

MANAGING "APPROACH CLIMB LIMIT" BEFORE TAKEOFF

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Let's say you are taking off from Lahore to land at Quetta (high elevation). First, as a routine you will check Box A, B and C to determine the max TOGW for takeoff from Lahore.

F15	17/03/2016	ALLAMA IQBAL INTRL	LHE	36R
ELEVATION= 712.0 (FT)	LIMITATION CODES		ATR72-500	FAR
T.O.R.A. = 3360.0 (M)	0-DRY CHECK	5-TYRE SPEED	ATR72-500	
A.S.D.A. = 3482.0 (M)	1-STRUCTURE	6-BRAKE ENERGY	V2/VS OPTIMIZED	V1/VR OPTIMIZED
T.O.D.A. = 3665.0 (M)	2-2ND-SEGMENT	7-RWY 2 ENGINES	AIR COND. ON	
SLOPE = 0.05 (%)	3-RUNWAY	8-FINAL T.O.	NORMAL CONDITIONS	
LARGE WIDTH ASSUMED	4-OBSTACLE	9-VMC	WITHOUT REVERSE	
TOW (KG)	CODES	QNH=1013.25 (HPA)	DRY RUNWAY	
V1 VR V2 (IAS KT)			SCREEN HEIGHT 35 FT	
DTOW / DTOW		DQNH= -15/ +15		
OAT (DC)	DV1 DVR DV2 / DV1 DVR DV2			
WIND (KT)				
-15	-10	0	10	20
36.0	21252 6-6	22750 2-6	22800 2-1	22800 2-1
	89 107 111	95 115 118	105 115 119	105 115 119
	-166 / +167	-326 / +49	+0 / +0	+0 / +0
	+0 -1 -1/ +0 +0 +0	+0 -1 +0/ +0 -4 -3	+2 +6 +5/ -3 -4 -4	+5 +6 +5/ -3 -4 -4

Let's say the temperature was 36 and you were box A limited to 22,800. This means you can takeoff with your maximum TOGW capability. But since you are landing at a high elevation airport with terrain all around, you will have to see if in case of a go around with single engine, your aircraft performance is sufficient to clear all the obstacles. High elevation means air is less dense so performance will be affected. So you can't afford to be very heavy. That's why you will check your approach climb limit before taking off (else it will be too late because you can't dump weight in air).

Assuming the expected temperature at Quetta is 36, your approach climb limit will be 19,769.

If you are above this weight you won't meet the required legal performance. So in addition to box A, B and C you calculate another limit. You may call it box D. Box D will be (as given in SOP) Expected Approach Climb Limit Weight (determined from FOS, as shown above) + Trip fuel (from Lahore to Quetta) + Taxi fuel.

LDG CHART 21/04/2016	QUETTA	UET	31R
ELEVATION= 5267.0 (FT)	LIMITATION CODES		ATR72-500 FAR
L.D.A. = 3658.0 (M)	0-WET CHECK	3-APPROACH CLIMB	ATR72-500
SLOPE = 1.01 (%)	1-STRUCTURE	4-LANDING CLIMB	ATR72-500
	2-RUNWAY		APPROACH
			NORMAL CONDITIONS
LANDING F30	QNH = 1013.25 (HPA)	LANDING F30	
APPROACH F15		APPROACH F15	
CAT I	LANDING WEIGHT (KG)	CAT I	
OAT (DC)	DRY OR WET RWY	CODE	DRY OR WET RWY
WIND (KT)			
-15	-10	0	10
36.0	19769	19769	19769
	3	3	3

Your max TOGW will be lower of Box A, B, C and D. This example clearly shows that landing at Quetta when temperature is 36, you need to be at 19,769 Kgs. That means you can be above this weight at takeoff provided you lose weight during flight to be 19769 at landing. The only weight you can lose in flight is of fuel (trip and taxi) by consuming it. If in this case your trip fuel was 900 Kg and taxi 91 Kg, then your box D will be 19769 + 900 + 91 = 20,760. Much lower than 22,800.

In other words, if you plan a takeoff at 22800 then you will burn only 991 Kgs during flight (taxi + trip), and your weight at landing will be 21,809 Kgs which is higher than your approach climb limit of 19,769. In case of a single engine go around during approach, you won't meet the required performance.

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