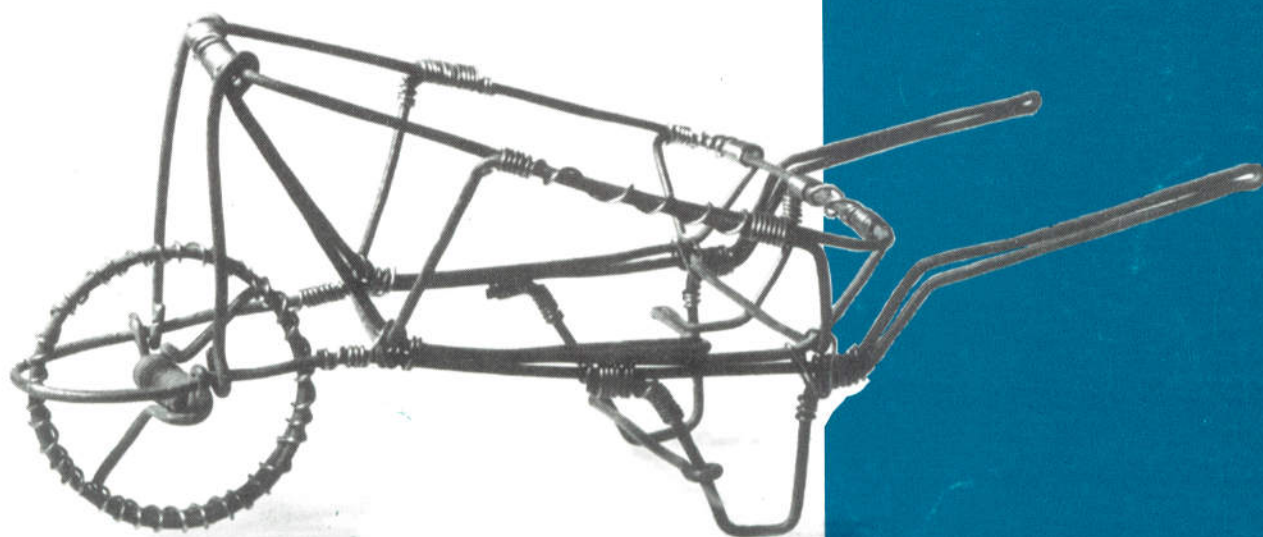




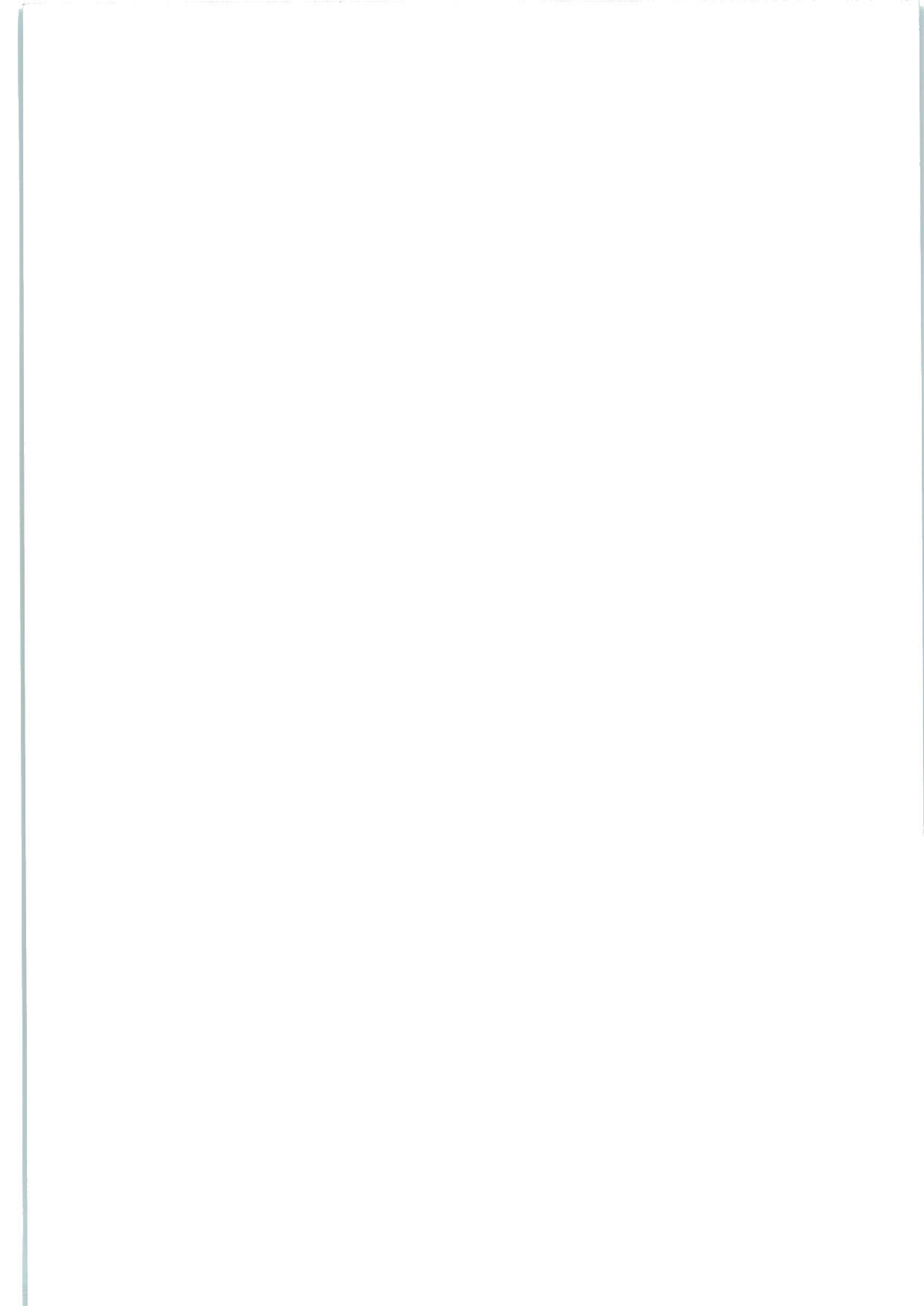
Development and the application of building regulations

Construction and
development



Number 4

R10 excl VAT



CONSTRUCTION AND DEVELOPMENT SERIES

NUMBER 4

Development and the application of building regulations

February 1993

Development Bank of Southern Africa

CONSTRUCTION AND DEVELOPMENT SERIES

Titles In this series Include

1	Socio-economic enhancement of development projects	R10
2	Interim guidelines for labour-based construction projects	R75
3	Guidelines for the identification of appropriate construction methods in developing areas	R10
4	Development and the application of building regulations	R10

Prices exclude VAT

These documents can be ordered from:
Development Bank of Southern Africa
P O Box 1234
Halfway House
1685
Tel (011) 313-3911
Fax (011) 313-3086

PREFACE

The formulation of policies and strategies to promote development in South Africa is arguably as important a product of the Development Bank of Southern Africa as its loan finance and technical assistance programmes.

This series of publications on "Construction and Development" illustrates this point.

Development projects in South Africa have traditionally been undertaken to meet only the physical needs of the recipient community. South Africa's changing social and economic environment demands that such projects be executed in a manner that ensures that the communities' other needs are also addressed. To achieve this projects should be structured so that opportunities for employment and the development of skills and entrepreneurial abilities are maximised.

Construction is an essential sector in any growing economy. In South Africa, it has historically been both an important employer and an industry which typified the over-capitalisation which has bedevilled the economy. These considerations, together with the fact that a large proportion of DBSA's lending goes to construction projects, suggested that it would be helpful to make practical proposals to assist the industry to adapt and contribute to development in the new circumstances.

The publications in this series present an approach to development that focuses on:

- the identification of the broad economic and social needs of communities
- optimal use of resources available to them
- ways in which communities can exploit the opportunities presented by development projects
- approaches to making best use of labour – an abundant but underutilised resource
- appropriate design and methods of building and construction
- the use of, and misconceptions about, building regulations

The publications are thus designed to help alleviate the constraints which have inhibited poorer communities from developing the skills at both individual and community level that can lead to the development of entrepreneurship and genuine empowerment.

This is perhaps the most important message of the series. It is above all through active participation in the process of development that individuals and communities can improve their quality of life. And it is to this end that the series is dedicated.

ACKNOWLEDGEMENTS

The author gratefully acknowledges valuable and constructive comments from Vic Woodlock, Manager of the Building Science and Regulations Division of The SABS, and Bryan Wallis, Manager of Agreement South Africa. Typing was patiently undertaken by Joey Motsepe, June Ntuli and Susan Vosper.

MODIFICATIONS AND ADDITIONS

Users and readers are requested to share their comments, recommendations and own experiences. Readers who wish to contribute to further editions should contact the author.

For further information contact:

D Macleod

Development Bank of Southern Africa
P O Box 1234, Halfway House, 1685
Tel: (011) 313-3911
Fax: (011) 313-3086/3072

COPYRIGHT

DBSA hereby grants permission for copying and quoting from this document, providing it is not done for gain and that the author is acknowledged.

Development Bank of Southern Africa

Headway Hill
Midrand
Transvaal

P O Box 1234
Halfway House
1685

August 1992

CONTENTS

PREFACE

ACKNOWLEDGEMENTS

1.	INTRODUCTION	1
2.	HISTORICAL NOTES	1
	2.1 Rest of World	1
	2.2 South Africa.....	2
3.	BUILDING REGULATIONS – WHAT IS AVAILABLE?	2
	3.1 National Building Regulations	2
	3.2 Agreement Certificates.....	3
	3.3 MANTAG.....	3
	3.4 Building Society Standards	4
4.	EFFECT OF EXISTING REGULATIONS ON DEVELOPMENT AND COSTS.....	4
	4.1 National Building Regulations	4
	4.2 Agreement Certificates.....	5
	4.3 MANTAG.....	5
	4.4 Building Society Standards	6
5.	DIFFERENT APPROACHES TO BUILDING REGULATIONS	6
6.	CONCLUSION	7
7.	COMPLIANCE WITH THE NBR REQUIREMENTS	7
8.	RECOMMENDATIONS.....	8
	 APPENDIX 1 – AGREEMENT CERTIFICATES	 10
	APPENDIX 2 – MANTAG	11

1. INTRODUCTION

Deregulation is taking place. Efforts are being made to get rid of unnecessary regulations that stifle initiative. The aim is to free the economy so that any hard worker can benefit from the results of his/her enterprise with a minimum of interference from bureaucracy.

This activity inevitably brings into question the usefulness and appropriateness of building regulations and the effect of these on development and on the cost of building.

This paper sets out some historical background on building regulations and examines the following questions in the South African context

- What regulations are applied?
- Are these regulations a hindrance to development and does their enforcement push up the cost of building by demanding standards that are unreasonably high?
- Is there another approach?

In Section 6 a conclusion is drawn on these matters and thereafter suggestions are given regarding compliance with the NBR, recommendations are made on where, when and how regulations should be applied and authorities are cautioned about the piecemeal application of regulations to particular problems or their piecemeal relaxation in such cases.

2. HISTORICAL NOTES

2.1 Rest of the World

Building regulations are not an invention of the modern age. In 1750 BC King Hammurabi of Babylon set out a code which covered many aspects of life and behaviour in that ancient civilisation.

Safety in building was ensured by the following succinct regulation: "If a builder shall build a house and that house shall later collapse, causing the death of the son of the house, then the builder's son shall be put to death."

In France, a rigid series of regulations and prescribed inspections and controls reduce the risk of building failure and the "Code Napoleon" extends the builder's liability for a structure for a much longer period than is common in the rest of Europe.

The homogeneous nature of Parisian architecture owes much to the fact that building regulations have been applied consistently in that city for most of the past three hundred years. These were so comprehensive that at one time a glazier needed to stock only five different sizes of panes of glass to repair any window in central Paris.

In England, building regulations have evolved from extremely rigid and prescriptive rules to performance-based criteria¹ dealing with all aspects of building including, for instance:

- the specification of minimum thermal transmittance values for walls, floors and roofs, with modifications allowed if double glazing is used
- less emphasis on space standards, for example minimum ceiling heights are no longer specified on the premise that no one will buy a house in which they cannot comfortably stand upright²

Approximately 15 years ago, India, which had until then operated a system of regulations similar to those in South Africa before 1985, decided to abandon much of the requirements of the regulations in an attempt "to put as many roofs over as many heads as possible quickly and economically". This led to a surge of uncontrolled building. The result of this is that India's resources are now stretched between the continuing problem of housing the homeless and the new problem of maintaining the poor and faulty buildings erected under the relaxed regulations.

2.2 South Africa

Until 1985 South African building was controlled in the urban areas by individual authorities, each applying prescriptive regulations adopted or formulated by themselves with, in many cases, no reference to other bodies.

In 1966 an attempt had been made to rationalise the disparate regulation throughout the Republic when the Standard Building Regulations (just as prescriptive as those referred to above) were produced. Unfortunately adoption of these was not made mandatory and this attempt at national rationalisation was not successful.

In 1985 the South African Bureau of Standards produced the National Building Regulations (NBR) and legislation was promulgated to ensure that these would be uniformly enforced country-wide.

All the regulations referred to in Section 2.2 applied to the urban areas of South Africa. The rural and tribal areas and the self-governing and independent states were not covered by this and could opt for any degree of control desired.

3. BUILDING REGULATIONS - WHAT IS AVAILABLE?

3.1 National Building Regulations

The most commonly used building regulations in Southern Africa are the National Building Regulations (NBR) prepared and published by the South African Bureau of Standards. It is probably true to say that, "because they are there" the NBR are used by a great many authorities, for example Lebowa and Transkei, which are not legally bound to apply these regulations but have no suitable alternatives available.

The NBR deal only with health and safety; they demand a certain level of performance in these two areas *but do not prescribe how this performance level should be achieved.*

¹ In England, the onus is firmly on the local authority to prove non-compliance with the requirements of the building regulations. In South Africa the applicant must prove compliance - a significant difference in approach.

² While this premise may be reasonably accurate in affluent First World situations, it ignores the "desperation factor" that operates on the market in much of the Third World.

³ The consolidated National Building Regulations that are applicable at this date (August 1991) are set out in SABS 0400-1990, which superseded SABS 0400-1987.

Two SABS Codes of Practice are relevant:

- (i) SABS 0400⁴: *Code of practice for the application of the National Building Regulations*; and
- (ii) SABS 0401: *Code of practice for the construction of dwelling houses in accordance with the National Building Regulations*

In SABS 0400 the NBR are quoted, and deemed-to-satisfy rules are set out. If buildings are constructed in accordance with the deemed-to-satisfy rules they will meet the requirements of the NBR. The rules are not regulations nor are they mandatory.

SABS 0401 is supplementary to and should be read in conjunction with SABS 0400.

In Section 1 it is stated that the document covers the application of the NBR to the erection of dwelling houses of all types, sizes and cost, irrespective of the building materials and methods used.

It accordingly deals with the application of the NBR to:

- conventional housing
- informal housing
- incremental housing

SABS 0401 suggests and discusses approaches to the problems of housing people and establishing reasonable standards for housing. The document does give useful guidance on the NBR and should be studied by all concerned with housing.

As with SABS 0400 the deemed-to-satisfy rules and the suggestions contained in SABS 0401 are not regulations nor are they mandatory.

3.2 Agreement Certificates

Building systems that are covered by an Agreement Certificate are accepted as complying with the NBR requirements. (See Appendix I.)

3.3 MANTAG

A MANTAG is issued by the Agreement Board of South Africa. It covers only single-storey houses, schools and primary health care facilities. The standard of performance required for these structures is lower than that required for Agreement Certification. (See Appendix 2.)

⁴ SABS 0400 and SABS 0401:

The technical requirements of the National Building Regulations are expressed in functional form. As this type of regulation specifies only the performance required of the building element or the end result expected, it is not always easy for either the building owner or the local authority to know how the regulations may be satisfied. It is an object of these codes to set out solutions to the problem in the form of simple prescriptive rules for construction methods that are deemed to satisfy the requirements of the regulation.

3.4 Building Society Standards

Where a building society provides the money to erect a dwelling, the society will generally prescribe the materials and method of construction that are acceptable to it. The standards thus prescribed invariably are in accordance with the rules set out in SABS 0400.

4. EFFECT OF EXISTING REGULATIONS ON DEVELOPMENT AND COSTS

4.1 National Building Regulations

It is widely held that the NBR standards are too high and that their application hinders development and thus results in costly buildings.⁵ However, an examination of the NBR shows that if these are applied correctly this is not the case.

The technical requirements set out in Parts B to V cover only two areas and these are safety and health.

The regulations have been formulated with the deliberate aim of allowing a wide choice of building materials and building techniques. The wording of the regulations has been kept as short and simple as possible and the regulations concern themselves with the performance demanded of any building element. The following examples are from Part K on walls:

K1. Structural strength and stability: Any wall shall be capable of safely sustaining any loads to which it is likely to be subjected and in the case of any structural wall shall be capable of safely transferring such loads to the foundations supporting such wall.

The next three regulations in Part K are stated equally simply and require that:

- If water penetration occurs it should not be detrimental to the health of the occupants nor should it affect the durability of the building. (K2)
- The roof of a building should be fixed to the walls in such a way that all normal forces which act on the roof are transferred to the walls. (K3)
- The wall should have the combustibility and fire resistance characteristics appropriate to the location and use of the wall. (K4)

The final regulation (K5), states that the above regulations will be satisfied if the deemed-to-satisfy rules in SABS 0400 are followed.

It is important to remember that the deemed-to-satisfy rules are not mandatory. While they describe methods of construction that, if followed, will result in durable buildings that satisfy the NBR, the designer is free to use any construction method, material or technique to achieve the desired end.

⁵ "Development" as discussed in this paper is as understood by the DBSA, i.e. development associated with the upliftment of the poor.

Property developers and entrepreneurs complain that "the NBR requirements for office buildings mean that they have to provide more toilets, fire escapes and fire fighting equipment than necessary and this pushes up costs and rentals". This paper does not address these or similar issues.

Another important point is that the NBR do not demand a minimum standard of durability nor do they address the question of standards of comfort (thermal performance, acoustic privacy, etc.).

The effect of these omissions is that the NBR can be applied to any type of building, from a high-rise office building to a modest wattle and clay house.

As discussed in Appendix B of SABS 0401, a wattle and clay house can be structurally sound and will withstand the elements for about two years before the walls require extensive maintenance, so for this period of time the house will satisfy the safety and health requirements of the NBR and will do so again when suitably maintained.

From the above it will be seen that the technical requirements of the NBR do not in fact impose unnecessarily high standards – it is logical to demand that in normal circumstances a wall of a building should not collapse, that it should not allow rainwater to penetrate and cause a health hazard or adversely affect the durability of the wall, and that it should not be so flammable that it is dangerous in the circumstances used.

The technical requirements set out in the NBR, then, are not a barrier to development. However, the administration of the NBR by local authorities to date has been for the most part characterised by a lack of understanding of the freedom of choice given by the NBR, an insistence that the deemed-to-satisfy rules of SABS 0400 describe a mandatory standard that must be met and a lack of consideration of the contents of SABS 0401.⁶ This approach has pushed up costs and there is no doubt that in many instances it has inhibited development.

4.2 Agreement Certificates

Agreement Certificates provide a detailed evaluation of the performance of buildings that are erected using innovative or unusual building systems or techniques and as such complement the NBR.

4.3 MANTAG

The MANTAG concept accepts that the economic reality of Southern Africa means that not everyone can afford to live in a dwelling constructed in accordance with the methods described in the deemed-to-satisfy sections of SABS 0400. The MANTAG standards represent a balance between affordability and acceptability and inherent in them is acceptance of the fact that low cost generally means an increased maintenance requirement.⁷

Houses constructed in accordance with MANTAG standards are capable of filling a gap in the market and thus assisting in development and in uplifting the standard of housing of many in Southern Africa.

⁶ This approach is justified by the local authorities on the grounds that it is difficult for the authority to judge whether or not a building method other than one covered by the deemed-to-satisfy rules will satisfy the regulations.

This approach effectively nullifies the intent of performance-based regulations. If the freedom of choice inherent in the NBR is to result in suitable buildings at reasonable cost, this deficiency in the knowledge and understanding of the local authorities must be made good.

⁷ To date this trade-off between low initial cost and increased long-term maintenance, although logical, has not been drawn to the attention of the purchasers of MANTAG dwellings, with some unfortunate results.

4.4

Building Society Standards

The simple, prescriptive requirements of these institutions ensure conventional and durable buildings – but at a price. The intelligent choice of alternative methods of construction can produce acceptable buildings at lower cost.

5.

DIFFERENT APPROACHES TO BUILDING REGULATIONS

If regulations are to be applied, they must be administered. *People are needed to enforce the regulations and a system is needed for applying the regulations and judging whether or not a proposal will comply.* This poses a problem for many developing states.

Some alternatives in regulation are:

- a. no regulations, hence no enforcement necessary
- b. simple prescriptive regulations, which say that walls shall be of brick or concrete block, what roofs shall be, that roof spans shall not exceed X metres, etc.
- c. different regulations for different levels of building

Alternative a is found in many of the rural areas, where the inhabitants build shelters or dwellings on ground that they have "permission to occupy". It is also found in the squatter camps that are springing up in close proximity to developed urban and industrial areas as southern Africa experiences the world-wide trend towards urbanisation with rural populations moving off the land in search of work and higher living standards.

These circumstances are unsatisfactory for safety and health. However, the rural dweller normally has the luxury of space around the dwelling and a relatively clean or cleanable environment. The threat to squatters' safety and health is greater. Undesirable as they might be, the circumstances outlined above allow the individual to build whatever he can afford, however rudimentary that might be, and that freedom is quite essential if a poor man is to provide shelter for his family.

Lack of resources and the reluctance of financial institutions to become involved in very low-cost housing will ensure that the need for freedom from regulation will be with us for some time to come. Rural populations and informally urbanised squatters cannot be subjected to regulations that put the cost of basic shelter from the elements beyond their means. While this situation exists, the main efforts of the authorities should be directed at:

- location and provision of stands to allow orderly rapid urbanisation (informal settlement)
- education in basic hygiene and health care
- the provision of potable water
- provision of appropriate sanitary facilities
- encouraging the development of community organisations, committees, etc. to facilitate community involvement in the upliftment of the people (see section 8.3 below)

Alternative b describes the situation in the Republic of South Africa when the Standard Building Regulations and other regulations were in force. The regulations were prescriptive and made no provision for any building methods other than those prescribed.⁸ This approach to regulation stifles initiative and pushes up costs as either cheaper alternatives cannot be used or their use must be subject to special permission. It is the approach adopted most often by the conservative building societies. While it is obvious that a building society must be sure that any building it finances will exist in a stable and re-saleable condition at least until the loan is paid off, the housing problems of Southern Africa will not be solved by a blind insistence on bricks and mortar and on all materials complying with SABS standards. Fortunately many building societies are now prepared to loan on Agreement Certificated buildings. MANTAG standards provide an indication of a minimum standard of performance and building societies should be prepared to consider loans on houses constructed under the aegis of a MANTAG.

Alternative c can to a very great extent be achieved by applying SABS 0401 to the provision of different levels of housing.

6. CONCLUSION

The requirements of the National Buildings Regulations must be met to ensure the health and safety of the occupants of buildings. The standard of buildings is not kept artificially high by the application of the NBR. Indeed, if the freedom of choice inherent in the NBR is used, it is possible to comply with the NBR requirements and have a building with lower standards than funding agencies will accept and with considerably lower standards than many people aspire to.

Under the aegis of the NBR builders can build to low but acceptable standards that can still attract funding.

However, given the economic realities of Southern Africa, it is also necessary for the poor to be able to provide themselves with basic shelter of whatever size and shape and using any material they can lay their hands on, and this building activity cannot easily be brought within the orbit of the NBR.

7. COMPLIANCE WITH THE NBR REQUIREMENTS

It is not unknown for entrepreneurs, when they are trying to penetrate the market with innovative building systems or unusual building materials, to publicly bemoan "the stifling effect of the NBR" and to claim that without such restrictions their particular solution would be well on the way to solving the housing crisis.

As previously stated, in South Africa the onus is on the individual to prove compliance with the requirements of the NBR. A study of the NBR makes it clear that this can be accomplished in several different ways:

- a. Design completely in accordance with the deemed-to-satisfy rules set out in SABS 0400 and in SABS 0401.
- b. Present a test report from the SABS.
- c. Present a test report from the CSIR.

⁸ Many local authorities have re-created the situation described by treating the deemed-to-satisfy rules in SABS 0400 as regulations.

- d. Present an Agreement Certificate covering the system or method of construction.
- e. Present an opinion on the design (verification) by a registered professional engineer.
- f. Present a MANTAG covering the system or method of construction.

Methods b to f can be time consuming and can involve the entrepreneur in expense. However, as long as the burden of proof rests with the individual and not with the local authority, it is necessary for the individual to provide such proof. Given these facts, any entrepreneur who wishes to introduce a new and untried building system or material to the market has the power to pre-empt local authority objection by arming himself with one of the proofs listed in items b to f.

8. RECOMMENDATIONS

- 8.1 Local authorities must ensure that their building control officers understand the freedom of choice inherent in the NBR.

Building control officers should use this freedom of choice to encourage levels of development that are appropriate (discussed in SABS 0401).

In lower levels of development (8.3 below) the control officer should adopt the role of adviser.

- 8.2 In proclaimed townships and urban areas:

- Apply the National Building Regulations generally.⁹
- Allow Agreement Certificated systems.
- Accept MANTAG standards as the minimum standard for housing, schools and primary health care facilities.¹⁰
- Allow buildings that are within the limiting sizes for a MANTAG dwelling (e.g. small business premises) to be erected in accordance with MANTAG systems.¹⁰

- 8.3 In rural areas where people have lived for centuries without the benefit of regulations and in squatter areas and areas of rapid urban development:

- Do not impose any regulations except in cases where the pressure of population is creating de facto urban areas and where the means exist or can be established for administering regulation.

In such areas it will be necessary to ensure:

⁹ The interpretation of the NBR by various local authorities is an issue that requires attention. Lines of communication need to be fostered between small builders and local authorities. A forum representing these two elements of the development process should be established. SABS 0401 could serve as a useful discussion document at such a forum.

¹⁰ Planning requirements can be used to judge the aesthetics of the more basic systems and their suitability or otherwise for use in an urban environment.

- * provision and protection of potable water and adequate sanitary facilities
- * that layouts are such that services and infrastructure can be installed at a later date as resources become available

This may best be achieved by providing advice and guidance to community-based organisations so that the people can protect their interests by self-regulation.

8.4 Building societies and other financial institutions should be encouraged to enter the low-cost housing market and to accept suitable innovative building methods that are acceptable to the end user (see 8.5 below).

8.5 Care must be taken that measures taken by the authorities to deal with the problems of squatting and rapid urban development do not undercut the low-cost housing market and discourage investment in this field.

This implies that a coordinated policy is required on:

- low-cost housing
- rapid urbanisation
- squatting
- the provision/sale of land for each of these levels
- the financing of all levels of accommodation

APPENDIX 1

AGREEMENT CERTIFICATES

These are granted to building systems, materials or techniques that have been evaluated against the performance criteria and minimum requirements for the assessment of innovative methods of construction as determined by the Agreement Board of South Africa.

As is the case with the Building Regulations, safety and health are taken into account and the criteria used are identical to the requirements of the NBR.

Durability and comfort are also considered. No requirements for durability are set down but any building system with a life of less than 20 years is not likely to be granted a certificate.

In all cases an estimate of the useful life of the building or material is given "assuming normal use, and regular and adequate maintenance". The use that a system will be subjected to is very important in considering the likely life of the building. If the lifestyle and resources of the people who will use the building are such that vandalism is likely or that maintenance will be skimped or non-existent, then obviously the life of any structure could be severely curtailed.

Comfort is dealt with by taking into consideration:

- the acoustic performance of the building
- the likelihood of condensation taking place within the structure
- the thermal performance of the building

The Agreement system requires that certificate holders adhere to a comprehensive formal quality assurance scheme. This is monitored at least once a year by inspectors from the SABS who report directly to the Agreement Board. If the reports indicate that standards are not being maintained, the Board may take action on this.

APPENDIX 2

MANTAG

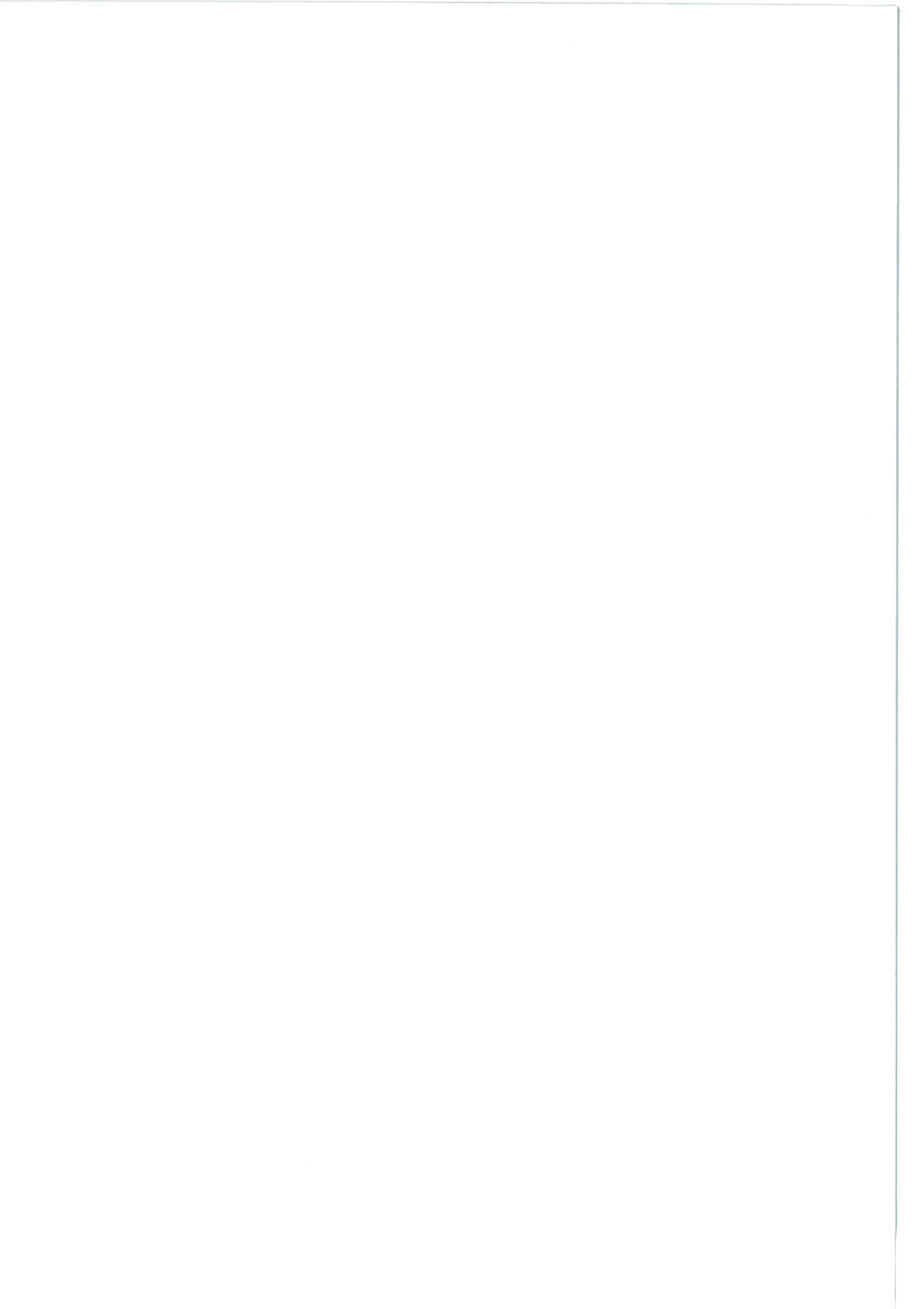
A MANTAG is a certificate granted by the Agreement Board. It applies only to single-storey houses, schools and primary health care facilities.

The basis of the MANTAG certification process is performance criteria that are generally lower than those required for Agreement certification. The criteria are intended to ensure acceptable performance in simple dwellings that can be erected at the least possible cost.

A MANTAG consist of two parts:

- MAN: This confirms compliance with minimum Agreement norms and applies to safety and health.
- TAG: Stands for Technical Advisory Guide. This provides technical advice on durability and comfort.

A lower resistance to rainwater penetration than that described in SABS 0400 is accepted, and boundary distances between walls with less than 30 minutes fire resistance are relaxed in special circumstances.



Cover: Wire sculpture by Billy Makhubela

Published by Development Bank of Southern Africa
P O Box 1234 Halfway House 1685
Telephone (011) 313-3911
Telefax (011) 313-3086