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Legal, Technical, Economic, and Organizational Issues of Emergency Repairs of Railway Infrastructure: A Case Study of Poland

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Abstract:

Purpose: *The purpose of this publication is to analyse and evaluate the multifaceted legal, technical, economic, and organizational issues associated with emergency repairs of railway infrastructure.*
Design/Methodology/Approach: *Achieving this goal required an interdisciplinary approach to the topic and a multifaceted evaluation related to cost estimation and the impact of various technical and operational factors on the costs of emergency repairs. Additionally, an expert method was used to gather opinions on the implementation of emergency repairs of railway infrastructure. The study utilized results from previous scientific research and extensive experience from conducted judicial expert opinions.*
Findings: *The article describes the essence and scope of work related to emergency repairs of railway infrastructure and conducts a multifaceted analysis and evaluation of the impact of individual factors on the costs of emergency repairs. The obtained research results and expert opinions provide answers to the legal aspects and the technical-organizational feasibility of implementing emergency repairs. Future research is necessary to continue examining legal and organizational changes in these repairs.*
Practical Implications: *The article presents the essence of emergency repairs of railway infrastructure, which has been a constant practice in railway operations in Poland and beyond. This issue remains important and relevant, as past experiences indicate many contentious issues often end up in court, involving infrastructure owners, repair contractors, and insurers, with sometimes significant disputed amounts.*
Originality/Value: *The publication uses original, long-term research on emergency repairs of railway infrastructure related to law, technology, economics, and management.*

Keywords: *Railway infrastructure, emergency repair, repair cost estimation, multifaceted analysis.*

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Paper Type: *Research article.*

1. Introduction

The article addresses the aftermath of railway accidents on Polish railway infrastructure. It is important to note that railway incidents and their consequences have been an inherent part of every transport sector since its inception, including rail transport (Zheng *et al.,* 2019, pp. 2590-2599; Batarlienė, 2020, pp. 1-12; Report ERA, 2024).

Railway incidents negatively impact not only entities related to rail transport, such as railway operators, infrastructure managers, siding users, or electricity distributors, affecting their image and generating significant financial burdens, but also third parties such as passengers, pedestrians, motorists, and rescue operation entities (Sitarz and Wachnik, 2020, pp. 50-54; Anagnostopoulos, 2024, pp. 187-196).

Technological advancements in rail transport and the introduction of mandatory safety management systems have reduced the number of railway incidents.

However, factors such as human errors, equipment failures, reckless actions by outsiders, and weather phenomena still cause railway incidents and their associated costs, leading to property damage, bodily injuries, or even fatalities (Pordel *et al.,* 2020, pp. 1068-1073; RSSB UK, 2020; Rosa, 2020, pp. 91-92; Konowrocki *et al.,* 2021, pp. 21-33; Unger *et al.,* 2023, pp. 1254-1274), (Figure 1).

Figure 1. *Image of infrastructure and wagons after a railway accident.*

Source: *Kupniewski, A. Wykolejenie w Tarnowie Opolskim. Do pięciu dni utrudnień. Rynek Kolejow. https://www.rynek-kolejowy.pl/wiadomosci/wykolejenie-w-tarnowie-opolskim-do-pieciu-dni-utrudnien-zdjecia-78185.html*

However, in the rich literature on railway infrastructure (Zhang *et al.,* 2016, pp. 326-334; Ploch and Sitarz, 2018, pp. 1254-1274; Punetha *et al.,* 2021, pp. 1254-1274; Nepomnyashchikh and Kirpichnikov, 2022, pp. 609-613), durability and reliability of its elements (Wang *et al.,* 2020, pp. 1-11; Reumers *et al.,* 2022, pp. 1-20; Li *et al.,* 2023, pp. 1-13), costs of construction and repairs of railway infrastructure (Sussmann and Thompson, 2017, pp. 1-7; Funk *et al.,* 2019, pp. 1-10; Butor *et al.,* 2020, pp. 15-22) and track works technology (Mindur, 2014; Sitarz, 2024), there are no studies on emergency repairs of railway tracks.

There are studies by institutions related to railway safety (FRA USA, 2009; Alex, 2017, pp. 1-21; Mindur, ed., 2017, pp. 684-731; Network Rail UK, 2023) or companies repairing railway infrastructure (Bonadiez *et al.,* 2022, pp. 1-21), but they do not concern emergency repairs.

The complexity and importance of this issue are evidenced by numerous court rulings at various levels, including appellate courts, involving significant disputed costs between infrastructure owners, contractors, carriers, and insurers. These institutions have different approaches to three key issues encompassing technical, organizational, legal, and financial aspects:

- Definition of emergency repair;
- Methods and technologies for emergency repairs of railway infrastructure;
- Standards, regulations, catalogs, and prices for calculating emergency repair costs.

These issues have not been systematically addressed. Insurers believe that emergency repairs should be settled according to standards for regular repairs and the cheapest technology using second-hand materials. Infrastructure owners believe that costs should be calculated based on market prices. Differences in these approaches can reach up to 100%.

The analysis by Marek Sitarz (Sitarz, 2024) clearly shows that emergency repairs differ fundamentally (legally, technically, organizationally, and in terms of timing) from regular investments and planned repairs. These differences significantly impact compensation costs, which can sometimes be substantial (damaged locomotives, wagons, power networks, railway tracks, or signaling devices) and must be covered by the insurer.

Typically, insurers want to pay about 40-60 percent of the costs incurred by the railway infrastructure owner for emergency repairs. Due to the lack of clear regulations and significant differences, these matters often end up in court.

The authors, with experience in such transport-related cases, want to highlight systemic errors in the implementation of emergency repairs in Polish rail transport at the interface between infrastructure owners and insurers.

The interdisciplinary and multifaceted nature of the article aims to analyze the technical, organizational, legal, and financial dependencies of emergency railway track repairs, associated with the conflict of interests between the infrastructure owner, the carrier, and the insurer. This analysis allowed for the formulation of recommendations aimed at minimizing these conflicts, particularly in financial and organizational aspects.

The study also incorporated information derived from the authors' extensive professional experience in railway infrastructure-related work. Additionally, to achieve the study's objective, multifaceted analyses and studies related to cost estimation and the impact of various technical and operational factors on emergency repair costs were conducted.

An expert method was also used to gather opinions on the implementation of emergency repairs of railway infrastructure from experts who deal with this issue in their professional or scientific work.

2. Emergency Repair

The definition of emergency repair of railway infrastructure is derived from §38 sec. 1 point 3 of Instruction Id-1 *"Technical conditions for maintaining track on railway lines"* (PKP PLK – the infrastructure owner), according to which a repair is understood as an emergency repair aimed at removing the effects of natural disasters, track failures, or railway accidents and restoring the line's operability with specified operational parameters as quickly as possible (Figure 2).

Additionally, trackwork planning is a time-extended cycle, whereas emergency repair involves addressing the consequences of a sudden event that may cause operational disruptions, thereby increasing the extent of losses.

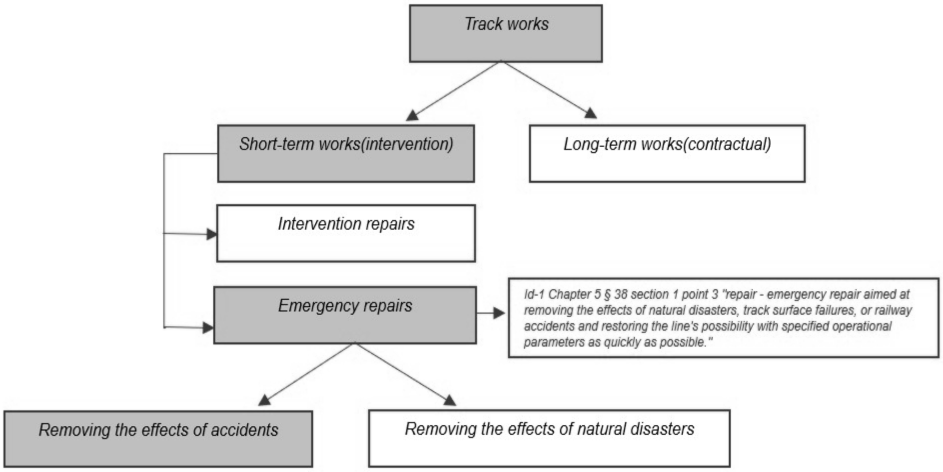
At the largest railway infrastructure conference in Poland in 2023 (600 participants), discussions with experts (manufacturers and contractors involved in the construction and repair of railway infrastructure) were conducted on these topics. The questions directed to the experts concerned understood problems related to emergency repairs of railway infrastructure, particularly focusing on:

- Identifying the most significant threats in implementing these repairs;
- Assessing the efficiency of institutions and individuals involved in these repairs;
- Reviewing legal and organizational solutions related to these repairs;

- Identifying the necessity of establishing new organizational and legal solutions.

For example, from these discussions, we know that there are only three railway turnout manufacturers in Poland who confirm the previous points regarding the costs of regular and emergency repairs. For instance, for the 60E1 1:9 R300 turnout to be installed on SP-93 prestressed concrete railway sleepers, the following data were obtained, Table 1.

Figure 2. *Position of emergency repair in railway trackwork.*



Source: *Author's own study: Sitarz, M. 2024. Wielokryterialna ocena finansowo-organizacyjna napraw awaryjnych infrastruktury kolejowej. Praca badawcza, Dąbrowa Górnicza.*

Table 1. *Second Turnout Manufacturer.*

ON.	Term	Turnout [PLN] from 2016 to 2023		Sleeper [PLN] from 2016 to 2023		Turnout and sleeper [PLN] from 2016 to 2023	
1.	Normal term 4–6 weeks	240,000–300,000	120,000–150,000	29,000–35,000	21,000–26,000	269,000–335,000	141,000–176,000
2.	Emergency term 2–3 weeks	270,000–350,000	140,000–170,000	33,000–38,000	23,000–28,000	303,000–388,000	173,000–198,000

Source: *Author's own study: Sitarz, M. 2024. Wielokryterialna ocena finansowo-organizacyjna napraw awaryjnych infrastruktury kolejowej. Praca badawcza, Dąbrowa Górnicza.*

1. Normal Term (in days): 28-42 calendar days.
2. Emergency Term (in days): 14-21 calendar days.

1. For turnouts, the price primarily depends on the turnout construction required by the client; this includes the type of blades and crossings, the grade of steel used for the profiles, the components, and the delivery term.
2. For prestressed concrete sleepers, the price is mainly influenced by the delivery location, the type of turnout, and the delivery term.

Summary of discussions with experts on the possibility of delivering railway infrastructure elements in emergency mode using turnouts as an example:

- Manufacturers do not have "free" railway infrastructure elements, such as turnouts, in stock;
- The base prices of these turnouts depend on many technical and organizational factors;
- The prices of turnouts delivered in emergency mode differ from those ordered in normal mode.

Emergency mode is not a normal situation, and derailments cannot be predicted, thus making it impossible to pre-arrange an emergency repair contract. A serious accident or incident necessitates work to be conducted under exceptional circumstances, requiring immediate action.

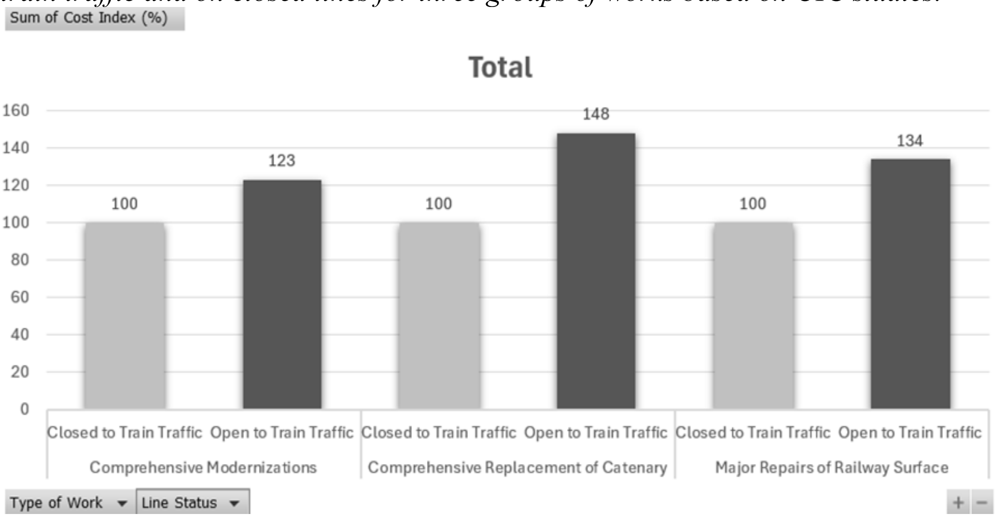
Such actions aim not only to limit further financial losses in fixed assets but also in public and social assets. Additionally, in such cases, contractors apply increased material prices and higher unit prices for performing the work, as the procurement of materials and engagement of equipment outside the delivery schedule and equipment operation involve additional costs.

It should also be noted that emergency mode affects repair costs and is associated with the need for immediate mobilization of resources by the contractor, which prevents them from obtaining low prices for materials (e.g. turnouts) and equipment. The necessity for the quickest possible track repair arises from the difficult operational situation on a specific line caused by high railway traffic density.

A prolonged repair process can cause significant disruptions in railway traffic. For example, based on European studies (UIC), repair costs vary significantly depending on whether the repair is on active or closed lines (Figure 3).

In emergency repairs, a crucial element is the storage location for damaged infrastructure and new infrastructure elements. This significantly affects the total cost of emergency repair and the speed of work completion. Storing materials at the work site would hinder the work, as materials would have to be stored directly on the railway tracks, blocking the movement of machines used to rebuild the railway infrastructure. This would lead to the obstruction of the maneuvering area for construction equipment.

Figure 3. *Comparison of the costs of works conducted on active railway lines for train traffic and on closed lines for three groups of works based on UIC studies.*



Source: *Author's own study: Sitarz, M. 2024. Wielokryterialna ocena finansowo-organizacyjna napraw awaryjnych infrastruktury kolejowej. Praca badawcza, Dąbrowa Górnicza.*

3. Methods and Technologies for Emergency Repairs of Railway Infrastructure

The replacement of damaged railway sleepers can be performed using several technologies, including:

- Manual replacement;
- Mechanical replacement, including:
    - Continuous track renewal train (PUN),
    - Gantry cranes,
    - Dual-mode excavators equipped with appropriate attachments.

Emergency work technologies are chosen based on the type of damage, local conditions, and the need for the quickest and least labor-intensive solutions. It is important to note the significant fact that the contractor must report immediately (sometimes within a few hours after the accident), especially when large amounts of equipment, materials, and personnel are required. We cannot always choose the technology we might prefer.

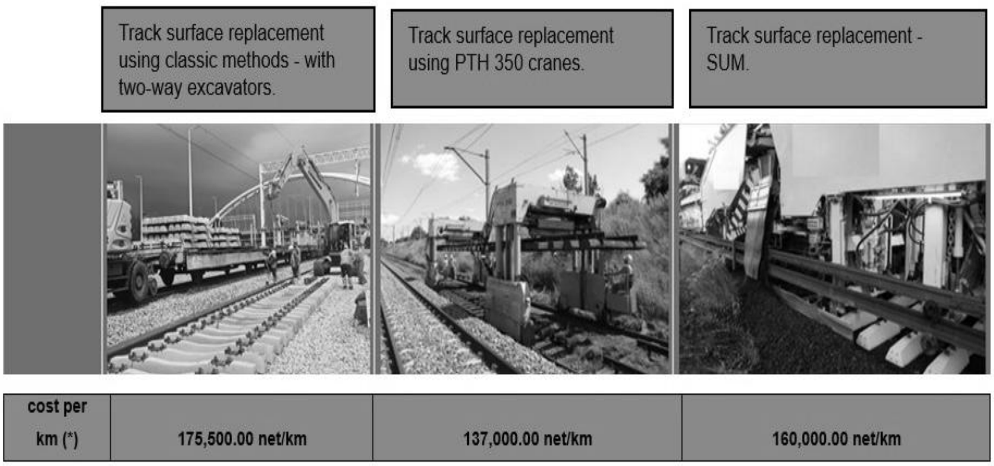
In emergency repairs, we choose the technology offered by the contractor – sometimes the only one available – and the contractor who guarantees the repair within the set timeframe (personnel, machines, and equipment). Generally, there are no internal regulations specifying emergency repair methods. However, there is the concept of emergency procurement, which is defined by the PKP Polskie Linie

Kolejowe S.A. Logistics Procurement Regulations. An example of the impact of work technology on the cost of repairing 1 km of railway track – at an emergency rate of 100 PLN/r-g, replacing the track surface without replacing the ballast and protective layer – is shown in Figure 4, while basic financial information is presented in Table 2.

The pressure to restore traffic parameters and limit possible financial and non-financial losses on an important international combined transport line (AGTC) will be incomparably greater than on a secondary or local line. The terrain, the availability of space (for storing materials and equipment), the possibility of full or partial mechanization of the work, and the availability of specialized machines and equipment also limit the choice of repair technology.

Each case of failure and the associated repair of infrastructure, damaged or destroyed due to a railway accident, should be considered individually, taking into account a combination of many different factors and conditions specific to the given place and time, while also considering the relevant laws, standards, instructions, and regulations.

Figure 4. *Impact of Work Technology on the Cost of Repairing 1 km of Railway Track.*



Source: *Author's own study; Sitarz, M. 2024. Wielokryterialna ocena finansowo-organizacyjna napraw awaryjnych infrastruktury kolejowej. Praca badawcza, Dąbrowa Górnicza.*

4. Standards, Regulations, Catalogs, and Prices for Calculating the Costs of Emergency Railway Infrastructure Repairs

Currently, the issue of methods and bases for cost estimation of emergency railway construction works is not covered by any legal acts in Poland. Therefore, the process of implementing emergency repairs "by direct award" according to the infrastructure owner's regulations is possible and even necessary, and it proceeds according to the approved procedures of the infrastructure owner. For the first time, the article presents the results of multifaceted optimization of cost estimation for emergency railway infrastructure repairs based on the catalogs used for railway investments and emergency repair prices.

Table 2. *Basic Financial Information.*

Performance	**dismantling** (km/day)		0.350	0.720	1.000
	assembly (km/day)			0.420	
Labor cost (PLN/day)			19,000.00	20,000.00	25,000.00
Equipment cost including locomotives (PLN/day)			10,920.00	14,460.00	45,250.00
Profiling and tamping cost (PLN/km)			90,000.00	90,000.00	90,000.00
Total [PLN/km] excluding mobilization			**174,485.71**	**137,861.11**	**160,250.00**

Source: *Author's own study: Sitarz, M. 2024. Wielokryterialna ocena finansowo-organizacyjna napraw awaryjnych infrastruktury kolejowej. Praca badawcza, Dąbrowa Górnicza.*

Example calculations and analyses for basic parameters of emergency repair (e.g. minimum, average, maximum rates, various indicators, execution technologies, costs of turnouts, etc.) were intended to show that such a cost estimate can be made based on the applicable catalogs for new investment projects, but their results are not useful for emergency repairs.

To illustrate and analyze the impact of various factors on the costs of "regular" and emergency repairs, the article calculated and analyzed the costs of only the first four items of the selected executive cost estimate (out of 226 items of an example accident on the PKP PLK S.A. line) for the road industry, Table 4 for the specific accident date and repair according to the "Sekocenbud" catalog.

In the case of works conducted near active tracks, additional correction coefficients are applied to increase labor costs – W1. Depending on the intensity of train traffic, the labor hour rate increases additionally from 1.1 to 1.5.

Due to the train traffic intensity exceeding 50 during the work, a coefficient of 1.5 was adopted. Due to the emergency mode of work, night hours, and holidays, additional coefficients increasing expenditures – W2, which are not covered by the standards, are also applied.

According to this publication, the minimum, average, and maximum costs for the road industry are as follows (Table 4):

Table 3. *The first four items of the selected cost estimate.*

ON.	Name
1.	Loading turnouts onto railway wagons in yards and bases
2.	Internal railway transport of turnouts and crossings over up to 1 km
3.	Unloading turnouts from railway wagons onto the storage yard or track
4.	Manual dismantling of standard railway turnouts with a 1:9 angle and a 300m radius, rail S-60 Turnout No. 11

Source: *Author's own study: Sitarz, M. 2024. Wielokryterialna ocena finansowo-organizacyjna napraw awaryjnych infrastruktury kolejowej. Praca badawcza, Dąbrowa Górnicza.*

Table 4. *Data accepted for calculations.*

ON.		Indirect costs [%]	Profit [%]	Labor [PLN] net
1.	Minimum value	40	4	10.00
2.	Average value	63	10.40	14.11
3.	Maximum value	80	16	23.00

Source: *Author's own study: Sitarz, M. 2024. Wielokryterialna ocena finansowo-organizacyjna napraw awaryjnych infrastruktury kolejowej. Praca badawcza, Dąbrowa Górnicza.*

Due to terrain conditions (special conditions), coefficients increasing the norms of equipment working time, such as excavators due to soil adhering to the bucket, dragline, or grab – W3, which amount to up to 1.6, may also be applied. These coefficients are applied based on the Collection of Work Standards for the Road Service issued by PKP.

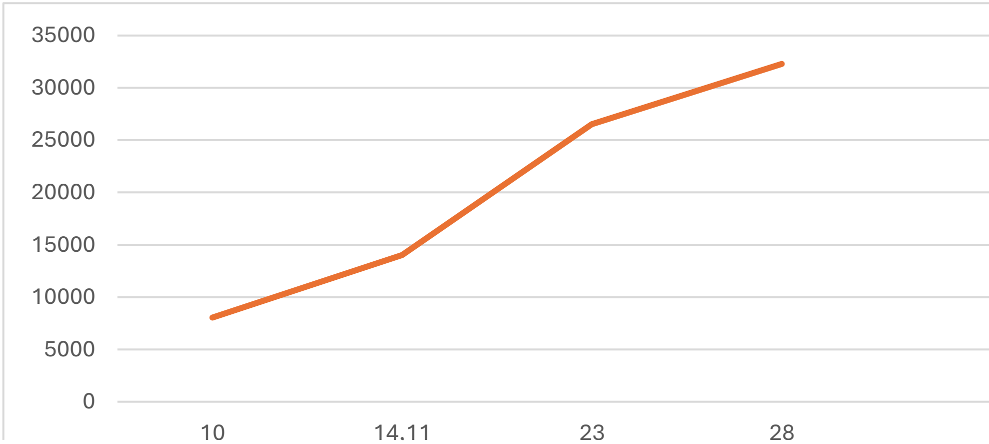
Due to the vast number of combinations for preparing a cost estimate for at least eight variables, each with at least three or four additional variables (e.g., minimum, average, maximum costs, and emergency repair costs), eight basic combinations were prepared to enable the analysis of emergency repair costs.

The analysis of four road cost estimate items for different variants includes only labor costs. Only items 3.1, Table 5, and items 1.1 and 2.1, Table 8, exemplify the total labor costs along with the cost of machine work. If we were to consider all items including labor costs, machine work costs, and material costs, the value of the cost estimate would increase proportionally significantly.

5. Calculation Results

Tables 5 to 7 present the results of the multi-variant analysis with different labor hour rates ranging from 10.00 PLN through 14.11 and 23.00 PLN to 28.00 PLN (Figure 5).

Figure 5. *Dependence of emergency repair costs [PLN] on the labor hour rate [PLN].*



Source: *Author's own study: Sitarz, M. 2024. Wielokryterialna ocena finansowo-organizacyjna napraw awaryjnych infrastruktury kolejowej. Praca badawcza, Dąbrowa Górnicza.*

From this chart, it follows that the analysis included the lowest, average, and largest catalog investment rates, as well as the rates adopted in the emergency repair contractor's cost estimate (28 PLN) after negotiations. It should be noted here that these rates are for road works, while rate calculations for all considered variants are included in Table 8.

Table 5. *Minimum, average, and maximum costs for the road construction sector are as follows.*

ON.		Indirect costs [%]	Profit [%]	Labor [PLN]	Calculations [PLN]
1.	Minimum value	40	4	10.00	8037.58
2.	Average value	63	10.40	14.11	14,016.50
3.	Maximum value	80	16	23.00	26,510.73
3.1	*Maximum value including equipment costs*	*80*	*16*	*23.00*	*37,505.22*

Source: *Author's own study: Sitarz, M. 2024. Wielokryterialna ocena finansowo-organizacyjna napraw awaryjnych infrastruktury kolejowej. Praca badawcza, Dąbrowa Górnicza.*

Table 6. *Variant 1 Variable labor hour rate, other items fixed [PLN].*

ON.	Labor hour rate	Indirect costs [Kp] %	Profit [Z] %	**Coefficient W1**	**Coefficient W2**	**Coefficient W3**	Cost estimate value of works excluding VAT

1.	14.11	80	16.0	1	1	1	16,263.64
2.	23.00	80	16.0	1	1	1	26,510.73
3.	28.00	80	16.0	1	1	1	32,273.82

Source: *Author's own study: Sitarz, M. 2024. Wielokryterialna ocena finansowo-organizacyjna napraw awaryjnych infrastruktury kolejowej. Praca badawcza, Dąbrowa Górnicza.*

Table 7. *Variant 7 Maximum cost [PLN].*

ON.	Labor hour rate	Indirect costs [Kp] %	Profit [Z] %	**Coefficient W1**	**Coefficient W2**	**Coefficient W3**	Cost estimate value of works excluding VAT
1.	23.00	80	16.0	1.5	1	1	**39,765.90**
1.1	*23.00 including equipment costs*	*88*	*16.0*	*1.5*	*1*	*1*	***56,257.73***
2.	28.00	80	16.0	1.5	1	1	**48,410.54**
2.1	*28.00 including equipment costs*	*80*	*16.0*	*1.5*	*1*	*1*	***64,902.38***

Source: *Author's own study: Sitarz, M. 2024. Wielokryterialna ocena finansowo-organizacyjna napraw awaryjnych infrastruktury kolejowej. Praca badawcza, Dąbrowa Górnicza.*

Analyzing only the first 4 items of the cost estimate out of 226, it can be stated that:

- The calculations of emergency repair costs related only to labor hours (Maximum calculations Sekocenbut (23 PLN, 80%, 16%, W1=1.5)) compared to the "Corrected post-completion cost estimate" are almost identical (40,470.85 PLN – 39,765.90 PLN, a difference of 704.95 PLN);
- In the case of including equipment costs (as it is in reality), these costs would be significantly higher (40,470.85 PLN and 56,257.73 PLN according to Sekocenbut (approximately 40% more) and 64,902.38 PLN according to emergency repair costs (approximately 60% more);
- Considering all 226 items of the cost estimate, the total costs would be similarly higher as for the selected first four items.

Table 8. *Summary of the first four items of the Cost Estimate [PLN].*

ON.	**Name**	**Cost Estimate**	**Maximum calculations Sekocenbut**	**Maximum calculations Sekocenbut**	**Maximum calculations Sekocenbut**

			(23 PLN, 80%, 16% without W1)	**(23 PLN, 80%, 16%, W1=1.5)**	**(28 PLN, 80%, 16%, W1=1.5)**
1.	Loading of turnouts onto railway wagons in compositions and bases	**5305.50**	5114.70	7672.15	9339.84
2.	Internal railway transport of turnouts and crossings for up to 1 km	**13,558.50**	9248.08	13871.92	16,887.60
3.	Unloading of turnouts from railway wagons onto the storage yard or track	**4106.85**	3359.56	5039.24	6134.73
4.	Manual dismantling of standard railway turnouts with a 1:9 slope and a 300m radius, rail type S-60, Turnout No. 11	**17,500.00**	8788.39	13,182.59	16,048.37
5.	**Total**	**40,470.85**	26,510.73	39,765.90	48,410.54
6.	***Total including equipment labor costs***	***40,470.85***	*37,505.22*	*56,257.73*	*64,902.38*

Source: *Author's own study: Sitarz, M. 2024. Wielokryterialna ocena finansowo-organizacyjna napraw awaryjnych infrastruktury kolejowej. Praca badawcza, Dąbrowa Górnicza.*

6. Conclusions

Based on the research and analyses presented in the article on emergency repair of railway infrastructure, it can be stated that for:

6.1 Emergency Repair

6.1.1. Emergency mode is not a normal situation, and it is impossible to predict derailments and thus enter an emergency repair contract in advance. A serious accident or incident means that work is conducted in an exceptional situation, needing immediate action. Such actions aim not only to limit further financial losses in fixed assets but also in public and social assets.

6.1.2. Contractors do not have “stocks” of infrastructure elements such as turnouts, SRK devices, or all necessary machines, as well as “reserve” highly qualified specialists in their warehouses. These elements must be purchased or rented from subcontractors also in emergency mode plus surcharges.

6.1.3. The prices of infrastructure elements delivered in emergency mode differ from the prices ordered in normal mode.

6.1.4. Emergency mode affects repair costs and is associated with the need for immediate mobilization of forces and resources by the contractor, which prevents them from obtaining low prices for materials, equipment, and hourly rates.

6.2 Methods and Technologies of Emergency Repairs of Railway Infrastructure

6.2.1 Emergency work technologies are chosen depending on the type of damage, local conditions, and aiming for the quickest and least labor-intensive solutions. It is important to note the very important fact of the immediate (sometimes a few hours after the accident) arrival of the contractor, especially when large amounts of equipment, materials, and people are required.

6.2.2 Each case of failure and related infrastructure repair, destroyed or damaged as a result of a railway accident, should be considered individually, taking into account the combination of many different factors and conditions characteristic of a given place and time, while considering the appropriate laws, standards, instructions, and regulations.

6.2.3 The terrain shape, site accessibility (storage of things and equipment), the possibility of complete or partial mechanization of works, and the availability of specialized machines and equipment also limit the choice of repair technology.

6.2.4 It was indicated that using the same standard or cost catalog for different infrastructure repair technologies is incorrect and leads to erroneous results.

6.3 Standards, Regulations, Catalogs, and Prices for Calculating Emergency Repair Costs of Railway Infrastructure

6.3.1 The costs of railway surface repair may vary depending on the specific case and depend on many factors, such as the scope and type of damage, the class and technical parameters of the track, the intensity of railway traffic, the availability of equipment and materials, local conditions, the nature of the work, e.g., emergency repair as a result of an accident or repair on active or closed lines, etc.

6.3.2 In emergency repairs, cost estimate proposals exceed the average values that apply on the market in the case of performing the subject repair in the public procurement mode. From the current practice – not only railway – it follows that in sudden, emergency situations, the hourly rates for workers, machines, and materials are generally higher because the potential contractor must include the client's requirements related to almost immediate commencement of repair work and the short deadline set for their completion.

6.3.3 There is also no "database" for the prices of materials, labor hours, and other cost-forming factors for works involving the removal of railway emergency repair effects.

6.3.4 Currently, the issue of methods and bases for cost estimation of emergency railway construction works is not covered by any legal acts. Catalogs, which form the only currently available and therefore commonly used normative base, do not have legal force and are only optional.

6.3.5 In the case of works conducted in emergency mode, correction coefficients increasing expenditures related to labor, materials, and equipment can be applied.

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