

AGRÉMENT SOUTH AFRICA CERTIFICATION AS ASSISTANCE TO THE ROADS ENGINEER

Joe Odhiambo

Abstract

The paper covers the role that Agrément South Africa plays in the introduction of innovative construction products as well as building systems. The paper relates Agrément South Africa's mandate which states that it shall support and promote the process of socio-economic development in Southern Africa as it relates to the construction industry by facilitating the introduction, application and utilization of satisfactory innovation and technology development. This paper illustrates the significant aide that the Agrément certification process offers for beleaguered roads engineers.

Key words: facilitating innovation, fitness-for-purpose, technical assessment, certification, non-standardised.

Introduction

In Southern Africa, as elsewhere in the third world, municipalities are taking the strain in responding to the call for communal and infrastructural development. Despite the amalgamation of small municipalities into district and metropolitan municipalities, the new municipalities may still find themselves with limited capacity. There is a clear need for whatever technical support that can be provided. This paper will embroider on a significant aide for beleaguered roads engineers.

This paper illustrates the role of technical assessment (also known as Agrément) organisations in the international construction market, and how the Agrément technical assessment and certification process can persuade users of the merits of innovative products that contribute to sustainability in construction, by providing assurance to the consumers and thus facilitating the introduction of innovative construction products and building systems.

Before one embarks on a construction project one is faced with the task of choosing from a wide variety of construction products that are available.

1 Conventional and innovative construction products

The decision to choose conventional construction product is made easier by the fact that they are tried and tested. They are familiar to building professionals and to the public in general. Based on this familiarity, both groups have a clear expectation with regard to the likely performance of these items. In addition standards and codes of practice govern their use and they feature in the deemed-to-satisfy rules set out in SANS 10400. In short the specification of building methods, materials and products that have built up a track record is attractive as it reduces the risk.

A steady stream of innovative construction products is being developed and introduced to the market. Roads engineers are regularly called on to "approve" the use of such products. Few roads engineers would deliberately stifle innovation, but they would be ill-advised to "approve" construction products and specify them in tenders, on the basis of the blithe opinion of a sales person. This is why engineers have come to rely so heavily on products for which there are SABS standards – and on design procedures for which there are SABS codes of practice. Such exemplary professional behaviour, however, still leaves a gaping ravine in the path of construction innovations. This is because there are no standards for innovations!

2 Choice on construction method to be used.

In the first world the choice of construction method to be used is very wide. It can be made from a variety of resources, materials and skills that are readily available. In construction in the developing world, a completely different set of criteria applies. It is of critical importance that the project is constructed in an appropriate way and using suitable materials. What is appropriate is not necessarily the same for different projects. As a general rule, though, the construction method must

- be affordable
- be acceptable to the client or the end user
- be durable for the expected life span of the project
- answer to the needs of the community
- make best use of local resources (this could include labour)
- be economically advantageous to the community
- use technology that is appropriate to the technical assimilation capability that exists within the country
- be of such a nature that the community's resources are sufficient to operate and maintain the buildings.

The decision of what construction system is to be used should therefore be carefully considered. It is advisable to get the opinion of the end users in reaching this decision. Bearing in mind that the general public does not usually have knowledge of the behavior, nor what to expect as part of the performance of unusual or innovative materials and construction methods.

The Agrément certification of construction products and building systems ensures the products are fit-for-purpose.

3 Construction approval in South Africa

Agrément South Africa was established in terms of a Ministerial Delegation of Authority by the Minister of Public Works in 1969 specifically to facilitate the introduction, application and utilisation of satisfactory innovation and technology development in the construction industry. The members of the Board of Agrément South Africa are appointed by the Minister and are drawn from both the public and private sectors. The current Board members were appointed in February 2004 by the Minister of Public Works, Ms Stella Segcau. These members are from various segments of the construction industry and reflect the relevant structures of society and government.

The Board members are:

- Mr Phetola NS Makgathe: Chairman of the Board and CEO of the National Home Builders Registration Council
- Mr Edwin Kruger: South African National Roads Agency
- Mr Mike Marler: Development Bank of Southern Africa
- Dr Rodney Milford: CSIR Building and Construction Technology
- Ms Ncedisa F Ncapai: Siseko Projects (Pty) Ltd
- Mr Cannon Noyana: Noyana's Management Consultancy
- Ms N D Shabalala: Senzandakho Business Management
- Adv. Ajay Sooklal: African Non-Destructive Testing Centre

In South Africa local authorities (municipalities) administer building approvals. Since the introduction of the National Building Regulations (NBRs), all local authorities in South Africa have applied these functional requirements when checking building plans that have been submitted for approval. The preface to the South African Bureau of Standards Code of Practice on the application of the National Building Regulations states:

The National Building Regulations have been written in their present form in order to encourage the use of innovative design, new materials and new construction methods where these can be shown to be suitable. However.... any building designed in accordance with accepted methods and constructed of conventional materials in accordance with the principles of good building practice should, in general, comply with the regulations.

Conventional construction for housing in the South African context is regarded as comprising concrete or clay brick or block masonry walls, with timber roof construction and metal or fibre-cement roof sheeting, or concrete or pressed metal roof tiles. For multi-storey commercial, business or residential construction, reinforced concrete framing with masonry external wall infill and either masonry or drywall internal partitioning is the norm, with structural steel framing used to a lesser extent for high-rise or factory buildings. Such conventional construction is covered by the deemed-to-satisfy rules set out in SANS 10400, "the application of the national building regulations."

As the NBRs are functional, performance-oriented and not prescriptive, a local authority may approve any form of construction simply on the basis that, from its own knowledge and experience, buildings similar to that proposed and which are sited in similar conditions have performed satisfactorily in the past. However, where a product falls outside the experience of the local authority's building control officer, he or she has the option to require an assurance regarding the fitness-for-purpose of the product before approving it for erection.

In terms of the NBRs this assurance can be given in one of four ways, namely:

- by submission of a test report from the CSIR, which is a statutory science council for research and development;
- by submission of a test report from the South African Bureau of Standards (SABS);
- by submission of a valid certificate issued by Agrément South Africa;
- by verification of a design by an independent Professional Engineer.

All houses that are built in South Africa have to be enrolled by the National Home Builders' Registration Council (NHBRC) and built to this body's standards. The NHBRC insists on Agrément certification for all houses that are constructed using non-standard or unconventional methods of construction and for non-standard construction products such as weatherproof wall coatings.

4 Technical approval organisations

There are two independent organisations in South Africa that are concerned with technical approval - the South African Bureau of Standards (SABS) and Agrément South Africa. While the former operates in a wide range of areas, the latter confines its activities to the construction industry. As this paper will show, the organisations' activities are largely complementary: the SABS deals with standards and codes of practice that relate to conventional products and co-operates with international organisations for standardisation, while Agrément South Africa assesses innovative, non-standardised construction materials, products and systems and maintains links with the World Federation of Technical Assessment Organisations and other Agrément organisations.

Which of the two organisations becomes involved with construction products is dictated by the development phase of the product in its life cycle.

5 The life cycle of products

Most new products go through similar development phases that can be categorised as:

- Conceptualisation and technology development
- Product development
- Introduction into the market
- Market acceptance and growth
- Ongoing marketing as conventional product.

Research organisations like the CSIR and universities as well as consultants and individual innovators can assist during the conceptualisation and technology development phase.

Agrément South Africa and the SABS have complementary but discrete roles during the product life cycle. These are illustrated in figure 1.

Agrément South Africa. Agrément evaluation and certification becomes relevant during the *product development* phase when, through technical assessment of prototypes, it can indicate to the entrepreneur whether the product will be fit-for-purpose.

Agrément South Africa's role is strongest during the *introduction into the market* phase when its certificate provides the entrepreneur with the instrument he needs to demonstrate his product's suitability for specified uses, while providing the user with the necessary independent, objective information and advice on the product's characteristics, benefits and limitations.

An integral part of Agrément South Africa's assessment and certification is the evaluation of the manufacturer's quality system. The application of the quality management system is monitored regularly after an Agrément certificate has been granted by Agrément South Africa.

As the product enters the *market acceptance and growth* phase, Agrément South Africa's role may diminish and be taken over by the SABS. Typically, once there are several manufacturers producing a similar product, there is a growing need to develop a standard for the product that covers its manufacture, materials used in production and quality procedures. The usual process followed by the SABS is to establish a committee comprising interested parties to draft such a standard. The experience and knowledge gained by the CSIR and Agrément South Africa during the earlier development phases may now be used as technical input in formulating the standard.

SABS. The SABS's role generally starts at the *market acceptance and growth* phase and becomes the dominant role in the *ongoing marketing as conventional product* phase, when the SABS listing and mark schemes provide the entrepreneur with the quality image needed, and the user with the reliable, credible source of quality assurance desired. During this phase Agrément certification would normally fall away.

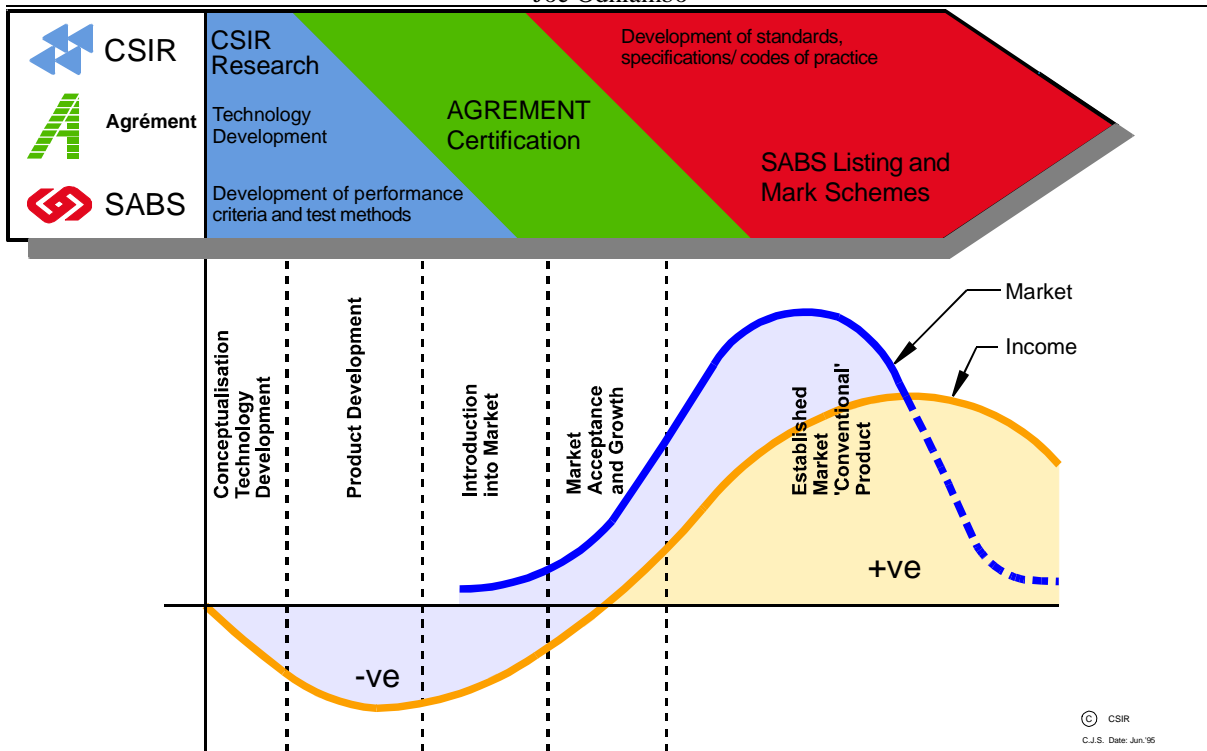


Figure 1: The roles of the CSIR, Agrément South Africa and the SABS in the product development cycle

6 The performance concept

When an entrepreneur requests a technical assessment by Agrément South Africa, it is because there are as yet no national standards for the product. Agrément South Africa bases its assessments on the performance concept, whereby the required performance-in-use of a product is specified in qualitative and quantitative performance terms without any specification as to how such performance is to be attained: assessment of fitness-for-purpose can then be based on criteria which are independent of the materials used or the method of production or manufacture.

The elements of the performance concept are:

- establishment of performance criteria appropriate to the use of the product;
- development or identification of suitable test methods or methods of assessment which may be applied in the measurement of performance;
- measurement of the actual performance of the product according to the established methods;
- judgment of acceptability in the light of the measured or assessed performance of the product against the appropriate performance criteria.

7 How does Agrément South Africa operate?

The Agrément Technical Agency carries out the evaluation on behalf of the Board. The Board carries out its mandate by evaluating the fitness-for-purpose of a variety of innovations which have included not only building systems, construction related materials and products but also a number of sanitation products and various types of plumbing pipes and fittings, bathtubs, bathroom and toilet units, as well as sanitary disposal systems. The evaluations are based on a range of performance criteria and cover technical aspects of the material or building system such as:

- Structural strength and stability
- acoustic performance
- condensation (in dwellings)
- durability and the maintenance required
- safety in case of fire
- durability
- thermal performance (of dwellings)

- energy performance of the building
- natural lighting
- ventilation
- water penetration
- damp-proofing
- quality management.

Where a subject is assessed to be fit-for-purpose, the applicant is granted an Agrément certificate. This is a technical document which includes a description of the subject, summarises the evaluation and gives conditions that must be met if the subject is to perform satisfactorily (for example, it may include specific instructions for backfilling around pipes if a particular pipe is the subject of the certificate).

The facilitation of innovative construction systems and building products can only succeed if buildings and structures are built right the first time and if they are fit for purpose. The financial and non-financial costs of non-conformance or poor quality of construction are well documented. A study in Europe (2002) estimated this to be between 5 and 10 % of the total output of the construction sector. The figure could probably be higher in South Africa.

8 The certification process in South Africa

The evaluation and certification process is divided into three phases:

- The first step is to initiate the process. Formal application for certification needs to be made together with detailed supporting documentation. A programme-preparation fee is required with the application. This fee is currently between R10000 and R20000.
- The second phase of the approval process involves the preparation of an appropriate evaluation programme in the form of an offer for consideration by the applicant. The offer will set out the nature and scope of the technical evaluation, give details of any testing that may be necessary, specify any test specimens and additional information that may be required. The proposal will include a quotation for carrying out the work and give a time estimate for its completion. The prices of evaluations vary considerably, depending on the type of certification, extent of the work, nature of tests required, supporting documentation provided and test reports submitted. Where appropriate, the results of an evaluation of the subject, by another member of the World Federation of Technical Assessment Organisations (WFTAO) will be considered. Typically the cost of evaluation and certification will be between R50000 and R150000. The evaluation and certification process normally takes from 4 to 12 months.
- On acceptance of the offer and payment of the evaluation fee, the process enters the third phase - that is, the execution of the evaluation programme with a view to the granting of a certificate. The feedback from all the specialists concerned is summarised in technical reports. Provided the results of the tests and assessments are satisfactory, an Agrément certificate is drafted, submitted to the applicant for comment and then to the Board of Agrément South Africa for approval. New certificates are gazetted in the *Government Gazette* as well as being published on the Agrément South Africa web site: www.agrement.co.za.

A certificate remains valid for three years subject to there being no changes to the product. Any changes to the product must be approved by Agrément South Africa prior to implementation.

9 Performance criteria in the national and international spheres

Clearly, the criteria which the product must satisfy, should take local conditions into consideration. For instance, a product intended for use in full sunlight is likely to be more prone to ultra-violet degradation in Southern Africa than in the Northern Hemisphere. Similarly, in the northern hemisphere products for use outdoors may be subjected to freezing temperatures not normally experienced in Southern Africa.

Within the WFTAO organisations, there is scope for liaison agreements between national member organisations. For instance, the Canadian Construction Materials Centre (CCMC) and Agrément South Africa have a liaison agreement in terms of which they:

- maintain communication concerning their operational relationship to keep abreast of changes and new developments in the various member organisations;
- routinely exchange information, both technical and otherwise, on assessment matters of mutual interest;
- are responsive to proposals from each other, without impinging on their respective autonomy;
- take into consideration technical evidence supplied by each other in order to facilitate the assessment and acceptance of construction products intended for export between the two countries and to minimise costs to their clients; and

- work together to develop procedures that will enable the future mutual acceptance of technical assessments and laboratory services.

WFTAO furthermore has a framework through which it is possible for two or more members to carry out a joint technical assessment of a construction product or system. In each participating member country the subject of the technical assessment is measured against that country's own performance criteria. Such a joint assessment, if positive, will result in the award of a certificate for the assessed construction product or system from one or both of the participating member organisations. Each certificate is valid in the country in which it has been awarded.

10 Advantages of certification

Unlike the situation in the European Union, Agrément certification of each new construction product is not generally a prerequisite for entry into the construction market, unless for specific construction products where consumer bodies such as the National Home Builders Registration Council insist on Agrément certification. Many manufacturers are opting for certification because the reality is that it is a very good marketing tool and the credibility lent to their products boosts their sales, covering the cost of the certification procedure within months.

In the broader African context, several of Agrément South Africa's certificate holders have reported that possession of an Agrément certificate for a construction product or system has facilitated acceptance of their products in other African countries. In Botswana, Lesotho and Namibia, In addition, an Agrément certificate is readily accepted and often required for innovative construction. In Francophone African countries, consultants and authorities are usually familiar with the French Agrément certification system.

11 Unblocking Innovation

There is a strong case to be made for facilitating the roads engineers' decisions when specifying construction products. The benefits of standardisation of conventional products have long been appreciated and standardisation must be supported and, indeed, nurtured.

With regard to the use of construction innovations, roads engineers can be pro-active in easing their decision-making. They should demand that the manufacturers and vendors of innovative products submit their products for Agrément assessment and certification.

On the regulatory front, building systems with Agrément certificates are deemed to satisfy the National Building Regulations. Agrément certificates list the occupancy classes for which building systems are approved and they set out precisely which regulations are satisfied. They also give a list of all structural limitations. This leaves the municipal building control officer the fairly easy task to peruse the applicant's building drawings for compliance with the remaining regulations. The roads official is relieved of the task of making technical judgment calls which may come to haunt him later.

12 Conclusion

This paper has shown one of the routes available to entrepreneurs and manufacturers of sustainable construction products to encourage the use of innovation. Internationally, technical assessment organisations have built up a track record which has demonstrated convincingly that by applying the performance concept they are able to assess any construction product, no matter how innovative the product may be.

REFERENCES

Innovation in building – the way ahead, 1985; CJ Schlotfeldt