Warm Mix Asphalt

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Overview

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WMA Definition

MTO adopted NAPA’s Definition of WMA

• A group of technologies which allow a reduction in the temperatures at which asphalt mixtures are produced and placed. WMA can be separated into 3 categories:
  • Chemical Processes
  • Organic Additives
  • Foaming Processes

• WMA allows compaction temperature to be reduced by 20-50°C while still achieving adequate compaction.
Benefits of WMA

When compared to Hot Mix Asphalt (HMA), WMA benefits include:

• Reduced asphalt plant emissions
• Reduced paving crew exposure to fumes
• Reduced fuel consumption
• Improved compaction and better joints
• Facilitates higher recycled asphalt pavement (RAP) content in the mix
• Less asphalt aging and the potential for reduced cracking
• Facilitates longer hauling distances
• Facilitates late season paving
Challenges of WMA

• Costs?
• Effectiveness of different technologies – not all are the same
• Ensuring long term performance including moisture susceptibility
• Mix design procedure
• Recyclability
• Restrictions/adjustments at the asphalt plant
MTO WMA Contracts

- MTO has paved about 500,000 tonnes of WMA since 2008.
- WMA technologies included Chemical and Organic; no Foaming technology has been used on MTO jobs.
- In 2011, WMA accounted for 10% of total asphalt paved on provincial highways.
- MTO set a 15% target for 2013 and 2014.
- Pavement performance of WMA has been comparable to HMA with slightly better joint quality.
QA Results

• In general, the lot mean compaction for WMA was either equal to or higher than HMA.

• WMA was paved at temperatures 10-30°C lower than HMA without any adverse effect on mix properties or compaction.

• TSR results on production WMA samples were significantly variable with values ranging from 44 to 117 percent.

• Hamburg rut depths were comparable between WMA and HMA.
Energy Savings on MTO WMA Contracts

- Replacing HMA with WMA on our contracts has saved an estimated 31,200 Giga Joules of energy.
- This energy saving is equal to 900,000 litres of diesel fuel, the equivalent of taking 126,000 vehicles off the roads for one day.
WMA Task Group

• An MTO/Industry WMA Task Group was formed in late 2010 to further investigate WMA and improve MTO’s specification. Issues under discussion included:
  • Mix design, PGAC (Performance Graded Asphalt Cement) selection, moisture sensitivity, rutting resistance, performance testing, RAP content, field performance, and emissions.

• Other objectives of the WMA Task Group would include:
  • Compiling a WMA state of the practice guide
  • Developing mix design procedures for WMA
  • Developing a WMA guideline for contractors
  • Developing educational material to promote WMA use
WMA Specification Requirements

• Superpave mix design according to LS-318
  • Flow Number (for info only)
  • Coating test
  • Compactability test
  • Minimum TSR of 80% is required
• TSR on the production samples performed by QA lab (for info only)
• Provide WMA supplier’s recommendations
• Contractors are encouraged to record the fuel usage at the asphalt plant during WMA/HMA production.
Closing Remarks

- WMA is an innovative green technology that reduces greenhouse gas and fuel consumption while improving compaction.
- MTO experience with WMA has been positive.
- MTO will continue to work with WMA Task Group to improve our WMA specification.
- Given the environmental benefits and potential performance improvements, the life cycle cost of WMA is expected to be similar to HMA.
- In addition to the permissive specification, MTO is specifying WMA in up to 15% of total asphalt quantity for 2013 and 2014.
- This 2-year program will allow the asphalt industry to invest in WMA technology and increase WMA use.
Thank You

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