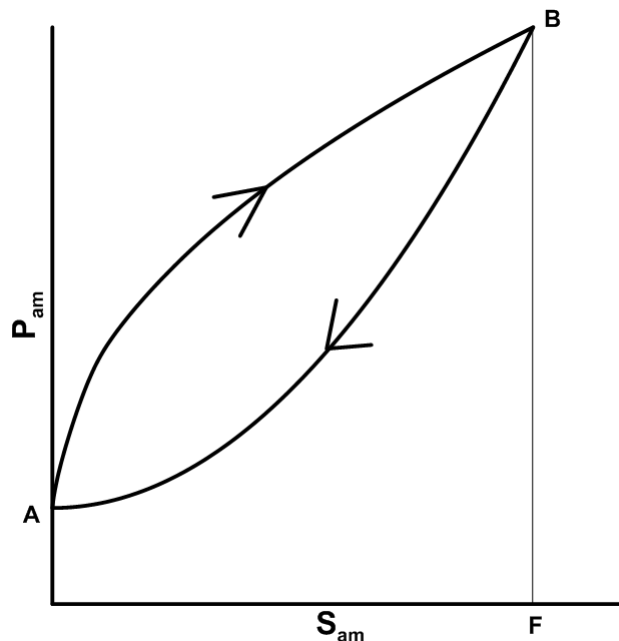


Landing gear task 1

- „Landing gear has to absorb total energy resulting from aeroplane descend rate at the moment of touch down. It also has to absorb energy resulting from the terrain roughness. In both cases landing gear stroke has to be large enough to avoid excessive accelerations and aeroplane structure loads.
- Most of this energy has to be absorbed irreversibly (eg. converted to the heat), so that aeroplane oscillations are quickly damped.”

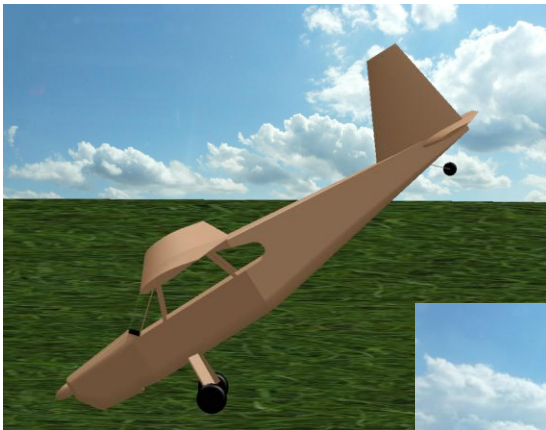
Cymerkiwicz



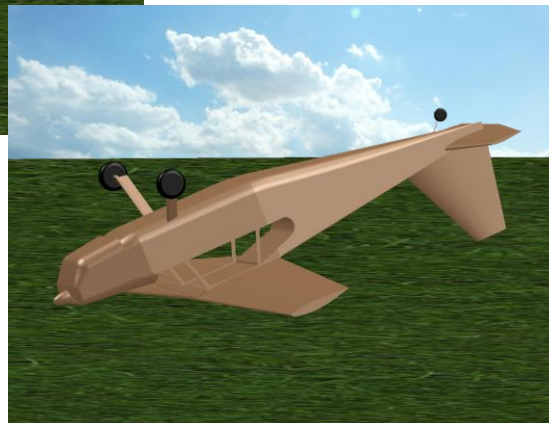
Landing gear task 2

- „Landing gear should have small rolling friction, in particular during takeoff run.
- Braking has to be as effective as possible to decrease landing run distance; brakes should hold an aeroplane stopped during engine tests up to the maximum RPM; differential braking is necessary to obtain good controllability and maneuverability on the ground.
- Landing gear has to provide acceptable stability (about all axes) controllability and maneuverability (directional) so that turnover can be avoided in any conditions including braking.”

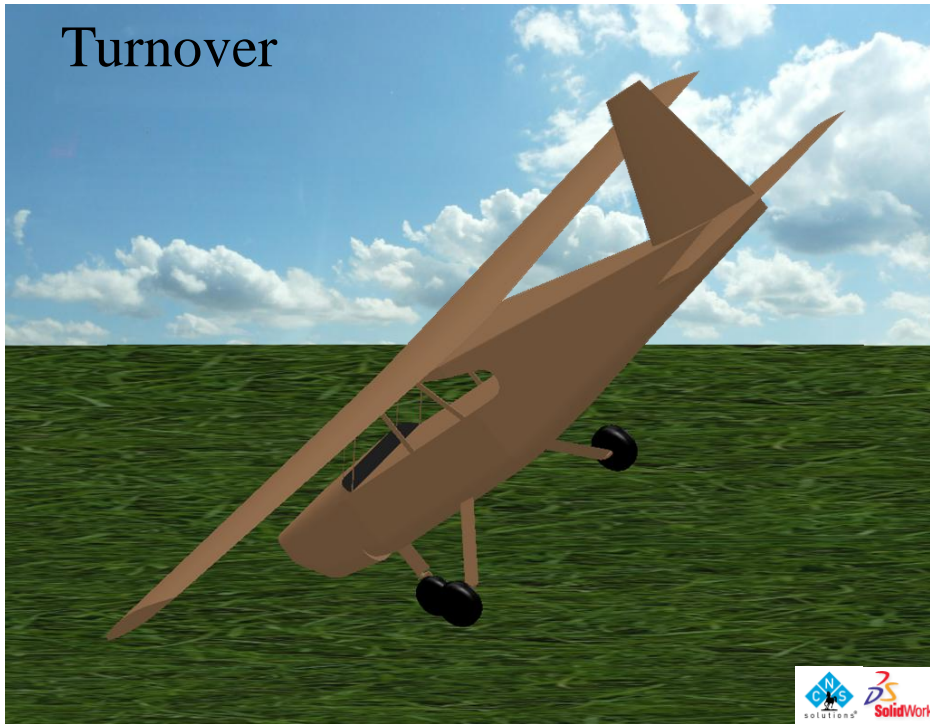
Cymerkiwicz



Turnover



Turnover



Landing gear task 3

- „In the case of any standard ground operations, non of the aeroplane components, except wheels, skids or floats, is allowed to touch the ground (including its average roughness) when landing gear deflection is maximal;
- Landing gear should be strong enough to accept any relevant loads, however it should be damaged first if permissible or ultimate loads are exceeded so that remaining aeroplane components are protected;
- Wheels travel along aeroplane longitudinal axis due to the shock absorber deflection should be as small as possible, moreover wheel track should be constant to avoid tires pull off.”

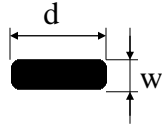
Cymerkiwicz





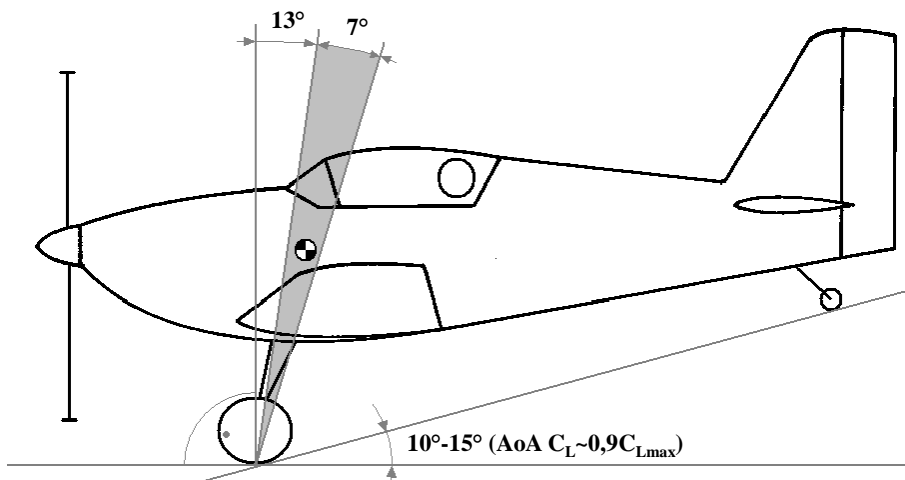


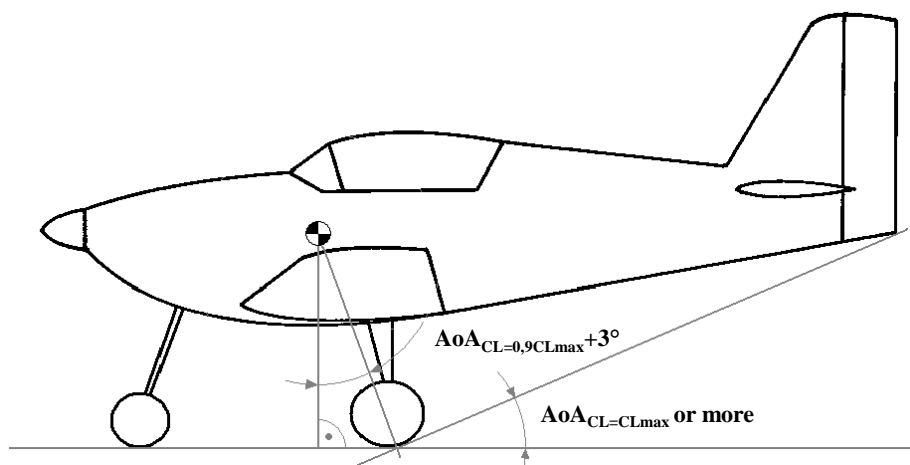
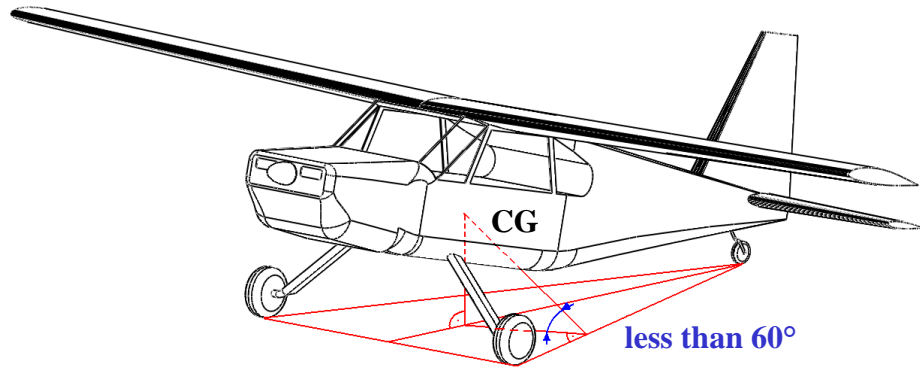
$$d = AW_m^B$$

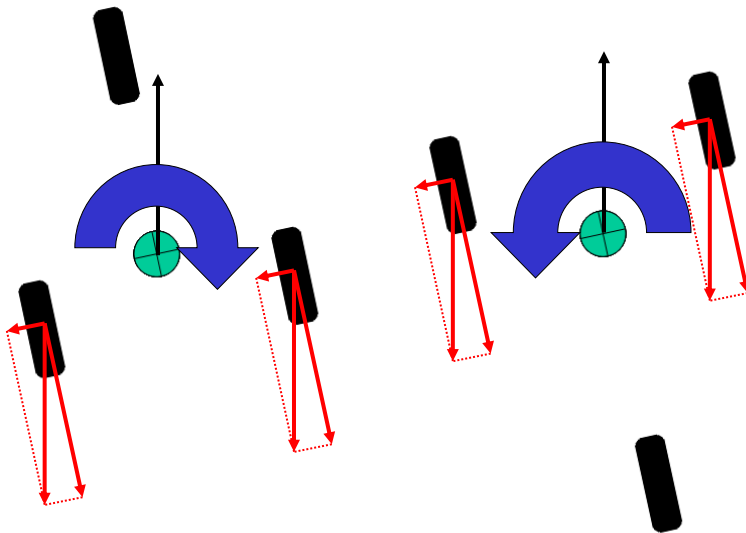
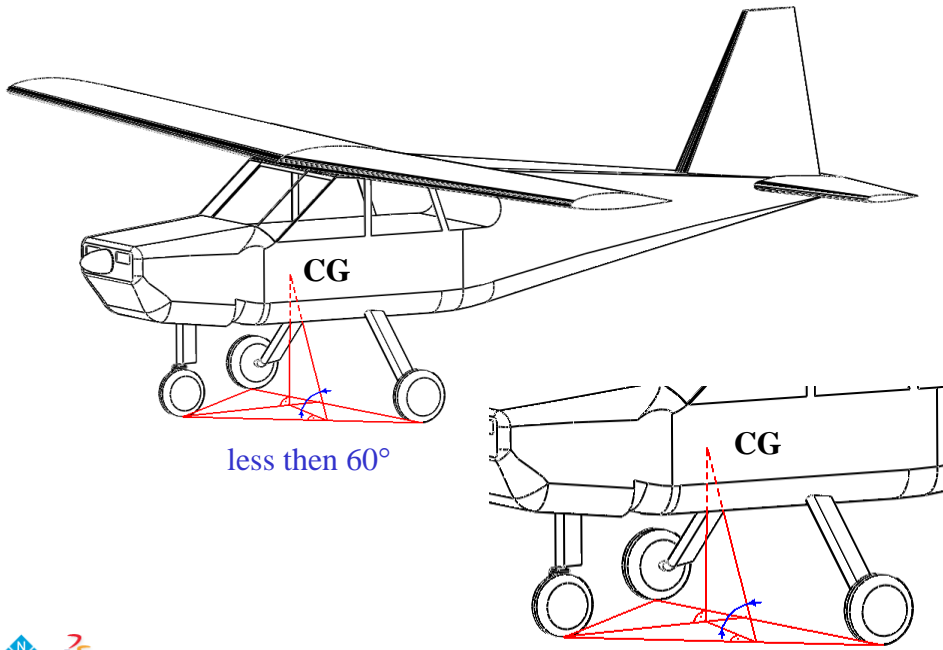


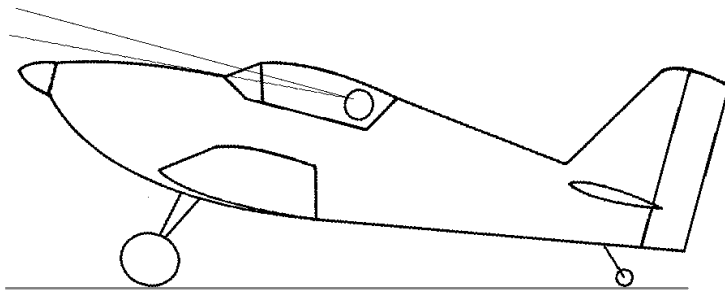
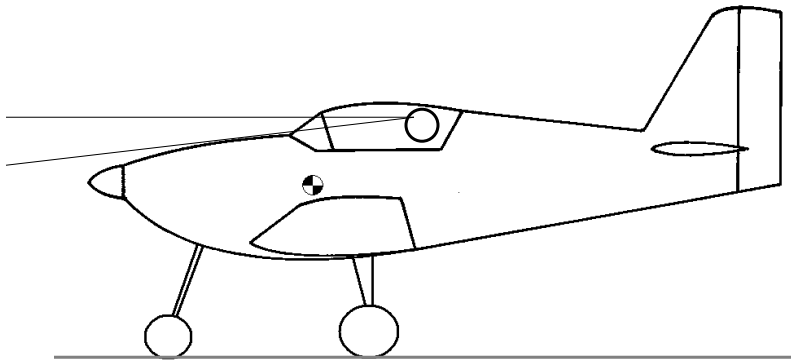
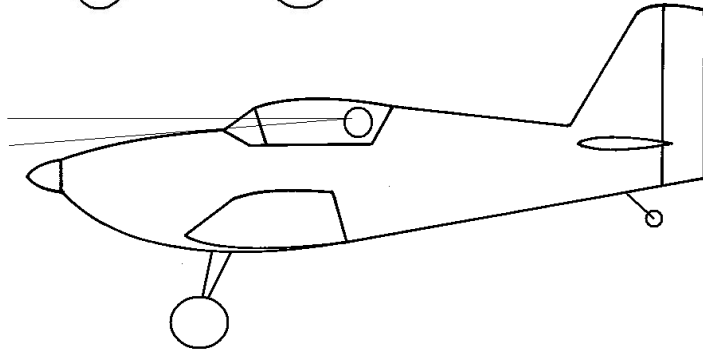
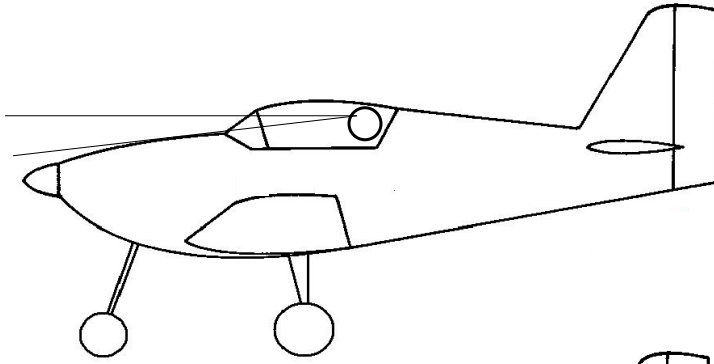
$$W_m = 0,9W_{TO}/N$$

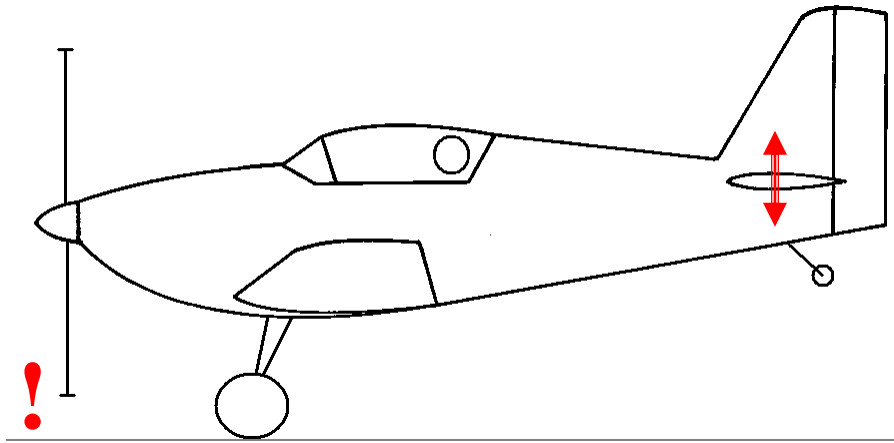
	d		w	
	A	B	A	B
General aviation	1.51	0.349	0.715	0.312
Business twin jet	2.69	0.251	1.17	0.216
Transport / bomber	1.63	0.315	0.104	0.48
Jet fighter / trainer	1.59	0.302	0.098	0.467



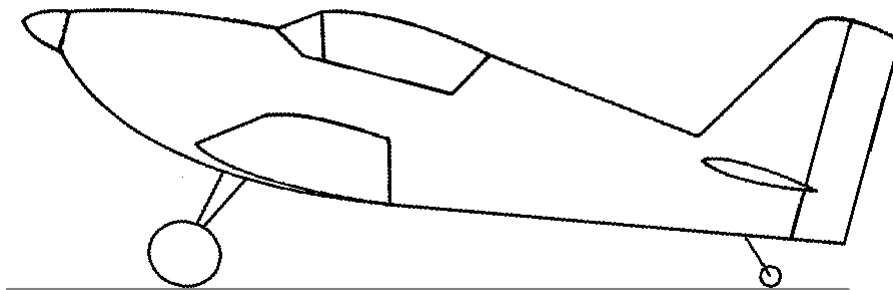




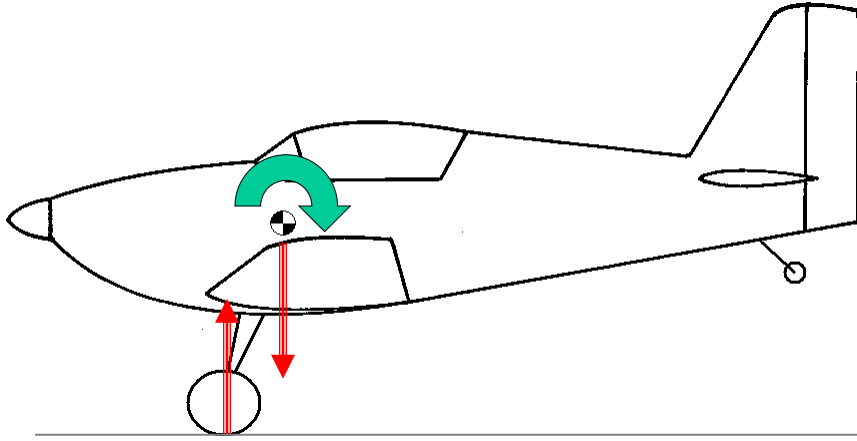




„three-point landing”

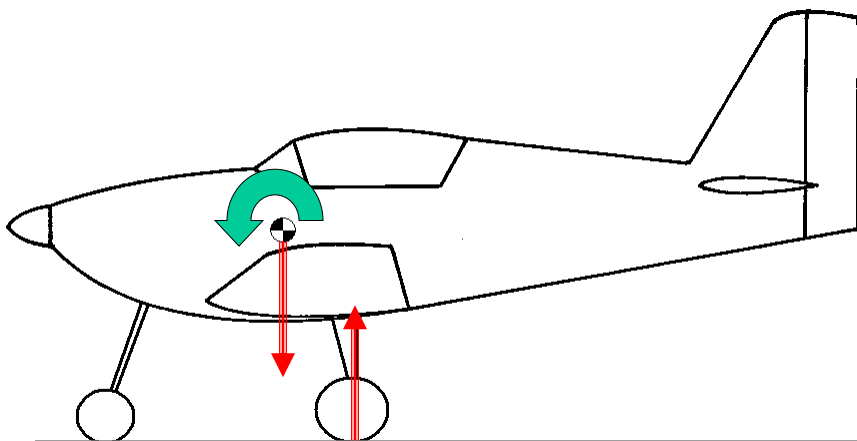


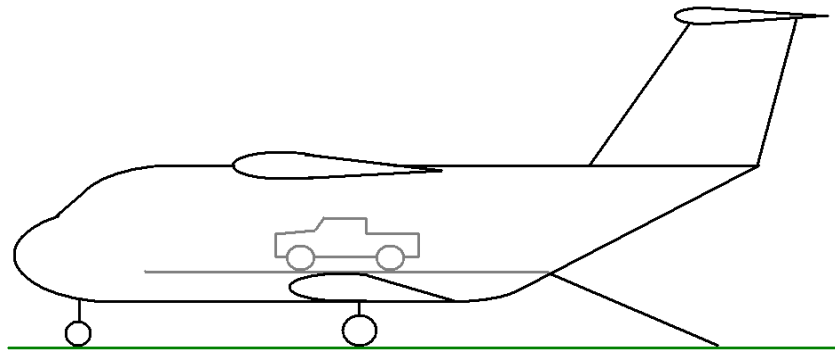
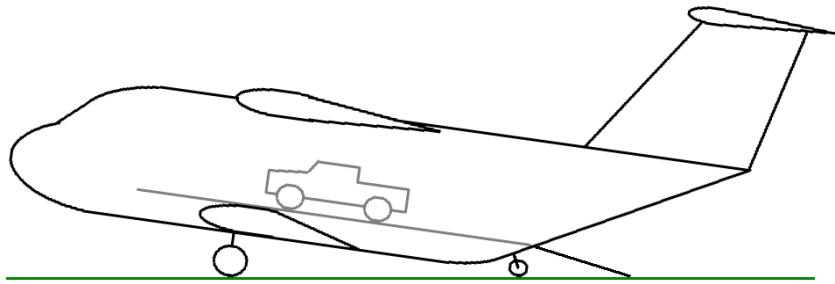
Overspeed landing



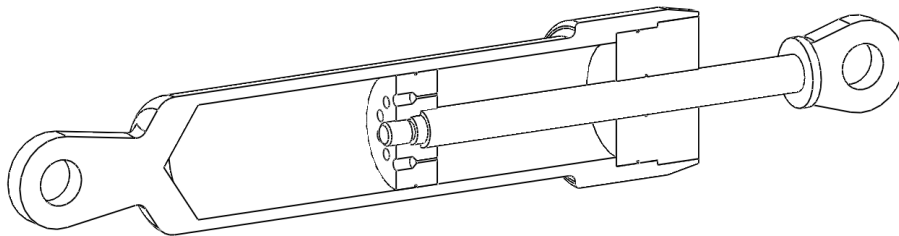
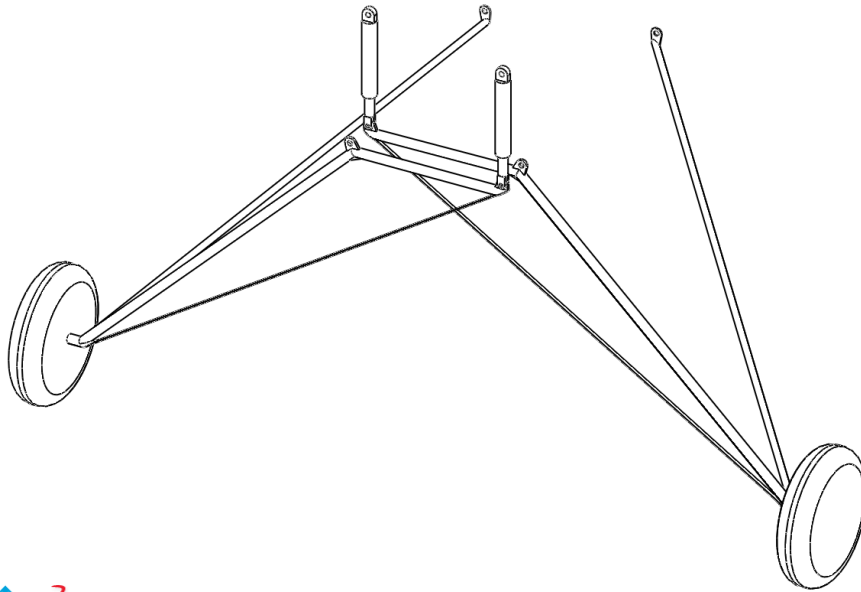
AoA increase → „bouncing”

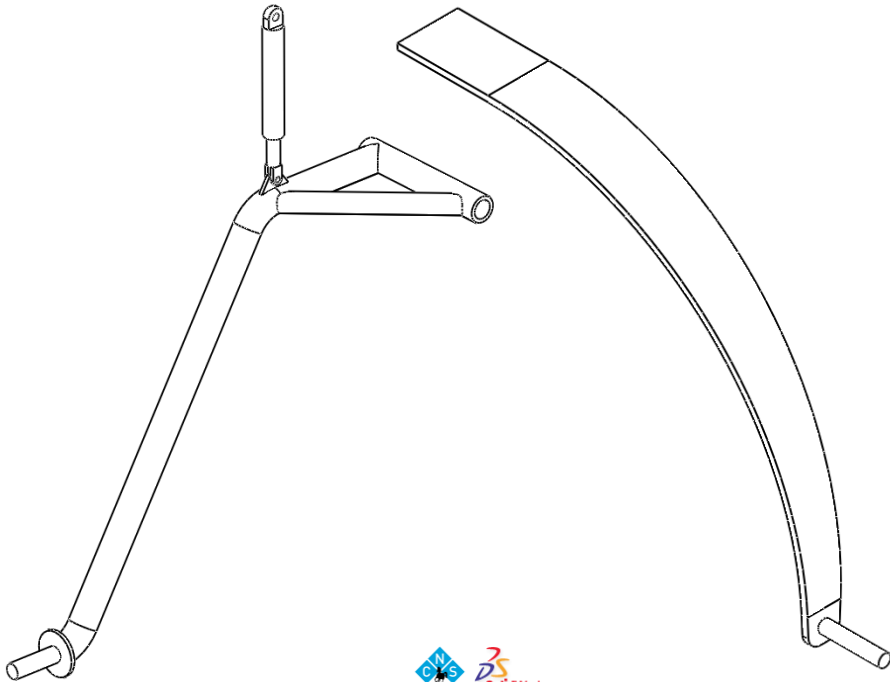
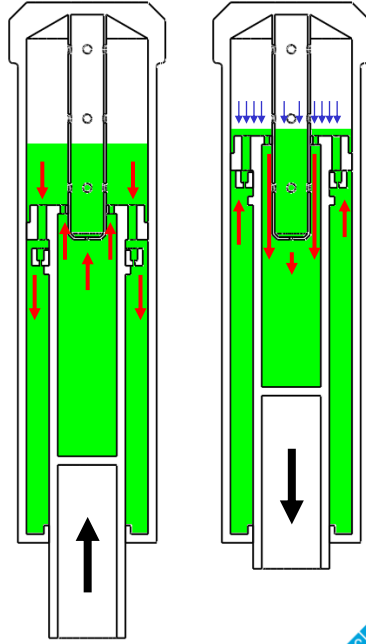
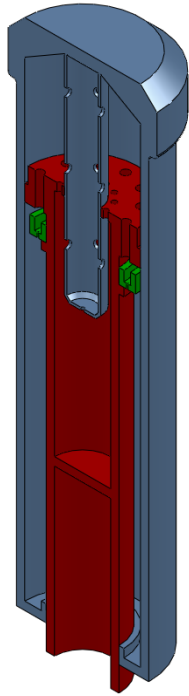
Overspeed landing

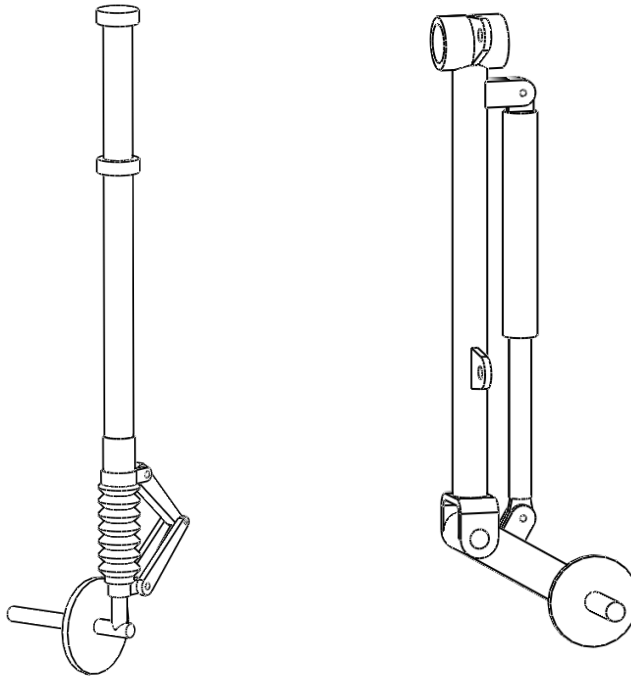




Feature \ Configuration	Nose wheel	Tail wheel
Drag	-	+
Weight	-	+
Retraction	-	+
Turnover	+	-
Bouncing	+	-
Stability	+	-
Controllability	-	+
Takeoff	+	-
Boarding	+	-
Visibility	+	-
Soft terrain	-	+







Retractable landing gear

Requirements:

- „Retraction time should not be excessive (6-12s in general aircraft), extension time should be even shorter.
- Mechanism should be as reliable as possible. Moreover redundant mechanism extending landing gear should be available in the case of primary mechanism failure.
- Landing gear should be mechanically locked in both terminal positions and secured against accidental retraction on the ground.
- Signaling clearly defining current landing gear position should be provided.”

Cymerkiwicz

