

PROGETTAZIONE DI UN NUOVO COMPLESSO RESIDENZIALE

Analisi del workflow - BIM

Ing. Leonardo Mattei

CHI SIAMO

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IL TEAM

La coesione è la chiave fondamentale del successo dei nostri progetti



Centro Commerciale Algo
Lagundo, Merano



Ampliamento Ospedale San
Maurizio, Bolzano



Centro Commerciale Twenty,
Bolzano

Ing. Leonardo Mattei

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Via Volta, 3 - 39100 Bolzano - Italy
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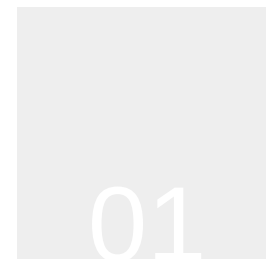
PROGETTAZIONE DI UN NUOVO COMPLESSO RESIDENZIALE



Complesso Residenziale Sonnenpark
Via Marconi, Laives (BZ)

Arch. Renzo Gennaro
Ing. Massimo Perli

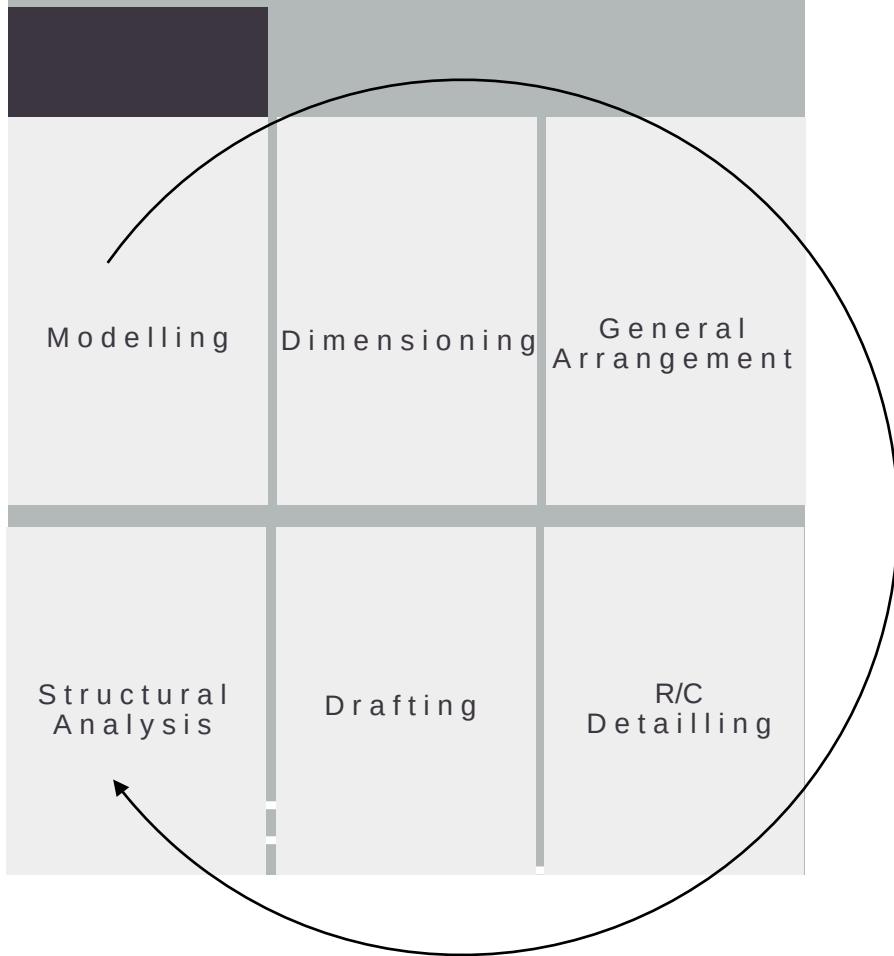
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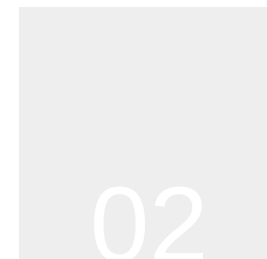


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100% CONTINUOUS BIM-WORKFLOW
FOR STRUCTURAL ENGINEERING

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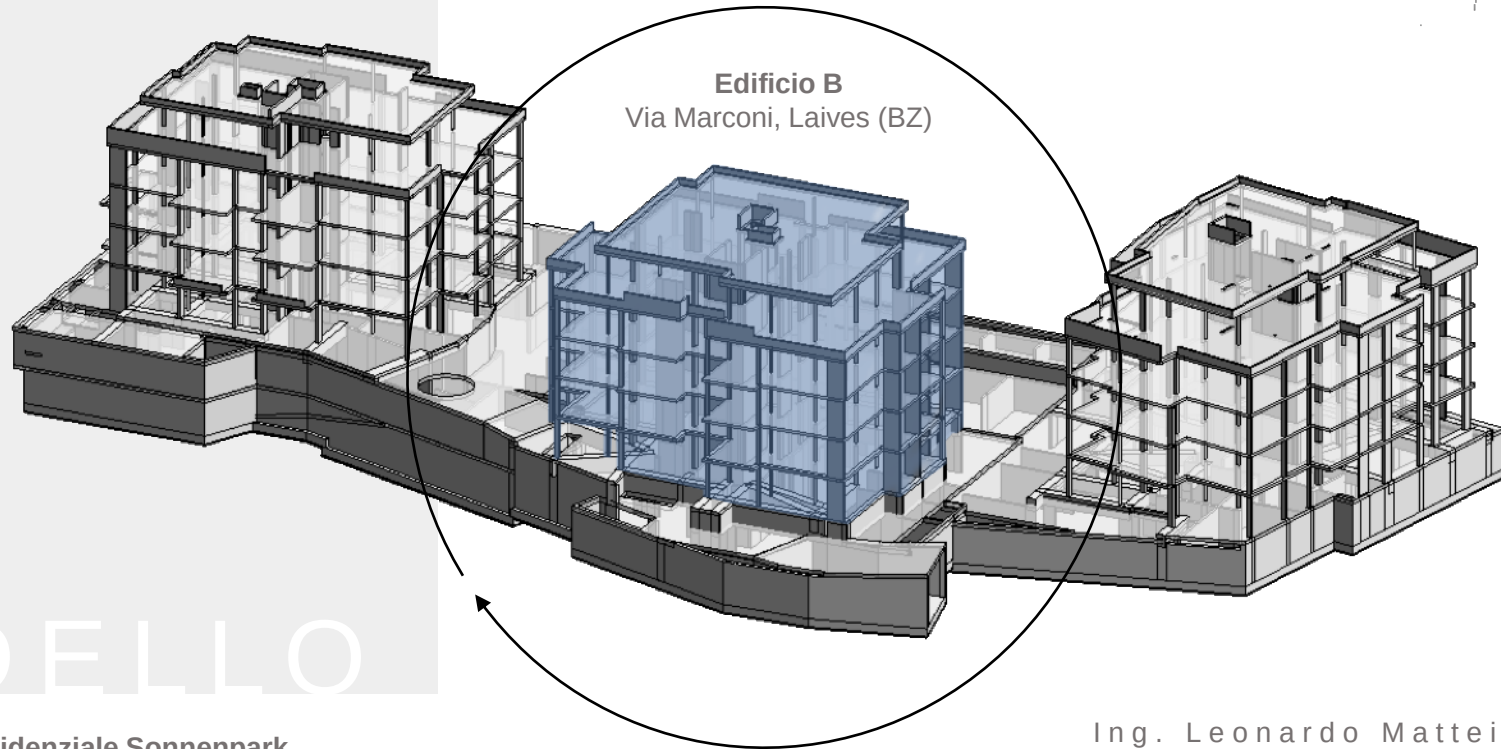
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Modellazione BIM del progetto

Modelling



MODELLO

Complesso Residenziale Sonnenpark
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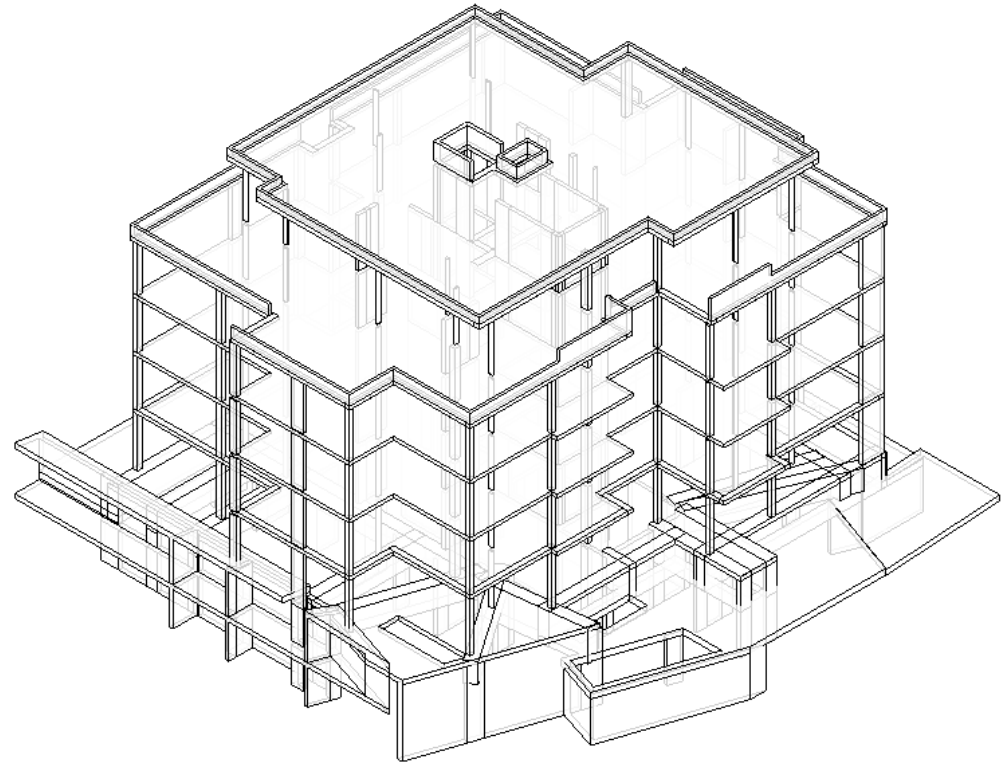


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03

Modellazione BIM del progetto

Modelling



EDIFICIO B

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Proprietà degli elementi strutturali

Modelling

Proprietà

 Pilastro in calcestruzzo 20x70cm

Pilastri strutturali (1)  Modifica tipo

Vincoli

Contrassegno di posizion...	A12(-0.47)-Ab(-0.36)
Livello di base	4° Solaio Edificio C +8.62
Offset base	0.2000
Livello superiore	5° Solaio Edificio A +11.82
Offset superiore	-0.2000
Stile pilastro	Verticale
Sposta con griglie	☒
Delimita il locale	☒
La base è associata	☒
La parte superiore è associ...	☒

Costruzione

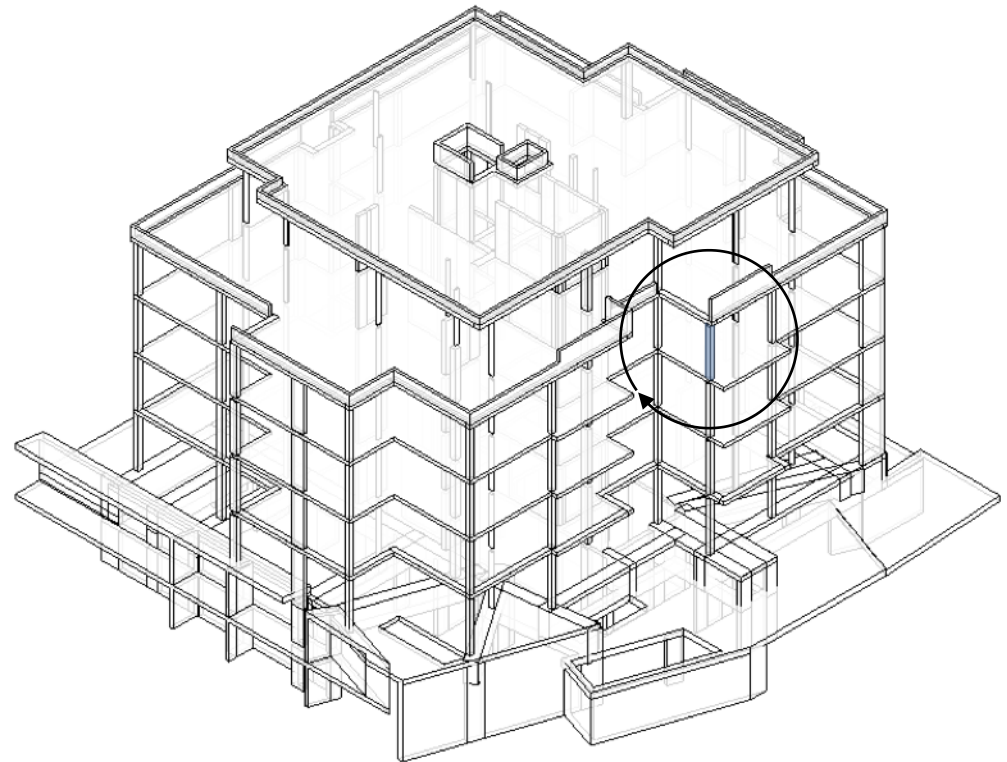
Giustificazione associazio...	Intersezione minima
Offset da associazione nel...	0.0000
Giustificazione associazio...	Intersezione minima
Offset da associazione nel...	0.0000

Materiali e finiture

Materiale strutturale	Calcestruzzo C30/37
-----------------------	---------------------

Strutturale

Attiva modello analitico	☒
Copriferro armatura - Sup...	Copriferro 25mm <25 mm>
Copriferro armatura - Sup...	Copriferro 25mm <25 mm>
Copriferro armatura - Altr...	Copriferro 25mm <25 mm>



Pilastro in calcestruzzo

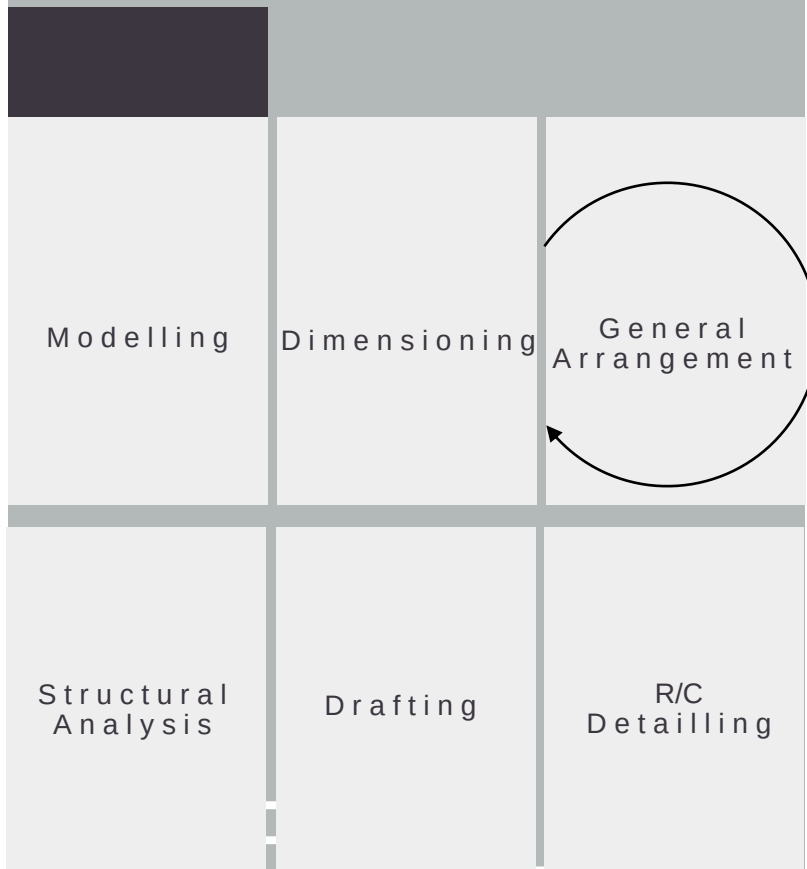
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05



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06

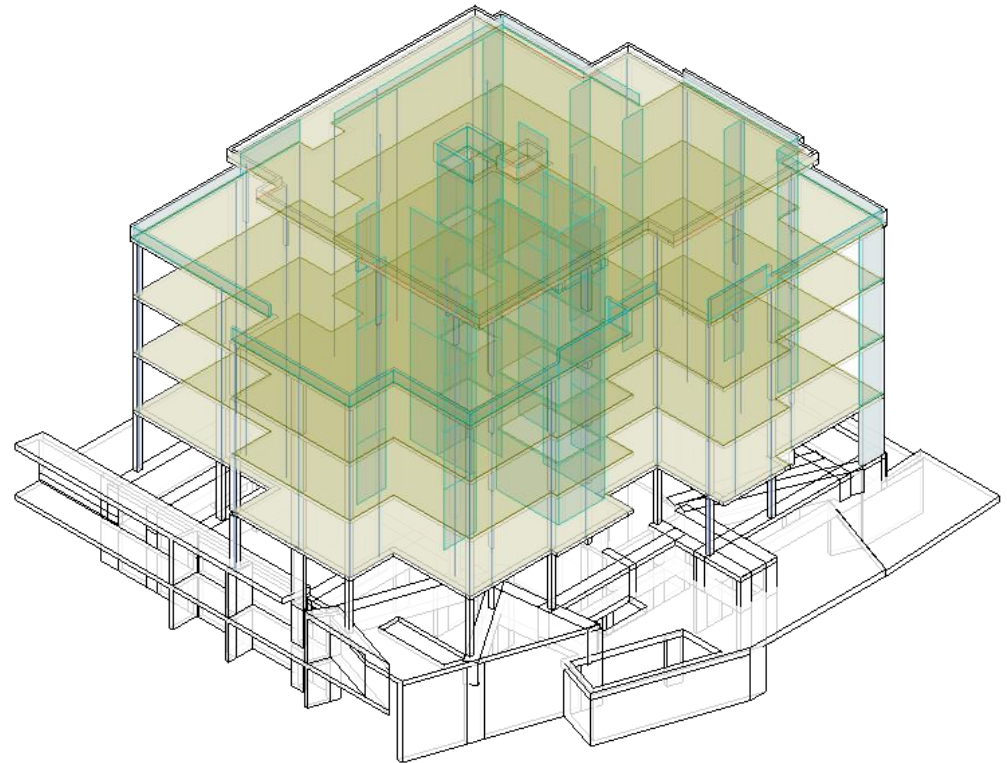
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Elementi analitici del modello

General
Arrangement



-  Solai
-  Pilastri
-  Setti

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Proprietà degli elementi analitici

Proprietà

SOFiSTiK: Structural Properties

Beam/Column

General

Structural Line Id 1235

Group 30

Name

Design Group

Section

Placement Centered

Effective Width

Meshing

Mesh Density

Releases at Start/End

Releases at Start Custom

N ☐

VY ☐

VZ ☐

MT ☐

MY ☐

MZ ☐

MB ☐

Releases at End Custom

N ☐

VY ☐

VZ ☐

MT ☐

MY ☐

MZ ☐

MB ☒

Rilasci/forze dell'elemento

Rilascio base Definito dall'utente

Fx base ☐

Fy base ☐

Fz base ☐

Mx base ☐

My base ☐

Mz base ☐

Rilascio parte superiore Definito dall'utente

Fx parte superiore ☐

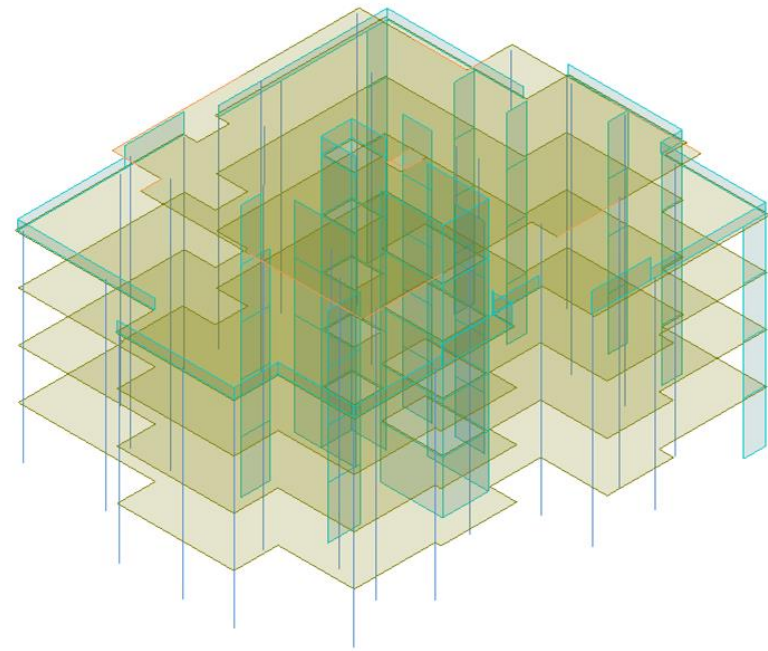
Fy parte superiore ☐

Fz parte superiore ☐

Mx parte superiore ☐

My parte superiore ☐

Mz parte superiore ☐



 Solai
 Pilastri
 Setti

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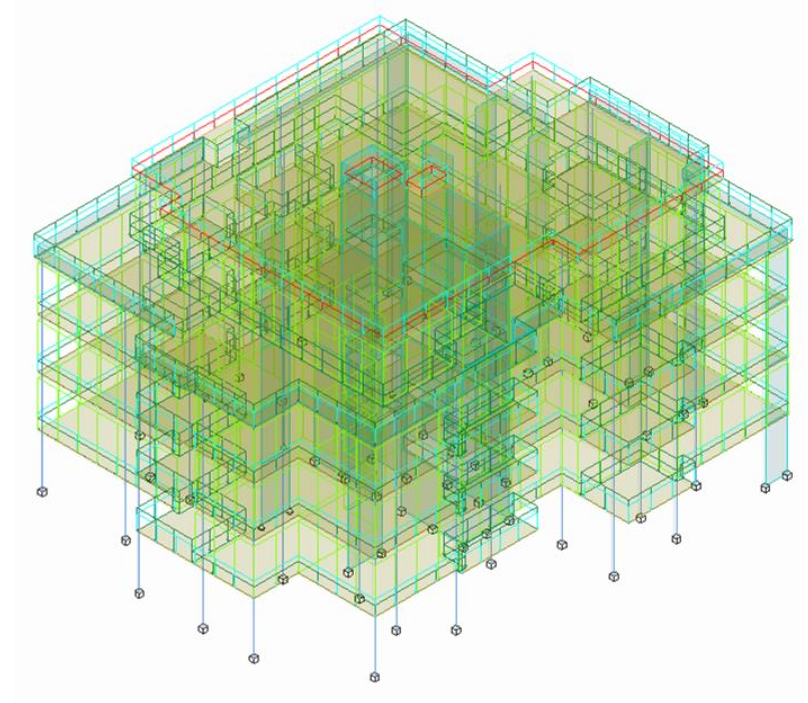
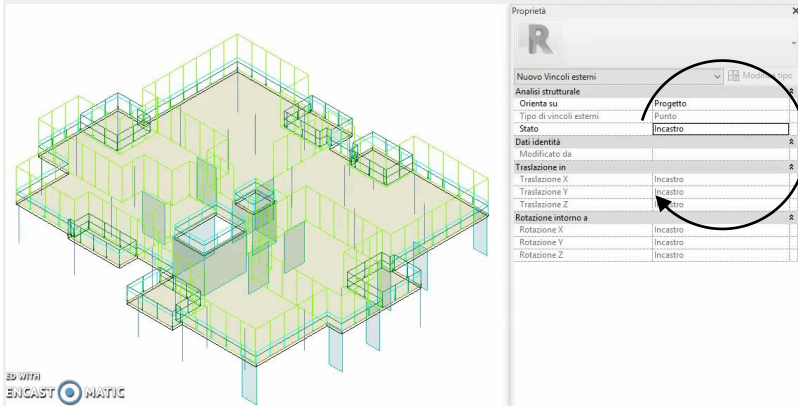


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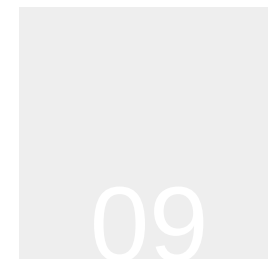
08

Vincoli e condizioni di carico

General Arrangement



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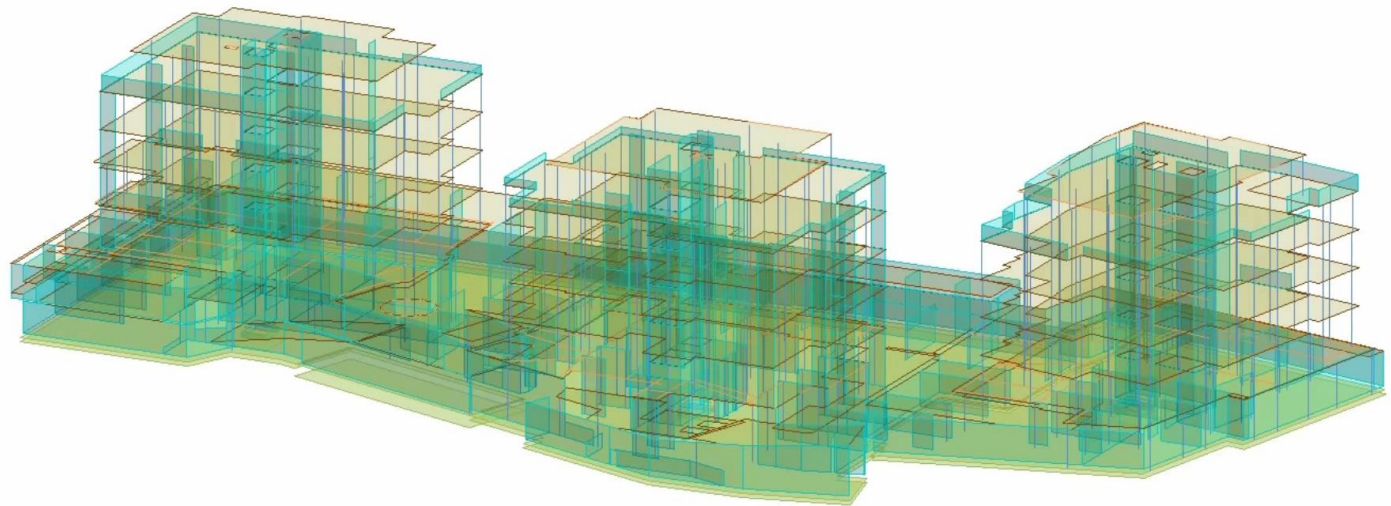


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Modellazione analitica del progetto



Modelling



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Via Marconi, Laives (BZ)

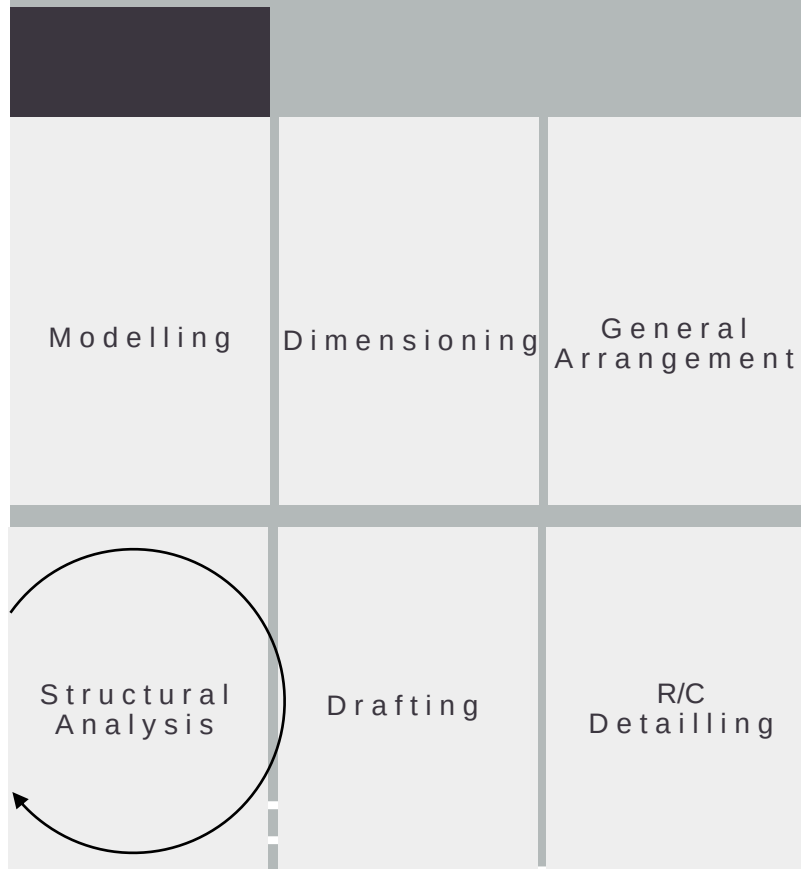
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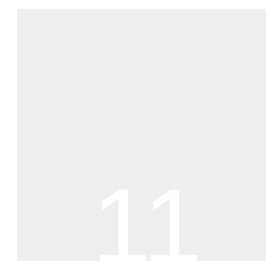
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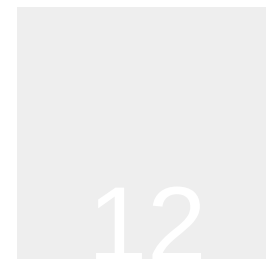


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Structural
Analysis

EDIFICIO B

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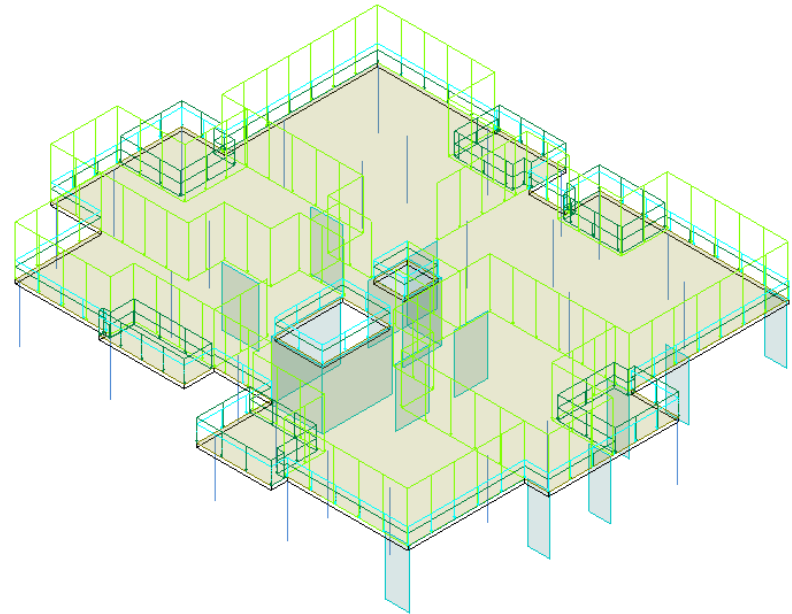
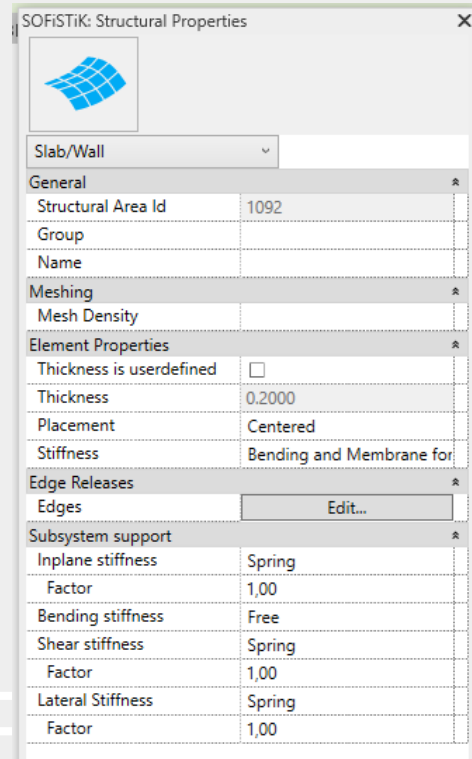


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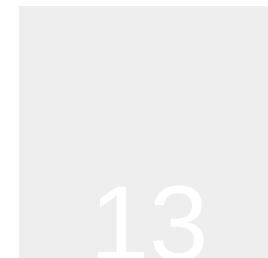
Estrazione di un sottosistema



Structural
Analysis

EDIF

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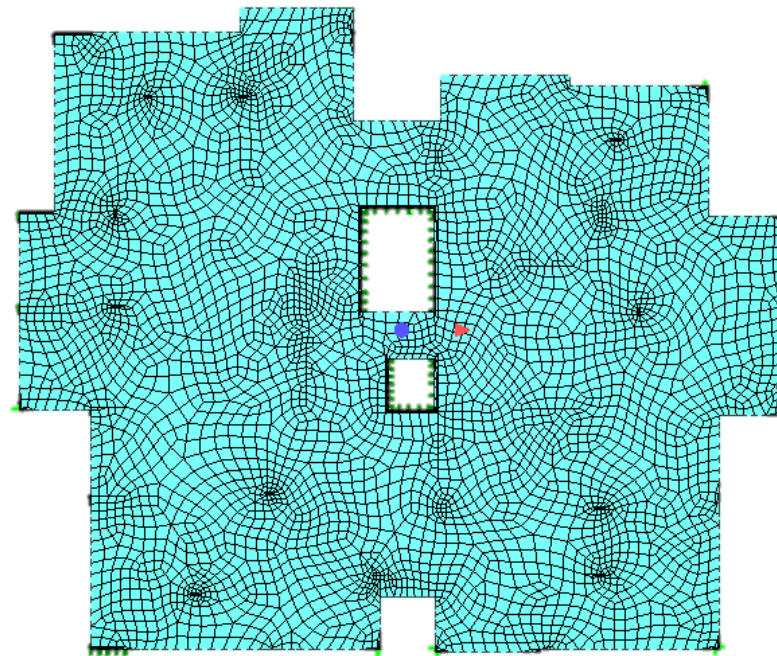


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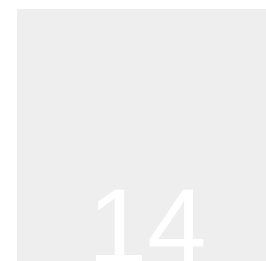
Estrazione di un sottosistema



Structural
Analysis

EDIFICIO B

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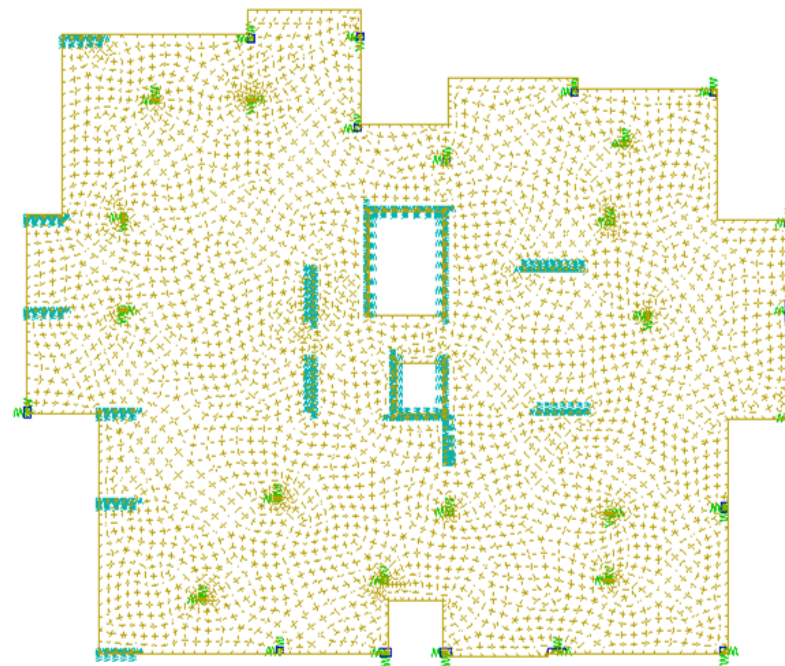


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Estrazione di un sottosistema

Structural
Analysis

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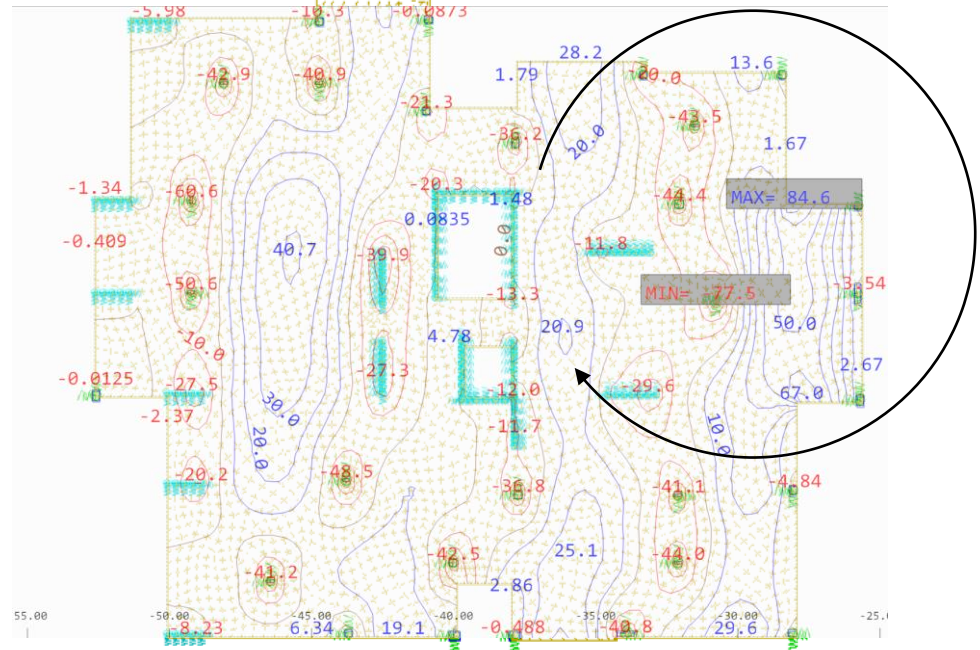
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Estrazione di un sottosistema

Stato di sollecitazione



Structural
Analysis

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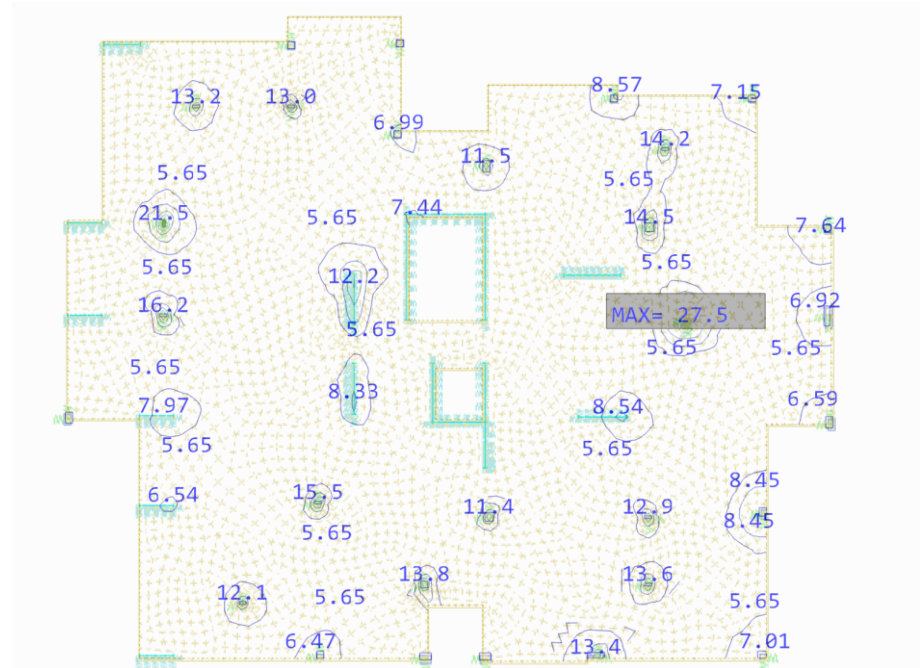
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Structural Analysis



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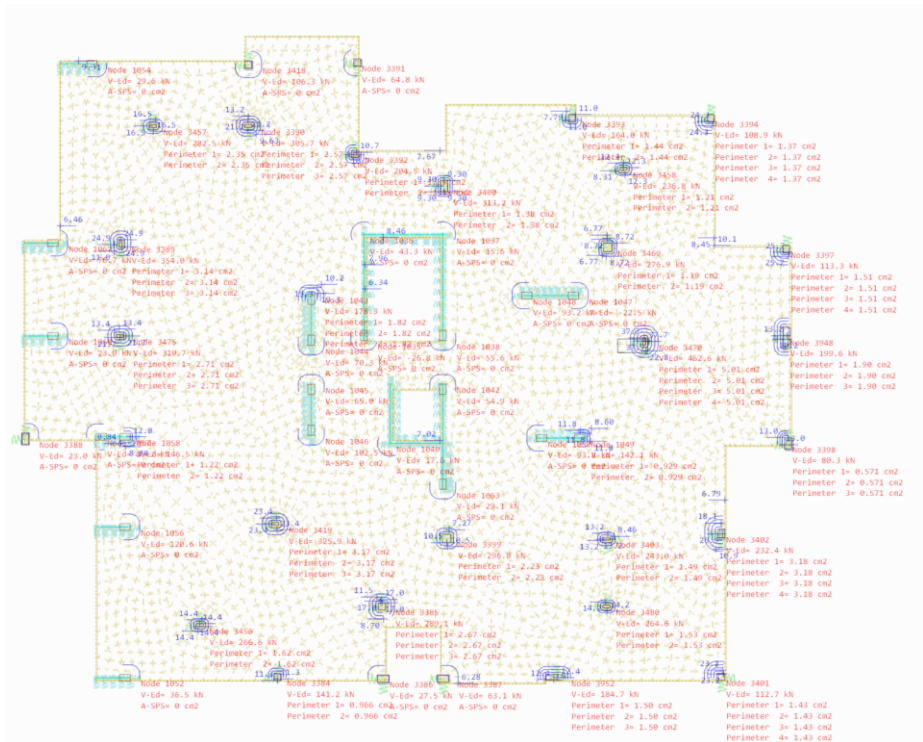
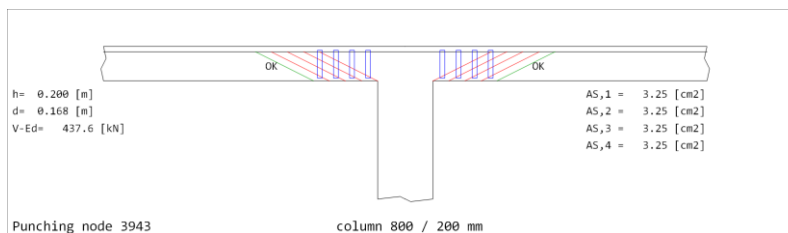


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Verifiche allo SLU

Punching

Node number	= 3943	X= -75.3 [m]	Y= -21.1 [m]
Z=	2.820 [m]		
Max. shear force V-ULS=	439.9 [kN]	LC= 2102 via QUAD connecting forces	
reduced by	2.3 [kN]	dead load -gamma over the column: V _{red} =	437.6 [kN]
(live load part not available after superposition and not subtracted)			
Column size	b= 0.200 [m]	a= 0.800 [m]	
Plate thickness h-slab=	0.200 [m]	d= 0.168 [m]	
1. perimeter at 2.0-d=	0.336 [m]	utot= 3.311 [m]	u1= 3.311 [m]
Tension reinfor. as >=	8.15 [cm ² /m]	ro= 0.49 [o/o]	v _{rdc} = 0.59 [MPa]
mue was increased to get less perimeters -> PUNCR0_L.			
v-Ed = 1.15-V/u/d	= 0.90 [MPa]	> 0.59 [MPa] = v _{rdc}	
1.15=flat eccentricity factor beta			
(1.07=eccentricity factor acc. EN 1992-1-1 6.4.3 (6.39))			
The value must be checked and input if necessary.			
At the column face: v-Ed(u0) =	1.50 [MPa]	< v-RD,max =	4.58 [MPa]
1. shear reinforcement perimeter at a1=0.50-d			
Optimum radial spacing reinforcement perimeters sr= 0.093 [m] =0.55-d			
No further shear reinforcement is required from uout= 5.07 [m]			
Shear reinforcem. Asw= (v-Ed-0.75-v _{rdc})-u-sr/1.5/f _{tywd} -ef (f _{tywd} -ef= 292.)			
1. perimeter	As1= 3.25 [cm ²]	ass= 20.20 [cm ² /m ²]	a1= 0.084 [m]
2. perimeter	As1= 3.25 [cm ²]	ass= 15.09 [cm ² /m ²]	a2= 0.177 [m]
3. perimeter	As1= 3.25 [cm ²]	ass= 12.04 [cm ² /m ²]	a3= 0.270 [m]
4. perimeter	As1= 3.25 [cm ²]	ass= 10.02 [cm ² /m ²]	a4= 0.364 [m]



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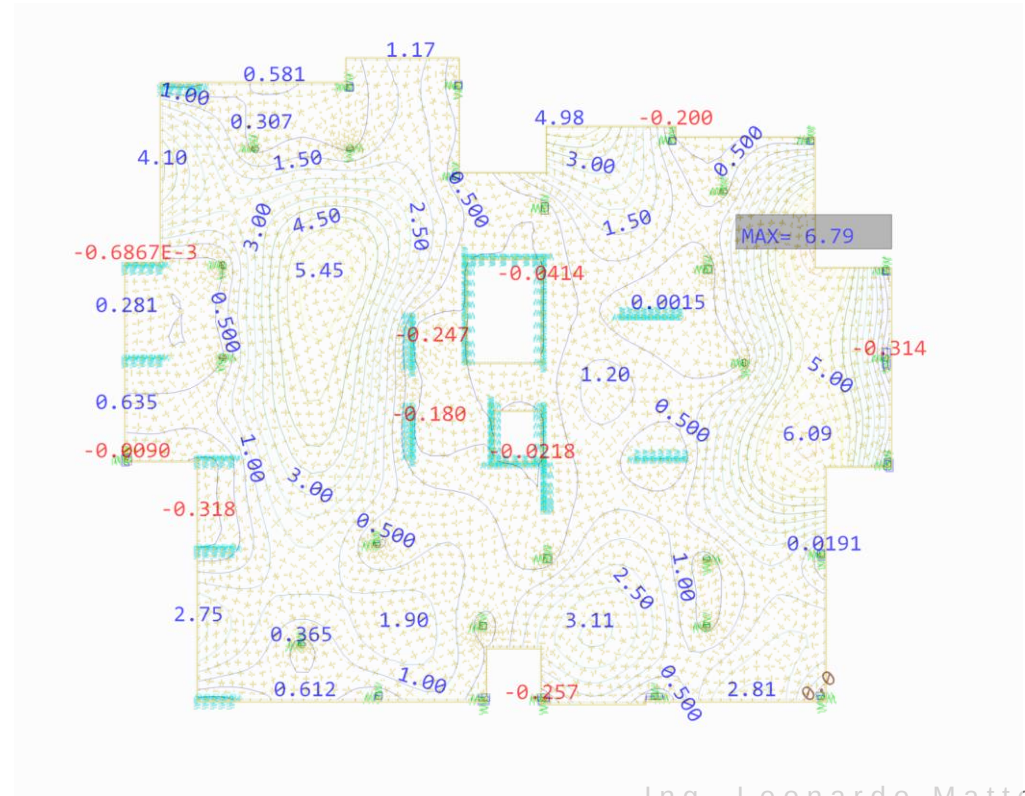
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Verifiche allo SLE

Displacements

Structural
Analysis

EDIFICIO B



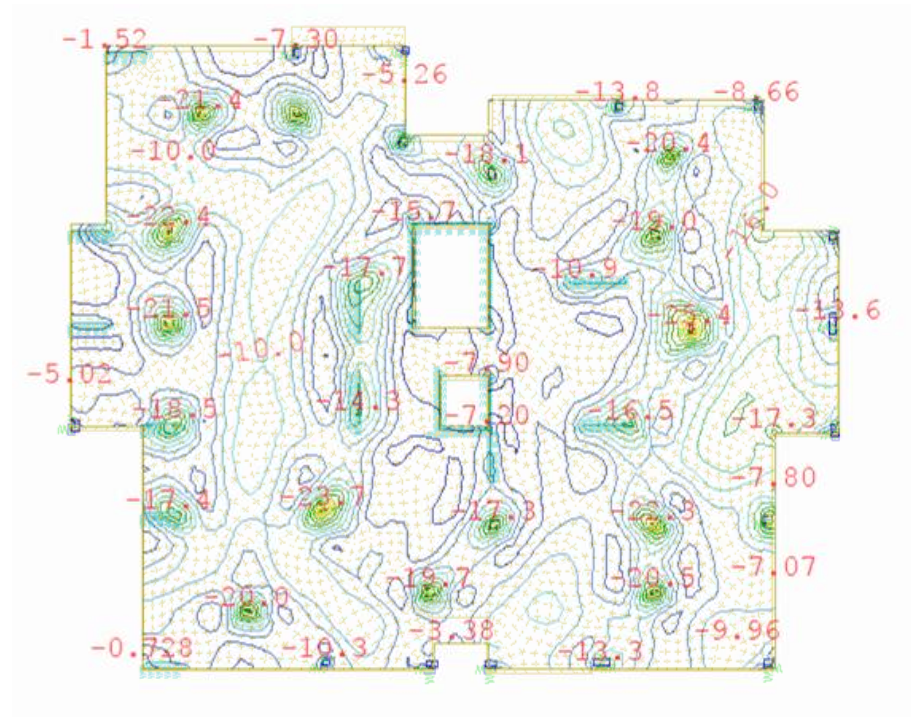
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Verifiche allo SLE

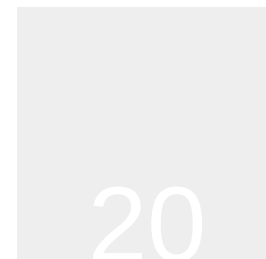
Concrete pressure

Structural
Analysis

EDIFICIO B



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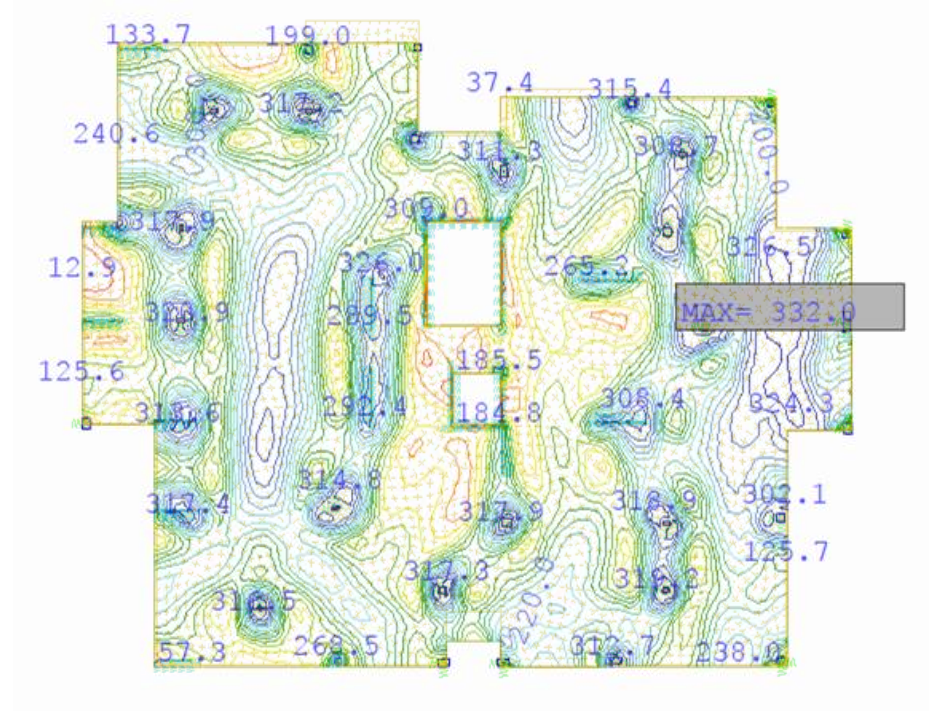
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Verifiche allo SLE

Steel stress

Structural
Analysis

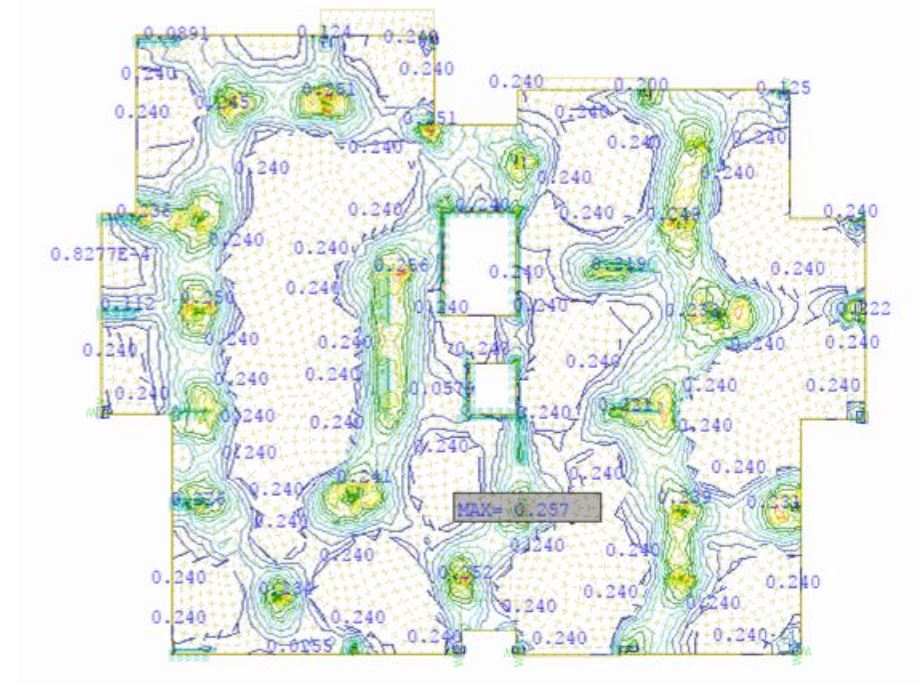
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Verifiche allo SLE

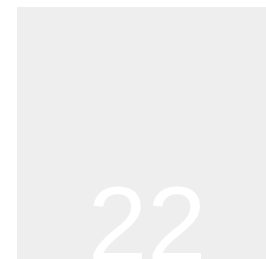
Crack width



Structural
Analysis

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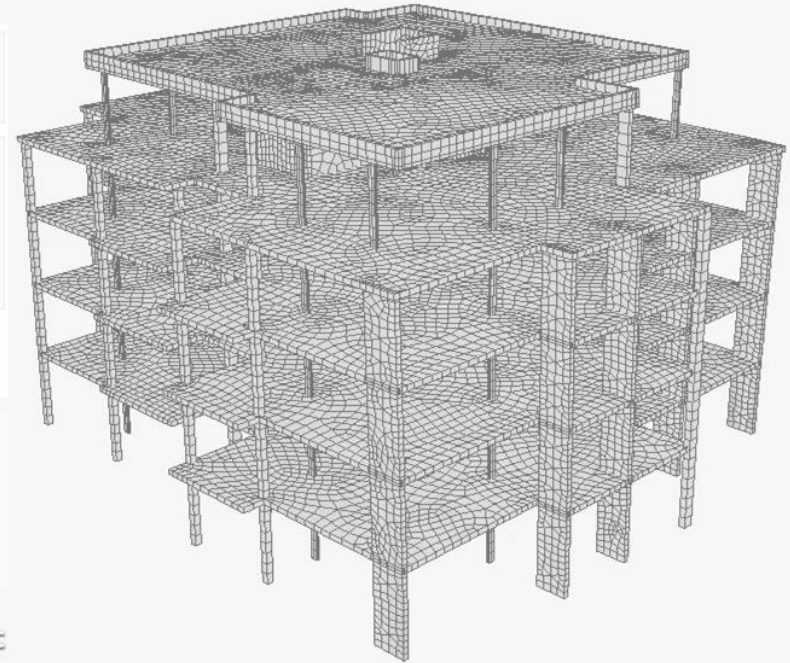
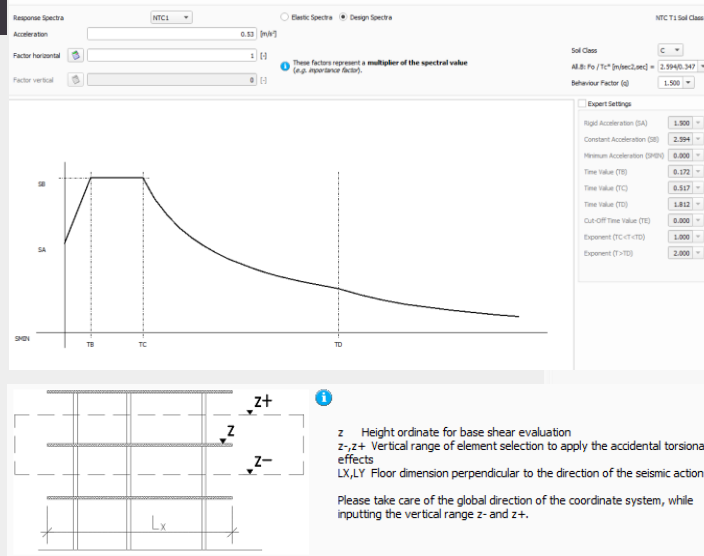


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Analisi dinamica



Structural
Analysis

ITA
CAST MATIC



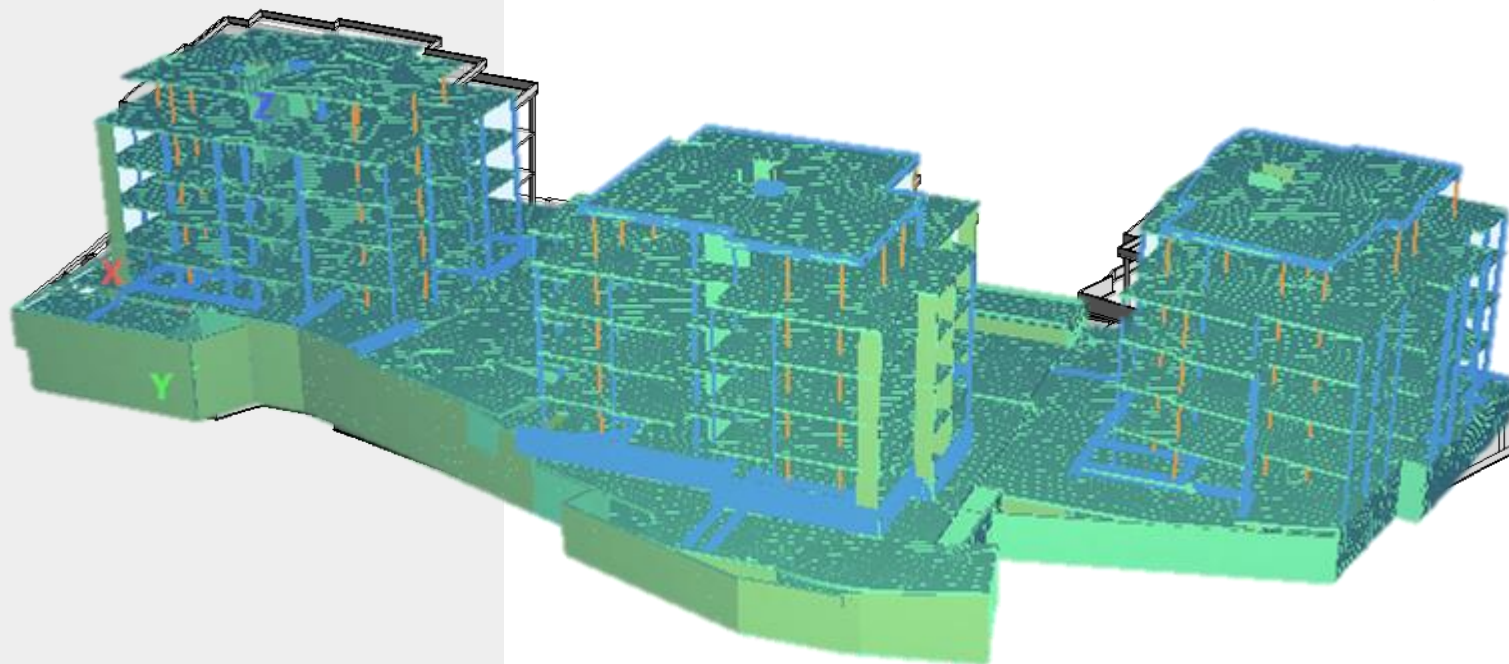
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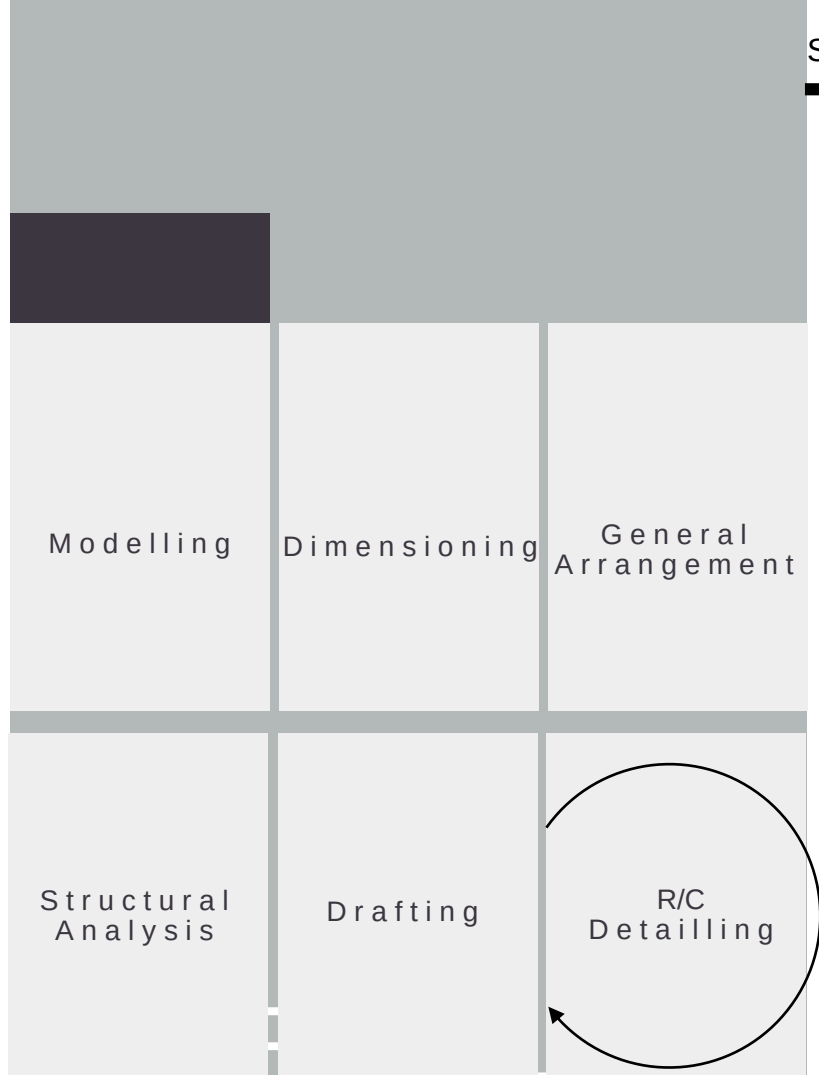


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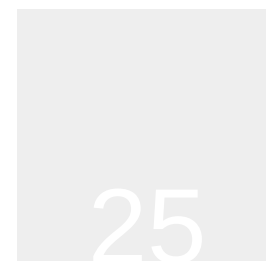
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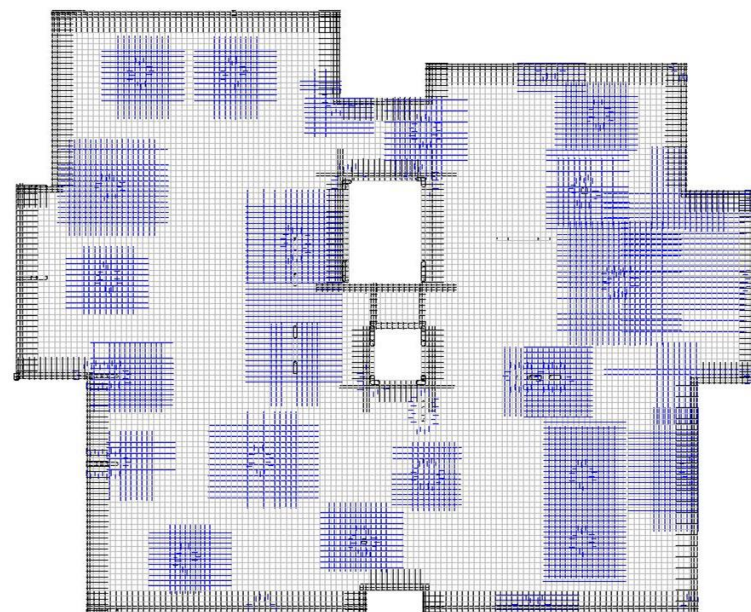
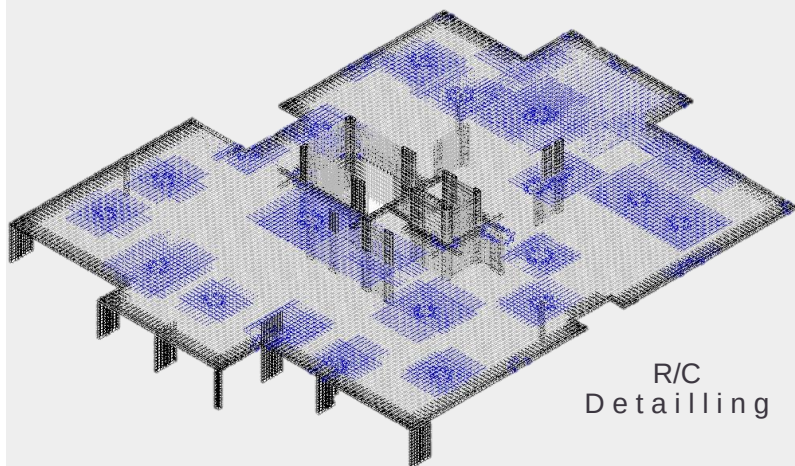


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Rappresentazione grafica



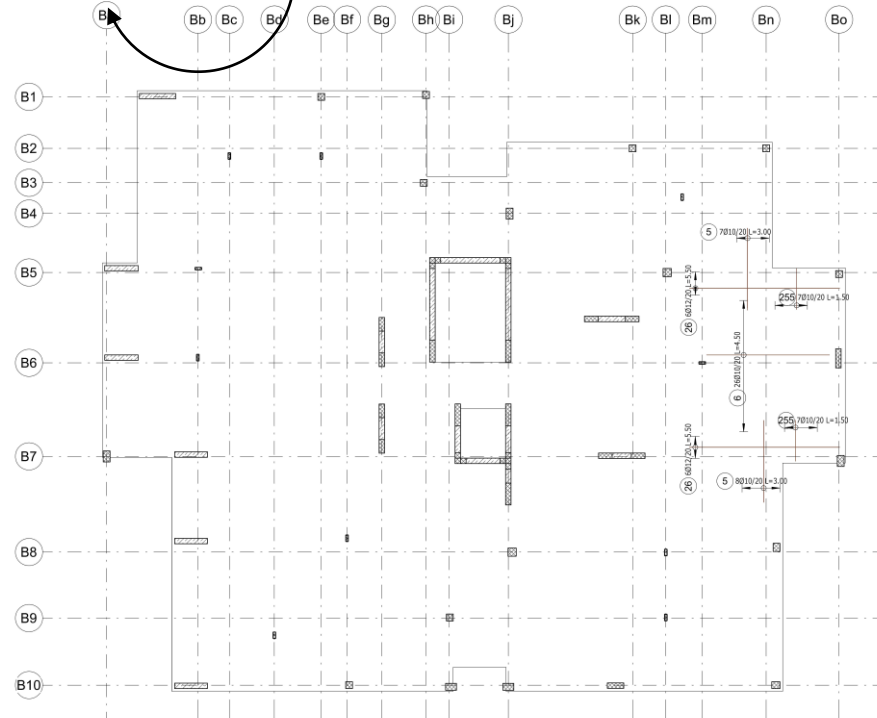
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Rappresentazione grafica

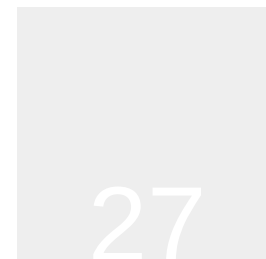
ARMATURA
INFERIORE

R/C
Detailing

ARMATURA AGGIUNTIVA INFERIORE
scala 1:100



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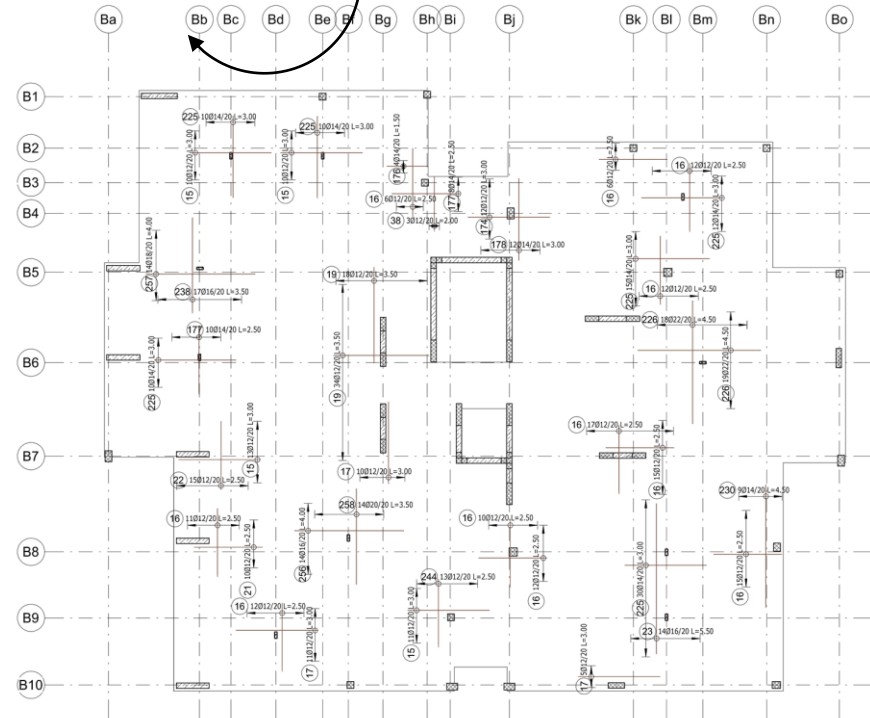
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Rappresentazione grafica

ARMATURA
SUPERIORE

R/C
Detailing

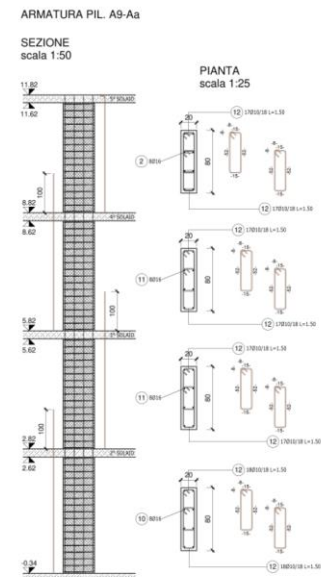
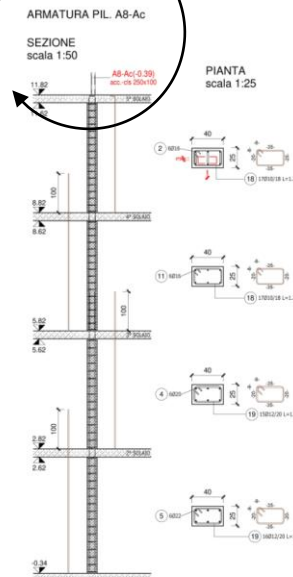
ARMATURA AGGIUNTIVA SUPERIORE
scala 1:100



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Rappresentazione grafica

PILASTRI



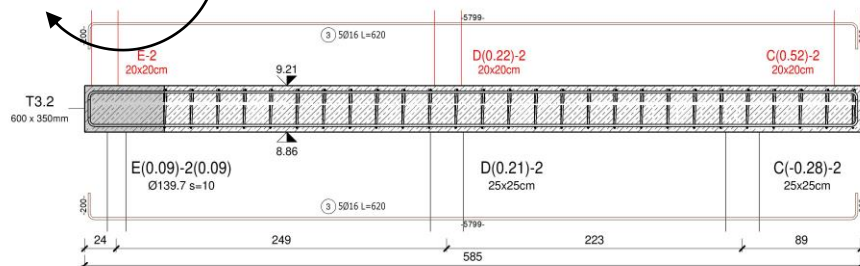
Armatura pilastro A8-Ac		
Commenti	Diametro barra	Kg
Pil. A8-Ac	10 mm	25.06 kg
Pil. A8-Ac	12 mm	33.43 kg
Pil. A8-Ac	16 mm	66.48 kg
Pil. A8-Ac	20 mm	58.82 kg
Pil. A8-Ac	22 mm	74.03 kg
297.82 kg		

Armatura pilastro A9-Aa		
Commenti	Diametro barra	Kg
Pil. A9-Aa	10 mm	122.15 kg
Pil. A9-Aa	16 mm	191.04 kg
313.19 kg		

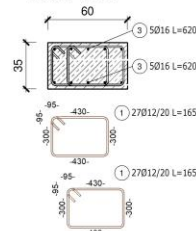
TRAVI

R/C
Detailing

ARMATURA T3.1
scala 1:25



SEZ T3.1
scala 1:25



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Rappresentazione grafica

Lista delle quantità

Materiale: Default			
Diametro delle barre	Numero delle barre	Lunghezza totale [m]	Peso totale
10 mm	112	465.36	286.91 kg
16 mm	30	67.53	106.58 kg
18 mm	48	110.72	221.17 kg
20 mm	188	514.66	1269.24 kg
22 mm	40	141.44	422.06 kg
Totale:			2305.97 kg

Lista dei ferri

Elemento strutturale	Pos. Nr.	Diametro	Lunghezza [m]	Quantità	Lunghezza totale [m] mandrino	Diametro	Forma	Tipo gancio	A [cm]	B [cm]	C [cm]	D [cm]	E / R	H _{total} / H _{free}	Rev
	1	10 mm	92.66	1	92.66	40 mm	77		47	15	878				
Commento: 58 Windungen; Ganghöhe 15															
	2	10 mm	44.63	1	44.63	40 mm	77		37	15	507				
Commento: 33 Windungen; Ganghöhe 15															
	3	10 mm	44.65	1	44.65	40 mm	77		37	15	507				
Commento: 33 Windungen; Ganghöhe 15															
	4	10 mm	24.82	1	24.82	40 mm	77		27	15	369				
Commento: 24 Windungen; Ganghöhe 15															
	5	10 mm	21.71	2	43.41	40 mm	77		27	15	309				
Commento: 20 Windungen; Ganghöhe 15															
	6	10 mm	26.59	1	26.59	40 mm	77		32	15	325				
Commento: 21 Windungen; Ganghöhe 15															
	7	10 mm	26.59	1	26.59	40 mm	77		32	15	325				

Elemento strutturale	Pos. Nr.	Diametro	Lunghezza [m]	Quantità	Lunghezza totale [m] mandrino	Diametro	Forma	Tipo gancio	A [cm]	B [cm]	C [cm]	D [cm]	E / R	H _{total} / H _{free}	Rev
	20	16 mm	2.00	10	20.00	112 mm	00		200						
Commento: PIL.Tipo 7-E-01															
	21	16 mm	1.65	10	16.50	112 mm	11		150	15				1	
Commento: PIL.Tipo 7-E-01															
	22	16 mm	3.10	10	31.03	112 mm	00		310					1	
Commento: PIL.Tipo 7-E-01															

Elemento strutturale	Pos. Nr.	Diametro	Lunghezza [m]	Quantità	Lunghezza totale [m] mandrino	Diametro	Forma	Tipo gancio	A [cm]	B [cm]	C [cm]	D [cm]	E / R	H _{total} / H _{free}	Rev
Commento: 21 Windungen; Ganghöhe 15															
	8	18 mm	2.00	16	32.00	270 mm	00		200						
Commento:															
	9	18 mm	3.22	16	51.52	270 mm	00		322						
Commento:															
	10	18 mm	1.70	16	27.20	270 mm	11		150	20					
Commento:															
	11	20 mm	2.00	40	80.00	80 mm	11		180	20					
Commento: PIL.Tipo 1-B02															
	12	20 mm	1.70	30	51.00	80 mm	11		150	20					
Commento:															
	13	20 mm	8.81	10	88.06	80 mm	00		881						
Commento: PIL.Tipo 1-B02															
	14	20 mm	3.09	20	61.80	80 mm	00		309						
Commento:															
	15	20 mm	3.70	34	125.80	80 mm	00		370						
Commento:															
	16	20 mm	2.00	54	108.00	80 mm	00		200						
Commento:															
	17	22 mm	5.07	20	101.40	330 mm	00		507						
Commento:															
	18	22 mm	2.00	20	40.04	330 mm	11		20	180					
Commento:															
	19	10 mm	1.56	104	162.01	40 mm	31	2	20	50	20	50		8	8
Commento: PIL.Tipo 5-D-03															

DISTINTA

GRAZIE PER L'ATTENZIONE

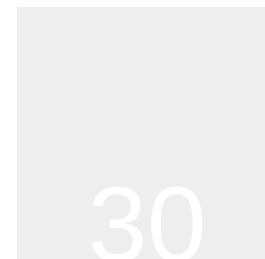
Aig
ASSOCIATI
PARTNER

IL TEAM

La coesione è la chiave fondamentale del successo dei nostri progetti



Ing. Leonardo Mattei



Aig
ASSOCIATI
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