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ANALYZING BID AND INDICATIVE PRICES IN HISTORIC BUILDING RECONSTRUCTIONS IN THE CZECH REPUBLIC

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Abstract

Valuing the reconstruction of historic buildings is a complex and challenging task due to the unique nature of these structures and the uncertainties involved in estimating the scope of work. This study aimed to bridge the gap between traditional construction practices and modern economic frameworks by developing a comprehensive methodology for the valuation of construction works on historic buildings. Focusing on the Czech Republic, the study analysed the tender budgets of 21 reconstruction projects to be carried out between 2020 and 2023. The analysis compared tender prices with standardised indicative prices to identify significant discrepancies and the reasons for them. The proposed methodology integrated market-based price analysis and traditional pricing tools, providing a robust framework for accurate cost estimation. This approach not only ensured the preservation of the cultural value of historic buildings, but also provided a practical, financially sound strategy for their restoration. The findings of this study provide valuable insights for stakeholders involved in the pricing and budgeting of restoration projects, helping to refine cost estimation methodologies and improve the efficiency and accuracy of budgeting processes.

Keywords:

Reconstruction of historical buildings;
Evaluation methodology;
Tender budgets;
Preservation of cultural heritage;
Cost estimation.

1 Introduction

The assessment of reconstruction work on historic buildings presents unique challenges that differ significantly from those associated with modern construction practices. The preservation of historic structures requires a careful approach that respects the cultural and architectural significance of the buildings, while ensuring that the restoration work is cost effective and financially sustainable. The aim of this paper is to explore the complexities involved in evaluating construction work on historic buildings, with a focus on the Czech Republic.

Historic buildings are irreplaceable treasures that provide invaluable insights into our cultural and architectural heritage. The intricate craftsmanship and materials used in their construction often require specialised restoration techniques and a deeper understanding of traditional building methods. These factors contribute to the complexity of estimating accurate costs for restoration projects, requiring a robust and multi-faceted valuation methodology.

The disparity between indicative prices and actual tender prices for construction projects on historic buildings highlights the need for a more sophisticated approach to cost estimation. Traditional costing methods often fall short because they cannot account for the unique requirements and uncertainties inherent in historic restoration. By integrating market-based pricing analysis with conventional pricing tools, we seek to bridge this gap and provide a more reliable framework for evaluating restoration work.

Our study covers the period from 2020 to 2023 and analyses data from 21 tender budgets for the reconstruction of historic buildings in different regions of the Czech Republic. Through this comprehensive analysis, we aim to identify significant differences between indicative and tender prices, and to understand the factors driving these discrepancies. The results of this research will contribute to the development of an effective valuation methodology that can be applied to similar projects, thus helping stakeholders to make informed decisions and optimise the allocation of resources. Through this research, we aim to improve the understanding of valuation practices in the restoration of historic buildings and to provide a robust model that balances heritage conservation with economic viability.

2 Literature Review

The assessment and valuation of construction work in the reconstruction of historical buildings have traditionally relied on qualitative methods and expert judgments. Recent advancements, however, have shifted towards integrating technology and data-driven approaches to enhance accuracy and efficiency. For example, the integration of smart technologies in historical building projects has proven to be an effective method to streamline these processes. The case study of Fuzhou City illustrates this well, as their implementation of a historical building conservation planning management system integrates geographic information technology and visualization tools to improve management and conservation efforts [1].

The renovation, rehabilitation, and adaptation of historical heritage buildings in public ownership pose unique challenges and opportunities. A recent study focused on the renovation of historical buildings of exceptional importance in Vienna's historic city centre provides valuable insights [2]. These projects, which include diverse buildings from various historical periods, emphasize the necessity of integrating modern technologies and interdisciplinary approaches to preserve historical value while meeting contemporary functional requirements. The ongoing renovations highlight a trend towards more sustainable and adaptive reuse of historical structures, driving future research directions in this field.

Planning the reconstruction of historical buildings presents unique challenges due to the limited existing knowledge of their architectural and construction details, as well as their historical substance. To manage this complexity, a method incorporating fuzzy stochastic networks has been proposed. This approach models the uncertainty inherent in estimating the parameters of reconstruction works, incorporating elements of fuzzy logic in the form of interval sets to better handle the variability and randomness of these projects. The method has been practically applied in the reconstruction of a historical retaining wall at the Wawel Royal Castle in Krakow, demonstrating its effectiveness in managing the undetermined structure of such projects [3].

In the realm of historical building reconstruction, significant financial investments are required, particularly for effective and durable application of materials. Assessing the hygric and thermal properties of these materials is crucial for ensuring their longevity and performance in specific conditions. A study by [4] explores these properties for several types of materials suitable for interior thermal insulation, such as calcium silicate, hydrophilic mineral wool, and sheep wool. Their findings indicate that these materials are generally appropriate for use in historical building envelopes, but their performance should be confirmed through computational simulations tailored to the unique characteristics of historical constructions.

The reconstruction of buildings generally enhances their utility, lifespan, and market value. However, this is contingent on both the owner's and an independent third party's evaluations. A recent study aimed at assessing the value increase in older buildings due to reconstruction reveals the discrepancies that can arise when comparing subjective expectations with objective valuation methods [5]. The findings suggest that while the reconstruction can significantly enhance a building's value, there are instances where it may have the opposite effect. The paper concludes with recommendations for ensuring that reconstruction efforts effectively maximize property value, taking into account both the historical significance and modern valuation techniques.

Incorporating modern information technologies such as Building Information Modeling (BIM) significantly enhances the accuracy of cost estimation in the restoration of historic buildings by enabling better information integration and reducing misunderstandings. This advanced approach also facilitates the creation of detailed component libraries, streamlining the design process for future projects. As a result, BIM aligns with the need for more robust and reliable valuation methodologies in historical restoration. These methodologies address the unique requirements and complexities inherent in such projects, leading to more accurate budgeting and resource allocation [6].

The conservation of built heritage is increasingly significant, particularly in the context of earthquake engineering and seismology. Evaluating and rehabilitating heritage buildings involves complex challenges in structural engineering and necessitates precise structural analysis techniques. Misleading assumptions can result in unsafe assessments or unnecessary high rehabilitation costs. A recent study presents and discusses two case studies in heritage building evaluation and reconstruction, offering valuable insights that can be applied to other historical buildings [7]. These case studies emphasize the importance of accurate evaluation and sustainable rehabilitation practices to preserve cultural value while ensuring safety and structural integrity.

Reconstructing historical buildings with a change of function, such as converting them into hotels or hostels, is an essential activity in revitalizing European urban centres. This strategy not only preserves the architectural heritage but also introduces profitable and attractive solutions that stimulate tourism and revitalization. A study highlights exemplary projects like the Molino Stucky Hilton hotel and the Generator hostel in Venice, as well as the Vienna House Andel's Lodz in Poland, demonstrating the unique architecture and exceptional character that can result from such reconstructions [8]. The focus on ergonomics and contemporary design solutions ensures that these buildings meet modern accessibility standards while providing a stimulating environment for residents and tourists alike.

Following a major earthquake in Zagreb, many historically significant masonry buildings suffered extensive damage, necessitating urgent assessment and rehabilitation to preserve their cultural value. One notable example is the culturally protected Prince Rudolf Infantry Barracks. A comprehensive study was conducted to evaluate the damage and propose effective rehabilitation strategies. This included a detailed historical analysis, in situ testing, and nonlinear static seismic analysis using the 3Muri software. Various strengthening scenarios were developed, applying different techniques to adhere to new Croatian laws on reconstruction. The study underscores the importance of meticulous condition assessment and tailored rehabilitation approaches to safeguard cultural heritage and ensure structural integrity [9].

The maintenance-focused conservation of heritage buildings emphasizes ongoing preservation rather than periodic major restorations or repairs. A recent study presents a model for such a maintenance-focused conservation plan, highlighting its importance in contrast to more traditional approaches like reconstruction or a "do-nothing" method. Conducted in the Australian context, where many buildings are categorized as "modern heritage," the research identifies key strategies and opportunities to integrate maintenance into facility management operations more effectively. Challenges to this approach are also evaluated. The study argues for the critical importance of maintenance in the long-term preservation of architectural heritage, suggesting that this approach can significantly improve the sustainability and integrity of heritage buildings [10].

The practice of designating parts of cities for preservation has roots in post-World War II reconstruction planning, evolving significantly from the 1970s onwards. A recent study investigates the influence of post-war reconstruction on urban preservation efforts, using Vienna as a case study. The research highlights how early reconstruction planning included elements of inheritance and preservation, influencing which parts of historic city centres were designated as worth preserving or rebuilding. By analysing historic maps and documents, the study illustrates how these early efforts informed longer-term urban development and the preservation of monuments and urban ensembles in "Old Vienna." The discourse on preservation and repair during this period laid the groundwork for the protection zones and monument values that are still evident today [11].

The enhancement of historical and cultural assets is often challenged by the presence of recently built structures that clash with the heritage value of their surroundings. A recent study proposes an innovative compensation-based model aimed at facilitating the demolition and reconstruction of such unsuitable buildings to enhance historic city centres. This model functions as a decision support system for public administrations, defining building rights to be transferred to private entrepreneurs while ensuring financial feasibility, environmental benefits, and overall positive public effects. The application of this model to Alberobello, an Italian UNESCO heritage site, highlights its effectiveness, demonstrating its potential for broader application in similar contexts [12].

The condition assessment of historical masonry buildings is crucial for ensuring their safe operation, especially during modernization or complex reconstruction projects. A recent study addresses the challenges of evaluating the technical condition of structural elements in historic buildings with brick construction. The research employs both non-destructive and destructive testing methods to analyse structural materials, identify material parameters, and understand deformations and support zones. By accurately assessing these factors, the study devises protective and strengthening strategies that consider the building's degradation processes. The findings emphasize the importance of integrating precise data into numerical models to verify compliance with load-bearing and deformability standards, ultimately supporting the long-term operation of these buildings [13].

The sustainable preservation and utilization of historical buildings and blocks require reliable spatial geometry data, typically generated through three-dimensional (3D) reconstruction. To improve this process, a novel AGF-LiDAR ("air-ground data fusion" based 3D laser radar) method has been developed. This technology integrates data from aerial and ground equipment in real-time, enhancing reconstruction quality and accuracy. Application of this method on historical buildings has shown significant improvements over traditional techniques, making it a promising tool for sustainable heritage preservation [14].

In the broader context of sustainable development, [15] examine the relationship between public R&D funding and sustainable development outcomes across EU member states. Their findings reveal a positive correlation between targeted public expenditures and R&D outcomes, with disparities among member states. This research offers insights into how public funding drives innovation in sustainable technologies, potentially benefiting fields like historical preservation and providing a framework for evaluating the impact of public investments in heritage conservation.

While our study focuses on historical building reconstructions, it's crucial to consider broader real estate market trends. [16] investigate the relationship between property prices, transaction volumes, and rents in European markets. They found that increased transactions predict price increases, but prices remain rigid during market cooldowns. This insight into price formation and market dynamics could inform valuation approaches for historic properties, especially in understanding how broader market trends might influence the costs and economic viability of reconstruction projects.

In the context of valuing historical building reconstructions, it's important to consider not just initial costs but the entire life cycle of the project. [17] proposes the Life Cycle Cost Inspector (LCCI), a tool for evaluating public procurement that incorporates life cycle costs. While Macek's focus is on general public procurement, his approach could be particularly relevant for historical preservation projects. The LCCI's ability to compare different investment alternatives based on acquisition, operating, and disposal costs over time could provide valuable insights for decision-making in historical building reconstructions, potentially leading to more sustainable and cost-effective preservation strategies.

3 The Methodology for Valuation of Construction Works on Historic Buildings

The methodology for valuation of construction works on historic buildings methodically addresses the approach to valuation of construction works related to immovable cultural heritage. The uniqueness of historical architectural elements requires more advanced technologies for their revitalisation compared to modern construction practices. Consequently, the valuation proposal is based on an analysis of market prices for construction works on historic structures, integrated with traditional pricing tools and methodologies.

The methodology aims to provide a comprehensive and rigorous approach to the pricing of restoration and conservation activities for historic properties in the Czech Republic. It bridges the gap between traditional building practices and modern economic frameworks, ensuring that the cultural value of historic buildings is preserved while providing a practical, financially sound approach to their restoration.

The methodology is based on a price system for civil engineering. This pricing system is a comprehensive database containing details of construction and installation works, materials and products, systematically organised into categorised items. Each item includes an identifier (code), a description and a unit of measurement, together with pricing and technical conditions that facilitate the calculation of necessary costs and the determination of unit prices. The values provided in these pricing systems are derived by statistical methods based on data collected from respondents (typically construction companies' bid prices from actual projects) according to a standardised calculation formula.

Most countries have their own national classification systems or at least standard structures for categorising building structures and works. In the Czech Republic, the classification system is known as the Classifier of Construction and Works (Třídník stavebních konstrukcí a prací, TSKP). This system underpins the price databases published by private engineering companies.

For complex historical structural elements that cannot be found in standard pricing databases, individual costing is used. This method calculates direct costs taking into account specific conditions, technology, production organisation, location and time. Individual cost estimation requires a clear understanding of the technology, construction conditions and an established information system in the areas of pricing and intrinsic costs. It also requires a normative basis for determining consumption, thorough preparation considering construction risks, and an assessment of business risks, price fluctuations and changes in other input conditions over time. It also requires a team of expert estimators who are not only technically competent but also have an intuitive understanding of the company's capabilities and market constraints.

Hourly rates are used in situations where it is difficult to determine the output per unit of production (e.g. m^2, m^3). This is particularly relevant when estimating the cost of restoration work where the extent of the work cannot be predetermined (e.g. work on stucco elements, facades, renaissance cornices, rococo decoration). It includes the cost of restoration assessments and specific tasks related to the particular work. The components of the hourly rate include the cost of labour, including contributions, the cost of minor materials, basic equipment for the specific task, overheads and profit. Excluded from the hourly rate are the costs of restoration materials, machinery (mainly rental), transport, scaffolding, demolition and site preparation.

The methodology outlines the systematic approach to the assessment and management of reconstructed historic properties, ensuring accuracy and completeness at each stage of the process (Figure 1).

The process begins with the identification of historic objects that are to be reconstructed. Once the relevant objects have been identified and documented, the next step is to obtain the project documentation for the selected objects. This is followed by a thorough review of the work inventory to ensure that it is consistent with the documentation provided. During this review it is important to identify any discrepancies or missing items.

Once the inventory has been verified, the next stage is to value the inventory items using standard prices. This step ensures that the estimate covers all the costs associated with carrying out the work. It is also important to ensure that the prices are indexed to the same level according to the current year or period under review and, if necessary, to re-index the prices to take account of any changes.

The next stage is to compile all the items in the work inventories into a comprehensive database. This database contains all the items for each monitored property, facilitating organised storage and easy future reference. For ease of analysis and usability, the items are then divided into sections based on type of work or craft discipline, thereby enhancing the comprehension and usability of the data.

The final stage is to compare the standard prices with the tender prices obtained from the project documentation. This comparative analysis helps to determine whether the tender prices are higher or lower than the standard prices. If there are discrepancies, it is important to identify the reasons for these differences in order to ensure an accurate and fair valuation.

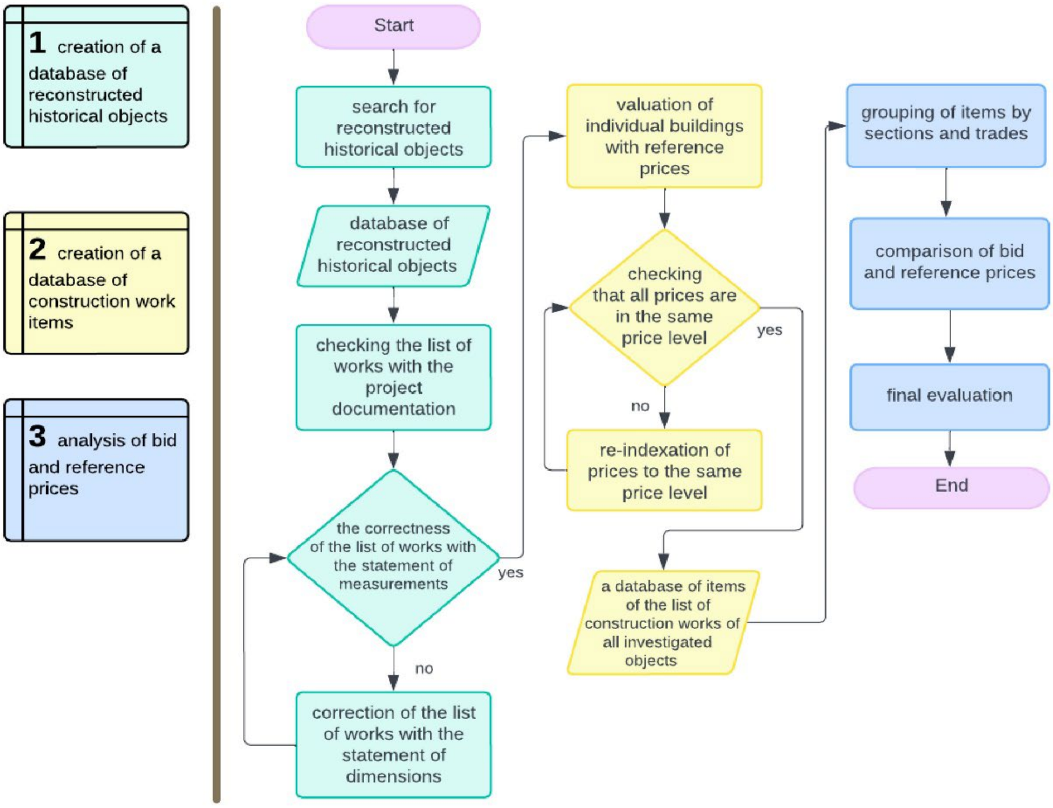

Fig. 1: Flowchart for Assessing Reconstructed Historical Objects.

4 Results and Discussion

In this article, we aim to show the differences that occur between indicative prices and bid prices for construction projects. This study builds on our previous research and analyses the period from 2020 to 2023. Our analysis is based on 21 tender budgets for the reconstruction of historic buildings. These historic buildings are located in the following regions Central Bohemia Region, Ústí nad Labem Region, Karlovy Vary Region, Pardubice Region and Pilsen Region.

The tender budgets were obtained through direct enquiries to the public contracting authorities for the construction works, who were obliged to assist us under the Act on Access to Public Information. All construction works involved the use of public funds, and due to the nature of transparent procurement processes, these budgets were made available to us.

In order to ensure consistency in our findings, we have only included construction budgets prepared on the basis of the ÚRS pricing system. Budgets based on the RTS pricing system were excluded from the analysis as their number was minimal.

As the budgets were prepared at different times between 2020 and 2023, it was necessary to standardise all budgets to the same price level in order to enable an objective comparison between the indicative and tender prices. The CS ÚRS II/2023 price level was used as a reference. In order to adjust the older budgets to this newer price level, we used statistical data on the development of construction prices published by the Czech Statistical Office [18].

Our comprehensive analysis thus provides a solid basis for understanding the differences in pricing methodologies over the period, ensuring that our conclusions are robust and evidence-based.

In order to provide a clearer understanding of the structure of the sample analysed, Figure 2 illustrates the percentage representation of individual construction elements. This percentage representation does not correspond to a standard construction budget, as the budgets examined relate to reconstruction work on historic buildings. Logically, earthworks and foundations are minimally represented in these budgets, as these elements are rarely altered during reconstruction. Conversely, demolition, surface treatment, carpentry structures and vertical structures are the most common elements.

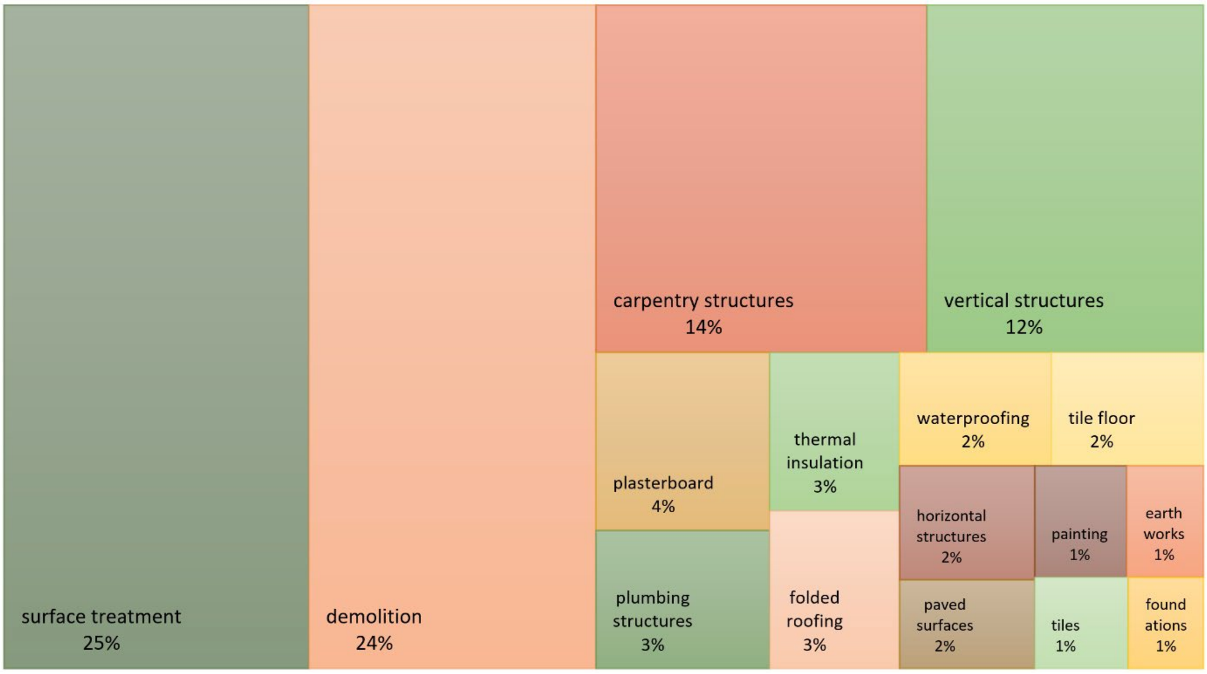

Fig. 2: Percentage occurrence of items by construction divisions and trades in the dataset.

Items related to joinery and locksmithing are absent from the sample analysed. These are mainly construction works, including materials, related to the renovation and replacement of window openings, door leaves, gates, staircases, grilles, railings and similar elements. Such construction elements are mostly calculated individually in the renovation and reconstruction of historical buildings and are listed as R-items in the budget itemisation.

In the statistical sample, the tender prices were compared with the indicative prices and the percentage difference between them was calculated for all items. The comparison was made between the tender prices and the indicative prices of the CS ÚRS price system for items within the sections of main works (HSV) and additional works (PSV). On the basis of this comparison, the percentage difference between them was calculated and an average value was determined.

The standard deviation was calculated for the whole sample and then for individual sections of HSV and PSV, and a histogram with frequency distribution for the following intervals was created:

- Bid price is more than 30% lower than the indicative price.
- Bid price is 20.00% - 29.99% lower than the indicative price.
- Bid price is 10.00% - 19.99% lower than the indicative price.
- Bid price is 0.00% - 9.99% lower than the indicative price.
- Bid price is 0.00% - 10.00% higher than the indicative price.
- Bid price is 10.01% - 20.00% higher than the indicative price.
- Bid price is 20.01% - 30.00% higher than the indicative price.
- Bid price is more than 30.00% higher than the indicative price.

The arithmetic mean was used to determine the central tendency of the sample. The standard deviation was calculated to determine the variability or dispersion of prices in the data set. This analysis allows us to understand the distribution and variability of prices between actual tender prices and indicative prices, providing insights into cost estimation and pricing strategies for construction projects on historic buildings.

4.1 Analysis of Bid Prices vs. Indicative Prices: Total Sample Statistics Compared

The average difference between bid prices and indicative prices for the whole statistical sample is -12.82%. This indicates that, on average, offer prices are lower than indicative prices. The standard deviation for the whole sample is 15.80%, which highlights the degree of variability in price differences across the sample. In other words, while some bid prices were much lower or higher than the guide prices, the average deviation tends to be around -12.82%.

For a more detailed understanding, Figure 3 illustrates these key statistical measures together with a histogram showing the frequency distribution of the percentage differences. The histogram is divided into intervals showing how often certain ranges of differences occurred within the sample. Among the sections analysed, vertical structures, surface adjustments and demolition of structures were the most common. Carpentry was the most common type of work in the PSV.

Key statistical findings from the full dataset include:

- Statistical sample size: 464 items
- Arithmetic mean (mean difference): $\bar{x}$ = -12.82%.
- Standard deviation: σ = 15.80%.

The histogram provides a visual representation of the distribution of differences between bid prices and indicative prices. This visualisation helps to identify patterns such as

- The most frequent range of differences,
- The presence of significant outliers,
- The spread and concentration of data points in the sample,
- The symmetry or skewness of the data distribution.

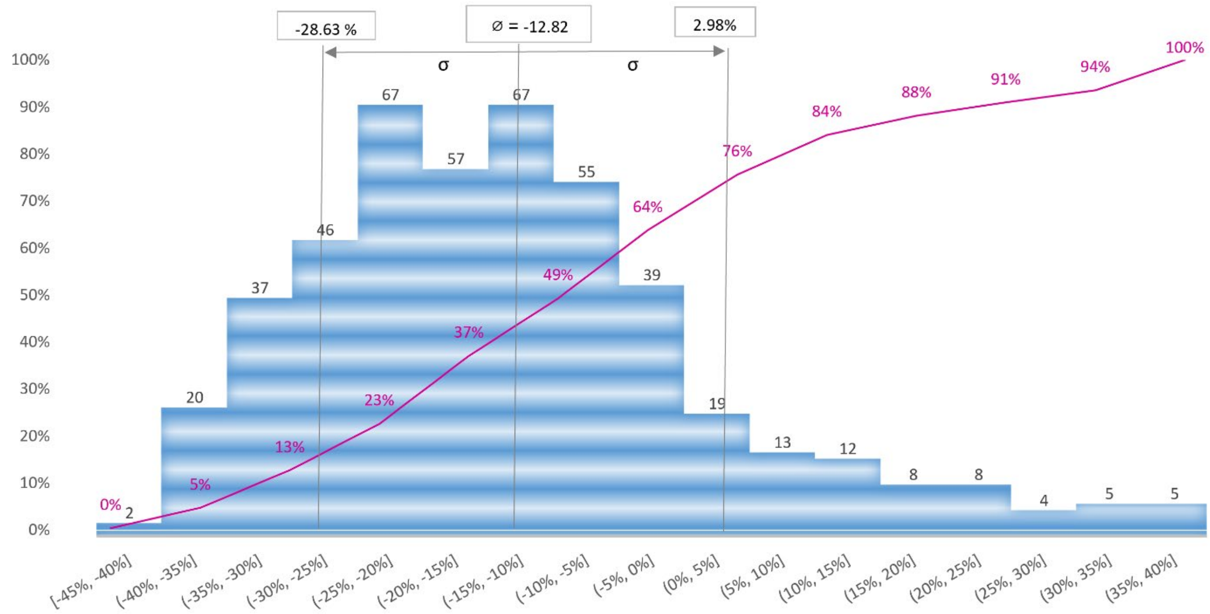

Fig. 3: Statistics of the total sample compared.

These insights are crucial for understanding how actual bid prices evolve in relation to the standardised indicative prices provided by the ÚRS pricing system. Such analysis helps to assess the accuracy and reliability of cost estimates used in the reconstruction of historic buildings.

Ultimately, this in-depth comparison and accompanying statistical analysis provides valuable information for stakeholders involved in the pricing and budgeting of construction projects, particularly for historic buildings. It helps to refine cost estimation methodologies to better reflect market realities, thereby improving the efficiency and accuracy of budgeting processes for future projects.

4.2 Analysis of Bid Prices vs. Indicative Prices: Vertical Construction Section

Vertical structures include elements such as load bearing walls, above foundation masonry, columns, walls, partitions, lintels and chimneys. The repair and maintenance category includes tasks such as filling openings, repairing masonry, injecting masonry, repairing masonry cornices, installing rolled steel beams in prepared openings and associated demolition work such as cutting pockets for anchoring elements.

This section is one of the most populated in terms of the number of items in the sample analysed. The average difference between the tender prices and the indicative prices for the vertical structures section is -12.98%. This indicates that, on average, the bid prices are lower than the indicative prices. The standard deviation for vertical structures is 3.23%, indicating a relatively low variability of price differences for this category.

Key statistical findings from the vertical structures section include:

- Statistical sample size: 56 items
- Arithmetic mean (mean difference): $\bar{x}$ = -12.98%.
- Standard deviation: σ = 3.23%.

Figure 4 illustrates the above statistical metrics along with a histogram showing the frequency distribution for the defined intervals. The histogram provides a visual representation of the distribution of differences between bid and sale prices.

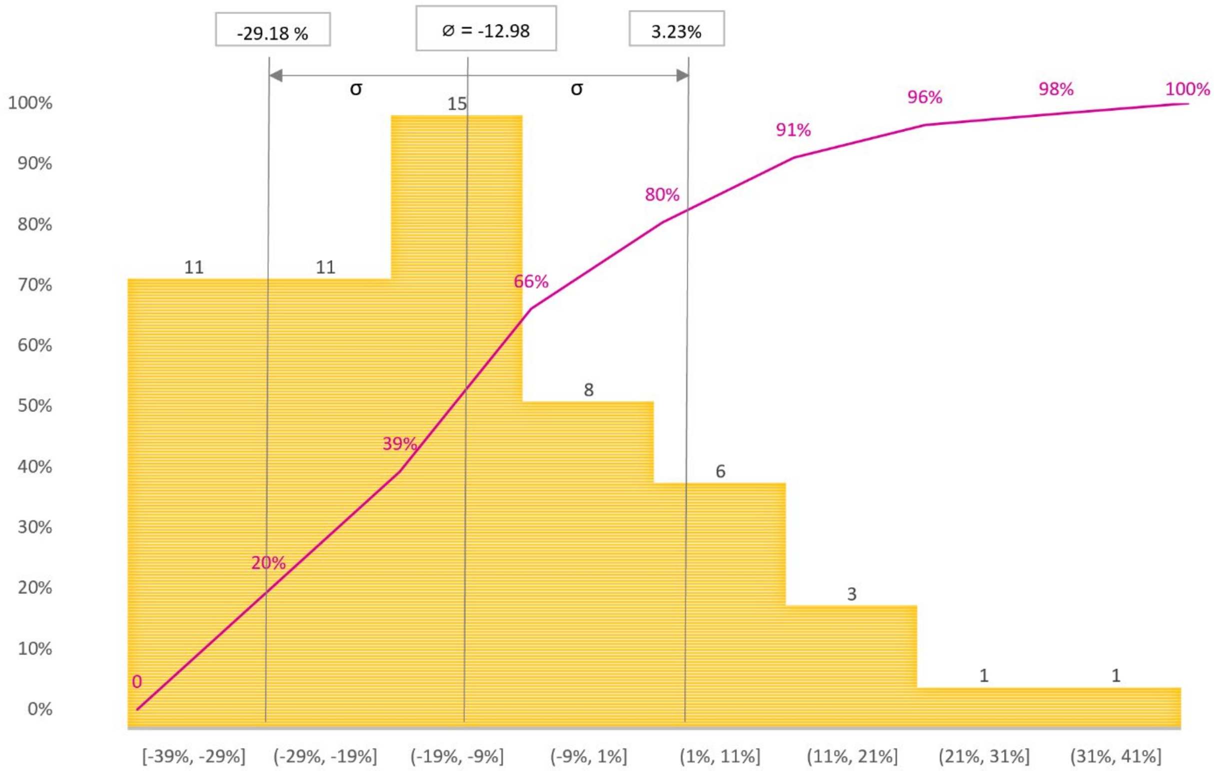

Fig. 4: Comparison of statistics for the vertical structures sample.

4.3 Analysis of Bid Prices vs. Indicative Prices: Surface Treatment Section

Construction work in this category is divided into three main groups: internal and external surface finishes, and floor surface finishes such as underlays, screeds, anhydrite and cement screeds. Internal and external surface finishes mainly include plastering of walls, ceilings, columns and soffits, as well as contact insulation systems using various materials. Among the items relating to the repair of historic buildings, the most common are those for levelling uneven surfaces, repairing small areas of plaster and filling cracks.

The average difference between tender prices and indicative prices in the statistical sample for surface treatment is -12.41%. This indicates that, on average, tender prices are lower than guide prices. The standard deviation for area adjustments is 4.40%, indicating some variability in price differences for this category.

Figure 5 illustrates the above statistical metrics along with a histogram showing the frequency distribution for the defined intervals. The histogram provides a visual representation of the distribution of differences between bid and sale prices.

Key statistical findings from the surface treatment section include:

- Statistical sample size: 118 items
- Arithmetic mean (mean difference): x̄ = -12.41%.
- Standard deviation: σ = 4.40%.

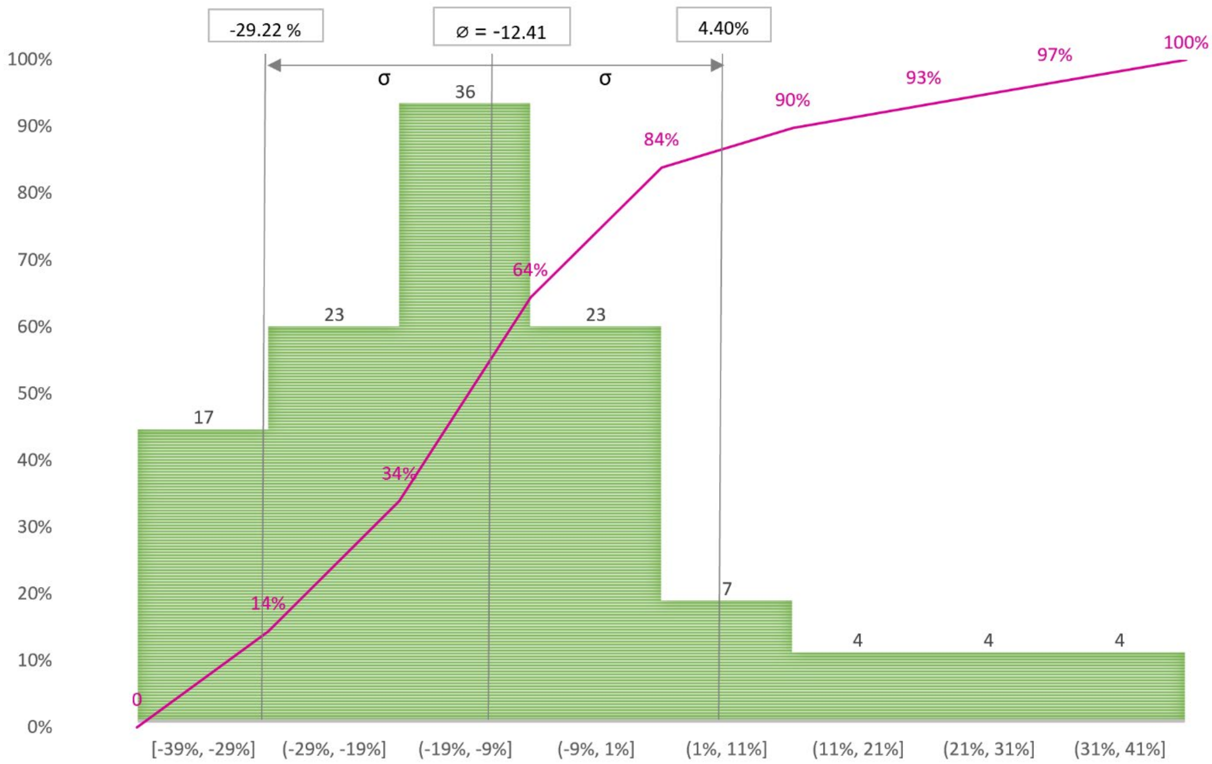

Fig. 5: Comparison of surface treatment sample statistics.

4.4 Analysis of Bid Prices vs. Indicative Prices: Carpentry Construction Section

Carpentry work mainly involves the assembly and dismantling of tied roof structures, lathing and roof boarding. Frequently used items include blasting, cutting and supplementing roof framing. In addition to roof structures, the sample also includes items for the assembly and dismantling of plank and board floors, wall cladding, laying sleepers under floors and cutting and supplementing ceiling beams.

The average difference between tender prices and indicative prices in the statistical sample for carpentry is -9.11%. This indicates that, on average, tender prices are lower than indicative prices. The standard deviation for carpentry is 3.71%, indicating a moderate variability in price differences for this category.

Figure 6 illustrates the above statistical measures together with a histogram showing the frequency distribution for the defined intervals. The histogram provides a visual representation of the distribution of differences between bid and sale prices.

Key statistical findings from the Joinery section include:

- Statistical sample size: 67 items
- Arithmetic mean (mean difference): x̄ = -9.11%.
- Standard deviation: σ = 3.71%.

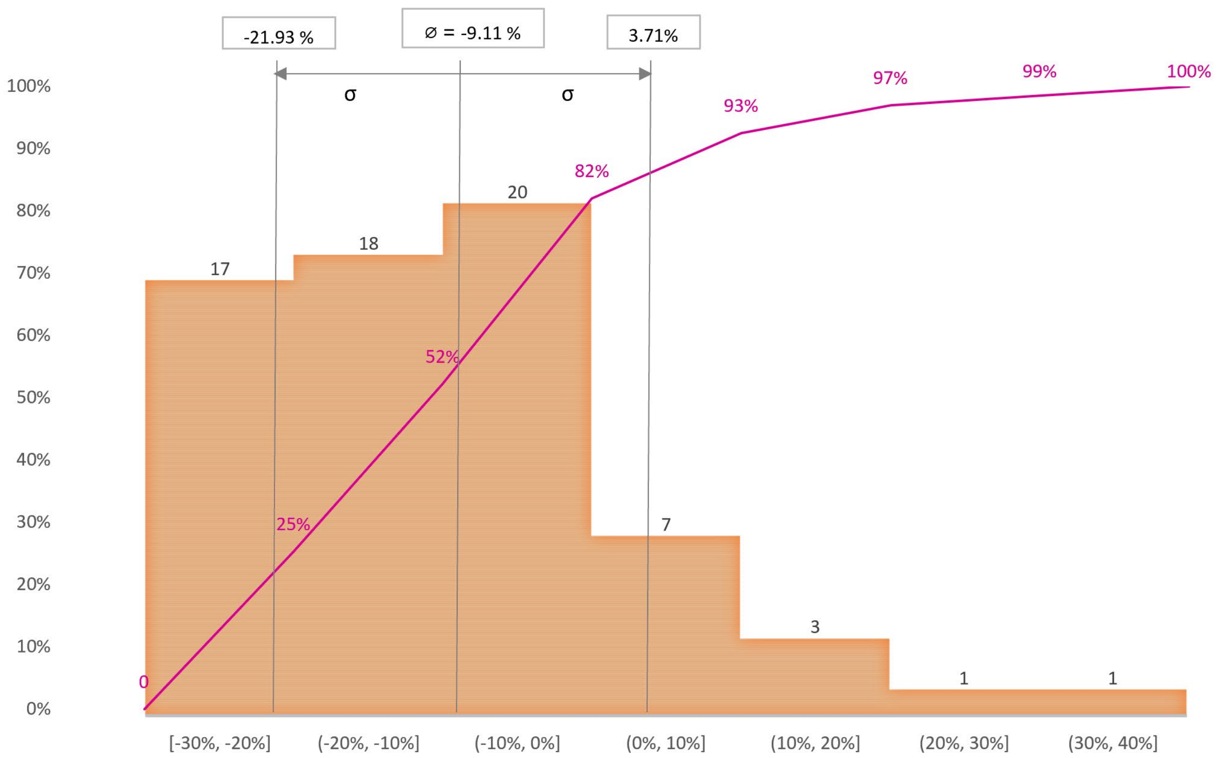

Fig. 6: Comparison of carpentry construction sample statistics.

4.5 Analysis of Bid Prices vs. Indicative Prices: Demolition Work Section

The most common items in this category evaluated the demolition of masonry and partitions, loosening of beam heads, removal of rolled steel beams, demolition of floors and subfloors, chiseling of masonry and reveals, cutting of pockets in masonry, underpinning of ceilings, removal of internal and external plaster, dismantling of window frames and openings in masonry, scraping of joints in masonry and removal of tile coverings. Also included in this category are items to assess the transport and disposal of rubble and excavated material to a landfill site.

The average difference between tender prices and indicative prices in the statistical sample for demolition work is -13.14%. This indicates that, on average, tender prices are lower than indicative prices. The standard deviation for demolition is 3.48%, indicating a moderate variability in price differences for this category.

Figure 7 illustrates the above statistical measures together with a histogram showing the frequency distribution for the defined intervals. The histogram provides a visual representation of the distribution of differences between bid and sale prices.

Key statistical findings from the demolition section include:

- Statistical sample size: 111 items
- Arithmetic mean (mean difference): $\bar{x}$ = -13.14%.
- Standard deviation: σ = 3.48%.

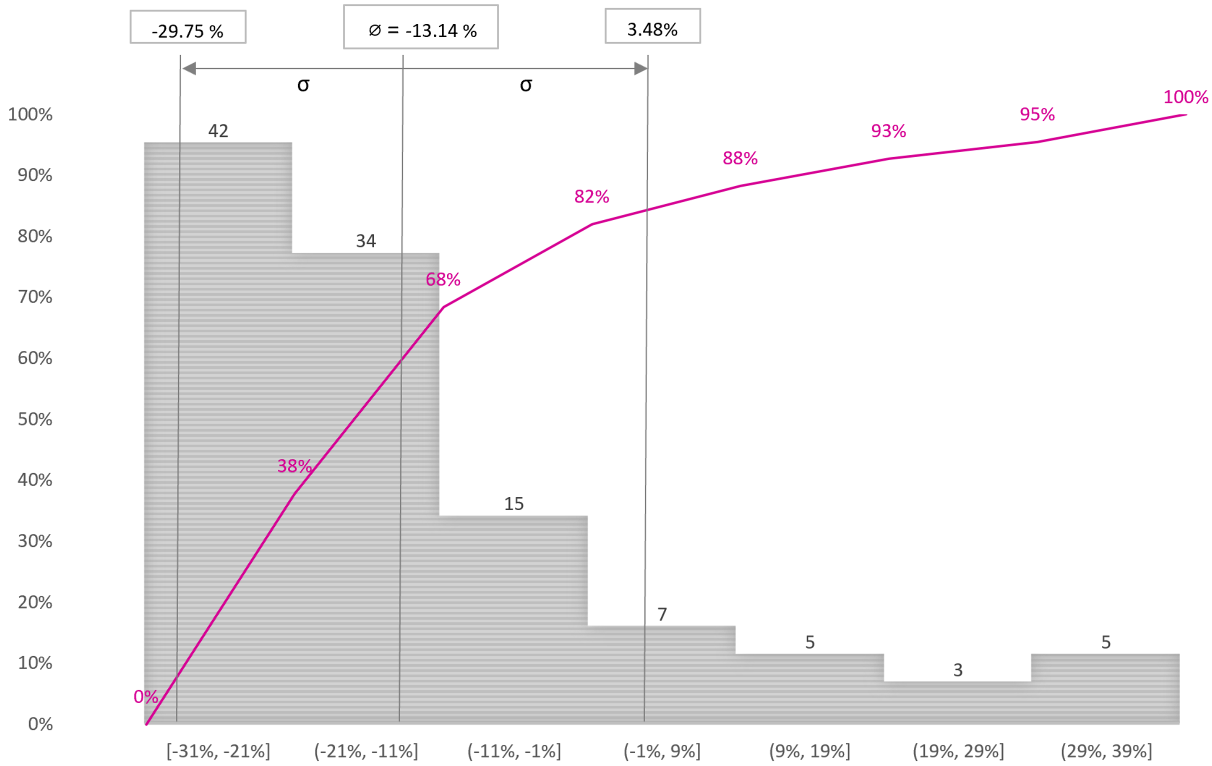

Fig. 7: Comparison of demolition work sample statistics.

5 Conclusion

Valuing the reconstruction of historic buildings is inherently problematic due to the nature of the work and the uncertainties involved in estimating quantities. The aim of analysing indicative prices was to determine whether they accurately reflect market prices for construction work. It is important to note that if the work on a building falls within the scope of restoration and can only be carried out by a certified restorer, these works must be valued individually, as indicative prices do not take into account the specificities of restoration tasks. In addition, refurbishment projects often involve a significant number of trades that are not listed in budgeting programmes and are individually priced in the tenders. These typically include joinery, metalwork and artistic elements.

The price analysis was carried out on a statistical sample of 464 items from 21 tender budgets. In comparison with the indicative prices of the ÚRS price system at the II/2023 price level, 85% of the examined items had tender prices that were lower than the indicative prices.

A detailed percentage distribution of the differences between tender and indicative prices by type of construction work is shown in Figure 8, which examines the difference between tender and indicative prices within the interval <-45%, -20%>. Demolition and surface treatment are the most common categories where the largest differences between bid prices and indicative prices are observed. One reason for this is the difficulty in standardising these types of work, as they are highly individual. For clarification, these are unit prices, so the total volume of work does not affect this statistic. Similar results are obtained for other price intervals such as <-19%, 0%>, etc.

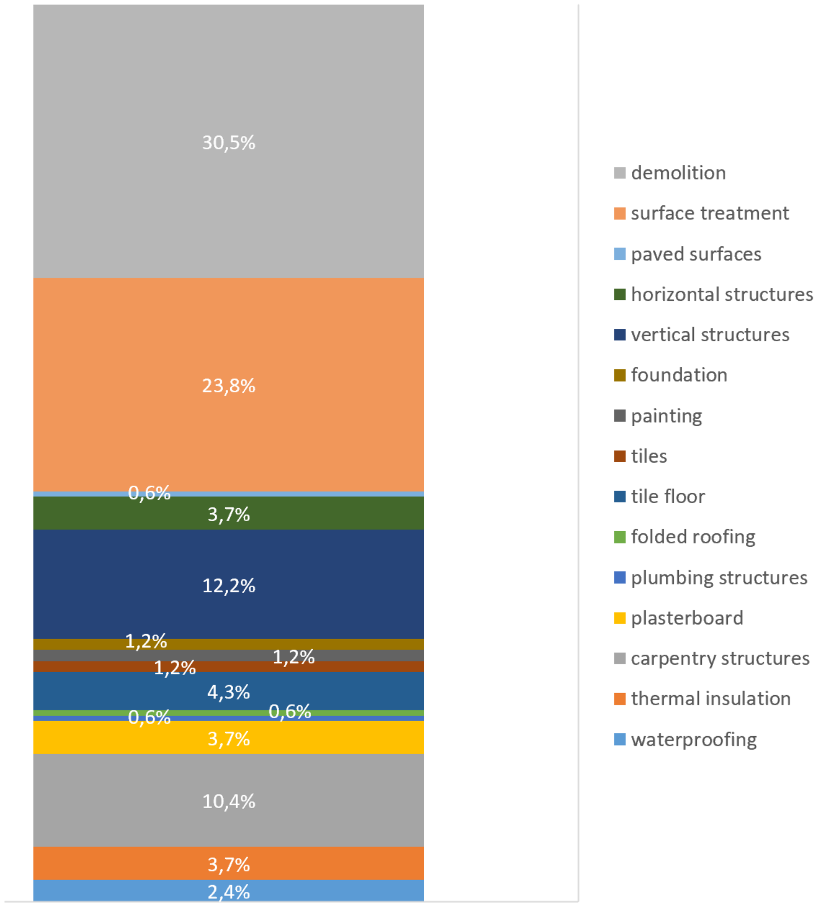

Fig. 8: Percentage distribution of differences between bid and indicative prices by type of construction work, <-45%, -20%>.

This paper presents a methodology for the valuation of construction works during the reconstruction of historical buildings. The valuation method is based on an analysis of market prices for construction work typically carried out on historic buildings, combined with traditional pricing tools and methods. Based on the research conducted, constructive elements and technological complexes were identified for the objects. The unit price assigned to these defined complexes is based on the principle of microbudgets and was prepared using the ÚRS pricing system.

This comprehensive approach combines the practical aspects of traditional costing methods with a detailed analysis of current market prices, providing a robust framework for accurately estimating the costs associated with the reconstruction of historic buildings. This methodology ensures that the unique requirements of preserving historic integrity are met, while taking into account the financial realities of such projects. Ultimately, this helps stakeholders plan, budget and execute restoration projects with greater precision and confidence.

The findings of this study highlight the need for individualised costing approaches in the restoration of historic buildings. The variability of bid prices compared to indicative prices also highlights the dynamic nature of market conditions affecting these specialist projects. By integrating historical data with contemporary pricing frameworks, we offer a more reliable and adaptable model for future restoration endeavours. This in turn will contribute to more efficient resource management, cost certainty and successful heritage conservation.

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