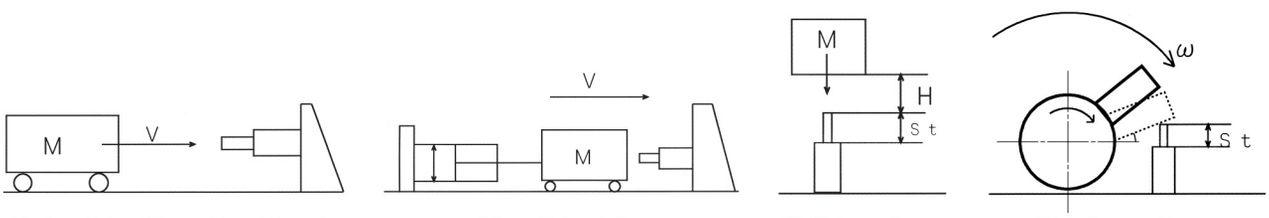
Selection Method for Soft Absorbers

1. Verifying the Type of Motion

Impact conditions can be divided into following categories. When making a selection, it is necessary to calculate the energy for the relevant category and then consider the attachment method.



Horizontal motion without thrust | Thrusting motion | Falling motion | Rotating motion

2. Energy Calculation

2-1. Linear motion

<Specifications to be verified>

Mass of the colliding object	: M (kg)
Impact rate	: V (m/s)
Thrust	: F (N) (air cylinder, thrust of the motor, friction, gravity, etc.)
Number of soft absorber receivers	: N
Falling height	: H (m) (Only if a falling motion is applicable. The soft absorber's stroke is not included.)
Soft absorber stroke	: St (m)

<Equations>

Horizontal motion without thrust	$E \quad \frac{1}{2} \quad M \quad V^2$
Thrusting motion	$E \quad \frac{1}{2} \quad M \quad V^2 \quad F \quad St$
Falling motion	$E \quad M \quad g \quad H \quad St$ (g: Acceleration due to gravity = 9.8m/s^2)

2-2. Rotating motion

<Specifications to be verified>

Mass of the colliding object	: M (kg)
Angular velocity of the impact	: (rad/s)
Torque	: T (N·m)
Moment of inertia	: I (kg·m^2)
Stopping angle	: (rad)

<Equations>

Thrusting motion	$E \quad \frac{1}{2} \quad I \quad ^2 \quad T$

2-3. Other equations (the following equations indicate the minimum values; the actual values will be larger)

Deceleration (G value)	G	$\frac{0.051 \quad V^2}{St}$	This indicates the degree of impact at the time of collision. (Smaller value means smaller impact)
Braking force	F	$\frac{E}{St}$	This indicates the resistance that is generated in the soft absorber at the moment of collision. This value is required for confirming the strength of attachment parts.
Braking time	t	$\frac{2 \quad St}{V}$	This indicates the time it takes for the colliding object to come to a complete stop after colliding with a soft absorber.