Disaster Response

Disaster Preparedness & Response Workshop: Focus on Earthquakes

Legazpi, Albay Province, Philippines,
June 19th & 20th 2013

INTRODUCTION

The Philippines is one of the most hazard-prone countries in the world. Experts predict that Metro Manila is likely to experience an estimated 7.2 magnitude earthquake resulting in a significant loss of life (estimated at 33,500) and considerable damage to key infrastructure including the mobile network. In recognition of this vulnerability, the GSMA Disaster Response Programme convened Filipino and other regional MNOs with stakeholders from Government, humanitarian and science agencies in a two-day workshop to discuss preparing for this threat. The event was organised in association with Smart Communications and with support from UN OCHA (Office for the Coordination of Humanitarian Affairs) and Globe Telecom. Participants spent the first day discussing network vulnerability and learning from experiences in other markets. The second day featured a presentation by UN OCHA introducing the humanitarian system to MNOs. The session provided an overview of how humanitarian principles, structure and partnership opportunities. Importantly, participants were given an opportunity to reflect on what mobile communication as a form of humanitarian assistance means for operators. The group also went on a field trip to APSEMO (Albay Public Safety and Emergency Management Office) to see first-hand how local disaster management authorities are using mobile in their preparedness and response activities. This summary provides a glimpse into the high level key messages from presenters. Further details can be found in the accompanying presentations online http://www.gsma.com/mobilefordevelopment/preparing-for-and-responding-to-earthquakes-lessons-questions-strategies-for-the-mobile-industry-presentations.

UNDERSTANDING THE RISKS AND IMPLICATIONS THAT EARTHQUAKES POSE FOR MOBILE NETWORK OPERATORS

In his opening remarks at the workshop, PHIVOLCS (Philippines Institute of Volcanology and Seismology), Director Renato Solidum Jr. reflected on the risks associated with earthquakes and the other hazards they may (trigger such as landslides, liquefaction and tsunamis) due to their rapid onset and relative infrequency. He emphasised that the intersection of exposure and vulnerability in Metro Manila requires urgent partnerships with organisations that monitor hazards to ensure that the most up-to-date information is being harnessed for proactive preparedness. Despite the overwhelming prospect of such a high magnitude quake, planning for the "worst-case scenario" needs to be undertaken now in order to build capacity and contingency plans to meet the realities that this disaster will present when it strikes.

Fouad Bendimerad, Director of the Earthquake and Mega-Cities Initiative provided an overview (*link to pres)* of the risks and implications of earthquakes for Mobile Network Operators. Drawing on experiences in Algeria (2003), Sumatra (2004), Haiti (2010), Japan (2011) and Christchurch (2011) he outlined some key points of vulnerability, the role and limits of building codes and resilience as a mantra of institutional preparedness. Below are some of the key messages from his presentation:

- There are basic questions to be asked around preparedness such as "what can we do" and "who should do what"- **an informed understanding of hazards is key** to this as it allows for better decisions to be made about where scarce resources should be allocated. *"The organisations that do this best tend to be the ones that have assessed themselves and asked some hard questions."*

- MNOs need to think broadly about infrastructural preparedness- it's not only the BTS that are vulnerable, but also key facilities such as offices and switching stations. *The mobile network is only as strong as the weakest link in the chain.*

- Buildings used by MNOs should be designed to be operational following an earthquake- building codes are designed to prevent a loss of life, rather than equipment damage. Utilities and water may not be available post-quake so adequate back up should be provisioned and vital equipment should be anchored, braced and fitted (for more information, NEBS standards provides guidance on building code standards for the telecom industry http://www.telcordia.com/services/testing/nebs/)

- A core challenge for MNOs is prioritising resilience in CAPEX and deciding where to invest for preparedness when the threat may not feel tangible.

- Understanding hazards and vulnerability ahead of time will help inform which buildings and assets are most critical to design and invest for greater resilience based on a hierarchized scale of risk.

CASE STUDIES FROM EMI

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Algerian Earthquake 2003: a 7.0 mg quake severely damaged the central office and antennas of an MNO crippling capacity. It is not only BTS that must be considered, but the resilience of key centralised offices and infrastructure.

Sumatra 2004: Telecommunications severely damaged and disrupted by a tsunami which knocked out towers and local switching stations

Peru 2007: Mobile network disrupted by damages to transmission and distribution systems, trunk lines, central offices and support facilities. These challenges were compounded by power failures.

Haiti 2010: Service on the spur connection to the BDSNi cable system which provided Haiti with its only direct fiber-optic connectivity to the outside world, was disrupted, with the terminal in Port-au-Prince being completely destroyed.

Japan 2011: 18 Central offices of MNOs destroyed and 23 submerged by the quake and tsunami. An estimated 65,000 towers were knocked offline.

Christchurch 2011: Liquefaction following the earthquake crippled the networks, microwave links and some PSTN copper and lead-covered cables were damaged. Generator re-fuelling presented major logistical challenges due to road conditions and congestion

REFLECTIONS AND ACTIONS FROM THE PHILIPPINES

*"Even if your network survives an earthquake, it is unlikely to survive the tsunami of calls that come after it."- Ramon Isberto, **Smart***

Ramon Isberto, Ariel Medina and Darwin Flores from Smart Communications, and Edgar Happa from Globe Telecommunications shared their perspectives on preparing for a severe quake in Metro Manila and lessons from typhoons, flooding and landslides that regularly impact the Philippines that could inform earthquake preparations. Key messages from their presentations are available here and summarised below. (http://www.gsma.com/mobilefordevelopment/preparing-for-and-responding-to-earthquakes-lessons-questions-strategies-for-the-mobile-industry-presentations)

- Government and response agencies often set parameters regarding what should be prioritised. MNOs need to be aware of what Government is planning so that they can reinforce the networks to support accordingly.

- On both the preparedness and response side, prioritisation is a challenge: How do you determine how best to allocate scarce resources in anticipation of a "random act of nature?" For example, calls following the triple disaster in Japan rose by an estimated 60 times, but you can't design a system able to operate at 6000% of maximum capacity.

- There is a need to balance pragmatism with provisioning for "worst-case" scenarios and ensuring that other vital industries (utilities, logistics, transport) are aligned.

- During Typhoon Pablo (Bopha) early tracking of the storm meant that engineers could protect some of the most vulnerable sites in advance.

- In places with marginal signal, Smart provided free charging and some limited satellite comms that were deployed in addition to the Vodafone Instant Network which they partnered with Telecoms Sans Frontiers to roll out.

- During flooding in Manila, Globe rescued 100 employees or their family members. Regular internal preparedness exercises and drills and continuously re-addressing the vulnerability of systems are essential.

- MNOs have a role in training and educating the public about what they can expect from the network in disaster situations, this has to happen before disaster strikes.

- Smart has designed the network to be flexible enough to divert cell site controllers from one site to another and has two network management centres that can monitor each other and manage strain.

- The Philippine domestic fibre optic network is in contingent ring configuration which allows one loop to take up slack from another it there is need.

LESSONS FROM OTHER MARKETS

David Sharpe from Digicel and Yasui Yoshinori of NTT DOCOMO provided lessons learned from the 2010 earthquake in Haiti and the 2011 triple disaster in Japan:

HAITI

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- The quake took place at 4:53 pm, a time when Digicel's staff were mostly localised, which aided in accounting for staff and beginning the recovery efforts. The timing of a disaster will impact response, so MNOs should prepare for different scenarios (ie. Day/evening/ weekend)
- Rooftop BTS were impacted by building collapse which resulted in the deployment of COWs
- Mobile money services were used to deliver vouchers and coupons digitally to heads of households
- Digicel donated generators and credit to 15 local radio stations to help them back on air
- *The notion of providing access to credit post-disaster is easy, yet has consequences in terms of congestion and network management*: Digicel provided subscribers with $5 UDS in airtime credit: this had unintended consequences, as some users typically only topped up $2/month. The subsequent surge in traffic led to serious network congestion after the earthquake.
- Having a crisis plan is essential: after a disaster, the co-ordination of people trying to do good may not be strong, and the majority of resources will be focused on keeping the network alive rather than establishing new partnerships to deliver broader humanitarian assistance.
- The data MNOs possess can be instrumental in informing humanitarian relief efforts: Digicel's collaboration with Flowminder enabled the NGO community to have better visibility of where displaced populations were moving during the cholera outbreak.
- Ericsson Response deployed in Haiti to support communications to the humanitarian system-Digicel provided them access to their 900 mhz band which they used to handle 3,000 calls per day for humanitarian responders
- Spectrum allocation for emergency use: how can more enabling agreements for pre-agreed bandwidth be structured to facilitate better response.

JAPAN

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- Despite massive damage to NTT DOCOMO's facilities caused by fire, water damage and power outages (375 stations required restoration), within one month coverage was almost at pre-disaster levels and the laying of new optical fibre was underway.
- Key lessons: (i) the higher the site, the more resilient (ii) connecting calls made over the packet network was easier than connecting over the circuit-switched network.
- Traffic volume increased 60 times normal levels but data traffic only increased 4 times
- Posting Restoration maps online was an important part of the strategy, as was the creation of the disaster message board. Creating public interfaces helped customers know what was happening and what they could expect. (http://www.nttdocomo.co.jp/english/info/disaster/disaster_board/), disaster voice message service (http://www.nttdocomo.co.jp/english/info/disaster/disaster_voice/ and data recovery service for water-damaged handsets)
- Subsequent disaster-preparedness measures include improving battery life, increasing the number of microwave backhauls and satellite equipment available and developing more resilient large-zone BTS

PARTNERSHIPS

The workshop featured presentations (http://www.gsma.com/mobilefordevelopment/preparing-for-and-responding-to-earthquakes-lessons-questions-strategies-for-the-mobile-industry-presentations) from the Corporate Network for Disaster Response, Ericsson Response, World Food Programme and Flowminder. These presentations and ensuing breakout discussions highlighted the need to have formal deployment mechanisms and channels of communications between the public and private sector established in advance. UN OCHA delivered a series of presentations designed to educate the mobile industry on humanitarian principles and explain the structure and players within the humanitarian system. In the event of a major natural disaster requiring external support, it is important that mobile operators have a sense of which humanitarian agencies will be present and what their roles are (and vice-versa) in order to better coordinate efforts. Developing a dialogue between these agencies and mobile operators which outlines how the network may be used for humanitarian communication purposes and what the capacity and expectations of each stakeholder group are will ease confusion and help ensure that life-saving communication is available to affected populations as soon as possible. Further information can be accessed in the presentations here (LINK)

SPOTLIGHT ON BIG DATA

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Erik Wetter from Flowminder (http://www.flowminder.org/) highlighted the potential for big data such as anonymised CDR records to be used in disaster response (for example, in predicting displacement and disease outbreak). Historical baseline data in addition to data made available immediately following a disaster can provide a clearer picture of crisis impacts. While not a silver bullet, the big data MNOs possess have many applications for social good as highlighted by initiatives such as the Orange Data for Development Challenge (http://www.d4d.orange.com/home). However, there are limitations around how long CDR records are stored and issues around consumer privacy and security that are still to be addressed. Given the sensitivity, it is important for MNOs to work with organisations that can analyse this data ahead of time to structure legal agreements and ensure that the anonymisation and aggregation processes are understood in order make the data available as possible in humanitarian situations. In Haiti, Digicel and Flowminder successfully partnered together to track populations displaced from Port-au-Prince after the earthquake and better allocate aid and information during the subsequent cholera outbreak. The length of time that it will take to negotiate a legal agreement for access will vary (in the case above, it took 12 hours). Going forward, MNOs should consider structuring these agreements in advance to ensure that big data can be safely and securely accessed when it's needed most.

CONCLUSIONS

- The mobile industry requires a better "disaster imagination." There is a need to help people appreciate the risks and impacts they face so that they can prepare, adapt and respond accordingly
- There is a need to mainstream disaster risk management across all business units for vulnerable MNOs. The real challenge is not in developing business continuity management plans but translating them into specific action
- It is essential to have a plan to monitor staff and have a sense of their mobility prior to a disaster: on*ce you lose your people, you lose your organisation*
- Some initiatives to support customers may have unintended consequences to the network (for example free airtime leading to congestion) which need to be considered and managed
- There is a need to take a broader approach to infrastructural resilience. Adhering to building codes is essential and may prevent a loss of life, but these codes do not necessarily account for protecting critical equipment housed inside
- It is difficult to plan for disasters that you are anticipating but have not yet experienced. However partnering with science-based organisations and improved inter-industry knowledge sharing can help build resilience
- There are always finite resources, so getting educated on where to invest for the greatest impact is important

- Preparedness improves response and saves lives but it can be overwhelming. Using immediate threats and experiences can be a bridge to addressing longer standing vulnerabilities such as mega-urban earthquakes, as much of the same infrastructure will be used in both cases.
- A complimentary approach is important- take existing challenges, build a baseline of response capacity within your organisation and grow from there

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when you restore the mobile network,
you rebuild the human network

Email: disasterresponse@gsma.com

Website: http://www.gsma.com/mobilefordevelopment/programmes/disaster-response