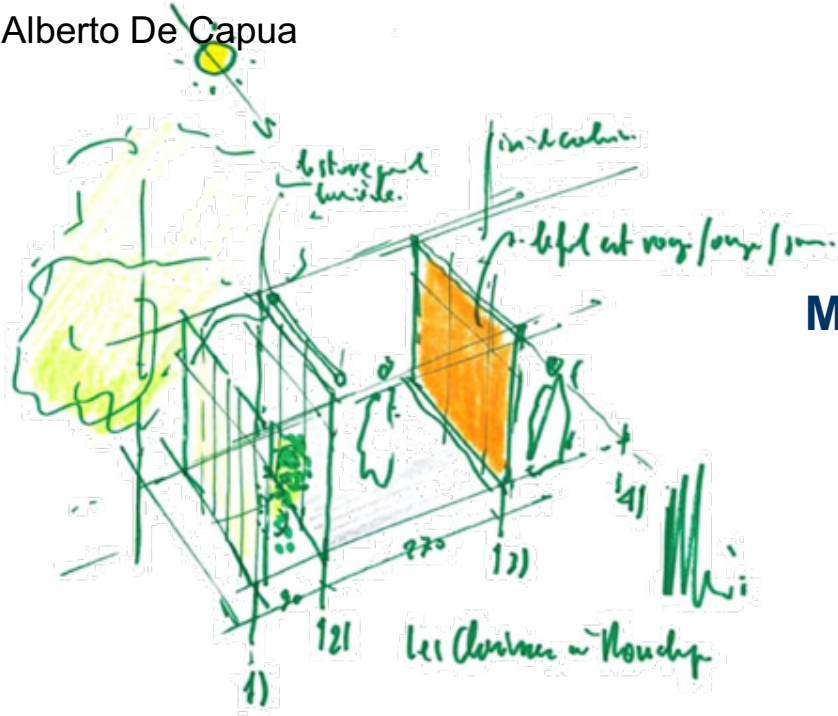


Materials for Architecture and Technological Innovation (6 CFU)

Materials Technologies for the Environment (6 CFU)

Prof. Alberto De Capua



MpA 12 INTERNAL PARTITION

- Verticals
- Horizontals
- Sloping

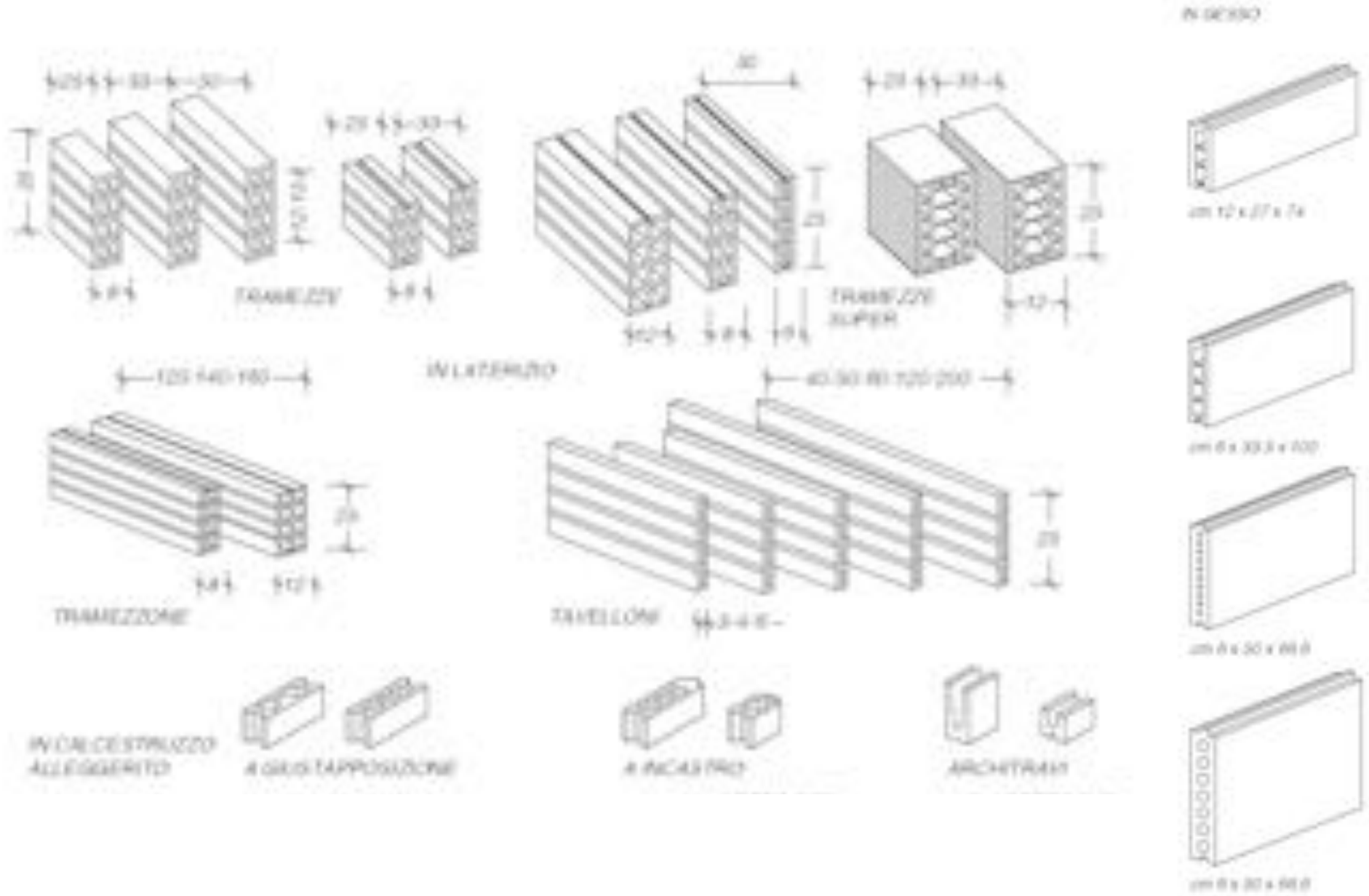
Renzo Piano Building Workshop

The expression **internal partition** means (**UNI 7960**) the technological unit that separates the internal spaces.

- The **separation** is realized from the physical, optical, acoustic, thermal, psychological point of view. It can be:
- **simple**: when it divide the internal spaces;
- **equipped**: when the division also contain engineering systems;
- **containers**: when it also provide for spaces to contain objects;
- **movable**: when, by means of easy mechanisms, they can be removed, change during time the separation between rooms.

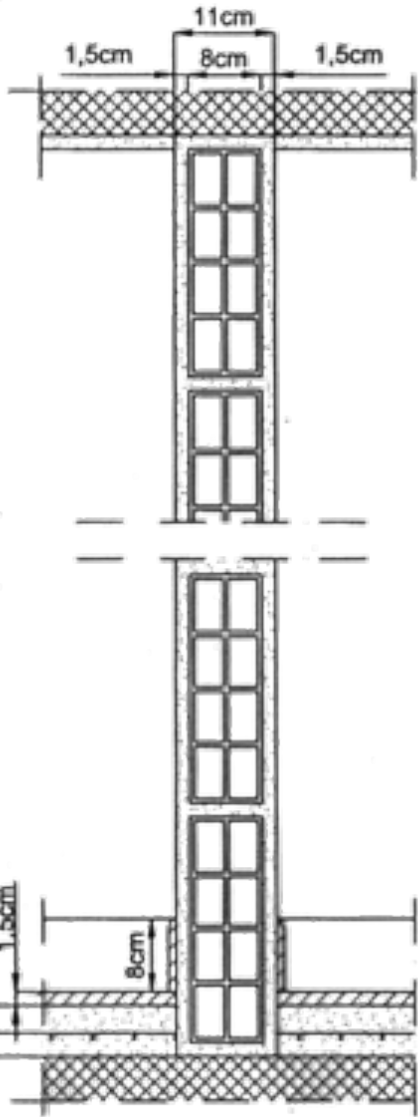
<i>Classes of technology Units</i>	<i>Technology Units</i>	<i>Classes of Technical Elements</i>
INTERNAL PARTITION	VERTICAL INTERNAL PARTITION	VERTICAL INTERNAL WALLS INTERIOR VERTICAL FRAMES PROTECTIVE ELEMENTS
	HORIZONTAL INTERNAL PARTITION	FLOORS MEZZANINES HORIZONTAL INTERNAL FRAMES
	SLOPED INTERNAL PARTITION	INTERNAL STAIRS INTERNAL RAMPS

Typologies of elements

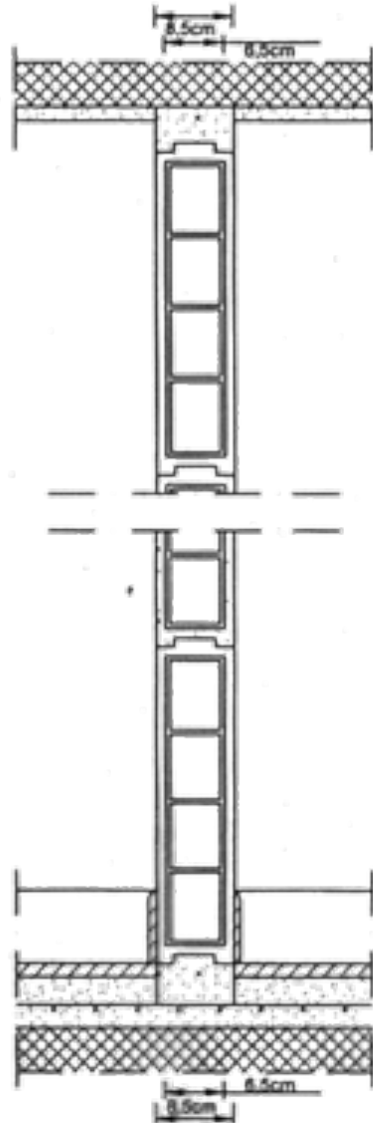


Vertical internal partitions

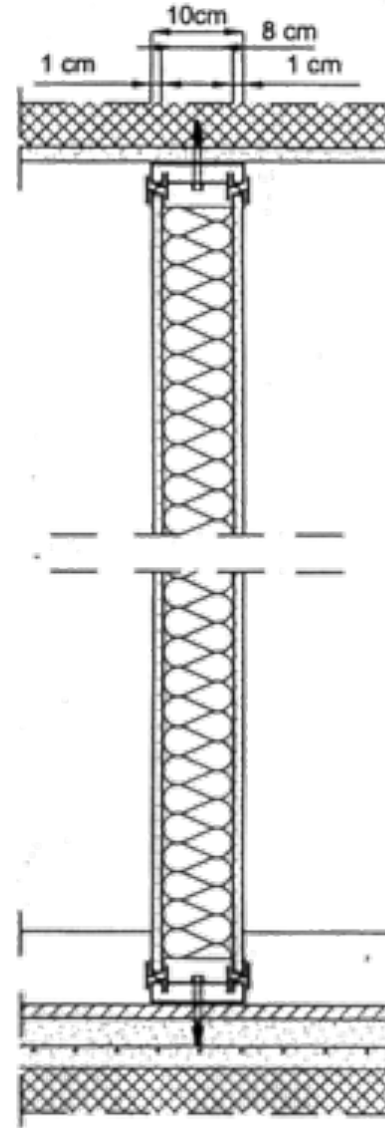
vertical interior walls — small elements



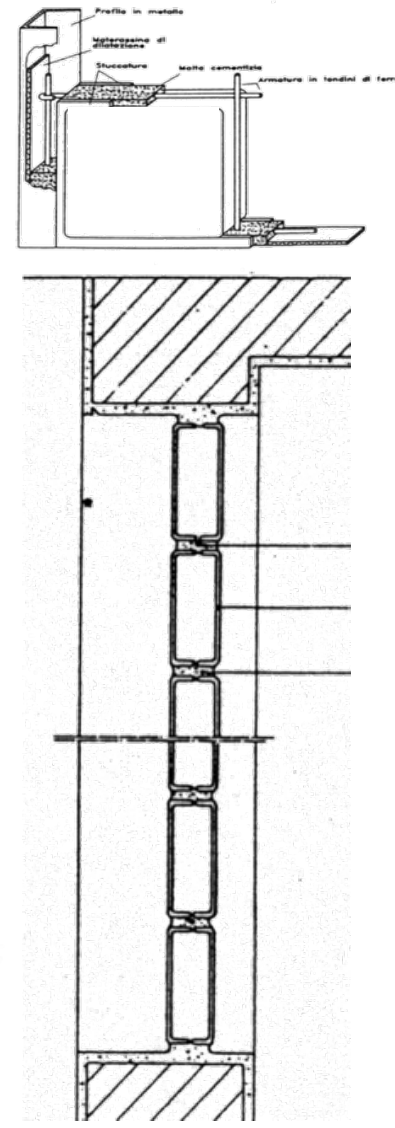
p. in mattoni forati



p. con blocchi in latero - gesso



p. con guida metallica e pannello sandwich

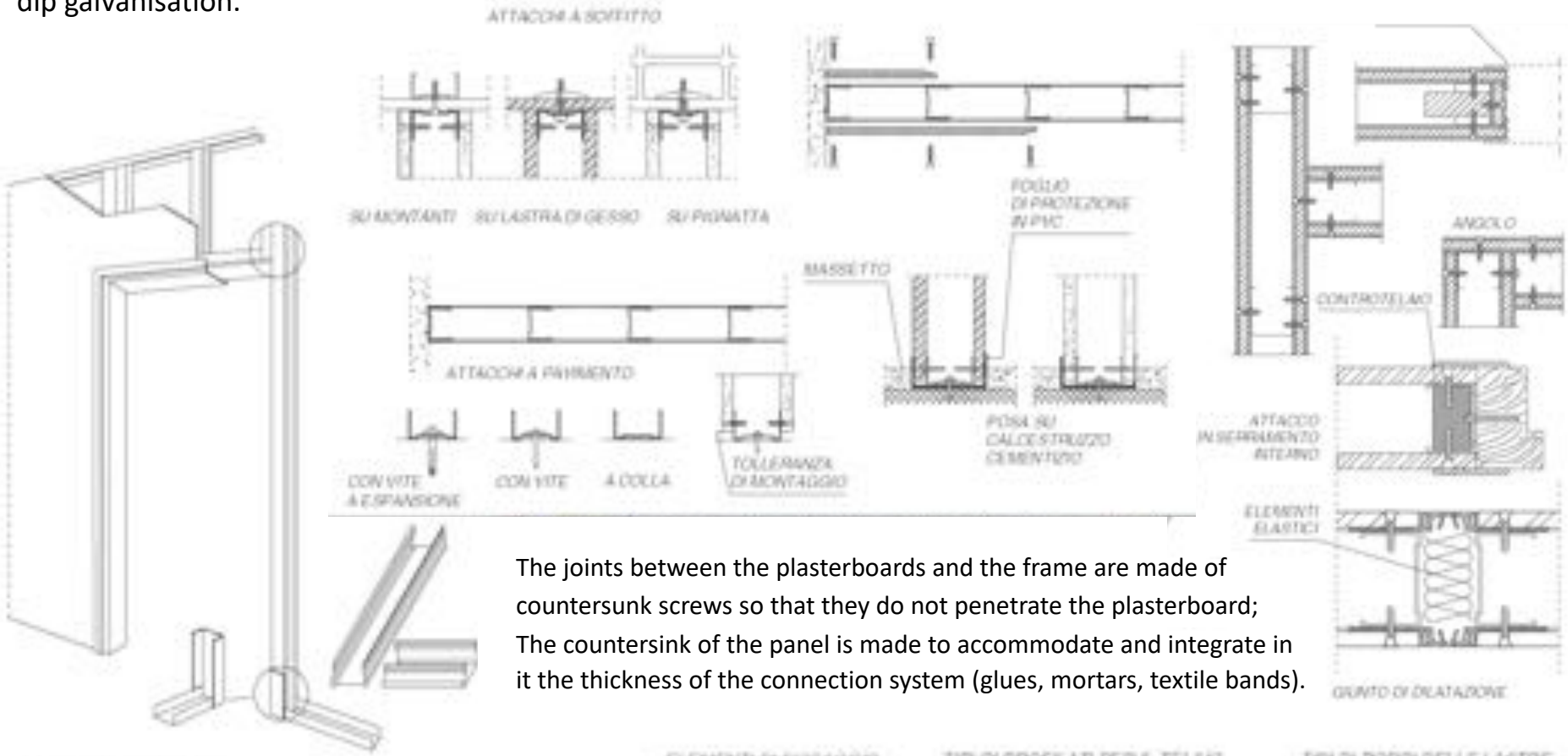


p. con vetro mattone










Vertical internal partitions

vertical interior walls — plasterboard (drywall)

The execution of the internal partitions by using plasterboards on metal frames is described in standard UNI 9154. The metallic structure is made of steel sheet profiles at least 0.60 mm thick, cold-bent and protected against corrosion by hot-dip galvanisation.

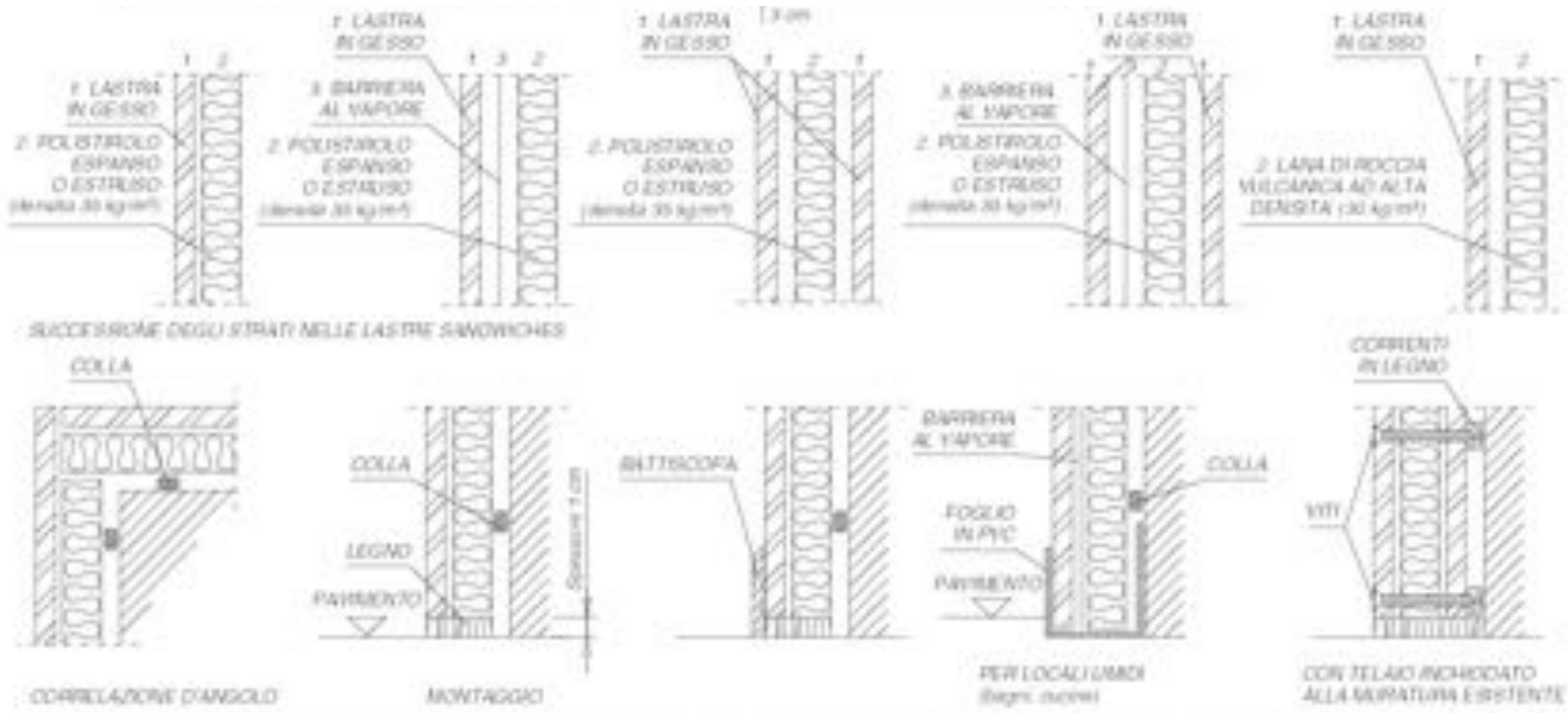


The joints between the plasterboards and the frame are made of countersunk screws so that they do not penetrate the plasterboard; The countersink of the panel is made to accommodate and integrate in it the thickness of the connection system (glues, mortars, textile bands).

ELEMENTI DI FISSAGGIO		TIPI DI PROFILATI PER IL TELAIO		TIPI DI BORDI DELLE LASTRE	
AVASATA CON APPUNTA A CRUCE		a-C		ARROTTIGLIATO	
AVASATA CON APPUNTA A CRUCE		a-U		DIRTTO	
TORSA CON APPUNTA A CRUCE		a-F		SMUSSATO	

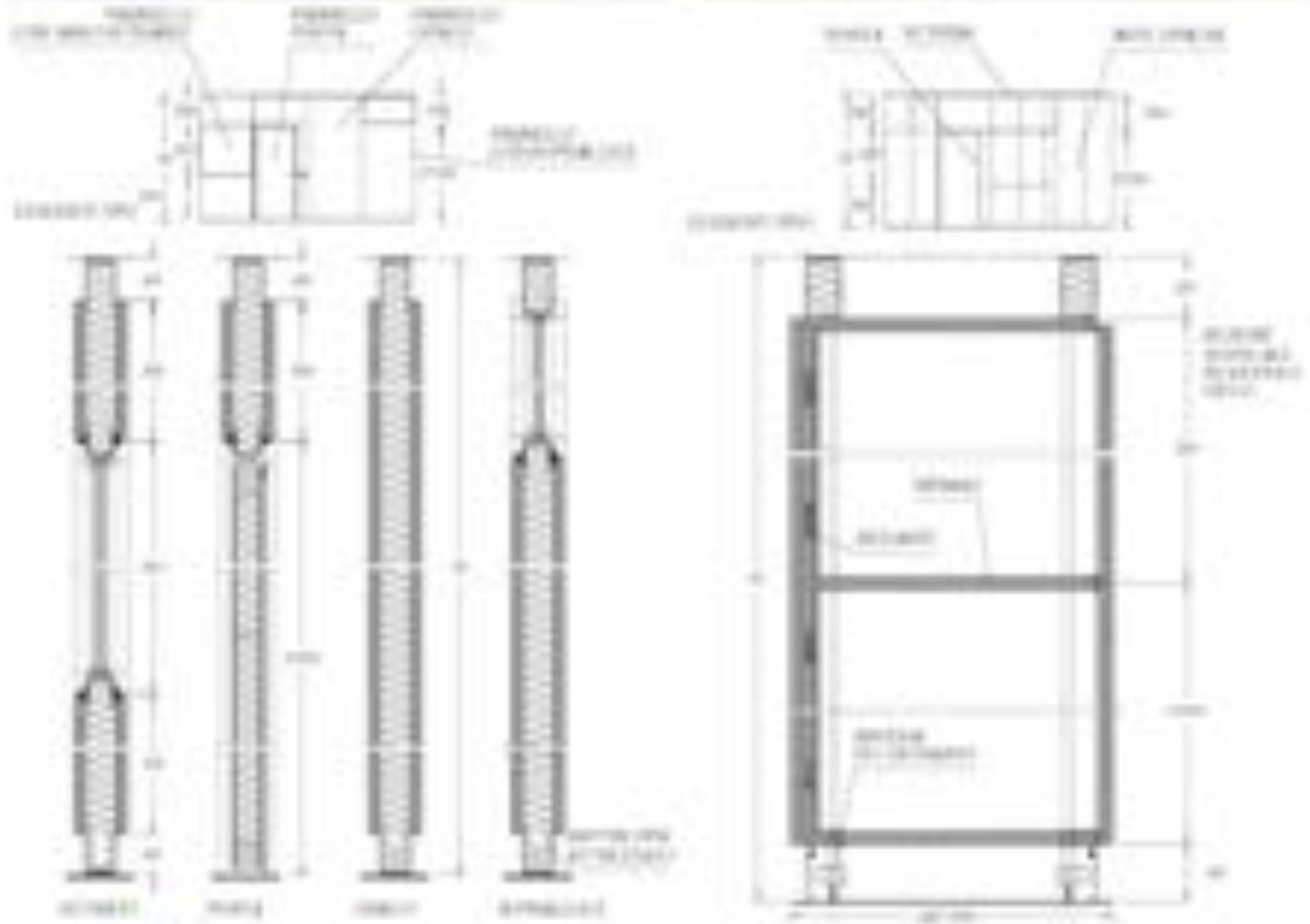
Vertical internal partitions

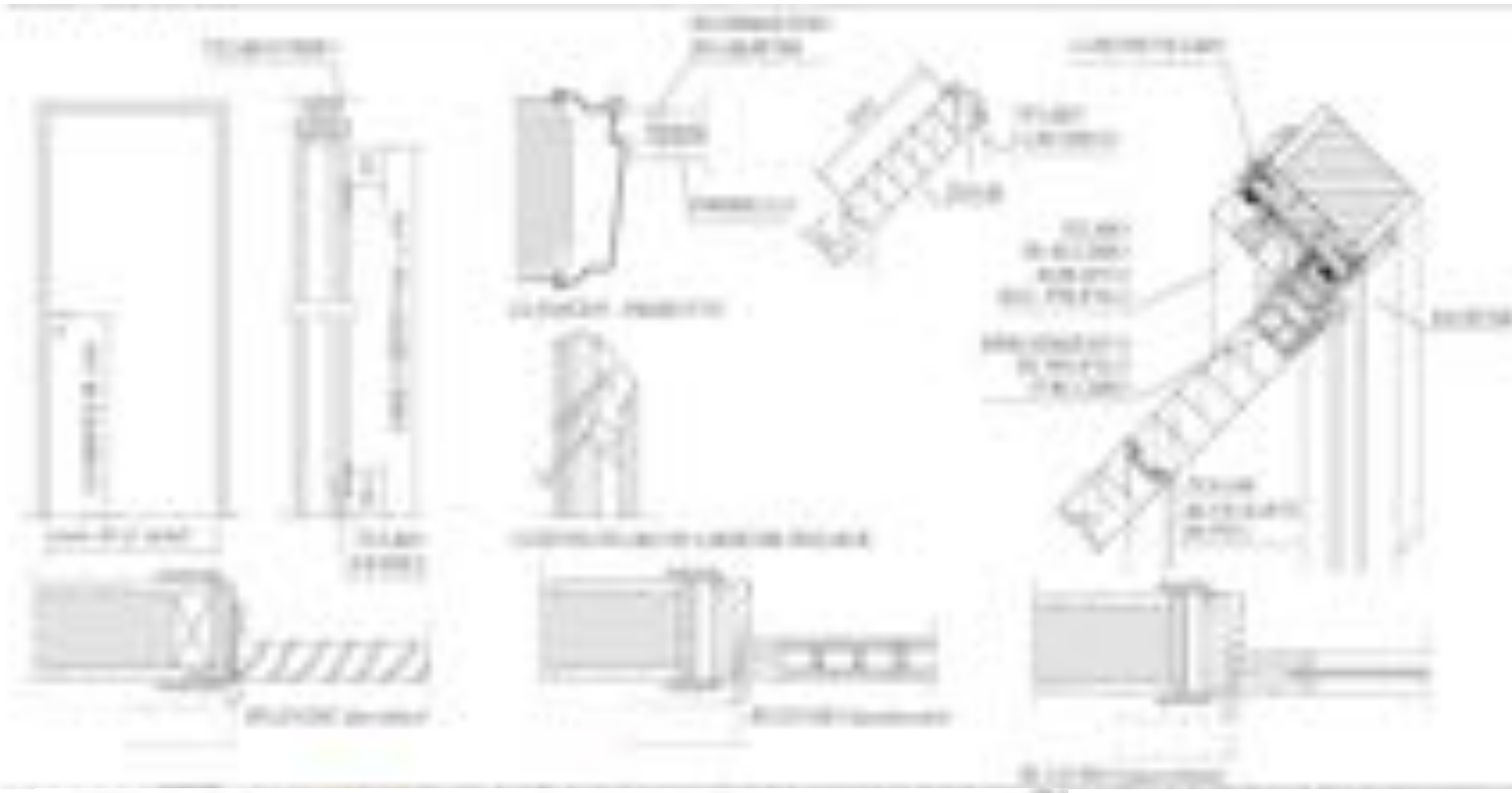
vertical interior walls — plasterboard and polystyrene foam panel



Vertical internal partitions

Movable interior partitions





Labels and dimensions for the bottom diagrams.

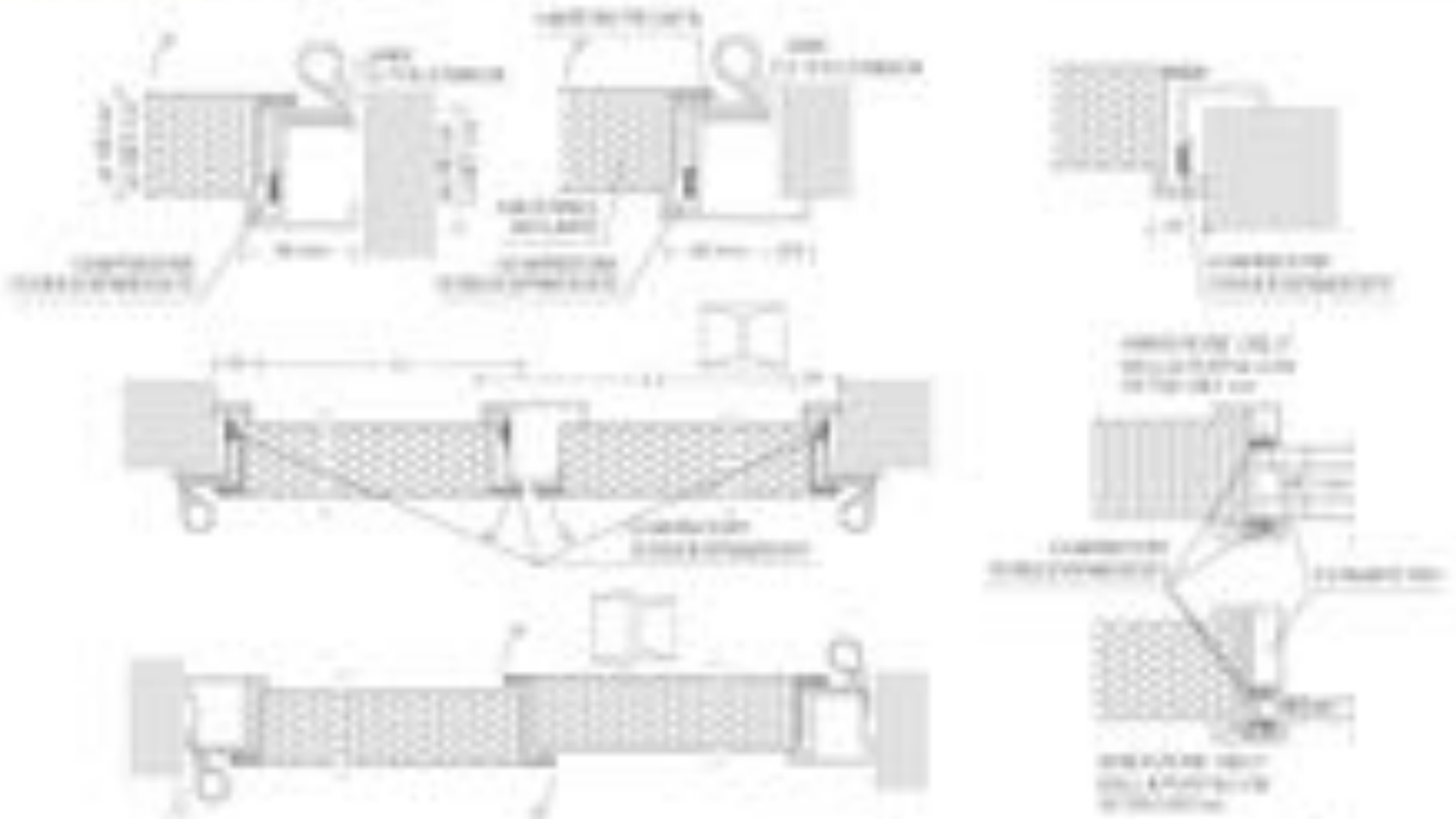
Vertical internal partitions

Vertical internal frames — FIREPROOF DOORS

They are made of pressed-bent sheet steel, cold calibrated, with fireproof materials in between. The rebate, the locks, the hinges and all the accessories must satisfy the class of resistance required by the doors.

The tests certify the class of conformity: RE aptitude for mechanical resistance under the action of fire, EI aptitude for mechanical resistance and thermal insulation (prevents the passage of heat and smoke on the opposite side); the number following the certification indicates the duration of the performance tested in minutes: 60, 90, 120.

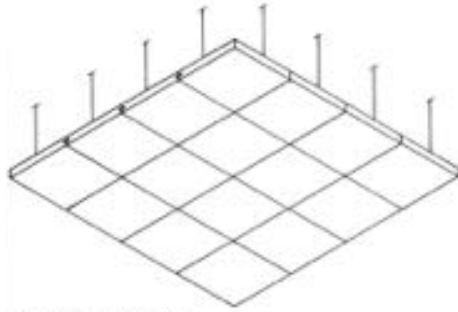
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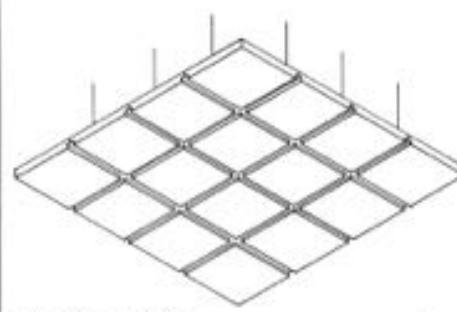
Horizontal internal partitions

false ceilings and mezzanines

In panels



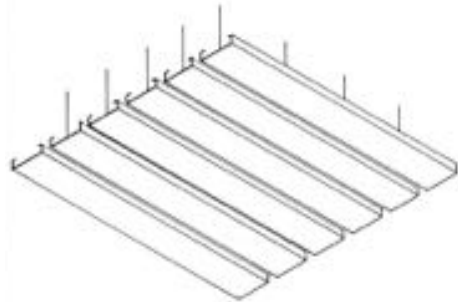
CON STRUTTURA
NASCOSTA



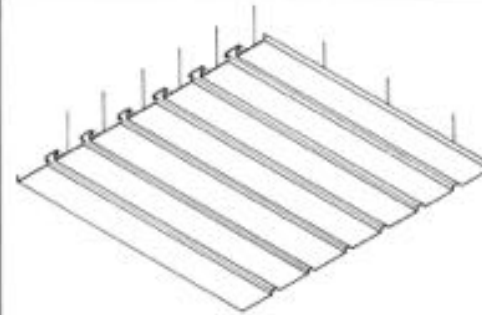
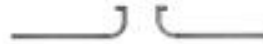
CON STRUTTURA
A VISTA



In slats



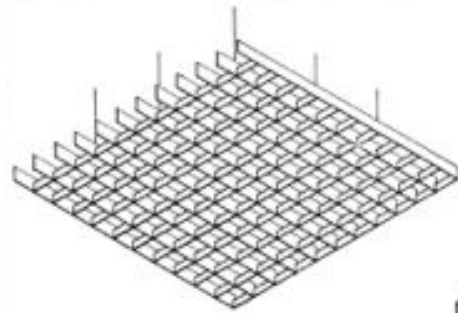
A GIUNTO APERTO



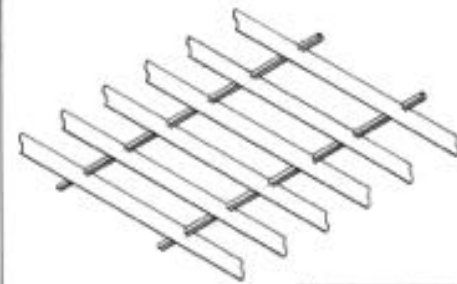
A GIUNTO CHIUSO



In grids



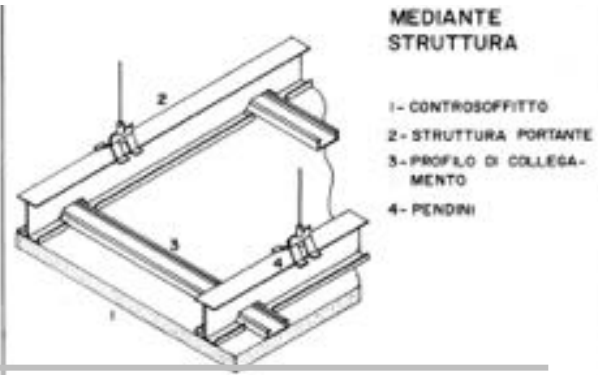
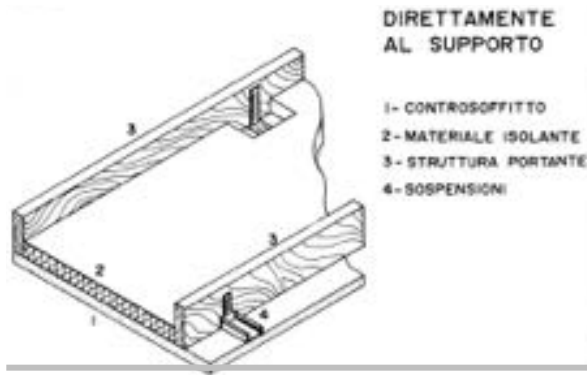
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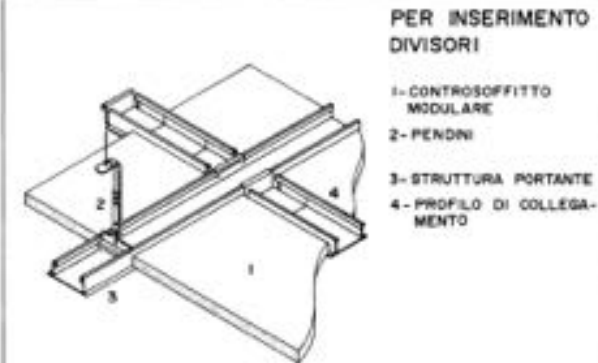
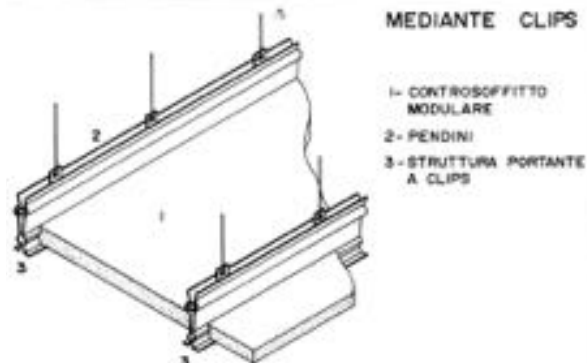
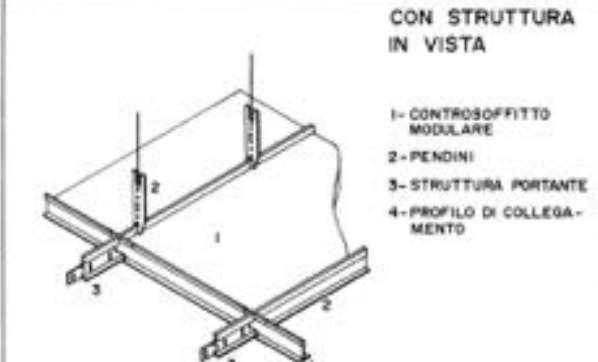
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Hang systems

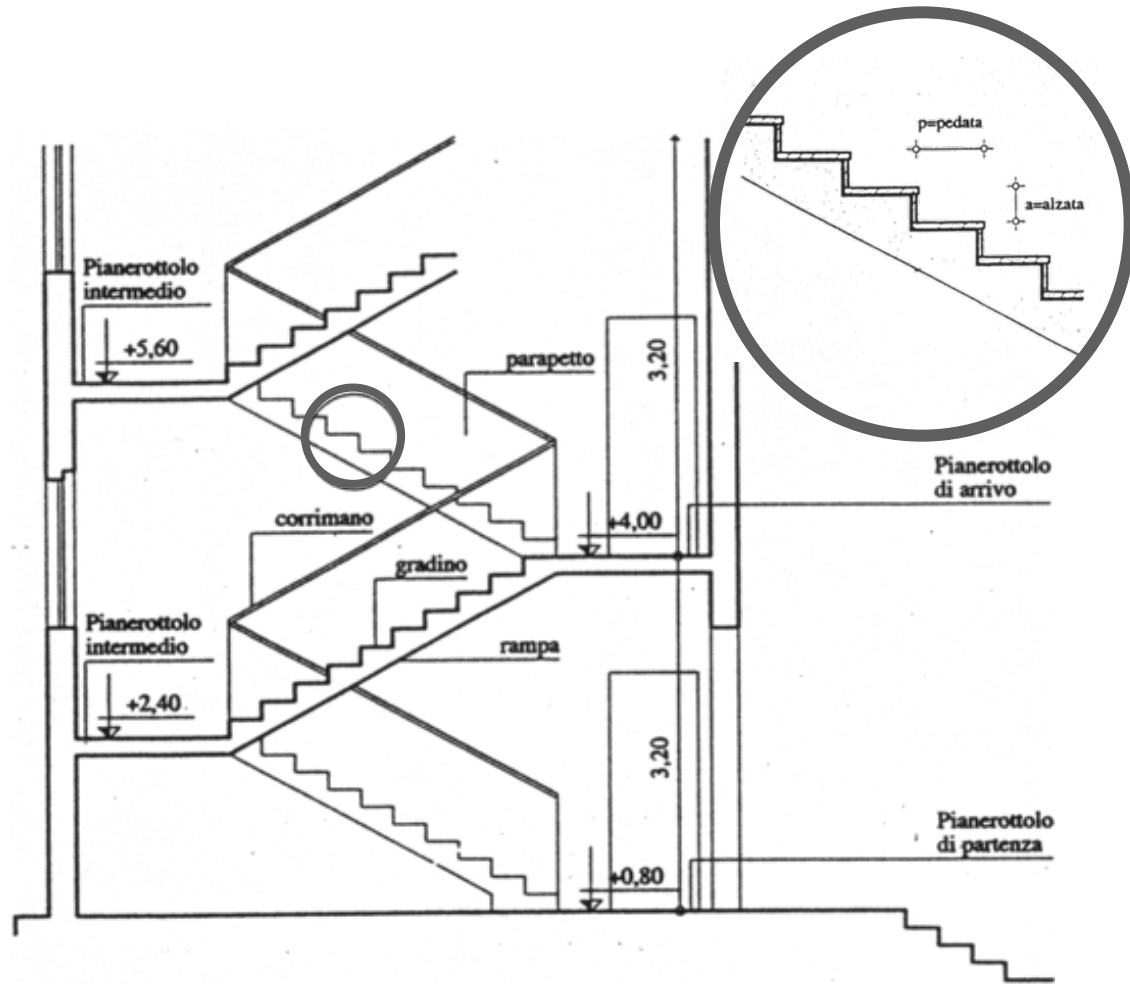
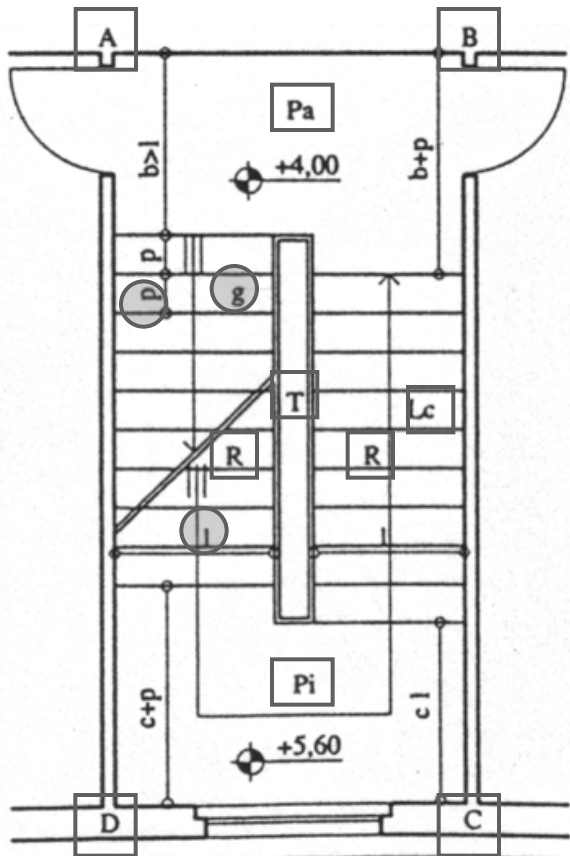


Framed system



Sloped internal partition

Internal stairs



ABCD: staircase compartment

R: Ramp

T: stairwell

Lc: Footfall line

Pa and Pi: arrival or intermediate landings

g: step

p: tread

l: width of the ramp

In order to ensure the best possible use of the stairs, it is recommended that:

- the **steps** of the ramps are all the same;
- the number of consecutive steps of a ramp does not exceed 12;
- the **width** of the ramps is dimensioned according to the number of people who can use them at the same time, in the same direction of use or in the two opposite directions, without obstructing themselves:
 - 1 person ml 0,80 - 1,00
 - 2 people ml 1,20 - 1,50
 - 3 people ml 1,80 - 2,40
- **ramps** exceeding 2,00 ml in width are interrupted lengthwise by intermediate handrails;
- the **dimensions** of the width of the landing and intermediate landings are not less than the dimensions of the width of the ramps.

The slope of a ramp determines the physical effort required to walk it, so it must be designed according to both the characteristics of the building and its users:

Light (or easy) stairs	Slope 27%-42%	Angle 15%-23%
Normal scales	Slope 42%-70%	Angle 23%-35%
Heavy (or steep) stairs	Slope 70%-100%	Angle 35%-45%
Board or machines ladders/stairs	Slope 100%-359%	Angle 45%-75%
Ladders, rope ladders, etc..	Slope 359%	Angle 75%-90%

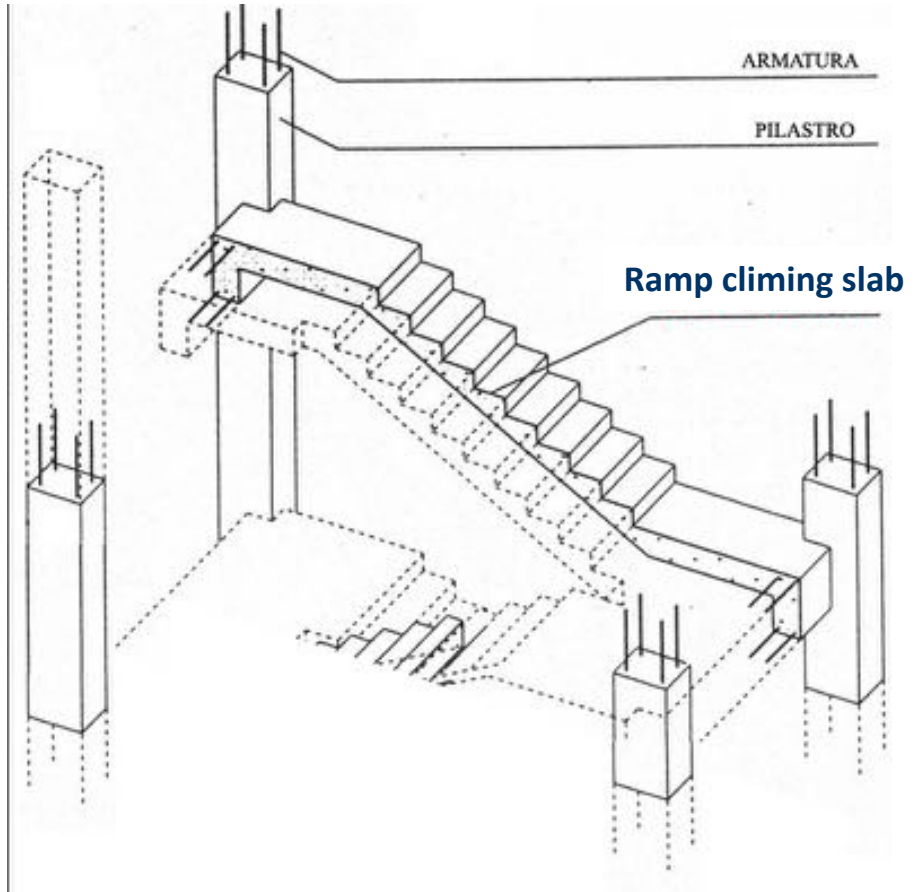
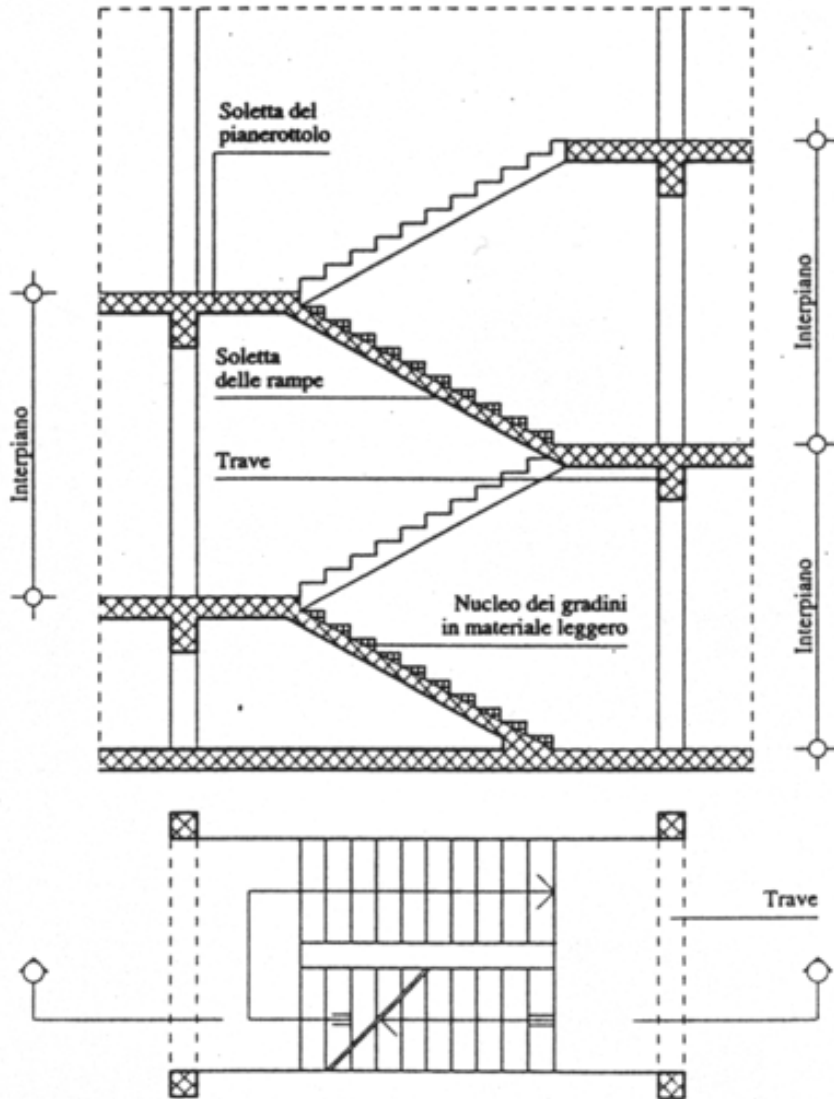
The slope is determined by the ratio between the measurement of the difference in level between the levels connected by a ramp and the measurement of the projection on the horizontal plane of the ramp itself and by the ratio between the dimensions of the lift and the tread.

The empirical formula Blondel is used to determine the values of the lift and tread:

$$2a + p = 62 \div 64$$

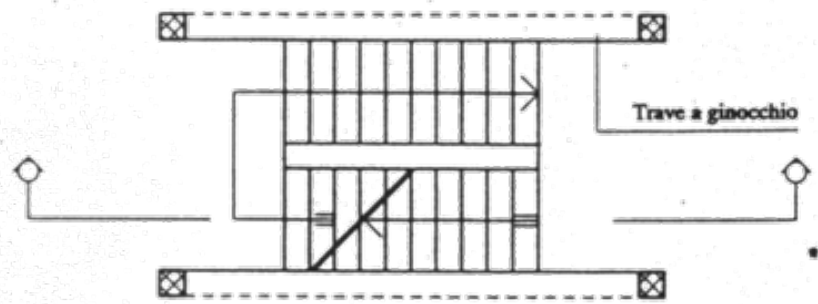
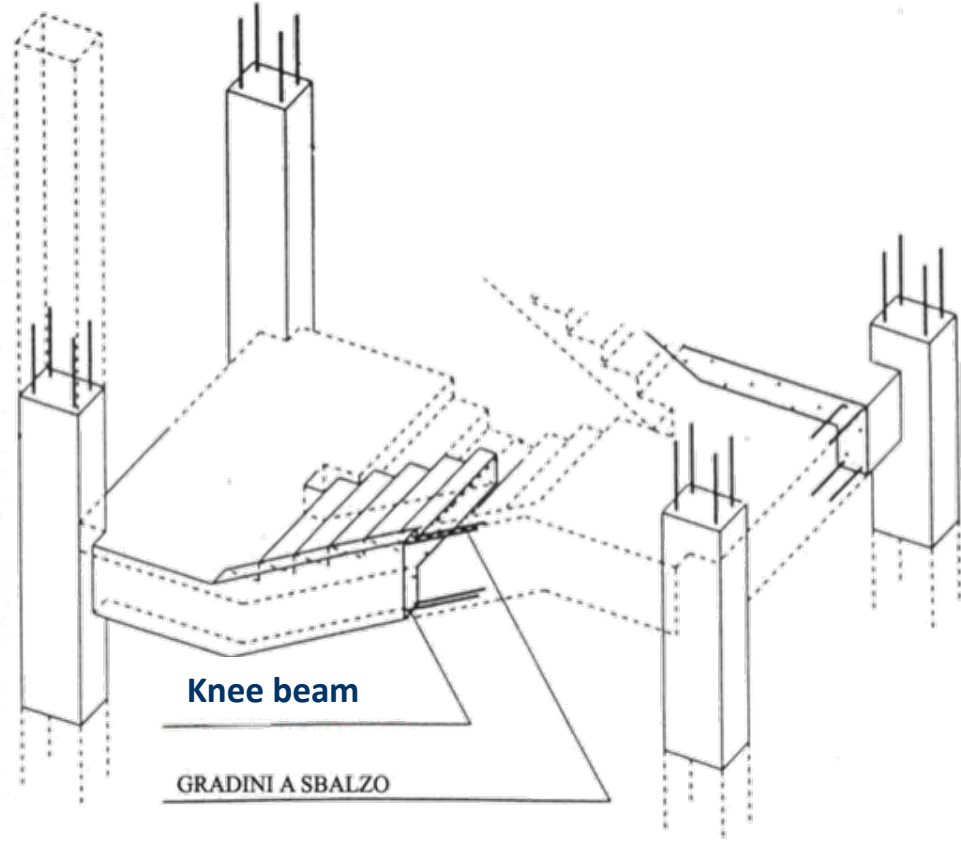
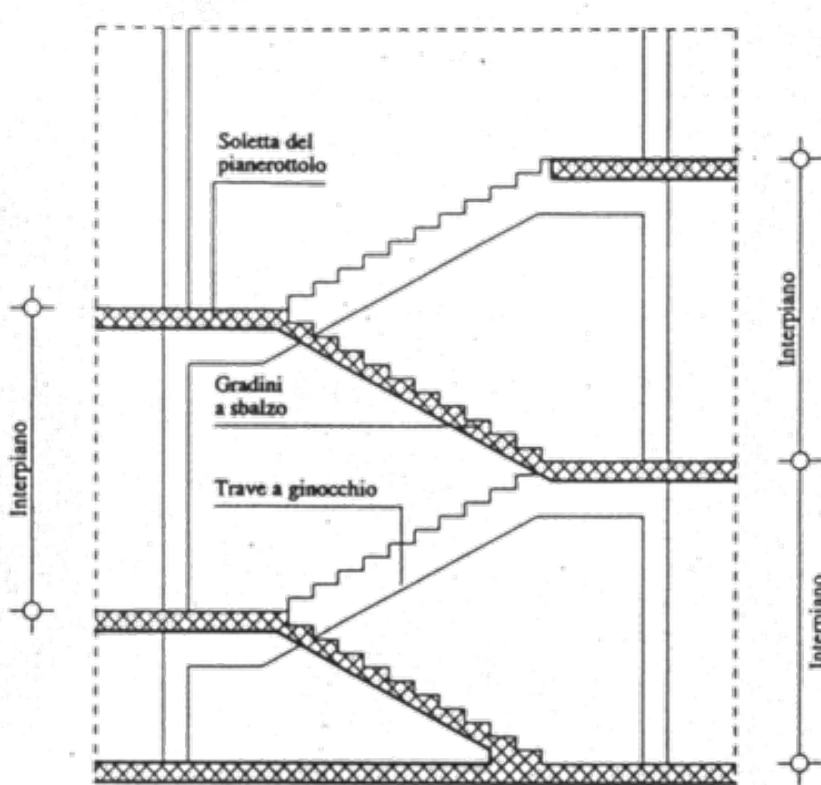
Sloped internal partition

ramp climbing slab



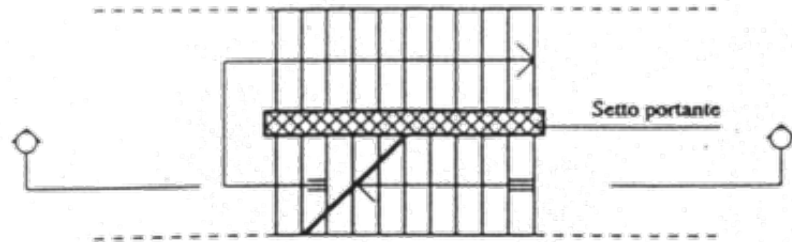
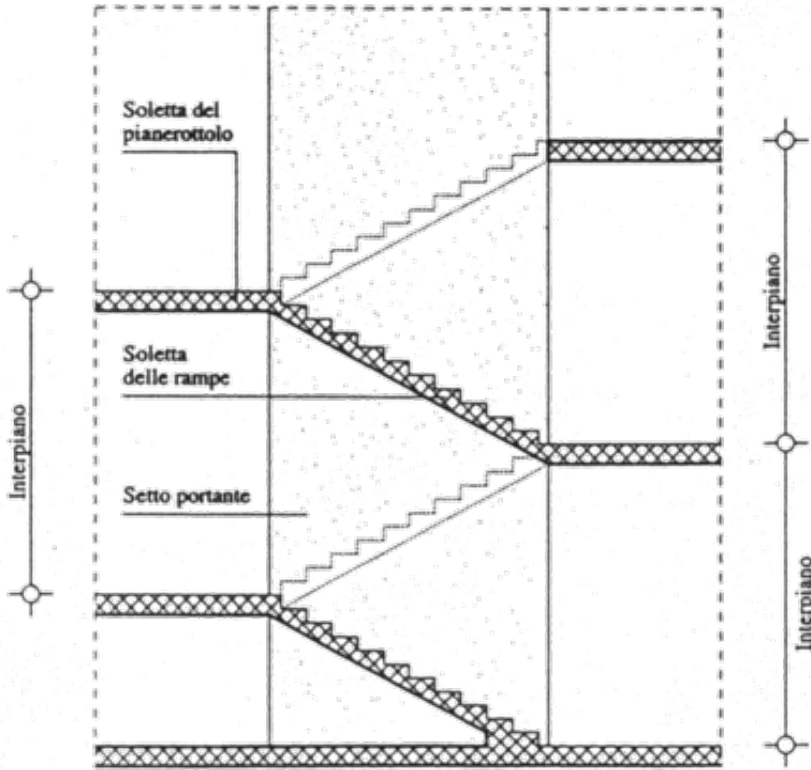
Sloped internal partition

ramp climbing slab – knee beam



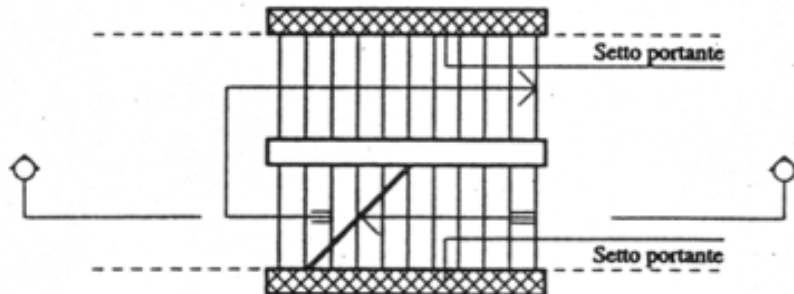
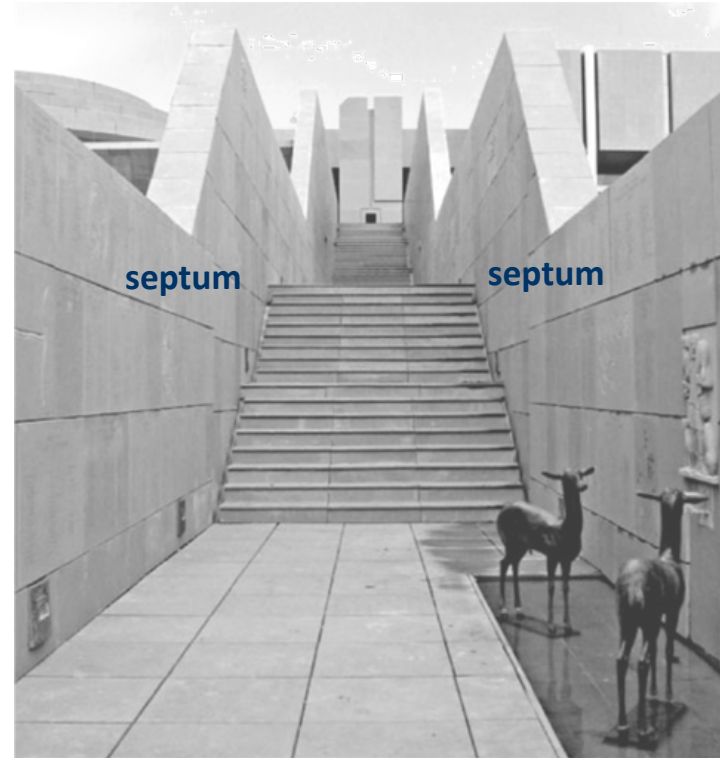
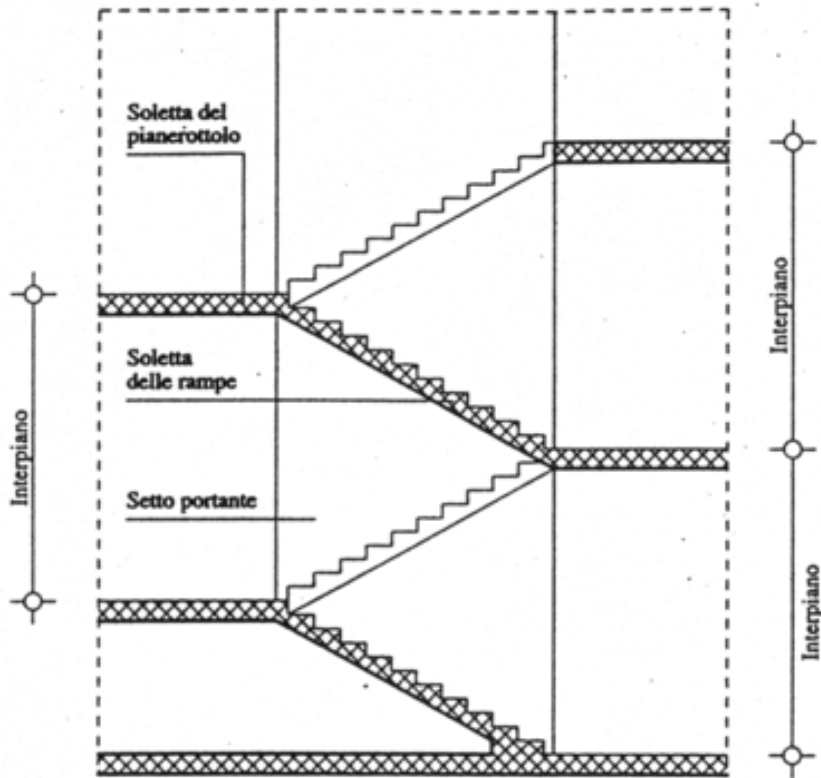
Sloped internal partition

ramp climbing slab — central septum structure



Sloped internal partition

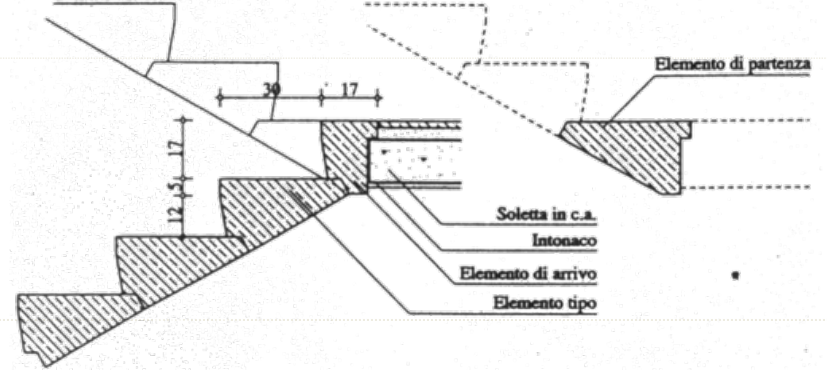
ramp climbing slab — two septum structure



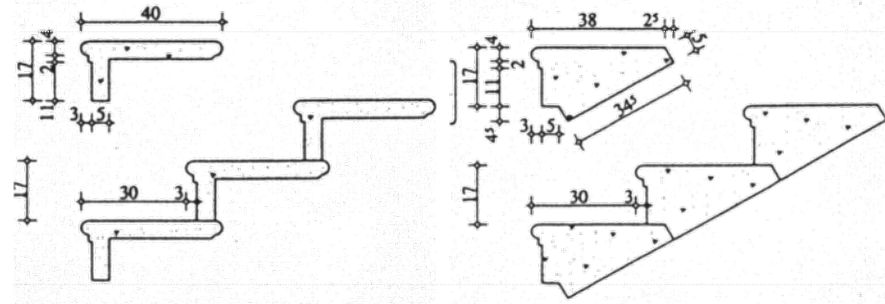
Sloped internal partition

ramp climbing slab — overhanging steps

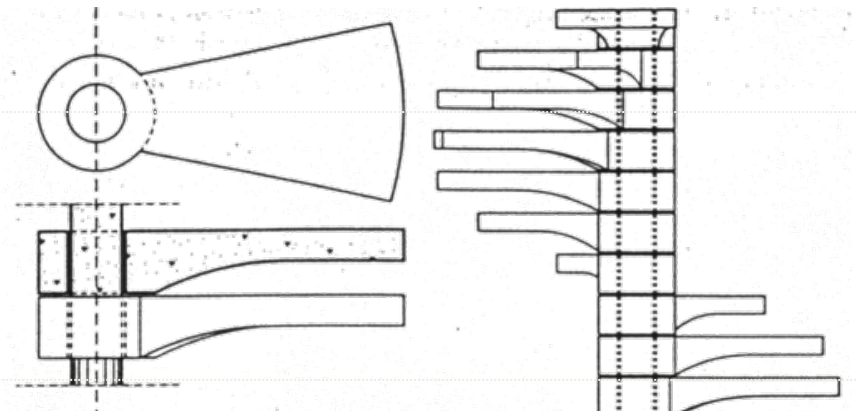
Overhanging steps in cutted stone



Prefab steps

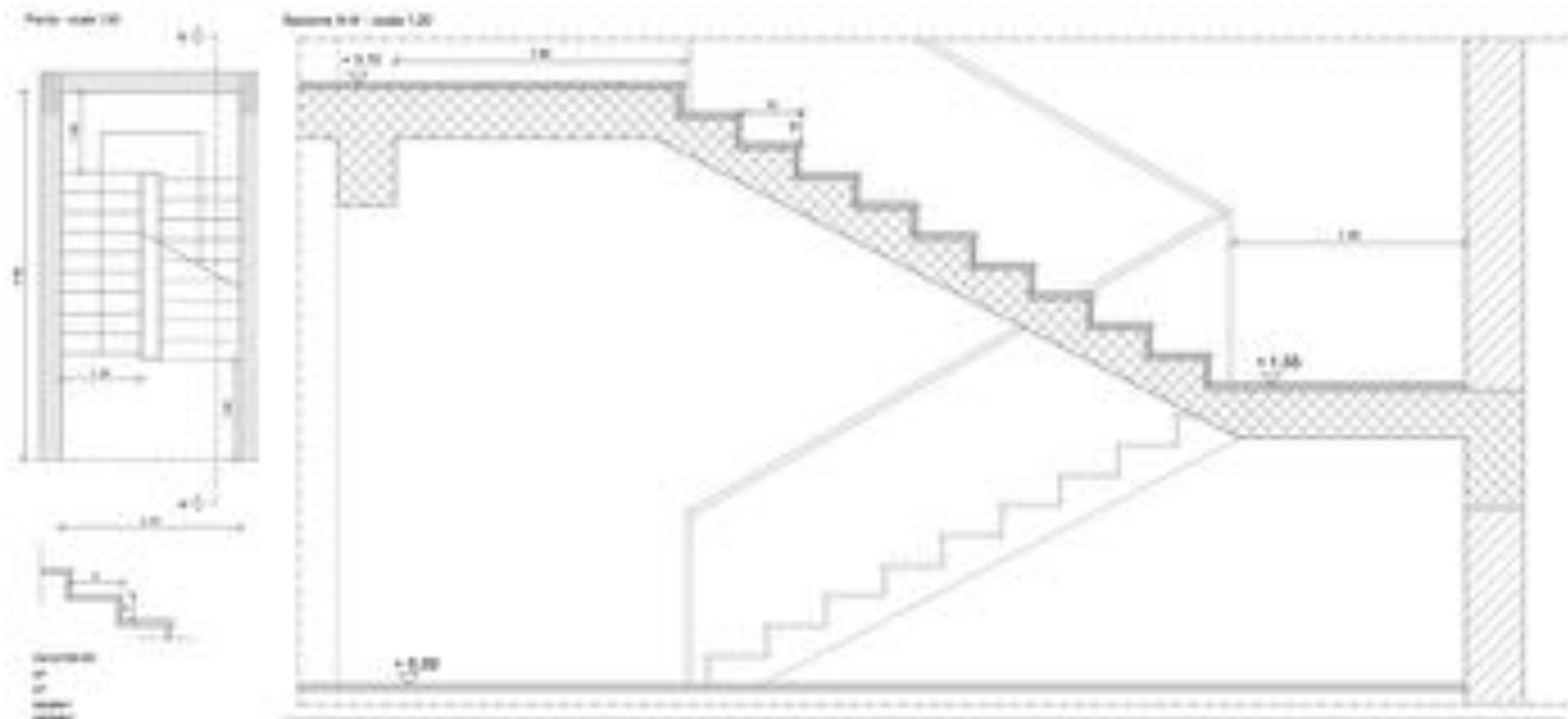


Overhanging steps on a spiral staircase



Alzate cm	15	15,2	15,5	15,7	16	16,2	16,5	16,7	17	17,2	17,5
Corri- spondenti pedate cm	33	32,6	32	31,6	31	30,6	30	29,6	29	28,6	28
Numero delle alzate	Distlivelli cm										
1	15	15,2	15,5	15,7	16	16,2	16,5	16,7	17	17,2	17,5
2	30	30,4	31	31,4	32	32,4	33	33,4	34	34,4	35
3	45	45,6	46,5	47,1	48	48,6	49,5	50,1	51	51,6	52,5
4	60	60,8	62	62,8	64	64,8	66	66,8	68	68,8	70
5	75	76	77,5	78,5	80	81	82,5	83,5	85	86	87,5
6	90	91,2	93	94,2	96	97,2	99	100,2	102	103,2	105
7	105	106,4	108,5	109,9	112	113,4	115,5	116,9	119	120,4	122,5
8	120	121,6	124	125,6	128	129,6	132	133,6	136	137,6	140
9	135	136,8	139,5	141,3	144	145,8	148,5	150,3	153	154,8	157,5
10	150	152	155	157	160	162	165	167	170	172	175
11	165	167,2	170,5	172,7	176	178,2	181,5	183,7	187	189,2	192,5
12	180	182,4	186	188,4	192	194,4	198	200,4	204	206,4	210
13	195	197,6	201,5	204,1	208	210,6	214,5	217,1	221	223,6	227,5
14	210	212,8	217	219,8	224	226,8	231	233,8	238	240,8	245
15	225	228	232,5	235,5	240	243	247,5	250,5	255	258	262,5
16	240	243,2	248	251,2	256	259,2	264	267,2	272	275,2	280
17	255	258,4	263,5	266,9	272	275,4	280,5	283,9	289	292,4	297,5
18	270	273,6	279	282,6	288	291,6	297	300,6	306	309,6	315
19	285	288,8	294,5	298,3	304	307,8	313,5	317,3	323	326,8	332,5
20	300	304	310	314	320	324	330	334	340	344	350
21	315	319,2	325,5	329,7	336	340,2	346,5	350,7	357	361,2	367,5
22	330	334,4	341	345,4	352	356,4	363	367,4	374	378,4	385
23	345	349,6	356,5	361,4	368	372,6	379,5	384,1	391	395,6	402,5
24	360	364,8	372	376,8	384	388,8	396	400,8	408	412,8	420
25	375	380	387,5	392,5	400	405	412,5	417,5	425	430	437,5

La progettazione della scala



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