The Impact of Bureaux de Contrôle on Damage Levels in Hurricanes

by
Tony Gibbs

1 Hurricane Luis in Saint Martin / Sint Maarten

In September 1995 Hurricane Luis passed to the north-east of the island of Saint Martin / Sint Maarten. Saint Martin is French and Sint Maarten is Dutch. The amount of damage in Sint Maarten was significantly more than in Saint Martin, although the French side of the island was closer to the centre of Luis than was the Dutch side.

It is accepted that factors other than distance from the eye of the storm, such as topography, affect wind speeds. However, there is no clear evidence that Sint Maarten experienced higher wind speeds than the French side. Unfortunately there were no anemometer measurements available on the French side and the only reliable anemometer readings on the Dutch side were at the Netherlands Antilles Meteorological Service at the airport. There the highest recorded gust was 99 knots or 51 metres per second (ms^{-1}). This was at a height of 10 metres above adjacent ground. The eye passed 50 kilometres north of Saint Martin / Sint Maarten so that it was the south-west, south and south-east eye walls that impacted on the island. This meant that Saint Martin / Sint Maarten was spared the full brunt of Luis. Indeed, the wind forces in the north eye wall would have been about 33% greater than those in the south eye wall.

Notwithstanding the relatively favourable location of the island, the amount of damage caused was significant. In the case of Dutch Sint Maarten the damage was catastrophic. Direct losses were equivalent to the gross domestic product (GDP) and indirect losses added a similar amount, for a total loss of the order of twice the GDP.

When I visited the shared island in May 1996, eight months after Luis, the Dutch side still showed considerable evidence of the damage due to Luis. This was not at all evident on the French side. How much of the difference was due to differing responses on the two sides I am unable to tell. However, those who were there during and immediately after the event confirmed that the differences in levels of damage were stark.

2 The Differing Regulatory Regimes

During my visit to Sint Maarten meetings were held with several engineers and builders who had worked on both sides of the island. The contrast in damage levels was discussed with them and their comments were revealing.

Mr Ronald Daal of Independent Consulting Engineers (ICE) indicated that there were significant differences in the regulatory regimes on the two sides of the border. ICE maintains offices in both territories. On the Dutch side the buildings are designed in accordance with a variety of standards, including those of the Netherlands. The checking authority is the government Public Works Department, although this task is occasionally contracted out to private firms. On the French side construction must comply with the French "norms" and the design and construction are checked by *bureaux de contrôle*. In Mr Daal's words, on the French side "you have to do it right".

During my visit the Contractors Association in Sint Maarten arranged an evening forum of architects, engineers, builders and government officials which I addressed on the subject of "Hurricanes and Their Effects on Buildings and Other Structures". After the lecture there was a wide-ranging discussion on various issues related to the Luis experience in Sint Maarten and the way forward for the building industry. Again, the contrast with French Sint Martin was alluded to. The differences outlined by those familiar with construction on both sides of the border included:

- better attention to conceptual design on the French side;
- greater consistency and uniformity of standards of design for earthquakes and hurricanes on the French side;
- the involvement of *bureaux de contrôle* on the French side.

3 *Bureaux de Contrôle*

The *bureaux de contrôle* are independent firms licensed by the state. They pay well and attract, and keep, some of the best talent. They check designs and also make site visits during construction. Their involvement in projects is necessary if decennial (10-year) insurance cover is to be obtained by the building owner. Lending agencies also demand the certification of *bureaux de contrôle*.

Because of the above observations in Sint Maarten / Saint Martin the Pan American Health Organisation Emergency Preparedness & Disaster Relief Coordination Programme office in Barbados assisted in sending me to Martinique in June 1996 to investigate the French system of controlling building standards. A considerable amount was learnt during a two-day visit. A full report on that visit would be well worth preparing and it is my desire so to do. However, in the meanwhile, it is useful to summarise the main information gathered during that visit.

During the visit, meetings were held with representatives of the government, architects, engineers, small builders, large contractors, developers, property managers and *bureaux de contrôle*. The most remarkable result of the various discussions was that I could not find anyone who disagreed with the system of using *bureaux de contrôle* to review the design and construction of buildings. Most comments were positively favourable. The *bureaux de contrôle* were seen as being generally helpful and as having a developmental role in the construction industry.

There are five *bureaux de contrôle* operating in Martinique at present. That provides clients with choices and provides some market-driven constraint over the cost of these services. The building owners pay the *bureaux de contrôle*. Thus, in effect, a building owner would employ two sets of consultants on each project - the design team and the *bureau de contrôle*.

There were some inconsistencies in the answers I received in seeking to find out the area of applicability of use of *bureaux de contrôle*. It appears that a law of 1978 required building owners to purchase decennial insurance for all new properties. The insurance providers require the certification of *bureaux de contrôle* before writing policies. But how widespread is this? Some persons indicated that all new buildings require *bureaux de contrôle*. Others said that all new buildings using borrowed funds for construction require *bureaux de contrôle*. Others said that all new buildings where the public has access require *bureaux de contrôle*. Suffice it to say that the use of *bureaux de contrôle* in Martinique and other parts of France is widespread and its beneficial effect on Saint Martin was manifest.

But how do others see the role of *bureaux de contrôle*? Here are two quotations from Peter Rice's book "The Engineer Imagines":

"It is no accident of time that both the La Villette and IBM

projects first appeared in France where there exist the most intelligent and knowledgeable checking authorities that I have come across. The large centralized controlling offices, *bureaux de contrôle*, Socotec, Veritas, CEP and others each have at their head engineers who are equal in ability to any I have encountered in the best design offices, as Centre Pompidou amply demonstrated." - page 113

"Others not so closely involved must also be asked to review the project to question the assumptions and demand explanations. ..... . The presence of a competent, dedicated and sceptical checking authority is also very important in this respect." - page 123

(Peter Rice, now deceased, was one of the outstanding structural engineers of the 20th Century.)

4 Other Countries

In one form or another the independent checking of design and construction is widespread in many jurisdictions. What sets France apart from most is the quality of their checking agencies. However, some other jurisdictions do adopt a similar approach for special facilities. In the United Kingdom all dams, tunnels and bridges are reviewed by specially-licensed, private-sector consultants. Here in the English-speaking Caribbean the Turks & Caicos Islands have made provisions for "special inspectors" in their recently-introduced building code. A similar arrangement is being proposed for the Organisation of Eastern Caribbean States building codes.

My own firm (Consulting Engineers Partnership Ltd) has had the experience of having *bureaux de contrôle* involved in two important projects for which we were the design engineers - the Central Bank of Barbados and the Eastern Caribbean Central Bank. We consider this approach to be worthy of adoption on a wider scale.

I would like to conclude by recommending that (at least) all health-care facilities in the Caribbean have, in the future, the involvement of *bureaux de contrôle* in addition to the conventional design teams for capital works projects, including additions to existing buildings and major renovations.