buildings

MDPI

Article

Legal Risk Assessment Model for Minimizing Risks in Reusing Concrete Elements

Ulrike Quapp [1,2,*] and Klaus Holschemacher [3,*]

[1] Civil Engineering Research Centre, VilniusTech, 10223 Vilnius, Lithuania
[2] Faculty of Civil Engineering, HTWK Leipzig, 04277 Leipzig, Germany
[3] Structural Concrete Institute, HTWK Leipzig, 04277 Leipzig, Germany
* Correspondence: ulrike.quapp@vilniustech.lt (U.Q.); klaus.holschemacher@htwk-leipzig.de (K.H.)

Abstract

The construction industry is a major contributor to global climate change, particularly through concrete production. Reuse of construction products, in general, and concrete elements, in particular, has the potential to promote resource efficiency and to reduce CO_2 emissions. Besides its advantages, this method is also associated with risks for all parties involved in a construction project. One of the factors hindering reuse pertains to legal considerations. The authors analyzed the legal basis for reusing concrete elements and reviewed legislation, policy, and the research literature with the systematic content analysis (SCA) method. The authors furthermore analyzed the legal situation under German law with regard to liability and burden of proof in projects in which concrete elements should be reused and developed a legal risk assessment model. The conclusion is that reuse of concrete elements can be increased by enhancing the awareness of project stakeholders regarding its legal risks. This enhancement in awareness should be accompanied by the development of skills to assess these risks and the acquisition of knowledge about potential limitations of liability. The paper provides a foundation for conducting an individual risk analysis according to German law and offers recommendations for behaviors that are deemed to be low-risk.

Keywords: concrete elements; legal analysis; reuse; risks; sustainability

1. Introduction

The issue of climate change is one of the most significant challenges currently facing the world. As the World Economic Forum [1] points out, the construction industry is responsible for 37% of global carbon emissions. Consequently, there are numerous ongoing initiatives worldwide with the aim of decarbonizing the building and construction sector. The United Nations (UN) has announced its intention to implement strategies with the aim of avoiding unnecessary extraction and production, shifting to regenerative materials, and improving the decarbonization of conventional materials [1]. The European Union, through the initiative known as the Green Deal, is endeavoring to position Europe as the world's first climate-neutral continent by the year 2050 [2]. In accordance with this policy, countries worldwide have enacted new legislation to achieve the international climate goals established in the Paris Agreement [3].

The commonality between these actions is that they all motivate the reuse of materials or entire building elements (sometimes also termed 'urban mining'). Furthermore, revaluation and repurposing of existing buildings instead of building new ones is expected to generate 50–75 per cent fewer emissions [4].

Check for updates

Academic Editors: Pramen P. Shrestha and Antonio Caggiano

Received: 25 May 2026
Revised: 13 June 2026
Accepted: 24 June 2026
Published: 28 June 2026

Copyright: © 2026 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license.

In accordance with Article 3(13) of the European Directive 2008/98/EC on waste and the repeal of certain directives [5], the term "reuse" is defined as any operation whereby products or components that do not constitute waste are utilized once more for the same purpose for which they were originally designed. The German Recycling and Waste Management Act employs precisely the same definition in Section 3(21) [6]. In essence, elements that are composed of concrete, reinforced concrete, or prestressed concrete can be reused. The highest potential for reuse is observed in precast prestressed concrete elements, due to the fact that they typically exhibit a lack of cracks and consequently possess enhanced durability. Moreover, they are more amenable to dismantling [7].

Concrete production can account for approximately 8% of global carbon dioxide emissions [1]. Approximately 47 million cubic meters of concrete are used in Germany each year, which is equivalent to about 110 million tons [8]. As such, the country is the largest cement and concrete market in the European Union. The German industry accounts for approximately 19% of European cement production, making it the back-bone of the construction industry in the EU [9]. A significant change in the motivation to reuse construction products will have a significant effect on construction sustainability in Europe and thus may contribute to the mitigation of climate change worldwide. Moreover, the financial aspects of the decision can prove to be a compelling factor in its favor [10].

The preconditions for the reuse of concrete elements are technical suitability and operability, compliance with codes or standards, and compliance with other legal requirements [11].

The following are potential scenarios for the reuse of building elements

- The reuse of materials within the confines of the same edifice, for instance in the context of revaluation initiatives, is a pertinent consideration.
- The integration of the existing element into a new construction at the same location is to be undertaken.
- The material under discussion should be reused in other construction projects in different locations.

The reuse of construction elements has been demonstrated to be financially advantageous, whilst concurrently supporting heritage preservation by maintaining the historic appearance of monuments [11].

The sustainable management of construction waste gained much attention in recent years (see, among others, [12,13]). However, in contrast to the recycling of construction waste, the share of reusing elements such as windows, doors, stairs, floors, or façade elements is still low [14]. As Menn [14] points out, legal concerns are one of a number of factors which militate against the feasibility of reusing building elements. Accordingly, Park and Tucker [15] discovered a significant impediment to the reuse of building materials and elements; namely, concerns regarding liability and the fulfillment of legal stipulations. Byers et al. [16] found themselves reluctant to engage with reuse projects, citing the perceived necessity of expertise, the financial implications, and the responsibility for materials' performance, given the paucity of data on their properties. In addition, the research findings of the authors, which were obtained from a self-administered survey, corroborated these concerns [17]. For instance, ensuring the quality and physical properties of reused concrete elements can prove challenging, which may result in delays and costly claims.

In light of the findings, it can be concluded that the utilization of reused concrete materials may be enhanced if the associated legal risks are clearly identified, accurately calculated, and effectively mitigated prior to stakeholders arriving at a rational decision regarding the reuse of concrete elements in a construction project.

To date, the existing literature on legal risks associated with the implementation of contracts for the reuse of construction elements is limited in scope. This ambiguous

legal situation carries significant risks for all project stakeholders. This paper examines which legal risks arise for employers and contractors when existing concrete elements are reused under German construction law and proposes a risk assessment model for contract implementation. This will contribute to enhancing the basis of knowledge and providing project stakeholders with the necessary support to make rational decisions.

2. Materials and Methods

In order to assess the pertinence of the research topic, the authors conducted a legal desk research analysis, employing a systematic content analysis (SCA) technique (for an introduction to SCA, see [18–20]) to examine pertinent policy and legal regulations at the international, European, and German levels. The authors investigated and illustrated the intention of the policymakers and legislators, as indicated by the information contained therein. This approach, recognized as a prevalent technique in legal research, typically involves the examination and analysis of legal requirements, political documents, and judicial opinions [21]. In this case, the researcher collects a set of documents on a particular subject and systematically reads them, recording consistent features of each and drawing inferences about their use and meaning [22]. This method is useful to study questions related to the law, such as external causes and effects of the law and legal institutions [22].

For the content analysis, authors selected and examined relevant law, starting with the highest applicable European law, the Treaty on the Functioning of the European Union (TFEU), in particular in Articles 191 to 193 [23]. This document gives authority to act on environment issues, such as waste management and climate change and to agree the Green Deal [2]. Following the legal principle that superior law takes priority over lower laws, the authors continued analyzing law and regulations on the lower European and on German level.

In order to detect and review legal risk in reuse and, based on the results, to develop supporting material, the authors conducted a legal risk analysis for reuse of construction elements, using the four essential steps of a risk management process:

1. Identify the risk;
2. Assess the risk;
3. Treat the risk;
4. Monitor and Report on the risk [24].

The authors conducted a review of the potential legal risks associated with the reuse of concrete elements. This analysis employed a legal analysis technique to assess the legal implications of reusing concrete elements:

1. Identification of the legal question;
2. Identification of the relevant law;
3. Determination of how the rule of law applies to the issue (sometimes referred to as the analysis step);
4. Conclusion, as a summary of the results of the legal analysis [25].

The authors of the study offer a framework for conducting a legal risk assessment and provide guidance on addressing liability issues in construction contracts. This guidance is presented through a legal risk assessment model (Figure 1) and recommendations for standardized communication.

The present study's limitation is its focus on the reuse of concrete elements in Germany. The legal risks associated with the use of recycled concrete or the reuse of components from other materials were not examined in this study. In addition, the authors' primary focus in the development of the model and formulation proposals was on employers and contractors as the principal stakeholders of a construction project. The legal analysis is

based on German Private Construction Law and can be used for construction contracting and implementation under consideration of the German Construction Tendering and Contract Regulations, part B (VOB/B) [26].

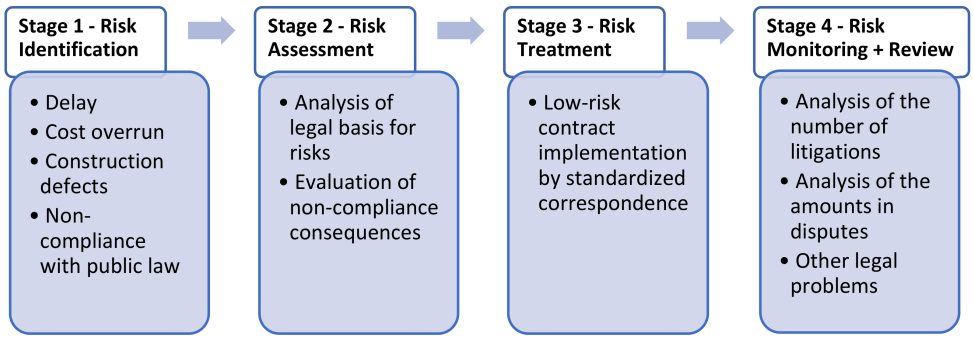

Figure 1. Legal Risk Assessment Model for Minimizing Risks in Reusing Concrete Elements.

As there are many different names for the construction stakeholders, the authors use "employer" in the following, instead of "client," "owner," or "contracting authority".

3. Results and Discussion

This section is divided according to the stages developed in the legal risk assessment model.

3.1. Legal Risk Analysis (Model Stage 1 and 2)

It is imperative for stakeholders to detect, analyze, and calculate the legal risks resulting from the reuse of concrete elements for each individual construction project, in order to facilitate a rational decision-making process. Despite the acknowledgement of the necessity of "Green Construction" by construction project stakeholders, concerns regarding legal risks from public and private construction law may emerge. The objective of conducting a risk analysis and formulating recommendations based on it is to ensure adherence to legal and contractual obligations. This objective can be achieved through the identification of legal risks, their subsequent assessment, and the formulation of legal compliance recommendations. The implementation of contracts that adhere to legal requirements can facilitate the mitigation of costly claims and disputes among construction project stakeholders.

The potential for legal complications in the context of German construction projects may stem from the intersection of public and private building legislation. The field of private construction law is concerned with the governance of contractual relationships among the various parties involved in the construction industry. The document under consideration delineates the rights and duties that arise from the construction contract. It also establishes the protocol for addressing issues that arise during the implementation of the contract, such as defects and delays. Moreover, the pertinent regulations concerning the allocation of liability and the burden of proof can be ascertained. The research demonstrated that the primary legal risks associated with the reuse of building materials or elements primarily stem from construction defects, delays, and cost overruns [27].

Following a comprehensive review of the pertinent literature, legal regulations, and standard contracts in Germany, the authors conducted a general risk analysis that forms the basis for a legal risk assessment model. The model's function is to provide support to construction process stakeholders in conducting their individual risk analysis for construction projects in Germany that involve the reuse of concrete elements. The present study constitutes a risk analysis, conducted for the purpose of investigating the potential risks

involved in the hypothetical scenario of employer and contractor negotiating construction works (excluding the tendering process) for the reuse of concrete beams. The legal basis is constituted by a construction contract in accordance with the VOB/B [26].

It is important to note that each construction project is unique, which makes it difficult to provide a solution that is applicable to all projects. Consequently, the authors developed a neutral legal risk assessment model (Figure 1) and standardized formulations that construction project stakeholders can readily utilize and modify to suit their individual construction projects. The authors of this study have a clear objective; namely, to provide support to stakeholders in construction projects so that they can overcome any concerns they may have. To this end, the authors propose a strategy of full disclosure regarding the potential risks involved in the reuse of concrete elements. In addition, they propose a method by which these risks can be assessed. In the context of construction contracts, which are characterized by their unique legal intricacies, it is imperative to undertake a meticulous examination of the legal risks faced by both the employer and the contractor. This analysis, undertaken by the authors of this study, is predicated on the recognition that the legal interests of the parties involved vary considerably.

3.1.1. Legal Risks of the Contractor

Reuse of elements carries with it a number of legal risks, including delays, cost overruns and/or construction defects resulting from the insufficient quality of the reuse material.

Responsibility for Quality

The VOB/B [26] places the liability for construction defects based on building products to the contractor. Furthermore, in instances where the products are supplied by the employer, the contractor assumes responsibility for any defects in their work, with the understanding that these defects are attributable to the products provided. This principle is equally applicable to the reuse of construction elements. The contractor may only relieve themselves from this liability by conducting a reasonable examination of the elements and, if necessary, announcing concerns regarding the quality of the provided materials or elements, as outlined in Section 13(3) VOB/B [26]. It is imperative that the contractor undertakes a systematic and methodical examination of the quality of the provided elements and the existing structure prior to and throughout the implementation of the contract.

Should there be any concerns regarding the quality of extant materials and elements, or the planned execution of the project, the contractor must inform the employer promptly. It is imperative to articulate the concerns in meticulous detail and in written form. Furthermore, the contractor should stipulate a deadline within which the employer must declare whether they intend to continue with the construction works. In the event that the employer issues instructions for the works to proceed without modifications, the responsibility for construction defects arising from such directives shall be transferred to the employer.

Responsibility for Delay

In the event of issues or concerns pertaining to the quality of extant building materials or elements, the contractor may encounter unwarranted delays in the completion of their works. In the event that the delay is attributable to the employer, the contractor is obligated to inform the employer in a timely manner in writing, as stipulated in Section 6(1) VOB/B [26], with a view to safeguarding their rights.

The VOB/B [26] stipulates that the contractor is liable for delivering a service that is free of defects until the employer accepts the work. Consequently, the contractor must assume the financial burden of fulfilling the contractual agreement. In the event of an inadequate service or observation of construction work, there is a possibility of liability for damages to the existing structure, as well as to other assets belonging to the employer.

Furthermore, the contractor is obligated to provide compensation to the employer for any delays in delivering the contracted service. It is imperative that these risks be given due consideration prior to agreeing to construction works in existing buildings involving the reuse of onsite construction elements.

Burden of Proof

The primary risk confronting the contractor is the uncertainty surrounding the quality of the elements. Until acceptance of the construction works is complete, the contractor is responsible for proving that their performance is free from defects. In certain instances, contractors may encounter significant challenges or only limited capacity to meticulously examine existing materials or components prior to contracting.

Risk Response

From a contractor's perspective, there are a number of approaches that could be adopted in order to address the situation in question. Firstly, it is important to note that the contractor has the right to reject the order. Secondly, a thorough investigation of the existing structure could be conducted, with the aim of assessing the risk of latent quality issues prior to the initiation of any contractual agreements. Typically, this process is both time-consuming and costly. It is imperative that the parties involved in the contractual agreement reach a consensus on the matter of cost allocation prior to the initiation of the investigative process. In the event that the investigation of the quality of extant elements cannot be conducted in an appropriate manner, the contractor is obliged to inform the employer of any concerns or issues that arise during the construction works. Should the employer elect to proceed with construction works despite the contractor's reservations, the contractor shall be absolved of any liability for defects arising from their services.

3.1.2. Legal Risks of the Employer

The employer faces legal risks when contracting for the reuse of concrete elements and implementing the contract. In instances where the employer furnishes the reuse elements, the primary legal risks pertain to delays in delivering the materials to the construction site and an inadequate quality of the reuse material.

In the event of a delay in the delivery of the reuse material, the employer is obligated to ensure an extension of the deadline for the contractor to deliver their services, as outlined in Section 6(2) VOB/B [26]. Moreover, the employer is obligated to indemnify the contractor for damages resulting from this delay, as stipulated in Section 6(6) VOB/B [26].

The contractor's liability for defects in their work, as well as the employer's liability for deficient building elements, is predicated on the provision of products that meet the requisite standards. This principle finds equal application in the reuse of elements. The employer's liability for construction damages is contingent upon the expression of concerns by the contractor regarding the quality of the provided elements, subsequent to which the employer issues a directive for the continuation of construction works. This scenario is delineated in Section 13(3) VOB/B [26].

3.2. Recommendations for Low-Risk Contract Implementation (Model Stage 3)

The authors developed recommendations for contract implementation in construction projects reusing concrete elements, which were derived from the legal risk analysis. It is imperative for the parties involved in construction contracts to exercise caution and discernment during the negotiation and execution of contracts when contemplating the reuse of building elements. Contract implementation entails an augmented degree of legal risk. Consequently, the authors of the study propose a set of guidelines to mitigate the risks associated with the reuse of building materials and elements.

3.2.1. Recommendations for Contractors

According to Section 311(2) and Section 241(2) of the German Civil Code [28], contractors are obligated to disclose any potential issues or concerns related to the reuse of building elements prior to the initiation of a contract or subsequent to the identification of such concerns. Consequently, the contractor is obligated to assess the quality of the existing material and elements, meticulously documenting any observed issues and concerns. Furthermore, the contractor is expected to define the contracted service with utmost specificity and to apprise the employer of any potential risks. This principle finds application in construction contracts under consideration of VOB/B as well [26].

In the event that the contractor identifies issues with the reused elements or expresses reservations regarding the likelihood of delivering a service that is free of defects due to reuse, these concerns must be communicated to the employer without delay, as stipulated in Section 13(3) VOB/B [26]. It is strongly advised that these concerns be addressed in written form to ensure documentation for potential future litigation. The following formulation is proposed by the authors:

> "With regard to the reuse of the concrete elements, I hereby express concerns regarding the quality of the existing elements. As you are aware, I am obliged by law to examine the construction materials provided, in this case the concrete elements, and to inform you of any concerns I may have. In detail, I have concerns regarding... [here describe the issue or concerns in as much detail as possible]. Please inform me promptly whether I should continue with the construction works despite my concerns or halt the works until a final decision about these concerns has been made. If you do not get in touch with me before [insert appropriate date—not too short], I will assume that you do not share my concerns and that you wish me to continue with the construction works."

In instances where delays are attributable to issues and concerns regarding the quality of existing building elements, it is recommended that contractors employ the following formulation to ensure the safeguarding of their rights:

> "I hereby inform you that I am unable to carry out my work to the required standard. This is due to the fact that the building elements provided by you do not meet the agreed quality standards. Please find below the reasons for this issue: ... [here provide a detailed explanation of the reasons for the hindrance]. This is hindering my ability to continue working on the project. Please be advised that you will be charged for the resulting additional costs."

This principle is equally applicable in instances of delay resulting from the employer's delayed delivery of the material. The authors recommend the following formulation:

> "Herewith I inform you that I am hindered in the proper execution of my work. The reasons for the hindrance are: ... [here provide the reason for the hindrance as detailed as possible]. The building elements that were agreed upon were not delivered within the specified timeframe, which has hindered my ability to continue with the project. Please be advised that you will be held responsible for the resulting additional costs."

3.2.2. Recommendations for Employers

In the event that the contractor addresses concerns regarding the quality of the provided elements by the employer, the authors recommend that the employer agrees to a quality check, even if it results in a certain expenditure of time and money. The following formulation is recommended by the authors:

> "We have received your correspondence regarding the quality of the concrete elements provided. We will consider and examine your concerns. Nevertheless, we would like to reiterate our expectation that you will complete the agreed work in a timely manner and to the required standard. Should your concerns be found to be without foundation, you will be liable for the resulting delay costs and any additional costs incurred. We will inform you about the results of the quality check before the specified date and, if necessary, will arrange a meeting with you before then. If you have not received a response from us by the stated date or if a meeting has not been arranged, you may assume that we do not share your concerns. In this instance, it is imperative that the work is completed in accordance with the contractual agreement."

In the event that the employer disregards the concerns and insists on the continuation of the construction works, the contractor will no longer be held liable for defects resulting from the utilization of substandard materials. In the event that the employer exhibits no concern regarding the elements' quality, it is advisable for them to proceed with the works to avoid delay.

In the event that the contractor is obligated to provide concrete elements that fail to meet the stipulated quality requirements as outlined in the construction contract, the employer reserves the right to demand the removal of the substandard elements from the construction site, as stipulated in Section 4(6) of VOB/B [26]. In the event that the contractor fails to comply with this directive, the employer reserves the right to undertake the removal of the elements in question and to seek reimbursement of incurred expenses:

> "I hereby request the removal of concrete elements that do not meet the contractual quality requirements from the construction site. This should take place by [insert appropriate date—not too short]. If the concrete elements are not removed until the aforementioned date, we will remove them at your cost."

3.3. Risk Monitoring and Review (Model Stage 4)

Risk monitoring and reviewing is the ongoing process of tracking, evaluating, and updating identified risks and their mitigation strategies. It is recommended that intended risk treatments have been implemented and are effective. Furthermore, a scheduled risk check (e.g., monthly, quarterly, after project finalization) is suggested. In the context of legal risks, the number of litigations, the amounts in disputes and the occurrence of other legal problems can serve as indicators. If, after implication of a risk strategy, legal problems do not decrease or stay consistent, an adaption of the strategy is necessary.

3.4. Implementation and Limitations

The results of the research can be used as a framework for conducting a legal risk assessment for construction projects in which reuse of concrete elements is planned. It offers guidance on addressing liability issues in construction contracts for the stakeholders of green construction projects. Figures 2–5 offer structured behavioral guidelines regarding how to react in legal challenging situations, both for the employer and contractor of construction reuse projects.

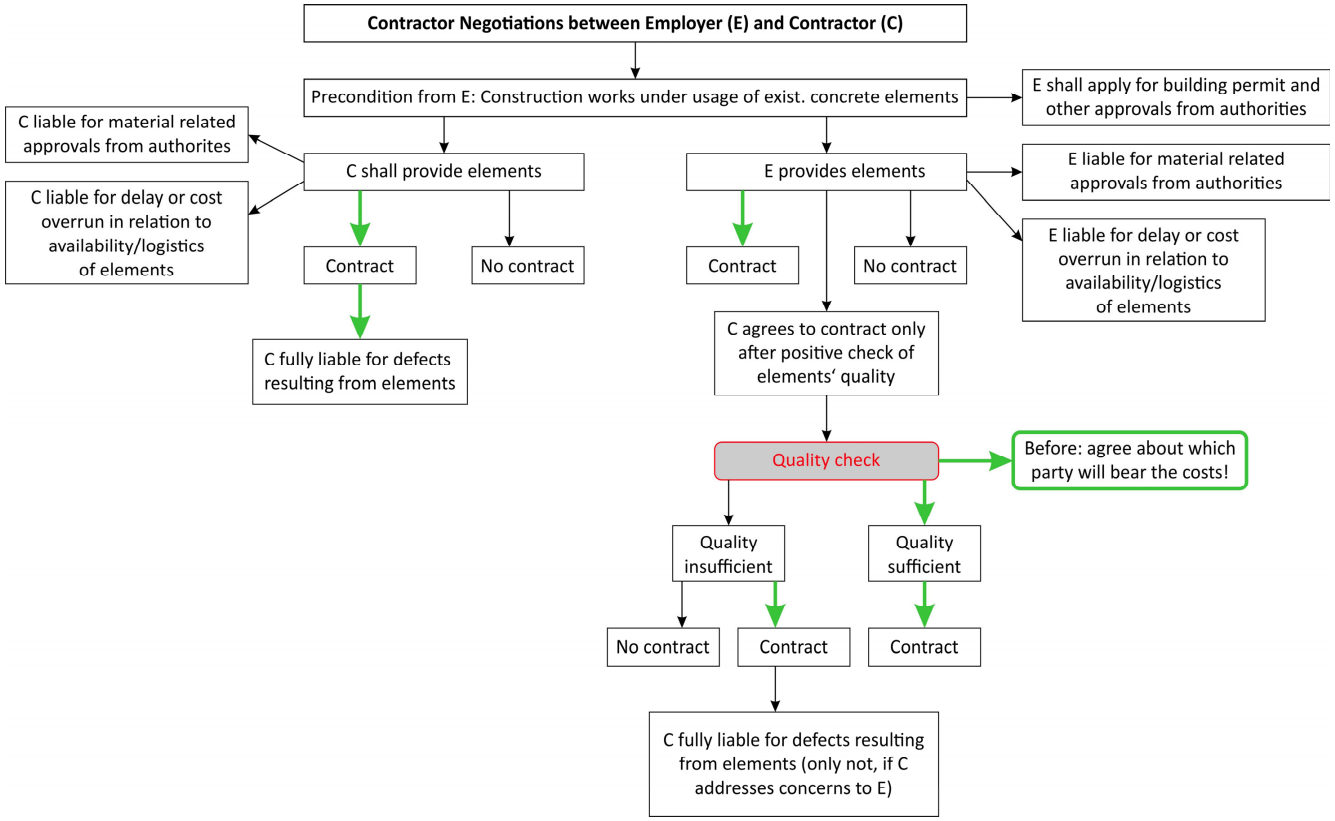

Figure 2. Flow chart for low-risk contracting in the interest of the employer.

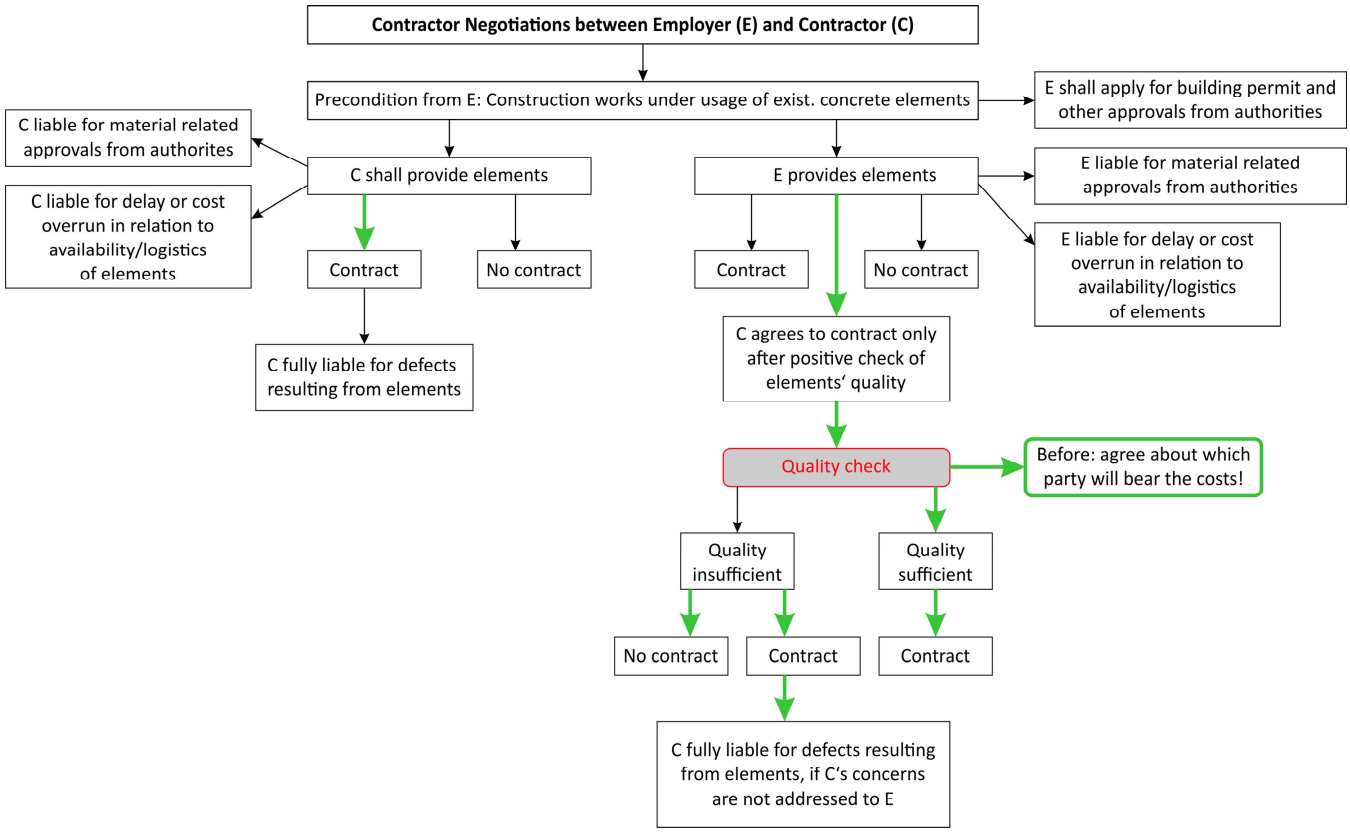

Figure 3. Flow chart for low-risk contracting in the interest of the contractor.

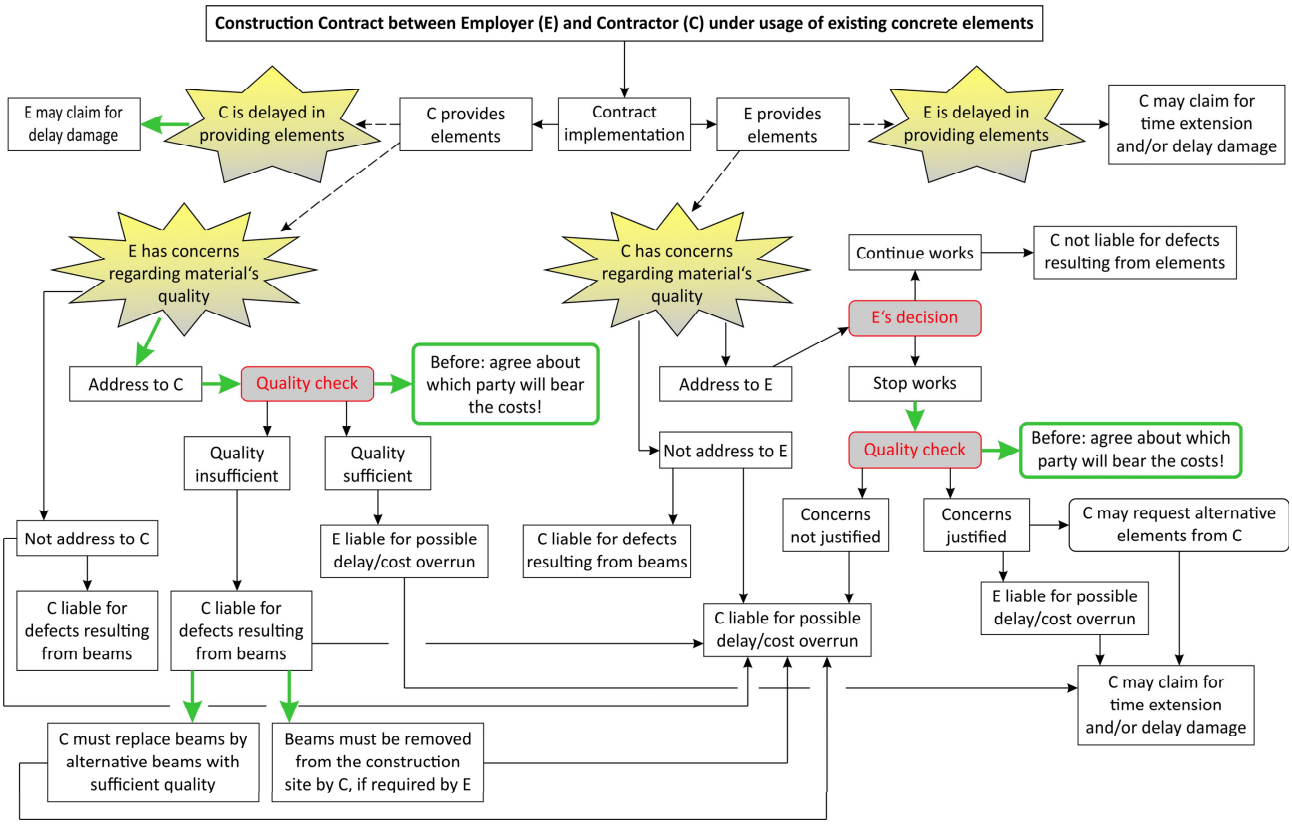

Figure 4. Flow chart for low-risk contract implementation in the interest of the employer.

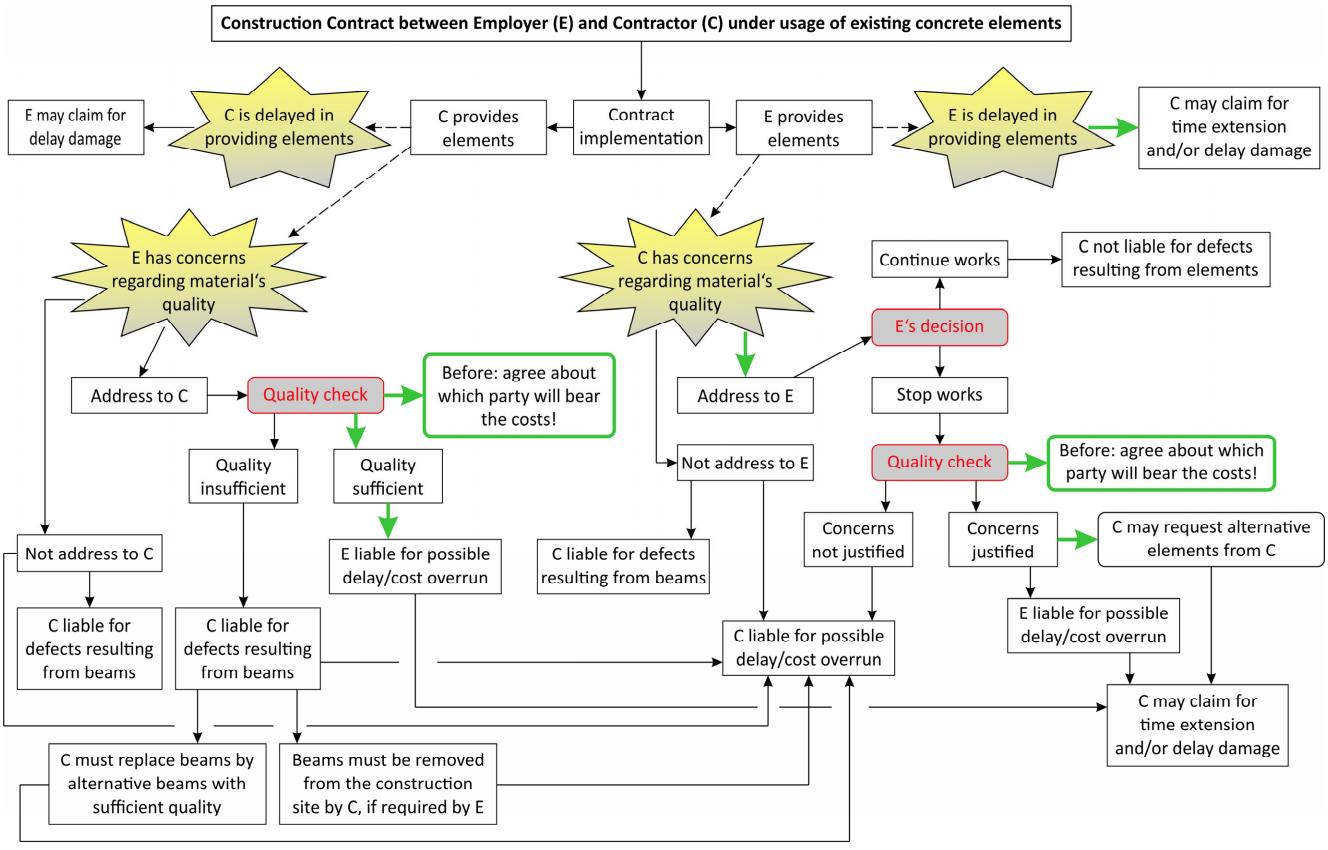

Figure 5. Flow chart for low-risk contract implementation in the interest of the contractor.

After examining the relevant literature, legal regulations, and standard contracts in Germany, the authors developed four flow charts as a basis for an individual risk analysis for construction projects in Germany intending to reuse concrete elements. They are applicable in the case that an employer and contractor negotiate construction works (without tendering) involving the reuse of concrete elements. The flow charts assess the risks for two scenarios:

1. the reuse elements will be provided by the employer;
2. the reuse elements shall be provided by the contractor.

The first two flow charts provide an overview about steps of negotiation for a construction contract for reusing concrete elements, one from the point of view of the employer (Figure 2) and the other in the interest of the contractor (Figure 3). The ideal legal decision pathway with the lowest legal risk is marked by green arrows. The third and fourth flow charts deal with the legal risks of contract implementation. Figure 4 shows the ideal legal behavior of the employer and Figure 5 of the contractor, marked with green arrows. Because, in a construction contract, the legal interests of the contract parties differ, the authors analyzed the legal risks for both the employer and the contractor separately.

Each construction project is individual, which makes it difficult to provide a one-size-fits-all solution. That is why the authors developed neutral flow charts and formulation proposals that construction project stakeholders can easily use and adjust to their individual construction project. The authors intend to support construction project stakeholders to overcome their concerns by honestly informing them about possible risks and helping them to assess these risks, which may contribute to the increased reuse of concrete elements.

Although the legal risk assessment model (Figure 1) was developed for reusing concrete elements, it is applicable to the reuse of other construction materials. The communication recommendations are only applicable to construction projects conducted under German law. However, the advantage of using standardized communication in construction projects can also be affirmed for other legal systems.

4. Conclusions

Reuse of concrete elements has been demonstrated to contribute to a reduction in demolition waste, raw material consumption, and greenhouse gas emissions. This subject has been acquiring increasing importance due to the ambitious sustainability objectives established by legislation and policy on a global scale. Furthermore, the reuse of building elements can contribute to heritage preservation by maintaining the historic appearance of an old building or monument.

However, before reusing elements, construction project stakeholders should carry out a due diligence process and analyze the risks of the individual construction project to make a rational decision about reusing elements. This objective can be achieved through the identification of legal risks, their subsequent assessment, and the formulation of legal compliance recommendations. The authors of the study presented the results of a legal analysis on the risks that could impede stakeholders from reusing concrete elements. This research was informed by a paucity of literature on the subject and led to the development of a legal risk assessment model and formulation proposals for contract implementation in projects that aim to reuse concrete elements. The objective of the authors was threefold: first, to address a research gap; second, to support contract parties in avoiding costly disputes and lawsuits; and third, to motivate construction project stakeholders to reuse concrete elements.

Author Contributions: Conceptualization, U.Q. and K.H.; methodology, U.Q.; investigation, U.Q.; writing—original draft preparation, U.Q.; writing—review and editing, K.H. All authors have read and agreed to the published version of the manuscript.

Funding: This research work has received funding from the project "Civil Engineering Research Centre" (agreement No S-A-UEI-23-5, ŠMSM).

Data Availability Statement: The original contributions presented in this study are included in the article. Further inquiries can be directed to the corresponding author.

Conflicts of Interest: The authors declare no conflicts of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

Abbreviations

The following abbreviations are used in this manuscript:

SCA	Systematic content analysis
CO_2	Carbon dioxide
UN	United Nations
EU	European Union
VOB/B	Vergabe und Vertragsordnung für Bauleistungen, part B

References

1. World Economic Forum. The Building Sector is Key to the Fight Against Climate Change. 2024. Available online: https://www.weforum.org/stories/2024/06/building-sector-climate-change-construction-materials/ (accessed on 14 January 2026).
2. European Commission. EU Climate Target Plan 2030. 2020. Available online: https://ec.europa.eu/commission/presscorner/detail/en/fs_20_1609 (accessed on 17 March 2026).
3. United Nations. Paris Agreement. 2015. Available online: https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf (accessed on 10 March 2026).
4. United Nations. UN Plan Promises Massive Emission Cuts in the Construction Sector—The Most Polluting and Toughest to Decarbonise. 2023. Available online: https://www.unep.org/news-and-stories/press-release/un-plan-promises-massive-emission-cuts-construction-sector-most (accessed on 12 March 2026).
5. European Parliament and Council. Directive 2008/98/EC of 19 November 2008 on Waste and Repealing Certain Directives, Last Amended 2024. 2024. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008L0098-20240218 (accessed on 10 March 2026).
6. Federal Republic of Germany. German Recycling and Waste Management Act of 24 February 2012, Last Amended 2023. 2023. Available online: https://www.gesetze-im-internet.de/krwg/BJNR021210012.html (accessed on 10 March 2026). (In German)
7. VDI Zentrum Ressourceneffizienz. Wiederverwendung von Bauprodukten. 2025. Available online: https://www.ressource-deutschland.de/baumaterialien/wiederverwendung-von-bauprodukten/ (accessed on 10 March 2026).
8. Verein Deutscher Ingenieure. Zement—So Weit Ist der Klimakiller auf dem Umweltfreundlichen Weg. 2023. Available online: https://www.vdi.de/news/detail/zement-so-weit-ist-der-klimakiller-auf-dem-umweltfreundlichen-weg.pdf (accessed on 27 October 2025).
9. Federal Ministry for Economic Affairs and Energy. Energiewende in der Industrie—Potenziale und Wechselwirkungen mit dem Energiesektor—Branchensteckbrief der Zement- und Kalkindustrie. 2020. Available online: https://www.bundeswirtschaftsministerium.de/Redaktion/DE/Downloads/E/energiewende-in-der-industrie-ap2a-branchensteckbrief-zement.pdf?__blob= publicationFile&v=4 (accessed on 19 January 2025).
10. Concular. Wiederverwendung von Baumaterialien—Zirkularität im Bauwesen. 2025. Available online: https://concular.de/wiede-rverwendung-von-baumaterialien-zirkularitaet-im-bauwesen/ (accessed on 10 March 2026).
11. Federal Republic of Germany. Baufachliche Richtlinien Recycling. 2018. Available online: https://www.bfr-recycling.de/downloads/Baufachliche_Richtlinien_Recycling.pdf (accessed on 16 March 2026).
12. Omer, M.M.; Rahman, R.A.; Almutairi, S. Strategies for Enhancing Construction Waste Recycling: A Usability Analysis. *Sustainability* **2022**, *14*, 5907. [CrossRef]
13. Omer, M.M.; Sofolahan, O.; Eze, E. Mitigating construction waste in Nigeria: The role of Building Information Modeling (BIM) at design and pre-contract stages. *Clean. Waste Syst.* **2025**, *11*, 100252. [CrossRef]

14. Menn, A. Die Wiederverwendung von Bauteilen—Ein Überblick aus vertragsrechtlicher Perspektive. In *Die Wiederverwendung von Bauteilen*; Abegg, A., Streiff, O., Eds.; Dike Verlag: Zurich, Switzerland, 2021; pp. 39–78.
15. Park, J.; Tucker, R. Overcoming barriers to the reuse of construction waste material in Australia: A review of the literature. *Int. J. Constr. Manag.* **2017**, *17*, 228–237. [CrossRef]
16. Byers, B.S.; Raghu, D.; Olumo, A.; De Wolf, C.; Haas, C. From research to practice: A review on technologies for addressing the information gap for building material reuse in circular construction. *Sustain. Prod. Consum.* **2024**, *45*, 177–191. [CrossRef]
17. Quapp, U.; Tamošaitienė, J.; Holschemacher, K. Barriers to Reusing Concrete Elements in Construction. In *Modern Building Materials, Structures and Techniques—MBMST 2026*; SPRINGER NATURE Conference Proceedings (in press). Kaklauskas, G., Banaitis, A., Rimkus, A., Eds.; Springer Nature: Cham, Switzerland, 2026.
18. Kaplan, A. Content Analysis and the theory of signs. *Philos. Sci.* **1943**, *10*, 230–247. [CrossRef]
19. Krippendorff, K. *Content Analysis: An Introduction to Its Methodology*, 3rd ed.; SAGE Publications: London, UK, 2013.
20. Srinivasan, R. Content Analysis Technique in Legal Research—A Critique. In *Access to Legal Information & Research in Digital Age*; Singh, R., Rao, S.D., Rai, S., Singh, A., Eds.; National Law University Press, National Law University: Delhi, India, 2012; pp. 137–144. Available online: https://www.nludelhi.ac.in/download/publication/2015/Access%20to%20LEgal%20Informationa-%20and%20Research%20in%20Digital%20Age.pdf#page=163 (accessed on 16 March 2026).
21. Salehijam, M. The Value of Systematic Content Analysis in Legal Research. *Tilburg Law Rev.* **2018**, *23*, 34–42. [CrossRef]
22. Hall, M.A.; Wright, R.F. Systematic Content Analysis of Judicial Opinions. *Calif. Law Rev.* **2008**, *96*, 63–122.
23. European Union. "Consolidated Version of the Treaty on European Union and the Treaty on the Functioning of the European Union" of 07 June 2016, Last Amended 2024. 2024. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02016ME%2FTXT-20240901 (accessed on 14 January 2025).
24. Naude, M.J.; Chiweshe, N. A proposed operational risk management framework for small and medium enterprises. *South Afr. J. Econ. Manag. Sci.* **2017**, *20*, a1621. [CrossRef]
25. Putman, W.H. *Legal Analysis and Writing*, 4th ed.; Cengage Learning, Inc.: Delmar, DE, USA, 2012.
26. Deutscher Vergabe- und Vertragsausschuss für Bauleistungen. Vergabe und Vertragsordnung für Bauleistungen–VOB/B (German Construction Tendering and Contract Regulation Part B) of 19 January 2016. 2016. Available online: https://www.verwaltungsvorschriften-im-internet.de/bsvwvbund_26062012_B15816361.htm (accessed on 17 March 2026).
27. Quapp, U.; Tamošaitienė, J.; Holschemacher, K. Legal Risk Assessment of Re-using Building Materials and Elements in Historic Structures. In *Structural Analysis of Historical Constructions*; Saloustros, S., Beyer, K., Eds.; RILEM Bookseries; Springer: Cham, Switzerland, 2026; pp. 2952–2962.
28. Federal Republic of Germany. "German Civil Code" of 18 August 1896, Last Amended 2026. 2024. Available online: https://www.gesetze-im-internet.de/englisch_bgb/index.html (accessed on 16 March 2026).

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.