WIND CODE EVALUATION

ST. LUCIA

Evaluation Conducted by Winston H.E. Suite

NAME OF DOCUMENT: The St. Lucia Building Code [1.01]
This code is also known as the Organization of Eastern Caribbean States (OECS) Code. It has been adapted and adopted by each individual island state as its own code.
It is in this context that it is here also described as the St. Lucia Building Code.
Separate legislation is therefore designed to give it legal standing in each territory.

YEAR: October 2001

GENERAL REMARKS: The principal reference Code is the Caribbean Uniform Building Code (CUBiC) [102]. The Code is administered by the Development Control Authority of St. Lucia and shall take precedence over any other building code or standard.

CONTENTS: The details are set out in the following sections:

SPECIFIC ITEMS:

Note: Bracketed numbers refer to Code's specific chapters or articles. [ ]
Parenthesis numbers refer to item of this document. ( )

1. SCOPE

1.1 Explicit Concepts and Limitations

[102.1] The Code shall apply to design and construction of new buildings and alteration, reconstruction, demolition, removal, relocation, maintenance and occupancy of existing buildings or any appurtenances connected or attached to such buildings or structures.

[102.1] The principal reference code is the Caribbean Uniform Building Code (CUBiC).

[102.2] It is not intended to supersede or amend legislation in force in St. Lucia. Developer must consult other listed legislation.

1.2 Performance Objectives

[106] Hurricane Precautions.

"During such periods of time as are designated by this Government as being a hurricane watch, the owner, occupant or user of a property shall take precautions for the securing of buildings and equipment". No specific performance objectives are given.

[102.2] "Developers/owners should also consult the Planning and Infrastructure Standards Manual prepared by UNCHS and the Manual for Developers prepared by the Development Control Authority of the Central Planning Unit of the Government of St. Lucia for guidance in respect of layout and infrastructure requirements of a development...."

2. WIND HAZARD

(See Evaluation Form for CUBiC).

3. WIND DESIGN ACTION

Basis of Design [1202.1] Section 12 Wind Loads

Under wind loads the code identifies "Buildings and structures shall be designed and constructed to resist the forces due to wind pressure. The forces

exerted by the wind on a building are the result of a combination of factors such as wind speed, exposure factor, aerodynamic shape of the structure and dynamic response factor".

Structural systems shall be designed and constructed to transfer wind forces to the ground.

On the question of wind pressure it states:

> "The effect of wind pressure on buildings and structures and parts thereof shall be determined from Part 2 Section 2 of the Caribbean Uniform Building Code (CUBiC)".

Differences between Wind and Earthquake [1205].

"The building frames to accommodate earthquake loads must be provided with ductility while for wind the buildings do not have to be designed on the basis of the same criteria, as the main factors affecting building response are the external shape and size of the building".

Table [12.5] lists important differences.

(Not addressed). Engineers and developers are invited to see CUBiC.

4. METHODS OF ANALYSIS

(Not addressed). The methods of analysis are those given in CUBiC.

5. INDUCED EFFECTS

(Not addressed). Users of this code are invited to see CUBiC.

6. SAFETY VERIFICATION

(Not addressed). Users of the code are invited to see CUBiC.

7. SMALL RESIDENTIAL BUILDINGS

The Code is mainly a small buildings code and divides buildings into

(a) Existing buildings - requiring alterations, repairs or rehabilitation to conform to the requirements of the code. [104]

(b) Historical - buildings requiring repairs, alterations and additions necessary for the preservation, restoration,

rehabilitation or continued use. These need not conform to the requirements of the Code under certain conditions.
[105]

(c) Unsafe buildings requiring notice to correct such by the Director.
[108]

Application to Build [109]

It addresses the issue of Application to Build and instructs the applicant as to the steps to be implemented in order to be granted approval.

Plans [110]

Plans are to be submitted with the application for development permission as set out in the Manual for Developers and detailed in plans.

Inspection [113]

It describes in detail the role of the Director of the Authority and that of the Building Inspector. Developers are invited to check with a consultant.
[114]

Here the Authority details the role of the Check Consultant in the review of plans and specifications to ensure that the works are being carried out in accordance with the Code Inspection by Engineer or Architect. Employed by the owner.
[115]

In accordance with 1.108 of CUBiC. Part I, the Director (DCA) may permit the engineer or architect employed by the owner to carry out the inspection of [114].

[301] Group Classification by use and Occupancy

Buildings are classified into:
Group A: Public Buildings.
Group B: Institutional Buildings.
Group C: Commercial and Industrial Buildings.
Group D: Office, Administrative and Retail Service Building.
Group E: Residential Buildings.
Group F: Hazardous Occupancy Building.

Buildings are also classified into the following types based on construction:
Type 1: Fire Resistant.
Type 2: Semi-Fire Resistant.

Type 3: Ordinary Masonry (Protected and Unprotected).
Type 4: Non-combustible.
Type 5: Wood Frame.

[403.1] The requirements of the Code are not intended to exclude the use of any method of construction not specifically described or recognized herein.

[403.3] Standards of construction shall be in accordance with the requirements of this Code and shall at least be equal to the requirements of the list of standards given in Appendices A and B or any other standard or Code approved by the Authority.

Section 14 Timber Construction

[1401] Timber members used for structural purposes shall be designed by methods admitting of rational analysis according to established principles of mechanics.
Standards of construction shall be at least equal to CUBiC Part 2 Section 8 – Structural Timber; or to the American Institute of Timber Construction AITC C 100 or BS5268 – Structural Use of Timber.
The Code therefore either relies upon or identifies minimum standards which must be met.

Section 17 Structural Steel

This section deals with the design and construction of steel buildings which must be carried out in accordance with Part 2 Section 7B "Structural Design Requirements – Structural Steel" of CUBiC.

Section 18 Small Buildings [1801]

Scope – Small buildings defined as single storey buildings of no more than 2,500 sq. ft. in floor area in Occupancy Group E (a) Residential building [301.6].

This section provides information on the design and construction of small wood framed and steel framed buildings using traditional methods of design.

This section is to be read with the following where appropriate:

(i) OECS Building Code

Section 14 – Timber Construction
Section 15 – Concrete Block Masonry
Section 16 – Plain and Reinforced Concrete
Section 17 – Structural Steel

(ii) Caribbean Uniform Building Code (CUBiC)

Part 2 – Section 8 – Structural Timber
Part 5 – Section 1 – Small Buildings (Draft only)

(iii) OECS Building Guidelines.

Wood-Frame Construction [1802]

This section shall conform to the provision of Section 14 – Timber Construction and Part 2 Section of CUBiC.

Table 18.2. Spans and Sizes of Ceiling Joists gives some information re maximum span, maximum spacing etc.

Post, Beam and Plank Construction [1803]

Conformance with Part 2 Section 8 of CUBiC.

Sheet Steel Stud Wall Framing [1804]

Refers to Cold Formed Steel Manual; August 1986 Edition with December 11, 1989 Addendum by the American Iron and Steel Institute.

RECOMMENDATIONS FOR CODE DEVELOPMENT

Since the principal Reference Code is CUBiC which is itself being considered for revision because it is outdated (1985), the OECS Building code can be considered outdated.

APPENDICES

A - British Standard and Codes Applicable
B - U.S. Agencies and Standards
C - Sheet Metal Gauges
D - Hazardous Material
E - Weights of Building Material
F - Accessibility Guidelines for Handicapped Persons
G - General Conditions for Fire Resistive Construction
H - Requirements of Group Occupancies
I - Classification by Types of Construction

WIND CODE EVALUATION

ST. LUCIA

Evaluation Conducted by Winston H.E. Suite

NAME OF DOCUMENT: OECS Building Guidelines
(Minimum Standards for the Construction of Small Buildings)

YEAR: 2001

GENERAL REMARKS: Guidelines developed for building and construction in keeping with acceptable building practices in the OECS.

These Guidelines are based primarily on the reports of the construction industry workshops held in 1985 and 1986 in Antigua, Anguilla, British Virgin Islands, Dominica, Montserrat, St. Kitts/Nevis and St. Vincent.

Other engineers and architects in the OECS and the Turks and Caicos Islands have contributed to the present document, building on the work previously carried out by the Pan Caribbean Disaster Prevention Preparedness Program (PCDPPP).

CONTENTS

SPECIFIC ITEMS:

Note: Bracketed numbers refer to Code Specific Chapters or Articles. [ ]
Parenthesis numbers refer to Items of this document. ( )

1. SCOPE

1.1 Explicit Concepts and Limitations

The Building Guidelines make use of the building traditions that lead to "safe" construction and introduce construction methods required for the proper use of contemporary materials to be used for the design and construction of simple buildings such as private dwellings and small retail shops of less than 3,000 sq. feet gross area. Designers and constructors of buildings outside the scope of the Guidelines must consult the Building Code for the relevant designs and construction requirement.

The Edition includes guidance to developers on the requirements for design and construction of small steel framed buildings (1999).

Some sketches have been taken from the Hurricane-Resistant Construction Manual prepared by the UNCHS/UNDP in 1991. Updating and redrawing of the sketches are being carried out with the help of UNCHS/UNDP Project for Programme. Support to the Human Settlements Sector in the OECS. The building codes and guidelines developed for the OECS countries are based upon:

(a) The Caribbean Uniform Building Code (CUBiC).

(b) The Bahamas Building Code.

(c) The Draft Jamaica National Building Code.

(d) The Turks and Caicos Islands Building Code.

(e) The Antigua and Barbuda Building Code and "as CUBiC does not yet include standards for foundation and building services, the appropriate US and UK standards have been used".

1.2 Performance Objectives

Hurricane Resistant Construction [3.3]

"It is very important in the Caribbean to be ever conscious of the fact the region lies in the hurricane belt".

"It is recommended that that the details shown in the guidelines must be adhered to in order to ensure safe construction".

"The areas most vulnerable to hurricane forces are the roofs, windows and walls".

"The objective of hurricane resistant construction is to produce a building that will not collapse during a hurricane. The building must be standing and its occupants should be safe".

[3.4] Rules for Construction of Hurricane Resistant Buildings.

These cover the following issues:

Building Site
Roofs
Windows and Doors
Walls
Timber Buildings
Steel Buildings

A number of drawings and sketches are provided to deal with the question of detailing for typical elements and structures [listed as A–1 through A–13].

Location: [3.4.1] Buildings sited in exposed areas are most vulnerable.

Roofs

[3.4.2] Experience and research have shown that flat roofs are vulnerable to high winds, the roof pitch should be not less than 25 to 30 degrees. Hip roofs should be used which are more hurricane resistant than the gable roof. Roof overhangs also experience high local pressures and, where possible, these should be kept to a minimum or removed. [A-7, A-8, A-9, A-10]

Walls

[3.4.4] The wall reinforcement must be properly anchored at the foundation and the ring beam levels.

Timber buildings

[3.4.5] The entire structure must be fastened to the foundations and tied together with timber braces and metal straps. [A-11, A-12, A-13]

Steel Buildings

[3.4.6] Under-sized sections and poor maintenance have led to significant reduction in the sizes of critical sections and hence failure. Holding down bolts with foundation.

2. WIND HAZARD

Buildings and structures shall be designed and constructed to resist the forces due to wind pressure.

The forces exerted by the wind are the result of a combination of factors such as:

(i) Wind speed.
(ii) Exposure factor.
(iii) Aerodynamic shape of the structure.
(iv) Dynamic response factor.

Structural systems shall be designed and constructed to transfer wind forces to the ground.

2.1 Basic Wind Speed

The effect of wind pressure on buildings and structures and parts thereof shall be determined from Part 2 Section 2 of the Caribbean Uniform Building Code [CUBiC].

Wind Pressure

The design engineer may utilise a design based on other internationally recognised and accepted information on the effects of wind on structures subject to the approval of the Director.

2.1.1 Height Above Ground
(not considered) see CUBiC

2.1.2 Ground Condition
(not considered) see CUBiC

2.1.3 Averaging Period
(not considered) see CUBiC

2.1.4 Return Period
(not considered) see CUBiC

2.1.5 Quality of Data
(not considered) see CUBiC

2.2 Topography

2.2.1 Escarpment
[3.4.1] (not considered in detail)

2.2.2 Ridges
(not considered)

2.2.3 Axisymmetric Hills
(not considered)

2.2.4 Valleys
[3.4.1] (not considered in detail)

3. WIND DESIGN ACTION

(not considered)

4. METHOD OF ANALYSIS

The guidelines are in the main prescriptive as opposed to analytic.

5. INDUCED EFFECT

5.1 Impact of Flying Objects
(not considered)

5.2 Wind Driven Rain
(not considered)

6. SAFETY VERIFICATION

6.1 Structure

For Timber Construction: [Section C]
Prescriptive guidelines are given for walls at [2.2]. Fig A-12 and A-13.
For roofs the same is given at [4.3]
Construction and [4.4] Fixing.

For Steel Construction [Section D]
Guidelines are given for hollow concrete block walls or metal cladding [3.1.1], [3.1.2]

6.2 Cladding and Non-Structured Element

Prescriptive guidelines are offered at [2.3]
Cladding Section C for Timber Construction

7. SMALL RESIDENTIAL BUILDINGS

This Code is principally about small buildings in general. The approach is more prescriptive than analytical based.

Specific guidelines are offered in Section B Concrete Construction – [1.3] Alternative Footings for a small Timber building [Fig C-1].

More guidelines are offered in Section D, Steel Construction [5] Performance Specification for Small Steel-Framed Buildings.

The criteria to be considered in this appraisal of pre-engineered buildings are:

(i) Resistance to wind and earthquake forces.
(ii) Resistance to corrosion.
(iii) Compatibility with environmental and aesthetic standards [5.1] Steel Construction Section D.

Detail specifications are presented in [5.2].

RECOMMENDATIONS FOR CODE IMPROVEMENT

The OECS Building Guidelines must be read in conjunction with the OECS Building Code which itself is to be seen as linked to CUBiC which is the principle reference Code and is considered for revision since it is outdated.