Dirt and Gravel Road Maintenance Program Receives a New Coordinator in Harrisburg

Karen Ely was named the new Dirt and Gravel Road Program Coordinator in December of 2009. She brings a wealth of knowledge and experience associated with Conservation Districts and the Dirt and Gravel Road Program into her new position. Karen’s Conservation District life started in 1998 as an educator in Northumberland County. In 2000 she became a technician in Union County where she administered the Dirt and Gravel Road Program for the District. In 2002, she moved back to Northumberland County Conservation District, this time as the District Manager. Karen remained active in the Program by attending workshops and overseeing technicians who administered the Program. In 2005, Karen made the move to become a Field Representative for the Southeast region of the Department of Environmental Protection. She served as the primary link between DEP and six counties in Southeast region. While there, she kept up with the Dirt and Gravel Road Program by attending workshops and participation in advisory groups for the Program. In 2007, she moved from Field Rep to Conservation Program Specialist located in Harrisburg.

In addition to her new responsibilities as Dirt and Gravel Road Program Coordinator, Karen will continue to work in support of the Leadership Development and Envirothon Programs. Karen is now located at the State Conservation Commission’s office in the Department of Agriculture Building in Harrisburg. She can be reached at: kaely@state.pa.us or 717-787-2103.

“The Dirt and Gravel Road Program will provide me with new challenges while continuing to work with conservation districts. I am looking forward to working with all of you in this new capacity.”

-Karen Ely
Dirt and Gravel Road Program Coordinator
The Center has received a recent influx of questions about the cost comparisons of paved -vs- unpaved roads. Much of this interest started with a December 2009 Associated Press article about municipalities in Maine reverting roads back to gravel to save on maintenance. The article “Roll up the Pavement: Gravel is Making a Comeback”, was picked up by major newspapers nationwide. The Center has done some investigating, and here is what we have found:

Historically, a great many road maintenance departments in the U.S. have made maintenance decisions regarding road surface treatments based to a large degree on notions and desires (i.e. - “Our goal is to pave all of our municipal roads by such and such a date”), rather than basing their decisions on a cost/benefit analysis. A relatively healthy economy, in conjunction with a relatively cheap global oil supply has allowed them to follow this path of indiscriminate paving.

The largest economic down-turn since the Great Depression, combined with the sharpest spike in crude oil prices on record, is causing many road maintenance entities to rethink these traditional ways. Instead of following the accepted modus operandi, many road departments are investigating non-traditional and innovative practices in maintaining or rehabilitating their roads, including turning asphalt paved roads back to aggregate-surfaced roads.

Studies in the past have shown that one clear factor that has a major influence on the annual maintenance costs of a road is its average daily traffic (ADT). Notwithstanding the initial construction costs, the average annual maintenance cost per mile of road is greater for bituminous asphalt roads with ADT counts below 100 when compared to gravel surfaced roads. The opposite holds true for roads with ADT counts in excess of 200. Throughout the Twentieth Century, the typical break-even point where it becomes more costly to maintain a gravel surface vs. an asphalt surface lies somewhere between 100 and 200 ADT. Of course, the variation in type of traffic, climate, road base conditions, and maintenance practices employed will influence the break-even point between the two surface treatments for each municipality.

All of those studies, however, were completed before 2003. Since then, there has been a precipitous rise in global crude oil prices which has doubled the cost of Hot Mix Asphalt over the last seven years. In that same period, the average price of surface aggregate has increased a more modest 40%.

The big question is, “What influence will the precipitous rise in crude oil prices and current economic down-turn have on the typical break-even point for most municipalities, and when does the cost-benefit analysis tip in favor of returning low-volume asphalt roads back to an aggregate surface?” While newer studies are needed using today’s cost figures, it seems obvious that municipalities who are looking at deteriorating paved roads with an ADT of less than 100 should at least consider returning these road to an unpaved surface.

As a side note, those municipalities that chose to convert some of their low volume paved roads back to aggregate surfaced roads should consider taking the opportunity to complete any necessary drainage and base improvements that your budget will allow.

This article was based on a research review and conversations with experts in the road maintenance field. It is provided as information only and does not reflect the views of Penn State University or any of its sponsors or affiliates.

-Tim Ziegler, CDGRS
Lee Everett, long time supervisor and friend of the Program from Polk Township, Monroe County, passed away in December. Lee completed the Program’s first demo project on Hell Hollow Road in 1997, and has remained a friend of the Program and Center ever since. We offer our condolences to his family and friends.

The Center holds approximately 8-10 ESM training each year. Scheduling for the 2010 calendar year can be found on page 4. If you are interested in hosting one of the three remaining training dates, please consider partnering with a neighboring District and contacting the Center ASAP to schedule a date before they are full. Remember that before a municipality applies for funding, someone from the municipality must have attended an ESM training within the pervious 5 years.

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**Districts: Please Use New Replenishment Forms**

Conservation Districts who submit replenishment forms are reminded to use **ONLY the new forms** with District mailing addresses on them. The new form is on the Center’s website [www.dirtandgravelroads.org](http://www.dirtandgravelroads.org) under “Resources – Blank Forms”. Replenishment forms should be mailed to: Mike Thomas; Bureau of Watershed Management; RCSOB; PO Box 8465; Harrisburg PA 17105-8465.

**Center Moves Its Offices**

The Center for Dirt and Gravel Road Studies changed affiliation in early 2009 to become part of the Larson Transportation Institute (LTI) at Penn State. That change has now become complete as the staff of the Center have moved their offices into the Transportation Research Building. Anyone looking to stop by while they are in town should head to rooms 214 through 219 in the Transportation Research Building (about 200 yards east of our former office). Advisory group members should note this change, as we will be making use of our new conference rooms available in the new building. Updated directions are available on the Center’s website [www.dirtandgravelroads.org](http://www.dirtandgravelroads.org) under “about us”.

**FREE Conveyor Belts**

The Center has obtained a large amount of used conveyor belt (courtesy of Kurt Knitter at Schuylkill Energy). These can be used to make belt diversions to prevent erosion on low use roads. (See “Conveyor Belt Diversions” Technical Bulletin on Center’s Website at [www.dirtandgravelroads.org](http://www.dirtandgravelroads.org) under “resources”, “technical bulletins”.) The Center will provide sections of belt FREE of charge to any District or Municipality. The fiber-reinforced belt is approximately 30” wide and ½” thick, and can be cut with an utility knife (typically cut to 15” width for use). If you are interested, contact Kathy Moir at the Center ([kam16@psu.edu](mailto:kam16@psu.edu)) for more information.

**GIS Update on Track for March**

The Center began upgrading the DGRoads GIS system Districts to an open-source MapWindow Software in 2009. For more background information, go to [www.dirtandgravelroads.org](http://www.dirtandgravelroads.org), under “Resources – GIS”).

**STATUS:** All Conservation Districts involved in the Dirt and Gravel Road Maintenance Program have submitted their Annual Summary Reports. Over the next few weeks, the Center will finish programming on the new MapWindow version of DGRoads for an anticipated March release. The new DGRoads, along with County data, will be made available online to facilitate future updates (instead of on CDs). Districts can expect to hear more details in the near future on how to download and install the software. At least one or two **optional** GIS trainings will be held in 2010 to go over the new Program.

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*February 2010*
The two-day ESM training covers many aspects of road maintenance and focuses on practices to reduce maintenance costs and environmental impact from unpaved roads.

Have questions or want to schedule an ESM training? Want to receive future newsletters?
Contact Kathy Moir at:
1-866-No-To-Mud
(1-866-668-6683)
dirtandgravel@psu.edu
www.dirtandgravelroads.org

Two-Day ESM Training Schedule

Venango/Crawford: March 10-11
Armstrong/Indiana: June 8-9
Wayne: Aug 17-18

Available Date: Nov 16-18

Contact the Center to register for a training, or to discuss hosting one (814-865-5355).

Other Events

2010 Dirt and Gravel Maintenance Workshop: Late September, final date and location to be determined.

PA State Assn. of Township Supervisors Conference: April 18-21, Hershey, PA
PACD: 7/19-20 Annual Meeting, State College
Worksite in Focus

Red Rose Revisited

2001 – 2009: eight years later

Project Overview:
Red Rose Road was an extensive road rehabilitation project that was completed in 2001, with Driving Surface Aggregate placed on the road in 2002. This demonstration project was completed in cooperation with the Huntingdon County Conservation District, the Penn State Experimental Forest, and Barree Township.

The Problem:
Red Rose Road was a severely “entrenched” roadway. The road elevation had been lowered over time by traffic, erosion, and maintenance activities. Over 1,200 feet of road was acting like a stream channel, collecting water from the surrounding land and funneling it to the small stream below. The long ditch drainage overwhelmed the small stream with excessive flows and sediment. The road also had a steep drop-off to the stream after the crossing, and was heavily shaded.

The Solution:
The best permanent solution for Red Rose Road was to restore a more natural drainage pattern by raising the road elevation. An on-site shale pit was used to raise over 1,000 linear feet of road 3 to 6 feet in elevation in compacted 8” lifts. (See photo sequence on reverse) Raising the road eliminated the downslope ditch, and provided necessary cover for crosspipes to be installed to drain the upslope ditch.

In addition to raising the road elevation, several other Environmentally Sensitive Maintenance Practices were implemented. Trees around the road were selectively thinned to reduce canopy cover without wholesale “daylighting” of the road. The section of road immediately after the crossing was shifted upslope approximately 50’ to provide a stable buffer between the road and stream. Several gradebreaks were installed on the road to provide pipe cover and prevent drainage from flowing down the road. The shale pit was retired after the project. Rootwads, stumps, and logs were used to stabilize both the shale pit and downslope bank on the relocated road.

The publishers of this publication gratefully acknowledge the financial support of the Pennsylvania Bureau of Forestry. For additional information or assistance, contact: Center for Dirt & Gravel Roads Studies, Penn State University, 207 Research Unit D, University Park, PA 16802 (Toll-Free Phone: 1-866-668-6683, Fax: 814-863-6787, Email: dirtandgravel@psu.edu). Additional copies available on our website at: www.dirtandgravelroads.org

Cost Summary:

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<th>Item</th>
<th>Cost</th>
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<tr>
<td>Road Fill &amp; Drainage</td>
<td>~$35,000</td>
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<tr>
<td>Included road filling (shale free on site), pipes, shale pit</td>
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<td>retirement, tree thinning, and bank stabilization.</td>
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<tr>
<td>DSA:</td>
<td>~$10,000</td>
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<tr>
<td>6” compacted depth, paver placed, roller compacted</td>
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<tr>
<td>This project was funded by Growing Greener</td>
<td></td>
</tr>
</tbody>
</table>

Maintenance
The road has only been “lightly graded” twice since aggregate placement in 2002.
Occasional potholes have been patched near the stream crossing where the road lacks crown. Other than that, no other maintenance has been needed.

For More Information:
Center for Dirt and Gravel Roads Studies
(814) 865-5355 www.dirtandgravelroads.org

BEFORE. Entrenched road traps runoff in ditch, transporting it to stream. Heavy canopy and insufficient cover to install crosspipes.
AFTER. Raised road eliminates left ditch, and provides cover for pipes to drain right ditch. Trees thinned and road shifted away from stream.
Eight Years Later…

Filling the road and adding crosspipes are relatively permanent solutions. The drainage on Red Rose Road has withstood the test of time very well. The road still sheds water from its downslope side. Gradebreaks are still functioning to insure water does not flow down the road. The added crosspipes still function to separate uphill ditch flow into manageable volumes and outlet it away from the stream.

The Driving Surface aggregate has performed well. It has been graded lightly only twice since placement in 2002. Notice that while the road was filled with shale in 2001, aggregate was not placed on the road until 2002. This time lag is recommended in order to allow the fill material to settle. It can then be graded in preparation for aggregate. Placing aggregate immediately over new fill may cause the aggregate to become deformed as the fill settles differentially underneath. It is important for road maintenance crews to be aware of surface drainage features such as gradebreaks during routine maintenance. One grading by an uninformed operator could easily remove these drainage features.

Don’t Take Our Word for it……..

“Overall, the project addressed and remedied several issues with Red Rose Road. First, it was a “sunken road” and any “fix” we did was a band aid at best. Although the project was rather expensive initially, it has remedied several problems and reduced the need for significant annual or biannual maintenance. We were able to successfully place drainage pipes and use grade breaks to redirect runoff, coupled with the use of DSA has significantly reduced sediment in the adjacent stream (leading to Shavers Creek and Stone Valley Lake).

The selective thinning (instead of daylighting) along the road has provided needed sunlight on the road surface but not opened it up too much to give drivers the impression that they can drive fast. Also, the selective thinning has not encouraged quick regrowth of saplings and small trees that are easily bent over or broken off onto the road from heavy wind or snow events.

In the eight years since the project was completed, we have only had to lightly grade the road twice and fill several potholes occasionally. The road improvements have also made the road much safer for winter travel since water and ice are no longer trapped in the road corridor.”

-Joseph A. Harding
Director of Forestlands, Penn State University

2001
BEFORE. Existing entrenched roadway traps drainage and transports it to stream around bend.

DURING. Entrenched road is filled with shale. Trees are selectively thinned.

2002
DURING. Driving Surface Aggregate is placed 8” deep using a motor-paver and compacted to 6” with a roller.

2009
AFTER. Raising the road provided a long-term solution to the runoff issues on Red Rose Road.