János Böhönyey
– Ernő Südi: Pulp mill,
Dunaújváros, 1957 – 1962

János Böhönyey
– Ernő Südi: Celulózka,
Dunaújváros, 1957 – 1962

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Attempts at systematization in Hungarian industrial architecture in the early Kádár period

NEZÁVISLÁ UNIVERZÁLNOSŤ
Pokusy o systematizáciu v maďarskej priemyselnej architektúre v ranom období Kádárovej vlády

Počas dvoch dekád, ktoré nasledovali po druhej svetovej vojne, zásadný problém v Maďarsku predstavovala systematizácia plánovania a realizácia priemyselnej architektúry, ktorá zahŕňala rýchlo sa meniacu a typologicky širokú škálu budov. Architekti štátnej Projekčnej spoločnosti priemyselných stavieb (Ipari Épülettervező Vállalat, IPARTERV), ktorá bola založená v roku 1948 a zamestnávala vyše tisíc pracovníkov, sa snažili aplikovať jednotné plánovacie metódy alebo projekčné techniky, v rámci rôznorodých oblastí priemyselnej architektúry, ktoré vždy prispôsobovali danému stavu ekonomiky a stavebníctva. To nevyhnutne viedlo k ustavičným odborným konfliktom týkajúcim sa raz ekonomických, inokedy funkčných a umeleckých otázok. Uvedená konfrontácia nadobudla na intenzite najmä v prvej dekáde politického režimu vedeného Jánosom Kádárom, ktorý sa dostal k moci po páde stalinistického diktátorstva Mátyása Rákosiho.

Komplexný program industrializácie bol spustený v ranom období Kádárovej vlády, v duchu socialistickej modernizácie, zameranej predovšetkým na zmenu hospodárskej politiky nastolenej Rákosiho érou. Tento počin bol pre maďarskú priemyselnú architektúru nesmiernou výzvou, nie však len kvôli obrovskému objemu práce, ktorú si vyžadoval: rozvoj priemyslu určil projektom nový smer, boli sformulované nové ciele hospodárskej politiky a zdalo sa, že bledne význam odborných hodnôt, tradícií, ako aj konštrukčných a technologických výdobytkov Rákosiho obdobia. Pokusy o systematizáciu, ktoré prebehli počas Rákosiho éry, boli podmienené predovšetkým konštrukčnými inováciami a architektonickým prístupom založeným na prefabrikácii, ktorá prebiehala priamo na stavbe, a ktorá bola do maďarskej priemyselnej architektúry zavedená v rokoch 1947 – 1950, keď došlo k znárodneniu maďarského stavebného priemyslu. Prefabrikácia na stavbe sa rýchlo rozšírila, lebo umožňovala vysoko efektívne využitie zdrojov a rýchlu výstavbu počas závratného tempa industrializácie začiatkom päťdesiatych rokov, keď maďarský stavebný priemysel nemal dostatok zdrojov a prostriedkov, ale ani významnejšie prefabrikačné zariadenia. Hoci vládol všeobecný súhlas, že rozvoj priemyselne vyrábaných štandardizovaných stavebných štruktúr je prioritou, stavebný priemysel nebol schopný tento cieľ dosiahnuť počas prvej dekády, to značí do začiatku šesťdesiatych rokov. Typizácia architektúry, na ktorú sa čakalo jednak z ideologických a jednak z hospodárskych dôvodov, nevyprodukovala výrazné výsledky: predovšetkým z dôvodu, že prevažnú väčšinu zákaziek predstavovali haly s obrovským rozpätím a technologické stavby, ktoré si vyžadovali ďalšie zložité architektonické usporiadania, ktoré boli zvyčajne jedinečnými návrhmi z dôvodov hospodárskych a geografických a boli zriedka postavené viac než jedenkrát, čiže neumožnili rozsiahlejšiu typizáciu.

Preto je pochopiteľné, že v tejto situácii sa prefabrikácia na stavbe javila ako konkurenčne najschopnejšie riešenie, lebo vyžadovala len relatívne malú mierku rozvoja stavebného priemyslu a umožňovala metódy, ktoré využívali montáž v podstate masovo vyrábaných konštrukčných prvkov, ktoré nahradili tradičné, sezónne realizované procesy. Výsledkom toho bolo, že prefabrikácia na stavbe bola pred politickými zástupcami stavebného priemyslu viac-menej obhájiteľná, tak z hospodárskeho, ako aj z ideologického pohľadu – minimálne na osem až desať rokov. Pozíciu prefabrikácie na stavbe podporila tiež skutočnosť, že IPARTERV sa od roku 1951 stalo samostatným oddelením, ktoré pracovalo na rozvoji konštrukčných systémov založených na prefabrikácií na stavbe a zaoberalo sa definovaním štandardov pre správu realizácií, to znamená otázkou rozšírenia prefabrikácie na stavbe, ako všeobecne aplikovateľného organizačného princípu vo výstavbe priemyselných projektov. Výrazné rozšírenie prefabrikácie na stavbe dalo skutočný impulz k vzniku vhodných, „prispôsobených" konštrukčných systémov a realizačných procesov počas špecifického rozvoja v danom období, zatiaľ čo dizajnéri mohli použiť technologické, návrhové a realizačné normy vytvorené už spomenutým oddelením IPARTERV.

V druhej polovici päťdesiatych rokov sa však všetko začalo meniť. Ako dôsledok zmien v maďarskom stavebnom priemysle a jeho

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prevádzkovej štruktúry, ako aj nadobudnutím technologických skúseností sa začalo spochybňovať všeobecné presvedčenie o prefabrikácii na stavbe ako najrentabilnejšom riešení pre rozsiahle priemyselné investície. Táto nová situácia podporila ďalšie procesy, ktoré boli z ekonomických dôvodov počas Rákosiho obdobia zatlačené do úzadia, ktorým dominovala monolitická technológia, ako aj rôzne oceľové a hliníkové konštrukcie. Ako prefabrikácia na stavbe strácala svoje vedúce postavenie. V Maďarsku, ako takmer v každej krajine východného bloku, sa dostala do popredia otázka typizácie založenej na priemyselne vyrábaných prvkoch a najmä otázka rozvoja univerzálnych halových systémov, aplikovaná predovšetkým v projektoch malej mierky.

Nové architektonické úlohy a prístupy, to značí vznikajúci princíp architektonickej univerzálnosti čoraz väčšmi ovplyvňovali ambície zamerané na systematizáciu priemyselnej architektúry. Táto tendencia prispela novými problémami k tým, ktoré existovali v maďarskej priemyselnej architektúre už v začiatkoch Kádárovho obdobia. Pre priemyselných architektov predstavovala výzvu nielen v súvislosti zladenia konštrukčného návrhu a technického riešenia, ale aj z pohľadu základných architektonických princípov: museli nájsť nové cesty typizácie a premyslieť priemyselnú výstavbu ako takú, teda previazaný systém výstavby, výrobnej technológie a potrieb človeka.

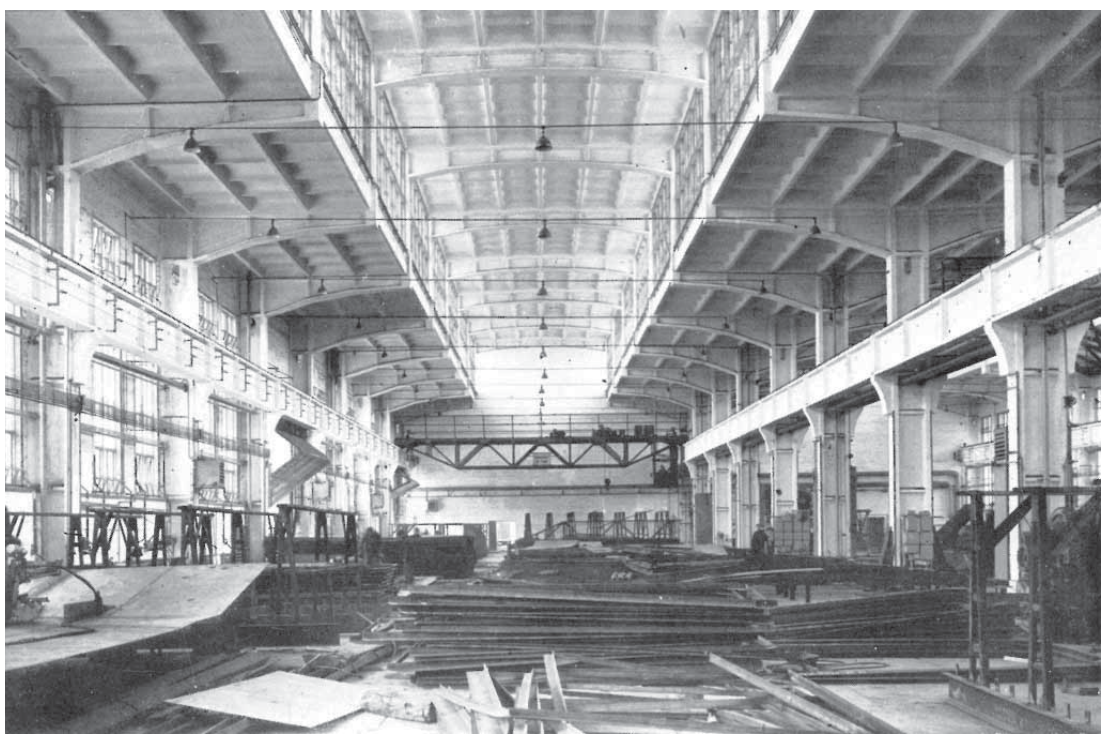
Narastajúci politický tlak v súvislosti s typizáciou sproblematizoval nezávislosť architektov a interpretáciu priemyselnej výstavby ako samostatnej práce – nielen preto, že z potrieb architektonickej činnosti sa posunula k zjednodušovaniu a opakovaniu, ale aj pre jedinečné tradície, intelektuálne pozadie a zmysel pre architektonické hodnoty, ktorými prefabrikácia na stavbe prispela do maďarskej priemyselnej architektúry. V prvej polovici šesťdesiatych rokov však vzhľadom na nepripravenosť stavebného priemyslu dochádzalo k výrobe vo veľkom meradle a aplikácii univerzálnych halových systémov veľmi pomaly. Od konca päťdesiatych rokov súčasne začal do oblasti maďarskej priemyselnej architektúry prenikať prístup typizácie a princíp univerzálnosti. Je zaujímavé, že ovplyvnil projektovanie niektorých prevádzok veľkého rozsahu, ako ťažkého priemyslu a chemického priemyslu s komplikovaným usporiadaním, v prípade ktorých prichádzali do úvahy skôr len individuálne, špeciálne konštrukčné riešenia. V týchto projektoch projektanti skúmali možné aplikácie toho, čo možno nazvať typizáciou na mieste, počas ktorej boli novopostavené prevádzky priemyselných závodov navrhnuté na základe jednotného systému dimenzií a konštrukcií. Typizácia na mieste sa usilovala použiť prístup navrhovania a analytickú metódu, ktoré slúžili ako východiskový bod na projektovanie univerzálnych halových systémov, zatiaľ čo boli dostatočne flexibilné, aby projektanti mohli vzhľadom na danú investíciu vybrať optimálny konštrukčný a projekčný systém. Typizácia na mieste v praxi znamenala syntézu rozličných experimentov – syntézu princípu univerzálnosti a rozšírených konštrukčných systémov. Počas týchto experimentov vznikli pôsobivé priemyselné závody, ktoré na jednej strane stelesňovali ideál univerzálnosti a na druhej strane mohli byť vnímané ako samostatné architektonické diela, keďže funkčne a esteticky boli ucelenými kompozíciami citlivo adaptovanými špecifikám daného projektu, čím predstavovali asertívnu odpoveď na kritiku týkajúcu sa schematickej povahy nových trendov typizácie.

Toto obdobie, ktoré charakterizuje hľadanie nových smerov v priemyselnej architektúre, má pre maďarskú architektúru ako takú mimoriadny význam: po zníženej prestíži architektúry, ktorá nevyhnutne vyplynula z diktátu socialistického realizmu, nasledovala určitá sebarehabilitácia a obnova modernizmu, lebo priemyselná architektúra prešla počas odborných procesov obdivuhodnou transformáciou. Ako súčasť toho diania bola spoločnosť IPARTERV– napriek svojej vnútornej kríze – povýšená na určitý vzor, ktorý stelesňoval postoj inovatívneho myslenia a umeleckej samostatnosti podriaďujúci sa obmedzujúcim okolnostiam daného obdobia.

The systematisation of planning and implementation in industrial architecture, which encompassed a rapidly changing and broad range of building types, was a crucial issue in Hungary throughout the two decades after World War II. The architects of the state-owned Industrial Building Design Company (Ipari Épülettervező Vállalat, IPARTERV), which was established in 1948 and employed a staff of over one thousand, strove to apply unified planning methods or implementation techniques to the diverse area of industrial architecture, while always adapting them to the given state of the economy and the building industry /1/. This uniformity inevitably resulted in constant professional conflicts arising from economic, functional and artistic issues, which later intensified especially in the first decade of János Kádár's political regime, after the collapse in 1956 of Mátyás Rákosi's Stalinist dictatorship. At the same time, the extraordinary structural innovativeness and architectural creativity bred by the period's political and economic turnover in the area of industrial architecture played a fundamental role in the 'self-rehabilitation' of Hungarian modernism that took place after the years of Stalinism.

ON-SITE PRECASTING: FROM DOMINANCE TO INTEGRATION

It was in the first years of the Kádár regime that a new comprehensive industrialisation programme was launched in the spirit of social modernisation. Closely connected to the ambitions of the period between 1956 and 1963, generally referred to by Hungarian historians as the 'early Kádár period', the programme was aimed at political stabilisation and the correction of the grave economic mistakes of the Rákosi dictatorship /2/. Initially, the economic policies of the new regime were based on the principle of a more temperate industrialisation (intensifying in nature, it gave preference to

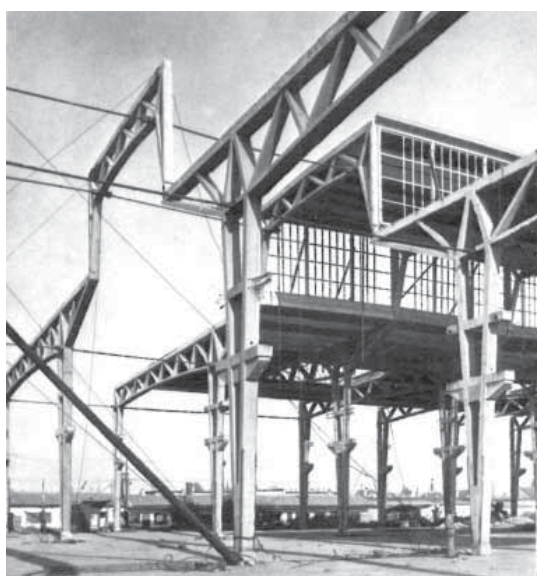


Gyula Mátrai – Károly Pászti – Imre Ozorai: Ganz Shipbuilding Plant, Budapest, 1953
Gyula Mátrai – Károly Pászti – Imre Ozorai: Závod na stavbu lodí Ganz, Budapešť, 1953

Source Zdroj: SZENDRŐI, Jenő – BAJNAY, László et al. eds: Magyar építészet 1945 – 1955. Képzőművészeti Alap Kiadóvállalata, Budapest 1955

light industry and the processing industries, tailored to the country's characteristics), but after 1958 – related to the internal party policies aiming towards radically improving the living standards of the population, as well as the production cooperation programmes within the COMECON countries – the emphasis was again shifted to supporting the extensive development of heavy industry, as well as the chemical and building industries /3/.

This undertaking represented an enormous challenge for Hungarian industrial architecture, and not merely because of the enormous amount of work it required: after the industrial development projects took a new direction and new economic policy objectives were formulated, the professional values, traditions, as well as structural and technological achievements of the Rákosi era seemed to decline in significance. Structural systems and implementation processes more closely in line with the new industrialisation concept had to be developed. In doing so, designers were at times faced with grave challenges, and at other times given the opportunity for productive experimentation, all the while being urged to remain open to international novelties. The paradigm shift also set new directions regarding the aspirations linked to industrial architectural systematisation. The engineers and designers of the new period did not set aside the achievements of the previous ten years; instead, they regarded them as starting points for their own work.



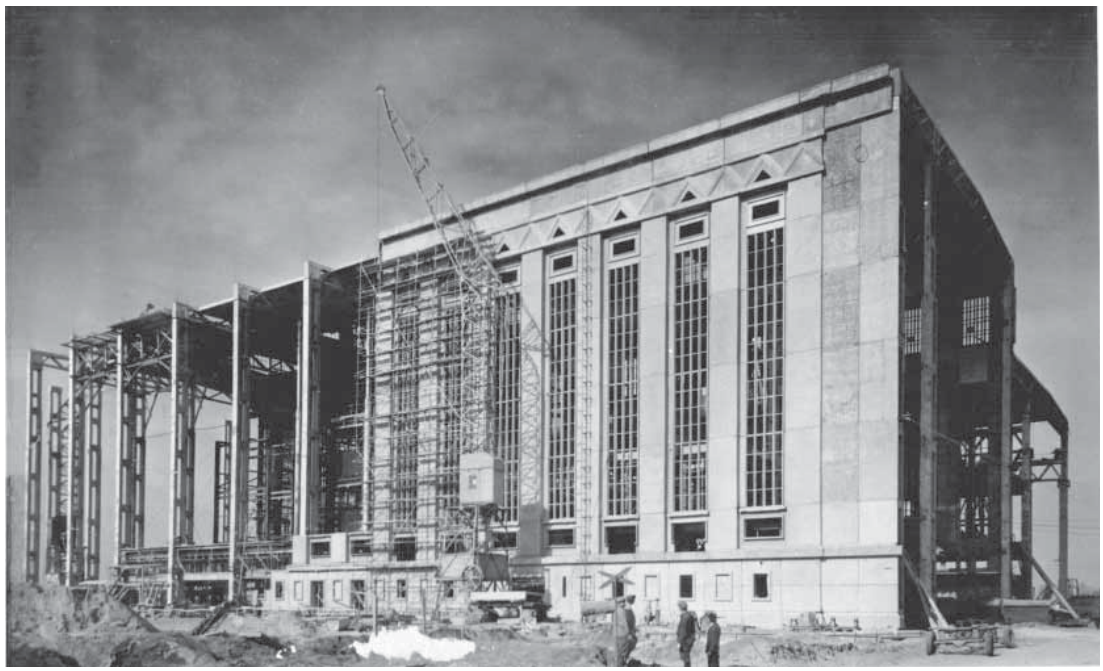
Gyula Mátrai – Károly Pászti – László Vasek: Transformer manufacturing hall, Csepel Iron and Metal Works, Budapest, 1953 – 1954

Gyula Mátrai – Károly Pászti – László Vasek: Transformačná výrobná hala, železiarske a kovospracujúce závody Csepel, Budapešť, 1953 – 1954

Source Zdroj: MOKK, László: Helyszíni előregyártás. Ipari épületek, csarnokok. Műszaki Könyvkiadó, Budapest 1961, p. 283

Attempts at systematisation in the Rákosi era were primarily determined by the structural innovation and architectural approach based on on-site precasting, which was introduced into Hungarian industrial architecture in 1947 – 1950, i.e. in the years of the nationalisation of the Hungarian building industry /4/. On-site precasting soon became widely used, as it enabled highly resource-efficient and fast construction during the giddy pace of industrialisation in the early 1950s, when the Hungarian building industry lacked not only sufficient resources and assets, but even significant prefabrication facilities. Although it was generally agreed that the main goal would have been the development of factory-made, standardized building structures, the construction industry could not meet this aim for an entire decade, i.e. until the early 1960s /5/. Architectural standardization, expected both ideologically and economically, did not produce significant results: the main reason being that the overwhelming majority of the commissions were halls with vast spans and technological structures that required other complicated architectural configurations, which were typically one-off designs because of the country's economic and geographical attributes and were rarely built more than once, thus not allowing the opportunity for extensive standardization /6/.

It is, therefore, understandable that in this situation on-site precasting appeared the most competitive solution by far: while requiring only relatively small-scale building industry development, it enabled methods that utilised the assembly of quasi mass-produced structural elements to replace the traditional, seasonally implemented processes. As a result, on-site precasting could be more or less justified both from an economic and ideological standpoint – for at least eight-ten years – to the representatives of building industry policy. It was argued that on-site precasting enabled the Hungarian building industry to rid itself of the shackles of the 'handicraft' practices of the bourgeois past and set off on the path towards the 'progressive' technologies of industrial pro-



Gyula Mátrai – Károly Pászti – László Bereczky – László Vasek: Power plant, Tiszapalkonya, 1952 – 1957

Gyula Mátrai – Károly Pászti – László Bereczky – László Vasek: Elektráreň, Tiszapalkonya, 1952 – 1957

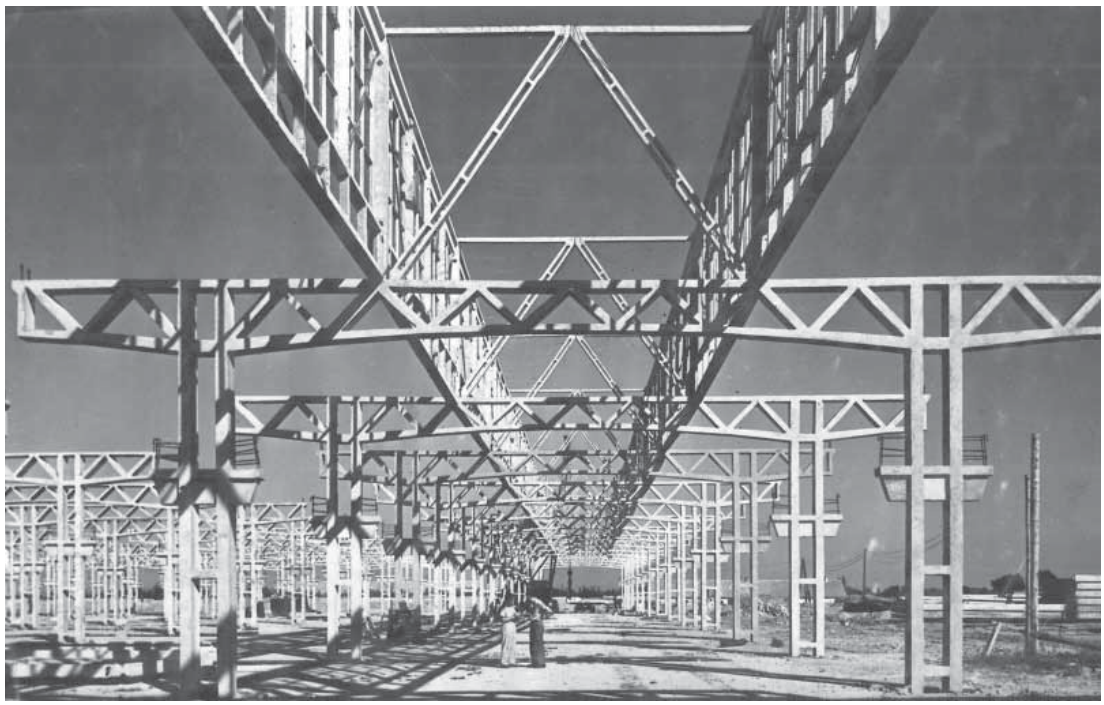
Source Zdroj: Foundation for Modern Industrial Architecture – IPARTERV Photo Archive / (Modern) (Ipari) Építészetért Alapítvány – IPARTERV Fotóarchívum, No. 2163

duction /7/. The position of on-site precasting was also strengthened by the existence, as of 1951, of a separate department at IPARTERV working on the development of structural systems based on on-site precasting as well as on the definition of standards for organising implementation, i.e. how to extend on-site precasting as a generally applied systematisation principle in industrial construction projects. Although the head of the department and prominent structural engineer Gyula Mátrai, and his colleagues – primarily Károly Pászti and Béla Fekete – drew ample inspiration during this work from contemporary international developments, they essentially created a system of on-site precasting adapted to local conditions /8/. The wide-range proliferation of on-site precasting was lent real impetus by the ability of this technology to enable virtually 'custom-made' structural systems adjusted precisely to the production technology structure of the new factories, and provided cost-effective implementation processes. In the meantime, designers were able to utilise the unified technological, design and implementation norms, modular system and structural schemes previously elaborated by IPARTERV's previously mentioned special department.

The great advantage of IPARTERV's practise was its utilisation of the flexibility inherent in on-site precasting, thus a great proportion of industrial architectural tasks could be included in this design and implementation system. IPARTERV therefore 'promised' comprehensive building industrialization and a continual development of organised design and implementation practise. At the same time, it kept the opportunity open for individual design as well as allowing relatively great space for designers to use their creativity, autonomous solutions and individual artistic principals, within the bounds of industrial architecture. After some time, this method began to exert an influence on the overall character of industrial architecture and thus became an important element

of IPARTERV's professional identity. This was the case particularly because Mátrai and his team laid the foundations for a special concrete structural aesthetics that played a significant role in the early 1950s in relaxing the confrontations in terms of aesthetics between the stylistic requirements imposed by socialist realist architecture (classicisation) and the functional configurations dictated by production technology systems /9/. The emblematic examples of the period – the assembly hall of the Ganz Shipbuilding Plant in Budapest, the transformer manufacturing hall of the Csepel Iron and Metal Works, and the Tiszapalkonya power plant – represent the 'golden age' of IPARTERV in the Hungarian architectural profession up to this day /10/. The structural innovations that were based on on-site precasting also helped to preserve the professional autonomy of industrial architecture in the face of socialist realism. It is no coincidence, therefore, that soon an aura of prestige developed around IPARTERV: it was at this time that the ideal of the company was formulated: as a bustling workshop open to fresh international technical and intellectual trends and able to realise the collective synthesis of engineering and artistic values /11/.

The company's vigorous research spirit and autonomy were considerably enhanced by the circle of designers – the main members of which were Miklós Gnädig and his colleagues Zoltán Zentai and Lajos Garay – who applied on-site precasting at a high standard but, unlike the Mátrai group, experimented with entirely new structural schemes and implementation systems in each new project. There were several professional disagreements between these two groups; nevertheless, their achievements, such as the superphosphate warehouse of the Borsod Chemical Works in Kazincbarcika (Miklós Gnädig, Gyula Horváth; 1952 – 1953) and the production halls of the Roller Bearing Factory in Debrecen were equally celebrated by the company /12/.



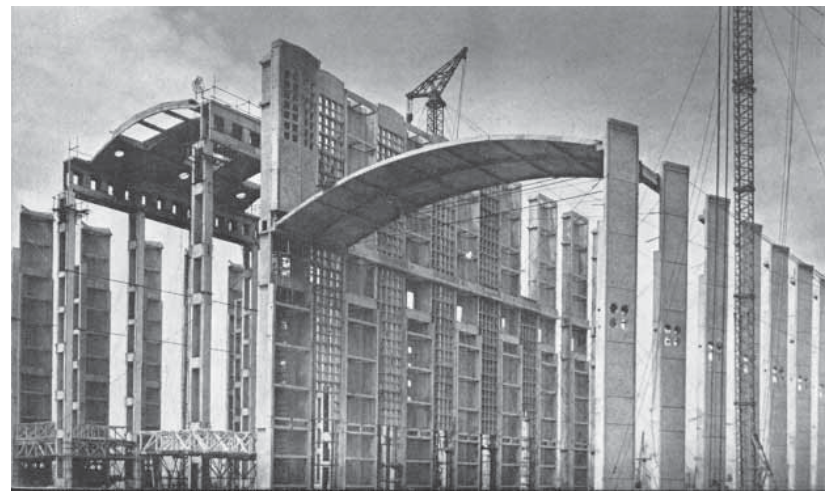
István Füzér – István Hermány – Lajos Garay: Roller Bearing Factory, Debrecen, 1952 – 1953

István Füzér – István Hermány – Lajos Garay: Továreň na valčekové ložiská, Debrecín, 1952 – 1953

Source Zdroj: Foundation for Modern Industrial Architecture – IPARTERV Photo Archive / (Modern) (Ipari) Építészetért Alapítvány – IPARTERV Fotóarchívum, No. 1210

However, in the second half of the 1950s everything began to change. The transformations in the Hungarian building industry and its operational structure, as well as the accumulated engineering experience, led to the gradual weakening of the general belief in on-site precasting technology as the most cost-effective solution for large-scale industrial investment in Hungary /13/. There was an increasing opinion that the professional prestige of on-site precasting had assumed such proportions, thanks to the wide-ranging publicity following its successful implementation, that architects began to chose it over other technologies virtually indiscriminately /14/. In any case, the adequate scale of applying on-site precasting was difficult to establish in the unstable economic situation of the era, which added further risk factors to this technology: what was advantageous in architectural and microeconomic levels (in terms of individual projects), proved to be increasingly unfeasible at macroeconomic levels /15/.

The body set up in 1957 by the Ministry of Building Affairs to assess the results of on-site precasting concluded that a new structural design practice needed to be developed. This practice would be based on the analysis of the parameters of individual projects based on a unified methodology, facilitating the selection of the most appropriate structural solution and implementation technology and thus excluding the 'old mistake' of rendering certain processes and principles absolute /16/. Essentially, this concept heralded a shift towards structural and technological heterogeneity in industrial architecture, and not only confined to technical solutions: on-site precasting, which fulfilled a fundamental role in the prestige and character of Hungarian industrial architecture, appeared as one of many elements in a diverse 'kaleidoscope' /17/. On-site precasting ceased to be a single dominant technology and became integrated into the range of implementation processes approved by IPARTERV, thus definitively putting an end to the ambitions of basing the systematisation of industrial architecture on this technology. This dramatic change is also indicated by the reference to on-site precasting in the majority of articles published from the beginning of the 1960s on architectural theory merely as a transition between 'handicraft' and 'industrial' technologies. In other words, it was described as an advanced method of the 'old times' but fundamentally regarded as an 'on-site construction' method as opposed to factory production technology /18/. Moreover, some theoreticians argued that on-site precasting practices hindered the development of factory production and standardisation, thus engendering a severe disadvantage /19/. Others, by contrast, held that on-site precasting helped to strengthen



Source Zdroj: La préfabrication lourde appliquée aux constructions industrielles en Hongrie. L'Architecture d'aujourd'hui, 83, 1959, p. 92

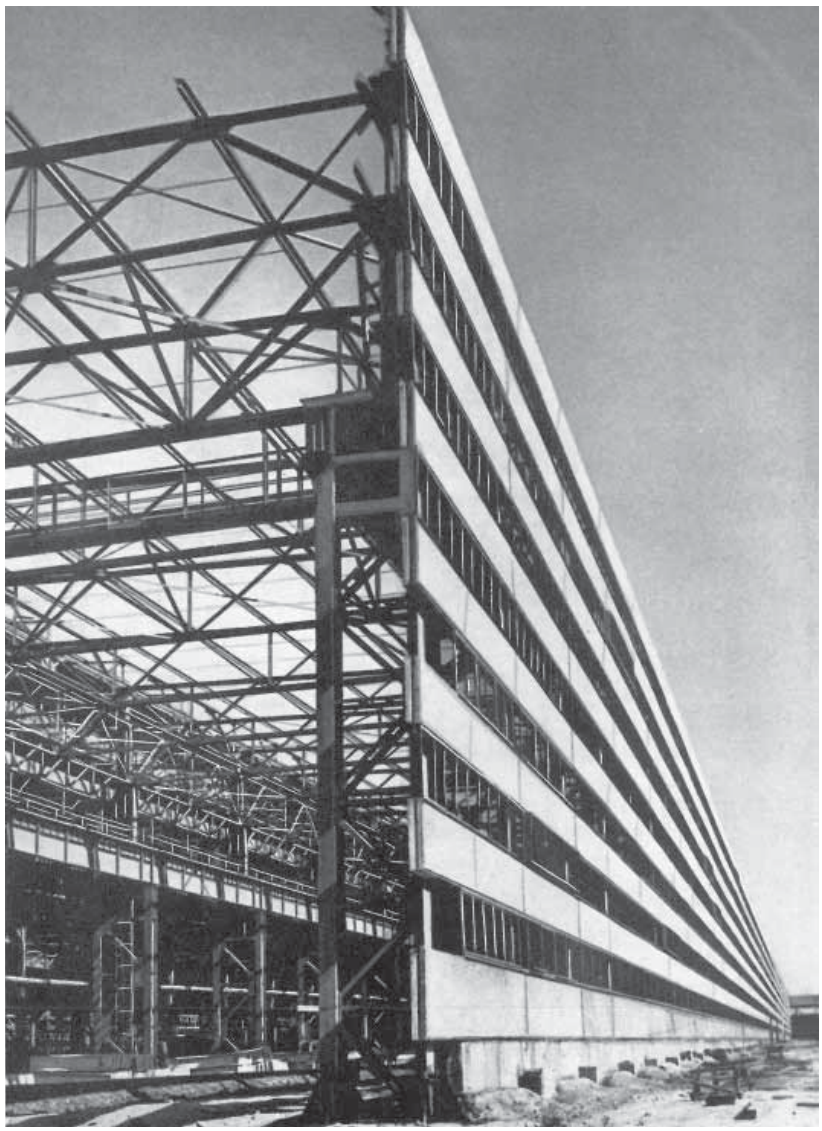
Source Zdroj: Foundation for Modern Industrial Architecture – IPARTERV Photo Archive / (Modern) (Ipari) Építészetért Alapítvány – IPARTERV Fotóarchívum, No. 4551

Gyula Mátrai – Árpád Szécsi – Ödön Szakács: Power plant, Pécsújhely, 1955 – 1959

Gyula Mátrai – Árpád Szécsi – Ödön Szakács: Elektráreň, Pécsújhely, 1955 – 1959

Viktor Pásztor – János Balázs Steel rolling works, Duna Iron and Steel Works, Dunaújváros, 1963 – 1967

Viktor Pásztor – János Balázs: Steel rolling works, železiarne a oceliarne Duna, Dunaújváros, 1963 – 1967

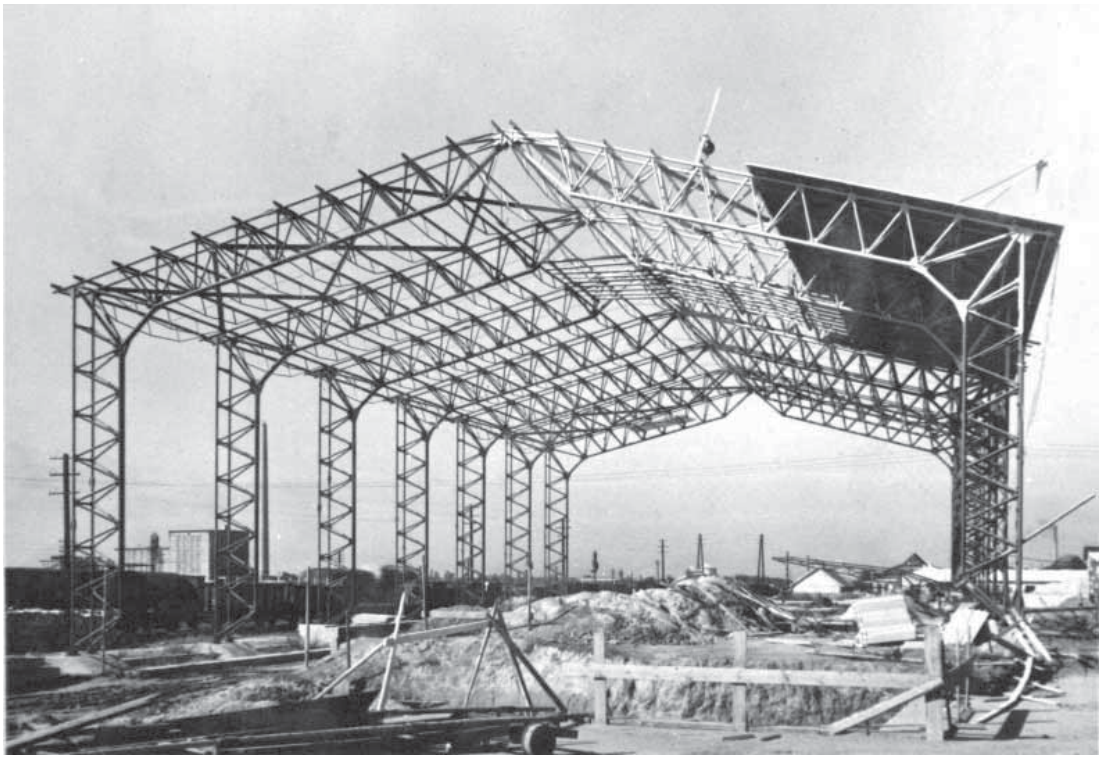


Source Zdroj: SZENDRŐI, Jenő: Ipari építészetünk. Műszaki Kiadó, Budapest 1965, p. 187

creativity in the area of working with fixed modules and standardised structural elements and therefore provided a truly beneficial basis for solving the problems that arose in the 1960s /20/.

Rearrangement was, of course, a slow process: on-site precasting retained a considerable role even in the years around 1960, since it was still used as the most appropriate technology in many construction projects with large-span halls and special architectural configurations. For this reason, structural innovation based on on-site precasting also continued /21/. Gigantic attempts were made, for example, towards a radically new system based on three-dimensional structural elements, in the course of the construction of the power plant in Pécsújhely /22/. In contrast, earlier structural solutions were further developed in the case of the Dunaújváros pulp mill (János Böhönyey, Ernő Südi; 1957 – 1962) /23/. These development projects were a response to the criticism aimed at on-site precasting, and the role of this technology undoubtedly began to decrease in IPARTERV's activity during this time. A clear indication of this decline was the closing of the on-site precasting department in 1961, ironically in the same year when the company was awarded the Ex-aequo mention of the August Perret Prize by the International Union of Architects for its internationally acclaimed achievement in the field of on-site precasting.

In this period, IPARTERV was already following the new direction, and increasingly used structural systems and technologies other than on-site precasting. These years of seeking the right path were far from being untroubled and were characterised by great architectural diversity: while gigantic yet relatively airy steel structures were used in the halls of the gigantic steel rolling works of the Duna Iron and Steel Works in Dunaújváros (Viktor Pásztor, Antal Springer, József Schőn, János Balázs, 1955 – 1960 and 1963 – 1967) /24/ and in the Budapest Petroleum Industry Machine Works, IPARTERV experimented with monolithic shell structures using innovative engineering solutions in the new buildings of the Tube Manufacturing Plant of the Csepel Iron and Metal Works /25/ and in the Budapest Diesel Gear Works of Ganz-MÁVAG /26/. Additionally, the halls of the Budapest Cable and Wire Rope Works



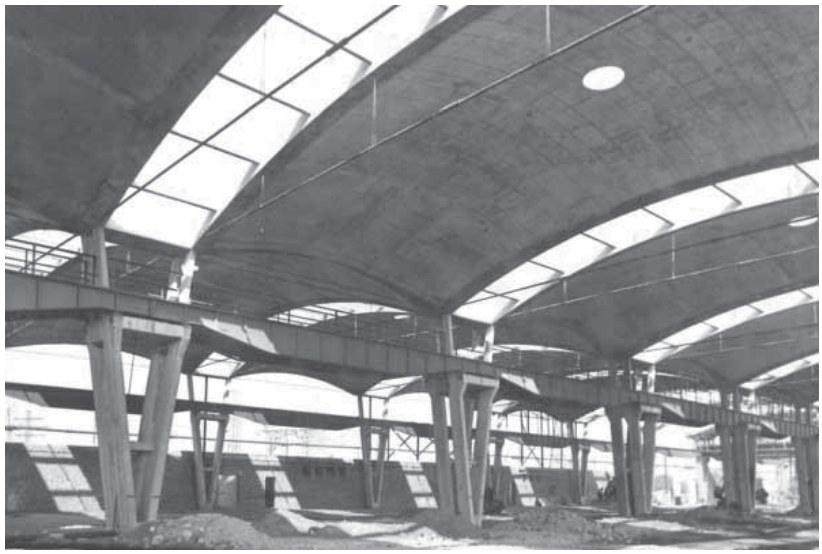
István Horváth – József Mayer: Petroleum Industry Machine Works, Budapest, early 1960s

István Horváth – József Mayer: Závod na spracovanie ropy, Budapešť, začiatok šesťdesiatych rokov

Source Zdroj: Foundation for Modern Industrial Architecture – IPARTERV Photo Archive / (Modern) (Ipari) Építészetért Alapítvány – IPARTERV Fotóarchívum, No. 4626)

were roofed with huge shell-structures precast on site /27/.

The structural and aesthetic renewal manifest in the work of IPARTERV was undoubtedly and significantly facilitated by the familiarity of their engineers and designers with three-dimensional concrete and metal structure systems, an area that was undergoing important development in the West and the Eastern Bloc alike /28/. Their attention was turned especially to systems that were widely popular in wide-span halls: the frame structures of many Hungarian industrial buildings suggest that their designers utilised the most recent international experience gained in the area of shell structures and space grid structures. On the whole, however, designers developed individual structural solutions adapted to the local requirements. This trend was enhanced by IPARTERV's own periodical, titled Ipari Építészeti Szemle (Industrial Architectural Review), the editors of which significantly changed the publication's profile from 1957, placing increasing emphasis on the latest foreign engineering developments and architectural tendencies. Hence IPARTERV's professional identity itself underwent gradual change: the representative buildings of the company sent out a clear message to the entire architectural community that on-site precasting no longer formed the single core of their image but a number of other innovations too. They also highlighted that opening up to the West was as important an objective in industrial architecture as it was in the politics, scientific and cultural life of the early Kádár period.



Source Zdroj: Foundation for Modern Industrial Architecture – IPARTERV Photo Archive / (Modern) (Ipari) Építészetért Alapítvány – IPARTERV Fotóarchívum, No. 5425

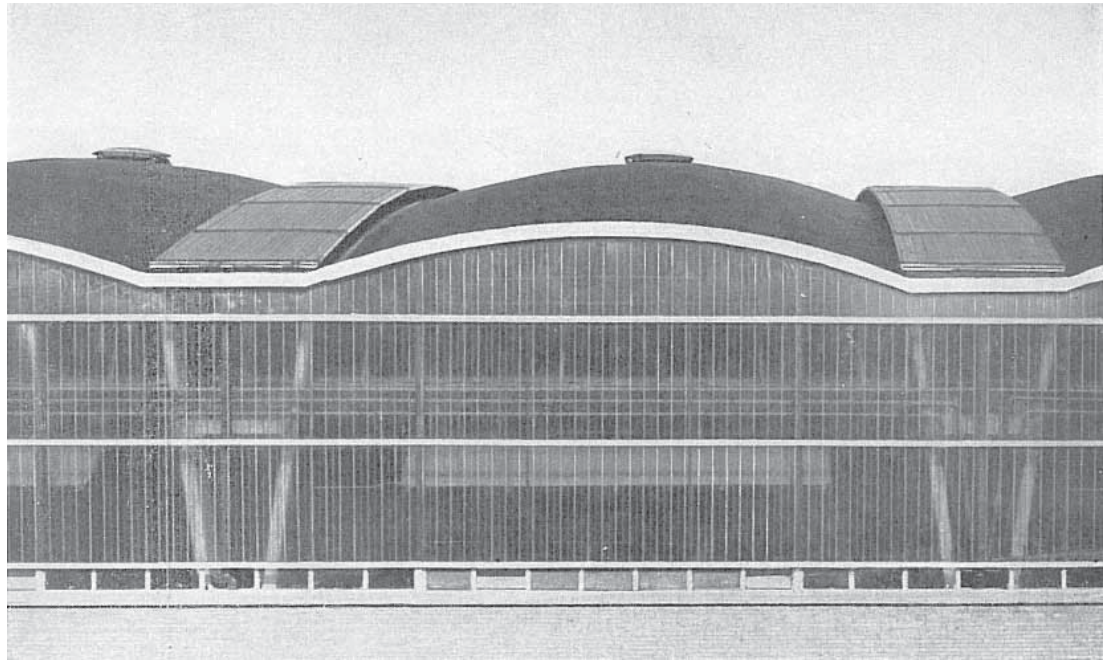
The economic and architectural benefits inherent in structural heterogeneity were of course mainly utilised in the case of large-scale construction projects in the heavy, chemical and building industries. By the end of the late 1950s, it had become obvious that factory-made, standardised structural systems were needed for smaller-scale halls in the light and machine industries – or at least this belief is what the official policy propagated in every forum.

FACTORY PRODUCTION AND UNIVERSALITY: THE REINTERPRETATION OF INDUSTRIAL BUILDINGS

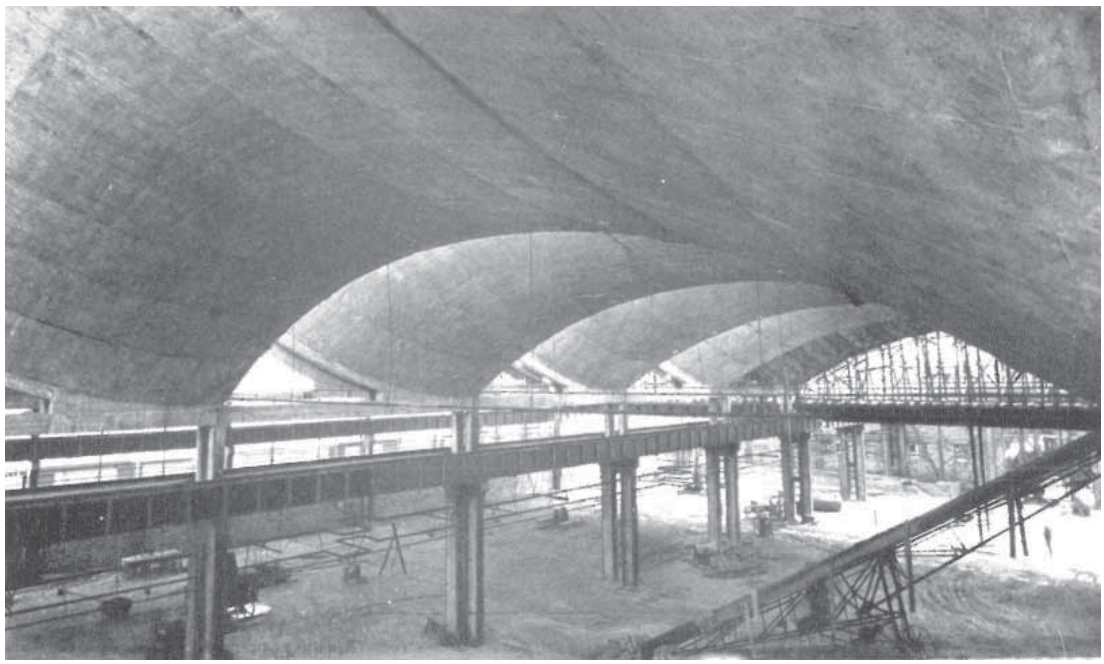
Lajos Szíjártó, the minister for building affairs, already stressed in 1955 that Hungary's grave lag in the area of factory production was untenable; therefore, the overall modernisation of new prefabrication facilities must begin as soon as possible in order for structural standardisation based on serial production – only theoretically known in

István Menyhárd – Lajos Semsey: Tube Manufacturing Plant, Csepel Iron and Metal Works, Budapest, about 1960 – 1962

István Menyhárd – Lajos Semsey: Továreň na výrobu potrubia, železiarske a kovospracujúce závody Csepel, Budapešť, okolo rokov 1960 – 1962



Source Zdroj: SZENDRŐI, Jenő: Ipari építészetünk. Műszaki Kiadó, Budapest 1965, p. 125

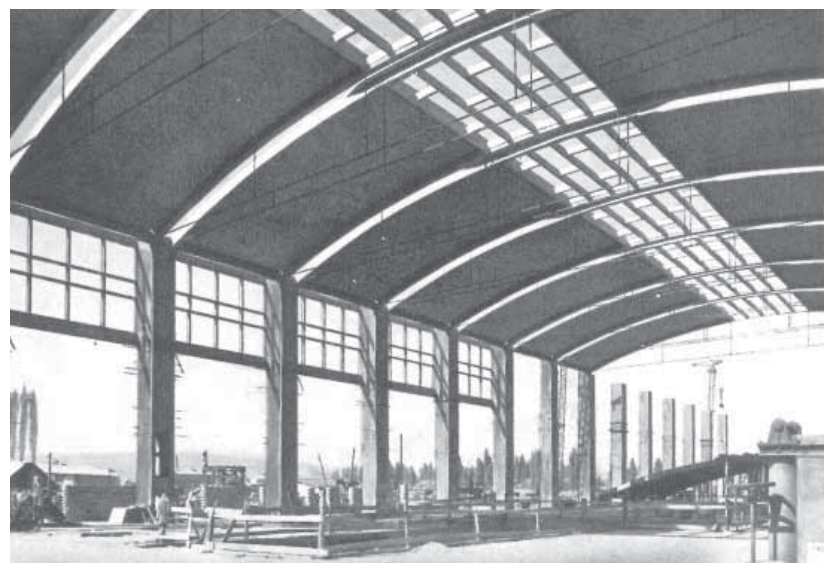


Pál Vincze – Csongor Horváth: Ganz-MÁVAG Diesel Gear Works, Budapest, early 1960s

Pál Vincze – Csongor Horváth: Závod na výrobu ozubených prevodov do dieselových motorov Ganz-MÁVAG, Budapešť, začiatok šesťdesiatych rokov

Source Zdroj: SZENDRŐI, Jenő: Ipari építészetünk. Műszaki Kiadó, Budapest 1965, p. 126

Hungary – to be introduced /29/. Szíjártó made a reference to the decree passed by the Soviet party leadership in 1954, prescribing the growth of prefabrication and standardisation, paying special attention to the development of universal standard halls that can be successfully used in construction projects in the light and machine industries /30/. Although the level of prefabrication and standardisation varied within the socialist countries of Central and Eastern Europe, the Soviet directive exerted an influence upon the building industry and architecture of the entire region in the second half of the 1950s. This process also fostered international cooperation programmes in the Eastern Bloc: the need for a wide-ranging standardisation system, prefabrication methodology and modular system was emphasised by two important events held in 1957, namely the 1st International Standardisation Congress in Berlin and the 2nd International Reinforced Concrete Prefabrication Congress in Dresden. A large Hungarian delegation was sent to both congresses /31/.



Gyula Mátrai – Károly Pászti – Arisztid Nagy: Cable and Wire Rope Works, Budapest, about 1960 – 1962

Gyula Mátrai – Károly Pászti – Arisztid Nagy: Závod na výrobu káblov a drôtených lán, Budapešť, okolo rokov 1960 – 1962

Source Zdroj: SZENDRŐI, Jenő: Ipari építészetünk. Műszaki Kiadó, Budapest 1965, p. 121

Source Zdroj: KATONA, József ed.: Építésiparosítás, műszaki tervezés, tipizálás. Típustervező Intézet, Budapest, 1969, p. 150

Mihály Bokor – Tibor Kovács – János Heffer: Mechanical Measuring Instrument Factory, Szekszárd, 1962 – 1963

Mihály Bokor – Tibor Kovács – János Heffer János: Závod na výrobu mechanických meracích prístrojov, Szekszárd, 1962 – 1963

Unlike Hungary, most socialist countries of Central and Eastern Europe had produced significant achievements in the above area. For example, in the GDR and Czechoslovakia, separate government institutions had been dealing for years with the development of standardisation principles and norms applicable to all areas of architecture /32/. Factory production had also been running at a much greater scale than in Hungary: at that time there were already numerous universal standard halls available for industrial construction projects not only in the GDR and Czechoslovakia but also in Poland /33/. While in these countries standardisation was organised and principles development based on the Soviet models, industrial architectural standardisation in the Soviet Union was implemented at an incomparably greater scale and in a far more complex system, thanks to the country's gigantic size and vast-scale industrialisation plans /34/.

It was in 1955 – 1957 that IPARTERV launched the first experiments to develop universal hall systems adapted to the Hungarian situation /35/. It seems that Hungarian architects and engineers also drew on the experience gained in the GDR, Czechoslovakia and the USSR from developing universal hall systems. These experiments were facilitated by the slow change of direction in the building industry (plans to organise wide-ranging factory production) as well as by the economic policy of the early Kádár period, during which greater emphasis was placed on the development of the light and machine industries /36/. In addition, the fast-paced increase in the automatisation of production introduced an ever greater demand on industrial buildings to meet the requirements of frequent technological changes, expansions and functional reorganisation. The significance of the new direction in standardisation and prefabrication was stressed by the Industrial Building Conference held by the Építőipari Tudományos Egyesület (Scientific Association of the Building Industry) in November 1961. Its final outcome was the proposal that the vast quantity of industrial halls to be built in the framework of the industrial development programme of the second five-year economic plan (1961 – 1965) could only be implemented cost-effectively and fast if universal standard systems based on factory production were used /37/. IPARTERV's first factory-produced universal hall system was also introduced at the conference, which was followed by other versions in the years to come /38/.

The new approach was an attempt at making a radical break with the practice of the standardised design of entire industrial buildings with a specific function. It was also aimed at examining the complex task of standardisation in its entirety, harmonising as many functional types of industrial architecture as possible and creating an integral system, while setting the possible objectives based on interdisciplinary studies. Most importantly, however, the concept of the standardised industrial building was now regarded not as a closed structure catering to one specific techno-

logical system of production –the generally held concept before – but as a 'framework' adaptable to significantly different factory processes. In practice, this approach resulted in variable, or universal, standard structures allowing for production technological changes /39/.

This direction of standardisation pointed well beyond the merely practical implications, in that it fundamentally affected the principles of architectural space and detail forming. The industrial building per se assumed a 'dual identity' resulting in a paradox. On one hand, the result was significantly disassociated from its production technology systems (i.e. no longer a 'customised' structure, as most of the buildings based on on-site precasting had been), and thus gained a certain degree of imminent 'autonomy'. On the other hand, the narrowed range of architectural components and the standardised ground plans significantly reduced the possibility for industrial buildings to have a design with a single, unique character, which had inevitably been the case in architectural practice when architectural structures were derived from unique production technology layouts. Conversely, in the context of the new standardisation method, the industrial building no longer functioned as a 'casing' built around a given production technology and thus subordinate to it, but rather as an easily rearrangable system allowing for ample leeway in spatial organization. It was, then, through the infinite variations that the industrial building could assume a unique form.

The new interpretation of the concept of the industrial building gradually gave rise to a new professional ideal – that of an economically constructed industrial building meeting the new technological requirements. Despite their public significance, the large-scale production and use of universal hall systems was a slow process. The first such system was applied in 1962 in the Százhalombatta Petroleum Refinery (Ottó Almstaier, Miklós Csics), which was followed by the Mechanical Measuring Instrument Factory in Szekszárd and other projects, but the real breakthrough came only in the mid-1960s /40/. Nevertheless, this standardisation approach influenced the entire area of Hungarian industrial architecture from the late 1950s onward.

Interestingly enough, this approach exerted the strongest impact in those branches of industrial architecture where it seemed to be the least applicable. This large group of industrial architectural tasks concerned large-scale construction projects in the heavy chemical, metallurgical and building material industries that required special ground plan configurations and supporting structures, yet with rarely repeated functions. In their case, standardisation did not appear even as a theoretical issue in the first half of the 1950s.

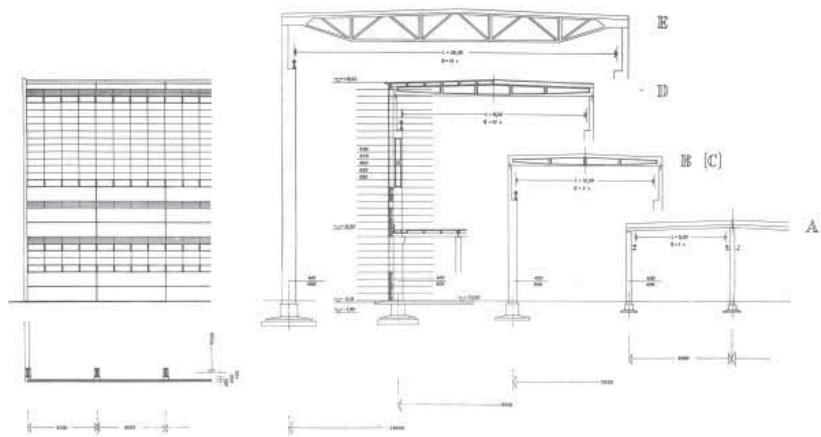
ON-SITE STANDARDISATION: EXPERIMENTS IN SYNTHESIS

In the Rákosi era, designers used a wide range of structures to cater to the diversity of functions and production technologies that marked construction projects in the heavy and chemical industries, due to the given situation of the economy and the building industry. This practise had already become untenable in the Kádár era, yet at the same time development projects in these industries continued to have individual profiles. As a result, architects started to explore possible solutions of on-site standardisation that could be applied to the new industrial plant projects.

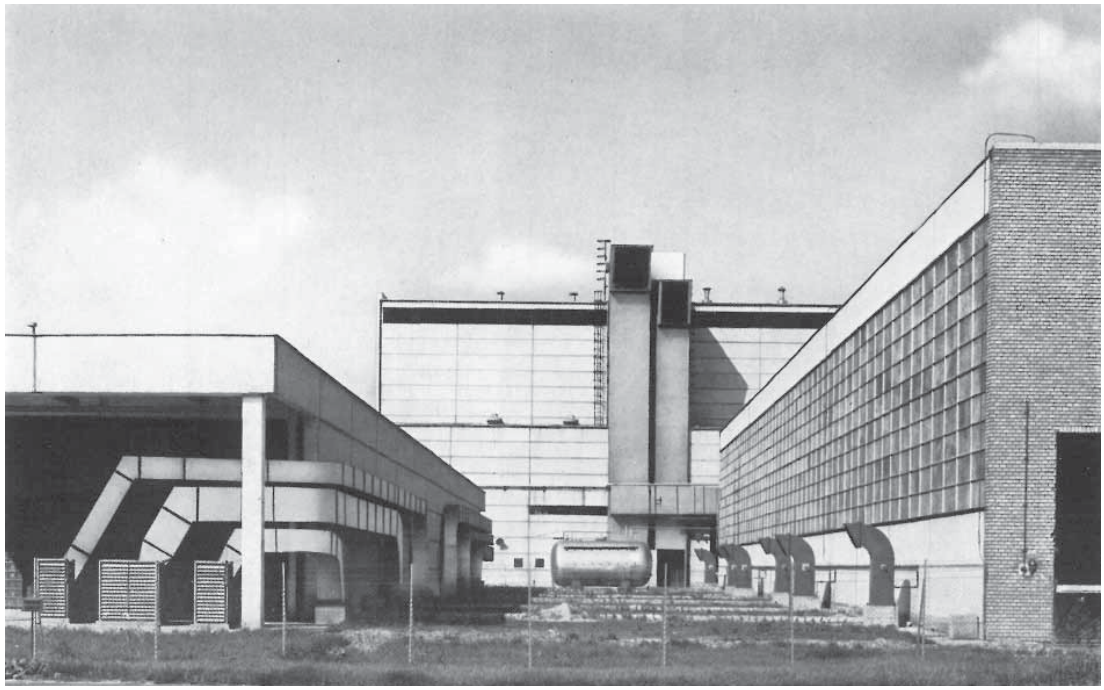
During this time, the outlines of a complex design practice not universally applied but always adjusted to each given task had formed. In this practice, the planning and prefabrication of larger industrial facilities was based on structural

László Bajnay – Miklós Gnädig: Structural system of the Tisza Chemical Works, Tiszaújváros, about 1959

László Bajnay – Miklós Gnädig: Konštrukčný systém chemických závodov Tisza, Tiszaújváros, okolo roku 1959



Source Zdroj: BAJNAY, László: Tiszavidéki Vegyi Kombinát. Nitrogén-műtrágyagyár. IÉSz, 18, 1960, p. 13



László Bajnay – Attila Koncz – Imre Schulteisz and their co-workers: Polyethylene Plant, Tisza Chemical Works, Tiszaújváros, 1966 – 1968

László Bajnay – Attila Koncz – Imre Schulteisz a ich spolupracovníci: Závod na polyetylén, chemické závody Tisza, Tiszaújváros, 1966 – 1968

Source Zdroj: SZENDRŐI, Jenő – ARNÓTH, Lajos et. al.: Magyar építészet 1945 – 1970. Corvina Kiadó, Budapest 1972, p. 172

modularization, at the same time precisely adjusted to the specifics of each building /41/. This on-site standardization sought to use a design approach and analytical method that served as the starting point for the design of universal hall systems (since the objective was to develop an optimal system of dimensions and standard structures suitable for a wide range of functions of a given industrial plant), while remaining open enough to allow designers to select the structural and implementation system optimally suited to the given project. As an outcome, architects were able to utilise their experience gained in the area of on-site precasting and at the same time had the opportunity to use factory production or innovative monolithic casting processes. In practice, on-site standardization essentially meant various experiments in synthesis – the syntheses of the principle of universality with the widely used structural systems. These experiments created the opportunity for a systematisation principle working towards the unification of planning and implementation methods, while regarding the openness to local, project-related characteristics as equally important to structural considerations. This practice was never developed into a unified system of norms, yet it became the 'density point' for the period's industrial architectural trends.

The Tisza Chemical Works (Tiszai Vegyi Kombinát, TVK) in Tiszaújváros was the first large-scale example of on-site standardisation and the most comprehensive in every aspect. During the functional analysis prior to the planning of TVK and the review of its production technology plans, it became clear that a modular system and a set of structural elements could be developed for chemical plants, a genre previously deemed unfit for standardisation, which would be suitable for all the phases of fertiliser and plastic production. Of course, to do so required a certain degree of oversizing (so that the largest equipment could also be fitted into the system); however, the resulting extra

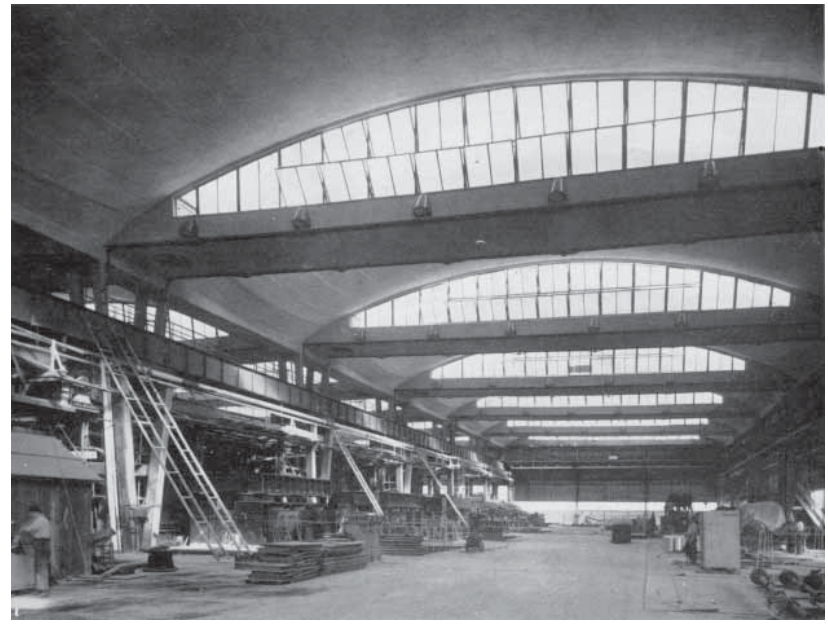
costs were compensated by the savings resulting from the use of standardised components that could be produced in great quantity [42].

The set of elements used for the building complex was produced in a temporary plant erected near the building site and later made into a permanent facility for the factory production of other standard structures, filling the gap in the building industry affecting the serial production of building structures. This solution was a kind of transition between on-site precasting and factory production –not only in a technological sense, but also in regard to the nature of the set of elements. The set of components was essentially designed and manufactured for a particular building complex, while the production itself was no longer aligned with the exact quantity of necessary elements but was aimed at creating a stock. As documented by architects, the main reason for this situation was for the set of elements to be suitable for virtually all kinds of chemical plants, and thus capable of use in other construction projects, too. Thanks to the harmonisation of structural, modular and production technological systems, during the construction of TVK the method of block building – i.e. the concentration of different manufacturing processes into the same block – was utilised to a greater extent than ever before.

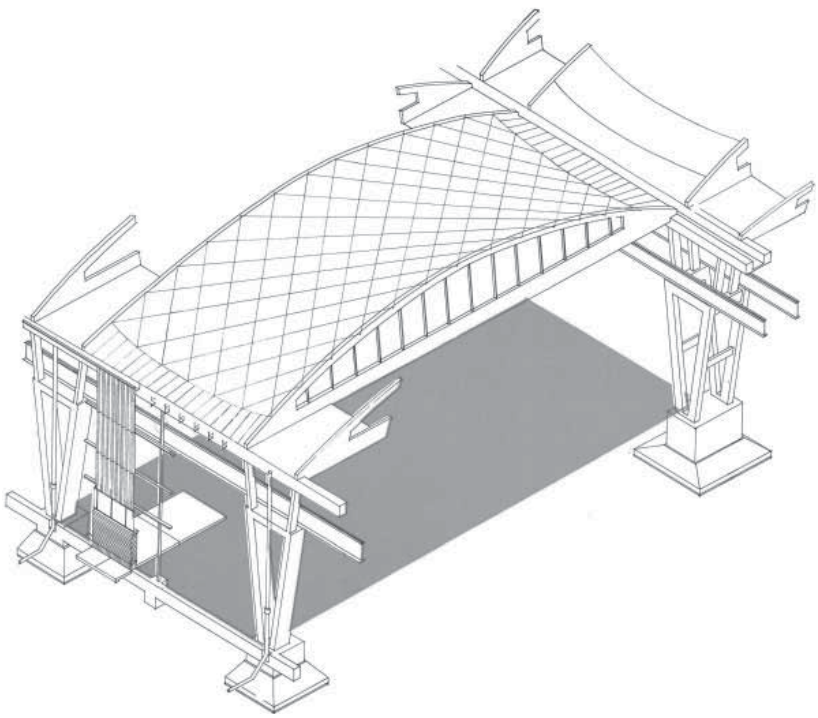
The results detailed above resulted in huge change in the architecture of heavy chemical plants in a formal and aesthetic sense as well. Heavy chemical factories built in the Rákosi era have 'perfectly customised' (i.e. precisely following the technological layout) architectural configurations, reflecting the predominant planning and implementation methods of the period, and as a result are very heterogeneous in regard to their masses and details. At the time architects had no opportunity to standardise either configurations or ground plans and structures, leaving them with little chance to think in terms of a unified design [43]. In contrast, the overall design of TVK is almost completely unified, thanks to the local modularisation, the use of block forms and the repetition of similar structures: the entire plant, in visual terms, is marked by horizontal masses with balanced proportions. TVK's visual homogeneity and aesthetic order is not created by application of facade elements but rather by the constructions themselves, i.e. the masses and details resulting from the internal order of structural elements designed for serial production. This situation is most powerfully visible on the facades: the horizontal bands of windows virtually appear as 'blank' wall panel sections. This design reflected the interchangeability of the system of standardised structures, their immanent dynamics (the potential of constant changeability) as well as the concrete layout of the production equipment, the entry points for natural light, or conversely, the technological and transportation-communication sections that required the blocking out of light. In a certain sense, the order of openings followed the 'bands' of human presence, ensuring the connection between the outer environment and the people working inside the plant. As a result, the 'pattern' of the facades was transformed into a complex visual projection of the industrial process: a kind of 'technological aesthetics' unfolding from the flexible and at the same time functionally determined system of relations between man, machine and building. On the one hand, the ideal of universality and reproduction was realised in TVK both in regard to the

Ipoly Farkas – Lajos Hidasi – István Menyhárd: Székesfehérvár Aluminum Works, from 1958

Ipoly Farkas – Lajos Hidasi – István Menyhárd: Hlinikárne Székesfehérvár, od roku 1958



Source Zdroj: Székesfehérvár. Alumíniumöntöde és présmű. MÉM, 6, 1961, p. 9



Source Zdroj: FARKAS, Ipoly – MENYHÁRD, István: Székesfehérvári új alumíniumöntöde és présmű. IÉSz, 18, 1960, p. 4

Ipoly Farkas – Lajos Hidasi – István Menyhárd: Structure of the Székesfehérvár Aluminum Works, from 1958

Ipoly Farkas – Lajos Hidasi – István Menyhárd: Konštrukcia hlinikární Székesfehérvár, od roku 1958

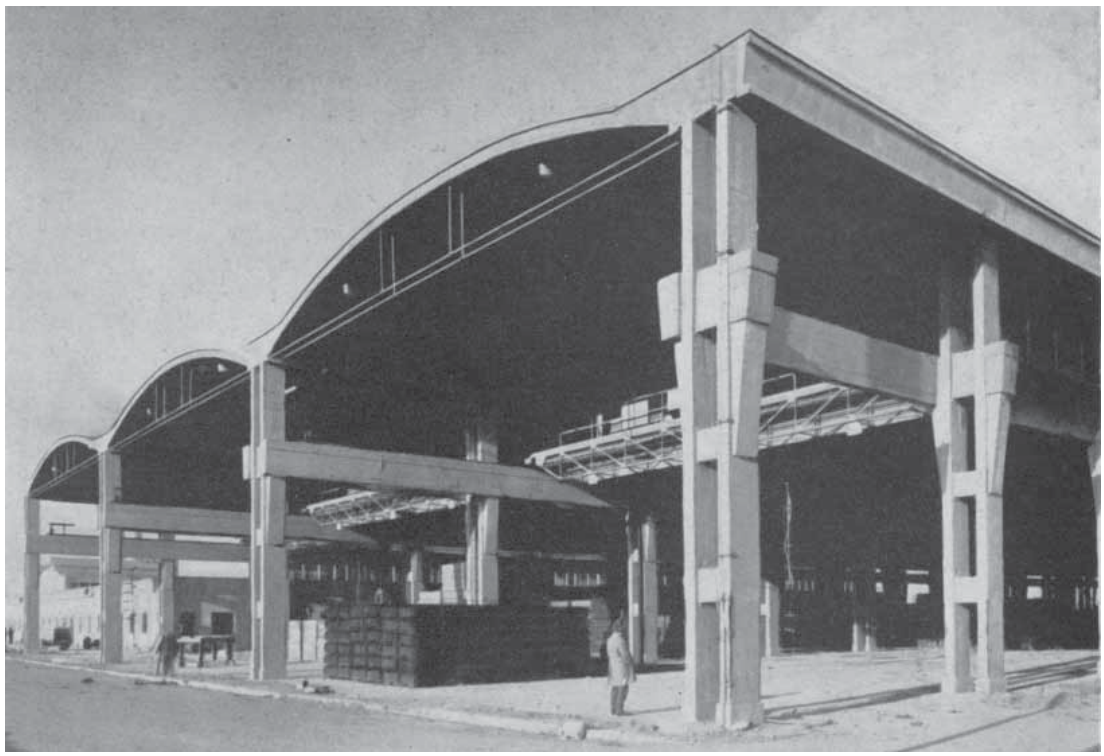
structures and the building technology, while, on the other hand, the plant exuded a special autonomy through being a unique architectural work built on the specific requirements of the given project. Hence, the TVK plant could be discussed in terms of a kind of autonomous universality.

Thanks to its nature, on-site standardisation also functioned in projects with structural principles and implementation technologies radically different from those in TVK. Therefore, the following industrial complexes will not only exemplify the various modes of on-site standardisation but also document the structural diversity of the period around 1960, namely the wealth of engineering and architectural standpoints, and the heterogeneity of outcomes resulting from experimentation.

The separate halls for the foundry and the presswork of the Székesfehérvár Aluminum Works were originally both planned to consist of four naves of varying heights and widths, but after unifying the technological dispositions and space requirements, a completely homogenous hall type (consisting of two naves of identical sizes) with a significantly smaller floorspace was designed, which was able to house both functions. A special mobile formwork was used to implement the monolithic shell structure of the halls cost effectively /44/. This system was successful: years later, the plant's millwork was also built using this hall type. The engineering innovation of the formwork and the structural-formal virtuosity made the facility into the emblematic example of the 'modernisation' of monolithic technologies. All of the articles written about the 'rehabilitation' of monolithic technology – regarded as an outdated method and one to be avoided in the Rákosi era – made reference to this plant, which was also given an important role in IPARTERV's self promotion for its high standard of on-site standardisation and its high aesthetic quality.

In many cases, even for shell structures it was preferable to use on-site precasting in place of the 'modernised' monolithic technology. One example is the Gas Silicate Plant in Berente, where the five functional units were blocked into three monumental halls thanks to cooperation between the architects and the engineers in charge of the production technology systems. The construction of the halls was based on the same structural system and dimensions: they were built by lining up standard sections, each with a rectangular ground plan consisting of pillars and a large-span shell element /45/.

In the case of the Orosháza Glass Factory, the technical system of production was so diverse that the architects (Tamás Böjthe, Vilmos Péry; 1961 – 1966) developed a multi-level standardisation system based on the differentiation of functions and structures /46/. They arranged the twenty-seven facilities into four groups according to their configurations and technological character. Each group was standardised according to the structural solutions best suited to the given scope of functions, yet in the end, the plant had a relatively unified design thanks to the relative homogeneity of the modular system. However, the application of too many structural systems (on-site precast

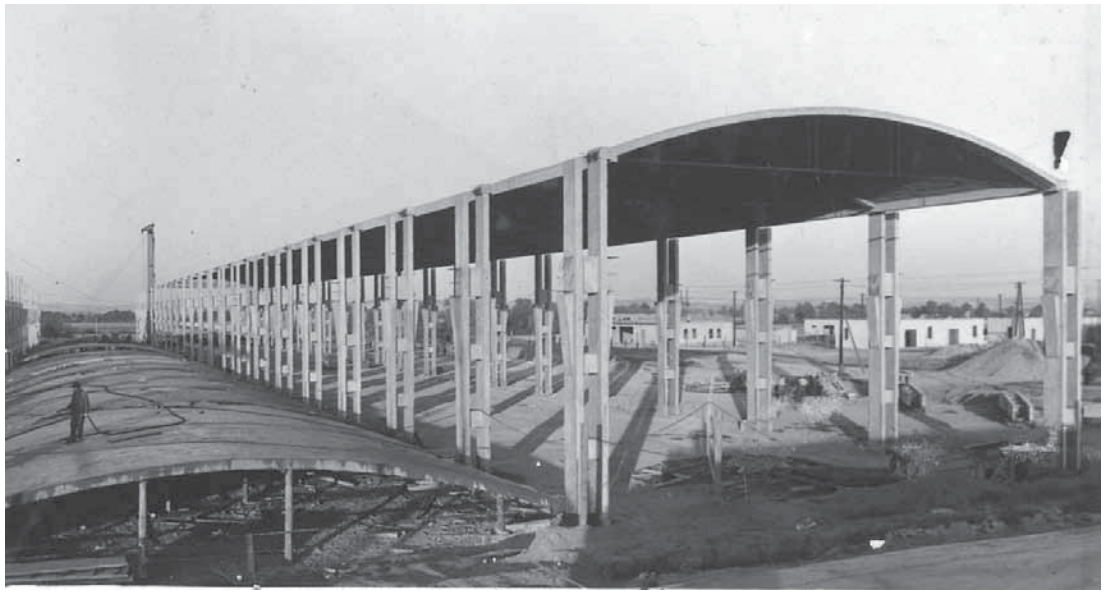


Gyula Mátrai – Károly Pászti – Árpád Szécsi: Gas Silicate Plant, Berente, 1960 – 1962
Gyula Mátrai – Károly Pászti – Árpád Szécsi: Závod na plynosilikát, Berente, 1960 – 1962

Source Zdroj: P. K. (PÁSZTI, Károly): Gázszilikátgyár, Berente. MÉM, 2, 1964, p. 57

and monolithic structures, steel and aluminium constructions, etc.) led to only partial success with the standardisation. In his criticism of the complex, structural designer Vilmos Péry called attention to the 'vulnerability' of on-site standardization, and to to the dependence of the success of a project on the level of investment organisation, the consistency of the development concept and the professional cooperation of all those involved in the construction process /47/.

The list of examples for other versions of on-site standardisation could continue. More detail could be added on how this practise continued in the second half of the 1960s, or to discuss how some of the on-site standardised structural systems became so successful as to be applied in numerous projects all over Hungary. But perhaps the examples above will be sufficient to highlight the essence of this phenomenon. Similar attempts were of course made in other countries of the region at the time, and similar problems called for similar solutions. A good example is the so-called compact building method, which was popular in the GDR and some parts of the USSR, aimed at harmonising the principles of universality and block building with site-specific standardization /48/. It can be clearly seen that the practice of on-site standardisation rarely attained the level of totality that it did in the case of the TVK plant and the Székesfehérvár Aluminum Works; however, every experiment also unambiguously reflects the attempts of architects to respond to the engineering, architectural and aesthetic challenges imposed on them by the standardisation 'constraint'. These examples also show how designers tried to overcome the obstacles resulting from the



Gyula Mátrai – Károly Pászti – Árpád Szécsi: Gas Silicate Plant, Berente, 1960 – 1962

Gyula Mátrai – Károly Pászti – Árpád Szécsi: Závod na plynosilikát, Berente, 1960 – 1962

Source Zdroj: Foundation for Modern Industrial Architecture – IPARTERV Photo Archive / (Modern) (Ipari) Építészetért Alapítvány – IPARTERV Fotóarchívum, No. 6171

uneven standards of performance in the building industry and at times from the special demands placed on them by the developers. Hence, on-site standardisation played a balancing role between the different systematisation methods and the tried and tested structural design practices of industrial architecture. Successful examples became embodiments of the ideal of total standardisation extending to each component. At the same time, these buildings were also seen as unique architectural works, as they represented a closed and autonomous unit 'tailored' to the specifics of a given project both in terms of their technical-technological and structural-formal solutions. This peculiar duality that characterised industrial complexes built with on-site standardisation became one of the most distinctive features of industrial architecture in the early Kádár period.

CONCLUSION: THE REPUTATION OF INDUSTRIAL ARCHITECTURE

The unique characteristics of Hungarian industrial architecture in responding to change, seeking balance and the need for systematisation as was manifest – albeit in different ways – in on-site precasting, on-site standardisation and innovation linked to new structures, engendered a highly positive professional and social reputation of IPARTERV – and of industrial architecture in general – despite the many failures in the area. Industrial architecture in Hungary also bore special significance in regard to architecture in general, especially in regard to the processes of 'self-rehabilitation' and the restoration of modernism after the loss of prestige as an inevitable result of the dictates of socialist realism. From the end of the 1950s, thanks to the activity of IPARTERV, a spectacular renewal of professional practice and architectural-engineering knowledge was achieved in industrial architecture, elevating the company into a kind of ideal for the other areas of Hungarian architecture. IPARTERV became the ideal of the application of innovative thinking and artistic autonomy in the face of political pressure that imposed an increasingly reductive design practice.

The root causes of the high reputation of IPARTERV are not to be sought only in their

search of ways towards architectural systematisation. In addition to the professional press, political propaganda also praised IPARTERV for its successes /49/, and from the 1950s several Western periodicals and books also published the spectacular developments of Hungarian industrial architecture /50/. These architectural innovations in turn attracted the attention of Hungarian theoreticians of architecture, who strengthened the 'construct' of IPARTERV as being an 'atypical' creative workshop /51/. Among others, perhaps the period's most influential theoretician, Máté Major, regarded Hungarian industrial architecture as the professional area with the highest standard of performance. He pointed out that the strict criteria of production technology placed a far greater expectation on industrial architecture than on any other architectural area for standards of implementation, as well as the level of scientific qualifications and creativity of architects /52/. What is more, he attributed far greater significance to the performance of Hungarian industrial architecture. The architectural complexity of TVK, in his view, was nothing less than one of the most important manifestations of architecture as a means of shaping socialist consciousness and an architectural activity that is fully industrialised, while remaining humane and aesthetically sensitive /53/. The theoretical viewpoint of Major and some of his contemporaries suggests that they justified the objectives set for architecture in the early Kádár period (i.e. the development of a new modernism aimed at mass prefabrication and standardisation) through the example of industrial architecture.

Consequently, in the early Kádár period industrial architecture owed its prestige in good part to its meeting the expectations of standardisation and at the same time successfully fending off the tendency to schematisation that became increasingly dominant in Hungarian architecture in the 1960s. And this end was achieved thanks to a large extent to the new attempts at systematization, and to the inventions of architects inspired by the Western trends of industrial architecture. Nonetheless, everything points to the same conclusion: all of these victories sufficed only to delay the processes leading to schematisation. From the second half of the 1960s, Hungarian industrial architecture – similarly to other areas of the profession – increasingly shifted in the direction of schematic standard types that radically reduced the range of applicable architectural means. The drama brought about by this process, however, forms the subject of another study.

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NOTES POZNÁMKY

1 About the history of IPARTERV: LUX, László – HARSÁNYI, István – TAKÁCS, Gyula – ALMSTAIER, Ottó: Az Iparterv 40 éve. MÉI, 12, 1988, pp. 538 – 588; BOROSTYÁNKŐI, Mátyás – BARNA, Krisztina: IPARTERV. In: SCHÉRY, Gábor ed.: A magyar tervezőirodák története. Budapest, Építésügyi Tájékoztatási Központ Kft. 2001, pp. 149 – 166; HABA, Péter: Zur Geschichte des IPARTERV. In: PETER, Markus – MÄRKLI, Peter et al. eds.: Architektur und Konstruktion 4: Technik & Systeme. Zürich, ETH – Eidgenössische Technische Hochschule 2013, pp. 87 – 89.

2 According to historian Ignác Romsics, the first period of the Kádár regime "was characterised by the bloody retribution against the revolutionaries, the restoration of the institutional system of the dictatorship, the solidification of Kádár's personal power, and, finally, the securing of international recognition for the new system." Romsics adds that "in order to achieve a more balanced [economic] growth and to win the trust of the population (…) he did not demand the population to make sacrifices, as Rákosi had, but (…) promised them prosperity and a high standard of living." – ROMSICS, Ignác: Magyarország története a XX. században. Budapest, Osiris Kiadó 2000, p. 399, 423. About the characteristics of the first decades of the Kádár era and issues of periodicisation, see: RAINER, M. János: The Sixties in Hungary – some historical and political approaches. In: RAINER, M. János – PÉTERI, György eds.: Muddling Through in the Long 1960s. Ideas and Everyday Life in High Politics and the Lower Classes of Communist Hungary. 1956 Institu-

te – Program on East European Cultures and Societies, Budapest, Trondheim 2005. pp. 4 – 26.

3 PETŐ, Iván – SZAKÁCS, Sándor: A hazai gazdaság négy évtizedének története 1945 – 1985. Budapest, Közgazdasági és Jogi Könyvkiadó 1985, pp. 369 – 376, 531 – 534.

4 About the introduction and development of on-site precasting: TAKÁCS, Gyula: A helyszíni vasbeton előregyártás. In: SZABÓ, János ed.: Nagyipari létesítmények 1945 – 1975. Budapest, Műszaki Könyvkiadó 1975, pp. 192 – 224.

5 Typical examples of this view: ARATÓ, Béla: Az üzemi előregyártás kérdéseiről. ÉÉ, 7 – 8, 1951, pp. 409 – 412; KORDIK, László: Az építőipari előregyártás fejlesztésének néhány kérdése. MÉI, 6, 1952, pp. 323 – 331.

6 Among others, this view is shared by: SZENDRŐI, Jenő: Az ipari épülettervezés fejlődése 1951-ben. MÉI, 1, 1952, p. 74; KISS, Ferenc: Ipari épülettipizálás. MÉI, 3, 1952, p. 253; RADOS, Kornél ed.: Ipartelepek építészete I. Budapest, Akadémiai Kiadó 1956, p. 228; SZENDRŐI, Jenő: Ipari épülettervezés sajátosságai. IÉSz, 20, 1961, p. 7; BENKŐ, Péter – WEISZ, Gyula: Műszaki fejlesztés a tervezés területén. MÉI, 12, 1953, pp. 374 – 375.

7 The most effective example of this rhetoric: LÉVAI, Andor: Ipari épületek a három- és ötéves tervben. ÉÉ, 1, 1949, pp. 24 – 35.

8 This system harmonised the planning processes, structural schemes, and implementation procedures: PÁSZTI, Károly: Nagyméretű elemekből előregyártott csarnokrendszerek és ezek térhatároló szerkezetei. Budapest, Mérnöki Továbbképző Intézet 1954. László Mokk contributed to the elaboration of the system with his knowledge as a civil engineer. He discusses the various Western European methods of on-site precasting in: MOKK, László: Bauen mit Stahlbetonfertigteilen – Hallen-Industriebauten. Budapest, Verlag für Bauwesen, Berlin – Ungarischer Verlag für Technik und Verlag der Ungarischen Akademie der Wissenschaften 1960.

9 About this, see: HABA, Péter: Reakciók a szocreálra. Forma és ideológia a magyar ipari építészetben 1950 és 1956 között. Építés- Építészettudomány, 3 – 4, 2012, pp. 331 – 363; HABA, Péter: Expression of energy – The architecture of power stations in Hungary between 1945 and 1970 Part I. Periodica Polytechnica Architecture, 1, 2012, pp. 24 – 29. http://www.pp.bme.hu/ar/article/view/7157/6391

10 The buildings are discussed in: La préfabrication lourde appliquée aux constructions industrielles en Hongrie. L'Architecture d'aujourd'hui, 83, 1959, pp. 92 – 97; MOKK, László: 1960, ibid, pp. 304, 327, 332.

11 For more details about this, see the last subchapter.

12 The buildings are discussed in: La préfabrication…, ibid, pp. 95, 93; MOKK, László: 1960, ibid, pp. 362 – 365. For the differences between the company's two groups: PÁSZTI, Károly: 1954, ibid, pp. 5 – 6.

13 From the mid-1950s, the industrial architectural publications repeatedly called attention to the practice of on-site precasting being in need of revision: MENYHÁRD, István: Reflexiók ipari és mezőgazdasági épületek üzemi előregyártásának kérdéséhez. MÉI, 9, 1955, pp. 406 – 407; BENKŐ, Péter: Műszaki fejlesztés az ipari és mezőgazdasági épülettervezés terén. MÉI, 9, 1955, pp. 500 – 511; KATONA, József: Vb. előregyártás a szovjet ipari építészetben. MÉI, 4, 1959, pp. 243 – 244.

14 A reference to this generally held view in: SZENDRŐI, Jenő: Ipari épülettervezés sajátosságai. IÉSz, 20 (1961), p. 11; RUZICSKA, Béla: Hazai alkotások és létrejöttük körülményei. MÉI, 3, 1964, pp. 157 – 159.

15 RUZICSKA, Béla: 1964, ibid, p. 159; RUZICSKA, Béla: Az ipari építészet teherviselő és térlezáró szerkezeteinek fejlődése Magyarországon. IÉSz, 25, 1969, pp. 78 – 80.

16 RUZICSKA, Béla: 1964, ibid, p. 159. The statement of the commission that set the directions for engineering development in industrial architecture is summed up in: KATONA, József: A magyar ipari építészet fejlesztésének lehetőségei. IÉSz, 16, 1957, pp. 1 – 18.

17 EGYED, Ferenc: Thoughts on 15 Years Planning Hungarian Industrial Structures. MÉM, 2, 1964, p. 66.

18 SZENDRŐI, Jenő: Vasbeton előregyártás a fejlődésben lévő országokban. IÉSz 22, 1963, p. 2; EGYED, Ferenc: ibid, pp. 64 – 65; RUZICSKA, Béla: 1969,

ibid, p. 79.

19 MENYHÁRD, István: 1955, ibid, p. 407.

20 RUZICSKA, Béla: 1964, ibid, p. 157.

21 KATONA, József: 1959, ibid, pp. 243 – 244.

22 The building is discussed in: La préfabrication…, ibid, p. 92; PÁSZTI, Károly: Pécsújhelyi erőmű üzemi épülete. IÉSz, 17, 1959, pp. 36 – 48; HLAVÁČEK, Emil: Průmyslová architectura v Maďarsku. Architektura ČSSR, 3, 1964, p. 204.

23 The building is discussed in: Strohzellulozefabrik in Dunaújváros. Die Baumeister, 2, 1964, p. 116.

24 PÁSZTOR, Viktor: Dunai Vasmű meleghengerműve. IÉSz, 20, 1960, pp. 1 – 10.; P.V.: Dunai Vasmű Hideghengerműve. MÉM, 2, 1964, pp. 50 – 52.

25 MENYHÁRD, István – SEMSEY, Lajos: A Csepeli Csőgyár hegesztőcsarnoka. MÉI, 4, 1962, pp. 156 – 159; SEMSEY, Lajos: Csepeli csőhegesztőmű csarnoka. IÉSz, 22, 1964, pp. 50 – 54.

26 HORVÁTH, Csongor: Héjszerkezetű shed-csarnok. MÉI, 10, 1963, pp. 453 – 457.

27 PÁSZTI, Károly: Kábel- és Sodronykötélgyár új üzemi csarnoka. IÉSz, 20, 1961, pp. 55 – 60.

28 This development is indicated by many monumental summary volumes published at that time. About concrete structures: Jürgen Joedicke: Schalenbau: Konstruktion und Gestaltung. Karl Krämer Verlag, Stuttgart 1962; about metal structures: Zygmunt Stanislaw Makowski: A survey of recent three-dimensional structures. Architectural Design, 1, 1966, pp. 10 – 41.

29 SZÍJÁRTÓ, Lajos építésügyi miniszter beszámolója az Országos Építésügyi Tanácskozáson. MÉI, 5 – 6, 1955, pp. 198 – 199; SZÍJÁRTÓ, Lajos: Építőiparunk 10 éves fejlődése. MÉI, 7, 1955, p. 283.

30 A Szovjetunió Kommunista Pártjának Központi Bizottsága és a Szovjetunió Minisztertanácsa határozata az előregyártott ipari vasbeton szerkezetek és elemek termelésének fejlesztéséről. MÉI, 9, 1954, pp. 365 – 369. Several highly respected engineers supported the cause, arguing that more focus must be placed on factory production and not on the enlargement and development of on-site precasting: MENYHÁRD, István: 1955, ibid; BENKŐ, Péter: 1955, ibid; VALKÓ, Ödön: Ipari épületszerkezetek előregyártása. IÉSz, 15, 1957, pp. 1 – 10. The necessity of a 'soviet type' change in the building industry was emphasised by the professional press for years: PATARICZA, Imre: Vasbetonelemek előregyártása a Szovjetunióban. MÉI, 3, 1959, pp. 188 – 189; KATONA, József: 1959, ibid, pp. 238 – 244.

31 For the congress in Berlin: PATARICZA, Imre: A típustervezés helyzete az NDK-ban. MÉI, 7 – 8, 1957, pp. 286 – 287. About the congress in Dresden: Dr. GYENGŐ, Tibor – SEBESTYÉN, Gyula: II. Vasbeton előregyártási Kongresszus. MÉI, 7 – 8, 1957, pp. 275 – 277.

32 For the developments in the GDR: RADOS, Kornél: 1956, ibid, pp. 240 – 241; PATARICZA, Imre: 1957, ibid, pp. 286 – 287. About the developments in Czechoslovakia: RADOS, Kornél: 1956, ibid, pp. 241 – 247.

33 For the standardized industrial structures in the GDR: PATARICZA, Imre: 1957, ibid, pp. 286 – 287; RADOS, Kornél: 1956, ibid, pp. 240 – 241. For the standardized industrial structures in Czechoslovakia: GERSA, Jiři: Stanovení hlavních směrů hospodárné typisace a normalisace u průmyslových staveb. Architektúra ČSSR, 7, 1958, pp. 718 – 724; PETRAŠ, A. – FERSÍK, F.: Vyhodnocení 'srovnání schválených typových podkladů průmyslových hal s halami dosud prováděnými. Architektúra ČSSR, 4, 1960, pp. 272 – 277; ZENTAI, Zoltán: Többcélú ipari típusépületek Csehszlovákiában. MT, 4, 1962, pp. 30 – 31; RADOS, Kornél: 1956, ibid, pp. 241 – 247. For the developments in Poland: ZENTAI, Zoltán – SZIJJÁRTÓ, Imre: A lengyel építőipar legújabb fejleményeinek egyes kérdései (ipari építés – lakásépítés). MÉI, 5, 1960, pp. 193 – 204.

34 For Soviet standardisation and prefabrication practices: PATARICZA, Imre: 1959, ibid; KATONA, József: 1959, ibid; RADOS, Kornél: 1956, ibid, pp. 230 – 239.

35 The first multifunctional hall systems in Hungary were developed by Zoltán Zentai and his colleagues. On this topic, see: VALKÓ, Ödön: Ipari épületszerkezetek előregyártása. IÉSz, 15, 1957, p. 2; ZENTAI, Zoltán: Üzemben

előregyártott mezőgazdasági épületek. IÉSz, 15, 1957, pp. 31 – 39; ZENTAI Zoltán: Ipari épületek tipizálása (raktárak, műhelyek). IÉSz, 19, 1960, pp. 75 – 80.

36 PETŐ, Iván – SZAKÁCS, Sándor: ibid, pp. 377 – 387.

37 The presentations held at the conference were published in issue 20 of IÉSz, 1961.

38 This standard structure is discussed in: SZENDRŐI, Jenő: 1961, ibid, p. 6; BAJNAY, László – SZENDRŐI, Jenő: Ipari építészeti típustervek. MÉI, 8, 1961, pp. 353 – 354; HLAVÁČEK, Emil: ibid, 195; Univerzális daruzatlan üzemi épület (pillérállás 9x9 méter). Tervezési tájékoztató – IPARTERV. 1961.

39 Issues related to universal standard halls, beyond considerations of structural engineering, are discussed in: BÖHÖNYEY, János: A tipizálás kérdései. MÉI, 4, 1961, pp. 145 – 156; ARNÓTH, Lajos: Az automatizálás és az ipari építészet. MÉI, 10, 1968, pp. 612 – 617; ARNÓTH, Lajos: Ipari épületek. In: SZENDRŐI, Jenő ed.: Magyar építészet 1945 – 1970. Corvina Kiadó, Budapest 1972, pp. 156 – 160. For the theoretical issues of standarisation in Hungarian industrial architecture: SIMON, Mariann: Korszerűbb és takarékosabb tervmegoldások. A hazai ipari építészet és a tipizálás 1961 – 1965. Építés-Építészettudomány, 3 – 4, 2012, pp. 313 – 330.

40 The complex in Szekszárd is discussed in: HLAVÁČEK, Emil: ibid, 194. The breakthrough is indicated by the increasing numbers of new standardized structures and their large-scale application from the mid-1960s: ZENTAI, Zoltán: Ipari építés. In: KATONA, József ed.: Építésiparosítás, műszaki tervezés, tipizálás. Budapest, Típustervező Intézet 1969, pp. 151 – 167; KATONA, József: Az ipari szerkezetfejlesztés 20 éve. MÉI, 4, 1969, pp. 205 – 211; BAJNAY, László: Tipizált vasbeton szerkezetek tömeges üzemi gyártása. In: SZABÓ, János: ibid, pp. 256 – 270.

41 For the practice of on-site standardisation in general, see: SZENDRŐI, Jenő: 1961, ibid, pp. 7 – 8; RUZICSKA, Béla: 1964, ibid, pp. 159 – 160; TAKÁCS, Gyula: A segédüzemi vasbeton előregyártás. In: SZABÓ, János: ibid, pp. 225 – 255.

42 The building complex is discussed in: BAJNAY, László: Tiszavidéki Vegyi Kombinát. Nitrogén-műtrágyagyár. IÉSz, 18, 1960, pp. 11 – 26; B. L.: Tisza Integrated Chemical Works (TVK) Nitrogen Fertilizer Factory. MÉM, 2, 1964, pp. 9 – 15; Verwaltung und Labor der Tisza-Werke, Ungarn. Der Baumeister, 11, 1964, pp. 1249 – 1251; HLAVÁČEK, Emil: ibid, pp. 195 – 197.

43 A characteristic example of this in Hungary is the Borsodi Vegyi Kombinát [Borsod Chemical Works], built in 1950 – 1955: SZÉKELY-KOVÁCS, Ferenc: Borsodi Vegyikombinát. MÉM, 11 – 12, 1955, p. 323.

44 FARKAS, Ipoly – MENYHÁRD, István: Székesfehérvári új alumíniumöntöde és présmű. IÉSz, 18, 1960, pp. 1 – 10; HLAVÁČEK, Emil: ibid, pp. 197 – 199.

45 P. K. (PÁSZTI, Károly): Gázszilikátgyár, Berente. MÉM, 2, 1964, pp. 56 – 57; PÁSZTI, Károly: Berentei gázszilikát-gyár. MT, 4, 1963, pp. 14 – 17.

46 PÉRY, Vilmos: Az Orosházi Üveggyár szerkezeti tervezésének néhány kérdése. MT, 10, 1962, pp. 33 – 36.

47 Ibid, p. 36.

48 PETRÓ, Bálint – OTTMÁR, Béla: A „kompakt” építési mód az NDK-ban. MÉI, 8, 1964, pp. 459 – 464.

49 In the period around 1958 – 1962, Népszabadság [People’s Freedom], the daily paper of the Hungarian Socialist Workers’ Party, published a series of spectacular photographs showing the new factories accompanied by texts full of the slogans of the era’s socialist techno-optimism.

50 The most important articles and book excerpts: La préfabrication…, ibid, pp. 92 – 97; MOKK, László: 1960, ibid; KIDDER SMITH, George Everard: The New Architecture of Europe. New York, The World Publishing Company 1961, 332; HENN, Walter: Industriebau. Band 3: Internationale Beispiele. München, Verlag Georg DW. Callwey 1962, pp. 36, 52, 350; Towers of Pharmacy. Architectural Review, 5, 1963, p. 381; Hungarian Industrial. Architectural Review, 4, 1963, p. 306; PETERS, Paulhans: Über Architektur und Architekten in Ungarn. Die Baumeister, 2, 1964, pp. 101 – 140; MAKOWSKI, Stanislaw: ibid; BANHAM, Reyner: The Architecture of the Well-Tempered Environment. London, The Architectural Press 1969, pp. 254 – 255.

51 Some of the most important publications relating to this: MAJOR, Máté: Építészetünk helyzetéről. Csillag, 10, 1956, pp. 779 – 794; MAJOR, Máté: A „szép” és a „művészi” mai építészetünkben. Magyar Tudomány, 3, 1961, pp. 607 – 621; MAJOR, Máté: Matter and Form in Hungarian Industrial Architecture. The New Hungarian Quarterly, 7, 1962, pp. 115 – 127; GRANASZTÓI, Pál: Húsz év magyar építészete. Magyar Nemzet 21. March 1965; NAGY, Elemér: Ipari építészetünk – építészetünk. Magyar Építőipar, 6, 1965, pp. 336 – 338. After some time, this narrative influenced the thinking of Hungarian architectural historians, and appeared even in the most up-to-date comprehensive studies.

52 MAJOR, Máté: 1956, ibid, p. 785; MAJOR, Máté: 1961, ibid, p. 616; MAJOR, Máté: 1962, ibid, pp. 115 – 127.

53 MAJOR, Máté: Építészet és társadalom. In: A Magyar Építőművészek Szövetsége (MÉSZ) jubileumi közgyűlése 1961. Budapest, MÉSZ 1961, p. 78.

ABBREVIATIONS:

ÉÉ – Építés-Építészet (Building-Architecture)

IÉSz – Ipari Építészeti Szemle (Industrial Architectural Review)

MÉI – Magyar Építőipar (Hungarian Building Industry)

MÉM – Magyar Építőművészet (Hungarian Architecture)

MT – Műszaki Tervezés (Civil Engineering)