



Energy Conservation in Buildings and Community Systems

IEA ECBCS ANNEX 50

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**3 building types:
Dieselweg**

Year of construction: 1952 / 1959 / 1970







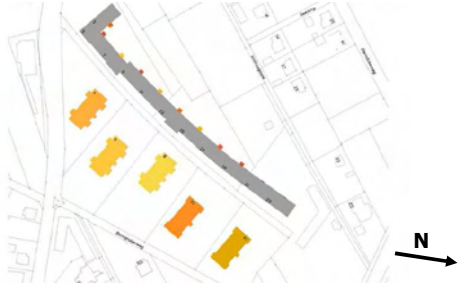


Dieselweg 3-19 Dieselweg 4, 6, 9

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Floor plan Graz, Dieselweg

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Year of construction: 1959


1st Phase of construction

Graz, Dieselweg

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Year of construction: 1970

1st Phase of construction

2nd Phase of construction




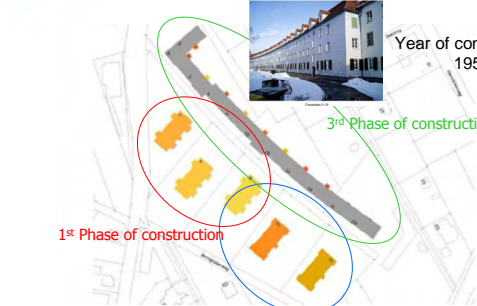


Graz, Dieselweg

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Year of construction: 1952

3rd Phase of construction

1st Phase of construction

2nd Phase of construction

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Survey foundation:

Basic data:
 Year of construction: 1959
 Number of apartments: 16
 Primary structure: solid structure (concrete, brick wall)

Technical System:
 Type of heating and energy source: decentral; 13% solid fuel; 33% Oil; 54% electric
 Hot water supply: decentral electric boilers
 Ventilation: natural ventilation

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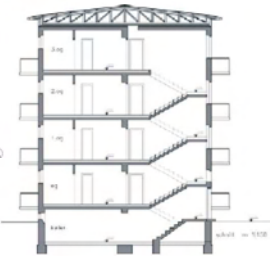


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actual stock

Very poorly insulated building

Graz, Dieselweg 4, 6, 8


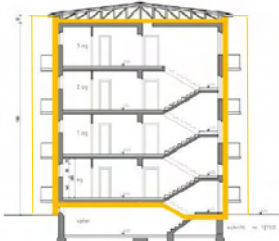


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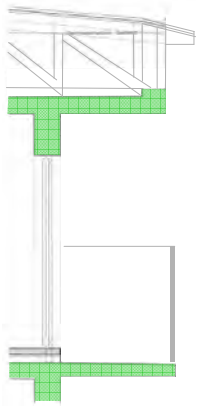




renovation

Graz, Dieselweg 4, 6, 8

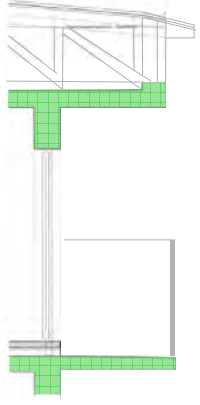

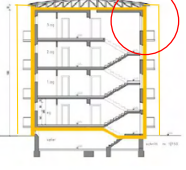

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balcony

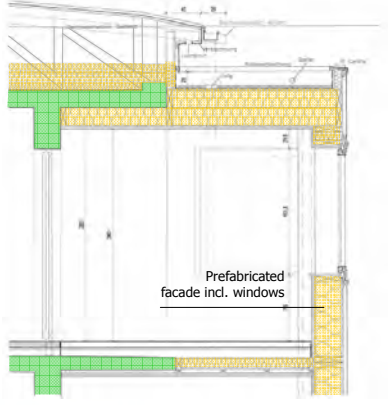

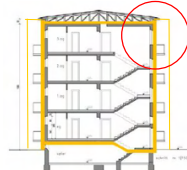

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balcony

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Prefabricated facade incl. windows

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Development & design:

Development of pre- fabricated modules :

- 3D – on-site measurement of building façade
- Development of the pre-fabricated module by a technical office "gap – solution"
- Approval of the detailed composition of the modules by the building physician, consulted by AEE INTEC
- Design of each module and all detailed drawings (window- connections, plinth-weathering, angles,..)
- Approval of the detailed drawings, consulted by AEE INTEC

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View on the building façade:

- Horizontal joints
- Integrated windows
- Dimension of modules fixed by the line of ceiling and the upper line of the windows
- Mounting order: starting with the lowest module

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Composition and layer formation of the prefabricated module :

Existing

- Internal plaster
- Existing exterior wall
- External plaster

On-site installation

- 40mm Equalization+installation plane
- 60mm Timber construction between rockwool

Pre-fabricated module

- 19mm OSB-board
- 120mm Post + mullion construction between rockwool
- 16mm MDF board
- 30mm Solar comb
- 29mm Rear ventilation
- Toughened safety glas

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Lateral window-connection < horizontal section >

Step 1

Step 2

Step 3

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Lateral window-connection < horizontal section >

Vapour – proof barrier

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< horizontal section > Detail 2

Singleroom ventilation - system heat-recovery

Borehole for ventilation pipe

Ventilation pipe

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On-site installation:

Preparation before mounting :

- Installation of the elevator 's construction
- Installation of electricity cables
- Bore – holes for ventilation – pipes
- Installation of heating supply for exterior walls
- Installation of equalization plane
- Mounting of sheet steel angles
<bearing at the plint-weathering>
- Mounting of rockwool between post and mullion construction
- Mounting of vapour-proof barriers
- Cutting-off roof-overhang

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Running of cables:



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Procedure of mounting:

Mounting and fitting the single modules :

- The pre-fabricated modules are brought by a truck and trailer on-site.
- Afterwards they are lifted by a truck-mounted crane to the building's façade.
- Two additional mobile-cranes are positioned on each side
- Assembly operators on these cranes are helping during the fitting procedure.

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Transportation on site:



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Mounting:



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Fitting:

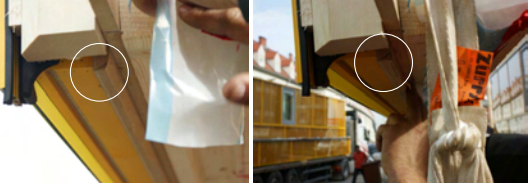


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Occurred problems:




Horizontal joint :


- MDF – board is designed with overhang
- During fitting procedure the upper module does not match to the lower module
- Too tight fits between the different modules

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Occurred problems:



Horizontal joint :


- Key and slot joint has no possibility to be moved
- Fitting is too tight !!!

Problem enlarged by:


- Large-scaled modules
- Mounting procedures at 3rd, 4th,... floor (high levels)
- Wood/timber construction is a "natural" construction material

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To be asked:



- What happens if it is necessary to get access to an element near the lower floors ?
- How to get access to the different pipes behind the fixed modules?

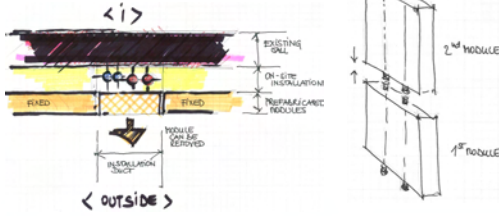
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To be asked:

- Development of "installation" / "access" - modules, which are integrated in the façade??

- If there are integrated pipes, how is it possible to get the couplings?



Thank you for your attention