

Comparative Performance of Alternative building technologies vs conventional in Reconstruction and Development Programme RDP Housing Construction

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Abstract

This study evaluates the suitability of alternative building technologies (ABTs) for the delivery of Reconstruction and Development Programme (RDP) housing in South Africa. The research responds to the persistent housing backlog, poor workmanship, recurring defects, and the labour-intensive nature of conventional brick-and-mortar construction. The aim was to determine which alternative construction method meets or exceeds conventional methods in terms of time, cost, and quality. A mixed-methods design was adopted, supported by literature review, questionnaires, interviews with contractors, regulators, end-user input, and observation through a site visit. The study examined three ABTs: Moladi Construction Technology, Hydraform Interlocking Brick Technology, and Sandbag Construction Technology. Findings show that all three alternatives offer relevant options to conventional methods, particularly through faster delivery, reduced dependence on highly skilled artisans, and potential improvements in sustainability and community participation. Among 23 contractor respondents, Sandbag Construction Technology was the most selected preferred ABT at 30%, while 17% selected Moladi and 17% selected Hydraform; however, the broader comparative assessment identified Moladi as the leading option overall in terms of time, cost, and quality. In addition, 39% of contractors indicated that end-user opinion is an important factor in deciding whether ABTs should be adopted. Responses from 8 end-users also suggest a generally positive attitude toward alternative methods when safety, performance, and access to housing are assured. The study concludes that ABTs, especially Moladi, can support faster, more cost-effective, and more sustainable RDP housing delivery in South Africa.

Keywords: Alternative building technologies, Moladi Construction Technology, Hydraform Interlocking Brick Technology, Sandbag, Affordable housing.

1. Introduction

Since the end of apartheid and the transition to democracy in 1994, the South African government has pursued the Reconstruction and Development Programme (RDP) as a key intervention for addressing the housing needs of previously disadvantaged communities. The programme was introduced to provide low-cost housing to families living in informal settlements and to improve their socio-economic conditions through access to basic services such as water and electricity, while also contributing to broader community upliftment (Greyling, 2010; Gabula, 2012; Amoah, 2019).

Despite the positive impact of the RDP housing programme over the past decades, its objectives have not been fully achieved. One of the major challenges has been the persistent housing backlog, which continues to affect a significant number of South Africans (Amoah, 2019). The backlog has been linked to several chronic impediments, including fraud, corruption, delays, absentee contractors, ghost houses, and poor workmanship, all of which undermine the effective delivery of housing (Manomano, 2018).

A central concern within the RDP housing programme is the poor quality of many completed houses. Defects in low-cost housing have resulted in substantial additional expenditure by government on rectification works (Buys and le Roux, 2013). More broadly, in the first 15 years of the programme, government spent R836.9 million to rectify 131,000 defective homes, while more than 5,000 defective houses were repaired during the 2010/2011 infrastructure boom at a cost of R971.1 million (Amoah, 2020). These defects are often associated with poor-quality workmanship, inadequate contractor selection, and weak quality inspection processes.

The current construction method used for RDP housing relies on conventional materials such as concrete, brick, mortar, and wood (Windapo, 2021). While widely used, this method is labour intensive and depends heavily on skilled artisans, who are in limited supply in South Africa (Windapo, 2021). As a result, conventional construction has contributed to inefficiencies in delivery and has not sufficiently incorporated sustainable building technologies. For an RDP house to be fit for habitation, it must satisfy criteria such as structural stability, effective drainage, lack of

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dampness, adequate piped water supply, and sufficient heating, lighting, and ventilation; failure to meet these standards renders the house defective (Buys and le Roux, 2013).

Given these challenges, there is a strong case for considering alternative building technologies in the delivery of RDP housing. To improve sustainability and cost effectiveness, alternative methods should be assessed against the conventional approach using time, cost, and quality as key performance criteria. Among the alternatives identified are Moladi housing technology, Hydraform interlocking bricks, and sandbag building technology. These methods present possible solutions to the ongoing challenges of backlog, cost, and quality in South Africa's low-cost housing sector.

2. Literature Review

The conventional brick/block-and-mortar method is identified as the dominant form of RDP house construction in South Africa. This system relies on strip footings, brick or block masonry, mortar joints, timber roof trusses and conventional plastered finishes, and is widely used because it is familiar within the industry (Mabuya and Scholes 2000; Janek 2013; Ryan 2022). Yet this method is labour intensive, highly dependent on skilled artisans and not well aligned with the realities of many RDP projects, where contractors are often required to draw labour from local communities with limited prior training (Windapo, 2021; Manomano and Tanga 2018). Typical RDP houses range from 36 m² to 45 m², and province-level cost figures indicate a rough construction cost of about R4 000–R5 000 per square metre, excluding land and some services (Tshangana 2018).

The weaknesses of the conventional method are a central concern. Five broad defect categories are identified: design of the houses, materials used, construction of the houses, maintenance of the houses, and limited beneficiary involvement (Buys and Le Roux, 2013). These problems do not operate independently; rather, they overlap and compound one another. The scale of the problem is demonstrated by expenditure on rectifying badly built houses between 2011/2012 and 2013/2014, with a total of R2.129 billion spent on fixing 341 625 units (Bailey 2017). In design terms, many RDP houses are criticised for poor orientation, insufficient weather protection, a lack of gutters, and in some cases the absence of ceilings, all of which undermine thermal comfort and increase exposure to environmental damage (Manomano, 2013; Ratshitanga 2017; van der Watt 2022). Material choices also contribute to poor performance. Hollow blocks are associated with damp penetration and mould in wet climates, while light metal door and window frames are prone to distortion and poor sealing. Construction problems extend beyond physical defects to

management issues, contractor selection and weak training of local labour, which together reduce workmanship quality and shorten the effective life of houses that should otherwise last much longer (Buys and Le Roux 2013; Manomano and Tanga 2018; van der Watt 2022). The literature further notes that limited maintenance support and low beneficiary participation weaken both long-term performance and community satisfaction (Gabula 2012; Windapo and Goulding 2013; Amoah, Kajimo-Shakantu et al. 2022).

Against this background, the literature turns to alternative building technologies (ABTs) as potential means of improving RDP housing delivery. Three technologies are prioritised including Moladi Construction Technology, Sandbag Construction Technology and Hydraform Interlocking Building Technology. These are selected because the literature suggests that they offer advantages in time, cost, quality, sustainability and opportunities for community engagement. Moladi is described as a South African technology based on reusable lightweight plastic formwork that is assembled on a raft foundation and filled with a specially modified mortar to cast the wall structure in situ (moladi 2022). The system is notable for repeat use of formwork, limited waste and the possibility of constructing the superstructure within a single day once the mould is assembled and filled. Sandbag technology uses eco-beams and stacked geofabric sandbags filled with sand, including excavated material from site where suitable, then finished with mesh and plaster or similar cladding. Its simplicity, thermal and acoustic properties, low waste and reduced need for highly skilled labour make it ideal (Kracht 2009; EcoSteps 2022; Windapo, Jarratt et al. 2022). Hydraform technology, by contrast, uses interlocking soil-cement blocks that are dry stacked and self-aligning, which reduces mortar use and simplifies wall construction (Uzoegbo and Ngowi 2003; Deepak 2011).

The important performance advantages to these ABTs. In relation to time, Moladi is presented as the fastest system because the walling structure can be completed through a fit-fill-strip process that takes roughly 12 hours in total for a 45 m² unit, excluding foundation curing time (Moladi 2022). Sandbag construction is also considered faster than conventional masonry because it avoids mortar-setting constraints and can proceed by stacking and plastering once bags are prepared (Strydom 2022). Hydraform blocks similarly reduce construction time because they are dry stacked and not limited by mortar drying; reported labour output is 7.05 m² per hour compared with 3.30 m² per hour for conventional concrete block construction, suggesting a 54% higher output (Aligamhe, Kaseem et al. 2020). Cost comparisons are more uneven, but sandbag construction is reported at approximately R3 500/m², below the conventional R4 000–R5 000/m² range (Strydom 2022; Tshangana 2018). For Moladi

and Hydraform, yet both systems are described as offering savings through lower skilled-labour requirements, reduced waste, reusable or locally sourced materials, and lower transport needs (Deepak 2011; moladi 2022).

In terms of quality and standards, it was acknowledged that the conventional construction benefits from established SANS guidance, notably SANS 10400 and SANS 10500 (Janek 2013), whereas the ABTs do not always have equivalent compliance standards framed in the same way. Even so, important approval pathways and quality assurances are already underway. Moladi's modified mortar and reusable formwork are presented as compliant through SABS-related approval and NHBRC acceptance, while sandbag and Hydraform technologies are associated with NHBRC and Agrément South Africa approval for use in housing contexts. Regarding sustainability advantage, Moladi reduces waste through reusable formwork; sandbag and Hydraform reuse site-derived materials and reduce reliance on conventional high-input materials; and all three systems potentially reduce long-term maintenance burdens compared with poorly executed conventional houses. Finally, community engagement is presented as a significant comparative advantage of ABTs. Because they are simpler to teach and less dependent on highly skilled artisans, Moladi, sandbag and Hydraform systems create greater scope for the involvement of local labour and skills development than conventional construction, which tends to concentrate power and technical knowledge in contractors and officials (Adediji and Fa 2012; Sekoboto and Landman 2019).

The comparative synthesis presented in Table 1 draws these findings together by evaluating ABTs against conventional construction across six indicators: construction process, time, cost, quality/applicable standards, sustainability and community engagement. Overall, the literature review establishes a strong basis for investigating whether ABTs can meet or exceed conventional performance requirements in RDP housing delivery, particularly where backlog reduction, quality improvement and broader developmental value are central concerns.

3. Methodology

This study adopted a mixed-methods design within a positivist research paradigm to evaluate whether selected alternative building technologies could meet or exceed the performance of conventional construction methods used in Reconstruction and Development Programme (RDP) housing in South Africa.

The study population comprised three stakeholder groups directly linked to RDP housing delivery and use, including contractors, regulators, and end-users. Contractors were purposefully selected because of their industry experience and practical knowledge of working with the South African government in RDP housing delivery. Regulators were included to explore possible resistance to the implementation of alternative building technologies within the RDP housing sector. Finally, End-users captured the social acceptance of alternative methods without shifting attention away from the central focus on time, cost, and quality. The final sample consisted of 23 contractors, 11 government respondents, and 8 end-users.

Data were collected using instruments including questionnaires, interviews, and a site visit observation. questionnaires were developed on Google Forms, each tailored to a specific respondent group. The online format allowed the questionnaires to be emailed and forwarded, thereby increasing circulation and the potential number of responses. Contractors and regulators received the questionnaire links by email, while end-users in Khayelitsha were engaged in person because email access was not considered a viable means of obtaining sufficient responses. Their answers were recorded directly on the Google Form, and assistance with translation was provided where language barriers existed. The end-user questionnaire focused on acceptance of alternative construction methods.

Data analysis was descriptive and comparative (Bhatia 2018). Responses from the three respondent groups formed the data pool for analysis. Qualitative data were analysed using content analysis to identify recurring themes and patterns (Williams 2007). Results were

Table 1: Comparison between the performance of ABTs with conventional construction

Performance Indicators	Moladi	Sandbag	Hydraform	Conventional Technology
Construction Process	Insitu-based	Insitu-based	Insitu-based	Insitu-based
Time	2 m ³ of concrete/hr	8 m ² /hr	7.05 m ² /hr	3.30 m ² /hr
Cost	-	R3500/m ²	-	R4000–5000
Quality – Applicable Standards	No compliance standard; Agrément South Africa approved; Approved by NHBRC; Styrofoam formwork SABS approved	No compliance standard; Approved by NHBRC	No compliance standard; Approved by NHBRC; Machinery SABS approved	SANS 10500; SANS 10400
Sustainability	Formwork reusable (50 times); low maintenance	Reuse of site soil; sandbags made from recycled material	Reuse of site soil; limited use of cement; low maintenance	High maintenance
Community Engagement	High (unskilled workforce)	High (unskilled workforce)	High (unskilled workforce)	Low (skilled workforce)

presented in both textual and diagrammatic form, including pie charts, bar graphs, and frequency diagrams. This analytical approach supported the comparison of the three alternative technologies with conventional RDP housing construction.

The study's reliability and validity was achieved through the use content and face validity (Mohajan, 2017). Ethical considerations included informed consent, privacy and confidentiality, and ethical clearance obtained from the University of Cape Town's Research Ethics Committee.

4. Results

4.1. Current construction methods

The results show that conventional methods dominate RDP housing construction, with 15 contractors using the standard block-and-mortar method and 3 contractors using the standard brick-and-mortar method. In contrast, alternative methods remain limited, with only 1 contractor reporting the use of Moladi and 1 contractor each reporting sandbags and Ecobeams, Sandbag, and Sandbag Construction. The detailed breakdown is presented in Table 2.

4.2. Drawbacks of current methods

The results show that the main drawbacks of current RDP construction methods relate to time and long-term

quality. As shown in Table 3, 8 contractors identified time constraints as the main disadvantage, while 5 reported long-term quality deficiencies. Other concerns included under-allocation of resources, identified by 3 contractors, as well as unskilled labour, worker training requirements, and corner cutting, each identified by 1 contractor.

4.3. Willingness to adopt alternative building technologies

Contractor willingness to adopt alternative technologies was mixed but not strongly negative. Of the 23 contractors, 9 respondents (39.1%) indicated that they would still participate in RDP projects if ABTs were required, 8 respondents (34.8%) selected "maybe," and 6 respondents (26.1%) selected "no." These results suggest that most contractors were either willing or potentially willing to participate, although a sizeable minority remained resistant.

4.4. Familiarity with alternative building technologies

Figure 1 shows that contractors had some awareness of alternative building technologies, although familiarity varied by method. Sandbag technology was the most recognised option, with 5 respondents familiar with sandbag only, while 3 respondents were familiar with Moladi only and 2 respondents with Hydraform only.

Table 2: Construction methods used in RDP housing projects

Construction method used in RDP housing projects	No. of responses
Standard block and mortar method	15
Standard brick and mortar method	3
Sandbags and Ecobeams	1
Sandbag	1
Sandbag Construction	1
Moladi	1
Not involved in the construction of RDP housing	1
Total	23

Table 3: Drawbacks/downfalls experienced by contractors using current methods in RDP projects

Disadvantages of the building technology	No. of responses
Time constraints	8
Quality deficiency in the long term	5
Under-allocation of resources	3
No drawbacks/downfalls	2
Other: Unskilled labour force	1
Other: Training of workers	1
Other: Corner cutting	1
Other: Planning of fill and quantities	1
Quality deficiency in the short term	0

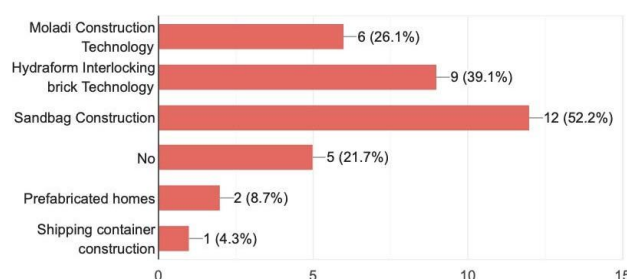


Figure 1: Bar Chart Showing the ABT's with which contractors have experience

However, 5 respondents had no prior familiarity with any of the technologies, suggesting that awareness of ABTs exists but remains uneven among contractors.

4.4.1. Comparative performance of alternative building technologies

Table 4 shows that all three ABTs were perceived positively when compared with standard technologies. Moladi recorded the highest total score (18), followed closely by sandbag and Hydraform, each with a score of 17. Moladi was rated better in terms of time by 7 respondents, cost by 5 respondents, and quality by 6 respondents, with no negative ratings for time or cost. This suggests that Moladi emerged as the strongest overall alternative when time, cost, and quality were considered together.

4.5. Implementation concerns, standards, and economic implications

Contractor concerns about ABT implementation

Contractors' main concerns were practical rather than cost related. As shown in Table 5, quality assurance was the most frequently reported concern, identified by 12 respondents. This was followed by possible initial delays in project completion, identified by 10 respondents, the effort required to train workers, identified by 9 respondents, and the unavailability of resources, identified by 8 respondents. Only 3 respondents considered ABTs too expensive. Regarding compliance with National Building Regulations, 11 respondents (47.8%) believed that ABTs could meet the requirements, 10 respondents (43.5%) were uncertain, and 2 respondents (8.7%) did not believe that they would. Overall, contractor hesitation was mainly associated with quality control,

transition challenges, training and resource availability rather than outright rejection of ABTs.

The responses concerning National Building Regulations indicate that contractors were not strongly opposed to the possibility that ABTs could satisfy requirements for strength, stability, serviceability and durability. Nearly half of the respondents believed that ABTs could meet the requirements, while a similar proportion remained uncertain. Only a small minority expressed a negative view. This pattern suggests conditional acceptance, with confidence likely depending on clearer evidence of testing, approval and quality assurance.

Economic benefits of ABTs

The perceived economic benefits of ABTs were mixed. 11 respondents indicated that ABTs offered no benefits, while another 11 respondents identified shortened project completion time as a benefit. In addition, 7 respondents believed that ABTs could improve structural quality, while 4 respondents identified lower cost implications. These results show that although some contractors were unconvinced, others recognised potential benefits, especially in relation to time savings and quality improvement.

4.6. End-user influence and contractor preference

Contractors were divided on whether end-user opinion should influence the choice between traditional and alternative methods. Nine respondents (39.1%) answered "yes," 8 respondents (34.8%) answered "no," and 6 respondents (26.1%) selected "maybe." The written responses in Table 6 show a similar division: 10

Table 4: Comparative assessment of ABTs in terms of time, cost and quality

Alternative Building Technology	Better in terms of time	Better in terms of cost	Better in terms of quality	Worse in terms of cost	Worse in terms of time	Worse in terms of quality	Total score
Moladi	7	5	6	0	0	N/A	18
Sandbag	9	5	6	-2	-1	N/A	17
Hydraform	8	4	6	-1	0	N/A	17

Table 5: Contractor concerns with the implementation of ABTs

Concerns with implementation	No. of responses	%
Inability of quality assurance	12	52%
New methods would have a negative effect on project completion time initially	10	44%
Too much effort to train workforce	9	39%
Unavailability of resources	8	35%
Other	7	30%
Too expensive	3	13%

Table 6: Table showing whether end-users opinion on the finished produce would be a large contributing factor

Contractor view on end-user opinion	No. of responses
End-user opinion should be considered	10
End-user opinion should not be considered	7

of the 17 respondents who provided qualitative answers believed that end-user opinion should be considered, while 7 believed that it should not. This suggests that ABT adoption is not only a technical issue but also depends on how contractors view beneficiary involvement.

Figure 2 shows that contractors' preferences were divided across the three ABTs. Sandbag was the most selected option, with 7 respondents, followed by Moladi and Hydraform with 4 respondents each. However, 8 respondents selected none of the listed alternatives. This suggests that although sandbag was the most preferred ABT, contractor preference did not fully match the performance comparison, where Moladi scored highest overall.

4.7. End-user Results

Figure 3 shows that end-users were generally open to alternative construction methods. The eight end-users surveyed in Khayelitsha expressed acceptance of ABTs, especially where the house would be safe, available, and better performing than existing RDP

houses. Some responses linked ABTs to improved safety, reduced moisture and cracking problems, and shorter waiting times for housing. This suggests that end-users were not resistant to ABTs and, in some cases, viewed them as potentially better than conventional RDP housing.

4.8. Regualtors Results

Regulator respondents viewed SABS approval as a possible barrier to ABT implementation. Of the 11 respondents, 5 (45.5%) answered "yes," 5 (45.5%) answered "maybe," and only 1 (9.1%) answered "no." This suggests that most regulators either recognised or suspected that certification requirements could affect the adoption of ABTs. Content analysis further showed that 6 of the 8 respondents who explained their views linked SABS approval to testing, while 2 were uncertain about the process. Testing was therefore seen as the main route to approval, although uncertainty remained about the exact procedure. Figure 4 shows that regularors hesitation toward ABTs was linked to several factors, including resource availability, possible end-user resistance, initial delays, cost, and concerns

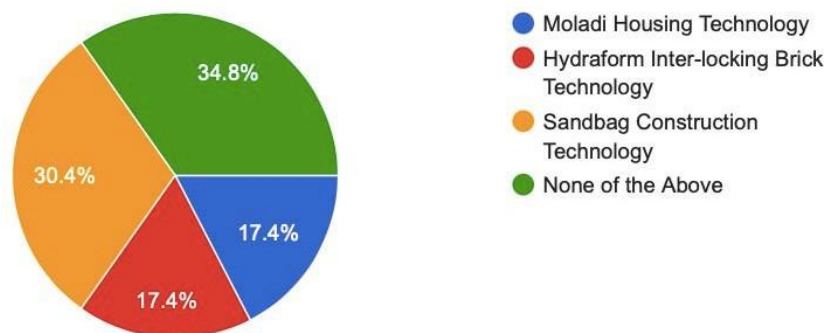


Figure 2: Pie chart showing the preference of contractors between ABT's

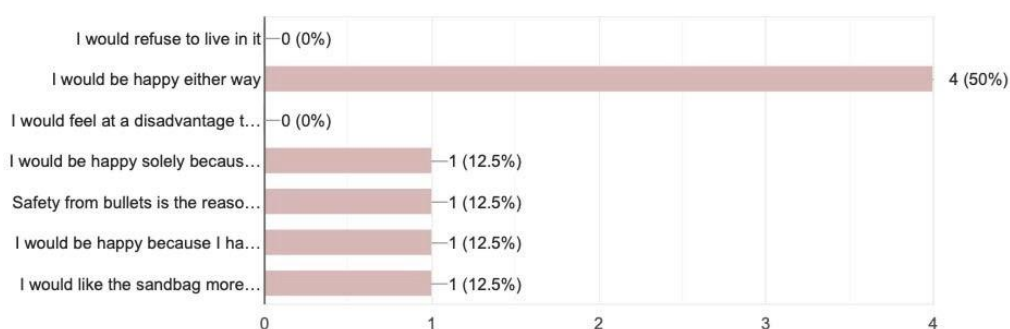


Figure 3: Bar chart showing whether end-users are concerned with the method of construction of their RDP home

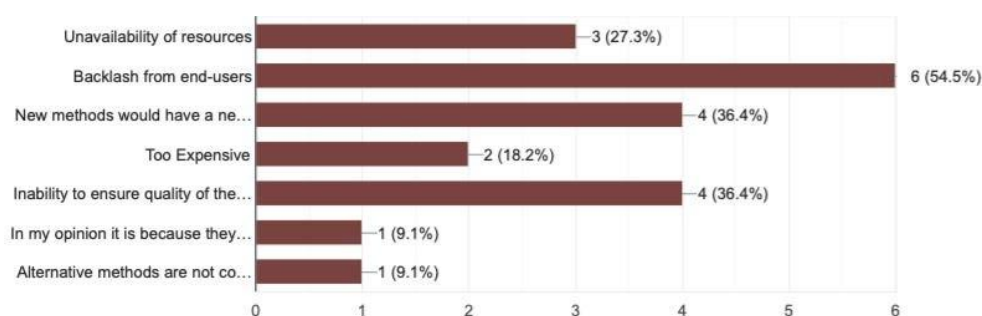


Figure 4: Bar chart showing why the SA government has been avoiding the use of ABT's in RDP projects

about structural quality. The written comments also suggest that ABTs are not yet well known or commonly used in South Africa. Overall, the results indicate that regulators' reluctance is mainly shaped by limited familiarity, institutional caution, and quality assurance concerns rather than complete rejection of alternative methods. The Khayelitsha site visit further supported this finding. Although the sandbag dwelling was reported to be more expensive per square metre than a comparable double-storey traditional RDP house, it showed advantages in community involvement, sustainability, and perceived wall strength. Overall, the results suggest that all three ABTs have potential, with Moladi performing strongest on time, cost, and quality, while sandbag remained attractive because of its social and practical benefits.

5. Discussion

The findings show that ABT performance in RDP housing depends on more than technical efficiency alone. It is shaped by the interaction between construction performance, contractor confidence, regulatory approval, and end-user acceptance. This supports the literature, which shows that RDP housing problems are linked to workmanship, materials, maintenance, beneficiary involvement, and delivery management (Buys and Le Roux, 2013; Manomano, 2013; Ratshitanga, 2017). Within the study's time-cost-quality framework, Moladi emerged as the strongest overall alternative. Recent studies described Moladi as a system that uses reusable plastic formwork, simplified wall construction, and rapid production, thereby reducing labour intensity and potential workmanship errors (Moladi, 2022; Manomano and Tanga, 2018; van der Watt, 2022). It is certainly based on these characteristics that respondents found it to be more beneficial than other alternative.

However, the findings also show that the highest-performing technology is not always the most preferred by contractors. Although Moladi ranked highest in the comparative assessment, Sandbag construction was the most preferred named ABT. This suggests that contractor preference may also be influenced by familiarity, perceived simplicity, sustainability, and community participation. Literature supports this interpretation by presenting Sandbag construction as a relatively simple method using eco-beams, geo-fabric bags, and locally available sand, while also offering benefits such as material reuse, sound insulation, fire resistance, and weather resistance (Strydom, 2022; EcoSteps, 2022; Kracht, 2009).

Conventional brick/block-and-mortar construction is labour intensive and dependent on skilled artisans, while poor workmanship contributes to defects and costly rectification works (Windapo, 2021; Buys and Le Roux, 2013; Amoah, 2020). The mentioned facts corroborate with the findings of this investigation,

showing that conventional RDP delivery remains constrained by slow construction, scarce skilled labour, resource limitations, and long-term quality problems. Observed contractor concerns about ABTs were therefore not mainly based on rejection of innovation, but on uncertainty about quality assurance, training, certification, and implementation risk. Regulators' concerns about SABS approval reinforce this point, suggesting that regulatory clarity remains central to ABT adoption.

Finally, the end-user and site-visit findings show that ABTs must also be assessed through social acceptance and community value. Although contractors were divided on whether end-user opinion should influence construction-method selection, end-users were generally receptive to alternative methods when linked to safety, strength, reduced cracking, and shorter waiting times. Beneficiary involvement and satisfaction are important in RDP housing performance, especially because end-users value physical, functional, maintenance, and sustainability outcomes (Windapo and Goulding, 2013; Juta, Moeti *et al.*, 2014; Kakaza, 2009). Overall, Moladi offers the strongest option under the time-cost-quality criteria, while Sandbag and Hydraform remain important because they address sustainability, community participation, and practical implementation concerns.

6. Conclusion

This paper examined the potential of alternative building technologies to improve South African RDP housing delivery by comparing Moladi Construction Technology, Sandbag Construction Technology, and Hydraform Interlocking Brick Technology with conventional brick/block-and-mortar construction. The comparison was based on time, cost, quality, standards, sustainability, and community engagement. The findings show that conventional RDP delivery continues to face challenges related to slow production, dependence on scarce skilled labour, and quality defects. They also show that contractors are not entirely resistant to alternative methods, although concerns remain regarding quality assurance, training, and implementation risk.

The paper concludes that Moladi offers the strongest overall alternative when assessed against time, cost, and quality. Its value lies in simplifying wall construction, reducing workmanship-related errors, accelerating delivery, and supporting repeatable production for mass housing. However, Sandbag and Hydraform also remain relevant, particularly in relation to sustainability, material reuse, and community participation. Overall, the study concludes that ABTs should be assessed through an integrated time-cost-quality and implementation lens, with Moladi offering the clearest pathway for more efficient low-cost housing delivery.

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Reference

- Adedeji, Y.M.D. and Fa, G. (2012) Sustainable housing provision: preference for the use of interlocking masonry in housing delivery in Nigeria. *Architecture Research*, 2(5), 81–86.
- Aligamhe, V.I., Kaseem, A.M. and Dania, S.F. (2020) Comparative Cost Analysis Between Hydraform Interlocking Brick and Sandcrete Block as Walling Materials for Low-Cost Housing Development in Nigeria. *Methodology*, 11(22).
- Amoah, C., Kajimo-Shakantu, K. and Van Shalkwyk, T. (2019) The level of participation of the end-users in the construction of the RDP houses: the case study of Manguang municipality. *International Journal of Construction Management*, 1–12.
- Amoah, C., Kajimo-Shakantu, K. and Van Shalkwyk, T. (2022) The level of participation of the end-users in the construction of the RDP houses: the case study of Manguang municipality. *International Journal of Construction Management*, 22(5), 949–960.
- Amoah, C., Van Schalkwyk, T. and Kajimo-Shakantu, K. (2021) Quality management of RDP housing construction: myth or reality? *Journal of Engineering, Design and Technology*.
- Bailey, S. (2017) RDP housing: Success or failure. In: *Southern African Catholic Bishops' Conference*, 1–5.
- Bhatia, M. (2018) Your Guide to Qualitative and Quantitative Data Analysis Methods [Online]. Available: <https://humansofdata.atlan.com/2018/09/qualitative-quantitative-data-analysis-methods/>
- Deepak, B. (2011) Masonry from stabilized earth blocks: Sustainable and structurally viable option. *Journal of Earth Sciences and Engineering*, 772.
- EcoSteps (2022) EcoSteps Sandbag Building [Online]. Available: <https://www.techxlab.org/solutions/ecosteps-sandbag-building>
- Gabula, Z.H. (2012) *Factors influencing the construction project success rates of Reconstruction Development Programme (RDP) housing projects in the Eastern Cape: a quality perspective: a census study*.
- Janek (2013) Concrete Foundation. *SANS 10400 National Building Regulations* [Online]. Available: <https://www.sans10400.co.za/concrete-foundations/>
- Juta, L., Moeti, K. et al. (2014) Community participation in South Africa: an assessment of the N2 gateway housing project in Langa/Joe Slovo Township. *Journal of Public Administration*, 49(4), 1113–1125.
- Kakaza, L. (2009) *An evaluation of selected steps to achieve successful community development projects with specific reference to crime and housing in Langa Township within Cape Town*. Cape Peninsula University of Technology.
- Kracht, S. (2009) *The Sandbag House*, 19.
- Mabuya, B. and Scholes, M. (2000) The three little houses: A comparative study of indoor and ambient temperatures in three low-cost housing types in Gauteng and Mpumalanga, South Africa. *International Journal of Environmental Research and Public Health*, 17(10), 3524.
- Manomano, T. (2013) *The perceptions of the Reconstruction and Development Programme (RDP) Housing beneficiaries in South Africa on the extent to which the project meet their housing needs: The case of Golf Course Estate in Alice Town, Eastern Cape Province*. University of Fort Hare.
- Manomano, T. and Tanga, P.T. (2018) Housing needs: the quality and quantity of housing provided by the government for the poor in the Eastern Cape Province in South Africa. *Social Work*, 54(1), 19–36.

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- Mohajan, H. (2017) Two criteria for good measurements in research: Validity and reliability. *Annals of Spiru Haret University Economics Series*, 4.
- Moladi (2022) moladi: About [Online]. Available: <https://www.moladi.co.za>
- Oyebisi, S., Ede, A. et al. (2021) Assessing the low-cost buildings in Nigeria using Hydraform blocks as walling materials: the journey so far. *IOP Conference Series: Materials Science and Engineering*. IOP Publishing.
- Ratshitanga, T. (2017) South Africa's public housing challenges. *Journal of Public Administration*, 52(1), 64–73.
- Ryan, M. (2022) How To Install Roof Trusses [Online]. Available: <https://www.roofcalc.com/how-to-install-roof-trusses/>
- Sekoboto, L. and Landman, K. (2019) Searching for more than just a house? The extent to which government provided RDP housing compared to self-help housing empower poor communities in South Africa. *Urban Forum*. Springer.
- Strydom, A. (2022) Sandbag Construction Building with Nature... [Online]. Available: <https://www.ecobuilders.co.za/sandbag-construction/frequently-asked-questions.php>
- Tshangana, M. (2018) *National Council of Provinces Question for Written Reply*. Minister for Human Settlements.
- Uzoegbo, H. and Ngowi, J. (2003) Structural behaviour of dry-stack interlocking block walling systems subject to in-plane loading. *Concrete Beton*, 103(4), 9–13.
- Williams, C. (2007) Research methods. *Journal of Business & Economics Research*, 5(3).
- Windapo, A., Jarratt, D. et al. (2022) Assessing the Structural properties of the Sandbag wall for alternative housing construction. *EPiC Series in Built Environment*, 3, 795–803.
- Windapo, A. et al. (2021) Use and performance of conventional and sustainable building technologies in low-income housing. *Sustainable Cities and Society*, 65, 102606.
- Windapo, A.O. and Goulding, J. (2013) Value-based perspectives of stakeholders' building requirements in low cost and government subsidised housing projects in South Africa. *Construction Innovation*, 13(4), 424–444.
- Žukauskas, P. et al. (2018) Philosophy and paradigm of scientific research. *Management Culture and Corporate Social Responsibility*, 121.