NUOVO NAUTILUS - NUOVO NAUTILUS EVO

PERMANENT VOID FORMER FOR LIGHTWEIGHT BIDIRECTIONAL SLABS

NEW NAUTILUS ADVANTAGES

System for the construction of lightened bidirectional slabs with flat intrados and large spans.

LARGE SPANS

NEW NAUTILUS permits the building of slabs with up to 20 m span, without protruding elements (beams or dosserets).

LIGHTNESS

The bidirectional flat intrados design allows the maximum lightening of the slab while mantaining high structural performances.

SEISMIC

The slab lightening is the first step to realize a lightweight structure with a great seismic response.

WATERPROOF

NEW NAUTILUS is made of polypropylene that is a waterproof element; therefore there can't be soaking issues or release of water over time.

OPTIMIZATION

The combination between great spans and lightweight slabs permits load limitations over pillars and foundations and the optimization of the layout distribution of the pillars.

VERSATILITY

NEW NAUTILUS can be used in combination with prefabricated slabs such as predalles, or for the construction of foundation plates combinated with post-tensioning systems.

LIGHTENING SYSTEMS ADVANTAGES

REDUCED SEISMIC RISK
A lighter structure with great seismic response

LOGISTICS ADVANTAGES
Steel and concrete savings permit the optimization of the building site

REI 120 CERTIFICATE
Laboratory report of fire resistance up to 120'

REDUCED CONCRETE CONSUMPTION
Reduction of the concrete consumption up to 25%

REDUCED IRON CONSUMPTION
Optimization of steel consumption reduced by 15% approximately

LOWER LOAD ON THE FOUNDATIONS
Possibility of reducing the sizes of the structure foundations

UP TO 15% MORE ECONOMIC THAN THE FULL SLAB
The sum of the descripted advantages guarantees economic savingseconomico

NEW NAUTILUS TECHNICAL DATA

SIZES

Base	520 x 520 mm
Heights	160 - 200 - 240 mm

NEW NAUTILUS MATERIAL

Polypropylene	PP

DOUBLE VERSION

The SINGLE formwork can be set up to be matched with another element in order to form DOUBLE structures:

- ideal for large spans;
- light;
- easy to install.

In all elements there is a spacer tab that allows the correct distancing between the formwork.

*For slabs from 26 to 68 cm high

DIMENSIONAL TABLE

NEW NAUTILUS SINGLE*

	HEIGHT	Actual size (mm)	Weight (kg)	Beam width (mm)	Formwork bearing (pieces/m²)	Concrete consumption (m³/m²)	Formwork volume (m³/pcs.)
	**H16 SINGLE**	520 x 520 x H160	1.32	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.079 0.084 0.089 0.093 0.096	0.033
	**H20 SINGLE**	520 x 520 x H200	1.43	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.102 0.108 0.114 0.118 0.123	0.040
	**H24 SINGLE**	520 x 520 x H240	1.54	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.125 0.132 0.138 0.144 0.149	0.047

*Packaging size: 110 x 120 cm, 400 pcs. Available feet: 0,4,5,6,7,8,9,10 cm

NEW NAUTILUS DOUBLE**

	HEIGHT	Actual size (mm)	Weight (kg)	Beam width (mm)	Formwork bearing (pieces/m²)	Concrete consumption (m³/m²)	Formwork volume (m³/pcs.)
	**H32 DOUBLE**	520 x 520 x H160+H160	2.64	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.158 0.168 0.178 0.186 0.192	0.066
	**H36 DOUBLE**	520 x 520 x H200+H160	2.75	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.181 0.192 0.203 0.211 0.219	0.073
	**H40 DOUBLE**	520 x 520 x H200+H200	2.86	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.204 0.216 0.228 0.236 0.246	0.080
	**H44 DOUBLE**	520 x 520 x H240+H200	2.97	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.227 0.240 0.252 0.262 0.272	0.087
	**H48 DOUBLE**	520 x 520 x H240+H240	3.08	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.250 0.264 0.276 0.288 0.298	0.094

**Packaging size: 110 x 120 cm, 200 pcs. Available feet: 0,5,6,7,8,9,10 cm

EXAMPLE OF CONSUMPTION CALCULATION

For slabs of 70+160+70 mm width with beams from 160 mm, the concrete consumption will be equal to 0.091 (NEW NAUTILUS H16) + 0.07 (lower slab) + 0.07 (upper slab), for a total of 0.231 m³/m² and a weight of 577.50 kg/m².

NEW NAUTILUS EVO TECHNICAL DATA

SIZES

Base	520 x 520 mm
Heights	100-130-160-200-240-280 mm

NEW NAUTILUS MATERIAL

Polypropylene	PP

THE CENTRAL CONE

The CENTRAL CONE helps the operetor to work well and accurately:

- actual visual check of the lower slab finishing;
- guarantee of the completeness of the structural section;
- high load-bearing resistance;
- lifting reduction during the pour;
- homogeneous and perfect intrados finishing.

*For slabs from 20 to 76 cm high

THE UPPER SPACERS

0.8 mm | EC2

In the upper section of the formwork there are uniformly distributed spacers 8 mm thick. These elements allow the upper reinforcement to be placed directly over the formwork in order to guarantee a suitable concrete covering.

THE SIDE TAB

2 x pz. | 100 - 200 mm | PP polipropilene

Every formwork is provided with side spacers that allow the correct installation of the elements according to the width of the beams, which is to be calculated during the design stage. The elements are marked from 100 to 200 mm and can be hooked to the side loops.

THE LOWER FOOT

50 - 100 mm | 4 x pz. | R.E.I.

The lower spacer feet are integral elements of the formwork: they are pressed molded with the rest of the item and allow the creation of the lower slab with a thickness evaluated during the design stage. The feet have a variable height from 50 to 100 mm.

DIMENSIONAL TABLE

NEW NAUTILUS EVO SINGLE*

	HEIGHT	Actual size (mm)	Weight (kg)	Beam width (mm)	Formwork bearing (pieces/m²)	Concrete consumption (m³/m²)	Formwork volume (m³/pcs.)
	**H10 SINGLE**	520 x 520 x H100	1.23	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.041 0.045 0.048 0.051 0.054	0.024
	**H13 SINGLE**	520 x 520 x H130	1.30	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.060 0.064 0.067 0.071 0.074	0.028
	**H16 SINGLE**	520 x 520 x H160	1.38	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.081 0.086 0.091 0.094 0.097	0.032
	**H20 SINGLE**	520 x 520 x H200	1.49	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.104 0.110 0.116 0.120 0.125	0.039
	**H24 SINGLE**	520 x 520 x H240	1.60	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.128 0.135 0.140 0.146 0.151	0.046
	**H28 SINGLE**	520 x 520 x H280	1.71	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.151 0.158 0.166 0.172 0.178	0.053

*Packaging size: 110 x 120 cm, 400 pcs. Available feet: 0,4,5,6,7,8,9,10 cm

NEW NAUTILUS EVO DOUBLE**

	HEIGHT	Actual size (mm)	Weight (kg)	Beam width (mm)	Formwork bearing (pieces/m²)	Concrete consumption (m³/m²)	Formwork volume (m³/pcs.)
	**H20 DOUBLE**	520 x 520 x H100+H100	2.46	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.083 0.090 0.096 0.102 0.107	0.048
	**H23 DOUBLE**	520 x 520 x H100+H130	2.53	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.102 0.110 0.118 0.124 0.130	0.052
	**H26 DOUBLE**	520 x 520 x H130+H130	2.60	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.123 0.131 0.139 0.146 0.152	0.056
	**H29 DOUBLE**	520 x 520 x H130+H160	2.67	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.141 0.150 0.158 0.166 0.172	0.060
	**H30 DOUBLE**	520 x 520 x H200+H100	2.72	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.146 0.155 0.164 0.171 0.178	0.063
	**H32 DOUBLE**	520 x 520 x H160+H160	2.75	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.162 0.171 0.181 0.189 0.195	0.064
	**H33 DOUBLE**	520 x 520 x H130+H200	2.78	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.165 0.174 0.183 0.191 0.199	0.067
	**H34 DOUBLE**	520 x 520 x H100+H240	2.83	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.169 0.179 0.189 0.197 0.205	0.070
	**H36 DOUBLE**	520 x 520 x H160+H200	2.86	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.185 0.196 0.207 0.214 0.222	0.071
	**H37 DOUBLE**	520 x 520 x H130+H240	2.89	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.188 0.199 0.208 0.217 0.225	0.074
	**H38 DOUBLE**	520 x 520 x H100+H280	2.94	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.192 0.203 0.214 0.223 0.231	0.077
	**H40 DOUBLE**	520 x 520 x H200+H200	2.97	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.208 0.220 0.232 0.240 0.250	0.078
	**H41 DOUBLE**	520 x 520 x H130+H280	3.00	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.215 0.225 0.235 0.246 0.255	0.081
	**H44 DOUBLE**	520 x 520 x H200+H240	3.08	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.232 0.245 0.256 0.266 0.276	0.085
	**H48 DOUBLE**	520 x 520 x H240+H240	3.19	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.255 0.269 0.281 0.292 0.302	0.092
	**H52 DOUBLE**	520 x 520 x H240+H280	3.30	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.282 0.295 0.308 0.321 0.332	0.099
	**H56 DOUBLE**	520 x 520 x H280+H280	3.41	120 140 160 180 200	2.44 2.30 2.16 2.04 1.93	0.308 0.322 0.336 0.349 0.361	0.106

**Packaging size: 110 x 120 cm, 200 pcs. Available feet: 0,5,6,7,8,9,10 cm

EXAMPLE OF CONSUMPTION CALCULATION

For slabs of 70+160+70 mm width with beams from 160 mm, the concrete consumption will be equal to 0.091 (NEW NAUTILUS H16) + 0.07 (lower slab) + 0.07 (upper slab), for a total of 0.231 m³/m² and a weight of 577.50 kg/m².

LARGE SPANS AND ANTI-SEISMIC ALTERNATIVE

NEW NAUTILUS light formwork slab guarantees high structural qualities. It permits the creation of 20 mt wide spans maintaining a reduced weight of the slab up to the 30%. The result is a very firm bidirectional slab that offers an excellent advantage in terms of seismic response thanks to the reduced weight.

SCHOOL BUILDINGS

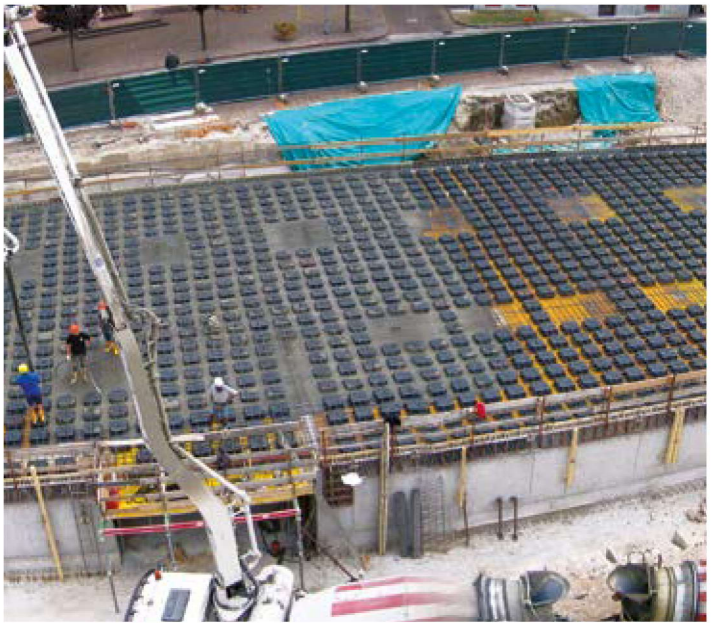
School buildings are the structures where prevention and safety must always be guaranteed. Together with the availability of wide spaces for students. NEW NAUTILUS system allows the creation of structural efficient slabs thanks to the bidirectional configuration which can easily face any seismic occurence due to the reduction of the self-weight of the slab. Moreoever, larger spans for a better space management can be easily built.

MULTI-STOREY BUILDINGS

The increasing of the seismic response of a building starts from a correct planning of the bearing structure.
The construction of a firm slab whose load doesn't excessively affect the pillars and the foundations is a fundamental aspect; NEW NAUTILUS EVO system completes these concepts by creating a very firm bidirectional slab with a reduction of its self weight up to 30%.

CAR PARKS

When building basement car parks or multi-storey car parks, the main aspect is the obtainment of the highest number possible of stalls. Through the building of bidirectional slabs and their lightening with NEW NAUTILUS EVO, it is possible to create larger spans than the traditional solutions but also to optimize the pillars position in order to create as much parking and manoeuvring space as possible.

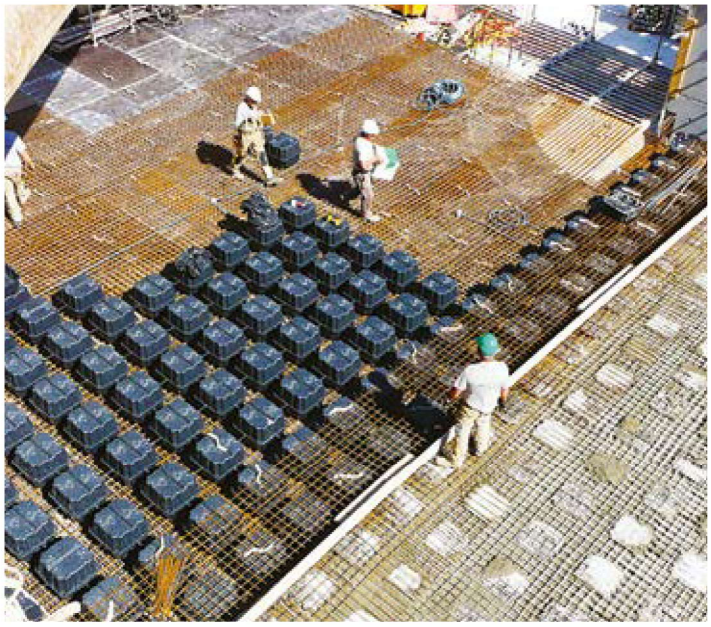


HOSPITALS

Hospitals are submitted to higher seismic standards of the high numbers of people they host. NEW NAUTILUS is a perfect method to bestow a seismic response on a building. Moreover, it allows the lightening of the structure mantaining even so high structural performances in order to face the huge loads typical of these buildings.

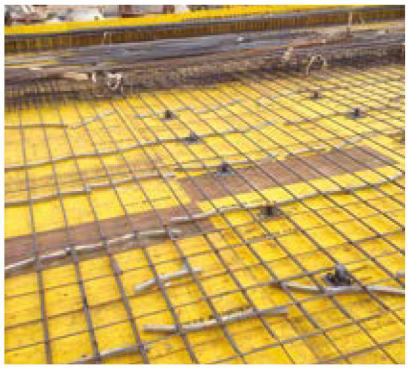
SLABS FOUNDATION

Usually buildings erected on grounds with poor load-bearing capacity need expensive and difficult to build foundation piles. NEW NAUTILUS makes possible the building of very stiff foundation slabs which can distribute the loads on a wide surface. Therefore a structure composed by a lattice of beams between two slabs, which can reduce to the minimum the differential settlements, is created.



ON-SITE INSTALLATION

① BASE DECK PREPARATION



② LOWER REINFORCEMENT & FULL ZONES

③ INSTALLATION OF NEW NAUTILUS

④ UPPER REINFORCEMENT INSTALLATION

⑤ 1st STAGE OF THE CONCRETE POUR

⑥ PAUSE BETWEEN THE 1st AND THE 2nd POUR

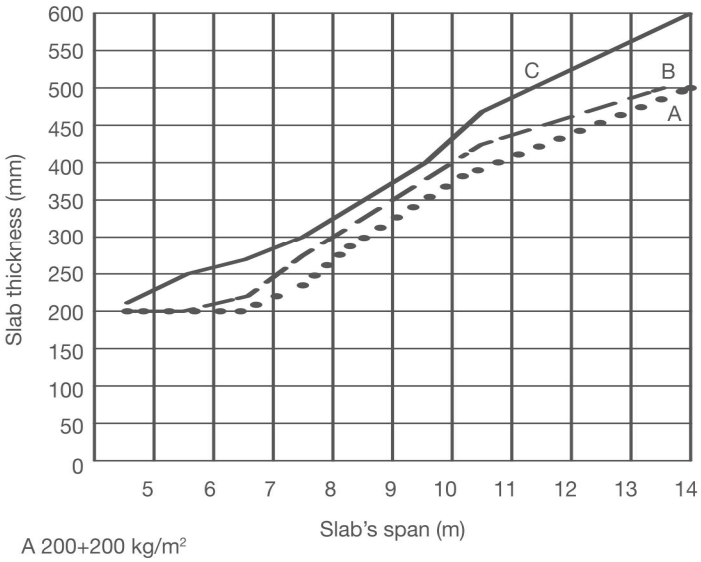
⑦ 2nd STAGE OF THE CONCRETE POUR

⑧ POST PROPPING

PRELIMINARY DESIGN ANALYSIS

THICKNESS EVALUATION

For preliminary design of a lightened slab with NEW NAUTILUS EVO: from the chart at the right it is possible to obtain the thickness of the slab on the basis the loads that act on the slab.



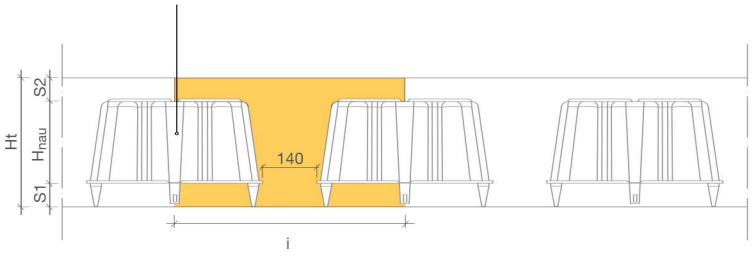
A 200+200 kg/m²
B 400+300 kg/m²
C 600+300 kg/m²

EXAMPLE

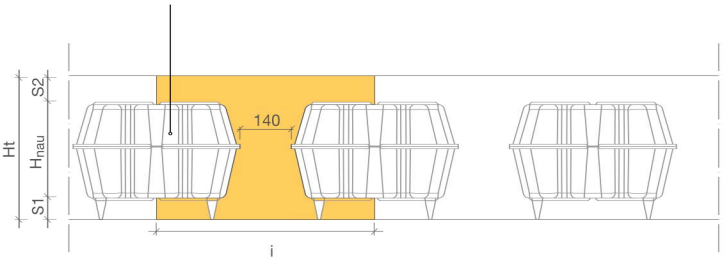
For a load of 400+300 kg/m² (live + dead) and spans (distance between the pillars) of 8 m, the thickness should be at first approximation of around 300 mm (lower base + lightening+ upper base).

For different duty conditions or particular load situation, some ad hoc modellings may be necessary.
Please contact Geoplast Technical Unit first.

New Nautilus Evo Single



New Nautilus Evo Double

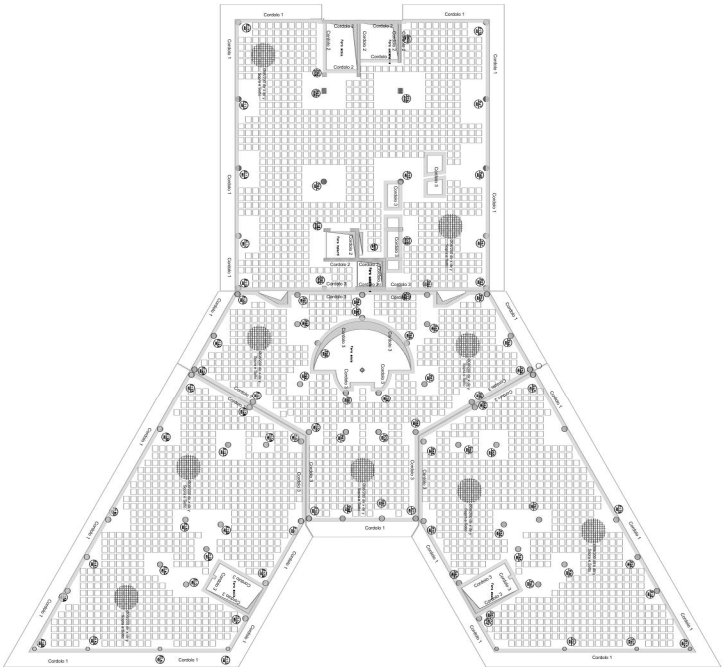


Pillar spacers L_x x L_y	Overload $G'_k + Q_k$	Propose thikness Ht	S_1	H_{nau}	S_2	Lightned slab inertia J_{nau}	Full slab inertia J_{full}	Self weight of lightned slab P_{nau}	Self weight of full slab P_{full}	Concrete / weight	Load reduction / steel
[m]	[kN/m²]	[cm]	[cm]	[cm]	[cm]	[cm⁴]	[cm⁴]	[kN/m²]	[kN/m²]	%	%
5	5.00	20	5	10	5	60821.26	66666.67	3.63	5.00	-27.4	-13.0
6	5.00	23	5	13	5	88537.95	101391.67	4.15	5.75	-27.8	-14.2
7	5.00	25	6	13	6	117362.62	130208.33	4.65	6.25	-25.6	-13.6
8	5.00	28	6	16	6	158952.73	182933.33	5.18	7.00	-26.0	-14.5
9	5.00	32	7	20	5	226197.71	273066.67	5.78	8.00	-27.8	-16.4
10	5.00	34	7	20	7	280664.38	327533.33	6.28	8.50	-26.1	-15.8
11	5.00	36	7	24	5	307772.12	388800.00	6.38	9.00	-29.1	-18.0
12	5.00	40	8	24	8	452305.45	533333.33	7.38	10.00	-26.2	-16.8
13	5.00	44	8	28	8	581150.55	709866.67	7.98	11.00	-27.5	-18.2
14	5.00	50	7	36	7	779649.39	1041666.67	8.48	12.50	-32.2	-22.3
15*	5.00	58	10	41	7	1236413.18	1625933.33	9.98	14.50	-31.2	-22.5
16*	5.00	64	8	48	8	1561851.26	2184533.33	10.73	16.00	-32.9	-24.4
17**	5.00	68	10	48	10	1997584.59	2620266.67	11.73	17.00	-31.0	-23.4
18**	5.00	72	10	52	10	2317962.12	3110400.00	12.43	18.00	-30.9	-23.6
19**	5.00	74	10	56	8	2386739.39	3376866.67	12.65	18.50	-31.6	-24.3
20**	5.00	76	10	56	10	2668006.06	3658133.33	13.15	19.00	-30.8	-23.8

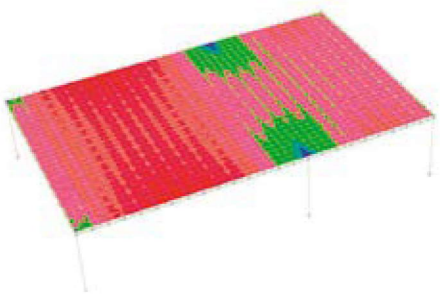
*It is recommended high performance concrete. **Post-tension.

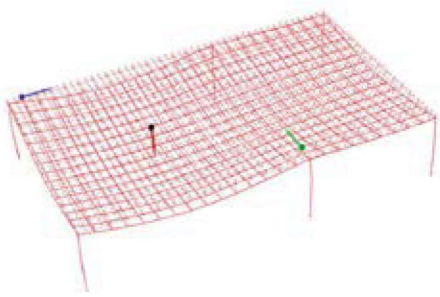
DEVELOPMENT AND ASSISTANCE

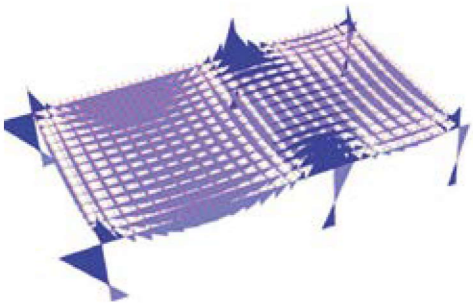
HOW TO OPTIMIZE THE PERFORMANCES OF A LIGHTENED SLAB



MODELLING OF THE FINISHING ELEMENTS FOR STRUCTURAL CHECKS







GEOPLAST TECHNICAL ASSISTANCE

Geoplast Technical Unit, with its staff of structural engineers, guarantees the needed support during all the stages in the worksite. After the analysis of the technical details and the possible restrictions of the construction, the technical staff defines the formwork system's configuration and developes the project, specifying the accessories. Prior agreement, when required, assistance in the worksite during the system's installation, the pouring stage and the removal, is provided.