VPG VERBUNDSYSTEME PLANUNGS-PRODUKTIONS-BAUGESELLSCHAFT mbH
Planning services, engineering services, project management and assembly of the VS-System elements
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VST VERBUNDSCHALUNGSTECHNIK GesmbH
Patents, licences, know-how contracts and cooperations, research and development
Wildgansgasse 1b/2
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Fax: 0043 (0) 2235 81 071-30
E-Mail: vienna@vst-austria.at

VST VERBUNDSCHALUNGSTECHNIK S.R.O.
Production and supply of the VS-System elements
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www.vst-austria.at

VST GROUP

"What matters is a fundamental transformation of civil engineering
and not a rationalization of past working methods."

[Ludwig Miës van der Rohe, »Industrielles Bauen«, 1924]

Our innovative composite formwork system allows industrialization and high flexibility. At the same time it meets all ecological and economical requirements.

Cover picture: Residential Building Lagbasen, Stockholm (Swe)

A STRONG COMPANY WITH

EXPERIENCE OF MANY YEARS

The development of the patented VS composite formwork system began back in the early 1980ies. Up to this day we have implemented hundreds of housing projects, hotels, restaurants, business and industrial buildings, leisure facilities and social institutions using this technology.

A company reorganisation was the impulse for our experienced engineers and skilled workers to establish this innovative formwork technology more firmly on the market.

COMPANY STRUCTURE VST GROUP

VST VERBUNDSCHALUNGSTECHNIK GmbH
Hennersdorf/Vienna
general manager: Mag.Dr. Michael Müller
shareholder: EYEMAXX International
Unternehmensberatung GmbH 75%, Ing. Siegfried Gassner 25%
VS owner of patent, VS licenser, Holding

Participations

VPG VERBUNDSYSTEME GMBH
Zell am See
general managers: Ing. Siegfried Gassner,
Dipl.- Ing. Gerhard Gappmaier
shareholder: VST Verbundschalungstechnik GmbH
100%, building industry, engineering office

VST VERBUNDSCHALUNGSTECHNIK S.R.O.
Nitra, Slovakia
general managers: Ing. Siegfried Gassner,
Vlado Novak
shareholder: VST Verbundschalungstechnik GmbH
100%, VS production of building material

GRUBER VERBUNDSCHALUNGEN SPOL. S.R.O.
Nitra, Slovakia
general manager: Dipl.- Ing. Jan Lesak
shareholder: VST Verbundschalungstechnik GmbH
100%, renting and leasing

VST NORDIC
Stockholm, Sweden
general managers: Anders Radestad,
Dipl.- Ing. Gerhard Gappmaier
shareholder: 75% LIHAB Förvaltning AB,
25% VST Verbundschalungstechnik GmbH
25%, building industry

THE PATENTED

VST FORMWORK SOLUTION

The VS-System is a solid construction method using concrete encasements. The formwork consists of cement-bonded particle boards (CBPB), which later remain in the building. The prefabricated elements form the composite formwork, which is filled out on-site with fluid concrete or self-compacting concrete (SCC) to gain stability.

The VS-System is an all-purpose system for loadbearing and non-load-bearing structures, a patented formwork system for walls, slabs, staircases, columns and beams.

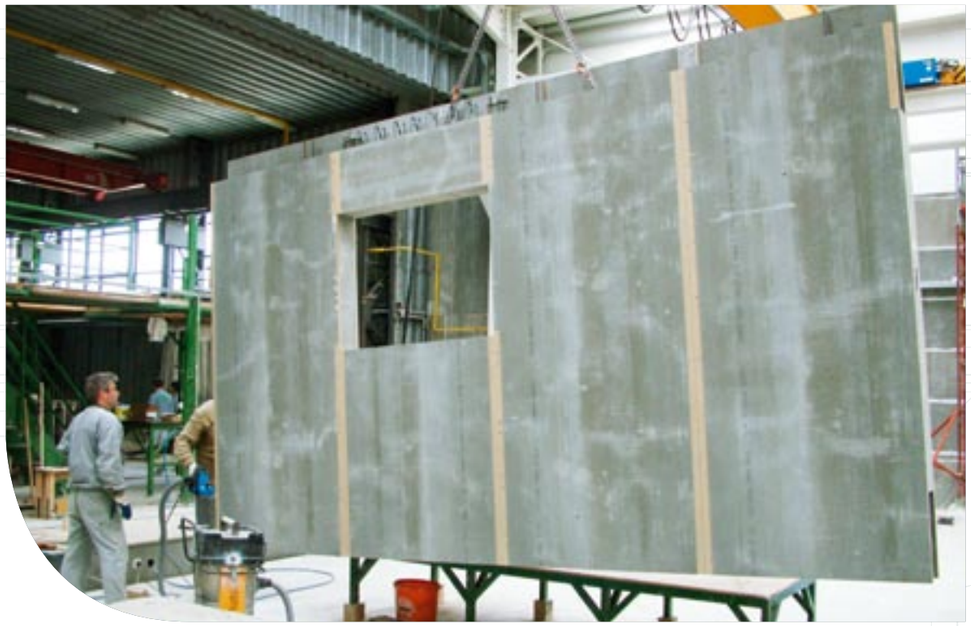
The most important advantages of the VS-System are: extremely short construction time, low overall costs, high quality and the healthy room climate resulting from the intensive humidity compensation.

The concrete core ensures stability, high sound insulation and optimum heat accumulation. The heat is "stored" due to the cement-bound press boards on both sides of the concrete core and the thermal protection fixed on the external wall. As a result, the arising heating costs are very low.

PRODUCTION

ALL PROVIDED BY ONE HAND

The VST formwork panels are produced in the VST factory Nitra (Slovakia). All needed steel elements and clips will be created in the VST-locksmithery, located near the production area.



So the VST Group is independent from other material suppliers (exception: basic products like steel sheets) and the production can react in a very short range of time

PRODUCTION

VST WALLS

VST wall elements will be produced individually according to specific workshop drawings including reinforcement if needed. The formwork elements will be completely produced including necessary reinforcement, openings for doors, windows, and service ducts. Because of the industrial manufacture the panels will be produced on a high level of precision.

TECHNOLOGY

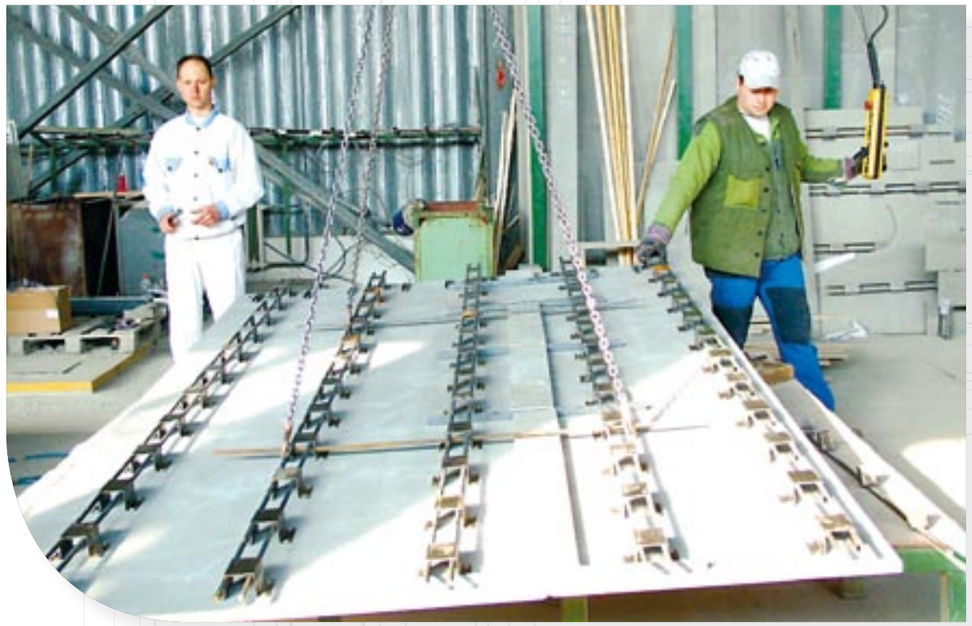
PRODUCTION

VST WALLS

The industrial manufacture leads to numerous advantages. The work on construction site is reduced to assembly and concreting of the panels. The lightweight character of the panels guarantees low costs for carriage and assembly.

PRODUCTION **VST SLABS** AND **SPECIAL**
CONSTRUCTION ELEMENTS

The VST slab-elements consist of 24mm thick cbpb and a VST developed hat-profile type HT, which will be screwed on top of the board in factory. This slab element will be produced with max 2.400 width and 6.000mm length.



If bigger spans are needed, the slab-elements will be connected on site. One of the main advantages is the very low weight of the panels and the fact that there is no limitation of structural system, length and geometric shape.

To provide a full loadbearing structural system additional VST-elements like columns, beams, stairs or capitals are produced in the VST factory as well.

PRODUCTION **VST LOCKSMITHERY** AND
REINFORCING BENDING UNIT

All clips (spacers), steel elements and reinforcement needed for production and carriage will be produced in the VST Group owned locksmithery and reinforcing bending unit.

RESIDENTIAL BUILDING

GATEWAY

This project is located near the city center of the Irish capital Dublin. The two blocks (D1 and D2) already built will be completed with three further objects. The whole area has an underground car park floor. The 8 floors of the object will be used for living. There are 3 penthouse flats located on top of the blocks with a panorama worth seeing.

Name of project:
Residential Building Gateway, construction stage block D1 and D2
Location: Dublin, Ireland

Characteristics:
Dwelling house with 157 flats and 1 retail unit
Underground car park beneath both blocks

Construction time on site:
February 2005 – August 2005

Facts of raw superstructure:
approx. 15.000m² of walls and 11.600m² of slabs

Special features:
city location, tight schedule

RESIDENTIAL BUILDING

LAGBASEN

This project was the first bigger object in Stockholm/Sweden realised by VST Group. Piles had to be used because of the bad foundation soil attributes. The basement floor is used as underground car parking as well. On Ground Floor level partly retail/gastronomic units and partly flats are located. In the remaining 6 upper floors only flats are provided. The nice garden yard invites the residents and guests to stay.

Name of project:
Residential Building Lagbasen

Location:
Stockholm/Sweden

Characteristics:
Dwelling house with 137 flats and approx. 10 retail and gastronomic units
Underground car park floor

Construction time on site:
November 2004 – July 2005

Facts of raw superstructure:
approx. 14.800m² of walls and 11.500m² of slabs

Special features:
city location, pile foundations

UCD – UNIVERSITY AND **COLLEGE** DUBLIN

The local University and College of Dublin had its supply of student accommodations expanded. This object contains 3 blocks which are linked together. By using the VST-System it was possible to meet the very tight time schedule. The accommodations are allocated on 6 floors; the object has no basement floor.

Name of project:
UCD – University and College Dublin

location:
Dublin, Ireland

Characteristics:
Residential Building for Students

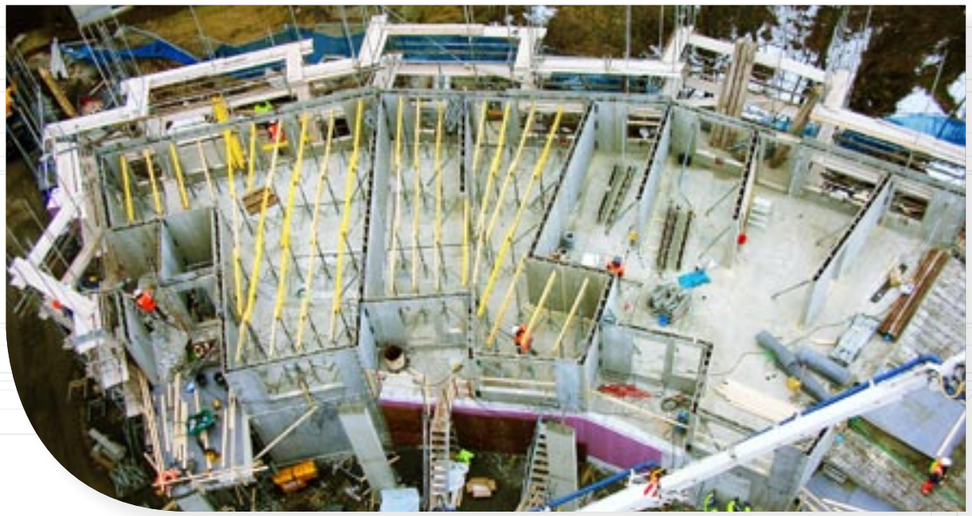
Construction time on site:
August 2005 – December 2005

Facts of raw superstructure:
approx. 10.200m² of walls
and 7.800m² of slabs

Special features:
tight schedule, specific solutions
provided for bathroom-pods

RESIDENTIAL BUILDING **SKYTTEPARKEN**

This residential object will be realised near a big hospital in Stockholm's district Södermalm. It is separated into 4 blocks which are linked together. The object is placed on a slope and consists of 8 floors (partly 9 floors) which are partly used as underground car park. During construction time the particularities of the hospital have to be observed.



Name of project:
Residential Building Skytteparken

Location:
Stockhom, Sweden

Characteristics:
Dwelling house with 126 flats separated in 4
Blocks 200 underground car park units

Construction time on site:
January 2006 – October 2006

Facts of raw superstructure:
approx. 17.000m² of walls and 17.500m² of slabs

Special features:
very challenging foundation soil conditions,
near a big hospital, extremely limited amount
of space on construction site

PRINCIPAL OFFICE VPG / ZELL AM SEE, AUSTRIA

VPG VERBUNDSYSTEME

In 1993 an office building with 900m² of office space and a 500m² selling area was erected to house the headquarters of VPG Verbundsysteme in Zell am See (Salzburg, Austria). Furthermore, an underground garage for 20 cars was built (watertight construction) as well as an atrium on the second floor.

Name of project:
principal office VPG Verbundsysteme

Location:
Zell am See, Austria

Characteristics:
Officebuilding with retail unit
and undergrund car park

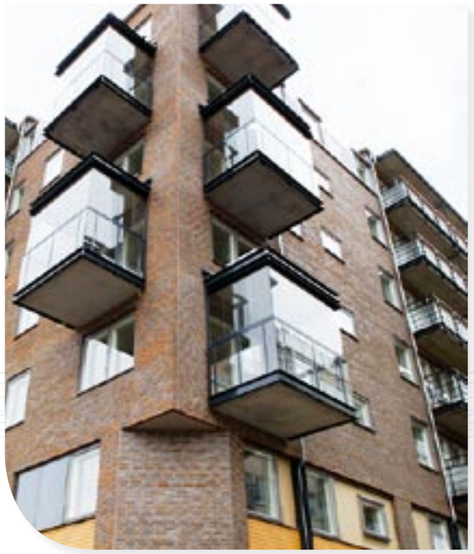
built in year 1993

Effective area:
whole object approx. 1.340m²; underground
car park with 20 car parks

RESIDENTIAL BUILDING

LAGBASEN

This project was the first bigger object in Stockholm/Sweden realised by VST Group. Piles had to be used because of the bad foundation soil attributes. The basement floor is used as underground car parking as well. On Ground Floor level partly retail/gastronomic units and partly flats are located. In the remaining 6 upper floors only flats are provided. The nice garden yard invites the residents and guests to stay.



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Dwelling house with 137 flats and
approx. 10 retail and gastronomic units
Underground car park floor

Construction time on site:
November 2004 – July 2005

Facts of raw superstructure:
approx. 14.800m² of walls and 11.500m² of slabs

Special features:
city location, pile foundations

DORINT

SÖL'RING HOF/SYLT

This picturesque hotel is located in the middle of the romantic dunes of the North Sea resort Rantum on the Sylt island (Germany). It offers 15 luxurious rooms and suites, a gourmet restaurant, a wine cellar, salon with fireside, wellness department and a large terrace overlooking the dunes and the sea.

The VS composite formwork system was used for the load-bearing elements. Furthermore, the five-star hotel was provided with a thatched roof which is typical for this region.

Building volume:
5.000m³

Construction time (building shell):
9 weeks

NURSING HOME

ERFURT

This project was constructed on a general contractor basis in Erfurt, the capital of Germany's federal state Thuringia. In approx. 35 weeks the nursing home with 97 rooms plus two additional residential building with 28 flats was built together with a partner.

Name of project:
Nursing home Erfurt

Location:
Erfurt, Germany

Charakteristics:
Nursing home and 2 Residential Buildings with 14 flats each

Construction time on site:
raw superstructure approx. 22 weeks;
complete structure approx. 35 weeks

Facts of raw superstructure:
approx. 9.200m² of walls and 7.000m² of slabs

Special features:
tight schedule - however only 5 assembly crew members were needed for raw superstructure

GRAND HOTEL

ZELL AM SEE

The historic Grand Hotel Zell am See (Salzburg/Austria) is situated on a peninsula in Lake Zell and was entirely rebuilt in its original shape from 1896. It offers 115 rooms, apartments and suites als well as restaurants, a convention center and a panoramic indoor swimming pool with sauna, whirlpool etc.

After a construction time of only ten months the hotel was put in operation. The basement floors are situated under the water surface of Lake Zell. The hotel's façade stands out due to its beautiful classicistic elements.

Building volume:
33.000m³

Construction time:
February 10, 1984 to December 23, 1984

RESIDENTIAL BUILDING

ANNAMOE ROAD

This residential building, containing three blocks, was constructed in Dublin's district of Cabra. The biggest block has flats on single floors, the two others also have two-storied flats (maisonettes) and partly a garden yard. An underground car park space is available for the residents. This project was the first major project done by VST Group in Ireland. The time needed for the raw superstructure was short, even considering the sometimes bad Irish weather.

Name of project:
Residential Building Annamoe Road, construction stage block A, B and C

Location:
Dublin, Ireland

Characteristics:
Dwelling house separated into three blocks and one underground car park floor

Construction time on site:
August 2004 – Dezember 2004

Facts of raw superstructure:
approx. 5.000m² of walls and 3.500m² of slabs

Special features:
city location, tight schedule, limited amount of space on construction site

LAKE HOUSE

DR. TRAPP

The building shell for this luxurious family home in Wustrow (Germany) was erected using VS-System elements as well as hand-shaped clinker brickwork for the external walls. The house is idyllicly situated at the Baltic Sea resort of Wustrow and has a thatched roof which is typical for this region.

Year of completion:
1998

RESIDENTIAL BUILDING

GATEWAY

This project is located near the city center of the Irish capital Dublin. The two blocks (D1 and D2) already built will be completed with three further objects. The whole area has an underground car park floor. The 8 floors of the object will be used for living. There are 3 penthouse flats located on top of the blocks with a panorama worth seeing.

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Construction time on site:
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Facts of raw superstructure:
approx. 15.000m² of walls
and 11.600m² of slabs

Special features:
city location, tight schedule

CAROLINE

OETKER STIFT

The Caroline Oetker Stift is a large first-class retirement home on the Johannisberg above Bielefeld (Germany). Is has 103 luxurious apartments, a chapel, bowling alleys, a large park and an indoor swimming pool.

Due to the very steep site a backwardly anchored bore pile wall was used to secure the building pit.

Construction stages:
Underground garage
103 luxurious apartments
Villa (connected by an underground passage)
Large park with orangery

Building volume:
48.000m³

Year of completion:
1994/1995

WHOLESALE BUILDING

JOLING

This wholesale building was erected in the Dutch city of Doetinchem in the year 2004. The building is a combination of VST formwork solutions and a steel framework (used for the exhibition hall).

Name of project:
Wholesale Building Joling

Location:
Doetinchem, Netherlands

Characteristics:
Wholesale Building separated into an office area and an exhibition hall

Total construction time including finishing:
5.5 months

Total useable floor space:
450m² for the office area and approx. 1.200m² for the exhibition

Special features:
combination of VST-system and steel framework

LEISURE CENTER

FILZMOOS

The modern leisure center Freizeitzentrum Filzmoos (Austria) offers indoor and outdoor swimming pools, saunas, bistro, climbing walls, playground, bowling alleys, solarium and a conference room.

VPG's engineers were responsible for the planning, project management, structural analysis and site management. Since the better part of the swim hall is column-free, a complex steel structure was used.

Building volume:
6.200m³

Year of completion:
2000

RESIDENTIAL BUILDING

KRISTOFF PLAZA

This building containing luxury apartments was built with the VST-system in one of the historically eldest Slovak bathing resorts, Trencianske Teplice. Most of the residents are exile-Slovaks who are domiciled in the US or Venezuela. The hermetically bolted building offers internal services for the residents – like cleaning, security or different sports. The outdoor pool is located on top of the underground car park floor.

Name of project:
Residential Building Kristoff Plaza

Location:
Trencianske Teplice, Slovakia

Characteristics:
Luxury Apartment Building with 42 flats

Total useable floor space:
from 45m² to 240m², underground car park floor

Built in year 2002

Facts of raw superstructure:
approx. 7.800m² of walls and 10.000m² of slabs

HALLE WESTFALEN

SPORTPARKHOTEL

The exclusive four-star hotel in Halle/Westphalia (Germany) offers 186 beds, an italian restaurant, a sauna, a park and a large and modernly equipped convention and conference center.

VPG's engineers took care of the design, working drawings, site management and structural analysis.

Building volume:
31.000m³

Year of completion:
1994

RESIDENZA

PURA

This residential building was developed near the lake Lago di Lugano in the City of Pura (CH). The design is positively influenced by special minimalistic architectural principles. The main focus is on reduction to the essentials. Frameless windows give the impression to have the garden yard inside.

Name of project:
Residential Building Residenza Pura

Location:
Pura, Switzerland

Characteristics:
Exclusive residential development containing 5 houses

Construction time on site:
February 2005 – August 2005

Total useable floor space:
1.510m²

Special features:
sloped building area, development of specific architectural details

www.min-design.com

JENA

COLUMBUS CENTER

The Columbus Center Jena (Germany) houses shops and service enterprises of all kinds. During the construction of this modern business center VPG's engineers were responsible for the planning, project management and structural analysis.

In addition, a parking garage for 350 cars was implemented.

Building volume:
38.000m³

Year of completion:
1992

BRENNER'S

PARKHOTEL

The largescale extension of the world famous "Brenner's Parkhotel" in downtown Baden-Baden (Germany) was an especially interesting challenge. The luxurious hotel which is situated at the Lichtentaler Allee directly at the river Oos is counted among the "Selection of German Luxury Hotels" and is one of the "Leading Hotels of the World". It offers its guests 110 exclusively furnished rooms as well as restaurants and a beauty spa.

VPG's engineers were responsible for working drawings, structural analysis and project management. VST's factories supplied all VS-System elements. Due to the high ground water level a truncated bore pile wall and an anchored ground slab were used to secure the building pit.

VS-System construction components:
2-storied underground garage for 240 cars
6-storied adminstrative wing "Haus Anstett"
5-storied "Villa Turgenjew" including four boutiques and 41 apartments
3-storied "Villa Viardot" including two boutiques and five luxury apartments

Building volume:
52.000m³

Construction time:
April 2, 1990 to April 30, 1991

RESIDENTIAL BUILDING

SACHSENGANG

This project is located near the city of Vienna and contains 22 terraced houses. As a channel of river Danube is very close, the residents have the possibility to swim and relax on the shore.

Name of project:
Residential Building Sachsengang

Location:
Maria Enzersdorf, Austria

Characteristics:
22 terraced houses (4 different types)
near a channel of river Danube

Total useable floor space:
approx: 4.000m²

Gesamtnutzflächen:
ca. 4.000m² Nettonutzfläche

Visualization by:
Zuchna, Salzburg

OFFICE BUILDING

HEILIGENSTÄTTERSTRASSE

This specific office building will be devolped in Vienna's 19th district. It is linked to an existing private hospital via a bridge. This object should support the private hospital with new areas for administration and medicals. The places of the partition walls are variable.

Name of project:
Office Building Heiligenstätterstrasse

Location:
Vienna, Austria

Characteristics:
Office Building with retail area,
underground car park areas

Total useable floor space:
7.200m² plus 91 underground car park spaces

Special features:
general contractor order, city location,
for analysis: high horizontal loads caused
by earthquakes must be considered

Visualization: bd-visual, Wien/Graz

Construction site Dorint Hotel An Der Messe Köln-Deutz

Construction site Kristoff Plaza Apartments, Trenčianske Teplice

VPG VERBUNDSYSTEME PLANUNGS-PRODUKTIONS-BAUGESELLSCHAFT MBH

DEPARTMENT FOR STRUCTURAL ANALYSIS AND STRUCTURAL DESIGN

Fields of activities:
- Structural engineering
- Industrial construction
- Civil engineering
- Special constructions

Our services:

Structural design:
- Preliminary design, design
- Planning for permission to build

Working drawings:
- Structural analysis
- Reinforcement drawings
- Steel construction drawings
- Timber construction drawings
- Prefebricated component drawings

Project management:
- Construction management
- Call for tenders, award of contracts, time scheduling
- Coordination
- On-site construction supervision

Consulting services:
- Feasibility studies
- Profitability calculation
- Renovation

Construction physics:
- Thermal protection
- Sound insulation
- Humidity protection

THE VST SYSTEM COMPONENTS AND ITS BEHAVIOUR WAS CHECKED PROPERLY IN THE PAST.

The pyramid of pharao Djoser, built in the 3rd dynasty approx. 2.650 B.C., is one of the oldest pyramids in Egypt.

Basics of the VST formwork solution

The patented VST-System is based upon the principle of permanent formwork, where the formwork stays in the object after all works on site. The shells of the VST-system are formed by 24mm thick cement bonded particle boards (cbpb). They will be assembled in the VST-factory in several processes in an industrial way. The VST wall and slab elements are acting together as the composite shell, they will be assembled on site accurately and will finally be poured with concrete (self compacting concrete) to get their final stability. Therefore the VST-system must be evaluated as in-situ concrete method. The cbpb remains in the building. In order to form the final shape of the elements and to resist concrete pressure, special steel components are acting inside (without any appearance on the outer surface). For all VST-elements the same type of cbpb is used. VST slabs will be strenghtend by special (VST-developed) cap-profiles on top of the boards.

fire testing of vst-system

VST SYSTEMTECHNOLOGY

As research and devolpement are a basic company principle, we can provide highly qualified engineering solutions. All this leads to huge experience as well as numerous certificates and testing reports. Should you require any special details, please contact one of our companies or representatives.

Advantages of VST System compared with traditional formwork solutions

In its prefabrication the VST System contains parts of industrial processes. A substantial part of the activities on construction site is transferred to stationary fabrication – independent of wind and weather. So approximately 60% of total labour-hours are relocated to factory and therefore into a secure sourrounding. The advantages of stationary production are optimised working processes and a higher efficieny and productivity. A fabrication process can be extended to 3 shifts (production round the clock).

The VST Systems requires only very short times for errecting raw superstructures. The simple and effective assembly of the panels on site and the omitting of striking-out the formwork and basic-plaster work including dry-out periods, will shorten the process time on site down to approx. 50% compared with traditional systems. The VST formwork system reduces costs for building site equipment (because of shorter rental periods or providing times of own material). The dimensioning of cranage leads to smaller types. The boards act like a jacket and protect the concrete against frost in winter or against too quick dry out in summer. The reduction of working time in winter also leads to positive cost effects.

These are also advantages for sites in city-locactions (less need of space for site equipment). Panels will be delivered and assembled just in time. After hardening of concrete, backpropping can be done and the final works inside can start. Cleaning and waste will be minimised significantly as well, therefore the costs for waste management are small. As the system offers an unexpected high level of exactness, the final object will be accurate as well. The risk of warranty is small because of the high VST quality assurance system.

advantages of VST compared with prefabricated concrete elements

The lightweight VST elements lead to economic costs for delivery and assembly. The concreting will be done in-situ – therefore the VST System will not have any joints between the panels. The wall and the slabs will be poured together and create a massive concrete structure.

areas of application

The VST System can be used economically for all structural raw superstructures and stabilisation elements. It combines the advantages of the concrete construction method (high resistance against pressure, tension and dynamic loads like earthquake loads plus high capacity to store thermal energy and an optimal sound insulation) with the advantages of the timber-construction method (agreeable climatical and hygrical conditions and a smooth surface temperature of the cement bonded particle board).

TECHNICAL DETAILS

VST WALLS

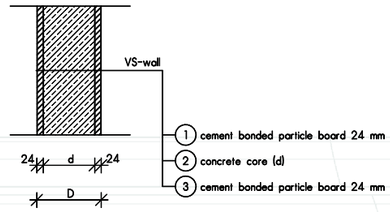
For the boards creating the surface, premium quality cement bonded particle boards with 24mm thickness will be used. As connecting elements only self-developed steel clips (steel-spacers) will be utilized.

They will be fixed with galvanised screws on the inner face of the board without any appearance on the visible side. All connections between the single VST-walls will be created as a 80mm wide and 1-2mm deep mill or a 12mm wide and 6mm deep V-shaped joint. This joints should be treated based upon supplier's instruction. All VST-wall elements will be fully manufactured and fitted with needed openings (doors, windows, service opes, etc.) and lifting units.

VST-walls can be used for vertical or pitched use on site. Reinforcement will be built in at factory according to drawings or requirement.

Actually we can produce the following wall types (thicknesses):

- D=175mm (thickness concrete core d=127mm)
- D=200mm (thickness concrete core d=152mm)
- D=215mm (thickness concrete core d=167mm)
- D=230mm (thickness concrete core d=182mm)
- D=250mm (thickness concrete core d=202mm)
- D=300mm (thickness concrete core d=252mm)



The overall thickness of the VST-wall element (measurement in architectural dwgs) will be given by the thickness of the concrete core and the thickness of the cbpb on each side.

Other wall thicknesses can be manufactured after request and reconfirmation.

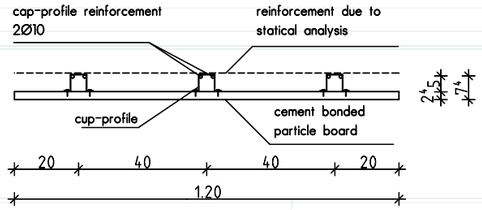
Example

TECHNICAL DETAILS

VST SLABS

The VST-slab-elements type HT will be produced with cbpb (thickness 24mm) and special cap-profiles (fixed height = 50mm) for horizontal or pitched slab areas. The single slab-elements will be assembled in factory to packages of 2.400mm width and max. 6.000mm length.

The cap-profiles (made of steel sheets and reinforcement bars) will be screwed on top of the cbpb with screws in a distance of 400mm (grid of cap-profiles). Height of cap-profile = 50mm / total height of a VST-slab-element = 75mm. The provided reinforcement bars can be used as bottom layer reinforcement (final slab-element on site) as well. The bottom surface of the slab must be treated according to supplier's instruction.



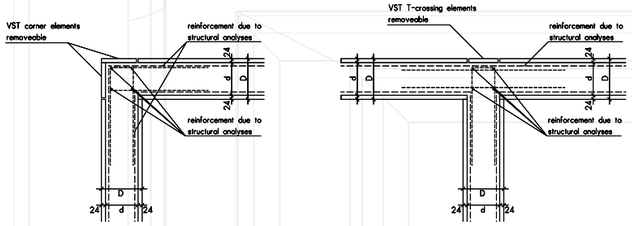
Example

TECHNICAL DETAILS **SPECIAL**

CONSTRUCTION ELEMENTS

With the VST formwork solution all elements of a loadbearing structure can be provided. In addition to main construction elements (VST-wall and slab-elements) we can offer:

- VST fringe boards (to create an edge or form an ope at slab-structures)
- VST columns (rectangular or quadratic) based upon structural analysis; reinforcement will be fitted into the VST element in factory
- VST beams (rectangular or quadratic) based upon structural analysis; reinforcement will be fitted into the VST element in factory
- VST stairs (straight flights and landings including fringes to form risers); reinforcement will be fitted into the VST element in factory
- VST capitels (shear heads) – to raise resistance against punching of slabs
- VST window boards – solution to provide the possibility to place a window in the thermal insulation area
- VST corners and T-crossing details – providing the possibility to build in reinforcement on site



detail E

detail D

Example

APPLICATION

OF VST SYSTEM

Ballymun / Dublin- Irland – total view

Leixlip / Dublin- Irland – partial view, Block I + J

Skytteparken / Stockholm - Schweden – site in winterseason

Leixlip / Dublin- Irland – partial view raw superstructure

TECHNICAL DETAILS

BUILDING PHYSICS

In this brochure we provide summaries regarding the following topics:

1) Fire protecion
2) sound insulation
3) thermal- and moisture insulation

Fire protection

The basic formwork element, the cement bonded particle board, was tested at Institute...(IBS).

Examination: behaviour in relation to fire (board itself). Certification in accordance with EN 13501-1:2002 and in respect of Ö-Normen EN 1716 und 13823 (SBI): With respect to burning behaviour: A2. With respect to smoke production: s1 (=lowest value). With respect to producing flaming particles and droplets: d0 (=lowest value)

Final certification: A2-s1, d0

Classification of overall wall-construction (including concrete core):
Wall type/- thickness: D=175mm (*), classification: REI 90D=200mm; D=175mm (*), REI 120 D=215mm, REI 120; D=230mm, REI 120; D=250mm, REI 120; D=300mm, REI 120;
(*) ... also EI 120

Sound Insulation

Theoretical calculations (Prof. DI Dr. Gerhard Kraml, Wien), measurements in laboratory (applied precision, Bratislava) and finally in-situ measurements were carried out to underline the suitability of the product. As the mass of the VST-system is relatively high, very good values are expected and will be reached.

Wall thickness/ -type	Mass (*)	Value of sound insulation	Reference standard / calculation
D=200mm	417 kg/m²	R'wR = 53 dB	DIN 4109 (German industrial standard)
D=230mm	485 kg/m²	R'wR = 55 dB	DIN 4109
D=250mm	532 kg/m²	R'wR = 56 dB	DIN 4109
D=200mm	417 kg/m²	Rw = 58 dB	according to calculations carried out by Prof. Dr. G. Kraml
D=230mm	485 kg/m²	Rw = 60 dB	according to calculations carried out by Prof. Dr. G. Kraml
D=250mm	532 kg/m²	Rw = 62 dB	according to calculations carried out by Prof. Dr. G. Kraml
D=200mm	417 kg/m²	Rw = 56 dB	Measurements in lab according to EN ISO 140-3
D=230mm	485 kg/m²	Rw = 57 dB	Measurements in lab according to EN ISO 140-3
D=250mm	532 kg/m²	Rw = 58 dB	Measurements in lab according to EN ISO 140-3

(*) used densities in calc: concrete ρ=2.300kg/m³; cement bonded particle board ρ=1.385 kg/m³

To make final statements the local situation of flanking elements and their quality must be observed.

Thermal insulation and moisture protection

The value of thermal conductivity λ of the board is 0,26 W/mK and the coefficient of diffusion resistance μ = 60 (values for calcualtion). Perimeter walls receive an insulation to reach the demands of thermal insulation. This insulation can be based on mineral wool or polystrene. The insulation systems may be with or without rear ventilation. According to scientific research of Fraunhofer Institute of Building Physics a proper wall construction is given when using the VST-system. With the confirmed values for temperature and moisture level and in respect of the pH-value of approx. 12 growth of mould is prevented. The board was also tested in laboratory regarding many other aspects – receiving positive results for all. VST walls can also be used for perimeter walls in soil-surrounding (basement walls) if there is no pressing ground water. A sealing (bitumen, etc.) should be used to provide a watertight construction.

VST SYSTEMTECHNOLOGY

FINAL TREATMENT OF

VST PANEL SURFACE

There are 2 types of joints available:

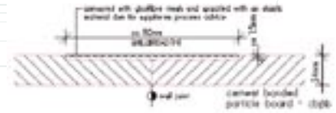
- V-joint

This joint is 12mm wide and approx 6mm deep (geometric shape can be modified after consultation). This joint can stay without any further treatment (only painting of the surface, joint stays as visible shadow-edge) or can be overworked in a painting procedure.

- Mill Joint

The area of the joint will be milled out (width approx 80mm, depth approx 2mm) in factory.
On site this area will be treated according to supplier's instructions.

- Priming of joint area with solventfree primer
- Filling of joint with elastic material
- Application of elastic mesh-stripe in a kind of painting glue
- Painting of whole surface with dispersion paint and fibrous web ("Microlith")



Regarding these layers, detailed instructions of the material's supplier are available. A scientific cooperation exists together with the painting specialists of Akzo Nobel (and Herbol).

A 5 year warranty is added to the painting instructions.

In the final stage the wall and slab surfaces may be designed as:

- smooth and painted area (all colours)
- papered area – with glassfibre
- plastered area
- tiled area

ASSEMBLY

VST WALL ASSEMBLY

Fixing of the VST-wall panel element to the crane-chains

Lifting of the VST-wall panel element to the location of final assembly

Placing of the VST wall panel element

Adjusting

Screwing of angled propping to wall element (top support)

Screwing of angled propping to concrete slab (bottom support)

Fixing of specific steel angle to provide lateral stability

ASSEMBLY

VST SLAB ASSEMBLY

Mounting and levelling of slab propping

Placing of VST-slab panel elements

Placing of reinforcement and technical equipment

Concreting of slab (assisted by pump)

PHOTO CREDITS

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page 30: ZUCHNA, Salzburg
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