ArcelorMittal Liège
Research and Development

Memo

To	ROBUST team
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Pages	1 of 8
Subject	**As built buidling_typology and performance**
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Premises

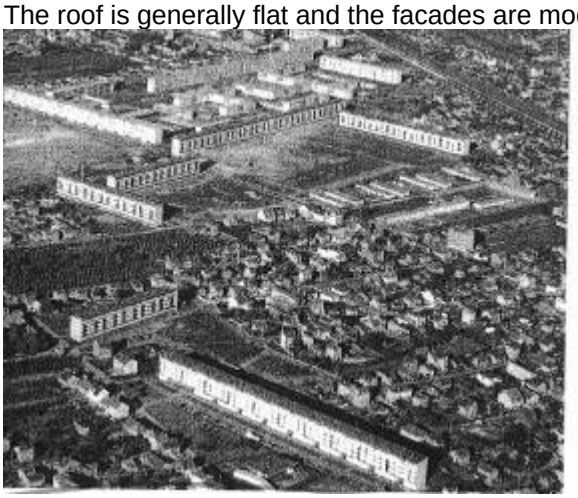
The information given in this document is mainly based on a French- Belgian literature based research. We start from the hypothesis that, regarding collective building, there have not been huge differences between the different techniques in central Europe.

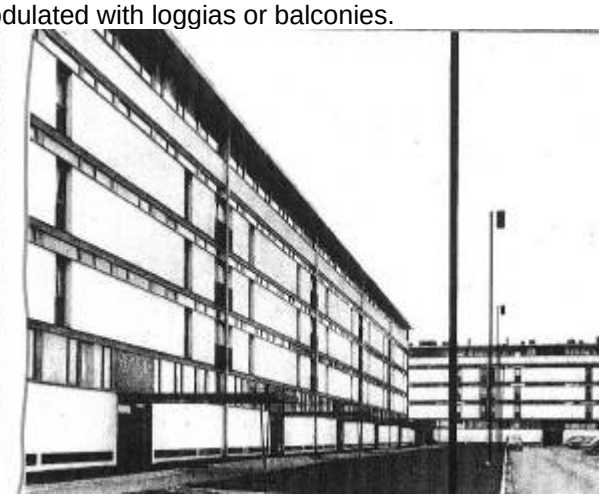
Type of collective residential building

In function of the geometry of the building we could divide the existing collective residential building park in mainly 3 families. The families of building have been classified mainly in function of their external geometry.

Low rise- horizontal building:

This horizontal type of building generally has between 4 and 6 floors. The number of apartments varies in function of the length of the building. The building has many independent entrances.
The roof is generally flat and the facades are modulated with loggias or balconies.





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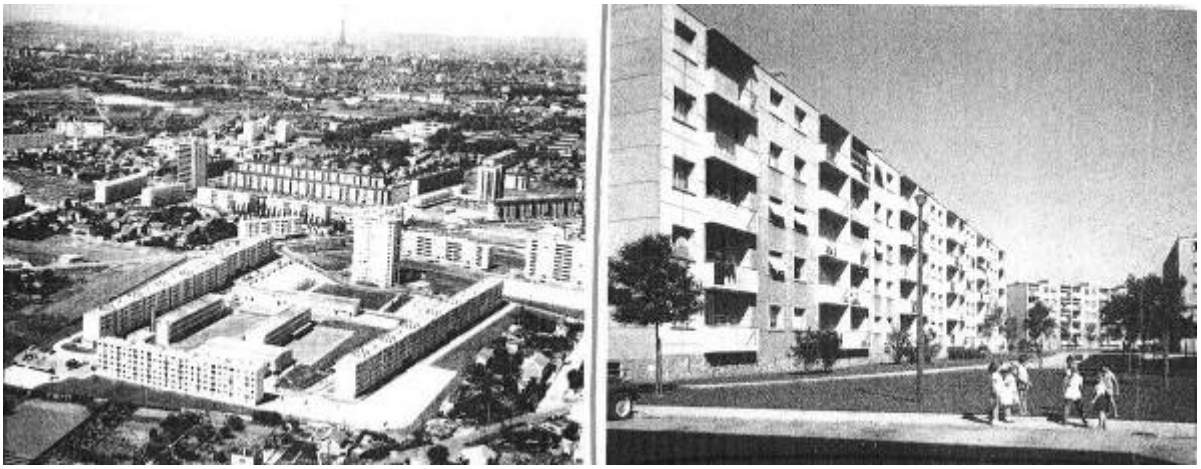
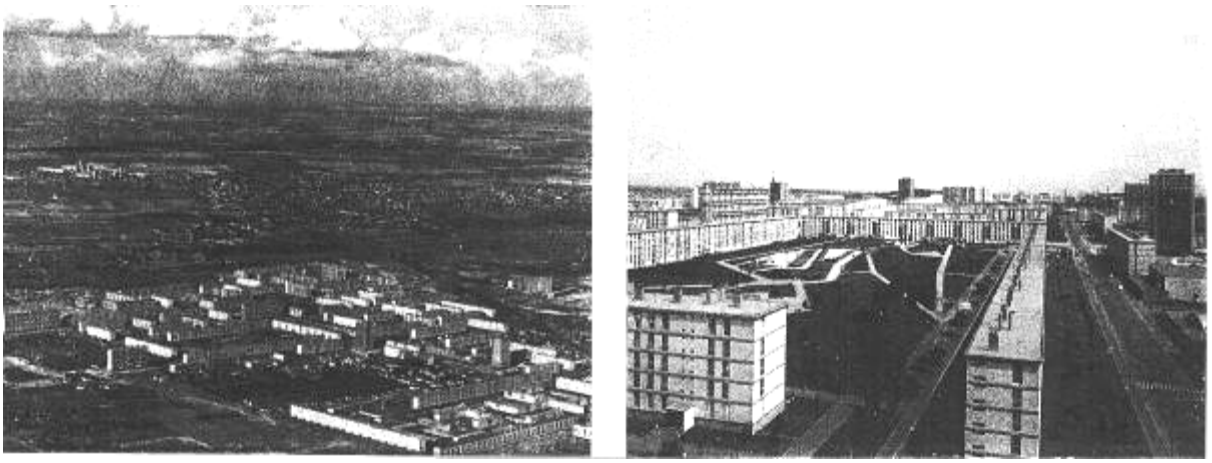


Pierrefitte Stains

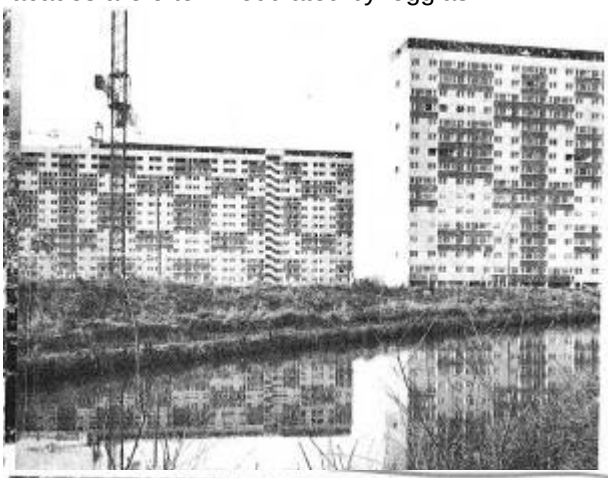


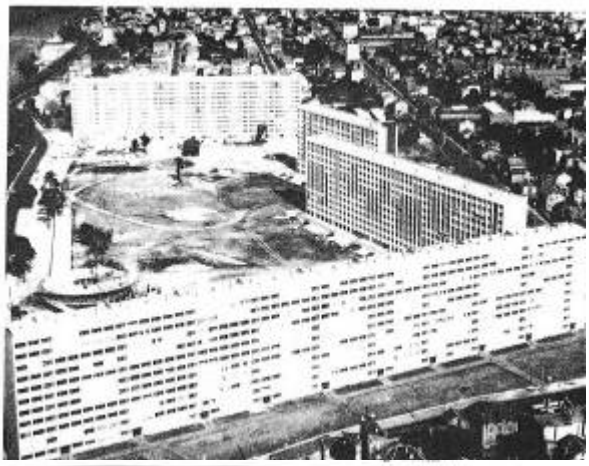
Villejuif

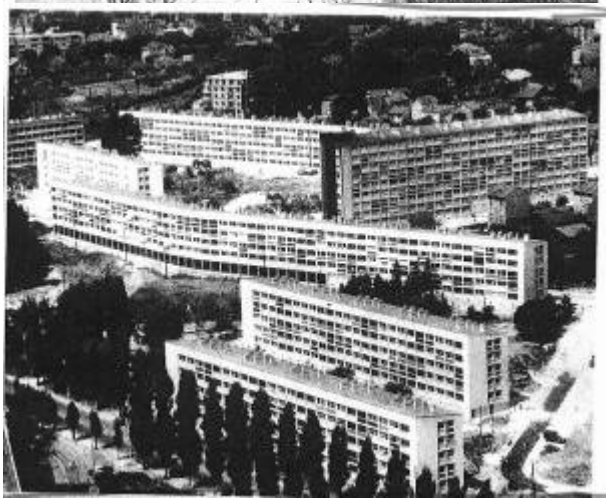
Sarcelles

High rise- vertical building

This type of building has on average between 8 and 15 floors and in general have offers more heterogeneous forms and dimensions.
The external access as well as the internal distribution of flats is very similar to the low rise buildings. The facades are often modulated by loggias







Meaux

Maison Alfort

Fontenay aux roses

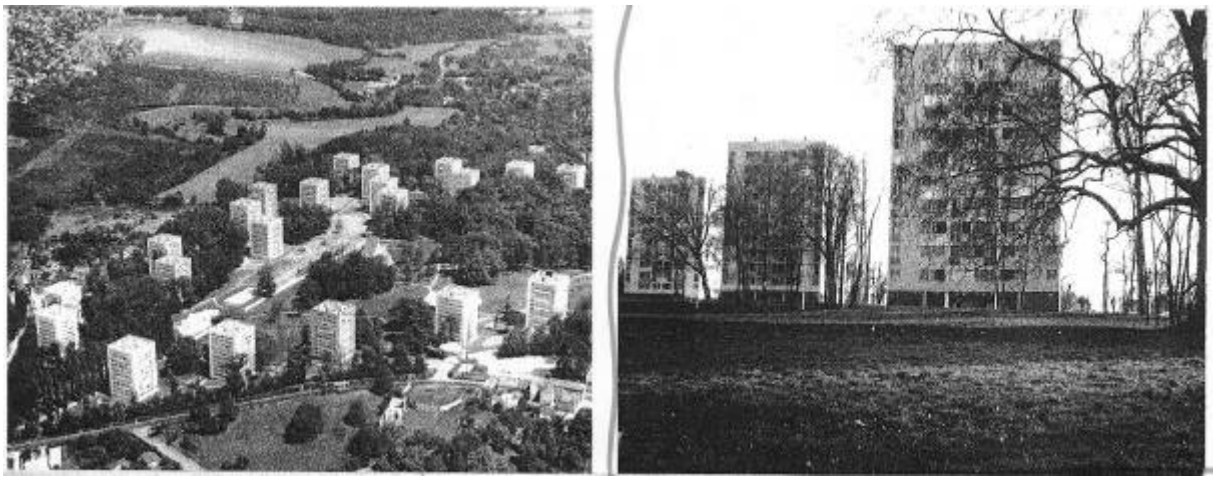
La Courneuve

The tower

The tower type of building (>8 floors) has been often organised around at a central hall that gives access to the different floors. There are examples of tower types of building with more extravagant shape as round shape or cross shapes.

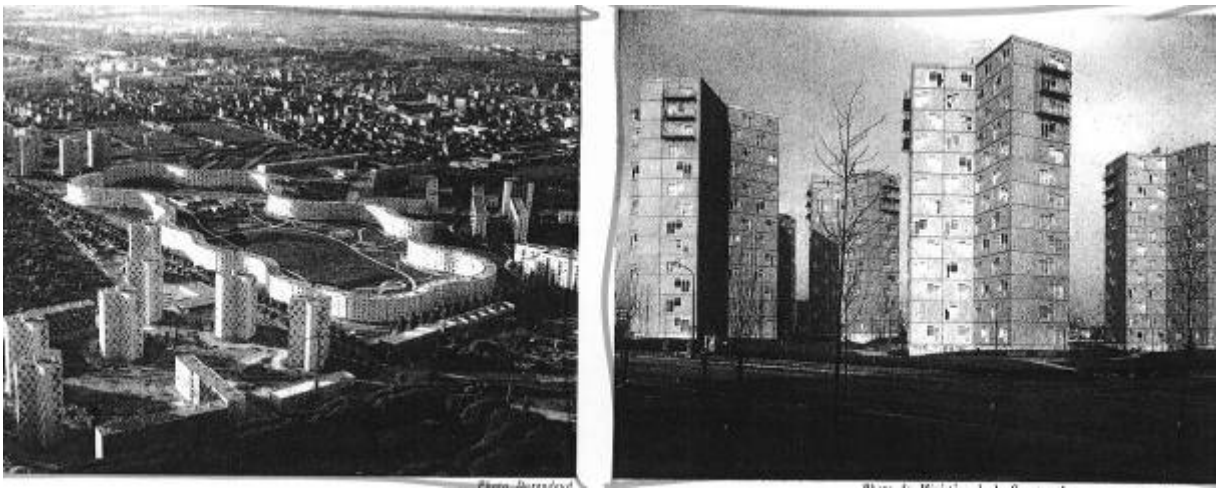
Bobigny

Maisons Alfort Ivry



Sucy en Brie

Pantin



Pantin

Geometry

The parameters that influence the most the performance and the compactness of the building are:

- The floor High (n the following table, a summary of the most common values).

	Floor high (m)	
	1945-1968	1968-1974
Low rise builing (GF+2)	2.6	-
Low rise building (GF+2-GF+5)	2.65	2.5
Low rise building (GF+5-GF+8)	2.55	-
High Rise building	-	2.5
Tower	-	2.5

- The type of ground floor (in the following tables, percentage of different ground floor types- building built between 1945 and 1974 in France)

	Repartition (%)
Ground floor on direct contact with the ground	1
Crawl space	13
Ground floor on non-heated space	76
ground floor on open space (pilotis)	10

- Type of roof

	Distribution (%)	
	1949-1961	**1962-1968**
Pitched roof	72	41
Flat/terrace roof	24	55
Mix roof	4	4

- Type of windows

	Distribution (%)		
	1957	**1967**	**1975**
Wooden frame	>70	67	71
Steel frame	24	16	<1
Aluminium frame	2	15	26
PVC frame	0	0	1

Thermal performances of existing facades

The thermal performances are judged in function of the U value of the constructive elements

- Masonry walls:

Plein bricks					
Thickness	<12 cm	13-19 cm	20-25	26-36	>37
U value	3.55	2.95	2.4	2.2	2

Holed bricks					
Thickness	<14 cm	15-19 cm	20-25 cm	26-36 cm	>37 cm
U value	2.95	2.65	2.35	2	1.4

- Concrete blocks

	Thickness		
	21cm	24cm	>34 cm
Plein block- U value	2.95	2.65	2
Holed block U value	2.35	2	1.4

- Prefabricated panels

Holed prefab panels-average U value	1.1
Concrete prefab panels-average U value	1.1
Concrete prefab + 3 cm insulation	1.4
Concrete prefab + 8 cm insulation	1.1