Subject: Market Usage Analysis Report for Q3

CONTROL SHEET FOR APPROVAL

Prepared for submission: Research and Development Specialist: R&D Specialist

(The Preparer agrees to the content of the submission made)

Preparer	Role	Signed	Submission Date
Anela Magwaza	R&D Specialist		28/11/2024

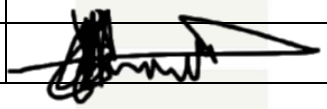
Recommended: Technical Group Leader: Research and Development (TGL: R&D)

(By signing below, TGL: R&D approves the content of the submission made.)

Approver	Role	Signed	Date
Dominique Geszler	TGL: R&D		28/11/2024

Recommended: Executive Committee (ExCo)

(By signing below, ExCo recommends the content of the submission made to TeCo for approval)

Recommender	Role	Signed	Approval Date
ExCo	CEO: Agrément South Africa		04/12/2024

Approval: Technical Committee (TeCo)

(By signing below, TeCo note and approve the content of the submission made for approval)

Approver	Role	Signed	Approval Date
Technical Committee	Chairperson:		

Approval: Industry Advisory Committee (IAC)

(By signing below, IAC note and approve the content of the submission made for approval)

Approver	Role	Signed	Approval Date
Industry Advisory Committee	Chairperson:		

Ratification: Board

(By signing below, the Board ratifies the content of the submission made)

Ratification	Role	Signed	Approval Date
Board of Agrément South Africa	Chairperson: Board of Agrément		

Name of meeting	: Technical Committee (TeCo) Meeting
Addressed to	: Agrément South Africa TeCo
Date	: 11/12/2024
From	: Research & Development Department

1. Purpose:

This submission seeks EXCO's approval for the Q3 Market Usage Analysis Report.

2. Background:

As enacted by the Agrément South Africa Act no. 11 of 2015, Agrément South Africa (ASA) must encourage the research and development of non-standardised construction-related products or systems. The organisation provides an enabling environment to pursue applied research, assess the impact of certified products, collaborate with other organisations in the built environment, promote the green building policy, and train small, medium, and microenterprises.

3. Deliberation:

The Market Usage Analysis Report aims to investigate how well ASA-certified building systems and products perform in real-world conditions beyond the controlled testing environments at the post-certification stage. The primary objective is to undertake performance in-use assessments focusing on the systems or products' technical performance, user experience and satisfaction, long-term performance and maintenance, and evaluate the economic impact. ASA conducts regular validity reviews to evaluate the performance of certified innovative systems or products during their implementation stage. These investigations are essential for assessing the quality of performance in real-world usage. The findings from these evaluations help to determine how well innovative systems and products are performing in the market, which, in turn, supports quality assurance efforts and identifies whether the certificate holder needs to reassess any aspects of their certification.

4. Financial Implications:

ASA will implement effective internal controls to mitigate identified financial risks within the Technical Services, Finance and Supply Chain Management Departments.

5. Operational Implications:

As an APP target, this report directly impacts the Technical Services Department's operational activities in conducting research and analysis and implementing measures to mitigate the risks identified in the report's outcomes.

6. Legal Implications:

Depending on the report's outcome, a certificate holder may need to follow review processes to prevent market and legal failures.

7. Recommendation:

It is recommended that EXCO approves the Market Usage Analysis Report for Q3.

End of Submission.

2024/2025 Quarter 3

Market Usage Analysis Report

The Technical Committee (TeCo) of Agrément South Africa

Assessing the Technical Efficacy of Innovative Building Systems and Products with Input from Relevant Stakeholders

Prepared by: Anela Magwaza

Department: Research and Development

Reviewed by: TGL: Research and Development

Date: 28 November 2024

Revision: 00

Executive Summary

Agrément South Africa (ASA) is mandated to assess innovative construction materials, products and systems where no South African National Standards are available. Part of fulfilling the organisation's mandate is facilitating the safe introduction of innovative technologies in the construction sector. This is done by assessing a product or system against performance criteria to determine its fitness for purpose. The Research and Development department undertook a market usage analysis for Agrément certified products and systems by conducting performance assessments focusing on technical aspects, ensuring the health, safety, and environmental compliance of the systems or products, as evaluated by consultants and end-users. The main aim is to investigate how well ASA-certified building systems and products perform in real-world conditions beyond the controlled testing environments at the post-certification stage.

The study used a qualitative research approach, using interviews to collect the necessary data to address the main objective. The data gathering technique utilised for the study was semi-structured interviews conducted telephonically and recorded. The sample comprised six (6) participants: two contractors, a foreman, an electrician and two end-users. The study results from the perspective of the interviewed industry professionals and end-users indicate general satisfaction with the technical performance, reliability, and ease of use of the sampled products and system. The participants expressed that both the product and system perform their intended primary function, and they are of the view that they will continue to perform for an extended period of time and achieve their expected life span.

Therefore, the study's results show that the sampled ASA-certified systems and products have performed their intended function in real-world applications (post-certification stage).

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1. Introduction

Agrément South Africa (ASA) is mandated to assess innovative construction systems, products and materials where no South African National Standards are available. Part of fulfilling the organisation's mandate is facilitating the safe introduction of innovative technologies in the construction sector. In this regard, Agrément South Africa issues a certification of innovative technologies after determining if a material, product or system is fit for purpose by assessing the material, product or system against performance criteria, which includes a quality management system. These systems' successful adoption and continued use depend on end-user satisfaction and professional endorsement as each group has unique needs and priorities. Therefore, ASA has conducted a study to evaluate these system's technical performance and quality assurance in real-world applications (post-certification stage) from the perspective of industry professionals and end-users. Technical performance will include those criteria for certification, such as structural stability, durability, fire resistance, water penetration, energy efficiency, thermal performance, condensation, acoustics, and quality assurance. Quality assurance criteria will also include product quality, workmanship and maintenance.

ASA conducts regular validity reviews to evaluate the performance of certified innovative systems or products during their implementation stage. These investigations are essential for assessing the quality of performance in real-world usage. The findings from these evaluations help to determine how well innovative systems and products are performing in the market, which, in turn, supports quality assurance efforts and identifies whether the certificate holder needs to reassess any aspects of their certification. Currently, there is insufficient data regarding the performance of certificate holders' products and systems during the implementation stage, highlighting the need to collect such data. Innovative building systems and products, such as walling systems, construction materials, civil engineering solutions, and software applications, require a thorough understanding of their technical quality and performance, including aspects such as workmanship and maintenance. This understanding will provide valuable insights for Agrément South Africa's Quality Assurance processes and support informed decision-making to promote sustainable and inclusive development within the building sector. Additionally, it will facilitate the effective adoption of innovative building technologies in both urban and rural settings across South Africa.

The main aim is to investigate how well ASA-certified building systems and products perform in real-world conditions beyond the controlled testing environments at the post-certification stage. The primary objective is to undertake performance in-use assessments focusing on the systems or products' technical performance, user experience and satisfaction, long-term performance and maintenance, and evaluate the economic impact. Therefore, the study addresses the following main research question: How do innovative building systems and products perform in real-world applications according to Agrément SA's performance criteria for certification from the perspective of the involved consultants and end-users?

2. Approach and Methodology

This section includes the research design, data collection method, sample selection, and data analysis method.

2.1 Research Design and Data Collection Method

The analysis utilised a qualitative research approach, using interviews to collect the necessary data to address the main objective. The data gathering technique utilised for the study is semi-structured interviews. Semi-structured interviews primarily rely on open-ended questions, encouraging participants to explore their thoughts and ideas in detail, articulate their opinions on the topic from a personal viewpoint, share their experiences, and use their own words (Karatsareas, 2022). The interview explores the experiences, views, opinions, ideas, beliefs, and/or motivations of entities/individuals on particular objects, issues, or phenomena (Islam & Aldaihani, 2022). The interviews were based on the technical performance of the system or product, user experience and satisfaction, long-term performance and maintenance and the economic impact. The interviews were conducted virtually by telephone and recorded using a voice recorder. Invitation letters were sent to the sample group explaining the research's purpose and background and obtaining their consent.

2.2 Sample Selection

The research interviews were conducted with industry professionals and beneficiaries of projects completed using the sampled product or system. The participants comprise industry professionals, such as architects, engineers, contractors, policymakers, or any other building professionals, as well as

end-users. This quarter's participants included one (1) subcontractor, two (2) contractors, one (1) foreman, and two (2) end-users. The interviews focused on the participants' perspectives on the technical performance and quality assurance of the system or product in real-world applications (post-certification stage).

The following ASA-certified systems and products were randomly selected and used during the interviews:

- 1996/237 (Amended October 2020) Hydraform Building System- Hydraform Development (Pty) Ltd
- 2021/624 Harvey Eco Tile- Harvey Roofing Products, a Macsteel Service Centres SA (Pty) Ltd division.

Industry professionals were asked the following questions:

Technical Performance

1. When was the project constructed?
2. How well does the system or product perform in meeting its intended purpose for each criterion (e.g., structural integrity, fire resistance, durability, water penetration, energy savings, thermal performance, condensation, and acoustics)?
3. Have you noticed any performance issues, defects or limitations with this system or product? If so, could you provide examples and indicate how frequently they occur? What steps are taken to resolve them?
4. How satisfied are you with the product or system quality, workmanship, energy efficiency, and cost savings compared to conventional brick-and-mortar?

Reliability and Maintenance

5. Was the maintenance manual provided and explained?
6. How has the system/product met all the performance criteria since installation?
7. Are there particular conditions (e.g., climate, usage levels) under which this system/product performs better or worse?
8. What has been your experience with the maintenance requirements of the system or product?

9. How would you evaluate the long-term performance of the system or product? Has it consistently maintained efficiency and functionality over time?
10. Has the system or product achieved its expected cost-efficiency in maintenance and operations?
11. Will the system or product achieve its expected lifespan? Why or why not?

End-users will be asked to answer the following questions:

Usability and Ease of Use

1. How easily can you use the system or product?
2. Were there any challenges you faced when learning to operate it?
3. How much help or training did you require, if any, to get started?

Technical Performance

4. How effectively does the system or product perform its main function?
5. Are there any functionalities you find difficult to understand or use?
6. What is your view on the standard of workmanship?
7. Have you noticed any areas where the system or product does not perform as expected?

Reliability and Maintenance

8. What has been your experience with maintaining the product or system? Does the product or system offer support? Was a maintenance manual provided?
9. Does it require more, less, or about the same maintenance as traditional systems or products?
10. How would you rate the product or system's reliability since you started using it?
11. Based on your experience so far, will the product or system continue to perform in the long term?

User-Satisfaction

12. How satisfied are you with the energy efficiency of the system/ product?
13. In your opinion, what is the best feature of the system/product?
14. Would you recommend this system/ product to others?
15. What improvements would you suggest for the system/ product?

2.3 Data Analysis

The data analysis technique used was the narrative analysis method, which focuses on the stories that individuals tell during interviews, aiming to understand how they construct meaning in their experiences (Riessman, 2008). Narrative analysis is often used in research on user experiences or social impacts, such as how innovative building technologies shape personal or community narratives (Riessman, 2008). Therefore, it was used in this study as it focused on the perspective of industry professionals and end users on the systems or products' technical performance, user experience and satisfaction, long-term performance, and maintenance, and evaluated the economic impact. The data was used to compare responses from the responses to identify the key factors to conclude.

3. Research Findings

The study's findings below are described according to the order of the questions. The first interviews were conducted for the Hydraform Building System and the second for the Harvey Eco Tile.

3.1 Hydraform Building System Interviews

The responses are from the perspective of the contractor, foreman, and subcontractor who worked on the Ngangelizwe housing project in Mthatha, Eastern Cape. It was constructed using the Hydraform building system in September 2020 and completed in April 2024. The responses are given verbatim.

3.1.1 Technical Performance

The study's findings from the contractor's perspective indicate that the Hydraform building system performs its intended purpose, is a good quality product, and contributes to aesthetically pleasing houses. The contractor indicated that Hydraform provided the subcontractors with 2-3 days of training on how the Hydraform brick works. The contractor has not noted any performance issues to date, and should any issue arise during construction, it was quickly resolved. The contractor expressed satisfaction with the quality of the Hydraform building system and the standard of workmanship; however, they would not know about cost savings as Hydraform provided the material.

The sub-contractor indicated that the system performs well and that the brick is strong. Currently, there have been no issues with the system. He noted that the house was built up to standard and expressed satisfaction with the quality of the building system.

The foreman indicated that the system performs its intended purpose and is structurally strong. It is energy efficient because it reduces heat during summer and traps heat in winter, keeping the house warm. The foreman also indicated that there had not been any performance issues with the building system. The foreman expressed satisfaction with the system's quality, and the standard of workmanship was good due to the strength of the brick.

3.1.2 Reliability and Maintenance

The contractor indicated that the house's maintenance is the end user's responsibility. The house built using Hydraform bricks has performed since construction and has no complaints. The contractor believes the system can perform in different weather conditions as it will not be damaged in winter or summer because of the good material. The contractor expresses the view that the house will perform for an extended period of time, depending on how the owner maintains it. The house built using the Hydraform building system will achieve its expected lifespan as the material is strong and of good quality.

The subcontractor is unaware of a maintenance manual or requirements for the system. He stated that the system has consistently performed since it was built and believes it will continue to perform over time. The subcontractor also believes the system will achieve its expected lifespan because the Hydraform brick is stronger than conventional brick.

The foreman is unaware of a maintenance manual or any maintenance requirements for the system. The foreman expressed that the building system has performed well since installation, and no complaints have been recorded. The foreman believes the system will perform well in all weather conditions. In terms of maintenance, the foreman suggests that a concrete sealer be used for waterproofing. The Hydraform building system has performed well over time, and it is believed that it will achieve its expected lifespan because other houses built in 2001 using the system are still standing and in good condition.

The responses below are from the end user of the Hydraform building system in the Ngangelizwe housing project.

3.1.3 Usability and Ease of Use

The study's findings indicate that from the end-users perspective, the system is easy to use and does not require any training. They have not had any challenges understanding how to use the house; however, the only challenge they have encountered is in the bathroom, where the toilet leaks at the bottom when you flush water. The end user indicated that the problem had been reported before construction was finished, but nothing had been done; therefore, they had to hire someone to fix the issue. The other challenge with the house is that it started cracking by the door due to some foundation settlement prior to occupying it, and the bathroom door does not close properly. The issue was reported, and they assisted by using a crack sealer to close the cracks, but they have to monitor further settling over time.

3.1.4 Technical Performance

The end-user indicated that the house was built well and performed its primary function of providing them with a place to live. The end-user has not had any difficulties using the house; no training was provided or needed before moving into it. The end-user noted that the house was built correctly, and her view of the standard of workmanship is satisfactory.

3.1.5 Reliability and Maintenance

The end user indicated they were not made aware of any maintenance requirements for the house. If there are any issues in the house, they take care of them on their own. The end user expressed that the house has, to a certain extent, been reliable since they started using it; however, they are concerned about the long-term performance of the house due to cracks in the house that occurred even before finishing construction.

3.1.6 User-Satisfaction

The end-user indicated they are satisfied with the house's energy efficiency as it tends to be cool in summer and warm in winter. The end-user is satisfied that the house is an improvement to the RDP houses that were previously built and that it is more liveable. The end-user said they would recommend the system to someone else. The end user suggested that more time could be dedicated during construction as it might have been given little attention due to building multiple houses simultaneously.

3.2 Harvey Eco Tile Interviews

The responses below are from the perspective of the contractor installing Harvey Eco Tiles at the Jacaranda Holiday Flats, Uvongo, KwaZulu Natal (KZN), completed in February 2022.

3.2.1 Technical Performance

The contractor indicated that the tile is structurally strong, almost unbreakable, and completely watertight. The contractor indicated that there are not any significant issues to be noted. The contractor is satisfied with the quality of the tile, and compared to the typical concrete tiles, it has a weight of one-third of a concrete tile roof, and there are no breakages when transporting or handling the tile.

3.2.2 Reliability and Maintenance

The contractor indicated that the tiles are maintenance-free. The contractor indicated that the tile performs better in windy and coastal areas, as it was chosen for the roof because it is non-corrosive. The fixing mechanism ensures it is optically windproof, as Jacaranda is located on the South Coast. The contractor is confident it will perform in the long term and is satisfied with the tile. The tile comes with a twenty-year warranty; however, there is no reason it should not continue operating for 30 years or more.

The responses below are from the end-user of the Harvey Eco Tile installed at Jacaranda Holiday Flats, Uvongo, KZN:

3.2.3 Usability and Ease of Use

The end user indicated that the tile is easy to use and that they have faced no challenges with it. They also indicated that no training was required to get started.

3.2.4 Technical Performance

The end-user indicated that the tile performs well as a roof covering. The building used to have constant leaking in the roof for the past years and has been constantly repaired. However, they have had no leaks since repairing it with Harvey Eco Tile. The end-user is very impressed with the workmanship of installing the tile. They were using a Harvey Tile-approved installer, ensuring a safety plan was in place and the work was done professionally. The end-user stated that no areas have been noted where the tile does not perform as expected.

3.2.5 Reliability and Maintenance

The end-user stated that there are no maintenance requirements for the tile, but there might be a slight discolouration from the original installation caused by the salt air on the coast, as the tiles are light in colour. The end-user expressed an overall impression of the tile and has been very reliable since they started using it. The end-user expressed that he firmly believes the tile will continue to perform in the long term as it is pretty strong.

3.2.6 User-Satisfaction

The end-user expressed that they were very impressed and satisfied with the tile. One of the best features of the tile is that each tile is screwed down with four screws while the typical tiles lie flat on the roof, and so far, the tiles are performing very well, considering they get strong winds as they are situated along the coast. Additionally, the tile has not had any problems since it was installed due to being situated along the coast, as some get corroded easily. The end user indicated that they would

recommend the tile to anyone looking for a reasonable tile, and the tile offers a twenty-year warranty and performs other tiles in the market. The end user would not suggest any improvements; the tile performs well.

3.2.7 Comparison of Participant's Responses

Two tables have been constructed to evaluate the responses more effectively—one for the innovative building system, Hydraform, and the other for the innovative building product, Harvey Eco Tile. The interview responses from participants have been summarized for each case.

For the Hydraform building system, the responses from four participants—the Contractor, Subcontractor, Foreman, and End-user—were compared. For Harvey Eco Tile, the responses from two participants were compared: the Contractor and the End-user.

Table 1 below presents the summarized responses for the Hydraform building system, while Table 2 presents the responses for Harvey Eco Tile.

Table 1: Comparison of the participants' responses to specific themes to identify critical factors for the Hydraform Building System

Themes	Contractor	Sub-Contractor	Foreman	End-user
Technical Performance	• The system performs for its intended purpose • There were no issues noted • The system is of good quality	• The system performs well, and the brick used is strong • There were no issues noted • The house was built to standard, and is satisfied with the quality of the building system	• The system performs its intended purpose and is structurally strong • There were no performance issues noted • The quality of the building system and the workmanship was satisfactory and of a good standard	• The house performs it primary function of providing shelter • There are no functionalities that are difficult to understand or use • The workmanship is satisfactory
Reliability and Maintenance	• The maintenance of the house is the responsibility of the end-user • The performance has been good, and there have not been any complaints noted since the construction	• There was no maintenance manual • The system has performed consistently since construction • The system will continue to perform over time • The system achieved its expected lifespan due to the brick strength	• There was no maintenance manual • The system has performed well since construction, and no complaints recorded • The system will continue to perform over time and achieve its expected lifespan as houses built	• There was no maintenance manual • There were issues with toilet leaks that were attended to at their own cost • A neutral view was expressed on the reliability of the house

	• The system can perform in all weather conditions • The house will perform for an extended period of time • The house will achieve its expected lifespan due to the strong and quality materials used		in 2001 with the same material are still standing	• There are concerns that the house might not continue performing due to cracks in the walls that formed during construction

Table 2: **Comparison of the participants' responses to specific themes to identify critical factors for the Hydraform Building System for the Harvey Eco Tile**

Themes	Contractor	End-user
Technical Performance	• The tile is very strong structurally, almost unbreakable and completely watertight • There were no issues noted • The quality of the tile is satisfactory, and no breakages are occurring during transportation and handling of the eco-tile	• The tile performs well as a roof covering • There are no leaks or issues experienced with the tile • The workmanship of installing the tile was impressive, as they were using a Harvey Tile-approved installer • There are no areas noted where the tile did not perform as expected
Reliability and Maintenance	• The tile is maintenance-free	• There are no maintenance requirements for the tile

	• The contractor is confident that it will perform in the long term and is satisfied with the tile • The tile comes with a twenty-year warranty; however, there is no reason that it should not continue to operate for 30 years or more	• The tile has shown some discolouration • The tile has been very reliable since they started using it • The tile will continue to perform in the long term due to its strength

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4. Conclusion

Considering the study's findings, the interviewed industry professionals and end users generally believe that the Hydraform building system performs well for its intended purpose. No issues have been noted, and the workmanship has been good. Therefore, one can express the view that the technical performance of the Hydraform building system is good from the view of the interviewed industry professionals and end-users. Furthermore, the study also outlines that the Hydraform building system is quite reliable since there have not been any complaints post-construction, and the participants believe that the building system will continue to perform for a long time and should achieve its expected lifespan. However, it should be noted that the interviewed participants are unsure about the maintenance of the building system and whether the system has any maintenance requirements.

Additionally, the study notes that the end-user is satisfied with the system because it looks much better than the other RDP houses that were previously built and is livable. The end-user said they would recommend the system to someone else. Therefore, from the perspective of the end-user and the interviewed industry professionals, the system performs well in real-world applications (post-certification stage).

The study findings outline that the Harvey Eco Tile performs well in real-world applications from the perspective of the end-user and contractor. This was noted in that the end expressed that there have been no challenges since using the tile, and it performs its primary function as a roof covering quite well. Furthermore, because it is strong, it is highly unlikely to corrode easily as they are situated along the coast with strong winds. The contractor also supported the idea that the tile was specifically chosen because it is noncorrosive and would be suitable in the project's location along the South Coast. The contractor and end-user also said that the tile will likely continue to perform in the long term because it is strong. The end user expressed overall satisfaction and is very impressed with how the tile has been functioning and would recommend it to others. The contractor noted that the Harvey Eco Tile is performing well so far, and it comes with a 20-year warranty; however, they expressed that there should not be any other reason why it will not perform for 30 years or more. The best feature about the tile, in the end users' opinion, is that each tile is screwed down with four screws to hold it

in place. Also, it is lightweight and offers a 20-year guarantee, outperforming all the other tiles they have looked at in the market.

5. Recommendations

Based on interviews with industry professionals and end-users, the study indicates that the ASA-certified systems and products have performed well in real-world applications. However, implementing and maintaining these products and systems must address a few issues.
Therefore, the following recommendations should be considered:

- Certificate holders should conduct public awareness campaigns or consultations regarding the systems or products used in their projects.
- Upon completing a project, the certificate holder must ensure that end users understand any maintenance requirements for the system or product's long-term performance.
- The certificate holder should inform end users about the procedures to follow if they encounter system or product challenges.
- It is crucial for the certificate holder to clearly define the responsibilities of end users in maintaining the functionality and performance of the system or product over time.
- Cracks that develop in the Hydraform building system should be monitored to determine whether they are due to minor foundation settlement or a more severe foundational issue.
- Additionally, the discolouration of the Harvey Eco Tile should be monitored over time to ensure its durability in response to weather exposure.

6. References

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