



Correction to: Developing a Rutting Prediction Model for HMA Pavements Using the LTPP Database

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Dear readers,

Unfortunately, the original article was published without the author's final correction requests.

The errors identified in the manuscript pertain to the presence of both unit systems, imperial and metric. The correction now includes both systems with the metric values present between parenthesis next to the imperial one within the text and tables. This error does not affect any result or analysis present in the paper.

In this article, Tables 1, 2, 5 and 6 were misrepresented and now include both imperial and metric values. Furthermore, the following text was modified where both values are now clarified:

- In section 5.1:

“The second cluster indicates that while temperature increases within the clusters, a slight increase in the rutting values was observed. This is explained by the fact that the sections located in Arizona have thicker layer thicknesses of the asphalt layer in the range of 8-11 in (20-28 cm) compared with the other sections with an asphalt layer thickness of range of 3-5 in (7.6-12.7 cm).”

- In section 5.2:

- a. The Interstate System, having the highest classification of roadways in the United States, provides the highest level of mobility and the highest speeds over the longest uninterrupted distance. They usually have posted speeds between 55 and 75 mph (88 and 120 km/hr).
- b. Collectors are major and minor roads that connect local roads and streets with arterials. Collectors provide less mobility than arterials at lower speeds and for shorter distances. The posted speed limit on collectors is usually between 35 and 55 mph (56 and 88 km/hr).
- c. Other Arterials include freeways, multilane highways, and other important roadways that supplement the Interstate System. They connect, as directly as practicable, the Nation's principal urbanized areas, cities, and industrial centers. Land access is limited. Posted speed limits on arterials usually range between 50 and 70 mph (80 and 112 km/hr).
- d. Local roads provide limited mobility and are the primary access to residential areas, businesses, farms, and other local areas. Local roads, with posted speed limits usually between 20 and 45 mph (32 and 72 km/hr), are the majority of roads in the U.S.

- In section 5.5.1:

“For 19 of the 24 GPS sites, the predicted rut depth was within 0.2 in (5 mm) of the measured rut depth.”

This misunderstanding has since been adjusted to ease the reading and understanding of the reader.

Please excuse this error.

The original article can be found online at <https://doi.org/10.1007/s42947-023-00340-9>.

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Table 1 Climatic data collected for the sections under study

State	Section	Max. temp., °F, (°C)	Freeze Index	Ave. precipitation, in, (mm)	Solar radiation (W/m ²)
Arizona	1025	74.8 (23.8)	25.3	13.0 (330)	174035
Arizona	1024	74.1 (23.4)	39.3	13.7 (348)	179796
Arizona	1022	84.8 (29.3)	9.3	9.0 (229)	177197
Arizona	1021	84.9 (29.4)	8.7	8.9 (226)	179206
Arizona	1018	85.4 (29.7)	0	12.7 (323)	180015
Arizona	1017	83.3 (28.5)	0.7	16.0 (406)	179206
Arizona	1006	90.1 (32.3)	0	13.3 (338)	181037
Arizona	1003	92.2 (33.4)	0	10.9 (277)	177764
California	8159	67.0 (19.4)	0	15.4 (391)	177216
California	8534b	93.4 (34.1)	0	2.1 (53)	178067
California	8535a	92.5 (33.6)	0	3.4 (86)	177890
California	0535b	93.5 (34.2)	0	2.4 (61)	176978
Colorado	1029	74.6 (23.7)	81	12.6 (320)	179548
Colorado	1053	70.1 (21.2)	530.5	12.0 (305)	178460
Idaho	1007	74.1 (23.4)	145.3	10.7 (272)	179035
Idaho	1020	73.6 (23.1)	295	8.6 (218)	175144
Montana	8129	72.2 (22.3)	414.6	11.1 (282)	176763
Nevada	1020	75.0 (23.9)	46	9.3 (236)	177998
New Mexico	1005	79.7 (26.5)	42.4	18.1 (460)	177482
Texas	1111	72.9 (22.7)	230.8	15.0 (381)	178323
Utah	1001	74.8 (23.8)	279	9.7 (246)	174706
Washington	1007a	70.9 (21.6)	499.3	9.7 (246)	178477
Washington	1005a	72.6 (22.6)	133.8	10.6 (269)	132779
Wyoming	7775	63.4 (17.4)	1019.8	8.3 (211)	135829

Table 2 General data collected and sections under study

State	Section	Road classification	SN	Max. temp. °F, (°C)	Accumulated truck traffic	IE* psi, (MPa)	H _{AC} in, (mm)	H _{base} in, (mm)	Mr _{base} psi, (MPa)
Arizona	1018	Rural Principal Arterial—Interstate	4.5	84.2–87 (29–30)	3510–6972	151794 (10461)	8.4 (213)	7.2 (183)	134.2 (3409)
Arizona	1017	Rural Principal Arterial—Interstate	5.2	81.5–85.1 (27.5–29.5)	3988–6533	1356603 (9353)	8.9 (226)	11.2 (284)	134.2 (3409)
Arizona	1003	Rural Principal Arterial—Interstate	6.4	90.5–93.2 (32.5–34)	17664–23328	1913877 (13196)	13.1 (333)	6 (152)	79.13 (2010)
Arizona	1006	Rural Principal Arterial—Interstate	4.1	89.6–93.2 (32–34)	19460–27815	1317756 (9086)	8.7 (221)	8.5 (216)	79.13 (2010)
Arizona	1024	Rural Principal Arterial—Interstate	5.5	72.5–76.1 (22.5–24.5)	10300–25269	1953837 (13471)	10.8 (274)	6.3 (160)	178.7 (4539)
Arizona	1025	Rural Principal Arterial—Interstate	3.7	72.5–76.1 (22.5–24.5)	12735–25483	2466438 (17005)	7.6 (193)	4.9 (124)	178.7 (4539)
California	8156	Rural Minor Arterial	3.8	65.3–69 (18.5–20.5)	2229–8503	712616 (4913)	3.9 (99)	15 (381)	170.93 (4342)
Colorado	1053	Rural Principal Arterial—Other	6.7	72.5–75.2 (22.5–24)	1712–6280	817329 (5635)	4.6 (117)	28.9 (734)	120 (3048)
Colorado	1029	Rural Principal Arterial—Other	3.8	67.1–70.7 (19.5–21.5)	1498–2659	1464096 (10095)	4.2 (107)	16.6 (422)	120 (3048)
Idaho	1007	Rural Principal Arterial—Other	4.6	71.6–74.3 (22–23.5)	2145–3072	904399 (6236)	3.6 (91)	19.4 (9493)	170.93 (4342)
Idaho	1020	Rural Principal Arterial—Other	4.4	73.4–74.3 (23–23.5)	715–3363	774909 (5343)	3.8 (97)	20.5 (521)	170.93 (4342)
Montana	8129	Rural Principal Arterial—Other	5	66.2–69.8 (19–21)	187–1975	1511681 (10423)	3.2 (81)	22.8 (579)	170.93 (4342)
Nevada	1020	Rural Principal Arterial—Other	3.2	78–80.6 (25.5–27)	845–3435	1471711 (10147)	7 (178)	4.7 (119)	120 (3048)
New-Mexico	1005	Rural Principal Arterial—Interstate	5	71.6–77 (22–25)	4374–28826	4347061 (29972)	8.7 (221)	8.5 (216)	79.13 (2010)
Texas	1111	Rural Principal Arterial—Other	3.9	79.7–83.3 (26.5–28.5)	3806–8070	1520936 (10486)	7.4 (188)	8.4 (213)	178.7 (4539)
Utah	1001	Rural Principal Arterial—Other	2.8	77–81 (25–27.2)	1943–5052	1164034 (8026)	5.5 (140)	5.8 (147)	170.93 (4342)
Washington	1007	Rural Principal Arterial—Other	4.9	71.6–77 (22–25)	234–3144	1411923 (9735)	6.4 (163)	13 (330)	61.96 (1574)
Washington	1005	Rural Principal Arterial—Interstate	6.7	69.1–73.4 (20.6–23)	12358–21230	1445014 (9963)	11.8 (300)	9.5 (241)	61.96 (1574)
Wyoming	7775	Rural Major Collector	2.5	60.8–66.2 (16–19)	411–1743	1307628 (9016)	4.7 (119)	6.8 (173)	61.96 (1574)

Table 5 Data collected for model comparison

State	Sect.	Kinematic viscosity (cSt)	S.D. in, (mm)	Annual temp., °F, (°C)	ESAL	H_{AC} in, (mm)	$Mr_{Asphalt}$ psi, (MPa)	Mr_{Base} psi, (MPa)	Strain Base	$Mr_{Subgrade}$ psi, (MPa)
Arizona	1003	350	0.0145	72 (22.2)	3573000	13.1	1290500	11474	0.00084	10715
Arizona	1006	350	0.0156	72 (22.2)	3586000	8.7	1493500	10324	0.00084	7909
Arizona	1017	350	0.0167	66 (18.9)	2454000	8.9	839550	19459	0.0007	16277
Arizona	1018	350	0.0161	70 (21.1)	2436000	8.4	839550	19451	0.0007	16277
Arizona	1021	350	0.0158	65 (18.3)	3485000	5.3	1228150	25912	0.00054	7275
Arizona	1022	234	0.0155	65 (18.3)	3501000	8.3	1595000	25912	0.00054	7275
Arizona	1024	234	0.0150	52 (11.1)	4447000	10.8	1194800	25327	0.00054	15931
Arizona	1025	273	0.0151	52 (11.1)	3619000	7.6	1232500	25912	0.00054	15931
California	8156	447	0.0151	59 (15.0)	143000	3.9	462550	24785	0.001	8449
California	8534	447	0.0150	73 (22.8)	504000	10.6	462550	24785	0.001	8449
California	8535	429	0.0149	73 (22.8)	982000	10.3	416150	25912	0.001	5738
Colorado	1029	649	0.0150	43 (6.1)	133000	4.2	913500	17400	0.00053	9421
Colorado	1053	649	0.0153	47 (8.3)	264	4.6	855500	25943	0.00053	9421
Idaho	1007	649	0.0158	49 (9.4)	80000	3.6	649600	24785	0.001	7691
Idaho	1020	649	0.0160	50 (10.0)	129000	3.8	649600	24781	0.001	7691
Montana	8129	649	0.0151	45 (7.2)	145000	3.2	867100	24785	0.001	16273
Nevada	1020	860.7	0.0159	56 (13.3)	290000	7	1083150	17400	0.0007	9135
New Mexico	1005	860.7	0.0194	53 (11.7)	386000	8.7	1290500	23956	0.00055	11448
Texas	1111	860.7	0.0152	61 (16.1)	161000	7.4	1112150	21315	0.00062	8239
Utah	1001	860.7	0.0148	55 (12.8)	46000	5.5	1300650	24785	0.001	7238
Washington	1005	649	0.0155	50 (10.0)	444000	11.8	907700	8984	0.00084	13127
Washington	1007	810	0.0159	53 (11.7)	145000	6.4	784450	8984	0.00084	7012
Wyoming	7775	649	0.0152	39 (3.9)	30000	4.7	3842500	8984	0.00084	5649

Table 6 Model comparison: rutting depth results from the three models

State	Section	Measured Rutting (average) in, (mm)		Model 1 in, (mm)		Model 2 in, (mm)		New Model in, (mm)	
Arizona	1003	0.62	(15.748)	0.18	(4.572)	0.18	(4.572)	0.5	(15.748)
Arizona	1006	0.32	(8.128)	0.26	(6.604)	0.13	(3.302)	0.4	(8.128)
Arizona	1017	0.52	(13.208)	0.14	(3.556)	0.14	(3.556)	0.5	(13.208)
Arizona	1018	0.49	(12.446)	0.20	(5.08)	0.13	(3.302)	0.6	(12.446)
Arizona	1021	1.02	(25.908)	0.33	(8.382)	0.09	(2.286)	0.8	(25.908)
Arizona	1022	0.79	(20.066)	0.20	(5.08)	0.13	(3.302)	0.7	(20.066)
Arizona	1024	0.28	(7.112)	0.15	(3.81)	0.15	(3.81)	0.3	(7.112)
Arizona	1025	0.23	(5.842)	0.18	(4.572)	0.12	(3.048)	0.3	(5.842)
California	8156	0.37	(9.398)	0.09	(2.286)	0.11	(2.794)	0.4	(9.398)
California	8534	0.23	(5.842)	0.06	(1.524)	0.19	(4.826)	0.3	(5.842)
California	8535	0.11	(2.794)	0.08	(2.032)	0.18	(4.572)	0.1	(2.794)
Colorado	1029	0.21	(5.334)	0.09	(2.286)	0.11	(2.794)	0.2	(5.334)
Colorado	1053	0.50	(12.7)	0.00	0	0.19	(4.826)	0.5	(12.7)
Idaho	1007	0.41	(10.414)	0.07	(1.778)	0.10	(2.54)	0.4	(10.414)
Idaho	1020	0.27	(6.858)	0.08	(2.032)	0.10	(2.54)	0.3	(6.858)
Montana	8129	0.41	(10.414)	0.09	(2.286)	0.09	(2.286)	0.4	(10.414)
Nevada	1020	0.35	(8.89)	0.06	(1.524)	0.15	(3.81)	0.4	(8.89)
New Mexico	1005	0.73	(18.542)	0.05	(1.27)	0.17	(4.318)	0.7	(18.542)
Texas	1111	0.19	(4.826)	0.05	(1.27)	0.17	(4.318)	0.3	(4.826)
Utah	1001	0.47	(11.938)	0.03	(0.762)	0.15	(3.81)	0.5	(11.938)
Washington	1005	0.30	(7.62)	0.04	(1.016)	0.22	(5.588)	0.1	(7.62)
Washington	1007	0.22	(5.588)	0.04	(1.016)	0.15	(3.81)	0.2	(5.588)
Wyoming	7775	0.31	(7.874)	0.03	(0.762)	0.14	(3.556)	0.4	(7.874)