FIDIC DISASTER MANAGEMENT GUIDE

For

Consulting Firms and Member Associations

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International Federation of Consulting Engineers
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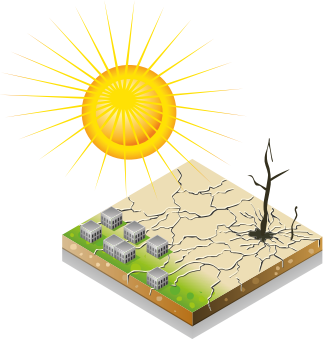

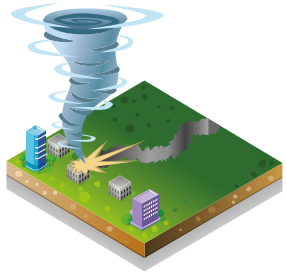

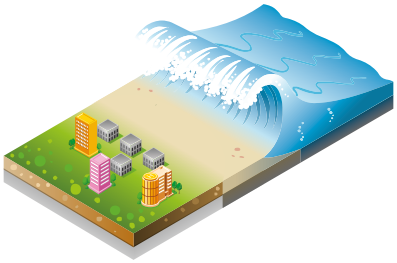

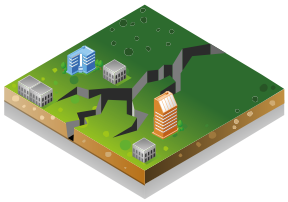

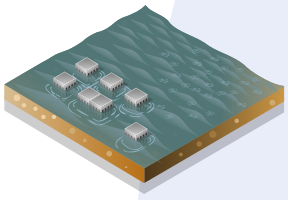

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RISK
REDUCTION
READINESS
PESPONSE
RECOVERY

1. INTRODUCTION

The frequency of catastrophic disasters appears to be increasing around the world. Increasing world population is leading to dense occupation levels in more marginal habitats. This, combined with modern high-speed communication, is increasing both the perceived and real impact of disasters on mankind and the built environment. Disasters both man-made and natural result in human tragedy and enormous financial losses. The world's media regularly bring us reports of hurricanes and typhoons, floods, mudslides, forest fires, tornadoes, volcano eruptions, and large-scale oil spills, not to mention earthquakes and tsunami, nuclear leakage, mass contamination and poisoning, terrorism, war and insurrection. The potential extent of damage to infrastructure and to the built environment appears to be increasing exponentially and along with it, the vital role of engineers in emergency management, assessment, retrofit and reconstruction.

One essential aspect of the day-to-day work of the engineer is risk assessment and mitigation. For a civil engineer this may involve assessment of maximum flood levels or the likelihood of a bridge being overloaded. For a mechanical engineer this may involve the consideration of the effects on a machine when load demand exceeds capacity. These skills in risk identification and management extend naturally into disaster preparedness and recovery.

Traditionally, the engineer participated as a government or military engineer acting under instruction from the Emergency Manager or Civil Defence. In many countries of the world this is how disasters are still managed, that is, directly by central or local government utilising their own engineering resources. Increasingly however, in countries where decentralisation and privatisation have prevailed, we are seeing private-sector engineers – consultants and their employees – filling such roles. Thus, there is a need for FIDIC, its regional groupings, Member Associations (MA) and member firms to prepare for future emergencies in a way that will optimize the value of their post-disaster efforts. It is intended that this guide will provide best practice advice to Member Associations and their member firms, their clients and civil defence or emergency management authorities, both local and national.

For MAs and Consulting Firms, the Guide shows what they can do to prepare in advance of an event and how they can contribute afterwards. This may include marketing their skills (tempered with sensitivity) in disaster management and recovery. The guide also suggests methods for managing inherent liability issues during and in the wake of disasters.

For Member Associations the guide shows how they can effectively coordinate, liaise, communicate, and act as the voice of engineers.

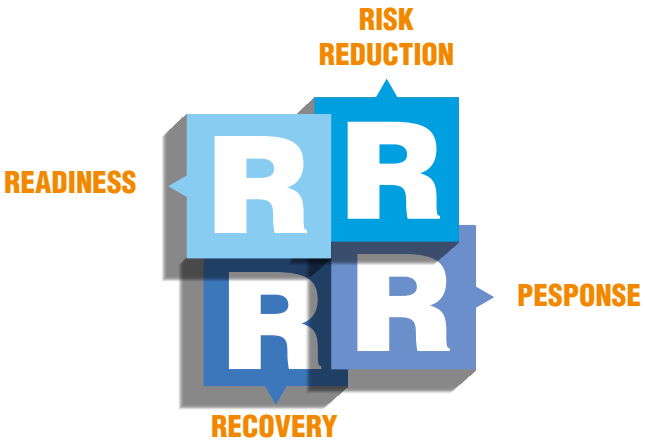
For clients and emergency management authorities, the Guide will provide an effective business practice reference for what they should do before, during and after disasters and in particular the value of pre-established lines of communications and template contracts (sometimes referred to as Priority Agreements, Standing Offers or As-and-When Contracts.) It will also, of course, outline the services they can expect from Consulting Engineers in a (post-) disaster scenario.

For broader society, the Guide will make for a useful reference document explaining the roles engineers can and will play in preparing for disasters and in the aftermath of a disaster. It should also help society to secure adequate preparedness from their local and national governments.

The Guide is not intended as a detailed manual on emergency management, but rather as a

strategic document outlining essential policies and covering the roles that the private consultant can play in disaster preparedness and disaster response. As such the reader will need to account for the considerable divergence in emergency response cultures and levels of preparedness. Further, while geared towards a domestic response, many of the concepts discussed here are equally applicable to international disaster response scenarios.

Effective disaster management is often described in terms of the **4 Rs**:



2. RISK REDUCTION

In the following sections this guide outlines the role of the consulting engineers in each of the 4 Rs.2. Risk Reduction

A key focus of emergency management centres on understanding the risks, minimising their occurrence and setting plans in place to deal with them. This is of course the focus of the work of most engineers and a concept they easily grasp. Engineers are trained to identify risk and much of the work we do is directed at eliminating, mitigating or reducing risk from either natural or man-made hazards. An understanding of the roles and experience of engineers, in the field of risk identification and reduction, by civil disaster managers, is essential to successfully utilising engineers in the event of a disaster.

Another key concept of strategic emergency management is resilience. In this context, the term resilience implies robustness and built-in redundancy or the ability to prepare for and adapt to changing conditions and unexpected eventualities. This can extend to communities, processes and emergency procedures, as well as hard infrastructure – another concept that engineers readily understand and implement. Integrating resilience into the design of infrastructure, systems and processes is an intrinsic part of risk-reduction methodology.

3.READINESS: PRE-DISASTER PREPAREDNESS

In the aftermath of a disaster, communities and authorities will invariably require technical expertise and they will expect engineers to provide it. However engineers themselves require training on how to respond in what can be stressful, emotional and time-constrained situations. Engineers may be called upon to give rapid advice without the time to undertake appropriate modeling or analysis.

- Individuals Engineers should be aware of what natural or man-made hazards may occur in their area of operation/habitation and undertake appropriate training. For example, within a seismic zone, relevant training for engineers may include:
  - First Aid
  - Coordinated incident management system

- Civil Defence Emergency management overview
- Building/infrastructure safety evaluation
- Urban Search And Rescue (USAR)
- Decision making under duress and based on limited information available.

Note that such training may not be commonly available and Member Associations could play a useful role in sourcing and coordinating appropriate training.

- Engineering Companies must be prepared and have contingency plans. Firms may choose to see this as an investment for a future business opportunity. In reality, if an office has staff with the skills and experience needed after an emergency, those staff will want to respond to help their communities. Planning should therefore:

  - Provide for the safety of their own staff and dependents
  - Provide ongoing operations, possibly while being faced with relocation
  - Provide work-from-home/remote-access technology for staff
  - Provide redundant backup data storage at an alternate location.

These primary issues are essential and top priority. Without their successful implementation, the following objectives may also fail.

  - Maintain a register of specialist expertise with the firm
  - Maintain a disaster response manual and library, including, for example, company assembly points, emergency response route mapping, flood risk and liquefaction risk mapping, together with contact information for emergency response and utility companies.
  - Maintain supplies of emergency equipment, Personal Protective Equipment (PPE), etc.
  - Provide specialist assistance to the civil defence/emergency management authorities
  - Release volunteer or seconded staff to specialist response teams
  - Service clients who have pre-negotiated priority response agreements as well as;
  - Respond to requests for emergency assistance from public and private clients
  - Predetermine standard engagement and liability limiting agreements. Note that in some cultures these will be arranged at an MA level.
  - Have contingency plans for staff working away from home, particularly internationally. This may include travel tracking and extraction plans.

Inflexible emergency response plans can be counter-productive as no two emergencies are the same. However pre-planning and specialist staff training are essential for effective response and for sound business practice.

- Member Associations should assist their member firms by:

  - Facilitating relevant training courses. Note that some form of certification of trained personnel is appropriate
  - Establishing and actively maintaining relationships with civil emergency management authorities
  - Maintaining registers of firms with relevant experience and resources
  - Prepare templates of post-disaster engagement and liability limiting agreements

- Liaising with professional institutes and technical groups to pre-prepare appropriately worded post-disaster literature e.g. assessment forms and warning signs. Consistency of wording used by engineers can be a significant issue
- Maintain relationships with media outlets and identify appropriate spokespersons
- Promoting best practice in disaster management/response.

- Member Associations should urge central and local government, public clients, private clients and Emergency Management Agencies to undertake:

  - Risk and potential damage assessment of all built environment
  - Pre-disaster mitigation, improving, planning
  - Emergency planning and exercises
  - Preparation of standard contracts (with appropriate limits of liability) and priority response agreements.
  - Centralised and ready Access to essential data – building plans, hydraulic models of flood plains etc. Note that much of this information may be held by engineering companies.
  - Establishing pre-disaster liability limiting legal frameworks
  - Integrating engineers into first responder decision-making.

Invariably, key lessons learned for emergency management agencies is that Professional Engineers are really useful people and that they need to be able to get hold of them fast!

4.RESPONSE: DISASTER MANAGEMENT ISSUES DURING THE EVENT AND IN THE IMMEDIATE AFTERMATH

During and immediately after a disaster, response will normally come from local resources (assuming they are not personally affected) followed by national and international teams e.g. Urban Search And Rescue (USAR). For Consulting Engineering Firms and individual Professional Engineers, key issues may include:

- Personal and employee safety – this may include health, fatigue and traumatic stress issues
- Assistance with disaster mitigation, recovery and rescue
- Secondment of key staff to temporary disaster management roles
- Building/Facility safety evaluation
- Aerial mapping of immediate post-disaster conditions
- An understanding of recovery imperatives - to minimise the likelihood of precipitous decisions during the response phase that may hinder or negatively impact later recovery.
- Proper documentation, including mapping, for future recovery funding applications. This is where an experienced consultant can provide particular value.
- Managing liabilities – in some jurisdictions engineers may be granted immunity from liability when they are working on behalf of an emergency controller, in a declared emergency. However, it is more likely that this will not be the case.

For the Member Associations, key issues will include:

- Communications with emergency management authorities
- Coordinating Professional Engineering resources
- Coordinating responses to media enquiries.

A key understanding is that, during this phase, engineers may be called upon to make quick decisions based on experience, without the research and analysis that would normally precede the offering of an opinion. It is primarily for this reason that engineers require liability indemnity during this phase.

5.RECOVERY 1 – DISASTER MANAGEMENT ISSUES IN THE SHORT TERM RECOVERY PHASE

Once safety and ongoing hazards are addressed, first phase recovery gets underway. This phase will normally include:

- Restoring essential services/utilities
- Immediate repairs
- Ongoing safety assessments
- In depth data gathering
- Communications - Providing information to the Emergency Management Authority, the public, business owners, and the media
- Recovery Planning.

For consulting firms, this phase can be very demanding on resources and prioritisation between on-going work and emergency generated work must occur. Careful management and wellbeing of staff will be ongoing to avoid burn-out and other stress-related issues. The need for collaboration with and secondment from out-of-affected area firms may be required (including potentially international collaboration). Commissions may be hurried and on a direct appointment basis but contracts and limitation of liability remain vitally important. Other challenges may involve working to reduced timeframes and with evolving technical standards and lessons learned. Maintaining sound business practice at all times is essential. It is worth noting that responders/ volunteers in the Response Phase may well find themselves gaining experience and local knowledge that places them in an advantageous position to bid for recovery phase projects.

For member associations during this phase, key tasks include monitoring industry workload and resources, maintaining liaison with emergency management authorities and advising members of work opportunities, changing standards and contractual/liability trends.

6.RECOVERY 2 – DISASTER MANAGEMENT ISSUES IN THE LONGER TERM RECOVERY AND RECONSTRUCTION PHASE

For Individual Engineers, consulting firms and member associations this phase resembles business-as-usual but with potential for redistribution of public and private investment, both regionally and by discipline, i.e. funding may be redirected from previously scheduled projects towards reconstruction.

Key issues will include:

- Resource demand – managing priorities
- Restoration levels and standards
- Emergency regulations and legislation
- Recovery Planning
- Longer term regulations and legislation
- Lessons Learned analysis and implementation
- Cost effective improvement versus restoration.

7.SUMMARY

Increasingly there is a role for the private sector engineer in post-disaster response and recovery. However, to respond effectively when needed, Professional Engineers, Consulting Firms and Member Associations need to prepare both themselves and their clients in advance of any disaster. In this respect, it becomes critical to prepare the interfaces between the engineering profession and the national or regional emergency management authorities.

Individual Engineers should consider their role in promoting resilience within their normal working environment and their possible involvement in emergency response. If involvement is likely then some form of training will be appropriate. Training may include:

- Awareness of potential vulnerabilities of lifelines, infrastructure and structures
- Taking all opportunities to implement risk reduction
- Understanding the roles of engineers in response and recovery.

Consulting firms need to consider whether they are likely to be involved in response and recovery and, if so, to prepare appropriately. Preparation will include:

- Emergency plans for the firm and its personnel
- An understanding of local and regional hazards
- Training Professional Engineers for their potential roles in response and recovery
- Priority agreements with key clients and an understanding of costs
- Predetermine standard engagement and liability limiting agreements

Member Associations need to understand what demands may be made on their member firms and what their own roles may be terms of training, communications and multi-agency liaison. Both consulting firms and member associations need to adopt business practices that facilitate preparedness of not only the firm but also the individual professionals within the firm. FIDIC can assist Member Associations with training programs, templates and international co-ordination and cooperation.

Unless engineers adequately prepare – both themselves individually and as a profession – then they may find themselves caught up in two additional ‘Rs’: Retribution and Restitution! Disasters will often focus attention on the Engineering profession and this can be for the right or the wrong reasons.

FIDIC acknowledges the valuable contributions of the international task group, led by Adam Thornton, under the auspices of the FIDIC Business Practice Committee chaired by Rick Prentice.

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FIDIC – International Federation of Consulting Engineers

FIDIC is the International Federation of Consulting Engineers. Its members are national associations of consulting engineers.

FIDIC has been charged since its foundation in 1913 with promoting and implementing the consulting engineering industry's strategic goals on behalf of its Member Associations, and with disseminating information and resources of interest to its members. Today, FIDIC membership covers more than 80 countries around the world.

FIDIC key objectives are:

- Represent globally the consulting engineering industry
- Enhance the image of consulting engineers
- Be the authority on issues relating to business practice
- Promote the development of a global and viable consulting engineering industry
- Promote quality
- Actively promote conformance to a code of ethics and to business integrity
- Promote commitment to sustainable development

FIDIC, in the furtherance of its goals, publishes international standard forms of contracts for works and for clients, consultants, sub-consultants, joint ventures, and representatives, together with related materials such as standard prequalification forms.

FIDIC also publishes business practice documents such as policy statements, position papers, guidelines, training manuals, and training resource kits in the areas of management systems (quality management, risk management, integrity management, environment management, sustainability) and business processes (consultant selection, quality based selection, tendering, procurement, insurance, liability, technology transfer, capacity building).

FIDIC organises the annual World Consulting Engineers Conference together with an extensive programme of seminars, capacity building workshops and training courses.

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