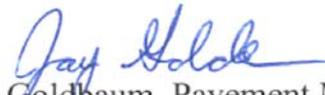


**DEPARTMENT OF TRANSPORTATION**  
 Materials and Geotechnical Branch  
 4201 East Arkansas Avenue  
 Denver, Colorado 80222



**DATE:** November 5, 2003

**TO:**  Tim Harris, Director of Staff Services

**FROM:**  Jay Goldbaum, Pavement Management and Design Program

**SUBJECT:** Policy Memo 17  
 Revising the Expert Opinion Curves

**Issue:** The maximum Remaining Service Life (RSL) generated from the family of curves for various flexible pavement groups was not accurately representing the field observations.

**Action:** Pavement Management is requesting ratification by the Chief Engineer to update the expert opinion curves for flexible pavements to better reflect the performance.

**Background:** During the 2002 quality assurance process for field verification of RSL data, 87 segments were reviewed and it was determined that a number of flexible pavement sites did not correlate with the results from the Pavement Management Program. A task force was started to investigate discrepancies. The task force compiled results from a RSL survey submitted to Regional Pavement Managers and other interested parties and determined ten flexible pavement groups shown in Table 1 produced most of the disagreement.

**Table 1**  
**Flexible Pavement Groups**

Pavement Group (1)	Traffic Classification (2)	Climate Classification (3)	Thickness Classification (4)
1121	Low	Cool	< 4"
1131	Low	Moderate	< 4"
1221	Medium	Cool	< 4"
1231	Medium	Moderate	< 4"
1223	Medium	Cool	>= 6"
2231	Medium	Moderate	< 4"
1233	Medium	Moderate	>= 6"
1331	High	Moderate	< 4"
2331	High	Moderate	< 4"
1343	High	Hot	>= 6"

**Note:**

- (1) The first number in the pavement group applies to the type of pavement. Number 1 is for flexible pavement and number 2 is for composite (asphalt over concrete) pavement.
- (2) The second number in the pavement group applies to the 20-year design 18k equivalent single axle loads.
- (3) The third number in the pavement group applies to the environmental zone in which the project was constructed.
- (4) The fourth number in the pavement group applies to the constructed pavement thickness.

From the survey, it was recommended to replace the RSL generated for the family of curves in the subject groups with the expert opinion shown in Table 2. In 2003, the field review of the RSL

was repeated at 51 segments throughout the state. The results of the 2003 field investigation found 60 percent of the discrepancies were in the subject flexible pavement groups (Please see 2003 RSL Field Investigation for more information).

**Table 2**  
**Recommended Maximum RSL**

Pavement Group	Family RSL (Years)	Recommended Maximum RSL (Years)	Difference (Years)
1121	11	14	+3
1131	10		+4
1221	18	13	-5
1231	22		-9
2231	7		+6
1331	18	11	-7
2331	8		+3
1223	11	18	+7
1233	25		-7
1343	9		+7

Table 3 indicates the impact on the 2002 and 2003 pavement condition using the recommended maximum RSL values. Table 4 indicates the impact on the 2002 and 2003 pavement condition if five of the pavement groups were replaced.

**Table 3**  
**Impact on Pavement Condition**  
**(Replace all ten pavement groups this year)**

	2002 / 2003 Pavement Condition (Percent)			2002 / 2003 Pavement Condition Using Recommended RSL (Percent)			2002 / 2003 Difference (Percent)		
	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
Statewide	39 / 42	18 / 16	43 / 42	27 / 30	22 / 20	51 / 50	-12 / -12	+4 / +4	+8 / +8
Region 1	41 / 49	15 / 14	44 / 37	24 / 41	19 / 15	57 / 44	-17 / -8	+4 / +1	+13 / +7
Region 2	38 / 39	18 / 17	44 / 44	29 / 32	20 / 18	51 / 50	-9 / -7	+2 / +1	+7 / +6
Region 3	34 / 37	14 / 17	52 / 46	28 / 22	21 / 28	51 / 50	-6 / -15	+7 / +11	-1 / +4
Region 4	49 / 53	18 / 15	33 / 32	30 / 32	26 / 21	44 / 47	-19 / -21	+8 / +6	+11 / +15
Region 5	31 / 25	24 / 13	45 / 62	24 / 21	21 / 14	55 / 65	-7 / -4	-3 / +1	+10 / +3
Region 6	32 / 50	23 / 21	45 / 29	20 / 33	24 / 25	56 / 42	-12 / -17	+1 / +4	+11 / +13

**Table 4**  
**Impact on Pavement Condition**  
**(Replace five pavement groups this year)**

	2002 / 2003 Pavement Condition (Percent)			2002 / 2003 Pavement Condition Using Recommended RSL (Percent)			2002 / 2003 Difference (Percent)		
	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
Statewide	39 / 42	18 / 16	43 / 42	32 / 33	20 / 20	48 / 47	-7 / -9	+2 / +4	+5 / +5
Region 1	41 / 49	15 / 14	44 / 37	32 / 48	16 / 11	52 / 41	-9 / -1	+1 / -3	+8 / +4
Region 2	38 / 39	18 / 17	44 / 44	35 / 37	18 / 15	47 / 48	-3 / -2	+0 / -2	+3 / +4
Region 3	34 / 37	14 / 17	52 / 46	33 / 27	17 / 26	50 / 47	-1 / -10	+3 / +9	-2 / +1
Region 4	49 / 53	18 / 15	33 / 32	36 / 42	24 / 18	40 / 40	-13 / -11	+6 / +3	+7 / +8
Region 5	31 / 25	24 / 13	45 / 62	27 / 22	23 / 13	50 / 65	-4 / -3	-1 / +0	+5 / +3
Region 6	32 / 50	23 / 21	45 / 29	29 / 38	20 / 27	51 / 35	-3 / -12	-3 / +6	+6 / +6

**Recommendation:** The Pavement Management Technical Committee has voted (see attached voting results) to replace the RSL generated by the family of curves with the RSL from expert opinion.

**Option 1:** Replace all pavement groups by January 2004.

**Option 2:** Replace five pavement groups (1121,1231,1223,1233, and 1343) by January 2004 with the remainder replaced by January 2005.

These values will be reviewed on an annual basis as part of the field investigation of RSL.

**Acceptance of the Recommendation:** At the November 5, 2003 Regional Transportation Directors meeting, members agreed to implement option 1 which will replace all 10 pavement groups by January 2004.

I concur. Craig Siracusa 11/14/03  
Craig Siracusa,  
Chief Engineer

cc: Tim Aschenbrener  
RTDs  
RMEs  
RPMs  
J. Wallace (FHWA)

## Items Requiring a Vote

*ISSUE: Shall the selected Family of curves be modified to the Proposed expert opinion values?*

### **RESULTS:**

	<b>Member</b>	<b>Vote</b>	<b>Comments</b>
Region 1	Janet Minter	YES	
Region 1	Bob LaForce	YES	By Phone
Region 2	Frank Walters	YES	
Region 2	Richard Zamora	YES	
Region 3	Bob Heidelmeier	YES	
Region 3	Dave Eller	YES	
Region 4	Rose McDonald	YES	
Region 4	Gary DeWitt	YES	
Region 5	Mike McVaugh	YES	
Region 5	Robert Shanks	YES	
Region 6	Bob Locander	YES	
Region 6	Reza Akhavan	NO	
HQ	Ali Farrohyar	YES	
HQ	Jay Goldbaum	YES	
DTD	Tamela Goorman	YES	
FHWA	Jean Wallace	No Vote	