Our Transportation System is in Crisis - 49

Today I examine some issues concerning the development of an evacuation transportation plan. There are two types of evacuation: one that occurs prior to a forecast catastrophic event, or pre-event evacuation; and, one that occurs following an unplanned catastrophic event, or post-event evacuation. Pre-event evacuation can be simple to perform—if the event can be predicted sufficiently in advance and with reasonable certainty. Natural disaster planning typically falls under the jurisdiction of emergency planning and law-enforcement agencies. Historically, engineers have played critical supporting roles to these agencies by providing expertise in, among others, protection during landslides and collapses of buildings, roads and bridges. One area where engineers have had relatively little input to disaster planning and preparedness has been in the area of evacuation transportation planning and traffic management.

On Monday July 11, 2005 at just after 2:00pm a low-powered device was detonated in downtown Port of Spain and the explosion caused serious injury to several persons, and an unexpected mad rush of persons and vehicles to escape from the Capital. The result was panic and massive pile up of traffic all over the city; public transport was almost impossible to access; telephone landlines were overloaded and the cellular system crashed; and, in the absence of frequent updates by the broadcast media, rumours of all kinds of disaster made the rounds.

On Wednesday July 13, 2005 at just after 12:00 noon, the Prime Minister's Office issued an emergency bulletin mandating that all business places should be closed by 12:30pm so that personnel may leave for home to protect themselves pending the arrival of Hurricane Emily, which was expected to hit landfall by 8:00pm. The result was again panic and massive pile up of traffic all over the city that lasted for three to fours hours; and, public transport was very difficult to access. The cellular telephone service was not yet restored.

The first event was an example of post-event evacuation, while the latter was a typical pre-event evacuation. Current storm-track forecasting systems are able to predict strike location within about 150 km, 24 hours before the storm makes landfall. So I believe that the Prime Minister's Office acting on the advice of the Office of Disaster Preparedness and Management (ODPM) could have done a broadcast on the Tuesday night that all business places should close at 12:30pm on Wednesday. That would have given people the option of going to work at all on Wednesday, and so potentially reducing the traffic demand.

A post-event evacuation differs from pre-event evacuation for several reasons, including: Unpredictability of the time available for the population to seek refuge; Increased complexity of traffic demand scenarios to be analysed; Possible reduction in road availability as certain elements of the road system may be rendered inoperative; Necessity to guarantee the simultaneous movements of both operative and rescue vehicles; increased difficulties in coordinating and directing the evacuation; Changes in ordinary behaviour due to panic; and, Increased probability of road accidents or unforeseen circumstances.

Prior to a pre-event disaster, the following questions should be asked: How much time is needed for the entire population to reach a safe place? How many people are at risk as a result of the estimated evacuation time? What routes must be used by public vehicles employed in the evacuation? What are the best evacuation points and bottlenecks on the network? What traffic control measures can be implemented to improve the efficiency of the critical points?

Usually the emphasis of evacuation planning is on removing the local and user population of a city / region to a safe location, so all roads lead exclusively out of the city. And the literature on evacuation plans (including from the Internet) usually only describes a strategy to escape from the city. The Government's proposed POS Evacuation Strategy is in accordance with removing the population from the city. For example, they recommend that the Priority Bus Route would be made one-way eastbound, and the shoulders would also be used where possible. And the emphasis on the function of the Eastern Main Road and Beetham Highway would be to facilitate eastbound traffic from the city. At least two concerns arise: (a) A traffic lane should always be left open for use by emergency vehicles and tow-trucks, particularly those travelling against the flow of evacuation traffic. (b) It is true that at least 65 percent of the users of the city come from the east, but all persons travelling from the east westwards to places west of Port of Spain must pass on some of these roads. Adequate provision may have to be made for this pass-through traffic, particularly in the case of pre-event evacuation.

The East West Corridor Expansion and Improvement Works concluded in 1999 that there was need for the reconstruction of five major corrugated metal pipe (cmp) culverts on the Beetham Highway between the NP Flyover and the Barataria Interchange. These culverts were installed in the 1940's during initial construction of the highway and have exceeded their

useful life, both structurally and hydrologically.

Let us imagine that it is a weekday afternoon at 3:00pm and there is heavy rainfall, and a newsflash just advised that one of these culverts has collapsed completely across both carriageways of the Beetham Highway. As a result there is major flooding on both the Eastern Main Road and the Priority Bus Route, and several areas of Beetham / Laventille. And concurrently, there is a major landslip across the Lady Young Road near the Lookout. In other words, the entire eastern side of POS is cut off from traffic accessibility. Is this scenario so far-fetched? Just a few weeks ago a cmp culvert across the Solomon Hochoy Highway near Gasparillo collapsed and had to be completed re-built, and this culvert would have been originally installed in the early 1970's. To be continued.

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