



Palm Beach County recently shared with us their newly revised *Streetscape Standards*—a document that provides uniform, minimum standards for the design, installation and maintenance of roadway landscape. It covers criteria for county and state roads, safe site distance, planting standards, plant types, cost estimates for planting and maintenance guidelines.

To borrow them, check *Streetscape* on the FAXBACK form on page 19.

In the last issue, we asked if anyone had any experience using Geofibers or a similar product. We also asked the same question of the other LTAP/T² Centers across the country and received the following replies:

From South Carolina—Our LTAP Center held a workshop titled “Geotextiles in Soil Pavements.” It was taught by Mr. Joel Sprague of Sprague and Sprague Consultants out of Greenville. His phone number is (864) 299-5393, and he should be able to offer assistance. The class handout materials are available, and we’ll be glad to share them with you. If you’d like a copy of the handouts, please check *Geotextiles* on the FAXBACK form on page 19.

From Nebraska—Our Center documented (video) a stabilization project in Platte County using a geo-fabric a few years ago. We’re doing a follow up on the project and will let you know how it turns out. Our contact person for the project was Alan Berry from Amoco Fabrics. He can be reached at (800) 445-7732. Hope that helps.

If you have a problem or question you’d like to have the opinion of others, please fax it to Nina at (352) 392-3224.

Off the Beaten Path

Try the Trench Safety Tutorial

Excavation cave-ins are a major source of fatalities in the construction industry and account for nearly one percent of all work related deaths in the United States.

Auburn University’s *Trench Safety* tutorial is a ten-lesson tutorial based on the latest OSHA requirements for construction excavation safety. The mechanics of trench cave-ins, the potential hazards to workers, the OSHA requirements on excavation safety and protective systems used to avoid trench cave-ins and protect workers from harm will also be explained.

Each lesson begins with specific learning objectives and ends with a set of review questions. Depending on your level of interest and preparation, it takes around three hours to complete. The cost is \$95.

For more information, a sample tutorial or to register on line, check out the web site at:

<http://www.bsc.auburn.edu/research/trench> or call Michael Hein at (334) 844-5380.



Having Trouble with your GPS?

The U.S. Department of Transportation recently issued a warning that users of the Global Positioning System (GPS) should contact the manufacturers of their receivers before Aug. 19 to determine if their systems could malfunction beginning on that date due to conditions related to “End-of-Week” (EOW) rollover. The GPS EOW rollover occurs every 1,024 weeks—about once every 20 years. The GPS system calculates time by counting the number of weeks since Jan. 6, 1980—up to a maximum of 1,024 weeks. At midnight between Aug. 21-22, 1999 Universal Time Coordinated (UTC)—8:00

p.m. Eastern Daylight Time—the GPS week “counter” will roll over to zero weeks. The Department of Defense (DOD), which operates the GPS satellites, says this will not create problems for the GPS satellites or DOD’s GPS ground control center, but it could present a problem for consumers who use GPS receivers and related applications. That’s because after Aug. 21, 1999, receivers that are not built to standards could process satellite data incorrectly and display inaccurate information.



TO: FLORIDA T² CENTER **FAX NO:** (352) 392-3224 **DATE:** _____
FROM: **NAME:** _____
ORGANIZATION: _____
ADDRESS: _____
CITY, STATE, ZIP: _____ **COUNTY:** _____
VOICE PHONE: _____
FAX NO: _____
E-MAIL ADDRESS: _____
 _____ Add/Correct mailing list with above information

T²VAN PROGRAM - on site - "FREE" Training _____ Call to Schedule Training

PUBLICATIONS and VIDEOS from the T² Media Center...

Just check the item(s) you wish to borrow on pages 14 and 15, fill out the information above and fax all pages to us. *It's that easy!*

_____ **ADD ME to the "Timely Workshop" Fax List**

T² workshops are added all during the year. For workshop information—between newsletter issues—check here and we'll notify you immediately.

ITEMS Mentioned in this Newsletter:

Subject	Mail Copy	Fax Copy
Orange County Alternative Surface Program Handouts (PDP)		
FACERS Award Nomination Form		
T ² Publication and/or Video Catalog -- circle one or both		
Math Course -- contact me		
Pavement Management Conference -- August 2001		
Palm Beach County's Streetscape Standards		
Geotextiles		

FAXBACK Quick Service Form

Florida Technology Transfer Quarterly is published by the Florida Transportation Technology (T²) Center at the University of Florida to facilitate the exchange of information in the areas of roads, bridges, general transportation and safety to all interested parties. Programs include the Local Technical Assistance Program (LTAP), the Florida Transportation Safety Training Assistance Program (FTSTP), the Rural Transit Assistance Program (RTAP) and the Florida Child Passenger Safety Program. Programs are sponsored through partnerships between the Florida Department of Transportation and the Federal Highway Administration. Public employees may receive this publication at no cost by completing and returning the FAXBACK form on page 19.

T² Hotline: (352) 392-2371

- Workshops ext. 223
- Customer Service ext. 245 or 227**
- Pilot/Escort Program ext. 225
- Traffic Safety Classes ext. 225
- Math Refresher/Self Study ext. 243
- Media Center ext. 237
- CTSTs ext. 231
- RTAP ext. 226
- APWA Videoconferences ext. 245
- Transportation Industrial Alliance ext. 245
- Child Passenger Safety Program ext. 299 or 300

SUNCOM: 622-2371

FAX: (352) 392-3224

Messages: (800) 226-1013

Email: t2@ce.ufl.edu

WWW: <http://www-t2.ce.ufl.edu>

The content and accuracy of this newsletter is the exclusive responsibility of the Florida Transportation Technology Transfer Center.

FLORIDA T² CENTER WORKSHOPS FOR FALL...

Highway Capacity Analysis

October 11-12

October 21-22

Fort Myers, FL

Orlando, FL

Environmental Impacts of Highway Construction and Maintenance

October 26

November 16

Orlando, FL

Gainesville, FL

Erosion Control/Stormwater Management

October 27

November 17

Orlando, FL

Gainesville, FL



Please see the newsletter inserts for more details and the course registration forms.

For more information, please call

Workshop Coordinator Chris Wilson at

(352) 392-2371, ext. 223 or

E-mail: chris@ce.ufl.edu

Florida Transportation Technology Transfer (T²) Center
 University of Florida
 512 Weil Hall
 PO Box 116585
 Gainesville FL 32611-6585

Non-profit Organization
 U.S. Postage Paid
 Permit Number 18
 Manasota FL

District Notes & News



Established 1923

Spring 2005

SUPERVISORS

Thomas H. Powell

President

Tom Rice

Vice-President

David Beane

Robert Berman

Michael Danchuk

STAFF

Gale English

General Manager

Michael Dillon

Operations Superintendent

Greta Rayman

Office Administrator

DISTRICT OFFICE

15600 Jupiter Farms Road

Jupiter, FL 33478

(561) 747-0550

www.sirwcd.org

sirwcd@sirwcd.org

Office Hours:

8:00 a.m. - 4:30 p.m.

Monday-Friday

*The Board of Supervisors meets
the third Thursday of each
month at the Jupiter High
School Media Center
at 7:30 p.m.
Contact the District Office
for an agenda.*

RIBBON CUTTING CEREMONY FOR JUPITER FARMS WATER QUALITY IMPROVEMENT PROJECT

The South Indian River Water Control District (SIRWCD), in conjunction with the South Florida Water Management District (SFWMD) and the Loxahatchee River Preservation Initiative, held a ribbon cutting ceremony Thursday, March 3 at a new water control structure south of Indiantown Road in Jupiter Farms.

SIRWCD's Board of Supervisors, Tom Powell, Tom Rice, David Beane, Bob Berman, and Michael Danchuk, District general manager Gale English, as well as David Brown, chairman of the Loxahatchee River Preservation Society and Patricia Walker, Lead Planner, Coastal Ecosystems Division, SFWMD, welcomed over 50 invited guests to the event and barbeque luncheon.



Lennart Lindahl, Tom Powell and David Logan

In addition, Tom Powell and Lennart Lindahl, District Engineer, presented a plaque to David Logan of Murray Logan Construction, Inc. in appreciation for their work as contractor for the project.

The project, known as the Ninth Plan of Improvements, provided for the construction, operation and maintenance of five water control structures within SIRWCD canals. These new structures affect 45 miles of the canal system and are intended to improve groundwater recharge and reduce over-drainage during dry



Left to right: Tom Rice, David Beane, Patricia Walker, Tom Powell, Michael Danchuk, Bob Berman and Lennart Lindahl

periods, as well as improve the quality of runoff eventually discharged into the Northwest Fork of the Loxahatchee River. The plan also includes a nonstructural component that establishes a definitive protocol between South Florida Water Management District (SFWMD) and SIRWCD for the operation of SFWMD structure G-92 for the purposes of improved flood control for SIRWCD and the delivery of freshwater flows to the Northwest Fork of the Loxahatchee River.

The \$1.6 million cost of the project is being paid for through grants from SFWMD, the Loxahatchee River Preservation Initiative, and SIRWCD.

SIRWCD serves Jupiter Farms, Palm Beach Country Estates, Egret Landing and Jupiter Commerce Park in northern Palm Beach County.



Water Control Structure

2005 Landowner-Initiated Roadway Improvement Project

In 2004, the District's Board of Supervisors instituted a new procedure for bundling landowner roadway improvement initiatives to streamline program implementation, thereby saving time and reducing costs.

As of the March 17 meeting, the District had received 16 new landowner-initiated petitions meeting the minimum requirement of 25% of affected landowners in each project area. One petition was removed from that list. The petitions are for the application of open-graded emulsified mix (OGEM) on the following roads in Jupiter Farms and Palm Beach Country Estates:

150th Court N. from 133rd Terrace N. to West Perimeter Canal
189th Court N. from Old Indiantown Road to Canal 10
110th Avenue from Sandy Run to 150th Court N.
153rd Court N. from 110th Avenue N. to 115th Avenue N.
111th Terrace from 150th Court N. to 154th Road N.
175th Road N. from Jupiter Farms Road to the west (approx. 1200 ft)
93rd Lane N. from 150th Court N. to 154th Road N.
71st Drive N. from 155th Place N. to Canal C
150th Place N. from 69th Drive N. to 69th Trail N.
151st Court N. from 69th Drive N. to 69th Trail N.
152nd Drive N. from 69th Drive N. to 69th Trail N.
153rd Court N. from 69th Drive N. to 69th Trail N.
154th Court N. from 69th Drive N. to 69th Trail N.
69th Trail N. from 154th Court N. to 150th Place N.
84th Avenue N. from 155th Place N. to 159th Court N.

An additional 16 petitions meeting the 25% minimum requirement have been received as of May 2. These petitions, as well as any additional petitions received, will be presented to the Board at the next meeting.

159th Court N. from Mellen Lane to 129th Place N.
169th Court N. from Alexander Run to Mellen Lane
158th Street N. from 133rd Terrace N. to West Perimeter Canal
150th Court N. from 125th Avenue N. to 128th Terrace N.
153rd Road N. from West Perimeter Canal to 133rd Terrace N.
153rd Road N. from 133rd Terrace N. to Canal 13
126th Terrace N. from 164th Court N. to Randolph Siding
126th Terrace N. from 165th Road N. to 169th Court N.
93rd Lane N. from 159th Terrace N. to Sandy Run
154th Place N. from 133rd Terrace N. to West Perimeter Canal
128th Trail N. from 170th Court N. to 174th Court N.
165th Road N. from Alexander Run to Haynie Lane
123rd Terrace N. from 165th Road N. to 169th Court N.
165th Road N. from Alexander Run to Mellen Lane
165th Street N. from 75th Avenue N. to 79th Terrace N.
88th Trail N. from 155th Place N. to 159th Court N.

This project is entitled the 2005 Landowner-Initiated Roadway Improvement Project. The Board has set a cut-off date of June 16 for this package of improvements. Any group of landowners who are considering having their road upgraded this year must have completed the petition process by June 16. Any requests for improvements received after June 16 will be considered in the next improvement package. After the improvement package cut-off date, District staff will develop cost estimates and define benefited areas. If the Board accepts the District Engineer's plans for the proposed improvements, such improvements will be presented to the affected landowners for a vote in the form of a referendum for each petitioned roadway. If a referendum passes, the District may then levy a special assessment against the benefited landowners.

Under the District's Special Act and Chapter 298 of the Florida Statutes, improvement projects such as roadway upgrades, are initiated by District landowners through written petitions presented to the District office or to the Board of Supervisors at a monthly Board meeting. Currently, three types of roads are available in the District - dirt roads, which are maintained on a regular basis by the District, county standard asphalt roadways, and OGEM surface stabilization (approximately half the cost of a county standard roadway). County standard roads and OGEM surfacing are considered upgrades and are available through petition by residents.

Florida Stormwater Education Corner

Protecting Florida's Water

In a previous issue, we discussed non-point source (NPS) pollution (commonly referred to as stormwater runoff) and its impact on water quality. Reducing runoff is a mandate by the Environmental Protection Agency (EPA). By making changes in and around your home, you can help reduce stormwater runoff problems, as well as improve groundwater quality.

Reduce impervious surfaces at home and increase the vegetated land cover of your property. Reduce rooftop runoff by directing downspouts to vegetated areas. Use permeable paving materials for driveways or patios to allow water to filter into the ground. Native plants should be planted and/or preserved to minimize runoff and retain rainwater on site. Lawns, which require a lot of water, mowing, and maintenance, should be kept to a minimum.

Cut down on fertilizers, pesticides, and herbicides. Use these chemicals sparingly and consider using organic fertilizers. Don't fertilize just before rainstorms, and compost or mulch lawn clippings.

Maintain your septic systems. Septic systems require regular maintenance, inspection, and pumping, or they will fail, resulting in costly repairs and potential pollution of ground and surface waters.

Water your landscape efficiently. If you use an automatic sprinkler system, set timers to water early in the morning to maximize infiltration and minimize evaporation. Over-watering will only cause the excess water to run off. Do not use sprinkler systems after significant rainfall. Visit www.sfwmd.gov for more tips and information.



GETTING TO KNOW YOUR BOARD OF SUPERVISORS



David Beane

David Beane has been a member of the Board of Supervisors since 1988, serving as vice-president for a number of years. He has been a resident of Jupiter Farms since 1979.

Mr. Beane grew up in Pennsylvania, moving to Palm Beach County in 1960 after graduation from Penn State University with a degree in mechanical engineering. He has been married for 39 years to his high-school sweetheart and has two grown children and two grandchildren.

Mr. Beane worked at Pratt & Whitney in West Palm Beach for his entire career. He started as a design engineer and worked on the team which developed the J58 engine that powers the record breaking SR71 "Blackbird" aircraft. Mr. Beane contributed to the design of most of Pratt & Whitney's military aircraft engines through the 60s and 70s and holds five patents for various engine design features. He founded and managed an engineering organization that develops designs and maintenance procedures for U.S. and foreign government customers to use in reducing the cost of ownership and enhancing operational readiness of P&W powered military aircraft. Mr. Beane retired in 1997 after 37 years of service.

He has been active in several civic and professional organizations over the years.



Bob Berman

Bob Berman has been a SIRWCD supervisor since early 1999. A resident of Palm Beach County since 1963, he has been involved with every issue in the District for 26 years, including

legislative, road and drainage construction, and political issues.

In the District, Mr. Berman was the co-developer of Egret Landing. Various companies owned by Mr. Berman include Berman Home Builders, Inc., Jupiter Farms Realty, Inc., Egret Landing Realty, Inc. and Berman Realty. He has been involved in over 5,000 real estate transactions in the District. In addition, he has started, owned, and operated companies in the fields of home construction, insurance, mortgage brokerage, equipment leasing, title company, flight training, and aircraft sales.

Mr. Berman has served on the board of directors of many organizations, highlighted by his election as president of the Northern Palm Beach County Board of Realtors. He is a graduate of Miami-Dade Junior College and Embry-Riddle Aeronautical University.



Michael Danchuk

Michael Danchuk is the newest member of the South Indian River Water Control District Board of Directors and was elected to the Board in October 2001. He was re-elected in October 2004. He is a strong supporter of allowing property owners to decide their future as long as it does not have a negative effect on neighbors and the environment.

Mr. Danchuk has been a landowner in the District since 1984 and lives in Palm Beach Country Estates. He has been president of the Donald Ross Landowners Association in Palm Beach Country Estates, a position he has held for over 10 years.

He was one of the founding members of the Coalition of Northwestern Communities, which was instrumental in saving the Loxahatchee Slough and having the FAU campus located in the current Abacoa development. He was a member of the Palm Beach County Planning Forum, the Jupiter Farms/Palm Beach Country Estates Wetlands Task Force, and was appointed to the Solid Waste Authority Advisory Board that was able to find a location for the north area transfer station. Currently he is a member of the Northern Educational Coalition which he helped create in 2002.

Mr. Danchuk has been married to Nicole for over 22 years. They have one daughter who is studying to be an environmental engineer. He has been in the marine industry for over 10 years and holds a trailer patent. He graduated from Rutgers College in 1975 with a degree in economics. A former insurance executive, he now also works as an administrator for a local law firm.



Tom Powell

Tom Powell has served as a supervisor since 1981. He has been a strong advocate of using the District's resources for permanent community improvements. Several major road paving programs and drainage system improvement programs have been completed by the District during his tenure.

Mr. Powell graduated from Ohio State University with a degree in aeronautical engineering in 1964 and moved to Palm Beach County in 1966 where he has lived with his wife and two children. Mr. Powell worked for McDonnell Aircraft Corporation as a test engineer on the Gemini spacecraft program in mid-60s. He worked for Pratt & Whitney in West Palm Beach for 33 years. Before retiring in 1999, he was responsible for managing the advanced technology

programs for the U.S. Government and international customers.

Mr. Powell has been a member of numerous professional and technical societies and has served on numerous special panels and technical committees. Mr. Powell and his wife attend St. Paul church.



Tom Rice, Sr.

Tom Rice, Sr. has been a SIRWCD supervisor since 1989. Mr. Rice served on the Palm Beach County Code Enforcement Board for 10 years, including several years as chairman.

Mr. Rice has been a resident of Florida and has had his real estate license since 1980. After two years, he received his Broker's license and formed Best of Florida Realty (www.bestflrealty.com), which primarily provides residential sales and property management as well as some commercial real estate services.

Intracoastal Management Services, which provides property management and financial services for condominium and property owners' associations, was established by Mr. Rice in 2001.

He was selected as one of the original trustees in the formation of Preferred Government Insurance Trust of Florida (PGIT). This trust provides workers compensation and other insurance coverage to government entities, such as SIRWCD. In five years, PGIT has become one of the top five providers in the nation to offer these services.

Mr. Rice has served as president of the Regional Multiple Listing Service and the Northern Palm Beach County Board of Realtors. He was selected as Realtor of the Year in 1990. He is a graduate of the Realtors Institute (GRI) and holds a Florida Community Association Manager's License (LCAM). He attended American University in Washington, D.C.

Prior to moving to Florida, Mr. Rice owned and managed WSCR Radio in Scranton, PA, following years of broadcast management in Maryland and Washington D.C. In Washington, he worked for NBC as an assistant TV director on many network news and special events programs and for WRC-TV. He also worked in the NBC Government Affairs Division.

Mr. Rice has been active in civic and professional organizations and is the recipient of many awards for his outstanding service and contributions.

David Beane - beane@sirwcd.org

Bob Berman - berman@sirwcd.org

Michael Danchuk - danchuk@sirwcd.org

Tom Powell - powell@sirwcd.org

Tom Rice - rice@sirwcd.org



15600 Jupiter Farms Road
Jupiter, FL 33478

PRSR STD
U S POSTAGE
PAID
WEST PALM BCH FL
PERMIT # 611

2005 Landowner-Initiated Roadway Improvement Project

Cut-off date for
roadway improvement
petitions is June 16

Visit www.sirwcd.org
for news updates!

SIRWCD Receives Grants from NRCS

SIRWCD has received a grant from the National Resource Conservation Service (NRCS) for repair and restoration work on hurricane damaged systems in the amount of \$1 million, of which 25% is a matching share and the balance of \$750,000 is additional income. As a result, the Board approved a budget amendment adding \$750,000 to West Side Water Control - Intergovernmental Income and \$750,000 to West Side Water Control - Sub Contract Canal Cleaning.

Two additional applications to NRCS for further funding assistance have recently been approved. One application was for \$400,000 to harden the 706 outfall canal banks, and the other was for \$100,000 to perform in-house drainage facilities restoration activities.

In a related matter, the Board approved special gain share bonuses for District Manager Gale English, Operations Superintendent Michael Dillion, and Office Manager Greta Raymond for their initiative and diligence in the aftermath of last year's hurricanes and their efforts in securing the grants from the NRCS, which has greatly benefited the District.

Ribbon Cutting for Palm Beach Country Estates Road Improvement Project



From left to right: District Manager Gale English and SIRWCD Supervisors Tom Rice, Tom Powell, Michael Danchuk and Bob Berman at a ribbon cutting ceremony marking the completion of construction of the county-standard asphalt roadways in Section 22 of Palm Beach Country Estates.

Open-Graded Emulsion Mixes (OGEM)

Introduction

OGEMS are prepared from medium-setting emulsions containing sufficient solvent to give deferred-set characteristics. Applications include base and surface courses on low volume roadways, patching, reinstatement, re-profiling and repair of shoulders. Depending on the choice of solvent in the medium-setting emulsions, the mixes may be laid immediately in mix-paving operations, laid a few hours after production or be stockpiled for weeks or months.

Design of Roads based on OGEM

Experience in Scandinavia and North Western USA shows that OGEMs are flexible materials with slightly lower stiffness than an equivalent thickness of hot mix but which tolerate greater deflections and which give good resistance to cracking due to fatigue, reflection or thermal stresses. The conclusion is that a structural layer equivalency 0.85-1.0 times that for hot-laid asphalt concrete can be assumed in design calculations. Layer coefficients (a_1) values 0.4-0.6 have been back-calculated from condition surveys, compared to 0.35-0.44 for dense-graded hot mix.

Aggregate Gradation and Asphalt Content

A wide variety of gradations has been successfully used with open-graded emulsion mixes, with top sizes up to 75 mm (3"). Fines less than 75 micron are usually limited to 2% maximum and the sand equivalency (measure of clay content) should be preferably above 65. Air voids after compaction range from 15% for thin surfacings to 20-30% for base materials and thicker surface layers. Semi-dense mixes can be used with similar emulsion recipes and laying techniques provided the aggregate does not contain reactive fines. Semi-dense mixes are easier to seal than open-graded.

Typically mixtures of washed crusher dust and chippings or other washed materials (including sand) can be used. Crushed aggregates give the best interlock. AEMA recommends that the coarse aggregate should show Los Angeles abrasion values of <50% for base courses and <40% for surface courses, and also that 75% of the aggregate should have two or more fractured faces and >90% one or more.

The asphalt contents in the table are for guidance only. The main object in the mix design is to include as much asphalt as possible without run-off.

Design of Open-Graded Mixes

Laboratory structural tests such as Marshall stability generally underestimate the performance of OGEMs. The design process is directed at finding the maximum film thickness of asphalt that can be achieved without run-off and ensuring good coating and water resistance.

Open-Graded Emulsion Mixes

Typical Recipes For Open-Graded Emulsion Mixes

Sieve Size mm	Base	20 mm Wearing Course	10 mm Wearing Course	Semi-Dense Wearing Course
38.1	100			
25.4	95-100	100		
19.0	--	90 - 100		90-100
12.7	25-60	--	100	75-95
9.5	--	20 - 55	85-100	60-80
4.75	0-10	0 - 10	--	40-60
2.36	0-5	0 - 5	0-10	25-45
1.18	--	--	0-5	14-30
0.60	--	--	--	8-18
0.30	--	--	--	5-10
0.15	--	--	--	3-8
0.075	0-2	0-2	0-2	2-5
Binder	2.7-4.0	3.8-4.8	3.6-4.8	3.8-4.6

The Centrifuge Kerosene Equivalent with SAE 10 oil (Kc) or a calculation based on aggregate grading can be used if necessary to give a starting point for the asphalt content.

$$\text{Emulsion level} = (Kc \times 1.5) + 3.5$$

Hand-mix tests using different asphalt emulsion formulas and different pre-wet water contents allow a recipe which gives good coating (close to 100% preferred for OGEMs) to be identified, and any unduly stiff mixes to be eliminated. To avoid excess drainage of emulsion, the water content should not exceed saturated-surface-dry (SSD).

The level of asphalt is increased until the drainage of emulsion from the uncompacted mix (e.g. as measured by the Chevron test) exceeds 0.5%. A higher drainage may be acceptable in mix-paving operations since the drained asphalt will help seal the underlying layer.

Some specifications demand early resistance to rain. In this case a wash-off test is required as soon as 15 minutes after compaction or after 24 hours curing. Less than 0.5% asphalt should wash off when 200 ml water is poured through a compacted specimen in a 4" mold.

A boiling-stripping test is used for a test of compatibility between emulsion and aggregate. 100 g of uncompacted mix is fully cured in an oven at 60°C (140°F) overnight, then placed in 400 ml vigorously-boiling water for 3 minutes, before re-estimating coverage. It should be >85%. An antistripping agent may be incorporated in the emulsion to help adhesion.

All information concerning this product and/or suggestions for handling and use contained herein are offered in good faith and are believed to be reliable. Akzo Nobel Chemicals Inc., however, makes no warranty as to the accuracy and/or sufficiency of such information and/or suggestions, as to the product's merchantability or fitness for any particular purpose, or that any suggested use will not infringe any patent. Nothing contained herein shall be construed as granting or extending any license under any patent. Buyer must determine for himself, by preliminary tests or otherwise, the suitability of this product for his purposes. The information contained herein supersedes all previously issued bulletins on the subject matter covered.

Open-Graded Emulsion Mixes

Emulsion Recipes

Typical emulsions meet specifications for cationic medium-set emulsions. Slower-setting emulsions based on Redicote E-250 are suitable for semi-dense mixes and allow some reduction in solvent content, when a long stockpile life is not required.

Asphalt	65 minimum	65 minimum	65 minimum
Solvent	10-15	5-15	5-15
Redicote E-4819	0.35-0.8	0.3-0.5	--
Redicote E-5	--	0.3-0.5	--
Redicote E-250	--	--	0.6-1.2
HCl (33%)	0.25-0.4	0.25-0.35	0.02
CaCl ₂	0.1	--	--
Water phase pH	2.0-4.0	2.5-4.0	5-7
Water	To 100	To 100	To 100

The viscosity grade of the base asphalt should be chosen to suit the local climate. Typically 70/90 or 80/100 penetration grades (AC-20 or AC-5) are used, but the binder will remain softer until all the solvent has evaporated, which may take years. Studies in Northwest U.S.A. have shown that residual binders on the roadway softer than AC-20 give more durable surfaces.

The solvent in the emulsion provides extended workability and the ability to stockpile. It can be added to the binder or water phase or to the hot emulsion as it exits the colloid mill. More volatile solvents give shorter stockpile life but faster cure. The choice of solvent depends on the local climatic conditions and the required stockpile life. A heavy flux may be used in cold regions to provide a permanently soft binder (approximately 5000-10,000 cSt at 60°C) which gives a flexible road resistant to frost heave damage.

Manufacturing the Mix

Simple mixers like concrete mixers or pug mills are suitable. It is even possible to hand-mix small quantities or to use a front-end loader on small stockpiles. Central mix plants equipped with two or more bins for different size fractions are preferred for consistent quality. Mobile mix pavers are also suitable.

Very dry aggregate should be pre-wetted to approximately 1% moisture before adding emulsion but excess water should be avoided because it is the primary cause of emulsion run-off. The mix should leave the mixer still dark-brown but virtually fully-coated, although a few uncoated larger particles are acceptable.

All information concerning this product and/or suggestions for handling and use contained herein are offered in good faith and are believed to be reliable. Akzo Nobel Chemicals Inc., however, makes no warranty as to the accuracy and/or sufficiency of such information and/or suggestions, as to the product's merchantability or fitness for any particular purpose, or that any suggested use will not infringe any patent. Nothing contained herein shall be construed as granting or extending any license under any patent. Buyer must determine for himself, by preliminary tests or otherwise, the suitability of this product for his purposes. The information contained herein supersedes all previously issued bulletins on the subject matter covered.

Open-Graded Emulsion Mixes

Water will run off the stockpile as the emulsion breaks. Some emulsion run-off is acceptable but it should be light-brown. The mix should be stockpiled for a few hours or days (depending on the cutter) before use. For extended storage life the stockpile should be covered.

Laying the Mixtures

The mixtures can be laid by hand, with a paver or with a grader depending on application. Underlying bituminous surfaces should normally be tack-coated; unbound materials should be prime-coated.

Compaction can be by plate compactor or any type of roller used for hot mixes but steel rollers stick less. The roller needs to be wetted to prevent sticking. Vibration is not usually advised. Some wash-off of emulsion may occur in heavy rain but usually this is not severe. The surface of each layer of the mixture is preferably spread evenly with coarse sand ("hokestone") at 3-6 kg/m² and compacted (trafficking may be sufficient). This especially helps to tighten the surface if a seal coat is planned.

The finished job can be sealed if necessary after about 6 months when most of the solvent has evaporated, but OGEMs can give good performance as wearing courses without sealing. If the surface is not to be sealed then the underlying surface below the OGEM must be sealed by a tack coat or prime coat.

References

1. *Open Graded Mixes Using Asphalt Emulsions* Recommended Performance Guidelines 2nd edition published by AEMA, pp65-69.
2. *Mix Design Method for Open-Graded Travel Plant Mixes*, Prittiri S. Kandhal, H. Richard Barro, 15th Annual Meeting of AEMA, Maui, Hawaii 1988.
3. *Performance of Open Graded Emulsion Mixtures*, Antony J. Kreich and Fred M. Fehsenfeld, 15th Annual Meeting of AEMA, Maui, Hawaii 1988.
4. *Open-Graded Emulsion Mixtures: 25 Years of Experience*, Gary Hicks, 21st Annual Meeting of AEMA, Hollywood, Florida 1994.
5. *Open-Graded Asphalt Emulsion Mixes*, John E Huffman, 23rd Annual Meeting of AEMA, Phoenix, Arizona 1996.
6. *Controlling Emulsion Run-off in Open-Graded Cold mixes*, Gerald Fitzpatrick and Richard Pemberton, 20th Annual Meeting of AEMA, Napa, California, 1993.

All information concerning this product and/or suggestions for handling and use contained herein are offered in good faith and are believed to be reliable. Akzo Nobel Chemicals Inc., however, makes no warranty as to the accuracy and/or sufficiency of such information and/or suggestions, as to the product's merchantability or fitness for any particular purpose, or that any suggested use will not infringe any patent. Nothing contained herein shall be construed as granting or extending any license under any patent. Buyer must determine for himself, by preliminary tests or otherwise, the suitability of this product for his purposes. The information contained herein supersedes all previously issued bulletins on the subject matter covered.



ERDMAN

ANTHONY

