HEALTH AND SAFETY EXECUTIVE			
CONSTRUCTION INDUSTRY ADVISORY COMMITTEE (CONIAC)			
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Catastrophic Events – follow-up work

A paper by Simon Longbottom, Head of Construction Policy and Sector

Action following 20 November CONIAC meeting:

1. UKCG

The final report and recommendations of CONIAC's Catastrophic Events Working Group (paper **M3/2013/1**) were discussed at the UK Contractors Group Health & Safety Group meeting on 5 December 2013, in particular the need for further work involving wider industry leadership and engagement on:

- improving communication on what is meant by catastrophic events;
- improving communication on "near misses" or where "nothing happened", but could easily have done so;
- early and timely publication of learning; and
- development of leading indicators using HSG 254 as a starting point.

All members were actioned to consider proposals to publicise Annex 5 of the report (characteristics of catastrophic events). The Secretariat took actions to consider the development of leading indicators and whether UKCG could find sources of funding for this work, which could perhaps be taken forward by CIRIA.

At the UKCG H&S Leadership Group meeting on 12 February it was agreed that UKCG companies would seek to report against 'high risk events' in addition to lost time incidents in 2014 as a leading indicator. A proposal would also be developed to produce a measure for temporary works against BS5975, and possibly also for MEWPS.

2. CIRIA

CIRIA are planning a networking event on catastrophic events.

3. Richard Ash ECIA

Richard Ash (CONIAC Member representing Engineering Construction Industry Association) has provided some further draft guidance on competence in relation to preventing catastrophic events for discussion appended to this paper.

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Appendix

[D R A F T]

Competence for catastrophe

Introduction

This guidance has been produced by the Construction Industry Advisory Committee (CONIAC). CONIAC's members represent employers, Trades Unions and other stakeholders involved in the construction industry. CONIAC is chaired by the Health and Safety Executive and meets regularly to address UK construction health and safety policy issues.

Sometimes construction work involves potential for catastrophic events to happen. It is not possible to decisively define what catastrophe does and does not mean. For instance it would be a catastrophe if a scaffold covering the entire frontage of a department store collapsed into a crowded city centre street. But it would not be a catastrophe if a simple access scaffold failed in the empty residential street behind the same store. There is an infinitely variable range between the two. Deciding whether or not you are dealing with a catastrophe risk is a question of judgement rather than measurement. Annex 1 suggests criteria which will help make that judgement. It is important NOT to assign catastrophe status to all risks merely in order to 'be on the safe side'. The point is a special and more rigorous focus on ensuring competence amongst those whose decisions have genuine impact on the likelihood of catastrophe occurring. Indiscriminately applying the same approach to all decision makers and all construction risks is unnecessary, counter-productive and poor risk management.

If there is a potential catastrophe risk, it is essential that the people managing it can do so effectively. The purpose of this guidance therefore is to explain the approach that should be taken in selecting people and organisations competent to manage catastrophe risks.

The approach is envisaged as being a more rigorous one than when assessing competence for lesser risks. This guidance does not suggest that the same approach is appropriate for lesser risks and should not be used as a pretext for requiring it in such cases.

Is there anything special about competence for catastrophe?

Not as much as many people might think. There is no 'magic' in managing potential catastrophe risks. There are no 'special' qualifications required. Managing catastrophe risks does not require anything 'new'. The underlying principle throughout this guidance is that people and organisations managing catastrophe risks and the environments giving rise to them have the qualities to;

ensure that well known existing standards really are delivered

Choosing the right people

The following paragraphs concern the selection of people who decide how catastrophe risk work is done and/or are responsible for controlling it when it is carried out. The advice is not intended to apply to every person coming into contact with the work. For instance, in installing and removing temporary support in a large city centre basement excavation, this guidance is relevant to selection of designers, engineers, site managers and supervisors. It is not intended to apply to the selection of tradesmen such as scaffolders, groundworkers, plant operators or steel erectors.

Sufficient time should be allowed for during the project planning stages for identifying and, if necessary, recruiting appropriate individuals before the work starts.

There is no formula or qualification which can independently define whether a person is competent to manage or control catastrophe risks. Deciding whether a person is competent or not is a matter of judgement rather than measurement. Exclusive reliance on administrative 'tick box' compliance approaches is highly unlikely to deliver such considered judgement.

Knowledge, experience, authority and attitude are the key issues. Some of these might be more important for some people than others. For instance attitude could be more important for an on-site manager than a designer working in a design office, but specialist technical expertise is probably more significant for the designer.

Whatever role is being addressed, those appointing anyone who makes decisions about and/or is subsequently responsible for controlling work involving catastrophe risks, should be able to confidently explain how the key issues were considered in the people they chose.

Knowledge

- Those making technical specifications should have clearly relevant specialist technical expertise
- Mere experience of using equipment such as falsework does not equate with and cannot substitute for the specialist technical expertise required by specifiers
- Where safety depends on site specific issues, familiarity with and understanding of them, whether that is held before appointment or generated afterwards

Experience

Previous experience should reflect

- The nature of the process giving rise to the risk eg scaffolding, cranes, tunnelling, temporary works

- The scale of the risk eg a site with 20 people or 200
- The project environment eg city centre, oil refinery, motorway

Authority

Those making decisions for managing catastrophe risks must have appropriate authority for their decisions to have effect. Named individuals' authority should be explicitly set out (and updated as necessary) in

- Job descriptions; and/or
- Health and safety plans; and/or
- Risk management procedures eg work authorisations/permits

Those with the authority and those subject to it should be equally clear on who has it and its nature. (Site inductions and rules can usefully highlight who is in charge of what in this respect).

Attitude

Individual attitudes are especially important amongst those responsible for managing catastrophe risks. Those appointing such people should be able to describe how they have satisfied themselves appropriate attitudes are held amongst the people they select. In practice this should usually entail

- Interviews and positive follow-up with previous employers for those who were previously unknown; or
- substantive knowledge as a result of first-hand experience with existing or previously employed people

Key attitude qualities are;

- readiness to 'say no', especially in the face of any conflicting operational pressures, or doubt as to whether necessary safety criteria have been met;
- consistent expectation of and demand for compliance from others in meeting the same criteria
- Consistent attention to detail eg if the design says 40 500kg props along line a-b, 3 X 450kg props 20cm to the left of line a-b is not accepted
- A insistence o explicitly confirming understanding when communicating requirements to others (and this requires both listening and speaking skills)
- recognition of their own limitations and a complementary readiness to seek help when they are reached

Choosing the right organisation

Those appointing organisations contributing to management of catastrophe risks should seek to identify organisational attitude in much the same way as

for individuals' attitudes described above. Thus, as with choosing the right people with the right attitude, the suitability of organisations should involve;

- substantive knowledge of their potential as a result of previous first-hand experience with them: or
- if that is not available interview and if necessary further research to draw justifiable conclusions

For organisations providing important elements of catastrophe risk management, it is not sufficient to rely exclusively on purely administrative 'tick box' pre engagement approaches. Assessors should be seeking to identify what the organisation is actually likely to deliver rather than merely gathering data about them. Assessors should therefore be able to demonstrate how their selection exercise reflected this quality.

speak with them and think about what they say

The following are relevant factors in assessing the competence of organisations engaged to contribute to catastrophe risk management. They are not intended to be a definitive or full list. They are intended to indicate the type of issues appointers can usefully address when they are discussing and thinking about candidates to manage construction catastrophe risks. Assessors may find some of these factors more relevant than others or they may perhaps find other ones that are equally useful. Each case will have its own peculiarities.

Are they likely to provide the right sort of people?

- Can they already identify named people with appropriate profiles and experience or are they relying o securing as yet unknown candidates from third parties
- Can they describe a coherent organisational system for securing and developing the sort of people with appropriate skills needed for this type of work

Does their management approach support **real** delivery

- Can they confidently and clearly describe explicit procedures for safety critical decision making eg arrangements for professional engineering checks and approval of falsework designs? (Possession of any one of number of generic management system standards eg ISO, may have some relevance in this respect. However, mere possession of such standards, by itself, does not substitute for the appointer investigating how that organisation behaves during their work)
- Can they deliver from their own in-house resources or are they relying o sub-contractors? If the latter do they know where they propose to get it, can those people provide it and will it be available to them during your project?
- Can they demonstrate how their staff can effectively secure support if needed to ensure resolution e in the event of an on-site engineer encountering opposition to his recommendations from other parties?

- Do they have real time access to appropriate external professional support if it is needed?
- Does their budget explicitly allow for risk management resources? Do the resources allowed for look sufficient?

Is their previous experience profile suitable?

- The scale of the risk: e lifting – is their experience mainly handling roof trusses on a housing site or heavy lifts in power stations
- The nature of the risk: e temporary works – is their experience in scaffold design or falsework design, as opposed to just design.
- The construction environment. For example is their background from
    - new build or repair and maintenance: or
    - isolated location or city centre; or
    - simple structures or complex ones; or,
    - 'traditional' contracts or something more 'sophisticated'; or
    - construction only sites or ones shared with other activities eg inside a working factory

Annex 1

CATASTROPHIC EVENTS IN CONSTRUCTION - FACTORS DETERMINING CATASTROPHIC POTENTIAL

Catastrophic events are characterised by two key features – (i) the low probability of their occurrence; and (ii) the potential or realised level of damage that can be caused when they do occur. Tempting though it might be, it would be very difficult and potentially overly simplistic to provide a list of the types of events that fall within or outside any given definition of a catastrophic event.

However, those involved in construction need to be able to identify those projects and activities where catastrophic potential might exist so it can bring to bear appropriate risk management techniques above and beyond the normal systems employed to manage risk.

Engineered safety is the focus of engineering and management skills on preventing catastrophic incidents and near misses, particularly the uncontrolled release of energy or dispersion of contaminants sufficient to cause or risk significant harm. All sources of energy must be considered, even if not under the direct control of the operational management, and must be considered throughout the project life-cycle. The skills required exceed those needed for managing workplace safety, and must embrace the ability to apply engineering science in practice. Particular hazards to consider include structural stability and integrity, behaviour of heavy moving objects including vehicles, electrical power isolation and containment, errant and unthinking behaviour, fail safe design, redundancy and time-related degradation.

This document sets out factors tending towards or away from events with catastrophic potential in order to ensure attention and resources can be focused where they are most needed. A single factor may be sufficient to indicate catastrophic potential but, equally, it may arise from a combination of factors when applied together.

Ultimately, construction companies will have to make appropriate judgements on a project by project basis.

Factors tending towards	Factors tending away
High potential energy within system: • *Multi-storey buildings or structures liable to complete collapse* • *Release of flammable gases under high pressure* • *High fire risk – multi-storey timber frame buildings undergoing construction*	Limited potential energy in system: • *Low rise buildings or structures where failure is likely to be limited to only parts of the structure* • *Release of flammable gases from low pressure systems* • *Fireloading similar to that when building is in occupation*
All potential energy released instantaneously: • *No early warning signs likely to be detectable before failure commences* • *Complete collapse of the building or structure is likely to occur* • *Energy release will be uncontrolled and unpredictable in terms of distribution and direction* • *Instantaneous explosion potential high* • *Fire could spread rapidly and uncontrollably with insufficient time to respond to alarms or other warning signs*	Potential energy could be released progressively: • *Signs of distress or failure evident before collapse commences* • *Collapse likely to be restricted to only relatively small sections of building or structure* • *Energy release likely tol occur in a predictable way* • *Instantaneous explosion potential low* *Fire could start relatively slowly triggering alarms or providing other warning signs which give sufficient time for safe evacuation*

Factors tending towards	Factors tending away
Potential domino effect • *Adjoining buildings, structures, services and transport corridors in close proximity* • *Plant and materials likely to be ejected as far as adjoining structures* • *Interdependence of one structure on another*	Low potential domino effect • *Adjoining buildings, structures, services or transport corridors a considerable distance away* • *Any ejected plant or materials unlikely to reach adjoining stuctures*
Factors tending towards	**Factors tending away**
High off-site casualty potential: • *Ejected plant or materials likely to breach site boundary* • *Site in close proximity to major railway lines or high speed roads* • *Site in close proximity to densely populated areas or buildings, e.g. in town or city centres* • *Vulnerable groups in close proximity, e.g. hospitals or schools*	Low off-site casualty potential: • *Site away from densely populated areas* • *No transport corridors in close proximity to site* • *Ejected plant or materials likely to be contained within site boundary*
Innovative materials/ techniques involved • *New materials being used or traditional materials being used in new ways* • *Structures of this type never previously constructed (internationally or by UK contractors)* • *Novel construction methods employed* • *Last minute changes*	Standard materials and techniques involved • *Traditional materials being used in traditional ways* • *Structures of this type widely constructed* • *Standard construction methods employed* • *No last minute changes*
Poor escape options • *Limited means of escape for workers due to factors such as restricted alternative means of escape, e.g. tunnels* • *Method of escape relatively slow, e.g necessitating use of limited capacity plant such as hoists or via. specialist equipment, e.g. airlocks* • *Distance to place of safety long* • *Large numbers of workers might require to evacuate simultaneously*	Good escape options • *Alternative means of escape available for workers* • *Distance to place of safety short* • *All workers can evacuate quickly* • *Escape possible on foot*
Poor processes • *Lack of adequate risk management Lack of independent checks and reviews* • *Inadequate time* • *Lack of team competency*	Good processes • *Good risk management* • *Competent team* • *Adequate time to consider and implement* • *Suitable independent advice and review*