

Note of compliance to the NF P93-520 norm



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1. **Procedural requirement** (extract from the NF P93-520 norm from the 11/97)

The manufacturer, importer or supplier, who by selling his product refers himself to the present document or to a text making a reference to one of his articles, must be able to provide to his customer the elements capable of justifying that the normative prescriptions have been respected.

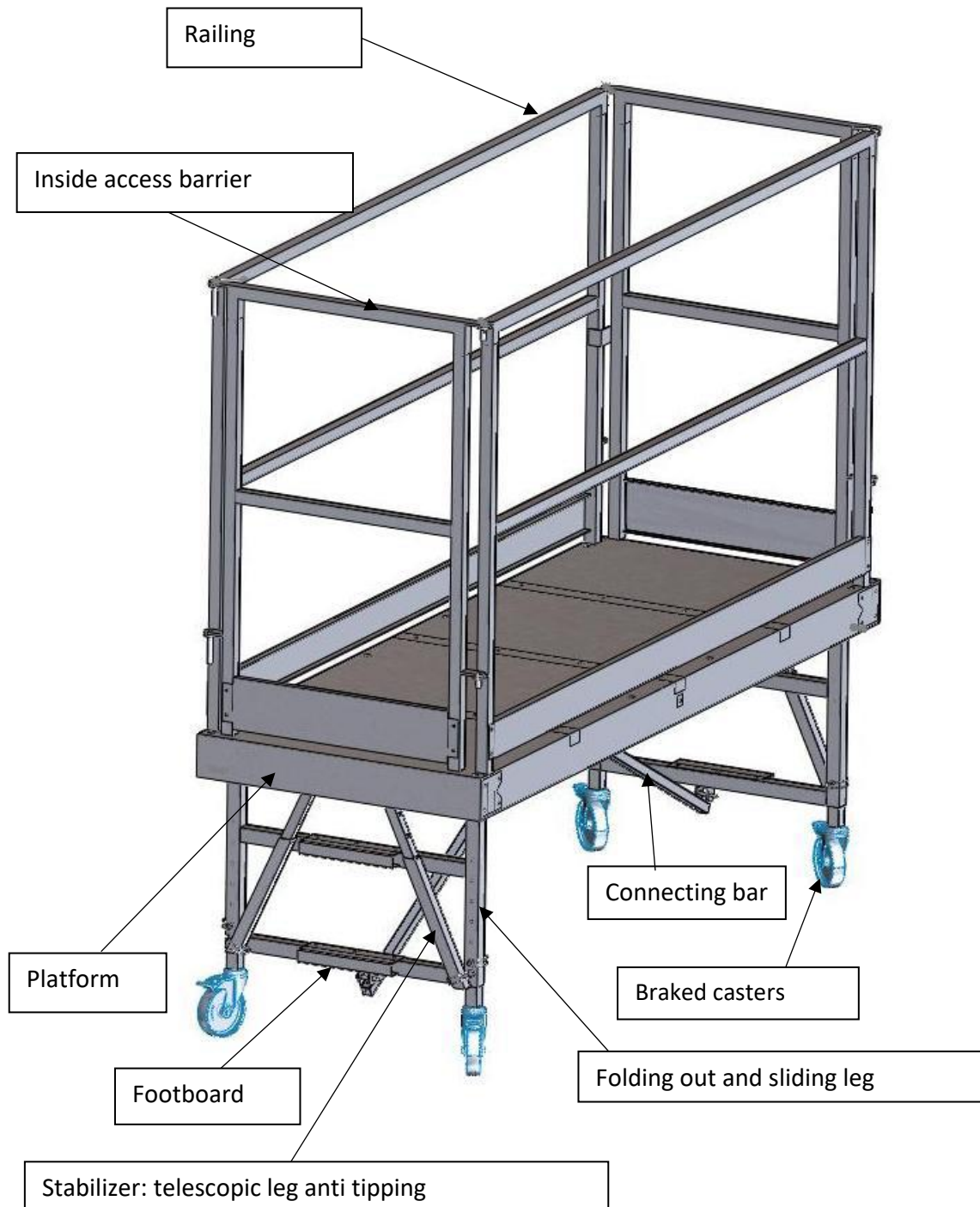
2. **Scope of application**

The objective of the present document is to define and validate the conception and minimal characteristics of the TSCR product in order to validate:

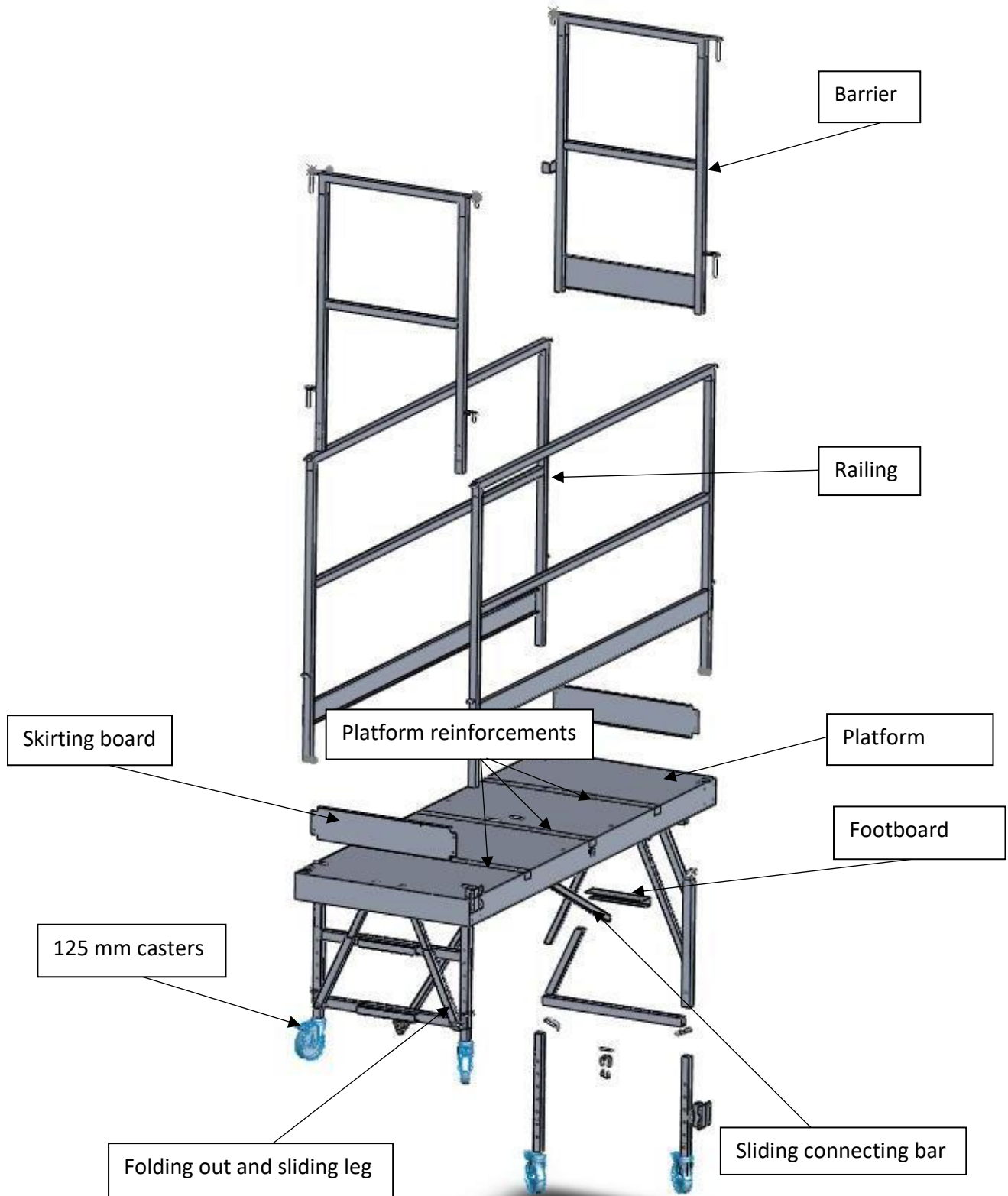
- its resistance
- its distortion
- its stability

The TSCR equipment is, as described in the linked instruction manual:

- can be moved manually on a firm and leveled ground
- has its dimensions fixed upon conception
- is self-balanced
- presents only one work plate by module, height adjustable
- is equipped with 4 braked casters
- reaches a maximal height of work defined between 2500 and 3000 mm
- reaches a setting height between 700 and 998 mm.



Assembled view of the platform



Exploded view of the platform

3. Definitions

3.1.Height

The maximal height of work of the equipment is defined between 2500 and 3000 mm.

The maximal setting height of the equipment is defined between 700 and 998 mm.

3.2.Casters:

The equipment is furnished with 4 rotating braked casters without any risk of accidental disassembly.

3.3.Adjustable legs:

The adjustable legs integrated to the structure allow a height adjustment.

3.4.Articulated base plate:

Non applicable.

3.5.Floor:

The floor is composed of one or several platforms constituting a work surface.

3.6.Pole and upright:

Non applicable.

3.7.Stringers and cross-members:

The equipment includes horizontal load bearing elements.

3.8.Horizontal framework:

The equipment includes a flat rigid horizontal structure.

3.9.Vertical framework:

Non applicable.

3.10. Bracing:

Non applicable.

3.11. Stabilizer:

Stabilizers are integrated to the equipment in order to widen the sustentation polygon and to control tipping.

3.12. Angle:

The equipment includes a step on its width destined to access the work platform.

4. Measurements

The useful width in-between skirting board is superior to 0.45m.

The floor length of a module is inferior to 2.50m.

5. Requirements regarding materials

5.1. Steel:

The steels that are used on the load bearing elements of the equipment are chosen amongst the S235 shades minimum and are compliant with the NF EN 10219-1 and 2 norms. Certificates of conformity are associated to the provisioning of the steels.

The thickness used for the tubes are ≥ 1.3 mm.

5.2. Aluminum alloys:

The aluminum alloys that are used on the load bearing elements of the equipment are chosen amongst the 6060 T6 shades and are compliant with the EN 755-2 index 50-630-2 norm. A requirement is specified on the order form to insure the yield point $R_{p0.2} \geq 180$ MPa and $A\% > 8\%$. Certificates of conformity are associated to the provisioning of the aluminums.

The thickness used for the tubes are ≥ 1.5 mm.

6. Construction layouts

6.1. Floor

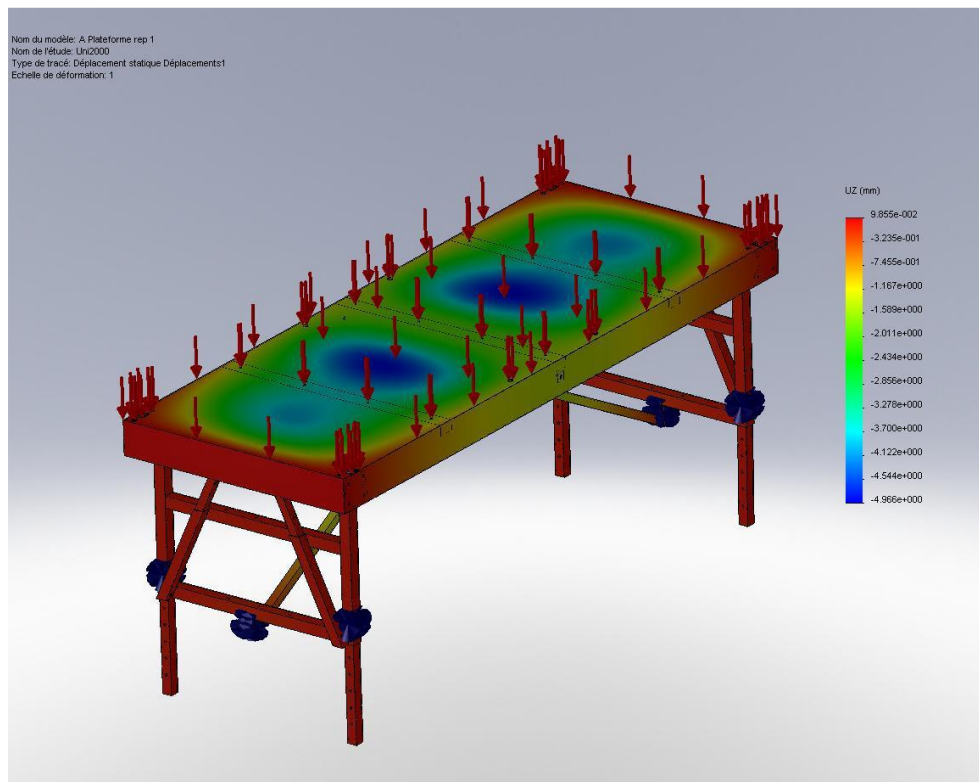
- Checking of the deflection under an effort :

The compliance to this requirement is validated by finite element calculation thanks to the help of the COSMOS calculation code associated to SOLIDWORKS. The data stated in the « maximum deflection » line are derived from these calculations:

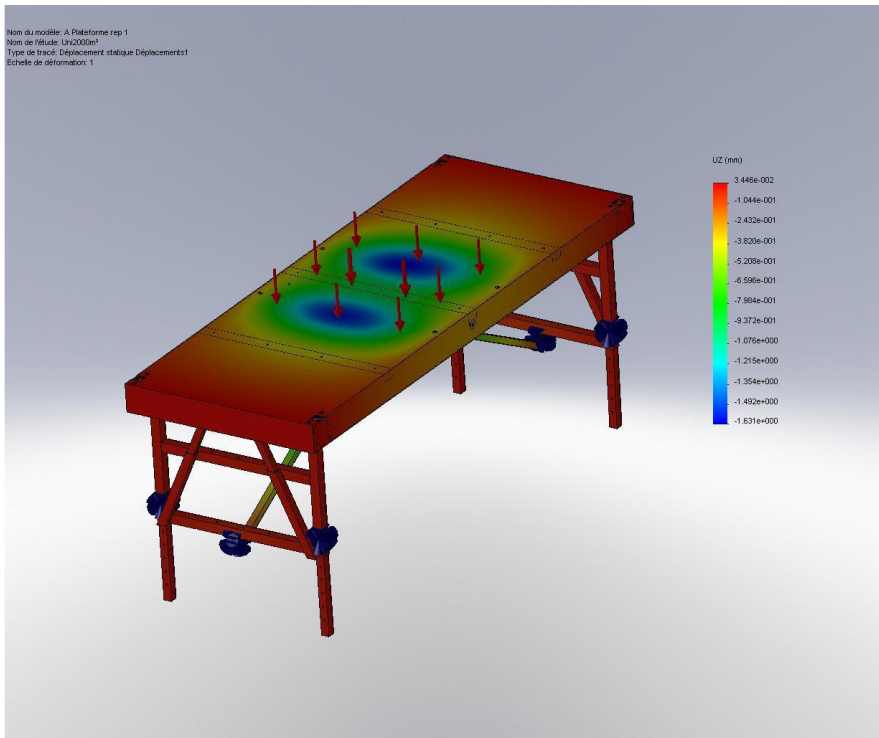
Loading graph:

Category	Uniform load	Distributed load 500x500mm	Distributed load 200x200mm
3	2000 N/m ²	1500 daN	1000 N
MAXIMUM deflection	6 mm	1.6 mm	2.5 mm
1/100 floor spans	19.91 mm	19.91 mm	19.91 mm

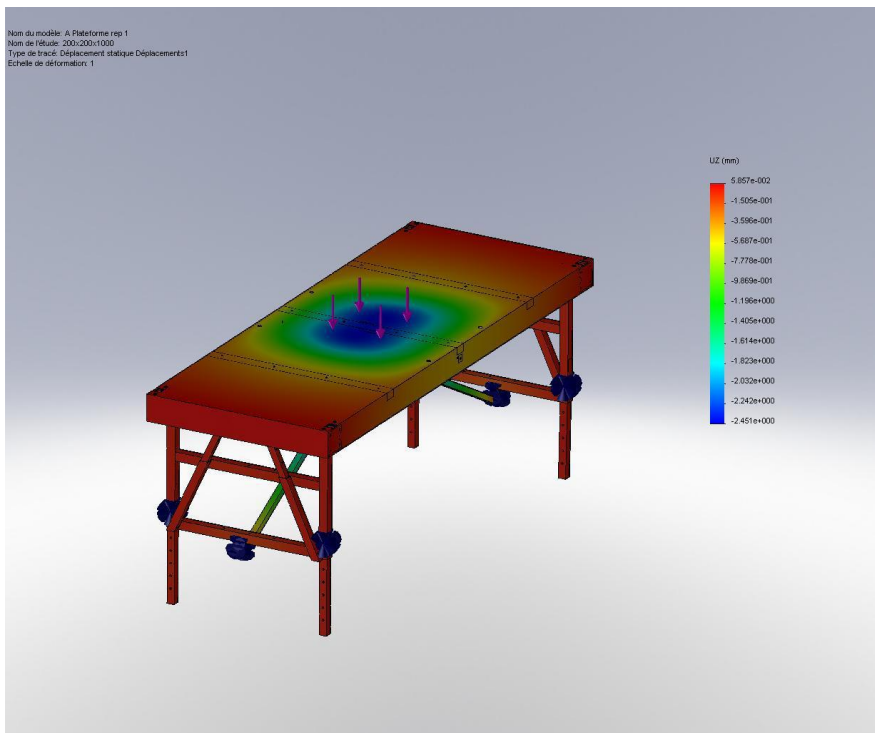
Maximum distortions calculated are inferior to 1/100 of the floor spans.



Uniform load 200 N/m²



Distributed load 500x500: 1500 N



Distributed load 200x200: 1000 N

- Constituents of the floor:

The floor is constituted with an aluminum sheet, relief printed of a non-slip floor (non-slip aluminum 2 x 3.3).

The floor is an integrated part of the bearing structure.

During the assembling of several modules, S235 steel connection components insure the rigidity of the set.

The floor does not include any opening of more than 25mm of width.

6.2. Access to the floor

Taking into account its conception, the access to the platform is on the smallest width of the equipment; thanks to bars mounted on the load bearing legs, which insures stability upon usage. Ground range on the first step is inferior to 400mm.

6.2.1. Inside access:

Non applicable.

6.2.2. Outside access:

Thanks to the access being on the smallest width of the platform, the conditions of stability of the equipment are insured.

The access door opens inwards the platform.

Access to the floor is empty on a minimal width of 0.40m.

6.2.3. Ladder:

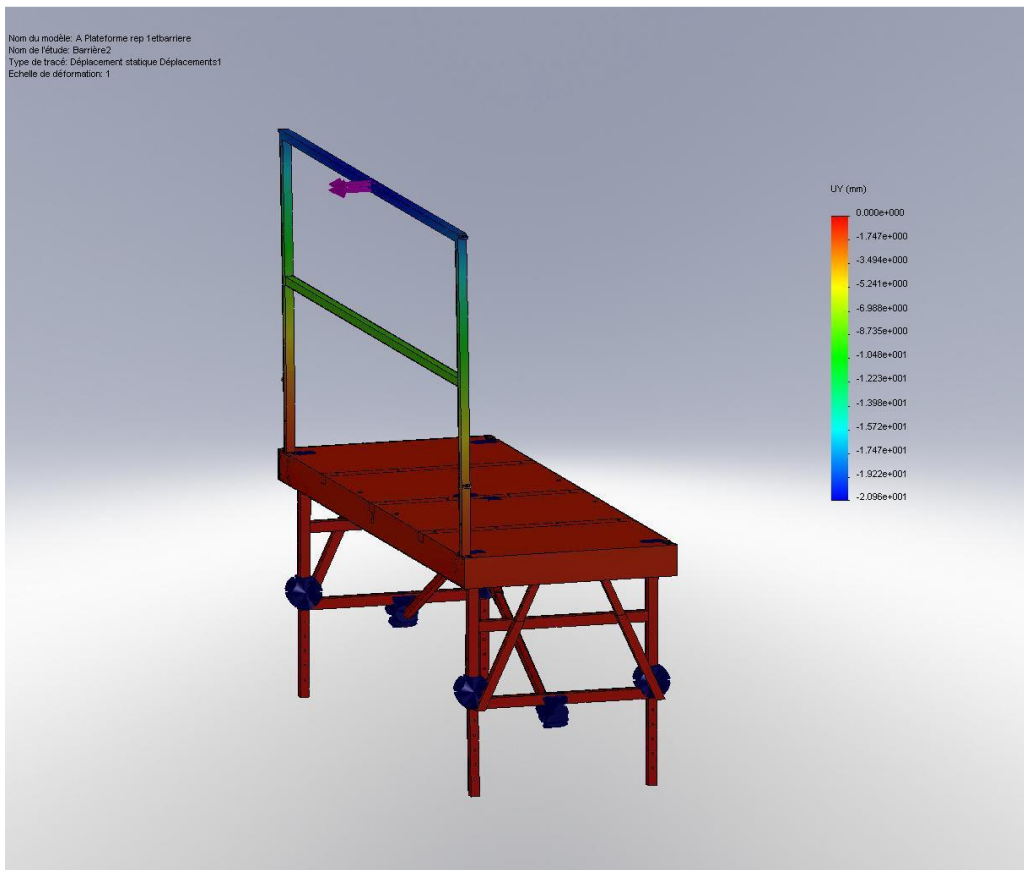
Non applicable.

6.3. Floor protection

The protection of the floor against falls from heights is insured thanks to a system of railing and skirting boards in compliance with the current regulation.

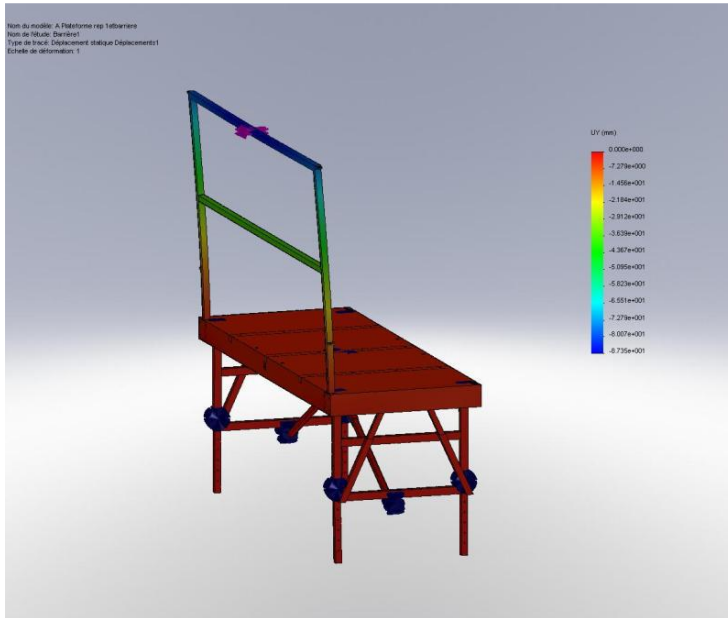
- Railing resistance:

a) The elastic arrow under a point load of 300 N applied horizontally is inferior to 35mm:

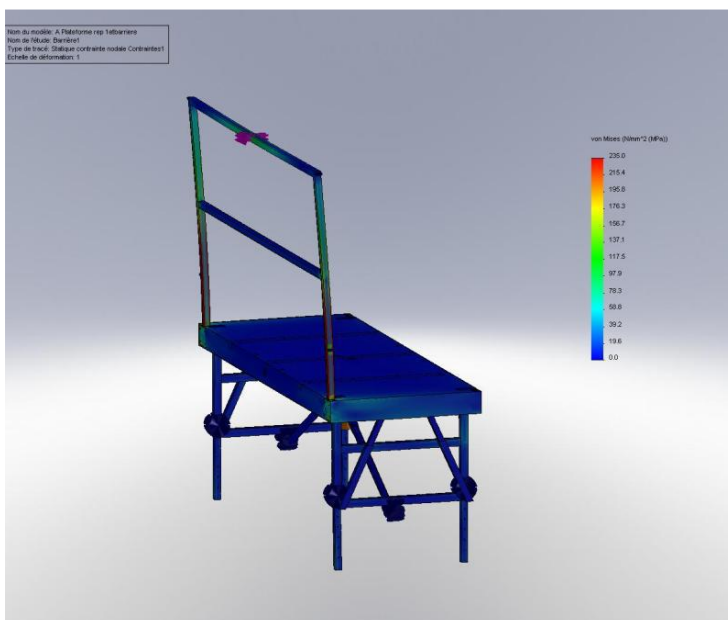


Distortion under an effort of 300 N: maximum displacement is of 21mm.

b) Displacement in every location in relation to the initial position does not exceed 200mm for a point load of 1500N applied vertically without break or disassembly:



Distortion under an effort of 1500 N: maximum displacement is of 87mm.



Constraints under an effort of 1500N: no critical area

6.4. Casters

The system is equipped with 4 rotating braked casters. The minimal diameter of the casters used is of 125mm. Braking provokes blockage of rotation and swiveling of the caster. Each caster can withstand a dynamic charge of 110daN or a total of 440daN for the 4 casters, which is equal to 2.2 times the nominal charge.

The casters used are in compliance with the DIN EN 12530 norm and to the tests described in the EN 12527 norm.

6.5. Stabilizer means

Means of stabilization are an integrated part of the structure and are equipped with adjustment systems insuring contact with the ground; these means allow to transmit the efforts of the structure to the ground.

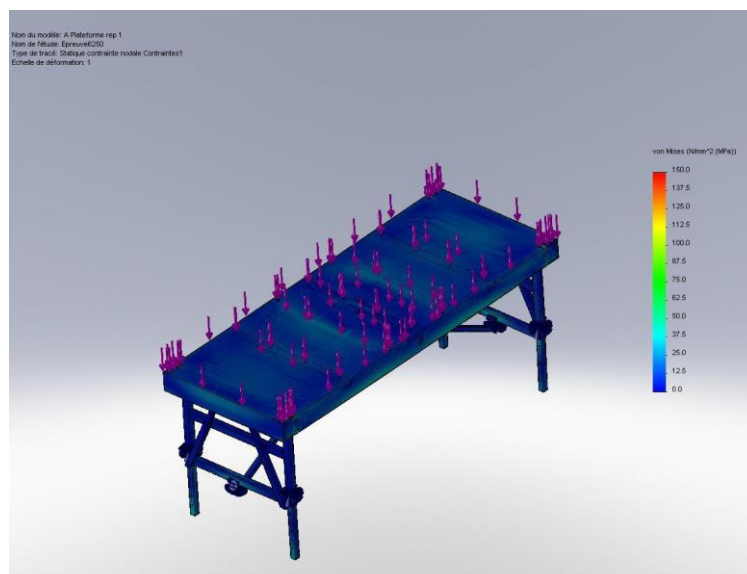
The calculations and tipping tests were realized with a safety factor of 1.5 for an horizontal effort of 30daN applied to the level of the floor (or an effort of 45daN).

The nacelle did not tip over during this test.

6.6. Overall strength resistance of the mounted assembly

6.6.1. A platform

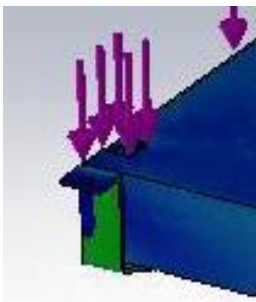
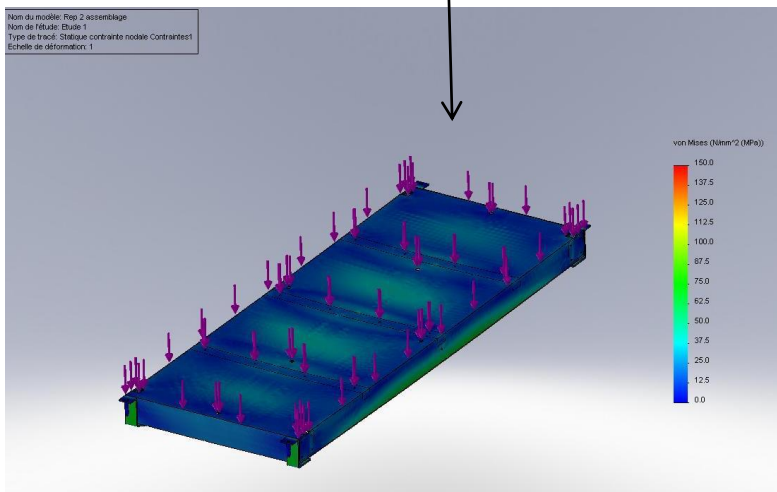
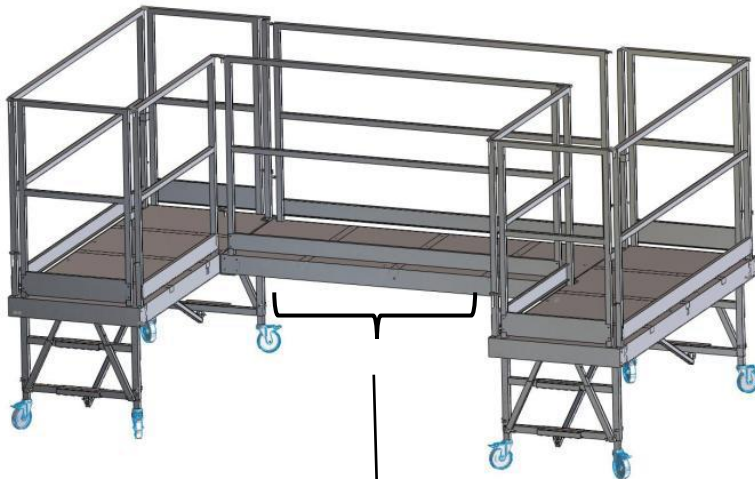
The mounted assembly resists to a load 2.5 times heavier than the service load ($2.5 \times 2500 = 6250\text{N}$) evenly distributed on the floor surface.



No exceedance of the elastic limit of the material for a load of 6250N.

6.6.2. Hooks provided intermediate platform resistance:

(evenly distributed load of 6250N)



No exceedance of the elastic limit of the material for a load of 6250N.

7. Tests:

Accuracy for the efforts: + - 1%

Accuracy for the displacements: + - 0.1 mm

Specific means for the tipping test:

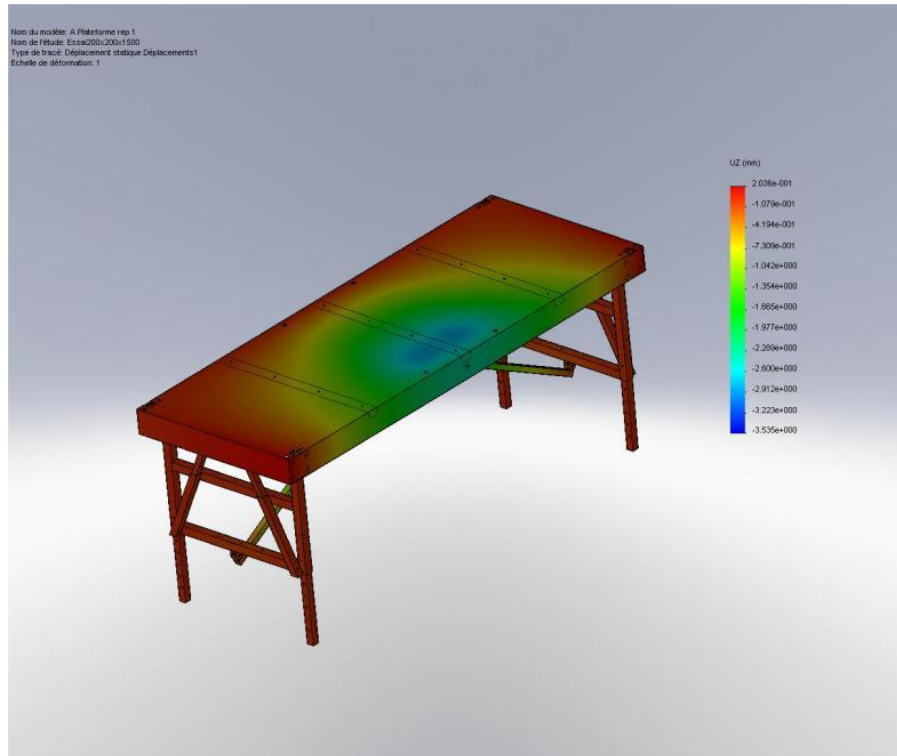
- KERN CH50K50 dynamometer for the force measurements
- FACOM « DELA » 5m for the dimension measurements.

7.1. Tests on floor:

(Tests carried out by finite elements calculation)

7.1.1. Tests on floor under localized charge:

7.1.1.1 On a surface of 200 x 200:



Load of 1000 N:

Arrow to point A: 2.3 mm

Arrow to point B: 0.1 mm

Load of 1500 N:

Arrow to point A: 3.5 mm

Arrow to point B: 0.2 mm

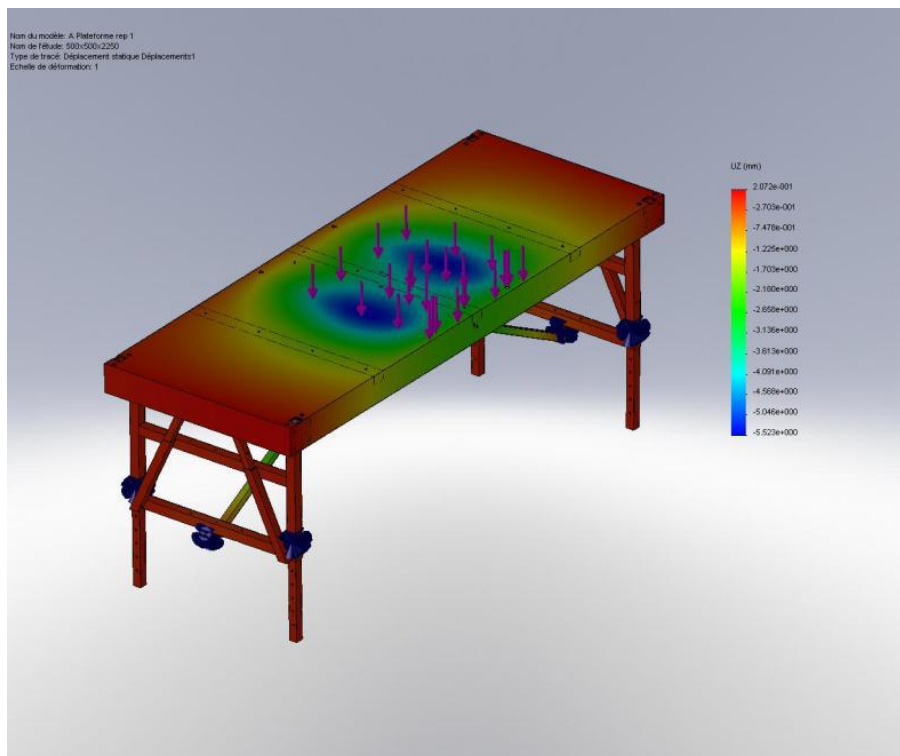
Load of 0 N (loosening of the load):

Residual arrow to point A: 0

Residual arrow to point B: 0

➔ The residual arrows are inferior to 1/1000 of the scope (1.991mm)

7.1.1.2 On a surface of 500 x 500



Load of 2250 N:

Arrow to point A: 2.6 mm

Load of 0 N (loosening of the load):

Residual arrow to point A: 0 mm

→ Maximal arrow to point A (2.6mm) does not exceed 1/100 of the scope (19.91 mm) and is inferior to 20mm.

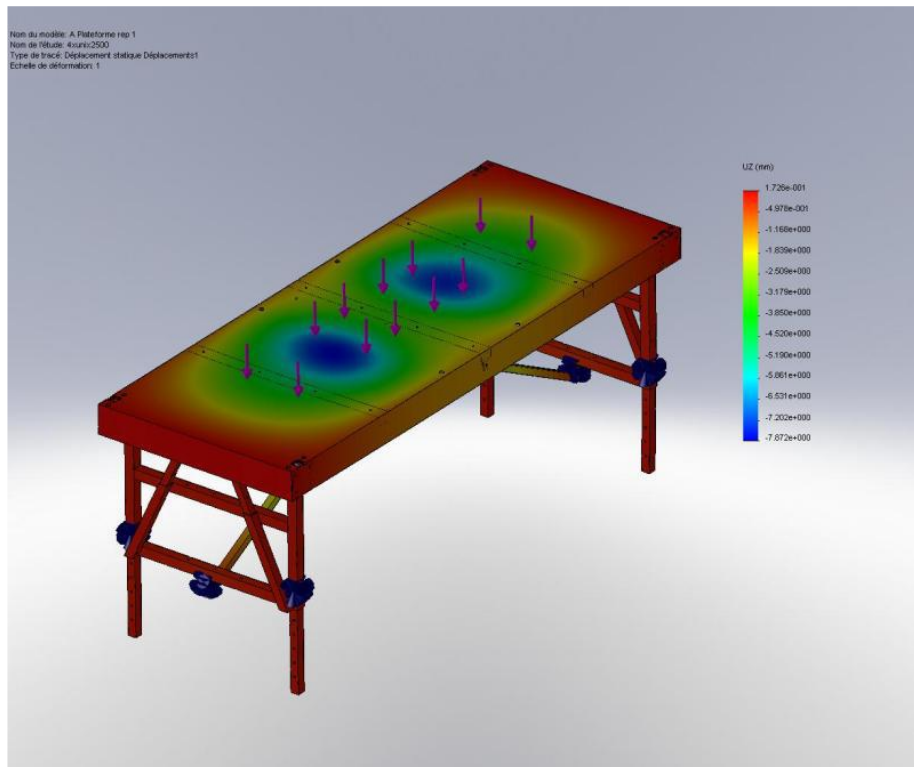
→ The residual arrow to point A is inferior to 1/1000 of the scope (1.991mm).

7.2. Tests on floor with evenly distributed load

(Tests carried out using finite elements calculation)

Load of 2000 N (nominal load):

Arrow to center: 1.7 mm



Load of 5000 N (2 times the nominal load):

The load of 5000N did not ruin the floor.

→ The arrow at the center of the floor (1.7mm) does not exceed the 1/1000 of the scope (1.91mm)

→ A load of 2 times the nominal load did not break the floor

7.3. Stability test

7.3.1. Stability test to flipping over during access

Non applicable.

It is accessed on the smallest width. The risk of tipping over is nonexistent.

7.3.2. Stability test to flipping over on work position

The platform is mounted to its maximum adjustable height, which is 998mm.

→ An effort of 450N on its longest length did not provoke the legs of the scaffold to leave the ground.

7.4. Bending tests of the railing

(tests carried out using finite elements calculation. § 6.3)

7.5. Access ladder tests:

Non applicable.

The system is not equipped with an access ladder.

7.6. Casters test:

The casters used are of a diameter of 125mm.

Each caster can withstand a dynamic load of 110daN, or a total of 440daN for the 4 casters, which represents 2.2 times the nominal load.

These casters are braked in rotation and swiveling. They are in compliance with the DIN EN 12527 norm; this norm includes the tests expected for the EN 12527 norm.

No additional test has been carried out on these casters.

7.7. Proof load test (§6.6):

The platform is set up at its highest adjustable height (998mm). The stabilizers are in work mode and the adjustable legs are coming out to their maximal extent. The proof load is fixed at $2.5 \times 2500 = 6250\text{N}$.

7.8. Dimensional and mechanical characteristics check of the materials:

The certificates of conformity of the materials used and the dimensional measurements carried out will be recorded in a transcript.

7.9. Marking:

A permanent marking will be crafted on the platform:

- Manufacturer logo: TSCS
- Year of conception: xxxx
- Maximum usable load: 200daN

7.10. Anti-corrosive protection:

Non applicable.

8. Characteristics of the platform – conclusions:

- This equipment is in compliance with the NF P93-520-1997 norm
- Maximal permitted load: 200daN per platform corresponding to 2 people per configuration
- Overall dimension, railing included: (L) 2000x (W)760x (H)2100mm
- Adjustable height of the platform from 700 to 998 mm, corresponding to a work height of 2500mm to 3000mm
- Materials handling casters of a diameter of 125mm equipped with brakes on each caster
- Direct stress maximum of tipping over: 45daN at floor height.

Note:

The hook allowing the pairing is equipped with a central flat vertical part which ensures a perfect immobilization of the modules between one another.

