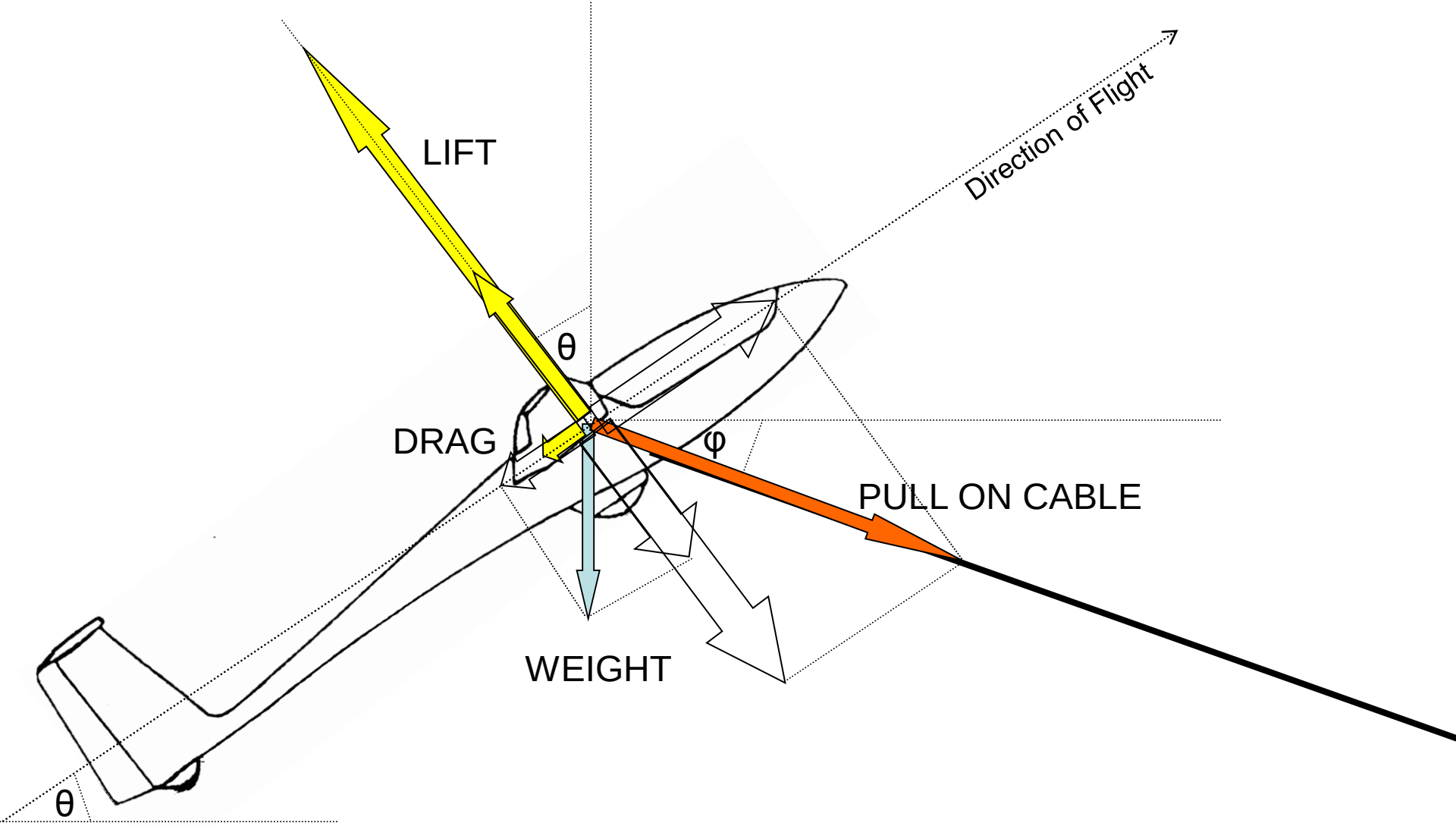
WINCH LAUNCHING

(DANGERS OF)



Note: Increased wing loading due to pull on the cable

Also Drag = component of Pull on Cable in direction of flight.

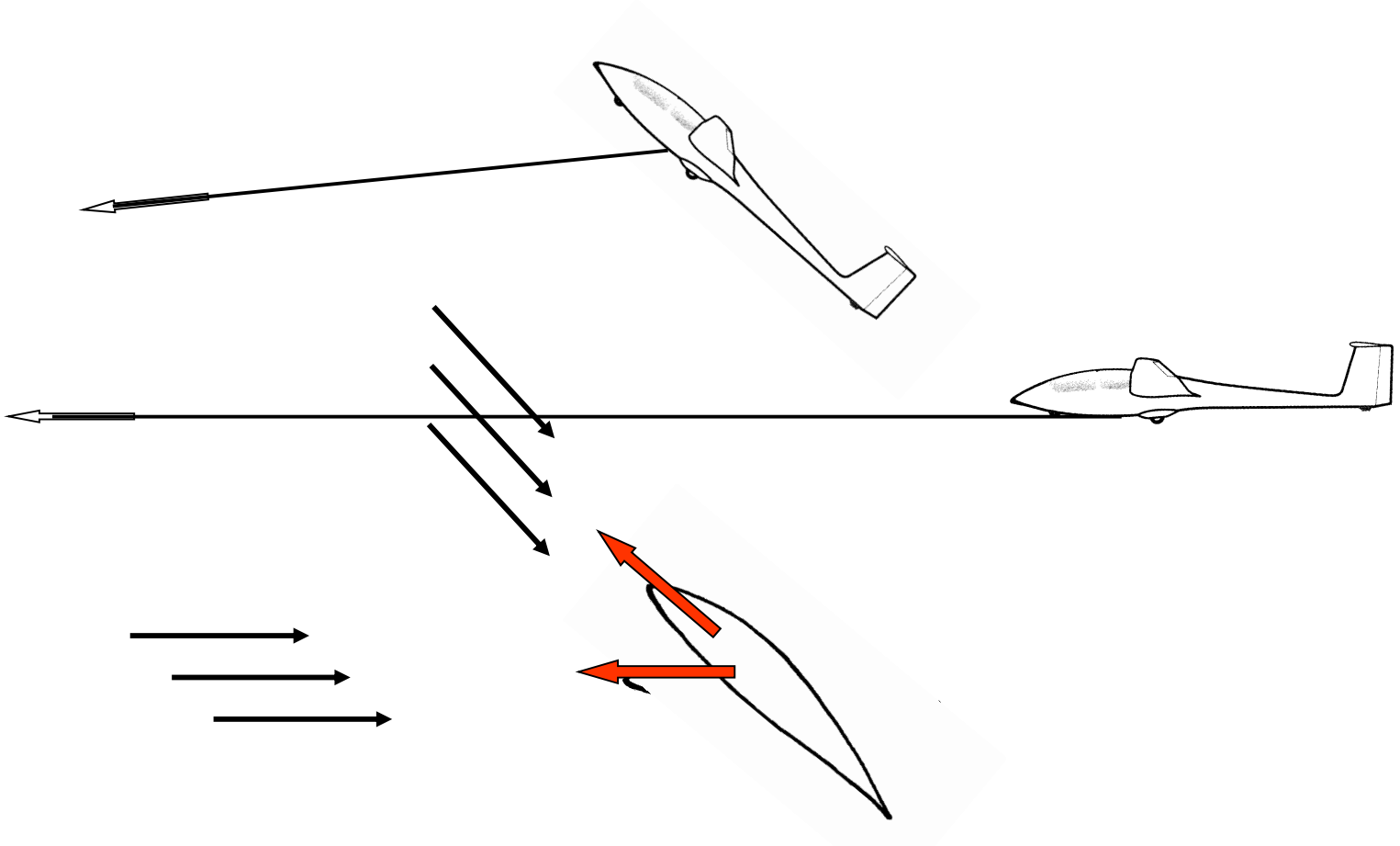
FORCES IN A WINCH LAUNCH

CABLE BREAKS

for a K21:-

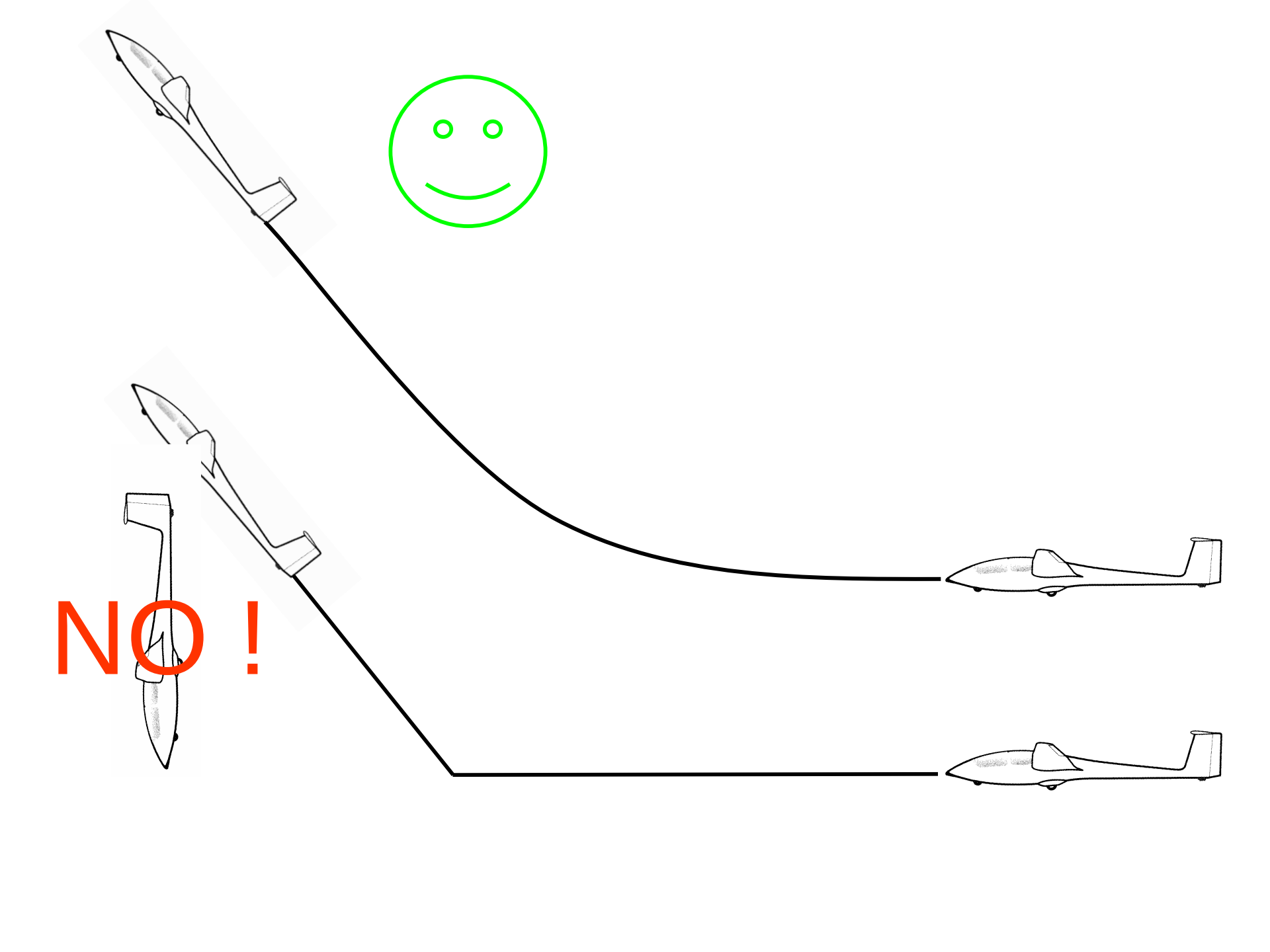
- Black link breaking strain is 2200 lbs
- They DO break !
- Approx all-up weight is say… 1100 lbs
- Crudely, 2g wing loading when the link breaks (?!)
- At 2g stall speed is approx. = 38 x $\sqrt{2}$ kts
- say 38 x 1.414 = 54kts stall while STILL ATTACHED to the wire
  - See Excel spreadsheet ‘winchlaunch’ for a better analysis and more precise figures
- BUT this is in the full climb (towards the top
  - when you are pulling hard)
- Probably of greater concern is the …

ROTATION



Requires smooth progressive rotation

So that angle of attack stays low

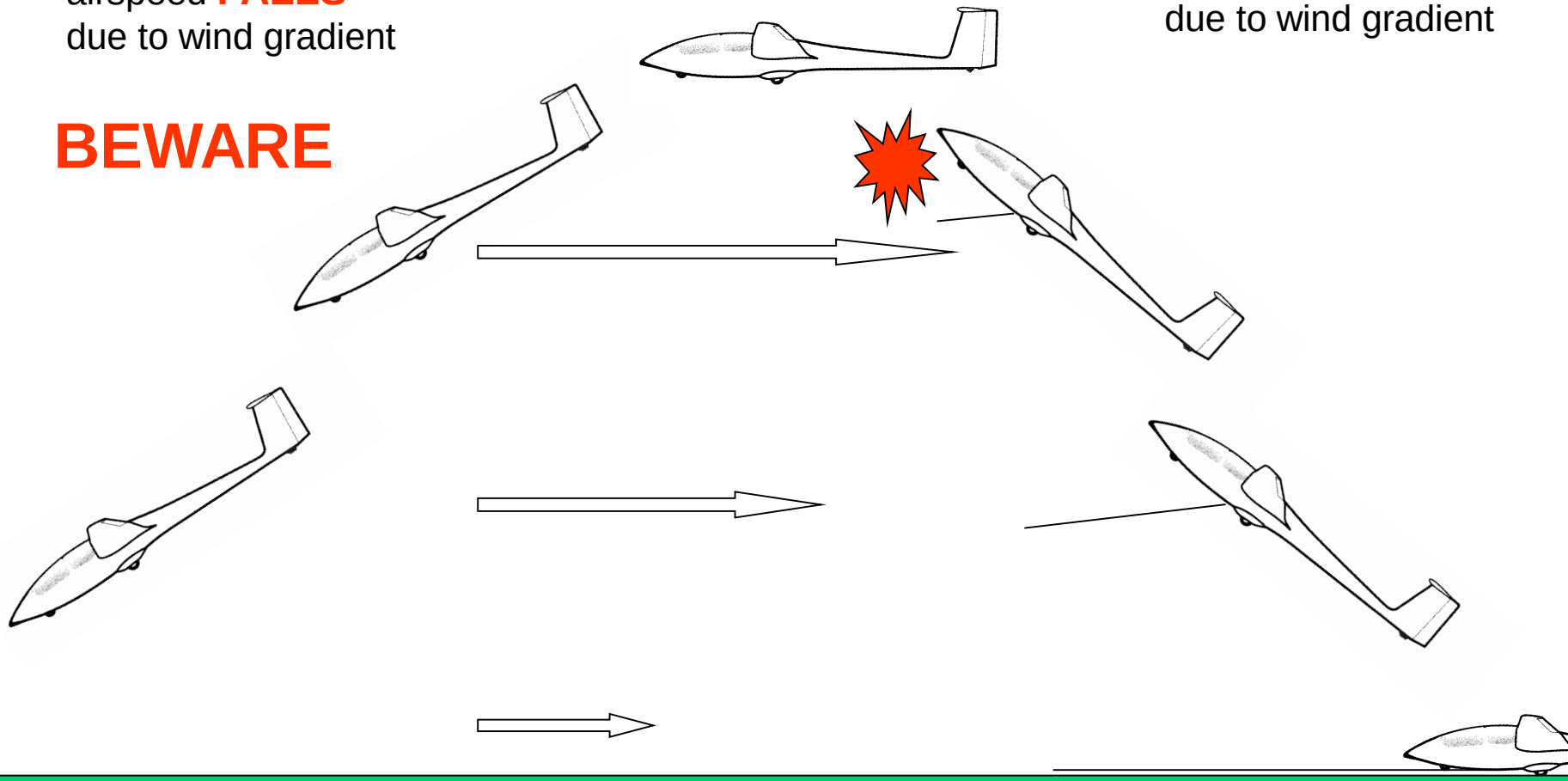

NO !

Effect of Wind Gradient

When descending airspeed **FALLS** due to wind gradient

BEWARE

When climbing airspeed increases due to wind gradient



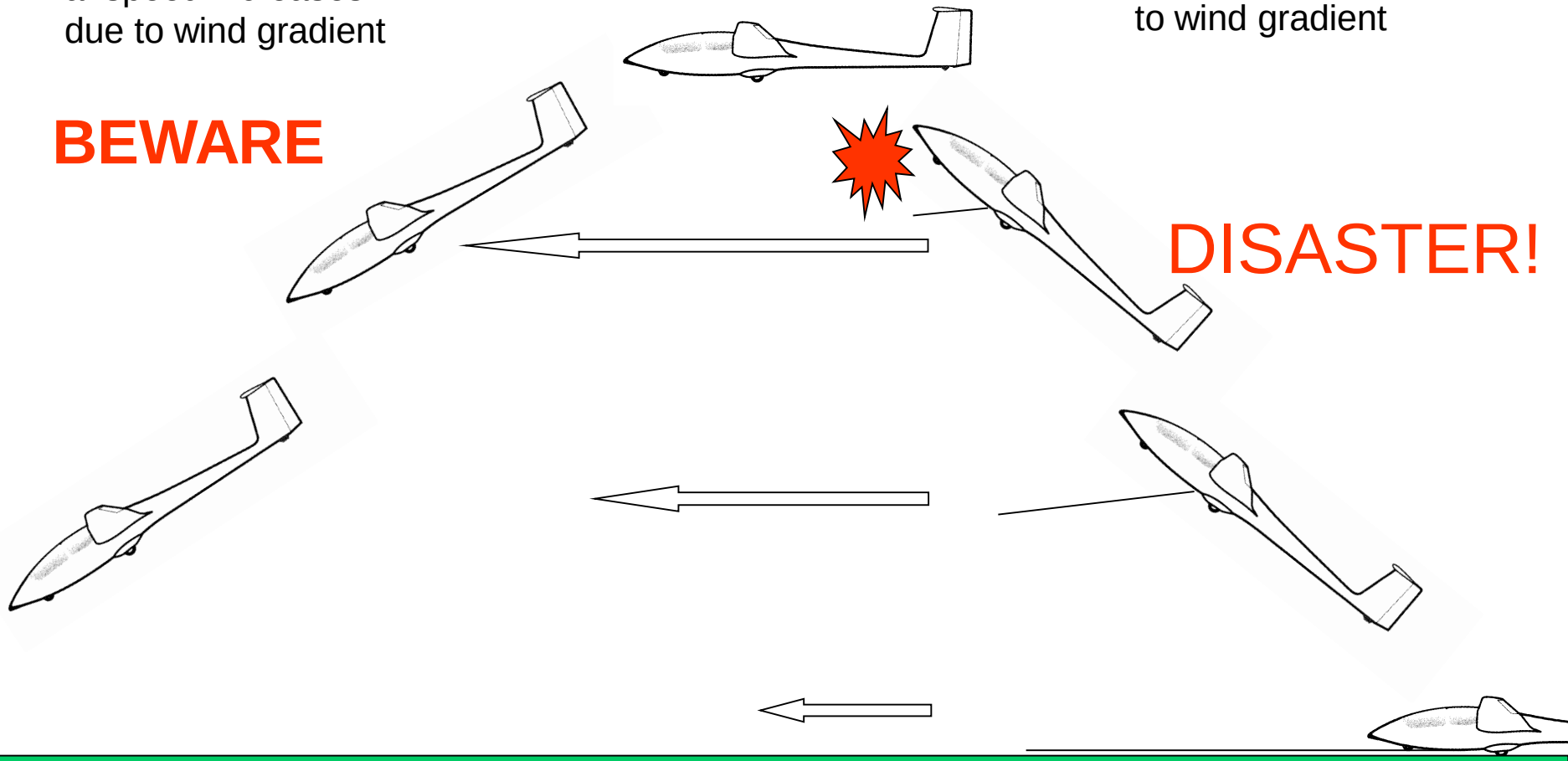
Effect of Wind Gradient – for a downwind launch

When descending airspeed increases due to wind gradient

When climbing airspeed FALLS due to wind gradient

BEWARE

DISASTER!

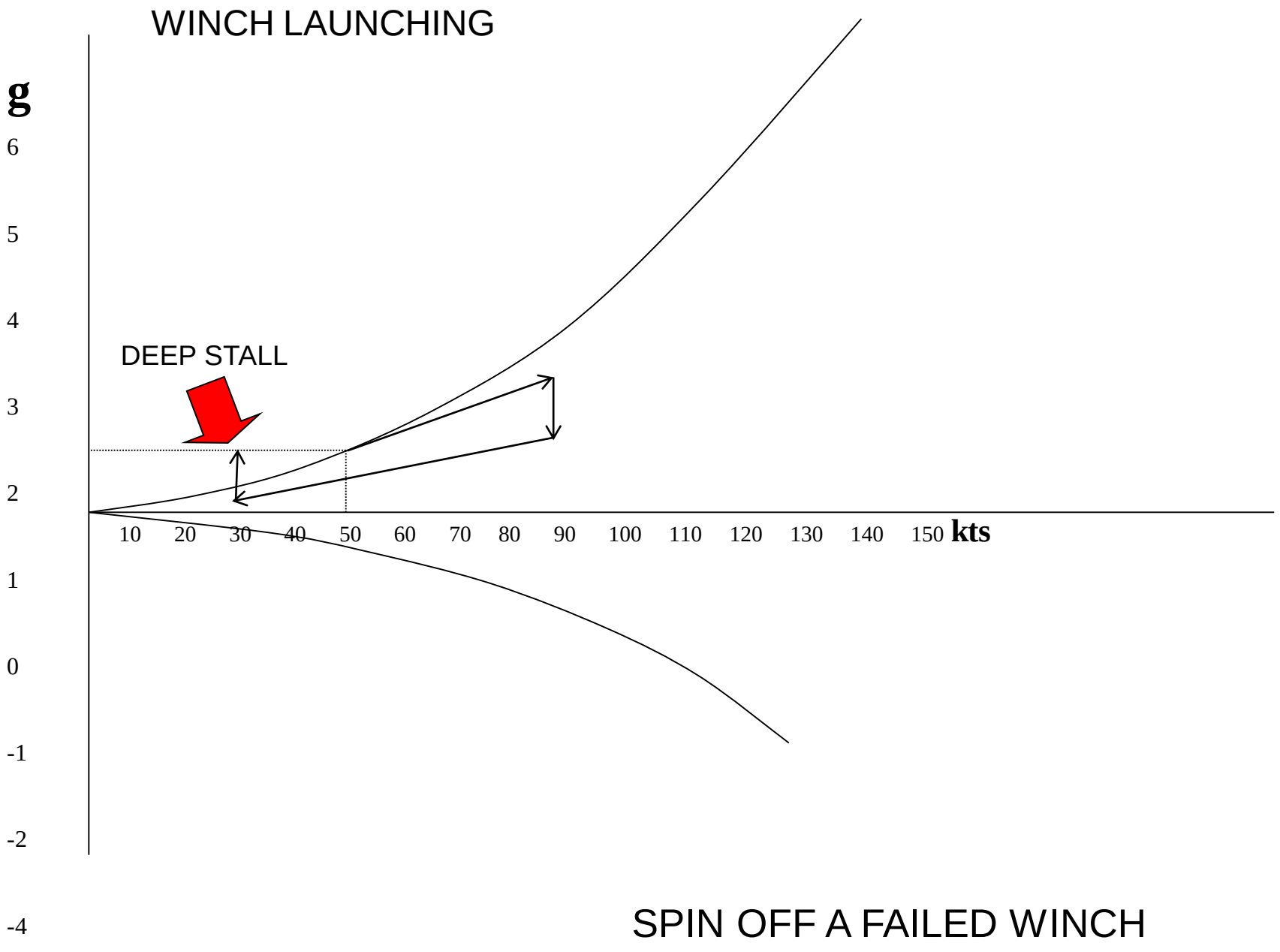


LOW FAILURES

- Power loss/release below 100ft is particularly hazardous – if not dealt with correctly.
- Avoid lowering the nose too far.
    - But then if you haven't rotated too quickly this won't be a problem.
    - Think of 'mirroring' the up-angle with the down angle
- Be cautious with the use of airbrakes.

- Instructors should not pull the release at these heights – for practice, only use winch driver initiated power failure. (Otherwise hitting the cable is inevitable) OR simulate off-wire.

Next slide better in portrait layout. See Bronze Lects Princ of Flt part 2.



SPIN OFF A FAILED WINCH LAUNCH