

Crossroads

Summer 1995



TRANSPORTATION Information Center

University of Wisconsin-Madison

Vegetation management is a growing concern

"To tell you the truth, I don't think we keep up with it," says Emmer Shields, Ashland County Highway Commissioner. In his far northern county, alder quickly invade the roadsides, many of which are steep and hard to mow.

In the south, tall, fast-growing grasses and noxious weeds are the problem. "With the number of road miles and the amount of staff we have, it's virtually impossible to keep up with it," says Steve Haag, Dane County Highway Superintendent.

Most counties use the state's mowing guidelines even on the county highway system: mowing as often as necessary to open vision corners and keep the shoulder clear for 15 feet or down to the bottom of the ditch line. Brush is mowed once every three or four years and noxious weeds are treated with herbicides as necessary. The ditch back slope and right of way area are generally left unmowed except that large-growing woody plants on the clear zone may be mowed every three or four years if necessary.

"Our mowing and herbicide policies will probably change little, but we need to reconsider how we design, plant and maintain our roadsides," says Dick Stark, regional landscape architect at the WisDOT Division of Highways. He is part of a work group that is writing a new Vegetation Management Plan for the Wisconsin Department of Transportation. A first draft is expected later this year, with the final version to be in place in 1996.

In the past, responsibilities for design and maintenance rested with different groups in WisDOT. The new plan seeks to integrate these programs and to clarify how much effort should be expended to maintain specialized plantings like prairie. The group also plans to identify budget resources for maintenance, investigate new erosion control techniques, and integrate new technologies.

One project that gets underway this summer is looking at thistle control. Under a WisDOT contract UW-Madison's Agronomy Department will be experimenting with different combinations of mowing, herbi-



Keeping grass mowed and ditch slopes visible is a constant roadside maintenance challenge.

cide treatment and biological control to see what works best to control this aggressive weed.

Despite the challenges, it's important for safety to keep shoulders and vision corners clear, and it's important for drainage to keep ditch bottoms clean.

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Idea Exchange

Gravel retriever saves work, money

A new attachment for a grader with a wing plow set-up will retrieve a good windrow of gravel from ditches, according to an article in *Transearch*, a newsletter from Alberta Transportation and Utilities.

The retriever, manufactured by Shortline Fabricating of Rosebud, Alberta, (about \$8,000 (CAN) in 1992), pulls gravel out of the shoulders with few lumps and little grass, saving labor and making it quicker and easier to work.

Fall just before freeze up and spring when the shoulders have dried are good times to shape shoulders and bring back lost gravel.

For further information contact Jim Ullery, General Foreman at 403/297-6311 in Calgary or Don Haase at 403/734-3877 in Gleichen. From the December 1994 issue of Transearch.

Single rope makes rumble strip

Also from Alberta comes this idea: stretch a single 2 inch diameter rope across the road to warn motorists they are approaching a work zone. It generally takes less than a minute to set up the rope by securing it to two stakes driven into the shoulder of the road. It is placed approximately 200 meters from the work zone. The Medicine Hat, Alberta, staff have been using it successfully for applications such a crack sealing where several set-ups are required in a short period of time.

Latex paint working well

Using latex paint for pavement marking has been proposed to reduce air pollution and cut hazardous wastes and toxic exposures. Latex has a life that is equal to and sometimes greater than alkyd paints. Recent improvements have made the product nearly as quick to set up as alkyds. In addition, latex seems to retain reflective beads better.

"We also like it because the cleanup is much easier," says Lyle Falk, Ozaukee County Highway Patrol Superintendent. They switched to latex about four years ago when he had to buy a new lane striping truck. "You have to adjust a little and fine tune it," Falk says. And you have to consider the weather. When humidity is high and temperatures low the paint takes longer to dry. Dry weather can cause paint build up on the nozzles.

Because the paint is water based and highly alkaline, all tanks, valves, piping, etc. should be stainless steel. Other equipment adjustments are needed as well, such as diaphragm-type pumps, higher pot and atomization pressures, greater nozzle openings, and lower heating temperatures. All striping equipment must be flushed

thoroughly because dried water based paint is very difficult to remove.

For small jobs like marking RR X-ings and crosswalks, Falk is using a stencil and a conventional house-painting roller. "It's a lot cheaper to throw away a roller than clean up the spray equipment," he says.

For more information on waterborne paints contact Lyle Falk at 414/284-4426. Thanks also to Scott Plouff of TAPCO for contributing to this article.

Reverse bucket configuration for easier culvert cleaning

When culverts are plugged by debris or beaver dams, they are hard to clear by ordinary loader bucket or shovel without causing damage. Steve Nording, an equipment operator in High Level, Alberta, built a bucket that was round and installed in reverse configuration. It reaches into the culvert and cleans it without damage. It saves labor, too. On one job the backhoe cleaned culvert ends



in two days that would have taken a over a week with hand labor. The first prototype cost \$1600 (CAN) to build, but Nording estimates that a second bucket would cost only \$350-\$400 (CAN).

For more information contact Brad Papirny, High Level Maintenance Foreman at 403/926-3208 or Terry Hood at 403/926-2241. From the December 1994 Alberta newsletter Transearch.

Do you have an idea to exchange? Have you designed a gadget or found a new way to do something that other highway people can use? Use the form on page 7 to let us know, or call Don Walker or Steve Pudloski at 800/442-4615.

Crossroads

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Plastic pipe winning converts

Improved design has made plastic pipe a responsible choice for culverts and storm drains. It is light weight, less expensive per foot than concrete, and relatively easy to install. Because the plastic has a smooth surface with less flow resistance, you can use a smaller diameter pipe than concrete or metal.

"We have used it in sandy and clay soils, in swampy areas, and under roads as storm sewers," says Bill Phillips, City of Tomah Public Works Foreman. "You can lay the larger pipe with two workers: a backhoe operator and a person in the trench. You can lay 18 inch pipe without a machine. Two people can lift it and move it."

Phillips, who has been using the pipe for five years, says that it requires about the same compaction as concrete pipe. "When we first used it, we didn't compact around it like we should have and it pushed up," he says. The pipe comes in 20 foot sections which snap together with seal tight, just like sewer pipe.

This year plastic pipe cost Tomah \$10.31 per foot for 18 inch diameter (which is equivalent in carrying capacity to a somewhat larger metal or concrete pipe). Concrete 18 inch pipe cost \$11.80 per foot.

"We still use concrete," says Phillips. "But if we have at least a foot of cover, we like to use the plastic."

Specifications for polyethylene plastic pipe are listed in the WisDOT Facilities Development Manual, Procedure 13-1-17, *Storm Sewer Materials Selection*. AASHTO also has materials specs up through 36 inches.

"We've had a plastic pipe installation up in Door County for six years," says Ron Cook, WisDOT Standards Policy Development Engineer. "The published



Lighter weight and lower cost make plastic pipe attractive for storm drains and culverts.

guidelines are conservative," he says, "until we get more experience with the product." For example, plastic pipe is prohibited under pavements on high volume streets. The state for now also requires mandrel testing to check for roundness after the pipe is in place. This measure may be dropped if deflection proves not to be a concern.

Not everyone is sold on plastic pipe, however. Bob Sindelar, Dodge Co. Highway Engineer, says, "The new designs are probably better, but the old flexible style you couldn't give to us." They are using aluminized corrugated steel pipe which in some cases, he says, is less expensive than polyethylene plastic and is guaranteed to last twice as long as galvanized metal pipe.

WisDOT's Facilities Development Manual is available by subscription. Copies should be available in your District office.

Calendar

T.I.C. workshops

Specific details and locations for workshops are in the announcements mailed to all Crossroads recipients. Don't forget the T.I.C.'s "Bring-a-Buddy" enrollment special.

Privatizing Public Works Services (teleconference) This hot topic is the focus of a national satellite conference presented in Wisconsin by the T.I.C. and the Wisconsin Chapter of APWA. Hearing first hand from local government pioneers about real world case studies that highlight three different strategies will help you deal with privatization in your own organization.

July 19 from 11:00 am to 2:30 pm at four Wisconsin locations.

Winter Maintenance Your opportunity to rethink your operations, learn from others and tune up your approach to snow and ice control and other winter maintenance activities.

Sept 12	Green Bay	Sept 20	Cable
Sept 13	Brookfield	Sept 21	Eau Claire
Sept 14	Barneveld	Sept 22	Tomah
Sept 19	Rhineland		

UW-Madison Seminars

Local government officials are eligible for a limited number of scholarships for the following engineering courses in Madison. Use the form on page 7 for details or call 800/442-4615.

Work Zone Traffic Control, July 26-28

Cost Effective Drainage System Design, August 21-24

Traffic Engineering Fundamentals, September 18-19

Effective Detention Basin Design Techniques, October 9-12

Managing Snow and Ice Control Operations, October 12-13

Traffic Signal Design Software, October 26-28

Advanced Traffic Signal Design Using TEAPAC, October 29-30

Pavement Rehabilitation, November 6-8

ROADWARE makes convincing argument

"The highway committee wanted to cut the maintenance budget from \$1.5 million down to \$800,000 a year," says Dave Beaster, Fond du Lac County Highway Engineer. "The ROADWARE computer program gave them five different scenarios. They found out that if they cut it, the average condition rating would fall a full point." As a result the committee decided instead to raise the maintenance budget 10 percent.

The program also helped convince highway commissioners of the value of filling cracks. "It showed them that every dollar spent early in the pavement's life extends that life," says Beaster.

Fond du Lac County has been using the Pavement Surface Evaluation and Rating program (PASER) for three years to record road condition and maintenance data and to help with maintenance decisions. Before using the program, the county had lots of history and cost data . . . spread all over the office. The ROADWARE computer program puts the information all in one record and that helps the accountant get a better handle on it, Beaster says.

It took effort to get the data into the computer, according to Beaster. In their case they did not adopt the state's segment data, but chose to enter their own. Some of it was old, so the staff had to measure pavement and shoulder widths as well as rating the surface condition.

The county also offers rating seminars for town supervisors and enters their data into the ROADWARE system. Almost half the towns now use the system.

"This way you have to have more than just an opinion of what needs to be done," says Beaster. "When ROADWARE helps select the maintenance projects it minimizes the political elements of the decisions."

Urbanizing village plays catch-up

The Village of Howard near Green Bay has replaced their in-house rating system with PASER, modifying the state's pavement sections to coincide with those they had been using.

The village has been doing major reconstruction and resurfacing of its streets (some of them 35 years old at the time) since 1988. "With completion of a major, four-lane road and areas where utilities had been replaced, we looked for projects where long-standing problems of growing traffic had to be addressed," says Peter R. Wills, Operations Manager, Village Engineer/Planner.

When they did their first PASER inventory in 1993, the program identified three times as many projects as the scaled-down budget could handle. The community used



It's easier to decide which pavement sections to treat or rehabilitate if you have accurate, objective pavement condition information.

the list to help plan a multi-year program and developed additional guidelines for which ones to do first.

The system helps village trustees better understand which street and road repairs are needed and why. It gives them a way to answer those questions about 'how about repaving my area?'

Help for smaller communities

In north central Wisconsin, as in most of the state, good roads are important for tourism and other economic development. It's no wonder, then, that both the North Central Wisconsin Regional Planning Commission (NCWRPC) and a county UWEX Community Development Agent put a lot of energy into helping local officials use the PASER rating system and the ROADWARE computer program.

Dave Mack, the NCWRPC transportation planner, estimates that nearly 60 communities have used their PASER assistance since the program began in 1991. RPC members pay a nominal fee for Mack to rate the roads, enter the WisDOT files and the ratings data into the computer, and produce a recommendations report for the local officials.

"This is a wonderful program for local communities to keep track of their roads and how they spend their highway dollars," says Mack. "It also helps enhance the local transportation network of the region." This year Mack will rate all of the streets for the City of Wausau. They became interested in ROADWARE after attending a recent T.I.C. workshop on the program.

Peter Manley, Wood County Community Resources Development Extension Agent, offers training sessions for local officials, then enters their ratings results into the ROADWARE program and sends them a printout. Sometimes he goes out with them to rate a few road sections to help them feel secure in their ratings.

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"When there's board turnover, it helps the new people see what they should be thinking about and helps them develop a priority list," says Manley. It also helps them clarify exactly which roads they are responsible for, and gives them a good objective tool for doing the spring road inspection.

Manley finds that people generally have little trouble understanding and using the rating system. "When they first try it, they are usually within one or two points of each other," he says. "After about 20 minutes they start to converge and there generally is consensus."

"ROADWARE helps them think about how to use their road budget, gets them to take a longer range perspective, helps them in applying for new funds, and helps them respond to their constituents," says Manley.

*For information on PASER and ROADWARE and copies of the manuals and program disks contact the T.I.C. at 800/442-4612 or use the form on page 7. A new video version of the training slide program is now available. Please see the **Resources** section for details.*

Cinder chips make better sealcoats

Study after study shows that sealcoating and crackfilling save money by extending the life of a road system. But many streets and highway departments are reluctant to use sealcoats, especially in urban areas. Too many drivers and neighbors complain about flying pea gravel just after the sealcoat is applied.

Power brooming before and after the application helps. So does posting warning signs and temporarily reducing speeds. "On heavily traveled roads, we close them and detour traffic while we are doing the sealcoating," says Steve Haag, Dane County Highway Department Superintendent. The county covered about 150 lane miles with chipseal in 1994.

Using cinder chips, the material that remains after coal is burned in a boiler, gives a solid surface at slightly less cost and with better public acceptance. The material meets state specifications for hardness but is more porous

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Resources

Publications listed here are available from the Wisconsin T.I.C. unless otherwise noted. To get your copy call 800/442-4615 or use the form on page 7. Videotapes are loaned free through Wisconsin County Extension offices.

Hot and Cold Mix Paving, Principles and Practice, CLRPP Report #95-4, March 1995, 97 pp.

This Cornell University workbook for local highway superintendents covers: materials and bituminous mixtures, cold mix and hot mix construction requirements, and selecting the right mix for your road. If you select paving alternatives and analyze costs, this book will help you do a better job, whether you do your own paving or hire others.

Maintaining Bridges after Inspection, National Association of County Engineers Training Guide Series, 1986, 123 pp.

A guide for the supervisors, crew leaders, and crews who maintain bridges. It is easy to read and illustrated with many drawings. Supervisors can use it to explain proper maintenance procedures to crew members.

Local Low Volume Roads and Streets, USDOT, Fed. Hwy. Admin. and Am. Soc. of Civil Engrs., Nov. 1992, 138 pp.

A reference manual with broad information on the design, maintenance, and operation of low volume roads (fewer than 500 vehicles per day). Discusses and references planning, construction and maintenance, traffic and safety design, pavement management and rehabilitation, and geometric design considerations. Particularly useful for individuals with limited technical expertise and experience.

What Every Supervisor Should Know, Lester Bittel & John Newstrom, McGraw-Hill, Inc., 1990, 614 pp.

Practical techniques, tips, and strategies for managing people. It spells out clear, realistic recommendations to help you handle the daily problems and challenges you face. Only a few copies available from the T.I.C.

People Skills, R. Bolton, Simon & Schuster, 1986, 300 pp.

A handbook to help you be a better communicator. Learn better skills for listening to others, asserting yourself, resolving conflicts, working out problems, and communicating calmly, even in stressful, emotionally-charged situations. Only a few copies available from the T.I.C.

Innovative Devices for Safer Work Zones, FHWA, Pub. No. FHWA-SA-95-029, January 1995, 14 pp.

Describes 11 new work zone safety devices developed during the SHRP program. Lists manufacturers and prices.

Asphalt PASER #17761, 46 min. videotape.

This training videotape helps local officials and roadway maintenance staff use the PASER pavement rating system. It investigates pavement distresses and performance and discusses environmental and structural causes of pavement deterioration. Describes how to evaluate the pavement on a scale of 1-10 and what types of maintenance to apply.

(The T.I.C. has added more than 35 new videotapes to its video lending library. A new catalog will be distributed soon. You can borrow tapes through your local UW-Extension County Office.)

Special bridge inspections underway

In 1987 a disastrous bridge failure on the New York Thruway led to a nationally mandated routine bridge inspection program. More recent failures have brought requirements for additional inspections and evaluations, especially for scour-critical and fracture-critical bridges. There is also a diving program in which any bridge over water that stays five feet deep or more all year round will be inspected by divers.

High velocity flows, as in floods, can wash or scour away the support material under bridge foundations. Because the damage is underwater, and the holes are often camouflaged by sediment, scour can be difficult to detect. The Coalinga Bridge on I-5 collapsed in March 1995 during a large flood. Scour appeared to be a contributing factor.

Determining scour damage requires detailed analysis by hydraulic, structural, and geotechnical engineers. However, local officials in Wisconsin have been asked to identify bridges with the potential for scour problems.

Gerry Krumdick of WisDOT's Bridge Maintenance Section is leading the state's scour-critical bridge identification effort. County highway departments were to submit a screening worksheet identifying bridges with potential scour problems this spring. Final scour evaluation is to be completed by 1997 under a federal program. If underwater inspection is needed, federal aid will pay for 80% of the cost.

To identify potential scour problems, inspectors can look for changes in the stream profile. A stream that is considerably deeper than at the last inspection may indicate degradation or scour, especially around bridge piers. Inspectors can also use a probe to check for scour holes or soft material in the streambed around the piers. New monitoring devices are being tested as well. The FHWA hydraulic engineering circulars (HEC) 18 and 20 have detailed background material on scour analysis.

Any structural change in a bridge may also indicate weakened foundations possibly from scour, according to Peter Lagasse, Senior Vice President of Ayres Associates engineering consultants. "Settlement of the piers or deck, or misalignment of the rail can be an indicator," he says. Through the FHWA National Highway Institute, Lagasse teaches workshops on scour and bridge inspection for state transportation agencies around the country.

Repairs for scour include reinforcing bridge piers with rock riprap or, in extreme cases, replacing the bridge.

Bridges with no records for the foundation type also pose a challenge. There are many such bridges in the state. Local officials are encouraged to pay special attention to these bridges during the next bridge inspection cycle, and after any major flood events.

Resource materials are available to help local officials and inspectors. These include the FHWA Technical



Scour is the suspected cause of a March 1995 bridge collapse on I-5 in California. Seven people died.

Advisory 1540.23 and a new bridge inspection coding guide. (Item 113 relates to scour evaluation.) Inspectors should also pay attention to items 60 (substructure), 61 (channel), 71 waterway adequacy, and 92 and 93 (critical features underwater).

Fracture-critical bridges

Fracture-critical bridges are those with two or fewer main members supporting them. Wisconsin is also participating in a special inspection of fracture critical bridges. Federal funding (80%) is also available for the next round of fracture critical inspections.

"We always inspect fracture critical bridges carefully," says Bob Sindelar Dodge County Highway Department Engineer. "A lot of them are being replaced for other reasons like age, bad abutments, limited load capacity, or being too narrow. We have some overhead truss bridges that were bought used and brought in here in 1913! They're at the top of our replacement list."

For more information on scour critical and underwater inspections, contact your WisDOT District office or your county highway department.

PONTIS software for bridges

PONTIS, a PC computer-based management system for bridges, began being tested on selected state highway bridge data last May. By the end of 1996, when the system is in use statewide, counties and other local authorities will be able to use it to store, update and report their bridge data.

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Bridge management software *continued from page 6*

"The program has degeneration curves that we can use to predict deterioration of a bridge. The manager can do 'what if' scenarios," says Daniel Fedderly, St. Croix County Highway Commissioner and chair of the Wisconsin County Highway Association's bridge committee. By contrast, the National Bridge Inventory (NBI), the existing bridge inspection data system, simply inventories inspection results.

Although inspection procedures will remain pretty much the same, PONTIS records more detail. For example, where NBI records the general condition of a bridge's substructure, PONTIS stores ratings for individual beams. Once the program has data from several inspection cycles, it will use that history of ratings to project deterioration of the bridge or its members.

"The goal of the management software is to help us use our bridge funds most efficiently," says Stan Woods, state bridge engineer for WisDOT. For example, current guidelines recommend putting one overlay on a bridge deck, then replacing the whole deck after the first overlay wears out. Data from PONTIS may be able to show that the deck is still solid and needs only another overlay.

In 1995 WisDOT district bridge staff will be working with and refining the inspection procedures and the program while University of Wisconsin engineers validate the deterioration models. "We will try to have PONTIS in place for the 1996 inspections which are due January 1, 1997," says Woods.

For more information about PONTIS contact your WisDOT district office.

Cinder chips *continued from page 5*

and has more sharp edges. As a result it grabs and holds the asphalt better than pea gravel, especially on the newer water soluble emulsions.

"There's a big difference in cleanup," says Toby Opheim, City of Madison Streets Department Operations Manager. "We pick up less than half as much of the cinder chips as we did with pea gravel." Less excess means fewer complaints and less waste.

Madison tested the material in 1993 on some road sections. "It held up terrifically in the winter, so we decided to go with it for the entire sealcoat program last year," says Opheim.

Being black gives the cinder chips another advantage: better winter snow melting on sunny days. Striping paint stands out better against the black background and the road looks "new" longer. There's also less dust and the sharper edges mean less hazard for bicyclists because the chips are more stable and have better embedment.

Cinder chips are economical. They are both less expensive per ton, and weigh less per yard. Dane County paid \$4.95 per ton for cinder chips last year compared to \$5.80 per ton for pea gravel. It weighs about 2000 pound per yard compared to 2600 for pea gravel. At those figures, it costs about 35% less.

"Besides," says Steve Haag, "this is a form of recycling. Sooner or later we will deplete the gravel supplies and here is a product that can substitute for it."

For more information on Madison's seal coating program, contact Toby Opheim at 608/246-4535. For more information on Dane County's seal coating program contact Steve Haag at 608/266-4012.

Reader Response



If you have a comment on a **Crossroads** story, a question about roadways or equipment, an item for the *Idea Exchange*, a request for workshop information or resources, or a name for our mailing list, fill in this form and mail *in an envelope* to:

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University of Wisconsin-Madison FAX 608/263-3160
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- Please put me on your **Crossroads** mailing list.
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(We'll call you to get more details or answer your question.)



Reducing red light running

Drivers who ignore traffic signals — speeding up for yellow lights and running red lights — may be a significant cause of intersection vehicle crashes. The Federal Highway Administration is beginning a safety campaign to reduce red light running. Terry Witkowski, City of Milwaukee Safety Director, hopes that city will be selected for the start-up phase.

“We think that the high number of ‘failure-to-yield’ crashes at 77 intersections which had traffic signals and 15 or more crashes, is a symptom of a significant red and yellow light running problem,” says Witkowski. Letters from residents agree, he says. Many of more than 100 letters received as part of a local driver improvement effort mention traffic signal offenses.

“It takes a combination of enforcement and education to change driver attitudes and habits,” says Witkowski. Operation Driver Improvement combined with “E-Z Corridors” enforcement zones and a three-year safety education program in Milwaukee, appears to have cut failure-to-yield crashes from 18,915 to 17,006 in the city. That program ended in 1994.

The FHWA red light running campaign is designed to help municipalities improve roadway safety. The agency has developed a public outreach plan and materials

including public service announcements, all of which were tested in Charleston, South Carolina, last summer.

This type of education effort is a new initiative for FHWA, says Catherine Ratté, FHWA Program Manager in the WisDOT Office of Transportation. The idea is to help improve the effectiveness of traffic control devices by reinforcing driver compliance. She hopes Milwaukee will be selected for this round and that in time the program will be available to all Wisconsin communities.

Correction

✓ Thanks to Engineer Bill Brinkmann of Delafield for catching our error in the Spring 1995 *Crossroads* Metri-Q quiz. The question was: “Locate the error in this value: 45,250 cm.” The answer we gave was: “0.4525 m or 452.5 mm”. Our answer was correct, but the question was wrong. We printed the value with a comma instead of a decimal point. The value should have read: 45.250 cm and it is wrong because WisDOT has adopted millimeters (mm) and meters (m) as its standard units and does not use centimeters (cm).

✓ A further error you may have spotted was using a comma to separate groups of three digits in the large number 45,250. The International Standard uses spaces: 45 250.

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