

$$n = \frac{vt}{u}$$

where

v = design hour volume for departures *or* arrivals, aircraft/hr

t = weighted mean stand occupancy, hr

u = utilization factor, suggested to be 0.6 to 0.8 where stands are shared

$$t = (0.2)(70) + (0.1)(50) + 0.7(57)$$

$$t = \frac{58.9 \text{ min}}{60} = 0.982 \text{ hr}$$

Another deterministic formula that has been calibrated on European traffic is

$$n = mqt$$

0.2	100	$t_1 = 70 \text{ min}$
0.1	50	$t_2 = 50 \text{ min}$
0.7	350	$t_3 = 57 \text{ min}$

where

m = design hour volume for arrivals *and* departures, aircraft/hr

q = proportion of arrivals to total movements

t = mean stand occupancy, hr

$$\text{Future stands} = \left[(\text{present stands} - 2) \times \frac{\text{future passengers}}{\text{present passengers}} \right] + 2$$

Activate Windows
Go to Settings to activate Windows

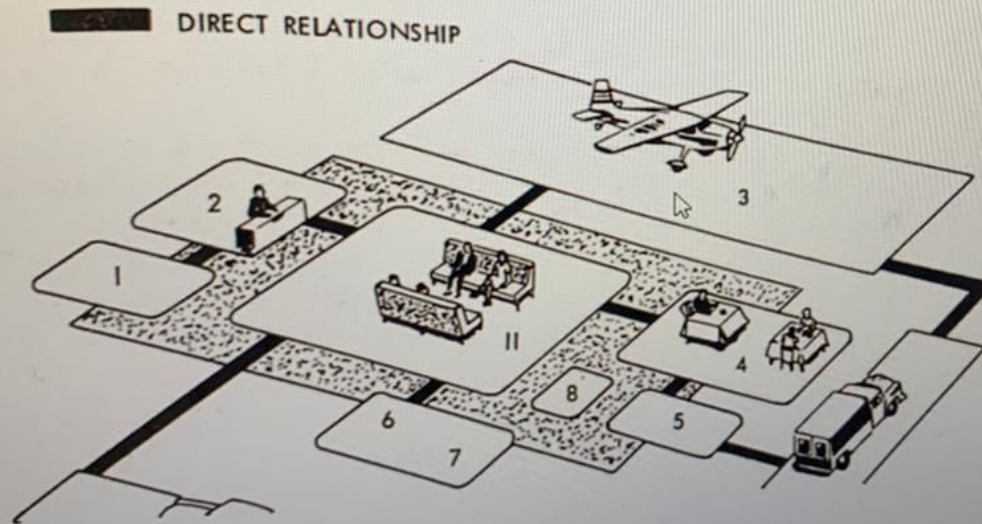
Terminal Building Required Facilities

- Airline operations: tickets, baggage, boarding lounges, crew operation room, communication center, offices, rest areas for crew and employees
- Airport Operation and maintenance: list p. 537
- Passenger Service: (tickets & baggage/ airline operation), waiting areas, shops, information centers, restaurants, car rentals, communications, rest rooms, bank, medical service, etc.,

Activate Windows
Go to Settings to activate Windows.

General Aviation Terminals: small, business and private aircrafts

Figure 17-9 Apron terminal area at a general aviation airport. (Courtesy Federal Aviation Administration.)



Activate Windows
Go to Settings to activate Windows.

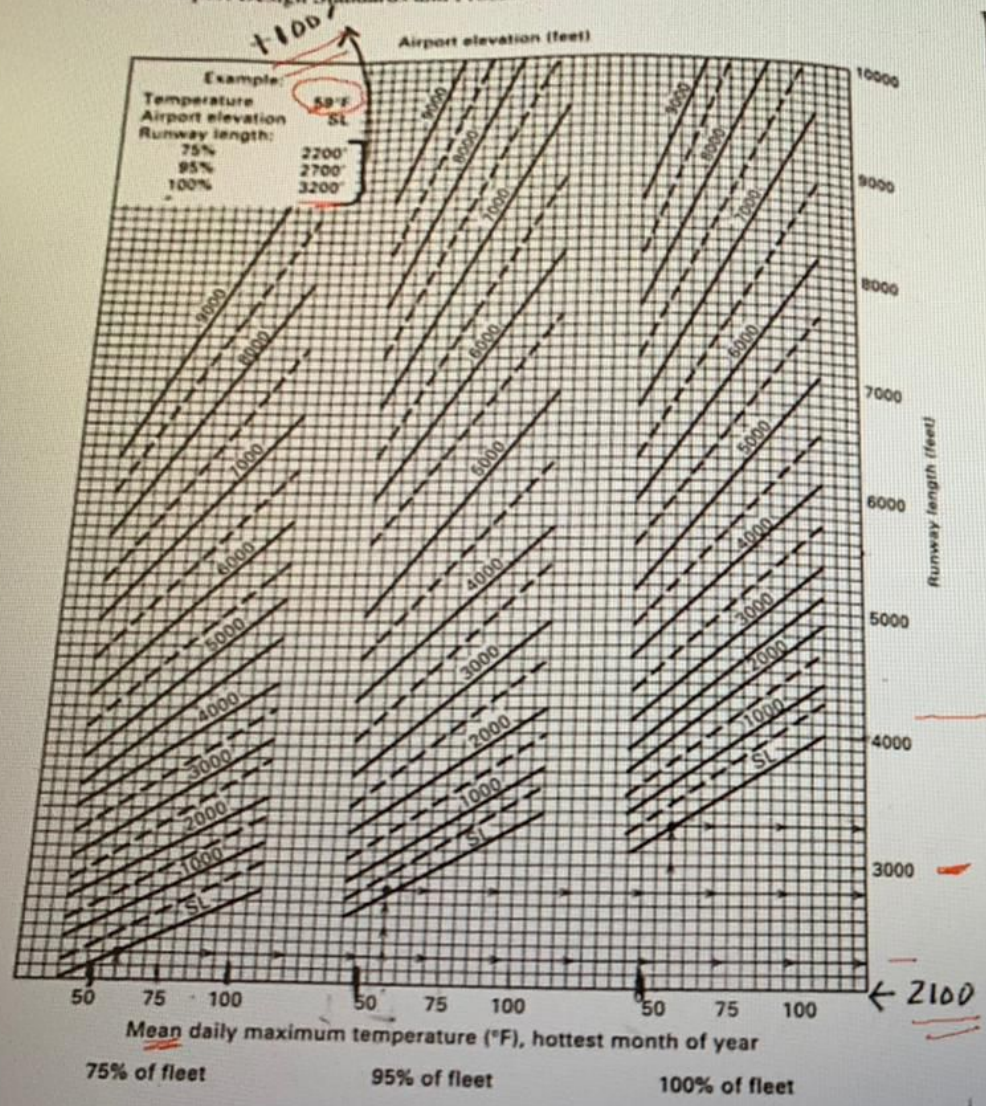
Ch. 18: Airport Design Standards

Runway length: function of

Horizontal alignment

- ✓ ○ Design aircraft/s
- ✗ ○ Air density
- ✗ ○ Elevation of airport
- Average maximum air temperature of airport
- Runway gradient

Activate Windows
Go to Settings to activate Windows.



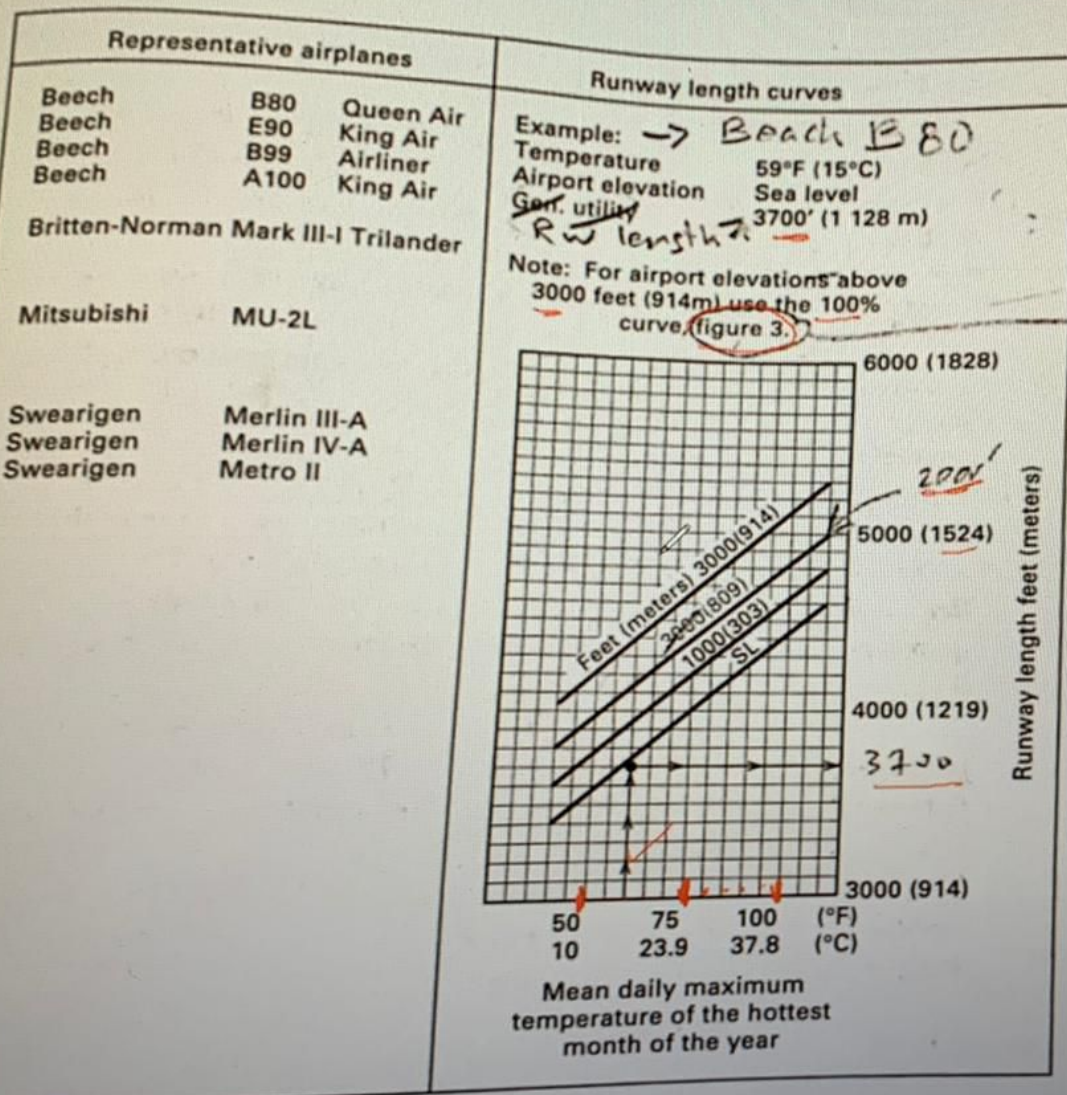
mean high temp
mean average
mean low temp

sea level

record high
May 25
20
15
5
low 18
11

Figure 18-1 Runway lengths required to serve aircraft

Activate Windows
Go to Settings to activate Windows.



18.1

18-2 Runway lengths required to serve small airplanes having 10 passenger
 FAA Advisory Circular 150/5320-2, Runway Length Requirements for Airport Design

Activate Windows
 Go to Settings to activate Windows

Compute the runway length requirements for a Boeing 757-232 series aircraft landing and taking off at an airport at an elevation of 500 m (1640 ft) at a normal maximum temperature of 30°C (86°F). Assume 25° flaps for landing and 5° flaps for take-off. Maximum operational take-off weight is 102,000 kg (224,686 lb) and maximum operational landing weight is 84,000 kg (185,035 lb). The airplane has two Pratt & Whitney 2037 engines.

$$84,000 \text{ kg} \leq 89,800 \text{ kg}$$

$$\text{elev } 500 \text{ m} = \underline{1640 \text{ ft}}$$

$$5.50 + \frac{640}{1000} \times .13 = 5.58$$

length of
runway
for
landing
requirement

$$\frac{1640 - 1000}{2000 - 1000} = \frac{x}{5580}$$

$$2000 - 1000 = 1000$$

$$5.63 - .05$$

Table 18-1 Runway Length Table: Aircraft Performance, Landing (Boeing 757-232 Series) PW 2037 Engine, 25° Flaps

Temperature (°C)	By Airport Elevation in Meters					
	0 m	500 m	1000 m	1500 m	2000 m	2500 m
	Maximum Allowable Landing Weight (1000 kg)					
10	89.8	89.8	89.8	89.8	89.8	89.8
12	89.8	89.8	89.8	89.8	89.8	89.8
14	89.8	89.8	89.8	89.8	89.8	89.8
16	89.8	89.8	89.8	89.8	89.8	89.8
18	89.8	89.8	89.8	89.8	89.8	89.8
20	89.8	89.8	89.8	89.8	89.8	89.8
22	89.8	89.8	89.8	89.8	89.8	89.8
24	89.8	89.8	89.8	89.8	89.8	89.8
26	89.8	89.8	89.8	89.8	89.8	89.8
28	89.8	89.8	89.8	89.8	89.8	89.8
30	89.8	89.8	89.8	89.8	89.8	89.8
32	89.8	89.8	89.8	89.8	89.8	89.8
34	89.8	89.8	89.8	89.8	89.8	89.8
36	89.8	89.8	89.8	89.8	89.8	89.8
38	89.8	89.8	89.8	89.8	89.8	89.8
40	89.8	89.8	89.8	89.8	89.8	89.8
42	89.8	89.8	89.8	89.8	87.5	82.9
44	89.8	89.8	89.8	89.8	85.2	81.0

Weight (1000 lb)	By Airport Elevation in Feet							
	0 ft	1000 ft	2000 ft	3000 ft	4000 ft	5000 ft	6000 ft	8000 ft
	Runway Length (1000 ft)							
125	3.65	3.72	3.79	3.85	3.92	3.98	4.05	4.18
130	3.89	3.96	4.04	4.12	4.21	4.30	4.39	4.49
135	4.08	4.17	4.26	4.35	4.45	4.56	4.67	4.80
140	4.24	4.33	4.43	4.54	4.65	4.77	4.90	5.04
145	4.37	4.48	4.58	4.69	4.81	4.94	5.08	5.24
150	4.49	4.60	4.71	4.83	4.95	5.09	5.23	5.39
155	4.60	4.71	4.82	4.95	5.08	5.22	5.36	5.52
160	4.70	4.81	4.93	5.06	5.19	5.33	5.48	5.64
165	4.80	4.92	5.04	5.17	5.30	5.45	5.60	5.76
170	4.92	5.03	5.16	5.29	5.43	5.57	5.72	5.88
175	5.04	5.16	5.29	5.42	5.57	5.71	5.87	6.03
180	5.19	5.32	5.44	5.58	5.73	5.88	6.04	6.22
185	5.37	5.50	5.63	5.77	5.92	6.09	6.26	6.45
190	5.59	5.72	5.86	6.00	6.16	6.33	6.51	6.74
195	5.85	5.98	6.13	6.28	6.45	6.64	6.85	7.10
200	6.15	6.30	6.45	6.61	6.79	7.00	7.25	7.54

Table 18-2 Runway Length Table: Aircraft Performance, Takeoff (Boeing 757-232 Series) PW 2037 Engine, 5° Flaps

Temperature (°C)	By Airport Elevation in Meters					
	0 m	500 m	1000 m	1500 m	2000 m	2500 m
Maximum Allowable Takeoff Weight (1000 kg)						
10	108.9	108.9	108.9	108.9	108.9	106.4
12	108.9	108.9	108.9	108.9	108.9	104.9
14	108.9	108.9	108.9	108.9	108.8	103.4
16	108.9	108.9	108.9	108.9	107.7	101.9
18	108.9	108.9	108.9	108.9	106.4	100.1
20	108.9	108.9	108.9	108.9	105.0	98.6
22	108.9	108.9	108.9	108.9	103.4	97.0
24	108.9	108.9	108.9	107.9	101.7	95.3
26	108.9	108.9	108.9	106.0	100.0	93.5
28	108.9	108.9	108.9	104.1	98.1	91.7
30	108.9	108.9	107.5	102.1	96.1	89.9
32	108.9	108.9	105.5	100.0	94.1	88.0
34	108.9	108.4	103.4	97.8	91.9	86.1
36	108.9	106.5	101.3	95.6	89.7	84.1
38	108.9	104.5	99.0	93.2	87.4	82.1
40	104.5	106.5	96.7	90.8	85.1	80.0
42	105.3	99.9	94.1	88.3	82.7	77.8
44	103.0	97.3	91.4	85.7	80.3	75.6

Temperature (°C)	By Airport Elevation in Meters					
	0 m	500 m	1000 m	1500 m	2000 m	2500 m
Reference Factor R						
10	52.1	54.8	58.2	62.7	68.5	76.1
12	52.2	54.7	58.2	62.9	69.1	77.0
14	52.3	54.8	58.3	63.2	69.8	78.2
16	52.4	54.9	58.6	63.7	70.6	79.6
18	52.6	55.2	59.0	64.4	71.7	81.2
20	52.8	55.6	59.6	65.3	72.9	82.9
22	53.1	56.2	60.4	66.3	74.4	84.9
24	53.5	56.8	61.4	67.6	76.0	87.2
26	53.9	57.6	62.5	69.1	78.0	89.6
28	54.5	58.6	63.8	70.8	80.1	92.4
30	55.1	59.7	65.4	72.8	82.6	95.3
32	56.0	61.0	67.1	75.0	85.3	98.5
34	56.9	62.4	69.0	77.5	88.3	102.0
36	58.0	64.0	71.2	80.2	91.6	105.8
38	59.3	65.7	73.6	83.3	95.2	109.9
40	60.7	67.7	76.2	86.6	99.1	114.2
42	62.4	69.8	79.0	90.2	103.4	118.8
44	64.2	72.1	82.1	94.1	108.1	123.8

Weight (1000 kg)	Runway Length in Meters							
	60	70	80	90	100	110	120	140
60	941	1087	1245	1401	1540	1648	1711	1646
65	1093	1259	1418	1569	1711	1844	1966	2076

max allowable to ke-off weight
102,000 kg < 108,000 kg OK

Table 18-2 Runway Length Table: Aircraft Performance, Takeoff (Boeing 757-232 Series) PW 2037 Engine, 5° Flaps (Continued)

Weight (1000 kg)	Runway Length in Meters							
	60	70	80	90	100	110	120	140
70	1247	1438	1617	1786	1951	2114	2279	2451
75	1409	1630	1843	2048	2249	2448	2646	2846
80	1581	1838	2096	2350	2599	2837	3062	3271
85	1769	2067	2377	2688	2990	3271	3522	3731
90	1975	2319	2685	3056	3414	3742	4021	4234
95	2205	2599	3022	3451	3864	4239	4554	4788
100	2462	2912	3388	3868	4330	4754	5117	5488
105	2750	3261	3782	4301	4804	5276	5748	6117
110	3074	3650	4207	4748				

(2581 m)