



Implementation of the Output and Performance-Based Road Contracts (OPRC) in Ukraine

Anna Kharchenko
Ph.D. in Engineering, Associate Professor
National Transport University

Implementation of long-term (up to 7 years) output and performance-based road contracts (OPRC) is foreseen under

The Law of Ukraine *On the Amendment of Certain Laws of Ukraine on the Reform of the Public Motor Road Management System* dated 17.11.2016 No. 1764-VIII

The Action Plan for the Implementation of the Concept of the Reform of the Public Motor Road Management System (p. 8).

The Law of Ukraine *On Motor Roads*



Закон України

Article 6. State Policy in the Area of Motor Roads

Maintenance of public motor roads and other types of motor roads may be carried out on the basis of long-term (up to seven years) output and performance-based public road maintenance agreements (contacts) according to the principle of ensuring their operational condition in compliance with the legislative acts, standards, and regulations.

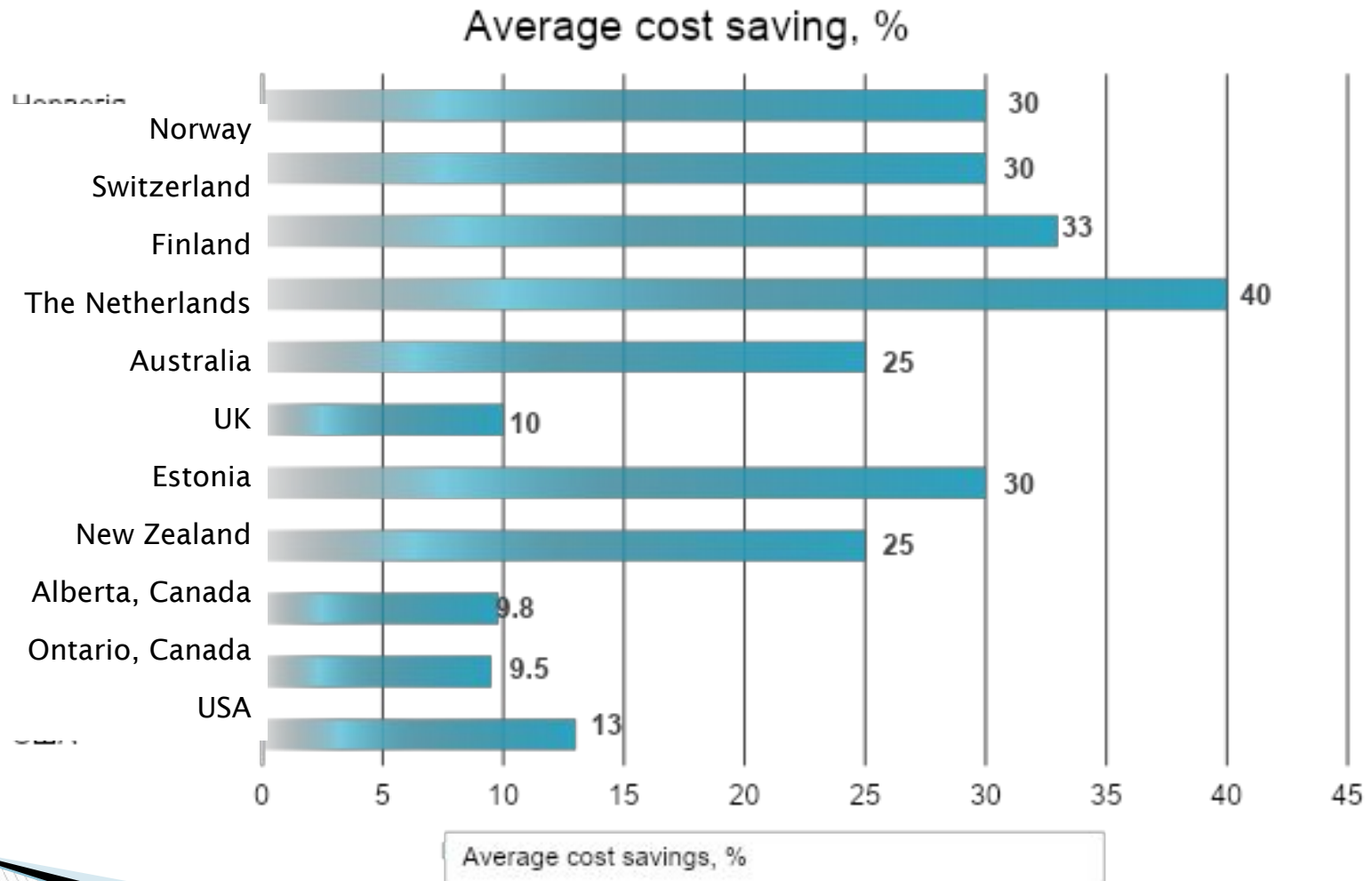


Закон України

Article 6. State Policy in the Area of Motor Roads (continued)

- Preservation and development of the public motor road network constitute a priority for the state.
- In order to ensure continuous proper audit (assessment) of the motor road technical condition and the quality of the road works, qualified road construction engineering consultants accredited according to the procedure established by the Cabinet of Ministers of Ukraine may be engaged.

Economic effect of application of the long-term output and performance-based road contracts



Differences from Traditional Contracts

Fulfillment of the long-term contracts is based on the foundation of specifications or standards - requirements to defect remediation in the course of the motor road maintenance.

The works rendered (services provided) by the contractor are paid in the event of achievement of final indicators (criteria) and not for the works performed or methods of their fulfillment.

The set of characteristics and parameters (criteria, requirements) established for each type of defect - risk category, remediation season, level of intervention, reaction time - for the operational maintenance level.

Penalty scores apply in the event of failure to meet the requirements.

New Regulatory Framework for Operational Maintenance Developed by the NTU



State Standard of Ukraine DSTU 8992:2020 Motor Roads.
Guidelines for Justifying Maintenance Service Levels
(date of enactment 01.07.2021)



State Standard of Ukraine DSTU 8993:2020 Motor Roads.
Service Levels for Operational Maintenance
(date of enactment 01.07.2021)



RECOMMENDATIONS for parameter justification for the
long-term output and performance-based public road
maintenance agreements
R D 2.4-37641918-926:202X

Provisions of the DSTU on the Guidelines for Justifying Maintenance Service Levels

- formulate requirements for the operational levels of motor road maintenance;
- contain the service level justification model;
- analytical procedure for the defect remediation delay risk assessment;
- application of contractual maintenance levels to determine the scope of works for defect remediation;
- assessment model for the number of contractual response terms exceedance;
- main stages of the procedure of motor road maintenance operational levels justification;

Types of Maintenance Levels under the Draft DSTU Guideline



Normative

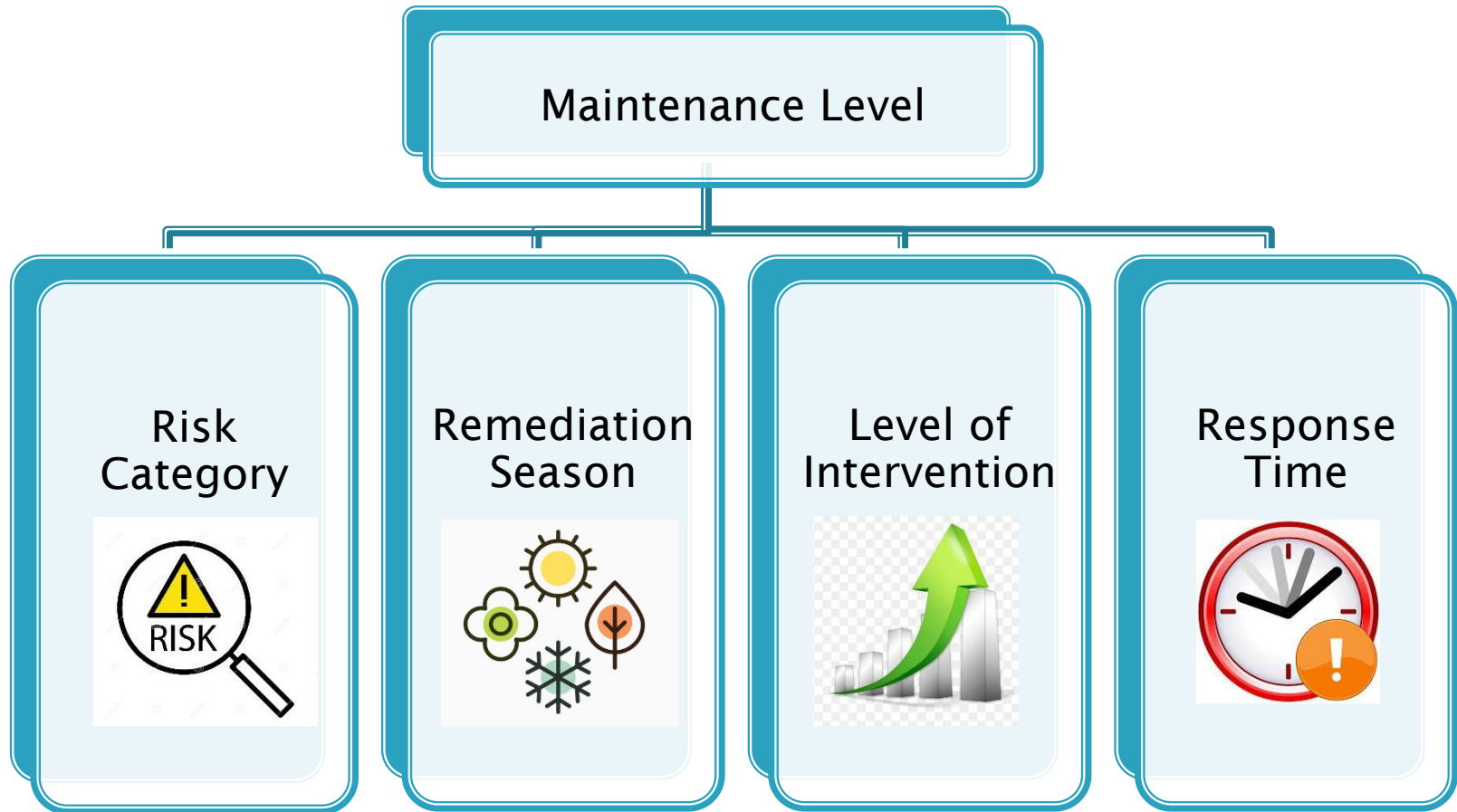
Maintenance level established by the national standard

Contractual

Maintenance level established in the maintenance level specification under the agreement, no lower than the normative maintenance level



Parameters for Each Defect, Forming Maintenance Levels



Types of Response Times under the DSTU Guideline

Contractual Response Time

A time period (hours or minutes) set out in the agreement between the time of first discovery and the time of defect remediation, which may not exceed the normative response time.

Normative Response Time

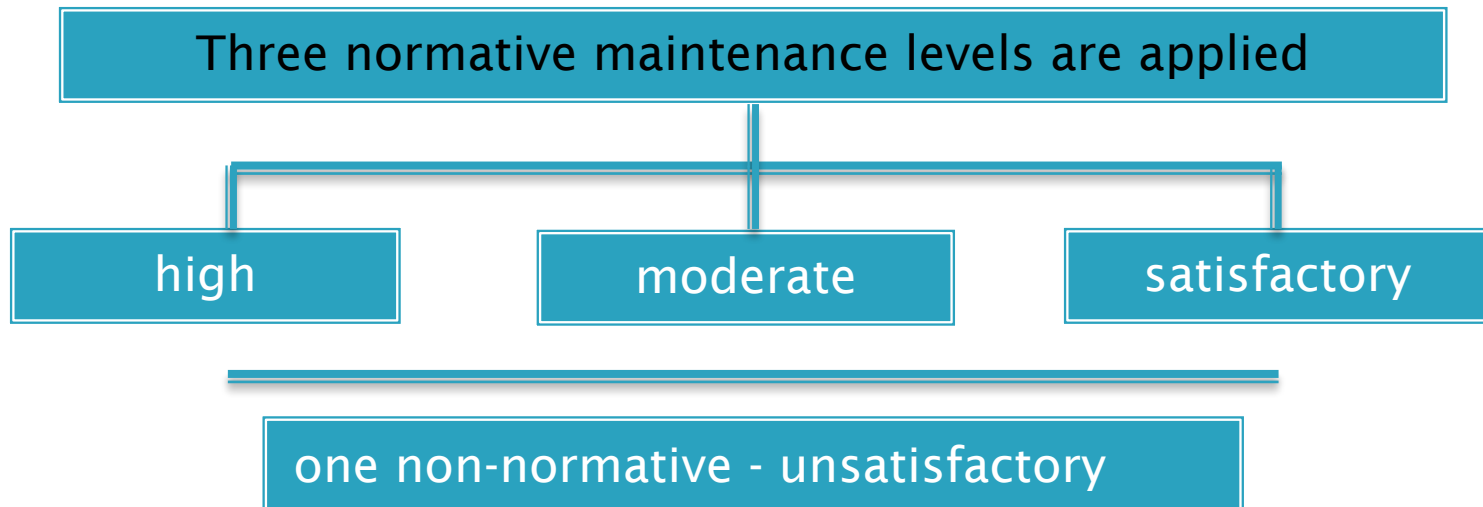
A time period (in hours or days) from defect discovery to its remediation, set by the applicable regulatory documents.

Actual Response Time

The actual time period from the time of the defect discovery (date, hour, minute) to the time of the defect remediation (date, hour, minute), minus the time when work performance was impossible due to the adverse weather conditions.

Road Maintenance Level under the Draft DSTU Guideline

Characteristics of certain condition of an element, component, road section, several road sections, road network defined through timeliness, completeness, and quality of defect remediation.



Assessment of the defect impact on the road element

Impact degree, C_{ϵ}	Impact probability, I_{ϵ}			
	1 – negligible	2 minor	3 – moderate	4 – high
1 – negligible	1	2	3	4
2 – minor	2	4	6	8
3 – moderate	3	6	9	12
4 – high	4	8	12	16

$$R = C_{\epsilon} \times I_{\epsilon} \quad (1)$$

Defect Remediation Priority Assessment

Defects impacting road user safety;

Defects established through the assessment of defect impact danger for the road element and through the element failure risk assessment;

Defects impacting the speed of the road element degradation;

Defects requiring remediation according to the directive requirements (i.e., removal (spraying) of weeds to reduce their impact on the agricultural lands) and unpleasant defects (i.e., offensive graffiti);

Defects, the preventive remediation of which will prevent their further development to the ultimate permissible size and severity (i.e., crack filling preventing formation of potholes and surface deformation);

Inconvenient defects or those considered unattractive as to their consumer qualities.

Motor Road Maintenance Level Classification

Maintenance level	General characteristics of the maintenance level.
High	Contractual maintenance levels, better than the normative ones, apply. Contractual response terms exceedance is avoided.
Medium	Contractual maintenance levels, better than the normative ones, apply. Percentage of defects remediated in excess of the contractual response time and those not yet remediated with response time overdue constitutes no more than 10% of the total number of remediated or available defects.
Low or permissible	Normative maintenance levels are used as contractual. Percentage of defects remediated in excess of the contractual response time and those not yet remediated with response time overdue constitutes no more than 15% of the total number of remediated or available defects.
Unacceptable	Percentage of defects remediated in excess of the contractual response time and those not yet remediated with response time overdue constitutes more than 15% of the total number of remediated or overdue defects under the contract.

The following are not included in the maintenance level assessment:



Defects on the road sections where repair or reconstruction works are in progress;

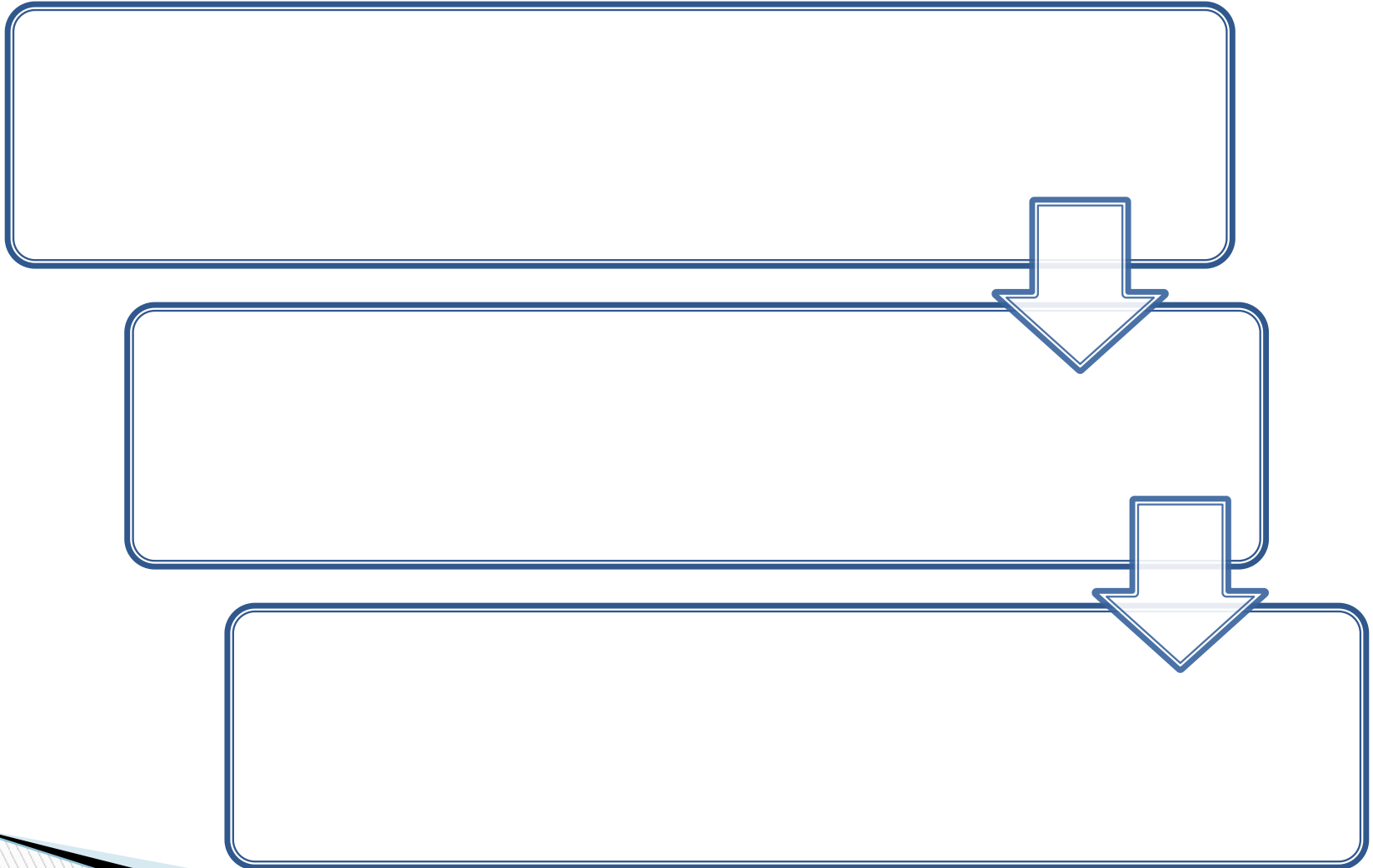


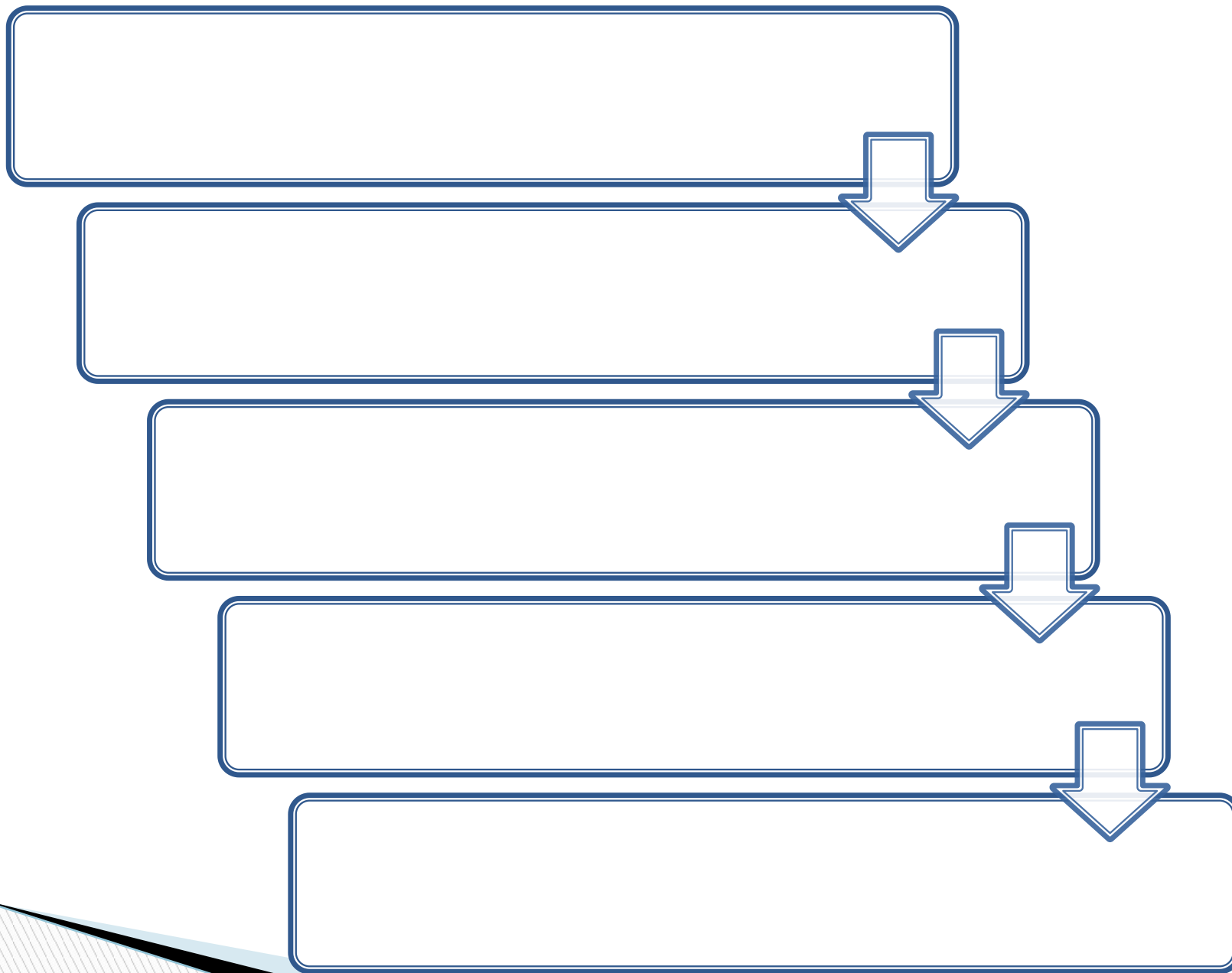
In the event that road element's delivery, in part or in full, into the normative condition is not provided under the agreement;



If at the time of the control, the defect is in the process of remediation and the remediation terms has not yet matured.

Maintenance Level Justification Procedure





Maintenance Level Justification Excerpt

Example

Table – Roadbed

Code	Defect remediation intervention level criterion	S e a s o n	T i m e	Maintenance level											
				Satisfactory				Medium				High			
				Requirement level				Requirement level				Requirement level			
				1	2	3	4	1	2	3	4	1	2	3	4
				Response time				Response time				Response time			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Reinforced shoulders (without hard surface), separation lines															
1.01	Destruction of the soil surface of the shoulders, separation lines deeper than	P	day s	10	10	10	10	7	7	7	7	5	5	5	5
1.02	Separation lines and non-reinforced parts of the shoulders, non-separated from the stop (reinforced) line by the curb stone, shall not be lower than the level of the adjacent edge of the driveway for more than 5.0 cm	P	day s	10	10	10	10	7	7	7	7	5	5	5	5

Key Parameters of the Long-Term Agreements

Comprehensiveness - the scope of the OPRC for the road elements and activity types (summer (spring, summer, fall) maintenance, winter maintenance, landscaping);

Composition and length of the road sections maintained under the OPRC, their significance (national or local), road type (international, national, etc.), road category;

OPRC duration (up to and including seven years);

Operational maintenance levels (OML) under the DSTU 8993;

Operational up-keeping levels (OUL) under the DSTU 8992 and DSTU 8993;

Expected cost of procurement;

Monthly fixed payment amounts for the works and services performed by the Contactor during the OPRC;

Penalty score accrued for the excess of the OPRC response time per time period for defect remediation provided under the OML specification;

Cost of one penalty score for the calculation of the amounts withheld from the monthly fixed payment due to the excess of the defect remediation response time.

Types of the Long-Term Agreements



Comprehensive OPRC



Specialized OPRC

(some OPRC, i.e., for road driveway dressing, bridge, road traffic organization technical means maintenance, etc.)

Subject Matter of the Long-Term Agreements



A section of one motor road

(route or corridor principle)

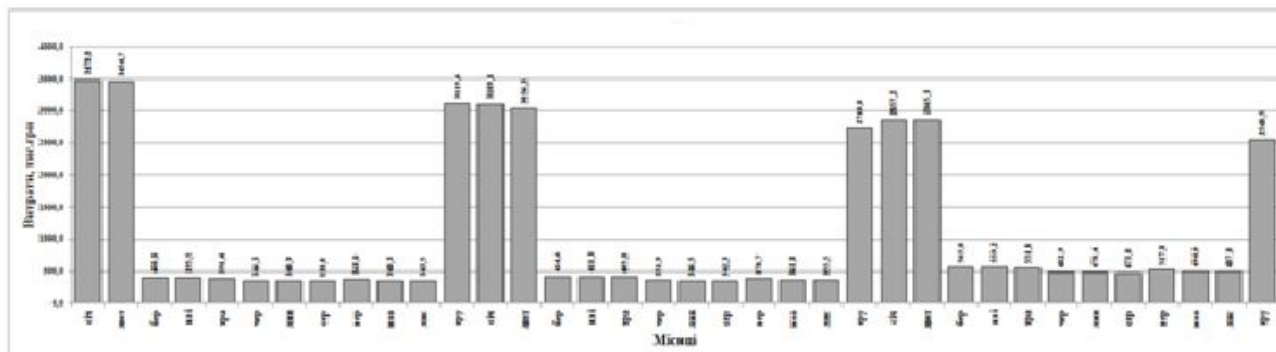


Sections of several motor roads, including of different types (i.e., regional and territorial) within a certain territory (network principle) or their individual elements or activity types (landscaping, traffic safety, road cleaning, etc.).

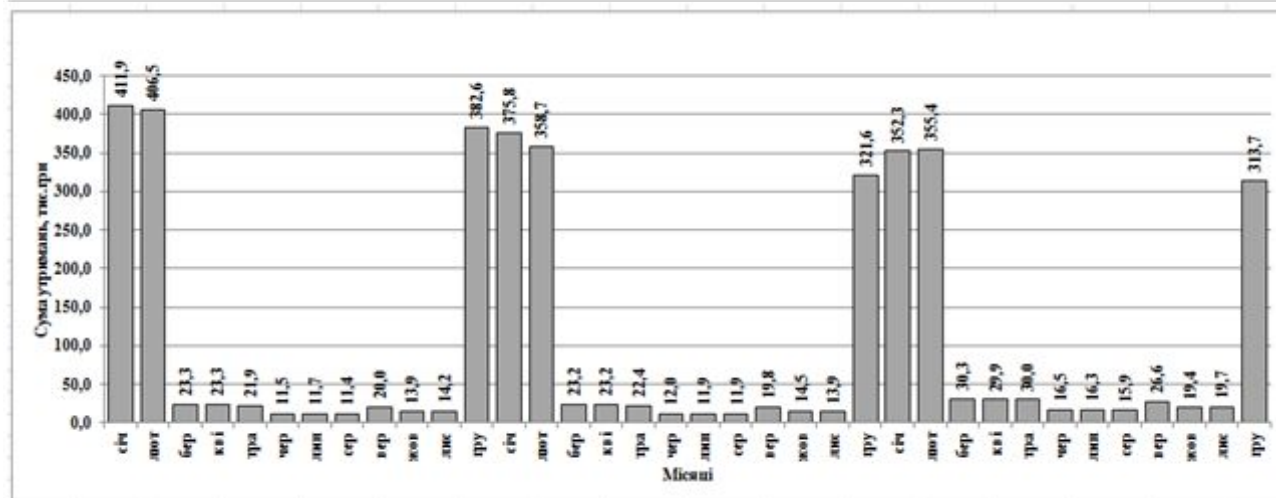
OML Sheet - Operational Maintenance Levels in LTCSimula

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Експлуатаційні рівні обслуговування (ЕРО)															
2	Код	Критерій рівня втручання з усунення дефекту	Сезон	Вимір часу	Рівень утримання											
3					Задовільний				Середній				Високий			
4					Рівень вимог				Рівень вимог				Рівень вимог			
5					1	2	3	4	1	2	3	4	1	2	3	4
6					Строк реагування				Строк реагування				Строк реагування			
41	1т28	Мул сміття блокують більше ніж 25 % поперечного перерізу в будь-якій точці	Р	діб	14	14	21	28	10	10	14	21	5	5	10	14
42	1т29	Пошкодження цілісності конструкції, нецільне залягання в навоколишньому ґрунті та/або матеріалі; пошкодження, що можуть призвести до витoku води, один випадок	Р	діб	14	14	21	28	10	10	14	21	5	5	10	14
43	т2	Покриття доржнього одягу														
44	т2п1	Вибіони, руйнування покриття проїзної частини та укріплених узбіч														
45	т2т1	Вибіони, руйнування покриття з ЕП не більше ніж 0,08 м2 та завглибшки до 4 см на одну одиницю, загальною площею м2 на 100 000 м2 покриття1 не більше ніж (за рівнями вимог: 1, 2, 3, 4):1—1,5; 2—3,0; 3—5,0; 4—7,0;	В	діб	5	7	7	10	4	5	5	7	3	3	4	5

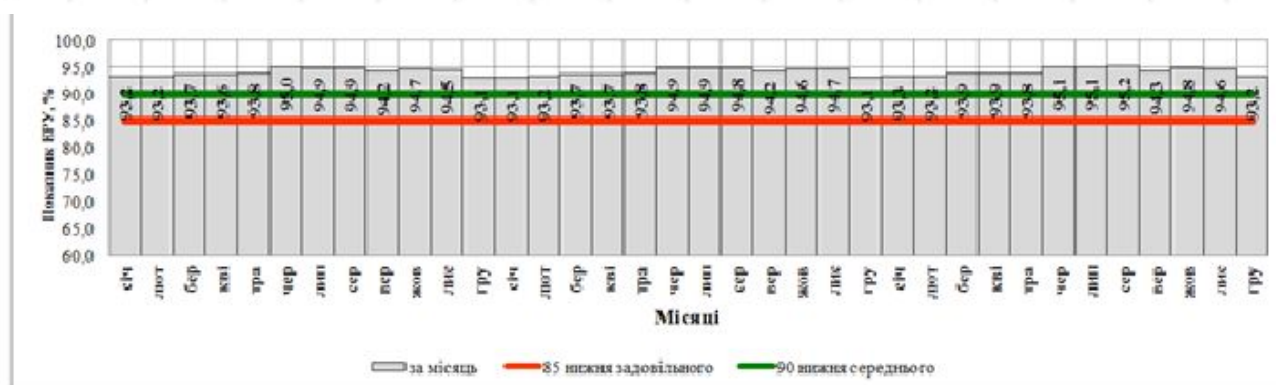
Costs



Penalties



Losses and Profit



Середнє значення показника ЕРУ, %
94.1 СЕРЕДНІЙ

ARLTC Software Expert Assessment Questionnaire Starting Sheet

A	B	C	D	E	F	G	H
			Анкети експертних оцінок				

Формування робочого листа вихідних
даних з шаблону

Оцінювання параметрів трикутних законів розподілу випадкових величин
тривалості, вартості та кількості випадків усунення дефекту

Код експерта	Відомості про експерта	№ оцінки	Рівень вимог	Рівень утрим.	Назва робочого листа у книзі
1	Головний інженер АТ "Дорога"	1	2	2	E1,B1,PB2,PY2

▶▶ ЕРО Шаблон Варіанти E1,B1,PB2,PY2



Thank you for your attention!

- Anna Kharchenko, Ph.D. in Engineering, Associate Professor National Transport University (NTU), Transport Construction and Property Management Department, Kyiv office: (044) 2807909, cell: (067)2557668, e-mail: anna-x3@ukr.net, a.kharchenko@ntu.edu.ua

Anna Kharchenko
Doctor of Technical Sciences, Associate Professor
Department of Transport Construction and Property
Management
National Transport University