Structural collapses

Sociology, Communication

Structural collapses are disasters that require efficient and immediate responses by engineers and other emergency services. This report discusses these responses in order to expose barriers and issues that could potentially cause a structuralfailure. It is imperative that each role is played at the highest degree of efficiency in such a disaster to minimize casualties and maximise safety. For this to occur, ICT engineers become critical to the instant response of such a disaster as through harnessingtechnology, they are able to monitor important data and effectively establish a reliable communicative network. Furthermore, communicationbefore any structural collapse is necessary, as it serves to improve accuracy through peer to peer assessment and collaborative data. (Matsushiba & Nishi 2010; Chintalapudi et al 2006; Ferworn & Ribeiro 2010; Lawson 2005)

Structuralhealthmonitoring (SHM) is highly effective in preventing structural collapses.

SHM is a low cost sensor network technology that collects extremely significant monitoring data of a structure and is used to identify any potential faults in the pre collapse, as well as the specific reason of failure in the post collapse (Matsushiba & Nishi 2010; Chintapaludi et al 2006). Such data is considered to be highly valuable in response to a structural collapse and its value is confirmed by Matsushiba & Nishi 'The system monitors structural vibration caused by earthquakes, detects structural damage and predicts performance and lifecycle of the structure' (2010, p. 76).

The monitoring data collected thus results in not only the location of any structural damage, but as well as the overall performance and condition of

the structure. With this, the SHM system is able to determine a structures approximate lifep and thus reducing its overall operational costs (Chintalapudi et al 2006). In addition to this, since the sensors are at low cost they are economically viable allowing for mass placement especially for large structures. This indefinitely improves safety as well as its property of monitoring wirelessly. Therefore with the use of such an advanced piece of sensor technology, the SHM system is highly effective in the prevention and thus response to structural collapses through constant monitoring.

Instant communication is essential during a structural collapse.

Communication is the basis of teamwork and collaboration. Such an idea becomes extremely significant during a structural collapse as it is required for engineers and emergency services to communicate, but actively play another role completely. This level of communication is necessary as through such differences in experience and skills, the collaboration is resultant in a much more precise analysis and in turn, a highly efficient approach to the structural collapse is found. Therefore the integration of technology becomes vital as it accelerates communication such that it becomes seamless and instantaneous, which is specifically necessary for such an immediate response to a disaster. As stated, 'in emergency management it is imperative that the communications be reliable and responsive' (Ferworn & Ribeiro 2010).

During a structural collapse, instant communication is clearly essential as any delay of significant information could lead to further failure or disaster (Ferworn & Ribeiro 2010). Such significant information could very possibly be

from as discussed above, a SHM system which through its data can effectively determine the location of damage (Matsushiba & Nishi 2010; Chintapaludi et al 2006). This essential type of data being instantaneously shared between the different teams during a structural collapse is of immeasurable value. Furthermore, through the application of technology, instant communication becomes more dynamic and reliable, especially due to its wireless property. Therefore, the establishment of such a network is highly recommended.

Communication beforehand is necessary for future preventions.

In the prevention of structural risks and damages, engineers and other significant roles need to communicate effectively beforehand in order to maximise the overall insight into a structure as similarly discussed above (Ferworn & Ribeiro 2010). Such pre communication involves peer to peer reviews and collaborations. With peer to peer reviews, structures beforehand are assessed by different people and thus aspects, effectively exposing much more potential faults rather than being reviewed by similar people in the same field of experience (Lawson 2005).

Pre communication through collaboration is also an essential factor in the prevention of structural collapses as it allows for the full sharing of knowledge and in turn creates a sense of openness as well as teamwork (Lawson 2005). Such a positive atmosphere is a catalyst for strong andcritical thinking, inevitably leading to strong structures accordingly.

These peer to peer communications have been discussed and described as 'powerful tools to improve safety as well as to improve performance' (Lawson 2005, p. 319). Due to the degree of effectiveness that they have upon engineers as well as other services, and thus the prevention of structural collapses, organisations have been formed to support these concepts. Such notable examples is the World Association of Nuclear Operators (WANO) and the Institute of Nuclear Power Operations (INPO). These organisations have implemented strategies like the peer to peer reviews and collaborations, which have resulted in the improvement of cooperation and the prioritisation of safety (Lawson 2005).

Conclusion

It is evident through these findings that ICT engineers skilled with modern technology become invaluable before, during and in the response to a structural collapse. This is due to their many abilities such as monitoring a structure through wireless sensor technology like the Structural Health Monitoring (SHM) system which provides copious amounts of important data (Matsushiba & Nishi 2010; Chintapaludi et al 2006), or the establishment of a network which essentially is a source of instantaneous communication, and thus teamwork (Ferworn & Ribeiro 2010). This teamwork through communication should also be established before any collapse, as it is a necessity to effectively share essential information with other engineers and services alike (Lawson 2005).

The issues within a structural collapse though, can be realised to be very specified in accordance for the need of collective data and group

cooperation. This is clear through the prioritization of safety and maximizing efficiency. In result, situational change is also be a factor in terms of priorities for a structural collapse response. Therefore for engineers, it is a common ground for the collaboration of skill and knowledge in order to truly become successful in the response to a structural collapse.