

Mostovi Slovenije / *Bridges of Slovenia*

Uvodnik / *Introduction*

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Mostovi so za slovensko arhitekturno stroko izjemno pomembna tema. Slovenski načrtovalci se že od nekdaj (in tudi danes) kot graditelji mostov merijo s samim svetovnim vrhom. Morda ne toliko po razponih in spektakularnosti, pač pa predvsem po tisti posebni občutljivi pripovednosti, poetičnosti in arhitekturni zasnovanosti, ki jo most gradi s prostorom, pokrajino ali z mestom, kamor je umeščen.

Most je naloga, ki nekako štrli ven iz običajnega arhitekturnega repertoarja. Nima notranjega prostora, doživljamo ga drugače kot hišo, pa tudi drugače kot »običajne« ureditve ali urbanizem. Je eminentna načrtovalska naloga, v kateri se lahko arhitekturni principi, kreativnost in doslednost udejanjijo v polnosti, kot pri nobeni drugi. Čeprav je v osnovi skrajno utilitarna naloga, se Vitruvijeva triada *Utilitas, Firmitas in Venustas*¹ pri njej izrazi v kar najbolj čisti obliki. Nič se ne da blefirati; most, ko je zgrajen, pač enostavno je. Ni zgolj tehnični element, infrastruktura, ki preko reke poveže dva bregova. Je tudi javni spomenik, simbol v prostoru, puščica, ki se pne preko vode. Zato ima poleg funkcionalnega tudi velik simbolni pomen. Z njim se prostora obeh bregov zgotovita, združita in povežeta. O tej posebni vlogi mostu v prostoru je pred mnogimi leti v AB-ju natančno pisal Dušan Pirjevec:

»Pod mostom ne teče le reka, izpod njegovih širokih lokov teče in se razliva ves ta "prisojni in krotki prostor", tj. celotna plodonosna in udomačena pokrajina z mestom, naselji, s polji in z gozdovi, a tudi z nebom nad njimi. Gre za ploden in udomačen prostor, tj. mesto, kjer ima človek svoj dom in svoj rajstni kraj. Ta prostor je zemlja in nebo nad njo, vznika iz mostu in ni torej kratko in malo zgolj neka pokrajina, del neke livade, preval nekega hriba ali katerikoli kos neba. Zemlja in nebo postaneta prostor šele, ko se tu naseli človek, in kot prostor izvira iz mostu. Iz mostu izvira prostor, na katerem se je človek ravnokar naselil, izvira mesto, kjer se nato lahko vzpostavijo določeni odnosi med ljudmi in nastane določena zgodovinska človeška skupnost. Več kot očitno je, da to ni navaden most, niti kakšna "lesena gradnja brez lepote, brez zgodovine in brez drugega smisla, kakor da služi meščanom in njihovi živini za prehod". Ta kamniti most ni zgolj most in ni namenjen zgolj za nekakšne prehode in komuniciranje, temveč je lepota in zgodovina. Ravno zato je most ne le podoba življenja, temveč podoba same trajnosti življenja: "da je življenje nedoumljiv čudež, saj se neprenehoma troši in osipa, vendar traja in stoji čvrsto kot most na Drini".«²

Sloviti višegrajski most na Drini, ki ga je dal zgraditi veliki vezir Mehmed paša Sokolović, je bil dokončan leta 1577. Kamniti most, dolg 180 m, je zasnoval najpomembnejši turški arhitekt Sinan, sodobnik in sopotnik italijanske renesanse, s katero lahko primerjamo njegova dela. Sinan je preko skupnega prijatelja Marcantonia Barbara vzpostavil stik z beneškim arhitektom Andreo Palladijem,³ ki je v svojem traktatu v besedi in z načrti natančno obdelal projekte za mostove iz kamna in lesa, po lastni zamisli in po obstoječih rimskih in kasnejših mostovih. Opisuje tudi znameniti Trajanov most preko Donave, o katerem pravi, da še stojijo oporniki sredi reke.⁴

Zanimivo je, da je nekaj desetletij prej, leta 1502, sultan Bajazit II. naročil projekt za kamniti most preko Zlatega Roga v Istanbulu samemu Leonardu da Vinci. Leonardov načrt je predvidel elegantni kamniti lok z razponom 230 m, stanjšan na temenu in razširjen proti bregovoma, kjer se je organsko zlil s kopnim. Most je bil pravi inženirski in oblikovni dragulj, tako da še danes živijo pobude, da bi ga uresničili. Še pred Leonardom je o mostovih pisal prvi moderni arhitekturni teoretik Alberti:⁵ most je opisal kot zelo pomemben del ceste in mesta, ki zahteva natančno in trajno gradnjo, pa naj bo kamnit ali lesen.

V Šibeniku rojeni klerik, inženir, inovator in učenjak Faust Vrančič⁶ je v svoji knjigi leta 1616 objavil sedem različnih tipov premoščanja razponov za mostove. Prvi je predlagal viseči most z železnimi kabli. Posebnost Vrančiča je, da ni

bil arhitekt, pač pa predvsem inženir. Tudi sicer so bili graditelji mostov izvedeni v inženirstvu, a povečini po osnovnem poklicu arhitekti – od velikih konstruktorjev rimskih akveduktov, gotških katedral, prek renesančnih »polihistorjev«, graditeljev kupol, kot so Brunelleschi, Michelangelo, Wren, ... vse do danes.

Ločitev med obliko in statiko se prične čutiti v delu arhitektov konstruktorjev, kot je npr. Jacques Germain Soufflot,⁷ v drugi polovici 18. stoletja. Inženir konstruktor postane samostojen poklic. 19. stoletje prinese vzpon velikih inženirjev: Eiffla (ki je bil tudi arhitekt), Paxtona in drugih. Gradili so jeklene viadukte, železniške mostove, obvladovali so velike razpone. A sprejem novega je bil težak. William Morris⁸ je o mostu Forth, enem največjih dosežkov mostogradnje 19. stoletja, zapisal:

»Nikoli ne bo arhitekture iz železa, saj je bil vsak naslednji napredek v inženirstvu vse grši in grši, dokler ni dosegel najvišje stopnje grdote pri železniškem mostu Forth.«

Benjamin Baker, načrtovalec mostu Forth, mu je odgovoril:

»[Dvomim], da ima gospod Morris najmanjše poznavanje lastnosti, ki jih mora imeti tako velika struktura, in zato ne more presoditi, kako jo dojemajo tisti, ki imajo potrebno znanje, saj le ti lahko cenijo smeri prenašanja sil in člene, ki te sile prevzemajo ... Nemogoče je za kogarkoli, da avtoritativno odloči o lepoti objekta, ne da bi poznal njegovo funkcijo ...«

Dialektika med estetskim izrazom in konstrukcijo je postopoma prerasla v nasprotje med konstruktorji in arhitekti. Akademski in historicistični pristop je videl arhitektovo vlogo v krašenju, monumentaliziranju in kontekstualiziranju inženirske (tehnično in strukturno logične) konstrukcije, ki jo zasnuje konstruktor.

Eifflov stolp je kot moderen električni pylon banalen; svoj končni ornamentiran izraz je dobil šele potem, ko je arhitekt Sauvestre dodal čipkaste okrase. V 20. stoletju so si pričeli arhitekti sposojati od inženirjev, torej tistih, ki so v 19. stoletju zasedli njihov prestol.⁹

Tekmovalni odnos med inženirji in arhitekti, ki je pogosto prerasel v pristojnostni spor, pa seveda še zdaleč ni bil razrešen. Splošno je znano, da je na moderno arhitekturo močno vplivala estetika inženirskih konstrukcij. Arhitekti zgodnjega modernizma so odkrili imanentno sodobnost in lepoto inženirskih struktur kot del napredka, izraza časa in modernega sveta. Zavrnilo so vlogo krasilca in na neki način obrnili sliko: na lepem so oni tisti, ki so bolj eksperimentalni, drzni in inovativni kot gradbeniki, predvsem pa imajo prednost večje širine. A dihotomija je ostala, in postala tudi tema za šale.

Ko spremljamo zabavno polemiko med gradbeniškim pogledom ing. Pržulja, ki vidi arhitekta kot »nujno zlo«, in elokventnim odgovorom prof. Vogelnika v naslednji številki, je jasno, da je to spopad za polje, ki ni last ne enega ne drugega.¹⁰

Pri mostovih sta si arhitekt in inženir najbližje. Pogosto sta združena v eni osebi, npr. v zgodovini pri da Vinciju, Sinanu in Palladiu, pa pri Schinklu ali danes pri Santiagu Calatravi, Normanu Fosterju in mnogih drugih. Pogosto gre za inženirja z arhitekturnim talentom in znanjem, kot pri britancu Ove Arupu in Švicarjih Robertu Maillartu, Christianu Mennu in Jürgu Conzettu, ali pa za arhitekta z dodatnim konstrukcijskim študijem in znanjem. V času timskega dela pa sta seveda nujna specializacija in kreativno dopolnjevanje. Ko se soočita figurativno in konstruktivno razmišljanje, ni nujno, da se najdetta na različnih bregovih – oba sta lahko tektonsko upravičena. Včasih je statičen kompromis osnova za arhitekturni ali spomeniški učinek. Most Ada v Beogradu bi verjetno lahko naredili bistveno ceneje z drugačno tehnologijo, vsekakor pa bi lahko izpustili konico, ki je nad prijemališčem kablov. Pa bi v tem primeru most lahko enako uspešno odigral vlogo nove ikone Beograda?

Kot pri arhitekturi nasploh, je pri mostovih še posebej prisotna osnovna tektonska delitev na okvirno konstrukcijo iz elementov, ki prenesejo tudi natezne sile, ter na konstrukcijo, zasnovane tako, da so v njej prisotne le tlačne sile – sestavljena je iz lokov in obokov, v katere so zloženi »zidaki«, majhni elementi, kamni, opeka ... Oba principa sta lahko izražena s klasičnim arhitekturnim jezikom, arhetipskimi oblikami, loki in oboki, rustiko, arhitekturnimi členi in ornamentali ali pa brez njih, kot gola konstrukcija brez retorike. Zgodovinsko je oblikovanje estetike velikokrat sledilo konstrukcijski logiki nekega materiala tudi po tem, ko ga je zamenjal nov. Prvi litoželezni most v angleškem Coalbrookdalu¹¹ je tako imel ločno obliko, ki je posnemala kamniti lok. Tudi betonski mostovi s klasično tektonsko skladnjo velikokrat uporabijo semperjanski *Materialwechsel* – kamnite oblike izvedejo v betonu, včasih celo z dodano kamnito oblogo.

Princip povzemanja oblike se prenaša od lesa v kamen, od kamna v beton, od lesa v lito železo in jeklo.

Zgodovina mostov je dvoumna, tako kot vsaka zgodovina, ki obravnava triumfalne in izjemne dosežke. V letih po 2. vojni so naročniki in gradbinci začeli preveč častiti lažne bogove ekonomije in je bila arhitekturna vloga mostov velikokrat potisnjena v ozadje. Če so v preteklosti rečnim bogovom ob gradnji žrtvovali dragocenosti in darove vgradili v temelje mostov, se v zadnjem času zdi, da je velikokrat edini cilj zgraditi premostitveni objekt s povsem minimalnimi stroški, medtem ko so vprašanja pomena, estetike in okolja pozabljena.

Kljub temu pa nas tudi dandanes osupne odličnost v oblikovanju mostov, predvsem v primerih, ko imajo arhitekti pri sodelovanju s konstrukcijskimi inženirji več kot le obrobno vlogo. Viadukt Črni Kal je zmaga človeka nad naravno topografijo. Čeprav je arhitekt formalno v ozadju, je njegova vloga odločilna.¹² Drug primer so mostovi, ki delujejo kot urbane skulpture in ki v mestu dobijo status civilne ikone. Pri teh je velikokrat upravičena odločitev, da most bodisi konstrukcijsko bodisi cenovno zavestno ni minimaliziran, da bi lahko izpolnil to svojo simbolno vlogo. To pa konstruktorji težko razumejo, saj jim npr. povečanje dimenzij ali cene zaradi estetskega učinka predstavlja enega od naglavnih grehov.

Tudi zaznavanje je drugačno kot pri drugih arhitekturnih nalogah. Mostovi včasih dosegajo meje izvedljivosti, kar jim daje očarljivost, in samoumevnost, da postanejo del topografije. Most se v okolje vključuje naravno, kot gotška katedrala v srednjeveško mesto.

Umeščanje v pokrajino se po eni strani dogaja na ravni krajinske povezanosti, za poglede »od zunaj«. Most, zlasti viadukt, uokvirja pogled na pokrajino. Je monumentaliziranje pokrajine, ko je pogled uokvirjen z ritmom stebrov. Silhete mostov so sodobni slavoloki, simbolne oblike z veliko močjo, ki jim jo daje predvsem njihova velikokrat izjemna velikost. Pri umeščanju ima pomembno vlogo premišljena igra topografije, geologije, kompozicije, skladnih linij, statike in gradnje. Most je večna igra merila in proporcev, mase in lahkotnosti, konstrukcije in preciznosti izvedbe in detajlov. Za doživljanje mostov so pomembna tudi občutja ljudi ob prehodu in ob pogledu nanj, pa spomini, čustva in primerjave. Gre za izmenjavo med zunanjo podobo in notranjo sliko.

Drugačen je dinamični pogled uporabnika cestnih in avtocestnih mostov iz avtomobila. Tu odigra največjo vlogo hitrost. Cesta je linearna arhitekturna promenada v velikem merilu. Doživetje pokrajine z mosta je režirano s potjo (časom) in hitrostjo. Paralaktični učinek približevanja, obkrožanja, zaporednih odpiranj, ritmičnih sekvenc, kadriranj in odmikanj oblikuje spektakularno doživetje vožnje. Prevladuje perspektivno doživljanje umestitve očesa gledalca v hitro bližajoči se prostor ceste, ko dojemamo razcep–prihod do tunela–viadukt kot stalno se odpirajoče in spet izginjajoče zaporedje dražljajev. Avtocesta je *Gesamtkunstwerk*. Viadukti so *grand projects*, ki prepričajo s širokopoteznostjo, z zamisljivo, v razponih, v merilu. Primerljivi so z rimskimi akvedukti, z gotskimi katedralami, s piramidami.

Postavitev mostu kot zastopnika »lepote in zgodovine« v naravni prostor je pomenila udomačitev divjine, podobno kot pri grškem templju. To, utemeljitveno vlogo mostu je v Ljubljani znotraj svojih mestnih ureditev uprizorjal Plečnik. Vsi njegovi ljubljanski mostovi so nekaj posebnega, saj vsak presega zgolj svojo osnovno namembnost.¹³ Od Plečnika, ki je prvi most zasnoval kot nekakšen tempelj nad reko, drugega kot zeleno potezo preko vode, tretjega spet kot nadaljevanje trga preko reke, se je nabor zamislil do danes še razširil. Na enem koncu pahljače je most kot utilitarni infrastrukturni objekt, na drugi pa most kot ikona na različnih ravneh, včasih celo kot ikona velikega mesta ali cele države.¹⁴

Mostovi tako utelešajo kolektivno naravo in politično moč naročnika (mesto, država, pomembne institucije ...). Leta 1985 je izšla tematska številka revije, ki jo imate v rokah: *Reka in mesto*, v kateri so natančno obravnavani ljubljanski

mostovi in ureditve (s poudarkom na Plečnikovih). Prispevki v njej se zavzemajo za prepoznanje izjemnega pomena oz. potenciala Ljubljaničev ter njenih mostov za mesto, češ da je skrit, neizkoriščen, celo zanemarjen. Od takrat se je marsikaj spremenilo. Ljubljana se je ponovno obrnila k svoji reki in nastale so nove ureditve, ki so junija 2012 dobile prestižno evropsko nagrado za javni prostor.¹⁵

Sodobni ljubljanski mostovi (Mesarski most, Žitna brv, Fabianijev most, natečajna Ribja brv itn.) nadaljujejo urbani teater po zgledu Benetk. Nastajajo novi ritmi umeščanja vzdolž toka reke, ko se med kamnitim mostom in naslednjim betonskim doda jekleni most, ki lebdi med bregovoma. Nastane ansambel, kompozicija, ki vključuje širše elemente in ki s konstrukcijo in s tektoniko uprizarja simbolni ritual povezave med bregovi, reko, ljudmi.

V Sloveniji so prestižni mostovi že od nekdaj nastajali v skupinah, kot kaže tudi vsebina naše številke. Zrasli so ob posebnih okoliščinah, ob gradnji železnice, cest in avtocest, ob modernizaciji mest.

Že prastari prebivalci ljubljanskega barja, mostiščarji, so živeli na koliščih, ki so jih z bregovi povezovali mostovi. Ljubljansko barje s kolišči je od leta 2011 na seznamu Unescove svetovne kulturne dediščine, v sklopu prazgodovinskih kolišč okoli Alp. Od rimske mreže cest ni v Sloveniji ostal ohranjen noben most, čeprav bi lahko tvegali rekonstrukcijo mosta čez Savo pri Črnučah po analogiji s Trajanovimi lesenimi in kamnitimi mostovi na Donavi, katerih podoba je ohranjena na kovancih. Najslavnejši je kamniti most čez Donavo pri Klodovu (med Srbijo in Romunijo), za katerega je načrt naredil sam Apolodor iz Damaska. Most je imel 21 lokov po 35 m in bil dolg 1.000 m. Prvi ohranjeni mostovi so pri nas nastajali v srednjem veku. Povezani so s cestami in z mesti. Veliko mostov sega v Napoleonov čas, kar je odraz javne usmerjenosti francoske države.

Mesta ob rekah so s svojimi mostovi (in rekami) povezana eksistencialno. To se odraža v imenih: Most na Soči, Zidani Most ali pa Ljubljana, ki deli ime s svojo reko. Maribor je z reko razdeljen na polovici, ki ju povezujejo niti mostov. Ljubljana je drugačna; Ljubljana pomeni zgostitev v sklenjenem telesu mesta in vizualni koridor za njegovo doživljanje, ne prekinitve kot v Mariboru, na Ptujju, v Novem mestu ali v nekaterih drugih mestih.

V Mariboru je Stari most, pa tudi najstarejši, Železniški most, del historičnega, meščanskega Maribora, medtem ko je Titov most s svojo inovativno inženirsko konstrukcijo simbol socialističnega, delavskega, industrijskega Maribora. Posebej pomembni so pogledi na mestno fasado, možni le z mostov. Prihod v mesto preko mostu je arhetipska situacija, ko se iz Starega mostu odpre pogled na Lent in silhueto mesta s stolpi in z griči v zaledju. To je panorama z razglednic, prav tako kot pogled z Lenta na Stari most, ki se nadaljuje skozi loke na naslednji most ...

Mostovi so univerzalno pričevanje človeške kulture in njihova vloga je (poleg prehoda preko rek in dolin) tudi ta, da predstavljajo prehod med nizkimi in visokimi gradnjami, med tehniko in kulturo, med inženirstvom in arhitekturo – torej med konstrukcijsko logiko in oblikovalsko svobodo. Pregled slovenskih mostov je zato po eni strani emocionalna, po drugi pa ekonomska in tehnološka čitanka smernic razvoja znanosti in tehnike, stopnje javne zavesti, odnosa do urbanega prostora in narave, nenazadnje tudi pojmovanja lepote in pomena.

1 Vitruvij, *O arhitekturi* (De architectura), FA, 2010. Vitruvijev obširni traktat – nastal je v 1. stol. pr. n. št. – je edino ohranjeno antično besedilo, ki obravnava tedanjo tehniko in arhitekturo.

2 Dušan Pirjevec, *Pod mostom ...*(o Andričevem Mostu na Drini, Heideggro itd.), ab - arhitektov bilten 38, 1978.

3 Deborah Howard, *Venice and the East: The Impact of the Islamic World on Venetian Architecture* (1100-1500), Yale University Press, 2000.

4 Andrea Palladio, *I quattro libri dell'architettura*, Venezia, 1570.

5 Leon Battista Alberti, *De re aedificatoria* 1485 (1. izd.), *O arhitekturi*, (Ljubljana: Studia humanitatis, 2007).

6 Fausto Veranzio, *Machinae Novae*, Venezia, 1616.

7 Pri gradnji cerkve St. Genevieve v Parizu (Pantheon, 1757–1790), je arhitekt Jacques Germain Soufflot združil strukturno lahkotnost gotike s klasičnim jezikom grških templjev jo izvedel z inovativnim in ekonomičnim statičnim konceptom jeklenih vezi v kamniti konstrukciji.

8 William Morris, oblikovalec, umetnik in pisatelj (1834-1896).

9 Edwin Lutyens, *The material World*.

10 Dr. Miljenko Pržulj, *Mostovi – dosežki, kriteriji vrednotenja, avtorstvo*, 10. slovenski kongres o cestah in prometu, Portorož, 2010 in dr. Blaž Vogelc, *Snovanje sodobnih mostov in viaduktov*, Gradbeni vestnik, 2011.

11 Abraham Darby, litoželezni most v Coalbrookdale, 1795, razpon 30 m.

12 Janez Koželj, *Viadukt Črni kal*, ab - arhitektov bilten 195/196, 2012.

13 Andrej Hrauský, *Plečnikovi mostovi, Kako je Plečnik reko približal mestu*, ab - arhitektov bilten 195/196, 2012.

14 Take ikone so Gabrijelčičev most Ada v Beogradu, Koželjev viadukt Črni kal itd.

15 <http://publicspace.org/en/works/g072-preureditve-nabrezij-in-mostovi-na-ljubljani>

Bridges are a very important topic for the Slovene architectural profession. Even today, as they always have done, Slovene designers rank among the world-class bridge builders. Maybe not as much when it comes to span and spectacle, but mostly by that special sensitive narrativity, poetic, and architectural design which the bridge builds in connection with the space, the landscape, or the city in which it is sited.

The bridge is a task which doesn't quite fit into the standard architectural repertoire. It doesn't have an interior space, it is an experience different both to that of a house and of "common" interventions or urban design. It is an eminent design task in which - unlike in any other - architectural principles, creativity, and consistency may be realised to their fullest extent. In spite of being fundamentally a patently utilitarian task, it accommodates Vitruvius's triad of *Utilitas, Firmitas, and Venustas*¹ in the purest of forms. There is no room for bluff, a bridge, when it's built, just simply is. It's not merely a technical element, infrastructure connecting two watersides across a river. It is also a public monument, a symbol in the space, an arrow arching across the river. This is why beside its functional significance, it also has a major symbolic one. By means of a bridge, the spaces of either bank condense, join, and connect. Years ago, Dušan Pirjevec wrote in detail about this special role of a bridge in the space in *ab* magazine:

"It is not only the river which floats under a bridge, from under its wide arches flows and pours forth all this 'tame space on the sunny side', i.e. the entire fecund and domesticated landscape with the city, communities, fields, and forests, as well as the sky above them. This is a fertile and domesticated space, i.e. the place where one has their home and their birthplace. This space is the earth and the sky above it, it issues from the bridge and it cannot therefore be brushed aside as just some landscape, a part of a meadow, some hill pass, or just any piece of the sky. The earth and the sky become a space only when humans settle it, and as a space, they derive from the bridge. The bridge is from where arises the space which has just been settled by humans, whence arises the place where relationships between people may be established and where a historical human community may be created. It is more than obvious that this is no ordinary bridge, nor some 'timber construction holding no beauty, no history, and no other purpose than to provide passage for the townspeople and their livestock'. This stone bridge is not just a bridge and its purpose is not mere passage and communication, but beauty and history. It is precisely for this reason that a bridge is not just an image of life, but rather the image of the very life's perpetuity: "that life is an unfathomable miracle, always being spent and shed, and yet enduring and standing strong like the bridge on the Drina".¹²

The famed bridge on the Drina in Višegrad, commissioned by the Grand Vizier Sokollu Mehmed Pasha, was completed in 1577. The stone bridge, 180 metres in length, was designed by the most important Ottoman architect Sinan, a contemporary and fellow of the Italian Renaissance, to which his works may be compared to. Through their common friend Marcantonio Barbaro, Sinan established contact with Venetian architect Andrea Palladio,³ whose treatise describes and depicts in great detail projects for stone and timber bridges, based both on his own ideas, and existing Roman and later bridges. He also describes the famous Trajan's bridge over the Danube, saying that the piers still stand in the middle of the river.⁴

Interestingly, some decades earlier, in 1502, Sultan Bayezid II commissioned a project for a stone bridge over the Golden Horn in Istanbul with Leonardo da Vinci himself. Leonardo's plan envisaged an elegant stone arch with a span of 230 metres, narrowing at the crown and widening towards the banks, where it blended organically with the land. The bridge was a true masterpiece of engineering and design, and there are initiatives even today to realise it. Even before Leonardo, the first modern architectural theoretician Alberti⁵ wrote about bridges. He described the bridge as a very important part of the road and the city demanding exacting and durable construction, be it made of stone or of timber.

In his 1616 book, Šibenik-born cleric, engineer, innovator, and scholar Faust Vrančić⁶ published seven different types of bridging spans. He was the first to suggest the suspension bridge with iron cables. Notably, he wasn't an architect but chiefly an engineer. There had been bridge builders before him who were also versed in engineering, yet for the most part architects by their core profession - both great builders of Roman aqueducts, Gothic cathedrals, Renaissance "polymaths", dome builders, as well as Brunelleschi, Michelangelo, and Wren, and so on to present day.

The divorce between form and statics begins to be felt in the work of architects - constructors such as Jacques Germain Soufflot,⁷ in the 2nd half of the 18th century; engineer constructor became an independent profession. The 19th century brought the rise of great engineers, Eiffel (who was also an architect), Paxton, and others. They were building steel viaducts, railway bridges, overcom-

ing large spans. But the acceptance of the new was difficult. William Morris wrote about the Forth bridge, one of the greatest achievements in bridge-building of the 19th century: "There never will be an architecture in iron, every improvement in machinery being uglier and uglier, until they reach the supremest specimen of all ugliness - The Forth Bridge."⁸

Benjamin Baker, the designer of Forth Bridge, responded: "[I doubt] if Mr Morris had the faintest knowledge of the duties which the great structure had to perform, and he could not judge the impression it made on the minds of those who, having the knowledge, could appreciate the directions of the lines of stress and the fitness of the several members to resist the forces. [...] It was impossible for anyone to pronounce authoritatively on the beauty of an object without knowing its function. [...]"

The dialectics between the aesthetic expression and construction gradually grew into an opposition between constructors and architects. The academic and historicist approach saw the architect's role in ornamentation, monumentalisation, and contextualisation of the engineering (technically and structurally logical) construction, which is designed by a constructor. The Eiffel tower is banal as a modern electricity pylon; it received its final ornamented expression only when architect Sauvestre added lace decorations. In the 20th century architects, whom engineers dethroned in the 19th century, began to borrow from them.⁹

The competitive relationship between engineers and architects, which often grew into a dispute of competencies, was naturally nowhere near its resolution. It is common knowledge that architecture was greatly influenced by the aesthetic of engineering construction. The architects of early Modernism discovered the immanent contemporaneity and beauty of engineering structures as part of progress, expression of the times, and the modern world. They turned down the role of ornamentor and in a way reversed the situation: suddenly, they were the ones who were more experimental, daring, and innovative than civil engineers, the breadth of their knowledge acting as a key advantage. But the dichotomy remained and even became the stuff of jokes. As we follow the amusing polemic which developed in Slovenia between the civil engineering outlook of ing. Miljenko Pržulj, who sees the architect as a "necessary evil", and the eloquent response by prof. Blaž Vogeljik in the following issue, it is clear that the subject of the dispute is a field belonging to neither one or the other.¹⁰

Bridges bring the architect and the engineer closest together. They are often found in one person, such as historically in da Vinci, Sinan, and Palladio, in Schinkel, and today in Santiago Calatrava, Norman Foster, and many others. Often, we are talking about an engineer with architectural talent and expertise, such as Ove Arup, and Swiss Robert Maillart, Christian Menn, and Jürg Conzett, or about an architect with additional studies and knowledge in construction. In the era of team work, specialisation and creative complementation are naturally mandatory. When figurative and constructive thinking are confronted, they are not necessarily at loggerheads - they may both be tectonically justified. Sometimes, a statical compromise is the basis for an architectural or monumental effect. Ada bridge in Belgrade could probably be realised with considerably lower cost and different technology; the spire above the cable anchoring could certainly be omitted. But would the bridge still be able to perform its role as a new icon of Belgrade as successfully?

Like generally in architecture, bridges in particular feature the basic tectonic division into frame constructions from elements being able to withstand also tension forces on the one hand, and from "blocks", small elements, stones, bricks, which, laid into arches and vaults, form a construction designed so as to feature only compression forces on the other hand. Both principles may be expressed with classical architectural language, archetypal forms, arches and vaults, rustication, architectural parts, with ornaments, or without them, as a "naked" construction without a "rhetoric". Historically, the design of the aesthetic often followed the construction logic of a material even when the material had been replaced with a new one. The first cast-iron bridge in Coalbrookdale, England¹¹ thus had an arched form which imitated a stone arch. Concrete bridges with a classical tectonic syntax also often use Semperian *Materialwechsel* - stone forms are executed in concrete, sometimes even with added stone cladding. The principle of modelling the form is transferred from wood to stone, from stone to concrete, from wood to cast iron and steel.

The history of bridges is ambiguous like any history which deals with triumphal and exceptional achievements. In the years after World War 2, investors and constructors began to excessively worship the false gods of economy and the architectural role of bridges was often relegated to the background. While in the past, sacrifices of precious items were made to river gods during the construction, and there were offerings embedded into bridges' foundations, it seems that lately, the only goal has been to build a bridging structure at the ab-

solute minimum of cost with the questions of meaning, aesthetics, and environment forgotten.

Despite this fact, even in the present period, the excellence in designing bridges has not disappeared, least so in cases where architects' role in their collaboration with construction engineers is more than just marginal. Viaduct Črni kal is the triumph of man over natural topography. Though formally, the architect is in the background, their role is decisive.¹² Another example may be found in bridges which function as urban sculptures and which gain the status of a civic icon in a city. In such cases, the decision not to consciously minimise the bridge either in terms of construction or cost is often justified in order for it to fulfil its symbolic function. Constructors have a difficult time understanding this, however; for them, increasing the dimensions or the cost for aesthetic effect represents one of the cardinal sins.

The perception of a bridge is also different compared to other architectural tasks. Bridges sometimes touch upon the very limits of execution, which gives them fascination, as well as the naturalness required for them to become a part of the topography. A bridge integrates into the environment in a natural way, like a Gothic cathedral into a Mediaeval city. On the one hand, the siting into the landscape is done on the level of landscape connectedness, for views "from the outside". A bridge, and a viaduct especially, frames the view of the landscape. The landscape is monumentalised when the view is framed by the rhythm of the columns. The silhouettes of bridges are contemporary triumphal arches, symbolic forms with great power, which they derive primarily from their often exceptional size. Siting involves a carefully considered play of topography, geology, composition, harmonious lines, statics, and construction. A bridge is a perennial game of scale and proportions, mass and lightness, construction and precision of execution and detail. In the experience of a bridge, people's feelings when they cross and look at it, as well as the memories, emotions, and comparisons are all of significance. It is about the exchange between the external appearance and the internal image.

The dynamic view out of a car by the user of road- and motorway bridges is different. Here, it is speed that plays the biggest role. The road is a large-scale linear architectural promenade. The experience of the landscape from a bridge is directed by means of distance (time) and velocity. The parallax effect of approaching, enveloping, successions of opening, rhythmical sequences, image composition, and receding is what shapes the spectacular experience of driving on a motorway. What dominates is the perspectival experience of the placement of the spectator's eye into the rapidly approaching space of the road, when one experiences a fork, the approach to a tunnel, then a viaduct as a constantly opening and again disappearing sequence of sensations. A motorway is a Gesamtkunstwerk. Viaducts are grand projects which convince with their grandness of concept, spans, and scale. They are comparable to aqueducts from Roman times, Gothic cathedrals, pyramids.

The placement of a bridge as an exponent of "beauty and history" into the natural space meant the domestication of the wilderness, similarly to the way a Greek temple did. Through his city interventions, this justifying role of the bridge was performed in Ljubljana by Jože Plečnik. All the bridges which he designed in Ljubljana are something special, with each one of them transcending its mere basic function.¹³ From the times of Plečnik, who designed the first bridge as a sort of a temple above the river, the second as a green stroke over the water, the third again as a continuation of the square across the river, the repertoire of principles grew further to the present day. On one end of the cline, there is the bridge as a utilitarian infrastructural object, on the other, there is the bridge as an icon on different levels, sometimes even as an icon of a large city or the entire country.¹⁴

Bridges therefore embody the collective nature and political potential of the investor (city, state, important institutions, etc.). In 1985, a thematic issue of *ab* magazine entitled *The River and the City* was published. The issue contained a systematic treatment of interventions and bridges in Ljubljana with an emphasis on Plečnik's interventions. The issue features articles advocating the recognition of the immense significance and potential of the river Ljubljanica and its bridges for the city - a potential which was hidden, unharnessed, and even neglected. A lot has changed since then, Ljubljana has again turned toward its river, and there have been new interventions created which in June 2012 were awarded with the prestigious European Prize for Urban Public Space.¹⁵

The contemporary bridges of Ljubljana (Butcher's Bridge, Grain Footpath, Fabiani's Bridge, the competition for the new Fish Footpath, etc) take after Venice in their continuation of the urban theatre. New rhythms of siting along the course of the river are created when between a stone bridge and a concrete one that follows it, a steel bridge floating between the banks is added. An ensemble is created, a composition, which includes wider elements and which uses its

construction and tectonics to stage a symbolic ritual of the connection between the river banks, the river, and the people.

In Slovenia, prestigious bridges have always been created in groups, as shown by the contents of our issue. They were built on special occasions, during the construction of railways, during the construction of roads and motorways, and during the modernisation of cities and towns.

Already the ancient inhabitants of the Ljubljana Marshes, the pile-dwellers, lived in lake dwellings which were connected to the shore with bridges. From 2011, Ljubljana Marshes and its pile-dwelling communities is part of UNESCO world cultural heritage as part of Prehistoric pile dwellings around the Alps. No bridges which were part of the Roman road network have been preserved in Slovenia, though a reconstruction of the bridge of the Sava near Črnuče could be attempted using the analogy with Trajan's timber and stone bridges on the Danube, whose appearance is preserved on coins. The most famous is the stone bridge over the Danube near Kladovo between Serbia and Rumania, the plans for which were drafted by Apollodorus of Damascus himself. The bridge had 21 arches at 35 metres each, and measured 1000 metres in length. The first preserved bridges in the Slovene territory have been built in the Middle Ages. They are connected with roads and cities. Many bridges have been built in the times of Napoleon Bonaparte, which is a reflection of the public inclination of the French state.

Cities built by rivers are existentially connected with their bridges (and rivers). This is expressed in their names: Most na Soči ("Bridge on the Soča"), Zidani Most ("Masonry Bridge"), or Ljubljana, which shares its name with its river. Maribor is divided by the river into two halves which are connected by the threads of bridges. Ljubljana is different, Ljubljanica means a concentration in the contiguous body of the city and a visual corridor for the experience of the city, rather than a discontinuation as seen in Maribor, Ptuj, Novo mesto, or certain other cities.

In Maribor, Old Bridge, as well as the oldest one, Railway Bridge, are part of the historical, bourgeois Maribor, while Tito's Bridge with its innovative engineering construction is a symbol of the socialist, proletarian, industrial Maribor. Particularly important are the views of the city's facade, enabled by the views from the bridges. The entrance into the city across the bridge is an archetypal situation, when the view of Lent and of the silhouette of the city with the turrets and the hills in the hinterland opens from Old Bridge. This is a postcard panorama, just like the view from Lent of Old Bridge, which continues through the arches to the next bridge and so on.

Bridges are an universal testimonies of human culture and their role, besides the passage over rivers and valleys, is also that of representation of the transition between constructional engineering and structural engineering, between technology and culture, and between engineering and architecture - that is to say between the logic of the construction and the freedom of the design. The overview of Slovene bridges is therefore in one way an emotional, and in another an economic and technological textbook of the trends of development of science and technology, the degree of public consciousness, the attitude to the urban space and nature, and, finally, also the ideas of beauty and meaning.

1 Vitruvius, *O arhitekturi (De architectura/On Architecture)*, Faculty of Architecture, 2010. Vitruvius's lengthy treatise - written in the 1st century BC - is the only preserved text of the Antiquity which deals with the contemporary technology and architecture.

2 Dušan Pirjevec, *Pod mostom.../Under the Bridge ... (about Andrič's Bridge on the Drina, Heidegger, etc.)*, *ab - Architect's Bulletin* 38, 1978.

3 Deborah Howard, *Venice and the East: The Impact of the Islamic World on Venetian Architecture (1100-1500)*, Yale University Press, 2000.

4 Andrea Palladio, *I quattro libri dell'architettura*, Venice, 1570.

5 Leon Battista Alberti, *De re aedificatoria 1485 (1st ed.)*; *O arhitekturi/On Architecture (Ljubljana: Studia humanitatis, 2007)*.

6 Fausto Veranzio, *Machinae Novae*, Venice, 1616.

7 In construction of the church of St Genevieve in Paris, (Panthéon, 1757-1790), architect Jacques Germain Soufflot combined the structural lightness of Gothic with the classical language of Greek temples and executed it with the innovative and economical statical concept of steel ties in stone construction.

8 William Morris, designer, artist, and writer (b. 1834; d. 1896).

9 Edwin Lutyens, *The Material World*.

10 Dr. Miljenko Pržulj, *Bridges - Achievements, Evaluation Criteria, Authorship*, 10th Slovenian Road and Transport Congress, Portorož, 2010 and Dr. Blaž Vogelnik, *Design of Modern Bridges and Viaducts*, *Slovenian Civil Engineer Journal*, 2011.

11 Abraham Darby, cast-iron bridge in Coalbrookdale, 1795, span 30 m.

12 Janez Koželj, *Viaduct Črni kal*, *ab - Architect's Bulletin* 195/196, 2012.

13 Andrej Hrauský, *Plečnik's Bridges: How Plečnik Brought the River Closer to the City*, *ab - architect's bulletin* 195/196, 2012.

14 Such icons include Gabrijelčič's Ada bridge in Belgrade, Koželj's viaduct Črni Kal etc.

15 <http://publicspace.org/en/works/g072-preureditve-nabrezij-in-mostovi-na-ljubljani>