

EARTHQUAKE AND TSUNAMI LIFELINE PERFORMANCE INVESTIGATION INDIA TEAM

The team members are:

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Acknowledgement

On behalf of the team I like to thank the following individuals:

Prof. M Prasad of India Institute of Technology, Chennai,
Mr. Ganapathy Muruges (DOT, CA on vacation in India),
Ms. Parthabha Gandhi (Ph D student of Prof Prasad, and
Mr. P.A.K. Murphy (ICE, India),

who provided us with the support and set up meetings with local utilities and district Collectors. Without their effort, we will not be able to collect as much information.

Overview

In order to be able to cover a large area to collect lifelines performance data, the team agreed to be divided into two sub-teams. One team went to Andaman Island (a Union Territory of India) to collect both earthquake and tsunami damage data while the second team went along the coastal area of Tamil Nadu State (from Chennai to Nagapattinam). In addition to assessing the performance of lifelines, the team also collected data related to social economic impact of this disaster.

Andaman Island

Port Blair structures were damaged by earthquake and tsunami on South Andaman Island. In general, the concrete pile wharf/pier structures performed quite well, and in some cases even carried vessels as they were dropped onto the deck, during the tsunami. Structures that had prior deterioration, either due to age, poor quality of construction or prior damage did fail during the earthquake, and there were cases where entire sections of piers had disappeared, and only light poles remain above the water line.

Tsunami damage to port and harbor structures was limited. In some cases barges or vessels were left on the top decks of wharves, and there was no apparent structural damage.

At Port Blair, South Andaman Island, the operations mandated that all vessels depart, following an earthquake. This saved many lives, as a ferry terminal was loading passengers at the time of the earthquake. There was 50 minutes until the first wave arrived, with a height of approximately 5 meters. The interval between the four waves was about 30 to 35 minutes. Port personnel did an excellent job of vacating the port, and making sure that all personnel had left the area.

The water level at Port Blair has been permanently raised by about 1 meter. It is believed that

this is a tectonic event, following the magnitude 9 earthquake. The rise in the mean sea level creates potential problems in that it is almost at the level of the underside of some wharf structures. It also modifies the mooring line angles, making them steeper, thus transferring more vertical load to bitts, bollards and hooks, and finally it changes the vertical location of berthing contact points.

The main ferry terminal was severely damaged by the earthquake and has been shut down.

Tamil Nadu

Telecommunication went down due to Central Offices inundated and had to turn power off to protect digital equipment. Power room of the Central Office, which is in the lower floor, was under water. It took Bharat Sanchar Nigam Limited (equivalent to North America Bell Company) 3 days to remove and re-install equipment from spares to bring telecommunication back to normal. During the process of removing and replacing water-damaged equipment, a fibre optics cable of SONET was severed that brought down several Central Offices from the intra office connection.

Downed power poles mainly caused electric power outage. In the Cuddalore district, there were more than 300 poles had to be replaced. The recovery of power took three days after the tsunami.

Ground water is the main source of water supply in this State; new taps were installed almost immediately. However water tanks were also supplied for the villages, particularly in the temporary shelters areas.

Kerosene is the main fuel for cooking in the tsunami impacted area; the Government relief office provided the supply to the victims.

Chennai Port damages were a result of mooring ships broken from the ties. A number of containers were floating in the harbor after the tsunami hit.

The damage structures of small port in Nagapattinam for cooking oil storage and fishing boats were quite extensive. A telecommunication tower was collapsed by the tsunami; it also took down the electric power cable and poles.

A railway line was damaged by the tsunami in Nagapattinam.

Due to factors such as fear, cost of fishing boat and fishing net repair during our visit, no fisherman is going out to the sea. Almost all wholesale fish markets were damaged by the tsunami. The Central Government through the Relief and Rehabilitation Office is taking applications from the victims to help them to finance repairs (loan and grant).

One of bridge at Nagapattinam had one of the piers taken out by tsunami; a steel truss is placed on top to provide single lane traffic for cars, carts and buses, a narrow walkway on the side for pedestrians.



Figure 1. The investigation team was well received by the Port Authority of Chennai. (Eskijian)



Figure 2. Damaged telephone cross connect box for the village. (Tang)



Figure 3. New transformer and new poles for power distribution (Tang)



Figure 4. Water Tanks for temporary shelters for victims (Tang)



Figure 5. Water truck filling water tanks, the white powder on either side of the road is bleach used to control infection. (Tang)



Figure 6. Fishing boats damaged by tsunami (Ames)



Figure 7. Collapsed telecommunication tower as a result of tsunami (Tang)



Figure 8. Damaged pier – for loading cooking oil to the tanks (Tang)



Figure 9. The village in Nagapattinam – the houses/huts close to the waterfront were wiped out by the tsunami (Tang)

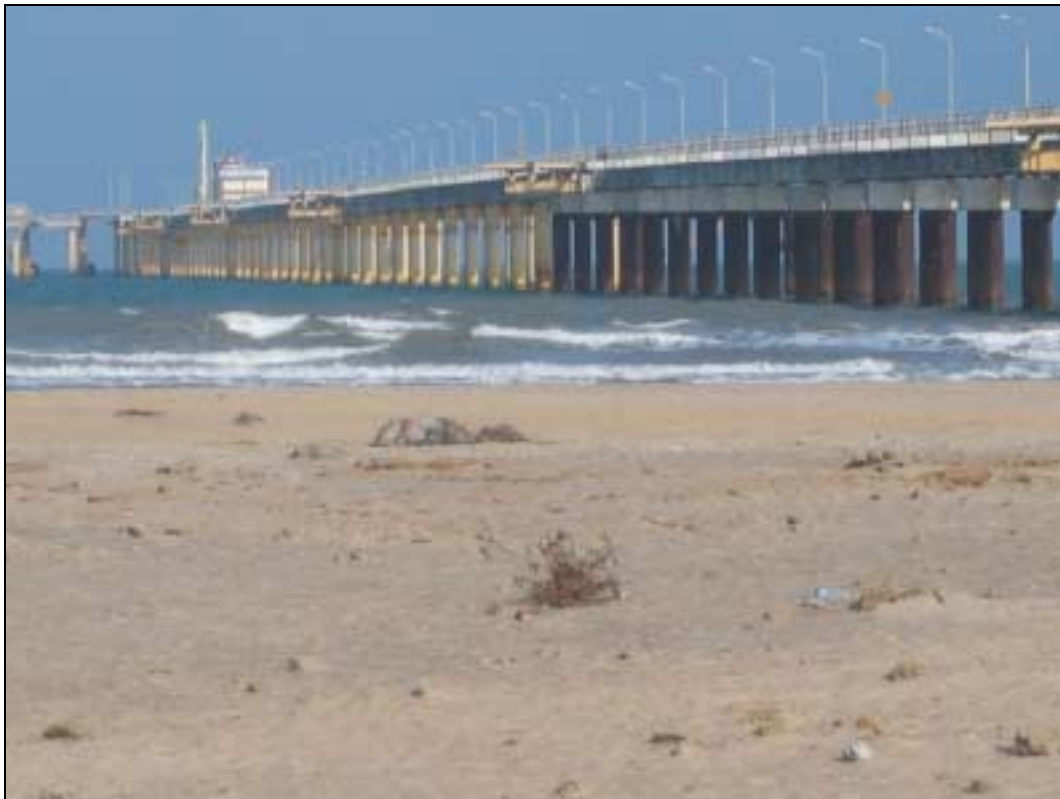


Figure 10. A well-built pier for unloading oil and gas from tankers. (Ames)