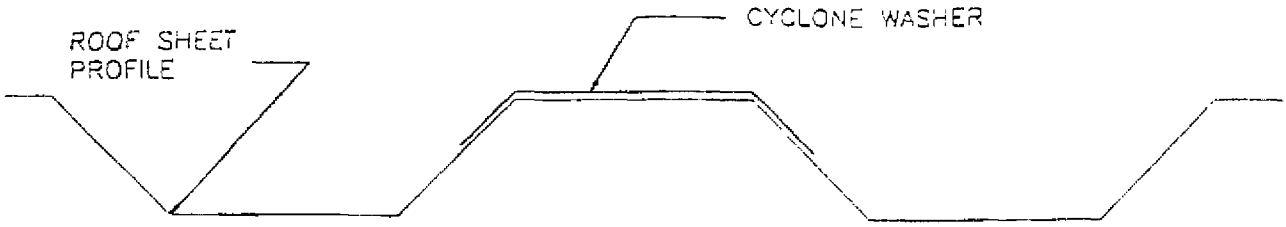
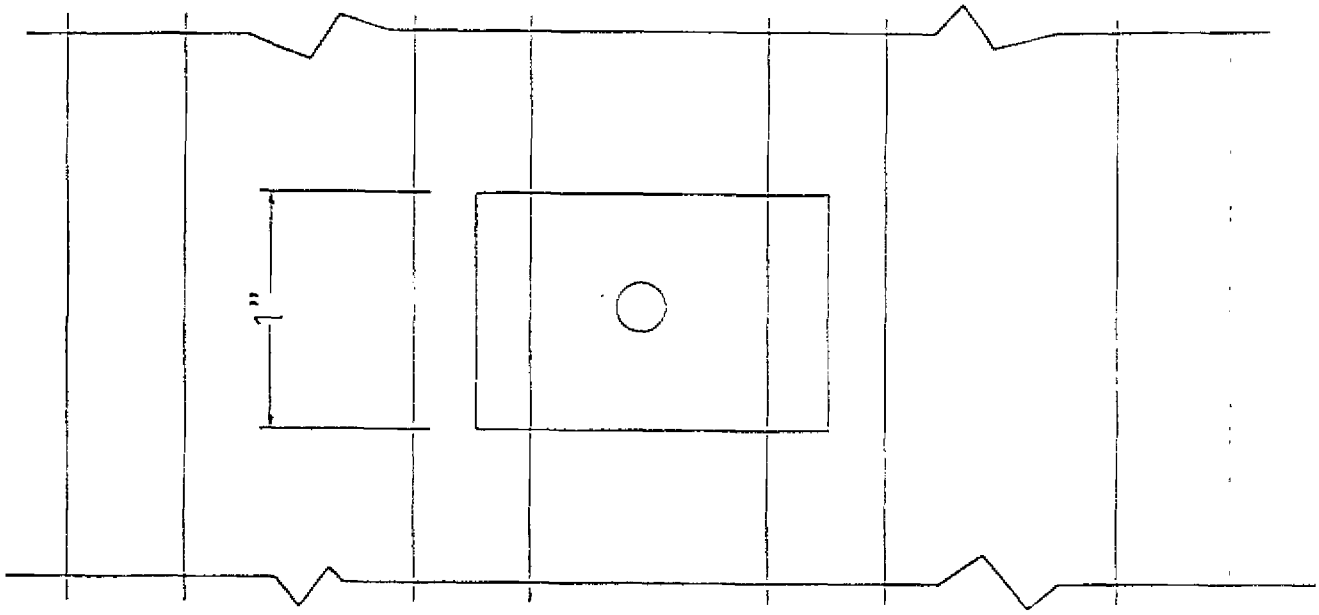
Appendix E

Sketches for Short-Term Measures to Mitigate Damage due to Hurricanes

These illustrations were taken from
"Guide to Making Your Home Hurricane Resistant"
prepared by Tony Gibbs and Philip Jordan of Consulting Engineers Partnership Ltd
for United Insurance Company Ltd
1997



ELEVATION



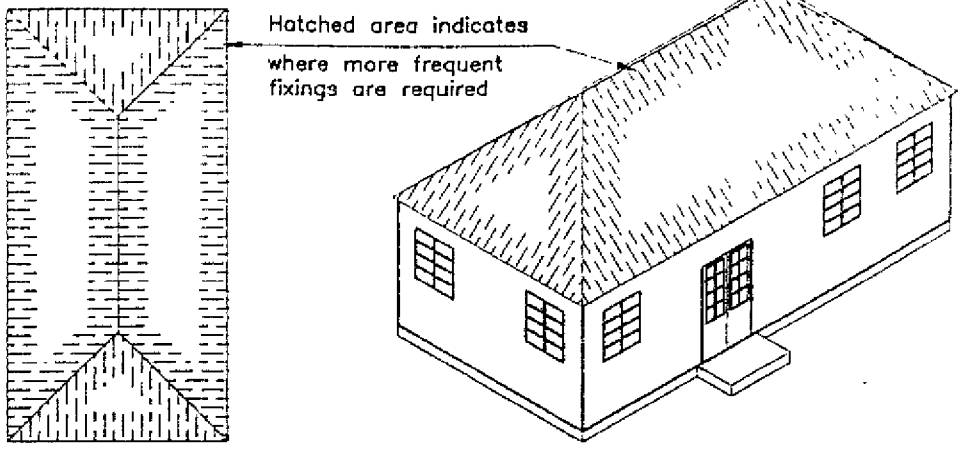
PLAN

CYCLONE WASHER DETAILS

NOTE

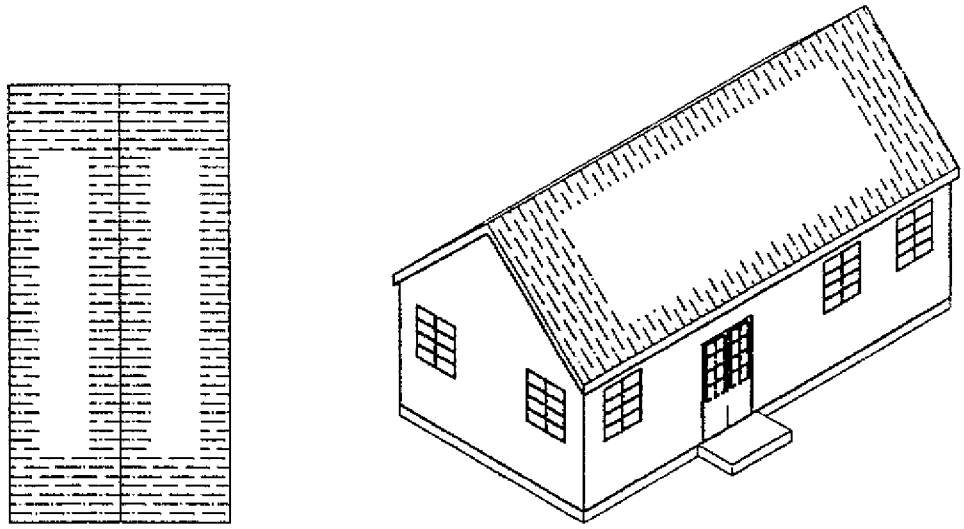
SHEETING FIXINGS TO BE AT EVERY CORRUGATION ON THE THREE NEAREST PURLINS AT ALL EAVES, RIDGES AND GABLE-ENDS.

NOTES	The Queen Elisabeth Hospital Bridgetown, Barbados	SCALE: Not To Scale
-		DATE: Aug 98
	Roof Details at Eaves, Ridges & Gable Ends	JOB No: CEP/20432
	CONSULTING ENGINEERS PARTNERSHIP LTD	SKETCH No: 3



plan isometric

hip–roof

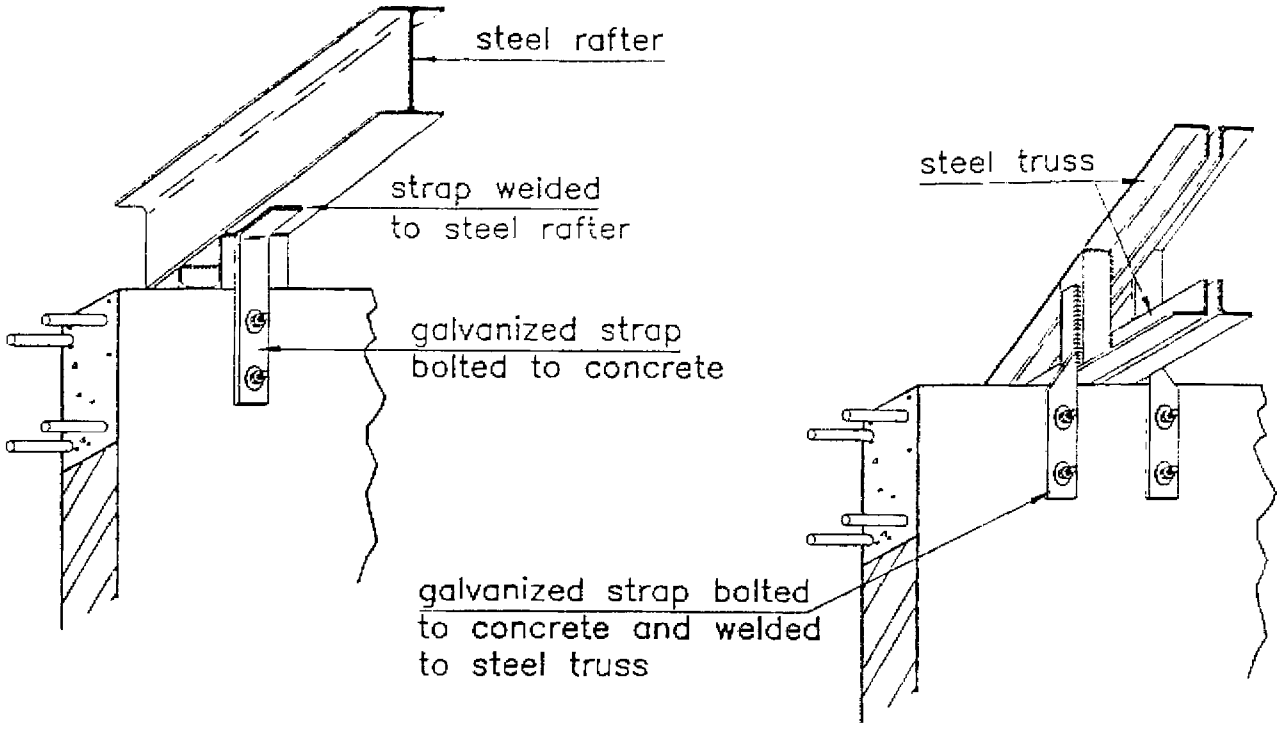


plan isometric

gable roof

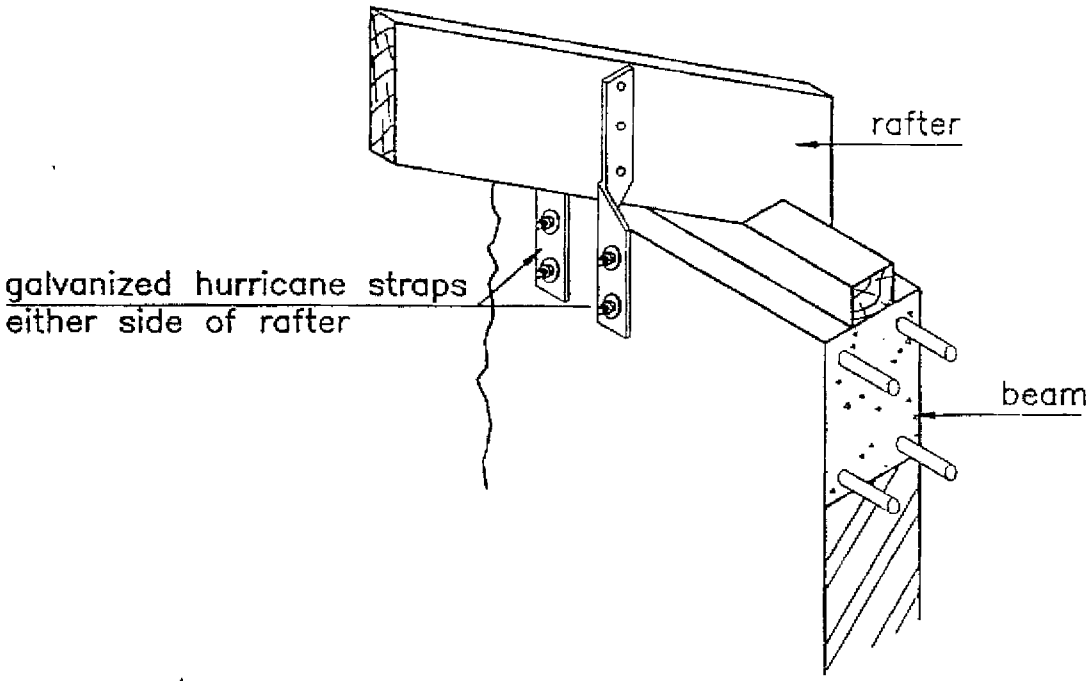
The more vulnerable areas of roofs

Guide Ref. #4



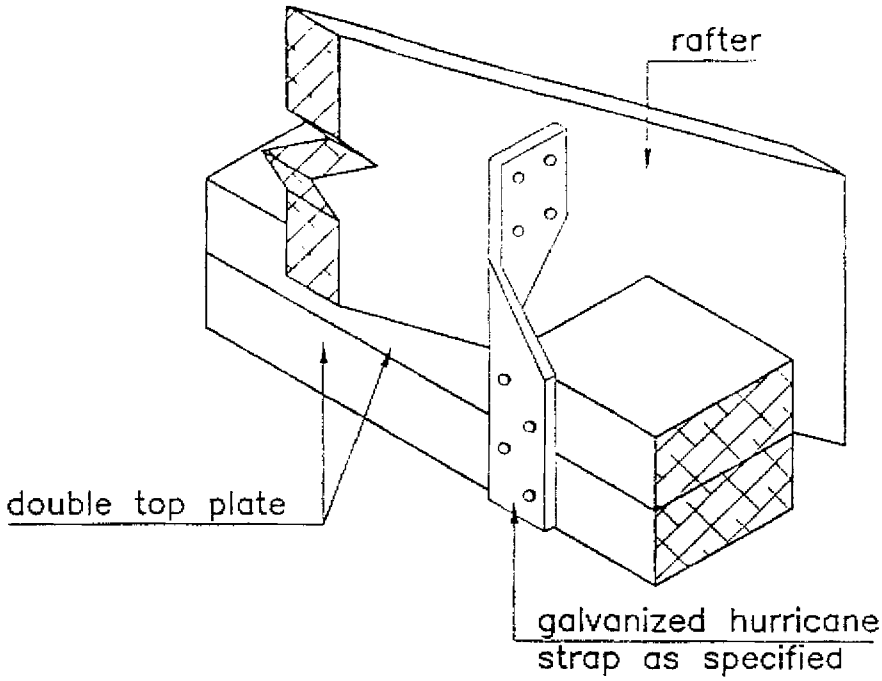
(after welding, apply rust–proofing coating)

Steel truss and rafter connection to concrete

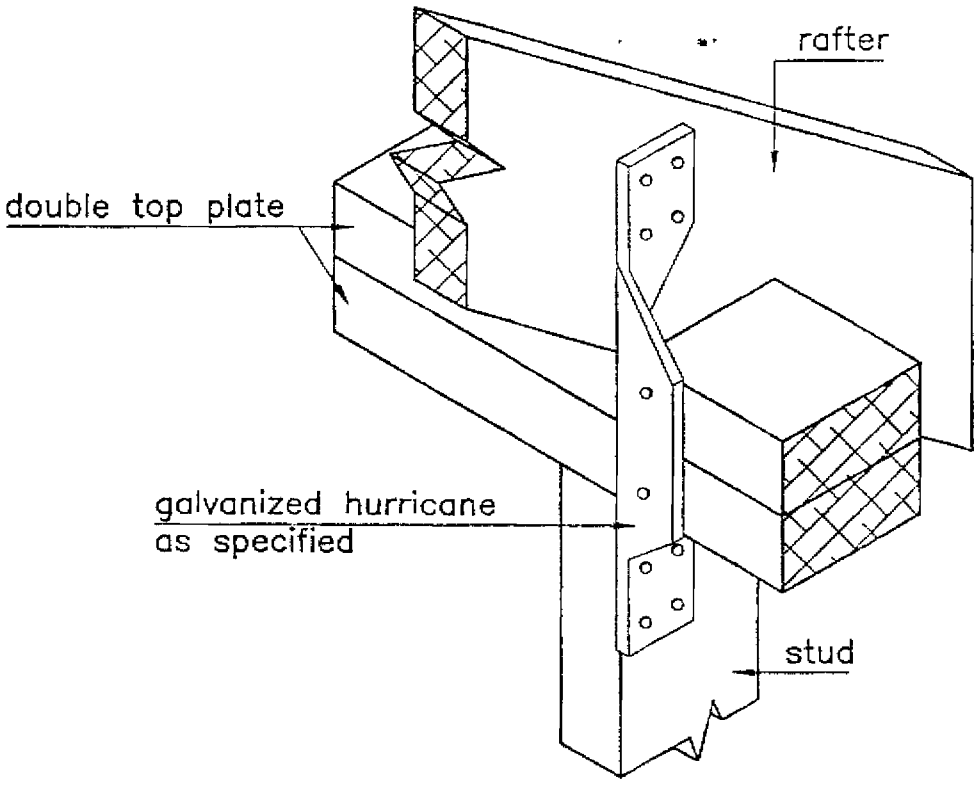


Timber rafter connection to concrete

Guide Ref. #6



Rafter & top plate connection

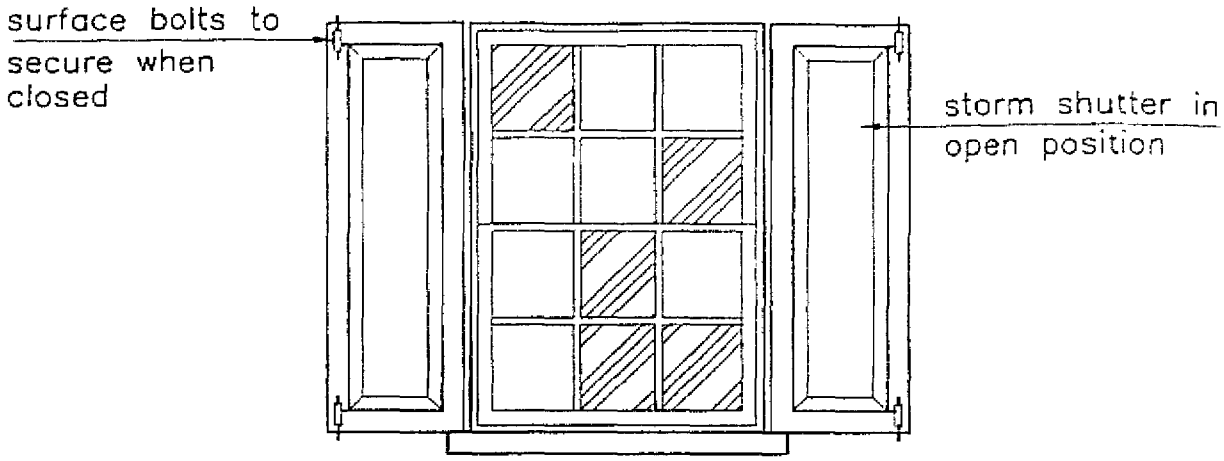


UNITED

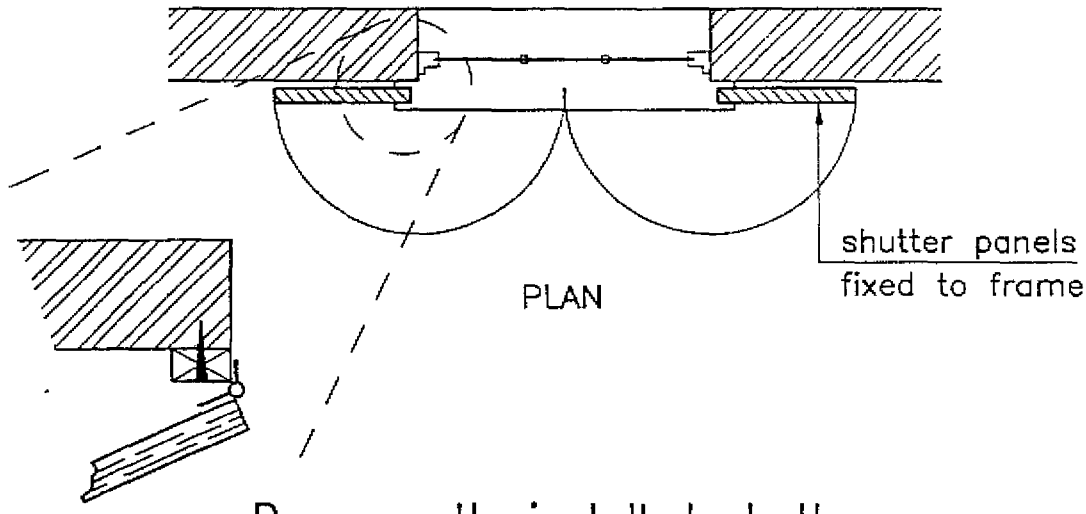
Stud, top plate & rafter connection

Guide Ref. #7

CEP



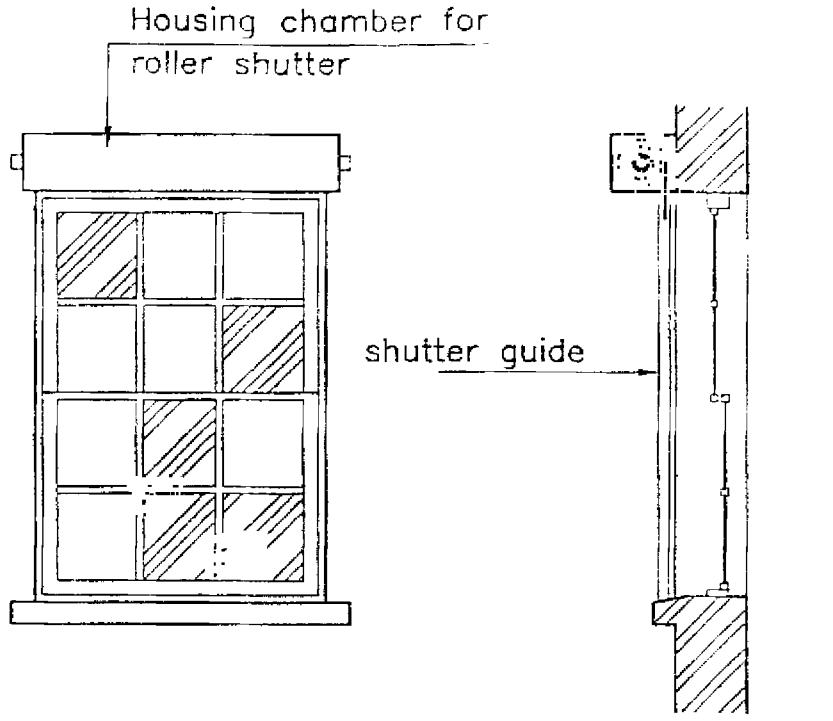
ELEVATION



PLAN

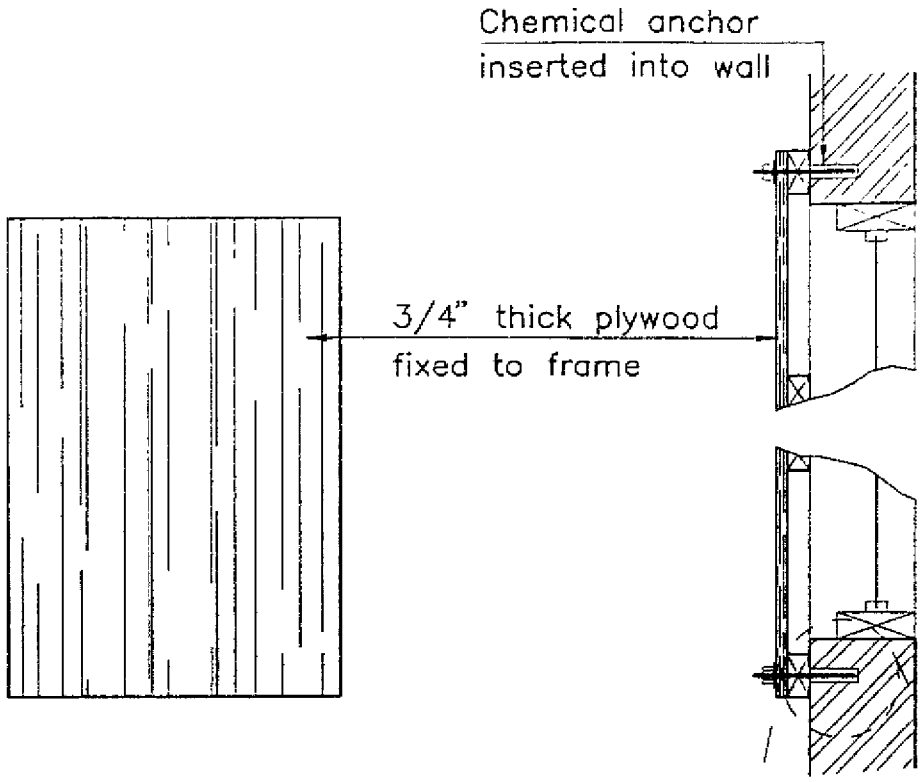
Permanently installed shutters

Guide Ref. #8



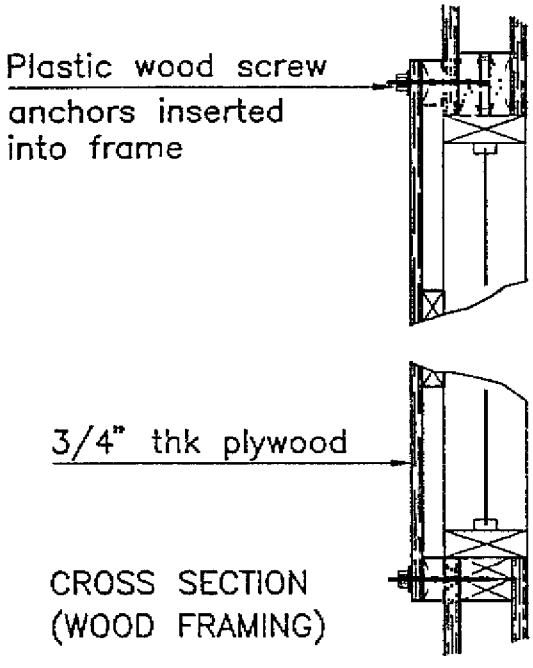
Roller shutter

Guide Ref. #9

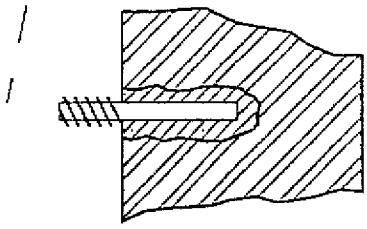


ELEVATION

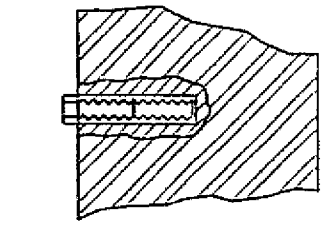
CROSS SECTION
(MASONRY)



CROSS SECTION
(WOOD FRAMING)



Threaded bar detail



Threaded socket detail

UNITED

Pre-fabricated removable shutter

Guide Ref. #10

CEP

To assist in making rational and comparative judgements of the vulnerabilities of the various buildings to hurricanes the WIND-RITE proprietary software developed by the Insurance Institute for Property Loss Reduction was used. Most of the buildings proved to be satisfactory. The exceptions were the "non-engineered" and "pre-engineered" buildings which were in the minority. Those buildings which were assessed to be satisfactory nevertheless required greater attention to be paid to the protection of windows and other openings of the envelope

To assist in making rational and comparative judgements of the vulnerabilities of the various buildings to earthquakes a procedure developed by Drs Hassan and Sozen was used. The full reference for this procedure is given in the report. Several of the buildings were assessed to be vulnerable The exceptions were the lightweight, single-storey buildings. (It must be pointed out that conscious earthquake-resistant design was not the norm when most of the buildings at the QEH were commissioned.) Because the assessment method was based solely on readily-available geometric characteristics of the buildings and without the benefit of construction details, I have recommended further analytical studies for the earthquake resistance of most of the critical buildings. An important source of concern is the proprietary SB floor system with its brittle, hollow-clay-tile, non-structural soffits. These are susceptible to spontaneous breakage under normal conditions. During earthquakes the amount of breakage could be extensive.

The utilities (electricity, telecommunications, water and sewerage) were generally satisfactory. However, there is an inadequate amount of water storage on site.

The absence of a complete set of as-built documents posed a severe restraint on the assessment of the facilities. It is most important that such documents be collected and carefully archived for all future facilities. Even at this stage, every effort should be made to source whatever documents may be in existence for the present facilities to build up as comprehensive a set of records as possible.

In their present conditions damage to the QEH buildings would only be moderate, particularly with respect to hurricanes. Nevertheless, all of the buildings could benefit from mitigation actions with respect to natural hazards.

The short-term measures aimed at reducing vulnerability to hurricanes include strenthening or replacing some of the lightweight roofing systems, provision of dedicated hurricane shutters, installation of hurricane straps in lightweight roof structures, securing chimneys with additional stays and improving the security of external doors. The estimate for implementing these short-term mitigation measures is BD$984,000.

The short-term measures aimed at reducing the vulnerability to earthquakes include the securing of non-structural components and equipment and providing the means to prevent

injury to occupants from falling pieces of the SB slabs. Preparatory work for these actions needs to be undertaken by the QEH staff and estimates are not given for these items.

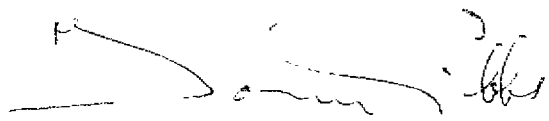
If the premises are retrofitted and the renovations executed in accordance with the general guidance in the report, the hospital should perform satisfactorily in future hazardous events such as earthquakes, hurricanes and torrential rains.

Most of the field surveys were undertaken by Andy Atherley and Andrew Mayo of CEP's Barbados office. They also participated significantly in the preparation of the report.

I wish to acknowledge the assistance of Messrs Mark Gittens and Len Walcott of the QEH staff and Mr Les Ethelridge formerly of the QEH. The support of Dr van Alphen and Mr David Taylor of PAHO was also important to me in carrying out the exercise.

The report follows.

Yours faithfully,



Tony Gibbs

enclosure