

top10 list



WAYS TO GET MORE DURABLE HMA PAVEMENTS

#8

PRODUCING
UNIFORM AND
CONSISTENT
(QUALITY) MIX

The goal of a mix design is to produce an asphalt mix with certain desirable characteristics such as workability, stability, durability, impermeability, flexibility, fatigue, rut and skid resistance. Once formulated, it is essential to have a fine-tuned manufacturing process to ensure consistent production of the mix design. The process includes coordinating material control, production control, and placement control in a manner that guarantees production of a mix that is within the set tolerances and specified temperatures. Adherence to these, matched with enforcing good specifications ensures a high standard of quality by minimizing variability.

Read the following check list to learn about the best practices for producing uniform and consistent quality mix.

Asphalt.

ONTARIO RIDES ON US





UNDERSTANDING THE FUNDAMENTALS

- Producing uniform and consistent (quality) Hot Mix Asphalt (HMA) begins with understanding the fundamentals of the mix type and the drivers for performance and economics. A good mix design limits production difficulties, and makes it easier to control or maintain balance in volumetric property fundamentals, materials (binder & aggregate) characterization, stockpile moisture considerations and mixture performance testing and analysis.



AGGREGATE MANAGEMENT

- Aggregates are of primary importance for mix consistency and performance. It is important to monitor their specific gravities and moisture relationships (G_{sr} , G_{sar} , G_{ser} , G_{sb}), including surface and internal voids where applicable. The influencing factors on aggregate specific gravity include its mineralogy, fines and dust content, shape, texture, gradation and sampling errors. Variabilities in aggregate specific gravities will have impact on the mix volumetric and optimum binder content.
- With most aggregates, changes in gradation result in changes in density. Therefore, controlling the gradation during the manufacturing process, and using good stockpiling practice at the quarry and plant, will provide a more uniform gradation and density of the aggregate in the stockpile, as well as the resulting mix.



RECYCLED MATERIAL MANAGEMENT

- Practices surrounding the management and use of recycled products will have impact on mix uniformity, consistency and production. Substantial errors in Voids in Mineral Aggregate (VMA) can occur if the incorrect Bulk Specific Gravity is utilized. It is advised to treat recycled products during production the same way as virgin aggregates.



INFLUENCING FACTORS & MATERIAL CONTROL

- Volumetric property relationships to binder content is fundamental to asphalt mix designs, production, construction and performance. It is critical to understand and pay attention to any factors that may influence the Maximum Theoretical Specific Gravity of the mix (G_{mm}), Bulk Specific Gravity of the mix (G_{mb}), and VMA. These influencing factors include, but are not limited to: binder content, aggregate gradation and blend composition, compaction temperature, test procedures, sampling, handling and hauling practices, test vacuum pressure, test agitation, and test temperature.



UNDERSTANDING VARIABILITIES

- The binder content is influenced by aggregate moisture content, recycled binder ratio, recycle feed rate, incorrect pump calibration, poor sampling and incorrect testing practices. Proactive quality control is essential to identify a need for adjustments, and knowing the sensitivities to such adjustments is recommended. Any such changes must be based on quality control (QC) testing and/or inspection data.
- The main plant issues that could drive Job Mix Formula (JMF) adjustments include: slight variation in AC content, poor dust controls, variable production rates and temperatures, inconsistent storage times and excessive switchovers.



CONSISTENCY

- A critical consideration should envisage variations to the JMF and the consequences to production. If the asphalt mix produced by the plant is consistent and uniform in binder content and aggregate mix throughout, then the resulting roadway made from this material will also be consistent and uniform assuming that the paving material has been properly handled and laid down.



COMPACTION

- Having a mix that is produced to exact specification and to a high degree of uniformity will not yield a good performing pavement if the required compaction is not achieved or if the compaction across the mat or along the length of the mat is not uniform. Mix volumetric properties and volumetric properties of the pavement after placement both need to be considered for a good performing pavement.



Ontario Asphalt Pavement Council

365 Brunel Road, Mississauga, ON L4Z 1Z5

Tel. 905-507-1107 • Fax. 905-890-8122 • www.onasphalt.org