

Supplemental Material

Table A1. The calculated $p_{\max}$ values in GPa for the manganese crossing.

Static loads [kN]	Velocity [km/h]														
	50					100					150				
	wheel type []					wheel type []					wheel type []				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
80	1.18	1.07	1.13	1.17	1.17	1.39	1.2	1.24	1.24	1.37	1.49	1.98	1.67	1.59	1.94
124	1.47	1.34	1.28	1.31	1.31	1.64	1.75	1.61	1.42	1.57	2.1	2.38	1.67	1.67	2.15
179	1.76	1.83	1.48	1.38	1.38	1.83	2.42	1.96	1.59	1.77	2.68	2.65	1.74	1.74	2.32

Table A2. The calculated $p_{\max}$ values in GPa for the chromium-bainitic crossing.

Static loads [kN]	Velocity [km/h]														
	50					100					150				
	wheel type []					wheel type []					wheel type []				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
80	2.5	2.43	2.52	2.1	2.17	2.83	2.86	2.72	2.25	2.86	3.42	3.43	3.23	2.43	3.35
124	2.96	2.95	2.95	2.58	2.69	3.20	3.06	2.88	2.8	3.03	3.65	3.53	3.27	3	3.41
179	3.34	3.29	3.11	2.99	3.15	3.64	3.47	3.14	3.1	3.31	3.85	3.69	3.34	3.5	3.45

Table A3. The calculated $p_{\max}$ values in GPa for the tool steel crossing.

Static loads [kN]	Velocity [km/h]														
	50					100					150				
	wheel type []					wheel type []					wheel type []				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
80	3.18	2.96	2.83	2.68	2.86	3.6	3.31	3.07	2.78	3.65	4.05	3.92	3.53	3.11	4.3
124	3.56	3.44	3.26	2.93	3.01	3.72	3.46	3.33	3.18	3.71	4.17	3.97	3.6	3.21	4.35
179	3.8	3.71	3.57	3.3	3.39	4.06	3.88	3.72	3.72	3.78	4.35	4.08	3.75	3.68	4.36

Table A4. The calculated $P_{dv,\max}$ values for the manganese crossing.

Static loads [kN]	Velocity [km/h]														
	50					100					150				
	wheel type []					wheel type []					wheel type []				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
80	0.9	0.85	0.84	0.8	0.9	0.95	1.06	0.93	0.92	0.95	1.08	1.14	1.01	1.08	1.23
124	1.1	0.99	0.95	0.88	0.95	1.09	1.12	1.09	1.01	1.03	1.26	1.19	1.06	1.14	1.28
179	1.22	1.15	1.1	0.9	1.13	1.18	1.16	1.18	1.08	1.12	1.36	1.26	1.17	1.18	1.32

Table A5. The calculated $P_{dv,\max}$ values for the chromium-bainitic crossing.

Static loads [kN]	Velocity [km/h]														
	50					100					150				
	wheel type []					wheel type []					wheel type []				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
80	1.18	1.1	1.12	1.01	1.03	1.33	1.34	1.25	1.13	1.40	1.72	1.67	1.54	1.21	1.62
124	1.5	1.52	1.35	1.21	1.26	1.53	1.41	1.34	1.39	1.54	1.8	1.57	1.58	1.5	1.65
179	1.78	1.69	1.48	1.43	1.49	1.77	1.65	1.51	1.46	1.61	1.91	1.82	1.62	1.7	1.66

Table A6. The calculated $P_{dv,\max}$ values for the tool steel crossing.

	Velocity [km/h]														
	50					100					150				

Static loads [kN]	wheel type []					wheel type []					wheel type []				
	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
80	1.1	0.95	0.91	0.86	0.93	1.27	1.08	1	0.9	1.26	1.39	1.35	1.2	1.07	1.53
124	1.23	1.18	1.06	1.01	1.05	1.25	1.16	1.1	1.08	1.28	1.46	1.31	1.23	1.12	1.56
179	1.34	1.29	1.2	1.2	1.17	1.36	1.31	1.26	1.29	1.31	1.5	1.4	1.3	1.31	1.57