

Two-Lift Open House

October 16, 2008

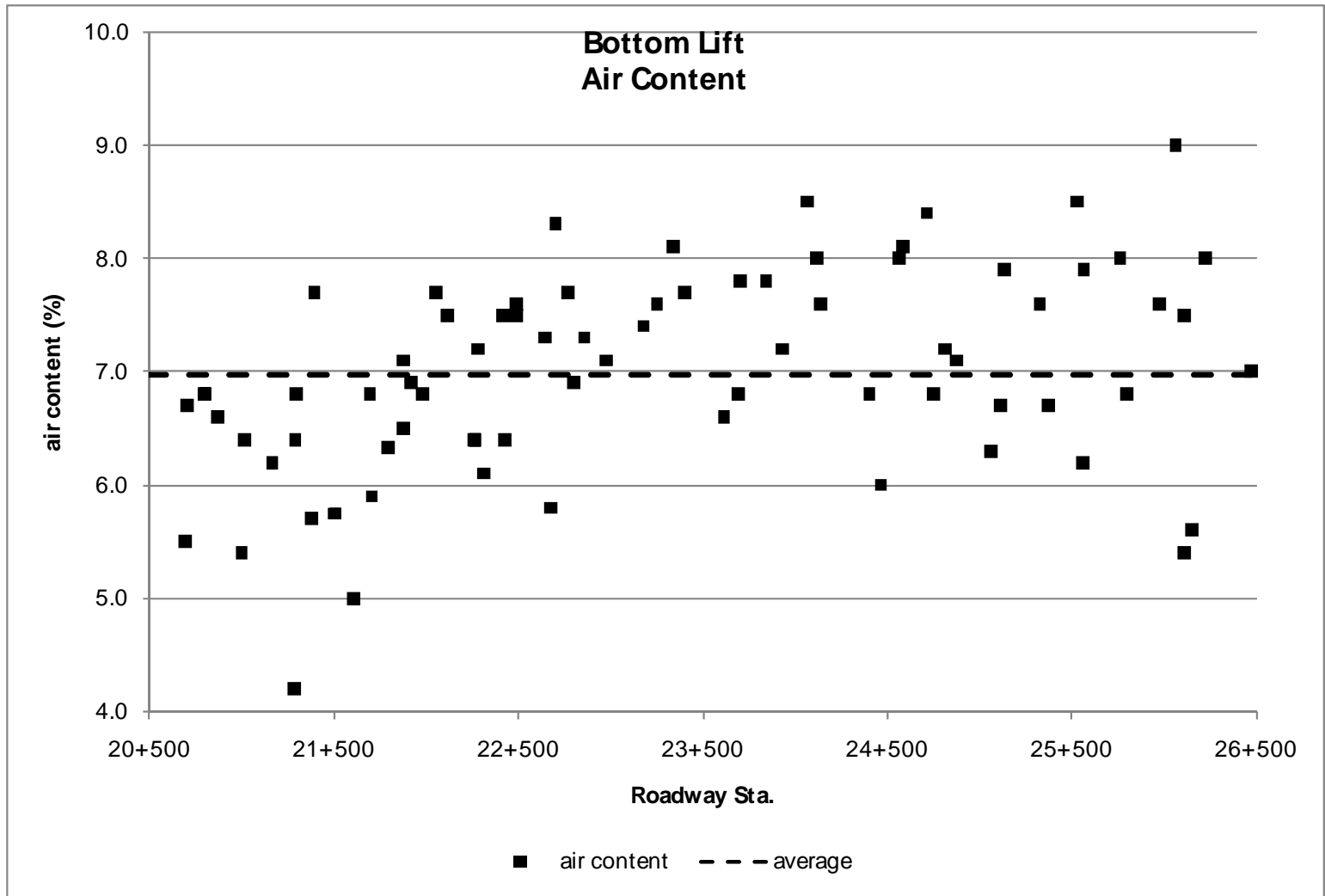
Review of Project Test Results



Bottom Lift Summary

	air content (%)	slump (in)	unit weight (lb/ft ³)	concrete temp. (°F)	microwave w/cm	ava spacing factor (mm)
n	79	79	79	57	6	61
minimum	4.2	0.5	134.1	65.7	0.44	0.180
maximum	9.0	3.5	143.5	82.6	0.47	0.442
average	7.0	1.3	139.0	75.6	0.45	0.285
standard deviation	0.9	0.5	1.7	3.4	0.01	0.062

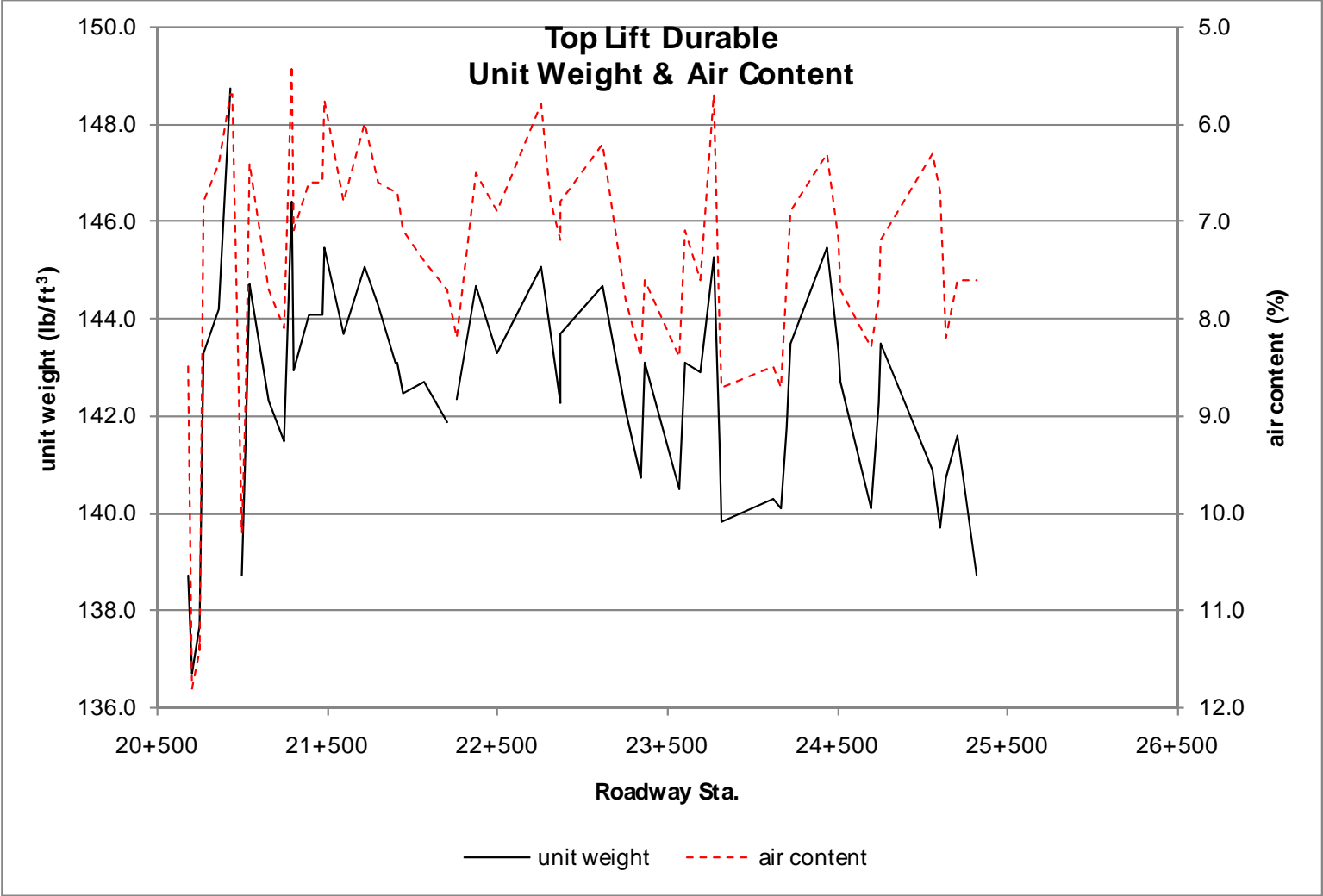
Bottom Lift Air Content



Durable Lift Summary

	air content (%)	slump (in)	unit weight (lb/ft ³)	concrete temp. (°F)	microwave w/cm	ava spacing factor (mm)
n	62	62	60	42	6	55
minimum	5.4	0.5	136.7	65.1	0.41	0.137
maximum	11.8	3.3	148.8	81.0	0.48	0.507
average	7.5	1.9	142.4	75.9	0.44	0.234
standard deviation	1.4	0.7	2.4	3.8	0.03	0.079

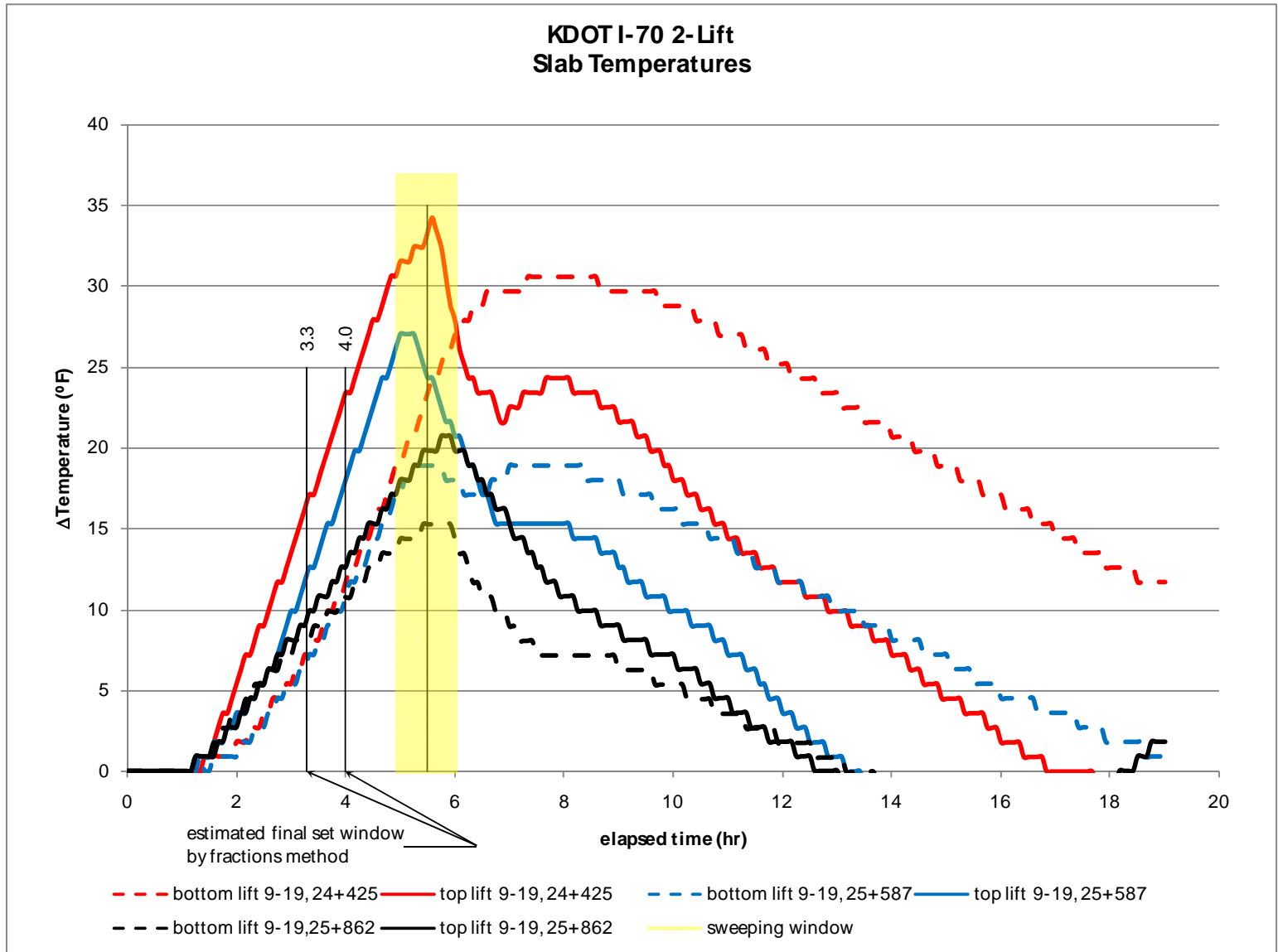
Durable Lift Unit Weight & Air Content



Exposed Lift Summary

	air content (%)	slump (in)	unit weight (lb/ft ³)	concrete temp. (°F)	microwave w/cm	ava spacing factor (mm)
n	15	15	15	11	3	23
minimum	5.0	0.5	138.9	73.0	0.44	0.136
maximum	8.1	3.7	146.6	84.2	0.47	0.342
average	6.8	2.2	141.9	79.7	0.45	0.238
standard deviation	1.0	0.8	2.1	3.3	0.02	0.053

Slab Temperature & Sweeping



Observations, Discussion & Questions

- Additional admixtures were utilized to create a bottom lift that was very stiff, so that it would not deform when the top lift was placed. How stiff is stiff enough? Are alternative spreading methods available that would eliminate this requirement?
- Is there a method for determining the minimum and/or optimum thickness of the top lift? What is the minimum thickness of top lift that can practically be constructed?

Observations, Discussion & Questions

- Deltas for labor and equipment costs between two-lift pavements and traditional single lift pavements need to be quantified to effectively determine if material and/or life-cycle costs can offset the cost deltas on a project specific basis.
- Both concrete mixtures used for the top lift were susceptible to segregation. Further research should identify combinations of materials and pavement vibrator systems that will minimize the potential for segregation (decreased durability) yet still yield the desired surface characteristics.



Observations, Discussion & Questions

- Modeling should be performed to characterize the relationship between varying coefficients of thermal expansion between the two lifts and the minimum bond strength required to overcome differential expansion and contraction between the two lifts.
- Best practices should be developed for controlling the thickness of both lifts through superelevation transitions.

