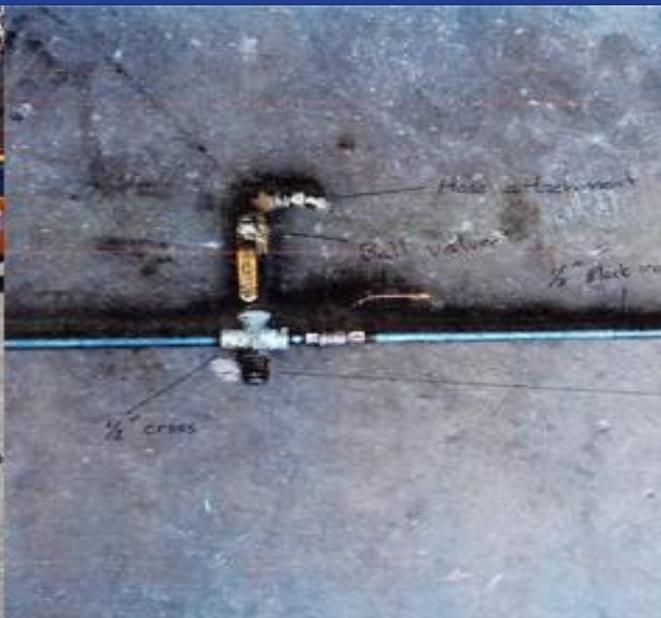


FHWA LTAP/TTAP
BUILD A BETTER MOUSETRAP
NATIONAL COMPETITION
National Entry Booklet 2013



Images from the 2013 Build a Better Mousetrap National Competition

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WHAT IS THE LOCAL AND TRIBAL TECHNICAL ASSISTANCE PROGRAM?

For over 30 years, the Federal Highway Administration Local & Tribal Technical Assistance Program (LTAP/TTAP) has provided information and training to local governments and agencies responsible for over three million miles of roads and over 300,000 bridges in the United States. The FHWA LTAP/TTAP Clearinghouse acts as a central source of information for 58 LTAP/TTAP Centers and other industry stakeholders.

The mission of LTAP/TTAP is to foster a safe, efficient, and environmentally sound surface transportation system by improving skills and increasing knowledge of the transportation workforce and decision makers.

The LTAP/TTAP Centers enable local counties, parishes, townships, cities and towns to improve their roads and bridges by supplying them with a variety of training programs, an information clearinghouse, new and existing technology updates, personalized technical assistance and newsletters.

Through these core services, LTAP/TTAP Centers provide access to training and information that may not have otherwise been accessible. Centers are able to provide local road departments with workforce development services; resources to enhance safety and security; solutions to environmental, congestion, capacity and other issues; technical publications; and training videos and materials. Sharing best practices is a cornerstone of the program; providing access to a wider range of information and resources creates a stronger national network overall.

WHAT IS THE BUILD A BETTER MOUSETRAP NATIONAL COMPETITION?

The Build a Better Mousetrap National Competition highlights innovative solutions to everyday problems and issues that local and county transportation workers and other LTAP/TTAP clients encounter. They 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. This booklet is a compilation of all the entries from the FHWA LTAP/TTAP 2013 Build a Better Mousetrap National Competition, representing LTAP/TTAP Centers from around the country.

If you would like additional information about the Build a Better Mousetrap National Competition please visit www.ltap.org or contact Carolyn Kramer at the FHWA LTAP/TTAP Clearinghouse at ckramer@artba.org or (202) 289-4434.

FIRST PLACE DYED HYDRAULIC FLUID: MICHIGAN

CONTACT:

City of Wyoming - Department of Public Works
Daniel Gard
City of Wyoming - Motorpool 2660 Burlingame SW
Wyoming, MI 49509
616-530-7262
gardd@wyomingmi.gov

PROBLEM STATEMENT:

Finding hydraulic leaks on snow-covered vehicles was difficult.

SOLUTION:

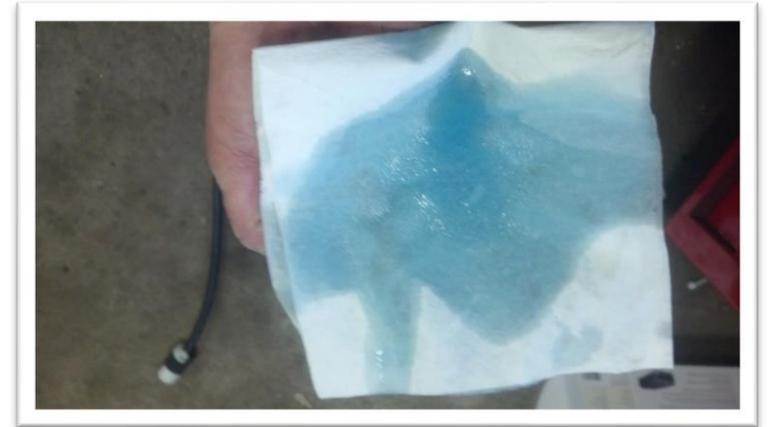
Dan Gard worked with a local oil distributor to find a blue, mineral-based dye to color the hydraulic fluid on City of Wyoming trucks. He chose blue because it stands out; most other colors can be confused with other truck fluids. To experiment with the dye, Dan added 1/2 to 1 cup to the 40 to 60 gallon hydraulic fluid tank on a few trucks. After experiencing no adverse effects, he added it to the rest of the trucks and also added about 3/4 gallon of dye to his agency's 300 gallon bulk hydraulic fluid tank. He has used the dye for three years. Dying the hydraulic fluid for their entire fleet requires about 4 gallons of dye per year.

LABOR/MATERIALS/COST:

\$35 per gallon

SAVINGS/BENEFITS TO THE COMMUNITY:

With the dye, hydraulic leaks are much easier to spot, which speeds up problem diagnosis and also simplifies the pre- and post-trip checks for drivers.



SECOND PLACE ASPHALT SPRAY BAR SYSTEM: COLORADO

CONTACT:

El Paso County Public Services
John McMinn
3275 Akers Dr
Colorado Springs, CO 80922
719-520-6827
ctap@colorado.edu

PROBLEM STATEMENT:

Our problem developed during our asphalt patching operations. When patching larger areas, for example "blade patching" using a grader or backhoe bucket, we were using our truck mounted spray wands to apply the "tack oil" so the asphalt would adhere properly to the existing asphalt surface. Doing this by hand resulted in uneven application, the use of too much product, and on windy days, the operator getting covered with tack oil - ruining clothing, getting into the trucks and worse at times getting into eyes and faces of employees. Using a distributor truck for these relatively small jobs was "overkill" and was too problematic with the amount of tack oil involved.

SOLUTION:

A pair of our employee/operators came up with a simple, cheap, and effective solution. Using their own time and money for the prototype, they developed a "spray-bar" that hung on the back of the asphalt patch truck, on the lift arms for the patch roller. The hand wand can be quickly disconnected, and the hose attached to the spray-bar. The bar has several valves that can control the width of the area being sprayed and the roller lift can raise or lower the bar changing the thickness of the pattern. This can all be turned on and off from inside the cab while on the move.

LABOR/MATERIALS/COST:

Total cost was about \$40.

SAVINGS/BENEFITS TO THE COMMUNITY:

The effect on the job was immediate and dramatic, we were seeing a more even application of the tack oil, resulting in a better final product, using about a third less oil saving us money at the onset. To top it all off, our operators were no longer going home "wearing" a layer of tack oil, keeping it out of their eyes and off their clothes. The spray-bar project has proven to be a "win/win" for the county and the workers!



THIRD PLACE BRINE MAKING TOTES: PENNSYLVANIA

CONTACT:

Nazareth Borough, Northampton County
Robert Reimer
134 South Main Street
Nazareth, PA 18064
610-759-2543
nazboro@rcn.com

PROBLEM STATEMENT:

This municipality, like many across Pennsylvania, wanted to apply brine to their winter maintenance program but did not have funds to purchase the necessary equipment.

SOLUTION:

The Public Works Director, Robert Reimer, contacted a neighboring municipality, who had been doing this for a couple of years. That municipality purchased the spray set-up along with a brine maker. Robert, along with his highway crew, had to find a way to make the brine and apply it at minimal cost. They came up with an idea to use palletized totes to make, apply and store the brine. The highway crew took about a day to cut the totes, drill the holes and install the pipe and valves along with the wooden hopper.

LABOR/MATERIALS/COST:

\$300 - for spray bar with hose, solenoid valve and camlock fittings \$150 - brine making tote \$90 - application tote \$540 in total costs.

SAVINGS/BENEFITS TO THE COMMUNITY:

Savings are abundant as a manufactured system can cost up to \$20,000. Savings for salt increase with each weather event: the first salting would take about 12-16 tons of salt for our streets. With brine it takes about one ton of salt.



SPRING COMPRESSION TOOL: CONNECTICUT

CONTACT:

Town of Vernon
Dwight Ryniewicz
383 Hartford Turnpike
Vernon, CT 06066
860-870-3500
dryniewicz@vernon-ct.gov

PROBLEM STATEMENT:

The mechanics needed a safer way to compress and install trip edge springs on Tenco Plows.

SOLUTION:

The tool is placed on top of the spring perch, with the shaft extending through the coil spring. A bolt is placed through the bottom of the tool, allowing the tool to be tightened and the spring to be compressed. Tension is taken off the spring, now the bottom retainer pin can be safely removed from the bottom spring perch. The tension can now be released on the tool and the spring can be safely removed. Reverse the procedure to reinstall. This tool works very well and has saved the town down time on equipment and increased productivity.

LABOR/MATERIALS/COST:

\$20.00 - \$30.00

SAVINGS/BENEFITS TO THE COMMUNITY:

Increased productivity and makes the job a lot safer.



INTAKE BACKING PLATES FOR CITY STORM DRAINS: MONTANA

CONTACT:

City of Bozeman Street Department
Steve Kurk
814 North Bozeman Avenue PO Box 1230
Bozeman, MT 59771
406-582-3200
skurk@bozeman.net

PROBLEM STATEMENT:

On the Bozeman city streets, intake backing plates covering stormwater drains were being damaged by heavy equipment running over them or struck by snow plow trucks during winter months. These plates are required by City of Bozeman's Engineering Department to protect debris from getting into the stormwater drain systems.

SOLUTION:

The usual method of replacing damaged intake backing plates required digging out old broken plates embedded in concrete, removal of concrete and infrastructure in concrete. It would take approximately three days in labor cutting into concrete to replace entire backing structure. After looking at viable solutions, it was determined that a metal cap could be bolted onto the remaining infrastructure of the damaged plate.

LABOR/MATERIALS/COST:

Cost Involved: Labor = \$75 (One employee three hours @ \$25/hour) Materials = \$25 Total Cost = \$100

SAVINGS/BENEFITS TO THE COMMUNITY:

The savings and benefits to the City of Bozeman include less time and materials for repairing damaged intake plates, approximately three hours versus three days, for a savings of \$700. The other benefit is repairing a damaged intake plate in a quicker time frame and thereby meeting the requirements of City of Bozeman's Engineering Department protecting the stormwater drain system.



MOTOR GRADE WHEEL RAKE: NORTH DAKOTA

CONTACT:

Griggs County in North Dakota
Matt Monson and Jim Anderson
PO Box 427
Cooperstown, ND 58424
701-797-3420
wayne.oien@griggscountynd.gov

PROBLEM STATEMENT:

After the ditch has been mowed, grass from the ditch blows onto the roadway. When blading the road with a motor grader, the grass mixes with the gravel causing big mounds and ridges. Two to three feet of mowed grass ends up on the roadway narrowing the width of the roadway. The mounds and ridges are a hazard to the traveling public and the potential for accidents increases.

SOLUTION:

Modify a wheel rake to mount on the front end of a motor grader to remove the loose grass on the roadway prior to the road being bladed. The rake attaches to the dozer blade with multiple adjustments for angle and height. After the loose grass is raked into the ditch it blows away or deteriorates.

LABOR/MATERIALS/COST:

The wheel rake was discarded by a local farmer and was acquired at no cost to the county. Miscellaneous material was used to modify the rake to include flat iron, telespar tubing, and nuts and bolts for a cost of \$50. The labor involved was for two people for 8 hours @\$35/hour combined for a cost of \$280. The total cost was \$330.

SAVINGS/BENEFITS TO THE COMMUNITY:

The safety to the traveling public is greatly improved by the elimination of mounds and ridges of mixed grass and gravel. The roadway is wider and the gravel is more evenly distributed on the roadway. In only having to make one pass blading with the wheel rake mounted on the motor grader saves time and money instead of having to make multiple passes without the rake. Employee and public safety is improved because they don't have to spend time on the road surface removing large bunches of grass mixed with gravel.



CONCRETE BRIDGE BEAM LAUNCHER: OHIO

CONTACT:

Preble County
David Krazl, Bridge Supervisor
1000 Preble Drive
Eaton, OH 45320
937-456-4600
davidk@prebeng.org

PROBLEM STATEMENT:

Our agency replaces up to eight bridges per year using precast bridge beams that are made by our workforce in our beam shop. Our fabricated pre-cast beam sizes range from 10 to 40 feet. Typically each bridge, depending on the span, would require at least 8 beams. The average beam sizes are 20 to 30 feet in length and 18 to 24 inches thick. Each beam, depending on length, can weigh up to approximately 20,000 pounds. Because of the intense schedule of bridge replacements and rising costs each year, we were looking for ways to save money. We evaluated the costs associated with beam replacement requiring the use of a private crane. There also were challenges at times for the subcontracted crane service to meet our tight schedules of the bridge crew during the busy construction season.

SOLUTION:

Build a beam launch devise. Basically it is a heavy duty rail track system with an attached cart that rolls back and forth. During the staging process, the beam launcher is hoisted across the span of the bridge abutments. The cart, simply made of a truck fifth wheel on heavy duty casters, is permanently attached to the rail. The beam launch requires the use of a rubber tired loader, a rubber tired excavator, and a track excavator. All these pieces of equipment are already used at the job site for the bridge construction. The semi-truck, with the loaded beam, backs up to the bridge. The loader attaches to one end of the beam, while the excavator attaches to the other end of the beam. The beam is then hoisted onto the beam launch. One end of the beam fits onto the launch cart, while the other beam is still secured to the loader. The loader attached to the rear of the beam then slowly moves forward. The forward end of the beam that is attached to the cart, then slowly wheels across the track to the other side of the bridge span. Two excavators, one located at each abutment wall, will then lift the beam off the cart equally. The beam is then set into place. It takes approximately four hours to set eight beams using the same amount of labor that it would have taken using a crane.

LABOR/MATERIALS/COST:

The total cost of material which included the two steel I-beams and steel members that were used to build the beam launcher was only \$1,100. Additional costs of \$2,400 included miscellaneous hardware, welding and torch use, and county workforce labor. The total investment of this device came to \$3,500 which is slightly over the crane service cost of JUST one bridge replacement project.

SAVINGS/BENEFITS TO THE COMMUNITY:

Crane costs from a sub-contractor average \$2,500 per bridge. The beam launcher will account for approximately \$25,000 per year savings. Another benefit is that the bridge crews have more flexibility with project scheduling in setting the bridge beams. Purchasing a crane is not a feasible option because of the expensive initial purchase, the additional maintenance costs, and having an experienced crane operator. This monetary savings can be applied to other much needed maintenance/replacement projects. Most importantly, this agency is proud of the hard work and team involvement with the bridge supervisor, fabricator, and all who were involved with this successful, cost savings solution.

APPENDIX: ADDITIONAL STATE MOUSETRAP

In this section you will find entries for Centers' Build a Better Mousetrap Regional Competitions.

ADDITIONAL REGIONAL ENTRIES:

COLORADO

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OHIO

Pg. 12

PENNSYLVANIA

Pg.

CONSTRUCTION FILE RACK: CITY OF FOUNTAIN

CONTACT:

Tom Harmon
City of Fountain Inspector
719-322-2074
tom@fontaincolorado.org

PROBLEM STATEMENT:

The amount of space and equipment needed for stands to store files to stand in become too cost prohibitive. Purchasing the stands was about \$100.00 each and to hold just this many files would have required about 5.5 racks.

SOLUTION:

A 7 foot by 4 foot Construction File Rack was designed and constructed to minimize cost and office space used.

LABOR/MATERIALS/COST:

The Construction File Rack was designed with three sheets of fiber board with 2" x 2" supports. Holding two of the sheets together, with one being about a 1/2 lower or higher than the other, a 3 1/2" hole was drilled through both of them. The holes were centered about 5.5 inches apart to mark drill holes for the hole saw. The back sheet which has no holes was screwed or nailed to two side sheets that are 2ft x 8ft. The front and back sheets are attached to 2" x 2" posts in order to support the file system. 3" by 24" cardboard tubes were attached through each hole. Due to low ceilings, the sheets were cut to 7 feet tall. The file rack took one person two days to construct. Letters were installed on the top row and numbers on the side rows to allow printing a list of plans for quick reference – for instance a subdivision located in B-3, etc.

SAVINGS/BENEFITS TO THE COMMUNITY:

The file rack holds 165 construction plans in a 4' x 2' area, expediting efficiency. The completed project saved the city about \$450.00, taking up a lot less room in offices.

SIDE CHUTE SYSTEM: ARAPAHOE COUNTY ROAD AND BRIDGE

CONTACT:

James Bunner and Frank Behrens
Arapahoe County Road and Bridge
4405 S. County Road 129
Bennett, CO 80102
jbunner@co.arapahoe.co.us

PROBLEM STATEMENT:

The Arapahoe County Road and Bridge Crew was looking for an easier way to fill in around the guard rail portions of our bridge decks after we had cleaned, graded, and added new asphalt near the guard rail sections of the bridge.

SOLUTION:

The Road and Bridge Crew has access to a shouldering machine, but felt that it was too big and would still not put the material where it needed to be - under the guard rail areas. The Crew then looked at tandems that have conveyer belts in the bottom and feed a side spinner for applying salt and sand. We pulled a spinner off the truck and extended the side chute. We made it so we could adjust it with a chain and could fold the chute up completely for travel mode. The chute is on the driver's side of the truck allowing the driver to see the amount of material needed and that it is being put out evenly. This allows other crew members to rake the material down to match grade without need of other equipment and with little or no waste.

LABOR/MATERIALS/COST:

The process to build the Side Chute and attach it to the truck took about 4 hours. The materials needed to build the chute included:

1 - 4'X2' used sign	6 - 1/2" lock washers
1 - 4'X2.5' used sign	6 - 1/2" flat washers
1 piece of 1/2 " conduit 13" long	3 - 1/4" nuts
1 - 5/16" chain hook	3 - 1/4" lock washers
1 - 5/16" clevis	3- 1/4" flat washers
10' of 5/16" chain	3 - 1/4" X 1" Bolts
18" of 1/2" thread	2 – Tarp Straps 6" long
12 - 1/2" nuts	

SAVINGS/BENEFITS TO THE COMMUNITY:

Total Cost was approximately \$200.

There is a great savings of time and material to Arapahoe County since we started using the Side Chute system. We are using about 25% as much time and material as we previously were to do fill-ins on the guard rail projects. The savings of materials and manpower has been significant.

By using the Side Chute system the projects are completed much quicker and more efficiently making it easier for us to control traffic and keep our safe by spending less time in the roadways.

OHIO

SPREADER/AUGER: St. Clair Township, Columbiana County (Second Place in Ohio's Build a Better Mousetrap State Competition)

Contact:

Scott Barrett, Road Supervisor
15442 Pugh Road Suite #1
East Liverpool, OH 43920
330-385-5509
sbarrett@stclairtwp.com

Problem Statement:

Spreader auger wears out too fast due to the abrasive winter mix of salt, #8 slag & #1G-ash.

Discussion of Solution:

Reinforce auger post & auger outer rims with stainless steel.

Labor, Equipment, & Materials Used:

Uses 5 lbs. #ER 308 LSI .030 stainless steel mig wire. About 4 hours of labor by a community service person (free labor).

Cost:

1 lbs. of #ER 308 LSI wire is about \$10.00 for about \$50.00 total in cost.

Savings/Benefits to the Community:

Depending on the season an auger would last about 1 ½ seasons without the reinforced outer rims & center post. Pictures #1, 2 & 3 are of our 3rd auger built last year. Pictures 4, 5, 6 & 7 are our 1st prototype 3 years ago till 2/13/2013 and going. The cost of auger about \$350.00. It only last about 1 ½ years. Our prototype has already lasted 3 years and still going strong. We should get at least another 3 years out of it easy. So our savings keep growing every 1 ½ years. So every 6 years we get out of an auger is 6/1 ½ yrs. = 4 less augers to buy. 4 x \$350.00 = \$1,400.00.

\$1,400.00 savings every 6 years per truck/6 years = \$233.30 per year savings.

End Results: \$ 233.30 a year savings per truck X 5 trucks = \$1,166.50 a year total savings

RHINO LIFT: Colerain Township, Hamilton County (Third Place in Ohio's Build a Better Mousetrap State Competition)

Contact:

Tim Lange, Road Supervisor
4160 Springdale Road
Colerain Township, Oh 45251
513-385-7502
tlange@colerain.org

Problem Statement:

We had a need to lift heavy castings for catch basin inlet rebuilding. With our aging infrastructure and over 3300 catch basin inlets we had to get creative to improve efficiency and promote safety for our employees, residents and the traveling public. To rebuild a catch basin, we had to take extra equipment to the job site, such as an extra dump truck pulling a drag with a backhoe. This took up valuable residential street parking and was necessary to give us room needed to park the equipment and perform the job. This also required an extra person and time for advanced posting of temporary no parking signs on the day prior to the work beginning. Another concern was a safety issue of unloading and loading the backhoe on the street. Also there was a lot of extra travel time and a piece of equipment tied up for an extended period that was needed and used only at the start of the rebuild to remove the casting and set it off to the side and then not needed again until the end of the rebuild which would be placing the casting back in place on the following day. Another item was a safety issue because workers would attempt to lift the lighter but still too heavy single catch basin inlet castings by hand to prevent all the inconveniences mentioned above which caused a major concern for back safety or additional injuries. The double catch basin inlet castings were just entirely too heavy and required the equipment and the inconveniences above.

Discussion of Solution:

Working as a team – Road Supervisor Tim Lange, Maintenance Workers Steve Rader, Paul Schwab & Kraig Rieman used years of experience & outside the box thinking to come up with a solution to address our problem as stated above. The goal was to increase productivity, save cost & improve safety. The key factors we addressed were to use the least amount of equipment possible while reducing lost travel time and to avoid using valuable street parking while also addressing personal and public safety issues. The solution was to utilize our single axle dump truck with the snow plow frame attached and putting to use the trucks hydraulics to perform the heavy lifting. We discussed, designed and fabricated a lifting arm with an easy to install system that attached to our existing snow plow frame and designed a clamp attachment for a secure and balanced hold on the casting. We named this the “Rhino Lift” – see the attached pictures and use your imagination and you will probably see how we came up with this name.

Labor, Equipment, & Materials Used:

The total labor thru design, building and modifications was about 30 hours. The equipment we used to construct The “Rhino Lift” attachment was simply utilizing our welder, cutting torch, grinder, drill and various hand tools. Materials we used were the scrap recycled beam, other pieces of scrap metal for the beam attachment to our existing plow frame and the clamp attachment, a section of chain, a plow marker bolted to the top of the frame in the front for visibility, and finally paint.

Cost:

Our Cost besides our labor hours were at a minimum. We used a recycled/scrap metal beam that had been in our possession and not used for about 25 years and scrap metal pieces and chain we had around the garage. The minor cost was the plow marker we installed after some trials so the driver could see the lifting arm in front of the truck from the driver’s seat and the paint. Estimated cost is \$75.00.

Savings/Benefits to the Community:

The savings & benefits of this innovativeness are dramatic. This creative tool was developed and designed for a minor cost with a major payback to Colerain Township and its residents. Overall efficiency was greatly improved from reducing the extra equipment to and from the job site twice. Labor hours were reduced as to not needing to post street in advance and moving the equipment to and from the job site twice. There will be a great savings in fuel usage. The residents will have less disruption and street parking issues will be reduced to only the area of the catch basin inlet repair. Safety for the township employees in regards to loading and unloading equipment on the street and for their personal back safety which is vitally important and will help reduce the chance for worker compensation claims. The “Rhino Lift” will greatly improve the ease of lifting and resetting castings thus making it safer, significantly reducing cost, improving the time needed and quantity of catch basin inlet rebuilds. The “Rhino Lift” is already paying dividends now and will way into the future.

THE “SNOW BELTER” TOTAL BRINE SYSTEM: Chardon Township, Geauga County

Contact:

John Washco – Road Superintendent
9949 Mentor Road
Chardon, OH 44024
440-285-9002
Chardontwproads@aol.com

Problem Statement:

How could a small Township Road Department in the “Snow Capital” of Ohio get the benefits of adding Brine to its snow fighting arsenal without spending an exorbitant amount of money on a fully functional, turn-key Brine System complete with mixing, distribution and storage?

Discussion of Solution:

ANSWER: We challenged one of the largest plastics/fluid handling companies in the Midwest to develop a total turn-key brine system made specifically for small towns at a price somewhere near \$10,000. Indelco Plastics Corporation of Minnesota accepted the challenge. Together we designed, developed and refined a turn-key system that now puts us in the same league as ODOT. During the initial design of the distribution tank we increased the challenge to have the tank double as a Hydro-seeding system during the off season. This additional use of the system greatly impressed our Trustees when it came time to attempt to get the purchase approved.

Labor, Equipment, & Materials Used:

Design phase; Received significant input from our Brine/Liquids Mentor, John Thorpe, retired ODOT/35 years. 850 gallon mix-tank with 5 HP Honda pump to agitate and dissolve the solution. 2,100 gallon storage tank. 725 gallon, skid mounted distribution tank, with 5 HP Honda Pump, spray bar with drag hoses. We modified the mix-tank agitating header to our own design which cut batch time from 2 hours to 30 minutes. We also designed a front mounted spray bar for applying liquids in icy conditions ahead of the wheels. Installed Firestone Air-Bag system on 2003 F-550 4x4 dump to accommodate the 725 gallon tank's weight. Simple manual valves, not costly electronic.

Cost:

Since we were the design, development and testing partners with Indelco, we received a significant discount on the system and purchased the proto-type for \$9,999.95. When the system goes to market this year it is anticipated to sell for \$15,900. We purchased a used 2,500 gallon storage tank locally to increase our total storage to 6,100 gal. We hope to add 10,000 gallons of additional storage this year and another distribution tanker truck with 2,000 gal. capacity.

Savings/Benefits to the Community:

First year cost analysis is not complete yet, but here are the facts. The tanker has been out countless times by itself where in the past 3-4 salt trucks would be used to treat road conditions. Roads pre-treated with brine no longer hard-pack which gives us MUCH SAFER roads and buys us time before plow trucks are needed, saving us man hours. We have been able to eliminate the salt/cinder mix and use straight salt which performs much better, and eliminates high berm conditions that damage roadways and are costly to clean up. Subdivisions that had been snow packed in the past are now cleared quickly and icy road conditions are nearly a thing of the past.

PUBLIC WORKS WORK ORDER & SPECIAL SERVICE REQUEST DATABASE: City of Centerville

Contact:

Marty Tackett
7970 South Suburban Road
Centerville, OH 45458
937-428-4738
MTackett@centervilleohio.gov

Problem Statement:

Being a Public Works Department that provides services to a City with a population of approximately 24,000 citizens we have a lot of various work orders that are generated for many requests. Our past system required our Public Works Secretary to write a work order that was a triplicate form that would allow for the Public Works Director to receive a copy, the Public Works Supervisor to receive a copy that would be handed down to the crews and finally an original that would be filed separately by location for future reference. Our Street Department would also assist our Refuse Department with bulk pickups that were recorded on triplicate forms as well. These special service requests were also used to bill the Refuse customer. Researching status of a particular work order or special service request required communication among staff members and/or the research through filing cabinets to find the desired information. Finding history for a particular address or request would take some time even though we had an organized filing system for the processed requests. Time is money and efficiency makes the difference especially when dealing with the public. Being able to sort out sign requests, asphalt requests, catch basin requests, tree requests etc. was nearly impossible under our old system.

Discussion of Solution:

Computerizing the work orders and special service requests would be the ideal arrangement so that at a click of the mouse we could generate the required information for any work order or special service request whether it was being processed, been processed or if a new work order was needed. Streamlining the process so that being able to go back multiple years would still be only a click away would be the focus of our goal. Having the ability to track required maintenance patterns or the ability to pull stats for various requests such as sign requests, asphalt complaints or catch basin repairs just to name a few would provide an efficient foundation for managing our resources. Allowing multiple employees in the organization to have access to the same information at the same time while sitting at their computer would be the ideal goal for efficiency for our organization. Customer service could be expanded throughout our department without the unnecessary research through file cabinets or communication with among employees to locate answers related to past or current work orders. The system would have to be user friendly, economical and accessible for all involved and Microsoft Access seemed to offer the answer.

Labor, Equipment, & Materials Used:

One of our Public Works Supervisors utilized his time for the labor on the project, the equipment used was a City owned computer and the materials were Microsoft Access program all of which the City already owned.

Cost:

As noted above the labor was provided by the City and the equipment and materials were already purchased. Time involved for designing the data base totaled approximately 80 hours and requires an additional 25 hours on a yearly basis to reorganize for the next year.

Savings/Benefits to the Community:

The entire project was performed in house so there was no upfront cost incurred. Future savings is difficult to measure since this is the type of project that gets better with time. When it comes to looking up a past records the older the record the longer it can take to locate. With a database that shows multiple years the answer can be generated at a click of the mouse preventing wasted hours looking through past records. Another savings is the reduced cost for paper. The past system required triplicate work orders and special service requests that cost 32 cents each in 2007. With the computerized Access system normal printer paper can be used to generate the work orders eliminating the third copy for the secretary's file since the program will store the information. The ease and convenience of looking up information and pulling specific reports for "types of complaints" allows our Department to see where our efforts are utilized. It allows us to track if there are patterns for maintenance that may be red flags for future planning. It provides special service request information for billing of our Refuse customers through our Finance Department. The new system has improved our efficiency and ability to provide excellent service for our residents.

BRINE DELIVERY SYSTEM: City of Cuyahoga Falls

Contact:

Charles Novak, Street Department
2560 Bailey Road Cuyahoga Falls, OH 44221
330-971-8030/ NovakCJ@cityofcf.com

Problem Statement:

To find a better way to fully utilize our salt brine supply in an efficient, easy to operate, and cost effective way, giving us the ability to anti-ice and de-ice roadways and parking lots, fill satellite brine tanks as well as the ability to flush bridge sidewalks with brine in the winter or bridge underpasses and raised islands with straight water in warmer months..

Discussion of Solution:

From a functionality perspective, we wanted something easy to operate, easy to take off and on if necessary, the ability to handle the harsh environment, and it had to at least handle all of our current application needs. We didn't want something that was too complicated to work on and it needed to be cost effective to build. An old plow frame, which was going to be scrapped out, was utilized for the framework. This gave us the ability to use it on any of our trucks, it was of sturdy construction, it had raising/lowering as well as power angling abilities, and it did not cost us anything extra for our project. By having our brine-dispensing unit in front of the truck, it gave the driver better vision of what was happening while looking forward and driving. The idea that it was better to push the snow from the front rather than to coat the snow from the back made this an even better idea. 2" flexible plastic tubing was used. This low cost material can handle the harsh environment while not rusting under the brine usage. The plastic tubing had gave us less friction loss for pressure through a smoother interior surface and fewer hard angles compared to steel plumbing. Simple brass ball valves were used to give the operator the different functionality. They could just use the front fan sprayers to de-ice, just used the side flusher for sidewalks, or adjust the valves to simply fill/refill the brine storage tanks at each salt barn.

Labor, Equipment, & Materials Used:

Labor – 2 persons @ 5 days each. Material–1 used plow frame(\$0), 4 ball valves(\$360), 20' vinyl 2" hose(\$40), Assorted 2" plumbing fittings(\$340), Rust-proofing paint(\$20)

Cost:

Total cost to fabricate - \$700-\$800

Savings/Benefits to the Community:

Salt brine is free to the Street Department while dry rock salt costs \$48.96 per ton. While using this unit to anti-ice, we are saving 5-7 times the amount of rock salt it would take to de-ice. When we are using it to de-ice, we are saving 100% in dry material! When used as a sidewalk flusher, the brine cuts right through even deep, heavy snow leaving wet sidewalks in no time. This works great for helping children get to school since State Route 8 and the Cuyahoga River bisects our city and bridge access is of great importance. We have a low cost solution that allows us to effectively remove snow and ice utilizing existing vehicles. We feel that it is easier and safer for our drivers as well as better for our citizens and the entire driving community!

COMPUTERIZED SIGN MAINTENANCE AND MANGEMENT RECORD KEEPING: Jackson Township, Ashland County

Contact:

Cheryl Welch, Township Trustee
464 Township Road 700
Polk, OH 44866
419-945-2698
Cwelch12@frontier.com

Problem Statement:

To automate the record keeping associated with road sign management and maintenance

Discussion of Solution:

When it became a federal mandate to implement sign retroreflectivity guidelines our township was faced with many concerns:

- 1) Once we determined which signs needed replaced how would we ultimately keep track of the signs that were being replaced, since municipalities have been given the flexibility to deal with the regulations on their own schedules we would not be replacing all of our signs at once.
- 2) Once a sign was replaced how would sign life retroreflectivity be tracked (as a HIP rated sign may last up to 10 years).
- 3) How would we track the replacement of an HIP rated sign that was damaged?
- 4) If we measured a signs retroreflectivity at different times of the year, where and how would we record that information?
- 5) Off-the-shelf road and traffic sign asset management software was costly and too complex for our township. (We have a budget of about \$225,000 – 23 miles of road to maintain).
- 6) The need was for something inexpensive and customizable to our immediate needs.

It became imperative that the solution be addressed in Microsoft Access because there was a need for multiple tables. At a minimum 2: Master sign and Sign Maintenance. Therefore a relational database was developed. A solution utilizing Microsoft Access had flexibility and expandability:

- Amount of data is irrelevant. A township with 10 signs vs one with 500 can be accommodated.
- Type of data is irrelevant which is why townships which require more information to be tracked on their signs can be easily accommodated.
- Complex queries can be built for any type of data retrieval.

Labor, Equipment, & Materials Used:

- 1) Used my own personal digital camera as well as the one owned by the township to take pictures of all the signs in the township (traffic, road, parking lot and others).
- 2) Assigned a unique code to each sign and recorded it in the database along with any other relevant data. NOTE: Easy to add fields to

capture any other data a township would deem important to their sign maintenance and management program.

3) Conducted a 30 minute training session with road crew and other two trustees on how to use application.

Cost:

Really nothing.

- Digital camera already owned by township for zoning department.
- Computer already owned by township.
- Software developers application tool was Microsoft Access which was already owned by the township as part of the Microsoft Office Suite.

This project was really just a matter of pulling all three components together – developing the application in Access and teaching everyone on how to use it.

Savings/Benefits to the Community:

Community of Township Officials:

- 1) The ease and simplicity of collecting data on paper can still exist – let's face it the road guy is still going to write down notes on paper or mentally record in his head what he's done with a sign – but the benefit is in using access to store and analyze that data, giving it meaning and order. Paper could be eliminated if road crew has a laptop that can go into the field.
- 2) Satisfies the FHWA's recommendation (from Chapter 4 of Publication No. FHWA-HRT-08-026) that agencies keep track of their sign inventory and periodically extract information on signs that are reaching the age at which they need to be replaced.
- 3) Satisfies the FHWA's recommendation (from Chapter 4 of Publication No. FHWA-HRT-08-026) that agencies track the installation date of their signs. Eliminates the practice of placing an installation date sticker on the sign.

Additional information:

#1) The uniqueness of this application is its simplicity. Initially capturing any and all "sign" history. Sign history can consist of single or multiple entries regarding:

- Purchase date
- Installation date
- Replacement date
- Retroreflectivity reviews

Very user-friendly and requires minimal computer literacy.

#2) The 2nd unique feature of this application is its expandability. Fields can be added or removed to accommodate any data collection an agency would deem appropriate for its needs.

#3) Reports are very basic as of right now. Can easily be modified to meet the needs of the users.

PILE CUT OFF TOOL: Logan County

Contact:

Todd Bumgardner, General Superintendent
1991 C.R. 13
P.O. Box 427
Bellefontaine, OH 43311
937-592-2791
tbumgardner@co.logan.oh.us

Problem Statement:

While building Ohio's 1st recycled thermoplastic bridge outside the Village of West Liberty in Logan County Ohio our crews were faced with the requirement of the design engineers for a level pile cut off. The level pile cut off was integral for the pile cap bearing and the stability of the thermoplastic structure. Even with extra care while driving to keep the piles plumb the crew knew that cutting the pile level using carbide tipped chainsaw chain to meet engineering requirements was going to be a challenge.

Discussion of Solution:

To achieve the design goals the chainsaw would need to be mounted securely while being free to pivot in the horizontal position. The pivot point would need to be connected to a platform that was secured to the pile. The end result would allow for the employee to just guide chainsaw through the cut.

The tool was based on a platform with a circular hole in the center a few inches larger than the pile diameter. The platform created the foundation for the chainsaw to "ride" on while being guided through the cut. On the platform were a scored arced guide and a chainsaw anchoring bolt that also served as a pivot point. A hole was drilled in the chainsaw bar near the end allowing the anchoring and pivot bolt to be inserted. The chainsaw was also outfitted with a piece of PVC pipe near the engine which allows the weight of the saw to ride on the platform. The design allowed for the PVC pipe to "ride" in the arced guide during the cut. The platform was welded to a circular two tiered cage also a few inches larger than the pile diameter. When fitted with bolts the circular cage solved both the leveling and anchoring of tool relative to the installed pile.

Labor, Equipment, & Materials Used:

1. One (1) Logan County Employee to fabricate (Six (6) hours at \$18.30/hour); Two (2) Logan County Employees to assist in fabrication and testing (three (3) hours at \$18.50/hour for two (2) (employees); Bridge Superintendent for design and oversight (Eight (8) hours at \$21.00/hour); Bending of cage rings and cutting of platform hole from fabrication shop – No Charge
2. Angle Steel – 1 1/4" x 1 1/4" x 72" at \$12.40/10' stick; Flat Steel – 2" at \$11.76/8' stick; Square Tube – 1" at \$15.92/8' stick; Sheet Steel – 20ga at \$11.62; Mics - \$20.00

Cost:

Labor: \$388.80; Materials: \$71.70= **Total Cost: \$460.50**

Savings/Benefits to the Community:

The Pile Cut-Off Tool was part of a complete bridge construction project. The Onion Ditch Bridge is the longest single span structure of its kind in the world and only the 2nd of its kind placed in service on the federal highway system. It is made of 100% recycled thermoplastic materials with stainless steel and galvanized bolted connections. The structure was funded through The Innovative Bridge Research and Deployment Program available from FHWA. The bridge has received national exposure in the February issue of Roads and Bridges Magazine. While common techniques and tools were used in construction often it took the ingenuity of the crew to get the days task completed. The Onion Ditch Bridge replaced a 1908 structure and is built to current standards. The lifecycle cost of the structure is projected to be much less than the typical bridge and will serve the public for many years.

3 IN ONE: Village of New Lexington

Contact:

Chuck Hicks, Public Service Director
215 South Main Street
New Lexington, OH 43764
740-342-4227
nlstreet@netpluscom.com

Problem Statement:

Truck Repair – Water Line Repair – Sewer Repair in one truck instead of 3 trucks.

Fire Dept. had old EMS Squad and gave to public service

Discussion of Solution:

Repair Trucks 1 truck
Repair Water Line 1 truck
Repair Sewer line 1 truck
Now 1 Truck is set up for all.

Labor, Equipment, & Materials Used:

Truck –	Free
Air Comp.	1400.00
Paint	70.00
2 Labor 21Hrs.	504.00
Total	1974.00

Cost:

Savings/Benefits to the Community:

Less fuel, less men because 1 truck broke down on road. Do not have to tow back. Can work on site, faster response time pull up on site. Less time moving 2 other trucks, space for parts, and tools.

SALT SPREADER SUPPORTS: Painesville Township, Lake County

Contact:

Bill Thompson, Service Director

558 Fairport-Nursery Road

Painesville, OH 44077

440-352-2661

wthompson@painesvilletwp.com

Problem Statement:

We were storing our salt spreaders in a separate location from our snowplows and wanted a way to keep them stored in the same area to better utilize our inside storage space. We wanted to be able to keep the salt spreaders off the floor.

Discussion of Solution:

Using existing holes in our Wassau plow frame, we designed and built spreader supports to store the spreader for each truck with the truck plow. They are now stored off the floor and we are using less storage area for both plows and spreaders.

Labor, Equipment, & Materials Used:

Our welder/maintenance man used angle iron and round stock to design and build the hangers. Each one had to be custom welded due to varying hole locations on plow supports.

Cost:

Material cost: \$25.00/set 8 sets = \$200.00

24 hours to cut & weld & paint

Savings/Benefits to the Community:

Better use of inside storage area allows us to keep more of our equipment stored inside out of the weather.

COLD PATCH PORTABLE STORAGE BIN: Painesville Township, Lake County

Contact:

Bill Thompson, Service Director

558 Fairport-Nursery Road

Painesville, OH 44077

440-352-2661

wthompson@painesvilletwp.com

Problem Statement:

Cold patch stored outside would get wet and the moisture would freeze. Using the cold patch was difficult due to ice and if the stockpile was not used quickly enough we would scrap it and purchase new material that was ready to use.

Discussion of Solution:

We needed a way to store the cold patch inside so it would be warm & ready to use at any time. We didn't like leaving it on a truck for extended periods because it limited the availability of the truck. We decided to build a wooden storage bin inside the Service Garage big enough to hold 1.5 tons of material. It was built so that it could be moved with a forklift if needed. We are able to load our truck inside using a skidsteer and dump any unused material back into the bin at the end of the day.

Labor, Equipment, & Materials Used:

Two men spent 12 hours building the bin out of 2x4 studs and treated plywood.

Cost:

Approx. \$150.00 for lumber and hardware

Savings/Benefits to the Community:

Less waste of cold patch stock due to extended periods of outside storage. We now are able to use 100% of purchased cold patch material.

PENNSYLVANIA

2ND AND 3RD PLACE ENTRIES: Pennsylvania

We would also like to recognize the following entrants who placed 2nd and 3rd, respectively:

Elk Township/Clarion County for their entry *Anti-Skid Remover for Under Guiderail*. During winter maintenance months, anti-skid material collects under guiderail and storm water runoff does not remove it from the roadway. In order to alleviate this problem, the crew fabricated an apparatus which mounts to the mold board of a grader to push and remove material from under guiderail. The total cost of materials was approximately \$50, plus six hours of labor. This mechanism allows the township to complete cleanup at 1/5th of the cost to complete it manually.



Borough of Mount Joy/Lancaster County for their entry *Offset Snow Plow*. The Borough has an Amtrak Bridge with a 4' sidewalk that needs to be shoveled when it snows. Due to the length (+/- 400 ft), it often takes at least 3 men to shovel. There is no way to use a snow blower or any other machinery without closing the bridge due to the width of the bridge. Through team brainstorming and ingenuity, the roadmaster designed a plow that could pivot off the 3-point hitch of a tractor, keeping the snow to the right side. This tool cost less than \$450 to complete and saves countless labor hours.

