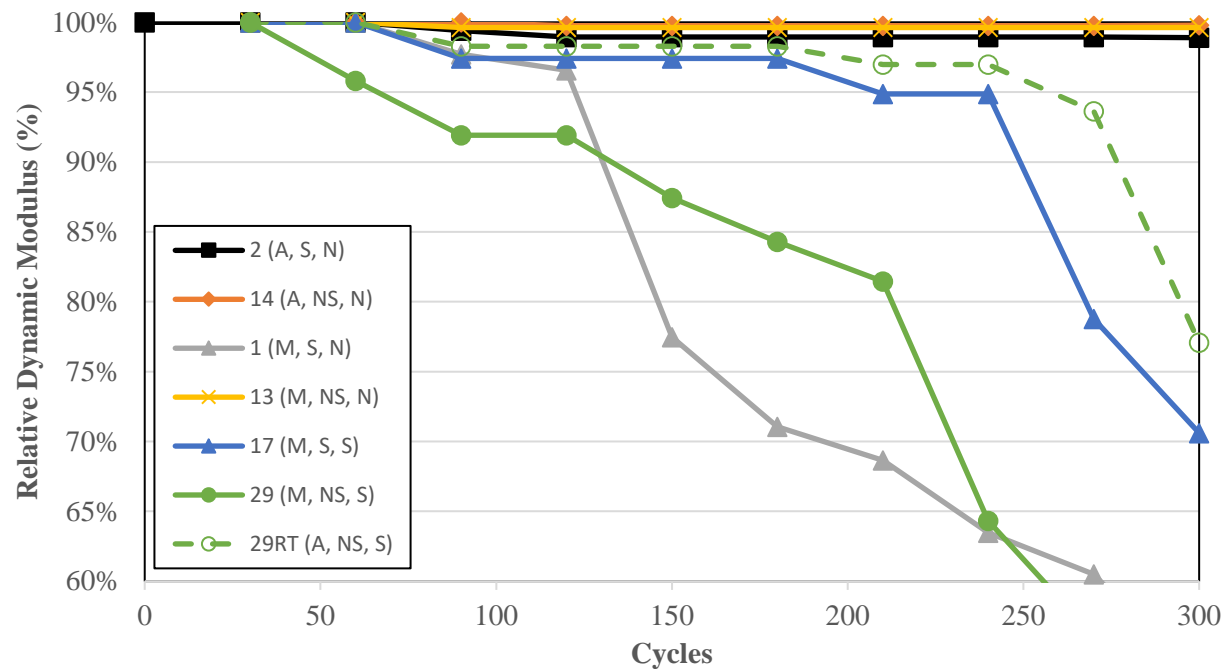


## APPENDIX G

# Data Obtained During F-T Testing

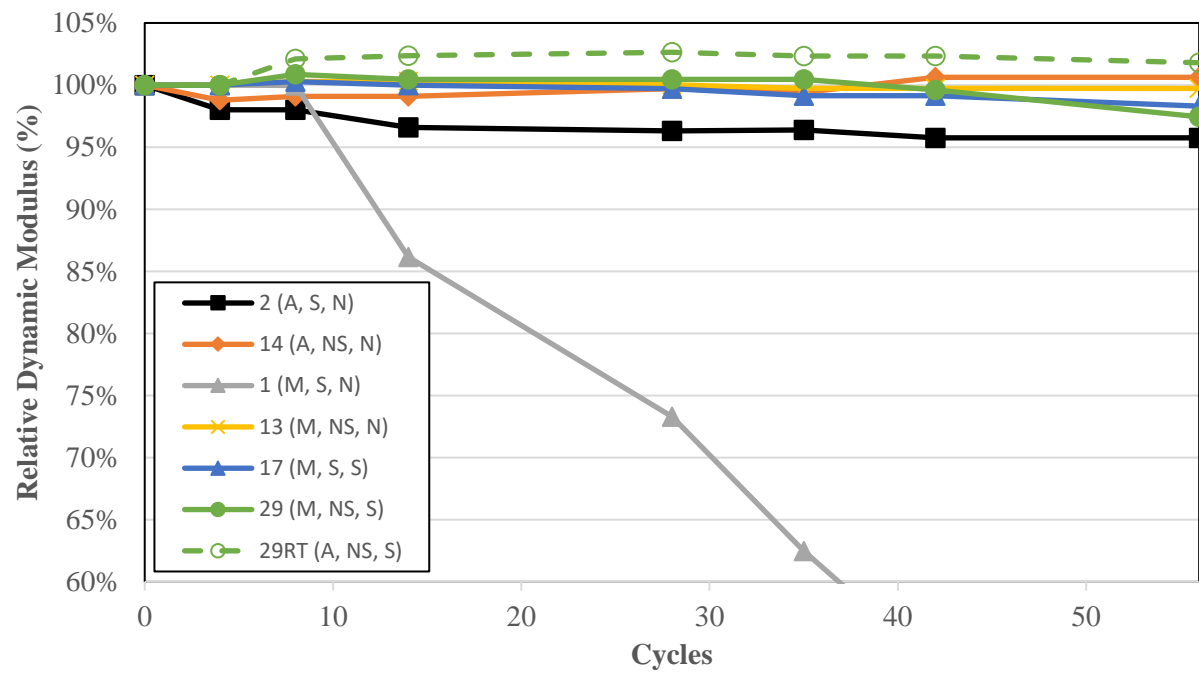
*AASHTO T 161 "A"*



Note: A = acceptable air content in fresh state, S = stable AEA, N = no significant effect due to SCM use, M = marginal air content in fresh state, NS = unstable AEA.

**Figure G-1. Relative dynamic modulus vs. F-T cycles for AASHTO T 161 "A".**

*CDF-A: Influence of Curing Time*



Note: A = acceptable air content in fresh state, S = stable AEA, N = no significant effect due to SCM use, M = marginal air content in fresh state, NS = unstable AEA.

**Figure G-2. Relative dynamic modulus vs. F-T cycles for CDF-A: FT1.**



**Figure G-3. Mixture 2 after 56 cycles in CDF-A:FT1 testing, average visual rating 2.**



**Figure G-4. Mixture 14 after 56 cycles in CDF-A:FT1 testing, average visual rating 5.**



**Figure G-5. Mixture 1 after 56 cycles in CDF-A:FT1 testing, average visual rating 4.**



**Figure G-6. Mixture 13 after 56 cycles in CDF-A:FT1 testing, average visual rating 1–2.**





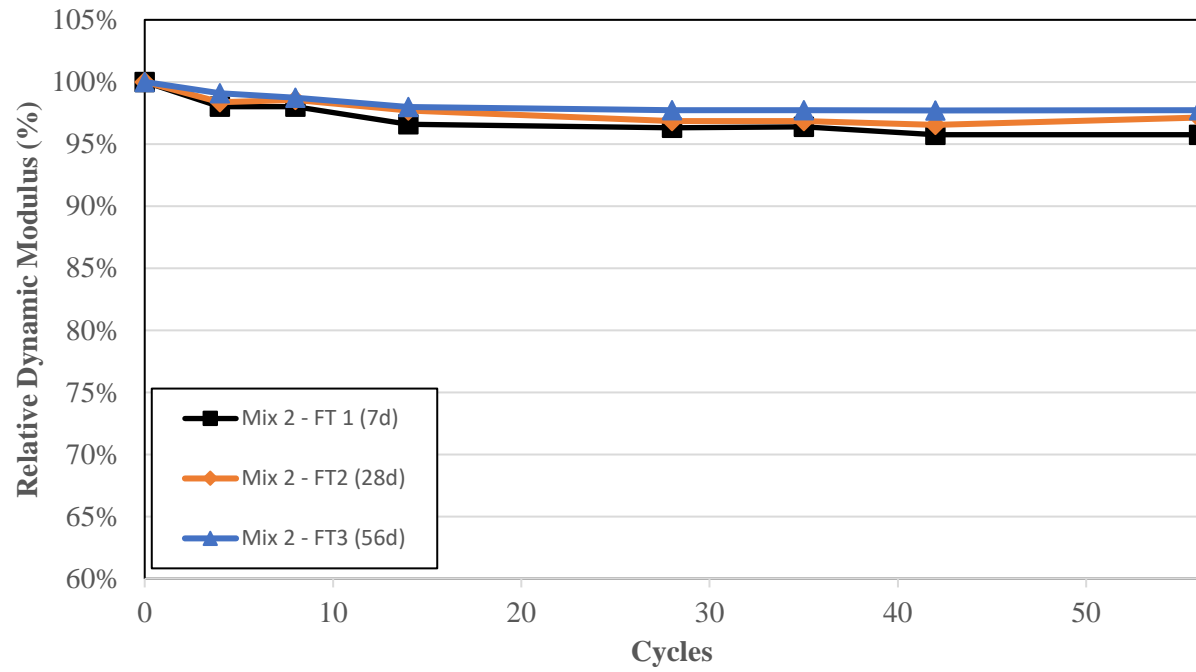
**Figure G-7. Mixture 17 after 56 cycles in CDF-A:FT1 testing, average visual rating 1.**



**Figure G-8. Mixture 29 after 56 cycles in CDF-A:FT1 testing, average visual rating 4.**

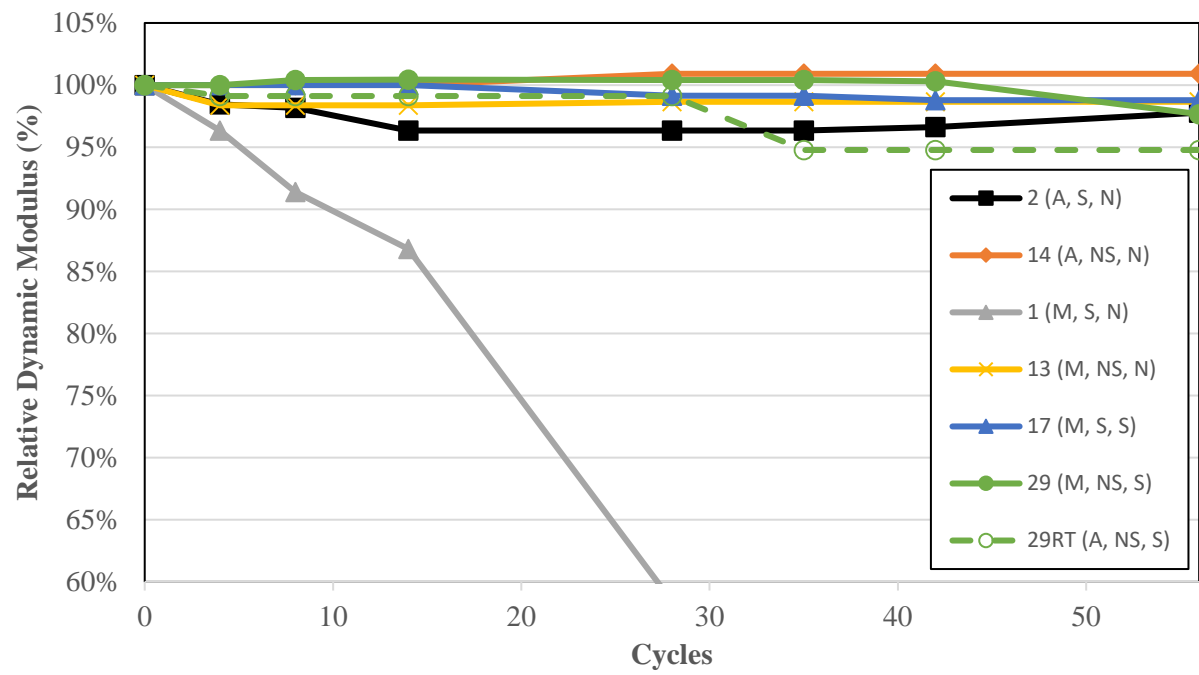


**Figure G-9. Mixture 29RT after 56 cycles in CDF-A:FT1 testing, average visual rating 3.**



**Figure G-10. Relative dynamic modulus vs. F-T cycles for CDF-A testing at various curing ages (7, 28, and 56 days).**

*CDF-B: Influence of Deicer Solution*



**Figure G-11. Relative dynamic modulus vs. F-T cycles for CDF-B:FT4.**





**Figure G-12. Mixture 2 (A, S, N) after 56 cycles in CDF-B:FT4 testing, average visual rating 2.**



**Figure G-13. Mixture 14 (A, NS, N) after 56 cycles in CDF-B:FT4 testing, average visual rating 1.**



**Figure G-14. Mixture 1 (M, S, N) after 56 cycles in CDF-B:FT4 testing, average visual rating 4–5.**



**Figure G-15. Mixture 13 (M, NS, N) after 56 cycles in CDF-B:FT4 testing, average visual rating 2.**



***Figure G-16. Mixture 17 (M, S, S) after 56 cycles in CDF-B:FT4 testing, average visual rating 2.***

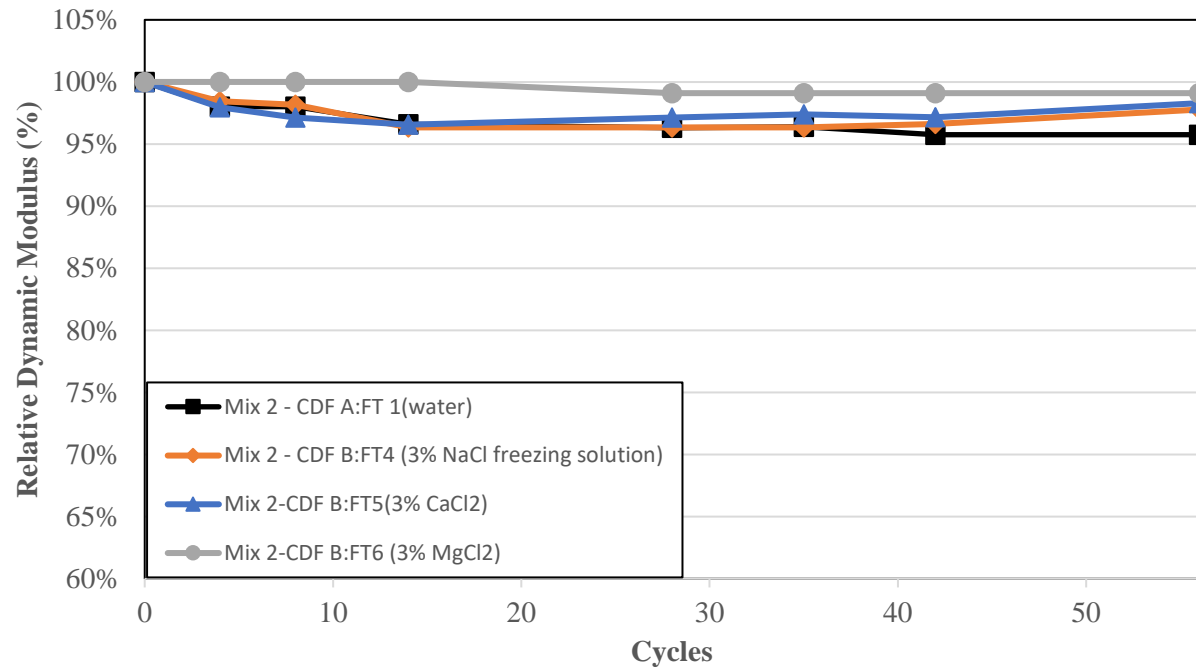


***Figure G-17. Mixture 29 (M, NS, S) after 56 cycles in CDF-B:FT4 testing, average visual rating 1.***



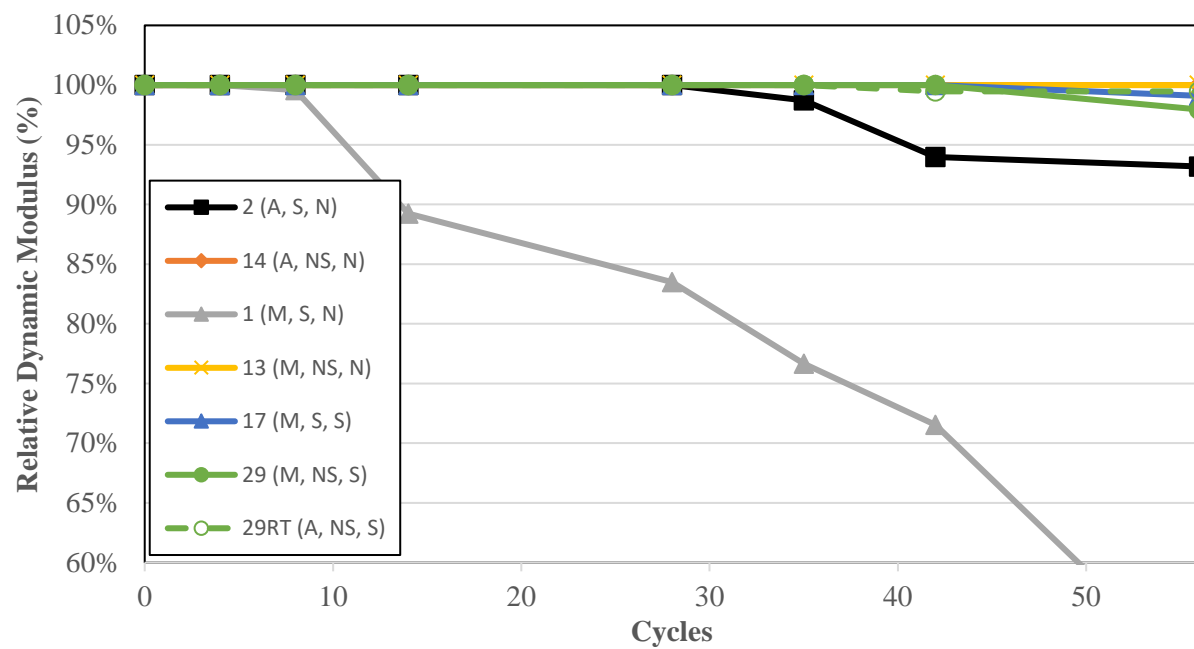
***Figure G-18. Mixture 29R (M, NS, S) after 56 cycles in CDF-B:FT4 testing, average visual rating 5.***





**Figure G-19. Relative dynamic modulus vs. F-T cycles for Mixture 2 across various deicer treatments.**

*CDF-C: Brine Pretreatment*



**Figure G-20. Relative dynamic modulus vs. F-T cycles for CDF-C:FT7.**



**Figure G-21. Mixture 2 (A, S, N) after 56 cycles in CDF-C:FT7 testing, average visual rating 2.**



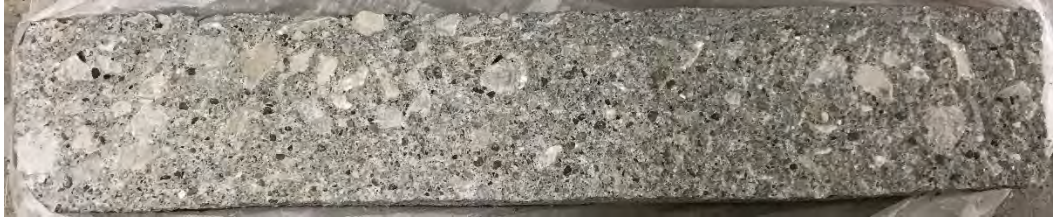
**Figure G-22. Mixture 14 (A, NS, N) after 56 cycles in CDF-C:FT7 testing, average visual rating 1.**



**Figure G-23. Mixture 1 (M, S, N) after 56 cycles in CDF-C:FT7 testing, average visual rating 5.**



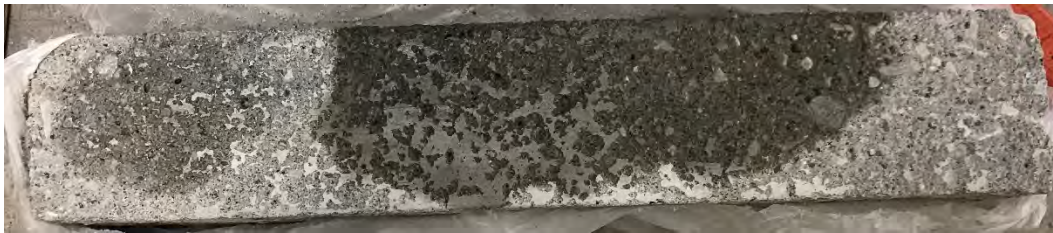
**Figure G-24. Mixture 13 (M, NS, N) after 56 cycles in CDF-C:FT7 testing, average visual rating 2.**



**Figure G-25. Mixture 17 (M, S, S) after 56 cycles in CDF-C:FT7 testing, average visual rating 4.**

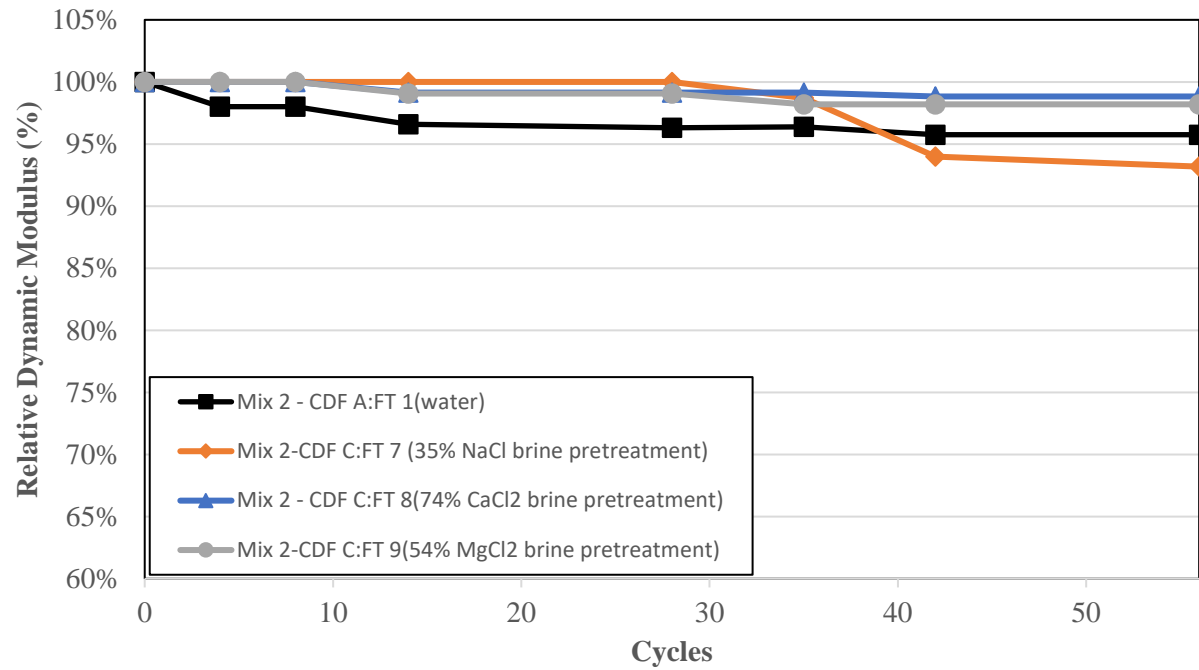


**Figure G-26. Mixture 29 (M, NS, S) after 56 cycles in CDF-C:FT7 testing, average visual rating 2.**



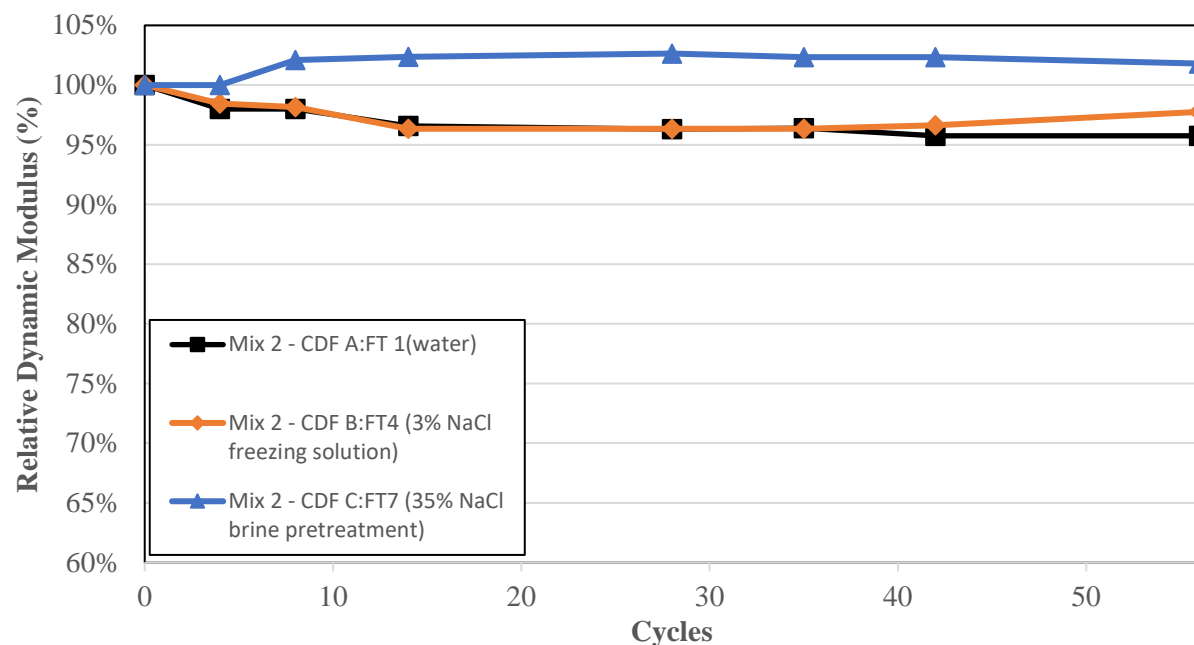
**Figure G-27. Mixture 29R (M, NS, S) after 56 cycles in CDF-C:FT7 testing, average visual rating 3.**



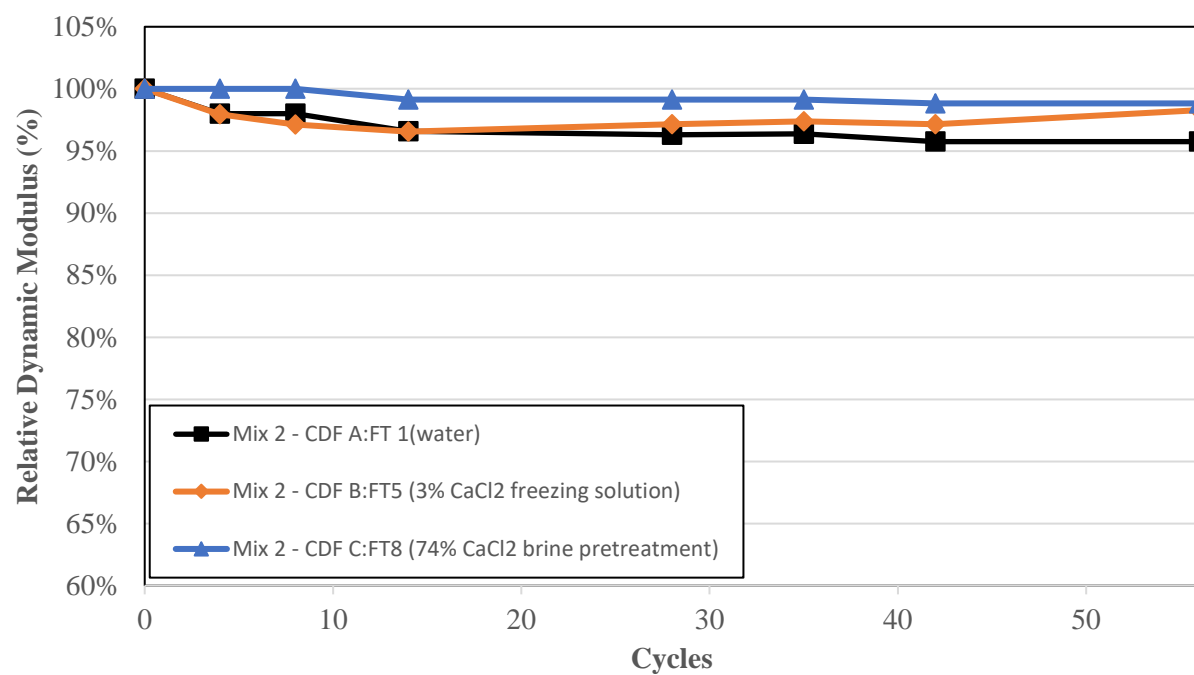


**Figure G-28. Relative dynamic modulus vs. F-T cycles for Mixture 2 across deicer brine pretreatments.**

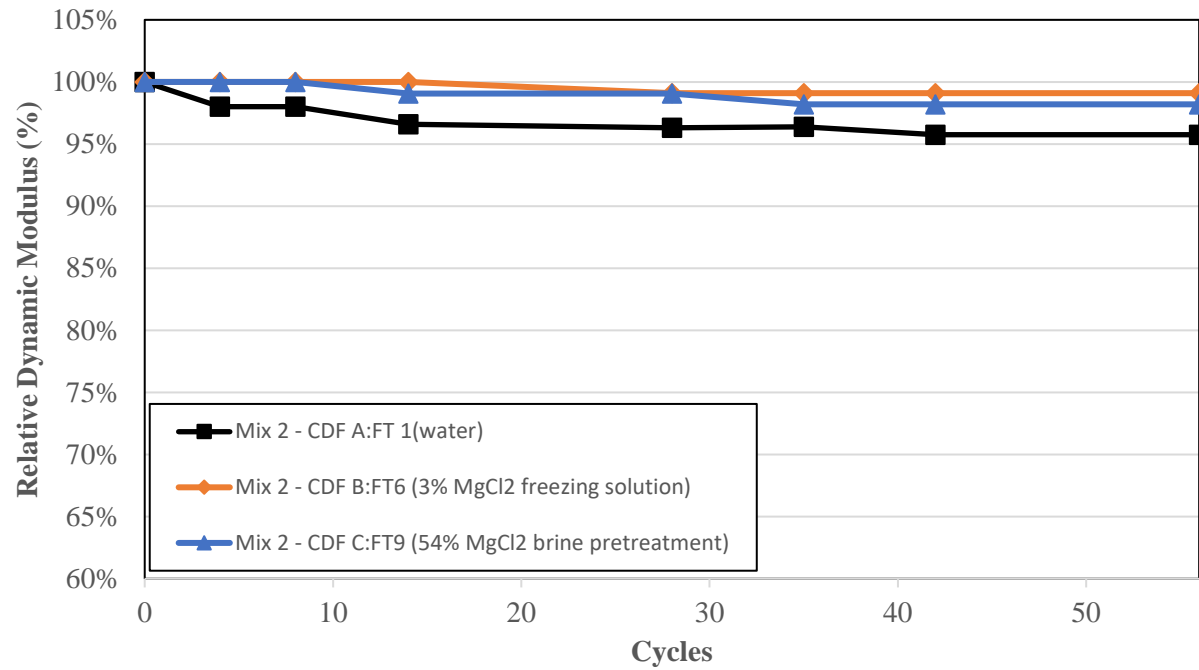
## Mixture 2 Performance Across Testing Variants



**Figure G-29. Relative dynamic modulus vs. F-T cycles for Mixture 2 across NaCl treatments.**



**Figure G-30. Relative dynamic modulus vs. F-T cycles for Mixture 2 across CaCl<sub>2</sub> treatments.**



**Figure G-31. Relative dynamic modulus vs. F-T cycles for Mixture 2 across  $MgCl_2$  treatments.**

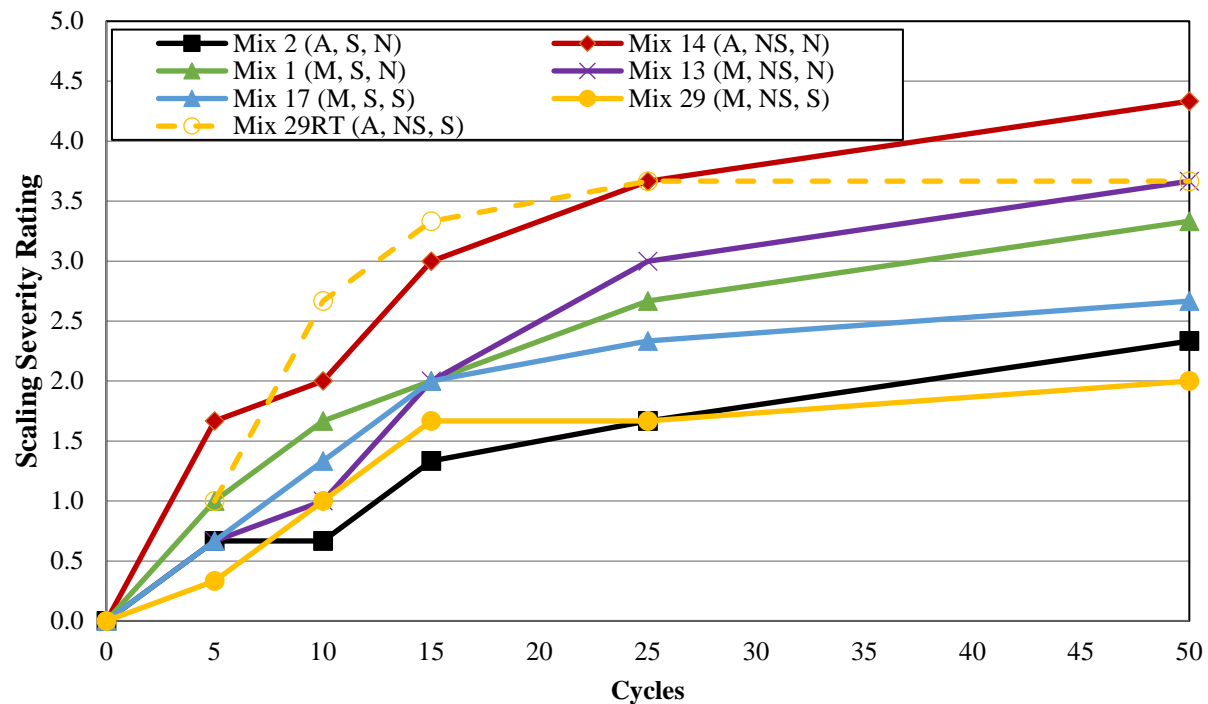
## ASTM C672: Deicer Scaling

The visual deicer scaling results are shown in Table G-1 and Figure G-32.

**Table G-1. Visual deicer scaling results.**

Mixture Designation	Average Rating (cycles)						Final Scaling Condition
	0	5	10	15	25	50	
2	0.0	0.7	0.7	1.3	1.7	2.3	2-Slight to moderate
14	0.0	1.7	2.0	3.0	3.7	4.3	4-Moderate to severe
1	0.0	1.0	1.7	2.0	2.7	3.3	3-Moderate
13	0.0	0.7	1.0	2.0	3.0	3.7	4-Moderate to severe
17	0.0	0.7	1.3	2.0	2.3	2.7	3-Moderate
29	0.0	0.3	1.0	1.7	1.7	2.0	2-Slight to moderate
29RT	0.0	1.0	2.7	3.3	3.7	3.7	4-Moderate to severe

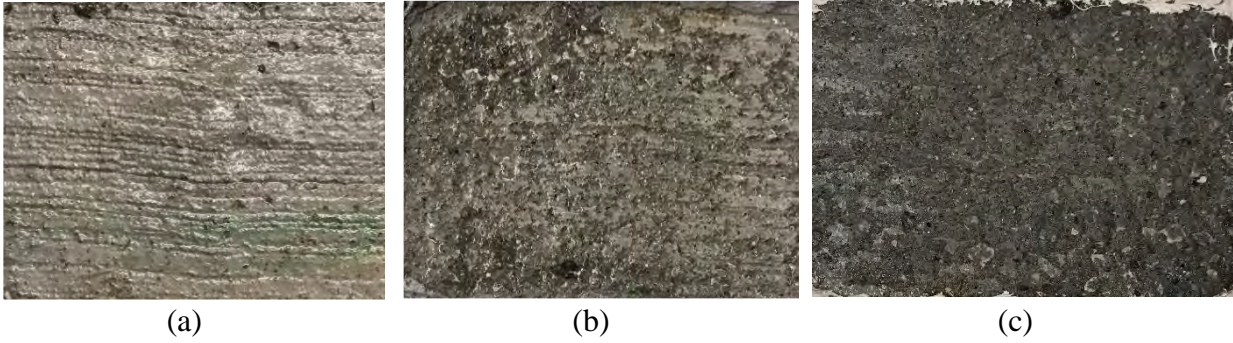
Note: RT = retempered.



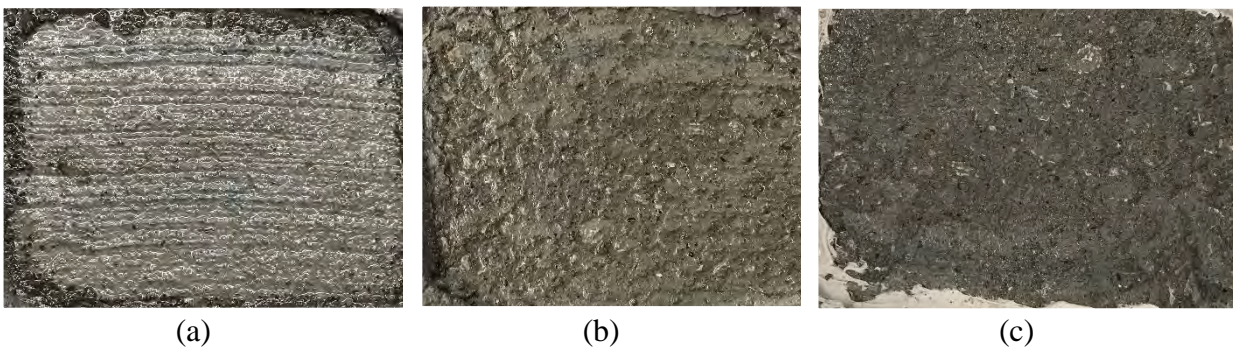
Note: A = acceptable air content in fresh state, S = stable AEA, N = no significant effect due to SCM use, M = marginal air content in fresh state, NS = unstable AEA.

**Figure G-32. Scaling vs. deicer cycles for ASTM C672.**

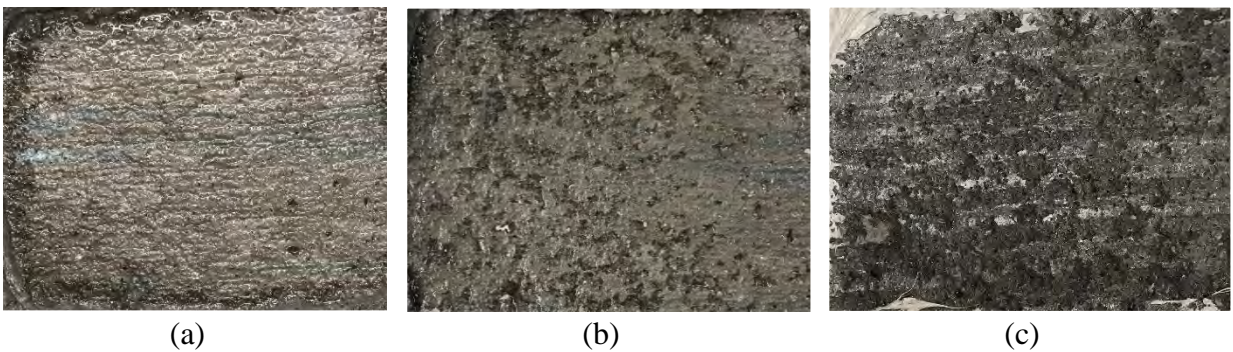




**Figure G-33. Mixture 2 (A, S, N) deicer testing results for (a) 0, (b) 25, and (c) 50 cycles, average visual rating 2.**

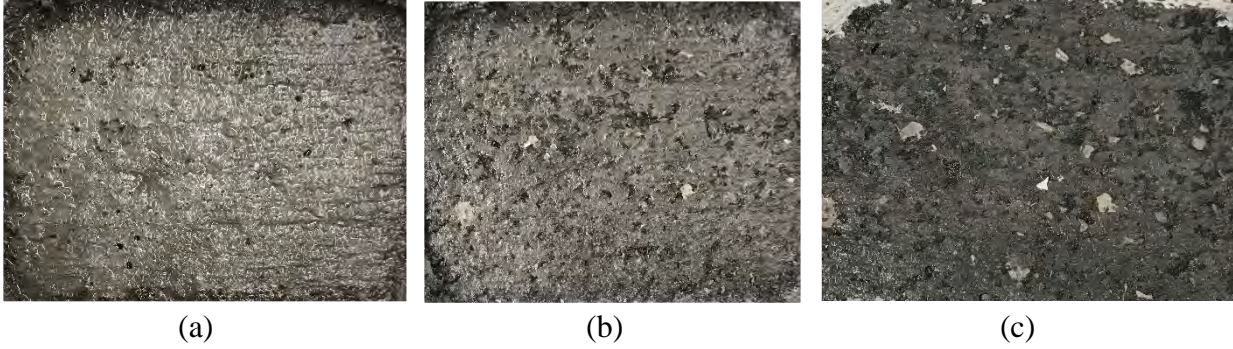


**Figure G-34. Mixture 14 (A, NS, N) deicer testing results for (a) 0, (b) 25, and (c) 50 cycles, average visual rating 3.**

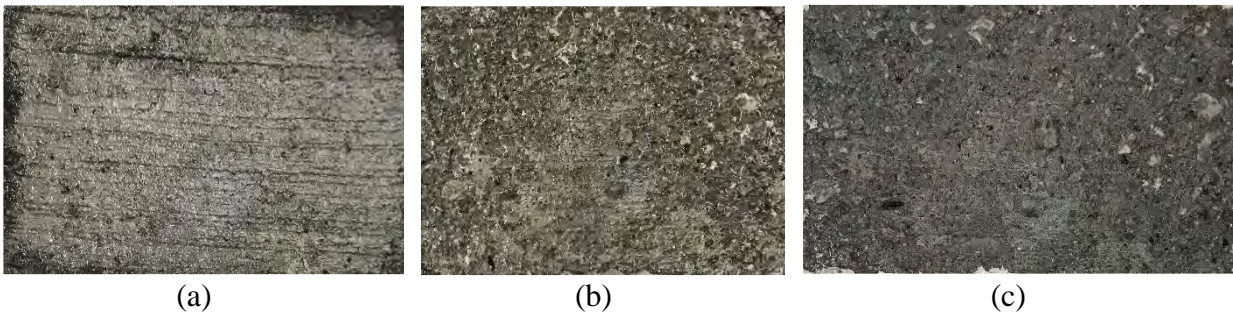


**Figure G-35. Mixture 1 (M, S, N) deicer testing results for (a) 0, (b) 25, and (c) 50 cycles, average visual rating 2.**

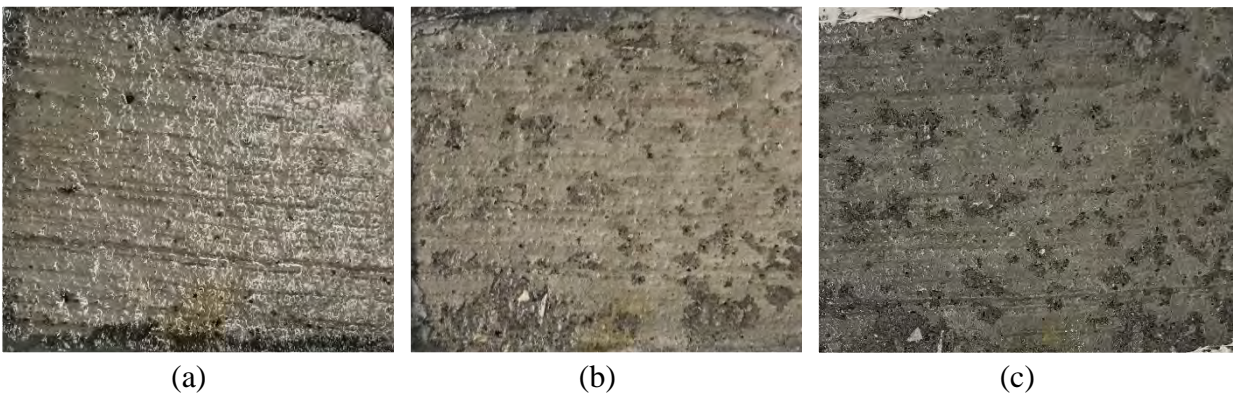




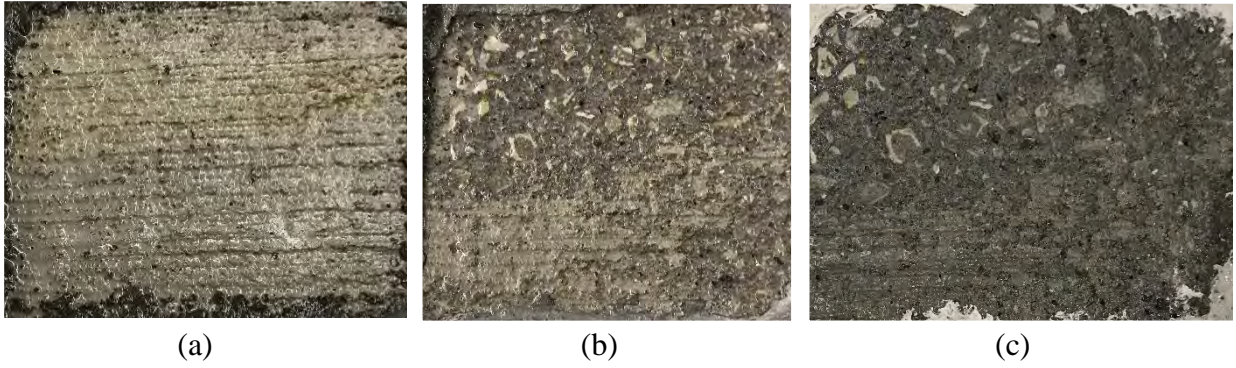
**Figure G-36. Mixture 13 (M, NS, N) deicer testing results (a) 0, (b) 25, and (c) 50 cycles, average visual rating 3.**



**Figure G-37. Mixture 17 (M, S, S) deicer testing results for (a) 0, (b) 25, and (c) 50 cycles, average visual rating 3.**

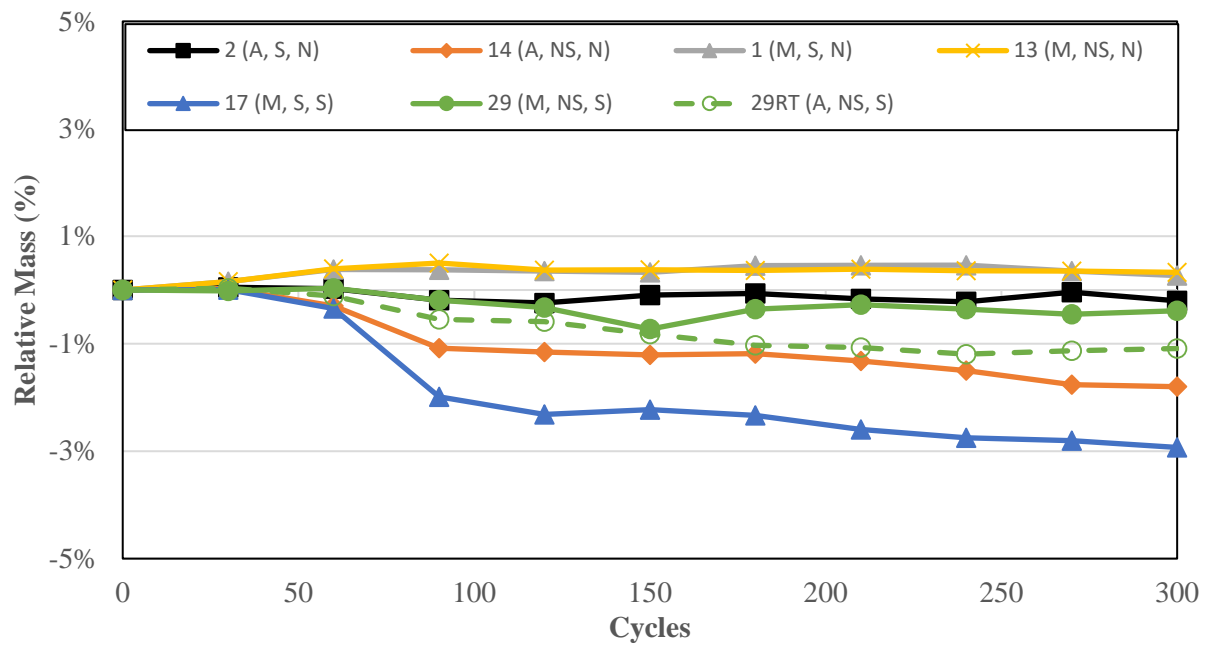


**Figure G-38. Mixture 29 (M, NS, S) deicer testing results for (a) 0, (b) 25, and (c) 50 cycles, average visual rating 1.**



***Figure G-39. Mixture 29RT (A, NS, S) deicer testing results for (a) 0, (b) 25, and (c) 50 cycles, average visual rating 3.***

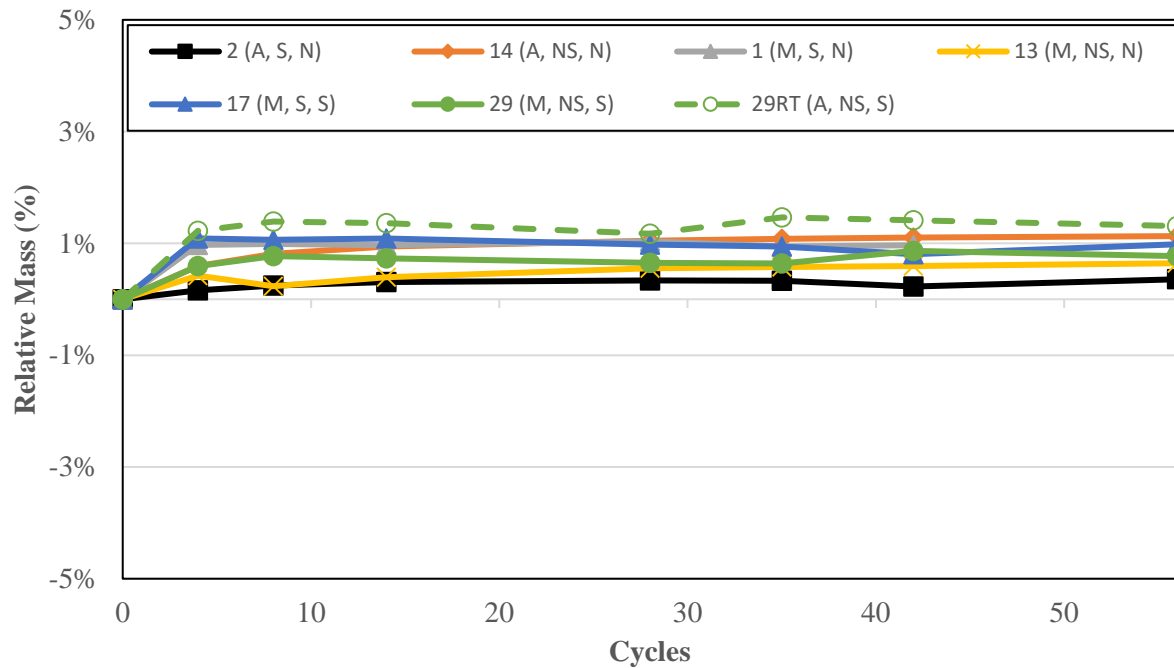
## Mass Loss Data Obtained During the F-T Testing



Note: A = acceptable air content in fresh state, S = stable AEA, N = no significant effect due to SCM use, M = marginal air content in fresh state, NS = unstable AEA.

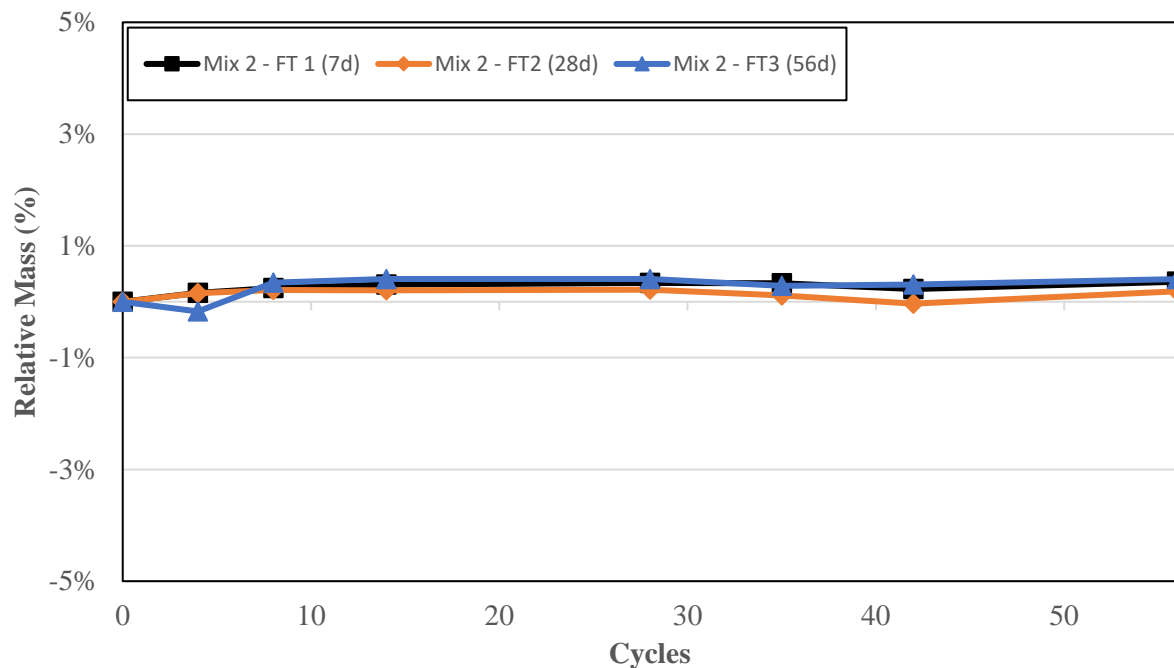
**Figure G-40. Relative mass vs. F-T cycles for AASHTO T 161 “A”.**



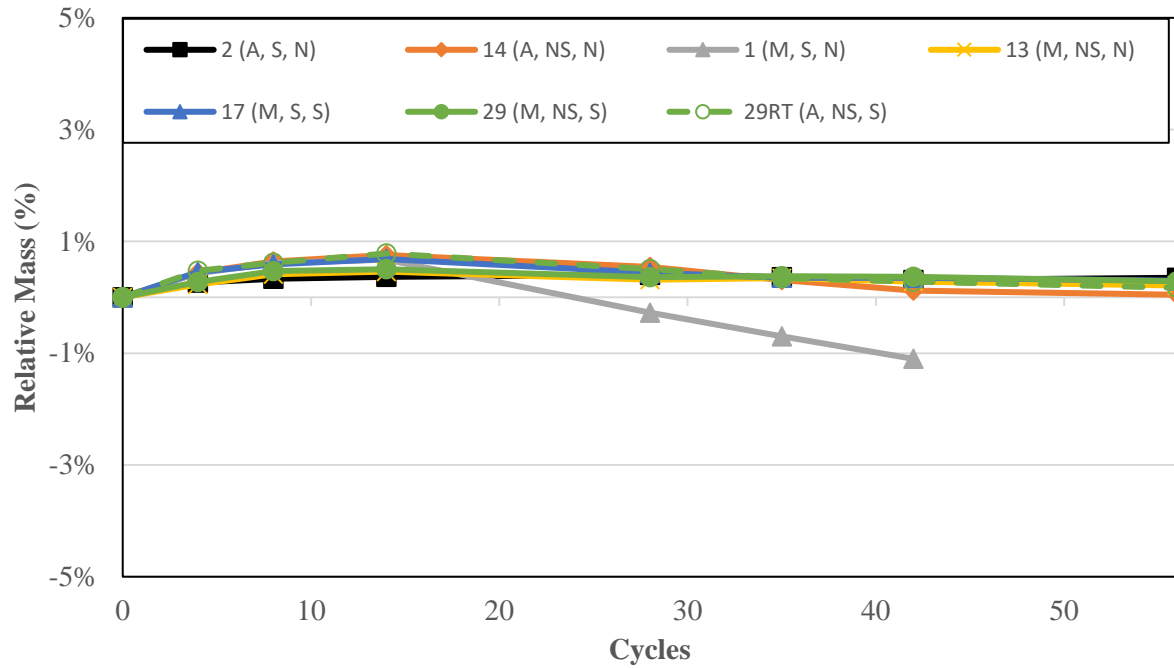


Note: A = acceptable air content in fresh state, S = stable AEA, N = no significant effect due to SCM use, M = marginal air content in fresh state, NS = unstable AEA.

**Figure G-41. Relative mass vs. F-T cycles for CDF-A:FT1.**

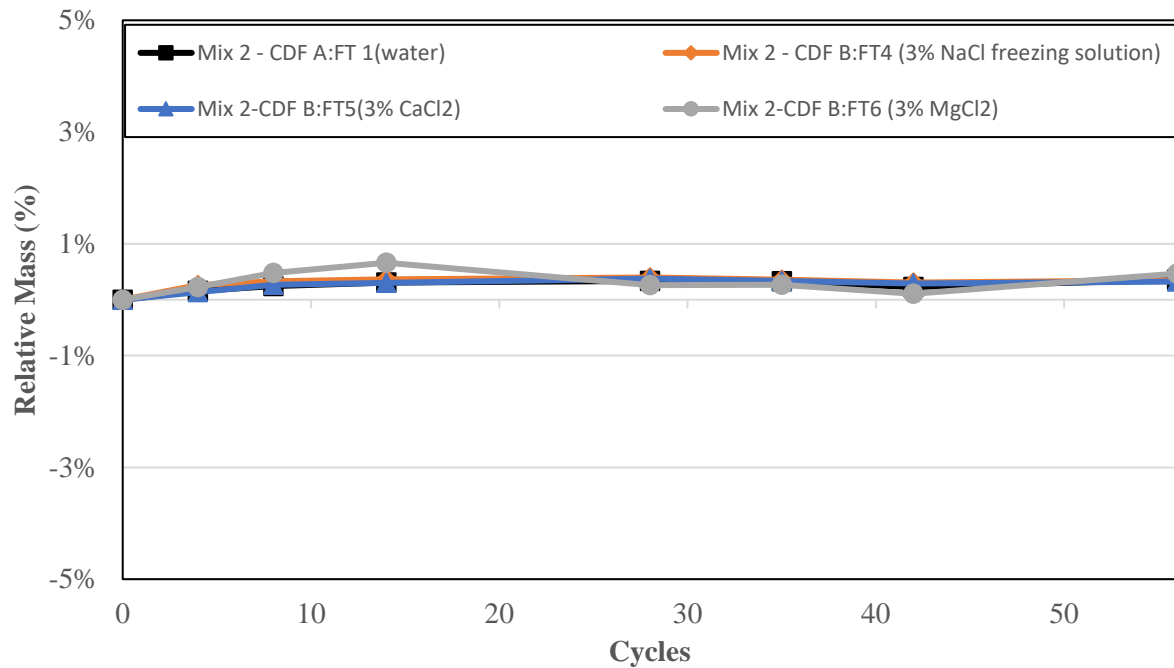


**Figure G-42. Relative dynamic modulus vs. F-T cycles for CDF-A testing at various curing ages (7, 28, and 56 days).**

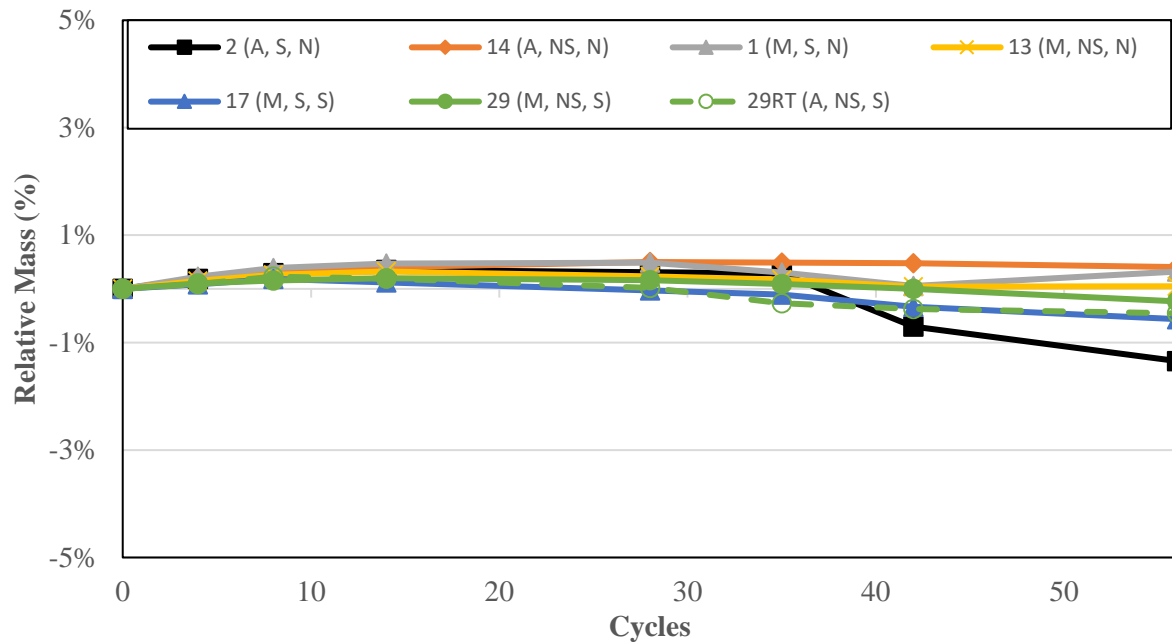


Note: A = acceptable air content in fresh state, S = stable AEA, N = no significant effect due to SCM use, M = marginal air content in fresh state, NS = unstable AEA.

**Figure G-43. Relative mass vs. F-T cycles for CDF-B:FT4.**

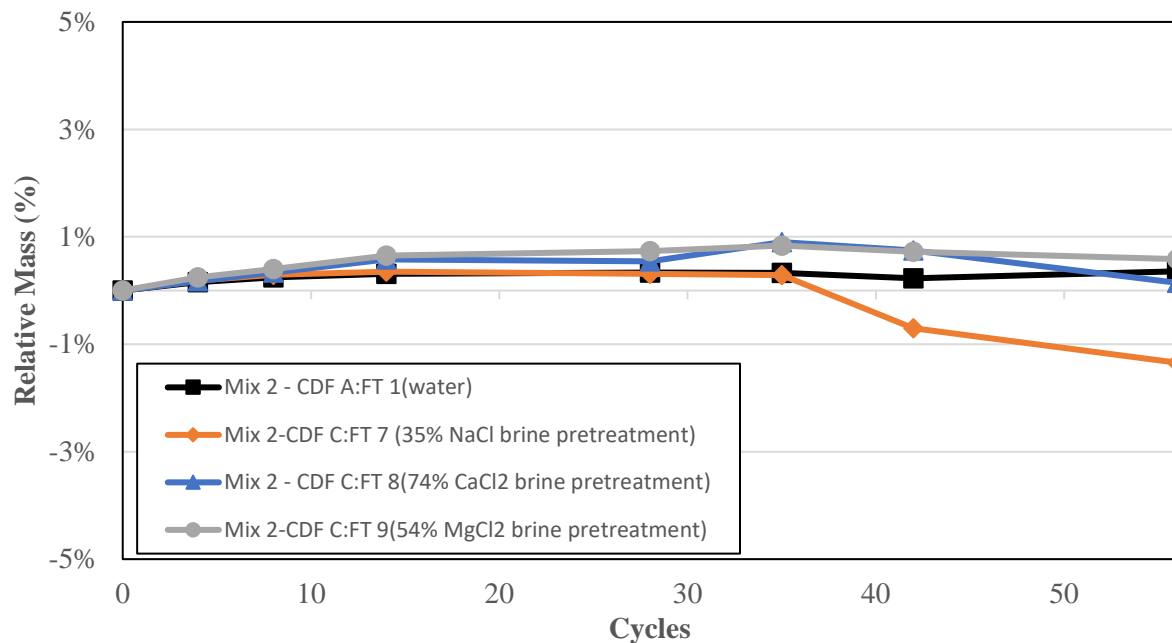


**Figure G-44. Relative mass vs. F-T cycles for Mixture 2 across deicer treatments.**



Note: A = acceptable air content in fresh state, S = stable AEA, N = no significant effect due to SCM use, M = marginal air content in fresh state, NS = unstable AEA.

**Figure G-45. Relative mass vs. F-T cycles for CDF-C:FT7.**



**Figure G-46. Relative mass vs. F-T cycles for Mixture 2 across deicer brine pretreatments.**