

Construction Industry/NDOT Advisory Committee

Materials Subcommittee

Meeting Minutes, January 26, 2009

Attendees:

Rudy Malfabon, NDOT Dir. Office
Reid Kaiser, NDOT Materials Div.
Darin Tedford, NDOT Materials Div.
Derek Betts, Granite Const.
Mitch Englestead, Ready-Mix, Inc.
Edgard Hitti, Paramount
Glen Fichardt, RHB

Gary Selmi, NDOT Const. Div.
Mark Salazar, NDOT Materials Div.
John Elkins, Granite Const.
Mike Robinson, Kleinfelder
Kevin Stoehr, Frehner Const. Co., Inc.
Parviz Noori, NDOT Materials Div.
Steve Hale, NDOT Construction Div.

I. Approve Minutes

The minutes of our meeting November 17, 2008 were approved as previously supplied by e-mail. Minutes from all subcommittees have been posted at: http://www.nevadadot.com/business/Liaison_Committee/MeetingAgendas.asp

II. Percent Within Limits (PWL)

NDOT Construction Division is considering if we will use a PWL spec. A PWL specification would be helpful in lieu of removing material. A liquidated damage amount is associated with a failing test. PWL is not intended for every characteristic, just a few characteristics we test. It was suggested to add it to next meeting's agenda. Granite has seen PWL specs on airport work for volumetric properties (air voids (related to in-place density), binder content, and certain sieves in gradation).

Materials Division has scanned the NDOT Testing Manual into pdf format for each test method. It should be available on the NDOT website in early 2009.

ACTION ITEM:

Add PWL to next meeting agenda for further discussion. NDOT Construction Division will take the lead on this topic.

III. Update on Previous Topics

Mix designs will be e-mailed in PDF format to contractor and Resident Engineer.

SEM Materials Update – The anticipated sale of SEM Material assets did not go through in December 2008. Further information will be available after a meeting to be held in early February 2009

IV. Economic Stimulus Briefing

Rudy provided an update on what we have been hearing: \$220 million +/- \$10 million approximately (actual number turned out to be \$201 million). We are hearing tight time frames to get the projects out (subsequently confirmed to be 120 days for 50% of NDOT's share, one year for all entities or stimulus funds are subject to redistribution). Some money will pass through to the local public agencies (actual number turned out to be about \$10 million to Washoe RTC and about \$40 million to RTC of Southern Nevada, \$6 million available statewide for enhancement projects).

NDOT did not have a firm project list at the time of this meeting but anticipated spending the stimulus funds on pavement preservation projects in order to have projects that could meet environmental and right-of-way certification requirements. Reid Kaiser previously e-mailed a 2-page PDF of possible NDOT projects.

Projects must be listed in the appropriate RTC's Transportation Improvement Program (TIP) and NDOT's Statewide Transportation Improvement Program (STIP); they can add projects by amendment. The project list may include projects such as 3R projects in the rural areas originally intended for FY 2010, Cheyenne Avenue in Las Vegas, Meadowood Interchange in Reno, and others. (NOTE: Final project list will be approved at March 12, 2009 Transportation Board Meeting). Contractors are OK with a three week period from advertisement to bid opening but did express concerns that contracts are advertised by NDOT on a Thursday and sometimes the plans are not available until Tuesday of the following week.

V. Recycled Asphalt Pavement (RAP)

Larry Sharp of Las Vegas Paving was unable to attend but provided a white paper citing reports on RAP and the fact that it has been used successfully on local agency projects.

From NDOT's perspective, there have been good projects and bad projects using RAP. We don't use a lot of RAP because we have a premium pavement, our pavements are in good shape, and we have decent aggregates.

The North McCarran project from North Virginia Street to 7th Street plans to use RAP but has been postponed until July 2009.

The NDOT bituminous lab was not as concerned with residual RAP binder causing stiffening, as we are not concerned with rutting or cracking. The Materials Division also looked at Granite's new construction RAP project but it was a lower volume road.

NDOT's current RAP specification allows only the cold-millings from the project under construction. The Materials Division understands that this complicates the logistics of stockpiling and handling but is willing to work out the details with contractors.

Test requirement is 100% passing the ½-inch sieve with an informational stockpile sample every 500 tons. Materials Division requires test results showing the RAP bituminous ratio and gradation after ignition oven. Mix design tests for mixes with RAP are the same requirements as those without RAP (stability, air voids, Lottman). RAP bin percentage is kept the same throughout production. Contractors could consider half RAP and half virgin aggregate, or possibly 1/3 RAP or ¼ RAP.

On Contract No. 3357, I-80 Keystone to CA State Line, open-grade with 8% binder was milled off versus a 20-year old pavement with crack sealant, which would have had a different effect if used as RAP.

Gregg Street in Sparks and Sparks Boulevard north of I-80 are two Washoe County road projects that used RAP without modified binders.

The question was posed can the contractor buy NDOT's cold-milling stockpiles? In some cases, such as on US 50, the cold-millings are stored in the pit for use by the county.

The question was posed whether Contractors have to redo mix designs on a two to three-year project. NDOT understands concerns with the single stockpile requirement.

VI. MSE Backfill

Reactivity source acceptance has been difficult in southern Nevada and tests have shown some inaccuracies. We will use non-metallic reinforcement (geogrid) on US 95 Package 1 (Rainbow to Ann). The Hilfiker wall at I-515 Flamingo interchange in Las Vegas was 20 years old and had corrosion in the steel reinforcing in the backfill. We are considering a monitoring system or checking the face of the wall for settlement.

VII. Alternate Burner Fuels

Contractors asked if NDOT is considering allowing alternate burner fuels, given the recent national trend to consider the environment in everything we do. Current NDOT spec requires No. 2 diesel, natural gas or propane. Blending with recycled fuel oil is prohibited. NDOT is concerned with getting a bad batch of blended burner fuel and having to deal with production variability and determining if bad material was placed on our road.

VIII. Future Meeting Date

April 21, 2009 at 9:00 a.m. Rudy will check on the NDOT Las Vegas Building A Conference Room for video-conferencing and Reid will check on the 3rd Floor Conference Room in Carson City. Topics for discussion are:

- PWL Specs Steve Hale from Construction Division could present what the Construction Division intends to do with percent within limit specifications.
- Baghouse Fines Discuss reintroduction of baghouse fines during the asphalt mix design process.
- Update on Stimulus Projects

Note: The following documents were e-mailed to subcommittee members prior to the meeting and are included in these minutes as attachments:

- “NDOT RAP, MSE Backfill and Alternate Burner Fuels 01-26-09” was e-mailed as a handout by Reid Kaiser (pages 5 – 8)
- “Southern Area RAP Usage Summary” was prepared by Larry Sharp of Las Vegas Paving and e-mailed by Rudy Malfabon prior to the meeting (pages 9 – 11)

NDOT RAP, MSE Backfill and Alternate Burner Fuels 01-26-09

RAP

NDOT is working to develop specifications to allow the use of RAP in an upcoming project. This research will help NDOT develop a balance between the need for using recycled products and the need to maintain our high standards for building roads. NDOT's specifications will address the following issues:

- 1) The contractor will be required to process his RAP stockpile to 100% passing the 1/2" screen. Additional screens may be added to ensure a uniform gradation. Informational samples of the RAP will be required every 500 tons and will include RAP gradation, bitumen ratio, aggregate gradation, and specific gravity. To reduce the potential for variation in RAP after the mix design has been completed, NDOT may require that the stockpile of RAP is prepared ahead of time and reserved specifically for use on the NDOT project. Tolerances may be developed for the variation in gradation, bitumen ratio and specific gravity of the RAP.
- 2) Acceptance of the plantmix will remain the same, including gradation, bitumen ratio, thickness, compaction, Hveem Stability, air voids and Lottman testing.
- 3) The Contractor's test results for the RAP material will be verified by NDOT and will be used to accept the materials submitted for the mix design(s).
- 4) The required amount of RAP will be 10 to 15%. Once the mix design has been completed, no change to the percentage of RAP will be allowed. Gradation changes required will need to be made through the virgin aggregate stockpiles. RAP feeding systems will be required to be interlocked and calibrated with the rest of the hot plant.
- 5) Rap will be used in the dense grade only.
- 6) For this first project, RAP may be specified for half of the total project.

These issues, and the specifications that will be developed accordingly, are a tentative and partial list only. Please contact the Materials Division with any concerns you may have. (Darin Tedford 775-888-7784)

MSE Backfill

The NDOT has built Mechanically Stabilized Earth retaining walls since the early 1970's. Historically NDOT has required the use of MSE walls composed of inextensible metallic reinforcements due to structural concerns about the long term durability and deformation of extensible reinforcements (geogrids, fabrics,

etc). NDOT MSE backfill materials have always been source (pit) tested, but until recently production testing of MSE Backfill during NDOT construction projects was not required. However, NDOT has always used corrosivity test methods that we believe were adopted from the California DOT, instead the AASHTO recommended test methods. We think this was done for expediency because AASHTO tests methods take much longer to complete. In 2004 footing excavations for a new sound wall barrier to be built along I 515 (btw Flamingo Road and Desert Inn in the Las Vegas Valley) exposed severely corroded metallic reinforcements on an MSE Wall that was less than 20 years old. Subsequently, NDOT commissioned a study to perform a condition assessment of the MSE walls at the site (McMahon & Man Consulting Engineers). The conclusions of this study basically attributed the accelerated reinforcement corrosion to the aggressiveness of the backfill used at the wall sites. Initially this was surprising since records showed the backfill had passed NDOT/AASHTO corrosivity criteria used for source acceptance. Consequently, the Materials Division investigated further and found that the NDOT test methods consistently under predicted the aggressiveness of the backfill by 30% to 50% as compared to AASHTO recommended tests. We also found that many times in the past a MSE backfill source was only accepted after submitting several samples (several of which had failed). This led us to believe that the inherent variability of Nevada MSE backfill sources, especially in Southern Nevada, combined with inadequate source testing, and the use less stringent (or less accurate) Nevada Test Methods was probably the main problem. We then initiated an Investigation of Corrosion of MSE Walls research project in conjunction with UNR. This study is on going. Materials Division also implemented required production testing of MSE backfill materials for NDOT Contracts about 2 years ago. We hope that these actions will help us gather enough information to make sure that NDOT does not continue to use aggressive backfills in MSE wall applications in future projects. In an effort to increase the availability of MSE backfill the Materials Division also implemented an internal work plan to see if it was possible to modify failing materials obtained from marginal MSE Backfill sources into acceptable material. The successful methods investigated included aggregate washing and gradation adjustments. It was found that aggregate washing/soaking typically removed substantial salts from the materials which were in turn carried away by the wash water. Dry sieving processes also helped somewhat by removing substantial fines which were thought to contain substantial salts as well. However, it is difficult to model such processes accurately in the lab as compared to field procedures so we aren't certain that such things could be accomplished economically in the field. Finally, NDOT and the Materials Division recognizes that the availability of MSE Backfill material that passes AASHTO corrosivity criteria is becoming very scarce, especially in the Las Vegas area. Therefore the Materials Division in conjunction with Bridge Division has initiated the building of 4 MSE walls with geosynthetics (geogrids) instead of metallic reinforcements in the upcoming US 95 Package 1 widening project in Las Vegas. It is our goal to show that MSE walls constructed with nonmetallic reinforcements (that aren't susceptible to corrosion) can be used to

overcome NDOT's backfill limitations economically, and still provide structures that NDOT's Bridge Division can have confidence in.

Alternate Burner Fuels

Based on review and consideration of several sources, NDOT has decided not to allow the use of Alternate Burner Fuels (Recycled Fuel Oils). Please see the attached memo, distributed to all of the Resident Engineers.

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

MEMORANDUM

November 25, 2008

To: All Resident Engineers


From: Gary Selmi, Chief Construction Engineer

Subject: Use of Alternate Burner Fuels

The Construction and Materials Divisions have reviewed recent proposals to use alternate burner fuels, also known as Recycled Fuel Oil (RFO). Also, samples of RFO supplied to two hot plants this past construction season have been inspected.

Based on concerns regarding the variability of each batch of the RFO material, residual chemical and particulate matter in the distilled RFO and possible incomplete combustion, use of this material is prohibited. Also, the blending of an approved fuel oil with a recycled material is prohibited.

Continue to use only burner fuels listed in Subsection 401.03.01 of the Standard Specifications. Certificates of compliance should be verified for each load of burner fuel supplied to the hotplant.

If you have any questions, please contact me at (775) 888-7460.

GS:slh

cc: Reid Kaiser, Chief Materials Engineer
All District Engineers
Asphalt Lab
Bituminous Lab
Lab Services
File

Las Vegas Paving Corporation
Larry Sharp

Southern Area RAP Usage Summary

Local History

For over 20 years the RTC in southern Nevada has allowed the use of 15% RAP in mix designs for use in off-site development projects. Its use has been extensive over that time frame and continues today with 15% RAP mixes being placed in nearly all public and private areas, from parking lots to major arterial roadways. Millions of tons of HMA with RAP have been placed in southern Nevada.

In 2001, the Clark County Public Works Department (CCPW) began mandating the use of PG76-22 binder for all capital improvement projects. NDOT was mandating PG76-22NV (southern areas) at that time as well. Clark County then began to mandate a PG76-22CC product that created a storage issue, which led to our exclusive use of the NDOT "NV" product.

As part of the design criteria, CCPW required rut-testing of the mix at the design phase and then follow-up testing of the production placements (in-place cores) at a rate of 1/3000 tons. Recovered binder testing from in-place core specimens was also stipulated and performed at frequencies of approximately 1/3000 tons. LVP began using these mixes with 15% RAP almost immediately and has placed hundreds of thousands of tons all over the Las Vegas Valley. Some of the more prominent CCPW projects where this combination of PG76-22NV and 15%RAP mixes have been placed are:

Flamingo Road, from Rainbow to Buffalo	53,000 tons
Jones Boulevard, from I-215 to Robindale	17,500 tons
Craig Road, from Buffalo to Durango	14,500 tons
Various Las Vegas Intersections	6,000 tons
Eastern Avenue at I-215	1,600 tons
Frank Sinatra Drive at Flamingo Road	15,000 tons
Harmon Avenue, from Decatur to Jones	20,000 tons
Hualapai Way at I-215	4,000 tons
Beltway Frontage Roads, Rainbow to Durango	50,000 tons
Industrial Road, from Tropicana to Hacienda	8,500 tons
Russell Road, from Paradise to Eastern	30,000 tons
Tropicana, from Rainbow to Durango	33,700 tons
Tropicana, from Decatur to Valley View	38,700 tons
Pulverize & Pave Project, Various Locations	62,000 tons
Pulverize & Pave Lots 1,2, & 3, Various Locations	<u>55,000 tons</u>
	409,500 tons

In June of 2007, LVP submitted a proposal to an RTC Section 401 Subcommittee to consider increasing the allowable amount of RAP from 15% to 30%. The proposal is still being considered.

Other Agencies

NDOT is one of seven other state agencies that do not allow the use of RAP in some form. All other state agencies have specifications in place for using RAP, many at rates of 30% or higher. These statistics come from the RAP Expert Task Group that was formed in 2007 by the FHWA. One of their goals is to “initiate several field projects throughout the US using high percentages of RAP (25% or more) in order to increase awareness of the benefits of RAP in HMA production and develop best practices for designing, processing, and handling RAP in HMA.”

Concerns

A common misconception about utilizing RAP in the production of HMA is that the quality and durability of the pavement will be compromised to some extent. Numerous national studies have been completed to show that RAP mixes can perform as well as conventional virgin HMA.

FHWA Publication No. FHWA-SA-95-060

“Pavement performance and detailed evaluations indicate that recycled HMA that is designed and controlled during production will perform comparably to conventional HMA and can improve material properties of the existing layer.”

NCHRP Project 9-12

“Use of RAP has proven to be economical and environmentally sound. In addition, mixtures containing RAP have, for the most part, been found to perform as well as virgin mixtures.”

RAP variability is also a major concern for some, but studies have shown that when using just 15% RAP the variability factor is mitigated because of the low percentage. From a design standpoint, when using RAP the grade of virgin binder may have to be adjusted to accommodate for the stiffening effect the residual binder in the RAP exhibits. However, it is widely accepted that when using only 15% RAP, no change in virgin binder grade is necessary.

NCHRP Research Results Digest, March 2001 - Number 253

“For low RAP contents, 10 to 20 percent, it is not necessary to do this testing (Determining RAP Binder Properties) because there is not enough of the old, hardened RAP binder present to change the total binder properties.”

Conclusion

We know it works, we've done it in the past, continue to do it today, and will do it in the future. There's been extensive studies done for decades across the nation on RAP usage and we're behind the times. Fifteen percent (15%) RAP usage is a standard practice in nearly all areas and the recent national movement is to increase that percentage. Given the current economic and environmental challenges we face, considering the wealth of supporting data and studies in place, using RAP is a solid, sound, and responsible decision.