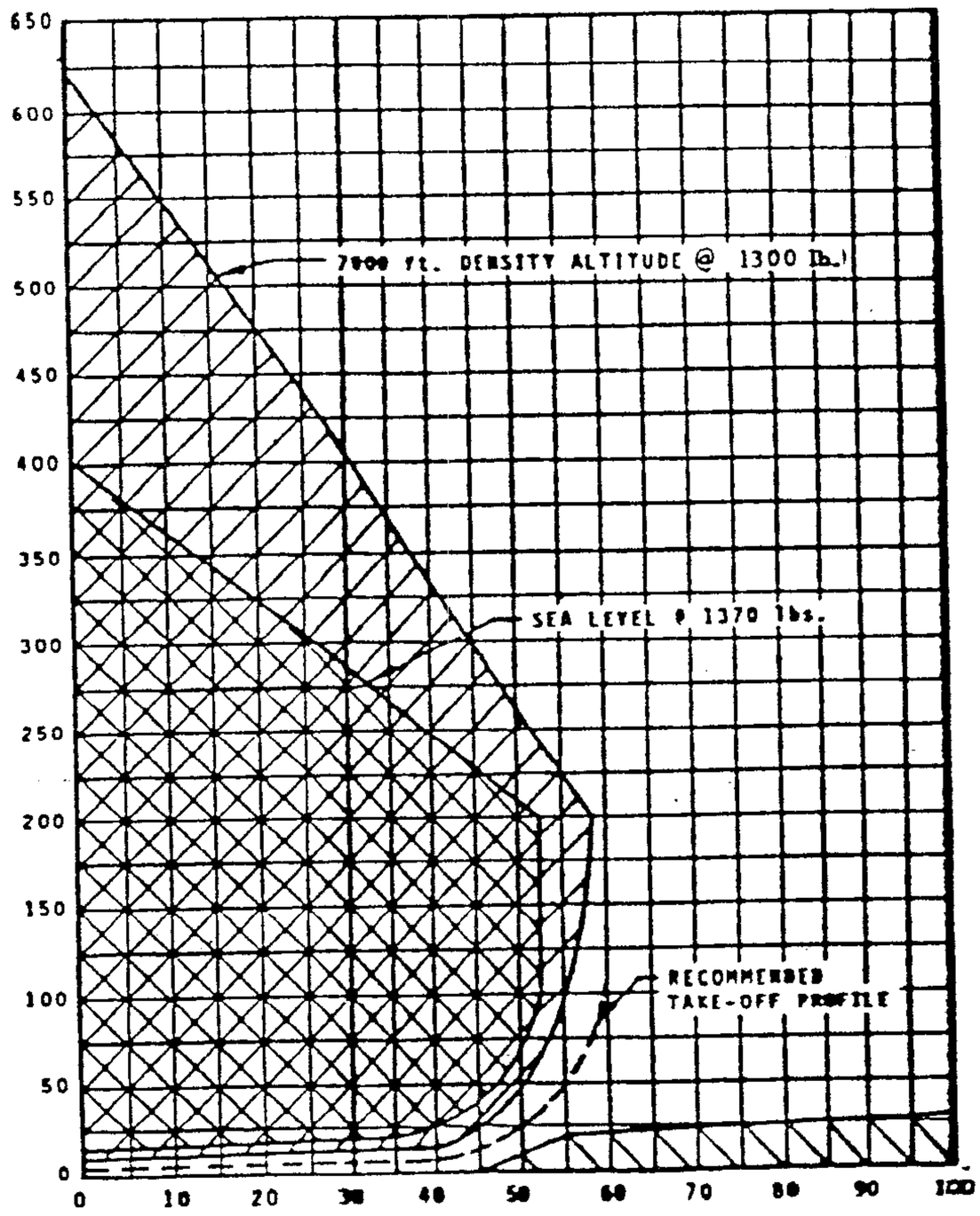
DEMONSTRATED CONDITIONS:

SMOOTH HARD SURFACE
WIND CALM
MAX POWER-ON RPM (104%)



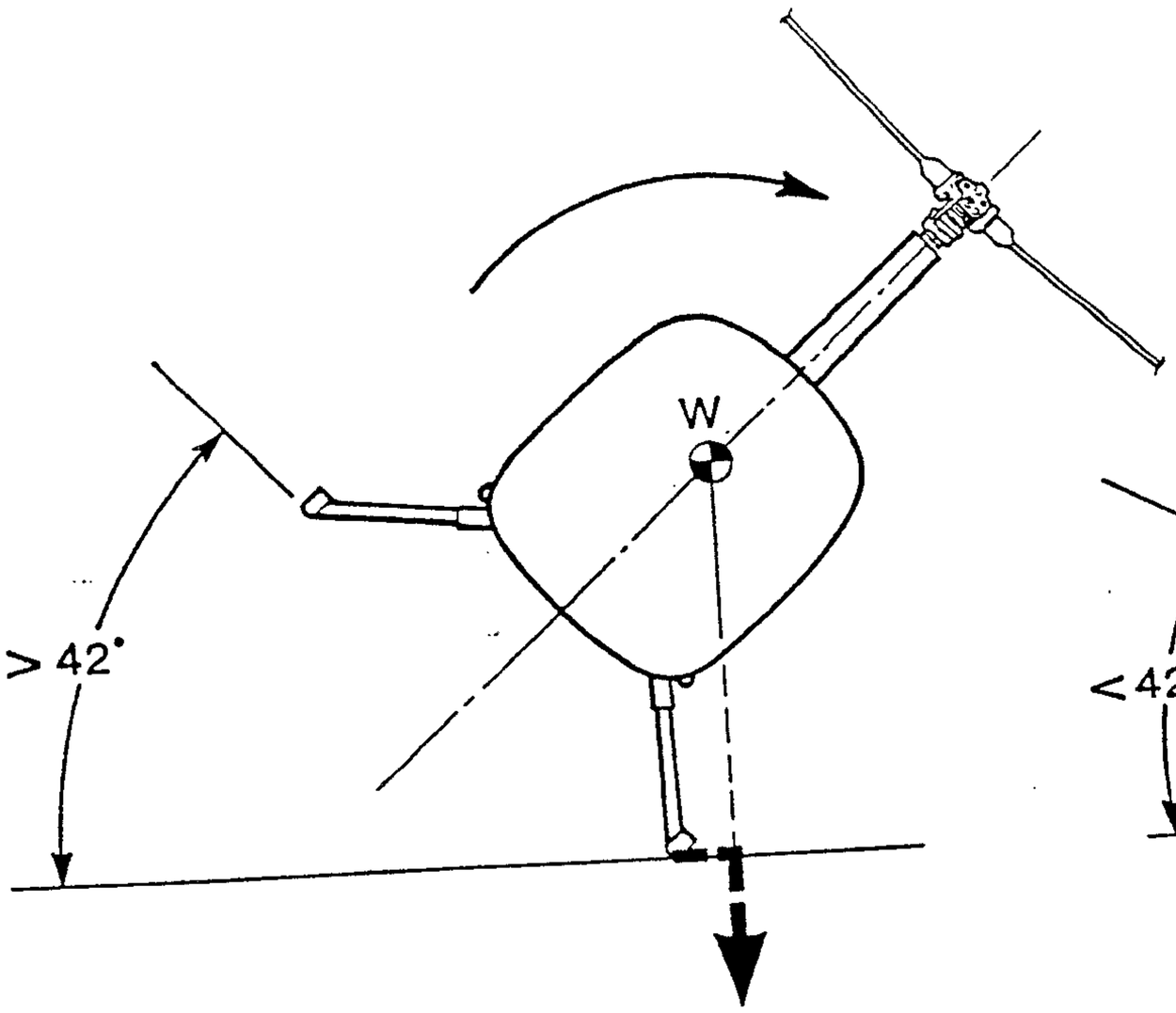
AVOID OPERATION IN SHADED AREAS

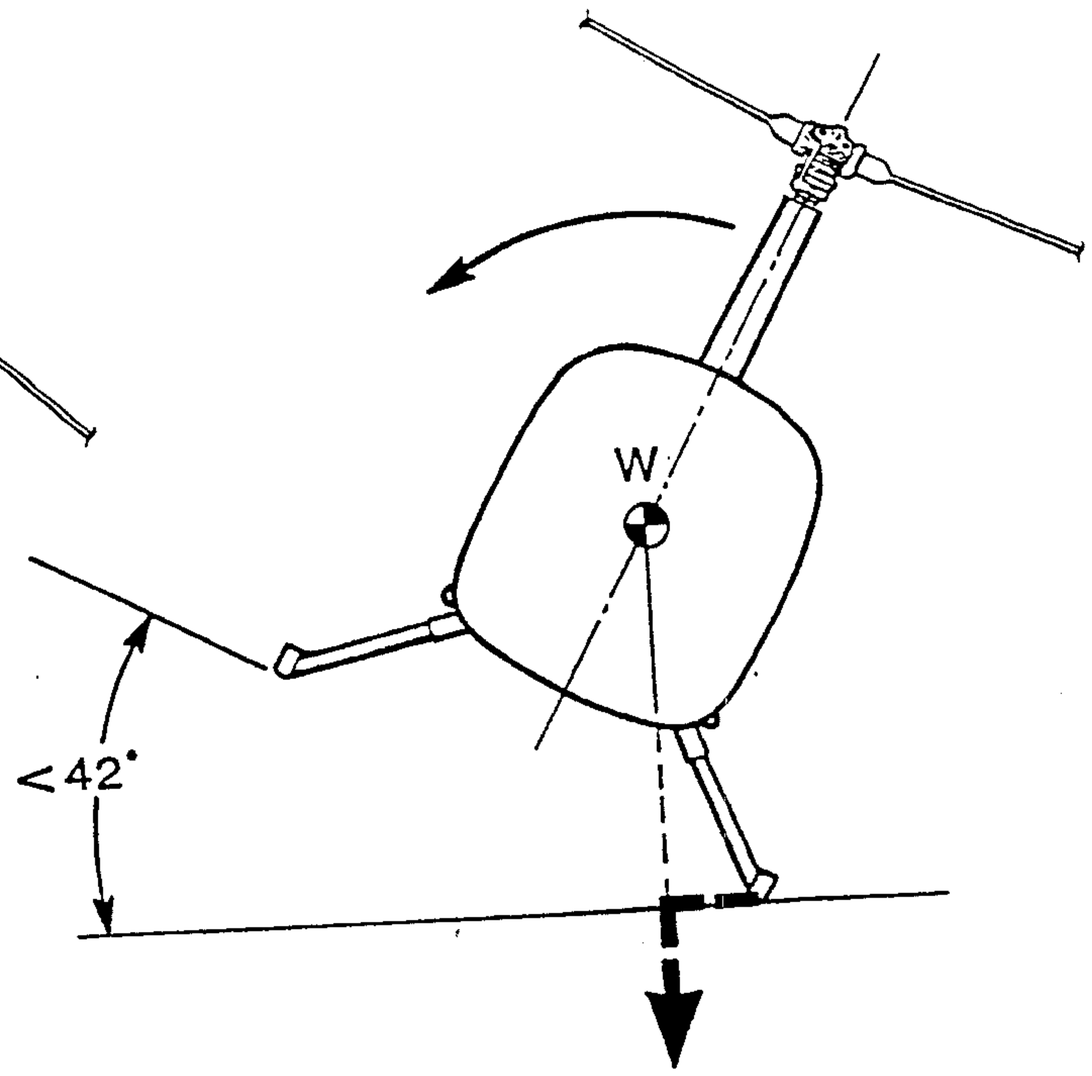
HEIGHT-VELOCITY DIAGRAM

FAA APPROVED 12 October 1983

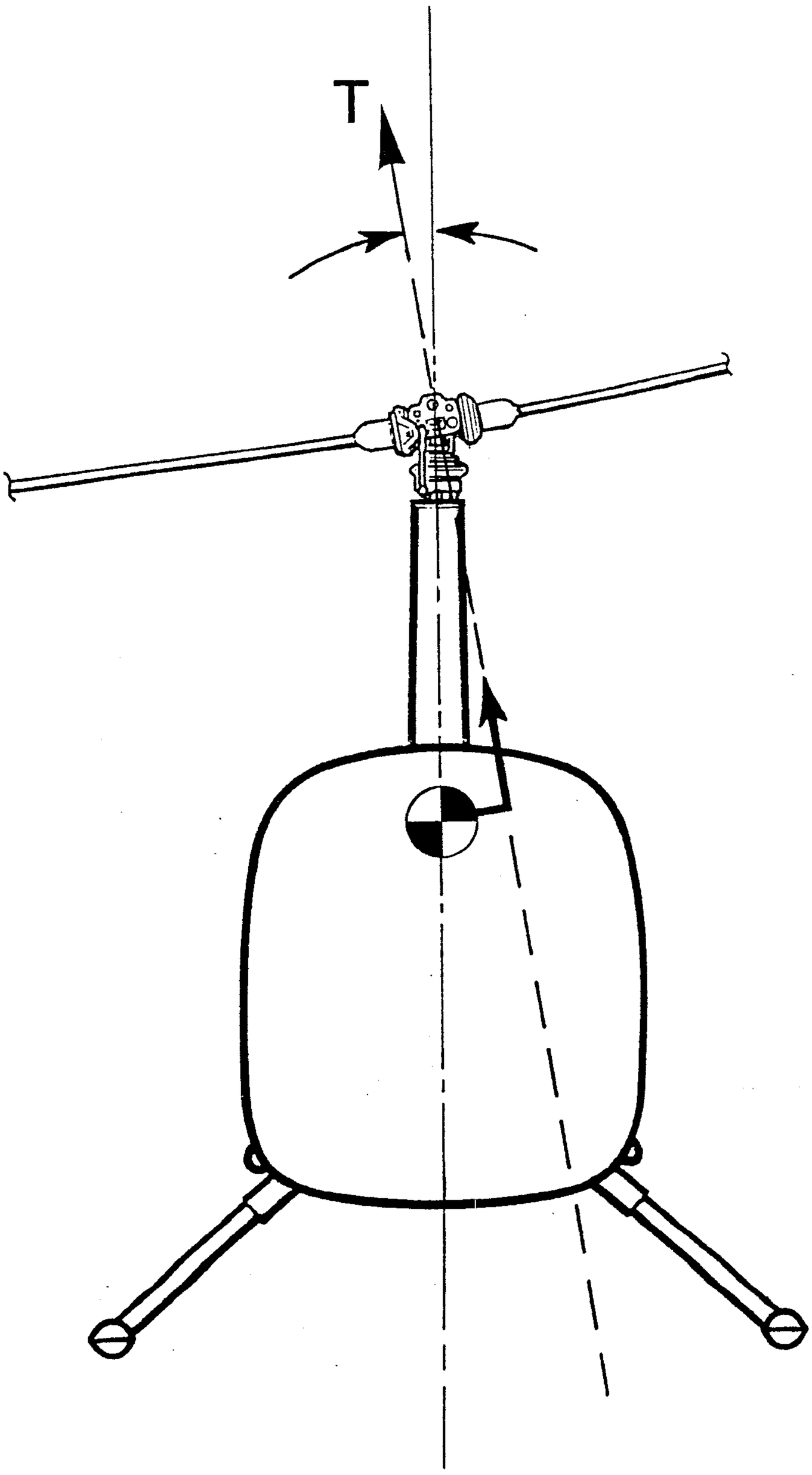
5-6.1

STATIC ROLL-OVER



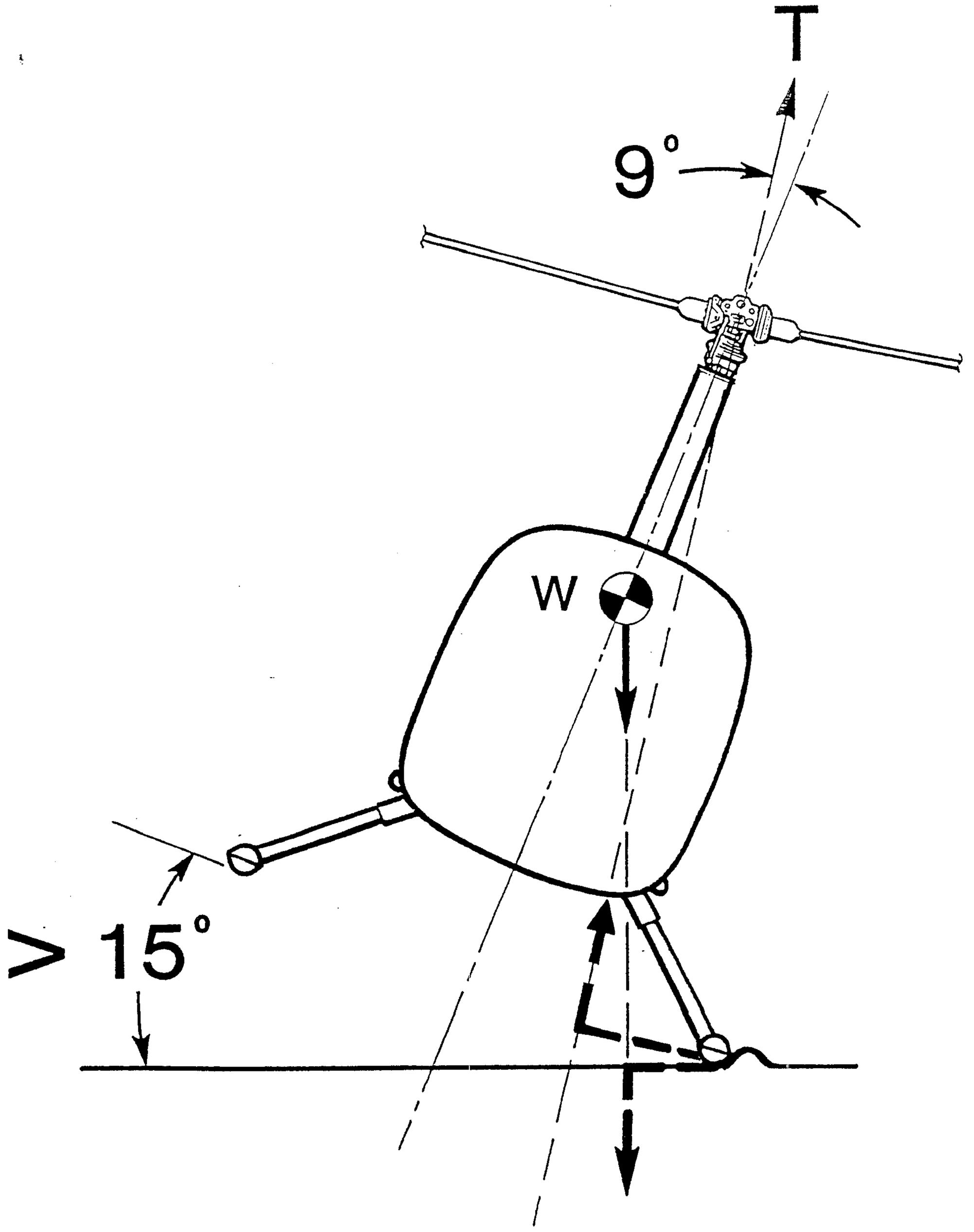


FREE BODY IN-FLIGHT

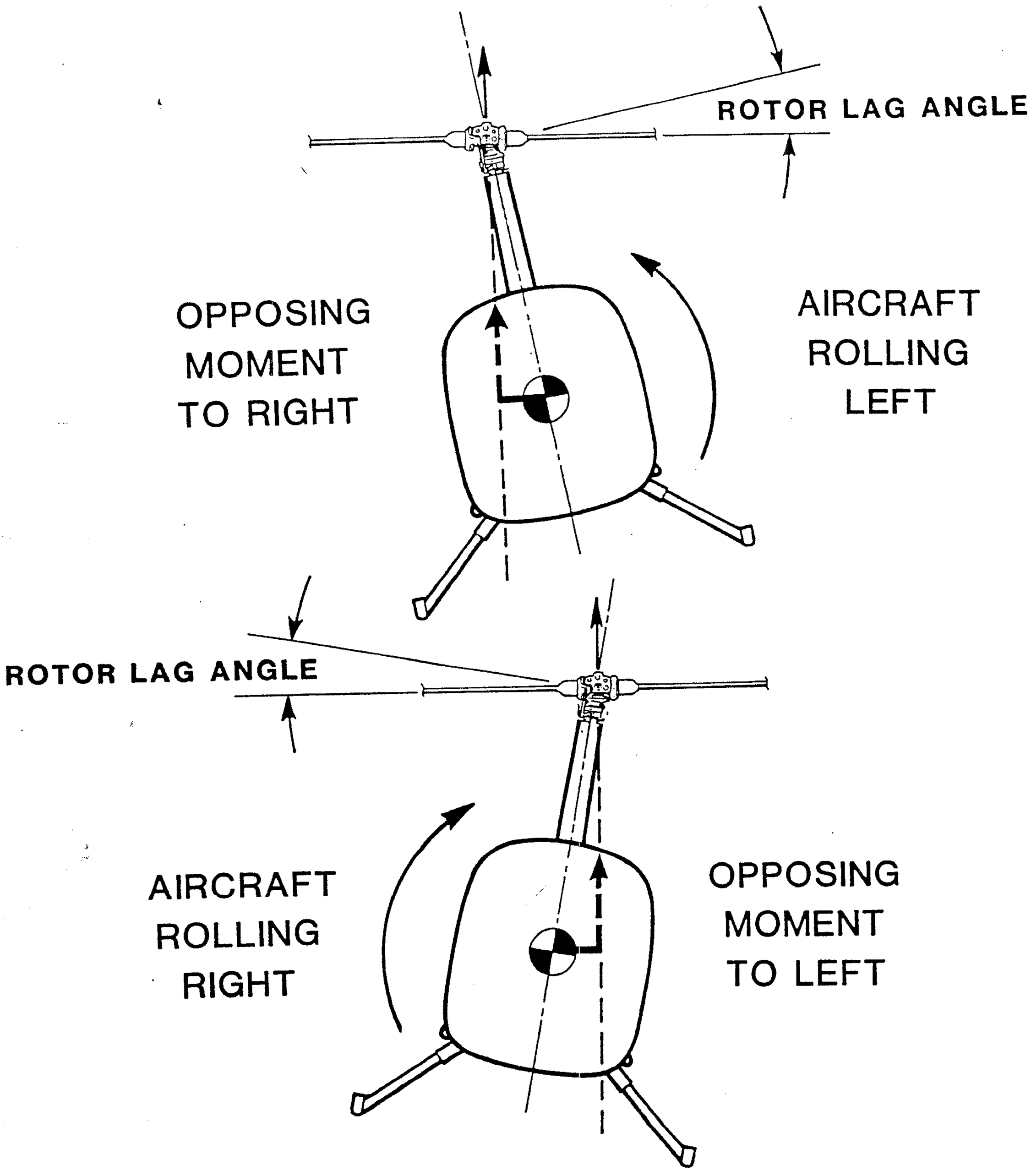


DYNAMIC ROLL-OVER

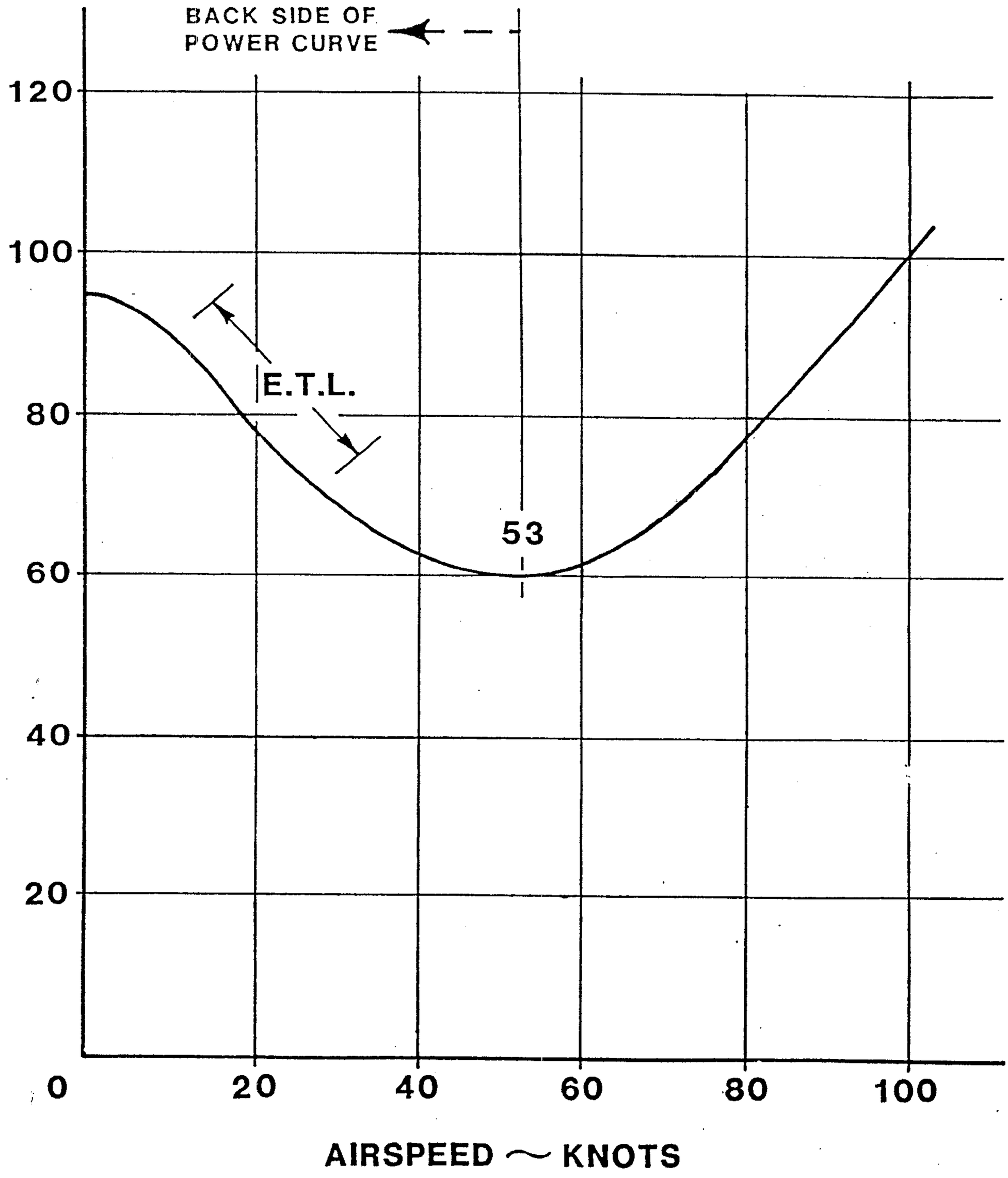
LOOKING FORWARD



ROTOR DAMPING



ROTOR POWER REQUIRED



STORED ENERGY

KINETIC ENERGY ~ $KE = \frac{1}{2} MV^2$

1. ROTOR RPM ~

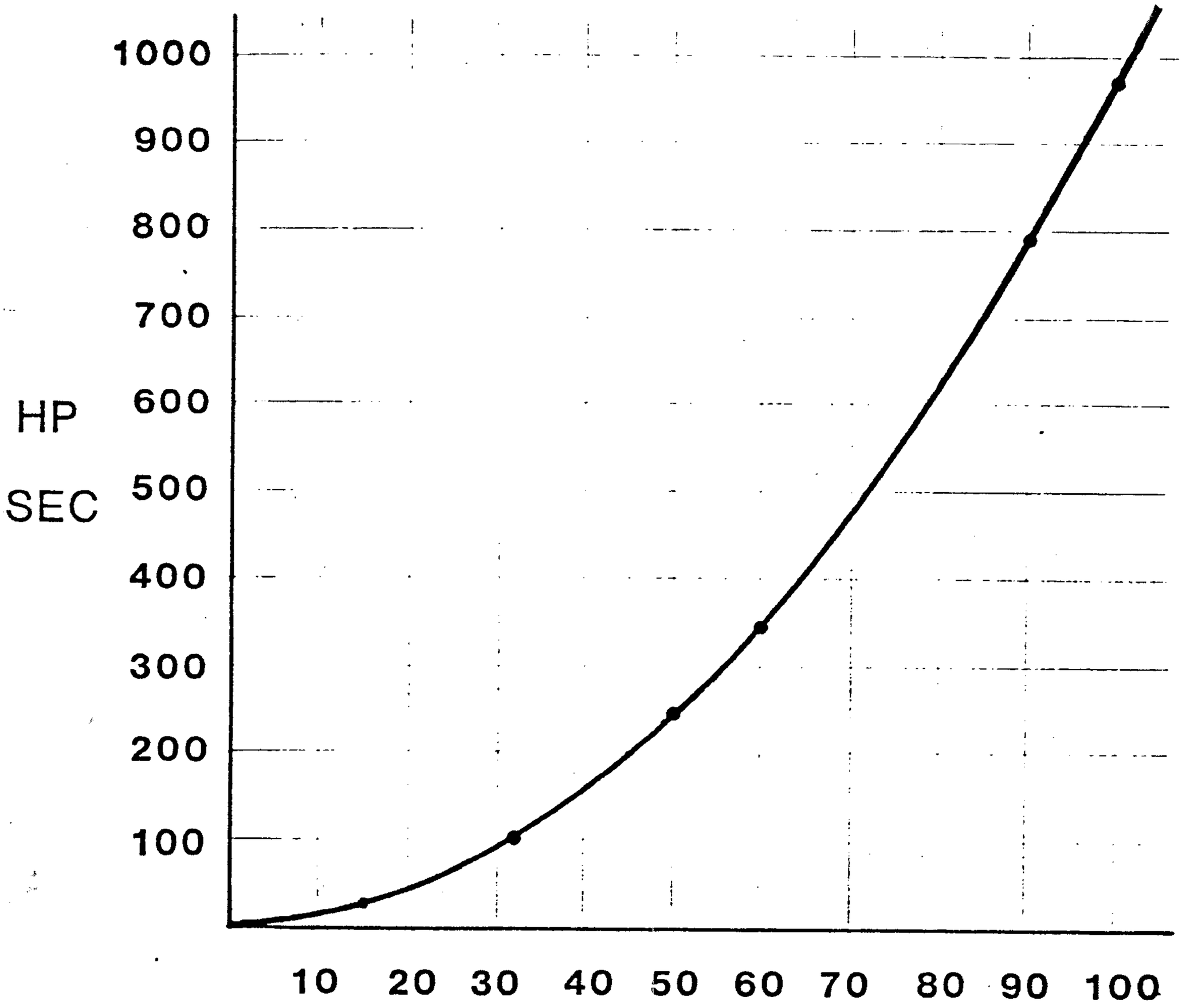
2. FORWARD SPEED

POTENTIAL ENERGY ~ PE = W x H

3. ALTITUDE ~ AGL

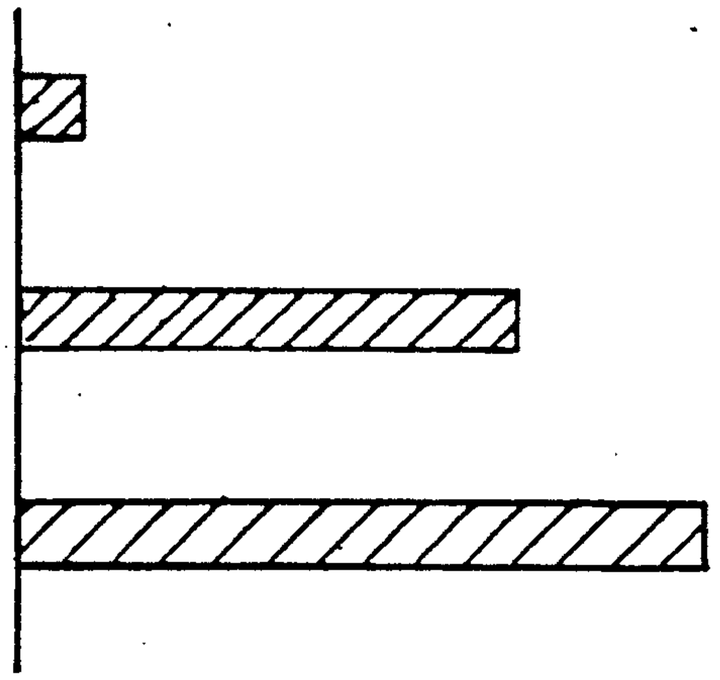
STORED ENERGY

FORWARD SPEED



STORED ENERGY

AT 90 KTS & 500 FT AGL

Rotor RPM	100 HP-SEC	
Forward Speed	800 HP-SEC	
Altitude ~ AGL	1100 HP-SEC	

2000

R22 Needs 90 HP To Maintain A/S & ALT.

FWD Cyclic & UP Coll. ~ STALL In 100 ÷ 90 = 1.1 SEC

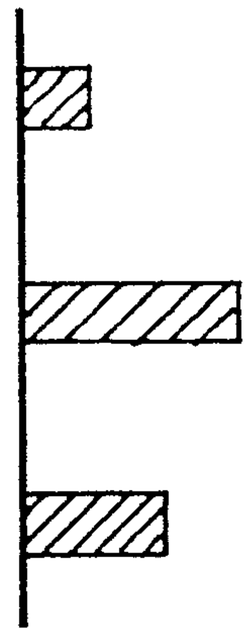
IF AVERAGE POWER REQUIRED IN AUTO ≃ 75 HP

WILL BE ON GROUND WITHIN 2000 ÷ 75 = 26 SEC

STORED ENERGY

AT 60 KTS & 100 FT AGL

Rotor RPM	100 HP-SEC	
Forward Speed	346 HP-SEC	
Altitude ~ AGL	220 HP-SEC	
	666	



IF AVERAGE POWER REQUIRED IN AUTO $\simeq$ 75 HP

WILL BE ON GROUND WITHIN $666 \div 75 = 9$ SEC

TO RECOVER 100 HP-SEC

Reduce RPM from 104% to 75% - 29%

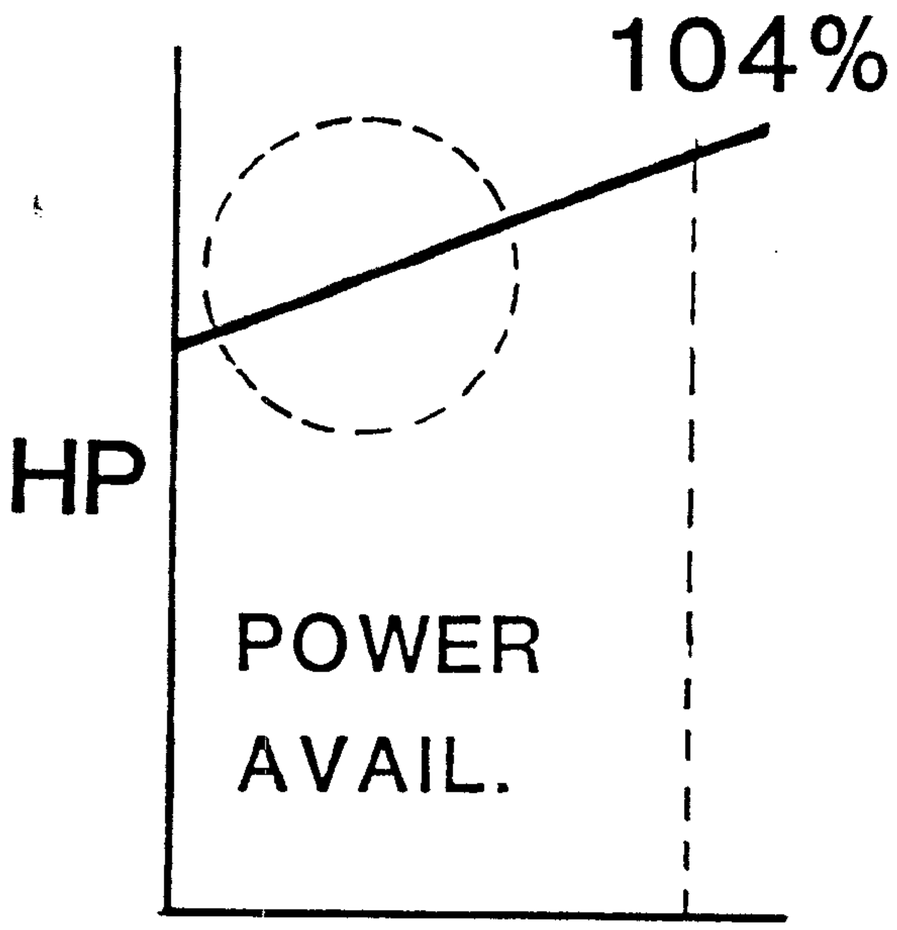
Reduce AIRSPEED from 90 to 84 KT - 6 KT

Reduce AIRSPEED from 60 to 50 KT - 10 KT

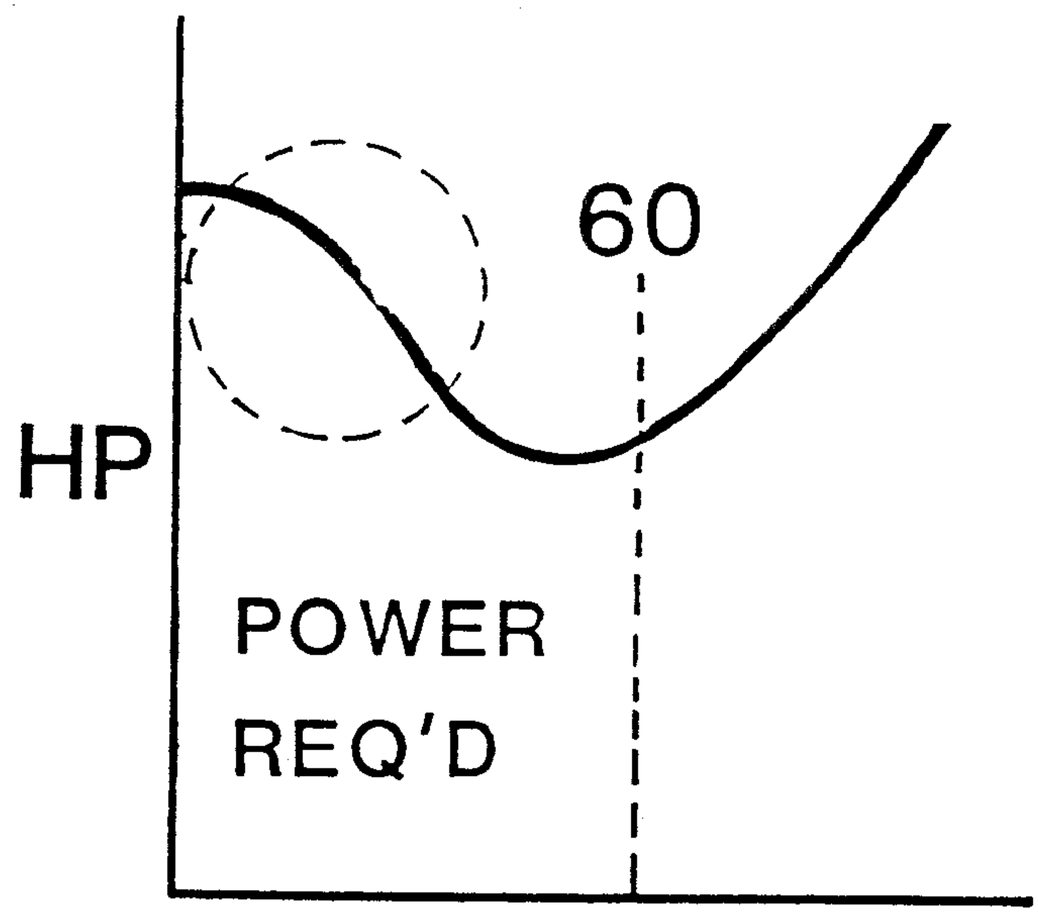
Reduce AIRSPEED from 32 to 0 KT - 32 KT

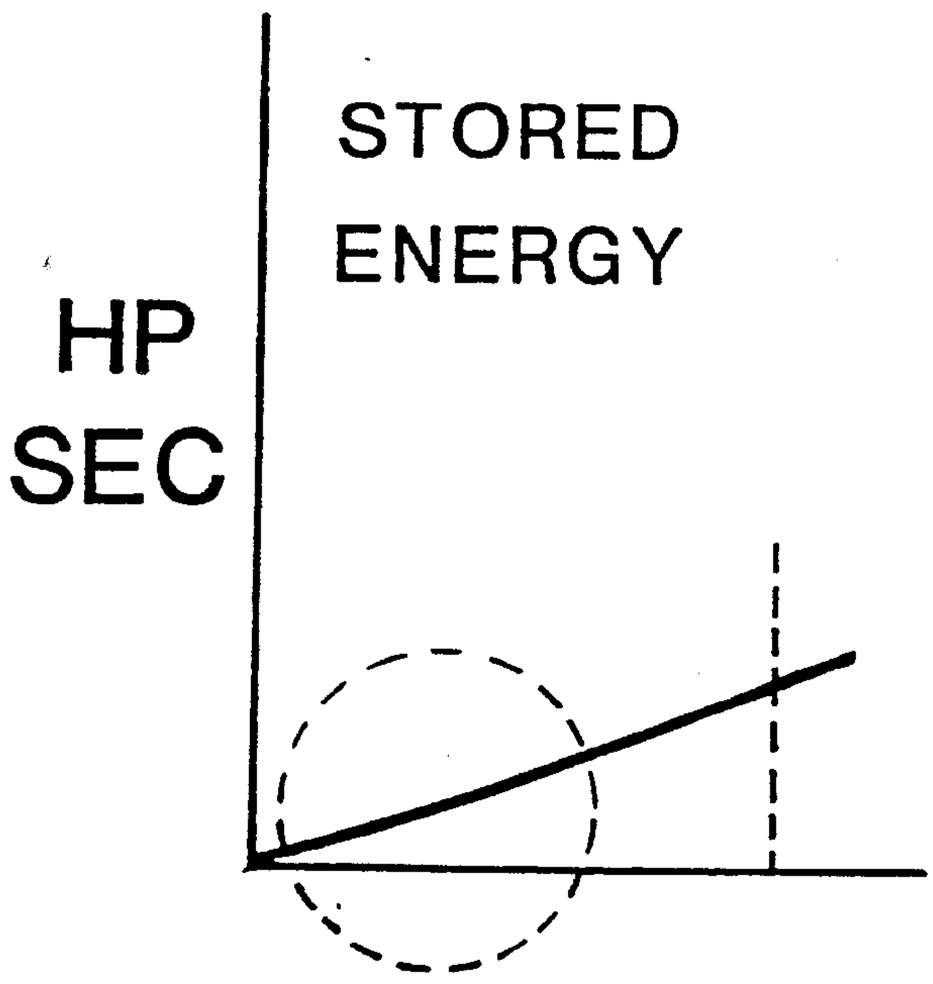
Reduce ALTITUDE by 46 FEET - 46 FT

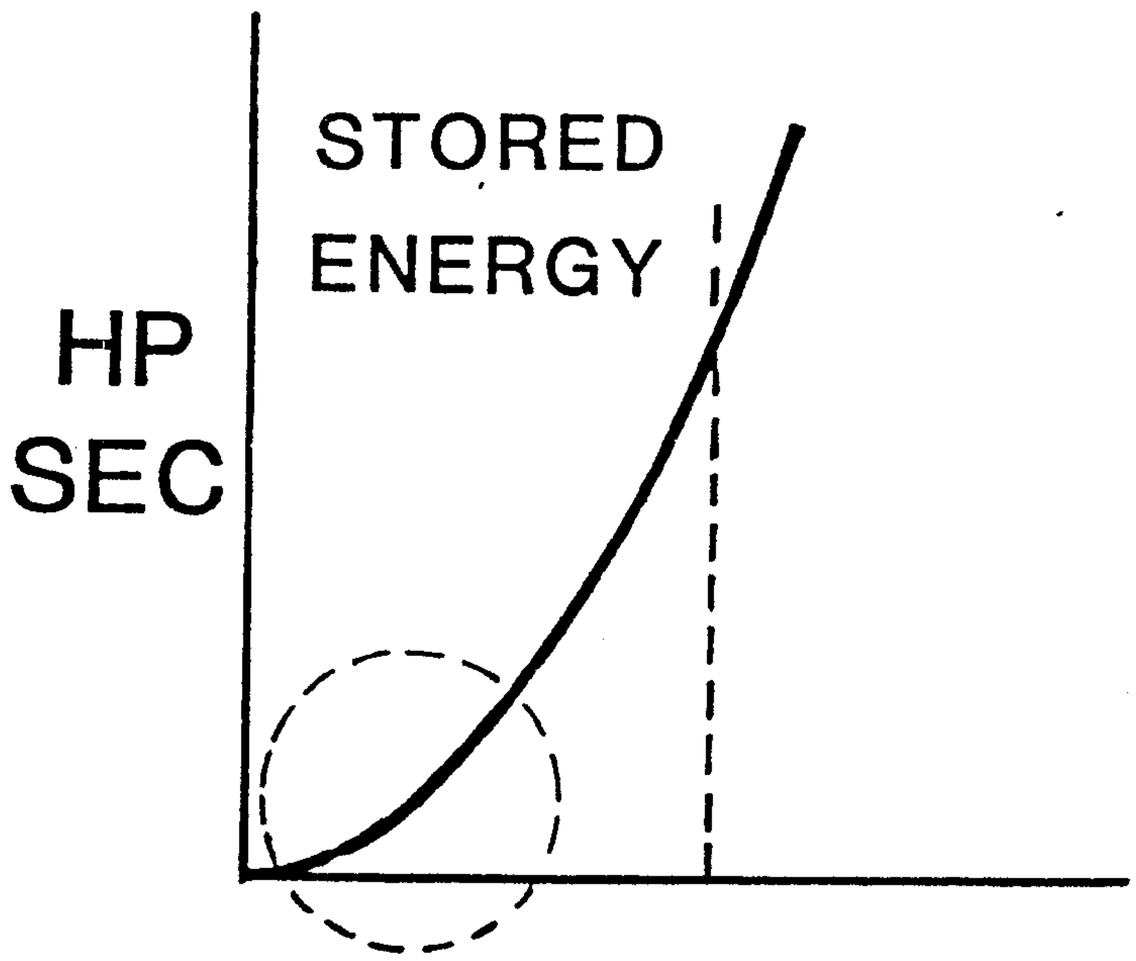
LOW ROTOR RPM



LOW AIRSPEED







CLIMB VERY CRITICAL

ASSUME: 1300 LB 60 KT 1000 FPM $\eta = .9$

$$\text{CLIMB POWER} = \frac{(1300)(1000)}{(33{,}000)(.9)} = 43 \text{ HP}$$

TOTAL POWER = 60 + 43 = 103 HP

EXAMPLES: POWER LOSS AT 100 FT

Continue Climb at 60 KT	100 ÷ 103 ≃ 1 Sec. to Stall
Reduce A/S to 50 KT (aft cyclic only)	200 ÷ 103 ≃ 2 Sec. to Stall

NEVER REMOVE HAND FROM COLLECTIVE DURING CLIMB