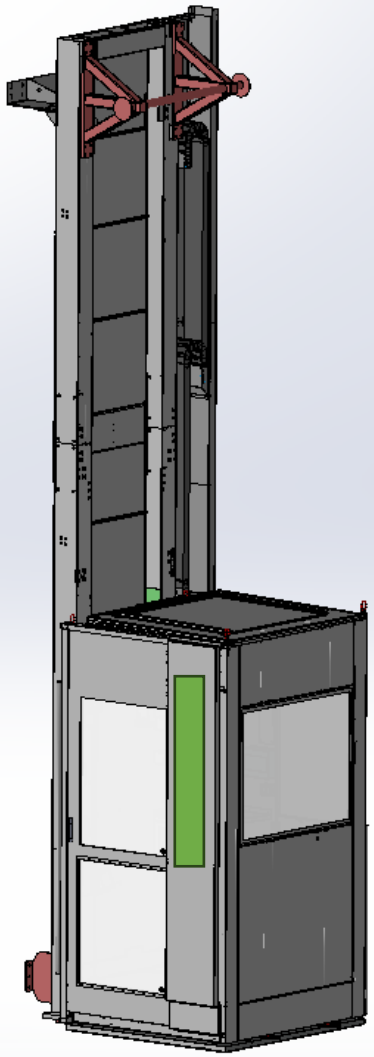
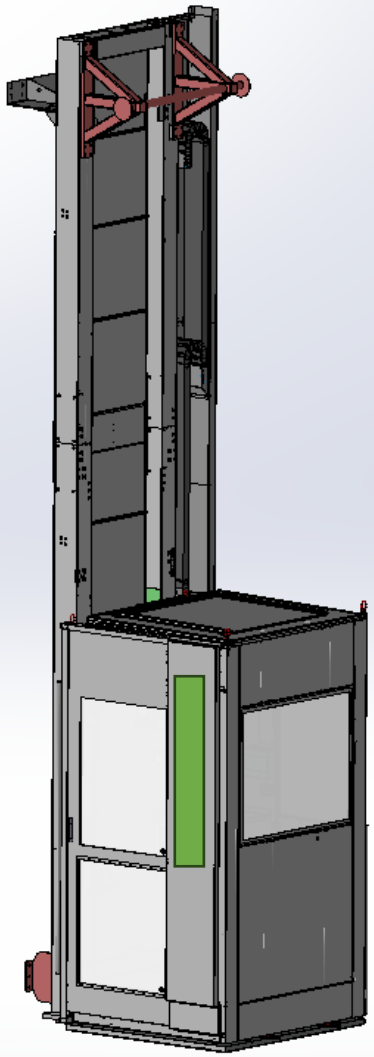


NEW CHAIN ELEVATOR
project feasibility analysis

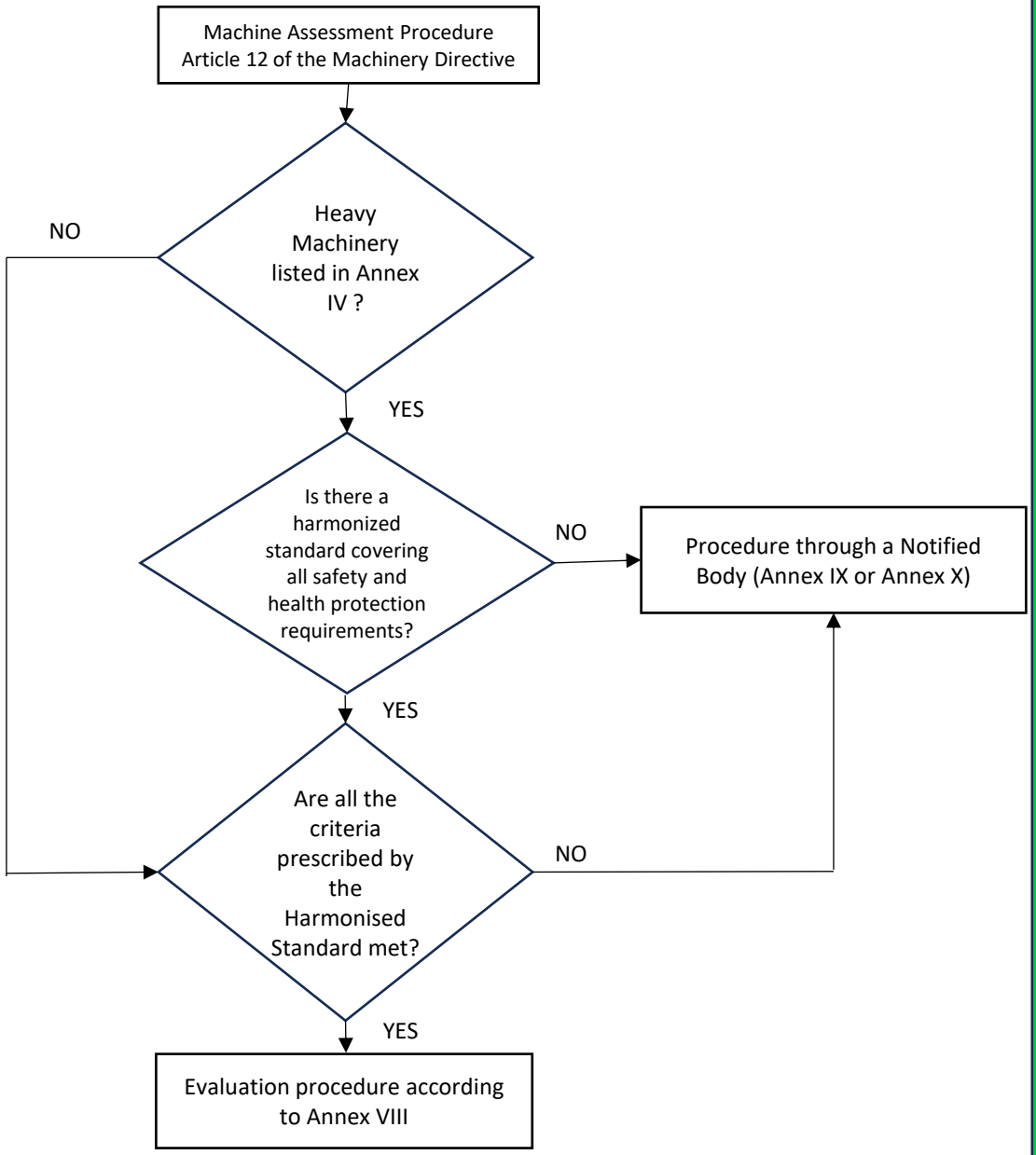


OBJECTIVES

1. Standardise the elevator
2. Eliminate height limits
3. Full compliance with the Harmonised Standards to avoid Notified Body

Oleodynamic Solution

Evaluation of Elevators according to the 'Machinery Directive'



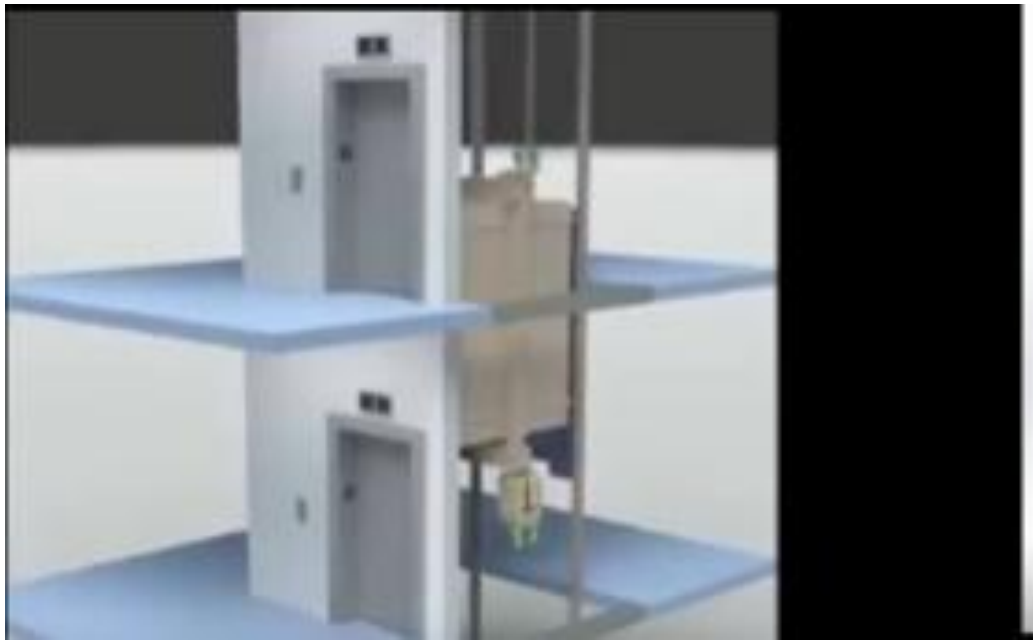
The Hydraulic System constructed according to the Lifts Norm

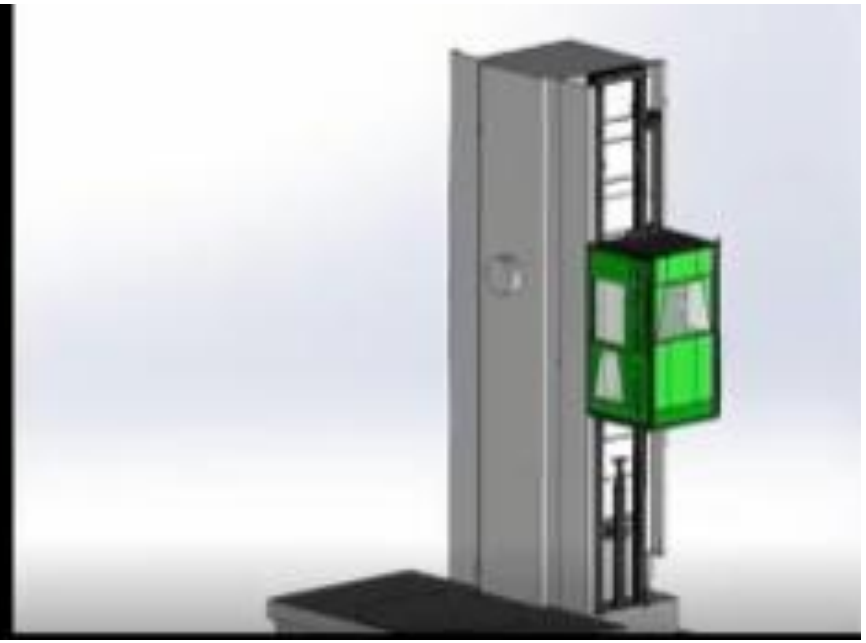
does NOT meet

all health and safety requirements

Notified Body

Lift Standard vs. Platform Elevator Standard

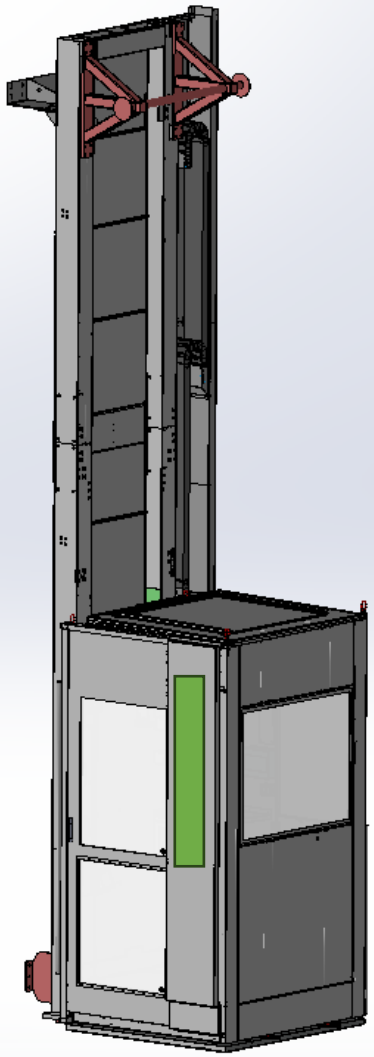




Lack of access to the floor:

Lifts (closed doors, direct access to the floor...) ➔ possible with emergency procedure

Plataform Elevators ➔ normal working condition



European Standard 14502-2:2008 - Platform Elevators

Binding aspects which are not fulfilled by the current lift system:

Art.5.6.1.5: it must not be possible to lower the elevator control unit using gravity alone

Art.5.6.1.6: it must not be possible to use counterweights for balancing the elevator control unit

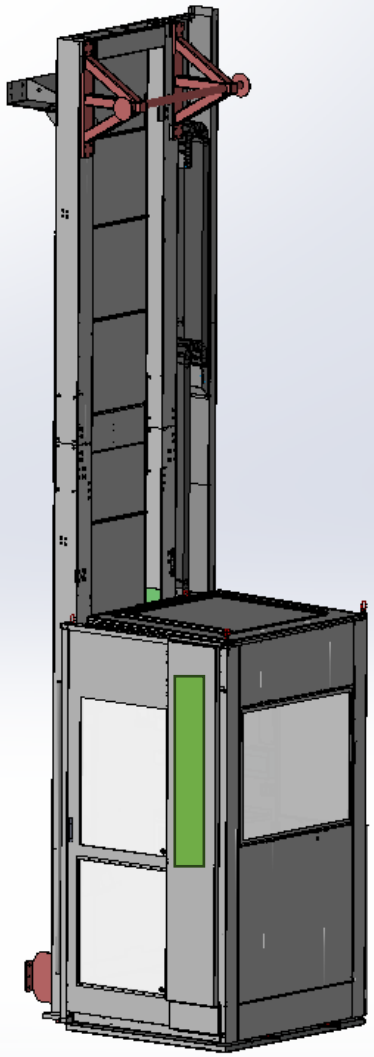
Art.5.6.6: hydraulic pistons [NO direct correspondence between civil and industrial elevators]

Art. 5.8.1.4: double limit switches

Appendix A - Safety Factors:

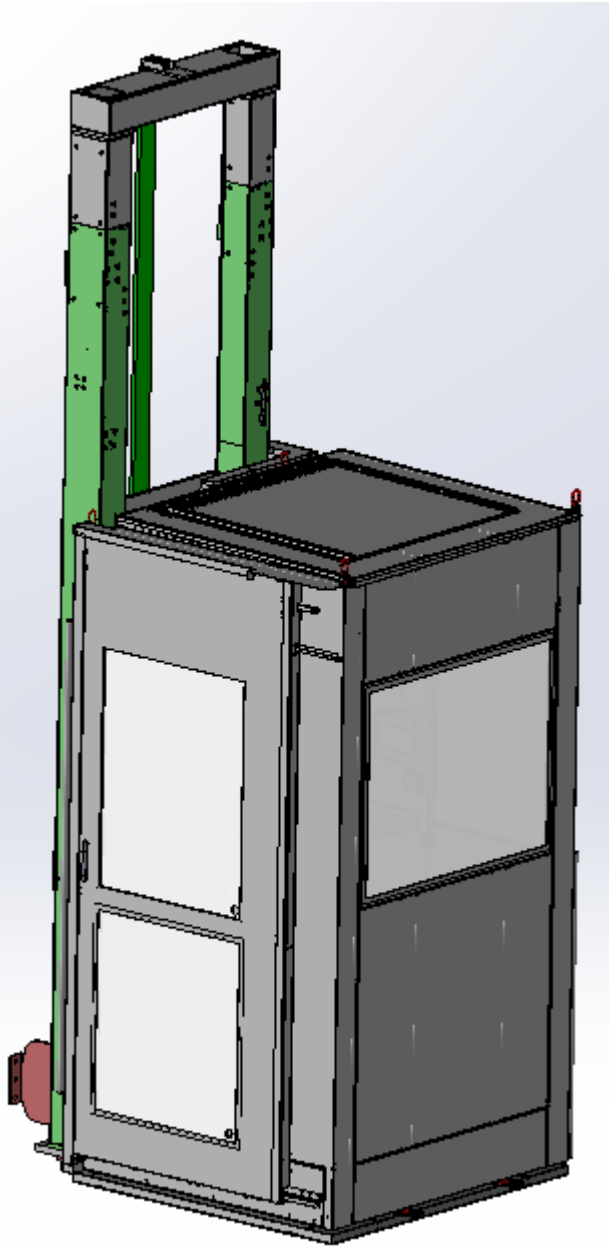
SF = 8 chains

SF = 10 cables



Alternative solutions analysed

1. Oleodynamic system (currently in use)
2. Cable system with winch at the top of the vertical frame
3. Winch cable system at the base of the lift
4. Rope system with winch on the bracket
5. Rack and pinion system
6. **Chain system**



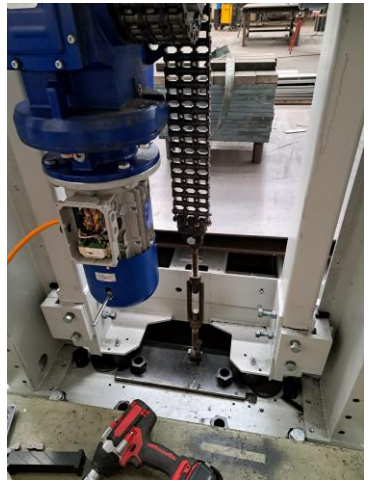
Chain System

Patented and Certified

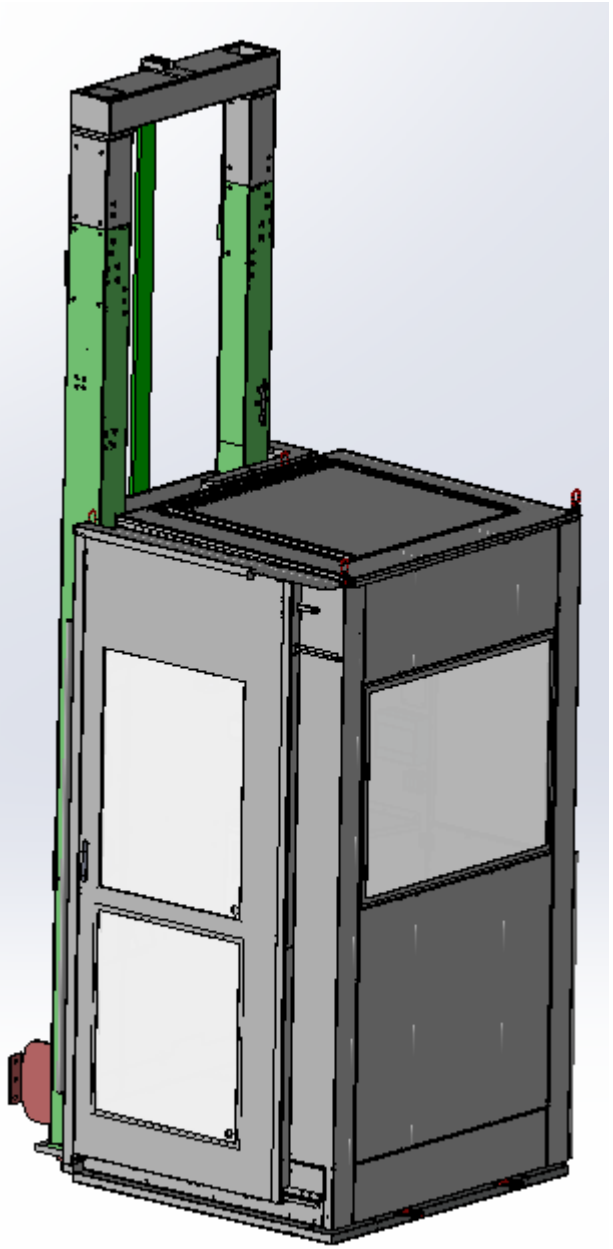
ADVANTAGES	DISADVANTAGES
Standardisation of installations	
No height limitation	
CE certificate can be provided	
Internal unlocking in cabin for the operator (*)	
Reduction of energy consumption from 3 kw to 2.2 kw	
Conformity with all harmonised standards	

(*) the motor is located directly on the bracket and is accessible to the operator by removing an insulated panel

Photos - Videos



Videos



Chain System - Details

- Possibility to maintain the current shape of the structure
- No need for counterweights
- Compliance with the required safety factor
- Compliance with harmonised standards
- Transition from project-based to scheduled production

Parachute system

Two clamps certified according to lift standard are located on the sides of the elevator and in contact with the vertical sliding guide, guaranteeing the locking of the system for a 3000 kg elevator with a sliding speed of 0.5 m/s

Unlocking of the system by the operator in the cabin

Directly in the cabin in case of power failure, by removing the engine cover panel, the operator has the option of gradually releasing the engine brake to lower the cabin (in case of an incorrect manoeuvre, the parachute would still be activated).

Elevator release system in the event of unintentional stop

The motor is of the self-braking type and is equipped with a lever which allows the manual release of the brake in case of unintentional stop of the load carrier during transport.

The manual lowering procedure must be carried out in accordance with the following instructions (given here on a preliminary basis):

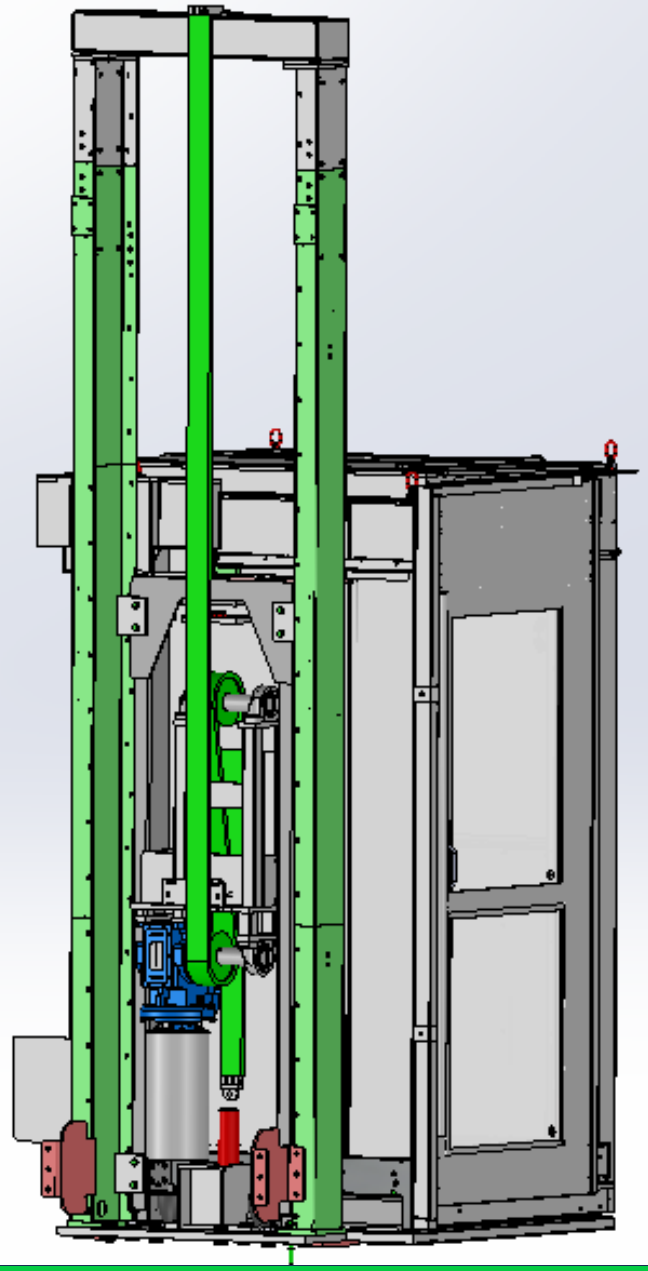
1 switch off the power supply via the main switch;

2 carefully operate the lever so that the load support is lowered in a controlled manner, without exceeding the normal operating speed, thus avoiding the intervention of the parachute;

3 lower the machine for short distances, pausing to prevent the brake from overheating;

4 return the release lever to its original position at the end of the emergency lowering.

The activity must be carried out by suitably trained personnel; in any case, the risk of involuntary movements will be limited by the parachute device, which may still intervene in the event of an incorrect manoeuvre.



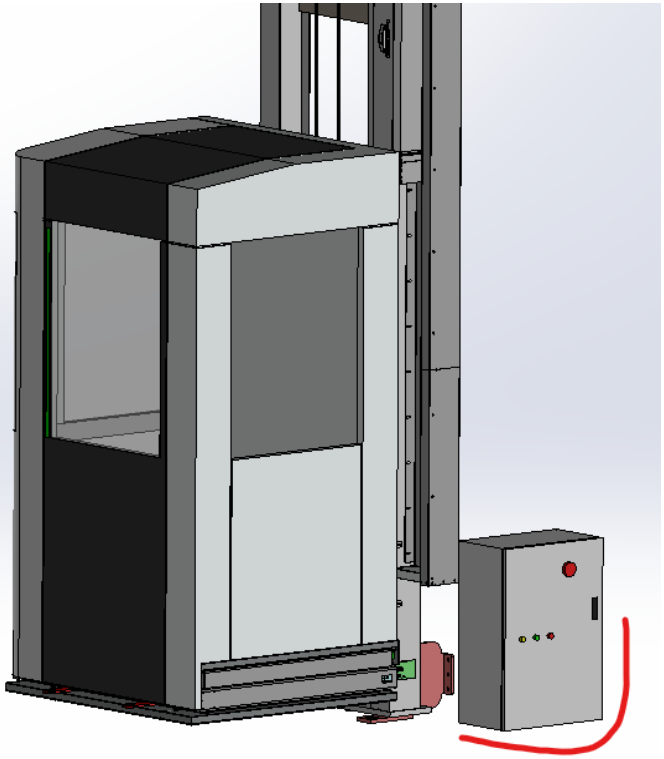
Motorisation

The motor is contained within the actual saddle support:

- Self-braking motor
- Gearbox
- Parachute system

The motor needs much less power than the current 3 kW (5.5 kW in some systems): less than 2.2 kW

CE certification



(optional)

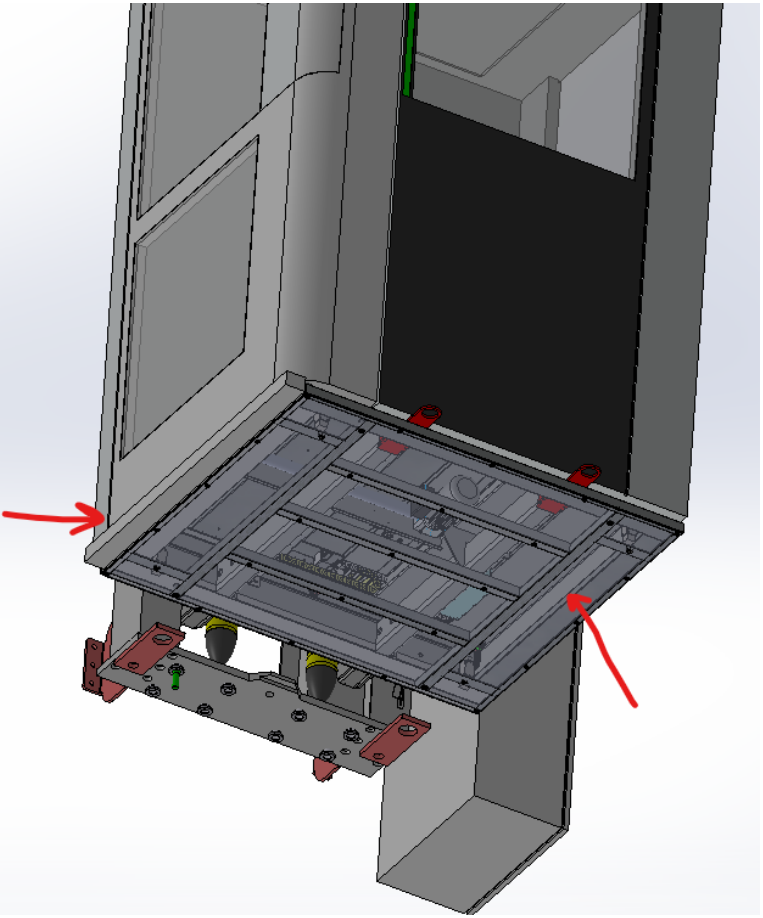
Thanks to its standardisation, the elevator can be equipped with its own CE type certificate.

This means that it is not necessary to apply for specific certification in accordance with point 17 of Annex IV of the Machinery Directive for ‘Devices for the lifting of persons... over 3 m’ through a Certification Body.

If this option is requested, an electrical panel will be built to separate the elevator from the rest of the machine as well as a simplified control panel in the cabin.

The panel located at the base of the column has the function of electrically supplying the elevator. It houses the power supply, the main electrical switch, a key-operated selector switch to give priority to the ground controls, pushbuttons for raising and lowering the platform and the emergency mushroom button. It is provided for the insertion of clean lubricants for signals from your panel to inhibit the operation of the elevator or to open doors in case of particular movements of the machine and output signals to send anomalies of the elevator to the machine logic.

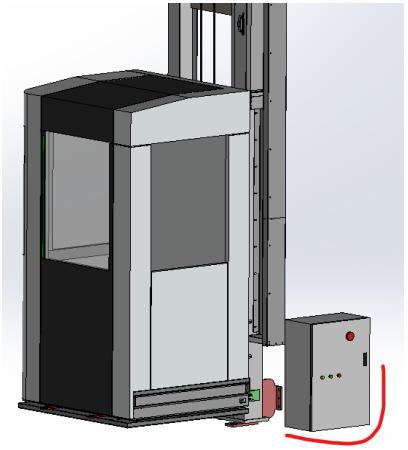
CE certification



(optional)

In case of certification, an anti-crushing sensor is mandatory for vertical lowering and highly recommended also for horizontal movement [EN 14502-2 Art. 5.5.4]..

Operating logic



The elevator is equipped with control buttons in the operator's cabin and also on the control panel of the fixed part.

By means of the key switch on the main control panel, the controls on both sides are activated.

Up and down:

the up and down movements are controlled by inverters to allow ramps and decelerations.

The cabin can only be raised if:

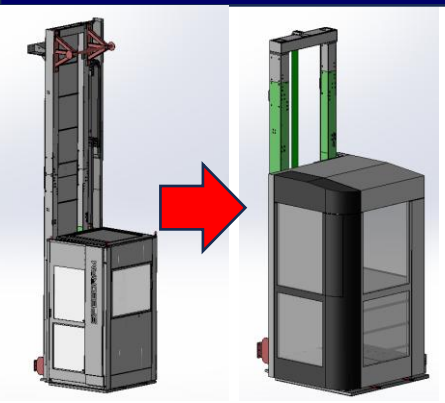
- the high limit switch of the car is at rest;
- the movement is enabled from the outside;
- the cabin transfer has returned.

The cabin can only be lowered if:

- the cabin low limit switch is at rest;
- the anti-repetition limit switches are at rest;
- the movement is enabled from the outside;
- the cabin transfer has returned.

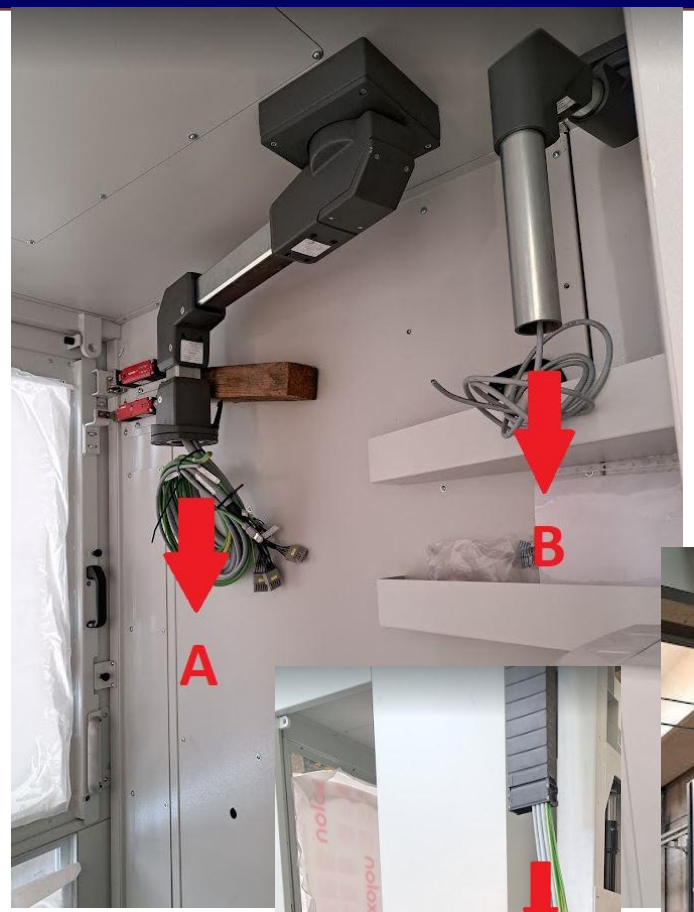
Cabin transfer:
cabin transfer movements are controlled by a reversible starter with direct motor drive.
The cabin can only be moved to the outside if:
- the cabin outward travel limit switch is at rest;
- the cabin pull-out limit switch is at rest;
- enabling movement from the outside.

The cabin can only be moved from the inside if:
- the cabin internal limit switch is at rest;
- enabling movement from the outside.



Chain vs. Hydraulic System

ADVANTAGES	DISADVANTAGES
Standardisation of installations - Scheduled production : - cost reduction - reduction of delivery times - reduction of production errors	
Full conformity with harmonised standards	
CE certificate can be provided	
In-cabin unlocking by the operator without the need for additional hydraulic cables	
Reduction of energy consumption from 3 - 5 kw to 2.2 kw	
Conservation of the current project [keeping the same fixed structure already existing]	
No height limits	
Installation only by means of mechanical connection to rails and panel connection by means of connector [no wiring of hydraulic and electrical control unit necessary]	
Reduced training of maintenance technicians [maintenance is done by electronic and mechanical technicians, no need for plumbing technicians]	
Predisposition for mounting a device on top of the system to facilitate special maintenance	



Complete wiring

- The system is fully wired:

  - cabin-support-structure.

- Components and cables can be purchased directly or supplied by the customer under agreement.
- The customer is responsible for the wiring of:

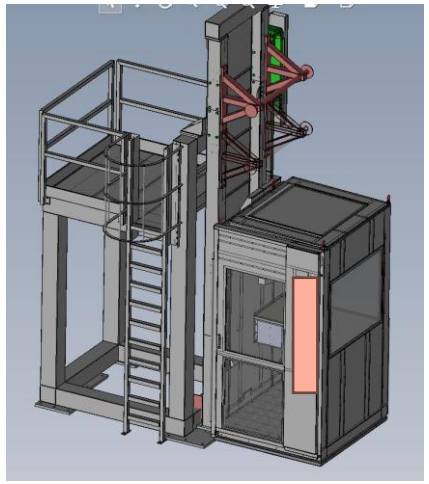
  - the control panel (A);

  - any additional monitors (B);

  - the output cables from the cable duct to the junction box of your installation (C) - Quasi Machine;

  - connection of the control panel to the Tool Machine Panel – CE.

- The internal wiring, sensors and handling components are already prepared and calibrated.



Elevator Test Tower

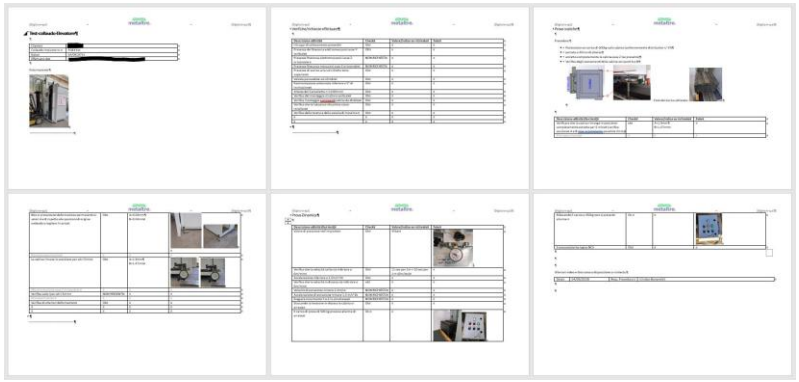
- Before shipment, the elevator is tested in a special test tower, which allows:
  - the static verification of the preservation of the position;
  - the verification of the load alarms;
  - the verification of the vertical and the horizontal sliding speed;
  - the verification of the structural deflection;
  - the complete wiring of structure and cabin.

Speed control

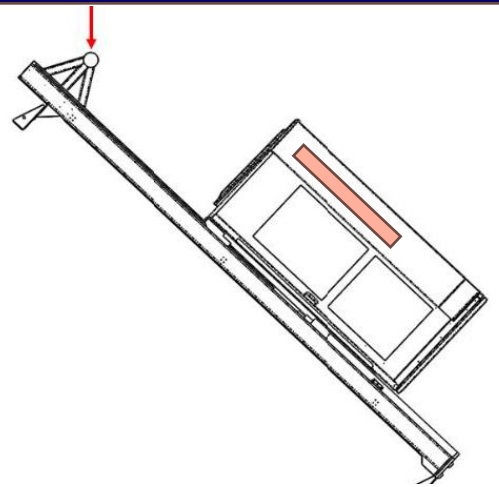
Flexion control

Load tests

Internal verification of alarms and correct wiring

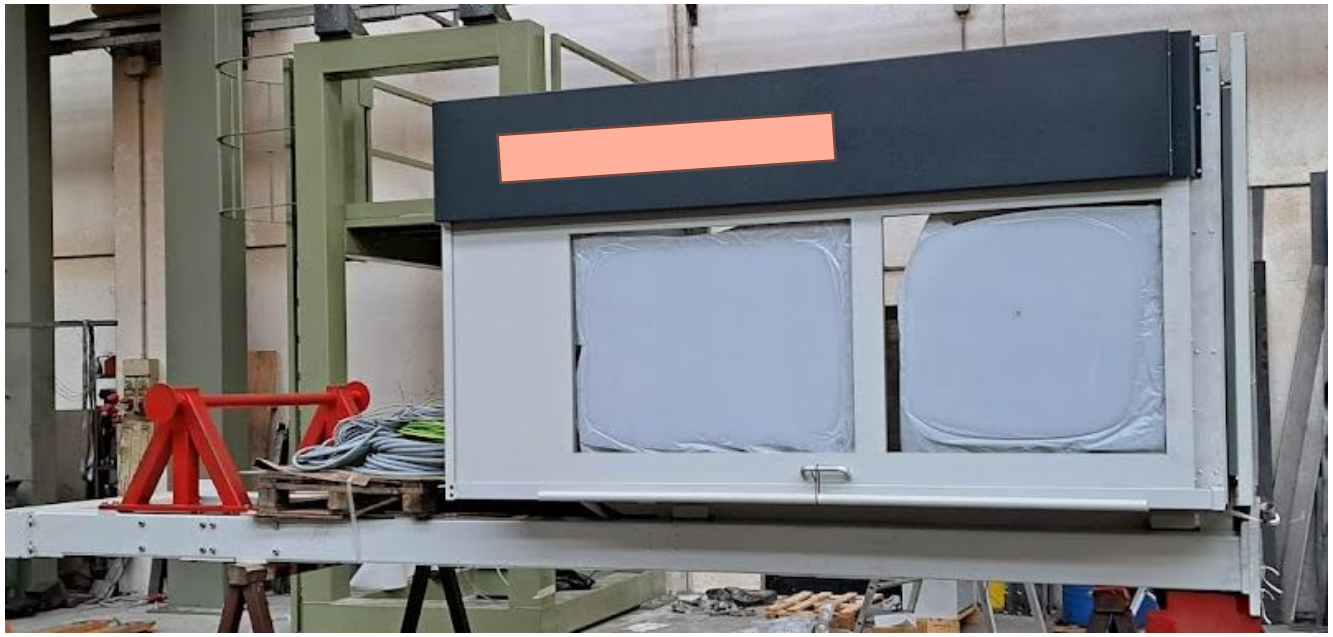


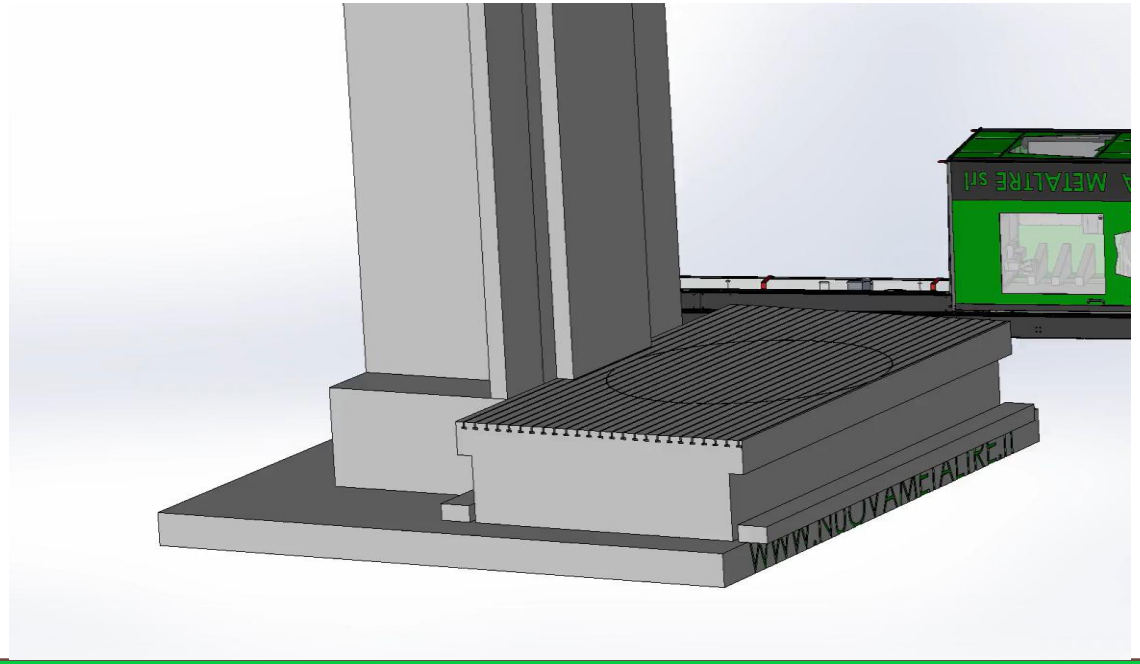
Verification report attached



Handling - Transport

- The installation is shipped in horizontal position and ready to be lifted and fixed to the machine tool with a single crane pull.





Personalisation of the Elevator

Thanks to its compact dimensions, the new chain system can be used in all existing installations without changing the existing design, while maintaining the guides and the aesthetic appearance of the cabin.

?

YOUR Company Solution:

New Technology, Same Project

Normative Security