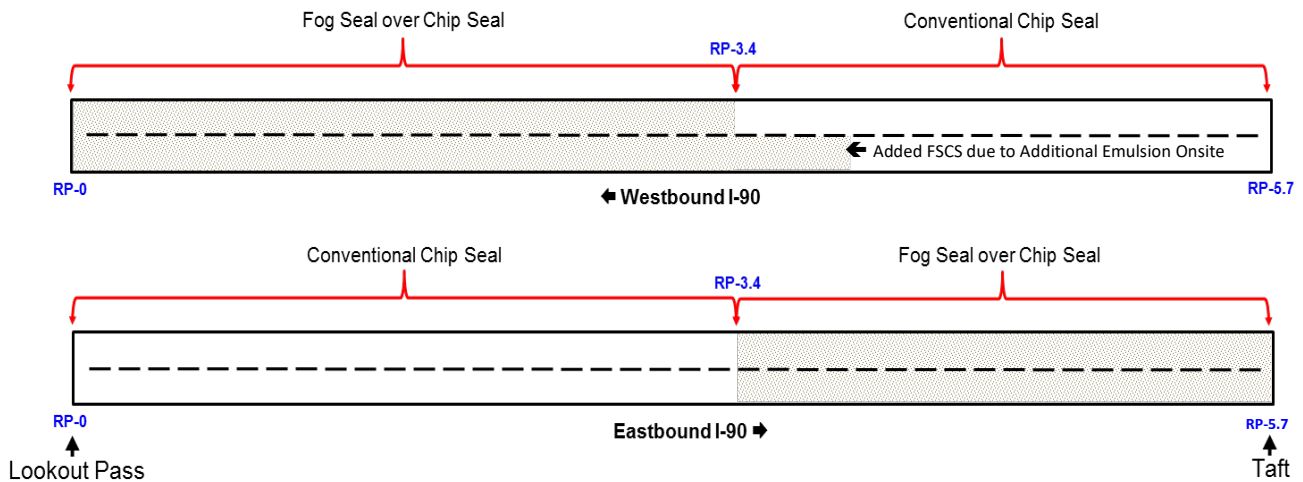


**Experimental Feature Final Report
January 2023**

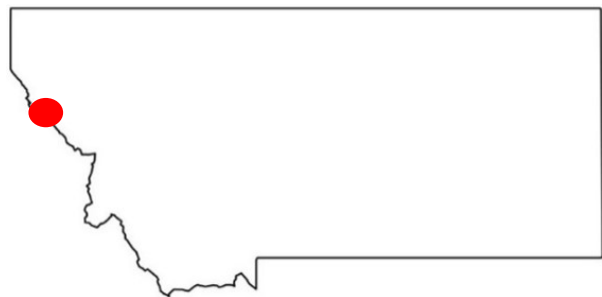
| | |
|-------------------------------------|--|
| Experimental Feature: | Fog Seal over Chip Seal comparison |
| Location: | Missoula District, Mineral County, Interstate 90, RP 0.0 – 5.7 |
| MDT Project Name: | Taft – West |
| MDT Project Number: | IM 90-1(215)0[8769] |
| Experimental Project Number: | MT-15-02 |
| Principle Investigator: | Chad DeAustin, Experimental Project Manager, (ExPM) |
| Technical Contact: | Jim Davies |
| Construction Date: | August 2015 |
| Date of Inspections: | May 2016, April 2017, September 2021 |

Project Map

*EXPERIMENTAL LAYOUT FOR FOG SEAL/SEAL & COVER PROJECT: Taft West/ IM 90-1(215)0



*All values are approximate: Not to scale



Project Description & Outline

This feature compares conventional chip seal procedures to a fog seal over chip seal application, with the focus of the evaluation being chip adhesion in each application. The project runs from RP 0 at the Idaho/Montana border to RP 5.7 near the Taft interchange. The area of the construction is a mountainous region of I-90 with harsh winter conditions and extreme temperature fluctuation. A project layout can be seen on the previous page. Each driving direction received opposite applications with them switching at RP 3.4. This establishes unbiased control and test sections for each.

Evaluation Procedures & Schedule

The measures of effectiveness prevalent with this feature are:

- Construction practices (constructability, construction time, cost effectiveness, etc.),
- Visual inspection of the surface.

In accordance with MDT's Experimental Features Procedures, the Experimental Project Manager 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.

2015: Installation/Construction Report
2016-2020: Annual Inspections/Evaluation Reports
2021: Final Evaluation /Final Report

Conclusion

This feature evaluation is inconclusive because of the extreme wear seen in the first 2 years of evaluation. The lower elevation section did hold up better but still experienced significant chip loss. There is little perceived difference between the test and control section.

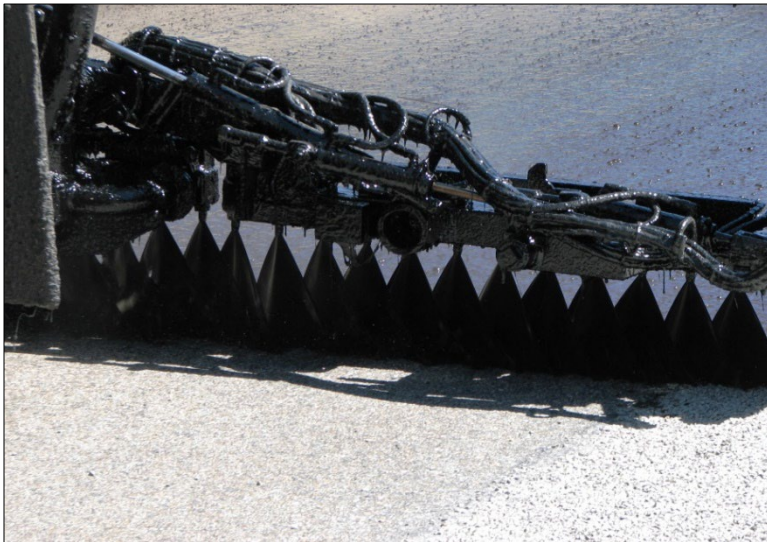
It should be noted, an adjacent section of roadway, project name [Exit 5 – East](#), was also an experimental feature evaluating a fog seal on chip seal application. There were a few differences between the two evaluations. Taft – West used CRS-2P emulsion and type 2 chips while Exit 5 – East used CHFRS – 2P and type 3 chips. The Exit 5 – East section was still in very good condition after 5 years of evaluation but with multiple differences it is tough to say which is responsible for better performance.

A dedicated [webpage](#) provides all reporting for the experimental feature.

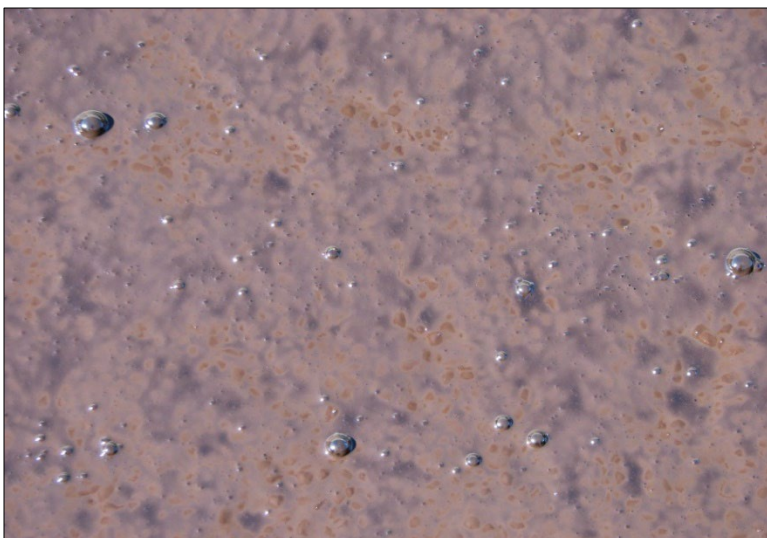
Construction Documentation – August 2015



← Typical application of CRS-2P emulsion (50/50 diluted with water), by asphalt distributor truck. Dilution blend was done at plant.



← The distributor truck spray bar appeared to have proper nozzle height and angle for correct distribution of emulsion.



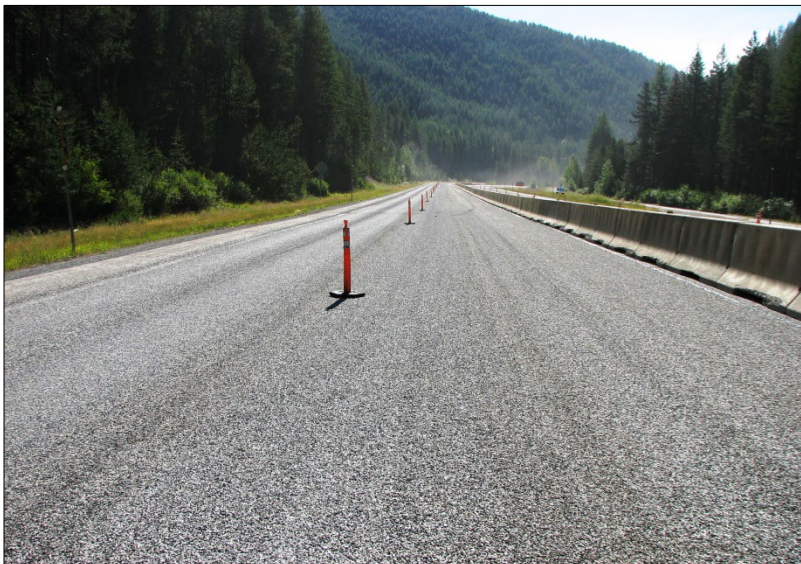
← Close up image of emulsion on pavement surface after application by spray.



← Representative image of chip spreader applying the specified Type 2 cover material.



← Several nine-tire pneumatic rollers are used in the compaction phase.



← Compaction completed and sufficiently cured to allow excess material removal to begin.



↑↓ Average visual appearance of chip seal embedment on project after cure and sweeping phase completed.





↩️ The CSS-1 Emulsion was applied at a diluted rate of 50/50 in one pass.



↩️ Completed pass of FSCS emulsion.



← Section of eastbound FSCS at approximate reference point 5.7/Taft Area Interchange: View west.



← Section of westbound FSCS at approximate reference point 0.0/Lookout Pass: View east.



← Extended Section of FSCS at approximate reference point 3.5; westbound passing lane.

Due to having additional emulsion on site, it was elected to continue the run an approximate 1200' east to exhaust the supply: View west.



↙ ↘ General images of the cured fog coating.

Overtime time due to topical oxidation, environmental factors, and general traffic; will remove (or flake) the layer of emulsion on the exposed surface of the aggregate and resemble a conventional chip





↑↓ Comparison of the level of residual bitumen binder within the Type 2 aggregate to the conventional chip seal and the added fog seal.



Year 1 – May 2016



← ↓ Areas west of mile point 3.4 toward the top of the pass shows sections of chip loss commonly associated with heavy snowplow activity.

Visually, most of the distress appears in the driving lanes.

Sections of bleeding and flushing were also observed.





← Example section of FSCS removed to asphalt surfacing.



← Additional image of surface flushing on the FSCS section.



← Close-up of intact FSCS surface texture.



← ↓ Several visual examples of CS performance throughout the project; areas where the chips are removed down to the base AC.



Year 2 – April 2017



↑ FSCS section; view west.



↑ CS section; view west.

Final Review – September 2021



← ↓ RP 3.2 in the eastbound lane, view east. These photos highlight the chip seal area. The photos below are varying distances of the chip seal surface.





← ↓ RP 4.0 in the eastbound lane, view east. These photos highlight the fog seal chip seal area. The photos below are varying distances of the chip seal surface.



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