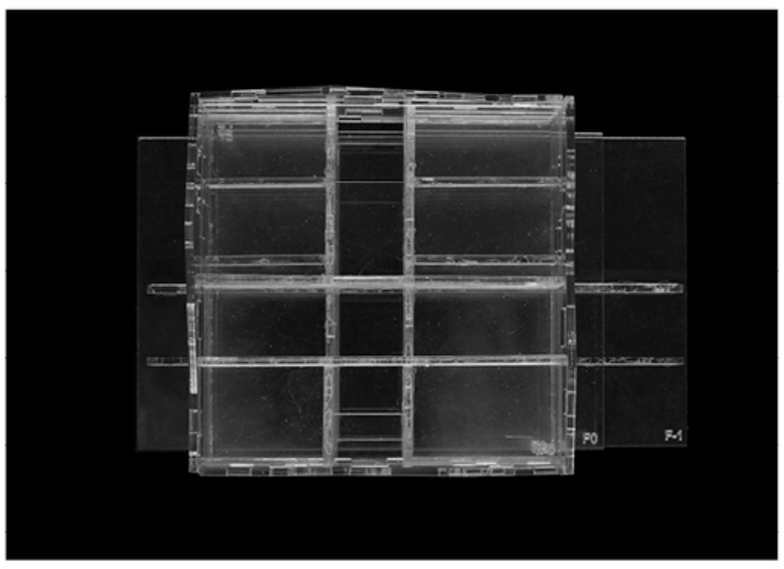
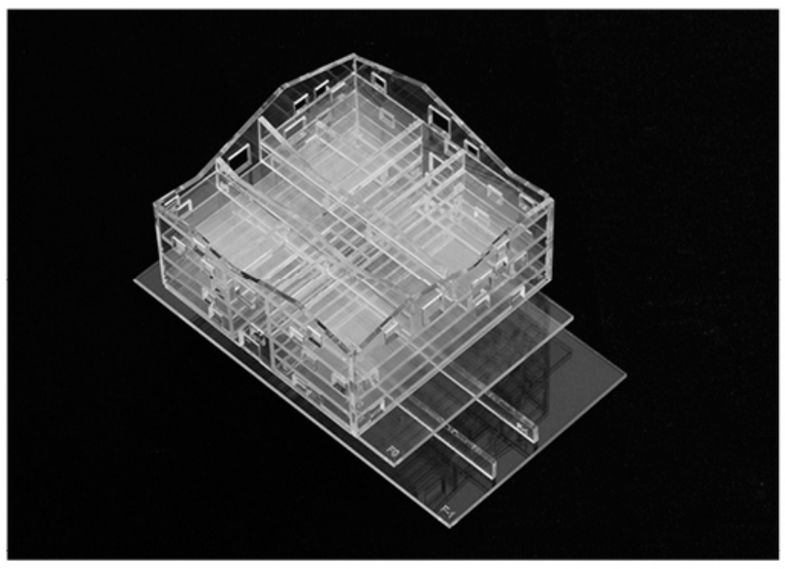
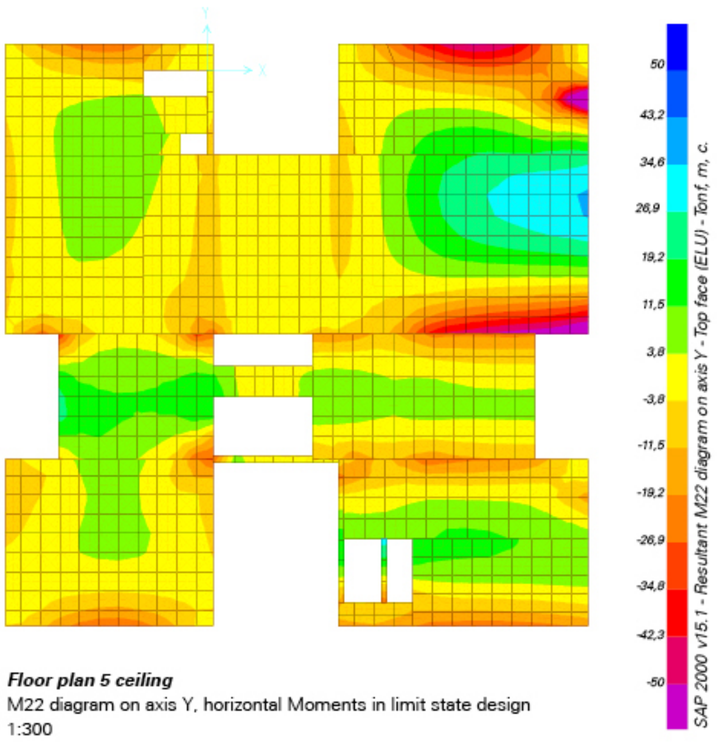
01. Concept
The structure is presented as a set of retaining walls, placed in a strategic orientation depending on the floor, which through their vertical arrangements download the loads across the model by moving and guiding them. Horizontal loads are derived through the reinforced concrete ceilings to the bearing façades and the interior bearing walls.
The amount of steel used for the rebars varies in density to resolve the most solicitated areas and also to establish a system of energetic regulation for the building structure.
The structure is set as a system, and it does not only plays the role of supporting the building itself but it stands in generating every space and an important energy regulation.

02. Structure & Programmation
The walls that form the interior core support make a 90 degrees rotation to provide the building with different entrances related to the different public spaces.
The rotation, in addition to offering the most important confronted views of the area, helps to the programmatic organization of the school, and distributes the space in a very efficient way.
The rotation stiffens the system and connects the ceilings to the facade for the loads lowering.

03. Structure calculation
The calculation of the structure has been concentrated on the model of the main bearing walls loads.
Initially, the overall structure is introduced without any kind of load (only own weight) to the finite structure calculation software SAP2000 to check the stability of the system itself.
After checking that the deformations of the model are not critical the related charges are introduced: CP, SU, snow and wind for all construction elements.



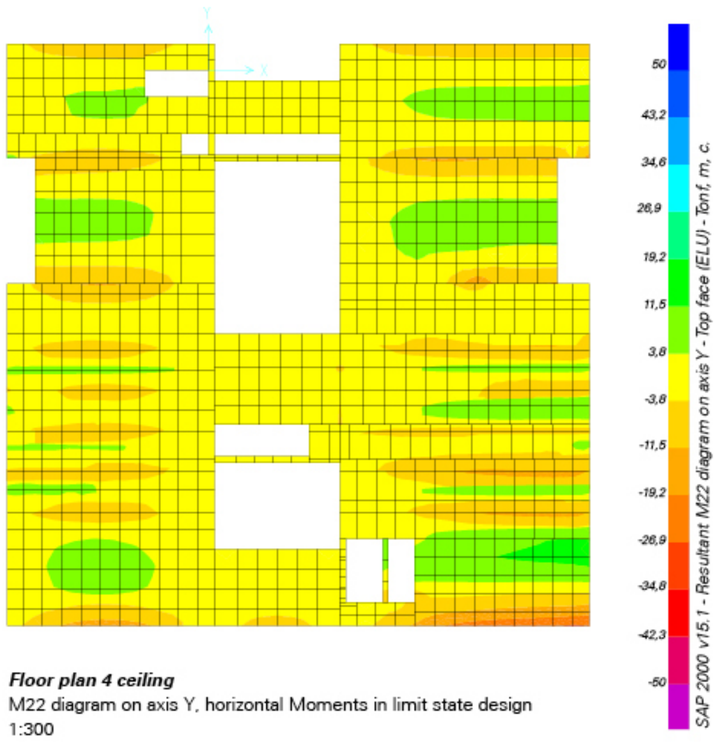




Floor plan 5 ceiling
M22 diagram on axis Y, horizontal Moments in limit state design
1:300

Floor plan 5
ELEMENT FORCES AREA SHELLS
Representative data max&min.

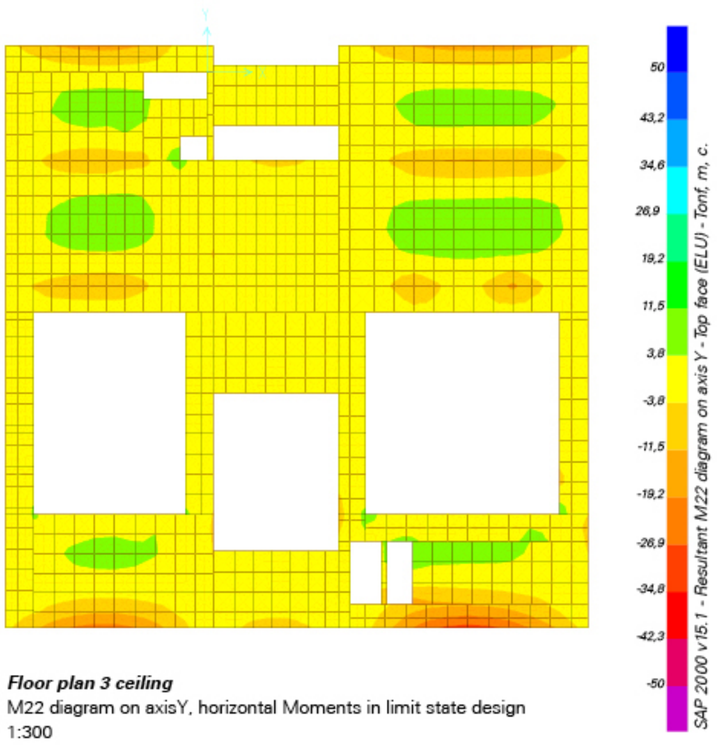
Area element	4867 | 4869
Shell-Type	Shell-thick | Shell-thick
Output case	ELS1 | ELS1
Casetype	Combination | Combination
F11 *Tonf/m*	3.83 | -2.36
F22 *Tonf/m*	13.03 | 18.27
F12 *Tonf/m*	-1.32 | -0.74
FMax *Tonf/m*	13.21 | 18.30
FMin *Tonf/m*	3.64 | -2.37
F Angle *Degrees*	-81.98 | -87.93
M11 *Tonf-m/m*	-9.29 | 5.84
M22 *Tonf-m/m*	**-46.59 | 32.43**
M12 *Tonf-m/m*	2.46 | -1.67
Mmax *Tonf-m/m*	-9.13 | 22.59
Mmin *Tonf-m/m*	-46.75 | 5.69
MAngle *Degrees*	-3.76 | -84.63
V13 *Tonf/m*	-1.17 | 0.35
V23 *Tonf/m*	-12.94 | -6.08
VMax. *Tonf/m*	12.91 | 6.08
VAngle *Degrees*	-84.84 | -87.69



Floor plan 4 ceiling
M22 diagram on axis Y, horizontal Moments in limit state design
1:300

Floor plan 4
ELEMENT FORCES AREA SHELLS
Representative data max&min.

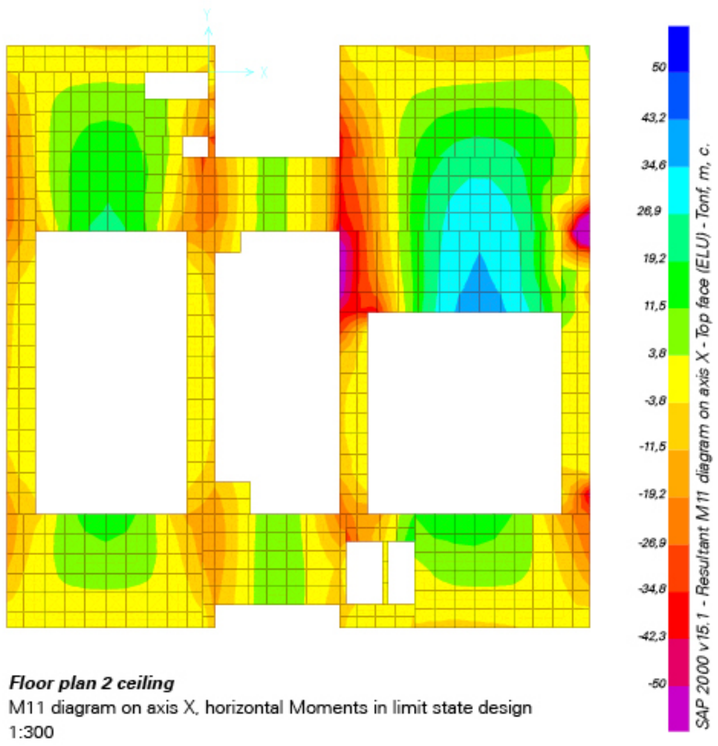
Area element	4049 | 3999
Shell-Type	Shell-thick | Shell-thick
Output case	ELS1 | ELS1
Casetype	Combination | Combination
F11 *Tonf/m*	-3.37 | -0.23
F22 *Tonf/m*	7.04 | -1.20
F12 *Tonf/m*	5.28 | -2.68
FMax *Tonf/m*	9.25 | 1.90
FMin *Tonf/m*	-5.68 | -3.34
F Angle *Degrees*	67.28 | -39.69
M11 *Tonf-m/m*	-1.98 | -0.41
M22 *Tonf-m/m*	**-19.25 | 10.38**
M12 *Tonf-m/m*	0.50 | 0.63
Mmax *Tonf-m/m*	-1.97 | 10.41
Mmin *Tonf-m/m*	-19.7 | -0.43
MAngle *Degrees*	1.68 | 87.15
V13 *Tonf/m*	-1.98 | 1.38
V23 *Tonf/m*	-6.82 | 1.03
VMax. *Tonf/m*	7.09 | 1.73
VAngle *Degrees*	-105.99 | 38.67



Floor plan 3 ceiling
M22 diagram on axisY, horizontal Moments in limit state design
1:300

Floor plan 3
ELEMENT FORCES AREA SHELLS
Representative data max&min.

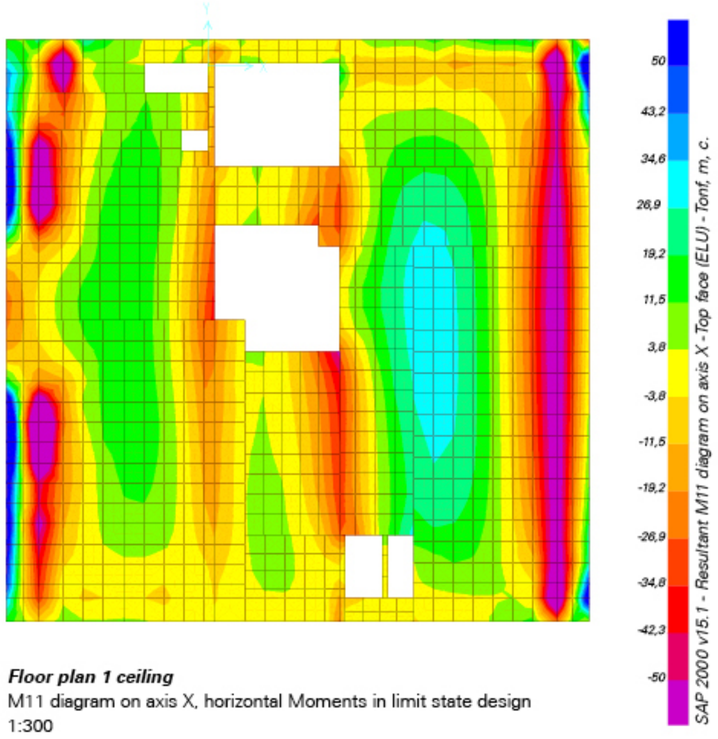
Area element	2604 | 2966
Shell-Type	Shell-thick | Shell-thick
Output case	ELS1 | ELS1
Casetype	Combination | Combination
F11 *Tonf/m*	16.74 | 3.21
F22 *Tonf/m*	-1.32 | 2.37
F12 *Tonf/m*	-4.51 | 0.17
FMax *Tonf/m*	17.80 | 3.24
FMin *Tonf/m*	-2.39 | 2.34
F Angle *Degrees*	-13.28 | 10.84
M11 *Tonf-m/m*	-4.33 | -8.69
M22 *Tonf-m/m*	**-21.75 | 7.51**
M12 *Tonf-m/m*	-0.15 | -0.53
Mmax *Tonf-m/m*	-4.32 | 7.53
Mmin *Tonf-m/m*	-21.78 | -8.71
MAngle *Degrees*	0.50 | -88.13
V13 *Tonf/m*	0.07 | 1.53
V23 *Tonf/m*	-8.33 | 1.86
VMax. *Tonf/m*	8.33 | 2.41
VAngle *Degrees*	-89.48 | 50.55



Floor plan 2 ceiling
M11 diagram on axis X, horizontal Moments in limit state design
1:300

Floor plan 2
ELEMENT FORCES AREA SHELLS
Representative data max&min.

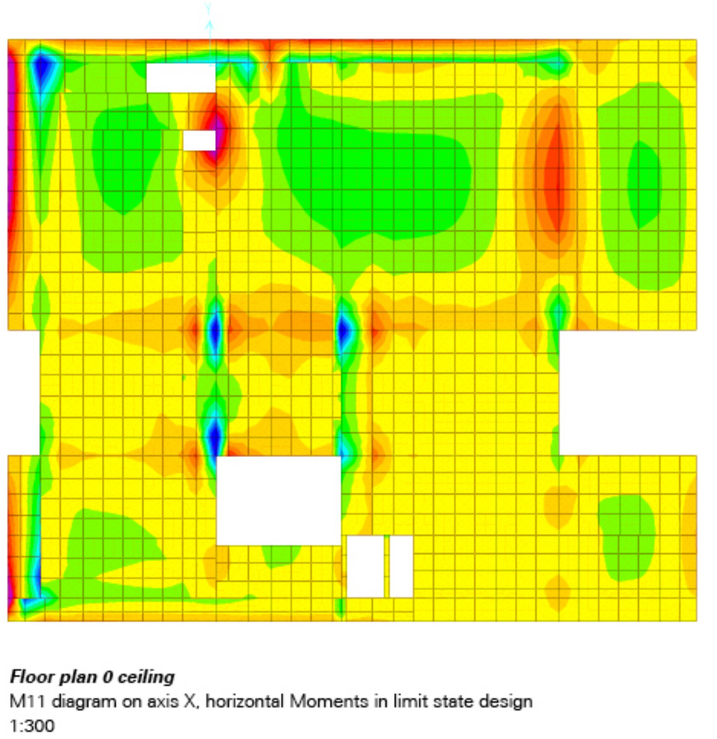
Area element	2264 | 2317
Shell-Type	Shell-thick | Shell-thick
Output case	ELS1 | ELS1
Casetype	Combination | Combination
F11 *Tonf/m*	2.14 | -1.21
F22 *Tonf/m*	21.13 | -0.21
F12 *Tonf/m*	-1.26 | 0.24
FMax *Tonf/m*	21.21 | -0.16
FMin *Tonf/m*	2.06 | -1.26
F Angle *Degrees*	-86.26 | 77.28
M11 *Tonf-m/m*	**-44.19 | 28.21**
M22 *Tonf-m/m*	-21.60 | 1.04
M12 *Tonf-m/m*	-17.64 | 0.98
Mmax *Tonf-m/m*	-12.03 | 28.24
Mmin *Tonf-m/m*	-53.77 | 1.00
MAngle *Degrees*	-61.39 | 2.06
V13 *Tonf/m*	27.93 | 1.56
V23 *Tonf/m*	-0.49 | -0.15
VMax. *Tonf/m*	27.03 | 1.56
VAngle *Degrees*	-1.00 | -5.36



Floor plan 1 ceiling
M11 diagram on axis X, horizontal Moments in limit state design
1:300

Floor plan 1
ELEMENT FORCES AREA SHELLS
Representative data max&min.

Area element	532 | 1665
Shell-Type	Shell-thick | Shell-thick
Output case	ELS1 | ELS1
Casetype	Combination | Combination
F11 *Tonf/m*	-27.77 | -13.86
F22 *Tonf/m*	-29.00 | 48.90
F12 *Tonf/m*	15.43 | -0.96
FMax *Tonf/m*	-12.95 | 48.21
FMin *Tonf/m*	-43.83 | -13.87
F Angle *Degrees*	43.85 | -89.09
M11 *Tonf-m/m*	**-48.99 | 45.32**
M22 *Tonf-m/m*	-33.19 | 9.53
M12 *Tonf-m/m*	-4.18 | 1.19
Mmax *Tonf-m/m*	-32.15 | 45.36
Mmin *Tonf-m/m*	-50.03 | 9.49
MAngle *Degrees*	-76.05 | 1.90
V13 *Tonf/m*	-20.60 | 39.81
V23 *Tonf/m*	26.35 | -0.45
VMax. *Tonf/m*	33.45 | 39.80
VAngle *Degrees*	51.97 | -0.65



Floor plan 0 ceiling
M11 diagram on axis X, horizontal Moments in limit state design
1:300

Floor plan 0
ELEMENT FORCES AREA SHELLS
Representative data max&min.

Area element	532 | 7387
Shell-Type	Shell-thick | Shell-thick
Output case	ELS1 | ELS1
Casetype	Combination | Combination
F11 *Tonf/m*	-18.20 | -64.66
F22 *Tonf/m*	5.79 | 51.03
F12 *Tonf/m*	-10.30 | 28.90
FMax *Tonf/m*	9.61 | 84.38
FMin *Tonf/m*	-22.02 | -68.01
F Angle *Degrees*	-69.67 | 83.38
M11 *Tonf-m/m*	**-48.69 | 49.90**
M22 *Tonf-m/m*	-9.17 | -10.18
M12 *Tonf-m/m*	0.65 | 3.05
Mmax *Tonf-m/m*	-9.17 | 53.99
Mmin *Tonf-m/m*	-48.70 | -10.32
MAngle *Degrees*	89.05 | 2.71
V13 *Tonf/m*	-32.40 | 56.58
V23 *Tonf/m*	-0.54 | 1.09
VMax. *Tonf/m*	32.40 | 66.58
VAngle *Degrees*	-179.05 | 0.82