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Project performance affecting claim events under the JBCC Principal Building Agreement in South Africa

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ABSTRACT

The Joint Building Contracts Committee Principal Building Agreement is the leading construction contract in South Africa, and it is common for claims to arise during projects where this agreement is used. This research aimed to investigate the claim events that most severely impact project performance under the agreement in the South African construction industry. The study employed a quantitative research approach and distributed an online structured questionnaire that was completed by 380 respondents, which included principal agent practitioners and contractors in South Africa. The collected data was analysed using descriptive statistics. The results revealed that the most impactful claim events are contract instructions, additional work, and adverse weather. On the other hand, the least impactful claim events are the exercise of statutory power, opening and testing of work, materials and goods, and the insolvency of a nominated subcontractor. This study addresses the knowledge gap around the types of claims that most severely impact project performance under the Joint Building Contracts Committee Principal Building Agreement in South Africa. It provides especially principal agents with a good base level understanding of the critical claims under this agreement, assisting them to prevent and effectively manage such claims to mitigate potential damages for all parties involved. Although this study focused on South Africa, the findings may also be applicable to users of the agreement in other contextual settings especially neighbouring countries.

Keywords: Construction claims; JBCC Principal Building Agreement; South Africa

1. INTRODUCTION

In the rapidly evolving context of developing economies, construction undertakings have a crucial function in propelling the advancement of infrastructure and economic prosperity. The success of the various construction undertakings largely hinges on the effective handling of contracts, a task that frequently encounters many hurdles especially in less developed nations. Efficient contract management is vital to ensuring projects are completed promptly, expenses are managed, quality is ensured, and risks are minimised (Charrett, 2018).

Considering the above, the CIDB (2019) highlights that the four main suites of construction contracts used in South Africa are: The Joint Building Contracts Committee (JBCC), General Conditions of Contract for Construction Works (GCC), FIDIC (International Federation of Consulting Engineers), and New Engineering Contract (NEC). The GCC, FIDIC, and NEC are forms of contract that can be used on all types of engineering and building works, while the JBCC is confined to only building works (CIDB, 2019). The JBCC, FIDIC, and NEC series of documents also contain short contract versions for minor construction works. The four series of documents jointly cover the generally encountered contracting strategies that are presently practised internationally (CIDB, 2019). Within this

context, the JBCC Principal Building Agreement is widely recognised as the leading construction contract in the South African building industry (De Klerk, 2021).

According to Mukuka et al. (2015) and Prinsloo (2018; 2019), it is uncommon for construction projects to proceed without numerous claims for additional time and costs, often leading to disputes in the industry. However, there is a lack of understanding among project participants regarding the critical claim events under the JBCC Principal Building Agreement. Furthermore, empirical studies on claims in the South African construction industry remain limited, and there is a scarcity of available literature specifically addressing the topic within the JBCC Principal Building Agreement (Le Roux, 2014; Maritz and Prinsloo, 2016). Thus, the purpose of the study presented in this paper is to identify the significant claim events under the JBCC Principal Building Agreement, with a view to minimising claims and disputes from arising.

2. CLAIMS AND CLAIM EVENTS UNDER THE JBCC PRINCIPAL BUILDING AGREEMENT

This section offers a broad introduction to claims, followed by an emphasis on the specific claim events pertaining to the JBCC Principal Building Agreement. This contextual information is essential for understanding the focus of the study.

2.1 Claims

According to Rai et al. (2021), a claim refers to the action taken by a party which feels aggrieved in order to seek redress for a deviation from the agreed-upon contractual obligations. For Hewitt (2011), a claim is the assertion of a party's rights based on the terms of the contract, specifically in the construction industry, where it entails the right to additional time or payment to complete the work. Similarly, McManus Jr. and Blank (2016) describe a construction claim as a request for an extension of time or additional payment resulting from a change or event that has impacted the schedule or content of the work, leading to extra costs for which compensation is sought. Various authors in the literature identify the common sources of construction claims as follows:

- Issuing variations and instructions;
- Delayed provision of construction information;
- Delayed selection of subcontractors and suppliers;
- Modifying information and material specifications;
- Instructing the suspension of the works;
- Impact of adverse weather conditions;
- Changing access and egress routes on the construction site;
- Differing site conditions from those specified in the contract, such as unexpected physical obstacles or man-made obstructions;
- Increased work quantities beyond what was initially stated in the contract;
- Inaccurate descriptions of items in the bills of quantities;
- Amending laws of the country where the project is located; and
- Instructing the acceleration of the works to make up for lost time (Fertitta et al., 2016); Nagata et al., 2018; Burr, 2018; Prinsloo, 2020; Putlitz, 2021).

Wilson (2021) underscored that the probability of claims increases with the size and complexity of a project. Similarly, Hall (2020) and Clark (2021) emphasised that contractual conditions outline the specific circumstances under which a contractor can seek additional payment or an extension of time from the employer.

2.2 Claim events under the JBCC Principal Building Agreement

Several studies have been conducted on the JBCC Principal Building Agreement, examining various aspects such as the management of clients' strategic objectives (Richards and Bowen, 2007), the effectiveness of payment and construction guarantees (Maritz, 2008), the agreement's efficacy for contractors (Cumberlege et al., 2008), contractors' perception and evaluation of risks (Othman and Harinarain, 2009; Othman and Harinarain, 2011a; Othman and Harinarain, 2011b), the compliance of edition 6.1 with statutory requirements (Maritz and Putlitz, 2014), and the facilitation of project management through the agreement (Du Plessis and Oosthuizen, 2018; Du Plessis, 2019). However, only three studies were found that specifically focused on claims, with two exploring the methods used by professionals to analyse claims and one considering the frequency of claim events (Le Roux, 2014; Maritz and Prinsloo, 2016; Deacon and Kajimo-Shakantu, 2023). Given the limited current knowledge of claims under the JBCC Principal Building Agreement, this study aims to address this gap by conducting an opinion survey among South African construction professionals and contractors to determine the most impactful claim events under the JBCC Principal Building Agreement.

The most recent edition of the JBCC Principal Building Agreement, which is edition 6.2, published in 2018, provides detailed provisions regarding the circumstances that allow a contractor to request a revision of the practical completion date and an adjustment of the contract value, as outlined in clause 23 (JBCC, 2018). The specific claim events associated with the JBCC Principal Building Agreement are presented in Table 1. Clause 23.1 of the agreement grants the contractor the entitlement to only a time extension for the events listed, while the events listed in clauses 23.2 and 23.3 provide the contractor with both an extension of time and additional payment.

Table 1: Claim events under the JBCC Principal Building Agreement

No.	JBCC PBA Clause	Event	Description
1	23.1.1	Adverse weather	If delay is caused by climatic conditions that inhibit progress towards practical completion.
2	23.1.2	Inability to obtain materials and goods	If delay is caused by the contractor's inability to obtain the materials and goods at such time as it would be possible for him to complete the works by the due date, and he has taken reasonable steps to avoid or reduce such delay.
3	23.1.3	Making good physical loss and repairing damage to the works	If delay is caused by the contractor making good any physical loss and repair damage to the works during the construction period that is not due to his or the employer's fault.
4	23.1.4	Late supply of a prime cost amount item	If the contractor complies with instructions and is delayed by the supplier of a prime cost amount item.
5	23.1.5	Exercise of statutory power	If the execution of the works is delayed by the exercise of statutory power by a body of state or public or local authority, through no fault of the contractor.
6	23.1.6	Force majeure	If delay is caused by the occurrence of a supervening circumstance that is unforeseeable and beyond the control of the contractor as per the JBCC definition of Force Majeure.
7	23.2.1	Delayed possession of the site	If delay is caused by the failure of the employer to give possession of the site on the agreed date as contained within the contract provisions.

8	23.2.2	Making good physical loss and repairing damage to the works	If the contractor complies with instructions to make good physical loss or damage to the works for which he is not at risk (in terms of clause 8.5).
9	23.2.3	Contract instructions	If the principal agent is late to issue an instruction, or fails to issue an instruction, provided that the contractor has in writing requested such instruction.
10	23.2.4	Opening and testing of work and materials and goods	If delay is caused by an instruction to open work for inspection that has been covered up and/or provide samples of work, materials, and goods to be tested, and the work, materials and goods are found to conform to the contract.
11	23.2.5	Late or incorrect issue of construction information	If delay is caused by the late or incorrect issue of construction information by the principal agent.
12	23.2.6	Late supply of free issue materials and goods	If delay is caused by the late supply of materials and goods that are issued by the employer.
13	23.2.7	Late appointment of a subcontractor	If delay is caused by the late instruction to appoint a nominated or selected subcontractor, provided that the contractor has taken reasonable steps to avoid or reduce such delay.
14	23.2.8	Late acceptance by the principal agent and/or agents of a design undertaken by a selected subcontractor	If delay is caused by the late acceptance of a selected subcontractor's design by the principal agent, provided that the contractor ensured that the subcontractor timeously prepared the subcontract documentation.
15	23.2.9	Act or omission by a nominated subcontractor or a direct contractor	If delay is caused by any default on the part of a nominated subcontractor or disruption by a direct contractor.
16	23.2.10	Insolvency of a nominated subcontractor	If delay is caused by the insolvency of a nominated subcontractor.
17	23.2.11	Suspension or termination by a subcontractor due to a default by the employer, the principal agent and/or agents	If delay is caused by the contractor's suspension of the works due to the failure of the principal agent to issue payment certificates within the provision of the contract or the failure of the employer to provide a payment guarantee.
18	23.2.12	Execution of additional work	If certain work is under measured in the bills of quantities or the principal agent issues an instruction for the execution of additional work.
19	23.2.13	Suspension of the works	If delay is caused by the contractor's suspension of the works due to the listed events in clauses 28.1.1 to 28.1.5.
20	23.3	Any cause beyond the contractor's reasonable control	If delay is caused by any other cause, not applicable to clauses 23.1 and 23.2, and which is beyond the contractor's reasonable control and could not have been anticipated.

Source: JBCC (2018)

3. METHODOLOGY

The study employed a quantitative research approach, which is characterised as an objective and systematic approach that involves the collection of numerical data (Abbott and McKinney, 2013; Farrell et al., 2017). To capture quantitative data in an observational context, the survey methodology was adopted, as it is widely recognised as a standard approach for recording such data (Zikmund et al., 2013). Surveys involve gathering information about various aspects of human behaviour from individuals or groups through questions that inquire about experiences, opinions, attitudes, and characteristics, with the

responses subsequently being tabulated (Leedy and Ormrod, 2016). The purpose of conducting surveys is to gain insights about a population by evaluating a sample of that population (Maree and Pietersen, 2019a). The primary advantage of quantitative research is the ability to draw conclusions for a larger population using a smaller group thereof (Creswell and Creswell, 2018). Surveys can be conducted using two main instruments: interviews and questionnaires (Mukherjee, 2019). In this study, a structured questionnaire comprising standardised questions in a specific order was employed (Cheung, 2014). This approach is effective for assessing the preferences and emotions of participants, as well as for efficiently quantifying data (Naoum, 2019). The survey aimed to gather information on the personal experiences of principal-agent practitioners and contractors regarding the claim events under the JBCC Principal Building Agreement that have the most impact on project performance.

3.1 Population, sampling method, and response rate

The study specifically targeted professionals working as principal agents in the construction industry and contractors registered with the Construction Industry Development Board (CIDB) to participate. In the role of the principal agent, individuals are appointed by the employer to act with full authority and responsibility in accordance with the terms of a construction contract, as highlighted by Richards (2017), Le Roux (2018), Putlitz (2018), and the South African Council for the Project and Construction Management Professions (SACPCMP) (2019). Consequently, the study selected construction project managers, architects, and quantity surveyors, as they typically fulfil the principal agent role in the building industry (Ramsden, 2018; Hauptfleisch, 2019), where the JBCC Principal Building Agreement is predominantly utilised. Additionally, contractors were included in the study because they are the parties that enter into construction contracts with employers to carry out the building works (Hauptfleisch and Siglé, 2018).

Ethics approval was sought and granted by the university ethics committee to conduct this study. Furthermore, permission was requested from and granted by the relevant professional bodies, namely, the South African Council for the Project and Construction Management Professions (SACPCMP), the South African Council for the Architectural Profession (SACAP), and the South African Council for the Quantity Surveying Profession (SACQSP), to conduct the survey among their registered professional members. Additionally, consent was obtained from the Construction Industry Development Board (CIDB) to survey their registered contractors.

The size of the population for the study was determined based on the total number of professionally registered members from the SACPCMP, SACAP, and SACQSP, as well as the number of contractors registered with the CIDB under grades 2 to 9 (Gray, 2021). The CIDB excluded their contractors registered under grade 1 from participating in the survey, while only the professional construction project manager (Pr. CPM) members of the SACPCMP were selected, considering the specific target population. Table 2 indicates the final population size based on the 2020/2021 annual reports of the respective organisations. The population size encompassed both individuals and organisations and was considered comprehensive as it included all the relevant professionals and contractors accessible in South Africa.

Table 2: Sampling framework

Organisation	Profession	No. of Members	Percentage of Population
CIDB	Builder/contractor	15 806	65.44%
SACAP	Pr. Architect	4 261	17.64%
SACQSP	Pr. Quantity Surveyor	2 409	9.97%
SACPCMP	Pr. Construction Project Manager	1 679	6.95%
Total		**24 155**	**100%**

The sampling methodology employed in this study aimed to achieve a non-biased and representative sample, which would enable reliable and valid findings. Given that the researchers had access to all individuals in the population through their respective organisations, voluntary response sampling was chosen for the study (Taherdoost, 2016). One important feature of this technique is that it provides an equal opportunity for every member of the population to be included in the sample based on their willingness to participate (Maree and Pietersen, 2019b).

A total of 380 participants responded to the survey. According to Krejcie and Morgan (1970), a sample size of 377 is considered valid for a general research population ranging between 20,000 and 25,000 when a confidence level of 95% is used. Additionally, using an online sample size calculator with a confidence level of 95%, the sample size for the target population size was calculated as 378 (Creative Research Systems, 2022). A sample size of 380 out of a population of 24,155 is therefore justified as an acceptable response rate in representing the interests, opinions, and views of the population (Holtom et al., 2022). Refer to Table 3 for the breakdown of the specific sample size of each sub-group.

Notwithstanding, it should be noted that the response rate may have been influenced by professionals and contractors who deemed the study irrelevant to them. This could include professionals who do not act in the capacity of the principal agent, as well as professionals and contractors working in the engineering sector of the construction industry who do not utilise the JBCC Principal Building Agreement. Additionally, the questionnaire may not have reached all intended recipients due to email spam filters being strict with the keyword 'survey' (Lindemann, 2021).

3.2 Data collection

As indicated, the study received ethical approval from the University of the Free State and the industry councils involved before embarking on data collection. To collect data, a questionnaire was developed and shared using an online tool called Google Forms. The researchers received support from the SACPCMP, SACAP, and SACQSP, who assisted in distributing the questionnaire link to their members. In the case of the CIDB, the researchers were provided with a list of contractors and their contact information. Subsequently, an email containing the questionnaire link was sent to the contractors, inviting them to participate in the study.

The online survey included three sections and primarily comprised closed-type questions due to their ease of answering and time-saving nature, making them convenient for respondents (Maree and Pietersen, 2019a). In the first section, the purpose of the study was stated, along with assurance of respondent's anonymity and contact information for survey inquiries. Participants were then required to provide their consent to proceed to the next section. The second section collected general information on the participants, including their profession or CIDB-grading, years of experience in the construction industry, sector of operation, and frequency of using the JBCC Principal Building Agreement. The third section focused on the effect of the various claim events under the JBCC Principal Building Agreement. Participants were asked to rate the impact of claims for the 20 events identified through the literature review using a five-point Likert scale, where 1 indicated 'not significant' and 5 indicated 'very significant'. The Likert scale numbers overall implied the following:

- Negligible consequence that can be handled through routine procedures.
- Low consequence that could threaten a project element, but normal monitoring and control procedures are sufficient.

- Moderate consequence that could necessitate project adjustments and thus requires monitoring of contributing factors and reassessment of project milestones.
- Significant consequence that threatens project objectives and therefore requires close management to avoid substantial cost increase, time delay, or reduction in technical performance.
- Extreme consequence that could stop project objectives by causing unacceptable schedule slippage cost overrun, or project failure.

3.3 Data analysis and interpretation of the findings

The data analysis for the study involved using R software version 4.1.1. Descriptive statistics were employed to determine the effect of the different claim events, following the guidelines provided by Bhattacharyya and Johnson (2019) and Maree and Pietersen (2019c). The analysis included calculating the distributions, means, and deviations in order to assess the severity of the various events.

The questionnaire scale was evaluated for its reliability using Cronbach's alpha (Cα) test. This test is commonly employed to assess the internal consistency of questionnaire scales. Cronbach's alpha value ranges between 0 and 1, where a higher value indicates greater internal consistency, while a lower value suggests less consistency. A minimum acceptable level of 0.6 is typically considered, while a value of 0.7 or higher is preferred (Field, 2017). To calculate Cronbach's alpha, the responses of each respondent regarding the effect of claims items were summed, and the total was divided by the number of items in the scale. The results revealed that the alpha coefficient was 0.96, indicating excellent internal consistency of the scale. The high alpha value, surpassing the preferred threshold of 0.7, confirms the reliability and trustworthiness of the questionnaire.

4. RESULTS

4.1 Characteristics of respondents

Table 3 presents the profile of the respondents, outlining their characteristics. The results show that the respondents were divided fairly evenly between building contractors and professional consultants. Additionally, the majority of the respondents were employed in the private sector and had accumulated over 10 years of experience in the construction industry. Moreover, most respondents primarily reported working on projects within the private sector, with a smaller percentage having experience in public sector projects.

Table 3: Characteristics of respondents (n = 380)

No.	Characteristic	Frequency	Percentage
1	**Profession**		
	Builder / Contractor	209	55.00%
	Pr. Architect	108	28.42%
	Pr. Construction Project Manager	46	12.11%
	Pr. Quantity Surveyor	17	4.47%
2	**Place of employment**		
	Public sector (i.e., government)	46	12%
	Private consulting firm	114	30%
	Private construction firm (i.e., contractor)	216	57%
	Academia	4	1%
3	**Years worked in the construction industry**		
	0 to 5 years	46	12%
	6 to 10 years	91	24%
	11 to 15 years	80	21%
	16 to 20 years	57	15%
	21 years or more	106	28%

4	**Types of building projects worked on (multiple choice)**		
	Private residential	213	56%
	Private commercial	213	56%
	Private industrial	99	26%
	Public health: government hospitals, clinics, etc.	30	8%
	Public works: government schools, libraries, infrastructure, etc.	27	7%
	Public human settlements: government low-cost housing	15	4%

4.2 Effect of claims

Table 4 indicates the severity of the recognised claim events under the JBCC Principal Building Agreement.

Table 4: Impact of claims

Impact of Claims										
JBCC PBA Clause	**Description**	**n**	**Mean**	**SD**	**Min.**	**Q1**	**Med.**	**Q3**	**Max.**	**Rank**
23.2.3	Contract instructions	380	3.13	1.33	1	2.00	3.0	4	5	1
23.2.12	Execution of additional work	380	3.10	1.36	1	2.00	3.0	4	5	2
23.1.1	Adverse weather	380	3.01	1.36	1	2.00	3.0	4	5	3
23.2.5	Late or incorrect issue of construction information	380	2.95	1.35	1	2.00	3.0	4	5	4
23.1.2	Inability to obtain materials and goods	380	2.92	1.33	1	2.00	3.0	4	5	5
23.3	Any cause beyond the contractor's reasonable control	380	2.89	1.37	1	2.00	3.0	4	5	6
23.2.13	Suspension of the works	380	2.88	1.43	1	2.00	3.0	4	5	7
23.2.1	Delayed possession of the site	380	2.73	1.39	1	2.00	2.0	4	5	8
23.2.7	Late appointment of a subcontractor	380	2.71	1.30	1	2.00	3.0	4	5	9
23.1.6	Force majeure	380	2.68	1.36	1	1.00	3.0	4	5	10
23.1.3	Making good physical loss and repairing damage to the works	380	2.61	1.22	1	2.00	2.5	4	5	11
23.2.8	Late acceptance by the principal agent and/or agents of a design undertaken by a selected subcontractor	380	2.61	1.33	1	1.00	2.0	4	5	12
23.1.4	Late supply of a prime cost amount item	380	2.59	1.22	1	2.00	2.0	4	5	13
23.2.11	Suspension or termination by a subcontractor due to a default by the employer, the principal agent and/or agents	380	2.58	1.37	1	1.00	2.0	4	5	14
23.2.6	Late supply of free issue materials and goods	380	2.57	1.33	1	1.00	2.0	4	5	15
23.2.9	Act or omission by a nominated subcontractor or a direct contractor	380	2.54	1.21	1	2.00	2.0	3	5	16
23.2.2	Making good physical loss and repairing damage to the works	380	2.54	1.25	1	1.00	2.0	3	5	17
23.2.10	Insolvency of a nominated subcontractor	380	2.52	1.38	1	1.00	2.0	4	5	18

23.2.4	Opening and testing of work and materials and goods	380	2.51	1.19	1	2.00	2.0	3	5	19
23.1.5	Exercise of statutory power	380	2.51	1.23	1	1.75	2.0	3	5	20

Note: SD = Standard deviation; Med. = Median

5. DISCUSSION OF THE FINDINGS

The respondents in this study were fairly divided, with 55% working as building contractors and 45% as professional consultants, including architects, construction project managers, and quantity surveyors (refer to Table 3). The respondents' level of knowledge was considered satisfactory, as 88% of them had work experience of 6 years or more in the construction industry. This aligns with the perspective of Olanrewaju and Anavhe (2014), who emphasised the importance of having a minimum of 5 years' work experience in construction before dealing with claims.

Table 3 illustrates that the respondents have diverse experience across various project types, although a significant portion of their work has been in the private sector. This can be attributed to the declining public sector expenditure on construction since 2016, which has led to the private sector emerging as the dominant investor in the South African construction industry, surpassing government and public entities (PWC, 2016; Ogbeifun et al., 2019; Watermeyer and Phillips, 2020; Olarewaju and Ibrahim, 2020; Stats SA, 2021; Mahlaka, 2022). The COVID-19 pandemic and subsequent national lockdown further exacerbated this imbalance by causing delays in the approval and implementation of public sector infrastructure projects (Arndt et al., 2020; National Treasury, 2021; Musonda and Rakolote, 2022; Chigara and Moyo, 2022). Additionally, contractors and consultants are increasingly hesitant to undertake public sector projects due to significant payment delays, with 60% of payments being overdue (Maritz and Robertson, 2012; CIDB, 2022).

According to Sullivan and Artino Jr. (2013), mean scores ranging from 2.5 to 3, which correspond to 50% to 60%, generally indicate moderate support for a cause. They also note that mean scores of 3 or higher, equivalent to 60% or more, suggest strong support for a cause. Regarding the importance of claims, three events were deemed significant in the present study as their mean scores exceeded 3. The remaining 17 events were considered ordinary since their mean scores ranged from 2.5 to 3. No event was considered insignificant, as none had a mean score of below 2.5. As a result, it can be concluded that 15% of the claim events are significant and 85% are ordinary in terms of their impact on project performance. The significant claim events will be further examined.

The most significant claim event identified was contract instructions (clause 23.2.3) (Mean = 3.13; SD = 1.33), which specifically addresses notifications related to contractual obligations, such as changes in specifications or when contract administrators fail to fulfil their contractual duties. However, it is important to note that this clause does not encompass alterations to the scope of work, which is addressed under clause 23.2.12 (execution of additional work) (Segal, 2018). This finding supports the studies conducted by Oyegoke and Al Kiyumi (2017), Assaf et al. (2019), Shaikh et al. (2019) and Guévremont and Hammad (2021) respectively, who similarly identified major changes in requirements and delayed responses from the owner's representatives as causes that result in major claims. It should further be emphasised that a contractor cannot make a claim if an instruction requires compliance with contractual obligations while the contractor is in default, such as subpar workmanship or failure to meet specifications (Iyer et al., 2008).

The second most significant claim event is the execution of additional work (clause 23.2.12) (Mean = 3.10; SD = 1.36). As mentioned earlier, this clause specifically covers contract instructions for the execution of additional work and encompasses two aspects: variations to the scope of work and instances where items in the bills of quantities (BOQ) are undermeasured (Segal, 2018). The JBCC Principal Building Agreement recognises that

contractors heavily rely on the BOQ to develop their construction program. Therefore, the agreement allows contractors to adjust their program when extra work is ordered or when items are found to be unmeasured, providing them with sufficient time to complete the additional work. Considering this, the emergence of claims is an unavoidable outcome when modifications occur in the scope of work, as these changes were not pre-emptively accounted for in the contract documentation (Apte and Pathak, 2016). However, as Le Roux (2014) and Prinsloo (2016) point out, sometimes claims in the South African building industry often lead to disputes due to employers either rejecting claims entirely or offering lesser amounts than what contractors believe they are entitled to.

The above findings support the studies conducted by Assaf and Al-Hejji (2006), Doloi et al. (2012), Das and Emuze (2018) and Elhag et al. (2020), which show that contract instructions for the execution of additional work, which was not initially included in the contract, have a significant impact on the time and cost performance of projects. Furthermore, the present study's finding is consistent with the conclusions drawn by Yousefi et al. (2016), Khabisi et al. (2016), Famiyeh et al. (2017), and Ansah and Sorooshian (2018), that contract instructions related to undermeasured quantities in the BOQ also have a severe impact on projects.

It is important to highlight that both the aforementioned claim events are associated with contract instructions, which affect projects by necessitating additional planning, coordination, resource allocation, and adjustments to project schedules and budgets (Gunduz and Elsherbeny, 2020; Reyneke and Simelane, 2022). Considering this, both events are also covered by clause 23.2 of the JBCC Principal Building Agreement, which means that they have implications for both time and cost. Consequently, these claim events naturally have a significant impact on project performance. The JBCC Principal Building Agreement, under subclause 17.5, is further clear in stating that a contract instruction must be provided in written form. There is a commonly raised question about whether an entry in the site instruction book or the minutes of a site meeting fulfils the requirement for a contract instruction to be in writing. However, it is not advisable for both the principal agent and contractor to consider such practices as satisfactory. It is important that a contract instruction is appropriately identified and dated, and that the contractor or an authorised site representative acknowledges its receipt by signing it (JBCC, 2019).

The third most significant claim event was found to be adverse weather (clause 23.1.1) (Mean = 3.01; SD = 1.36). The most common form of adverse weather is rain, and the JBCC Principal Building Agreement acknowledges that rain-related delays have a dual impact by recognising the resulting circumstances (Segal, 2018). Typically, rain prevents contractors from working during its occurrence and also leaves the construction site muddy and waterlogged, requiring work to halt until it dries out. Other examples of adverse weather conditions include strong winds, which affect work at elevated heights, and extremely cold weather, which hampers the handling and setting of concrete. This finding resonates with the deductions made by Motlhatlhedi and Nel (2019) and Karim and Amin (2021), that progress towards practical completion is severely impeded by the occurrence of unfavourable weather conditions.

6. CONCLUSION

The primary contribution of this study is to highlight the significant claim events within the JBCC Principal Building Agreement, as perceived by the main stakeholders, namely principal agents and contractors. The most prominent claim events in terms of severity, along with their corresponding contract clauses, were contract instructions (clause 23.2.3), execution of additional work (clause 23.2.12), and adverse weather conditions (clause 23.1.1). On the other hand, the least critical claim events were the exercise of statutory power (clause 23.1.5), opening and testing of work, materials, and goods (clause 23.2.4), and the insolvency of a

nominated subcontractor (clause 23.2.10). The claim events all impact negatively on the time and cost performance of projects, with varying levels of severity. The study concludes that while it is neither realistic nor feasible to prevent all claims, understanding the nature of claims could minimise their occurrences and/or plan for how to deal with the consequences of their severity better. In addition, this can also provide some lessons learnt for the benefit of contractual parties in future construction projects.

The study contributes to the theoretical understanding of construction claims by highlighting significant claim events within the JBCC Principal Building Agreement. This enhances the knowledge about the types of events that tend to lead to claims in construction projects. Moreover, the results of the study can directly impact the practical handling of claims under the JBCC Principal Building Agreement. By understanding the types of events that commonly lead to claims, stakeholders can be better prepared to address them effectively. By emphasising the importance of paying attention to the identified claim events to prevent or minimise future claims, the study has practical implications for project planning, risk management, and the development of strategies to mitigate potential issues.

Drawing from the findings of this study, the following recommendations are suggested to mitigate unwarranted claims with severe effects. To prevent or minimise changes requested by the employer during the project execution, it is advisable for employers to allocate additional time to the design stages. By thoroughly reviewing and fine-tuning the design before approving the detailed design, employers can ensure that they achieve the desired outcome and avoid the need for significant modifications later on. Further, recognising the absence of a flawless compilation of construction information, it is crucial for professional teams under the leadership of the principal consultant to diligently examine tender documents. This meticulous review aims to identify and rectify any errors or inaccuracies present in bills of quantities, drawings, specifications, and schedules.

At the beginning of a contract, it is further essential for the principal agent and contractor to affirm the procedure outlined in the contract for managing changes and variations, whereby mutual agreement should be reached regarding the requesting, issuing, and documenting of contract instructions. However, if changes become necessary, they should be handled promptly. Upon realising the need for a change request, it is important that the principal agent analyses its impact on time and cost, with the schedule and budget accordingly revised upon its approval. It is further advised that a contract instruction should be prepared in the office using a standard office template, which receives greater attention and scrutiny compared to one issued hastily at the site.

Lastly, principal agents should also conduct a comprehensive examination of contract programmes to prevent impractical schedules that cannot be feasibly accomplished. It is crucial to incorporate contingency plans for unfavourable weather conditions, including precipitation, wind speeds, humidity, and temperature, within the schedule. Historical weather data sources should be utilised to estimate the average number of workdays lost in the past due to adverse weather, assuming that similar weather patterns will recur in the future.

The paper ends with a note on the limitations of the present study. It must be noted that the study is limited to the JBCC Principal Building Agreement and does not consider other types of construction contracts, which restricts the generalizability of the findings to the building sector of the construction industry. The focus of the study on South Africa also limits the applicability of the study's findings to other countries, such as Botswana and Swaziland, which have their own unique contexts in terms of industry practices, regulations, and market conditions. The study also identifies critical claim events but does not delve into the quantification of their impact on project performance. This lack of impact assessment restricts a comprehensive understanding of how these claim events influence project outcomes, which could be important for project planning and risk management.

To build on the valuable insights provided by this study, a follow-up study should be conducted to quantify the impact of the claim events on project performance in terms of time and cost. In addition, further investigations could be carried out to examine the severity of claims under the JBCC Principal Building Agreement in other countries especially in the Southern African region. Another area for further research identified is an investigation into the claim events within the JBCC Principal Building Agreement that commonly give rise to disputes.

7. DATA AVAILABILITY STATEMENT

All data that support the findings of this study are available from the corresponding author upon reasonable request.

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9. DISCLOSURE OF INTEREST

Both the authors declare that they have no conflicts of interest.

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