

Brick, stone, plastered and rendered façades, façade coverings

István Vidovszky PhD

evaluation

1

19th century

the structure of the facade getting independent from the load-bearing structure inside the building – change of the approach



facade coverings, claddings

typical structure system

2

traditional

- A. *load-bearing wall structure (+ rendered surface)*
- B. *load-bearing wall structure + surface coverings (ceramic/brick /stone decoration)*

modern


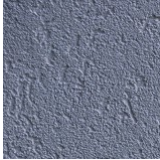








- C. *load-bearing wall structure + insulation + rendered surface*
- D. *load-bearing wall structure + insulation + surface supporting system + surface structure*

rendering - material

2




- *traditional lime-Portland-cement rendering*
- *frost resistant Portland-cement rendering*
- *fire proof rendering*
- *isolating render mortar*
- *thin surface rendering mortar with polyester mesh reinforcement*
- *color stone plaster*

rendering -surface treatment Types of render finishes 3

| | | | | |
|---|---|---|--|---|
|  |  |  |  |  |
| <i>rendered</i> | <i>colored rendered</i> | <i>combed</i> | <i>scratched</i> | <i>broomed</i> |
|  |  |  |  |  |
| <i>smooth</i> | <i>rough</i> | <i>Tyrolean</i> | <i>polished</i> | <i>roughcast/ wet dashed</i> |

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

surface treatment Types of architectural render finishes 4

| | | |
|---|---|--|
|  |  |  |
| <i>brick effect render</i> | <i>ashlar effect render</i> | <i>sgraffito</i> |

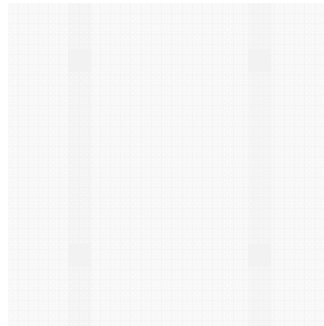
Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

work sequence of rendering

5

traditional

1. *mark out*
2. *rendering alignment spots*
3. *rendering alignment stripes*
4. *surface rendering*
5. *surface smooth*



Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management

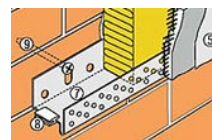
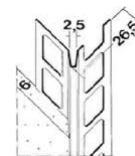
2012.10.16

work sequence of rendering

6

modern

1. *set up*
2. *set aligning profiles*
3. *surface rendering*
4. *surface smoothing*




Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management

2012.10.16


handtools

finishing tools


7



finishing trowels




plastic float



sponge float



finishing trowels



foam float



foam float



broom



comb



foam float


Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management
2012.10.16


equipments


8


temporary structures:


- mortar silo
- scaffolding (above 1,5m)
- mortar mixers
- plastering machines














Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management
2012.10.16

facade insulation - material 9

- *polystyren*
- *polyurethane*
- *fiberglass /glass wool*
- *mineral wool*
- *woodwool board*
- + *combinations*

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

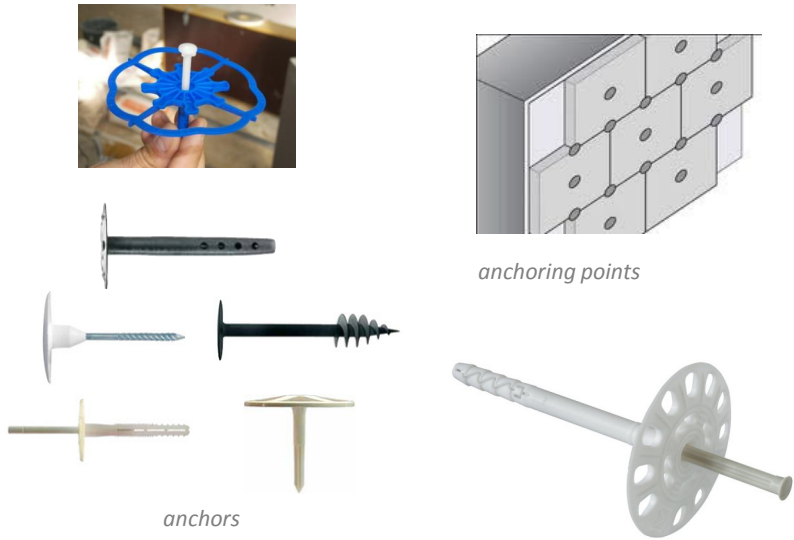
facade insulation - fixing 10

glued + anchored

above the surface *below the surface*

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

facade insulation - fixing 11




anchors

anchoring points

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

facade insulation + rendering 12



edge protection

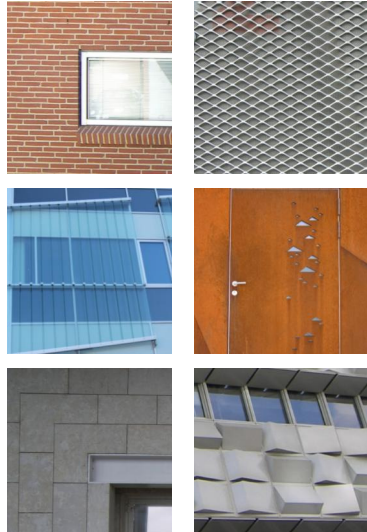
base coat

finish coat

smoothing

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

facade coverings - material 13



- *brick facades*
- *stone facades*
- *metal sheets*
- *timber panel*
- *cement panel*
- *glass panel*
- *plastic panel*
- *ceramic facade panel*
- *polycarbonate*

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

modern facades - requirements 14

| Statics | Insulation | Detailing / functionality | Appearance |
|---|--|---|-------------------------------------|
| load bearing capacity (self load + impacts) | heat protection (thermal comfort) | maintenability, sustainability and resonable cost | surface quality |
| wind load (+/-) resistance | protection against UV radiation | joints and dilatation | applied colors |
| optimal / required distance of the props, proper material quality, etc. | protection against moisture (rainwater, vapour load) | security aspects – property protection | proportions of the surface elements |
| | acoustic protection | fire protection | |
| | | workability / viability | |

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

assembled facades systems

15

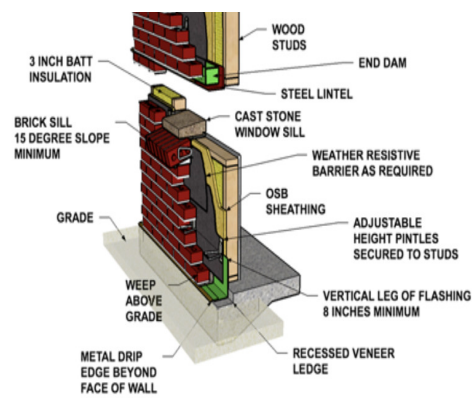
Load bearing wall / skeleton structure + exterior wall + insulation + assembled surface

influencing factors (consequences of e.g. material characteristics):

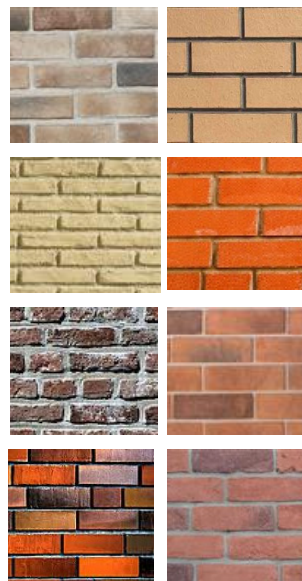
- *element size (min.-max.)*
- *element weight (average /max.)*
- *element shape*

modern brick facades

16



metal supporting system



modern stone facades 17

Teherhordó falazat Hőszigetelés Kőlap
 FXR 6035-30
 Rozsdamentes kőlapőgzítő elem
 Döböl 180 mm
 Döböl furat 27x60 mm
 Furat 27x45 mm
 Tömlőbaryag
 4 mm menetes fej
 A max. 10 mm
 A max. 10 mm
 Legye min. 20 mm

metal supporting system

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

timber panels 18

42 x 42 mm Corner trim 21 x 92 mm Batten ThermoWood® Cladding
 21 x 92 mm Corner trim / Batten ThermoWood® Cladding

150x40 (cladding) corner trim
 150x40 (cladding) corner trim
 150x40 (cladding) corner trim
 150x40 (cladding) corner trim
 150x40 (cladding) corner trim
 150x40 (cladding) corner trim

timber supporting system

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

19

cement boards

1. load bearing wall
2. thermo insulation
3. supporting battens
4. EPDM joint tape
5. gap
6. facade panel
7. screw

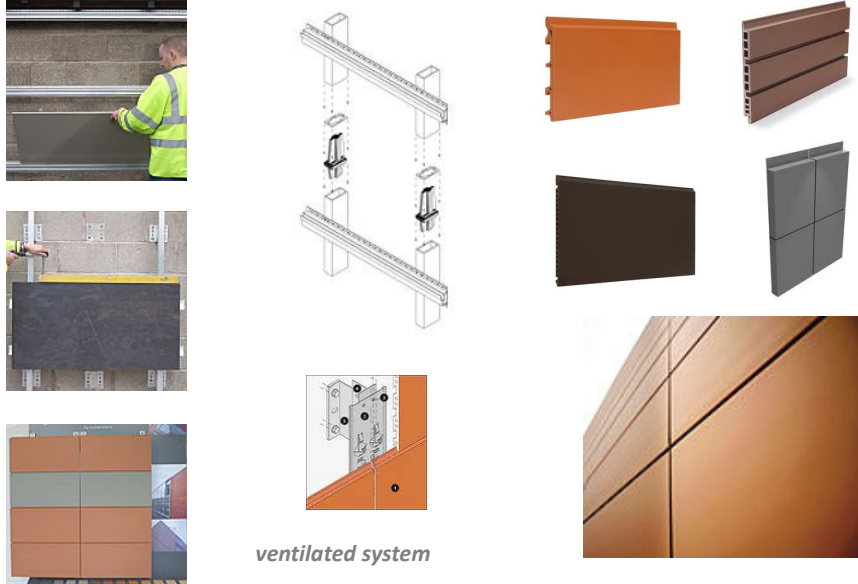
Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

20

glass facade panels / U-profile glass

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

ceramic facade panales 21




The image displays various aspects of a ceramic facade system. On the left, three photographs show a worker in a high-visibility vest installing panels on a building facade, a large dark panel being moved, and a completed section of the facade. In the center, a technical diagram illustrates the 'ventilated system' with its structural components. To the right, several panels are shown in different colors (orange, dark brown, black, grey) and finishes (smooth, textured). A large photograph at the bottom right shows a close-up of the installed orange panels.

ventilated system

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

metal sheet panels 22



The image shows different types of metal sheet panels: a solid grey panel, a perforated grey panel, a dark blue ribbed panel, and a grey perforated panel. Below these, a 3D cutaway diagram shows a panel mounted on a supporting system with yellow clips. To the right, a technical drawing provides a detailed view of the mounting system with labels in Italian: 'PARTICOLARE SU PANNELLO "A"', 'PER SOSTENERE IL PANNELLO AL CENTRO AVVITARE FRONTALMENTE IL "BATTICOGNA" ALLE APPROPRIATE ALCETTE PRESENTI SULLA TRAVERSINA', 'TRAVERSINA CON FORI PER "ALCETTE" (SOPRAPPORTE)', 'DUELLE "BATTICOGNA"', and 'PANNELLO REF. "A"'. The drawing also shows a 'PANNELLO REF. "B"'.

mounted on a supporting system

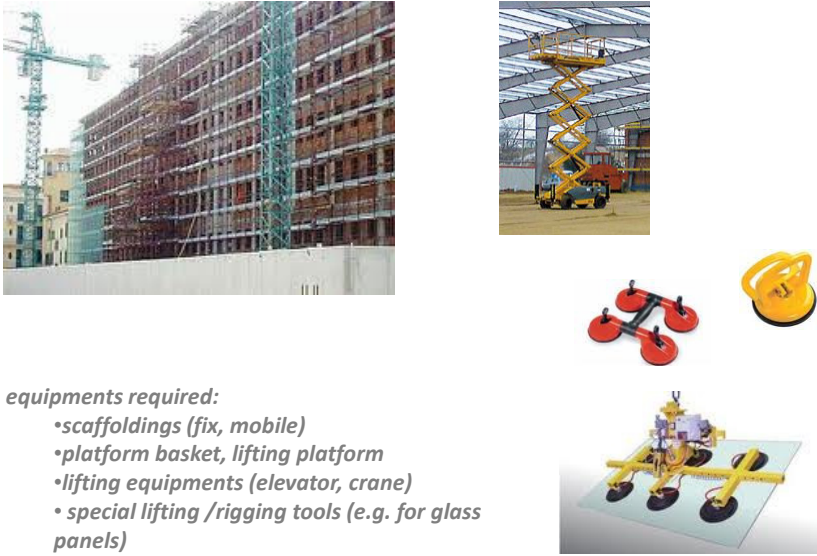
Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

plastic panels 23



Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

Transportation - site logistic 24



equipments required:

- scaffoldings (fix, mobile)
- platform basket, lifting platform
- lifting equipments (elevator, crane)
- special lifting /rigging tools (e.g. for glass panels)

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management 2012.10.16

Assembly

25



lifting

Assembly

26



mounting

examples

27



Office building, London, United Kingdom

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management

2012.10.16

examples

28



Office building, Lisbon, Portugal

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management

2012.10.16

examples

29



U-profile glass facade system, VIA University College, Horsens, Denmark

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management

2012.10.16

examples

30



Brick facade, Apartment building, New York, USA

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management

2012.10.16

examples

31



Fiberglass-concrete facade, „Soccer-City”, Johannesburg, South Africa

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management

2012.10.16

examples

32



Ceramic facade covering, Spanish Expo-Pavilion, Aichi, Japan

Vidovszky – BUTE/BME-Faculty of Architecture – Department of Construction Technology and Management

2012.10.16



Thank you for your attention!

References

R

- [1] http://tennisonrendering.com/products_finishes.php 24-10-2011
- [2] <http://www.krm-heritage-plasters.co.uk/page4.htm> 24-10-2011
- [3] <http://www.mkmgrup.eu/index.php?mPath=522> 24-10-2011
- [4] <http://www.masonrysystems.org> 24-10-2011
- [5] Tóth Elek: Homlokzatok, Szakipari technológiák, 24-10-2011
- [6] Épületszerkeztani segédlet, Kőburkolat Rögzítése, SZIE
- [7] Finnforest Thermowood – Technical manual
- [8] Homlokzatburkolat. Tervezési és szerelés útmutató a következő termékekhez: Cembrit Metro, Cembrit Edge, Cembrit Fusion, Cembrit True
- [9] <http://www.stylepark.com> 16-10-2012