

DCA06FA058
Airworthiness Group Factual Report Addendum 7
Main Landing Gear Loads

Attachment 4
Certification and ISE Landing Spectra
(6 pages)

FedEx MD-10-10 Certification
 MLG Landing Spectrum (per 1000 Flights)
 Air Filler Valve Bore Stress - No Nickel
 (Includes 47 ksi Residual Tension Stress)

Condition	Stress (ksi)	FEM Factor 1.10*Stress	Max Stress (Ksi)	Min Stress (ksi)	R	n	N	n/N
SB6 0.5A		0	47	47	1.00	-----		0.00000000
SB6 0.5B		0	47	47	1.00	-----		0.00000000
SB6 0.5C		0	47	47	1.00	-----		0.00000000
SB6 1.5A		0	47	47	1.00	-----		0.00000000
SB6 1.5B		0	47	47	1.00	-----		0.00000000
SB6 1.5C		0	47	47	1.00	-----		0.00000000
SB6 2.5A	1.9	2.1	49.1	44.9	0.91	-----	1.000E+12	0.00000000
SB6 2.5B		1.6	48.6	45.4	0.93	-----	1.000E+12	0.00000000
SB6 2.5C		1.1	48.1	45.9	0.96	-----	1.000E+12	0.00000000
SB6 3.5A	56.0	61.7	108.7	-14.7	-0.13	-----	1.140E+08	0.00000107
SB6 3.5B		46.2	93.2	0.8	0.01	-----	4.841E+11	0.00000000
SB6 3.5C		30.8	77.8	16.2	0.21	-----	1.000E+12	0.00000000
SB6 4.5A	84.2	92.6	139.6	-45.6	-0.33	---	3.636E+05	0.00007975
SB6 4.5B		69.5	116.5	-22.5	-0.19	---	2.564E+07	0.00000113
SB6 4.5C		46.3	93.3	0.7	0.01	---	4.841E+11	0.00000000
SB6 5.5A	101.1	111.2	158.2	-64.2	-0.41	----	4.708E+04	0.00015292
SB6 5.5B		83.4	130.4	-36.4	-0.28	----	1.933E+06	0.00000373
SB6 5.5C		55.6	102.6	-8.6	-0.08	----	1.279E+10	0.00000000
SB6 6.5A	97.3	107.0	154.0	-60.0	-0.39	-----	9.384E+04	0.00001527
SB6 6.5B		80.3	127.3	-33.3	-0.26	-----	3.005E+06	0.00000048
SB6 6.5C		53.5	100.5	-6.5	-0.06	-----	2.397E+10	0.00000000
SB6 7.5A	117.9	129.7	176.7	-82.7	-0.47	----	1.120E+04	0.00002679
SB6 7.5B		97.3	144.3	-50.3	-0.35	----	2.161E+05	0.00000139
SB6 7.5C		64.8	111.8	-17.8	-0.16	----	6.400E+07	0.00000000
SB6 8.5A	144.8	159.3	206.3	-112.3	-0.54	-----	1.304E+03	0.00004602
SB6 8.5B		119.5	166.5	-72.5	-0.44	-----	2.420E+04	0.00000248
SB6 8.5C		79.7	126.7	-32.7	-0.26	-----	3.500E+06	0.00000002
SB6 9.5A	171.7	188.9	235.9	-141.9	-0.60	-----	2.551E+02	0.00002613
SB6 9.5B		141.7	188.7	-94.7	-0.50	-----	3.289E+03	0.00000203
SB6 9.5C		94.5	141.5	-47.5	-0.34	-----	2.923E+05	0.00000002
Total								0.00035924

FedEx MD-10-10 Certification
 MLG Landing Spectrum (per 1000 Flights)
 Air Filler Valve Bore Stress - With 0.008" Nickel
 (Includes 47 ksi Residual Tension Stress)

Condition	Stress (ksi)	FEM Factor 1.10*Stress	Max Stress (Ksi)	Min Stress (ksi)	R	n	N	n/N
SB6 0.5A		0	47	47	1.00	-----		0.00000000
SB6 0.5B		0	47	47	1.00	-----		0.00000000
SB6 0.5C		0	47	47	1.00	-----		0.00000000
SB6 1.5A		0	47	47	1.00	-----		0.00000000
SB6 1.5B		0	47	47	1.00	-----		0.00000000
SB6 1.5C		0	47	47	1.00	-----		0.00000000
SB6 2.5A	1.9	2.1	49.9	44.9	0.90	-----	1.000E+12	0.00000000
SB6 2.5B		1.6	49.2	45.4	0.92	-----	1.000E+12	0.00000000
SB6 2.5C		1.1	48.4	45.9	0.95	-----	1.000E+12	0.00000000
SB6 3.5A	56.0	61.7	130.2	-14.7	-0.11	-----	2.721E+06	0.00004484
SB6 3.5B		46.2	109.4	0.8	0.01	-----	3.114E+09	0.00000004
SB6 3.5C		30.8	88.6	16.2	0.18	-----	1.000E+12	0.00000000
SB6 4.5A	84.2	92.6	172.0	-45.6	-0.27	---	3.185E+04	0.00091054
SB6 4.5B		69.5	140.8	-22.5	-0.16	---	7.301E+05	0.00003972
SB6 4.5C		46.3	109.5	0.7	0.01	---	3.114E+09	0.00000001
SB6 5.5A	101.1	111.2	197.2	-64.2	-0.33	---	3.517E+03	0.00204723
SB6 5.5B		83.4	159.6	-36.4	-0.23	---	8.839E+04	0.00008146
SB6 5.5C		55.6	122.1	-8.6	-0.07	---	5.662E+07	0.00000013
SB6 6.5A	97.3	107.0	191.5	-60.0	-0.31	-----	5.240E+03	0.00027352
SB6 6.5B		80.3	155.4	-33.3	-0.21	-----	1.224E+05	0.00001171
SB6 6.5C		53.5	119.2	-6.5	-0.05	-----	1.154E+08	0.00000001
SB6 7.5A	117.9	129.7	222.1	-82.7	-0.37	---	8.233E+02	0.00036440
SB6 7.5B		97.3	178.3	-50.3	-0.28	---	2.075E+04	0.00001446
SB6 7.5C		64.8	134.5	-17.8	-0.13	---	1.562E+06	0.00000019
SB6 8.5A	144.8	159.3	262.1	-112.3	-0.43	-----	7.734E+01	0.00077579
SB6 8.5B		119.5	208.3	-72.5	-0.35	-----	1.790E+03	0.00003352
SB6 8.5C		79.7	154.5	-32.7	-0.21	-----	1.334E+05	0.00000045
SB6 9.5A	171.7	188.9	302.0	-141.9	-0.47	-----	9.704E+00	0.00068700
SB6 9.5B		141.7	238.3	-94.7	-0.40	-----	3.389E+02	0.00001967
SB6 9.5C		94.5	174.5	-47.5	-0.27	-----	2.755E+04	0.00000024
Total								0.00530493

FedEx MD-10-10 In-Service Evaluation
RMLG Landing Spectrum (per 1000 Flights)
Air Filler Valve Bore Stress - No Nickel
(Includes 47 ksi Residual Tension Stress)

Condition	Stress (ksi)		Max Stress (Ksi)	Min Stress (ksi)	R	n	N	n/N
LAND 040A	40		87.0	7.0	0.080	113.92	1.000E+12	0.00000000
LAND 040B	30		77.0	17.0	0.221	113.92	1.000E+12	0.00000000
LAND 040C	20		67.0	27.0	0.403	113.92	1.000E+12	0.00000000
LAND 050A	50		97.0	-3.0	-0.031	29.54	6.327E+10	0.00000000
LAND 050B	37.5		84.5	9.5	0.112	29.54	1.000E+12	0.00000000
LAND 050C	25		72.0	22.0	0.306	29.54	1.000E+12	0.00000000
LAND 060A	60		107.0	-13.0	-0.121	37.97	1.389E+08	0.00000027
LAND 060B	45		92.0	2.0	0.022	37.97	6.850E+11	0.00000000
LAND 060C	30		77.0	17.0	0.221	37.97	1.000E+12	0.00000000
LAND 070A	70		117.0	-23.0	-0.197	21.10	2.151E+07	0.00000098
LAND 070B	52.5		99.5	-5.5	-0.055	21.10	3.300E+10	0.00000000
LAND 070C	35		82.0	12.0	0.146	21.10	1.000E+12	0.00000000
LAND 080A	80		127.0	-33.0	-0.260	8.44	3.005E+06	0.00000281
LAND 080B	60		107.0	-13.0	-0.121	8.44	1.389E+08	0.00000006
LAND 080C	40		87.0	7.0	0.080	8.44	1.000E+12	0.00000000
LAND 090A	90		137.0	-43.0	-0.314	8.44	4.583E+05	0.00001841
LAND 090B	67.5		114.5	-20.5	-0.179	8.44	3.670E+07	0.00000023
LAND 090C	45		92.0	2.0	0.022	8.44	6.850E+11	0.00000000
LAND 100A	100		147.0	-53.0	-0.361	16.88	1.646E+05	0.00010255
LAND 100B	75		122.0	-28.0	-0.230	16.88	6.617E+06	0.00000255
LAND 100C	50		97.0	-3.0	-0.031	16.88	6.327E+10	0.00000000
LAND 110A	110		157.0	-63.0	-0.401	8.44	5.132E+04	0.00016443
LAND 110B	82.5		129.5	-35.5	-0.274	8.44	2.233E+06	0.00000378
LAND 110C	55		102.0	-8.0	-0.078	8.44	1.279E+10	0.00000000
LAND 120A	120		167.0	-73.0	-0.437	12.66	2.234E+04	0.00056663
LAND 120B	90		137.0	-43.0	-0.314	12.66	4.583E+05	0.00002762
LAND 120C	60		107.0	-13.0	-0.121	12.66	1.389E+08	0.00000009
LAND 130A	130		177.0	-83.0	-0.469	4.22	1.041E+04	0.00040551
LAND 130B	97.5		144.5	-50.5	-0.349	4.22	2.161E+05	0.00001953
LAND 130C	65		112.0	-18.0	-0.161	4.22	5.305E+07	0.00000008
LAND 140A	140		187.0	-93.0	-0.497	0.00	5.195E+03	0.00000000
LAND 140B	105		152.0	-58.0	-0.382	0.00	1.117E+05	0.00000000
LAND 140C	70		117.0	-23.0	-0.197	0.00	2.151E+07	0.00000000
LAND 150A	150		197.0	-103.0	-0.523	4.22	2.063E+03	0.00204481
LAND 150B	112.5		159.5	-65.5	-0.411	4.22	4.322E+04	0.00009762
LAND 150C	75		122.0	-28.0	-0.230	4.22	6.617E+06	0.00000064
LAND 160A	160		207.0	-113.0	-0.546	4.22	1.236E+03	0.00341441
LAND 160B	120		167.0	-73.0	-0.437	4.22	2.234E+04	0.00018888
LAND 160C	80		127.0	-33.0	-0.260	4.22	3.005E+06	0.00000140

Total 0.00706329

FedEx MD-10-10 In-Service Evaluation
RMLG Landing Spectrum (per 1000 Flights)
Air Filler Valve Bore Stress - With 0.008" Nickel
(Includes 47 ksi Residual Tension Stress)

Condition	Stress (ksi)		Max Stress (Ksi)	Min Stress (ksi)	R	n	N	n/N
LAND 040A	40		101.0	7.0	0.069	113.92	3.447E+10	0.00000000
LAND 040B	30		87.5	17.0	0.194	113.92	1.000E+12	0.00000000
LAND 040C	20		74.0	27.0	0.365	113.92	1.000E+12	0.00000000
LAND 050A	50		114.5	-3.0	-0.026	29.54	4.093E+08	0.00000007
LAND 050B	37.5		97.6	9.5	0.097	29.54	1.254E+11	0.00000000
LAND 050C	25		80.8	22.0	0.272	29.54	1.000E+12	0.00000000
LAND 060A	60		128.0	-13.0	-0.102	37.97	3.642E+06	0.00001043
LAND 060B	45		107.8	2.0	0.019	37.97	5.555E+09	0.00000001
LAND 060C	30		87.5	17.0	0.194	37.97	1.000E+12	0.00000000
LAND 070A	70		141.5	-23.0	-0.163	21.10	6.486E+05	0.00003253
LAND 070B	52.5		117.9	-5.5	-0.047	21.10	1.892E+08	0.00000011
LAND 070C	35		94.3	12.0	0.127	21.10	3.435E+11	0.00000000
LAND 080A	80		155.0	-33.0	-0.213	8.44	1.224E+05	0.00006892
LAND 080B	60		128.0	-13.0	-0.102	8.44	3.642E+06	0.00000232
LAND 080C	40		101.0	7.0	0.069	8.44	3.447E+10	0.00000000
LAND 090A	90		168.5	-43.0	-0.255	8.44	4.283E+04	0.00019701
LAND 090B	67.5		138.1	-20.5	-0.148	8.44	9.318E+05	0.00000906
LAND 090C	45		107.8	2.0	0.019	8.44	5.555E+09	0.00000000
LAND 100A	100		182.0	-53.0	-0.291	16.88	1.577E+04	0.00107037
LAND 100B	75		148.3	-28.0	-0.189	16.88	3.028E+05	0.00005574
LAND 100C	50		114.5	-3.0	-0.026	16.88	4.093E+08	0.00000004
LAND 110A	110		195.5	-63.0	-0.322	8.44	4.008E+03	0.00210530
LAND 110B	82.5		158.4	-35.5	-0.224	8.44	9.564E+04	0.00008824
LAND 110C	55		121.3	-8.0	-0.066	8.44	7.149E+07	0.00000012
LAND 120A	120		209.0	-73.0	-0.349	12.66	1.693E+03	0.00747519
LAND 120B	90		168.5	-43.0	-0.255	12.66	4.283E+04	0.00029551
LAND 120C	60		128.0	-13.0	-0.102	12.66	3.642E+06	0.00000348
LAND 130A	130		222.5	-83.0	-0.373	4.22	8.233E+02	0.00512521
LAND 130B	97.5		178.6	-50.5	-0.283	4.22	2.075E+04	0.00020331
LAND 130C	65		134.8	-18.0	-0.134	4.22	1.562E+06	0.00000270
LAND 140A	140		236.0	-93.0	-0.394	0.00	3.786E+02	0.00000000
LAND 140B	105		188.8	-58.0	-0.307	0.00	6.443E+03	0.00000000
LAND 140C	70		141.5	-23.0	-0.163	0.00	6.486E+05	0.00000000
LAND 150A	150		249.5	-103.0	-0.413	4.22	1.574E+02	0.02681085
LAND 150B	112.5		198.9	-65.5	-0.329	4.22	3.297E+03	0.00127979
LAND 150C	75		148.3	-28.0	-0.189	4.22	3.028E+05	0.00001394
LAND 160A	160		263.0	-113.0	-0.430	4.22	7.323E+01	0.05761997
LAND 160B	120		209.0	-73.0	-0.349	4.22	1.693E+03	0.00249173
LAND 160C	80		155.0	-33.0	-0.213	4.22	1.224E+05	0.00003446

Total

0.10499639

FedEx MD-10-10 In-Service Evaluation
 LMLG Landing Spectrum (per 1000 Flights)
 Air Filler Valve Bore Stress - No Nickel
 (Includes 47 ksi Residual Tension Stress)

Condition	Stress (ksi)		Max Stress (Ksi)	Min Stress (ksi)	R	n	N	n/N
LAND 040A	40		87.0	7.0	0.080	59.07	1.000E+12	0.00000000
LAND 040B	30		77.0	17.0	0.221	59.07	1.000E+12	0.00000000
LAND 040C	20		67.0	27.0	0.403	59.07	1.000E+12	0.00000000
LAND 050A	50		97.0	-3.0	-0.031	12.66	6.327E+10	0.00000000
LAND 050B	37.5		84.5	9.5	0.112	12.66	1.000E+12	0.00000000
LAND 050C	25		72.0	22.0	0.306	12.66	1.000E+12	0.00000000
LAND 060A	60		107.0	-13.0	-0.121	29.54	1.389E+08	0.00000021
LAND 060B	45		92.0	2.0	0.022	29.54	6.850E+11	0.00000000
LAND 060C	30		77.0	17.0	0.221	29.54	1.000E+12	0.00000000
LAND 070A	70		117.0	-23.0	-0.197	8.44	2.151E+07	0.00000039
LAND 070B	52.5		99.5	-5.5	-0.055	8.44	3.300E+10	0.00000000
LAND 070C	35		82.0	12.0	0.146	8.44	1.000E+12	0.00000000
LAND 080A	80		127.0	-33.0	-0.260	29.54	3.005E+06	0.00000983
LAND 080B	60		107.0	-13.0	-0.121	29.54	1.389E+08	0.00000021
LAND 080C	40		87.0	7.0	0.080	29.54	1.000E+12	0.00000000
LAND 090A	90		137.0	-43.0	-0.314	12.66	4.583E+05	0.00002762
LAND 090B	67.5		114.5	-20.5	-0.179	12.66	3.670E+07	0.00000034
LAND 090C	45		92.0	2.0	0.022	12.66	6.850E+11	0.00000000
LAND 100A	100		147.0	-53.0	-0.361	8.44	1.646E+05	0.00005128
LAND 100B	75		122.0	-28.0	-0.230	8.44	6.617E+06	0.00000128
LAND 100C	50		97.0	-3.0	-0.031	8.44	6.327E+10	0.00000000
LAND 110A	110		157.0	-63.0	-0.401	4.22	5.132E+04	0.00008221
LAND 110B	82.5		129.5	-35.5	-0.274	4.22	2.233E+06	0.00000189
LAND 110C	55		102.0	-8.0	-0.078	4.22	1.279E+10	0.00000000
LAND 120A	120		167.0	-73.0	-0.437	0.00	2.234E+04	0.00000000
LAND 120B	90		137.0	-43.0	-0.314	0.00	4.583E+05	0.00000000
LAND 120C	60		107.0	-13.0	-0.121	0.00	1.389E+08	0.00000000
LAND 130A	130		177.0	-83.0	-0.469	0.00	1.041E+04	0.00000000
LAND 130B	97.5		144.5	-50.5	-0.349	0.00	2.161E+05	0.00000000
LAND 130C	65		112.0	-18.0	-0.161	0.00	5.305E+07	0.00000000
LAND 140A	140		187.0	-93.0	-0.497	4.22	5.195E+03	0.00081213
LAND 140B	105		152.0	-58.0	-0.382	4.22	1.117E+05	0.00003776
LAND 140C	70		117.0	-23.0	-0.197	4.22	2.151E+07	0.00000020
LAND 150A	150		197.0	-103.0	-0.523	0.00	2.063E+03	0.00000000
LAND 150B	112.5		159.5	-65.5	-0.411	0.00	4.322E+04	0.00000000
LAND 150C	75		122.0	-28.0	-0.230	0.00	6.617E+06	0.00000000
LAND 160A	160		207.0	-113.0	-0.546	0.00	1.236E+03	0.00000000
LAND 160B	120		167.0	-73.0	-0.437	0.00	2.234E+04	0.00000000
LAND 160C	80		127.0	-33.0	-0.260	0.00	3.005E+06	0.00000000

Total 0.00102536

FedEx MD-10-10 In-Service Evaluation
 LMLG Landing Spectrum (per 1000 Flights)
 Air Filler Valve Bore Stress - With 0.008" Nickel
 (Includes 47 ksi Residual Tension Stress)

Condition	Stress (ksi)		Max Stress (Ksi)	Min Stress (ksi)	R	n	N	n/N
LAND 040A	40		101.0	7.0	0.069	59.07	3.447E+10	0.00000000
LAND 040B	30		87.5	17.0	0.194	59.07	1.000E+12	0.00000000
LAND 040C	20		74.0	27.0	0.365	59.07	1.000E+12	0.00000000
LAND 050A	50		114.5	-3.0	-0.026	12.66	4.093E+08	0.00000003
LAND 050B	37.5		97.6	9.5	0.097	12.66	1.254E+11	0.00000000
LAND 050C	25		80.8	22.0	0.272	12.66	1.000E+12	0.00000000
LAND 060A	60		128.0	-13.0	-0.102	29.54	3.642E+06	0.00000811
LAND 060B	45		107.8	2.0	0.019	29.54	5.555E+09	0.00000001
LAND 060C	30		87.5	17.0	0.194	29.54	1.000E+12	0.00000000
LAND 070A	70		141.5	-23.0	-0.163	8.44	6.486E+05	0.00001301
LAND 070B	52.5		117.9	-5.5	-0.047	8.44	1.892E+08	0.00000004
LAND 070C	35		94.3	12.0	0.127	8.44	3.435E+11	0.00000000
LAND 080A	80		155.0	-33.0	-0.213	29.54	1.224E+05	0.00024121
LAND 080B	60		128.0	-13.0	-0.102	29.54	3.642E+06	0.00000811
LAND 080C	40		101.0	7.0	0.069	29.54	3.447E+10	0.00000000
LAND 090A	90		168.5	-43.0	-0.255	12.66	4.283E+04	0.00029551
LAND 090B	67.5		138.1	-20.5	-0.148	12.66	9.318E+05	0.00001358
LAND 090C	45		107.8	2.0	0.019	12.66	5.555E+09	0.00000000
LAND 100A	100		182.0	-53.0	-0.291	8.44	1.577E+04	0.00053518
LAND 100B	75		148.3	-28.0	-0.189	8.44	3.028E+05	0.00002787
LAND 100C	50		114.5	-3.0	-0.026	8.44	4.093E+08	0.00000002
LAND 110A	110		195.5	-63.0	-0.322	4.22	4.008E+03	0.00105265
LAND 110B	82.5		158.4	-35.5	-0.224	4.22	9.564E+04	0.00004412
LAND 110C	55		121.3	-8.0	-0.066	4.22	7.149E+07	0.00000006
LAND 120A	120		209.0	-73.0	-0.349	0.00	1.693E+03	0.00000000
LAND 120B	90		168.5	-43.0	-0.255	0.00	4.283E+04	0.00000000
LAND 120C	60		128.0	-13.0	-0.102	0.00	3.642E+06	0.00000000
LAND 130A	130		222.5	-83.0	-0.373	0.00	8.233E+02	0.00000000
LAND 130B	97.5		178.6	-50.5	-0.283	0.00	2.075E+04	0.00000000
LAND 130C	65		134.8	-18.0	-0.134	0.00	1.562E+06	0.00000000
LAND 140A	140		236.0	-93.0	-0.394	4.22	3.786E+02	0.01114336
LAND 140B	105		188.8	-58.0	-0.307	4.22	6.443E+03	0.00065486
LAND 140C	70		141.5	-23.0	-0.163	4.22	6.486E+05	0.00000651
LAND 150A	150		249.5	-103.0	-0.413	0.00	1.574E+02	0.00000000
LAND 150B	112.5		198.9	-65.5	-0.329	0.00	3.297E+03	0.00000000
LAND 150C	75		148.3	-28.0	-0.189	0.00	3.028E+05	0.00000000
LAND 160A	160		263.0	-113.0	-0.430	0.00	7.323E+01	0.00000000
LAND 160B	120		209.0	-73.0	-0.349	0.00	1.693E+03	0.00000000
LAND 160C	80		155.0	-33.0	-0.213	0.00	1.224E+05	0.00000000

Total

0.01404425