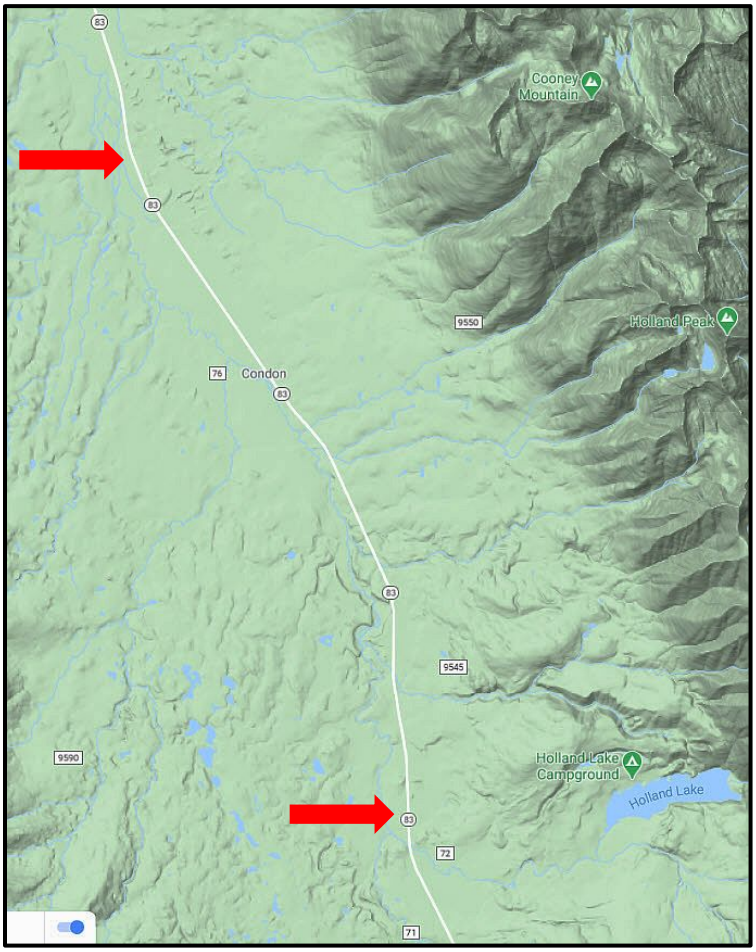
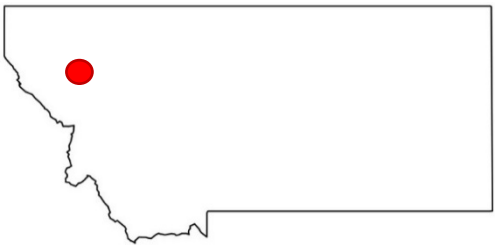
Experimental Feature Construction Report & Evaluation
September 2021

Experimental Feature:	Longitudinal Joint Void Reducing Asphalt Membrane (VRAM)
Location:	Missoula District, Missoula County, MT 83, Reference Post 31.5-47.8
MDT Project Name:	Condon – North & South
MDT Project Number:	STPP 83-1(40)32[9500]
Experimental Project Number:	MT-20-06
Principle Investigator:	Chad DeAustin, ExPM
Technical Contact:	Jason Livingston, EPM, Kalispell Construction
Construction Date:	July/August 2020
Date of Inspections:	September 2021

Project Map





*Location approximate, not to scale.

Project Description & Outline

The objective of this feature is to determine the effectiveness of adding a void reducing asphalt membrane (VRAM) to mitigate longitudinal joint deterioration on a two-lane primary highway.

JBAND was the selected VRAM product which is produced by Asphalt Materials. It is applied by spray truck as a heavy fluid membrane under the intended longitudinal joint. Per manufacturers information, once cured the JBAND remains a non-tracking stripe; as production AC is applied over the membrane and compacted it migrates into the overlay to reduce joint permeability. It has been reported on average that 50-70% of the VRAM may migrate into the AC.

JBAND will be applied in two passes at approximate 9" in width. One lane is milled and cleaned, then a pass of VRAM is applied at the milled centerline joint. The VRAM is allowed to cure, the lane has tack applied then paved. The other lane is milled, subsequently cleaned and the VRAM is applied at that milled joint followed by tack application and paving.

Application rate was specified at 1.67 lb./ft based on an 18" (46cm) wide strip with an average product thickness of 5/32".

Evaluation Procedures & Schedule

The measure of effectiveness (MOE) prevalent with this project will focus on:

- Construction practice,
- Long-term durability of the VRAM/JBAND application at the centerline joint.

In accordance with the Department's 'Experimental Project Procedures,' Research will monitor and report on performance for a minimum of five years annually. This includes delivery of a work plan, construction report, annual reports, and final project report.

2020:	Installation/Construction Report
2021-2025:	Annual Inspections/Evaluation Reports
2025:	Final Evaluation Report/Project Conclusion

A web page will be dedicated to display all reporting from the project.

URL: https://www.mdt.mt.gov/research/projects/condon.shtml

Preconstruction Documentation – June 2020

🡸🡻 Several examples of centerline joint condition prior to start of project. Top image is near RP 32, lower is near RP 43.

Construction Documentation – July/August 2020

⬅⬇ Several images of the first milling pass on the southbound lane. Prior to the VRAM application the milled area was broom swept then a hand-held blower was used at the centerline.

⬅⬇ The project used a self-contained distributer unit for the JBAND application.

The distributer is equipped with a heating and recirculating system along with computerized pressure unit to insure the desired application rate.

A conveyor belt transfers the wrapped blocks of JBAND to the receiving hopper (yellow arrow).

⬅⬇ Several examples of the VRAM distribution in progress.

A worker follows behind to ensure the driver maintains correct alignment to the centerline joint.

The worker also carries a large spatula (or floor scraper) to assist in the proper spread of product.

⬅ Completed southbound VRAM pass under cure.

Based on the application rate and ambient condition, adequate cure may take between 15-30 minutes.

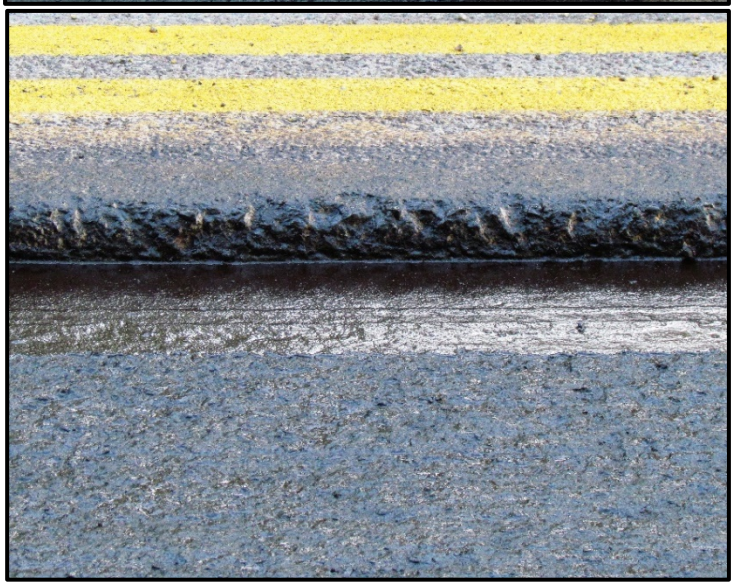
⬅ Areas of VRAM placement considered under applied, or vehicle movement may have separated the product from the pavement, were field marked and reapplied by hand.

Close-up of VRAM with an approximate cure of 15 minutes (southbound lane).

⬆ Initially the tack coat was applied over the VRAM, it was reported there were instances where vehicles driving over the VRAM pulled or tore the strip. It was felt the tack may be causing the VRAM to become too sticky and this process was changed to tacking just prior paving.

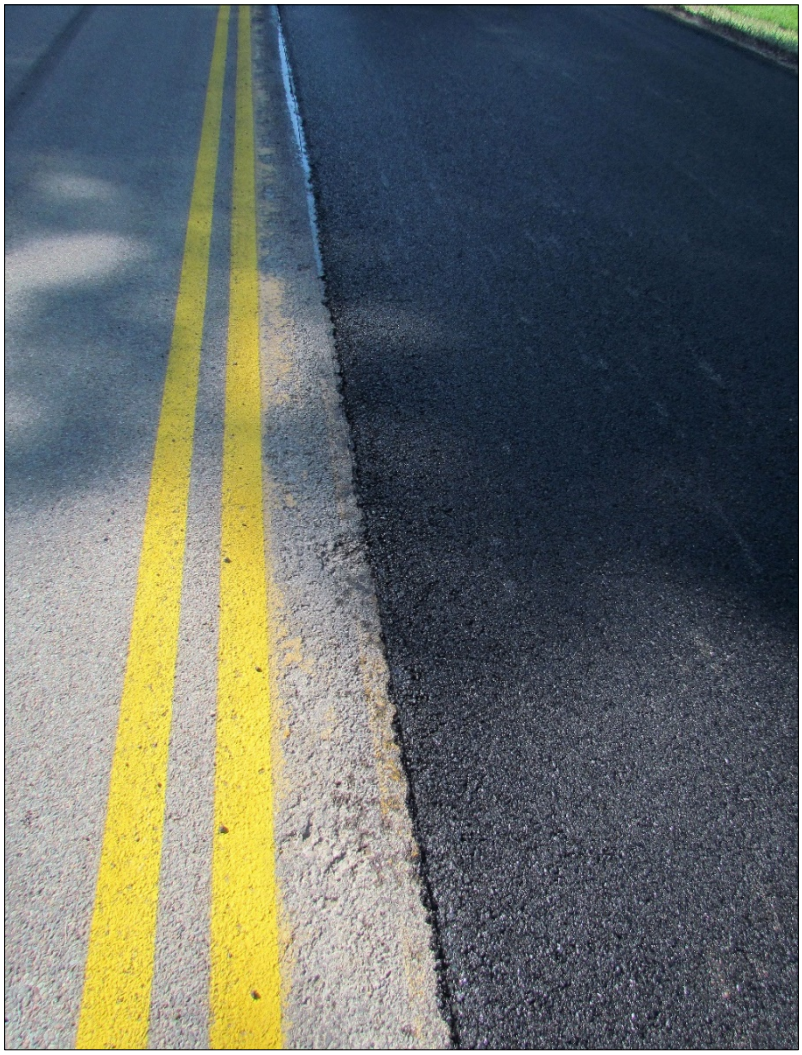
🡸 Start of southbound tack coat.

🡸 Completed tack run.



🡸 Close-up of tack at centerline joint.

⬅ Start of the southbound paving phase.



⬅ Example of compacted AC at longitudinal centerline.

⬅ Northbound lane milled and prepped for VRAM application.

⬅ This image shows the mill pass that has cut into the southbound lane JBAND strip. The pen marks the edge of the JBAND strip.

⬅ Northbound lane with VRAM strip applied.

⬆ Northbound lane paving completed.
⬇ Project with temporary striping and centerline rumble strip. Chip seal was completed in August 2020.

🡅 Several core samples taken from the projects centerline which shows the extent of the VRAM migration into the AC matrix. The core on the far left is split. Image courtesy of CES Review Section.

Site Inspections

Year 1 – September 2021

⬅ View south near RP 34. It appears that the VRAM has begun to bleed through the chip seal. This was consistent throughout the project.

⬅ ⬇ Views from multiple distances of the centerline and bleed through of VRAM material.

🡸 View north near RP 43. More examples of the VRAM bleeding through chip seal at the centerline joint

🡸 The VRAM can be seen here bleeding through between the CLRS.

🡸 As seen in this photo, the chips appear to be present but flooded with the VRAM.

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