

FOCUS

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A New Focus on Pavements

Working with States and other partners to deliver a national pavement network that is safe, long lasting, cost effective, environmentally sensitive, and effectively maintained remains the goal of the Federal Highway Administration's (FHWA) pavement and materials program. In order to deliver a more strategically effective program, all of the offices responsible for pavements across FHWA are coordinating their efforts within six focus areas. "These focus areas will drive our entire pavements and materials program," says Peter Stephanos, Director of FHWA's Office of Pavement Technology. The six focus areas are:

- Pavement design and analysis.
- Pavement materials and construction technology.
- Pavement management and preservation.
- Pavement surface characteristics.
- Construction and materials quality assurance.
- Environmental stewardship.

The focus areas will guide FHWA in developing and deploying the technologies that highway agencies need to build, preserve, and maintain better pavements and will maximize FHWA resources to achieve improvements in the Nation's pavement network. "States are having to do more with less. We want to work with them to introduce tools and technologies to make their job easier. We also need to strive to develop a more effective partnership with State and local agencies, industry, and academia," says Stephanos. In partnership with States,

FHWA will assess the current state of practice nationally for each focus area, recognize best practices that can be advanced, identify gaps where improved technologies or methods can be developed, and define and evaluate existing risks that need to be mitigated. This assessment will be conducted to develop strategies that FHWA will deliver over the next 3 to 5 years to achieve performance objectives for the Nation's pavement network. These strategies will consider all areas of technology advancement and program management, including research, development, implementation, technology transfer, policy, and regulatory actions. FHWA will continue to work closely with State and local highway agencies to deliver the program.

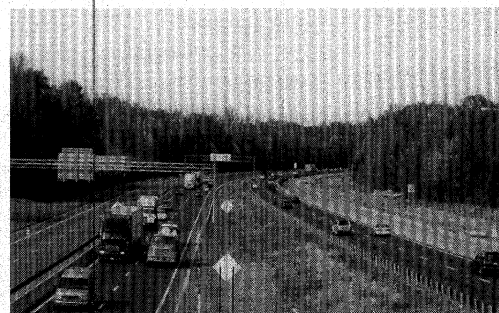
The six focus areas will guide FHWA's Research and Development efforts in conducting new and applied research, as well as FHWA's Technical Service Teams (TSTs). The TSTs work to deploy new technologies,

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www.tfhrc.gov/focus/focus.htm



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FHWA's pavement and materials program will work with States to introduce new tools and technologies for building, preserving, and maintaining better pavements.

A New Focus on Pavements,

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including providing training and other assistance in using the technologies (see sidebars). "The Research and Technology offices and the Technical Service Teams that operate through the FHWA Resource Center will continue to be great resources for States," says Stephanos.

FHWA will issue an annual performance report for the pavement and materials program, which will be shared with stakeholders outside of FHWA, including the American Association of State Highway

and Transportation Officials and the Transportation Research Board's new Committee for Pavement Technology Review and Evaluation. The report will assess the effectiveness of the program activities in achieving performance objectives and will provide an overview of the current state of each focus area.

To learn more about FHWA's pavement initiatives, visit www.fhwa.dot.gov/pavement. *

Pavement and Materials Technical Service Team

With the goal of improving mobility on the Nation's highways through national leadership, innovation, and program delivery, FHWA's Pavement and Materials Technical Service Team (TST) offers a range of services to help State and local agencies and others design and build better pavements. The team has members located across the country. "Our initiatives have included supporting implementation of the new *Mechanistic-Empirical Pavement Design Guide*," says team leader Tom Harman of FHWA. The team also participated this year in a scanning tour on warm mix asphalt technology and will be actively involved in the deployment activities for this technology.

The team's assistance to State and local agencies covers the areas of optimizing pavement performance, improving asset management, advancing quality systems, and building technical capabilities, as well as achieving safer pavement surface characteristics and practicing environmental stewardship. Recent activities have included assisting in developing life-cycle cost processes, conducting pavement preservation and quality assurance reviews, and holding training on topics ranging from pavement design to distress identification to the Percent Within Limits quality measure.

For more information on the many resources offered by the TST, visit www.fhwa.dot.gov/resourcecenter/teams/pavement/index.cfm, or contact Tom Harman at FHWA, 410-962-0134 (email: tom.harman@fhwa.dot.gov).

To learn more about FHWA's technical service teams, please see page 7.

Construction and Project Management Technical Service Team

FHWA's Construction and Project Management Technical Service Team (TST) has technical specialists located across the country to assist State and local transportation agencies and others with improving the construction management process. The team offers technical assistance, technology transfer, and training. Current initiatives include supporting the presentation of the National Highway Institute's Construction Inspection: Workmanship and Quality course, as well as implementation of life-cycle cost analysis and alternative contracting solutions. The team has also presented a workshop on FHWA's *Construction Program Management and Inspection Guide* to 46 States. In June 2007, the team participated in an FHWA Value Engineering (VE) Roundtable held in La Crosse, Wisconsin. The meeting was designed to provide a networking opportunity for States in the Midwest to share ideas and lessons learned to improve their VE programs. The roundtable also aimed to encourage progress in using VE in other parts of the country.

For more information on the many resources the team offers, contact team leader Rob Elliott at the FHWA Resource Center, 404-562-3941 (email: rob.elliott@fhwa.dot.gov), or visit www.fhwa.dot.gov/resourcecenter/teams/construction/index.cfm.

Take a Look at Two-Lift Concrete Paving

Is two-lift concrete construction coming to a pavement near you? Recommended for implementation in the United States following a May 2006 international scanning tour on long-life concrete pavements (see October 2006 *Focus*), the technique was recently highlighted in a videoconference held by Iowa State University and the Federal Highway Administration's (FHWA) Highways for LIFE (HfL) program and Office of Pavement Technology.

Drawing participants from across the country, the conference featured information on the European scanning tour, which was sponsored by FHWA, the American Association of State Highway and Transportation Officials, and the Transportation Research Board's National Cooperative Highway Research Program. "In the countries visited, 'concrete pavement' means 'long life,'" noted scanning tour participant Tom Cackler, Director of the National Concrete Pavement Technology Center at Iowa State University. Also featured at the videoconference was a presentation by Dr. Hermann Sommer, Chair of the Committee for Specifications for Concrete Pavements and Soil Stabilization in Austria. Austria has extensive experience in using two-lift technology.

Two-lift construction involves the placement of two wet-on-wet layers of

concrete, rather than the commonly used approach of using a single, homogenous layer. This innovation is designed to provide superior resistance to freeze-thaw damage, as well as noise reduction and improved skid resistance. Recycled or other more economical materials can be used as aggregate in most of the concrete slab, with the highest quality aggregate reserved for use in the pavement's thinner upper lift. Two-lift construction can also accommodate the use of an exposed aggregate surface to mitigate noise. While two-lift construction is not new to the United States, in recent years it has only been used on an experimental basis. Two-lift paving was used on the Chrysler Freeway in Detroit in the 1990s, for example.

"Two-lift construction contributes to the green highway concept," said videoconference participant Charles Goodspeed, Director of the Transportation Technology Transfer Center at the University of New Hampshire. The use of recycled materials for much of the aggregate minimizes the need for high-quality new aggregate and cuts down on landfill waste. "We're using fewer resources and minimizing the truck traffic and fuel costs required to haul new aggregate," said Goodspeed.

Austria, Belgium, the Netherlands, Germany, and the United Kingdom are all currently using two-lift paving. Austria

has 2,092 km (1,300 mi) of roadways and expressways, with 804 km (500 mi) of concrete pavements. It started using two-lift concrete paving in 1991. "We consider the long-term performance very satisfactory," said Sommer. Two mixing plants and two pavers are used, with the two pavers positioned 13 to 16 ft (4 to 5 m) apart. The top lift is placed before the bottom lift starts to dry, with up to 1/2 hour between the placement of the layers.

Best practices described by Sommer include making the top layer as thin as possible, using shallow milling to ensure a good bond with the subbase, and curing immediately after brushing to prevent cracks. "The efficiency of the curing compounds is very important," said Sommer. Austria also uses an exposed aggregate surface to reduce

pavement noise. Sommer noted that the cost of two-lift paving has not been significantly higher in Austria.

States currently looking into using two-lift paving include Kansas, Florida, and Washington. The Kansas Department of Transportation will use it on a trial pavement section this summer, while the Washington State Department of Transportation is planning a project in the Spokane area.

For more information on two-lift concrete paving, contact Suneel Vanikar at FHWA, 202-366-0120 (email: suneel.vanikar@fhwa.dot.gov). The conference minutes and presentations are available online at www.cptechcenter.org/projects/two%2Dlift%2Dpaving/.

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The use of recycled materials for much of the aggregate minimizes the need for high-quality new aggregate and cuts down on landfill waste.

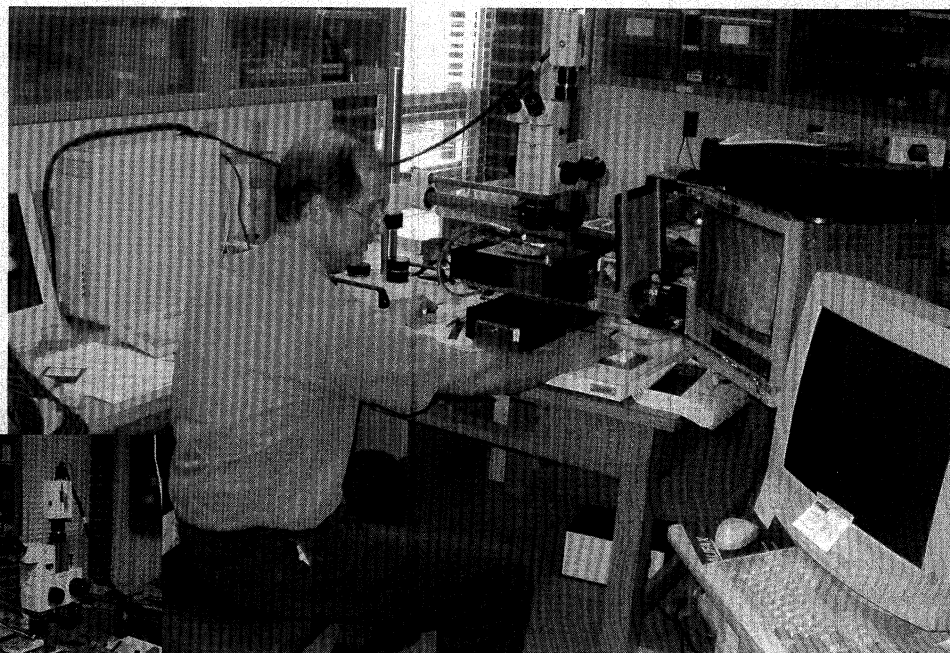
The screenshot displays the National Concrete Pavement Technology Center website. It features a sidebar with navigation links such as 'Home', 'About Us', 'Contact Us', 'Publications', 'Events', 'Resources', and 'Links'. The main content area is titled 'Resources on Two-Lift Paving Construction' and includes a list of resources, a technical documents section, and a workshop and training materials section. The workshop materials section lists a videoconference on June 27, 2007, and a workshop on June 28, 2007, both focusing on two-lift paving construction. The website also includes a logo for the Center for Transportation Technology Transfer (C3T) and a link to the FHWA website.

Visit the National Concrete Pavement Technology Center online at www.cptechcenter.org/projects/two%2Dlift%2Dpaving/ to learn more about two-lift concrete construction.

FHWA Releases Updated Petrographic Manual

The Federal Highway Administration (FHWA) has released an updated resource for transportation practitioners that provides guidance on using hydraulic cement concrete (HCC) petrography. *Petrographic Methods of Examining Hardened Concrete: A Petrographic Manual* (Pub. No. FHWA-HRT-04-150), complete with procedures, instructions, and photographs, is designed to aid practitioners who lack formal petrographic training. Petrographic analysis uses microscopic techniques to study concrete condition and quality, as well as distress, deterioration, and failure. "The manual highlights methods that have proven to be the most useful in the field and in the laboratory," says Richard Meininger of FHWA's Office of Infrastructure Research and Development.

The manual discusses the petrography of HCC, chemical reactions of rocks and minerals in HCC, and the identification of common rocks and minerals necessary for a complete description of HCC. The targeted audience includes petrographers, geologists, engineers, chemists, consultants, and university researchers. "The manual will be helpful in doing forensic work and troubleshooting problems related to concrete deterioration, as well as examining mineral aggregates or recycled aggregates," says Meininger. For example, if concrete shows cracking soon after construction, a petrographic analysis can help determine the nature of the cracking and its possible cause. Currently many of the practitioners performing concrete petrography work are geologists with formal training in optical mineralogy and petrography. Because the petrographic examination of HCC is more qualitative than quantitative, it can be difficult to train new practitioners who lack the field experience in examining HCC and identifying the various features



Left: Partially automated linear traverse equipment for determining air-void parameters.

Above: Senior Research Scientist D. Stephen Lane in the Virginia Transportation Research Council's Petrography Laboratory in Charlottesville, VA.

that may indicate the quality of the material. The manual aims to close this gap.

Developed in 1992 by petrographer Hollis N. Walker of the Virginia Transportation Research Council (VTRC), the original manual has served as an important guide to the field of concrete petrology. D. Stephen Lane, senior research scientist at the VTRC, has led the effort to update the publication to reflect recent advances in techniques and work in the field. Additions include chapters on the use of the scanning electron microscope to examine concrete and concrete-making materials and the identification and classification of rocks and minerals in aggregates. Another useful addition is a chapter on alkali-aggregate reactions, which outlines the process for investigating a case of concrete deterioration and illustrates the features that provide evidence of alkali-silica or alkali-carbonate reactions.

With the new chapter on alkali-aggregate reactions, the updated manual will

serve as a vital tool for FHWA's alkali-silica reactivity (ASR) program, which is aimed at preventing and mitigating ASR in concrete pavements and structures (see April 2007 *Focus*). "The Petrographic Manual will help achieve one of the objectives in the inventory of structures affected by ASR by confirming that the deterioration mechanism is actually ASR and not some other type of deterioration, and will also help in recognizing situations where other deterioration mechanisms may be occurring in conjunction with ASR," says Meininger. "In some cases, the question may be asked: 'Which deterioration occurred first, and was it a causal factor in subsequent deterioration?'"

The manual is available online at www.fhwa.dot.gov/pavement/pccp/pubs/04150. For more information, contact Richard Meininger at FHWA, 202-493-3191 (email: richard.meininger@fhwa.dot.gov).

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FHWA Course Offers Intensive Introduction to Highway Materials

An intensive introduction to materials, mix design procedures, and quality assurance is offered by the Federal Highway Administration's (FHWA) 2008 Highway Materials Engineering Course. Presented through FHWA's National Highway Institute, the curriculum for the 6-week course was developed by national experts in the various materials areas, under the guidance of State department of transportation materials engineers and FHWA materials specialists.

Designed for State transportation department engineers who require a basic knowledge of highway materials, the course will be held at the University of Nevada-Reno from February 4 through March 21, 2008. A 1-week break is scheduled for February 25–29, 2008. The course fee is \$6,600. Travel and other expenses for participants must also be funded by their own agencies. Applicants should have a good academic background in mathematics and science and either an undergraduate degree in engineering or equivalent engineering experience in the highway field.

The curriculum covers materials control and acceptance; soils and foundations; steels, weldings, and coatings; aggregates and unbound bases; asphalt materials and paving mixtures; and concrete. The course includes 150 hours of classroom time, 50 hours of laboratory work, reading and problem-solving assignments, and exams. "Participants will gain valuable skills, including being able to identify and describe the characteristics and engineering properties of the materials used in highways and describe the important steps and considerations in mix design procedures," says Michael Rafalowski of FHWA's Office of Pavement Technology.

Applications are due to FHWA by November 1, 2007. All applicants will be notified of their status by December 1, 2007. The selection criteria includes the strength of endorsement from an applicant's agency and an applicant's potential contribution to the agency's highway materials program, as well as highway engineering experience and academic and professional achievements. Priority will be given to employees of State, local, and Federal agencies involved in highway construction.

For more details on the course or to obtain an application, visit www.fhwa.dot.gov/pavement/materials/131023.cfm. More information is also available from Michael Rafalowski at FHWA, 202-366-1571 (email: michael.rafalowski@fhwa.dot.gov). *

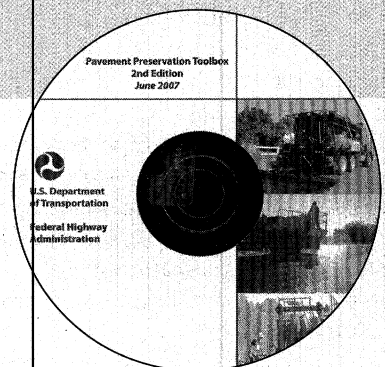
Pavement Preservation Toolbox CD: The Sequel

Now available is the second edition of the Federal Highway Administration's (FHWA) popular *Pavement Preservation Toolbox* CD. Essentially a one-stop library, the toolbox contains a wealth of information on cutting edge technologies and practices in pavement preservation. The second edition provides the same ease of accessibility, but with a greater volume of documents and resources to help State and local transportation agencies manage their highway assets.

Additions to the CD include:

- California Department of Transportation (Caltrans) *Maintenance Technical Advisory Guide*.
- FHWA's *A Quick Check of Your Highway Network Health* booklet.
- FHWA's *Federal Lands Highways Context Sensitive Roadway Surfacing Selection Guide and Photo Album*.
- Web links to the National Center for Pavement Preservation and State pavement preservation centers in California and Texas.
- Recent FHWA technical and policy memos on pavement preservation.
- National Cooperative Highway Research Program reports on pavement preservation.
- Recent pavement preservation publications from the Asphalt Emulsion Manufacturers Association, International Slurry Surfacing Association, Asphalt Recycling and Reclaiming Association, International Grooving and Grinding Association, and the American Concrete Pavement Association.

To obtain a copy of the free CD, contact your local FHWA Division office or Joe Gregory in the FHWA Office of Asset Management, 202-366-1557 (email: joseph.gregory@fhwa.dot.gov). *



Highway Technology Calendar

The following events provide opportunities to learn more about products and technologies for accelerating infrastructure innovations.

Fifty-Eighth Annual Highway Geology Symposium

October 15–18, 2007, Pocono Manor, PA

The symposium will include technical sessions on highway geology topics, including landslides, slope stabilization techniques, and ground modification programs. A day-long field trip to local sites will include the Hickory Run Boulder Field, Lehigh Gap, and the Lehigh Tunnel on the Pennsylvania Turnpike.

Contact: Kerry Petrasic at the Pennsylvania Department of Transportation, 717-787-4319 (email: kpetrasic@state.pa.us), or Justice Maswoswe at the Federal Highway Administration's (FHWA) Resource Center, 410-962-2460 (email: justice.maswoswe@fhwa.dot.gov). Information on the symposium is also available online at www.highwaygeologysymposium.org.

Precast/Prestressed Concrete Institute (PCI) National Concrete Bridge Conference

October 22–24, 2007, Phoenix, AZ

Sponsored by PCI and FHWA, the conference will provide a forum for state-of-the-art reports on concrete bridges, showcasing precast, prestressed concrete bridges in particular. The conference is aimed at State and Federal bridge designers, consultants, academics, and industry engineers.

Contact: John Dick at PCI, 312-360-3205 (email: JDick@PCI.org), or Gary Jakovich at FHWA, 202-366-4596 (email: gary.jakovich@fhwa.dot.gov). Information is available online at www.pci.org/news/bridge_conference.

Seventh National Conference on Transportation Asset Management

November 6–8, 2007, New Orleans, LA

Three thematic tracks will be featured at the conference: Integration of Maintenance and Operations into Transportation Asset Management, Putting Economics into Practice, and Transportation Asset Management in the Ports and Harbors Community. The conference is sponsored by the Transportation Research Board's (TRB) Committees on Transportation Asset Management and Transportation Economics, with support from FHWA's Office of Asset Management.

Contact: David Floyd at TRB, 202-334-2966 (email: dfloyd@nas.edu), or Francine Shaw-Whitson at FHWA, 202-366-8028 (email: francine.shaw-whitson@fhwa.dot.gov).

International Conference on Optimizing Paving Concrete Mixtures and Accelerated Concrete Pavement Construction and Rehabilitation

November 7–9, 2007, Atlanta, GA

The conference will provide an international forum to address various aspects of concrete mixture optimization and accelerated concrete pavement construction and rehabilitation that result in long life for pavements. The event is being organized as part of the technology transfer activities for FHWA's Concrete Pavement Technology Program.

Contact: Shiraz Tayabji at CTLGroup, 410-997-0400 (fax: 410-997-8480;

email: stayabji@CTLGroup.com), or Sam Tyson at FHWA, 202-366-1326 (email: sam.tyson@fhwa.dot.gov). Information and online registration are available at www.fhwa.dot.gov/pavement/concrete/2007CPTPconf.cfm.

Highway Quality Conference

November 13–14, 2007, San Diego, CA

Sponsored by the National Partnership for Highway Quality (NPHQ), the conference will share information about advanced tools and techniques, best practices, and innovations in highway quality.

Contact: Bob Templeton at NPHQ, 512-301-9899 (email: btemplenphq@aol.com), or Ken Jacoby at FHWA, 202-366-6503 (email: ken.jacoby@fhwa.dot.gov). Information is also available at www.nphq.org.

World Steel Bridge Symposium 2007

December 4–7, 2007, New Orleans, LA

The symposium will bring together design engineers, construction professionals, transportation officials, representatives from academia, and others to discuss state-of-the-art practices for enhancing steel bridge design, fabrication, and construction techniques. This event is sponsored by the National Steel Bridge Alliance and FHWA.

Contact: Elizabeth Purdy at the American Institute of Steel Construction, Inc., 312-670-5421 (email: purdy@aisc.org), or Vasant Mistry at FHWA, 202-366-4599 (email:

vasant.mistry@fhwa.dot.gov). For additional information, visit www.steelbridges.org (click on "World Steel Bridge Symposium").

TRB 87th Annual Meeting January 13-17, 2008, Washington, DC

Transportation professionals from around the world will gather at the meeting to share perspectives on current developments in transportation research, policy, and practice.

Contact: For information, visit the TRB Annual Meeting Web site at www.trb.org/meeting. Questions about the meeting can be emailed to TRBMeetings@NAS.edu.

Fourth International Conference on Bridge Maintenance, Safety, and Management July 13-17, 2008, Seoul, Korea

The conference will address such topics as bridge management systems, design and analysis, reliability and risk management, fatigue analysis, measurement and monitoring, and damage assessment. The event is being organized by the International Association for Bridge Maintenance and Safety and hosted by the Korea Bridge Design and Engineering Research Center at Seoul National University.

Contact: Ian Friedland at FHWA, 202-493-3023 (email: ian.friedland@fhwa.dot.gov), or visit www.iabmas08.org.

*

A Helping Hand

For additional infrastructure-related technical support, training, and technology assistance, contact the following FHWA Technical Service Teams:

Geotech and Hydraulics Technical Service Team

Contact: Peter Osborn, 410-962-0702 (email: peter.osborn@fhwa.dot.gov)
www.fhwa.dot.gov/resourcecenter/teams/geotech/index.cfm

Structures Technical Service Team

Contact: Shoukry Elnahal, 410-962-2362 (email: shoukry.elnahal@fhwa.dot.gov)
www.fhwa.dot.gov/resourcecenter/teams/structures/index.cfm

Safety and Design Technical Service Team

Contact: Patrick Hasson, 708-283-3595 (email: patrick.hasson@fhwa.dot.gov)
www.fhwa.dot.gov/resourcecenter/teams/safety/index.cfm

The screenshot shows the FHWA Resource Center website. The main content area is titled "FHWA Resource Center STRUCTURES TEAM". It includes a welcome message, a list of team members with their titles and contact information, and a sidebar with navigation links. The team members listed are Shoukry Elnahal (Team Leader), Melvin Harris (Program Assistant), Nani Brown (Program Assistant), and Raj Allamey (Structural Engineer). The sidebar contains links for Home, What's New, Structures Home, Structures Solutions/Best Practices, Structures Training, Structures Newsletters & Publications, Structures Media Center, Structures Calendar, Structures Links, Letters of Appreciation, POLICY, and RESEARCH.

FOCUS

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