Policy Paper

Bridges in Ukraine: Crisis, Challenges and Way Forward

A comprehensive review of Ukraine's
and the public policies that govern planning, design, construction, and maintenance
of bridges in Ukraine

Viktor Zagreba, 2025

Policy Paper «Bridges in Ukraine: Crisis, Challenges and Way Forward» – Viktor Zagreba, 2025.

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Image on the cover by Viktor Zagreba.

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Introduction

According to the Constitution of Ukraine and public sources, the area of Ukraine is 603,628 square kilometres. This is 93% larger than the territory of Poland, which is considered the main country for comparison in this publication. Ukraine has a developed network of roads and railways. Based on data from the Ministry of Infrastructure, there are approximately 160,000 kilometres of roads (of which 52,000 km are state-importance roads) and 19,772 km of operational railways. Bridges are also part of these transport networks. According to the State Enterprise "National Institute for Infrastructure Development" (NIRI), there are approximately 28,500 bridges in Ukraine. Among them, as of early 2025, the State Recovery Agency (formerly "Ukravtodor" until 2023) accounted for 5,770 bridges, oblast administrations for 10,013 bridges, communal property included 3,663 bridges, and JSC "Ukrzaliznytsia" had 6,186 bridges on its balance sheet.[1].

The total length of all bridges and overpasses in Ukraine as of the end of 2020 was 746.8 km. This is approximately equal to the distance from the Ukrainian border to Berlin, Germany.

Almost all bridges in Ukraine are under state or communal ownership. Bridges within closed facilities such as ports, industrial enterprises, or residential complexes may be privately owned, but these are rather exceptions. From the perspective of Ukrainian legislation, a public-private partnership scenario for the construction and operation of bridges in Ukraine is possible, but in practice, there have been no such examples yet.

Table 1. Number of bridges on the balance sheets of Ukrainian organizations as of early 2025

Property	Managing entities (Balance holders)	Locations	Quantity	Share
State	Oblast State (Military) Administrations	Local roads (C, O)	10,013	39%
State	State Agency for Restoration of Ukraine (former Ukravtodor)	State roads (T, P, H, M)	5,770	23%
State	JSC "Ukrzaliznytsia" (Ukrainian Railways)	Railway bridges and overpasses	6,186	24%
Communal	Territorial Communities	Streets of settlements and communal roads	3,663	14%

[1] Дані про кількість об’єктів навродяться на підставі листа НІРІ №19.4-18-130-09/151-75 від 05.03.2025

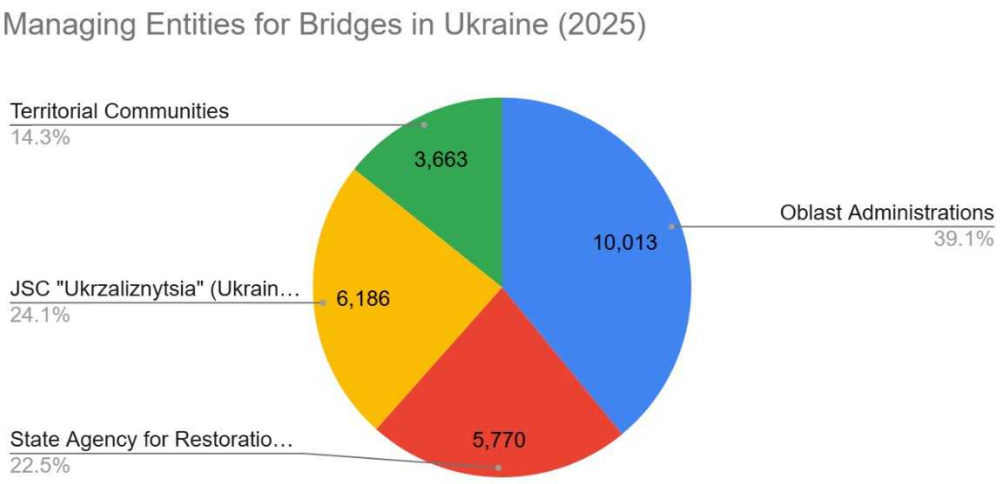

Figure 1. Distribution of bridges by balance holders

Current state

Technical Wear

A large proportion of bridges in Ukraine are worn out. Technical wear or degradation of a structure is the deterioration of elements during operation, which involves the worsening of initial design parameters such as load-bearing capacity and carrying capacity[2]. This is directly related to the conditions and number of years a bridge has been in operation.

Sixty years is considered by experts to be the period after which wear usually becomes critical and the object's condition requires preparation for reconstruction, as the structures approach the end of their lifecycle. This "lifespan" is relatively short compared, for example, to residential or non-residential buildings, due to the nature of the loads and impacts bridges are subjected to: atmospheric precipitation, water freezing, temperature fluctuations, transport loads, and so on. Half of all bridges in Ukraine have already crossed this 60-year mark

Table 3. Number of bridges with an operational life of over 60 years:

Location	Total number	Aged over 60 years	
		Number	Share
Local roads (C, O)	10013	2958	30%
State roads (T, P, H, M)	5770	2129	37%
Railway bridges	6186	5115	83%

[2] ДСТУ 9181:2022 "Настанова з оцінювання та прогнозування технічного стану автодорожніх мостів"

Brigdes in communities	3663	1825	50%
Total	**25632**	**12027**	**47%**

As of 2025, it follows from the provided data that 47% of all bridges in Ukraine were built before 1964. In the context of operational life, it is also appropriate to review the number of relatively new bridges, built after 1991 or that have undergone reconstruction. Such bridges account for about 15%.

Table 4. Number of bridges built and reconstructed since 1991:

Location	Total number	Built after 1991	
		Number	Share
Local roads (C, O)	10013	738	7%
State roads (T, P, H, M)	5770	1175	20%
Railway bridges	6186	1036	17%
Brigdes in communities	3663	832	23%
Total	**25632**	**3781**	**15%**

The time factor is not the only factor affecting the wear of bridge elements. Another important factor is the quality of timely regulatory and repair works, or rather the lack thereof, which is operational maintenance. Ukraine has regulatory requirements for these works, however, as practicing engineers say, customers often do not perform such works at all, perform them untimely or not in full, or impose obligations on the operating organization (communal enterprise or maintenance company), but do not provide these obligations with financial, human, and technical resources. For example, routine preventive repairs of the roadway surface, normative replacement of waterproofing, routine repairs of drainage systems, anti-corrosion treatment of metal parts, repairs and replacements of expansion joints, etc., are not performed in a timely manner. This leads to significantly faster and irreversible destruction of structures under the influence of corrosion, dynamic loads, and material fatigue.

According to NIRI experts, the current technical condition of bridges has been significantly affected by their improper maintenance and operation during the economically difficult periods of Ukraine's recent history, specifically in the 1990s and 2000s. As a result, a significant part of the structures currently requires capital repairs or reconstruction, as existing significant defects and damages can no longer be eliminated by operational maintenance methods. In financial and organizational terms, this poses a serious challenge for Ukraine, especially considering the current war situation and limited state resources.

Scope and Severity of the Challenge

The severity of the problems of a particular structure is measured by its *operational state*. According to Ukrainian standards, five such states are defined[3]:

Number	Name and explanation of the operational state according to Ukrainian norms
State 1	**Serviceable condition** – The bridge or its elements meet all design requirements and current operational norms.
State 2	**Partially serviceable condition –** The bridge or its elements partially do not meet design requirements, but the requirements of the first and second groups of limit states are not violated. This implies certain defects or damages that may require minor repair works.
State 3	**Operable condition** – Partially does not meet design requirements. Partial violation of requirements (damage or wear of structures) is possible, which does not limit the normal functioning of the structure.
State 4	**Limited operable condition –** Requirements for limit states are exceeded. The structure is operable in a limited mode and requires special monitoring of its elements. The bridge has serious damage or defects that pose a threat.
State 5	**Inoperable condition –** Does not meet the requirements of limit states, and their satisfaction is deemed impossible. It necessitates the cessation of the structure's operation and requires an urgent decision regarding its reconstruction or closure.

These categories are determined based on the results of periodic inspections and technical surveys conducted by specialized organizations. In common parlance, these states are referred to as “third, fourth, fifth”. Ukrainian norms do not include terms like “critical” or “emergency” states, although these evaluative characteristics are often used in articles, news reports, and other media publications. In this publication, the characteristic „critical state bridge“ or „emergency bridge“ applies to structures in the 4th and 5th states. According to NIRI data as of early 2025, about 25% of all bridges for which information is available are in these states – in the 4th or 5th. Regarding 35% of all bridges, information about their technical condition is completely absent, therefore, what proportion of them are in an emergency state is unknown. It can be reasonably assumed that this proportion is also significant.

[3] Відповідно до ДСТУ 9181:2022 "Настанова з оцінювання та прогнозування технічного стану автодорожніх мостів"

Table 5. Number of bridges in limited operable condition (State 4) and inoperable condition

Location	Total number	Operational state			Lack of information
		4 (Limited operable)	5 (Inoperable)	Together 4+5	
Local roads (C, O)	10013	2144	122	2266	6048
State roads (T, P, H, M)	5770	1233	320	1553	1388
Railway bridges	6186	128	1576	1704	0
Bridges in communities	3663	496	193	689	1666
Total	**25632**	**4001**	**2211**	**6212**	**9102**
Share, %	*100%*	*15.61%*	*8.63%*	*24.24%*	*35.51%*

Dynamics of Deterioration

The transition of bridges from one state to another is a unidirectional and non-linear process. Initially, degradation occurs slowly, but over time it accelerates. The further a bridge is in its life cycle, the steeper the curve of its deterioration becomes. Timely operational maintenance and repair works can influence this, but the general pattern remains the same. This pattern is well illustrated by the Ukrainian scientific article “Operational Condition of Bridges in Ukraine” from 2019. Its authors used data on 5620 bridges entered into the Analytical-Expert Bridge Management System (AESUM), which has been developed and filled since 2004. At the time of the article's preparation in 2019, the situation was as follows:

Table 6. Operational condition of bridges in Ukraine as of 2019

State	Number	Share, %	Разом, %
State 1	109	2%	13%
State 2	620	11%	
State 3	3314	59%	77%
State 4	1484	26%	
State 5	93	2%	
Total:	**5620**	**100**	

The government published updated generalized information on the condition of bridges in Ukraine in the summer of 2023, following a surge in political attention to the problem of bridge conditions[4]. The share of inoperable bridges (in the 5th state) in Ukraine increased 4.5 times (+450%) in just four years. In 2019 there were 2% such bridges, in 2023 - 9%. This sharp deterioration of the situation between 2019 and 2023 is theoretically explained by scientists on the bridge degradation curve.

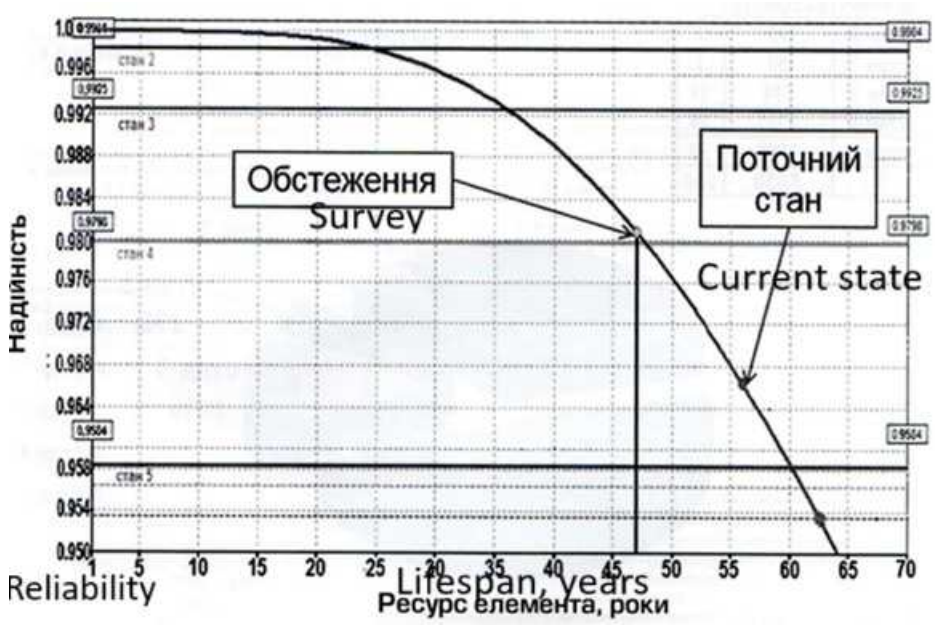

Figure 2. Bridge condition degradation curve (L.P. Bodnar, P.M. Koval, S.M. Stepanov, L.H. Panibratets, 2019)

The graph makes it clear that the reliability coefficient of bridge elements (vertical axis) sharply decreases starting from approximately 35 years of operation, and the further it goes, the more vertical the curve becomes. The critical condition level (state 5) is theoretically reached by a

[4] "Комісія з перевірки стану мостів: представлено попередні висновки", Ministry of Infrastructure of Ukraine, 27.07.2023 https://mtu.gov.ua/news/34560.html

structure after 60 years of operation. The vertical scale shows reliability. This means that for older bridges, the probability of failure (i.e., collapse) increases in a non-linear progression.

It should be noted that changes in the assessment methodology occurred in 2023. From the beginning of 2023, a new standard DSTU 9181:2022 (replacing DSTU-N B V.2.3-23:2012) came into force, which somewhat changed the approach to assessing the technical condition of bridges. According to the updated DSTU, if at least one defining element (superstructure, supports, or foundations) receives a 5th state, the entire structure is automatically classified as inoperable (5th state). At the same time, the previous standard allowed assigning a 4th or even 3rd state to the structure under similar circumstances. Regardless, structures are rapidly losing their residual resource, especially those built before 1964. All this indicates a high degree of acuteness of the problem, and that in the future, the number and frequency of bridge element failures will increase.

Collapsing Bridges (Mostopad)

Journalists dubbed the phenomenon of bridges collapsing and their spans or other parts falling during operation as "*Mostopad*"[5]. One can assess that the Mostopad began in Ukraine approximately in 2017:

1. February 2017: part of the Shuliavska overpass in Kyiv collapsed. [6]
2. February 2019: a bridge on state highway R-24 in Ternopil region collapsed. [7]
3. August 2019: near Kharkiv, on international highway M-12, an overpass span collapsed onto railway tracks. [8]
4. May 2020: near Nikopol, Dnipropetrovsk region, on highway H-23, a bridge over the Chortomlyk River collapsed while a truck was crossing it. [9]
5. May 2021: on state highway H-17 between Lviv and Lutsk, travelers saw a collapse on the road, as the bridge collapsed overnight. [10]
6. July 2023: a bridge in Zakarpattia, on state highway H-09, collapsed under an overloaded truck. Several people were injured. The bridge had been deemed inoperable since 2018. [11] Notably, the bridge collapsed during the work of a government commission, created by a decision of the National Security and Defence Council.

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[5] Наприклад, публікація в газеті “День” під назвою “Зупинити “мостопад” 01.07.2020 року: https://day.kyiv.ua/article/den-ukrayiny/zupynyty-mostopad

[6] У Києві частково обвалився Шулявський шляхопровід, https://www.bbc.com/ukrainian/news-39110128

[7] На Тернопільщині обвалився аварійний міст – дорожники звинувачують водіїв, https://tsn.ua/ukrayina/na-ternopilschini-obvalivsya-avariyniy-mist-dorozhniki-zvinuvachuyut-vodiyiv-1297404.html

[8] Під Харковом обвалився автомобільний міст, https://kh.depo.ua/ukr/kh/pid-kharkovom-obvalivsya-avtomobilniy-mist-201908251017631

[9] У Дніпропетровській області в річку впав міст, коли по ньому проїжджала фура, https://lb.ua/society/2020/05/20/457946_dnepropetrovskoy_oblasti_reku.html

[10] На трасі біля Кам'янки-Бузької провалився міст через Західний Буг - Захід.нет, 03.05.2021, https://zaxid.net/na_trasi_bilya_kamyanki_buzkoyi_provalivsya_mist_cherez_zahidniy_bug_n1518376

[11] На Закарпатті впав міст з автівками: названо причину трагедії - УНІАН, 25.07.2023, https://www.unian.ua/economics/transport/na-zakarpatti-obvalivsya-mist-shcho-vidomo-12339744.html

7. June 2024: elements of the Povitroflotsky overpass collapsed in the capital, blocking traffic on one of the main avenues of the capital. [12]
8. November 2024: in Dzhankoi district of occupied Crimea, an overpass collapsed onto railway tracks along with cars. [13]

Figure 3. Collapsed bridges in Lviv region (2021) and Zakarpattia (2023) as reported in the media.

This list mentions only major Mostopad episodes that made national news. However, in Ukraine there are thousands of small bridges on local roads and streets of towns and cities, which also disintegrate due to their condition and age, but these cases of Mostopad are covered only in local media. This indicates the wide, national scale of the bridge condition problem. In some collapse episodes, such as points 4 or 6, the direct blame of the collapse was put on a heavy truck that was overloaded. However, this does not negate the fact that thousands of bridges in Ukraine are in a worn-out condition and require urgent action to prevent them from falling down.

Bridge Inspections and Checks

Engineering inspection of a bridge is a normatively regulated, labour-intensive, and lengthy process that requires a decision and financing from the client and services of a qualified contractor. Inspecting all 28 thousand bridges in Ukraine is a huge task in itself.

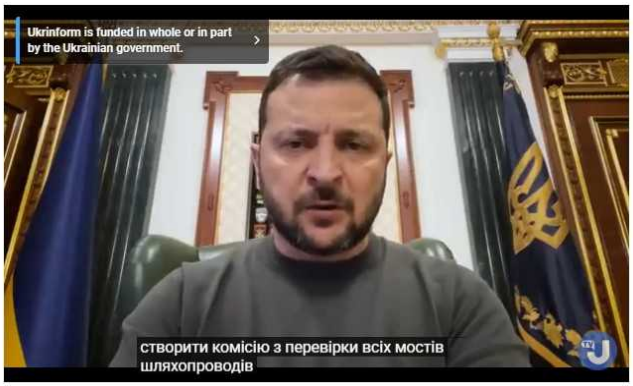
The previously mentioned scientific article from 2019 provides the following data: in the last years before the Covid-19 pandemic, the following number of bridges were inspected per year in Ukraine: 130 bridges in 2018, 263 bridges in 2017, and 333 bridges in 2016. In subsequent years,

[12] «У Києві обвалилася частина Повітрофлотського шляхопроводу»: https://www.rbc.ua/rus/news/kievi-obvalilasya-chastina-povitroflotskogo-1718814273.html
[13] «У Джанкойському районі Криму обвалився міст над залізницею: є інформація про постраждалих»: https://24tv.ua/obval-mosta-krimu-dzhankoyskomu-rayoni-vpav-mist-cherez-perenavantazhennya_n2685426

according to NIRI data, the volume of inspections significantly increased. For example, only on state roads, 455 bridges (approximately 8.5% of the total number of such bridges) were inspected in 2021, and 673 bridges (12.5%) in 2023.

In the summer of 2023, by decision of the National Security and Defence Council dated 23.06.2023, a commission for the inspection of bridge structures was created, headed by Vice Prime Minister and Head of the Ministry of Infrastructure Oleksandr Kubrakov. [14] At that time, no direct reason for the creation of the commission was mentioned, for example, the sudden collapse of a specific bridge[15], however, on June 23, 2023, state leaders dedicated their attention to the problem of emergency bridges throughout the country. The President of Ukraine held a meeting of the National Security and Defence Council, where among the three agenda items, one was about the condition of bridge structures. The President announced the creation of a “commission for bridge checking”[16].

"Prime Minister Shmyhal also reported on the difficult situation with the condition of bridges and overpasses in the largest cities, particularly in Kyiv. The condition is frankly dangerous. There is a decision by the National Security and Defence Council to create a commission to check all bridges and overpasses throughout the country. Vice Prime Minister Kubrakov is responsible for the check," the President announced in a video address.[17].



As the President's statement, the commission's attention was largely focused on Kyiv and other large cities, meaning focus on bridges that are under communal rather than national responsibility. In the official decisions on the establishment of the commission, the phrase “check of bridges” was used, not “inspection”. The procedures and scope of such a “check” are not described in legislation or other norms of Ukraine, so it could be conducted according to the methodology determined by the commission itself, in a limited time and without financial resources. Therefore, the preliminary conclusions of the government commission were published already a month after it was created, [18] and the press release about the final completion of the commission's work was released two months after its launch.[19] Experts

[14] Розпорядження Кабінету Міністрів України від 27 червня 2023 р. № 578-р “Про утворення комісії з перевірки стану мостових споруд”, https://www.kmu.gov.ua/npas/pro-utvorennia-komisii-z-perevirky-stanu-mostovykh-sporud-i270623-578
[15] Єдиний значний епізод “мостопаду” у 2023 році стався на Закарпатті вже після створення комісії.
[16] «Зеленський повідомив про створення комісії для обстеження мостів» - Кореспондент, 23.06.2023, https://ua.korrespondent.net/ukraine/4601190-zelenskyi-povidomyv-pro-stvorennia-komisii-dlia-obstezhennia-mostiv
[17] «Спеціальна комісія перевірить стан мостів і шляхопроводів по Україні – Президент», Укрінформ, 23.06.2023, https://www.ukrinform.ua/rubric-vidbudova/3726869-specialna-komisia-perevirit-stan-mostiv-i-slahoprovodiv-po-ukraini-prezident.html
[18] Мінінфраструктури, 27.07.2023, https://mtu.gov.ua/news/34560.html

within the commission visited and visually examined bridges in Kyiv, Zhytomyr, and Rivne, as reported by the media, as well as some locations in other cities (not covered by the media). The commission also worked with information about bridges present in the national database AESUM. Additional inquiries were sent to local government bodies, and their responses were received and processed

Figure 4. Condition of bridges checked by the commission. Photo by the State Agency for Restoration, 2023

Data on the number of bridges for which information was processed by the commission were not published in either the preliminary or the final press release. It is clear that the commission did not have the opportunity to inspect or even visit 9,000 bridges for which information on their condition was missing, in a short period. Therefore, the commission worked with information not about "all bridges across the country," but only about those for which information was available in the AESUM system or which local balance holders could promptly provide. This was stated by commission member, engineer Dmytro Bespalov. During the commission's work, he was once again convinced that many balance-holding organizations in Ukraine simply lack a system for managing bridges as assets. *"It's a big problem that we don't have an asset management system. Bridges are assets. If such a system existed, it would be a kind of safeguard against bridge collapse. It's like a service book for a car," says transport engineer Dmytro Bespalov. "As a result, we don't know how many bridges we have, what condition they are in, and we don't understand the order in which to restore them."* – comments Mr. Bespalov.

Bridge inspection is an important diagnostic procedure needed for every structure, especially those for which information is missing and whose operational life exceeds 60 years. However, it should be remembered that commission checks of checking and engineering inspections,

[19] Мінінфраструктури, 21.08.2023, https://mtu.gov.ua/news/34627.html

although serving as a source of up-to-date information, are not capable of solving the large-scale crisis of the worn-out condition of bridges.

> "If a bridge is in the 5th condition, no matter how much you inspect it, its condition will not improve. Inspection, commission review, checking – these are often just a way to document once again what is already known,"

– comments Anna Minyukova, a railway engineer who works in bridge design and engineering inspection.

In conclusion, political attention to the problem of bridge condition at the highest level – from the President, the National Security and Defence Council, the Prime Minister, and the Minister of Infrastructure – is undoubtedly a positive phenomenon, as without high-level political attention, it will not be possible to stop the crisis and transition to systematic asset management. However, in 2023, the focus of this attention was limited to a quick "check of bridges" and its media coverage, rather than on finding deeper problems and potential solutions from the perspective of public policy. The surge in political and media attention and the intensive work of the temporary commission members did not result in changes in state policy or the policies of local self-government bodies regarding the reconstruction of emergency bridges, the prioritization of objects and expenditure of funds, or operational maintenance. Furthermore, there was no systemic change in the volume of available information on the condition of bridge structures or improvement in the organizational or financial capacity of balance holders in the field of bridge management. During the next escalation of political and media attention, for example, after the next high-profile case of "mostopad," which will inevitably occur, the impetus for action should be directed not at finding culprits or quick commission checks of checking, but at systematic and strategic improvement of public policy following the example of successful EU practices.

Critical Infrastructure

In the legal framework of Ukraine, there is a concept of "critical infrastructure objects (facilities)" exists. According to the law from 2021[20], "critical infrastructure objects are infrastructure objects, systems, their parts, and their totality, which are important for the economy, national security, and defence, and whose disruption of functioning can harm vital national interests". By this definition, strategic bridges should belong to such objects, and probably do, though it is impossible to know for certain as this information is classified. An indirect sign that a bridge is included in this „critical list" is the presence of armed security personnel at the facility. According to eyewitnesses, such patrols can be observed on some bridges across the Dnipro River or on railway bridges throughout the country.

[20] Закон України 1882-IX від 16.11.2021 „Про критичну інфраструктуру": https://zakon.rada.gov.ua/laws/show/1882-20#Text

However, the problem is that the "critical" status does not directly result in prioritized allocation of funds. According to the law, the goal of state policy regarding critical infrastructure objects is "ensuring the security of critical infrastructure objects, preventing unauthorized interference in their functioning, forecasting and preventing crisis situations at critical infrastructure objects".

The preservation of critical infrastructure bridges from destruction or incapacitation without unauthorized interference (enemies, saboteurs) is not listed among the goals in the Law. Perhaps this explains why, at the state level, strategic bridges are not separated from others, and when decisions are made about the preparation and funding of projects (capital repairs, reconstructions, new construction), bridges of strategic importance do not become a priority. On the contrary, such large and problematic bridges do not receive priority due to their great complexity, scale of work, and corresponding need for funds.

Engineer Dmytro Bespalov, who frequently comments on bridge infrastructure issues for the media and previously served as an advisor to the Minister of Infrastructure of Ukraine, confirms this situation. *"Ukraine lacks the definition of priorities. There are more important bridges, and there are less important ones. Obviously, we need to prioritize the more important ones. The constructions that have taken place recently – I'm not sure that such prioritization was done, and that Ukraine repaired or rebuilt the most important bridges"*, – states Bespalov.

As an illustrative example, the engineer refers to the capital city of Kyiv, which for many years has had no difficulties in filling its local budget and thus had all the resources to establish an effective asset management system for its bridges. However, Kyiv—despite these favorable conditions—is a case of a critical situation regarding the condition of strategic bridges and the absence of clear prioritization.

In 2023, Kyiv Mayor Vitaliy Klitschko stated that the city had 175 bridges and overpasses on its balance sheet (excluding pedestrian bridges), and that all of Kyiv's bridges are *"managed by the municipal enterprise 'Kyivavtoshlyakhmist', which is responsible for the maintenance of artificial structures and regularly inspects them.* [21]*"* There is no official open-access information on the condition of these structures. Therefore, in 2023–2024, the civic organization "Kyiv Passengers" sent formal information requests to various asset holders in the capital and compiled data from the responses regarding the operational state of Kyiv's bridges. This monitoring revealed the following:

"In Kyiv, there are 31 bridges that are unserviceable, including 28 transport bridges and 3 pedestrian ones, while another 53 are in limited working condition—44 transport and 9 pedestrian bridges. Altogether, this means that 75 bridges are in critical or emergency condition," reported Oleksandr Rak, head of the civic organization "Kyiv Passengers," for this study. According to official data collected by the organization, four bridge crossings over the Dnipro River include structures that are in an emergency condition.

[21] Міст Патона, міст Метро та Подільський: Кличко розповів про перспективи переправ через Дніпро, Київ Вечірній, https://vechirniy.kyiv.ua/news/85420/

"These bridges could realistically collapse at any moment, especially if overloaded trucks cross them or if an explosion occurs. This is truly a major problem,"

commented Dmytro Bespalov on the condition of the bridges over the Dnipro River.

Meanwhile, as Kyiv's and Ukraine's most important bridges face the risk of catastrophic collapse any day, the capital continues to spend billions of hryvnias on the construction of new overpasses that hold no strategic significance. In 2024 alone, the city opened two new grade-separated interchanges in the Obolon residential district and completed the reconstruction of a similar interchange on Dehtiarivska Street. None of these three bridges cross railways or rivers, meaning that traffic have been effectively managed with traffic signals, as is standard practice in the EU. This approach was proposed by transport planners and civil society organizations, but their rational recommendations were ultimately ignored by city decision-makers.[22]

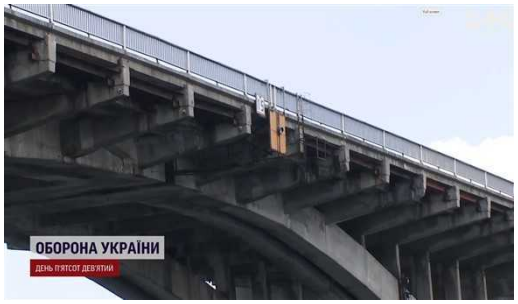
Figure 5. New road interchange in Obolon, opened by V. Klychko in 2024. Photo: Mayor's Office.

The problem of the deteriorating condition of strategically important bridges is not limited to Kyiv. For many years, the Kryukiv Bridge over the Dnipro in Kremenchuk (built in 1948) and the Varvarivskyi Bridge over the Southern Bug in Mykolaiv have been in a problematic state. The latter was officially declared structurally deficient back in 2008[23], just 44 years after it was put into operation in 1964. In October 2023, the Government approved the transfer of this bridge, along with another bridge in Mykolaiv, to the state balance. [24]

Table 7. Examples of Strategic Bridges in Ukraine and Their Condition

[22] Черговий міст «утомився» в Києві. Це причина переглянути підхід КМДА до шляхопроводів і розв'язок, The Village, 03.10.2023, https://www.village.com.ua/village/city/transport/344075-chergoviy-mist-utomivsya-v-kievi-tse-prichina-pereglyanuti-pidhid-kmda-do-shlyahoprovodiv-i-rozv-yazok

[23] Південнобузька мостова переправа. 57 років тому в Миколаєві відкрили Варварівський міст - Суспільне, 18.07.2021, https://suspilne.media/mykolaiv/148417-pivdennobuzka-mostova-pereprava-57-rokiv-tomu-v-mikolaevi-vidkrili-varvarivskij-mist/

	**Southern Bridge over the Dnipro River.** Kyiv. Opened in 1990 (34 years of operation). Currently in the fourth condition state (limited operability).
	**Northern bridge crossing over the Dnipro.** Kyiv. The bridge crossing was opened in 1976 (48 years). The cable-stayed bridge is in a limited operability (fourth) condition state, while the bridge over the Desenka River is in a non-operable (fifth) condition state.
	**Metro Bridge over the Dnipro River.** Kyiv. Opened in 1965 (59 years). The main bridge over the Dnipro is in a fifth (non-operable) condition state, while the bridge over the Rusanivska channel is in a fourth (limited operability) condition state.
	**Paton Bridge over the Dnipro River.** Kyiv. Opened in 1953 (72 years). A welded steel bridge with the status of an architectural monument. It is in a fifth (non-operable) condition state.
	**Kryukivskyi Bridge over the Dnopro.** Kremenchuk. Opened (restored) in 1948. In 2019, citizens submitted a petition to the President of Ukraine, claiming that the bridge “has been in a critical (emergency) condition for 30 years” and that the balance holder, Ukrzaliznytsia (Ukrainian Railways), has not been carrying out repairs.[25]

[24] Уряд передав важливі мости в Миколаєві в управління Агентства відновлення, — Денис Шмигаль, Урядовий Портал, 13.10.2023, https://www.kmu.gov.ua/news/uriad-peredav-vazhlyvi-mosty-v-mykolaievi-v-upravlinnia-ahentstva-vidnovlennia-denys-shmyhal

[25] Електронні петиції, №22/068662-еп, https://petition.president.gov.ua/petition/68662

Delayed construction projects and unfinished bridges

A widespread problem in Ukraine is that bridge construction projects often take significantly longer than what is specified in the project and cost documentation. Such projects are commonly referred to in the media as “dovgobud” (from „building long“). Sometimes construction work stops for several years or even decades. It is impossible to estimate the total number of such long-term projects across the country, but every industry expert or concerned citizen can recall at least one bridge that either has been under construction for decades (receiving “new impulses” with the emergence of new presidents or mayors), has not been built at all for a long time, or has been partially built and opened but not completed fully. Examples of such projects include large strategic crossings over the Dnipro River, as well as many local (non-strategic) bridges, which are relatively simple in terms of structural design and project management.

The Podilsko-Voskresensky Bridge Crossing in Kyiv is a complex and extremely expensive project, marked by serious issues in its planning and design decisions.[26] The bridge stands as a typical example of mistakes in strategic and transport planning, as well as questionable design and management choices. According to publications from 2017, the German government was willing and financially able to assist Kyiv in completing this project. As part of the preparation and studies, there were numerous visits by the Federal Minister of Transport and Digital Infrastructure of Germany, Alexander Dobrindt, site visits, and negotiations with the newly elected Kyiv mayor, Vitali Klitschko. However, all these negotiations and visits ended without results — in the same year, 2017, the completion of the bridge was entrusted to a front company connected to Denis Komarnytskyi[27], who was close to the city leadership and later officially named by the NABU (National Anti-Corruption Bureau of Ukraine) as the organizer of a criminal group. The Germans, based on their research and experience, included this failed project in an academic publication as an example of how not to build bridges.[28] The bridge was included in Kyiv’s Master Plan in 1986, and the design documentation was developed in 1993. Since then, it has been repeatedly updated and revised. The project was supposed to consist of a complex of bridges and overpasses, connecting Voskresenka with the center of Kyiv. Construction began in 1993 but proceeded with long delays. Eventually, vehicle traffic on part of the crossing was opened in 2024. However, the project plans did not include infrastructure for bicycle traffic, despite the fact that in 2017 the Kyiv City Council recognized the bridge as part of a first-category bike route. Only in 2025 were attempts recorded to equip the bridge with bike lanes, marked by road paint.[29]

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[26] “З нізвідки в нікуди. Де буде починатися і закінчуватися Подільський міст”, Економічна правда, 19.08.2019: https://epravda.com.ua/publications/2019/08/19/650111/

[27] Комарницький з Кличком і Тищенко присвоїли 6 млрд грн, виділені на Подільсько-Воскресенський міст, 30.06.2020: https://www.rbc.ua/ukr/news/komarnitskiy-klichko-tishchenko-prisvoili-1593508134.html

[28] "Міст на Троєщину" увійде в німецький посібник - Deutsche Welle, 05.04.2017: https://www.dw.com/uk/%D1%8F%D0%BA-%D0%BD%D0%B5-%D1%82%D1%80%D0%B5%D0%B1%D0%B0-%D0%B1%D1%83%D0%B4%D1%83%D0%B2%D0%B0%D1%82%D0%B8-%D0%BC%D1%96%D1%81%D1%82-%D0%BD%D0%B0-%D1%82%D1%80%D0%BE%D1%94%D1%89%D0%B8%D0%BD%D1%83-%D1%83%D0%B2%D1%96%D0%B9%D0%B4%D0%B5-%D0%B2-%D0%BD%D1%96%D0%BC%D0%B5%D1%86%D1%8C%D0%BA%D0%B8%D0%B9-%D0%BF%D0%BE%D1%81%D1%96%D0%B1%D0%BD%D0%B8%D0%BA/a-38309919

The Darnytskyi rail-and-road bridge in Kyiv, unlike the Podilsko-Voskresenskyi crossing, was constructed relatively quickly. Work began in 2004, rail traffic started in 2010, and automobile traffic in 2011. The rapid construction pace is explained by the fact that the project was implemented by JSC "Ukrzaliznytsia" (Ukrainian Railways). However, in 2011 the structure was opened in an unfinished state, as not all planned ramps from the bridge were built. Some were completed between 2012 and 2023, but one of the ramps on the left bank still remains unbuilt, so the entire project remains incomplete.[30].

The "New Bridge" in Zaporizhzhia. Construction began in 2004 and progressed slowly over the next 10 years before being halted. Work resumed in 2016-2017 but was stopped again. The bridge's structures stood above the Dnipro River for over 15 years, exposed to weather conditions without any anti-corrosion protection. The project received a new boost in 2019 under President Zelensky, and in 2022 the bridge was partially opened — allowing vehicle traffic on some sections under a temporary scheme. However, with the full-scale war starting in 2022, construction work ceased, and the bridge crossing remains unfinished.

The "New Bridge" in Kremenchuk. The decision to build this bridge was made back in 1989, and project documentation was commissioned at the same time. From 1993 to 2022, there were numerous attempts to organize the construction of the bridge, including the creation of working groups and a separate legal entity. In 2002, President Leonid Kuchma instructed the Cabinet of Ministers to design and build the bridge. In 2012, Prime Minister Viktor Yanukovych, during a visit to Kremenchuk, announced plans to start construction in 2013. Construction work did begin that year with the erection of one of the supports, but the project stalled at that point.

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[29] ПОДІЛЬСЬКИЙ МІСТ: ПРЕЗЕНТУВАЛИ НОВУ СХЕМУ РУХУ З ВЕЛОСМУГАМИ ТА БЕЗ ВІДОКРЕМЛЕНИХ ТРАМВАЙНИХ КОЛІЙ - https://kiev.vgorode.ua/ukr/news/transport_y_ynfrastruktura/a1273881-podilskij-mist-prezentuvali-novu-skhema-rukhu-z-velosmuhami-ta-bez-vidokremlenikh-tramvajnikh-kolij

[30] "Дві половини Дарницького моста живуть окремим життям" - The Village, 16.11.2024: https://www.village.com.ua/village/city/infrastructure/356929-dvi-polovini-darnitskogo-mosta-zhivut-okremim-zhittyam-e-horosha-novina-vin-mayzhe-spravniy-nbsp

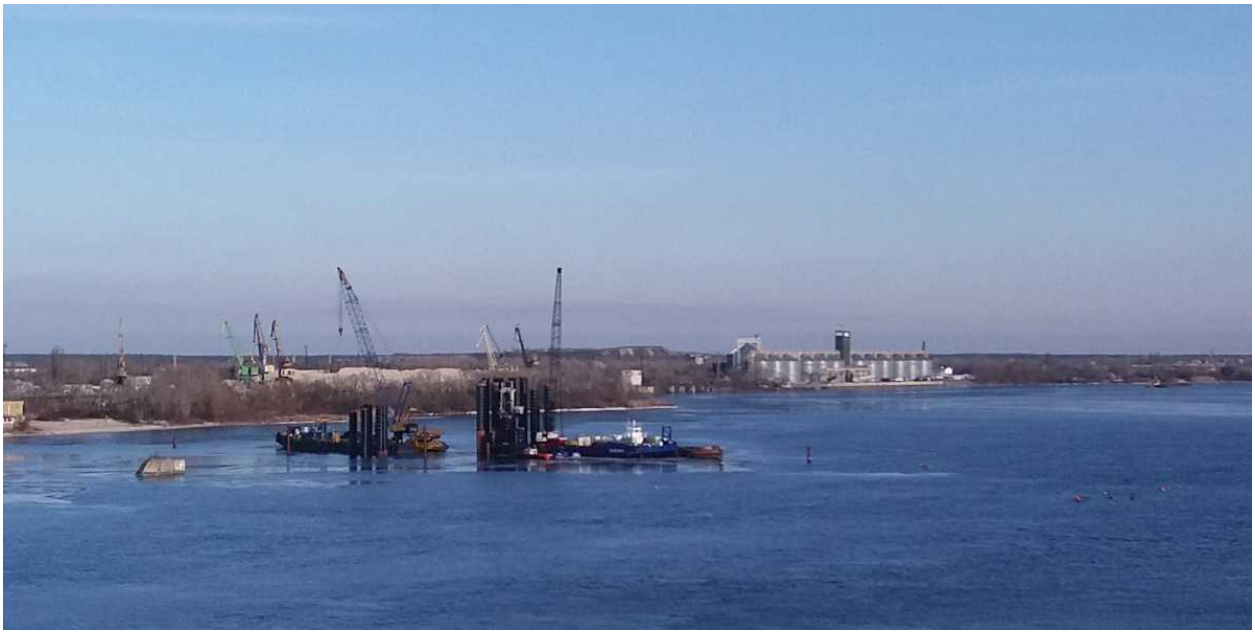


Figure 6. Construction site of the new bridge across the Dnipro River in Kremenchuk in 2013. Archive photo.

The next steps toward the bridge's construction were taken in January 2021, under President Zelensky: a tender was held, won by a Turkish company. *"The estimated start of construction is spring 2021. According to plans, the construction will last three years*," reported Ukravtodor, [31] led by O. Kubrakov. However, these announcements did not materialize, and between 2021 and 2024, work on the project was not resumed.

Overpass over the railway in Kherson. The decision on the need for an overpass in the Tavriyskyi neighborhood was included in Kherson's master plan in 1986. In 1989, design work began at the research institute "Mosdorproekt." After a long pause, the project documentation was finalized, and construction was ceremoniously launched under the banners of the "Party of Regions" in 2012, but work stopped again. In 2017, construction resumed, marked by burying another time capsule for future generations, but this attempt was short-lived as well. In 2019, the head of the Kherson Regional State Administration, Yurii Husiev, stated that the project was planned to be completed with a €25 million EBRD, which did not happen. In 2020, funding and construction continued under the so-called "Great Construction" program, despite the fact that the bridge has no strategic importance for the state. In the summer of 2021, the project was "partially opened," meaning one half was opened without sidewalks. The second phase and sidewalks were promised to be opened by the end of 2021, [32] but this was not fulfilled. In winter 2022, Kherson was occupied, and in 2023 it was liberated.

[31] https://hmarochos.kiev.ua/2021/01/22/turetska-kompaniya-buduvatyme-kremenchutskyj-mist-cherez-dnipro-proyekt/

[32] "З'єднав місто: першу частину масштабного шляхопроводу відкрили в Херсоні", 25.04.2021: https://kanaldim.tv/soedinil-dve-chasti-goroda-pervuyu-chast-masshtabnogo-puteprovoda-otkryli-v-hersone-video/

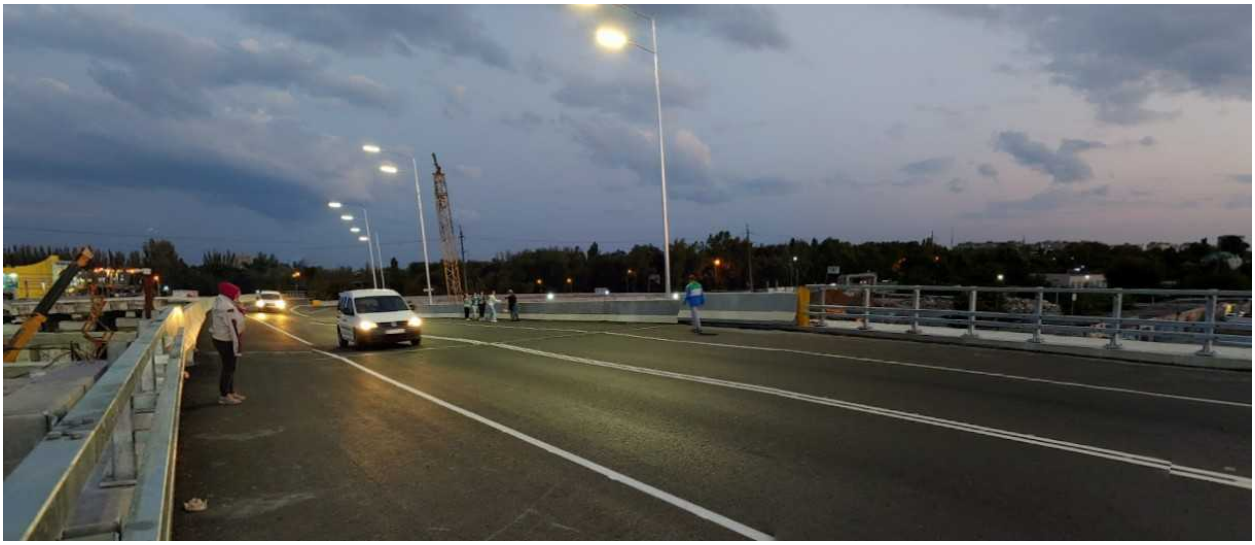


Figure 7. Unfinished overpass in Kherson – project in implelemtation since 1989. Photo Google Streetview.

As of 2025, the overpass remains only partially built (one half) and lacks sidewalks. However, the project design includes as many as four lanes for automobile traffic. The project budget has continuously increased: in 2012 it was 197 million UAH, by 2017 it rose to 357 million UAH, and in 2021 it exceeded 1.5 billion UAH. There have been corruption scandals and criminal investigations. After 37 years since the start of design, the bridge is still unfinished.

The bridge in Ivano-Frankivsk over the Bystrytsia-Nadvirnianska River. The first stone was ceremoniously laid by the city mayor, Ruslan Martsynkiv, in spring 2016. The project immediately faced criticism from residents due to questionable planning decisions: the bridge is located next to an existing one, it has only two traffic lanes, narrow sidewalks that end at stairs, no provision for trolleybus traffic or bicycle infrastructure, road safety concerns, and lack of transport planning. Meanwhile, work on site continued, and the cost increased from 120 million UAH to 426 million UAH in the first two years. Due to funding issues, work was halted. In 2020, the city council managed to lobby funds from the state budget as part of the “Great Construction” program, even though this local bridge lacks strategic significance for the state. Work resumed, and costs rose again. Construction, which was supposed to take one year, has already lasted 9 years. The expected cost is approaching 1 billion UAH [33], while the exposed steel elements of the bridge are suffering damage due to corrosion. Anti-corrosion treatment and painting have not been carried out during these 9 years.

[33] https://suspilne.media/ivano-frankivsk/952791-mer-marcinkiv-rozpoviv-koli-u-frankivsku-planuut-vidkriti-novij-mist-na-pasicnu/

Figure 8. The delayed bridge project in Ivano-Frankivsk. Photo: Suspilne.

Strengths of Ukraine's Bridge Sector

Th Ukrainian bridge sector not only faces problems and challenges but also undoubtedly has significant positive aspects that deserve to be highlighted and considered by those interested in this field.

1. **Strong engineering traditions and skilled engineers.** Since 1991, thanks to higher education institutions in Ukraine, a new generation of bridge engineers has been formed who are successful, knowledgeable, and productive. This human capital holds significant potential for further effective work in the next 15-25 years both in Ukraine and within the unified European market. At the same time, Ukraine suffers from a shortage of students and young specialists willing to study civil engineering and become quality engineers. However, Ukraine's engineering school lacks international integration and exchange between Ukrainian academic, student, and engineering communities with foreign colleagues. Previously, international knowledge and practice exchange happened mainly with Russia and Belarus, but after 2015, especially after 2022, this connection naturally ceased.
2. **Extensive practice of bridge design and construction in 2017 – 2024.** During these years, clients and contractors in Ukraine implemented hundreds of bridge projects of varying complexity and scale. Ukraine has developed an ecosystem of engineers, suppliers, manufacturers, contractors, researchers, and other specialists and organizations who have actively worked and built up their individual and organizational capacities in recent years. This means Ukraine possesses fresh experience, up-to-date technologies, and a large number of recent projects — all forming a solid foundation for large-scale reconstruction of bridges in Ukraine within relatively short timelines.

3. **Adaptability and ability to learn**. Ukrainian engineers and companies quickly adapt to changes in regulatory environments. While Eurocodes have remained unchanged for over 15 years, Ukrainian DBNs (state building norms) have undergone dozens of changes and updated editions. The Ukrainian engineering community not only incorporates changes in norms but continuously learns new technologies, methods, and software. Active professional development and training occur already on the job.
4. **High competence and considerable experience in bridge inspection and digitization.** Ukrainian standards for inspection and assessment of the operational condition of bridges are well developed and proven in practice. The key expert center for bridge inspection is the State Enterprise "National Institute for Infrastructure Development," while other research and engineering institutions also have significant experience conducting inspections, creating digital bridge passports, digital models, and more.
5. **Strong capacity of the construction sector**. Thanks to sufficient funding of the road industry in 2017-2023, Ukrainian road construction companies developed, created bridge and engineering divisions, built networks of partners, suppliers, and contractors, and gained valuable experience executing complex projects within short deadlines, cooperating effectively and finding optimal solutions. The Ukrainian construction sector has modern equipment, human resources, and financial capital. However, this situation is not stable, as the market became much more complicated after 2024.
6. **Convergence of Ukrainian norms and standards with European standards**. As mentioned elsewhere in this research, Ukrainian DBNs related to loadings are already close to Eurocodes, and many old state standards regarding materials and components have been replaced with European Standards (EN). This alignment will facilitate Ukraine's future transition to Eurocodes, which will, of course, be accompanied by national annexes.

Destruction in 2022 and „Rapid Reconstruction"

The full-scale invasion of Ukraine by the Russian Federation began on February 24, 2022, and active hostilities were ongoing at the time of preparing this publication. During the tragic events of the war, bridges often became victims of the situation. Some were blown up by Ukraine's defense forces to stop the advance of enemy convoys, while others were destroyed by Russian airstrikes or during the occupiers' retreat. Particularly significant losses of bridges occurred in the Kyiv, Chernihiv, Kharkiv, Kherson, and Mykolaiv regions (not to mention the Donetsk region, the situation there will become clear after the war ends).

War Damage of 2022

According to information from the State Reconstruction Agency as of June 2023[34], as a result of Russian military aggression, 346 bridges and overpasses were damaged or destroyed, of which 157 were on roads of national importance. Information on the number of damaged and destroyed structures after June 2023 has not been published in open sources. Active hostilities continued throughout 2023 and 2024, with the front line shifting. Final assessments of destruction should be conducted only after the cessation of hostilities. Among the bridges destroyed during the military actions were several strategic crossings over the Dnipro River — the Antonivskyi Bridge near Kherson and the bridge crossing over the dam of the Kakhovka Hydroelectric Power Plant.

Figure 9. Antonivskyi Bridge over the Dnipro River near Kherson, destroyed by military actions. Archive photo.

How extensive are these losses? Given the concentration of destruction in several regions, these are undoubtedly massive losses for the country's transportation system, society, and the state as a whole. However, if we consider the total number of bridge structures in Ukraine, 346 represents approximately 1.2% of the 28,500 bridges officially recorded. For comparison, the number of bridges that are already in an unserviceable (fifth) operational condition is 2,211 — nearly six times more.

[34] https://gmk.center/ua/opinion/u-vidbudovi-mostiv-vikoristovuietsya-lishe-ukrainskij-metal/

Without in any way downplaying the significance of Ukraine's infrastructure losses caused by the criminal armed aggression of the Russian Federation, it can still be said that — even in the absence of direct military action — a much larger number of bridges in Ukraine are gradually deteriorating due to wear and tear, aging, and a lack of proper maintenance. In the former case, the culprit is clear; in the latter, there is no single person or entity to blame.

„Rapid Reconstruction" of 2022-2023

In the spring of 2022, the country's leadership made a strategic decision to begin rebuilding bridges without waiting for the war to end. This reconstruction was to proceed under the banner of speed. Just a month and a half after the start of the full-scale invasion, the President of Ukraine announced a commitment to rapid recovery:

"I am confident that we will be able to rebuild our country quickly, no matter the scale of the damage… It will be a historic reconstruction. A project that will inspire the world just as much as our fight for freedom. Just as much as our fight for Ukraine" — declared President Zelensky on April 11, 2022.[35]*.*

Figure 10. Infographic published by the State Agency for Restoration on May 30, 2023

In May 2023, a year after the President's declaration on rapid reconstruction, the State Agency for Restoration reported that 12 war-damaged bridges had already been rebuilt, and work was ongoing on 25 additional structures across Zhytomyr, Kyiv, Chernihiv, Kharkiv, Kherson, and

[35] Зруйновані будинки і мости: Зеленський показав наслідки російського вторгнення - Державна агенція "Укрінформ", 11.04.2022, https://www.ukrinform.ua/rubric-ato/3454875-zrujnovani-budinki-i-mosti-zelenskij-pokazav-naslidki-rosijskogo-vtorgnenna.html

Mykolaiv regions. In total, 37 bridges were under the scope of the so-called "rapid restoration" initiative. [36]

Monitoring of the “Rapid Reconstruction”

Researcher Oleh Hrechukh points out, that in 2022–2023, speed was prioritized over procedures, building codes, and legal requirements.

> *“Contracts for bridge reconstruction were signed without complying with public procurement legislation, without competitive tenders, and without adhering to required project design stages. A so-called ‘design–build’ model became widespread in public contracts—despite it being absent from Ukrainian legislation. This model was interpreted as a wartime necessity.”*

To assess the cost dimension of the rapid reconstruction efforts, researchers Oleh Hrechukh and Viktor Zagreba collected and analyzed all accessible data on bridge projects in two regions where the recovery effort began earliest: Kyiv and Chernihiv oblasts. The monitoring included only bridges on national roads. Key data sources used were the government platforms *DREAM.gov.ua, Prozorro.gov.ua, e-Construction.gov.ua*. Additional sources included media reports and official responses from the Reconstruction Services in Kyiv and Chernihiv oblasts to information requests. Despite limited access to information on rapid reconstruction projects, the researchers were able to gather critical data. Although they could not access project engineering documents, which made it impossible to evaluate the volume of materials used, they did succeed in collecting valuable data on estimated (preliminary) costs for all monitored projects, and final (actual) costs for a subset of those projects.

Table 8. Scope of the “Rapid Reconstruction” Bridge Monitoring in Two Oblasts

Oblast	Number of bridges	Total length, meter	Preliminary cost, UAH
Kyivska	14	2008	4 458 668 577,00
Chernihivska	12	3105	8 064 816 472,00
Total	**26**	**5113**	**12 523 485 049,00**

The data from this monitoring exceed the figures published by the State Restoration Agency in May 2023. At that time, the Agency reported only 10 bridges each for Kyiv and Chernihiv Oblasts — a total of 20 sites. In contrast, the monitoring revealed that regional restoration services were

[36] “Агентство відновлення продовжує активно відбудовувати мости в Україні” - Сайт Держвідновлення, 20.05.2023, https://restoration.gov.ua/press/news/55516.html

actually working on 26 bridges across these two oblasts. This discrepancy in government data was noted multiple times during the research.

The monitoring of rapid bridge reconstruction projects in Kyiv and Chernihiv Oblasts led to the following general findings:

1) **Lack of publicly available data on projects.** The monitoring revealed that it is impossible to find comprehensive, detailed information about the reconstruction projects in open sources. Moreover, this lack of transparency was more pronounced in Chernihiv Oblast than in Kyiv Oblast. The data from this monitoring exceed the figures presented in the State Recovery Agency's publication from May 2023: at that time, Kyiv and Chernihiv regions were reported to have 10 bridges each, totaling 20 objects. According to the current monitoring, regional recovery services have been working on 26 bridges in these two regions. Such discrepancies between information from the state have been repeatedly identified during the research.

Table 9. Public Availability of Data on "Rapid Reconstruction" Bridge Projects

Indicator	Kyivska oblast	Chernihivska oblast
Procurement portal Prozorro.gov.ua	3 of 14	6 of 12
State construction portal e-construction.gov.ua	0 of 14	7 of 12
Data on bridge length	14 of 14	12 of 12
Data on bridge width	13 of 14	7 of 12

Avoiding the publication of information about public construction projects, such as bridges and roads, is not a new phenomenon. It was regularly observed even before 2022, despite political statements about accountability and transparency as tools to prevent corruption. Typical methods of hiding project information include refusing to publish cost calculations for construction works on *Prozorro.gov.ua*, or publishing only generalized forms of cost calculations which makes analysis and verification impossible.[37]

2) Cost of bridges per square meter. The monitoring outcomes made it possible to calculate the relative cost (per square meter) for a significant portion of newly constructed bridges. This calculation was conducted for 13 newly rebuilt bridges in Kyiv region and 2 bridges in Chernihiv region. The calculations did not include projects that (a) lacked data on bridge width, and (b) had only partial damage, such as cases where only one or several spans were destroyed and then rebuilt, with the rest of the structure intact. The cost per square meter was calculated in Ukrainian

[37] Топ-тендери тижня: шляховики дали 479 млн на ремонт мосту – ціни будматеріалів НЕ показали і порушили методику Кубракова - Наші Гроші, 09.04.2023, https://nashigroshi.org/2023/04/09/top-tendery-tyzhnia-shliakhovyky-za-479-mln-vidremontuiut-mist-po-novym-neprozorym-pravylam-tsinoutvorennia-kubrakova/

hryvnias based on expected project costs obtained from the construction expert reports, and for easier international comparison, converted at the time-relevant exchange rates into Euro and US dollars. The full set of collected data on all projects has been processed in electronic spreadsheets, and a brief table with outcomes in presented below.

Table 10. Estimated Cost of "Rapid Reconstruction" Bridges, per Square Meter

	Title	Lenth, meter	Width, meter	Surface, sq. meter	Cost per 1 sq.meter
1	New construction of a bridge over the Irpin River at km 5 + 621 of the road R-30	114.97	21.6	2,483.35	**6 872,13**
2	Overhaul of the bridge over the Irpin River at km 23 + 470 M-07	138,4	21,6	2989,44	**2 044,62**
3	Overhaul of the bridge over the Irpin River at km 36 + 490 R-02	155,95	12,75	1988,36	**5 598,97**
4	The bridge over the Desna River on the M-01 highway. Southern entrance to the city of Chernihiv, km 11+414	58,14	11,55	671.00	**5 163,93**
5	The bridge over the Desna River on the road P-65 km 80+650	60,2	8,5	671.00	**2 953,96**
6	Reconstruction of the overpass via the railway at km 133 + 600 of the public highway H-07 Kyiv - Sumy - Yunakivka	83,25	32,6	2713,95	**3 345,12**
7	Overhaul of the bridge over the Bilous River at km 157 + 876 of the public highway M-01 Kyiv — Chernihiv — Novi Yarylovichi	132,35	11	1455,85	**2 982,16**
8	Bridge over the Zamglai River at km 12 + 264 of the state road N-27 Chernihiv — Mena — Sosnytsia — Gremyach	36,8	9,5	349,6	**2 970,16**
9	Bridge over the Desna River at km 9 + 244 of the public road T-25-21 /M-02/	334,32	13,25	4429,74	**2 010,79**
10	The bridge over the Seim River on highway M-02 km 126+780	289,63	11	3185,93	**5 509,47**
11	Overhaul of the bridge over the Desna River at km 136+177 of the public highway M-01 Kyiv — Chernihiv — Novi Yarylovichi	102	11	1,122.00	**5 730,53**
12	Bridge over the Bilous River at km 10 + 474 of the T-25-06 public road	84,11	11	925,21	**12 344,78**
13	Overhaul of the bridge over the chanel at km 3 + 447 of the public highway M-01 Kyiv — Chernihiv — Novi Yarylovichi	310	11	3,410.00	**3 372,68**
14	Reconstruction of the overpass via the railway at km 161+113 of the public highway M-01 Kyiv — Chernihiv — Novi Yarylovichi	108,87	16	1741,92	**2 912,87**
15	Overhaul of the bridge over the Smiach River at km 49+804 of the public highway H-28 Chernihiv — Gorodnia - Senkivka	631,61	23	14527,03	**10 276,56**
	Average				**4939,25**

Cost of New Bridges in Ukraine

As seen from the table on previous page, the average cost for the 15 studied bridge projects included in the rapid reconstruction plans for 2022-23 was 4,939 euros per square meter. For 13 of these projects, the cost ranged between 2,000 and 7,000 euros per square meter. Two projects stand out with significantly higher costs, which is indicated by the costs of 10,276 and 12,344 euros per square meter.

Additionally, the study revealed significant discrepancies between the initially declared estimated costs of the projects and the costs found in the project documentation. According to interviewed experts, this is expected and understandable when the preliminary cost estimates are lower than those later determined in the detailed design and estimate documentation. This can be explained by objective circumstances: the clients did not have complete information about the extent of the damage and the future scope of work, and the costs of materials, fuel, and labor in 2023 became significantly higher than in the pre-war year of 2021.

The study revealed a significant fact of substantial cost increases already at the construction stage, after the development and approval of the project and estimate documentation. This concerns the largest object in the conducted monitoring — the so-called “Chernihiv Bridge” [38], which cost taxpayers €10,276.56 per square meter, twice the average rate. According to public sources and responses from the Recovery Service in Chernihiv Oblast, the cost of this project during construction rose from 4.854 billion to 5.806 billion hryvnias, approximately a 1 billion hryvnia increase. This represents a +20% increase compared to the project estimate documentation. Such significant cost growth during construction is not a new phenomenon in Ukraine. It is highly likely occurring with other “quick recovery” projects as well, but remains unknown to the public.

Comparison with Poland

As part of the study, the author collected from open sources information for a sample of 14 bridge projects in Poland. These bridges were put into operation roughly during the same period when Ukraine was carrying out the “rapid reconstruction” announced by the President. The Polish sample, like the Ukrainian one, is diverse: bridge lengths range from 16 to 815 meters, widths from 12 to 25 meters. Similar to Ukraine, some projects included dismantling old structures and site preparation, some involved construction or reconstruction of access roads and artificial lighting, and some used existing foundation supports. Each bridge project is unique, so it’s impossible to account for all differences—especially without access to design documentation. Nevertheless, the random and diverse selection of Polish bridges, with varying types, sizes, and structures, allows for an informative and reliable generalization and comparison, provided methodological consistency is maintained.

[38] Будівництво мосту через р. Десна на автомобільній дорозі державного значення М-01 Київ - Чернігів - Нові Яриловичі (на м. Гомель). Південний під'їзд до м. Чернігова, км 11+414.

Similarly to the monitoring of projects in Ukraine, the authors collected from open sources information on the length, width, and cost of each bridge project in Poland and calculated the cost per square meter in different currencies, using the exchange rate current for the year the project was completed.

The results of the comparative study showed that bridges in Ukraine during 2022–2024 were significantly more expensive than bridges in Poland — by 47.9%.

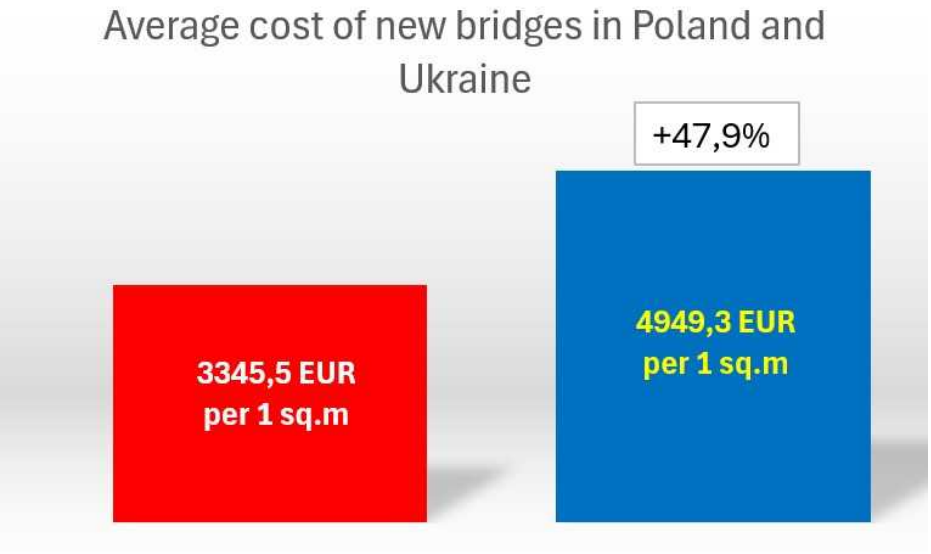


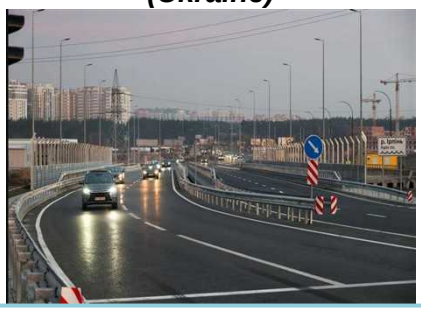
Figure 11. Revealed difference in the cost of bridges in Ukraine and Poland

Key findings of the Ukraine-Poland bridge cost comparison:

1. The average cost of bridges in **Ukraine exceeds that of Poland by 47.9%** (4,949.4 euros per 1 sq. meter in Ukraine versus 3,345.5 euros in Poland);
2. All bridges in Poland, except one, **have a cost significantly lower** than the average Ukrainian cost of 4,949.4 euros;
3. The most expensive bridge **in Ukraine is 368% more costly** than the average cost of bridges in Poland per 1 sq. meter;
4. There are no bridges in Ukraine **costing less than 2,000 euros** per 1 sq. meter, while Poland has three such bridges;
5. In Ukraine, **7 bridges cost more than 5,000 euros** per 1 sq. meter, whereas in Poland there was only one such bridge.

Regarding point 5, the high cost of one bridge in Poland is likely explained by the chosen architectural and engineering solutions, which were not observed in Ukraine. It is a modern arch bridge with a 120-meter span, without supports in the riverbed. It cost taxpayers 6,446 euros per 1 square meter

Table 11. New bridges over the Sola River (Poland) and over the Irpin River (Ukraine)

	Bridge over the Sola River (Poland) 	***Bridge over the Irpin River (Ukraine)*** 
Length	*129 m*	*114 m*
Width	*12 m*	*21.6 m*
Area	*1548 sq.m.*	*2437 sq.m.*
Type	*Arched steel*	*Beam reinforced concrete*
Span	*120 meters*	*24 and 33 meters*
Project cost	*10.05 million EUR (43 million PLN)*	*17.06 million EUR (663.77 million UAH)*
Cost per 1 sq.m.	*6497 EUR*	*6872 EUR*

Problem Identification from a Public Policy Perspective

The state of bridges in Ukraine faces drastic challenges, and the trend is negative. The number of structures requiring attention is enormous, project costs are disproportionately high, and planning and design decisions often raise questions. Some bridges are collapsing, while others remain unfinished for decades. All these identified and described facts and trends are the result of systemic and long-standing problems in state policy and public asset management practices. These problems are detailed in the following sections.

What are the causes of these outcomes? This section takes a deeper look: it formulates and describes less obvious but more fundamental problems from the perspective of state policy and public administration.

Improper Maintenance

Bridge maintenance is a meticulous and well-regulated process. It involves a set of scheduled routine tasks, as well as minor repairs carried out as needed. Maintaining a bridge can be

compared to owning a car. Regular replacement of fluids, filters, and belts, along with timely diagnostics and minor repairs, ensures reliable and long-lasting vehicle performance. Similarly, regulatory documents specify routine maintenance and repair intervals for bridge components. For example, the maintenance interval for bridge expansion joints is 15 years, and waterproofing needs to be replaced every 10–15 years. Other bridge elements also require care, anti-corrosion treatment, and additional work. If maintenance is neglected, defects accumulate over time until repairs become ineffective. Unlike caring for personal cars, however, bridge maintenance has not been a priority for decision-makers over recent decades.

> *"Funds for bridge are barely allocated; all maintenance is limited to snow removal, salting, and patching potholes. Because of this, bridges last significantly less than they should,"*

says Serhiy Rud, a bridge engineer who has participated in the design of over a hundred projects. Engineer Anna Minyukova offers a similar assessment:

> *"For the past 30 years, the strategy for bridge maintenance in Ukraine has been and remains — do nothing until a critical point is reached, when building a new structure becomes easier and cheaper than repairing the existing one."*

These assessments are supported both by statistical data on the condition of bridges in Ukraine (see Section 1) and by specific examples of bridges rapidly deteriorating into hazardous states. The Northern Bridge crossing in Kyiv is less than 50 years old but is already in an emergency condition. The Southern Bridge in the capital — nearly as old as Ukraine's independence — has been in operation for only 35 years but has long been problematic and is currently classified in the fourth operational condition category.

It is important to note that even unfinished or "frozen" projects require maintenance because the installed elements begin their service life and are subjected to static loads, precipitation, temperature changes, and so on. Unfinished components stand exposed for years or decades, suffer corrosion, and naturally make further successful maintenance far less likely.

Lack of Strategic Differentiation

Not all bridges are equally important for the state and society. Some bridge structures can safely serve their planned operational life of 60–80 years and be replaced through traffic closure and reconstruction. For example, bridges over small rivers, railways, or overpasses over other roads often have no strategic importance from a transport connectivity perspective, regardless of the classification of the road they are on, especially if traffic can be quickly and cheaply redirected around them or a grade crossing can be organized.

In Ukraine, cheap and simple temporary bridges are sometimes built over small rivers (which often serve for years or even decades), and crossings at grade can be organized over railways or roads.

An example of a bridge that turned out to be non-strategic, despite being located on a state highway, is the railway overpass in the village of Delyatyn in the Carpathians near Yaremche, on the H-09 highway. This dilapidated bridge underwent major repairs in 2021 with [39] At that time, a temporary detour was arranged near the overpass for passenger cars and small trucks, while larger trucks were rerouted through other nearby settlements.

Despite significant tourist traffic on this road, the prolonged closure of this structure did not lead to any negative consequences at a strategic level. It turned out that the temporary closure of this bridge was not strategically important for the state, the region, or the local communities.

At the same time, there are bridges that have strategic transport importance for the state. Taking them out of service, even temporarily, is extremely costly for society, the economy, and the country's connectivity. This is not about sabotage risks, but about the bridge's transport function and what happens if it goes out of operation. The absence or remoteness of alternative routes across the obstacle, the complexity or impossibility of building a temporary crossing—these factors make the bridge critical and unavoidable. The division into strategic and non-strategic bridges based on these circumstances exists and is applied in Germany, according to an expert.

> *"A bridge over a large river or a sea bay is usually a strategic object. Its service life should exceed 100 years. This is because closing such structures and building new replacements is extremely expensive and complicated,"*

says Michael Bornmann, a German bridge engineer and head of a project company, in an expert interview. He notes that bridges are not considered strategic if a temporary crossing can be arranged quickly and cheaply or if traffic can be rerouted.

In Ukraine, there is no formal distinction between strategic and non-strategic bridges in terms of their transport importance and necessity (i.e., whether they can be bypassed). This follows from an analysis of Ukrainian legislative and technical standards. This is also confirmed in an expert interview by bridge engineer and designer Serhii Rud. *"Officially, such a distinction does not exist*

[39] У Делятині настелили новий міст – конструкція із віражем, 2021: https://kurs.if.ua/society/u-delyatyni-nastelyly-mist-konstrukcziya-iz-virazhem/

in Ukraine. The client can independently determine which bridge is strategic, for example, based on defense considerations. Generally, priority is given to bridges on international roads because these usually have significant traffic flow and serve as key logistical routes," says Serhii Rud, who has worked with bridges for over 20 years.

The absence of classification of bridges by strategic importance at the national level is also confirmed by Ukraine's National Transport Strategy until 2040, approved by the Cabinet of Ministers of Ukraine in December 2024[40]. The strategy's text does not include any discussion of the condition problems of the country's main bridges, nor does it define goals or measures aimed at their preservation and reconstruction. Ukraine's construction norms and regulations (DBN) also do not distinguish requirements regarding the planned service life or maintenance for ordinary bridges versus strategic, important bridges. The only differentiation is by the material from which the bridge is made. For reinforced concrete simply supported bridges, the planned service life is 80 years; for reinforced concrete continuous and steel bridges, it is 100 years.

The absence of a differentiated approach to bridges based on their importance is a striking contrast between Ukraine and EU practices, for example, Germany's. *"From an economic standpoint, it does not make sense to make ordinary, local bridges overly durable. It is more reasonable to plan their renewal every 60–80 years. However, strategic bridges are usually designed and maintained to last over 100 years, ideally indefinitely, and so that repairs can be carried out without a full traffic closure,"* explains engineer Michael Bornmann about the bridge sector in Germany.

[40] https://zakon.rada.gov.ua/laws/show/430-2018-%D1%80#Text

Table 12. Examples of Strategic Bridges Worldwide

	**Hohenzollern Bridge over the Rhine in Cologne, Germany** Built in 1911 as a rail and road bridge. Partially blown up in 1945, it was restored in 1948. In its current state, the bridge serves for railway traffic, pedestrians, and cyclists
	**Sydney Harbour Bridge, Australia** Opened in 1932 and is still serving without problems (for 93 years). Operational maintenance work on the bridge is carried out daily – a dedicated team of specialists constantly works solely on this bridge.
	**Golden Gate Bridge over the San Francisco Strait, USA** Opened in 1937. Thanks to constant care, ongoing repairs, and anti-corrosion measures, the bridge has successfully served for almost 90 years in difficult conditions – fog, winds, and the salty water of the Pacific Ocean.

Absent or Improper Planning

A common phenomenon in Ukraine is the adoption of suboptimal decisions in the planning of bridge projects, or even a complete lack of planning tools usage. Often, a political decision is made that a bridge or overpass is needed, and it must be built at a specific location. However, technical decisions—such as the number of lanes, geometric parameters, and other specifications—are made based on prescriptive building codes that are not grounded in transport planning, comparison of alternatives, or economic analysis.

Transportation engineer Dmytro Bespalov explains that bridge planning should have two levels:

(1) **Prioritization of projects** — deciding which projects to start first and why;
(2) **Technical planning** — determining what kind of bridge is needed, how wide it should be, its cross-sectional profile, load capacities, and so forth.

Bespalov has observed and studied hundreds of transport projects over the last 20 years, both at national and local levels, and came to the conclusion:

> *"Ukraine is failing in both these directions — prioritization and technical planning. We build the wrong projects and build them with parameters that don't meet actual needs. This is terrible from the perspective of efficient use of very limited funds."*

There are many examples of poor planning leading to wasteful projects. For instance, the three local (non-strategic) transport interchanges in Kyiv, completed in 2024, were built without applying transport planning — simply following a political decision by Kyiv's leadership.

TEO instead of a proper Feasibility Study

A typical stage in project planning in the Western world is the Feasibility Study, which also has a shortened (simplified) version called the Pre-Feasibility Study. In Ukraine, this stage is not considered part of planning (research) but part of project design, and this design phase is called the Technical and Economic Justification (TEO) [41] . In Poland, the Feasibility Study is called "badanie wykonalności drogi" or "studium wykonalności" (feasibility study), and it is conducted during the investment preparation phase, not as a part of the design phase.

Feasibility Study in the theory and practice of successful countries is a stage of formal technical planning, during which baseline information is collected (geodetic and geological surveys, land use analysis, environmental studies), and various project implementation options are developed and compared from transport, technical, economic, environmental, and social perspectives. The goal is to provide policymakers and managers with the most complete information to choose the most optimal option that meets needs and budget. At this stage, the project concept and basic parameters are formed, consultations with stakeholders take place, along with presentations and discussions.

Engineer Dmytro Bespalov, who has worked extensively with the TEO stage in Ukraine and Feasibility Studies abroad, shares his assessment:

[41] Відповідно до ДБН А.2.2-3:2014 «Склад та зміст проектної документації на будівництво».

"From my experience, in Ukraine TEO documents are usually of low quality, containing little engineering, few facts and baseline data. There are many general phrases, and often 'pulling things by the ears,' where there is a favored option and fake competitor variants are created."

Bespalov adds that clients and designers in Ukraine are often aware of serious shortcomings in the TEO documents and take a lenient attitude, saying, "It's okay, we will fix everything at the next stage." However, these errors usually remain uncorrected in subsequent stages and carry over into the working design. Bespalov has also seen cases where purely imitative TEOs for bridges or overpasses were done—completely detached from reality, lacking truthful input data—yet allowed the contractor to receive millions of hryvnias from the budget client, while the client fulfilled the requirement for justification and simply shelved the document labeled "TEO."

Excessive Number of Traffic Lanes

The road leading to and from a bridge may have only two lanes, yet the bridge itself has four lanes (2+2). This is exactly what Ukrainians noticed on the most expensive "rapid reconstruction" bridge built on the approach to Chernihiv. This combination naturally raised questions: why such waste of money? Answer: this is prescribed by the Ukrainian standards.

First problem: DBN V.2.3-4:2015 – the main Ukrainian document regarding bridge planning and design – mandates that "when designing and constructing bridges and overpasses on public roads of categories II and III, which in the future are expected to be expanded to category I parameters, the appropriate widening of bridges and overpasses must be provided to avoid their further reconstruction." So, there is a plan somewhere, that assumes that the currently tw0-lane entrance to Chernihiv will someday have a highway profile 2+2, so the bridge on this road is designed and built to highway standards already now, during the ongoing war and a record-striking cost. And is this future 2+2 upgrade of this road stretch even necessary, considering the very little traffic flows?

Second problem: Linear approach to forecasting traffic flows. Ukraine follows a well-established traditional practice comes from the national norms and standards, in which engineers to calculate a constant and steady annual growth of traffic volume. Usually, a growth coefficient of 4% per year is assumed. Thus, on a road currently carrying 1,000 vehicles (equivalent units) per day, it is expected that in 10 years this will increase to 1,480 vehicles, and in 20 years — 2,229 vehicles.

"I, as an engineer, am forced to use this methodology, although I believe it is fundamentally wrong. Where these 4% per year come from is unclear," says Chief Engineer Kostyantyn Shcherbachenko, who has worked in road projects for over 25 years. Transport engineer Dmytro Bespalov agrees with him. He says that when he first learned about this 4%, he simply didn't believe it: *"I still can't believe that we have such a primitive and illogical standard. Even schoolchildren can calculate this, but here engineers do. In the real world, transport planning doesn't work like that. Demand for travel is much more complex and generally not stable. There*

are four steps you need to go through to forecast demand for a road or bridge. And at every stage, you can influence the figures and change the final demand".

The practice of assuming a fixed annual growth rate in traffic volume is outdated and does not reflect real-world trends or contemporary challenges in transport policy. This becomes clear when comparing traffic volume forecasts made between 2000 and 2025 for routes toward Belarus and Russia — for example, in the Chernihiv region — with actual current traffic data. The forecasts have significantly overestimated traffic growth.

This simplified, post-soviet linear approach contradicts all existing European practices. In the EU, official transport strategies, such as the EU Sustainable and Smart Mobility Strategy[42], emphasize reducing car traffic by avoiding unnecessary trips, shifting freight transport to railways, and promoting urban and local mobility via public transit and cycling.

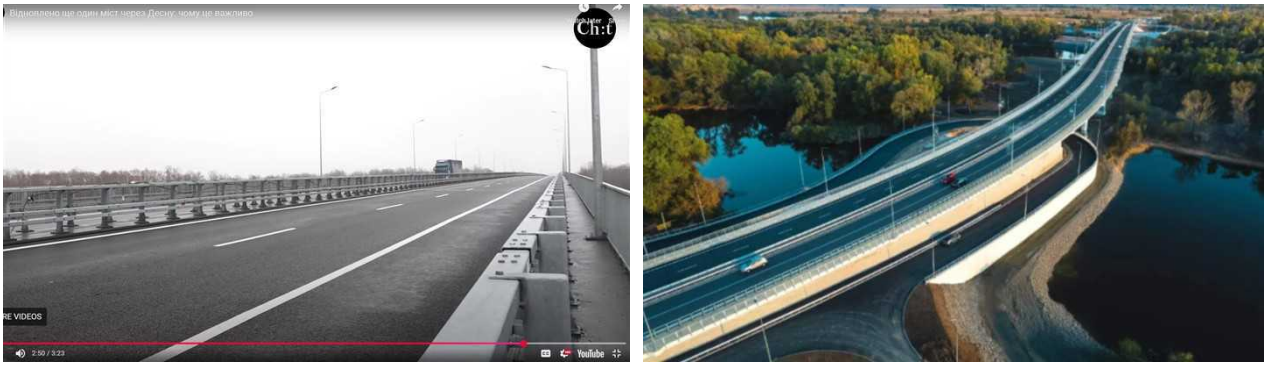


Figure 12. Two "rapid reconstruction" bridges in Ukraine, each featuring 4 traffic lanes. Photos from media reports.

Both rapidly reconstructed bridges near Chernihiv have 2+2 traffic lanes, even though traffic volumes exceeding 21,000 vehicles per day (the threshold according to DBN) have not been present there neither before nor after 2022. The very little traffic flow is also evident from video reports of the newly opened bridges, where only few vehicles are seen to use the bridge.

Figure 13. The new Pelješac Bridge in Croatia, featuring one traffic lane in each direction. Photo: Google Sreetview.

[42] COM/2020/789, «Sustainable and Smart Mobility Strategy – putting European transport on track for the future» (2020): https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789

An international example from the EU. The *Pelješac Bridge* over the sea strait in Croatia (not far from Dubrovnik), opened in 2022, has only one lane in each direction, and this capacity is reasonable for the extensive traffic flows, especially in summer months. According to public data, Croatia receives 20.6 million tourists annually, and the city of Dubrovnik alone accounts for 4.5 million overnight stays per year. In addition to rational dimensions (width), this new bridge in Croatia cost €7,400 per square meter, which is significantly lower cost than with many much simpler and smaller bridges in Ukraine.

Cycling infrastructure provisions

Bridges in Ukraine often ignore bicycle traffic, even when cycling routes are included in local planning and strategic documents. The new bridge over the Irpin River in the village of Romanivka, Kyiv region, built in 2023, lacks bike lanes — cyclists must share the roadway with motor vehicles, putting themselves at risk on this new and expensive bridge.

“The city bike path in Irpin ends right before the bridge on one side of the river, while the other bike path, constructed in 2020 under the regional Recovery Agency’s order, starts on the opposite bank and leads to the nearest metro station toward Kyiv. The client did not include a bike lane in the bridge’s technical specifications, so it was not built,” explains Oleg Grechukh, architect and bridge construction researcher, author of the monograph Bridges of Ukraine.

The Romanivka bridge example is not unique. The unfinished and partially opened Podilsko-Voskresenskyi Bridge Crossing in Kyiv also lacks bicycle infrastructure, even though one of Kyiv’s key bike routes, outlined in the city’s Bicycle Infrastructure Development Concept approved by the Kyiv City Council in 2018, passes over this bridge.[43].

Management and Financial Planning

The widespread issue of lengthy or frozen construction projects in Ukraine is often attributed by clients and politicians to funding problems. However, funding is merely one of the tools for project implementation, and financial planning is an integral part of overall project planning. In EU countries, if an official does not have confirmed sources of funding to fully complete a project according to the approved plan, the decision to start construction — particularly of a bridge — is simply not made.

Delays during implementation do occasionally result from unforeseen issues, such as complications during earthworks. However, far more often the root causes lie in poor planning and project management. These planning errors — including those related to financial strategy — can have severe consequences for society and ultimately make projects significantly more expensive.

“Halting bridge construction is a serious problem. It means that far more money will be required later. Re-establishing the construction site, bringing equipment and personnel back — all of that

[43] Про затвердження Концепції розвитку велосипедної інфроструктури в місті Києві, https://kyivcity.gov.ua/npa/pro_zatverdzhennya_kontseptsi_rozvitku_velosipedno_infrostrukturi_v_misti_kyevi/

is very costly. And then there’s the detection and fixing of defects, revisions to design and cost estimates, and rising prices of materials,” explains engineer Serhii Rud, who has worked on many such delayed projects.

According to standard construction schedules — which are part of a project’s technical and financial documentation — a bridge of 50–70 meters in length should typically be built within 6 to 12 months. Major strategic bridges across the Dnipro River are expected to be completed in 3–4 years. If this doesn't happen, the underlying issues are usually in management and financial planning.

The Problem of Financing

Among politicians and in the expert community, one popular opinion is that the main problem of the bridge sector in Ukraine is a lack of funding — as if, with enough money, there would be no issues. However, the facts do not support this opinion. In the years leading up to 2022, the available funding for road asset managers was sufficient — or even more than sufficient — thanks to successful reforms implemented between 2015 and 2018, which are worth briefly recalling.

In 2016, a process of legislative amendments began, eventually leading to the creation of the State Road Fund as a special fund within the state budget. This fund became operational on January 1, 2018, during the tenure of President Petro Poroshenko, Prime Minister Volodymyr Groysman, and Minister of Infrastructure Volodymyr Omelyan. The state began collecting and allocating dedicated revenues exclusively for road infrastructure, with funding sources including portions of the excise tax on fuel, tires, vehicles, and spare parts. As a result, annual funding for state roads (managed by Ukravtodor) increased from 24.8 billion UAH in 2017 to 135 billion UAH in 2021 — a 5.5-fold increase in just four years.[44]

[44] Дані за 2016-2020 роки з порталу VoxUkraine: https://voxukraine.org/velike-budivnitstvo-shho-vidbuvayetsya-z-remontom-dorig, за 2021 рік зі звіту «Укравтодору» (див.наст.)

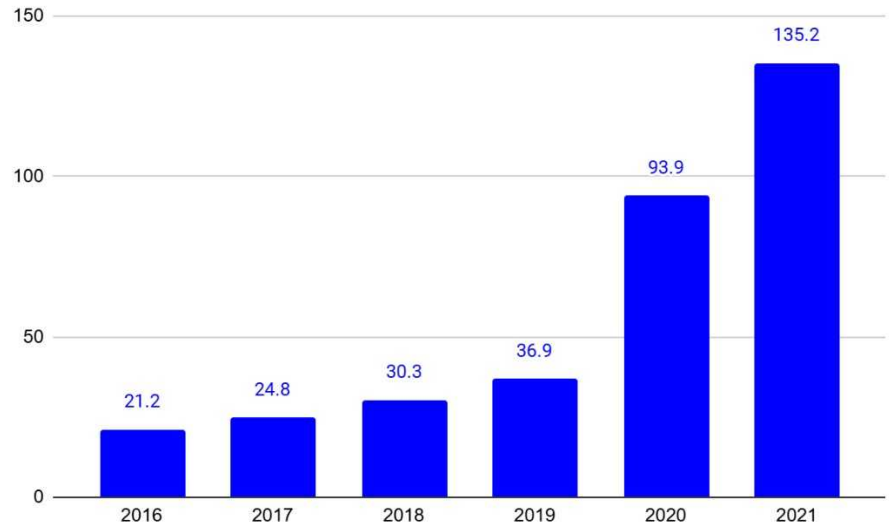


Figure 14. State Budget Funding for National Roads, in Billion UAH.

According to a 2018 World Bank assessment, Ukraine required 30 billion UAH annually between 2018 and 2022 (excluding inflation adjustments) to adequately fund capital and routine road repairs. [45] As shown in the graph, by 2018–2019, the amount of funds available to Ukravtodor already met the Bank's estimate, and from 2020 onward, significantly exceeded it.

It is difficult to determine exactly how many bridges were reconstructed or underwent major repairs during those years, as Ukravtodor's reports do not clearly separate capital works from routine maintenance. In 2021, Ukravtodor reported repair activities on 307 artificial structures, but this figure includes both bridge reconstructions and minor repairs. [46]

The decentralization reform in Ukraine began several years before the establishment of the State Road Fund and had positive financial effects for local infrastructure owners as early as 2015. Amendments to the Budget Code redirected significant tax revenues to local budgets: 60% of the personal income tax (PIT), 100% of the unified tax, a portion of the excise tax from retail sales (until 2020), including motor fuel, as well as land and property taxes.

As a result, the total annual revenues of local budgets increased from 68.6 billion UAH in 2014 to 304.0 billion UAH in 2020—an increase of 4.5 times. Concrete examples of how the decentralization reform improved the financial capacities of cities between 2014 and 2020:

- **Kyiv**: The revenue part of the local budget gradually increased from 24 billion UAH in 2014 to 60.6 billion UAH in 2021 — a 252% increase.
- **Ivano-Frankivsk:** Budget revenues grew from 832 million UAH to 2.945 billion UAH — a 354% increase.

[45] Там само.
[46] Звіт Державного агентства автомобільних доріг України за 2021 рік, https://restoration.gov.ua/4489/zvity/49385/49386.pdf

- **Kherson**: The local budget rose from 1.2 billion UAH to 2.712 billion UAH — a 226% increase.

These figures clearly demonstrate that cities received significantly more financial resources after the decentralization reform, which should have enabled more consistent investment in infrastructure, including bridges. At the same time, none of these three cities—Kyiv, Ivano-Frankivsk, or Kherson—managed between 2015 and 2021 to adequately maintain their existing bridges, complete long-standing construction projects, or successfully deliver new ones (as in the case of Ivano-Frankivsk). This situation reflects a broader pattern across the country.

All of this supports the conclusion that the core issues, at least in 2015-2022, were not a lack of funding, but rather shortcomings in management, planning, and execution. However, it is worth noting that funding shortages have become an increasingly severe problem starting from 2023–2024, particularly due to the ongoing war and shifting national priorities.

Corruption and Conflict of Interests

This research does not aim to delve deeply into the issue of corruption; however, it would be unrealistic to ignore these “facts of life” altogether. Kickbacks, bribery, and rigged tenders—these aspects of corruption were mentioned by foreign experts interviewed by the author during the course of the study. To briefly acknowledge the problem of corruption, the author did not conduct an independent investigation, but instead cites information from open sources that confirm its presence in the road construction sector and provide an idea of its scale and level.

At the same time, the author emphasizes that corruption in the bridge and road sector is not universal, nor is it the main or sole cause of the challenges and trends described in this analytical report. The presence and scale of corruption largely depend on the contracting authorities and the rules of the game within their organizations.

Corruption in local projects: A long-running and large-scale investigation by the National Anti-Corruption Bureau of Ukraine (NABU), known as “Clean City”, concluded in the spring of 2025 with public disclosure and formal suspicions issued to numerous individuals. According to NABU’s findings, the key figure—the “leader of the criminal organization”—was Dmytro Komarnytskyi[47], a person closely connected to both the President’s Office and the Mayor of Kyiv.

As early as 2021, investigative journalists had already published irrefutable evidence of billion-hryvnia corruption schemes orchestrated by Komarnytskyi on Kyiv’s infrastructure projects.[48] One of the most prominent and long-lasting schemes involved the Podilsko-Voskresenskyi Bridge project, which became a symbol of misused taxpayer funds and stalled urban development.

[47] https://www.youtube.com/watch?v=iv3TmQSgNWY&ab_channel=NABU
[48] https://www.youtube.com/watch?v=4wEOgKStvmE&ab_channel=BIHUSInfo

Corruption in national road projects: In 2018, the Security Service of Ukraine (SBU) uncovered the embezzlement of 30 million hryvnias involving Oleksandr Kharchenko[49], who was then the deputy head of Ukravtodor under Slavomir Novak. [50] In 2019, a coalition of 15 public organizations publicly appealed to state leaders to intervene and prevent the appointment of a corrupt official from the Ternopil Road Service (part of Ukravtodor) as Novak's deputy. That same year, the head of the Mykolaiv Road Service was exposed for corruption involving bribes reportedly amounting to $90,000 and 300,000 hryvnias. [51] In 2020, after leaving his position and fleeing Ukraine, Novak himself was arrested in Poland on charges related to corruption connected to Ukrainian road projects. Around 50 simultaneous searches were conducted across both countries.[52] After spending nine months in custody, Novak has been under alternative preventive measures since 2021. The court trial against him and other alleged participants in the corruption schemes began in 2024. The charges cover 17 instances of criminal corruption related to Ukraine's road infrastructure projects.

During the full-scale invasion, several major corruption scandals involving large sums also emerged. In 2023, the National Anti-Corruption Bureau of Ukraine (NABU) disclosed multiple uncovered corruption schemes involving Members of Parliament and other high-ranking officials, with bribes totaling hundreds of millions of hryvnias. [53] At that time, the Minister of Infrastructure, Oleksandr Kubrakov, and the head of "Derzhvidnovlennya" (State Recovery Agency), Mustafa Nayem, secretly cooperated with investigators, effectively handing over the bribers to law enforcement and helping gather indisputable evidence. Both leaders subsequently lost loyalty with President Zelensky's office and were removed from their positions.

In 2024, another corruption scandal rocked the road sector, this time involving the entire leadership team of the Dnipropetrovsk Regional State (Military) Administration. According to a NABU press release, the episode involved a sum of 286 million hryvnias, and suspicions were formally presented to five senior officials.[54] It should be understood that only a tiny fraction of all corruption schemes and incidents occurring in Ukraine ever reach the media—and even less make it into official NABU press releases. Almost always, these processes happen quietly and remain unknown to the general public.

In summary, corruption is often present in road (including bridge) projects in Ukraine, although there is no evidence that it occurs in every single project. It is also reasonable to assume that the scale of corruption in large projects can be significant, with the organizers and beneficiaries operating at high political levels.

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[49] https://www.rbc.ua/ukr/news/korruptsiya-ukravtodore-ulichennyy-prisvoenii-1537883109.html
[50] Новак –колишній міністр транспорту Польщі, який очолював «Укравтодор» у 2016-2019 роках.
[51] https://nabu.gov.ua/news/novyny-spravu-kerivnyka-sluzhby-avtodorig-mykolayivskoyi-oblasti-skerovano-do-sudu/
[52] https://www.bbc.com/ukrainian/news-53469906
[53] https://nabu.gov.ua/news/koruptc-ia-u-sfer-v-dnovlennia-p-dozriuiut-sia-chinn-nardepi-b-znesmen-ker-vniki-kompan-i/
[54] https://nabu.gov.ua/news/dorozhnia-koruptciia-v-dnipropetrovs-kiyi-oda-vykryto-skhemu-na-286-mln-grn-pid-chas-voyennogo-stanu/

Corruption as a phenomenon can directly contribute to the emergence and severity of some systemic problems described in this report. It creates a distorted system of interests (or a conflict of interest): the true interests of decision-makers conflict with their nominal interests as officials, as well as with the interests of society, the state, and users of the transport systems.

Here are examples of a distorted system of interests and motivations that allegedly take place in Ukraine:

- Certain officials may have an interest in project and planning decisions that involve excessive volumes of work and materials, as this leads to higher project budgets and increases the size of illicit gains;
- Certain officials may benefit from “long-term unfinished projects” (so-called “long builds”) remaining incomplete for as long as possible, since prolonged projects with rising budgets represent a long-term and substantial source of illicit profits;
- Certain officials may have an interest in allowing bridges to deteriorate to a hazardous condition, so they can later “allocate funds” for major repairs and reconstructions, which have significantly higher budget figures and greater opportunities for illicit gain than routine maintenance works.

Pure transparency – such as publishing tender documents – is a workable and necessary element for changing this broken system of conflicting interests, but it is not sufficient on its own. Corruption — as a widely spread practice and part of the existing *status quo* — must be seriously taken into account in any possible changes in the public policies. Future reforms should be aimed at creating conditions and rules so that the system of interests and motivations of decision-makers is no longer in conflict with the interests of the state, society, economic feasibility, and sustainability.

Prescriptive Norms Instead of Parametric or Performance-Based Norms

One of the reasons for the problem of excessive parameters and material consumption is the use of a prescriptive method of standardization. Ukraine has politically decided to move away from this approach but has yet to fully implement that decision. The policy analytical document (Green Paper) titled *“Parametric Standardization in Construction”* (2020) [55], which is entirely devoted to this topic, defines these methods as follows:

- Parametric method of standardization in construction — a way of setting requirements for a construction object that involves defining goals and/or parameters of safety, functionality, and quality of the construction object (criteria, operational performance requirements, and/or their indicators);
- Prescriptive method of standardization in construction — a way of setting requirements for a construction object that involves an element-by-element description of the object (solutions, structures, materials) without allowing alternatives;

[55] “Параметричне нормування у будівництві”: Д. Барзилович, І. Лагунова, І. Бардасова, С. Буравченко, А. Нечепорук, О. Медведчук, О. Марушева, В. Колесник, BRDO: https://brdo.com.ua/wp-content/uploads/2024/06/14-ZK-Parametrychne-normuvannya-v-budivnytstvi.pdf

- Performance-based (target) method — involves defining goals and specific criteria for evaluating the technical characteristics of the object. [56]

In other words, the **parametric method** sets standards by describing the functions and parameters of the future object and its components (a bridge, street, school, or hospital). Based on these functions and parameters, as well as other input data, architects and engineers, together with clients and future users of the structure, search for and find optimal solutions. Naturally, the future project must also comply with general requirements for reliability, durability, longevity of structures, fire safety, and, for example, energy efficiency. However, how this compliance is achieved is not dictated by prescriptive rules, but decided by the project authors based on their education, experience, and the use of modern software tools. The parametric method encourages creative and innovative solutions while aiming to achieve high economic efficiency (cost-benefit ratio). This is why in EU countries you can often see bridges, schools, or kindergartens with unique designs—something rarely seen in Ukraine.

In the **prescriptive method,** characteristic of the USSR, Russia, and Ukraine, the standards do not explain functions, criteria, or the logic of decision-making, but only provide dry requirements, restrictions, and specific numerical prescriptions: width, length, height, distance, area, radius, quantity. The role of architects for creative implementation in such a directive regulatory environment is reduced almost to zero. Architectural and aesthetic components, the experience and needs of future users, as well as economic efficiency, play no role. The only requirement is that there are no contradictions anywhere with the parameters contained in the standards.

"The function of engineers in Ukraine is to ensure that all directive requirements of the standards are followed in the projects, even if they are not rational. The role of the engineer, at least in the road sector, is reduced almost to zero" *, says Kostyantyn Shcherbachenko, a road engineer and head of the Ukrainian Association of Road Safety Auditors.*

Ukraine has taken several steps toward transitioning from the Soviet prescriptive method to the European parametric method of standardization. In 2019, the parametric method was enshrined in Ukrainian legislation, along with definitions for the prescriptive and target methods.
[57]. The law also clearly established that the prescriptive method should no longer be the priority in construction: "Preference is given to the parametric and target methods of standardization in construction," declares Article 7-1 of the Law of Ukraine "On Building Codes."

Certain steps have been taken to implement these visionary provisions of the law: the DSTU "Guideline on the Application of the Parametric Standardization Method in Construction" was adopted and came into force in the summer of 2023. [58] However, in practice, the parametric

[56] Існує також цільовий метод, який передбачає визначення цілей та конкретних критеріїв оцінки технічних характеристик об'єкта нормування у будівництві
[57] Закон України "Про будівельні норми", https://zakon.rada.gov.ua/laws/show/1704-17#Text

method is not used in the bridge and road sectors, where the prescriptive method still prevails. Instead of discontinuing the application of the prescriptive building codes (DBN) and transitioning to guidelines in accordance with global practices, Ukraine continues to develop and approve new editions of the DBN without changing the approach. [59]

What does this lead to? Suboptimal design solutions and, consequently, an excessive amount of materials and funds required by the projects.

Typical consequences of applying prescriptive norms for bridges in Ukraine:

- Bridges are wider than necessary — resulting in higher material costs, unnecessarily high project expenses, and excessive greenhouse gas emissions;
- Lack of consideration for pedestrian and cyclist traffic in bridge designs: clients and designers limit themselves to the minimum requirements of the building codes (DBN);
- Negative impact on road safety, leading to accidents, injuries, fatalities, and economic losses for society. For example: in the absence of a dedicated bike lane, cyclists must ride in the right traffic lane with cars according to traffic rules, making them vulnerable to vehicle collisions.

The described consequences of suboptimal design solutions are supported by real examples and comparisons of bridges in Ukraine and neighbouring countries.

Example 1. Lane width. In Ukraine, lane width is prescribed by building codes (DBN) in a directive manner, without connection to the function or speed limits of the road or street. In Ukraine, if a road belongs to an international or national category, the lane width on it (including bridges) must be 3.75 meters. This applies even on sections where the road runs through city streets with a speed limit of 50 km/h.

Lane width in international practice

The official European Commission manual for road infrastructure safety assessment, *Network Wide Road Safety Assessment – Methodology and Implementation Handbook*, clearly states that wider lanes increase speed and encourage risky driving behavior. [60] Typical lane widths in EU cities range from 2.80 to 3.25 meters, whereas in Ukraine the standard lane width is 3.75 meters. In Germany, a lane width of 3.75 meters is used on federal autobahns (category A), where speed limits are often absent. During roadworks on German autobahns, lane widths are reduced—typically the right lane narrows to 3.0 meters and the left lane to 2.10 meters.

On federal highways (category B) with 1+1 or 1+2 profiles, typical lane widths are 3.5 meters, sometimes 3.25 or 3.0 meters. When such roads pass through populated areas, urban

[58] ДСТУ 9193:2022 Система нормування у будівництві. Настанова щодо застосування параметричного методу нормування у будівництві

[59] Наприклад, ДБН В.2.3-26:2024 "Мости і труби. Проєктування сталевих конструкцій", ДБН В.2.3-27:2023 "Тунелі. Норми проєктування".

[60] European Commission, Road infrastructure guidelines: https://road-safety.transport.ec.europa.eu/eu-road-safety-policy/priorities/infrastructure/road-infrastructure-guidelines_en?

standards apply, with lane widths ranging from 2.75 to 3.50 meters depending on the street's function and the planned traffic speed. [61]

Thus, due to the directive norms of the DBN (Building Codes), the width of each traffic lane on bridges in populated areas in Ukraine can be up to 1 meter wider than in Germany (3.75 m instead of 2.75 m). If a bridge has 4 lanes, this means 4 "extra" meters of width. The excessive width directly affects the cost of the structures and the volume of materials consumed.

Figure 15. Lane widths: 3.75 m in Ukraine and 3.00 m in Poland. Photos: State Recovery Agency and Google Streetview

On the left side photo is a newly built bridge opened in 2024 in the city of Terebovlia, Ternopil region. This bridge belongs to the national road M-19. On the right: a similar bridge in Poland. Due to differences in regulatory requirements, the total width of the Ukrainian bridge is 12.8 meters, while the bridge in Poland is about 10 meters wide.

Example 2. Barrier fencing. In Ukraine, safety barriers are required on all bridges without exception, regardless of their function, traffic speed, or the type of obstacle the bridge crosses. These factors only affect the type of barrier fencing (its containment capacity). This means, first, an impact on width—each barrier requires about 0.5 meters, adding at least 1 meter to the total bridge width. Second, it causes expenses for installation and ongoing maintenance of this infrastructure element. The third consequence is the use of hundreds or thousands of tons of steel and the associated greenhouse gas emissions that could have been avoided. The fourth consequence is risks to the health and safety of those on the other side of the barrier (pedestrians and cyclists), since the backside of the barriers often has unprotected parts of metal structures. Cases where barriers are not installed at all or are installed only along the outer edge of the sidewalk are not allowed under Ukrainian regulations. What is permitted in Poland or Germany is prohibited in Ukraine.

[61] Ширина типового легкового автомобіля складає бл. 1,80 м, а великовантажного близько 3,0 м.

Figure 16. Parametric application of barrier fencing in Poland. Photos: Google Streetview and archive.

In EU countries, parametric standards usually recommend installing barrier fencing depending on the circumstances and based on risk management principles. On bridges within populated areas, barrier fencing is often generally absent. Sometimes, a decision is made to place the barrier fencing together with the railing at the edge of the bridge, rather than between the sidewalk and the carriageway.

Figure 17. Bridge widths and barrier fencing in Germany and France. Google Streetview.

Barrier fencing may also be absent on bridges outside populated areas, for example at “grade-separated crossings” where local roads pass over highways (autobahns). On the left in the photo: a bridge over the A7 autobahn in Germany; on the right – over the A4 highway in France.

Overengineering

Bridges in Ukraine are often characterized by excessiveness, which results in overuse of materials and funds. International experts who studied long-term bridge projects in Ukraine were struck by the “wastefulness” and, consequently, the enormous budgets. *“Bridges in Kyiv and Ivano-Frankivsk are very different, but both are quite massive. In Poland, we definitely wouldn’t choose such structural solutions. We would design much lighter and cheaper bridges that fully perform their functions and have an adequate safety margin in accordance with Eurocodes,”* says Krzysztof Wachalski, a bridge engineer and head of a design firm in Gdańsk.

This very overuse of materials may explain the trend identified in the study, showing that newly built bridges in Ukraine are on average 48% more expensive than bridges in Poland. For large

strategic bridges, such as those in Kyiv or Zaporizhzhia, the difference in material volumes and final cost can amount not just to tens, but to hundreds of percent.

A proof was identified and described by researcher Oleg Grechukh. In Ukraine, there is a directive requirement in the standards: if a bridge has a consequence class CC3 (which applies to all bridges on international and national state roads), then even a simple bridge with low traffic intensity must have an additional safety margin. In 2023, scientists published an article stating that such excessive standard requirements lead to an additional material consumption of about 20% without changing functional capabilities. Quote: *"The imposed requirements in the DBN regarding the additional reliability coefficient of 1.25 for bridges are unacceptable, as they alter the existing balance between bridge calculations according to DBN B.1.2-15 and EN 1991-2 and may cause unjustified material overuse up to 20%."*

Incomplete Transition to European Standards

Ukraine as early as in 2005 set a political course toward global and European integration, aiming to join the European Union. The state committed itself to a broad range of international reform obligations, including in the field of technical regulation (which also covers the bridge sector). These obligations are outlined in the Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community, and their member states, on the other hand, as well as in the Agreement of the World Trade Organization, and include, among other things:

- convergence of technical regulation systems, standards, and conformity assessment;
- implementation of the relevant provisions of the EU acquis communautaire into national legislation;
- carrying out administrative and institutional reforms necessary to fulfill the Association Agreement in accordance with the Agreement on Conformity Assessment and Acceptance of Industrial Products (ACAA Agreement);
- establishment of an effective and transparent administrative system required for the convergence of technical regulation systems;
- creation of conditions for the free movement of goods and services within the market.[62].

One of the outcomes of these reforms is expected to be the transition to European standards for structural calculations, known as Eurocodes. Over the following years, ten main Eurocodes were officially translated and approved. However, their practical application remains limited. As of 2025, for example, bridge structures, like most other constructions, are not designed according to Eurocodes, despite the existing regulatory framework.

Ukraine has only a few examples of applying European standards. In particular, according to Anna Gontarenko, Acting Executive Director of the Association "Ukrainian Steel Construction Center" (USCC), the design of Terminal D at Boryspil Airport was carried out according to Eurocodes —

[62] Зелена книга "Параметричне нормування у будівництві", Офіс ефективного регулювання BRDO, 2020, https://brdo.com.ua/wp-content/uploads/2024/06/14-ZK-Parametrychne-normuvannya-v-budivnytstvi.pdf

Japanese and Turkish specialists worked on it, while Ukrainian engineers adapted the technical solutions to local conditions. There are also several industrial steel facilities designed according to European standards, which belong to international corporations.

The legal mechanism for implementing Eurocodes in Ukraine is defined by the Resolution of the Cabinet of Ministers of Ukraine dated May 23, 2011, No. 547. According to this document:

- Eurocodes may be applied for the design of new objects and reconstructions.
- During the transitional period, both national building codes (DBN) and harmonized European standards are allowed to coexist in Ukraine.
- The client has the right to choose which regulatory system to use for the design; however, mixed use of DBN and Eurocodes within the same object is not allowed to avoid technical and legal inconsistencies.

Anna Gontarenko explains that the full-scale Russian invasion in 2022 became a catalyst for accelerated transition to European standards, especially in steel construction. According to her, the loss of industrial capacities in Mariupol and other occupied territories, where products were manufactured according to Ukrainian standards (such as steel of certain strength classes, metal fittings), effectively made the further use of many DSTU standards impossible. At the same time, similar products are not produced in EU countries, and importing them from Russia is unacceptable for political and security reasons.

In late 2022, Ukraine's national standardization authority adopted over 20,000 European standards. On January 1, 2023, the Law of Ukraine "On the Provision of Construction Products on the Market" came into effect, implementing the requirements of the EU Construction Products Regulation No. 305/2011. This means that starting in 2026, following the repeal of the 2006 technical regulation, the requirements for construction products in Ukraine will be fully aligned with European standards.

On July 9, 2024, a Colloquium on "Implementation of the Second Generation of Eurocodes in Ukraine" was held, bringing together representatives from the Ministry of Infrastructure, technical committees, specialized research institutions, universities, as well as design and self-regulatory organizations. Participants discussed the experience of applying the first generation of Eurocodes and reached a consensus that during the implementation of the second generation, the use of national building codes (DBN) should be completely phased out, transitioning exclusively to design according to Eurocodes. The transition period is expected to last 2–3 years.

However, as of June 2025, the Ministry of Infrastructure has not yet prepared a draft amendment to the Cabinet of Ministers' Resolution No. 547 that would legally establish a two-year deadline for this transition. "This slows down the implementation of a unified regulatory system and creates uncertainty for the market," explains Anna Hontarenko. She adds that widespread use of Eurocodes, particularly in the design of infrastructure projects, is still ahead: *"It requires the completion of the development of national annexes to the Eurocodes, the harmonization of regulatory and technical documentation, and the introduction of corresponding changes to current legislation."*

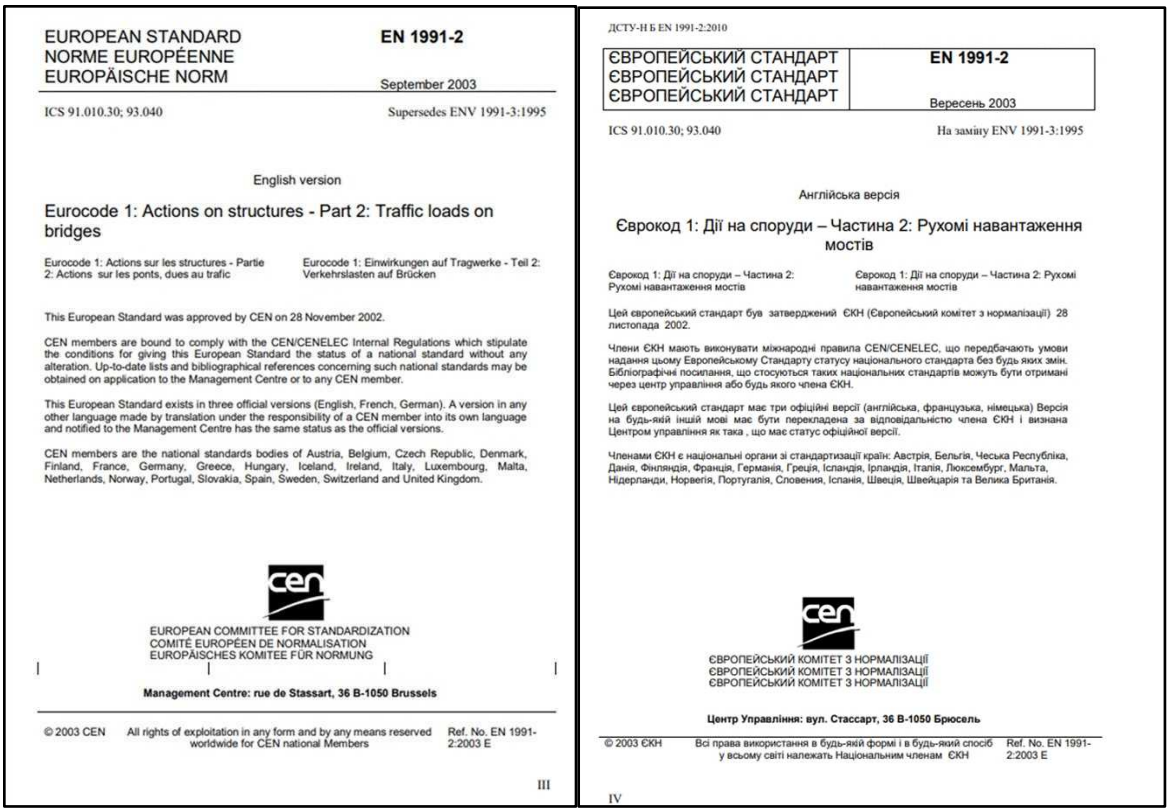
An interesting example of the transition to Eurocodes is Kazakhstan, which made a political decision to switch from Soviet-Russian SNiPs to Eurocodes starting in 2021.[63] Professor Volodymyr Semko, Doctor of Sciences, is well versed in Eurocodes, as he has been teaching them for many years to students at Poznan University of Technology (Poland). He shares that he once worked on Eurocode application manuals for Kazakhstan. He also adds that even Russia at one point planned to adopt Eurocodes, and Belarus actually made the switch: *"The Belarusians transitioned to Eurocodes, worked with them for several years, but then, due to political circumstances, abandoned the effort. The first time I got acquainted with Eurocodes was through translations made for Belarus, under the index TPK EN. I read these Belarusian versions back in 2009,"* says V. Semko.

Engineers say that the current DBN of Ukraine are generally close to the Eurocodes in their requirements—in other words, harmonized. Yurii Lototskyi, who has been designing bridges since 2011, states that when it comes to load levels, DBNs and Eurocodes are at the same level, and in some cases, our design loads are even higher. This means there is no problem that recently built Ukrainian bridges would fail to meet Eurocode standards in terms of stability and strength.

"Ukraine made a very important step forward in 2006 with the updated DBNs. At that time, Russia was revising its SNiPs, moving towards loads A-14 and NK-100. In Ukraine, thanks to people like Petro Koval, Albert Lyashchenko, and others, we adopted load A-15, which is close to the Eurocodes, rather than following the SNiPs," says bridge engineer Yurii Lototskyi.

The interlocutor concludes that bridges built according to the current DBNs, with load standards A-15 and NK-100, will meet the Eurocodes in terms of load requirements. However, older bridges constructed before 2006, prior to the adoption of the updated DBNs, still do not comply with either our DBNs or the Eurocodes.

[63] «В 2020 году Казахстан полностью перешел на Еврокоды»: https://okna-kz.com/news/20210129/v-2020-hodu-kazakhstan-polnostyu



EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1991-2

September 2003

ICS 91.010.30; 93.040 Supersedes ENV 1991-3:1995

English version

Eurocode 1: Actions on structures - Part 2: Traffic loads on bridges

Eurocode 1: Actions sur les structures - Partie 2: Actions sur les ponts, dues au trafic

Eurocode 1: Einwirkungen auf Tragwerke - Teil 2: Verkehrslasten auf Brücken

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ЄВРОПЕЙСЬКИЙ СТАНДАРТ
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EN 1991-2

Вересень 2003

ICS 91.010.30; 93.040 На заміну ENV 1991-3:1995

Англійська версія

Єврокод 1: Дії на споруди – Частина 2: Рухомі навантаження мостів

Єврокод 1: Дії на споруди – Частина 2: Рухомі навантаження мостів

Єврокод 1: Дії на споруди – Частина 2: Рухомі навантаження мостів

Цей європейський стандарт був затверджений ЄКН (Європейський комітет з нормалізації) 28 листопада 2002.

Члени ЄКН мають виконувати міжнародні правила CEN/CENELEC, що передбачають умови надання цьому Європейському Стандарту статусу національного стандарта без будь яких змін. Бібліографічні посилання, що стосуються таких національних стандартів можуть бути отримані через центр управління або будь якого члена ЄКН.

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ЄВРОПЕЙСЬКИЙ КОМІТЕТ З НОРМАЛІЗАЦІЇ
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IV

Figure 18. One of the Eurocodes translated and approved in Ukraine, but yet not applied to bridges.

Experts agree that Ukraine's transition to the Eurocodes is necessary, and the sooner, the better. Yurii Lototsky says: *"I consider Ukraine's transition to the Eurocodes to be mandatory. This does not cancel all DBN, because—for example—requirements regarding road design and land planning are not covered by Eurocodes and will remain Ukrainian. The transition is unquestionable; it is only a matter of time. Perhaps we just need to 'break the inertia.' By the way, that's exactly what our neighbour Belarus did. One day, only the Eurocodes were valid there. And they learned very quickly."*

Professor Volodymyr Semko expressed a similar opinion:

> *"I believe we definitely need to switch to the Eurocodes. The national system has outlived itself. The transition to the Eurocodes, in my view, should not be evolutionary but revolutionary. Make the political decision, that's it. A transition period of a maximum of one year, and after that—only Eurocodes"*

Concerns that Ukrainian design organizations will not be able to adapt and learn to calculate according to new standards are considered unfounded by the experts. Volodymyr Semko answers

the question of whether it is difficult for Ukrainian engineers to master the Eurocodes*: "I don't see any problem learning something new. Engineers, in general, study all their lives. In this field, it's impossible to stand still and not learn or retrain. Progress doesn't stop; not only technologies change, but also standards. On the contrary, in Ukraine, the rate of change of standards is much higher than in the European Union."*

He gives a comparison: in the EU, Eurocode 2 has been in force for over 20 years, and the second generation will only come into effect on September 1, 2027. Meanwhile, in Ukraine, there have already been many changes during this time. "In 18 years, the main standards have changed at least five times, and there are still dozens of other DBNs that must be followed," emphasizes V. Semko.

Climate and Environment Impacts

Carbon dioxide (CO_2) emissions are one of the key drivers of climate change, and their reduction is a top priority for the global community, as outlined in the Paris Agreement. Ukraine, as a party to the Agreement, has also committed to reducing greenhouse gas emissions.

The construction sector is one of the largest sources of CO_2 emissions, responsible for approximately 25% of global emissions. The main reason is the use of highly energy-intensive materials, particularly cement and steel, which have a massive carbon footprint. Cement production accounts for about 8% of global CO_2 emissions, while steel contributes around 7%. This high level of emissions is due to the significant energy consumption and chemical processes involved in their production. According to international studies, the production of 1 ton of steel results in approximately 1.8 tons of CO_2 emissions. Some modern technologies can reduce this figure to 1.41 tons of CO_2 per ton of steel, but it still represents a substantial amount. Cement production leads to emissions ranging from 0.85 to 1.0 tons of CO_2 per ton, primarily due to the calcination of limestone, which releases CO_2 during the formation of clinker.

Bridges can also negatively impact wildlife, and there are specific recommendations to minimize this impact. One important aspect is ensuring ecological continuity in habitats of wild animals. For example, if natural migration routes pass through a river valley, bridge designs can include additional spans so that not only the riverbed but also a strip of land (floodplain) remains under the bridge, allowing animals to pass freely. Although environmental impact assessments are a mandatory part of project documentation in Ukraine, the actual impact on wildlife requires separate research and analysis.

Bridges may also affect water quality in rivers and lakes, which is particularly relevant for Ukraine, where many older bridges lack proper drainage systems. In such cases, rainwater flows directly into water bodies, carrying pollutants such as road dust, solid particles, petroleum products, and heavy metals that accumulate on the roadway. To mitigate this impact, modern bridges are equipped with stormwater collection and treatment systems that filter contaminants before discharge into the environment. In recent years, Ukraine has also introduced requirements for such systems. However, their long-term effectiveness depends on proper maintenance —

keeping pipelines intact and filters clean. As previously mentioned, Ukraine faces significant challenges in maintaining its bridges.

A positive example of environmentally friendly infrastructure is the construction of ecoducts (or green bridges) — special crossings designed to reconnect habitats divided by transport routes. Ecoducts help restore migration paths, reduce the risk of animal-vehicle collisions, and contribute to biodiversity conservation. In countries such as Germany, France, and the Netherlands, ecoducts are actively incorporated into road construction. In contrast, they are still absent in Ukraine. In recent years, the planning and design of the country's first such structure began as part of the future northern bypass of Lviv.

Closeness of Ukraine's Bridge Market

Both Polish and German engineering firms, whose executives were interviewed as part of the study, expressed interest in working in Ukraine, with willingness to invest and open design offices. However, they all highlighted the isolation and lack of transparency in the Ukrainian market, and of course, mentioned concerns about high levels of corruption.

Ukrainian engineers also see value in joining the unified European market. Yurii Lototskyi says:

> *"Ukraine is politically moving towards the EU, and the EU means one market, one set of standards. We sell our products to them, and they sell theirs to us. We cannot keep our market isolated. The design market must also be open"*

He continues, that at present, no one from Europe can design here using our DBNs (State Building Norms). He says, this is unfair competition. There should be more competition, because that brings progress and development. He adds that he and other engineers he knows would be interested in entering the EU market themselves: "Personally, I'd love to work on projects abroad, in the EU market. We've talked to colleagues in countries like Poland — their wages are significantly higher than ours. So the transition to Eurocodes would open up new opportunities for our engineers and firms."

Practicing engineers point out that transitioning to Eurocodes is a necessary step for European integration — but not a sufficient one. "I believe that Ukraine must not only adopt Eurocodes, but also switch to standard contracts like FIDIC," says Polish engineer Krzysztof Wachałski. He argues that standardized contracts are the very reason engineering, consulting, and construction firms from the EU can work confidently in other countries, avoiding risks related to the peculiarities of local legislation, complex regulatory systems, and even corruption. Holding international and transparent tenders is, of course, also a basic expectation.

Conclusions and Recommendations

Conclusion 1. Maintenance and preservation of existing bridges must take priority over the construction of new ones.

The condition of bridges in Ukraine has reached a critical state due to a lack of proper maintenance. As a result, the service life of even relatively new structures is significantly reduced, while older bridges are experiencing destructive levels of deterioration. Inadequate maintenance is manifested in missed or completely ignored scheduled maintenance, residual-principle funding, and the lack of sufficient human and material-technical resources within the organizations and departments responsible for these tasks.

To resolve the bridge infrastructure crisis in a sustainable way, public policy and funding must prioritize the preservation and proper management of existing assets over the creation of new ones. Otherwise, Ukraine risks facing a scenario in which even the “new” bridges built between 2018 and 2025 will degrade to the fourth (critical) condition stage within just 20–30 years of use — instead of the projected 80–100 years.

- **Recommendation 1.1.** Implement asset management, starting with a comprehensive inventory and inspection of bridges. At the national level, supported by appropriate funding, it is essential to collect and enter up-to-date information on all bridges managed by all asset holders into the "Analytical and Expert System for Bridge Management" (AESUM) database as soon as possible. Reasonable exceptions include temporarily occupied territories and active combat zones.
- **Recommendation 1.2.** Ensure targeted funding from the state budget or international sources to cover the costs necessary for establishing an effective asset management system, including the collection and updating of asset information, inspections, database maintenance, connection of all asset holders (at all administrative levels), and strengthening institutional capacity (through training and education).
- **Recommendation 1.3.** Introduce a nationwide moratorium on the implementation of new construction projects for bridges, overpasses, and pedestrian crossings (both above and below ground) if the asset holder already has bridges in the 4th or 5th operational condition level, or if the actual condition of the bridges is unknown — except in rare, justified cases.

Conclusion 2. It is necessary to identify strategically important bridges from a transportation perspective and prioritize them over others.

As outlined in this study, not all bridges are equally important. In Ukraine, there is currently no classification system—either in regulations or political practice—that distinguishes bridges based on strategic significance. First, this lack of categorization makes it impossible to effectively prioritize management efforts and allocate limited financial resources. Second, it shifts focus away from preserving and restoring the most critical bridges toward building new, simpler structures. Third, it results in overdesigned solutions and excessive spending on secondary (non-strategic) bridges, since the same design parameters and service life expectations are applied to them as to strategic ones.

As a result of not differentiating between strategic and other bridges, the national and local asset holders' limited resources are spread thin across numerous low-priority structures, while the condition of truly strategic bridges deteriorates at a disproportionately accelerated rate.

- **Recommendation 2.1. Introduce criteria and a standardized practice for identifying strategically prioritized bridges.** The criteria should include current traffic volume, projected transportation and economic consequences of the bridge being taken out of service (to be determined and calculated mathematically, including via modeling), feasibility and expected cost of establishing alternative connectivity (e.g., temporary structures or ground-level crossings).
- **Recommendation 2.2. Prioritize budget expenditures on bridges and overpasses across all levels of government and international programs** in the following order: Routine maintenance and operational upkeep of existing structures, Rehabilitation work for strategically prioritized existing bridges (major repairs and reconstructions), Construction of strategically prioritized new bridges (e.g., bridges across the Dnipro and Southern Bug rivers).
- **Recommendation 2.3. Impose a moratorium on the design and construction of road overpasses, multi-level interchanges, pedestrian underpasses or overpasses** in locations where road traffic can be effectively and safely managed at grade level (e.g., traffic lights, roundabouts). If such existing structures are in operational condition category 5, they should be dismantled and replaced with at-grade solutions, rather than being reconstructed or repaired.

Conclusion 3. Planning and studies must constitute a separate pre-design stage in preparing investments, preceding the development of design and cost documentation.
Ukraine should introduce a distinct project planning phase—Feasibility Studies—and carry it out in line with modern international best practices. This stage should take place before the preparation of technical project documentation. The current lack, insufficiency, or superficiality of technical and transport planning during the feasibility study phase often leads to flawed strategic decisions that result in costly consequences for society and the state. For instance, new bridges are sometimes built in areas where there is no real demand, or they include suboptimal transport solutions. The planning stage should involve wide engagement of stakeholders, and the results of the research should be published and publicly discussed. Based on the feasibility study, authorized decision-makers determine which option is most reasonable to move forward with, and the findings of the study serve as the basis for drafting the terms of reference for detailed project design.

- **Recommendation 3.1. Discontinue the use of Technical and Economic Evaluation (TEO) and Technical and Economic Calculations (TER) as formal design stages defined by national construction norms (DBN)**. Instead, introduce regulations that allow clients to conduct various types of preliminary feasibility studies for infrastructure projects (including full Feasibility Studies), based on the experience of international financial institutions (IFIs), development programs, and successful practices of EU member states.

- **Recommendation 3.2. When regulating the planning stages of project preparation, apply parametric and target-oriented approaches to standardization rather than a prescriptive method**. International guidelines and practices should be used as a foundation—specifically, standard requirements and evaluation criteria from the World Bank, EIB, EBRD, GIZ, and similar institutions.
- **Recommendation 3.3. Abolish outdated regulations and discontinue the practice of forecasting traffic loads based on the outdated assumption of constant and indefinite growth of automobile traffic**. Transition to traffic estimation and modelling methodologies commonly used in the EU and already piloted at the local level in Ukraine. These include the use of equivalent unit coefficients, transport flow modelling tools, and road safety impact assessments, among others.

Conclusion 4. Ukraine should finalize its European integration in the bridge sector by adopting EU approaches and regulatory standards. Despite declared political intentions to integrate into the European space, steps taken since 2005, and its status as an EU candidate country (since 2022), Ukraine's transition to EU approaches and technical standards in bridge construction remains incomplete. Bridges continue to be designed using domestic regulatory traditions, not European ones. Although the Law of Ukraine "On Building Codes" prioritizes parametric over prescriptive methods, in practice bridges are still designed using outdated prescriptive norms. Ukraine should make a political decision to adopt the Eurocodes (EN) for structural design—following the example of post-socialist EU countries and, more recently, Kazakhstan. The engineering and construction sectors in Ukraine are fully capable of handling this transition, which would allow them to work within the same framework as their European counterparts.

- **Recommendation 4.1. Mandate the exclusive use of Eurocodes for structural calculations in bridge design for all new projects starting from a specific date (e.g., January 1, 2027).** Require contracting authorities to include this requirement in terms of reference and instruct the Ministry for Communities, Territories and Infrastructure Development to update and officially adopt the necessary technical documents.
- **Recommendation 4.2. Transition from a prescriptive to a parametric approach in bridge design regulation,** which will encourage the use of innovative architectural and engineering solutions aligned with global best practices. Develop guidelines for project decision-making based on efficiency assessments, not just compliance with formal requirements.
- **Recommendation 4.3. Where Ukrainian regulations lack provisions for certain preparatory, survey, or design processes, legally permit the use of national standards from selected EU member states.** Examples are those representing best practice, such as Poland, Germany, Czechia, Lithuania, France, Spain, Italy, Sweden, Denmark.

Conclusion 5. Ukraine should integrate into the European single market regarding bridge planning, design, and construction. Ukraine's national regulatory framework for the bridge sector leads to the isolation of its market for planning, design, and construction and contradicts the country's political and economic course toward EU accession and integration into the

European single market. The current regulations act as a barrier preventing EU companies from providing services and performing works in Ukraine, even in partnership with local firms. This "regulatory wall" also complicates opportunities for Ukrainian engineers and companies to work on foreign projects, as Ukrainian specialists and firms, with rare exceptions, lack a portfolio of designs according to Eurocodes.

- **Recommendation 5.1. Initiate an annual international conference on Ukraine's bridge sector with participation and funding from international partners**. Invite leaders of bridge-owning organizations at all levels from Ukraine and the EU, research, design, expert, and consulting organizations, engineering and construction companies from Ukraine and the EU, media, and civil society organizations. Publish conference materials openly, including video recordings of presentations.
- **Recommendation 5.2. Under the political leadership of the Minister for Communities and Territories Development of Ukraine and with support from international partners, plan and implement a dedicated "track" of bridge projects designed and executed according to European standards.** Invite consortia of companies from EU member states and Ukraine to participate. Early projects, free from corruption and implemented transparently with high-level political support, will test and increase EU business interest in bridge projects in Ukraine, build essential experience and understanding of processes and services, and help update Ukrainian regulations based on European integration principles and parametric regulatory methods.
- **Recommendation 5.3. Secure international funding from partner governments, funds, and programs supporting Ukraine's recovery for conducting the first international tenders to implement bridge projects,** which may be executed by Ukrainian construction companies or international consortia.

Terms and Abbreviations

This publication is intended for a broad audience, which may not be deeply familiar with specialized industry terminology. For better understanding of the content, definitions and explanations of terms and abbreviations used in this analytical report are provided below. These definitions do not necessarily correspond word-for-word with those in Ukrainian regulations and standards but preserve the intended meaning.

Bridge – a transport structure designed to allow passage over obstacles for rail and road vehicles, pedestrians, and various utility communications.
Bridge crossing – a complex of structures consisting of a bridge (or multiple bridges), approaches, and other transport and hydraulic engineering structures.
Overpass – a transport structure (bridge) over a railway, highway, or street.
Viaduct – a transport structure crossing a gorge or other natural depression.
Span – a part of a bridge structure that covers the space between two adjacent supports.
Flyover (elevated roadway) – a multi-span structure built instead of an embankment or to use the space beneath for various purposes.
National roads – highways that provide inter-regional, international, and national transport connections. They are categorized as international (M), national (H), regional (P), and territorial (T).
Local roads – roads providing transport connections within a single region or between settlements. They are divided into regional (O) and district (C) roads.
Streets and roads within settlements – street and road network of cities, towns, and villages providing transport and pedestrian movement within the settlement.
State Recovery Agency (Derzhvidnovlennya) – the State Agency for Recovery and Infrastructure Development of Ukraine, established in 2023 based on the State Agency of Motor Roads of Ukraine (''Ukravtodor'').
Ministry of Infrastructure – the central executive body responsible for transport infrastructure in Ukraine. Its name and powers were changed several times between 2021 and 2024 by the Cabinet of Ministers.
NIRI – State Enterprise “National Institute of Infrastructure Development” (until 2023, known as SE “DerzhdorNDI named after Shulgin”).
DBN – State Building Codes of Ukraine.
DSTU – State Standards of Ukraine.
PDR – Rules of the Road Traffic of Ukraine.
EN – European standards (Eurocodes and related norms).

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