



pennsylvania
DEPARTMENT OF TRANSPORTATION

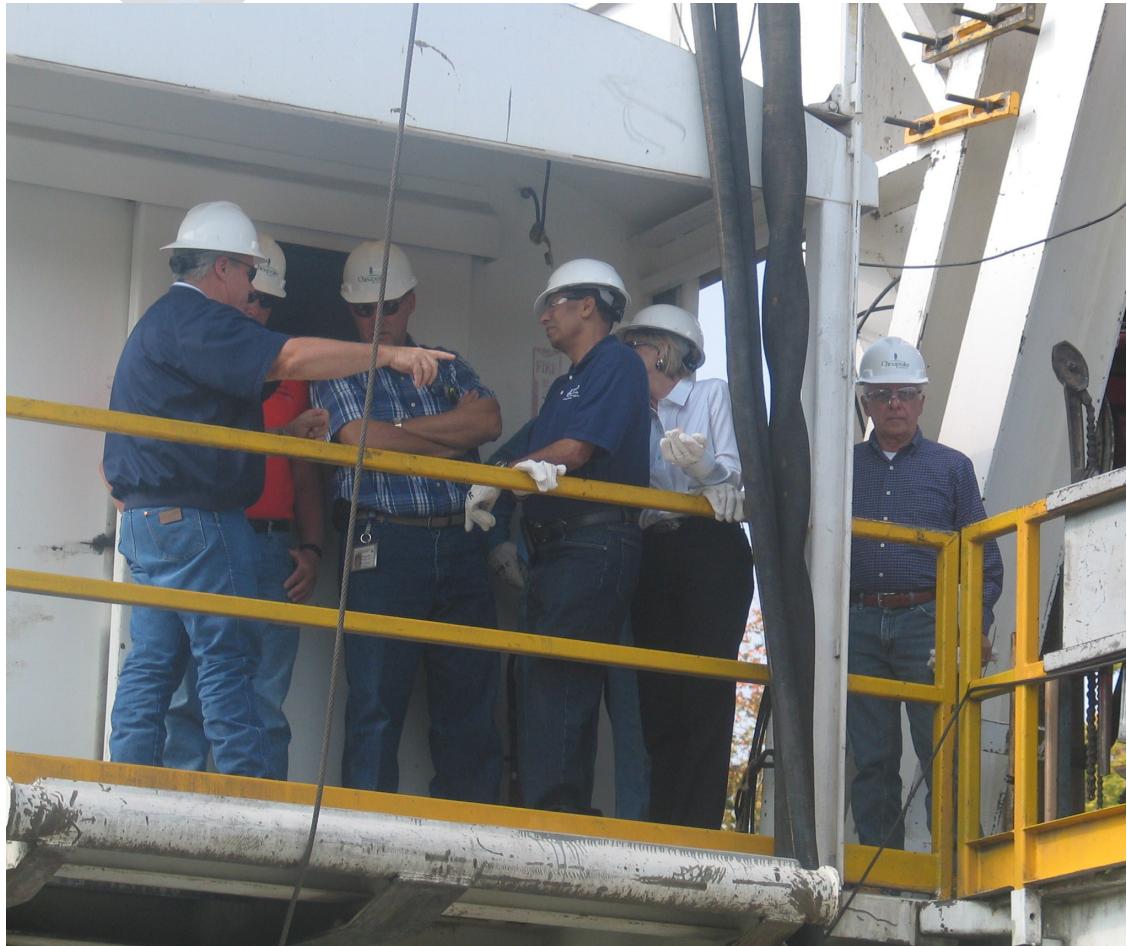
PennDOT Local Technical Assistance Program

moving FORWARD

WINTER 2010/2011

A quarterly review of news and information about Pennsylvania local roads.

LTAP Advisory Committee Tours Marcellus Shale Drilling Operation



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In September, the LTAP Advisory Committee toured a Marcellus shale drilling operation in Bradford County. At its meeting the previous day, the committee heard a variety of presentations about the impact of Marcellus shale development on local and state roads. Presenters included a township supervisor from Bradford County, a program manager from the Northern Tier Regional Planning and Development Commission, and a representative from PennDOT's Bureau of Operations and Maintenance.

Municipalities must make sure flaggers are properly trained

Training Helps to Ensure Safer Work Zones

IN MAY 2010, A FLAGGER AT A PENNDOT WORK ZONE in Lebanon County was killed when a motorist crested a hill, saw a line of traffic stopped at the work zone, and swerved to avoid the vehicles, striking the flagger instead. Unfortunately, scenarios like this are repeated several times a year as approximately two to six workers are killed annually in accidents in Pennsylvania roadway work zones.

"In 2009, four highway workers and 19 motorists died in work-zone crashes in Pennsylvania, highlighting the sudden tragedy that can occur when motorists fail to slow down or stay alert for rapidly changing traffic conditions," says PennDOT Secretary Allen D. Biehler, P.E. "The men and women who are dedicated to improving our roads and bridges should not have to risk life and limb simply because motorists are distracted or in a hurry."

To help safeguard roadway workers and make work zones safer for road crews and the traveling public, the state recently included new requirements in the April 2010 edition of Publication 213, Temporary Traffic Control Guidelines, that all flaggers on roads open to the public be properly trained.

"In the past, this requirement didn't apply to municipalities, only PennDOT workers and contractors," says Patrick Wright of Pennoni Associates. But now, anyone who has flagging responsibilities, from municipal road crews to fire police to utility companies, must meet the flagger training requirements mandated in PennDOT Publication 408.

"The flagger is critical to maintaining safety in a work zone," says Wright, who has been delivering flagger training to municipalities across the state in conjunction with the Pennsylvania State Association of Township Supervisors. Anyone who attends the training and passes the 20-question quiz (with at least a 70 percent score) receives a flagger training wallet-sized card as proof that he or she is trained to direct traffic on public roadways. The training, which covers flagger visibility and procedures and traffic-control guidelines, is valid for three years.

Increasing Flagger's Visibility

The flagger's job is critical for ensuring the safety of his or her fellow workers, the traveling public, and him or herself.

"Work zones create unexpected conditions for the motorist traveling down the road," says Wright. "Unfortunately, motorists are sometimes inattentive, aggressive or impaired. In fact, speeding is the most common reason for crashes in work zones with rear-end crashes occurring most frequently."

The most dangerous job at a work zone is that of flagger. "The most common person hit in a work zone is the flagger," says Wright. "But training does contribute to improved safety. If a flagger is trained, that employee is better protected against accidents."

Making yourself visible to motorists is the most important thing a flagger can do. "Most preventable injuries to flaggers occur because of poor positioning and visibility," he says. "A flagger should never step



To allow traffic to proceed at a work zone, the flagger should face approaching motorists and hold the Stop/Slow paddle with the SLOW message facing oncoming traffic. For added emphasis, the flagger may gesture with his free hand.

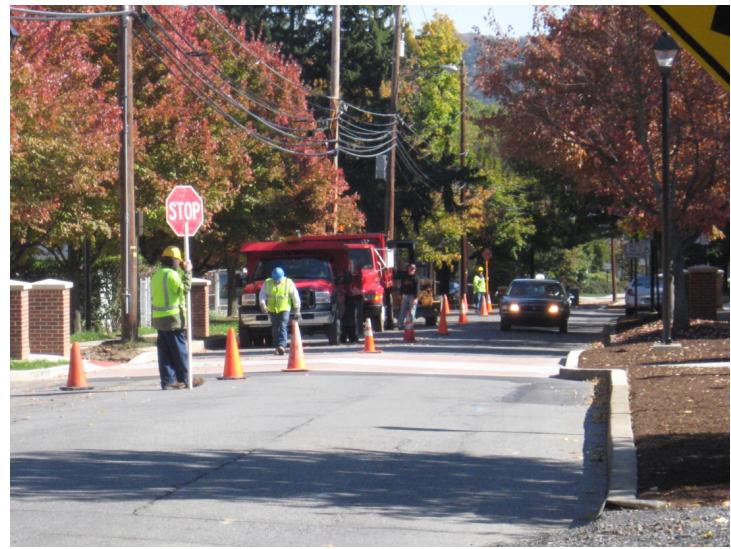
out in front of a moving car. Instead, stay on the shoulder of the road or to the side of the traveling lane, and never turn your back to traffic. Once the first vehicle has been stopped, a flagger can step out to the inside center of the lane so that approaching cars can see you. But, always have a clear escape route so that you can quickly move away from any incoming danger."

Other ways to increase the visibility of the flagger to the traveling public include the following:

- Use a stop/slow retroreflective paddle (min. 18 inches in diameter on a min. 72-inch staff). A retroreflective red flag (min. 24 inches in diameter on a 3-foot staff) is used at intersections or in emergency situations.
- Wear a protective helmet and a safety vest that meets the minimum ANSI Class 2 high-visibility requirements. These are required items. Optional flagger apparel includes high-visibility fluorescent rain gear in inclement weather and ANSI Class 3 retroreflective leggings or chaps at nighttime.
- Position yourself to provide the greatest color contrast against the surroundings. Do not stand in the shade.
- Stand erect and gesture with your free hand (the one not holding the paddle or flag) to direct vehicles to stop, slow down, or proceed through the work zone. Do not lean, sit, or lie on any vehicle.



Single flaggers can be used for short-term work zones on low-volume roads. Make sure that motorists from both directions have an unobstructed view of the flagger. In this photo, the flagger does not have an escape route, and the hill in the background limits sight distance.



Making themselves visible to motorists is the most important thing flaggers can do. In this photo, the flagger is positioned on the wrong side of the roadway.

- Maintain a buffer zone from other workers, equipment, and material so you do not blend in with people and objects around you. A flagger must be located a minimum of 200 feet from a stationary work zone and a minimum of 100 feet from a mobile work zone.
- Use proper signage to alert motorists of work zones and that a flagger is present. Publication 213 includes requirements for advanced-warning signage and work zone setup for a variety of circumstances.
- Walk down the road and verify that a flagger is clearly visible for the minimum distance required by Publication 213 as determined by the speed limit on the road. For example, on a 25 miles-per-hour roadway, the flagger must be clearly visible at least 155 feet away. On a 50 mph highway, the distance is 425 feet.
- At nighttime work zones, illuminate the flagger with floodlights.

Flagger Conduct and Setup

The flagger should be authoritative, attentive, professional, courteous and polite, even if motorists become irate or rude. In addition, he or she should be free to concentrate on his or her flagging duties without any distractions.

"That means no electronics," says Wright. "No cell phones, iPods, or radios. The only radio that is allowed would be the one used to stay in communication with the other flagger."

The flagger should be authoritative, attentive, professional, courteous and polite, even if motorists become irate or rude.

Likewise, the flagger should only be responsible for flagging duties and not assigned any other tasks at the work zone.

"If you don't have enough personnel to maintain the safety of the work zone or if the road is too twisty or curvy to ensure the flagger's safety, then consider other alternatives," says Wright.

Flaggers are placed in position as the first workers to arrive and the last to leave in a work zone, and it is required that they be able to communicate with each other. This can be done using a handheld or portable radio, predetermined hand signals, a flag that is passed to the last vehicle, or an official or pilot car.

"One of the flaggers should be appointed the chief flagger," says Wright, "and the flaggers should operate as one mind, staying visible or in contact with each other as much as possible."

Single flaggers can be used for short-term work zones on low-volume roads if the following conditions are met (as shown in PennDOT Publication 213, Figure PATA10C):

Have You Built a Better Mousetrap?

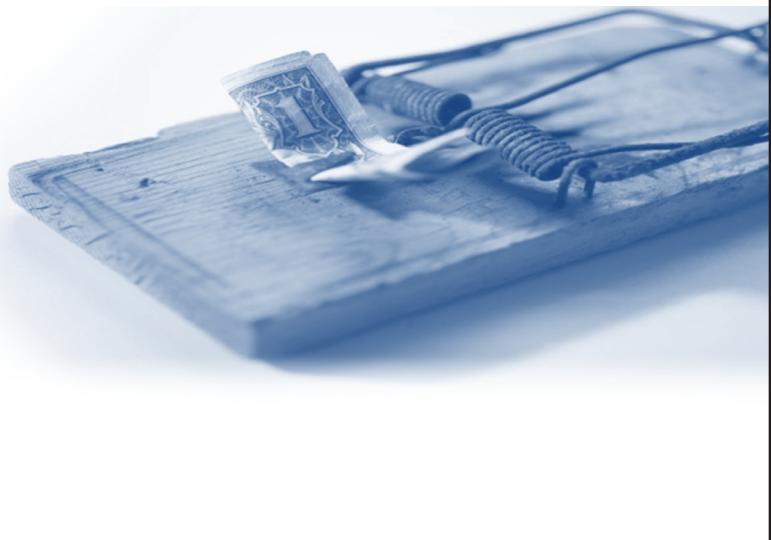
Show it off by entering PennDOT's competition seeking innovative gadgets, improved transportation

Have you or one of your coworkers recently built an innovative gadget or developed an improved way to do a job? If so, now is the time to show off a project your municipality is proud of in the Build a Better Mousetrap Competition.

PennDOT is looking for projects that you, your employees, or crew designed and built. It can be anything from the development of tools, equipment modifications, and/or processes that increase safety, reduce cost, improve efficiency, and improve the quality of transportation.

If you have something you think would qualify for this competition, submit your entries to PennDOT by **Friday, February 11**. A state winner will be chosen in March and announced at the annual conference of the winner's respective municipal association. Entries will be judged by a committee of your peers on cost, savings/benefits to the community, ingenuity, transferability to others, and effectiveness.

The winning entry will be submitted into a national competition to compete for prizes and, of course, bragging rights. Winners of the national competition will be announced at the annual LTAP/TTAP national conference this summer. All entries at the national level will be posted on the LTAP/TTAP program Web site and compiled into an electronic booklet.



An entry form, which includes descriptions of 2009 winners of the national competition, will be mailed to every municipality in November. The entry form is also available online at the LTAP Web site. To enter the competition, complete the entry form and return it by Friday, February 11, to PennDOT/LTAP, 400 North St., 6th floor, Harrisburg, PA 17120.



Flagger Training Helps to Ensure Safer Work Zones

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- Motorists from both directions must have an unobstructed view of the flagger.
- The length of the one-lane work zone section (not including any taper) is no more than 250 feet.
- No more than 12 vehicles pass the work zone in a five-minute period, or the average daily traffic (ADT) is no greater than 1,500 vehicles per day.

The state's Publication 213 and the federal Manual for Uniform Traffic Control Devices (MUTCD) include information on setting up work zones, depending on the conditions (such as two-lane roadways, intersections, short-term or long-term projects), and procedures for flagging itself.

"About 75 percent of traffic problems at work zones are caused by human error," says Wright. "Making sure the flagger is properly trained and is visible to the public is the first step in preventing problems." ♦

Flaggers are required to wear a protective helmet and a safety vest that meets the minimum ANSI Class 2 high-visibility requirements. Optional apparel includes wearing ANSI Class 3 retroreflective chaps at nighttime.

Beyond Cement, Sand, Water, and Aggregate

Approved materials, proper application go far in creating successful roadways

by Craig Reed, Director, Bureau of Municipal Services; James Smedley, Division Manager, Bureau of Municipal Services; Alan Williams, Supervisor, District 10-0, Bureau of Municipal Services; Richard Stirling, Municipal Services Specialist, Bureau of Municipal Services

A YOUNG ENGINEER ON HIS FIRST WEEK of a roadway construction project asked the experienced construction inspector, “What goes into a good batch of concrete?” The inspector replied, “Cement, sand, water, and aggregate.”

Several weeks later, the young engineer noticed a recently poured section of concrete being removed and replaced. Despite being new, the concrete had many cracks and displayed serious flaws. So, the young engineer asked the experienced inspector, “What goes into a bad batch of concrete?” Without hesitation the inspector replied, “Cement, sand, water, and aggregate.”

This engineer learned a valuable lesson: Successful pavement installation goes beyond simply knowing the list of required materials. Municipalities that use inferior materials or rely on poor workmanship quickly learn that the finished product will not perform well and may fail prematurely. Instead, local governments must ensure that the materials they are buying meet PennDOT requirements and are applied properly.

Starts with PennDOT-Approved Vendors

Contractors and suppliers provide local governments with countless quantities of materials to repave streets and reconstruct bridges. Such materials help Pennsylvania’s municipalities maintain more than 77,000 miles of local roadways and 6,400 local bridges.

State law requires these materials to meet PennDOT-approved state specifications, which mean that the product has been thoroughly tested and is proven to be safe, durable, and consistent. Using approved materials provides a municipality with confidence that it is getting a quality product for the intended work to be performed.

Municipalities that use materials that do not meet PennDOT specifications not only create unsafe conditions and a reduced life expectancy for their roadways, but they risk losing their ability to use Liquid Fuels Funds for qualified purchases.

Quality Assurance Tests in the Field

To ensure that all material and work are of the highest quality and consistency, local governments are encouraged to run field quality assurance tests. Although roadway material is typically tested at the plants where it is manufactured, such testing is done on a large volume intended to represent all materials delivered to job sites. Therefore, it's important for municipalities to conduct on-site testing to ensure

the material they are purchasing meets specifications and has not become segregated or contaminated during processing and delivery. PennDOT's municipal services representatives can offer assistance on how to set up a test program in a municipality.

In lieu of immediate formal testing upon delivery of stockpiled material, local governments can generally observe the materials to see if any irregularities exist, such as clumps of mud, excessive fines or coarse aggregates, or excessive moisture. If an irregularity is observed, the municipality may then want to perform formal testing of the materials. When placing the materials, municipalities can do a similar visual inspection to make sure the materials are reacting as expected in terms of not segregating, not being too moist or dry, and not compacting or rutting or raveling when opened to traffic.

Proper Application of Materials

Municipalities should keep in mind that improper application of materials can be as much at fault for pavement failure as the material itself. The right material has to be used in the right location and placed properly, or the material itself has little chance to succeed. For example, Driving Surface Aggregate (DSA) is designed to be placed at a 6- to 8-inch compacted depth. If it's applied at a 2- to 3-inch depth instead, it will not work properly.

Another example is MC-70, which is designed to penetrate aggregate surfaces to stabilize the surface and adhere to the fine aggregate to deter dust. If placed on a bituminous, impervious surface, MC-70 cannot penetrate the surface and will not cure. Improper or lack of even compaction (i.e., compacting aggregate by using the tires of the hauling truck) is the primary cause for failure of aggregates on stabilized roads.

PennDOT Resources Can Help

Municipalities can check various PennDOT publications to determine if the product they are interested in is approved by the department. Publication 408, Specifications, is the best general guideline for confirming approved products. Publication 447, Approved Products for Lower Volume Local Roads, is another good resource.

PennDOT publications are also useful for verifying approved vendors of specific materials and products. Approved vendors of aggregate, for example, are located in Publication 34. The list of approved bituminous suppliers can be found in Publication 41. Bulletin 15 is a valuable resource for both product approval and approved vendors. All these publications are available at www.dot.state.pa.us, Forms, Publications & Maps. PennDOT district municipal services representatives are also an invaluable source for information and technical assistance. ◆

Don't Run Short on Concrete

How to estimate quantities for municipal projects

by John Hopkins
Municipal Transportation Specialist, PSATS

HAVE YOU EVER SEEN A WORK CREW pouring concrete and heard someone yell, "Holy cow! We are going to need more concrete!" Or, have you ever watched as concrete is poured level with the top of the forms and then the concrete truck driver says, "Well, that is the last of them. What do you want me to do with the three yards of concrete left in my truck?"

Using concrete doesn't have to be that way. Municipalities can determine the precise amount of concrete needed for any type of project once they learn how to calculate it using some simple math formulas.

Understanding the Math

To start, let's review a little bit about math.

Convert to common units.

Before you begin your calculations, you must convert all measurements into common units (such as inches, feet, yards, etc). How would you multiply 11 feet times 6 inches, for example? Obviously, you must convert either the 11 feet into inches or the 6 inches into a decimal part of a foot.

Inches into feet—Converting the 6 inches into a decimal part of a foot is the preferred choice since in our English system of numbers, the "foot" is the base unit of measurement. This system then divides

Calculating the Volume for Ordering Concrete

1. Convert all measurements into common units (usually into feet). If there are any fractions, first convert them into decimals.

$$\text{EX: } 3\frac{1}{2} \text{ inches} = 3.5 \text{ inches } (1 \div 2 = .5)$$

$$3.5 \text{ inches} = .29 \text{ feet}$$

$$(3.5 \text{ in.} \div 12 \text{ in./foot} = .29 \text{ feet})$$

2. Plug all measurements into the formula for volume – length x width x height (L x W x H) – to get a measurement expressed in cubic feet.

$$\text{EX: } 125 \text{ feet (L)} \times 4 \text{ feet (W)} \times .29 \text{ feet (H)} = \\ 145 \text{ cubic feet (Volume)}$$

3. Convert cubic feet to cubic yards by dividing the measurement determined by the formula for volume by 27 (the amount of cubic feet in a yard).

$$\text{EX: } 145 \text{ cu. ft.} \div 27 \text{ cu. ft./yard} = 5.37 \text{ cubic yards} \\ (\text{round to } 5.5)$$

feet into smaller units (inches, fractions) or multiple units of a foot (yards, miles).

So, how do you convert 6 inches into feet? Everyone knows there are 12 inches in one foot. If you take the number of measured inches (6) and divide it by the number of inches in a foot (12), you will have the measurement expressed in feet (in decimal form). In our example, $6 \div 12 = .50$ feet.

Using this conversion formula in another example, you would change 7 inches into feet by taking the number of inches (7) and dividing it by 12 to get .583333 feet, which you can round to .58 feet.

Fractions into decimals—But, what do you do if your measurement is in fractions of an inch? Since you are changing the inches into decimal numbers, you will need to change the fractions into decimals.

To do this, simply take the top number in the fraction and divide it by the bottom number. For the fraction $\frac{1}{2}$, for example, you would divide the top number (1) by the bottom number (2) to get .5. For the fraction $\frac{3}{8}$, divide 3 by 8 to get .375, which you can round to .38.

With all the numbers now in decimal form, you can proceed with converting inches into feet as we've already reviewed.

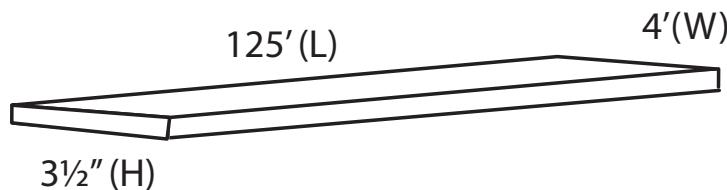
Applying the Calculations

Use the formula.

Once you have all the measurements converted into like units (feet) in decimal form, you are ready to apply some calculations to your measurements. Calculating quantities for concrete requires using three dimensions: length times width (which is area) times the height (thickness) or L x W x H. If you are using feet as your standard unit of measurement, this formula will give you the volume of concrete in cubic feet.

Most projects use standard-dimension lumber for forms: 2-by-4s or 2-by-6s. You would assume that a 2-by-4 is 4 inches wide, right? Well, that's no longer true with today's lumber. A 2-by-4 is now actually $3\frac{1}{2}$ inches wide. That's important to know when you begin your calculations.

Here is an example project. You are pouring a sidewalk 4 feet wide by 125 feet long and using 2-by-4s for forms. To calculate the quantity of concrete needed for this project, you will use the formula L x W x H to get cubic feet.



Before calculating volume, convert the $3\frac{1}{2}$ inches into .29 feet.

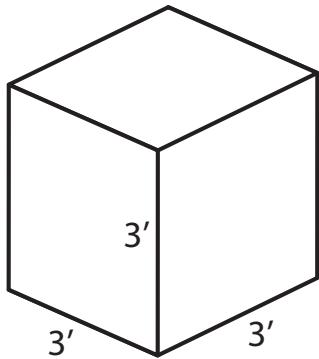
Plug your dimensions into the formula, keeping in mind that the height of the form is really $3\frac{1}{2}$ inches, not 4. So your calculation will be 125 feet (L) x 4 feet (W) x $3\frac{1}{2}$ inches (H).

Convert to common units. Before you can calculate this quantity, you have to convert the $3\frac{1}{2}$ inches into feet. To do that, first change the fraction $\frac{1}{2}$ into a decimal ($1 \div 2 = .5$) and add this to the 3 inches. Next, divide the 3.5 inches by 12 to change it into feet: $3.5 \div 12 = .29$ feet.

Plug measurements into the formula $L \times W \times H$. Now, you are ready to plug your measurements (all expressed in feet) into the formula $L \times W \times H$ to get the necessary quantity of concrete expressed in cubic feet ($125 \text{ feet} \times 4 \text{ feet} \times .29 \text{ feet} = 145 \text{ cubic feet}$).

Convert cubic feet into cubic yards.

Because concrete is measured in cubic yards, you will have to convert your cubic-foot measurement to cubic yards. Below is a cubic yard (remember 3 feet = 1 yard).



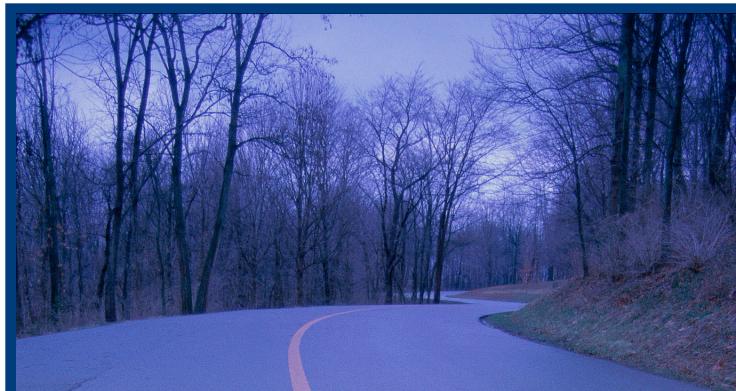
A cubic yard equals 27 cubic feet.

Using the formula $L \times W \times H$, we know that there are 27 cubic feet in a cubic yard ($3 \text{ feet} \times 3 \text{ feet} \times 3 \text{ feet} = 27 \text{ cubic feet}$).

To convert the cubic feet you calculated for your forms into cubic yards, divide the cubic feet measurement you calculated by 27. In our sidewalk project example, we determined that a sidewalk measuring 4 feet wide and 125 feet long (poured into 2-by-4s, which gives us a height of .29 feet) required 145 cubic feet of concrete. To convert to cubic yards, divide 145 by 27, and you will wind up with 5.37 cubic yards ($145 \div 27 = 5.37$).

Since concrete is usually ordered to the nearest $\frac{1}{4}$ to $\frac{1}{2}$ cubic yard, you would round the 5.37 to 5.5 cubic yards. By ordering this amount of concrete for your sidewalk project, you are guaranteeing that you will neither run short nor have too much excess concrete. Learning how to calculate the precise quantity of concreted needed for a project will save you time, money, materials, and aggravation. ♦

Note: There are online calculators that will calculate the quantities of concrete, aggregate, or asphalt for you. One example is www.pennsysupply.com/pennsy/Products_Services/Calculator.aspx.



Advisory Committee to Assess Financial Needs of Local Roads

The responsibility for the operation and maintenance of more than 77,000 miles of highways statewide is divided among 67 counties and 2,562 municipalities throughout Pennsylvania. Unlike PennDOT highways and bridges, little available and reliable data exist regarding the condition of local roads, the needs on this system, the available funding, and the unfunded needs. The Pennsylvania State Transportation Advisory Committee (TAC) has organized a task force to assess the needs of local systems and develop methods to quantify these needs.

This study will look at the evaluation of the operation and maintenance of local roads, which includes highway pavements, bridges, signing and markings, traffic signals, winter maintenance, and stormwater management. Current policies and programs will be reviewed, and options for expanding local government funding for transportation will be identified and evaluated. From this study, local needs will be updated, new methodologies will be developed, and recommendations will be made for how to improve funding of local highways.

A draft version of the report should be completed and provided to the full Transportation Advisory Committee by April 2011, with a final version presented to the State Transportation Commission in the summer of 2011. A municipal services representative has been included in the study group. An electronic copy of the report will be made available to PennDOT for printing, distributing, and posting online.

Marcellus Shale Development and Municipal Roads

Preventing damage to roads and local water supplies

by Tim Ziegler, Center for Dirt and Gravel Road Studies, Penn State

BENEATH ROUGHLY 60 PERCENT OF PENNSYLVANIA lies one of the world's largest known energy reserves. The Keystone State has recently been referred to as the Saudi Arabia of natural gas, and much of the early production data coming from wellhead reports verify that there is indeed "gold in them-there-hills."

The tapping of the Marcellus Shale Play is already proving to be a shot in the arm for some of the state's most economically depressed regions. Jobs are being created that will allow young people to stay and build a future here. Land values and lease royalties are enabling many hard-working Pennsylvanians to be able to retire comfortably or save the family farm. Some within the state think the industry may even help to fund the needs of the public sector. Ultimately, the hope is that Pennsylvania and its citizens will prosper from the opportunity that this new industry presents.

However, as the old adage goes, there is no such thing as a free lunch, and along with the benefits come the costs. Among the more notable costs of deep shale development are environmental concerns and damages to municipal roads, resulting from the large-scale heavy hauling operations required by the industry. While Pennsylvania's Marcellus region has miles of roads to serve the gas industry, many of these roads are graveled or paved routes never designed to handle the number of vehicles they are now subject to, let alone the heavy-weight hauling requirements associated with deep shale gas development.

But, by being proactive and allowing the gas industry to come in and fix these rural roads before they begin hauling, municipalities are taking a preemptive strike in maintaining their roads. And, by insisting that environmentally sensitive road maintenance practices are followed, municipalities will help to avoid degradation of their streams and lakes and potential damage to their water supply.

The Problem: Impassable Roads and Environmental Degradation

Last spring, news reports described how many municipal roads were reduced to mud holes by scores of overweight trucks serving the gas industry. In some cases, the roads were rendered impassable to passenger vehicles. Not wanting to repeat past mistakes, the gas industry and government officials alike have re-evaluated standard operating procedures related to the Marcellus shale drilling operations and decided how to proceed to prevent a repeat of those problems.

With the exponential growth of the gas industry comes another cause for concern—the potential degradation of the environment. Most of us have heard the concerns about hydraulic fracturing, water withdrawals, and potential chemical spills. However, one of the less publicized concerns includes stormwater issues associated with pad construction, access roads, and damaged public roads. The



Last spring, a number of municipal roads were reduced to mud holes by overweight trucks serving the Marcellus shale drilling operations. To prevent a repeat of this road damage, the Center for Dirt and Gravel Roads recommends that unpaved municipal roads be upgraded before hauling begins. Unpaved roads in particular are prime candidates for preemptive road improvements.



photos courtesy of PennDOT

Municipalities located in the gas patch are urged to address potential road problems and concerns early and be as proactive as possible.

state Department of Environmental Protection (DEP) has assumed responsibility for monitoring water runoff at the well site and on access roads, but it is up to municipal officials to ensure that their roads do not become a pollution problem should they break under load.

Municipalities located in the gas patch are urged to address potential problems and concerns early and be as proactive as possible. They have a duty to protect both the public infrastructure and the environment and to minimize the costs while doing so.

The Solution: Improve Roads Before Hauling

Since mid-2008, the Center for Dirt and Gravel Road Studies at Penn State has been promoting the idea of upgrading unpaved municipal roads before hauling begins. The focus should be on roads that either are in close proximity to a stream, wetland, or impoundment or are at risk of catastrophic failure because of inadequate drainage or poor base composition. Unpaved roads in particular are prime candidates for preemptive road improvements because they lack a costly bituminous or concrete overlay that would substantially raise the cost of the process and they often experience greater damage during the spring thaw than hard surfaced roads do.

Upgrades to roads should occur before the hauling begins and should center on the following actions: reinforcing the base at known weak spots, addressing existing drainage problems, and improving road drainage in anticipation of additional run-off, especially at new intersections with access roads, pipelines, and drainage swales. The goal is not only to protect the existing infrastructure and surrounding environment, but to lengthen the maintenance cycle and reduce the need for costly grading and re-graveling. In addition to long-term cost savings, such pre-haul road upgrades will have a wide host of other positive consequences, including environmental stewardship/compliance, enhanced community safety, better public relations, and economic growth beyond the gas industry.

By addressing road base stability and problematic drainage issues prior to subjecting roads to hundreds or thousands of very heavy trucks, municipalities can reduce the number of catastrophic road failures, minimize the need for tons of tailgated stone usually required to prolong a passable road, and reduce sediment released to surrounding surface waters. With fewer hazardous road conditions, emergency vehicles will be able to access homes and businesses, and residents will not be inconvenienced by poor road conditions or impassable roads.

Road Practices to Protect the Environment

Another concern associated with the increased traffic and hauling operations of the gas industry is that many unpaved public roads in the Marcellus region share watersheds with the highest quality streams in the state. Communities throughout the region rely on these streams for tourism and outdoor recreation. By restoring and maintaining local roads, municipalities are also helping to protect these valuable resources.

Rather than the traditional maintenance historically performed to recondition roads, road crews have to be willing to employ environmentally sensitive road maintenance practices aimed at reducing erosion. For example, instead of installing very long and deep parallel ditches on both sides of the road with relatively few deep outlets, municipalities should establish wide and shallow ditches with multiple outlets to avoid concentrated drainage, minimize flow volumes, and reduce the effects of concentrated flow.

If gas development continues as expected, and energy companies or their contractors continue to perform maintenance and repair work on local roads, then municipalities must be proactive and encourage the gas companies to adhere to the following practices:

- Improve the road base prior to heavy hauling.
- Replace failing or inadequate crosspipes.
- Install more ditch outlets (crosspipes and turnouts) than may currently exist on the road.
- Locate ditch outlets away from streams.
- Establish wide and shallow ditches instead of narrow and deep ditches.

These practices will help to minimize the cost of future road maintenance, enhance public safety, and maintain the health of local streams. Adherence to these concepts is particularly important when the road is in close proximity to a stream.

As our rural road network evolves to meet the needs of this emerging industry, so too should the way we maintain those roads. Pennsylvania's rural roads are vital to the successful economic development of the state and the communities affected by Marcellus shale development. With collaboration among industry, state and local officials, and community residents, all of Pennsylvania is more likely to benefit from this recent economic opportunity. Adoption of environmentally sensitive road maintenance practices will leave our communities better off for the next generation of Pennsylvanians. ♦

Making Communities More Livable Through Transportation Planning

GIVING PEOPLE CHOICES ABOUT HOW to get from Point A to Point B is at the heart of the concept of livability, says Roy Kienitz, the U.S. Department of Transportation's undersecretary for transportation policy. Kienitz outlined the goals and objectives of the department's livability initiative in a recent podcast for the LTAP/TTAP community.

"Livability is about helping ensure that we have places that have transportation choices, different types of housing and other uses, like shopping and jobs, and destinations that are relatively close to one another and easily accessible," Kienitz said. "It describes many of the small towns that grew up in America over the last 150 years."

Over the last four or five decades, however, the rise of a more car-dependent culture has meant that a lot of communities have moved away from that concept, he said.

"We think there is value in having communities with these essential components, and we're trying to make sure that the way we make transportation investments helps support that type of space," he said.

A Change in Mentality

The livability concept is a departure from the mentality that has developed over the last 40 or 50 years in the transportation industry, which holds that the purpose of the transportation profession is to move things around, Kienitz said. Livability turns that idea on its head.

"The purpose of the transportation profession is to support people and the communities they live in so they can work better and be more pleasant and functional," Kienitz said. "Our job is fundamentally about communities and people, so it's a little bit less heavy on the engineering and a little bit more heavy on the context in which the engineering is done."

Kienitz said that transportation professionals have become used to a process where, when it's time to get people from one place to another, you count the number of people, you look in a book on the shelf, and it tells you if a road should be two, four, or six lanes. Then, you turn to that chapter to find out what the road should look like.

"Then you go out and you build that," he said. "That's what we've all grown used to."

The difference with the livability concept is that it recognizes that a town in Vermont, for example, is very different from a town in west Texas.

"That means you can't just look it up in a book," he said. "You have to go to Vermont and you have to understand that town, that community, and those people. You have to understand what growth is going to be like and what is valued about that place. That might lead you to a very different solution than what is in the book."

In west Texas, on the other hand, you'll have a totally different situation, as well as different geography, community expectations, and history, which might lead to a very different set of circumstances than what was present in Vermont.

Giving people choices about how to get from Point A to Point B is at the heart of the concept of livability.

"So, context is king, rather than standardized design," he said.

How Transportation Impacts Livability

Livability's goal of creating places that offer choices in transportation and housing, as well as accessible destinations, requires a change in transportation planning, Kienitz said.

"Before you decide how you're going to spend your transportation dollars in a community, you actually have to look at that community and see what it will take to help it get closer to that livability profile," he said. "It's much more about identifying gaps in specific places to drive your expenditures and decision making, rather than adopting a particular technology or designing a facility and then doing that same thing everywhere."

In that way, livability is very much a needs-based concept, he said. That means that although everything is on the table for consideration, from opportunities for walking and biking to driving and mass transit, it doesn't mean that each and every one of those modes needs to be in every community.

"The problem with having a car-oriented development pattern and, therefore, transportation system means that the people who decide how development will happen and where the roads will be built are making the decision for everyone else about what kinds of transportation are going to be used," he said.

In a community that has a well-functioning, well-thought-out road system, destinations that allow for different modes of transit, and the availability of those modes, the choice is left up to the people, Kienitz said.

"In the end," he asked, "what's more American than leaving the final choice up to the individual?"

Implementing Livability

Many communities have been practicing the livability concept for decades, Kienitz noted. "We in Washington are catching up with lots of people who are already well down the road," he said.

The U.S. Department of Transportation is trying to make livability an objective and outcome in everything it does, Kienitz said, from spending discretionary funds and deciding what loans to give out to interacting with Congress about legislation and with state and local governments about project design and funding.

"The goal is to have the federal government always thinking about this when considering transportation policy and investment," he said.

Kienitz observed that since the adoption of the interstate highway

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COURSE	DATES & TIMES HELD	FACILITY	COUNTY
Equipment & Worker Safety (RS-S01)	Nov. 16, 8 to 11:30 a.m.	York City Wastewater Treatment Plant, York	York
Principles of Paving (RS-M12)	Nov. 17, 8 a.m. to 3 p.m.	Paradise Township Building, Paradise	Lancaster
Bridge Maintenance & Inspection (RS-M01)	Nov. 18, 8 a.m. to 2 p.m.	Brady Township Community Center, Luthersburg	Clearfield
Winter Maintenance (RS-M06)	Nov. 19, 8 a.m. to 3 p.m.	PSATS Training Center, Enola	Cumberland
Drainage: The Key to Roads That Last (RS-M04)	Nov. 23, 8 a.m. to 2 p.m.	Lehigh Valley Planning Commission, Allentown	Lehigh
Principles of Paving (RS-M12)	Dec. 2, 8 a.m. to 3 p.m.	Lehigh Valley Planning Commission, Allentown	Lehigh
Asphalt Roads Common Maintenance Problems (RS-M03)	Dec. 8, 8 a.m. to 12:30 p.m.	Lehigh Valley Planning Commission, Allentown	Lehigh
Traffic Signs (RS-S02)	Dec. 8, 8 a.m. to 3 p.m.	Woodward Township Fire Hall, Linden	Lycoming
Engineering & Traffic Studies (RS-S06)	Dec. 9, 8:30 a.m. to 4:30 p.m.	Monroe County Public Safety Center, Stroudsburg	Monroe
Equipment & Worker Safety (RS-S01)	Dec. 9, 8 to 11:30 a.m.	Lower Salford Township, Harleysville	Montgomery
Winter Maintenance (RS-M06)	Dec. 10, 8 a.m. to 3 p.m.	East Whiteland Township, Frazer	Chester

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system some 50 years ago and the advent of the federal government's involvement in transportation, the industry has gotten used to Washington saying, "We've got the answer, here's money to build it, and we're going to tell you what it is."

The livability concept is different, he explained.

"We don't want to tell you the answer," he said. "We want you to look at your community and figure out how to make it better and offer more options to more people to let them figure out how they want to organize their lives. You tell us what's going to do that in your community."

Challenges Remain

For the livability model to become a fundamental federal program, it will need to be included in the transportation funding reauthorization bill, which is still pending, Kienitz said. Consequently, there is a limited amount of funding and structure for the quasi-program.

This dearth of dollars has led to another challenge: finding a way to measure the success of the livability components in a community. There's a way to do it, but it involves a lot of collecting and compiling

of data, which is labor-intensive and can be costly, Kienitz said.

Limited funding means that state and local governments are not getting what they need to do the projects they want to do, and they don't want to divert any amount toward data collection, he said.

"If, down the road, there is enough money to do some of these projects, there might be enough to figure out of they're working," he said.

One thing is certain: When that funding becomes available, there will be plenty of communities clamoring for it, Kienitz said.

"Secretary [of Transportation Ray] LaHood says that everywhere he goes, people thank him for talking about this and tell him they really want to do this in their communities," he said. "His personal experience is that there is a demand for this everywhere."

That, if nothing else, is the best reason to make livability a federal priority, Kienitz said.

"What is the job of the federal government if not to respond to people's desire to improve their lives within the fiscal realities we have?" he asked.

For more information about the U.S. DOT's livability program, log onto www.dot.gov and click on the link for "Livability and the U.S. Department of Transportation." ♦

Meet the LTAP Advisory Committee

The PennDOT LTAP Advisory Committee is comprised of an appointed group of municipal government (elected and/or appointed) officials who serve a critical role as program advocates and assist PennDOT by attending training courses, reviewing course materials and content, and functioning in an advisory role on a variety of LTAP issues. The following officials currently serve as members of the Advisory Committee:

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