A-2. Extracts from the Barbados Homebuilders Guide showing Optimum Shape of a Small Building & Roof

2. SHAPE OF THE HOUSE

2.1 Roof

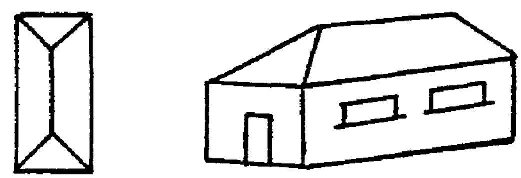
The shape of the building, especially that of the roof, will influence the magnitude of the wind loads on the structure.

The higher the wind loading, the greater is the tendency for the building to suffer wind damage. Experience and experiment have shown that houses with hip roofs have the best record of resistance. The next best roof shape is the high gable roof with a pitch of 30^o to 45^o. The low gable roof and the flat roof have been found to have the worst record of resistance to wind loads.

Roof shape in order of preference.

Plan   Isometric

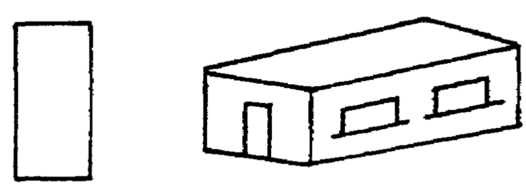
(1) Hip
Pitch 25^o to 40^o



(2) High Gable
Pitch 30^o to 45^o

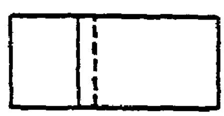
(3) Low Gable
Pitch less than 25^o

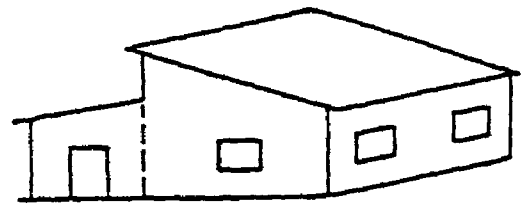
(4) Flat
Pitch 0^o to 4^o



In Barbados, a particularly bad shape has become very popular during the past 25 years. This is illustrated below. The disadvantages associated with this shape result from the low pitch of the roof and the connection at the ridge. High suction forces are present at the ridge of a pitched roof, in addition with the split roof an overhang is often present at the ridge, and as will be shown later, this will serve to increase the forces tending to lift it off.

(5) Plan Isometric





A-3. Extract from the Barbados Homebuilders Guide showing the Details of Roof Connections

4.9 Roofs

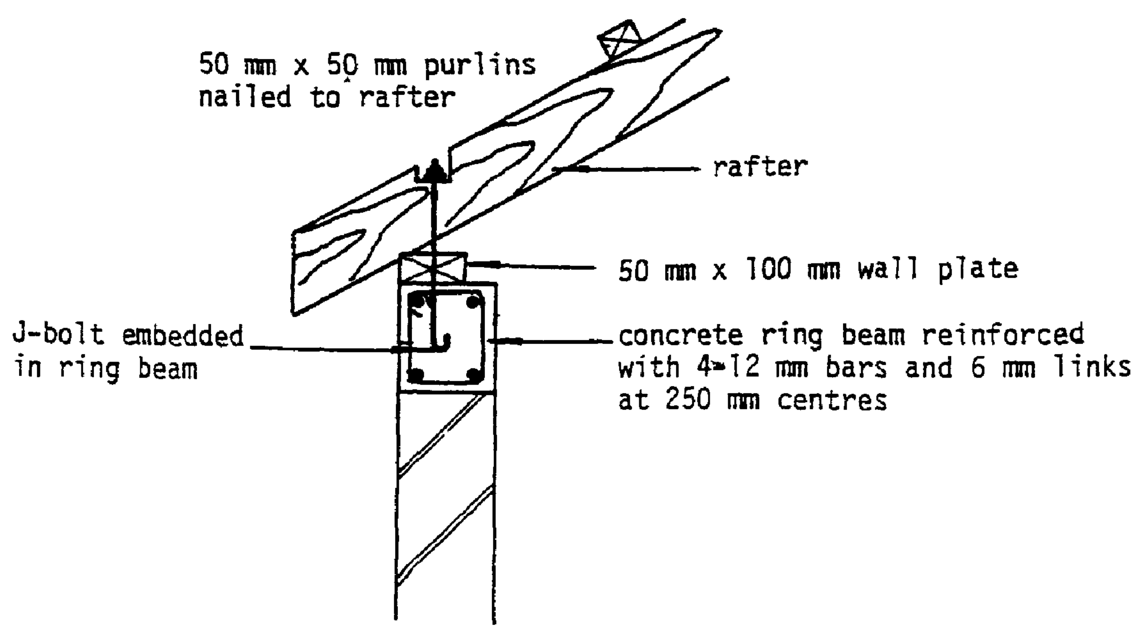
4.9.1 General.

The roof must be securely fixed to the rest of the structure. Failure to observe this rule is the single greatest cause of damage to houses due to hurricane force winds. If the roof stays on the house and the walls are of sufficient strength, then there is little likelihood of the house being damaged or destroyed by a hurricane.

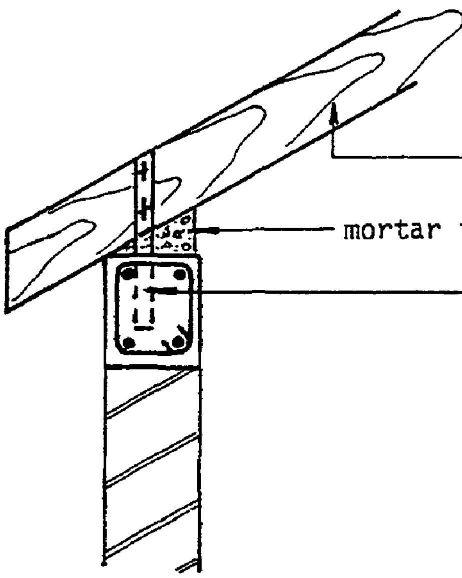
4.9.2 Masonry Walls.

When the loadbearing elements are masonry walls, a reinforced concrete ring beam, 300 mm deep by the width of the wall should be provided at roof level to tie the walls together and to transfer the roof loads to the walls.

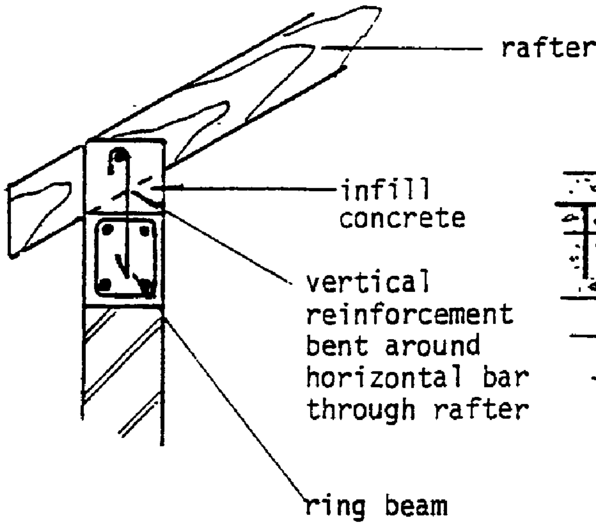
Since the fixing of the roof members to the rest of the structure is critical for the survival of the house, a bolted connection is recommended. 12 mm diameter galvanised J-bolts embedded in the ring beam for at least 200 mm and threaded through pre-drilled holes in the rafters will provide a secure connection. A wall plate is often provided at the roof and may be used as a levelling plate for the rafters.



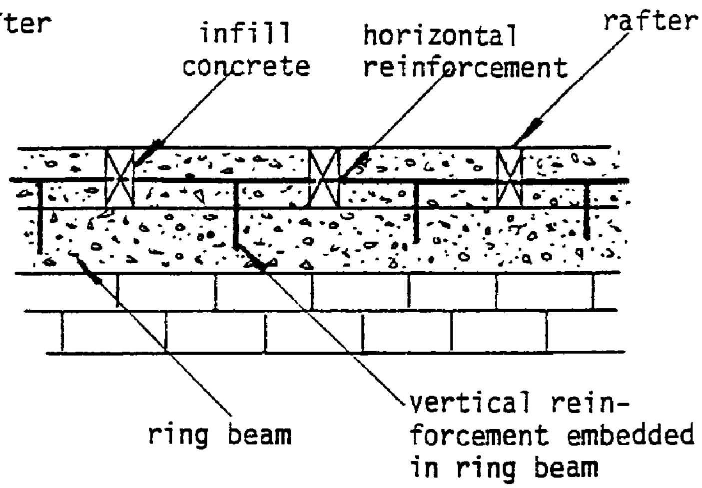
Alternatively, metal straps, often referred to as hurricane straps, embedded in the concrete belt beam and nailed to the rafters may be used for the connection. These straps may be fabricated by the builder from 20 gauge galvanised sheet metal.



A very popular and secure connection used in Barbados is to embed the rafter in concrete. This is achieved by casting the concrete ring beam, about 200 mm to 300 mm deep, with vertical reinforcement, usually 6 mm or 8 mm diameter bars, projecting at almost 600 mm centres. The rafters, with a pre-drilled hole in the horizontal direction, are then put in position and a reinforcing bar, a 12 mm diameter for example, is then threaded through the rafter. The vertical reinforcement is then bent over the horizontal bar and the space between the rafters infilled with concrete. One advantage of this connection is that there is no need to know the precise location of the rafters when casting the belt beam with the projecting reinforcement; a disadvantage is the tendency for the timber to rot when in concrete, especially if the timber is exposed to rain.

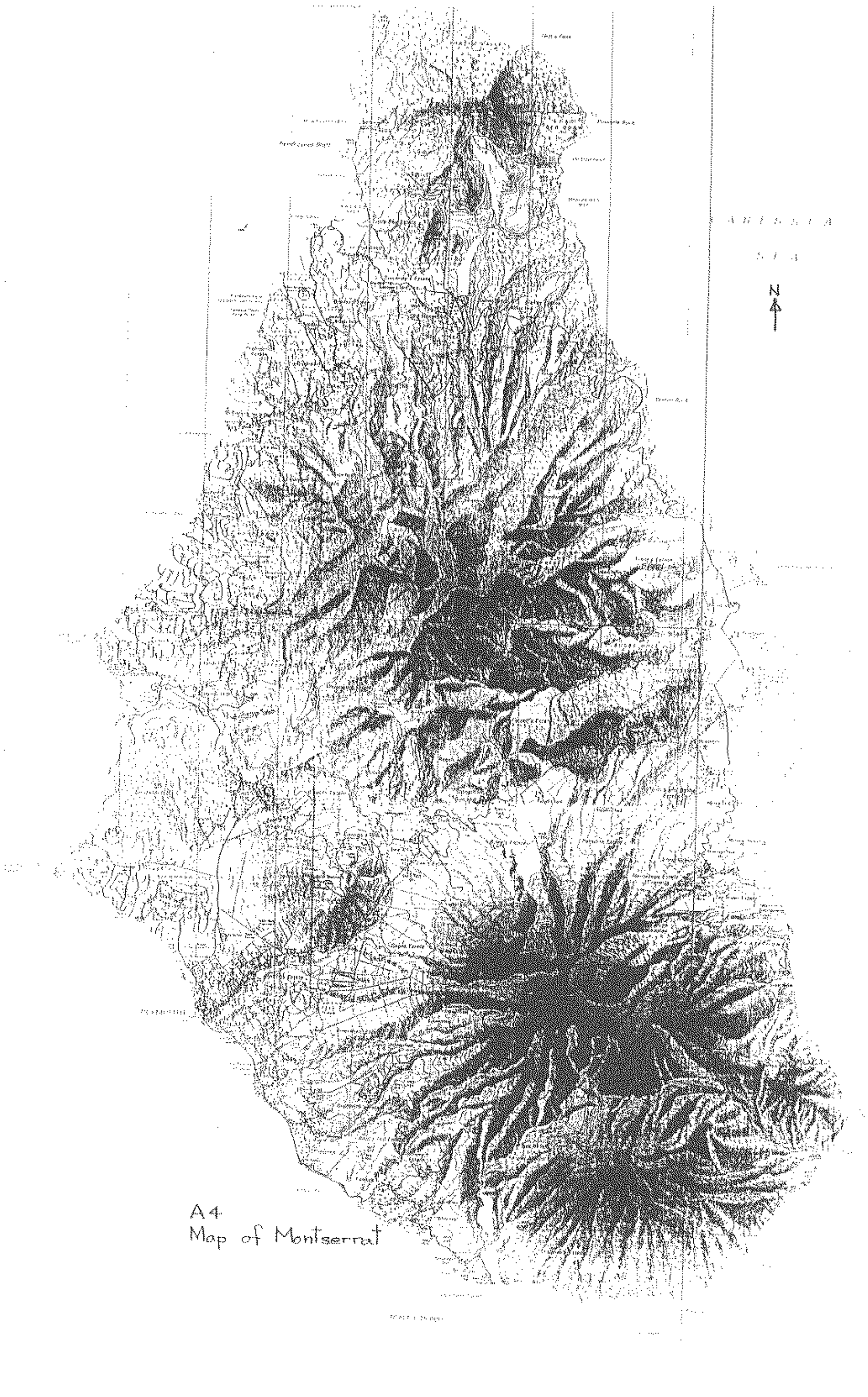


Section



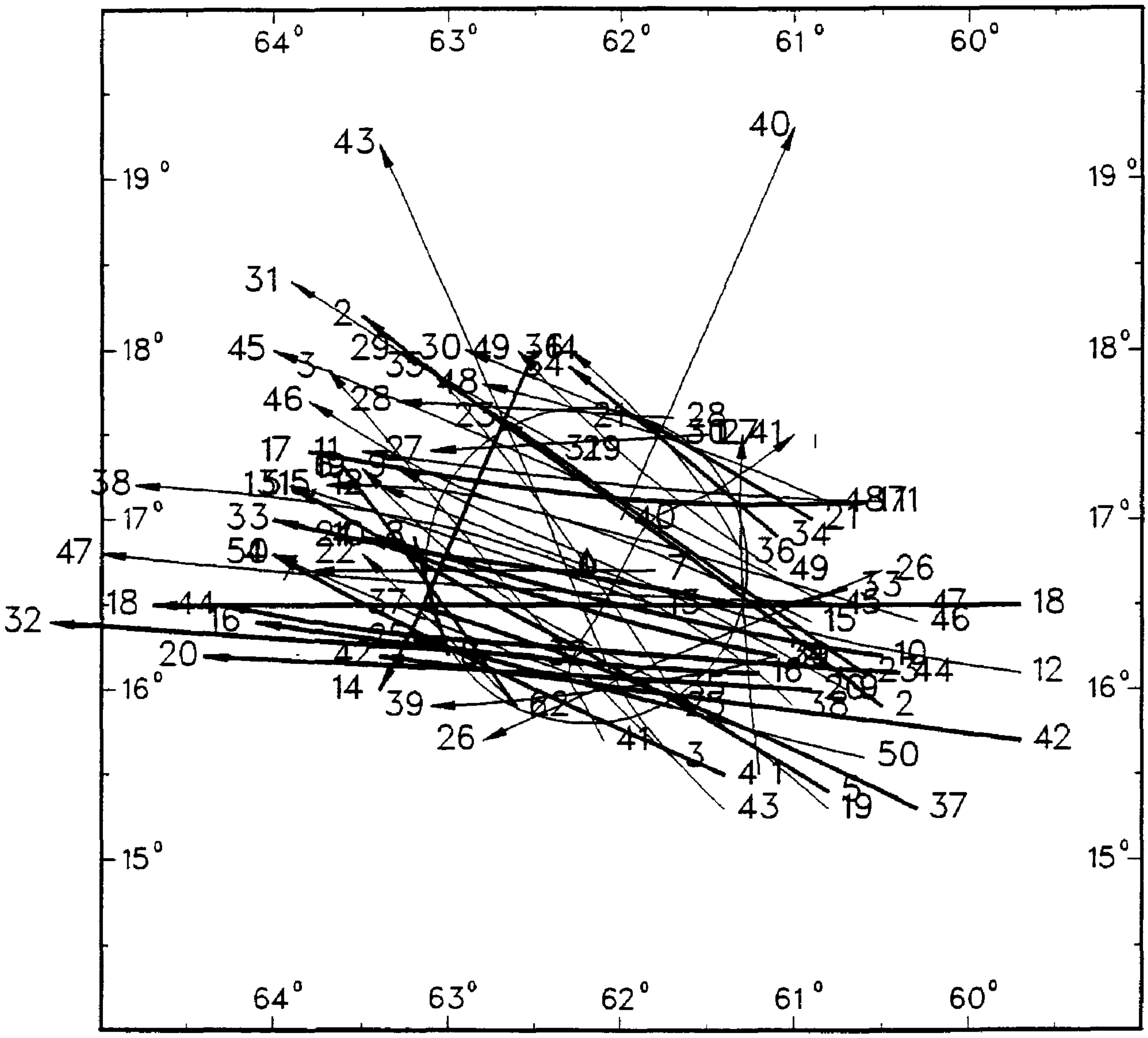
Elevation

"Imágen reducida del original"



A5 – I

Tropical Cyclones Passing Within 100km of Montserrat
1886 – 1986



The Boundary Layer Wind Tunnel Laboratory
The University of Western Ontario
London, Ontario

Tropical Cyclones Passing Within 100km of Montserrat 1886 – 1986

1.	TS	Not Named	Nov. 2, 1888
2.	HR	Not Named	Sep. 3, 1889
3.	TS	Not Named	Oct. 2, 1889
4.	HR	Not Named	Aug. 19, 1891
5.	HR	Not Named	Aug. 16, 1893
6.	HR	Not Named	Oct. 13, 1894
7.	HR	Not Named	Sep. 22, 1896
8.	HR	Not Named	Sep. 11, 1898
9.	TS	Not Named	Sep. 21, 1898
10.	HR	Not Named	Aug. 7, 1899
11.	HR	Not Named	Aug. 31, 1900
12.	TS	Not Named	Oct. 9, 1901
13.	HR	Not Named	Jul. 19, 1903
14.	HR	Not Named	Mar. 8, 1908
15.	HR	Not Named	Sep. 25, 1908
16.	HR	Not Named	Aug. 22, 1909
17.	HR	Not Named	Sep. 6, 1910
18.	HR	Not Named	Aug. 10, 1915
19.	HR	Not Named	Jul. 12, 1916
20.	HR	Not Named	Sep. 21, 1917
21.	HR	Not Named	Sep. 16, 1922
22.	HR	Not Named	Aug. 18, 1924
23.	HR	Not Named	Aug. 28, 1924
24.	HR	Not Named	Sep. 13, 1928
25.	HR	Not Named	Sep. 1, 1930
26.	HR	Not Named	Oct. 31, 1932
27.	TS	Not Named	Jul. 14, 1933
28.	TS	Not Named	Sep. 27, 1933
29.	TS	Not Named	Aug. 8, 1938
30.	TS	Not Named	Aug. 13, 1943
31.	HR	Not Named	Oct. 16, 1947
32.	HR	Not Named	Sep. 21, 1949
33.	HR	BAKER	Aug. 22, 1950
34.	HR	DOG	Sep. 1, 1950
35.	HR	EDNA	Sep. 14, 1953
36.	HR	HILDA	Sep. 11, 1955
37.	HR	BETSY	Aug. 11, 1956
38.	TS	EDITH	Aug. 18, 1959
39.	HR	FRANCES	Oct. 1, 1961
40.	HR	JENNY	Nov. 1, 1961
41.	TS	HELENA	Oct. 27, 1963
42.	HR	CLEO	Aug. 22, 1964
43.	HR	BETSY	Aug. 29, 1965
44.	HR	INEZ	Sep. 27, 1966
45.	TS	DORIA	Aug. 23, 1971
46.	TS	CHRISTINE	Sep. 3, 1973
47.	HR	CARMEN	Aug. 30, 1974
48.	HR	FREDERIC	Sep. 3, 1979
49.	HR	FLOYD	Sep. 4, 1981
50.	HR	GERT	Sep. 8, 1981

The Boundary Layer Wind Tunnel Laboratory
The University of Western Ontario
London, Ontario