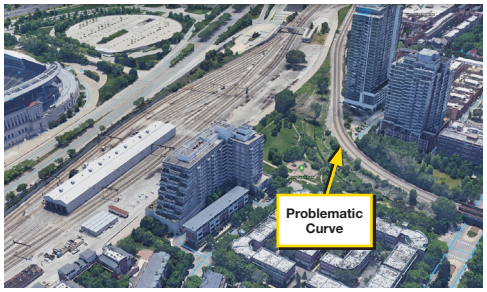
LORAM®

FRICTION MANAGEMENT
CASE STUDY

Noise Reduction on a Class 1 Railroad Using Friction Management

Background

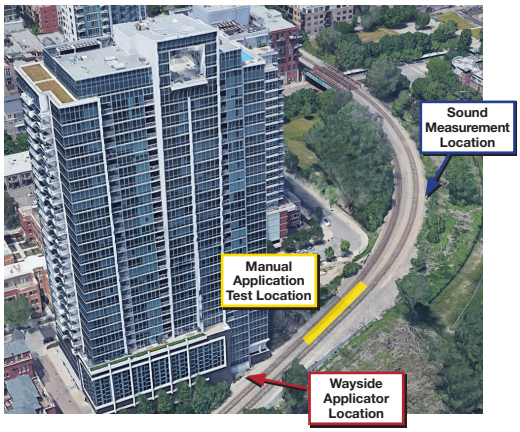
In February 2020, a North American Class 1 railroad requested Loram's help resolving noise issues near a problematic curve. The curve is located in a densely populated residential downtown area and sees numerous freight and commuter trains throughout the day. The railroad frequently received noise complaints as freight traffic traveled through this curve. Previously, the railroad worked with other friction management suppliers to mitigate these noise issues, but the friction modifier material proved ineffective and did not carry far enough into the curve. With the complaints continuing, the railroad sought Loram's assistance.



Location: Chicago, Illinois

Test Plan Scope

Within days, Loram and the railroad worked together to build a test plan and execute noise measurements. Loram performed six noise measurements at this curve with two tests on dry rail, two tests with manually applied friction modifier, and two tests with friction modifier applied by a Loram TracShield® top of rail wayside applicator. Noise measurements were taken for 10–20 minutes.



Test Results

Loram's TOR-Xtend® top of rail friction modifier was used for the tests following the two dry tests. With TOR-Xtend manually applied directly before each freight train, the average number of measured events over 90 dB per minute was decreased by 72.5% compared to the two dry tests, and the average decibel levels were reduced by 13.5%. With the TracShield unit applying TOR-Xtend, two freight trains passed through with only 4 and 6 total events over 90 dB, compared to 46 and 63 events during the dry tests. The near-continuous application of the TOR-Xtend from the TracShield unit also produced a 6.2% reduction in average decibel levels when compared to the dry tests.

With the TracShield unit applying TOR-Xtend, two freight trains passed through with only 4 and 6 total events over 90 dB, compared to 46 and 63 events during the dry tests.

Overall, the four tests with TOR-Xtend applied to the rail resulted in a 79.2% reduction in occurrences measured above 90 dB and a 9.8% reduction in average decibel level. For perspective, this reduction in noise levels is the equivalent to the difference between standing next to a lawnmower and standing next to a vacuum cleaner. The average perceived loudness during the dry tests was 1.8 times greater than what was observed during the TOR-Xtend and TracShield tests. Based on Loram's subsequent discussions with this railroad, since introducing the TracShield and TOR-Xtend at this location the noise complaints have stopped completely, and there have been no adverse effects to train braking.

TracShield Application Bar

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Test Methodology

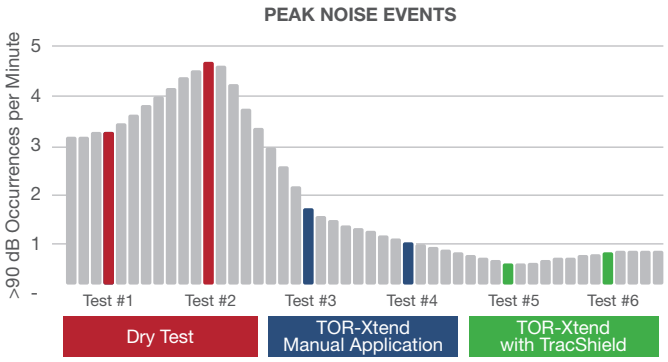
Dry Tests: Loram took noise measurements while two revenue freight trains traversed the curve with no friction modifier on the rail.

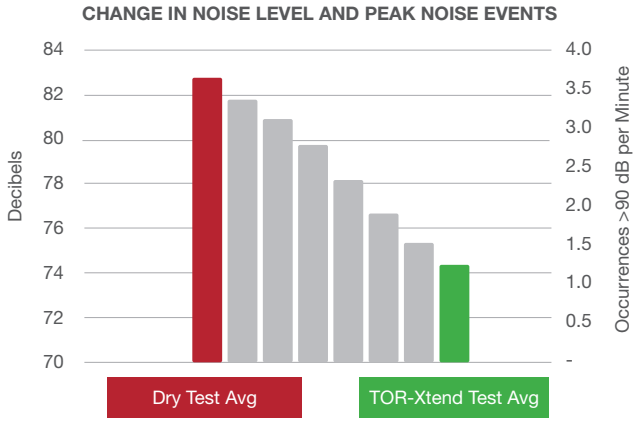
Manually Applied Friction Modifier Tests: Following the dry tests, Loram performed two tests with Loram's TOR-Xtend applied manually to the rail approaching the test curve. Loram applied approximately 1 mL of TOR-Xtend on the high and low rails, spaced evenly at every third tie for 50 feet leading into the curve.

Wayside Lubricator Friction Modifier Tests: With the understanding that it's not practical to rely on manual application, we utilized Loram's TracShield top of rail wayside applicator to apply approximately 200 mL per 1,000 axles of TOR-Xtend on the high and low rails approaching the test curve to provide real-world scenarios. We allowed the TracShield unit to operate for four days before the wayside applicator tests.

Overall, the four tests with TOR-Xtend applied to the rail resulted in a 79.2% reduction in occurrences measured above 90 dB and a 9.8% reduction in average decibel level.

Test Data





	Time	Test Duration (minutes)	Avg. dB Level	Events >90 dB	Avg. >90 dB Events per Minute
Dry Test #1	9:48 PM	20	82.5	63	3.15
Dry Test #2	12:20 AM	10	83.2	46	4.60
Manual Application Test #1	12:13 AM	11	70.3	15	1.36
Manual Application Test #2	12:55 AM	16	73.1	12	0.75
Wayside Application #1	8:54 PM	12	77.0	4	0.33
Wayside Application #2	10:57 PM	10	78.4	6	0.60

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