.00)
- IS-188 (A-D) HOT MIX ASPHALT IS THE BEST BUY ALL OF THE TIME**. A new series of publications jointly published by the Asphalt Institute and the National Asphalt Pavement Association highlighting the benefits of hot mix asphalt. (Complimentary)
- IS-188A STUDY SHOWS COSTS OF ASPHALT PAVEMENT LESS THAN CONCRETE ON OHIO INTERSTATES**. A recent study of Ohio's asphalt and concrete interstate pavements shows that asphalt pavements have provided 25 to 34 years of continuous services and were less costly to construct and maintain than adjoining concrete pavements. 4 pages. (Complimentary)

Asphalt Institute Publications

- IS-188B** **HOT MIX ASPHALT PREVAILS IN PAVEMENT CONTESTS.** The Maryland State Highway Administration thinks “we’ve found the solution to our rutting problem while maintaining all the advantages of Hot Mix construction.” A follow-up of a recent industry competition to develop a long lasting economic solution to intersection pavement problems. 4 pages (Complimentary)
- IS-188C** **ASPHALT REPLACES CONCRETE IN AWARD WINNING INTERSTATE REHABILITATION.** State-of-the-art hot mix asphalt pavement replaces a worn-out, inadequate concrete roadbed. Its construction utilized the latest techniques. Two forms of recycling which the contractor employed saved money, time, congestion, and landfill space. (I-440 Raleigh, NC Beltline) 4 pages (Complimentary)
- IS-188D** **ASPHALT CONSTRUCTION KEEPS TRAFFIC MOVING.** Piney Grove Road project in Columbia, SC showcases flexibility and durability of hot mix asphalt. The project was completed 129 days faster than predicted. Promoting motorist safety, relieving congestion, and maintaining traffic flow in a growth area was achieved using hot mix asphalt – no other material would have allowed the project to be finished so quickly. (Piney Grove Road/Interstate 26) 2 pages. (Complimentary)
- IS-200** **POLYMER MODIFIED ASPHALT FOR THE PAVING INDUSTRY.** Polymer modified asphalt (PMA) for paving is introduced in this 12-page overview of how the asphalt industry has specified, blended, mixed and stored, and used polymers in hot mix asphalt – including Superpave construction tips. Fully illustrated. 12 pages (\$20.00)
- IS-201** **GRADE CONTROL GUIDELINES FOR SMOOTH HMA PAVEMENTS.** This new Information Series details the necessity of using grade controls for constructing smooth pavements. Strict controls and good paving fundamentals are key to obtaining smoothness requirements. Illustrated. (\$20.00)
- IS-210** **PROCEDURES TO IMPROVE THE PRECISION OF HMA VOLUMETRIC CALCULATIONS.** This new publication details two procedures to improve the precision of hot mix asphalt (HMA) volumetric: (1) asphalt ageing at the design lab and at the field lab and (2) using effective aggregate specific gravity to calculate voids in mineral aggregate (VMA) of plant produced HMA. 12 pages. (\$30.00)
- PR-1** **ENVIRONMENTAL APPLICATIONS OF HOT MIX ASPHALT.** This very informative book describes the many uses of hot mix asphalt (HMA) in environmentally sensitive applications. It highlights liner systems for drinking water reservoirs, fish hatcheries, and sludge drying pads, in addition to chemical containment and landfill caps and other applications. Fully illustrated, 24 pages. (\$30.00)
- PR-2** **HIGH PERFORMANCE HOT MIX ASPHALT INTERSECTIONS.** High Performance Hot Mix Asphalt Intersections is an up-to-date look into how to plan and design our intersections to accommodate the increasing loading demands of these high-stress pavement applications. Fully illustrated, 8 pages. (\$15.00)
- PR-3** **ASPHALT PAVEMENT REHABILITATION TECHNIQUES.** Rehabilitating our highways with HMA saves resources, time and money. See how in this informative, 4 page technical brochure on rehab techniques. (\$10.00)
- PR-4** **HIGH PERFORMANCE HOT MIX ASPHALT INTERSECTIONS–PACKAGE!** The High Performance Hot Mix Asphalt Intersections–Package! is an up-to-date look at how to plan and design our intersections to accommodate today’s increasing traffic demands. This 3-ring binder contains the complete, four-part Intersection Strategy series including the “World’s Strongest Intersection”; (PR–2) High Performance Hot Mix Asphalt Intersections Booklet; a complete PowerPoint Presentation on diskette that illustrates how planning and designing high-stress asphalt pavements is fundamental; and the AASHTO MP2–99 Grade Bumping Policy. Fully illustrated. (\$35.00)

NAPA PUBLICATIONS

INFORMATION SERIES

- IS-52 FUNDAMENTALS OF THE OPERATION AND MAINTENANCE OF THE EXHAUST GAS SYSTEM IN A HOT MIX ASPHALT FACILITY (2/99)** This publication offers technological and operational information organised in an easy-to-use format. Divided into eight chapters for quick reference, each chapter describes the particular pieces of equipment found in an HMA facility that interact with the exhaust gas system. 118 pp. (\$75.00)
- IS-75 NOISE IN AND AROUND ASPHALT PLANTS.** Where does noise occur around a hot-mix plant, what causes it and how can it be controlled? This extremely useful document describes noise fundamentals, how, when and where they occur in a hot-mix operation, and methods and materials for controlling noise. 38 pp. (\$20.00)
- IS-80 NAPA WATER POLLUTION CONTROL MANUAL (9/80).** Written for owners and operators of asphalt plants, this brochure covers the special considerations brought about by use of wet emission control systems. Enables you to learn about what you must do to prevent and control plant spills, whether emission control system is wet or dry. 32 pp. (\$20.00)
- IS-84 DEVELOPMENT OF MARSHALL PROCEDURES FOR DESIGNING ASPHALT PAVING MIXTURES (1993).** Understanding what is involved in designing a Hot Mix Asphalt paving mixture and how the various materials are selected, how they act and react with each other, and how the pavement performs are all of vital importance. This publication discusses the development and use of Marshall procedures for testing mix designs. 24 pp. (\$15.00)
- IS-86 PREVENTING FIRES AND EXPLOSIONS IN HOT MIX ASPHALT PLANTS (5/84).** Pinpointing sources of potential fires and explosions and steps to take for their prevention are covered in this publication. In addition to addressing the subject in general, separate sections cover the batch plant and the drum mix plant. Includes a handy check list of preventive measures. 32 pp. (\$15.00)
- IS-97 BLISTERING IN ASPHALT PAVEMENTS: CAUSES AND CURES (11/87).** Describes the mechanisms that can lead to blistering of asphalt pavements, including moisture vapor pressure, soluble salts, uncured steel slags, and microbial action. Also discussed are the effects of factors such as mix characteristics, aggregate properties, drainage, temperature, and construction procedures. Finally, procedures to minimise blistering in asphalt pavements are proposed and suggestions are made on how the probable cause can be determined and what remedial action should be taken. 20 pp. (\$15.00)
- IS-98 CRACKING AND SEATING OF PCC PAVEMENTS PRIOR TO OVERLAYING WITH HOT MIX ASPHALT — STATE OF THE ART (2/89).** Updates
- NAPA's earlier IS-91, this publication describes the Cracking and Seating process, typical cracking equipment, crack pattern and piece size, seating, influencing factors, and more. Also lists known states having conducted Cracking and Seating projects and procedures followed. 16 pp. (\$15.00)
- IS-99 SIMPLIFIED DESIGN GUIDE FOR HOT MIX ASPHALT (HMA) RAILROAD TRACKBEDS (4/88).** Provides a quick look at more recent projects and developments in the use of Hot Mix Asphalt in railway trackbed construction and also offers a general design guide for determining mat thicknesses. 8 pp. (\$10.00)
- IS-100 STRUCTURAL EVALUATION OF CRACKED AND SEATED PCC PAVEMENTS FOR OVERLAYING WITH HOT MIX ASPHALT (9/87).** Many agencies have shown an interest in Cracking and Seating or are currently using it as a rehabilitation alternative for distressed pcc pavements. This publication contains the results of a study which determined structural strengths so that overlay thicknesses could be calculated for Cracked and Seated pcc layers. 21 pp. (\$10.00)
- IS-102 MAKING THE MOST OF TEMPERATURE/ VISCOSITY CHARACTERISTICS (3/95).** One of the more difficult problems facing the Hot Mix Asphalt contractor is dealing with the temperature susceptibility of asphalt cements during HMA mixing, storage, and paving operations. This publication gives guidelines on how to use available data on asphalt cement properties in selecting the best temperatures for mixing, compacting, and spraying. 34 pp. (\$15.00)
- IS-103 LARGE STONE MIXES: A HISTORICAL INSIGHT (2/89).** This publication reviews the history of large stone mixes and discusses the evolution of asphalt pavements from the early 19th century pavements to the Warren patents of the early 20th century and the development of the "Topeka" mix. Using lessons from pavement designs of the past, the author draws useful conclusions for strengthening today's HMA pavements through the use of large stone mixes. 6 pp. (\$6.00)

NAPA Publications

- IS-105 DESIGN AND PERFORMANCE STUDY OF A HEAVY DUTY LARGE STONE HOT MIX ASPHALT UNDER CONCENTRATED PUNCHING SHEAR CONDITIONS (2/89).** This publication describes a laboratory and field study to design a Hot Mix Asphalt (HMA) that could withstand the punching and shearing conditions found in a railroad yard trailer loading and unloading facility. The trials, conducted at a Burlington Northern Railroad yard in St Paul, Minnesota in July, 1983, were administered with the main objective of designing a mix that could tolerate the high punching shear effect of the steel dolly wheels of a loaded trailer, plus the high gross loads of front-end loaders that load and unload trailers from the rail flat cars. 15 pp. (\$10.00)
- IS-106 CURRENT INDUSTRY PRACTICES AND PROCEDURES FOR DETERMINING ASPHALT CEMENT CONTENT IN HOT MIX ASPHALT (8/91).** The use of chlorinated solvents to determine AC content of HMA samples has come under attack for alleged health and environmental reasons. Also, the test method itself has come under question. This report examines current available methods and advantages and disadvantages, including alternative methods. 32 pp. (\$20.00)
- IS-107 ESTIMATING USER COSTS OF ASPHALT AND CONCRETE PAVEMENT RE-HABILITATION (3/90).** User delay costs are becoming an ever-increasing factor when considering rehabilitation costs of a roadway and are even a factor when the original paving materials are selected. This publication reports on 12 projects studied in Texas involving HMA overlays on pcc; HMA overlays on an HMA pavement; and pcc overlays on pcc pavement. In all cases, HMA was a clear winner for least down-time. 12 pp. (\$10.00)
- IS-108 TESTING AND EVALUATION OF LARGE STONE MIXES USING MARSHALL MIX DESIGN PROCEDURES (10/90).** The increasing use of large-stone (aggregate size over one inch) HMA pavements has been inhibited by a lack of suitable test procedures and equipment; this has now been remedied through development of modified Marshall test procedures and equipment. This publication discusses the background for development of modified Marshall procedures and large stone mix designs, including field data from projects constructed by a number of states. Included also is a proposed test method using Marshall apparatus and an experimental specification from Kentucky for large stone base mixes. 30 pp. (\$20.00)
- IS-109 DESIGN OF HOT MIX ASPHALT PAVEMENTS FOR COMMERCIAL, INDUSTRIAL & RESIDENTIAL AREAS (7/91).** Recognising the important differences between public highways and commercial pavements, the authors address the special requirements and informational needs of private placement specifiers and designers. This manual provides practical information on selection of pavement and base materials, alternative construction methods, and HMA design criteria, including how to calculate axle loads and arrive at pavement thickness. 62 pp. (\$35.00)
- IS-110 THIN HOT MIX ASPHALT SURFACINGS. (2/96).** Thin HMA surfaces, ranging from ½ in (12.5 mm) to 1½ in (37.5 mm), are being used increasingly to extend pavement life, improve riding quality and safety characteristics, and reduce road-tyre noise. This guide reviews the specific attributes of various mix types – including SMA (Stone Matrix Asphalt) and Open Graded Friction Course – so careful consideration can be given to selecting the appropriate mix design for various applications. 8 pp. (\$10.00)
- IS-111 PAVEMENT SMOOTHNESS (10/98).** Smooth pavements increase roadway safety, vehicle operating speeds, ride quality, driver comfort, vehicle behaviour (braking, steering and control), and lower vehicle operating costs. Additionally, smooth pavements provide improved long-term pavement performance and reduce annual pavement maintenance costs. This publication provides all these factors, plus outlines techniques for achieving smoothness. 20 pp. (\$15.00)
- IS-112 THE EFFECTS OF TESTING AND PRODUCTION PROCEDURES ON MIX DESIGN RESULTS (7/91).** Most agencies rely on standard test methods (ASTM or AASHTO) when developing mixture designs, however, in many instances these standard methods have been modified by agencies or individuals for their own use and very significant effects on mixture designs have resulted. This publication discusses current mix design practice, effects of materials (asphalt cement, aggregates, etc.) on mix designs, and effects of production on mix design performance. 7 pp. (\$10.00)
- IS-115 DESIGN, CONSTRUCTION AND MAINTENANCE OF OPEN-GRADED ASPHALT FRICTION COURSES (5/02).** This new publication discusses materials selection, mix design, construction, pavement structural design, winter maintenance and rehabilitation necessary to maximise the potential for open-graded asphalt courses (OGFC). An OGFC pavement is an open-graded Hot Mix Asphalt mixture with interconnecting voids that provide improved surface drainage during rainfall and reduce noise pollution. 22 pp. (\$20.00)
- IS-117 GUIDELINES FOR USE OF HMA OVERLAY TO REHABILITATE PCC PAVEMENTS (9/94).** Hot Mix Asphalt overlays are a long-term economical solution to rehabilitating distressed Portland Cement Concrete pavements — if the proper overlay thickness is selected to eliminate reflection cracking. Based on a nationwide study of PCC pavement preparation methods for HMA overlay conducted by PCS/Law Engineering, this technical guide focuses on determining overlay thickness. It presents an innovative hierarchical determination approach related to project size and importance. 74 pp. (\$35.00)

- IS-119 HOT MIX ASPHALT FOR HIGH STRESS APPLICATIONS** (1/96). Hot Mix Asphalt pavements can be designed and constructed to provide economical, long-life pavements for high-stress loading conditions, ranging from airfields to bus lanes to high-traffic urban intersections. A key to a successful pavement is a design that will resist premature rutting. This publication reviews the causes and cures of rutting and presents recommended mix design and construction guidelines. 12 pp. (\$10.00)
- IS-120 BALANCING PRODUCTION RATES IN HOT MIX ASPHALT OPERATIONS** (5/96). The line from a HMA production facility to a paving train can stretch for miles. So how do you produce a quality product at a cost-efficient price when the production process is so spread out? This practical guide provides step-by-step information on how to calculate and coordinate HMA production, hauling, paving, and compaction. Applying these steps will help reduce job conflicts while improving quality, productivity, and profitability, whether the paving job is across the street or across the state. 24 pp. (\$20.00)
- IS-121 ROLLER OPERATIONS FOR QUALITY** (1/02). A how-to primer covering proper operating techniques for manual and automatic paving, including procedures for controlling the paving angle and the flow or "head" of material. Valuable troubleshooting guides are also included to help operators recognize and correct segregation, streaks, and other mat flaws. 18 pp. (\$15.00)
- IS-122 SPILL PREVENTION CONTROL & COUNTER-MEASURES (SPCC) PLAN GUIDANCE MANUAL** (1/96). Under federal regulations, Hot Mix Asphalt facilities that store certain quantities of oil and oil products, including petroleum, vegetable, and mineral oils, must have a Spill Prevention Control and Counter-measure (SPCC) Plan. With its step-by-step instructions, this manual walks you through the process of developing and implementing a plan for your facility. It also contains examples of the required forms. 150 pp. (\$125.00)
- IS-123 RECYCLING HOT MIX ASPHALT PAVEMENTS** (4/96). The advantages and benefits of using Reclaimed Asphalt Pavement (RAP) have all been well documented. Here's a publication that looks at the latest technology as it explains the how to's of RAP: how to reclaim, size, store, and process RAP in various types of HMA facilities. Calculations for determining the costs and savings available from using RAP are also provided. 22 pp. (\$20.00)
- IS-124 FIELD MANAGEMENT OF HOT MIX ASPHALT** (1/97). This handy reference will assist HMA producers in understanding what variable factors can affect volumetric properties in a HMA mix. Emphasis is placed on what can cause differences in mix characteristics between the lab and plant production. A ranking system prioritises the importance of each factor which may contribute to the differences. Factors considered include: aggregate, asphalt binder, plant production process, mix storage, and hauling. 47 pp. (\$30.00)
- IS-125 PAVER OPERATIONS FOR QUALITY** (1/03). The valuable and popular training tool "Paver Operations for Quality" has been revised and now includes new information on the use of automatic screed controls and material transfer devices and on preventing segregation. 7 This publication is written in easy-to-understand terms with more graphics that will help all members of the paving crew, including foremen, dump persons, paver operators, screed persons and laborers. 36 pp. (\$20.00)
- IS-127 EVALUATION OF BAGHOUSE FINES FOR HOT MIX ASPHALT** (3/99). Since the 1970s, dust collection systems (baghouses) have been used to capture fines from HMA facility exhaust systems. Baghouse fines have been successfully reintroduced to Hot Mix Asphalt (HMA) mixtures as mineral fillers.
- The purpose of this report is to recommend guidelines on (a) Characterization of baghouse fines, (b) evaluation of the stiffening effect of fines on properties of fines-asphalt matrix, and (c) evaluation of the effect of fines on properties of HMA. The recommended guidelines should ensure a successful, cost-effective use of baghouse fines or other fillers in HMA paving mixtures. 36 pp. (\$20.00)
- IS-128 HMA PAVEMENT MIX TYPE SELECTION GUIDE** (2/01). This joint publication by Federal Highways Administration (FHWA) and NAPA provides designers with methods for selecting appropriate mix types while considering factors such as traffic, environment, subsurface pavement structure, existing pavement condition and preparation and economics. Targeted are OGFC, SMA and fine- and coarse-graded dense mixes. 28 pp. (\$20.00)
- IS-129 A GUIDELINE FOR THE DESIGN AND CONSTRUCTION OF HMA PAVEMENTS FOR TRAILS AND PATHS** (4/02). The popularity of paved bicycle paths and pedestrian trails has increased dramatically over the past decade. Many local agencies are looking for the best way to provide the most economical and safest trail surface. Hot Mix Asphalt (HMA) pavements have proved to give a smooth, flexible, long-lasting surface preferred by the outdoor enthusiast for recreational purposes and links to public transportation centres. This publication provides guidelines and recommendations for the design and construction of asphalt pavements for trails and paths. 16pp. (\$25.00).
- IS-131 DESIGN, CONSTRUCTION AND MAINTENANCE GUIDE FOR POROUS ASPHALT PAVEMENTS** (10/03). This document provides guidelines and recommendations for design, construction and maintenance of porous asphalt pavements. Factors considered for determining applicability include rainfall, soil infiltration capability, usage/loading, frequency of use, cost and stormwater regulations. 16 pp. (\$20.00)

NAPA Publications

NEW

IS-132 RUBBLIZATION (1/06). Design and Construction Guidelines on Rubblizing and overlaying PPC Pavements with Hot-Mix Asphalts. 32 pp. (\$25.00)

NEW

IS-133 BOLD INITIATIVES IN THE ASPHALT INDUSTRY TO SAFEGUARD HEALTH, SAFETY AND THE ENVIRONMENT (12/07). This 24-page publication describes the ongoing approach used by the asphalt industry in the U.S. to work on complex environmental, health, and safety issues. This approach has yielded milestone achievements that have been cited by government agencies as a model for other industries. Examples of accomplishments summarized in the paper include emissions studies, engineering controls on asphalt pavers, warm-mix asphalt, the silica/milling partnership, the Diamond Achievement Commendation, sustainability, work-zone safety, recycling, the International Health Symposium of June 2006, and the NCAT oven test for asphalt cement content. 24 pp. (\$15.00)

NEW

IS- 134 WARM-MIX ASPHALT: CONTRACTORS' EXPERIENCES (7/08). Warm-mix asphalt is one of the most important breakthroughs for the asphalt industry. Contractors around the country are using this new technology and observing the lowered emissions and fuel savings. In addition, potential construction benefits are being explored, including ease of compaction, improved longitudinal joints, the opportunity for longer haul distances, and the prospect of extending the paving season. This publication captures the experiences of seven contractors from different states who have used warm mix. Learn from them how warm-mix asphalt worked, what they learned from the experience, and what surprised them. 24 pp. (\$30.00)

PH-001 HOT-MIX ASPHALT PAVING HANDBOOK

(1/01). This best-selling, practical guide to every aspect of HMA paving – from specifying and mix design through manufacturing and compacting – has been updated and expanded to include discussions of QC/QA, Superpave and other recent advancements. Developed under the sponsorship of the TRB, NAPA, FHWA, AASHTO, the FAA and the U.S. Army, this

comprehensive handbook has become essential for specifiers, contractors, consultants and all others involved with using Hot Mix Asphalt. The topics covered in the expanded second edition of the handbook include: project organization, manufacturing facilities, emission controls, mix delivery, surface preparation, mix placement, joint construction and mat problems and solutions. 213 pp. (\$55.00)

TEXTBOOKS

TB-001 HOT MIX ASPHALT MATERIALS, MIXTURE DESIGN AND CONSTRUCTION. An expanded and updated hardcover second edition of the best selling textbook published by the National Center for Asphalt Technology (NCAT). Not only the premier textbook for university instruction on Hot Mix Asphalt, it is also an excellent reference book for anyone wanting to know more about asphalt technology. The second edition includes new sections covering Stone Matrix Asphalt, Superpave performance grade (PG) asphalt

binders, Superpave mix design, and asphalt modifiers. Updated material includes the latest information on: asphalt refining; aggregates; HMA mix design; characterization of asphalt mixtures; equipment and construction; performance and distress; and maintenance, rehabilitation, and reconstruction of HMA. The most complete and up-to-date book of its type. Quantity prices on request. 585 pp. (\$140.00)

QUALITY IMPROVEMENT SERIES

- QIS-97** **QUALITY CONTROL FOR HOT MIX ASPHALT OPERATIONS** (9/02). A comprehensive guide to setting up a quality assurance program for Hot Mix Asphalt operations. Includes chapters on developing a quality control organization, field and facility operations, sampling and evaluation procedures, personnel and laboratory requirements and more. 66 pp. (\$30.00)
- QIS-102** **EFFECT OF BAGHOUSE FINES ON MIXTURE DESIGN PROPERTIES** (4/82). Use of a baghouse collector at a hot-mix facility creates a source of mineral dust containing finer particles than does traditional mineral fillers. For economic and environmental reasons, it is desirable to add this baghouse dust to the asphalt mix when appropriate mix design considerations are made. This report presents the results of a study on the effect of baghouse fines on mixture design properties. 24 pp. (\$10.00)
- QIS-106** **CORROSION IN HOT MIX ASPHALT FACILITIES** (1/93). Identifies types and causes of equipment corrosion, and provides tips for corrosion prevention. 8 pp. (\$10.00)
- QIS-108** **TENDER MIXES: PROBABLE CAUSES** (1/98). Although not a frequent problem, tender mixes can cause problems not only to the customer, but also to the contractor who may incur construction delays and/or remedial treatment. Here is an overview of tender mixes, their causes, and solutions. 12 pp. (\$10.00)
- QIS-110** **SEGREGATION CAUSES AND CURES FOR HOT MIX ASPHALT** (1/93). This new joint publication by the American Association of State Highway and Transportation Officials and the National Asphalt Pavement Association can be a valuable diagnostic aid in determining the causes and finding the cures for mix segregation. This publication looks at each step, from mix design, through manufacturing, to paving operations, which can cause mix segregation. Includes foldout diagnostic chart for spotting and solving segregation problems. 32 pp. (\$30.00)
- QIS-111** **THE DESIGN OF HOT MIX ASPHALT FOR HEAVY DUTY PAVEMENTS** (10/95). Airport runways built with Hot Mix Asphalt carrying loads in excess of 800,000 lbs. have performed quite well, as this publication points out in its chapters covering operational factors, materials selection, mixture design, and structural design of heavy duty pavements for highways, airports, railroad yards, logging yards, etc. 16 pp. (\$10.00)
- QIS-112** **CONSTRUCTING QUALITY HOT MIX ASPHALT PAVEMENTS – A TROUBLESHOOTING GUIDE** (2/03). Often, when constructing Hot Mix Asphalt pavements, a problem arises for which the solution is not readily available and which is thus overlooked at the expense of quality. This handy guide will help you identify possible solutions to a number of potential problems that may occur during paving operations. The easy-to-read format makes problem solving simple and quick. 30 pp. (\$15.00)
- QIS-114A** **USING ADDITIVES AND MODIFIERS IN HOT MIX ASPHALT (Part A)** (1/93). An overwhelming number of materials are now being marketed as additives, modifiers or aids for improving asphalt binders and mixtures. A careful review of the constituent materials, their properties and applications indicates these materials can be grouped or classified for easier understanding, and NAPA has gathered the detailed information available in this publication; it is also available in a three-ring loose-leaf binder. 12 pp. (\$10.00)
- QIS-117** **ASPHALT TREATED PERMEABLE MATERIAL – ITS EVOLUTION AND APPLICATION** (9/94). Recognition of the fact that the presence of free water hastens pavement deterioration has led to an increased awareness and acceptance of providing internal pavement drainage as standard practice. The development and usage of Asphalt Treated Permeable Material (ATPM) offers a relatively low cost way to achieve positive rapid pavement drainage and this publication reviews ATPM's evolution, usage, design considerations, specifications, construction, and case histories of projects constructed. 32 pp. (\$10.00)
- QIS-118** **COLD WEATHER COMPACTION** (2/98). Although cold weather is not ideal for placing and compacting HMA, field experience confirms that it can be accomplished under adverse conditions. Among factors discussed are mix characteristics, base conditions, transportation, lift thicknesses, types of rollers, handwork, joint construction and specifications and guidelines for cold weather compaction. 15 pp. (\$10.00)

NAPA Publications

- QIS-119** **MOISTURE SUSCEPTIBILITY OF HMA MIXES: IDENTIFICATION OF PROBLEM AND RECOMMENDED SOLUTIONS** (3/01). Stripping of Hot Mix Asphalt pavements appears to have recently become a major problem, and more and more states are specifying the use of antistripping agents. This publication describes the external factors and/or in-place properties of HMA pavements that can induce premature stripping. Suggestions for alleviating problems associated with these factors are also given. 24 pp. (\$10.00)
- QIP-120** **CONTROL OF BAGHOUSE FINES** (6/93). Baghouse fines are the very small aggregate particles that become airborne during the drying process and are collected in fabric "dust" filters. This report examines various systems for collecting baghouse fines and for returning them to the HMA production process. Equipment maintenance guidelines are discussed. 20 pp. (\$10.00)
- QIS-121** **LONGITUDINAL JOINTS: PROBLEMS AND SOLUTIONS** (1/98). Few areas of Hot Mix Asphalt construction have spurred as much consternation as longitudinal joints. As a critical element in the durability and longevity of a HMA pavement, longitudinal joint construction requires care and proper technique. This publication identifies a variety of techniques that have been successfully used to construct good longitudinal joints. Future needs are also discussed. 12 pp. (\$10.00)
- QIS-122** **DESIGNING AND CONSTRUCTING SMA MIXTURES – STATE-OF-THE-PRACTICE** (3/02). Stone Matrix Asphalt (SMA) is a tough, stable, rut-resistant mixture. The SMA design concept relies on The recommendations for mix design, plant production, paving compaction, and quality assurance discussed in this report should provide the guidance necessary to maximize the potential for SMA and minimize production problems. 47 pp. (\$30.00)
- QIS-123** **DESIGN, CONSTRUCTION AND PERFORMANCE OF HEAVY DUTY MIXES** (5/02). This new publication consolidates and updates other NAPA publications dealing with large stone and heavy-duty mixes. These mixes are needed in any pavement structure that is subjected to heavy vehicle traffic, such as urban interstates, airports, container facilities and logging yards. This publication is a valuable reference for pavement designers and specifiers, plant foremen and operators, and paving crews. 40 pp. (\$25.00)
- NEW**
QIS-124 **DESIGNING HMA MIXTURES WITH HIGH RAP CONTENT – A PRACTICAL GUIDE** (3/07). The newest NAPA publication on RAP and recycling is a joint publication of NAPA, AASHTO, and FHWA. Recycling asphalt pavement into HMA saves precious natural resources and reduces the cost of pavement for the travelling public. This publication provides practical guidelines for HMA mixtures with at least 25 percent RAP, including materials evaluation, mix design, plant verification, and quality control necessary to produce a quality pavement. 35 pp. (\$40.00)

PROMOTIONAL SERIES

- PS-17 ASPHALT FOR ENVIRONMENTAL LINERS** Hot Mix Asphalt makes an ideal liner for sanitary landfills, hazardous waste disposal sites, reservoirs, sewage lagoons and other applications requiring an impenetrable barrier where containment is necessary. A number of such installations and applications are described. 6 pp. (\$10.00)
- PS-18 ASPHALT PAVEMENT FOR ATHLETICS AND RECREATION** (8/85). A joint NAPA-Asphalt Institute publication, illustrates the variety of uses for Hot Mix Asphalt in recreation (tennis courts, running tracks, etc.), including suggested designs. 12 pp. (\$10.00)
- PS-20 PAVEMENT LIFE CYCLE COSTING** (2/91) This publication takes a look at life cycle costing techniques used by many specifying agencies and points out their strengths and flaws. While devising a technique that takes into account the very real costs of user delays and other often overlooked variables, it makes a strong case for Hot Mix Asphalt pavements. 20 pp. (\$15.00)
- PS-22 HOT MIX ASPHALT IN RAILROAD TRACK-BEDS** (7/87). Hot Mix Asphalt trackbed installations offer many advantages: low maintenance, the spreading of load distribution, ballast confinement, waterproofing and pumping prevention. This publication describes

the many benefits of HMA, trackbed installations and reports on HMA trackbed installation projects and performance. 6 pp. (\$10.00)

- PS-23 HOT MIX ASPHALT RECYCLING** (12/88). Recycling HMA pavements as a way of effectively cutting costs and to correct common problems such as tight clearances and loss of curbs is presented. Factors determining savings on Recycled Hot Mix Asphalt are also discussed. 6 pp. (\$10.00)
- PS-24 MODERN ASPHALT PLANTS ARE DESIGNED TO OPERATE IN A PEOPLE ENVIRONMENT** (11/97). This attractive four-colour brochure is designed to be an aid in locating HMA manufacturing facilities. It explains various Industry terms and gives a "tour" of a modern HMA facility. Includes answers to typical questions that neighbourhood and community leaders often ask. 8 pp. (\$10.00)
- PS-25 BREAK, RATTLE AND ROLL** (7/94). Promotes the use of Hot Mix Asphalt overlays placed on distressed Portland Cement Concrete pavements (PCC). Written for the nontechnical decision maker, this brochure reviews a nationwide study of PCC pavement preparation methods for HMA overlay conducted by PCS/Law Engineering for NAPA and the State Asphalt Pavement Associations. Technical references for engineers are included. 6 pp. (N/C)

SPECIAL REPORTS

- SR-165 EVALUATING THE USE OF WASTE MATERIALS IN HOT MIX ASPHALT** (11/93). Increasingly, the use of "waste" materials such as glass, rubber, etc., in asphalt paving mixtures is being advocated. However, questions need to be raised on the engineering, environmental, and economic impacts such use would have. This Report outlines in clear, simple language the concerns that need to be addressed – including performance, worker health, recyclability, and production modifications – before a decision is made to include waste materials in paving mixtures. 8 pp. (\$10.00)
- SR-166 EVALUATION OF STACK EMISSIONS FROM HMA FACILITY OPERATIONS** (12/93). The Clean Air Act imposes numerous requirements for state and local governments to control air pollution and emissions. To help HMA facility operators comply with these policies, NAPA undertook a testing program to measure and analyse stack emissions from a variety of HMA facilities using a range of fuel types. Results are summarised in this report and can, in many cases, be used in place of site-specific tests to calculate air emission inventories and evaluate major or non-major polluter status. 14 pp. (\$50.00)

- SR-180 SUPERPAVE CONSTRUCTION GUIDELINES** (2/98). As the Superpave mix design system has been implemented across the country, highway agencies and contractors have learned that Superpave mixes can require special handling. This Special Report, produced jointly by NAPA and the FHWA, points out the differences in production and construction procedures for conventional HMA and Superpave mixes. Plant production, trucking, placement, compaction, and QC/QA are discussed. These guidelines were developed at a workshop attended by a cross section of highway construction industry and state and federal agency representatives with Superpave experience. 18 pp. (\$20.00)

- SR-181 REPORT OF CUSTOMER-ORIENTED HIGHWAY CONSTRUCTION WORKSHOP** (3/98). Contractors and highway officials are being challenged by motorists to improve safety and ease congestion in work zones. This special report, developed from a NAPA and FHWA conference, presents the issues of meeting this challenge and suggests activities for improving safety, reducing delays and minimising disruption during construction and maintenance. 20pp. (N/C)

NAPA Publications

SR-187 **RECYCLING PRACTICES FOR HMA.** (9/00). This publication provides an overview of recycling in the asphalt industry, including both reclaimed asphalt pavement (RAP) and the use of materials from other industries. Topics such as comparisons between virgin and recycled asphalt; recycling foundry sand; and crumb-rubber and roofing shingles in Hot Mix Asphalt, and using reclaimed asphalt pavement in Superpave mixtures, are covered. 32 pp. (\$25.00)

NEW
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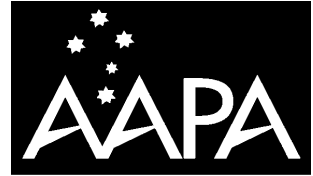
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