Accelerated Innovation Deployment (AID) Demonstration Project:

Pine Mountain Road – Westwood Avenue Rehabilitation

Final Report
April 8, 2016
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INTRODUCTION

ACCELERATED INNOVATION DEPLOYMENT (AID) DEMONSTRATION GRANTS

The Accelerated Innovation Deployment (AID) program is one aspect of the multi-faceted Technology and Innovation Deployment Program (TIDP) approach, which provides funding and other resources to offset the risk of trying an innovation. The AID Demonstration funds are available for any project eligible for assistance under title 23, United States Code. Projects eligible for funding shall include proven innovative practices or technologies such as those included in the EDC initiative. Innovations may include infrastructure and non-infrastructure strategies or activities, which the award recipient intends to implement and adopt as a significant improvement from their conventional practice.

The Federal Highway Administration (FHWA) Accelerated Innovation Deployment (AID) Demonstration grant program, which is administered through the FHWA Center for Accelerating Innovation (CAI), provides incentive funding and other resources for eligible entities to offset the risk of trying an innovation and to accelerate the implementation and adoption of that innovation in highway transportation.

Projects deemed eligible for funding included proven innovative practices or technologies, including infrastructure and non-infrastructure strategies or activities, which the applicant or subrecipient intends to implement and adopt as a significant improvement from their conventional practice. The AID Demonstration funds were available for any project eligible for assistance under title 23, United States Code.

Entities eligible to apply included State departments of transportation (DOT), Federal Land Management Agencies, and tribal governments as well as metropolitan planning organizations (MPOs) and local governments which applied through the State DOT as subrecipients.

REPORT SCOPE AND ORGANIZATION

This report documents the Dickinson County Road Commission (DCRC) demonstration grant award for Pine Mountain Road – Westwood Avenue Rehabilitation using Hot-in-Place Recycling (HIPR) and Warm Mix Ultra-thin Asphalt (WMA). The report presents details relevant to the employed project innovations, the overarching TIDP goals, performance metrics measurement and analysis, lessons learned, and the status of activities related to adoption of Hot-in-Place Recycling and Warm Mix Asphalt as conventional practice by the Dickinson County Road Commission.

Leading up to the construction, much was made of this project locally because of the innovation being proposed, since HIPR and WMA Ultra-thin methods had not been used locally. Much more interest was expressed for the HIPR method than the WMA ultra-thin. DCRC determined early on that to accommodate the HIPR interest, a project demonstration and open house would be scheduled.
This took place on August 26, 2015, at the Kingsford City hall. Fifty-one (51) people representing cities, villages, county road agencies, the Michigan Department of Transportation (MDOT), representatives from Michigan Local Technical Assistance Program (LTAP), several local consultants, and grad students and a professor from Michigan Technological University (MTU) attended the informational meeting. Patrick Faster, past president of ARRA (Asphalt Recycling and Reclaiming Association) spoke about various methods of asphalt pavement recycling including HIPR among others. Then the group went to the jobsite to see the HIPR process in action.

During the meeting we discussed the project would also include WMA overlay and we asked those in attendance if they had interest in viewing that process also. Only the MTU professor and grad students expressed interest in the WMA. No formal large meeting was held to showcase the demonstration of WMA, but we did schedule a meeting with the MTU reps to tour the site and asphalt plant on September 17, 2015, when the WMA was being placed.
PROJECT OVERVIEW

This project is a joint venture between the Dickinson County Road Commission (DCRC) and the City of Kingsford for the rehabilitation of Pine Mountain Road/Westwood Avenue from US-2 / US-141 to Brookfield Street. This is an all-season federal aid eligible route entering the Cities of Iron Mountain and Kingsford, as well as Ford Airport, Pine Mountain Resort, two schools districts and several City of Kingsford industries and businesses. Speed of construction is important here, as road closures affect much traffic, therefore we are proposing to use the PAVEMENT innovations of recycle in place (RIP) for base pavement and a warm mix asphalt (WMA) surface course. The use of RIP not only speeds up construction which means less disruption for the motorist and more worker safety, but also fully recycles the existing pavement, reducing the need to provide new and virgin materials for the asphalt and substantial reduces cost. DCRC is not aware of any other RIP projects constructed in Michigan’s Upper Peninsula, so this would make a good demonstration project for the region.

LESSONS LEARNED

Through this project, the Dickinson County Road Commission gained valuable insights with regard to the innovative HIPR and WMA used. The following were some of the lessons learned:

- HIPR is a valuable but little used tool in the road preservation toolbox. However like any tool, it has a time & place it is best suited for and it can’t be used everywhere to fix everything.
- HIPR speeds up construction.
- The Mobilization to Michigan’s Upper Peninsula (UP) for HIPR contractors is high, so the project must be large enough to spread the mobilization cost over to make this the best financial option when comparing to traditional construction.
- The starts of each section the HIPR process is different than just running down the road. Our special provision for future HIPR will need to address the start and stop of the HIPR process on the roadway.
- The HIPR process uses only the existing material so ride quality after construction of the HIPR. After just the HIPR, the ride quality is only slightly better than the road prior to recycling.
- Unlike a new asphalt mat, where a supply of new asphalt is available to correct dips and bumps, HIPR contactors can only adjust the screed to fill dips and take out ruts which relocates the existing materials at the screed.
- Depending on where and how temperature is taken, results can vary greatly.
- The finished HIPR is similar to a leveling course. Traffic can run on it for extended periods of time without an overlaying surface.
- Although industry says use rejuvenator at 0.1 gallon per square yard recycled, watch it as the old pavement may need more or less. This is easy to see visually. Because the rejuvenating agent adds elastic properties back to the old asphalt, it is desirable to
maximize its application. A maximum application rate is reached just as the pavement begins to show oil streaks and occasional minor flushing.

- Rejuvenating agent does not need to be an emulsion. There are good engineered oils that do the job too. The purpose of the rejuvenator is to restore the original properties of the asphalt, and the modifiers are found in the oil, not the carrier. A hot AC with less water or other inert carrier agents more readily mixes & bonds into the existing pavement as there is no water or other carrier to evaporate away.

- Unless the road is without distortion, an overlay with thickness is needed as a surface over the HIPR to smooth it and improve ride quality. The thickness should be sufficient to smooth and true both the road profile & crown if the road was not recycled.

- Although WMA seems like an economical alternative to traditional “hot” asphalt and it is and has been permitted for all Michigan asphalt pavements for years, the local contractors in our area are not reducing the heat on most projects. This is surprising considering MDOT has inserted a “WMA is permitted” specification in every local agency project for the past several years. But when questioned about this, they provide no reason as to why they keep making hot mix. However, the local paving contractors are using the technology not to turn down the temperature of the mix, but as a compaction aid.

- WMA is only allowed to be as cold as 225 degrees per the Michigan spec. (Traditional HMA is typically delivered to the jobsite 270-320). At this lower temperature the water foamed WMA does not have a noticeably longer or shorter cure & set time than traditional hot mix.
PROJECT DETAILS

BACKGROUND

The project rehabilitated 4.5 miles of Pine Mountain Road/Westwood Avenue. Both the Dickinson County Road Commission (DCRC) and the City of Kingsford see this as a vital route to the region and partnered in its renovation. The project involved PAVEMENT innovations of recycle in place (RIP) for base pavement and a warm mix asphalt (WMA) surface course.

Pine Mountain Road - Westwood Avenue provides access to the Cities of Iron Mountain and Kingsford, Pine Mountain Resort, Ford Regional Airport, the school districts and the many City of Kingsford industries and businesses.

Figure 1 shows the project location.

Figure 1. Map. Project location.
PROJECT DESCRIPTION

The DCRC and City of Kingsford used AID funds to rehabilitate 4.5 miles of Pine Mountain Road/Westwood Avenue. Both the Dickinson County Road Commission and the City of Kingsford see Pine Mountain Road/Westwood Avenue as a vital route to the region and partnered in its renovation. The route serves the Cities of Iron Mountain and Kingsford, Pine Mountain Resort, Ford Regional Airport, several school districts and the many City of Kingsford industries and businesses. ADT on the road is 2500 with 7% trucks. This is one of the higher ADT roads in Dickinson County.

The existing conditions had the road rated as 2-4 according to the PASER scale. This puts the road in the poor condition. PASER is a road rating scale developed by the University of Wisconsin. The Asset Management Council of Michigan (TAMC) adopted PASER as the State’s official road rating scale for asphalt roads.

The pre-construction condition of the road showed wheel path cracking and rutting was abundant. The road was also showing block cracking. Some small areas of the pavement had completely failed.

Figure 2. Wheel path cracking & rutting.
Traditionally, a road with a failing pavement such as this would be repaired by the crush, shape, and repave method. An overlay would buy it life, but with the wheel path cracking & rutting, the overlay wouldn’t last long enough to satisfy the public.

If we hadn’t gotten the AID Grant, we were looking to move our small urban money here and do the job in segments. However, by doing this, the road would not be completely repaired until 25 years in to the future. The problem we were facing is the road would not last that long.
Since Small urban dollars are only available every other year, and the local task force has decided to rotate the money each cycle to a different agency (i.e. - to the Road Commission, then City of Iron Mountain, the City of Kingsford, then City of Norway, then back to the Road Commission), we were looking at repairing the road over the next 4 cycles. The road commission last got the small urban money in 2014, and was looking at putting money in 2022, 2030, 2038, and 2040 on this road.

Based on the PASER data, the Remaining Service Life (RSL) for the road was already negative, meaning it the pavement is in the poor condition and outlasted it regular life. In this condition, there was no way we could hold the existing road together under the traffic loadings without major failure long enough to get the small urban money needed to make the repairs.

The project involved PAVEMENT innovations of recycle in place (RIP) for base pavement and a warm mix asphalt (WMA) surface course. The project was environmentally responsible & efficient by recycling 100% of the existing pavement, therefore reducing the need for virgin materials including stone and oil. Only a thin lift of new WMA pavement was be used as a wearing surface. Even this surface is also more environmentally friendly than traditional hot mix asphalt.

The use of RIP not only sped up construction which means less disruption for the motorist and more worker safety, but also fully recycled the existing pavement, reducing the need to provide new and virgin materials for the asphalt and substantial reduces cost.

![Figure 5. Recycle in place tines & screed.](image)

WMA has been around for a while, but is not readily used. We are aware of only one other project in the UP with WMA - Delta County did a project a few years back. It is remarkable to only have limited WMA laid since WMA has been allowed by special provision in Michigan for
several years. In fact MDOT inserts into every project a special provision specifically calling out WMA as an allowed option for all asphalt pavements.

Figure 6. Water injection unit for WMA at the asphalt plant.

Along with the paving, other miscellaneous work such as shouldering the pavement and pavement marking (striping) was included in the project.

The goals for the innovations included:

1. **Shorten the time the road is under construction.** Pine Mountain Road –Westwood Avenue is an important heavily traveled road to the area. Quicker construction means less user delay & frustration. This can be measured by actual time of this construction compared to traditional methods such as crush, shape, and then pave.

2. **Environmentally friendly construction.** Less fuel will be used in the RIP and WMA processes than traditional methods. Although hard to measure on the project site, we will rely on the contractor and industry to provide this information.

3. **Durability.** We want a road that will handle the traffic that uses it. We would like to see it wear similar to other new pavements, but understand industry says that RIP typically lasts about 75% or more the life of new asphalt. The DCRC can’t find another local example or any examples of RIP in a similar northern climate. This will be determined by road ratings. The Dickinson County Road Commission maintains a data base on all its roads including PASER rating on all its paved roads. This project will be compared to other projects of similar traffic and age to see if the structure is holding up.

4. **Cost.** By utilizing Recycle In Place (RIP) technology, it is estimated that the cost of pavement rehabilitation will be substantially reduced in comparison...
to traditional crushing and shaping and repaving with HMA. Pre-bid project estimates guessed a 25% savings over a crush, shape, and pave project.

DCRC performed the design engineering for the project, and prepared the plans, unique special provisions, and the construction cost estimate. MDOT provided oversight in all areas of this project, according to the Programmatic Stewardship Agreement between FHWA and MDOT. As a result, interactions with FHWA during the project were at a minimum. Early on MDOT said they would oversee the work and all questions and inquiries would go through them.

MDOT reviewed the plans & specifications, and actually advertised the project, then opened the bids. Bacco Construction of Iron Mountain, Michigan was awarded the contract. Bacco completed the preparatory work, and the WMA surface and other associated work. Gallagher Asphalt of Thornton, Illinois was the subcontractor for the hot in place recycling (HIPR).

MDOT was very helpful in keeping the project moving quickly. In the project kick-off meeting, MDOT agreed to allow the project to progress at a rate independent of the posted LAP Project Planning Guide. Using the shorter schedule, final plans were submitted in just 2 months after the kick-off meeting. The frustrating delay was an issue with MDOT Specs & Estimates review not fully understanding the work. Over all, it went through the MDOT system pretty quickly.

TE CHNOLOGY TRANSFER ACTIVITIES

There were also many opportunities for technology transfer before & during the work. The Dickinson County Road Commission and the City of Kingsford reached out to the public several times letting the people know of this project. The Iron Mountain Daily news ran stories about the project on March 3, 2015, August 27, 2015, and October 8, 2015. See Appendix A. ABC 10 had segments in the evening news about the project on August 14, 2015 and August 26, 2015. The project Engineer also appeared on in touch, a local radio show spotlighting local news and events on January 30, 2015 discussing the project.

Because of the news coverage, and the uniqueness of the work, the project had the interest of many groups, agencies, and individuals. Also there was much more interest in the HIPR than the WMA as this had not been done locally, but was touted as a possible less expensive and quicker way to fix failing roads.

With this amount of interest in the HIPR, a project showcase meeting was held August 26, 2015. Fifty-one (51) people attended from both Michigan and Wisconsin representing various counties, cities, villages, MDOT, consultants, and even Michigan Tech. The program was first a short presentation about pavement recycling by Patrick Faster, the former president of the Asphalt Recycling and Reclaiming Association and current board member of the Federal Highway’s Pavement Preservation Task Group. This was followed by a short time of questions then the group was invited to the jobsite to see the pavement recycling taking place.

Since WMA was also an innovation being used, we planned on offering a meeting showcasing that also. However, talking to other local agencies, there was little interest in seeing this. At the HIPR showcase, it was mentioned that the project also would be using WMA and the large group was asked if there was interest in seeing this. Only the group from MTU wanted to see that.
September 17, 2015, Professor Zanping You and four (4) graduate students visited the worksite and the asphalt plant. Brian Vourinen, Bacco Construction Company’s Mix Design Specialist, gave a tour of the asphalt plant and the material stockpiled for the asphalt. Brian pointed out the various parts of the plant and described how the WMA differed from their regular asphalt. He also showed the water injection system, describing how it works.

Besides these more formal technology transfer meetings, several others visited the site at various unscheduled times during the construction and met with the Engineer and/or inspector to discuss the project. These included Tony Gretz (MDOT Superior Region), Brian Johnson (MDOT Materials Engineer), Justin Wickman (Kingsford DPW Director), Todd Rowell (Dickinson County Road Commission Superintendent of Roads), Tony Edlebeck (Kingsford City Manager), and many others.

In addition, Marty Fittante, Aide to State Senator Tom Casperson (Chair of the Michigan Senate’s Transportation Committee) scheduled a time to see the HIPR process. He expressed that the Senator had interest in this project, but could not personally get away from Lansing.
DATA COLLECTION AND ANALYSIS

Performance measures consistent with the project goals were jointly established for this project by Dickinson County Road Commission and FHWA to qualify, not to quantify, the effectiveness of the innovation to inform the AID Demonstration program in working toward best practices, programmatic performance measures, and future decision making guidelines.

During construction, DCRC collected data to determine the impact of using hot-in-place recycling (HIPR) and warm mix asphalt (WMA) on schedule, cost, and quality during and after construction and demonstrate the ability to:

- Reduce overall project delivery time and associated costs
- Reduce life cycle costs through producing a high-quality project
- Reduce impacts to the traveling public and project abutters
- Satisfy the needs and desires of our customers
- Provide a more environmentally friendly construction project

This section discusses how the Dickinson County Road Commission established baseline criteria, monitored and recorded data during the implementation of the innovation, and analyzed and assessed the results for each of the performance measures related to these focus areas.

SCHEDULE

Streamlining the project delivery process results in earlier overall project completion. This in turn provides greater service to our end users sooner. The use of HIPR innovation sped up the construction by not crushed, milling or otherwise removing the pavement, and by not needing to shape and compact the road base as with traditional construction. Rather, the existing pavement was recycled without ever removing it from the roadway. The recycled asphalt became the leveling course on which the surface was laid.

The method traditionally employed by the Dickinson County Road Commission to deliver a comparable project would be to crush the existing pavement into the gravel base, grade and compact this recycled asphalt gravel mix, and then repave the road with 2 courses of asphalt pavement such as was used in: County Road 569 (Foster City Road) constructed in 2014, Hydraulic Falls Road also constructed in 2014, or Leeman Road constructed in 2015. It is estimated that if this project was built by the crush, shape, pave method, it would require an estimated 24 days of lane closures. However, by making use of HIPR for this project we were able to realize a savings of 14 days of lane closure.

The following details how we were able to achieve these time savings. Actual number of days the road had lane closures = 14 days (3.3 days per mile). Table 1 below shows the lane closure time compared to traditional crush, shape, and pave projects.
Table 1. Time comparisons to crush, shape, pave projects.

On a traditional crush-shape and pave it averages 5-8 days of lane closures per mile. This project provided an estimated savings of 5-14 days of lane closures over a traditional crush shape and pave project. See Appendix B for cost & time comparisons to similar work.

There is also a financial component of time. With less time of lane closure, there is less user delay. The road gets fixed quicker which means the public is on a good road sooner. Traffic resumes its normal patterns quicker.

COST

A traditional project of similar scope and scale delivered using our traditional methods of crush, shape, and pave was originally estimated to cost $1.17 million as shown below (from the AID application).

Table 2. Cost estimate for a crush, shape, pave project.

It should be noted that the original scoping was just the 3.6 mile in the Road Commission’s jurisdiction. The project was expanded to 4.2 miles when the City of Kingsford came on board. The Dickinson County Road Commission originally estimated that the use of HIPR and WMA would result in a cost savings of approximately $400,000.

The actual direct financial cost associated with construction of this project using HIPR & WMA resulted in a cost of $760,227. This is a savings of over $414,000 when compared to a similar traditional crush shape, and pave project. This is approximately $95,000 per mile.

QUALITY

As previously discussed, using traditional project delivery techniques of the Dickinson County Road Commission, the Pine Mountain Road – Westwood Avenue project would have been built using a crush, shape & pave method. This would destroy the existing pavement, crushing it into the gravel base. This pavement was full of good stone, and had a lot of good asphalt binder still in it, but this all would be lost. New binder and stone would need to be mixed for the new asphalt. However, through the use of HIPR we were able to rejuvenate and reuse the old pavement and construction became more environmentally friendly than traditional roadway construction by recycling 100% of the existing pavement on the grade, therefore reducing the need for virgin materials including stone and oil, and the associated trucking.

Only a thin lift of new WMA pavement was be used as a wearing surface. Being warm-mix asphalt, this surface is also more environmentally friendly than traditional hot mix asphalt by not requiring the burning of as much fossil fuels to heat the mix. According to Bacco Construction Company, they estimate of a savings of 0.1-0.2 gallons of heating fuel per ton the asphalt at the mixing plant, or roughly 500 gallons of fuel saved.

During the HIPR operation, the existing pavement was heated using 2 propane road heaters. Once the existing pavement was heated, new asphalt rejuvenating oil was sprayed over the surface. The heated asphalt & new oil was then raked and mixed together with tines and an auger before being laid back under a screed. This raking and mixing removed the cracks in the existing asphalt surface. The contractor had the rake tines set approximately ¼ inch above to bottom of the existing asphalt. This was in case there was a thin area in the existing asphalt as they did not want to drag up gravel into the recycled HMA, which would greatly change the mix and require much more rejuvenating oil. However, the inspector did dig down through the newly laid recycled asphalt to the underlying non-raked asphalt immediately behind the screed and found the underlying asphalt softened with the heat. It is assumed that this softened asphalt may have had some of the overlying recycled asphalt mixed (squeezed) in with the compaction of the roller, reducing the cracks in this bottom layer.

However, the fact that the bottom of the asphalt was not physically rejuvenated and mixed, along the unknowns of the exact mix properties of the recycled asphalt, it is difficult to state with authority the projects performance until it has been through a few seasons of traffic & weather.
RECOMMENDATIONS AND IMPLEMENTATION

RECOMMENDATIONS

The Dickinson County Road Commission determined from the results of our data analysis and sense of satisfaction from the facility users that the HIPR method is a valuable but little used tool in the road preservation toolbox. However like any tool, it has a time and place it is best suited for and it can’t be used everywhere to fix everything. The HIPR process uses only the existing material so ride quality after this process is only slightly better than that of the road prior to recycling. Unless the road is without distortion, an overlay with sufficient thickness to correct the ride as is if it was applied directly to the existing pavement is needed as a surface over the HIPR to smooth it and provide smoothness and ride quality if these are desired.

Although WMA seems like an economical alternative to traditional “hot” asphalt and it is and has been permitted for all Michigan asphalt pavements for years, the local contractors in our area are not jumping fully on board. However, when questioned about this, they can provide no reason as to why they don’t like it. But the technology is being used. Most asphalt contractors are using some form of WMA technology, not to produce WMA, but as an aid in achieving density of traditional hot mixes.

We are adopting HIPR into our standard operating procedures as another tool in the pavement preservation toolbox, scoping each road to see if it is the proper fix. WMA will continue to be an option for contractors as it has been in the past.

However, we also identified the following areas that could be improved upon in future applications of this innovation:

- Depending on where and how temperature is taken, results can vary greatly. If taken by the heater, temperatures are much hotter than when taken in front of the screed. We assume it is the burner heat being measured, not the pavement temperature. The spec must be changed for the HIPR so it states the inspector is to take the temperature behind the heater but in front of the tines & screed, away from the flames.
- We had an MDOT official tell us the HIPR process was too hot for the asphalt and caused much grief to both the engineer and contractor. However, when visiting the WMA plant, the asphalt was being mixed and tumbling through the flame, and yet MDOT had no issues here. I am not sure if the language about maximum asphalt temperature needs to be changed, or more training on what it actually means and how asphalt is actually produced is needed.
- Rejuvenating agent does not need to be an emulsion. There are good engineered oils that do the job too. In fact, our contractor supplied an engineered oil which met or passed all of the physical properties required of the emulsion. We need to change the word “emulsion” to “engineered oil” or similar.
Unlike a new asphalt mat, where a contractor can use additional asphalt to correct dips and bumps, HIPR contactors can only adjust the screed to fill dips and take out ruts which relocates the existing materials at the screed, but they are limited in the amount they can adjust the screed. Our road was too uneven (dips & ruts) for the HIPR contractor to remove enough of the bumps & dips so the 3/4 inch overlay could provide a perfect surface. We should have used a 1 or 1 ¼ inch overlay on top of the HIPR. Projects with rutting should consider a thicker overlay than the ¾ inch ultra-thin used here.

The finished HIPR is similar to a leveling course. Traffic can run on it for extended periods of time without an overlaying surface. To get this project out to bid quickly, we copied part of a specification stating the HIPR could only be left uncapped for a short period of time. This section of specification needs to be removed as it can be driven on.

We need to revise the HIPR specification for screed requirements. To get this project out to bid quickly, we used a previously approved MDOT special provision for similar work, modified based on comments from various plan review meetings. The contractor demonstrated HIPR doesn’t need a 30 foot ski for grade control, have vibrators, etc. However, the screed does need to be width adjustable and able to break in the middle. To correct ruts, the contractor lowered the middle and moved that material out to fill the ruts. For deeper ruts, the contractor lowered the whole screed to keep some material in the screed. With the screed moving independently of the existing road surface frequently to smooth ruts, bumps and depressions, a ski cannot be used for grade control.

We need to revise the smooth surface language in the HIPR specification. The HIPR screed operator had to plunge the screed into the mat to get some material against the screed to level the road. The contractor did rake these joints for smoothness as best they could with the materials present. But the process of diving the screed into the existing mat to get materials to fill the screed for strike off caused small depressions. A surface of sufficient thickness would fill & smooth these dips.

**STATUS OF IMPLEMENTATION AND ADOPTION**

Since the completion of the Pine Mountain Road – Westwood Avenue project the Dickinson County Road Commission has undertaken the following activities to implement HIPR and WMA into our standard operating procedures as a significant improvement from our traditional practice for similar type projects:

- We are including the WMA permissive specification in all locally let HMA projects. This is similar to what MDOT has been doing for year through LAP let projects.
- We are considering HIPR when scoping projects as a possible fix, especially for roads having PASER ratings 3-4-5 range.
A-2
Kingsford road work

(Continued from page one)

Deployment (AID) Demonstration program.

The work involves hot-in-place recycling and a top application of warm mix asphalt. This cost-saving technique is environmentally friendly, as it recycles 100 percent of the existing pavement, according to federal highway officials.

Kingsford will pay about 20 percent of the local share of the project, or about $17,000, plus about $16,000 for its share of the engineering, said City Manager Tony Edelebeck.

The grant, announced in January, is part of $5.4 million in funds awarded to assist innovative road and bridge work in six states. The recycling method is expected to cut construction costs by nearly 45 percent.

The proposed agreement will be reviewed by the city and road commission before a final draft is presented.

In other action Monday, the Kingsford council:

- Awarded a bid to Town & Country Sales of Quinnesec for the purchase of a 2015 Ford pickup truck for $26,985, provided it meets specifications.
- Edwards Chevrolet of Iron Mountain and ERA Chevrolet of Norway also submitted bids, but at slightly higher prices, for a new two-wheel drive heavy duty 35/ton pickup truck for the public works department.
- Authorized seeking bids to replace windows at the Kingsford Public Safety Department building, as budgeted by the city for the 2014-15 fiscal year.
- Noted that Board of Review sessions to hear property tax assessment appeals are scheduled from 9 a.m. to 4:30 p.m. Monday, March 9, and 1:30 p.m. to 9 p.m. Tuesday, March 10.

Jim Anderson's email address is janderson@ironmountaindailynews.com.

Crivitz drug arrests

(Continued from page one)

A K-9 unit led to the recovery of methamphetamine and drug paraphernalia.

Assisting in the investigation were the Marquette Police Department, Marquette County Sheriff's Office, Crivitz Police Department, and KIND officers from the Kingsford Public Safety Department, Iron Mountain Police Department, Norway Police Department, and Dickinson County Sheriff's Office.

Anyone who has information about illegal drug activity in the Marquette County area is urged to contact the Marquette County Sheriff's Office at (715) 732-7626 or Crime Stoppers at 1-800-427-5857. Tips can also be submitted at www.tipsubmit.com or by texting "Marquette" plus a message to 274637.

Nikki Young's email address is nyoung@ironmountaindailynews.com.

...Iron River man sent to prison

(Continued from page one)

was about five or six years old, and the abuse continued until 2012, according to Powell.

Powell said in court that the victim has suffered from psychological trauma and depression, been diagnosed with bipolar disorder and attention deficit hyperactivity disorder, and was hospitalized after jumping from a roof in a suicide attempt.

Johnson has now been convicted in connection to incidents involving a total of four different underage victims, Powell said.

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Chamber neutral on sales tax

LANSING (AP) — The Michigan Chamber of Commerce has decided to neither support nor oppose a May ballot proposal that would increase the state sales tax as part of a road funding plan.

Chamber President and CEO Rich Studley said Monday there isn't a consensus among the organization's membership on Proposal 1. The chamber represents 6,700 employers, trade associations and local chambers.

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March 0-65

Game

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"Good Old Fashion Taste...
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New road project aims to be lean and green

Local News, Central UP, Dickinson County, Community, Construction / Development

KINGSFORD — A road in Dickinson County is getting an upgrade, but it’s not your average road construction project.

http://abc10up.com/new-road-project-aims-to-be-lean-and-green/
Officials are calling the innovations being used to resurface the Pine Mountain Road and Westwood Avenue corridor between Brookfield Street in Kingsford and US-2 examples of “green construction.” First, crews will be heating the surface to recycle the current material, which officials say will save on new ingredients and the fossil fuels used to put them down.

“When that’s done, we’ll come back with a warm—mix ultra thin top,” said Dickinson County Road Commission Engineer Lance Malburg. “Warm—mix meaning it doesn’t get as hot as a regular asphalt. It’s actually laid at a cooler temperature, so we’re going to save more fossil fuels again. It’s also environmentally friendly because we never pick up the pavement, we never have a gravel surface. So if it rains, there’s no runoff — no sediment in the ditches or in the streams.”

Another benefit of the technology is a shorter construction time.

“We’re going to speed up construction we’re hoping about two weeks in this project over traditional,” Malburg added, “because with recycle—In—place, we don’t have to mill or pick up or pulverize the old road.”

Eighty percent of this collaborative effort between the City of Kingsford and the Dickinson County Road Commission is being funded by an Accelerated Innovation Deployment grant from the Federal Highway Administration. The cost of the project is also expected to be reduced by using the new methods.

“This project right now, as it stands, is sitting about 750,000 [dollars],” said Malburg, “if we would do it through traditional methods, we’d be looking at 1.2 to maybe 1.5 million.”

These techniques have been used in other areas, but they are new to Dickinson County.

“We’re going to be monitoring it for a few years, and if the results are similar to traditional paving, by all means, it’s another tool in the toolbox,” added Malburg.

Single-lane closures should be expected along the corridor until crews have completed the project, which will last through September.
New road project aims to be lean and green - Upper Peninsula ABC 10

POSTED BY ANDY KULIE

More U.P. News

TAGGED WITH
Dickinson County Road Commission  road  US-2  Lance Mapburg  Pine Mountain Road  City of Kingsford  Engineer  Westwood Avenue

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http://abc10up.com/new-road-project-aims-to-be-lean-and-green/

12/17/2015
The Dickinson County Road Commission and the City of Kingsford
Along with
Bacco Construction Company and Gallagher Asphalt

Invite you to a Project Showcase for
Hot-in-Place Recycling of Asphalt Pavement

We will be meeting at:

11:00 AM (Central), Wednesday, August 26, 2015
at
The Kingsford City Hall
305 S. Carpenter Avenue
Kingsford, Michigan

There will be a short presentation then traveling to the jobsite to see the actual work

Reserve your place by RSVP to the Dickinson County Road Commission
Phone: (906) 774-1588
Fax: (906) 774-7227

This is an active jobsite. Please bring work shoes and a safety vest if you have one.
<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Email</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Tony Gretz</td>
<td>MDOT</td>
<td><a href="mailto:gretza@michigan.gov">gretza@michigan.gov</a></td>
<td>906-786-1320</td>
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<tr>
<td>Steve Cadeau</td>
<td>MDOT</td>
<td><a href="mailto:cadeaus@michigan.gov">cadeaus@michigan.gov</a></td>
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<td>Tom Gereau</td>
<td>MDOT</td>
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<td>Dongdong Ge</td>
<td>MTU</td>
<td><a href="mailto:dgei@mtu.edu">dgei@mtu.edu</a></td>
<td>906-315-8922</td>
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<tr>
<td>Sunny Chen</td>
<td>MTU</td>
<td><a href="mailto:sychen@mtu.edu">sychen@mtu.edu</a></td>
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<tr>
<td>Zhanping You</td>
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<td><a href="mailto:zyou@mtu.edu">zyou@mtu.edu</a></td>
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<tr>
<td>Hui Yao</td>
<td>MTU</td>
<td><a href="mailto:huiyao@mtu.edu">huiyao@mtu.edu</a></td>
<td>906-323-4849</td>
</tr>
<tr>
<td>David Parker</td>
<td>MTU</td>
<td><a href="mailto:dparker@mtu.edu">dparker@mtu.edu</a></td>
<td>(906) 667-2016</td>
</tr>
<tr>
<td>Don Duncombe</td>
<td></td>
<td></td>
<td>275-8222</td>
</tr>
<tr>
<td>Missy Geiser</td>
<td>DERC</td>
<td></td>
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<tr>
<td>Sandra Lindhein</td>
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<tr>
<td>John Kelleher</td>
<td>Coleman Eng.</td>
<td></td>
<td>906-774-3940</td>
</tr>
<tr>
<td>Ron Watenich</td>
<td>NTM</td>
<td></td>
<td>906-368-4458</td>
</tr>
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KINGSFORD — Reduce, reuse, recycle is a common theme around the U.P. and it’s made its way to road repair.

http://abc10up.com/reduce-reuse-recycle-comes-to-u-p-roads/ 12/17/2015
The Pine Mountain Road – Westwood Avenue project is using an avant-garde type of road construction that reuses asphalt. The hot-in-place (HIP) recycled pavement and warm mix asphalt (WMA) innovations are cost effective options that are more environmentally friendly and save time.

“The idea is that we keep the existing asphalt,” said Dickinson County Road Commission Engineer Lance Malburg, “just heat it up and add a little bit of oil to rejuvenate it and then lay it back out. It’s green, we don’t bring in new stone, it doesn’t take as much oil as it does to make new asphalt, you don’t have the trucking involved. It speeds up the time because you don’t mill first, you don’t have all of the paving lifts, it’s a one step – one shop process. It’s a very unique process for the area. We don’t do recycling up here that I’m aware of.”

A presentation was given to help people from surrounding areas decide if this type of construction would be beneficial for their county.

“This is another tool in the toolbox,” added Malburg, “it’s not really well used up here. We’re really just trying to let people know this is out there and available. There’s been a lot of interest from the day we proposed the project and it’s a way that instead of having 100 people on the site at different times we can have a meeting and show them what’s going on, how the process works, and what it is.”

The city of Kingsford will monitor the performance of the 4.2 miles that is being recycled and repaired over time and evaluate if it is a viable option to use on future projects.

POSTED BY CALEB SCANLON

Caleb M. Scanlon is a reporter for ABC 10 / CW 6 and joined the news team in 2015. He grew up in Negaunee, where he attended Negaunee High School. Caleb completed his Bachelor’s degree in Media Production and New Technologies from Northern Michigan University with a minor in Communication Studies. Caleb interned with ABC 10 / CW 6 in the fall of 2014. During his free time, Caleb enjoys spending time with his wife Samantha, his stepson Fred, and his cats Scotty, Remus, and Fitzgerald. Caleb plays a multitude of musical instruments and performs in a band called Concord Through Keys. When there isn’t snow on the ground, Caleb can often be found at Al-Quaal playing disc golf.

TAGGED WITH
construction    Dickinson County Road Commission    road construction    Lance Malburg    Pine Mountain Road    Westwood Avenue    road repair    recycle

http://abc10up.com/reduce-reuse-recycle-comes-to-u-p-roads/  12/17/2015
Reduce, reuse, recycle comes to U.P. roads - Upper Peninsula ABC 10

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  abc10up.com

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http://abc10up.com/reduce-reuse-recycle-comes-to-u-p-roads/  12/17/2015
Refinery work spikes gas prices

CHICAGO — Midwest refineries may be seeing tougher times ahead, with a wave of shutdowns and maintenance to hit the region. One refinery in Illinois has already announced plans to close for maintenance, and more could follow as regulators and industry officials grapple with rising fuel costs and supply chain disruptions.

In brief

Driver charged in teen’s death

**FX CHICAGO —** A Chicago police officer has been charged with reckless driving in connection with a fatal accident that killed a 16-year-old girl.

Nearby, an 18-year-old driver faces several charges in a separate incident involving a pedestrian.

Snyder signs insurance bill

**LANINGEN, Michigan —** Michigan Governor Rick Snyder signed legislation Wednesday aimed at reducing the cost of auto insurance for drivers.

The governor said the bill includes changes that will benefit consumers by providing discounts for safe driving and encouraging the use of alternative transportation options.

Michigan bill taxes medical marijuana

**LANINGEN, Michigan —** Michigan lawmakers have passed a bill that would place a tax on medical marijuana, raising concerns among some advocates.

State proceeds with U.P. prison changes

**MINERVA, Michigan —** The Michigan Department of Corrections is moving forward with plans to close the Kinross Correctional Facility and develop a new facility in the Upper Peninsula.

The department announced its intention in 2018, citing the need to address overcrowding and improve inmate safety.
APPENDIX B

TIME & COST

COMPARISONS TO

TYPICAL PROJECTS
CR 569 costs

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Units</th>
<th>Item Code</th>
<th>Quantity Placed</th>
<th>Unit Price</th>
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$695,798.22

cost = $248,230.72 per mile say $250,000
4.2 miles = $1,050,000.00

Days of lane closure = 13 4.637837838 days per mile
4.2 miles = 19.47891892 days

NOTE: bridge deck & guardrail WORK REMOVED as Pine Mtn Rd has none in the project

This is possible match for Pine Mtn Rd as simialr pavement structure as would be needed
Hydraulic Falls Road costs

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<tr>
<th>Item Description</th>
<th>Units</th>
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Total $177,640.92

Cost = $378,508.49 per mile say $380,000

4.2 miles = $1,596,000.00

Days of lane closure = 4 8.523002421 days per mile

4.2 miles = 35.79661017 days
REFERENCES

1. MDOT Special Provision 12SP501(Z), approved 4-19-13, FHWA approved 4-22-13
2. E-mail from Brian Vuorinen, Bacco Construction Company, 9-23-15
MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
WARM-MIX ASPHALT PERMISSIVE USE

CFS:KPK

a. Description. This work consists of furnishing a warm-mix asphalt (WMA) mixture using a water-injection foaming device, water foaming additive, or chemical additive for Superpave Mix Types E03, LVSP, E1, E3, E10, E30, E50 and GGSP in lieu of the standard Superpave hot mix asphalt (HMA) specified if the Contractor elects to do so. All work must be in accordance with the standard specifications and applicable special provisions, except as modified herein. No deviations to acceptance test methods/procedures will be allowed.


Chemical additives, if used, will be from the Colorado Department of Transportation Approved List of Unrestricted Warm Mix Asphalt (WMA) Technologies.

(www.coloradodot.info/business/apl/asphalt-warm-mix.html)

Base lab testing temperatures for compaction of gyratory samples on the binder suppliers recommended value for the original binder.

c. Construction.

1. Equipment. Provide equipment for the WMA technology being utilized.

2. Placing WMA. The Department will reject loads with a temperature either below 225 degrees F or greater than +20 degrees F from the recommended maximum mixing temperature specified by the binder producer at the time of discharge from behind the screed.

d. Measurement and Payment. If the Contractor elects to provide a WMA mixture as a substitute for a HMA Superpave mixture as discussed above, this will be done with the understanding that the pay items in the original contract will not be changed and the WMA will be provided under those original pay items at the bid prices submitted.
Because we run warm mix all the time, I don't see a difference. In this situation we did run the mix temperature about 20 degrees less than we normally would so there would have been 0.1-0.2 gal less per ton used.

The interesting thing I got out of this project in particular was the mix selection, and voids requirement. 7.1% asphalt with no RAP actually increased the price per ton about 9 to 14 dollars and actually increased the use of fossil fuels in the form of asphalt greatly because RAP wasn't allowed in this situation.

A S603 with 25% rap would have been a good selection for mix. That would have been about 4.6% virgin AC versus 7.1% at 550 a ton liquid prices it equates 13.75 reduction in price and less virgin AC used, and an increase in thickness.

The total price with increased tons I didn't take into account, and im sure there are other factors I don't know anything about. But this is only my observation on this whole project.

Overall I think it turned out quite well for how it was done.

Hi Brian,

Wondering if you could help.

I am working on my final report of the project for FHWA as part of the grant requirement.

We used in our application the “green” aspects of warm mix – since it isn’t as hot, not as much fossil fuel in burned in the plant. (we were seeing 250-270 in the field, compared to seeing 290-320 with regular asphalt)

Is there any way to actually compare the fuel used in making this warm mix vs. a traditional hot mix asphalt? Or a rough comparison? (something like it takes xx.x gallons per degree to heat a ton of mix, or a load of mix).

If not, that is ok. I can simply state the temperature difference and say therefore less fuel was used.

Thanks

Lance Malburg, P.E.
Engineer
Dickinson County Road Commission
P.O. Box 519
1107 S. Milwaukee Ave
Iron Mountain, MI 49801
Main: (906)774-1588
Engineering: (906)774-1162