fischer
innovative solutions

fischer

innovative solutions

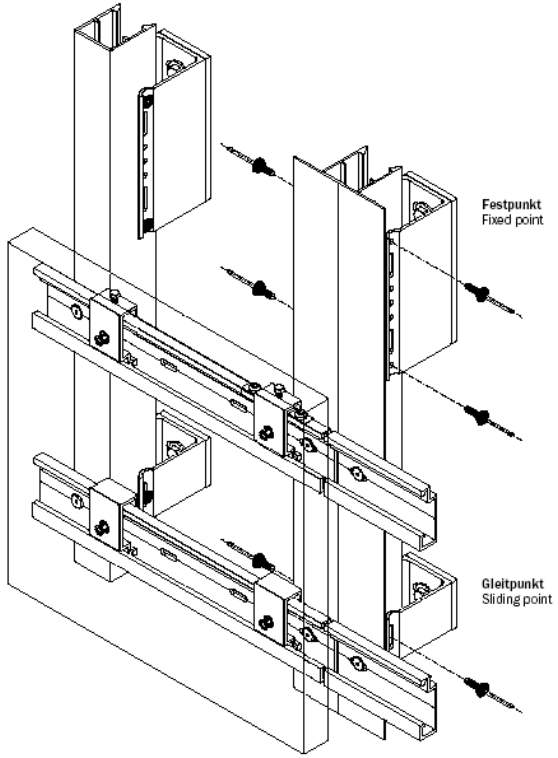
Effective Installation of natural stone Facade

- Introduction (BWM)
- Possibilities of the fixation of natural stone facades
- Acceralate the effectivity
  - Installation
  - Reducing time & costs
- Some referals

Introduction to BWM Fassadensysteme GmbH

We are not selling cars …

we are selling, producing and advicing



BWM: Concepting, Advicing architects and installers, calculation in statics and building physics, detail planning …

BWM Fassadentechnik GmbH

Headquarter is placed in Leinfelden (near Stuttgart)

Production is placed in Gorleben (between Hamburg & Hannover)

Different methods of fixing natural stone panels on the facade

- **Visible Fixing**
  - Screwing
  - Hooks
  - Clamps
- **Unvisible Fixing**
  - clamps
  - Glueing
  - Towels
  - Undercut anchor

Visble Fixed : 1. Screwing

Mockup for a project in Andorra

Arguments for this system:

- Thin and small panels
- Irregular forms and overlapping areas
- Very „exotic“ kind of art

Visble Fixed : 1. Screwing

Project driven system

Small description :

- Using an steel panel for support
- Slates have to be predrilled

Visble Fixed : 2. Hooks

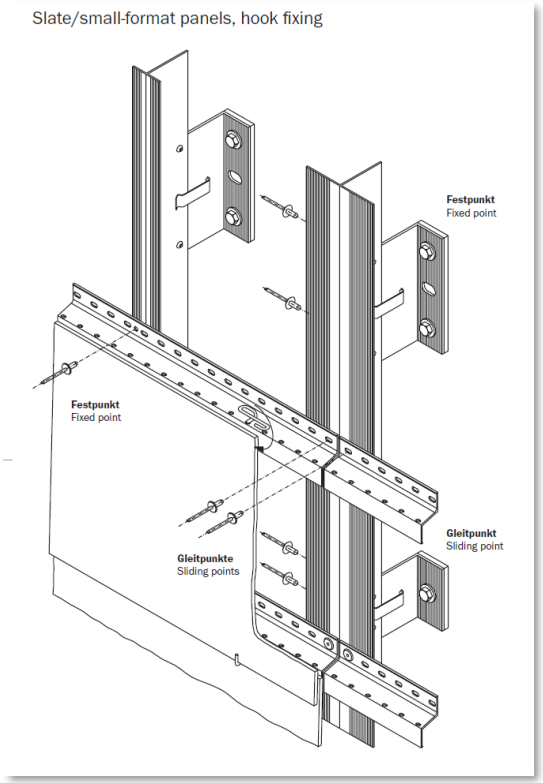
Project near Stockholm (power station)

Arguments for this system

- Thin and small slates
- Vertical mounting
- „Loving hooks“

Visble Fixed : 2. Hooks

System ATK 104



Small description

- Predrilled slated will be fixed by stainless steel – coloured - hooks

Visble Fixed : 3.a) Clamps

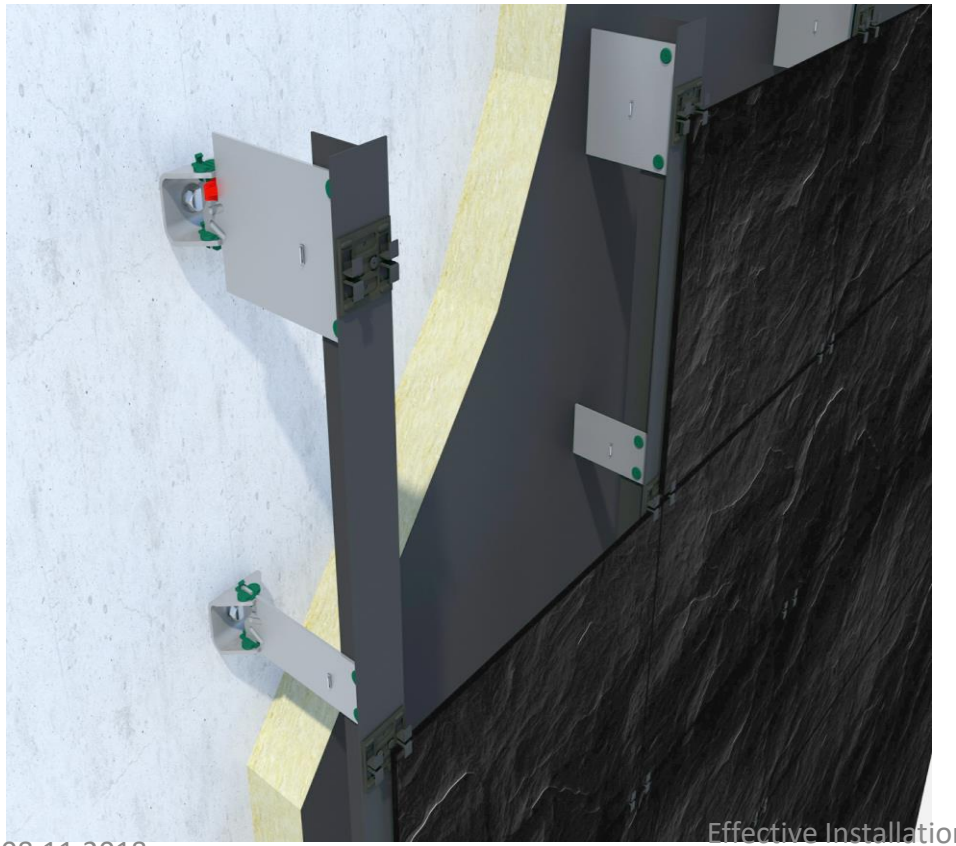
Bornholm, Centre of sustainability

Arguments for using this system

- Thin and small slates
- Vertical mounting
- Short time of installation
- Reducing installation costs

Visble Fixed : 3.a) Clamps

System ATK 100 KL

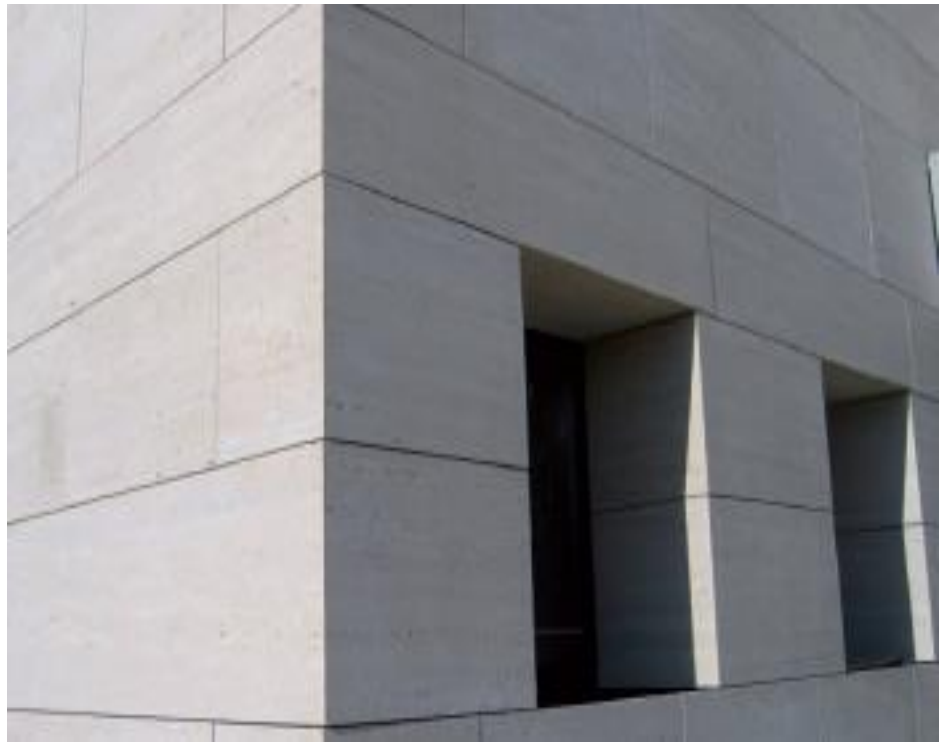


Small description

[03-04-2017_ATL100-KL_1980dpi_Cam-001.mp4]

Visble or unvisible fixing : 3. b) Clamps

Limestone project

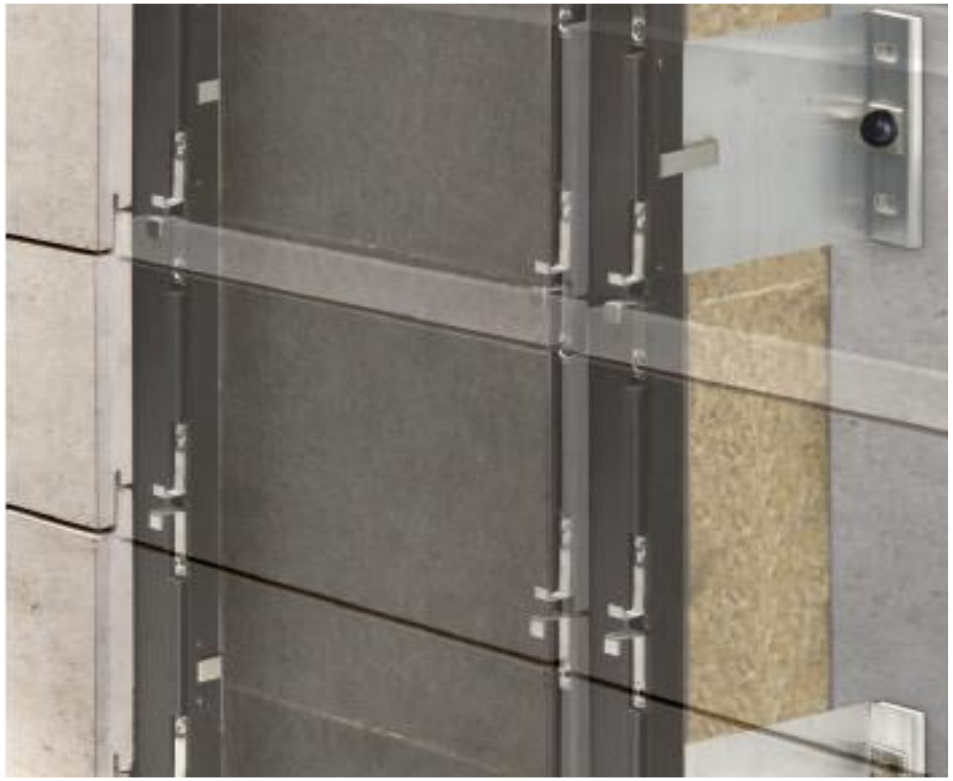


Arguments for this system

- Visible fixing for slates < 13 mm
- Unvisible fixing for slates > 15 mm. Precondition is the stone has to be slotted

Visble or unvisible fixing : 3. b) Clamps

Limestone project



Small description

- Clamps in stainless steel are fixed in a „special vertical rail profile“
- High grade of „prefabrication“ is possible

Unvisible fixing : 4 Glueing

Nordea Bank, Kopenhagen

Arguments for glueing

- Two kinds of installation
  - Glueing on the the building side
  - Glueing prefabricated
- Special blank rails
- Glueing certifications, tests are necessary & installation team has to be trianed up in glueing
- Prefabrication is almost necessary

Unvisible fixing : 4 Glueing

ATK 100

Small description

- Take care and observe the regulatiosn of the supplier, in case of ..
  - Humidity
  - Temperature
  - Dust
  - Period of time …

Unvisible fixing : 4 Glueing

Glueing process the four steps

Small description

- Cleaning
- Primering
- Taping
- Glueing

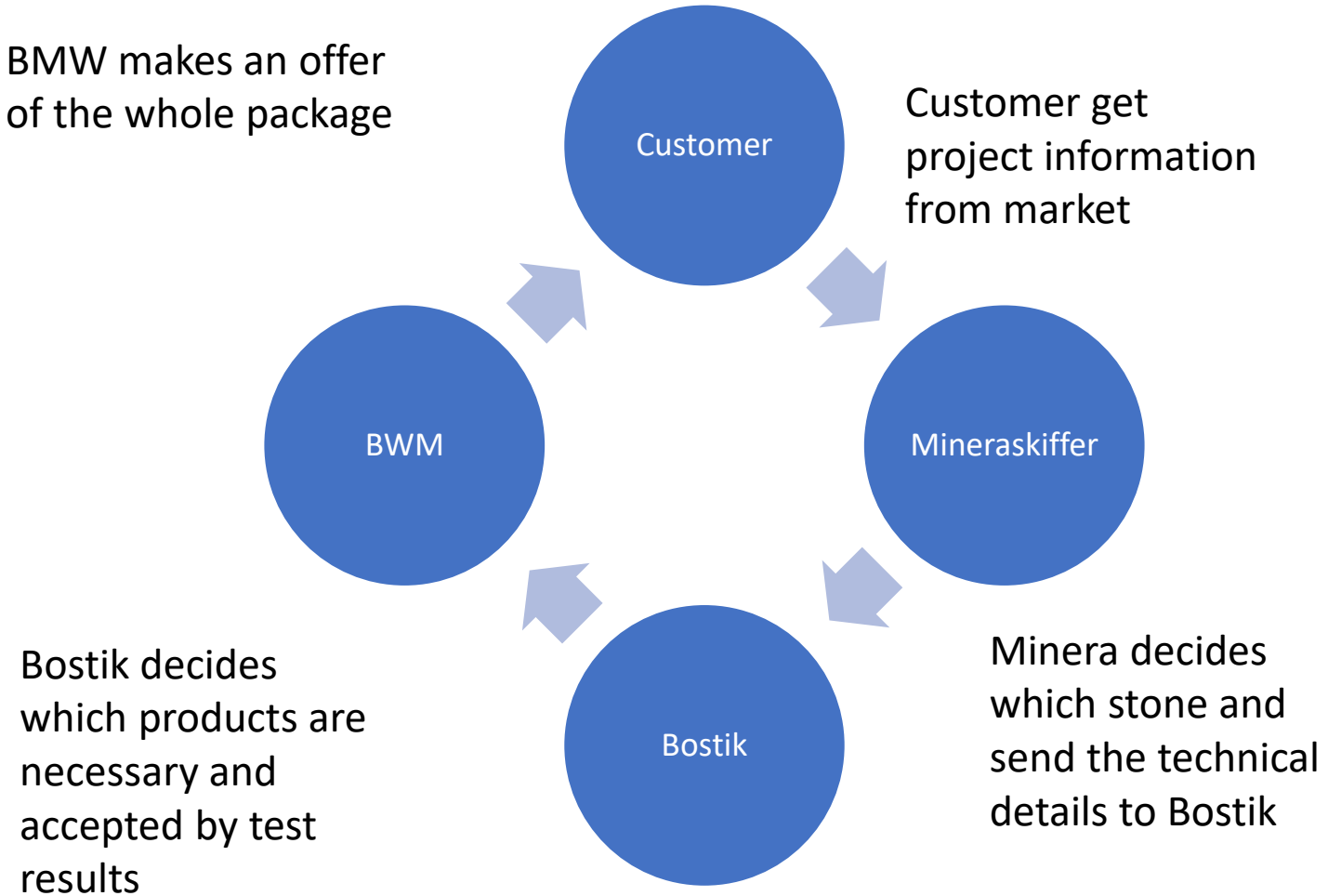
Unvisible fixing : 4 Glueing

Certification

Small description

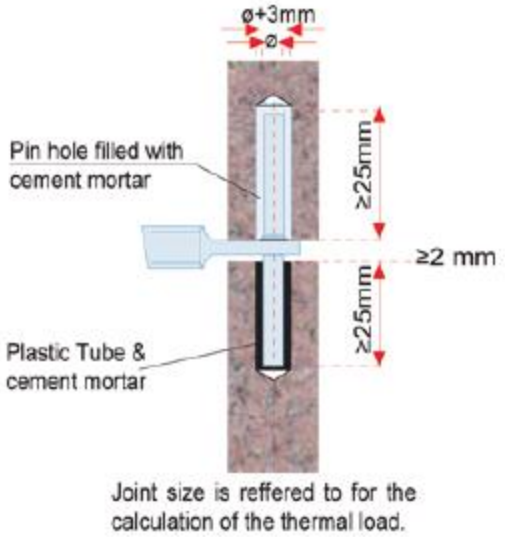
- Certificated test allows the using of the combination (Natural stone-Glueing material – Aluminium Substructure)

Flow chart for glued projects



Unvisible fixing : 5 Dowels

Certification

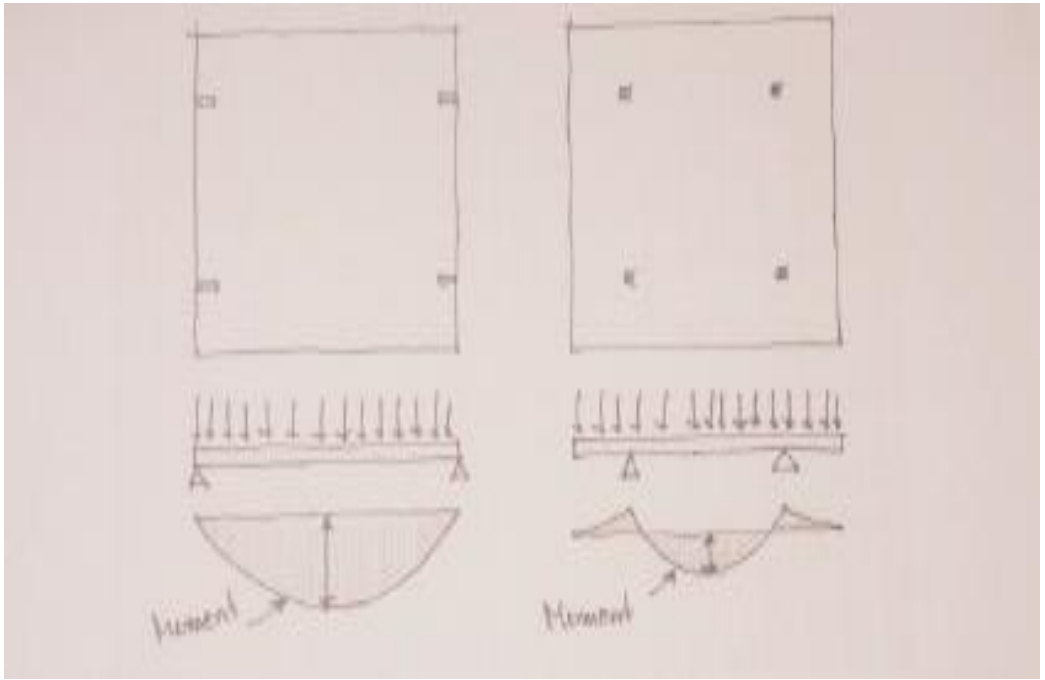


Argumentation for dowels

- Traditional method

Unvisible fixing : 5 Dowels

No BWM system !!



Argumentation against dowels

- „Stress“ forces for the natural stone panel
- A lot of complaints regarding of the spalling at the edges of the natural stone panels

Unvisible fixing : 6 Horizontal system & Undercut anchor

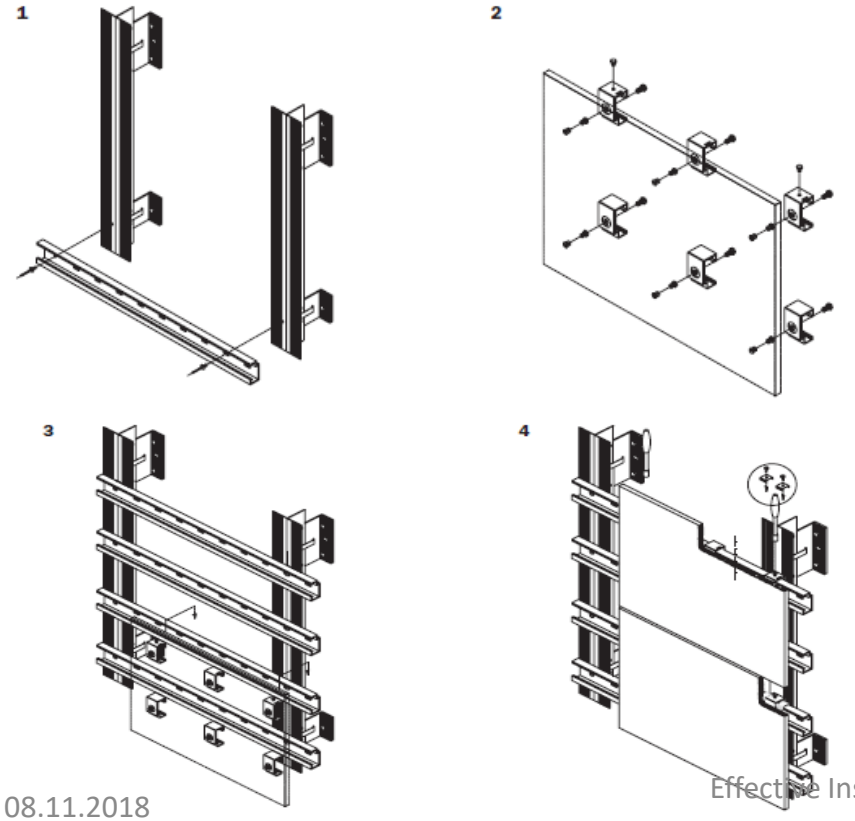
Russia, Grasnodar Stadium

Argumentation for undercutanchor

- High loads
- More stressfree forces for naturalstone
- Many options for realization of details

Unvisible fixing : 6 Horizontal system & Undercut anchor

Mounting Sequence

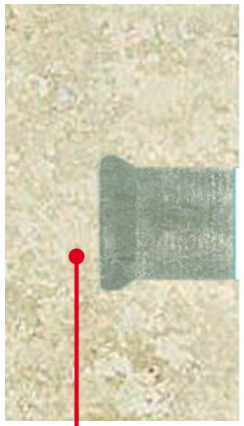


Argumentation for undercutanchor

- Installation of the vertical subframe
- Fixing of the clasps with undercutanchor *)
- Hang in
- Optimizatize the position of the panel

Unvisible fixing : Fixing of the clasps with undercutanchor *)

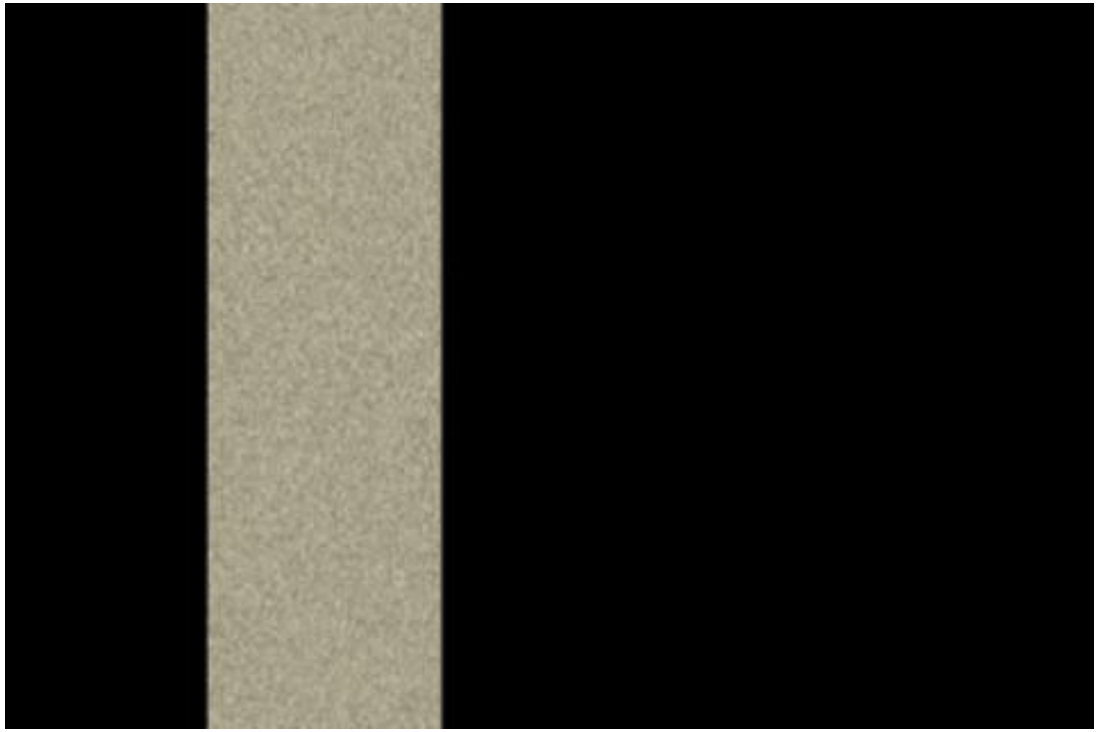
Installation of the undercut anchor



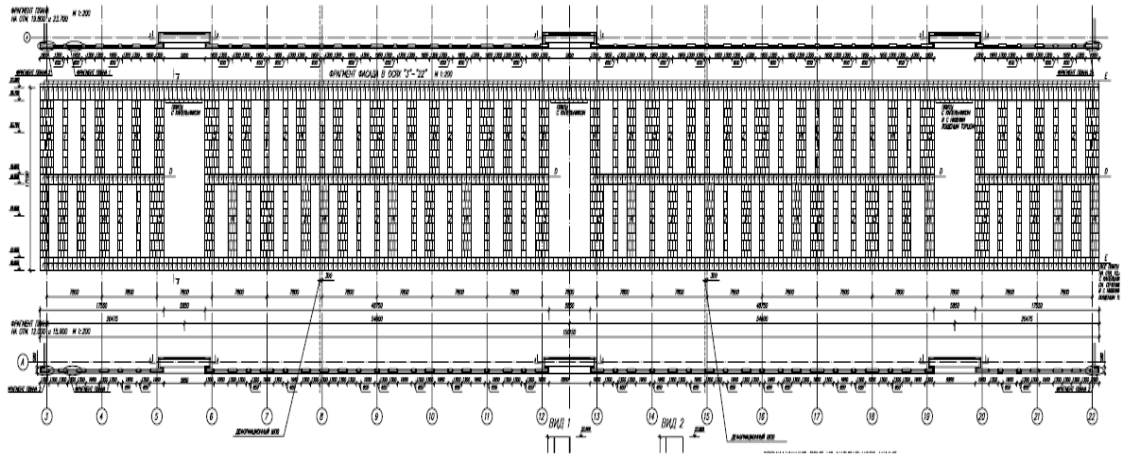
Undercut anchor

Undercut hole in the panel material

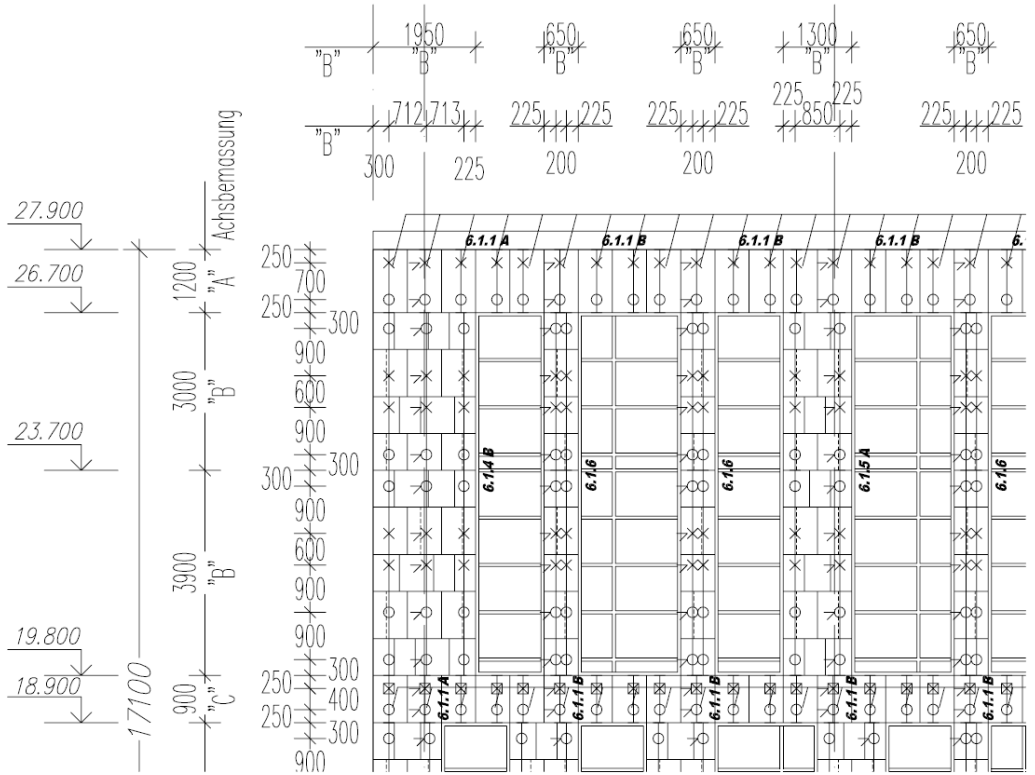
Argumentation for undercutanchor



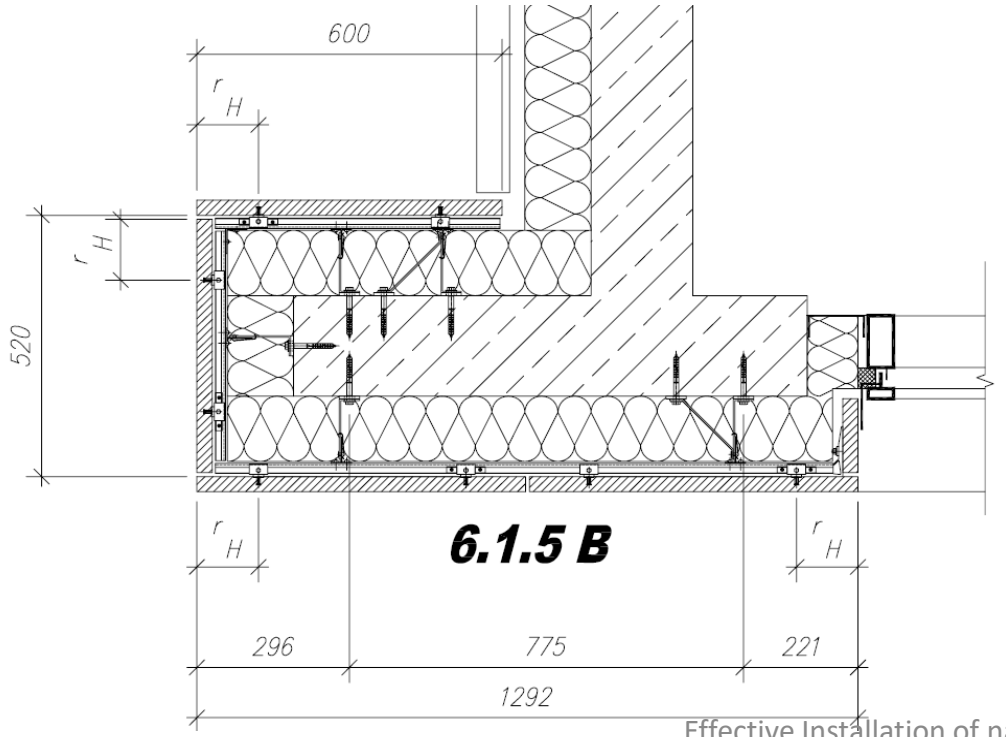
Rus- Moscow Krasnoproletarskaja



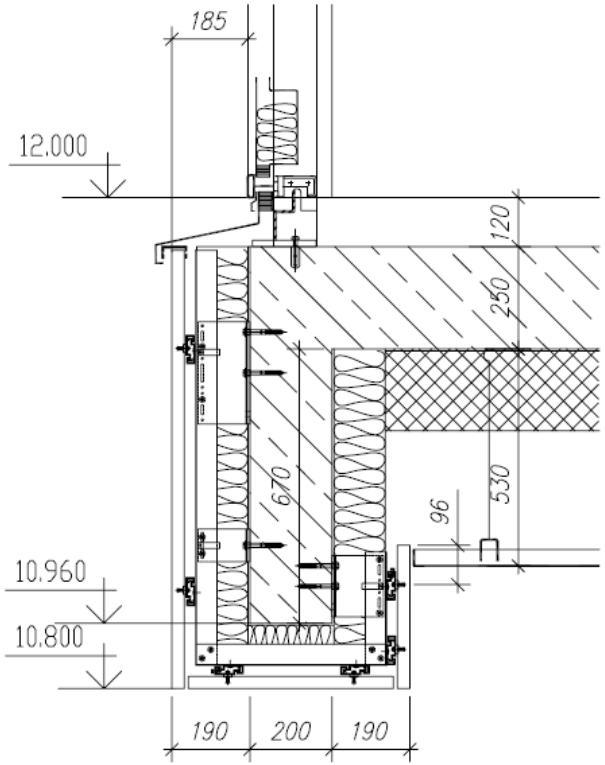
Russian detail planning



Detail corner



Detail planning - ceiling

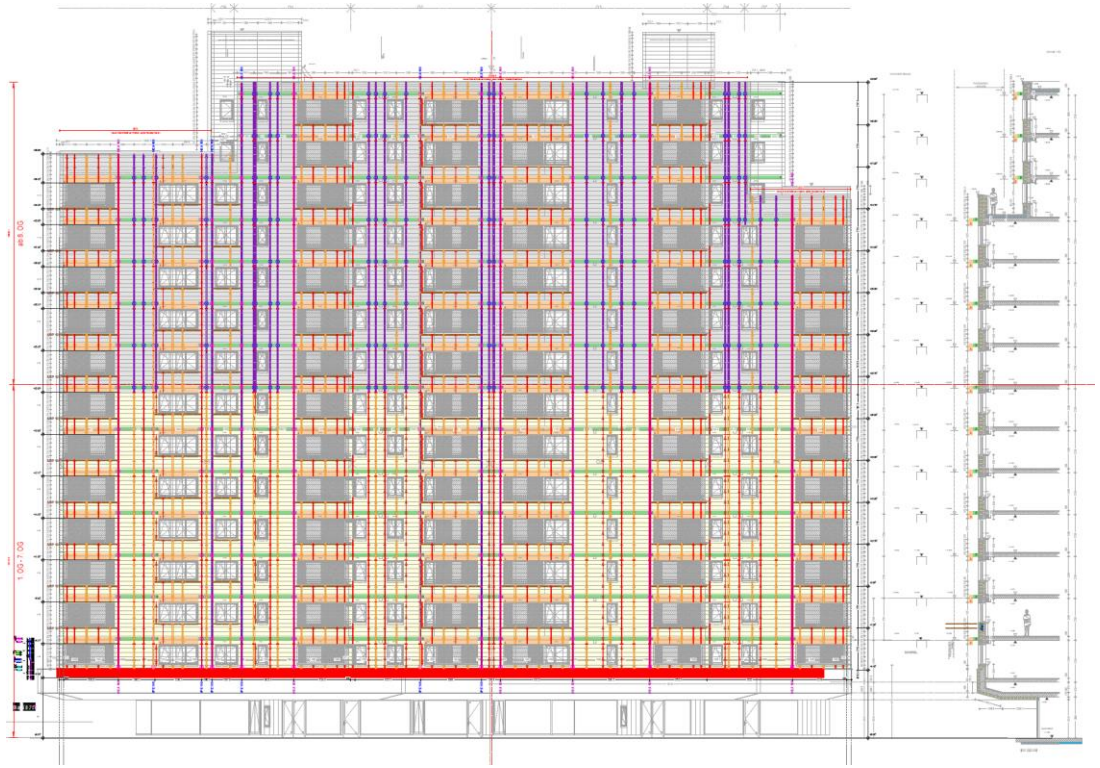


The result .. Krasnoproletarskaja, Moscow

Pre- fabrication

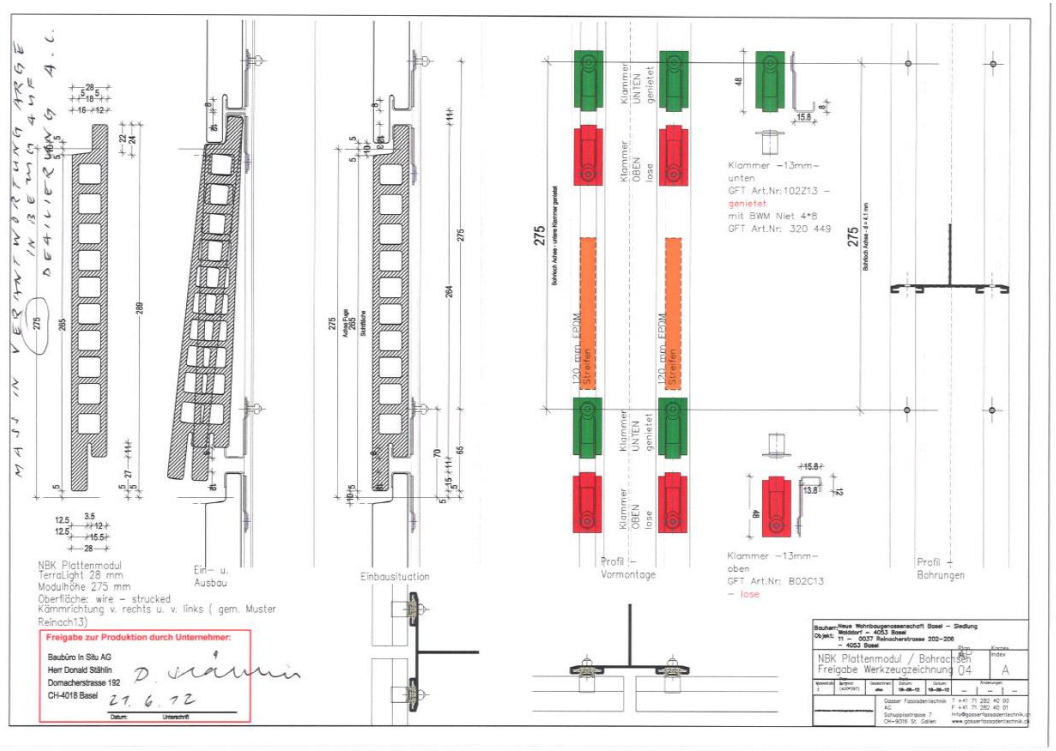
CAD- Drawings (i.e. architect)

„Translation“ into subframe system

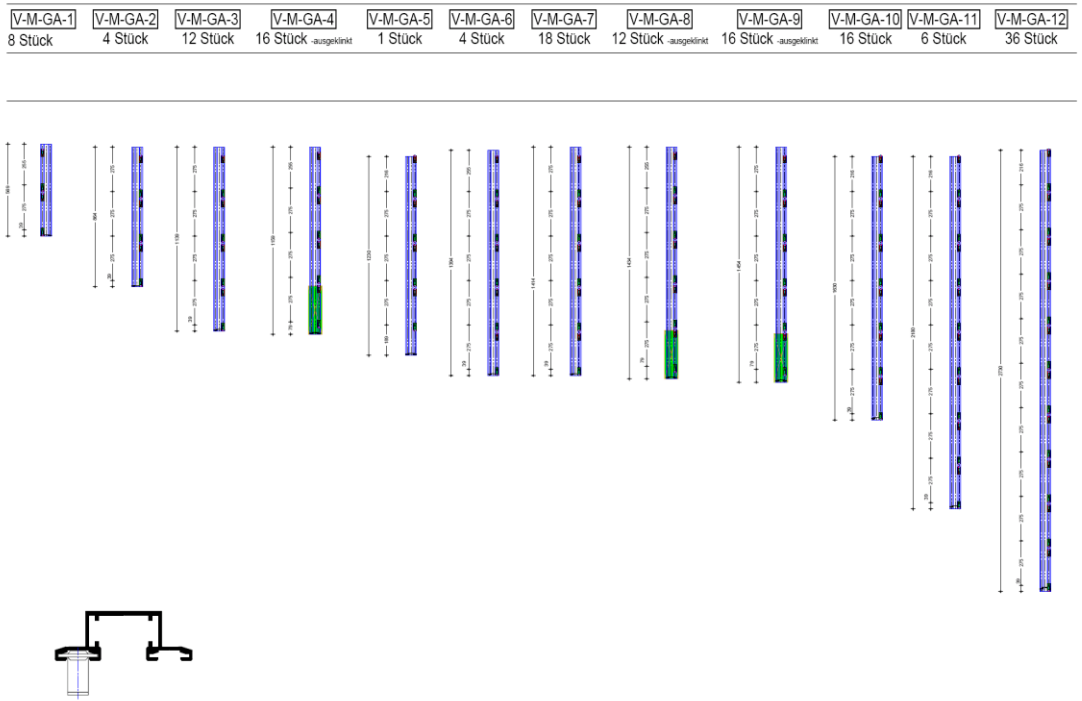


Pre- fabrication

Definition of the BWM fixing system



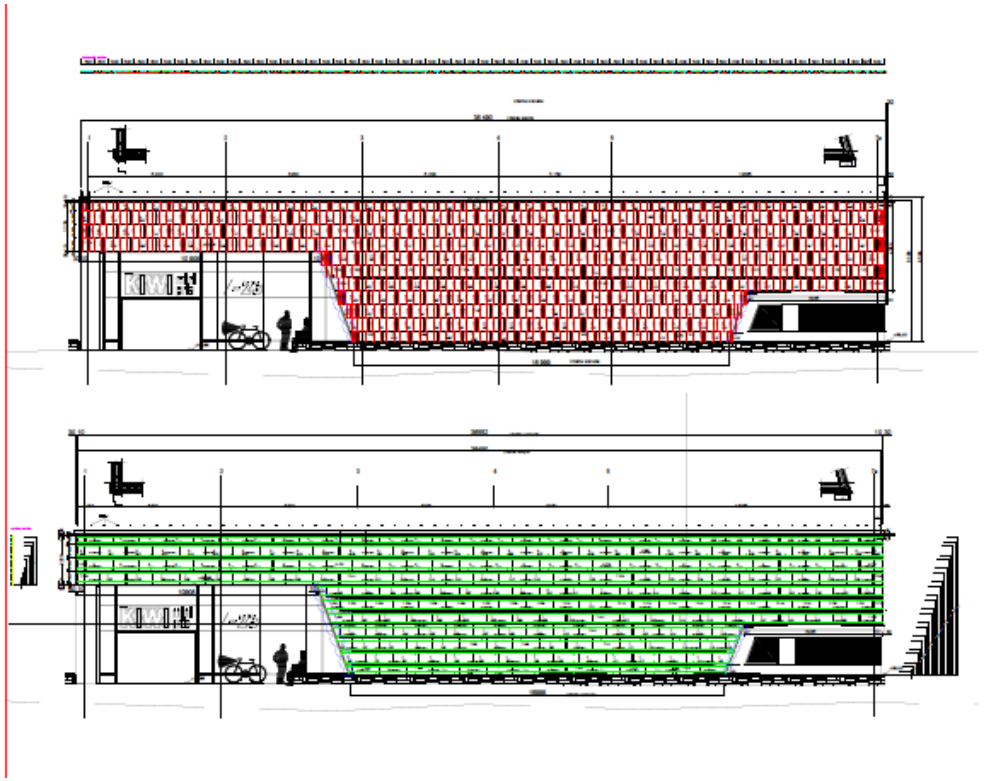
Definition of the „IKEA- package“



Pre- fabrication

Shipping package

Operating instructions



Pre- fabrication

PV Project in Trondheim

PV Project in Oslo

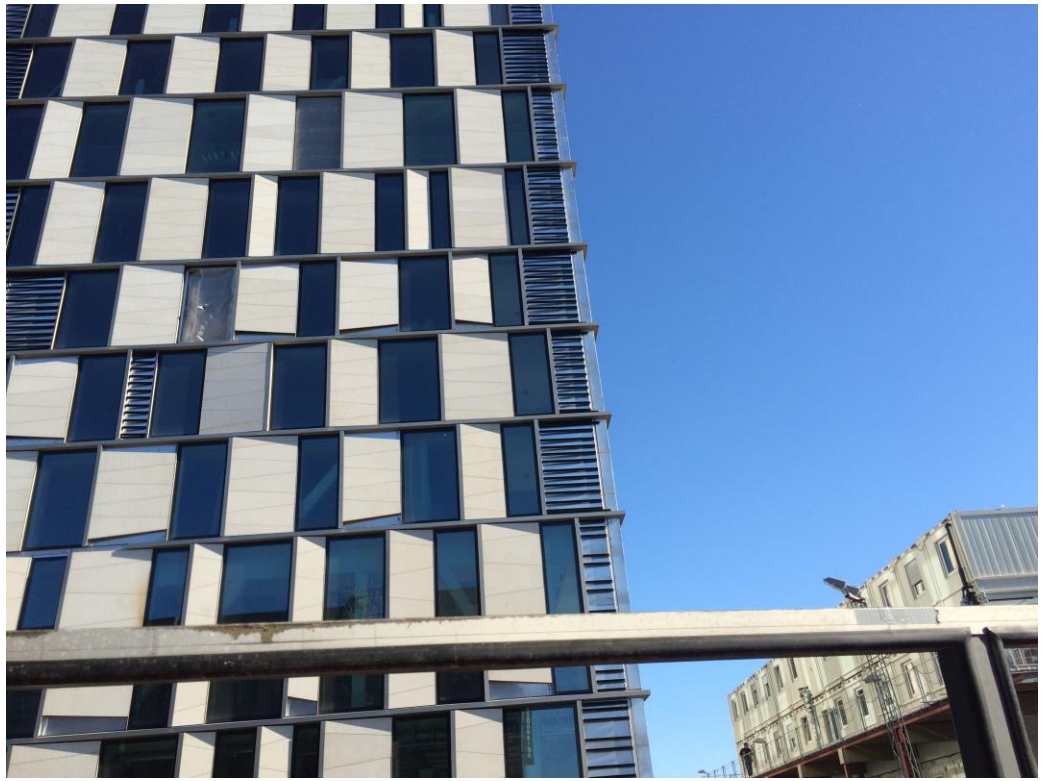
Pre- fabrication

Requirements for this jobsite

- Building is closed to the main train station → traffic !
- The installation time for the natural stone panels was from 22:00 – 5 :00 o`clock

For hang in the prefabricated panels

Project Stockholm Orgelpipan



Pre- fabrication

„Enviromental situation“: no space

Project Stockholm Orgelpipan

Pre- fabrication :

- Reduction of the total mounting time of the facade (ca.30 %)
- Optimizing of material supply and waste (10 % less material)
- Permanent transparence of the costs / cost controlling
- small tolarences on the building side

referals

Al Hamra Kuwait

Technical description

- Natural Stone
- 15.000 sqm
- Undercut Anchor

referals

Russia, Grassnodar Stadium,

Technical description

- Natural Stone
- 35.000 sqm
- Undercut Anchor
- Stainless steel subframe

referals

„Enviromental situation“: no space

Al Hamra Kuwait

- Natural Stone
- 15.000 sqm
- Undercut Anchor

referals

USA New York Warren Street

Technical description

- Natural Stone (Jura Limestone)
- 13.000 sqm
- Prefabricated ….

referals

Chile Santiago de Chile Bahá ì Temple

Technical description

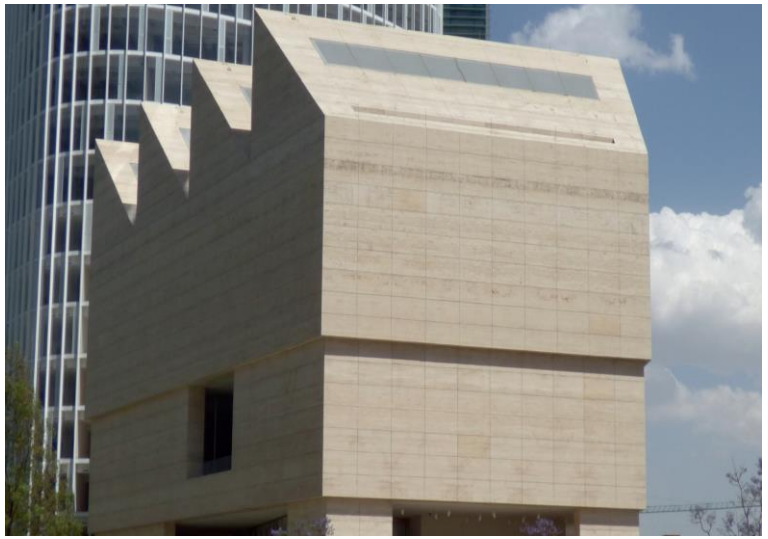
- Translucent Natural Stone & Glass
- 11.000 sqm
- Undercut Anchor

referals

Mexico, Jumex Museo

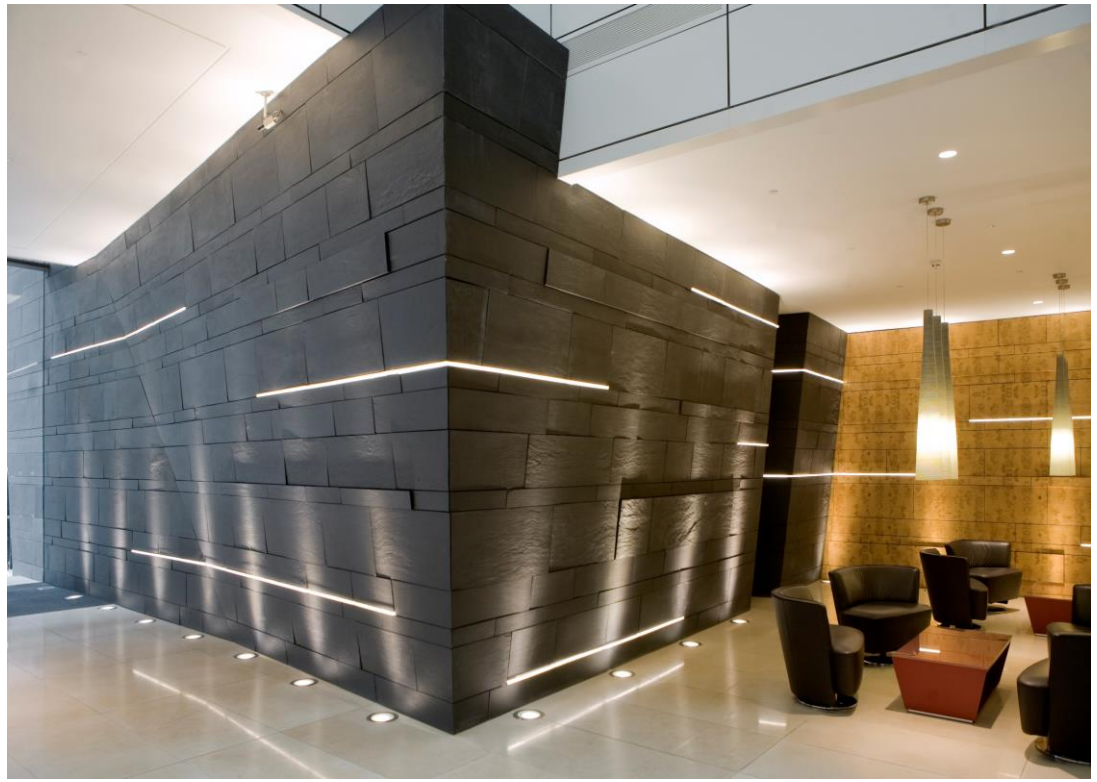
Technical description

- Natural Stone (Granite)
- 5.800 sqm



referals

United Kongdom London Houndsditch



Technical description

- Internal using
- Natural stone fixed under different angles

referals

France Paris La Defence

Technical description

- Ceiling and facade
- 25.000 sqm
- Refurbishment

referals

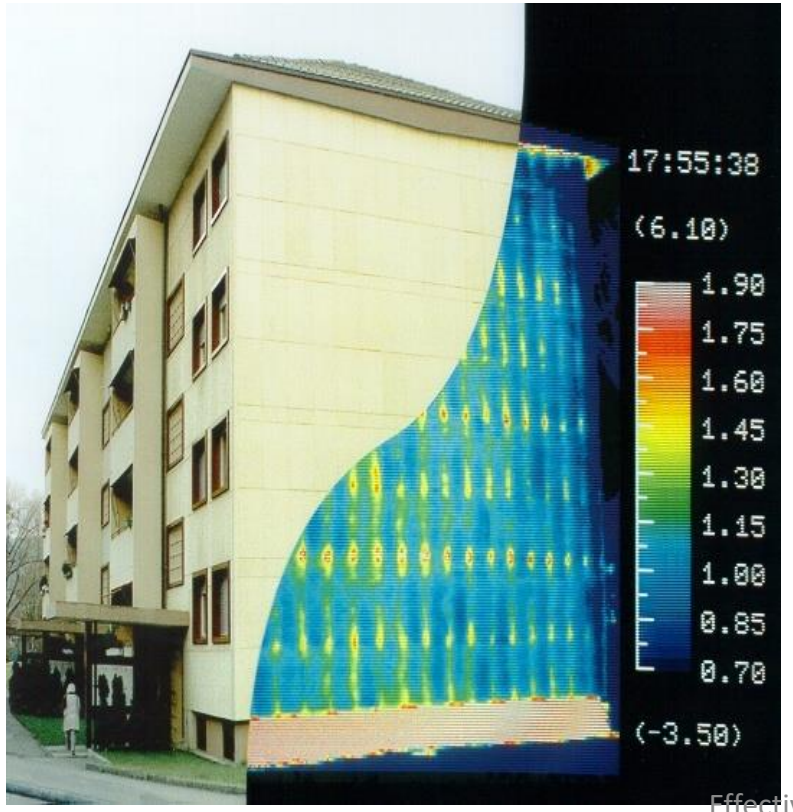
China Bejjing new governement district

Technical description

- Natural Stone (Granite)
- 700.000 sqm
- Undercut fixed

Last topic …

Building phyiscal aspects



Technical description

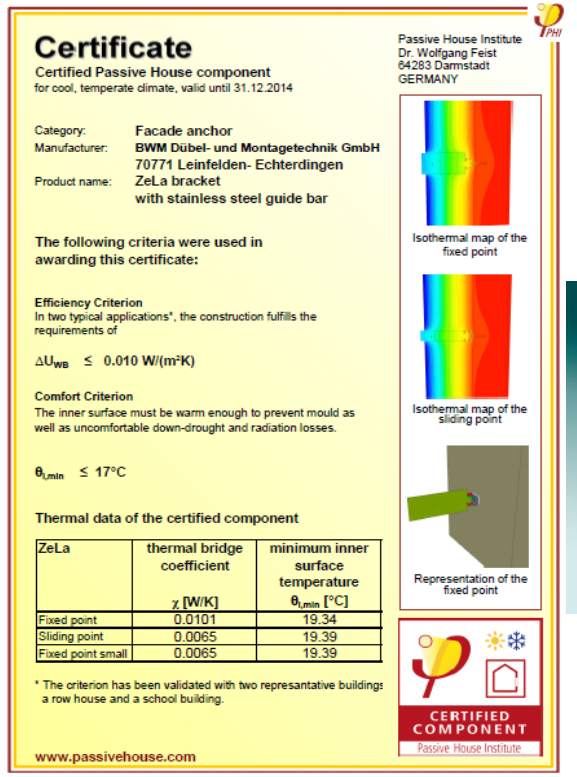
To achieve the technical requirements of the building physical aspects, we have to reduce the coldbridges of the substructures …..

Last topic …

Requirements

- The requirements of the international regulations and rules are growing !
- In several European countries the Buildings have to achieve Passivhouse Standard !

.. We fulfill it ☺



Certificate

Certified Passive House component
for cool, temperate climate, valid until 31.12.2014

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
GERMANY

Category: Facade anchor
Manufacturer: BWM Dübel- und Montagetechnik GmbH
70771 Leinfelden- Echterdingen
Product name: ZeLa bracket
with stainless steel guide bar

The following criteria were used in awarding this certificate:

Efficiency Criterion
In two typical applications*, the construction fulfills the requirements of

$\Delta U_{WB} \leq 0.010$ W/(m²K)

Comfort Criterion
The inner surface must be warm enough to prevent mould as well as uncomfortable down-drought and radiation losses.

$\theta_{i,min} \leq 17$°C

Thermal data of the certified component

ZeLa	thermal bridge coefficient χ [W/K]	minimum inner surface temperature $\theta_{i,min}$ [°C]
Fixed point	0.0101	19.34
Sliding point	0.0065	19.39
Fixed point small	0.0065	19.39

* The criterion has been validated with two represantative buildings a row house and a school building.

www.passivehouse.com

Isothermal map of the fixed point

Isothermal map of the sliding point

Representation of the fixed point

CERTIFIED COMPONENT
Passive House Institute

Thank you very much for your attention !