MASS INTERCHANGE

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# THE GRADER AS A GRINDER


At last an attachment that might get your under-utilized grader working again. Attached to the moldboard of a motor grader, the RotoGrader's 72-inch long rotary cutter drum equips the machine to cut and pulverize road shoulders and gravel roads and perform light surface milling of asphalt pavement. The cutter head has a diameter of 18 inches and holds 108 conical, tungsten-carbide cutting teeth. Optional cutter-drum widths are available.

The cutter can work at rotation speeds ranging from 100 rpm to 425 rpm. The cutter drum can be angled to the work, producing a nearly smooth, cross-hatch pattern in the asphalt, rather than the grooved pattern of a cutting drum that can only be set parallel to the machine's axles.

Power for the hydraulic cutter comes from a self-contained, skid-mounted unit which includes a four-cylinder, 125 horsepower turbo-diesel.. The skid bolts easily to the motor grader's front scarifier bracket, or it can be mounted in the rear.

A single-axis joystick in the cab controls drum speed, engine throttle, pump engagement and the emergency stop function. Drum height, cutting angle and horizontal extension are adjusted by the moldboard controls.

The unit can work on one lane without blocking the other. The grader can be driven, rather than trailered, to work areas that are within a mile or two of each other. The crew can set up a work zone, level off the bump and move on in fairly rapid order.

Although the RotoGrader won't replace a milling machine in any production job, it brings substantially more power to a milling task than loader attachments. The extra power opens up a number of new possibilities. In addition to shoulder and surface touch-up work, the unit can correct intersection areas with pavement shoves due to high traffic braking forces.

The RotoGrader has the power to grind away 1-2" of asphalt on each pass. Its 72-inch drum length lets the operator remove the shoved areas while producing a surface that provides more skid resistance. It costs about $50,000 depending on specifications.

# NEW STUFF: MOTOR GRADERS

If there's any road construction equipment to which you can apply the old adage "build a better mousetrap," it has to be motor graders. More and more companies seem to want the world to beat a path to their door by offering new designs or upgraded models in motor grading equipment.

Six-wheel-drive graders combine a breakthrough front-drive system and better hydraulic plumbing to handle everything from fine grading at ultra-slow speeds to power ripping.


Power output is matched to the rear wheels. When one wheel loses traction, it does not rob power from the other or require valve corrections. Electronic controls keep the front wheels in virtually perfect synchronicity with the mechanically driven rear wheels.

Technological developments also include fully modulated inching pedals that deliver ultimate control in fine-grading applications. U-gate shifters provide flexibility with their full-power shift operation of eight forward and four reverse gears.

Other benefits are the elimination of stalling out on heavy loads, and the quick and easy shifting into gears 5-8 for high-speed travel above 26 mph. There are also new circular geometry blade suspension systems. They enable true 90-degree bank sloping that makes for easy positioning while providing exceptional reach and ground clearance. The design often situates two pistons on top of the circle for maximum support. Retractable indicators provide a clear view of pin engagement, eliminating any guesswork.

Closed-center hydraulic systems or valves allow fluid to flow to each implement. This makes the operation of multiple controls easier than ever before. Variable displacement pumps and load-sensing systems give the operator the right amount of power needed for particular situations.

Brake systems often have three safety levels that ensure braking even if the engine is dead. Standard foot-operated, sealed-oil disc brakes are hydraulically actuated to each wheel. If the operator encounters a hydraulic pressure loss, there are nitrogen accumulator safety systems that back up the power. There also is the parking brake, which is activitated automatically.

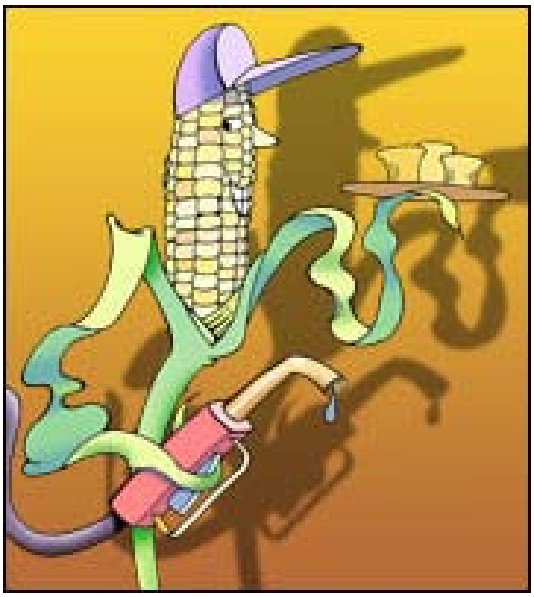
Other safety features on new graders include a roll-over protective structure, as well as a falling-object protective structure. Access steps on either side of the machines are constructed with a belted-type material to minimize the chance of injury when the operator enters or exits.

Graders are now equipped with a digital message center that reduces unplanned downtime by monitoring and tracking their operating condition and providing diagnostic data to assure performance. The system constantly monitors different elements of the graders such as engine coolant level, coolant temperature, hydraulic oil temperature, transmission oil temperature, clutch pressure and brakes.

Finally, the latest earthmoving machines provide a level of performance and accuracy unimaginable until recently. A new breed of motor graders use fully automated GPS control systems that offer a new approach to solving demanding earthwork tasks such as vertical curves and super elevations common in road construction.

*Articles on page 1 and 2 are reprinted from the Nevada Milepost Spring 2007 with permission from the Nevada LTAP.*

# LET's GO BIO



Soy is now great in your fuel tank as well as on your sushi. It's cleaner, it's available, and it's affordable. In 1895, Dr. Rudolf Diesel developed the first compression-ignition engine specifically to run on vegetable oil, but it took over a century for this country to reconsider it as both a food and fuel source. The engine he unveiled at the World's Fair in 1898 ran on peanut oil but in the 1920s he switched to petroleum fuels when these became cost effective and available.

Over the years, America's appetite for petroleum has had severe impacts on the environment and public health. In addition to polluting emissions and endangering natural resources, dependence on foreign oil has impacted national security. In addressing these concerns, the Commonwealth will require agencies to substitute (bio) fuel for a portion of their petroleum fuel in all diesel vehicles and equipment and in boilers that use #2 heating fuel beginning in FY08. The mandate is the result of ANF Bulletin #13, issued in August, 2006 as part of an Energy Plan. The plan will be implemented via a guidance document and trainings provided by an interagency team consisting of EOEA, DOER and OSD.

**Biofuels have many benefits:**

- ✔ **Renewable energy source made in the U.S,**
- ✔ **Usable in most diesel equipment wihout modifications,**
- ✔ **Increased fuel lubricity (formerly provided by sulfur), and**
- ✔ **Reduction of particulate matter and tailpipe emissions that impact climate change.**

Most exhaust emissions are significantly lower than petrol diesel even when burning a biodiesel and petrol-diesel blend. When using pure biodiesel, unburned hydrocarbons drop 67 percent; carbon monoxide is down 48 percent; and sulfates decline 100 percent. Carcinogenic byproducts are reduced at least 75 percent. The only increase is nitrogen oxide, a component of smog, which could rise as much as 10 percent over regular diesel fuel depending on the age and design of an engine. The oils within biodiesel fuel offer exceptional wear protection in pumps and other moving parts. Blend ratios as low as 1% can provide up to 30% more lubricity over conventional diesel fuel. It is nontoxic, biodegradable, and has a higher flashpoint than diesel but still must be treated as any flammable liquid and handled with care.

Ultra Low Sulfur Diesel (ULSD) complies with the new EPA standard for sulfur content in on-road diesel fuel sold in the U.S. The allowable sulfur content for ULSD (15 ppm) represents a 97 percent reduction in sulfur content from the previous standard of 500 ppm. Reducing emissions of sulfur compounds into the atmosphere helps prevent acid rain. In conjunction with emission control retrofits (also available on statewide contract #VEH71), ULSD helps reduce emissions of nitrous oxides and particulates that contribute to asthma and other respiratory illnesses.

Biofuels targeted within the new mandate include biodiesel blends for vehicles and equipment ranging from B5 to B20, biofuel for heating purposes and E85 ethanol (85% ethanol to 15% gasoline blend). Biodiesel made from virgin soy is already offered on OSD's statewide contract #ENE23. Recommended blends include B20 (20% biodiesel, 80% ULSD) for spring and summer months and B5 (5% biodiesel, 95% ULSD) for late fall and winter months. The product meets the


industry standard ASTM 6751 and, in recommended blends, conforms to the warranties of all major vehicle and equipment manufacturers.

Users of the new mix include the University of Massachusetts/Amherst that is purchasing B20 biofuel for 15 percent of its vehicles and equipment such as trucks, heavy equipment and lawn mowers. Barnstable, Harwich and Provincetown DPWs have purchased one third of the biodiesel supply on the Cape through the Barnstable County Consortium Bid. The Cape Cod Renewable Fuels Partnership (CCRFP) is striving to expand the use of renewable fuels in local communities by providing a forum to educate potential users and create opportunities for funding and collaboration.

ULSD is currently the only diesel fuel available for use in on-road vehicles in the U.S. All 2007 diesel equipment requires ULSD. Even as little as one tank of incorrect fuel can cause damage to the engine, fuel system, or pollution control system. Fuel additives are not recommended by the manufacturers for 2007 emission compliant vehicles.

The Mass Turnpike Authority and MassHighway have transitioned to biofuels, with many cities/towns also moving to cleaner diesel fuels.

For more information go to:
**www.comm-pass.com or Contract #ENE23**
For accredited producers and distributors go to:
**www.bq-9000.org**

Thanks to Neil Andres, Barnstable DPW and Baystate Roads Advisory Board member, for his assistance in the preparation of this article.

## NEW GOALS FOR AASHTO

"The last time America had a national vision for transportation was when the Interstate System was launched in 1956," said AASHTO Executive Director John Horsley. "Since 1950, our population has increased by 130 million, highway travel has increased five-fold ... what it will take to meet America's surface-transportation needs for the future will require a different approach than was taken in the past. It will require a multi-modal and an intermodal approach... it will also require solutions which go beyond transportation improvements alone and include policies addressing land use, energy, global climate change, the environment, and community quality of life," Horsley said. The new report "Transportation/Invest in Our Future: Surface Transportation Policy Recommendations" sets eight major goals:

1. Increase federal highway funding to $73 billion annually and increase transit funding to $17.3 billion annually by 2015;

2. Supplement state and local revenues through alternative financing options;

3. Double transit ridership over the next 20 years;

4. Preserve the 47,000 miles Interstate Highway System so it lasts for another 50 years;

5. Double the capacity of the Interstate Highway System over next 50 years;

6. Reduce annual fatalities on U.S. Highways by 10,000 per decade;

7. Reduce congestion and energy consumption and improve air quality;

8. Establish a National Rail Transportation Policy to address the needs of passenger-travel and freight users.

More than 1,800 high school students attended the **Fifth Annual Massachusetts Construction Career Days (MassCCD)** to learn about job opportunities in the industry, including the construction, engineering and environmental fields with both union and open-shop companies. The industry faces a shortage of young, qualified workers and MassCCD was created to help address this shortage and to educate high-school students about the wide range of career possibilities. The event shows students that construction is a great profession -- whether their interests lie in math, carpentry, mechanics or science -- and that the industry offers rewarding, high-paying jobs.

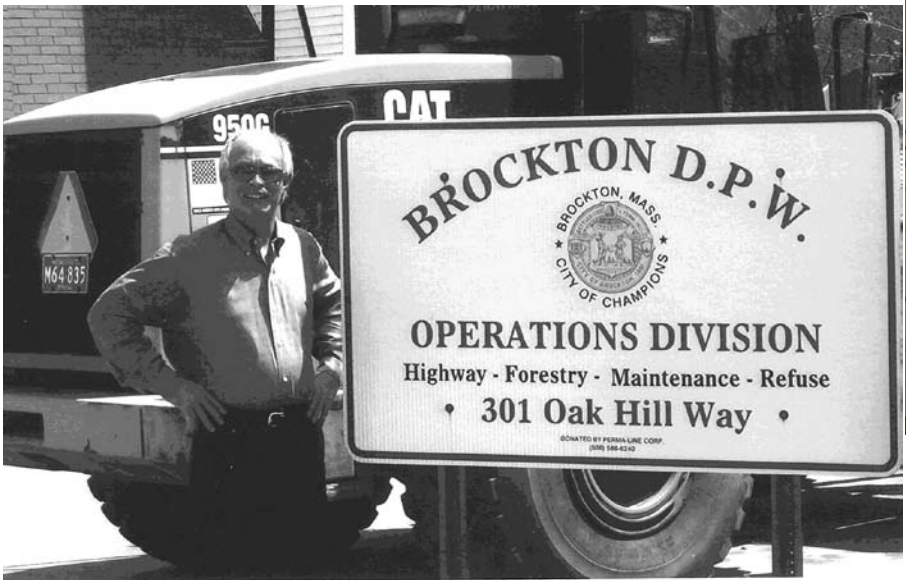
Exhibitors included construction companies, vendors, equipment dealers, police and fire departments, labor unions, apprentice programs, colleges and organizations. The exhibitors donated their time, equipment and, in some cases, operators -- there is no cost to participate other than these contributions.

Students tried their operating skills on backhoes, excavators, jackhammers, pavers, and bulldozers. They were able to participate in concrete finishing, welding, cutting and burning, electrical work, carpentry, laying brick and block, surveying, field engineering and computer design activities.

The Boston Society of Civil Engineers offered students the chance to win $500 for their school in a competitive engineering contest. Six engineering work stations allowed students to build a 6' tall tower of balloons, construct a functional circuit, design sails for a small boat, consider new ways to provide safe drinking water, and devise a model bridge. This year's winner was "Monty" *aka* Montachusett Technical Vocational School.

This three-day event was held at the Laborer's Training Facility in Hopkinton, MA. Thanks to all the vendors, supporters, organizations, and teachers who made this year such a fabulously successful MassCCD. And the weather cooperated. Please join us next year.

# MASTER ROADS SCHOLAR
# CRAIG CHIN YOUNG - BROCKTON, MA




*Craig C. Young at Brockton's DPW at left and receiving his award from Chris Ahmadjian at the Baystate Roads Advisory Board Meeting*

Craig Chin Young has been a resident of Brockton, MA, since 1964 and is the third generation to call "The City of Champions" his home.

Craig's introduction to public service began as a youth from his father, Major Henry Chin Young, U.S.A.F. retired, after 25 years of service to his country as a B-52 Aircraft Commander. In 1988 , Henry once again retired from public service after 20 years as a state engineer, Grade V from District 7 in Middleboro, MA.

After graduating from the University of Massachusetts/ Amherst, Craig began working for the Brockton Engineering Department in 1972. Promotions through civil service exams allowed him to progress from Grade 1 to Grade IV, performing duties from an Engineer's Aid to Construction Inspector for city utilities and roadway public works projects.

In April of 1996 after 24 years with the engineering division of the Brockton DPW, he was promoted to Superintendent of Operations and is currently in charge of 43 employees in four sections: Highway, Forestry, Refuse and Maintenance. Brockton has a multi-cultural population of over 95,000 with a density of 4,300 residents per square mile. There are over 340 miles of roadways and 30 miles of estuaries within an area of 32 square miles. The public works challenges for this city are very demanding.

Craig reminds us that the field of public works requires that we "do more with less." In attempting to meet this challenge, we must promote education, technology, safety, organization and proper management of both finances and personnel. Craig feels that these issues must be attacked "head-on" using creative thinking to solve a myriad of problems. He believes in the power of networking in order to stay on the cutting edge of technology and not trying to re-invent the wheel.

Mr. Young has developed his networking skills with membership in the American Public Works Association, Massachusetts Highway Association, American Water Works Association, Barnstable County Public Works Association, and Massachusetts Tree Wardens Association. He currently serves as first vice president of the Plymouth County Highway Association.

The Brockton Department of Public Works has recently been added to the list of "First Responders" by the Governor and the Commissioner of the Massachusetts Department of Public Safety.

Craig reminds all of us that three speed dials are available on home phones: FIRE, POLICE AND YOUR LOCAL DPW although not necessarily in that order. He welcomes comments from his community.

# MASTER ROADS SCHOLAR
# MICHAEL P. CURTIN - BROCKTON, MA


*Mike Curtin receiving his award from Chris Ahmadjian above and hard at work at left.*

Michael Curtin is a lifelong resident of Brockton where he still resides with his wife and three children. He is a 1973 graduate of Brockton High School.

Mike began his career with the City of Brockton as a teenager in high school in the early 1970s working summers for the Park and Recreation Department. He became a permanent employee in 1975, working for the Refuse Department as a heavy motor equipment operator. In 1985, Mike transferred to the DPW Highway Department as a hoist operator. He was promoted to the position of working foreman in 1987, became construction foreman in 1996, and general foreman in 1998, a positon he holds today.

During the past nine years, he has supervised over 40 employees in the highway, forestry and vehicle maintenance divisions. He supervises snow removal and sanding operations, that include DPW employees and private contractors. River maintenance, flooding prevention, and pothole and street repair fall under his list of duties. He is involved with the Traffic Commission for site reviews and the Emergency Management Committee in planning.

Brockton is a large city, with a population of approximately 95,000 and 340 miles of roads. Maintaining this amount of roadways is a challenge, and Mike must come up with creative ways to provide quality services during times of frequent budget cuts.

Since Mike started his career with the DPW at such an early age, he feels that a great deal of his knowledge was gained from on-the-job training. As a teenager, he learned that a strong work ethic and dedication to quality workmanship would take him far. Unpredictable New England weather has also been a great teacher.

Mike feels that the Baystate Roads Program has been a great source for learning and networking with other people in the transportation field. He is a member of the American Public Works Association, Massachusetts Highway Association, Plymouth County Highway Association, and Barnstable County Public Works Association. He has earned a certificate from Clean Harbors Environmental Service for completing the Hazardous Waste Operations Program and has attended training sessions in Debris Management and Chlorine Safety. In 2003, he received the Vocational Service Award from the Rotary Club for dedicated service to the Brockton DPW Highway Department.

In his free time, Mike heads toward wilderness areas and enjoys hiking in the woods with his dogs. His favorite vacation spot is Maine where he has achieved the Master Maine Guide status.

## 2007 NEEDS SURVEY

Thanks to all who completed the annual Baystate Roads Customer Satisfaction Survey which provided valuable input for the program's planning purposes. Home Depot certificates are going out to these five lucky winners who were randomly chosen from the 106 responses:

| | |
|---|---|
| **MICHAEL CURTIN** | Brockton DPW |
| **JASON SKEELS** | Amherst DPW |
| **ANGELA SNELL** | Shrewsbury Parks & Recreation |
| **RONALD TRUDEAU** | Southbridge DPW |
| **JOHN WOODSMALL** | Southborough DPW |

## in this issue



Congratulations to the newest Baystate Roads Scholars on their fine achievement. Keep saving those certificates and you, too, could be listed here

**Mark Coviello, Natick DPW**
**William DeRosa, Natick DPW**

**Baystate Roads Scholars**


The Baystate Roads Program, which publishes Mass Interchange each quarter, is a Technology Transfer (T2) Center created under the Federal Highway Administration's (FHWA) Local Technical Assistance Program (LTAP). This newsletter is prepared in cooperation with The Excecutive Office of Transportation (EOT) and the United States Department of Transportation Federal Highway Administration. FHWA is joined by EOT, UMass Transportation Center at the University of Massachusetts/Amherst, and local public works departments in an effort to share and apply the best in transportation technologies. In addition to publishing Mass Interchange, the Baystate Roads Program facilitates information exchange by conducting workshops, providing reports and publications and videotapes on request, and offering one-to-one technical assistance on specific roadway issues. Because the program relies on input from many sources, inquiries, articles and ideas are encouraged.


**LTAP Local Technical Assistance Program**

**To contact the Baystate Roads Program call (413) 545-2604 or FAX 413-545-6471**

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