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To cite this article: Iwona Rybka *et al* 2017 *IOP Conf. Ser.: Mater. Sci. Eng.* **245** 072009

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# Risk of Contractors' Claims On the Example of Road Works

Iwona Rybka<sup>1</sup>, Elżbieta Bondar-Nowakowska<sup>1</sup>, Katarzyna Pawluk<sup>2</sup>, Mieczysław Połoński<sup>2</sup>

<sup>1</sup> Wrocław University of Environmental and Life Sciences, C. K. Norwida 25, 50-375 Wrocław, Poland

<sup>2</sup> Warsaw University of Life Sciences, Nowoursynowska 166, 02-787 Warsaw, Poland

iwona.rybka@up.wroc.pl

**Abstract.** The aim of the study is to analyse claims filed by building contractors during the project implementation. The work is divided into two parts. In the first part problems associated with the management of claims in the construction process were discussed. Bearing in mind that claims may result in prolongation of the investment or exceeding planned budget, possibilities of applying information included in documents connected with claims procedure to risk management was analysed in the second part of the study. The basis of the analysis is a review of 226 documents. They originate from 8 construction sites completed in the last 5 years in south-western Poland. In each case, these were linear road projects, executed by different contractors, according to conditions in the contract set out in the "Yellow Book" FIDIC. In the study, other documents relating events that according to contractors entitled them to claim were also analysed. They included among others: project documentation, terms of reference, construction log, reports and correspondence under the contract. The events constituting the reason for contractors' claims were classified according to their sources. 8 areas of potential threats were distinguished. They were presented in the form of a block diagram. Most events initiating the claims were reported in the following group - adverse actions of third parties, while the fewest were recorded in the group - the lack of access to the construction site. Based on calculated similarity indicators it was found that considered construction sites were diversified in terms of the number of the events occurrence that generated the claim and their sources. In recent years, many road projects are completed behind the schedule and their initially planned budgets are significantly exceeded. Conducted research indicated that data derived from the analysis of documents connected with claims can be applied to identify and classify both cost and schedule risk factors. Obtained data can also be useful at the stage of risk control because early diagnosis of threats in relation to technical and organizational aspects is necessary to take effective action.

## 1. Introduction

The events which, in the opinion of contractors make it difficult for them to complete the tasks in the required time and in accordance with the adopted budget, occur during the execution of the construction contract, [1-14]. This results from, inter alia, great complexity, diversity and uniqueness of the works, dependence on the terrain and weather conditions, need for specialized technological and organizational solutions, lack of continuity in material and financial resources providing. Despite the in-depth study of these problems, the scope of mentioned factors effect on the process of construction projects implementation has not been described in detail so far [4, 15, 16].

Contractual provisions of construction contracts assume the right of the contractor to demand compensation in case of difficulties. This mainly concerns the additional payment, extension of the time for completion or both of them concurrently. The contractor's entitlement to request for such



compensation is called the claim. The financial claims or the claims for prolongation arise as a result of divergence or difficulties of executing the object compared to the clauses contained in the contract. Submitting the claims by the contractors has become a common phenomenon in the few last years. Even the claims management has been developing as a discipline [17, 18].

The International Contract Conditions of FIDIC provide the procedure that should be respected by the contractor, if they consider themselves to be entitled to the time prolongation, the additional payment, or both [19, 20].

Conventionally, this procedure is called the procedure of the claim. It has been illustrated in detail in figure 1. The document initiating the presented procedure is a "notice of claim". It is the written notification submitted by the contractor immediately after the event, which in their opinion prevents them from continuation of the works in accordance with the terms of the contract.

An attention in the proposed scheme of proceedings should be paid to the role of contract engineer. In terms of the international FIDIC procedures, it is a unit managing the contract. It can be concluded from the scheme that the responsibilities of the contract engineer include examination and monitoring as well as consultation on problems which are the basis of the claim with each party. "Notice of claim" is the basis allowing to start these activities.

According to the figure 1, the procedure related to approval of the claim is complex and long. One of the purposes of this paper is to introduce its initial stage. This period is marked by frame on the presented scheme.

The analysis of construction documents found that the "notice of claim" is the most valuable source of information about potential threats on the contract. This document is prepared by the contractor and handed over to the contract engineer as soon as practicable after the contractor became aware of the adverse event. The "notice of claim" describes the adverse event. However, the contractor is not obliged to indicate there the size of losses effecting the extension of execution time or an additional payment. The notice cannot be disapproval at once without prior detailed verification of its legitimacy. At the same time, the "notice of claim" does not prejudge that the contractor is entitled to any compensation under the described adverse event. The legitimacy of the claim is the subject of further analysis of the contract engineer.

Substantive examination of the contractor's notice may be only conducted after the submission of the so-called "final claim". The contractor submits this document after the cessation of the effects resulting from the adverse event. The "final claim" is prepared by the contractor as a summary of their claim. This document includes complete information justifying the basis of the claim, and the claimed time extension and/or additional payments. Not every "notice of claim" ends with the "final claim". The result of the "notice of claim" to a high degree depends on the participants of the contract. The task of the contract engineer is to undertake an action aimed at mitigation of adverse effects of the reported circumstances immediately after getting the contractor's notice. The parties can always reach an agreement, or the contractor might also admit that the adverse event occurred, but he did not suffer losses because of it. In this case, the contractor waives the claim. If it is not possible to avoid the effects of adverse events, or an agreement between the parties is not achieved, the contract engineer is obligated to make a fair determination of claim legitimacy taking due regard of all relevant circumstances. At the result, the contract engineer approves or disapproves the claim.

If the parties do not agree with the engineer's determination, the dispute is subject of the Dispute Adjudication Board consideration. The decision of the Dispute Adjudication Board is another step towards an objective evaluation of the effect of events in order to come to an amicable settlement of the dispute. The decision does not meet the criteria of judgment; hence it is applicable as long as the parties do not express their discontent. In case of appeal, the parties have the right of arbitration as one instance institution of the arbitration court. The judgment of the arbitration court, after registration under a common court, obtains the enforcement clause. Bringing an action at law is the extremity.

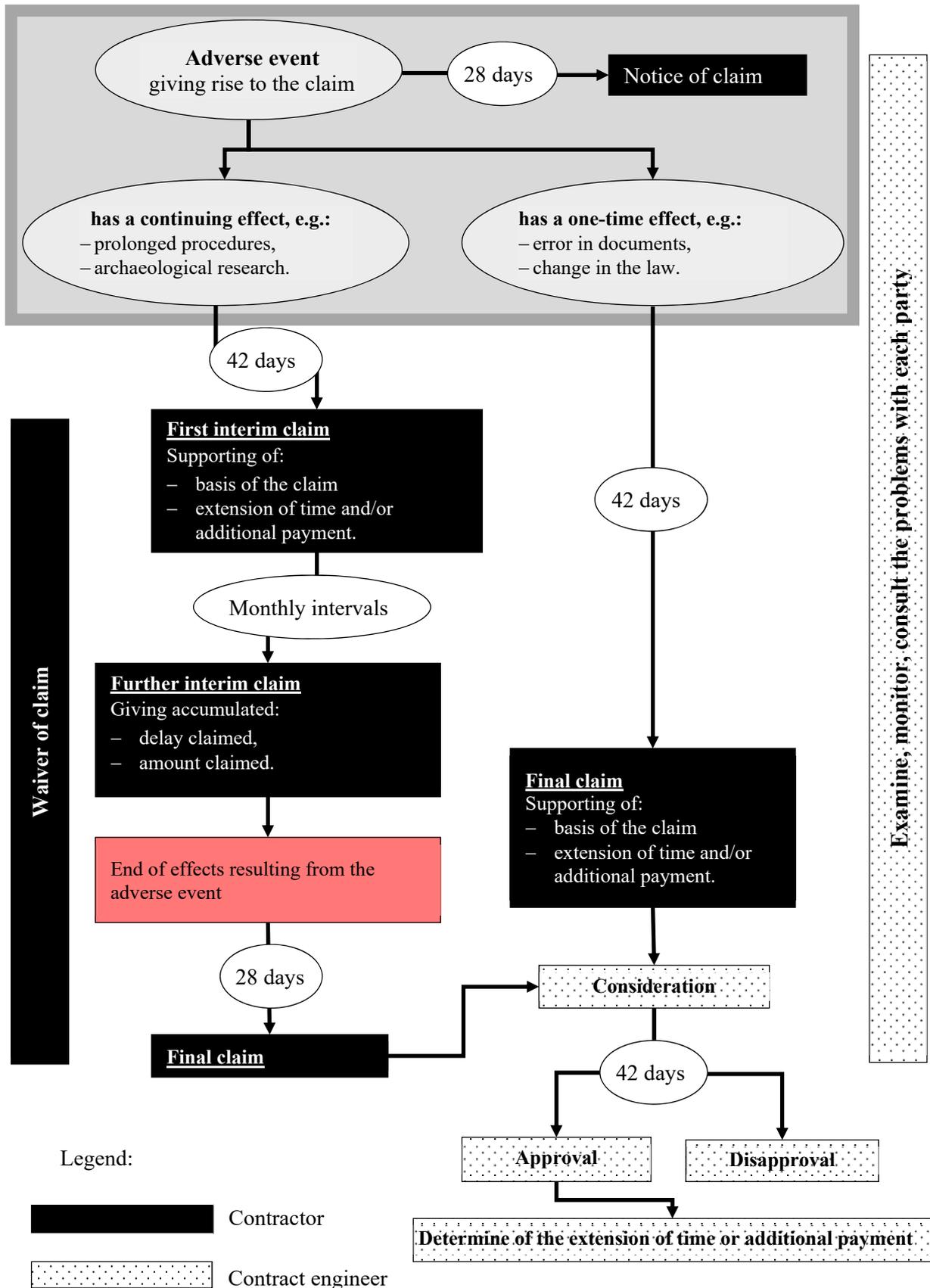


Figure 1. The procedure of contractor's claims management [20]

The aim of this study is the recognition of the risk of claims. Particularly, the factors generating the contractors' claims were identified and classified in the study, and the number of claims that are their consequence was determined. The knowledge of such factors and their early detection are the basis for planning and taking actions allowing to reduce the number of claims, and concurrently, to reduce the risk level [17]. It is known from experience that improved efficiency of construction works can be achieved both improving the technology and organization, as well as through appropriate management of adverse events occurring during the construction process [21-23].

## 2. Research method and objects

The basis of the analysis is the review of the documentation prepared at the stage of design and construction of eight investment. All of them were executed according to the contractual conditions specified in the "Yellow Book" of FIDIC. Considered investments are comparable in terms of the works scope, conditions of execution, duration and budget allocated for their implementation. The scope of works included in each case the design and execution of road section. An average length of described road sections was 15 km. The shortest of them was 11 km, the longest - 22 km. All investments were realized over the last 5 years, each by a different contractor. Currently, five of them are completed, and three are in the final stage.

The "notices of claim" were analysed in detail in order to obtain information about the claims reported by contractors. All cases examined in this study were registered on the basis of this document. Also, other documents concerning the events that, according to the contractors, entitled them to claim were analysed. They included, inter alia, project documentation, terms of reference, construction log, reports and correspondence under the contract.

## 3. Results and discussions

Two hundred and twenty-six "notices of claim" were identified on the basis of the documentation review. Not all notices indicated in the study ended with contractor's compensation for an adverse event. Certain claims were rejected as unjustified. Also, the notices abandoned by the contractors were recorded. This was due to the fact that the notices were only a signal of a potential danger, and an undertaking of appropriate measures allowed to prevent the contractor against the losses. The contractors often did not clarify in their notices the amount of additional payment or the extension of the time they considered to be entitled because of adverse event.

All cases were classified according to the factors that caused the difficulties. The division on internal and external factors was taken into account in the adopted classification. The first group included the factors dependent on the contracting party. The second group consisted of the factors resulting from external factors, not under the control of the contracting parties. The classification of these factors is presented in figure 2.

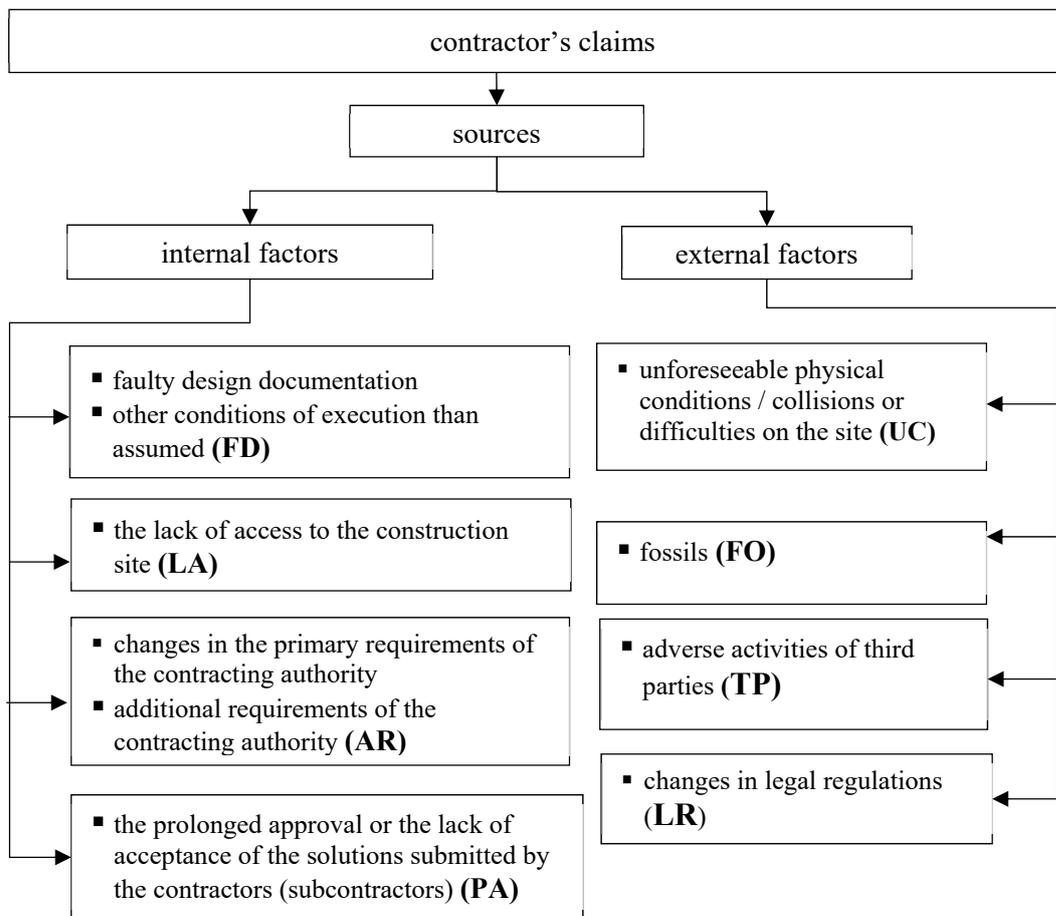
The data in figure 3 reveals that the external factors influence on the number of claims is much stronger than internal factors.

The data presented in figure 3 indicate that the influence of a third party (TP) should be considered as the most unprofitable factor in terms of generated claims. These are the institutions such as authorities, offices, operators of infrastructure on the site, local community, owners of the plots on which the work is conducted. The structure of the events that cause the claims in this group (TP) was as follows:

- 50% the change of decision or conditions issued by the institution conditioning the realization of the construction project,
- 36% prolonged administrative procedure,
- 8% no-settled issue of compensation for the easement area or change of the plot ownership,
- 6% the works of other entities interfering with the works of contractor - hampering their actions.

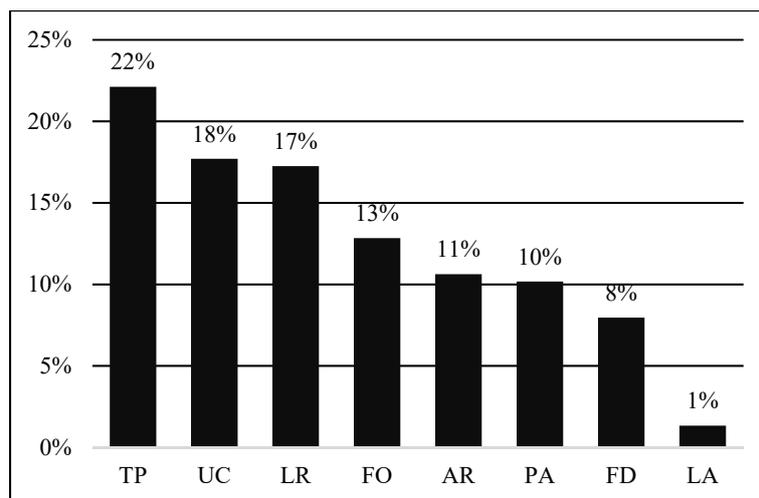
Another factor in terms of the number of contractors' claims were unforeseeable physical conditions (UC). They were mainly related to the following difficulties on the site:

- 65% faulty located over- and underground infrastructure,
- 18% faulty identified ground and water conditions in the project documentation,
- 10% unforeseen, protected elements of nature,
- 7% other barriers on the site (e. g. not inventoried fragments of the buildings).



**Figure 2.** Classification of factors underlying claims

The identified factors were further classified in terms of their frequency. This is presented in figure 3.



**Figure 3.** The claims structure according to the factor causing them

The similar effect on the claims occurrence as unforeseeable physical conditions (UC), was observed for the changes in legal regulations (LR). This factor structure is as follows:

- 44% the company’s operations - billing, contracts and wages, social benefits,
- 28% technical conditions,

- 18% environmental protection,
- 10% administrative procedures related to the construction investment process (e.g. public procurement law).

The data presented in figure 3 should be regarded as a qualitative and quantitative structure of the causes of road works contractor's claims. It was determined on the basis of information obtained from eight objects, executed under similar conditions, by different contractors. Thus, it should constitute a model of the rising of claims in road works completion. The aim of further analysis conducted in the study was verification whether this on model fits to the conditions that occur during the implementation of individual objects. This would allow to state whether the data presented in figure 3 may be used in the future for the preparation of claims management plans, as well as cost and schedule risk management plans of road construction investments.

The similarity indices of the structure of the model shown in figure 3 were determined for this purpose. Then it was compared with the structures of claims characterizing individual objects. The similarity indices of structures were calculated using the following formula [24]:

$$P = \sum \min(u_{ia}, u_{ib}) \quad (1)$$

where:  $u_{ia}$ ,  $u_{ib}$  – structure indices of a and b sets calculated using the following formula

$$u_i = \frac{w_i}{\sum w_i} \quad (2)$$

where:

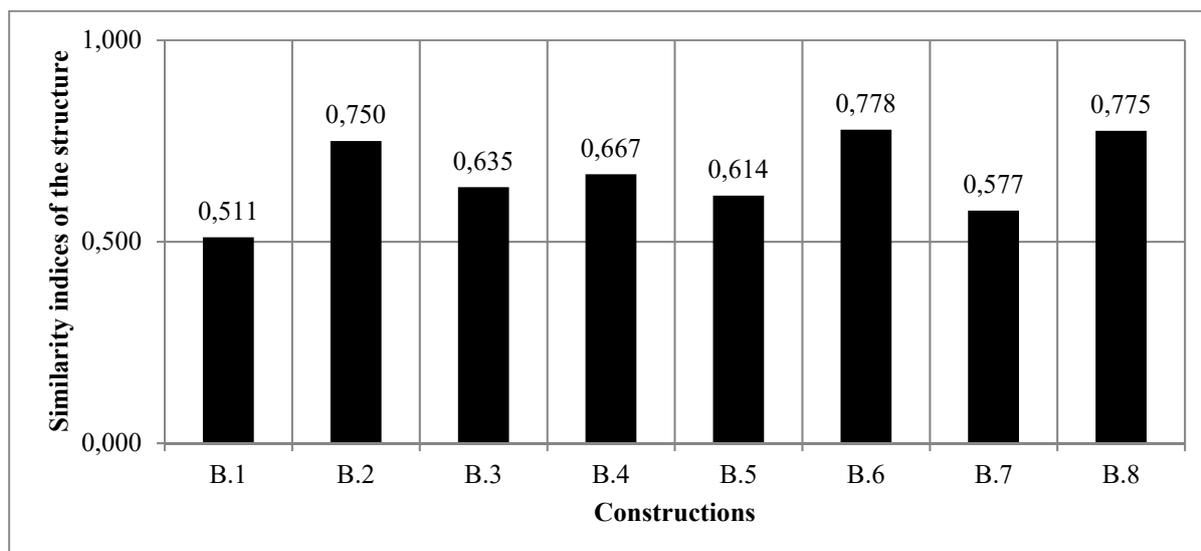
- $u_i$  – structure indices,
- $w_i$  – number of elements in the range of structure.

Table 1 provides the exemplary way of similarity indices - P determination for the structure of the claims was assumed as a model, and the structure corresponding to the construction B.1. The subsequent comparisons, just as the presented example, excluded the claims that corresponded to a particular site from the model's structure.

**Table 1.** The structure indices

The source of claim	The number of claims in the model's structure	The number of claims for construction – B. 1	The structure index for model's structure	The structure index for $u_{iB1}$	$\min(u_{iB1-8}, u_{iB1}, )$
<b>BD</b>	17	1	0.086	0.036	0.036
<b>TB</b>	3	0	0.015	0.000	0.000
<b>ZD</b>	24	0	0.121	0.000	0.000
<b>OZ</b>	20	3	0.101	0.107	0.101
<b>WF</b>	24	16	0.121	0.571	0.121
<b>ZA</b>	29	0	0.146	0.000	0.000
<b>PT</b>	43	7	0.217	0.250	0.217
<b>ZP</b>	38	1	0.192	0.036	0.036
<b>TOTAL</b>	198	28	1	1	<b>0.511</b>

The values of similarity indices of the considered constructions compared to the similarity indices of the model structure are presented in figure 4.



**Figure 4.** The similarity indices of the considered constructions compared to the similarity indices of structure model

The results indicate that high similarity in the case of investment B. 2, B. 6. and B. 8. In other cases, it is smaller, but always above 0.500. It is difficult to conclude unequivocally on the basis of these findings whether the source of the claims and the extent of their effect presented in the model structure can be applied to the claims management plans and other documents related to the planning of the works, since there is no experience in this field. Therefore, the structures of claims on the particular construction sites were compared in order to obtain additional information. The results of calculations are presented in table 2.

**Table 2.** The similarity of individual objects in terms of the sources and number of claims

	B. 1	B. 2	B. 3	B. 4	B. 5	B. 6	B. 7	B. 8
B. 1		0. 489	0. 441	0. 321	0. 571	0. 450	0. 419	<b>0. 312</b>
B. 2			0. 512	0. 635	0. 477	0. 773	0. 582	<b>0. 831</b>
B. 3				0. 493	0. 631	0. 561	0. 526	0. 576
B. 4					0. 493	0. 817	0. 667	0. 637
B. 5						0. 527	0. 350	0. 589
B. 6							0. 680	0. 779
B. 7								0. 559
B. 8								

The results presented in table 2 reveal large diversity. Both small similarity of objects in terms of reported claims - 0.312, as well as large similarity - 0.837, can be indicated. These values prove the differentiated effect of the eight claims-generating factors considered in the study on the analysed investments.

A little correlation between the source of the claim and a specific object also indicates that the nature of the claim is not the characteristic feature of a particular object (or the contractor). It can be expected that indicated in the study sources of claims would arise during the implementation of other similar works. Additionally, it should be mentioned that the differentiation of compared investments in terms of the structure of claims might reflect greater or lesser activity of the management of the site resulting in the number of reported claims.

The results of both comparative analysis demonstrated that the similarity of model structure of claims and the structures characteristic for individual objects is greater than the relative similarity of objects. It

should be assumed on this basis that the presented model of claims structure can be useful in road works planning.

#### 4. Conclusions

The claims management requires the knowledge about the source and the frequency of claims submitting by the contractors. This issue was the subject of this study. The paper presents the results of the study which aim was to identify and prioritize the factors which constitute a major cause of the claims.

The contractor's claims occur frequently during the execution of construction contracts. Their prevention is difficult because, as it was indicated by the analysis, to a lower degree they depend on the participants of the project, and more are due to external factors. For this reason, it is justified to manage the claims so as to reduce their effects.

The results of the research and the analysis conducted in this study include:

1. identification of the main sources of the risk of the claims during the road works,
2. prioritization of the potential threats depending on the number of their occurrence,
3. presentation of the model structure of the factors generating contractor's claims.

The results obtained indicate the possibility of an application of the proposed model of claim's structure in practice. However, the source data for this model should be continuously verified. It also should be taken into account, that each investment is unique and is characterized by specific conditions of execution. The contract engineer should analyse and archive information about the claims after completion of each object. The prepared registers should include all circumstances of adverse events occurrence. The identified adverse events should be systemized according to a uniform classification system, for instance such as proposed in the study. Such register would allow to improve the presented model, paying special attention to the support for future projects, and elimination of subjectivism in the claims managing.

The problem of the consequences of the claims in relation to the duration and cost of the investment still need an investigation. This issue was not considered in this study. The contractors not always clarified in the "notice of claim", the additional payment or extension of the time to receive they considered to be entitled due to reported difficulties. Also, the notices discontinued by the contractors were noted during the documentation review. Most often they constituted a signal of a potential risk, however, an undertaking of appropriate measures allowed to protect the contractor against the losses. Also, not every "notice of claim" about the contractor's losses was justified substantively. All of this demonstrates the need for further modification of the presented model through in-depth studies.

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