The Draw Footbridge over the Motława River in Gdansk

Competition Entry 263013

Entry Contents:

- **NARRATIVE SECTION WITH GRAPHIC APPENDIX**
- GRAPHIC SECTION: 3 panels sized 70 x 100cm, 1/3, 2/3, 3/3
- DIGITAL SECTION: 1 CD disc with files and movie
- SEALED ENVELOPE: Identification Card

Narrative section with graphic appendix

Table of Contents:

A. Introduction

The Municipality of the City of Gdansk has launched a design competition to build a new draw footbridge over the Motława River to the Ołowianka Island.

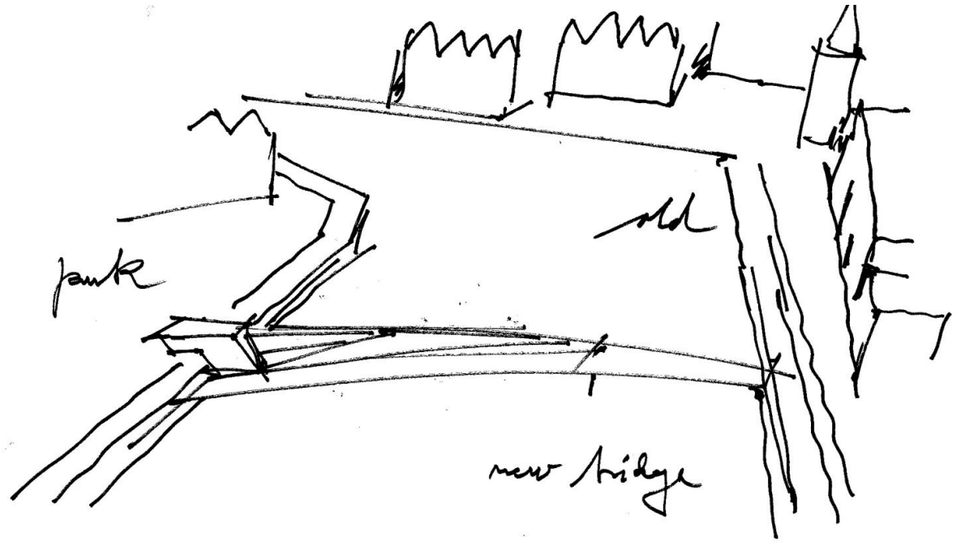
Location close to the delicate historic old town (protected cultural and archaeological heritage) requires very respectful and subtle approach to design, especially as drawbridges usually look like machines.

B. Concept of the Solution

According to the design competition propositions, footbridge location, function and whole context, we define our design focus especially on:

- Simple and direct link of both river banks inside comfortable slopes
- Minimal visual intrusion of historical urban space
- Cultural and Archaeological Heritage protection
- Impression of transparency and lightness
- Additional value to city's identity and tribute to the exceptional cultural urban location
- Dynamic and lively public space
- River bank of the Main City as clear as possible
- Drawbridge with fast operation and simple maintenance

On this basis we prepare a concept of a single leaf bascule bridge with very clear and simple design with small number of visible structural elements. Entire machinery with operation mechanism and control building is placed on the Ołowianka Island, releasing the sights on Old Town shores.



Connection of both banks is made within maximal slope of 6% with symmetrical inclinations. Movable steel structure is placed in the centre of the cross section, positioned partly above deck and partly underneath. Triangle formed movable structure is dividing deck on two separated pathway, to be joined together on the Old Town side of the bridge. This side of the bridge is designed as simple and low cost concrete integral structure.

Walking or cycling over the bridge is an inspiring experience. One can use the structure itself as some kind of public furniture, like benches in the park or playground for children. But structure is not elegant only from the top; it is designed that one can admire it also from below, when bridge is open.

The new bridge respects the existing urban historical appearance of the Motława River corridor developed over the ages, but also sets a clear statement for the future. The bridge imposes the least possible intrusion to the important views of the old city core along the corridor and with its lightness and transparency clearly emphasizes presence of structural and architectonic inventiveness and courage. With no doubt the new draw footbridge will perfectly fit into the very exclusive location and further on becomes a new, modern landmark of the city. It will not only connect the old city river bank with the Ołowianka Island, but it will also connect the past and the future of Gdansk.

C. Description of Technical Solutions

C1. Landscape

The new footbridge in Gdansk is important at least from two aspects;

- It connects Gdansk city centre with Olowianka Island over the Motlawa river
- Footbridge itself becomes an important city landmark

Both aspects are important in revitalisation of Olowianka Island, which already started with new Philharmonic hall in ex electro plant building.

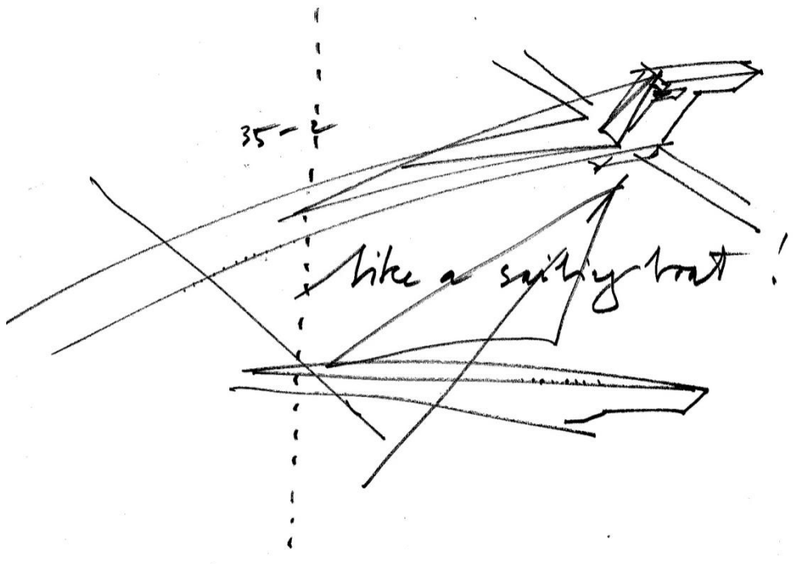
Of course important part of revitalisation beside interesting and needed public buildings and restaurants is public open space; such as riverbanks, plazas, squares and parks. Public space with green areas, urban furniture and public programme attracts people together, to participate and to make this public place vibrant and alive.

On the Island side Footbridge is located in the middle of the open space between Philharmonic hall and hotel. Existing parking space is not nice but we believe is still needed.

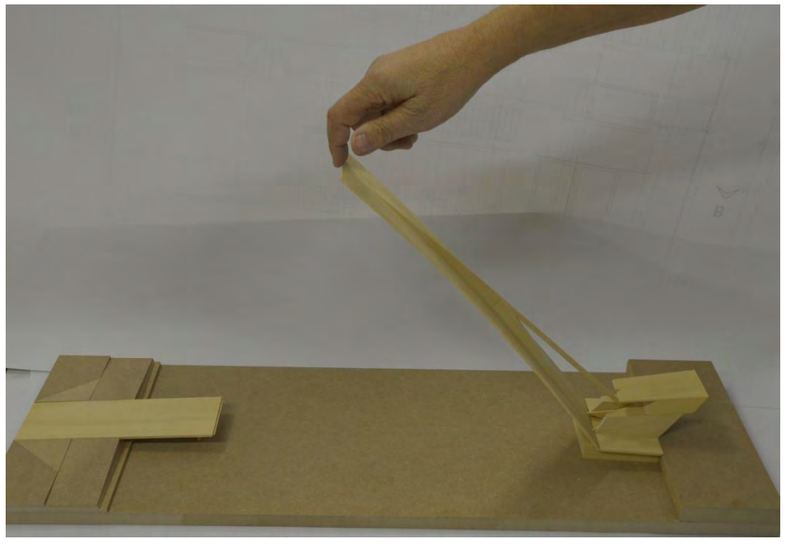
We created a new public space between two buildings which is a mix of parking, square, communication and riverbank corso. It is an open space with green (trees, hedges), water fountain, urban equipment and parking. Parking should be designed as square and not as classic parking lot in asphalt and white stripes. Parking is important for Philharmonic hall, and visitors visiting city centre over new footbridge. All vertical differences between existing riverbank level and new footbridge level are corrected with gentle slopes, making passage over the bridge possible also for disabled.

On the city centre side we need riverbank corso too. All vertical differences between existing riverbank level and new footbridge level are corrected with gentle slopes, making passage over the bridge possible also for disabled. New riverbank corso is made of new pavement (similar to one on the other side of the bridge), tree lines and urban equipment. This riverbank should become main pedestrian corso because there is no traffic, not to mention beautiful open views on the city.

In "bigger screen" this bridge will bring a new fresh chance for revitalisation of Olowianka Island. City should make firts public space, riverbanks corsos, squares and parks to attract developers.



Like a sail boat



Solution was tested also on the physical model

C2. Architecture - The Bridge with a Touch of the Wind

The new footbridge proposal designed to cross the river Moltawa is going to be situated in the historical centre of Gdansk – a sensitive ambiance due to its historical significance and cultural heritage protection. Today's complex of the facilities on the left riverbank are revitalised according to the principles of active renovation, meaning that contemporary, visually refined buildings are added to the existing historical urban fabric, while the right riverbank is left empty with a parking lot. The new facilities on the left riverbank meet the cultural heritage protection law height criteria, but at the same time they mark a clear relationship between the old and the annexed new with their contemporary expression. Having considered such aspects our proposal for the footbridge is designed as a distinctly contemporary minimalist construction. The footbridge control building is consistently integrated into the visual composition of the bridge.

The bridge is composed of two parts. The first, shorter part, is situated on the left riverbank and is fixed, resting on a column in the water. The second, longer part of the bridge is movable and can be lifted with a hydraulic mechanism that opens the way to watercraft. The movable part of the bridge, the drawbridge, is composed of a light minimalist construction designed as an innovative free-lying beam that has been developed in height due to technical characteristics of the construction. The construction particularities split the pedestrian path on the right side of the river in two parts, similarly to the well known footbridge designed by Günther Domenig in Graz or the awarded Studenci footbridge in Maribor.

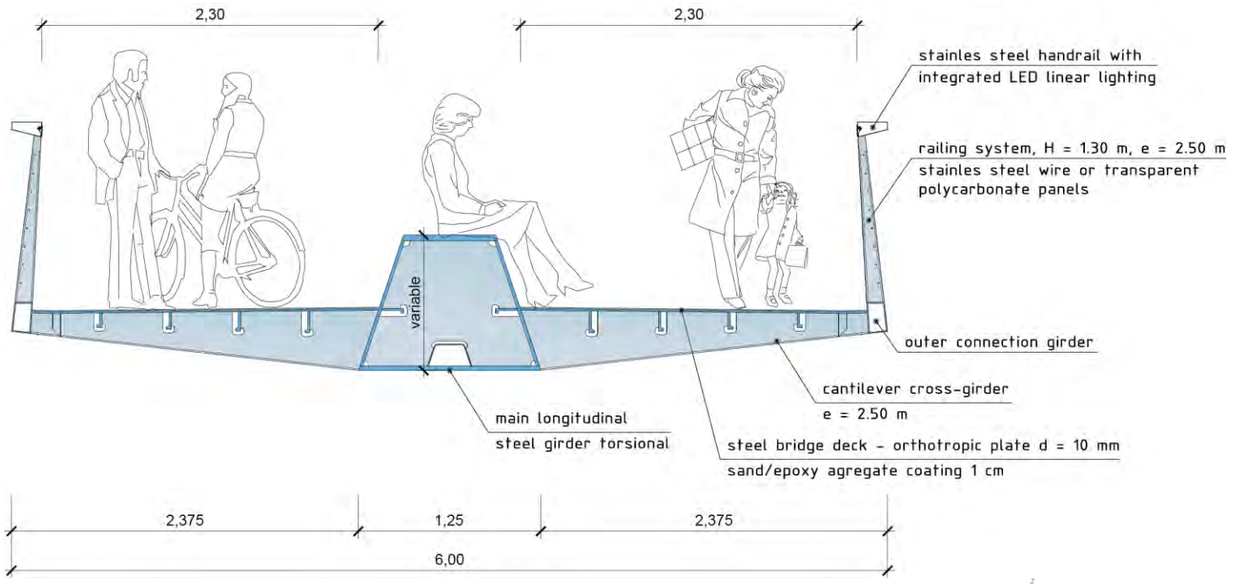
The mechanism to elevate the drawbridge is placed in a special cofferdam on the right riverbank. In the same location there are the operator's back-up facilities designed as an integral part of the body of the bridge. All the necessary technical elements to elevate the drawbridge as well as the facilities for the staff are organised in the command module. The location provides a good overview of what is happening on the river, on the riverbanks, as well as on the bridge. In addition, the wide panoramic window of the command module has a symbolic significance as the "guard" of the bridge.

The bridge is designed as a dynamic form and draws on several associations. It reminds us of a dynamic, refined design of contemporary high-technology sailing boats that have captain facilities with the outlook overhang placed on the stern. In this way we can understand the bridge as a part of the image of the city, an example of built technical architecture on the one hand, and on the other we can understand it as a part of a dynamic river ambiance, designed according to the principles of naval aesthetics.

All of the bridge equipment has a feel of the naval. We propose two possibilities for the design of the bridge railing. It can be a railing composed of vertical props and horizontal crossbars, or a railing made out of glass, completely transparent. Both types of railings we propose are tested inventory of constructed bridges and ensure panoramic views from the bridge as well as across the bridge. The bridge is lit with LEDs that are placed below the railing handle and light only the surface of the bridge, which provides an undisturbed way to observe the sky at night.

Despite its modest size, the new footbridge can become one of the important symbols of contemporary Gdansk vitality due to its daring, dynamic form.

C3. Bridge Structure – Simple and Clear Flow of Forces

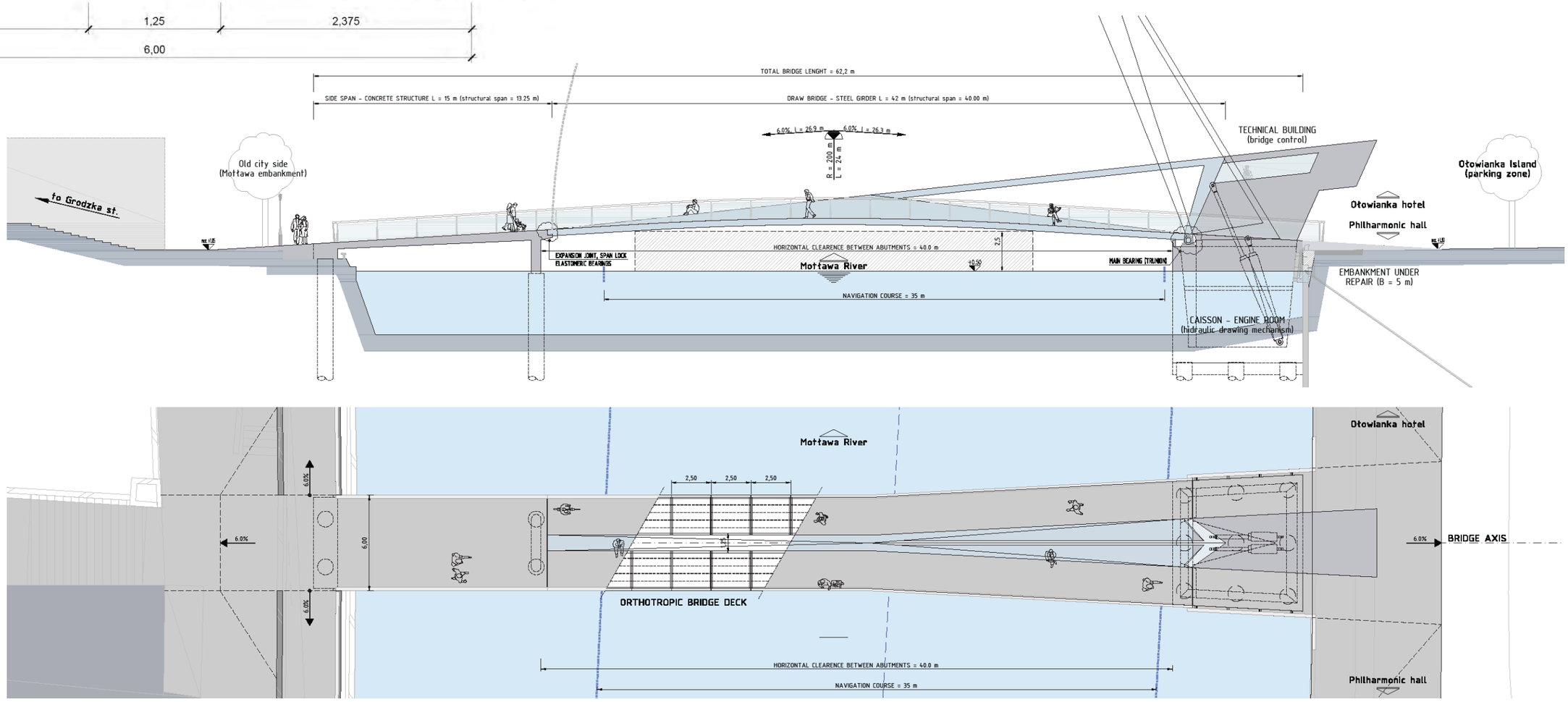


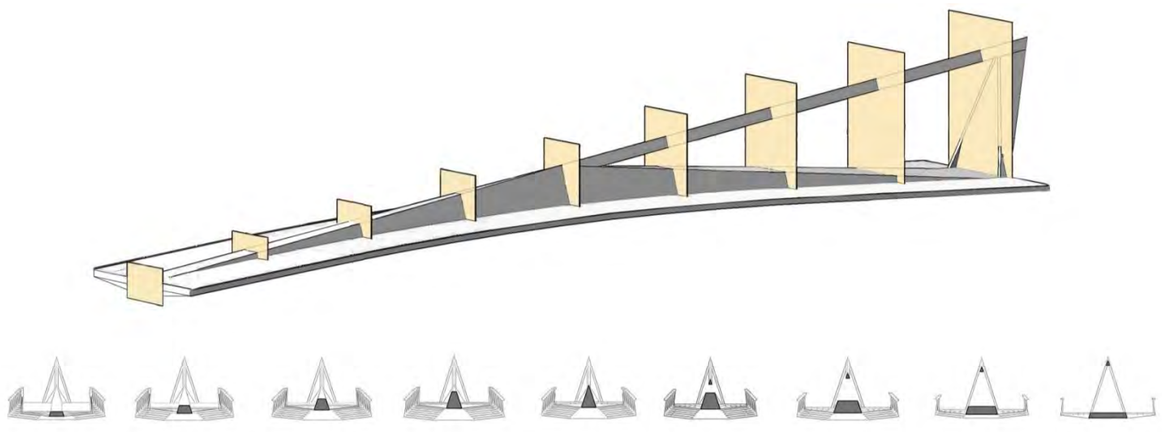
The footbridge is 62,2 m long and 6m to max 8m wide. Main structural parts of the bridge are:

- Integral concrete structure on left (Old Town) bank L=15m
- Movable steel structure in the middle of the river L=41m
- Concrete caisson as foundation and engine room L=8m
- Control building on the top of the engine room

Concrete structures are quite common, as is the control house. Therefore, we will not describe them specifically. Their dimensions are shown in the drawings and in the bill of quantities.

Movable part of the footbridge is single leaf bascule type. This is most often constructed type of movable bridges, due to the reliability, the shortest operation time and easy maintenance. It is open by turning about a horizontal axis (trunnion), which can be provided also as maintenance free for life time. Span and weight of cantilevered flap allow us to open it without additional counter weight, what make the structure even simpler. Rotation is powered by electro-hydraulic lifting mechanism, which is most reliable drive for modern drawbridges.





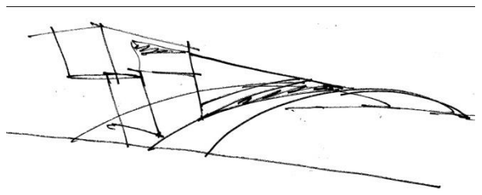
Model and cross sections of steel movable girder

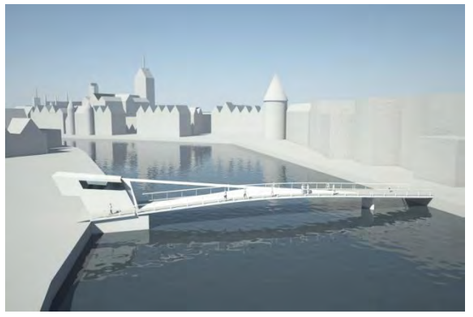
Due to limited structure depth, special type of structure was adopted. Steel triangular shaped structure has a span of 40 m and a maximum structural height of 1.90 m (L/21), positioned partly above deck (from 0 to 1,50 m) and partly underneath (constant 0,40 m). Pathways are on both cantilevered sides of this longitudinal torque girder. Deck is orthotropic steel structure, plate of 10 mm thickness with longitudinal ribs and cross girders. Both, main steel girder and deck is made of steel S355 or fine grain steel S460. Structure is welded in shop, transported and erected on the site.

In horizontal position (bridge in function and hydraulic off) structure acts almost as simply supported girder, while in lifting stage this is a stayed bascule bridge. From calculations can be seen, that the footbridge would have enough damping for the comfort of pedestrian with one TMP device (G=10 kN) in the middle of the span.

Control building is set in axis of the bridge, direct on top of the foundation caisson with engine room. Thus provides communication for control and maintenance (down and up). Operator's room on the top provides excellent direct visual control of whole traffic on footbridge and river area. In appearance the control building is some kind of reminiscent of the old port crane in Gdansk or poop deck on stern of old Baltic ships.

Due to poor ground condition all foundation would be designed as deep pile foundations.





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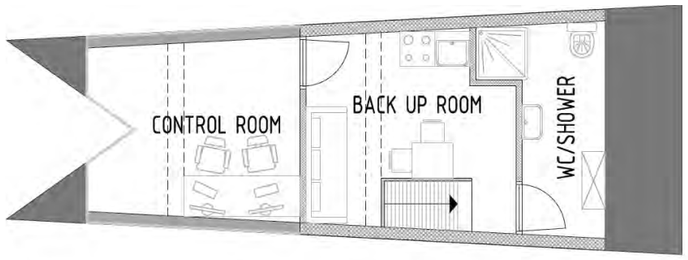
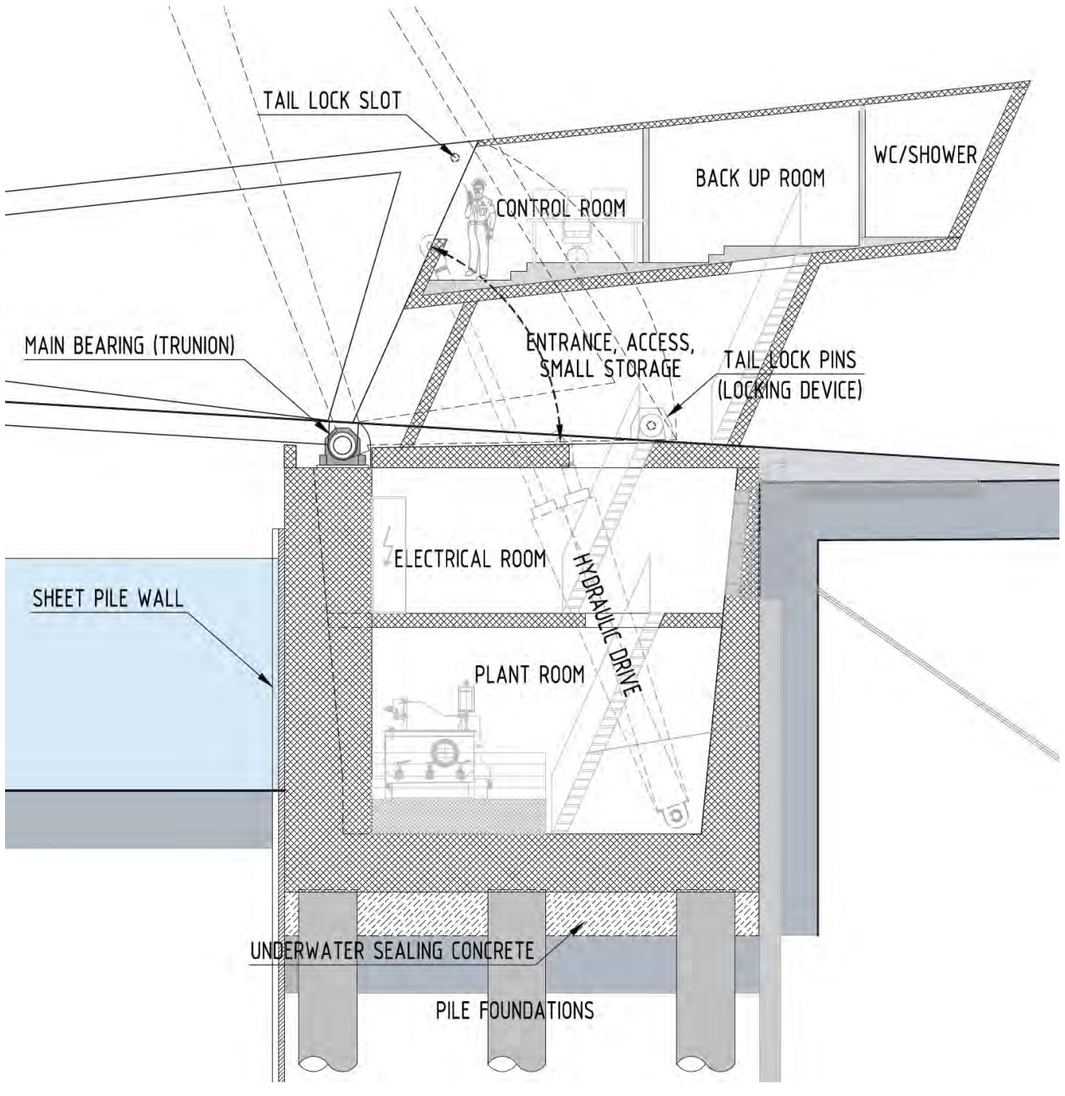




C4. Drawbridge Mechanism Reliable / Fast / Low-Maintenance

Bascule bridge over the river Motlawa is equipped with electro-hydraulic lifting mechanism, which consists of the following main components:

- Hydraulic drive aggregate
- Two main hydraulic double action cylinders
- Cylinder for locking the bridge in the lifted position.
- Electronic equipment for the drive, manoeuvring and securing the hydraulic drive.
- Electronic equipment for securing, monitoring and navigating the footbridge.

The main characteristics, the description of the intended gear and the manner of manoeuvring is described below.

Main technical data

Hydraulic pump unit

Reservoir capacity Q = 1600 l

Pump unit 3 pcs, with axial piston pump with pressure and flow control system

Axial piston pump q= 71 cmm^3/rev

EM power N= 3 x 45 kW; n= 1500 rev/min; 380 /220 V

Control current 24 VDC

Position indication device - 4-20 mA

Main hydraulic cylinder

Pulling force … F_{pu}= 2500 kN

Pushing force... F_{ps}= 0 kN

Piston diameter …..D= 420 mm

Piston rod diameter d= 200 mm

Stroke ……H= 4200 mm

Nominal working pressure … p_N=250 bar

Maximum system pressure …p_s=280 bar

Operating time

Opening and closing time t= 2 min

Emergency closing time max. te= 15 min

Description of hydraulic drive

Hydraulic drive is located in the room under the control house. It consists of a tank (Q=1600 l) and three sets of axial piston pumps, which are electro motor driven and positioned on a separate steal frame. Under the hydraulic drive there is a safety assuring oil interception reservoir.

Hydraulic two-way cylinders have a ceramic coated (“Ceramax”) piston rod. The exits of the cylinder are equipped with a chamber (0 bar) for oil leakage (connected directly to the reservoir) and ice and sweepings scrapers.

The cylinders are connected to the bridge with the self-aligning maintenance –free bearing. The drive medium is bio-degradable – ecologically acceptable oil.

We manoeuvre the movement with a directional pilot operated l hydraulic valve, acceleration and deceleration is arranged by axial pump with pressure and flow el. control system. In the both end positions of the bridge the cylinder chamber are connected, that does not allow the bridge dynamics to affect the hydraulic cylinder.

Due to safety (emergency case) we can lower the bridge with the hydraulic drive without using the energy. In the emergency situation, the speed of the lowering of the bridge is controlled by flow control valve.

On the both end positions of the bridge there are locking devices; manoeuvring is done by hydraulic cylinders. The position of the bridge is followed with electrical devices. The end positions of the bridge are secured by limit switches.

Description of main bearing

The rotation of the bridge is enabled by two radial maintenance free spherical plain bearings, positioned in the casing to the left and right of the bridge steel structure. The load is transferred on the bearing over the main common axis, build in the steel structure of the bridge.

Axial force on a bearing: F_{bm}= 2 x 2780 kN.

C5. Main Electrical and Control Equipment

Safety in Most Important

Hydraulic drive on the drawbridge is operated using electrical equipment, which has the following main features:

- Commissioning, operation and protection of drive motors on the hydraulic aggregate.
- Protection and management of hydraulic components installed on the hydraulic aggregate to allow peaceful stranding bridge in the final positions at the same time to achieve a complete manipulation on time.
- Safe operation with the bridge with help of hydraulic power packs and equipment for the protection and signaling.
- Signaling through the bridge position encoder and position switches.
- Signaling status and management of ramps, preventing entry to the bridge. They are placed on the shore on both sides of the bridge.
- Management with warning traffic lights on both sides of the bridge.
- Management with audible warning signals installed on both sides of the bridge.
- Provided is a device for measuring wind speed.
- For a visual overview of what is happening on the bridge are provided three cameras two of which are on the Ołowianka Island and one in the old part of town.
- To check that the bridge is empty before the planned manipulation (regardless of visual contact from space for local management) are three laser scanners. Two on the side of management house and one on the opposite bank.
- Along the bridge is planned lighting.
- The bridge is adequately protected against lightning strikes and earthed by codes.
- The space for management is regulated signalling and protection against fire.
- Facilities for management and where the equipment is installed are illuminated and, if necessary, locally air-conditioned.

The main equipment is installed in the technical building on Olowianka Island, where also the hydraulic power unit is located. It consists of:

- Energy cupboard for commissioning, operation and protection of electric motors. On it is located the main power switch. Start of electric motors is provided by a system star-delta.
- Automation cupboard in which are the main elements such as
  - device for uninterruptible power supply
  - two pcs. of processor computer (PLC)
  - cables and other equipment for the management of ramps and signalling
- Control panel with all facilities for the management and control of equipment state.

On the old part of the city is located

- Cupboard for automation and integration, which is intended to operate with the equipment for safety and signalling on this side of the bridge.

For wireless backup communication between equipment on both banks two optical cables are used, which are adequately protected and placed on the bottom of the river along the route under the bridge. Power cable, properly dimensioned (at least 3 x 45 kW installed capacity) should be brought to the control building. All other energy, command and signal cables are included in the electrical design.

Material Quantities and Cost Estimation					
	quantity	unit	€/unit	€	€
1. Mobilization					**150.000**
Site development : site roads, earth works surveying, construction technology, etc., ...	1,00	Σ	150.000,00	150.000	
2. Foundations					**181.900**
Steel sheet pile walls	386,00	m2	150,00	57.900	
Piles DN 100cm	260,00	m1	420,00	109.200	
Steel tube encasement	2,00	pcs.	3.600,00	7.200	
Lean concrete	20,00	m3	80,00	1.600	
Underwater conrete	50,00	m3	120,00	6.000	
3. North abutment					**2.274**
Concrete	6,00	m3	100,00	600	
Formwork	15,00	m2	50,00	750	
Reinforcement (140 kg/m3)	840,00	kg	1,10	924	
4. Piers					**1.990**
Concrete	4,00	m3	100,00	400	
Formwork	14,20	m2	50,00	710	
Reinforcement (200 kg/m3)	800,00	kg	1,10	880	
5. South abutment					**194.048**
Concrete	588,00	m3	120,00	70.560	
Formwork	400,00	m2	50,00	20.000	
Reinforcement (160 kg/m3)	94.080,00	kg	1,10	103.488	
6. Approach structures - north and south					**38.300**
Concrete	160,00	m3	100,00	16.000	
Formwork	94,00	m2	50,00	4.700	
Reinforcement (100 kg/m3)	16.000,00	kg	1,10	17.600	
7. Control building					**200.000**
Concrete, reinforcement, formwork, structural steel, facade, maintanance platforms, stairs, ledders, pins and shafts, ...	1,00	Σ	250.000,00	200.000	
8. Bridge girder					**398.092**
Structural steel	74.000,00	kg	5,00	370.000	
Concrete	24,00	m3	110,00	2.640	
Formwork	90,00	m2	50,00	4.500	
Reinforcement (180 kg/m3)	4.320,00	kg	1,10	4.752	
Scaffold	81,00	m2	200,00	16.200	
9. Mechanical/Electrical					**670.000**
Hydraulic equipment	1,00	Σ	390.000,00	390.000	
Electric equipment	1,00	Σ	220.000,00	220.000	
Main bearing with trunnion	2,00	pcs.	30.000,00	60.000	
10. Accessories - equipment					**140.234**
Epoxi coating (wearing surface)	285,00	m2	50,00	14.250	
Steel fences with edge fascias	124,00	m1	180,00	22.320	
Bearing P1 1000 kN	2,00	pcs.	3.000,00	6.000	
Tuned mass damper TMD 10kN	1,00	pcs.	15.000,00	15.000	
Expansion joint	9,20	m1	920,00	8.464	
Drainage outlets DN 50	28,00	pcs.	150,00	4.200	
Conduits-installation : lightning, illumination, ...	1,00	Σ	50.000,00	50.000	
Traffic signs : walkway, navigation, ...	1,00	Σ	10.000,00	10.000	
Accessories for controling and service	1,00	Σ	10.000,00	10.000	
11. Design services					**300.000**
Preliminary, main and detail design, load test, ..., (structural, electrical, mechanical, architectural, landscape, survey)	1,00	Σ	300.000,00	300.000	
12. Unforseen					**341.526**
15%	15	%	2.276.838,00	341.526	
TOTAL		Σ		**2.618.364**	**2.618.364**
archeological investigations, geotecnical investigations,			exluded		
public utilities to the bridge site, relocations of utilities			exluded		
tendering, engineering services, legal fees			exluded		

D. Cost Estimation and Time Schedule

Cost and duration of investment depends from market prices, preparatory works, type of public procurements (design-bid-built or design-built) and others. In this stage only approximately evaluation can be given.

We estimate that cost of the drawbridge would be from 2,5 to 3,0 million Euros.

Time schedule:	preparatory and design stage	1 - 1,5 year
	Building stage	1 - 1,5 year
	Together	2 – 2,5 year

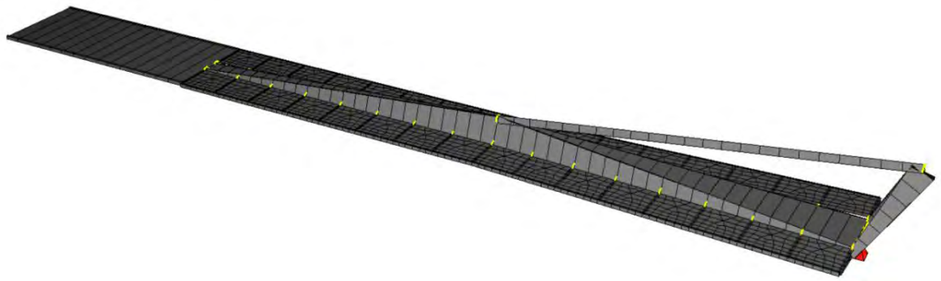
E. Calculation Annex

1. General

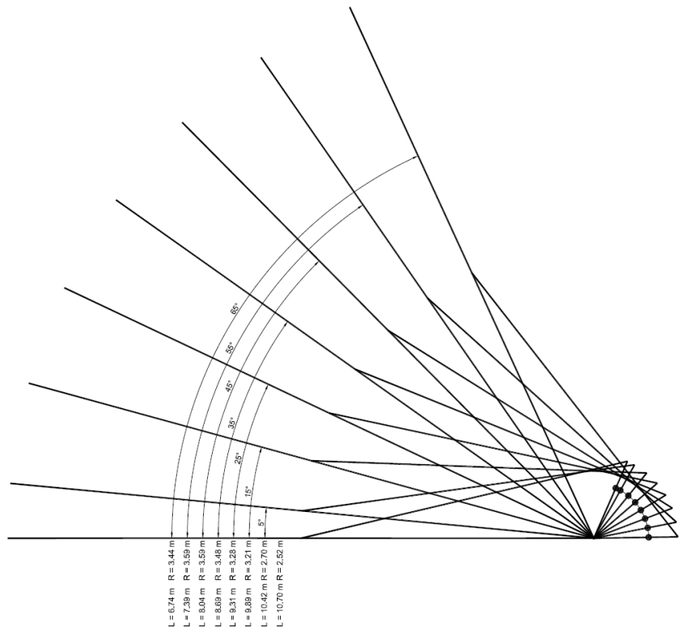
The total bridge length is 55.8 m. Side span is a concrete girder 12.5 m long and height of 0.40m-0.60m. Draw bridge is steel girder with structural length of 40.0 m and height of 0.40m – 1.87m. The width of bridge is from 6.00 m to 8.08 m.

Materials:

Steel	S 355 or S 460
Concrete	C25/30, C 30/37, C 35/35
Reinforcement	S 500



3D model of construction for serviceability stage



Scheme of lifting stages

2. Load introduction

- **Permanent loads**

SELF WEIGHT

Self weight is taken into account with actual properties of cross-sections and specific weight of materials with **g=78.5 kN/m^3 for steel and 25.0 kN/m^3 for concrete**.

ADDITIONAL DEAD LOAD

railing system G = 1.5 kN/m

- **Live load**

Live load on footbridges is in accordance with Eurocode 1: Actions on structures - Part 2: Traffic loads on bridges.

Load taken into account is **4,0 kN/m^2**.

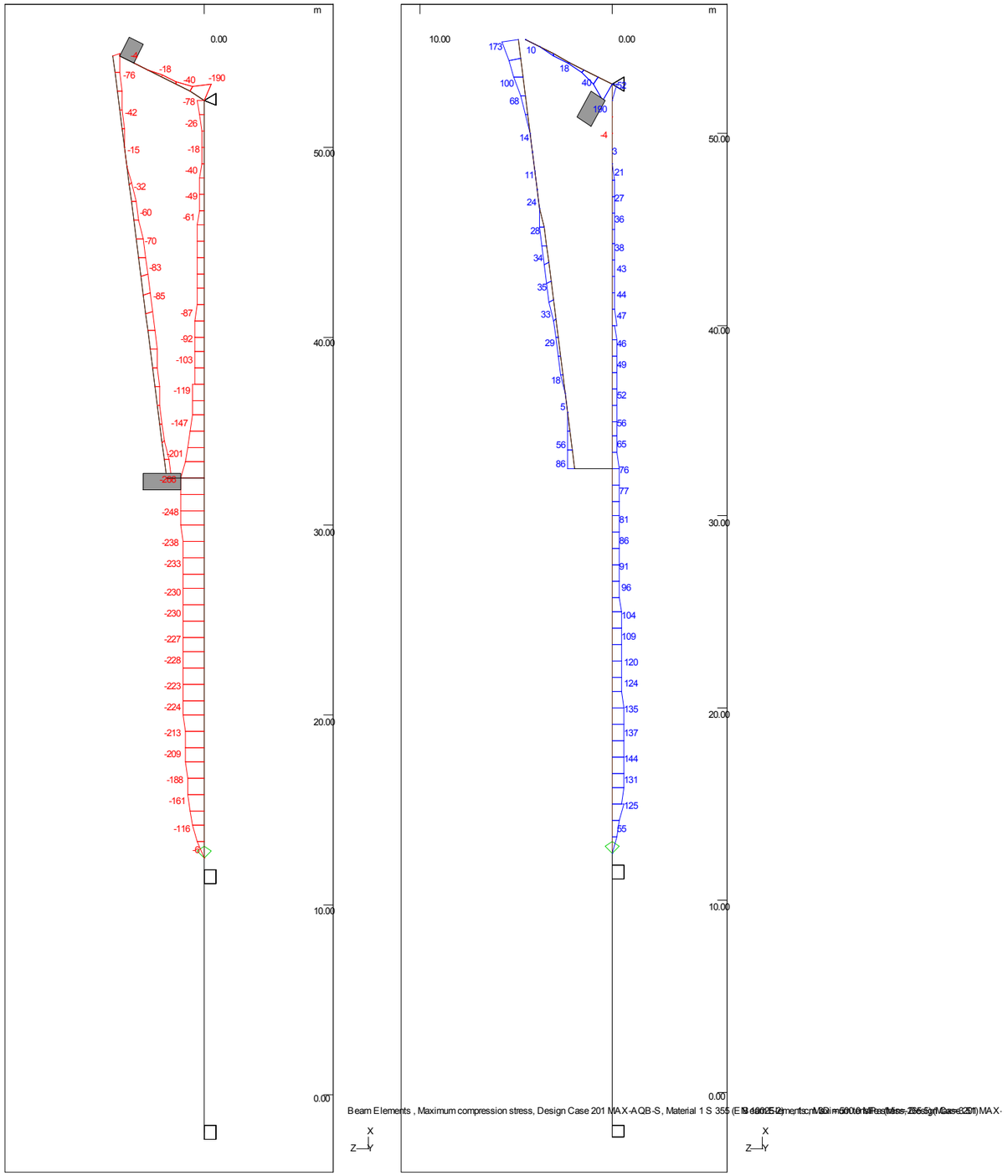
- **Wind load**

According to ZTV-ING part 9 the bridge can be uplifted up to wind speed of 20.8 m/s, which is upper limit of 8 beauforts.

$v_{b(ref)}$	20,8	m/s
ρ	1,25	kg/m^3
terain	II	ktg
z_0	0,05	
z_{min}	2	
k_r	0,19	
$c_o(z)$	1	
k_l	1	
σv	3,952	
q_b	0,270	

height (z)	width (B)	$c_r(z)$	$v_m(z)$	$I_v(z)$	$c_e(z)$	c_f	c_d	$q_p(z)$ (kN/m^2)	$q_p(z)*B*c_d*c_f$ (kN/m)	$q_p(z)_x c_d*c_f$ (kN/m^2)
0,000	8,10	0,70	14,58	0,271	1,423	1,30	1,00	0,385	4,05	0,50
36,250	6,00	1,25	26,03	0,152	3,230	1,30	1,00	0,873	6,81	1,14

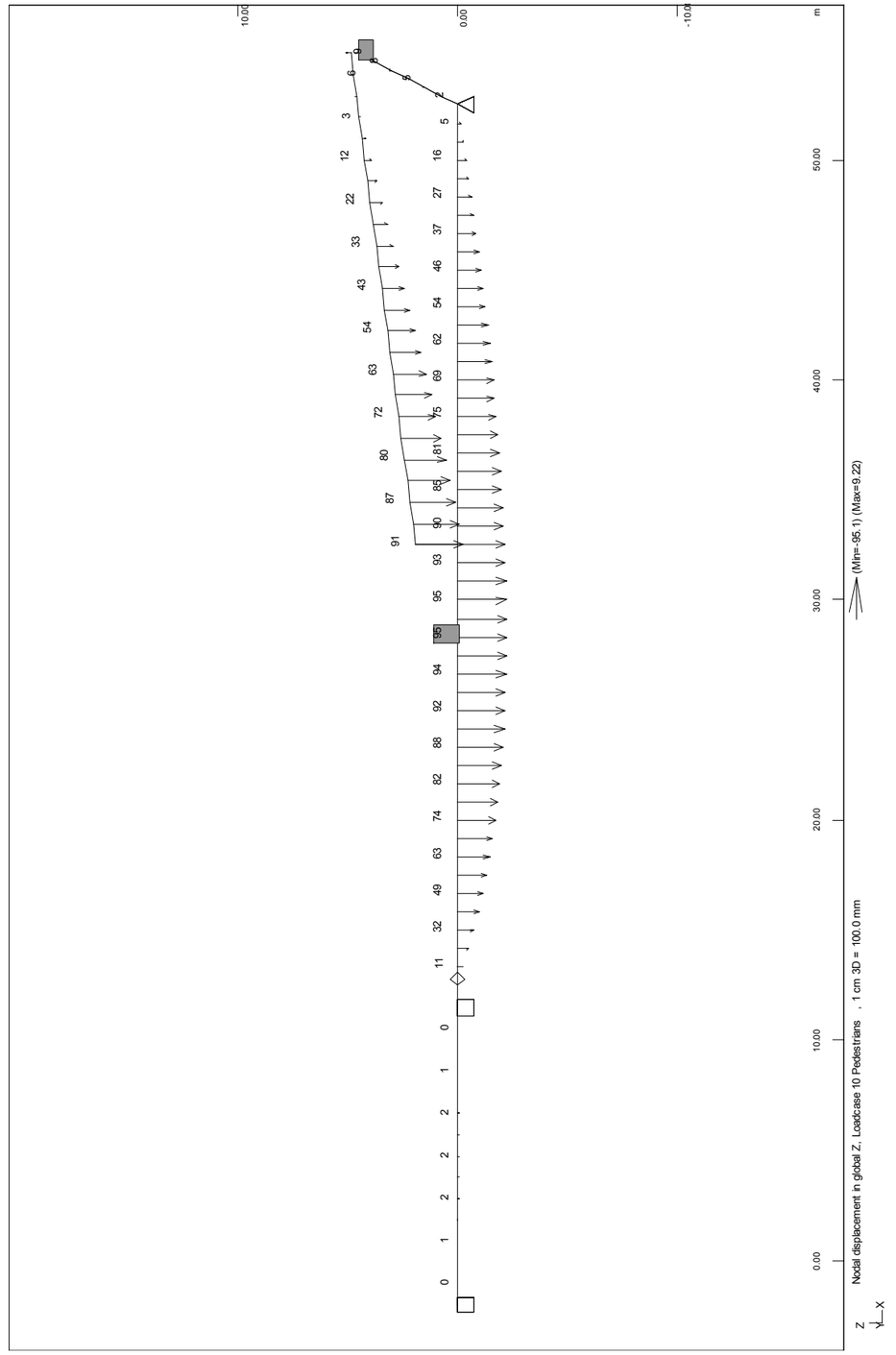
3. Ultimate limit state



Maximum compression stress: **-266 MPa < 355 MPa .....OK**

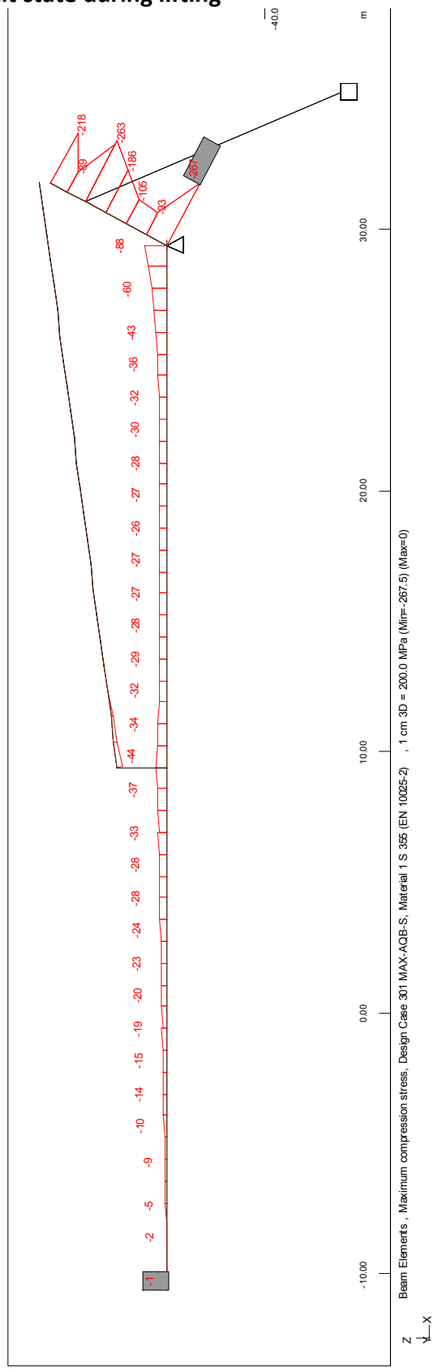
Maximum tensile stress: **190 MPa < 355 MPa .....OK**

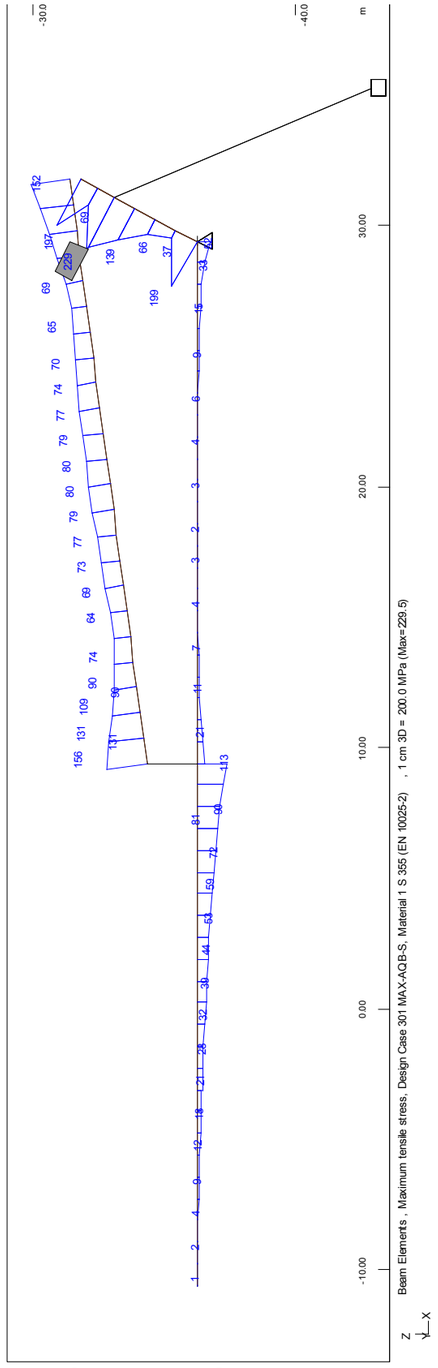
4. Deformations due to live load

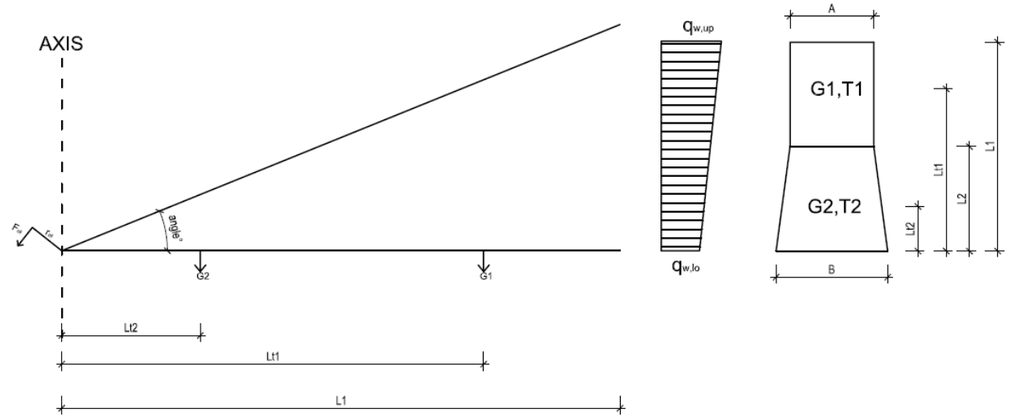


95 mm = L/420

5. Ultimate limit state during lifting





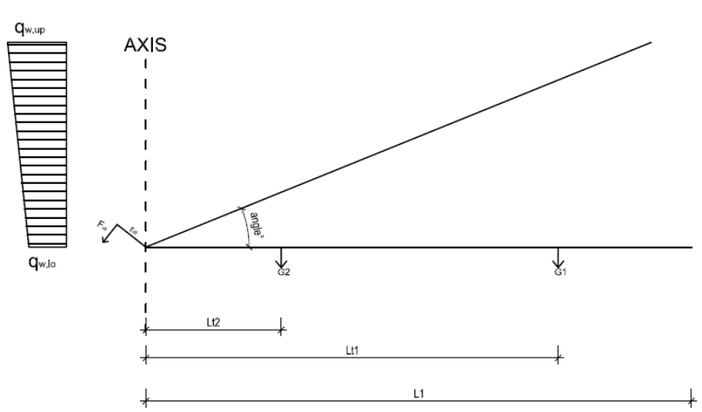


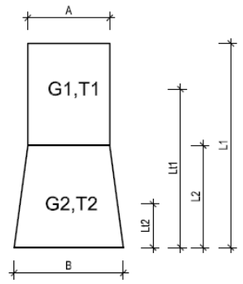
	G1	291,00	kN	qw,up	1,14	kN/m2							
	G2	553,00	kN	qw,lo	0,50	kN/m2							
	G3	0,00	kN										
	L1	40,00	m	Lt1	30,00	m							
	L2	20,00	m	Lt2	9,50	m							
	A	6,00	m										
	B	8,10	m										

Angle	G1	Li,1	G2	Li,2	∑G	Mg	Aw	Mw	ΔM	rcii	∑Fcii	∑G+∑Fcii	∑Fcii/2
	[kN]	[m]	[kN]	[m]	[kN]	[kNm]	[m2]	[kNm]	[kNm]	[m]	[kN]	[kN]	[kN]
0	291,00	30,00	553,00	9,50	844,00	13983,50	0,00	0,00	13983,50	2,52	5549	6393,01	2775
5	291,00	29,89	553,00	9,46	844,00	13930,29	22,75	20,24	13910,05	2,7	5152	5995,87	2576
15	291,00	28,98	553,00	9,18	844,00	13507,02	67,55	204,07	13302,95	3,21	4144	4988,22	2072
25	291,00	27,19	553,00	8,61	844,00	12673,35	110,30	609,27	12064,08	3,28	3678	4522,07	1839
35	291,00	24,57	553,00	7,78	844,00	11454,61	149,70	1232,88	10221,73	3,48	2937	3781,28	1469
45	291,00	21,21	553,00	6,72	844,00	9887,83	184,55	2022,43	7865,39	3,59	2191	3034,92	1095
55	291,00	17,21	553,00	5,45	844,00	8020,61	213,80	2881,60	5139,01	3,59	1431	2275,48	716
65	291,00	12,68	553,00	4,01	844,00	5909,68	236,55	3686,85	2222,83	3,44	646	1490,17	323

Maximum compression stress: **-267 MPa < 355 MPa .....OK**

Maximum tensile stress: **229 MPa < 355 MPa .....OK**





	G1	291,00	kN	qw,up	1,14	kN/m2								
	G2	553,00	kN	qw,lo	0,50	kN/m2								
	G3	0,00	kN											
	L1	40,00	m	Lt1	30,00	m								
	L2	20,00	m	Lt2	9,50	m								
	A	6,00	m											
	B	8,10	m											

Angle	G1	Li,1	G2	Li,2	∑G	Mg	Aw	Mw	ΔM	rcii	∑Fcii	∑G+∑Fcii	∑Fcii/2
	[kN]	[m]	[kN]	[m]	[kN]	[kNm]	[m2]	[kNm]	[kNm]	[m]	[kN]	[kN]	[kN]
0	291,00	30,00	553,00	9,50	844,00	13983,50	0,00	0,00	13983,50	2,52	5549	6393,01	2775
5	291,00	29,89	553,00	9,46	844,00	13930,29	22,75	20,24	13950,53	2,7	5167	6010,86	2583
15	291,00	28,98	553,00	9,18	844,00	13507,02	67,55	204,07	13711,10	3,21	4271	5115,37	2136
25	291,00	27,19	553,00	8,61	844,00	12673,35	110,30	609,27	13282,63	3,28	4050	4893,58	2025
35	291,00	24,57	553,00	7,78	844,00	11454,61	149,70	1232,88	12687,49	3,48	3646	4489,83	1823
45	291,00	21,21	553,00	6,72	844,00	9887,83	184,55	2022,43	11910,26	3,59	3318	4161,62	1659
55	291,00	17,21	553,00	5,45	844,00	8020,61	213,80	2881,60	10902,20	3,59	3037	3880,83	1518
65	291,00	12,68	553,00	4,01	844,00	5909,68	236,55	3686,85	9596,53	3,44	2790	3633,69	1395

6. Dynamik

1st Eigenform (quer) T = 0.625s

2nd Eigenform (vertikal) T = 0.542s

3rd Eigenform (quer) T = 0.392s

4th Eigenform (vertikal) T = 0.287s

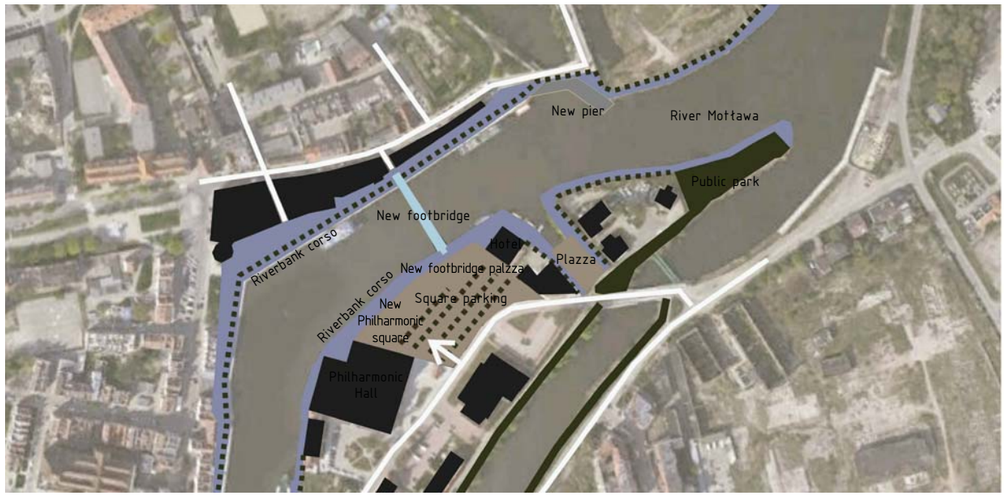
5th Eigenform (vertikal) T = 0.161s

6th Eigenform (vertikal) T = 0.135s

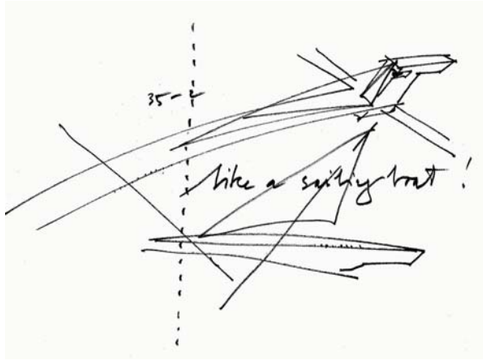
7. Conclusion to Calculation Annex

Basic static analysis confirms construction in terms of design, safety, capacity and usability. Construction materials, elements and dimensions are selected properly so they provide a safe and comfortable use.

the new draw footbridge over the Mottawa River in GDANSK



The new bridge respects the existing urban historical appearance of the Mottawa River corridor developed over the ages, but also sets a clear statement for the future. The bridge imposes the lest possible intrusion to the important views of the old city core along the corridor and with its lightness and transparency clearly emphasizes presence of structural and architectonic inventiveness and courage. With no doubt the new draw footbridge will perfectly fit into the very exclusive location and further on become a new, modern landmark of the city. It will not only connect the old city river bank with the Otowianka Island, but it will also connect the past and the future of Gdansk.

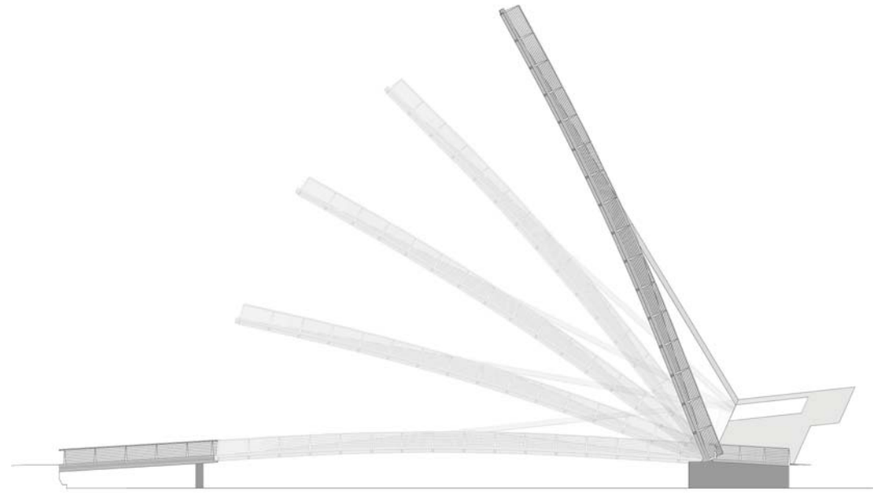


The Concept of our solution:

- Simple and direct link of both river banks inside comfortable slopes
- Minimal visual intrusion of historical urban space
- Cultural and Archaeological Heritage protection
- Impression of transparency and lightness
- Additional value to city's identity and tribute to the exceptional cultural urban location
- Dynamic and lively public space
- River bank of the Main City as clear as possible
- Drawbridge with fast operation and simple maintenance

... it is a concept of single leaf bascule bridge with very clear and simple design with small number of visible structural elements. Entire machinery with operation mechanism and control building is placed on the Otowianka Island, releasing the sights on Old Town.

Walking or cycling over the bridge is inspiring experience. We can use the structure itself as some kind of public furniture, like benches in the park or playground for children. But structure is not elegant only from the top; it is designed that one can admire it also from beneath, when bridge is open for vessels to pass.



the new draw footbridge over the Motława River in GDANSK