



Design Manual for M.C.M.E.L Platform System

FOR
DESIGNERS, ENGINEERS, ARCHITECTS,
CONTRACTORS & INSTALLERS.



1 - USES OF platforms

Decks, terraces, balconies, staircases and mezzanines are used in homes and in residential, commercial, and industrial buildings to ensure support, stability and safety at a certain height to users. Generally, it names platforms.

Platform consists specifically of a horizontal structure include beams, braces and spacers, supported by columns at a certain height from the ground.

The platform can be attached to the building or be standing alone. Component parts, the posts, which support horizontal and vertical loads transferring them to various floors by means of anchorages. The handrails are fixed to the surface and structure of the platform. The assembly must be able to support and transfer the static and dynamic loads in accordance with NBC's requirements.

These components can be constructed from different materials such as wood, steel, aluminium, plastic, or a combination of two or more materials (a hybrid).

FIGURE 1: COMPONENT PARTS OF BOARDS



Prepared and approved by:
Patrice Austin, ing.
Digitech 3D inc.
2020-01-22





Aluminium components have several advantageous characteristics such as resistance to corrosion and bad weather, higher mechanical resistance and are relatively lightweight. Notably for these reasons, aluminium structure systems are widely used in the construction industry for the external perimeters of balconies, footbridges, staircases, etc.

M.C.M.E.L. is a family business that encourages a creative environment, and is always up-to-date on the newest industry developments so as to offer innovative products to its clients. The company distinguishes itself by offering products that are within reach of all budgets while recognized for their elegance, durability, ease of installation, and low maintenance.

This manual is a design and installation guide for engineers, architects, designers, and installers of aluminium and wooden platform structure recovered with aluminium boards. In this way, installers can determine the type of beams and spacing between them, the arrangement of component parts comprised in the system and the specifications for all anchoring as required.

Following codes are applicable in Platform system design:

- National Building code of Canada 2010
- Ontario Building Code 2012
- CAN/CSA-S157-05/S157.1-05 (R2010) - Strength Design in Aluminum

2 - M.C.M.E.L PLATFORM SYSTEMS

M.C.M.E.L. offers a platform system including boards and aluminum structure. It suits many applications as platform, deck, mezzanine, balcony and staircase. The structure can be designed with wood or with M.C.M.E.L aluminum extrusions in convenience with Canadian standards. Boards are maiden in aluminum with M.C.M.E.L exclusive extrusions.

FIGURE 2: M.C.M.E.L WOOD COLOR BOARD



FIGURE 3: M.C.M.E.L EXCLUSIVE EXTRUSIONS

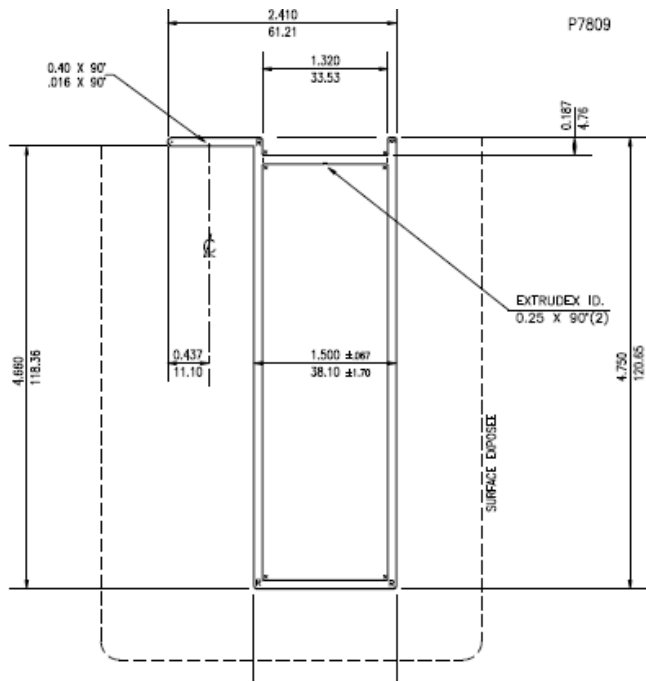


FIGURE 5: M.C.M.E.L EXCLUSIVE CLOSED BOARDS

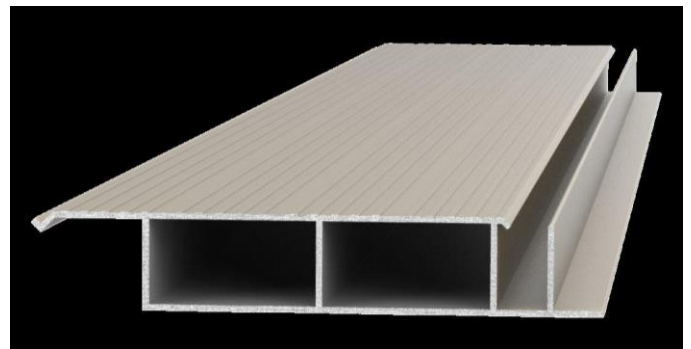
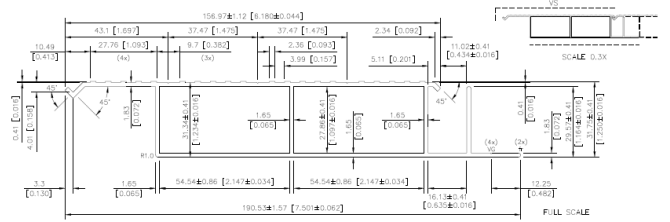


FIGURE 6: M.C.M.E.L EXCLUSIVE OPEN BOARDS

SECTION NO : PMCM 3849
(2nd. After Modified)

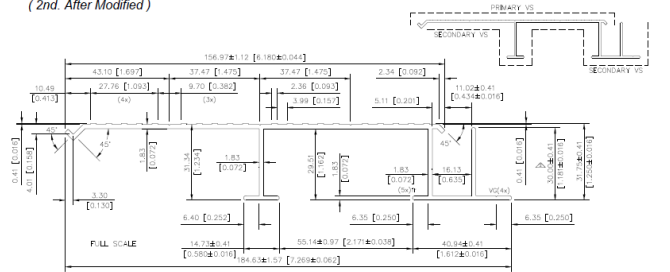
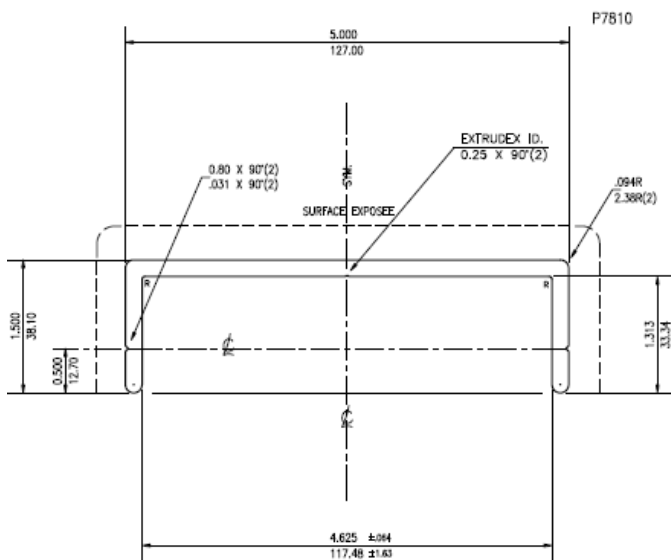


FIGURE 4: M.C.M.E.L EXCLUSIVE EXTRUSIONS





INSTALLATION RECOMMENDATIONS

3 - DESIGN PROCEDURE

3.1 LOADS

For residential application under 3 levels structure, loads applied on the decking systems, according to NBC 2010 and Ontario Building Code 2012, are 55 psf (Dead Load = 40 psf + Live Load = 15 psf). Loads considered are the excess loads due to usage. Permanent load, dynamic load and snow load are considered in this load case.

Please note these loads are specified in this manual for wooden and aluminum structure for residential applications. Designer shall consult M.C.M.E.L for further information or different applications.

4 - STRUCTURAL DESIGN

The load distribution and the structural analysis of the different railing systems are determined in accordance with the following parameters:

- Horizontal area of the platform;
- Number of column support the platform;
- Distance between supporting columns.
- Type of material of the structure (wood or M.C.M.E.L. aluminum extrusions).

Structural design and verification has been performed according CAN/CSA-S157-05/S157.1-05 (R2010) - Strength Design in Aluminum and wooden structure, According to the Ontario Building Code 2012 and NBC 2010.

5 - DESIGN STAGE OF RAILING SYSTEMS

1. Determine dimensions of the platform (Span A and Span B);
2. Determine the number of column on each span to find distance between them;
3. Choose distance between beam or length of braces (16 or 24 inches);
4. Choose type of structure:
 - a. For Aluminum structure, use DI003-006_MEP-9003_D;
 - b. These documents are provided by M.C.M.E.L.'s team to distributors, engineers, architects, contractors. You can see the first page of each document in figures 7 and 8, below.
5. According to the load combinations and dimension, evaluate components and assembly to respect Ontario Building Code 2012 and NBC 2010;

FIGURE 7: DI003-006_MEP-9003_C



87654321

Notes:

- The header joist must be directly above the columns for the dimension "D" in Table 1 to be valid. [shape 2]
- The shape 3 must be used in addition to the standard structure as the view at the page 4.
- The position and the spacing of the columns must be adjusted when a staircase is attached to the structure. The dimension "D" must be reduced.
- The connections shown in the following page must be respected for the dimensions in Table 1 to be valid.
- Every deck must have a side anchored to a wall. This also applies to a deck with multiple floors.
- It is important to use this document in conjunction with the documents about column and guard dimensioning to complete the deck selection.

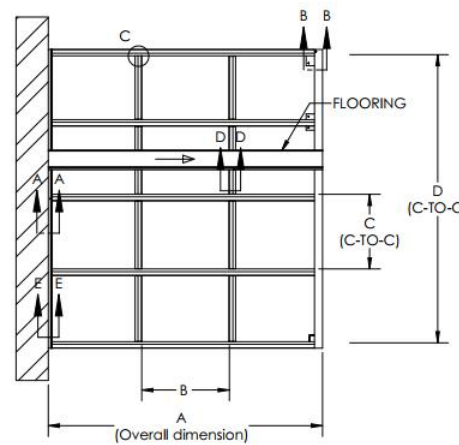








TABLE 1: FLOOR DIMENSION

BALCONY DEPTH: A	MAXIMUM SPACE BETWEEN SECONDARY JOIST (SHAPE 1): B		MAXIMUM SPACE BETWEEN MAIN JOIST (SHAPE 1): C	MAXIMUM SPACE BETWEEN COLUMNS: D	
	PLANKING: SHAPE 4	PLANKING: SHAPE 5		EXTERIOR JOIST: SHAPE 2	EXTERIOR JOIST: SHAPE 3
48	24,0	24,0	20,0	126,9	177,1
54	27,0	27,0	20,0	119,7	169,2
60	30,0	30,0	20,0	113,5	160,6
66	33,0	33,0	20,0	108,2	153,1
72	36,0	36,0	20,0	103,6	146,6
78	26,0	26,0	16,0	99,6	140,8
84	28,0	28,0	16,0	96,0	135,7
90	30,0	30,0	16,0	92,7	131,1
96	30,0	30,0	16,0	89,8	126,9
102	30,0	30,0	12,0	87,1	123,1
108	30,0	30,0	12,0	84,6	119,7
114	30,0	30,0	12,0	82,4	116,5
120	30,0	30,0	12,0	80,3	113,5
126	30,0	30,0	12,0	78,3	110,8
132	30,0	30,0	12,0	76,5	108,2
138	30,0	30,0	12,0	74,9	105,9
144	30,0	30,0	12,0	73,3	103,6


TABLE 2: PROFILE


SHAPE	VIEW	PROPERTIES
1	 V-15226	A= 1.16 po2 A= 748 mm2 I= 3.08 po2 I= 1.28E+6 mm4
2	 S-15267	A= 1.42 po2 A= 916 mm2 I= 4.73 po2 I= 1.96E+6 mm4
3	 S-15267 x2 V-15148	A= 2.84 po2 A= 1832 mm2 I= 9.46 po4 I= 3.92E+6 mm4
4	 M8061	A= 1.22 po2 A= 787 mm2 I= 0.32 po2 I= 1.33E+5 mm4
5	 PMCM 3849	A= 0.85 po2 A= 548 mm2 I= 0.15 po2 I= 6.24E+4 mm4

Drawn by:



Digitech3D Inc.
608 Marie-Victorin
Verchères,
QC, J0L 2R0
T. 514 821-1787

At the demand of:
 **McMEL**
HEADQUARTERS
500 rue Isidore Dagenais
St-Roch-de-l'Achigan
QC, J0K 3H0
McMEL T. 450-588-2415



LICENSÉ PROFESSIONNEL EN INGÉNIEUR
P. Y. AUSTIN
1992-2022
PROVINCE OF ONTARIO

Owner: **McMEL**

Project manager: -

Architect(s): -

General entrepreneur: -

Project: -

TOLERANCES, IF NOT INDICATED:
 IMPERIAL METRIC
 x .002" x .04mm
 x.x .01" x .05mm
 x.xx .01" x .05mm
 x.xxx .01" x .05mm
 x.xxx .01" x .05mm
 ANGLES 1/2"
 MACHINED SURFACE FINISH 125 Mu in./

LEGAL NOTICES:
 1. This drawing is the intellectual property of Digitech3D Inc. Any reproduction is prohibited and punishable.
 2. Only an engineer-issued drawing with the "POUR FABRICATION" ("FOR BUILDING" in french) mention can be used for construction purposes.
 3. No measurement may be taken directly on the drawing. Please refer to the dimensions given in the drawing.
 4. Digitech3D Inc. is not responsible for modifications not included in the drawing.
 5. The informations included in the drawing are specific to this project. The drawing can not be used for other purposes without the consent of Digitech3D Inc.

REFERENCE ONLY

Structure:	STRUCTURE
Drawing number:	D1003-006_MEP-9003
Approved by:	Date:
Drawn by:	Date:
Checked by:	Date:
Released by:	Date:
Format:	Revision:
Scale:	Page:

87654321

DESIGN AND TECHNICAL INFORMATION ABOUT COMPONENTS

6 - PHYSICAL PROPERTIES

Conforming to CSA standard S175-05 calculation of aluminium structures, the physical characteristics of aluminium alloys are the following:

- Modulus of elasticity, $E = 70,000 \text{ MPa}$
- Shearing module, $G = 26,000 \text{ MPa}$
- Linear coefficient of thermal expansion, $\alpha = 24 \times 10^{-6} / ^\circ\text{C}$
- Poisson coefficient, $\nu = 0,33$
- Density, $\rho = 2700 \text{ kg/m}^3$

The properties of the sections of the component parts used for M.C.M.E.L platform systems are showed in tables 1, 2 and 3. The mechanical and physical properties of components of the railing system are used in order to evaluate the bearing capacity of these component against the stress of the external loads imposed by Codes.

7 - MECHANICAL PROPERTIES

Mechanical properties of the railing system components used in M.C.M.E.L products are in accordance with the CAN/CSA-S157-05/S157.1-05 R2010) - Strength Design in Aluminum and appeared in table 3.

TABLE 1: SECTION PROPERTIES OF EXTRUSIONS (SEE FIGURES 3 TO 6 FOR EXAMPLES OF DRAWINGS)






SHAPE	VIEW	PROPERTIES
1	 V-15226	$A = 1.16 \text{ po}^2$ $A = 748 \text{ mm}^2$ $I = 3.08 \text{ po}^2$ $I = 1.28\text{E}+6 \text{ mm}^4$
2	 S-15267	$A = 1.42 \text{ po}^2$ $A = 916 \text{ mm}^2$ $I = 4.73 \text{ po}^2$ $I = 1.96\text{E}+6 \text{ mm}^4$
3	 S-15267 x2	$A = 2.84 \text{ po}^2$ $A = 1832 \text{ mm}^2$ $I = 9,46 \text{ po}^4$ $I = 3,92\text{E}+6 \text{ mm}^4$
4	 M8061	$A = 1.22 \text{ po}^2$ $A = 787 \text{ mm}^2$ $I = 0.32 \text{ po}^2$ $I = 1.33\text{E}+5 \text{ mm}^4$
5	 PMCM 3849	$A = 0.85 \text{ po}^2$ $A = 548 \text{ mm}^2$ $I = 0.15 \text{ po}^2$ $I = 6.24\text{E}+4 \text{ mm}^4$

TABLE 3: SPECIFICATION OF ALUMINUM ALLOY USED FOR M.C.M.E.L PRODUCTS

	Fu	Fy traction	Fy Compression
6005-T5 Profil 1 and 2	260 MPa (37.7 ksi)	240 MPa (34.8 ksi)	240 MPa (34.8 ksi)
6063-T5 Profil 4 and 5	186MPa (26.9 ksi)	145 MPa (21.0 ksi)	145 MPa (21.0 ksi)