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MŰÉP Consulting Engineers Ltd.

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MŰÉP is member of TMSZ / FIDIC.
**Description**  Reconstruction of Horváth House
**Location**  Balatonfüred, Hungary
**Client**  Angyalőd László Rt.
**Services**  Building permit and execution plans

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**Description**  Reconstruction of County and City Court of Zalaegerszeg
**Location**  Zalaegerszeg, Hungary
**Client**  Ministry of Justice
**Services**  Building permit and execution plans
Construction management
Technical site supervision

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**Description**  Károlyi Palace
**Location**  Budapest, Hungary
**Client**  Petőfi Literary Museum
**Services**  Design of external restoration
Concept design for Museum of Hungarian Literature
# HORVÁTH HOUSE

**Description**
Reconstruction of Horváth House

**Location**
Balatonfüred, Hungary

**Client**
Angyalföldi Lakásépítő Rt.

**Services**
Building permit and execution plans

**Awards**
Prix d’Excellence of FIABCI

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HORVÁTH HOUSE

Description
Reconstruction of Horváth House

Location
Balatonfüred, Hungary

Client
Angyalföldi Lakásépítő Rt.

Services
Building plans
Execution Plans

Awards
Prix d’Excellence of FIABCi
HORVÁTH HÁZ REKONSTRUKCIÓ
BALATONFÜRED, GYÓGY TÉR 3.

A rekonstrukció tervezői:
- Ügyvezető Igazgató: Zepkó Ferenc
- Építész tervező: Kiss Judit, Zepkó Ferenc
- Műszaki és informatikai konzulens: Németh Katalin
- Turizmusi és felelegető felügyelő: KOH

A belsőépítész tervezői:
- Kiss Júlia
- Műszaki kulató: Kovács Klára
- László Csaba

A statisztika tervezője:
- Statikus tervező: Petrik Géza

A felületépítészeti tervezői:
- Épületépítész: D Molnár György
- Műszaki és informatikai Kft.

Az elektronikai tervező:
- Somogyi Gábor
- Somogyi Épületépítész és Műszaki Kft.

Kerttervező:
- Nemes Zoltán VÁR-KERT
- Mészáros Tervezési Kft.

Megfordultak falai között, köztük Berzsenyi Dénes, Vörösmarty Miklós, Wesselenyi Miklós, Deak Ferenc, Kosuth Lajos. 1825-ben itt rendezték meg az első Anna-Bálkát is. Az épület eredetileg egy három oldalon körbeépített belső udvar tartalmazott, ekkor a negyedik, nyugat számban csupán egy kocsin és ámírásokkal kaptak helyet. Jelenlegi külön formáját az 1820-30-as években nyerte el, ekkor épült a második emelet és a fedőező. Nagyobb beavatkozás a ház életében a második világháború után következett be, amikor az államosítást követően Bányszállás üdülőjére, majd bányászok számára kialakított szanatórium működött benne. Ekkor építették meg a negyedik épületészlet a negyedik épületrész.

Az épület eredetileg középfolyosós alaprajzi rendszerben készült. Ezt megváltoztattak, mikor a közlekedőt oldaldőlfolyosóként az udvar homlokzat mellé helyezték át. A homlokzat lényegében változatlan maradt, nélkül visszatért a beavatkozás újra. Ezenfelül a negyedik épületészet és általában a kisebb változásokat megörzött.


AZ UDM Consulting Engineers Ltd.
nokból nyíló üvegezett ajtón keresztül, valamint az északi kapun keresztül törünk. Ide nyílnak a földszinti lakások. Az épület északi oldali földszintjén, valamint a déli oldal alagorásban üzleteket tervezünk. Ezt az elrendezést a meglévő tereprészletek indokolják: a terület a Balatoni irányában késik, tehát a déli oldali földszint az épület túloldal oldalán alagorás elhelyezkedésétől. Ugyanez az adottságok hihetetlenül lehetett az épület előtti teraszos élőkert alá fedett garázst elhelyezni. Ennek padlósszintje a Kisfaludy utca járdavonalától csupán kb. 30 cm mélyében van. A garázstetősíntént az ide nyílni üzletek, pizzéria és kávézók teraszai kapak helyet. A terasz két végén kapcsolódnak a közterülethez: a Győr tér felől a rémpán, a nyugati végén, a Kisfaludy utcáról lépcsőn keresztül lehet megközelíteni.

Mint már említettük, a homlokzat őrzi meg leginkább az eredeti jellegét, így az épület külső megjelenésén csak kismeretségi beavatkozásokat tervezünk. A Kisfaludy utcai déli homlokzaton, a XIX. század második feleből ismert ábrázolásokkal összehangolva, a földszinti lakásokhoz hasonlókat teremtőként kapcsolunk. Alatta fedett passzázs alakul ki, védeve az üzletek látogatóit és a sétálókat az időjárás viszontagságáról. Főolté, az első emeleten a sarakzítókknál, illetve a páros oszlokokban érkezéknél késülnek. Az északi oldal üzleteinek portáljai is a kor hangulatát idezik. Az épület külső nyílásairól igyekeznek összehangolva hozni a mai kor igényeit és a korhű kialakítást. Összetartóak megfelelnek az eredetnek, külső oldalára szalagolóra tervezünk, amely amellélt, hogy hangulati elem, hatással segít a különböző hőmérsékleti kialakulásban. Az üzletek ajtóikra fa spárra kerül felszerelésre. A homlokzat lehet, az ablakok zöldre másolhatóak, a főkapu tölgyből készült.
„EVERYBODY’S CHURCH”

**Description**
Reconstruction of roofing and bell-roof,
New Rehabilitational Center by extending the building

**Location**
Cserkesz u. 7-9.
Budapest, Hungary

**Client**
EPK Emberbarát Alapítvány

**Services**
Building permit and execution plans

**Year**
1994-1995
MUSEUM OF HUNGARIAN LITERATURE

Description
Museum of Hungarian Literature

Location
Károlyi Mihály utca 16.
Budapest, V.ker., Hungary

Client
Petőfi Literary Museum

Services
Concept design
General design for the reconstruction

Year
1997-1998
ARCHAISM AND UP-TO-DATENESS VALUE-ADDED REFURBISHMENT OF WINDOWS ON A HISTORIC BUILDING KÁROLYI PALACE, BUDAPEST

László Szabó and Ferenc Zepkó
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H–1521 Budapest, POB. 91. Hungary

Received: March 7, 2006

Abstract

Harmonizing preservation of historic values with technical performance is a complex issue at renovation of historic buildings. Through the example of the design and permitting process of the Károlyi Palace historic windows’ refurbishment the authors demonstrate how authentic appearance can be combined with today’s requirements.

Keywords: historic building, renovation, window refurbishment.

Introduction

Following a planned, authorized but unrealized programme in 1990, the renovation of the building envelope of the former Károlyi Palace in Budapest, that time the Petőfi Literature Museum, today House of Hungarian Literature, took place in 1996-97.

As designer and site supervisor of the revived reconstruction programme the authors had to cope with several interesting questions of profession, protection of historic buildings and renovation techniques. The professionally most challenging was the refurbishment of the windows.

1. Method and Principles of Survey and Diagnostics

As dealing with a historic building the basic targets of the survey works were:

- typology of the windows and external doors,
- survey and systematization of window profiles and fittings (hinges, locks, handles, etc.),
- detailed dimensional survey of different window and door types and
- detailed, documented diagnostics of the existing status.
32 different window types have been identified throughout the building. The survey extended to documenting the structural elements, typical details, variations and deviations within types.

With systematizing analysis of the surveyed details authors managed to identify which structures are probably *originals*, which are *later but identical* ones, and what *former repairs, partial or full replacements* have been carried out.

The *documenting of the existing status* was made with pictures, detailed description of typology and one-by-one individual diagnostics.

The authors classified the windows into three categories:

- plank-case / carpenter-type windows (2 single glazed leafs, outside one opened outwards, inside one inwards);
- sash-window (2 single glazed, vertically sliding leafs)
- joined window (2 single glazed leafs both opened inwards).
The *plank-case* windows and balcony doors have been identified as originals. A few windows of the library were converted into *sash-windows* (the former hinges of the plank-case are still visible) most likely following the journey of counts István Széchenyi and György Károlyi to England in 1834, based on the experience gained there.

The *joined windows* were installed later, during the opening of a new façade of the palace, following the demolition of a smaller building attached to the palace from South and creating today’s Henszlmann Street.

Within the three basic types 32 sub-types have been identified by shape, dimension and divisions (number of leafs).

The target of the *individual, detailed diagnostics* on one hand was to identify and check *individual dimensions* within the forming future renovation concept, and to provide *general conclusions, statements of diagnostics* as basis for the *renovation concept* on the other hand by analysing the detailed documentation of technical status.

The following general conclusions of diagnostics can be highlighted:

- sagging of leafs, repair by planing, decrease of air-tightness, sound insulation and resistance to rain as consequence;
- loosened hinges;
- loosened corner joints on window leafs, deformation of leafs, deflection from plane;
- aging and drop of putty.

The outside leafs of the plank-case windows were replaced in 1972 using undeco-rated profiles not matching the remaining windows, made of poor quality timber. These leafs were found in very bad condition (though were only 20 years old).

### 1.1. Renovation Alternatives and Their Analysis

As a first step the authors elaborated refurbishment / replacement modes (on basis of the typology, the surveyed details and results of diagnostics) that bring the required results, are feasible and acceptable from point of historic buildings’ protection. These alternatives required evaluation from different aspects:

- protection of historic buildings;
- technological possibilities, demand of labour and budget;
- expected technical result, with special emphasis on thermal properties and acoustic insulation.

For the plank-case window, most typical by number, three alternatives have been outlined:
a) **full structural replacement with identical geometry and profile system** can annul the diagnosed structural problems and can provide a new-quality window within frames of the structure (with a calculated average U-value of 3.0-3.5 W/m²K), but it *conserves* the old structural system and affects all the joining internal finishes, with all its supplementary works.

b) **Replacing the outside frame and leaf with identical profiles and single glazing and renewing the inside leaf** would also re-build the original structure, would not affect the joining internal wooden finishes, but is weaker than alternative a).

c) **Replacing the outside frame and leaf with a new individual structure**, built of profiles matching the original windows in appearance, incorporating *insulating glass* would not hurt the historic appearance, and is up-to-date in technical performance (e.g. thermal and acoustic insulation, withstanding striking rain), answering today’s demands in energetics, noise reduction and other requirements, with moderate additional costs. The calculated average U-value of this structure is 1.9 W/m²K.

The thermal analysis was carried out using *Frame4plus*, a software of 2-dimensional final differential numeric method (*Figs. 2, 3 and 4*).

![Fig. 2. Analysis of thermal insulation: Alternative c) – structural model](image-url)

Similar analysis was made for the joined type windows as well.
Fig. 3. Analysis of thermal insulation: Alternative c) – temperature distribution

Fig. 4. Analysis of thermal insulation: Alternative c) – isotherms and heat flow
2. Negotiating with the Authority of Historic Buildings and with the Contractor

The authors have negotiated the outlined alternatives with the Office for Protection of Historic Buildings. The authority first rejected any alternatives using non-identical structure, but having the details and the analysis introduced they turned to be a creative partner supporting the preparation of the renovation.

Following the design, which was almost a product development, sample leaves were manufactured and installed. After certain corrections alternative c) with insulating glass gained acceptance in second version. The process took 3 months, and the supporting and developing attitude of the contractor was exemplary.

3. Manufacturing and Installation

Having had the decision the shop-drawings were worked out (Fig. 5) and manufacturing the frames and leaves of 158 windows, individual in dimensions and belonging to 9 type classes, started.

The structure was made with triple connection between frame and leaf, sealed with foam rubber strip at the middle one, with the required ventilating (de-watering) holes drilled both on frame and leaf, with silicone seal on both sides of the insulating glass. The divided leaves were glazed by one insulating glass unit for higher stiffness, providing the authentic appearance with external division profiles on both sides of the IG unit.

The insulating glass composition is 3-8-3 mm (of annealed clear float), using a spacer non-metallic in colour and surface: the black TREMCO Swiggle® spacer. This spacer is hardly visible and therefore recommended for historic applications in several European countries.

The fittings were manufactured individually, according to the type of opening, and providing authentic appearance. The conventional-looking locks though provide a proper closing onto the rubber gasket seal.

4. Aspects of Operation

The future operation aspects brought the authors towards a decision in favour of higher performance windows. The total heat loss of the building is not indifferent (especially considering the narrow budget of the institution). Further, the acoustic insulation could be critical for certain literature performances to exclude the significant traffic noise of Károlyi Street.

The manufacturing and construction took place in 1996–97. The authors have lately checked the technical status of the windows, after 7 years in operation, and were informed about proper functioning (Fig. 6). These technical performances can be kept in even longer terms with carefully planned and executed maintenance.
Fig. 5. Individual profile system for IG unit, with authentic appearance, resulting in value added reconstruction

5. Conclusion

The authors have designed the renovation with individual windows on the Károlyi Palace targeting high technical performance while maintaining good architectural and historic appearance. The improved thermal and acoustic insulation, the withstanding of rain, etc. brings clear advantages to the building owner, however did not require significant cost addition.
Fig. 6. The window manufactured according to Fig. 5 drawings in 2004 (age: 7 years)
COUNTY AND CITY COURT OF ZALAEGERSZEG

Description
Reconstruction of County and City Court of Zalaegerszeg

Location
Zalaegerszeg, Hungary

Client
Ministry of Justice, County and City Court of Zalaegerszeg

Services
Building permit
Execution plans
Construction management
Site supervision
BUDAPEST ICE-RINK

Description
Budapest Ice-rink

Location
Budapest, Hungary

Client
Ministry of Justice,

Services
Concept design

Year
2002
RECONSTRUCTION OF THE ‘VÁROSЛИGET’ ICE RINK
THOUGHTS FROM A COMPETITION PAPER

László Szabó and Ferenc Zépkó
Department of Building Construction Budapest University of Technology and
Economics H–1521 Budapest, POB. 91. Hungary
Received: December 16, 2002

Abstract

The building of the ‘Városliget’ (City Park) Ice Rink, mellowed by age, stands in one of Budapest’s most important tourist
districts. The Capital has called a design competition for the renewal of it, to gain idea not only for the renewal of the building
and the winter-time open air ice rink / summer-time boating lake area, but at the same time to create so far missing tourist
infrastructure of the City Park and Heroes’ Square. We outlined an up-to-date solution as befitted this function, breaking away
from former conservative development ideas. Our plan includes the construction of a new ice rink with bus- and car park
underneath, and underground new building section in front of the main entrance (changing room in winter, multifunctional
space in summer), and an underpass road section to give the Kós Károly Promenade back to pedestrians.

Keywords: renovation of historic buildings, ice rink, underground parking, renovation design.

1. A Little History

Városliget (City Park) is one of the most visited tourist places in Hungary. The architectural face of
Budapest’s largest park started to form with the national ex- hibition in 1885 and the millennium
exhibition in 1896, and resulted in a built environment harmonising with nature by the 1930’s.

The park itself and the cultural, entertainment and tourist institutions there attract public in all
seasons. Large numbers of people come to visit Heroes’ Square (the heart of Városliget), the Millennium
Monument, the Monument of Hungarian Heroes, the Museum of Fine Arts, the Art Gallery, but the
neighbouring Zoo, the Széchenyi Bath, Vajdahunyad Castle and the Ice Rink/Boating Lake with its
building are also frequented.

The Városliget Ice Rink is one of the oldest Hungarian sports establishments. The first Skating
Club of Pest was established in 1869. The erection of the first valuable building at the ice rink is
associated with Ödön Lechner, who won the job through a design competition in 1875. This light
building made of stone and richly decorated with wood has been pulled down when becoming
unsuitable for the extremely developing skating sport. The recent building is the work of Imre
Francsek, architect of the Capital’s Public Work Council (1891).
The boating lake and the ice rink have aged, the architecturally valuable building became outdated morally as well. The idea of the renovation is not new, we made a design for conceptual permit and obtained this permit in 1990 for NSI.

2. The Governing Aspects of the Competition

Budapest City Council’s Mayor Office called a national open design competition for the reconstruction design of the Városliget Ice Rink and its building in 2002.

The papers were expected to find architectural answer for two, seasonally different demands:

- to serve both free-time skating and occasional championships on high level in Autumn and Winter and

- to create so far missing tourist infrastructure for the City Park and Heroes’ Square and to provide a boating lake over the ice rink area in Spring and Summer.

Fig. 1. Layout of the Ice Rink and surroundings – renewal plan
3. Our Principles

A team from the Department of Building Construction (Faculty of Civil Engineering at BUTE), MÜ EP Consulting Engineers Ltd. and UVATERV Engineering Co. submitted joint papers for the design competition.

The governing principle of our ‘brain storming’ raised from the fact that the lake is hardly acceptable for boating due to the former additive reconstruction of bottom of the boating lake, and the slope of the base is unsuitable for making quality ice, for housing a championship; therefore new base slab is required. The requirement of providing a precisely flat surface on top of several meters of peat and mud (the former bottom of lake), has matched the idea to create part of the missing infrastructure below this ecologically unworthy area in form of underground parking (drawing away 34 parking buses and 530 cars from the surface load!). The top of this structure lends itself particularly well both to ice making and forming lake bottom. All surrounding paved areas are ecologically more valuable, so the park-like area can be extended till Dózsa György Street – it would be a sin to keep parking there.

The other cornerstone of our plan is to raise the standard of the changing rooms for skaters. The main building of the Ice Rink would be freed from the changing room function by creating a 2000 m² underground, multifunctional building section in front of the main entrance. Having the moveable partitions and furniture removed from the wintertime changing rooms and cloak-room, this multifunctional space could house exhibitions, music events, smaller sport events in Summer. New infrastructure can be developed here to provide the so far missing services for Heroes Square and surroundings. The main building and the ice rink could be reached from here (e.g. through moving platforms). We planned a glass entrance building for surface connection, next to the bowman statue (using non-glare tempered structural glazing with stainless steel fixtures, in an almost invisible appearance).

The spaces excellent for sale or for rent in the main building of the Ice Rink could be fully freed for cultural, catering, trade and sports competition infrastructure. The underground parking and the underground multifunctional area provide high standard services for free-time and sports skating in winter and provide the so far missing infrastructure for Heroes Square and surrounding.

Progressing from the above and extending the thought of re-organising the area, we drafted a third idea, giving the Kós Károly Promenade back to pedestrians. Road traffic can be driven underground in front of the Art Gallery, than returned to surface in a later point of the Promenade (not nearer than Vajdahunyad Castle). This part of the City Park will not be divided by road traffic any more. The area around the lake would get its park and promenade character back thanks to this underpass. The underground parking lot could also be reached from the underpass. The underpass road section could be built in a second phase also.
4. The Baseless Worries Related to Foundation Issues

The planned structures can be found realistic if the misconception, which is read in the tender, and which is based on former notes and surveys, could be cleared up. According to this, the load bearing soil layer is down at 10–14 m depth, under the peat and mud forming the bottom of the former natural lake, and consequently the main building lays on larchwood piles. If that were true, the underground structures would be unrealistic.

The close area of the main building is free of such dangers. A soil test report dated in 1999 (which is also part of the tender) shows that the load bearing soil layer is at 2–2.5 m depth, the deepest point is at −3.00 m. According to the uncoverings the foundation of the main building was made with soil replacement (crushed lime gravel and sandy gravel) using strip foundation. A closed planking was probably used to secure the trench, the remaining poles of it could mislead the former investigations and prompt that the building rested on pile foundation.

Carefully considering the real soil conditions the underground structures can be expediently built, without particular technical difficulties.

*Fig. 2. Groundfloor (ice level) and 1st floor plan of the main building*
Fig. 3. Section of the main building with the underground changing room/multifunctional space and the underground parking

5. The Hill Hiding Mechanical Services

The building section housing the mechanical equipment is designed according to the urban arrangement regulation, modifying the basin of the lake. The mechanical building would be of 2 levels. A technological corridor goes all around the ice rink, along the perimeter of the underground parking lot, this can be reached directly from the ice technology equipment room, providing easy maintenance, checking and safe operation.

This building would receive an intensive green roof, which is only 1.50 m higher than the pavement level of the Olaf Palme Promenade. Two openings are required on the roof: one over the condensers and one providing ventilation for the boiler and the ventilation mechanical room.

We made a single-level variation of the mechanical building, also modifying the access ramp to the underground parking lot.

6. More Details about the Underground Parking Lot

The underground parking lot is open for public use and mainly serves the parking needs of the Ice Rink, the institutions, places of interest in the City Park. On the other hand the reinforced concrete structure guarantees perfect surface for ice making. Making the 2–3 cm needed ice of standard quality instead of 10 cm or more on sloped surface is a way of cutting energy costs.
The ramp to the underground parking lot is located at Olaf Palme Promenade, with three traffic lanes for providing two lanes to the actually heavier traffic direction. Bus parks require higher interior, so part of the parking lot is single-level, while the other part suitable only for cars is two-level. The parking could receive 34 tourist buses and 533 cars.

The bus parking zone is closer to the Heroes Square so the tourist traffic towards the museums and the square can be solved by 2 escalators and an elevator. We planned more smoke-free stairs as emergency exit routes.

The environment-friendly, effective and dynamic traffic organisation would be driven by an active electronic traffic signal and information system (marking full areas, guidance to empty parking places, etc.).

The construction of the underground parking lot is planned with concrete wall surrounding, surface drain and watertight (0.2 litres/sqm/day) reinforced concrete base slab and side walls. The upper deck is a multi-layer structure, a special roof as it is bottom of lake and ice rink base slab at the same time.

7. Ice Rink and Boating Lake

Increasing the recent ice surface a new speed skating rink suitable for international championships, a hockey rink, and two curling fields will be created. The total ice surface will be 14 540 sqm.

Due to the ice rink arrangement, the basin of the lake should be minimally modified. Side walls have to be heightened in certain sections to achieve 80 cm water depth. Building new locks and keeping existing ones is necessary in order to keep control over the winter – summer water surface.

8. Conclusions

The ideas drafted in our competition papers create the so far missing infrastructure, preserving and developing natural and built values and serve the high level expected today from the new establishments. We are convinced that creative thinking is required, putting aside old routines when designing such an important renewal. Decisions and ideas bold at first sight should be undertaken.

9. Epilogue

None of the prized design competition papers answer the demand for infrastructure, their solutions somewhat preserve the existing situation. It seems (and not only in this competition) that it is tough giving up convention-driven development and design ideas.

Our design competition papers have been disqualified due to formal reasons (negligible by our opinion). Being dedicated to the development of the Városliget Ice Rink we offered the content of our papers for use to the Capital...
**Description**
Reinforced concrete structure of Sanierung Kolping Jugendwohnen

**Location**
Augsburg, Germany

**Client**
SCHAEFER+MERKIN Ingenieure GmbH.

**Services**
Execution plans of reinforced concrete structures

**Volume**
4,000 m²

**Year**
2014-2015

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**Description**
Dexagon Office Building

**Location**
Budapest, Hungary

**Client**
Bischoff Kft.

**Services**
Building permit
General design
Architectural design
Structural design
Execution plans
Construction management
Technical site supervision

**Volume**
11,500 m²

**Year**
2003-2005
DANONE OFFICE BUILDING

Description
Danone Office Building

Location
Keresztúri út 210.
Budapest, X.ker, Hungary

Client
Danone Tejtermékgyártó és Forgalmazó Kft.

Services
Building permit
General design
Architectural design
Structural design
Execution plans
Construction management
Technical site supervision
DEXAGON OFFICE BUILDING

**Description**
Dexagon Office Building

**Location**
Fehérvári út 50-52.
Budapest, XI. ker, Hungary

**Client**
Bischoff Kft.

**Services**
Building permit
General design
Architectural design
Structural design
Execution plans
Construction management
Technical site supervision
DIACENTER OFFICE BUILDING

Description
Diacenter Office Building

Location
Megyeri út 53.
Budapest, IV.ker, Hungary

Services
Concept design

Year
2005
ÓBUDA 300 PROJECT

Description
Three residential buildings

Location
Vörösvári út 111.
Budapest, XI.ker, Hungary

Client
TIROS Resources Ltd.
ADPM Consult

Services
Building permit

Year
2004
**RESIDENTIAL**

**FÁY KÖZ 13.**

**Description**
Three-storey residential building

**Location**
Fáy köz 13.
Budapest, Hungary

**Client**
DTH Invest Kft.

**Services**
Building permit
Execution plans

**Year**
2004
# REFERENCES

## RESIDENTIAL

**FÁY UTCA 89.**

**Description**
Six-storey residential building

**Location**
Fáy utca 89.
Budapest, Hungary

**Client**
Lakás – Ingatlanforgalmazó és Ingatlanfejlesztő Kft.

**Services**
Building permit
Execution plans

**Year**
2003-2004
Having more than 30 years of experience in the analysis and design of civil engineering projects we offer advanced solutions in structural analysis, design and supervision of the construction of special structures like **STEEL STRUCTURES** (steel buildings, industrial supporting structures, oil tanks, telecommunication towers, etc.), **CONCRETE STRUCTURES** (industrial buildings, parking facilities, multi-storey buildings, industrial civil engineering constructions, etc.) and site restoration projects.
Some of our customers are: OT Industries, LUKOIL, Vodafone, AUDI, Philip Morris, SHELL, ESSO, T-Mobile, MOL, Kraft Foods, TESCO, OBI, ALDI, Schaefer-Merkin, University of Pécs, Ministry of Justice (Hungary), BKV Budapest Public Transport Co., Hungarian Circus and Variety Theatre Co., etc.

Our office is also active in the research area, producing science papers and participating in conferences and research programmes. Our leaders are lecturers on Budapest University of Technology and Economics.

We use TEKLA, Nemetschek ALLPLAN, STAAD Pro, AutoCAD, ArchiCAD, Axis VM, ConSteel softwares to create structures from our engineering ideas fitting the corresponding country’s standards (EU standards, SNIP, GOST).
<table>
<thead>
<tr>
<th>Description</th>
<th>Waste-water treatment plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Siófok, Hungary</td>
</tr>
<tr>
<td>Client</td>
<td>Kristály Zrt.</td>
</tr>
<tr>
<td>Services</td>
<td>Execution plans</td>
</tr>
<tr>
<td></td>
<td>Structural design</td>
</tr>
<tr>
<td></td>
<td>Structural calculations</td>
</tr>
<tr>
<td>Volume</td>
<td>20 t of steel</td>
</tr>
<tr>
<td>Year</td>
<td>2015</td>
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<table>
<thead>
<tr>
<th>Description</th>
<th>Automobile industrial complex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Tatabánya, Hungary</td>
</tr>
<tr>
<td>Client</td>
<td>Market Zrt.</td>
</tr>
<tr>
<td>Services</td>
<td>Structural design of steel structures</td>
</tr>
<tr>
<td></td>
<td>Structural calculations</td>
</tr>
<tr>
<td></td>
<td>Execution plans of steel structures</td>
</tr>
<tr>
<td>Volume</td>
<td>60 t of steel</td>
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<tr>
<td>Year</td>
<td>2015</td>
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<table>
<thead>
<tr>
<th>Description</th>
<th>Energy industrial plant</th>
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<tbody>
<tr>
<td>Location</td>
<td>Kryvyi Rih, Ukraine</td>
</tr>
<tr>
<td>Client</td>
<td>KÉSZ Zrt.</td>
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<tr>
<td>Services</td>
<td>Structural design</td>
</tr>
<tr>
<td></td>
<td>Expert consultancy</td>
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<td></td>
<td>Execution plans of steel structures</td>
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<tr>
<td>Volume</td>
<td>250 t of steel</td>
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<tr>
<td>Year</td>
<td>2015</td>
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</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Bioethanol factory</th>
</tr>
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<tbody>
<tr>
<td>Location</td>
<td>Dunaföldvár, Hungary</td>
</tr>
<tr>
<td>Client</td>
<td>KÉSZ Zrt.</td>
</tr>
<tr>
<td>Services</td>
<td>Structural design of steel structures</td>
</tr>
<tr>
<td></td>
<td>Structural calculations</td>
</tr>
<tr>
<td></td>
<td>Execution plans of steel structures</td>
</tr>
<tr>
<td>Volume</td>
<td>300 t of steel, 30 m high silos</td>
</tr>
<tr>
<td>Year</td>
<td>2014-15</td>
</tr>
<tr>
<td>Description</td>
<td>Reinforced concrete structure of the main inspection chamber for inverted siphons under the central train station</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>Stuttgart, Germany</td>
</tr>
<tr>
<td><strong>Client</strong></td>
<td>SCHAEFER+MERKIN Ingenieure GmbH.</td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>Execution plans and structural design of reinforced concrete structures</td>
</tr>
<tr>
<td><strong>Volume</strong></td>
<td>65 t steel reinforcement bar</td>
</tr>
<tr>
<td><strong>Year</strong></td>
<td>2014</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Food industrial factory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td>Tők, Hungary</td>
</tr>
<tr>
<td><strong>Client</strong></td>
<td>Komposzt-Ferm Kft.</td>
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<tr>
<td><strong>Services</strong></td>
<td>Execution plans, Structural design, Structural calculations</td>
</tr>
<tr>
<td><strong>Volume</strong></td>
<td>200 t of steel</td>
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<tr>
<td><strong>Year</strong></td>
<td>2014</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Aircraft engine parts repair factory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td>Veresegyháza, Hungary</td>
</tr>
<tr>
<td><strong>Client</strong></td>
<td>GE Aviation</td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>Structural design of the extension of the factory building, Structural calculations, Architectural design, Expert consultancy, Execution plans</td>
</tr>
<tr>
<td><strong>Volume</strong></td>
<td>40 t of steel</td>
</tr>
<tr>
<td><strong>Year</strong></td>
<td>2014</td>
</tr>
</tbody>
</table>
### Steel structures of an automobile industrial complex

**Location**: Miskolc, Hungary  
**Client**: Market Zrt.  
**Services**: Execution plans, Structural design, Structural calculations  
**Volume**: 60 t of steel  
**Year**: 2014

---

### Chemical industrial factory

**Location**: Tiszaujváros, Hungary  
**Client**: OT Industries  
**Services**: Execution plans, Structural design, Structural calculations, Expert consultancy  
**Volume**: 300 t of steel, 400 m pipeline support  
**Year**: 2013-2014

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### Hydrogen plant

**Location**: Volgograd, Russia  
**Client**: OT Industries  
**Services**: Execution plans, Structural design, Structural calculations  
**Volume**: ~1500 t of steel, ~150000 t of reinforced concrete  
**Year**: 2012-2013
### Refractory Products Plant
- **Description**: Refractory products plant
- **Location**: Rio de Janeiro, Brazil
- **Client**: OS-Architekten – Zt. GmbH / RHI Ag.
- **Services**: Structural design, Preliminary structural calculations, Expert consultancy
- **Volume**: 50,000 m², 3,000 t of steel, 90 m high silos
- **Year**: 2011

### Warehouse for Hazardous Goods
- **Description**: Warehouse for hazardous goods
- **Location**: Gyál, Hungary
- **Client**: Aik Kft.
- **Services**: Building permit and execution plans, Architectural design, Structural design
- **Volume**: 25,000 m²
- **Year**: 2005-2006

### Coffee and Sweets Industry Plant
- **Description**: Coffee and sweets industry plant
- **Location**: Budapest, Hungary
- **Client**: Kraft Jacobs Suchard Kraft Foods Hungária Kft.
- **Services**: Building permit and execution plans, Architectural design, Structural design, Construction management, Technical site supervision
- **Volume**: 25,000 m² (foundant kitchen, coffee plant)
- **Year**: 1993-2003
Description: Warehouse for finished and raw goods

Location: Nyíregyháza, Hungary

Client: Nyidofer Rt.

Services: Building permit and execution plans

Volume: 4770 m²

Year: 1996-2001
<table>
<thead>
<tr>
<th>Description</th>
<th>Astana 2017 Expo Buildings - Reinforced concrete structures</th>
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</thead>
<tbody>
<tr>
<td>Location</td>
<td>Astana, Kazakhstan</td>
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<tr>
<td>Client</td>
<td>SCHAEFER+MERKIN Ingenieure GmbH.</td>
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<td>Services</td>
<td>Execution plans of reinforced concrete</td>
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<tr>
<td>Volume</td>
<td>70 000 m² reinforced concrete structure</td>
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<td>2014</td>
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</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Köki Terminál Shopping and Intermodal Center, Bus and Metro Terminal, OBI store, P+R parking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Budapest, Hungary</td>
</tr>
<tr>
<td>Client</td>
<td>R-Co Ingatlanforgalmazó Kft</td>
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<tr>
<td>Services</td>
<td>General design, Architectural design, Structural design, Building permit and execution plans, Technical supervision</td>
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<tr>
<td>Volume</td>
<td>220 000 m²</td>
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<td>Year</td>
<td>2005-2012</td>
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<table>
<thead>
<tr>
<th>Description</th>
<th>OBI stores</th>
</tr>
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<tbody>
<tr>
<td>Location</td>
<td>Hungary</td>
</tr>
<tr>
<td>Client</td>
<td>OBI Magyarország Kft./ Galbor Kft.</td>
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<td>Services</td>
<td>Building permit and execution plans</td>
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<td>Volume</td>
<td>12 locations</td>
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<td>Year</td>
<td>2002-2012</td>
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**REFERENCES**

**TRADE AND SERVICE**

<table>
<thead>
<tr>
<th>Description</th>
<th>Shell fuel stations</th>
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<tbody>
<tr>
<td>Location</td>
<td>Hungary</td>
</tr>
<tr>
<td>Client</td>
<td>Shell Hungary Kft.</td>
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<tr>
<td>Services</td>
<td>Building permit and Execution plans</td>
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<tr>
<td>Volume</td>
<td>120 locations</td>
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<tr>
<td>Year</td>
<td>1993-2012</td>
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</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>MOL fuel stations</th>
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</thead>
<tbody>
<tr>
<td>Location</td>
<td>Hungary</td>
</tr>
<tr>
<td>Client</td>
<td>MOL Nyrt.</td>
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<tr>
<td>Services</td>
<td>Building permit and execution plans Elaboration of new standard design and engineering manual</td>
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<tr>
<td>Volume</td>
<td>25 locations, 2 versions of manuals</td>
</tr>
<tr>
<td>Year</td>
<td>2005-2015</td>
</tr>
</tbody>
</table>
SIGNIFICANT REFERENCES

**INDUSTRIAL**

- Building permit, execution plans and construction management of “JACOBS” Coffee Plant (Client: JACOBS SUCHARD Budapest Kft. – PHILIP MORRIS)
- Building permit, execution plans and construction management of KJS Fondant Kitchen and Flavouring (Client: KRFAT JACOBS SUCHARD HUNGARY Kft. – PHILIP MORRIS)
- Building permit, execution plans and construction management of KJS “BEPEX” (Client: KRFAT JACOBS SUCHARD HUNGARY Kft. – PHILIP MORRIS)
- Building permit, execution plans, construction management and site supervision of a food QA laboratory (Client: Zwack Unicum Zrt.)
- Architectural execution plans of several ticket offices placed in underground passages of Metro 2 (Client: BKV Zrt. - Budapest Public Transport Co.)
- Construction management and site supervision of an industrial hall (Client: Európa Ingatlanbefektetési Alap)
- Building permit and execution plans of a printing office (Client: Európa Ingatlanbefektetési Alap)
- Building permit and execution plans of a Warehouse for hazardous goods (Client: ALK Kft.)
- Building permit and execution plans of Tikkurila Warehouse (Client: Autoker Holding Kft.)
- Building permit and execution plans of a warehouse for finished goods, expansion of a warehouse for raw goods and execution plan of a QA laboratory (Client: Nydofer Rt.)
- Building permit and execution plans of Vodafone Switching and Data Centres (Client: Vodafone Magyarország Rt.)
- Building permit and execution plans of 600 Vodafone, 100 Westel and 50 Pannon mobile communication network stations (Clients: Vodafone Magyarország Rt., Westel 900 GSM / T-Mobile, Telenor – former Pannon GSM )
- Execution plans of civil structures in a Hydrogen plant in Volgograd, Russia. Reinforced concrete and steel structures and buildups.(Client: OT Industries)
- Execution plans of the extension of a chemical industrial factory in Tiszaújváros, Hungary (Client: OT Industries)
- Execution plans of an automobile industrial complex in Miskolc, Hungary (Client: Market Zrt.)
• Execution plans of the extension of an aircraft-engine-repair factory in Veresegyház, Hungary (Client: GE Aviation)

• Execution plans of a food industrial factory in Tök, Hungary (Client: Komposzt-Ferm Kft.)

• Execution plans of steel structures in an energy industrial plant in Dunaföldvár, Hungary (Client: KÉSZ Zrt.)

• Execution plans of steel structures in an energy industrial plant in Kryviy Rih, Ukraine (Client: KÉSZ Zrt.)

• Execution plans of the steel structures of an automobile industrial complex in Tatabánya, Hungary (Client: Market Zrt.)

• Execution plans of a waste water treatment plant in Siófok, Hungary (Client: Kristály Zrt.)

**TRADE AND SERVICE**

• General design and general site supervision of KÖKI Terminál Shopping and Intermodal Center, Bus and Metro Terminal, Obi store, P+R parking (Client: R-Co Ingatlanforgalmazó Zrt.)

• Construction management of Vértes Shopping and Entertainment Center, Volán Bus Terminal (Client: Európa Ingatlanbefektetési Alap)

• Building permit and execution plans of OBI Stores (Client: OBI Hungary Kft. / Galbor Kft.)

• Building permit and execution plans of Profi Food Stores (Client: Profi Hungary Kft., Ker-Est Kft.)

• Standard design of Match Food Stores (Client: Csemege-Match Zrt.)

• Construction management, site supervision and fit-out plans of Quick Fast Food Restaurants (Client: Quick Hungária Kft., Wend-Co Kft.)

• Building permit and execution plans of Shell fuel stations (Client: Shell Hungary Kft.)

• Building permit and execution plans of Esso fuel stations (Client: Esso Hungária Kft.)

• Building permit and execution plans of K&H Bank offices (3 locations, Client: K&H Bank)

• Building permit and execution plans of ABN AMRO Bank offices (Client: ABN AMRO Bank)

• Building permit and execution plans, Standard design and engineering manual of MOL fuel stations (Client: MOL Nyrt.)
OFFICE AND PUBLIC

- Building permit and execution plans, construction management and site supervision of Danone Office Building (Client: Danone Tejtermékgyártó és forgalmazó Kft.)
- Building permit and execution plans, construction management and site supervision of Kraft Foods Office Building (Client: Kraft Foods Hungária Kft.)
- Execution plans, construction management and site supervision of SCA HYGIENE Products’ Office Building (Client: SCA HYGIENE Produkts Kft.)
- Building permit and execution plan of Dexagon Office Building (Client: Bischoff Kft.)
- Building permit and execution plan of a new office building and laboratory (Client: ÁMEI Ásványolajtermék Minőségellenőrzési Kft.)
- Review of execution plans of Tatabánya open air water park (Client: The Municipality of Tatabánya)
- Building and execution plans of expansion of Siófok’s Hospital / EU financed project (Client: Mediplan Kft.)
- Building permit, execution plans and site supervision of the building of Vásárosnamény Court Yard (Client: Ministry of Justice)
- Building permit, execution plans and execution plans of the building of Mátészalka Court Yard (Client: Ministry of Justice)
- Building permit and execution plans of the Court Yard’s New Office and Meeting room in Szombathely. (Client: Ministry of Justice)
- Building permit and execution plans of Reménysugár Rehabilitation Centre (Client: Reménysugár Habilitációs Intézet)
- Review/expertise of various PPP projects: Construction of Palace of Art, Construction of Papp László Sport Aréna (Clients: State Audit Office of Hungary)
- Review of PPP projects: Construction of six Student Hostels in Pécs, Hungary. (Client: University of Pécs)

HISTORICAL

- Building permit and execution plans of Reconstruction of Horváth House - Reconstruction of the historic building creating 46 apartments and new underground parking (Client: Angyalföldi Lakásépítő Rt.) The project was awarded with the Prix d'Excellence of FIABCI.
- Building permit, execution plans, construction management and site supervision of Reconstruction of County and City Court of Zalaegerszeg (Client: Ministry of Justice, County and City Court of Zalaegerszeg)
- Concept design for the Museum of Hungarian Literature, general design for the façade and roof reconstruction of Károlyi palace (Client: Petőfi Literary Museum)
• Build permit, execution plans and designer site supervision of the energetic reconstruction of “Tündéralota” (Fairy Palace) (Client: Hungarian Institute for Educational Research and Development)

**OTHERS**

• Interior design in the Parliament Building (Parliament Library, Europe Library, Prime Minister’s Office, elevators, etc.)
• Building permit and execution plans of DUNAQUA-THERM’s office and emergency station (Client: DUNAQUA_THERM Water, Drainage and Heat Services Co.)
• Building permit and execution plans of the reconstruction of the buildings of Budapest’s Grand Circus (Client: Hungarian Circus and Variety Theatre Co.)
• Execution plans for reconstruction of EPK – Everybody’s Church bulbous cupola and metal-plated roof dome (Client: Human-Friendly Foundation)
• Design of the roof reconstruction of main entrance gate, electric power station and bus dispatcher room at BKV South-Pest Bus Facilities (flat roof conversion to low-inclination pitched roof). (Client: BKV Budapest Public Transport Co.)
• Building permit and execution plans of a tyre storage building (Client: BKV Budapest Public Transport Co.)