Cambridge Center for Behavioral Studies
Safety Accreditation Report

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Executive Summary

Our 5-day visit with Costain leaders revealed a construction and engineering company that has clearly adopted behavioral science as an approach to managing safety on its projects, as well as in its corporate offices. Further, we saw good evidence that the company’s leaders are using behavioral science to improve the business.

Over 1700 Costain, Client employees, and subcontractor employees have been trained in behavioral science through the Costain Behavioural Safety (CBS) process. More are being trained every week and with each new project. One of the impressive aspects of the CBS process is that Costain shares it with clients, Joint Venture partners, and contractors. When asked why Costain would share CBS with competitors, one leader said, “Because it’s the right thing to do.” We agree.

People throughout the company are mastering behavioral science to a level that allows them to use the terms appropriately, and demonstrate application of concepts in a wide variety of contexts. Traditional training is often long on concepts and short on application; CBS has not fallen into this trap.

The safety results achieved by CBS are impressive. Company-wide injury rates have steadily declined since 2005 when CBS was first begun. Moreover, YTD AFR results for 2011 are .06 compared to an industry average of .45. The improvements observed from 2010 to 2011 (YTD) translate into an estimated £800,000 in direct savings from reduced injuries.

In short, the Cambridge Center for Behavioral Studies (CCBS) auditors were impressed with Costain’s level of commitment and success in creating safe environments for its workforce and clients. CBS is much more than a set of observation checklists and procedural training. Costain has created a process in which leadership is the focus; they have spent considerable time decoding behavioral science and behavior-based safety so that company leaders can apply the concepts in ways that work to make the company better.

We recommend that Costain be accredited as a company with an exemplary safety program based on behavioral science. This accreditation extends to Costain Joint Ventures in which CBS has been adopted and it explicitly excludes Costain projects and Joint Ventures in which CBS has not been adopted.

We expect to continue to see strong results from Costain as they continue to stretch the limits of how behavior-based safety is used in the construction industry.
Accreditation Visit Overview

During the 5-day visit, CCBS auditors met with a number of individuals at most levels of the organization ranging from Managing Directors to operatives working on sites (see Appendix A).

We visited Costain’s corporate offices in Maidenhead and Styal Road and construction projects at Brighton & Hove, Bond Street, Trawsfynydd, Bidston Moss, and Five Fords. We met with individuals from all three divisions of the company, and saw CBS progress and outcomes from 8 of the 10 sectors (2 sectors have no current projects). Based on the visit, we feel we have sampled enough of the company’s operations to recommend accreditation.

In our meetings, we interviewed a number of Costain and subcontractor employees and managers individually and in small groups, toured projects and talked to people on site, examined recent data, reviewed management procedures for the CBS process, discussed leadership’s role in the process, assessed people’s knowledge and use of the CBS process, and directly observed some CBS training being delivered. Observations during our visit support and validate the data and indicate that the BBS process described in the application operates effectively.

Costain’s CBS program meets the three basic criteria of the Commission on Behavioral Safety: 1) The program is behavioral; 2) the BBS program has had a visible impact on safety behavior; and 3) the program has produced sustained positive performance over 3 or more years. Therefore, we recommend that Costain be accredited in Behavior-Based safety by the Cambridge Center for Behavioral Studies.

Costain began CBS in 2005 at one large construction project, with courses designed to teach behavior management and leadership-led safety. That project had 4 years (7 million man-hours) of injury-free work. Since that time, the CBS program has produced a high level of engagement in the company and is currently being practiced widely. Since 2011 the CBS program has become part of an overall safety, health, and environment program called Costain Cares that incorporates the core behavioral principles of CBS. Costain Cares addresses a number of different health and safety issues for their workers and supply chain. Further, the data delivered to us indicate that the projects on which CBS has been practiced have substantially lower injury rates than the projects on which it has not been practiced.

CBS has been implemented primarily through teaching courses on the science of behavior for people at all levels of the organization. The courses appear to be highly effective and behaviorally sound. The courses encourage managers to use behavioral science in all aspects of the business and decision-making because leaders create the environments that drive the behavior of others.

CBS is largely managed in a decentralized manner, where projects are given a toolbox of behavioral techniques and coached through the use of these tools by trainers and the CBS Delivery Manager. In addition, projects send monthly data to the CBS Delivery Manager so he can check the level of engagement in each project. These data allow him to target projects, sectors, and divisions that need support. He then interacts with the appropriate individuals (Project Managers, Sector Directors, Managing Directors, etc.) to help them create and execute plans to improve.
Safety Results

Costain’s safety results are stellar. Company-wide Accident Frequency Ratio (AFR)\(^1\) in 2010 was .14 compared to the UK construction industry average of .45. There has been a gradual downtrend in company AFR since 2005 (approximately .21); AFR in 2011 through 1-Nov was .06. In construction circles, good performance in the UK is considered to be .2 or better.

Not only does Costain’s safety record compare favorably to the UK construction industry as a whole, comparing projects that are fully engaged in CBS to those who are not shows a dramatic difference. Fully CBS-engaged projects have an average AFR of .035 for 2011 (YTD); whereas projects not engaged in CBS have an average AFR of .23. In addition, cross-site comparisons reveal multiple replications of CBS effects across job sites (see Appendix B for data that show 7 replications across sites).

At least seven sites were reported to have earned current records of over 865,000 man-hours without a recordable injury (range: 865,000 – 2.2 million; average: 1.5 million).

The most recent reduction in AFR from 2010 to 2011 (YTD) produced an estimated cost savings of £880,000 in direct costs of injury for the company.

Data

We received an overwhelming amount of data during the visit, including:

- Data on specific behavioral improvement projects (BIPS) conducted by individuals, resulting from CBS courses
- Near miss and hazard reporting data
- Injury data including RIDDORs and minor injuries
- RF card data from anonymous surveys
- Corporate data on engagement in CBS across projects, sectors, and divisions
- Site-specific data

Some of the data are presented in the CBS application that was created and submitted by Costain. These data will not be reprinted in the current report. The data we requested and received during site visits are attached (see Appendix B). The data include replications of the CBS program across various Costain projects. It should be noted that the AFR comparisons made on p. 24 compare Costain projects to Costain Joint-Venture (JV) projects (these JVs are legal entities of their own, apart from Costain). In the latter projects with the highest AFRs, the JV partners chose not to adopt the CBS program and delivered inferior safety results.

CBS Courses

Overall, the CBS process is delivered through several types of courses:

- Manager courses (4 modules with an improvement plan after the course is completed). These are often a mix of Costain, Subcontractor, and Client employees and courses are mostly delivered by Hollin Consulting.

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\(^1\) AFR = N of RIDDOR Incidents X 100,000/total hours worked. RIDDOR is the UK equivalent to OSHA reportable and stands for Reporting of Injuries, Diseases and Dangerous Occurrence Regulations.
• Train-the-trainer courses for Costain trainers, delivered by Hollin Consulting.
• Front line supervisor courses (4 modules with an improvement plan after the course is completed). These are often a mix of Costain, Subcontractor, and Clients employees and courses are mostly delivered by Costain trainers.
• Employee courses (1-3 hours). These are usually subcontractor employees and delivered by Costain trainers.
• Refresher courses (2-4 modules). Delivered by Costain trainers.
• Taster courses (2 modules). Delivered by Costain trainers.

The CBS courses involve 3-4 hour modules, held every 2 weeks, and contain homework (case studies and reading) between modules. The trainer delivers timely feedback on assignments completed between modules. Participants write questions used in anonymous polling during the workshop sessions. Each participant receives a score and the score is made public to the small group (12 to 15) in each course. Asking for BIPS at the end of training is a very nice compliment to the course and promotes application of the course concepts.

Strengths of the CBS Process

Leadership and Management

• We were impressed with the leadership in the company. Leaders at all levels appear to have learned enough about behavioral science to apply the concepts in a wide variety of situations.
• Managers use behavioral science in decision-making. CBS has created an environment in which managers at all levels are demonstrating generalized skills in behavior analysis. For example, they have a project in Abu Dhabi and recognize that neither the workers nor the managers have the same values as those in the UK. This is to be expected, however, they turned the discussion of values into a discussion of how to determine the consequences that drive behavior there.
• CBS has created a platform for behavioral science to be used in other parts of the business. Many of the conversations we had during our visit suggest that this is already happening, to great benefit.
• We were impressed with the strategy of focusing on leadership behavior throughout the organization, rather than simply the behavior of the workforce. This is probably important for any organization, but is essential for Costain as their workforce is constantly changing and they directly employ a small percentage of any project’s workforce.

Analysis & Data-Based Decisions

• A number of managers described a process of using data to experiment and make decisions in the business and at their site, however, this varied across settings.
• CBS seems to have created a culture in which leaders seek to understand the causes of behavior rather than simply reacting to it. Most leaders described a process of asking questions of the workforce when problem performance arises.
• CBS training has changed over time based on the feedback they get from the students on performance and from satisfaction surveys.
• Most sites use RF Cards to gather anonymous data from the workforce. These data are used to gauge progress, to test for knowledge, and to get feedback on ideas before formally testing them.
Application of Behavioral Science

• There were many examples of people describing behavioral concepts correctly, outside of and within their own job areas. For example, many front line supervisors openly explained why certain antecedents are ineffective, and correctly distinguished the concepts of negative reinforcement, punishment, and positive reinforcement.

• Positive reinforcement programs were in place in all sites and they varied in terms of tangible rewards/reinforcers. All also used social reinforcers.

• One of the main features of the CBS program can be categorized as engagement. By increasing manager and supervisor engagement with the workforce they have created a highly positive work environment, however, this was more apparent on some sites, for example, Bidston-Moss, than others.

• There is a great deal of talk, across the company, of using near miss data for learning about safety rather than for blaming workers. Most sites are engaged in determining ways to get engagement from the workforce. Near miss and hazard reporting is often seen as a proxy for engagement. These reports are often gathered from the workforce, through written means and/or regular face-to-face communications with foremen and supervisors. Employees receive feedback on their input in various ways, ranging from graphs and verbal communications to a “you said, we did” board showing the progress of idea implementation. Some sites had some employees conduct observations, but most sites engage employees through encouraging them to find, report, and correct hazards and near misses.

• We saw some good examples of workers creating innovations and sharing them within sites. For example at Bond Street, a worker created a jig at home that he used to protect his feet when drilling. Bond Street managers measure, feed data back to the workforce, and try to reward submissions of innovations.

• We had many examples from the sites that they spend time analyzing behavior, thinking about the consequences of behavior, and planning consequences that will promote the desired results and not fraudulent reporting (whether this be through reinforcement or punishment, or both). In addition, some sites were engaging the workforce in these behavior analyses.

• There is an impressive amount of data associated with the CBS process, and most of it stays at the project level so that it can be used for decision-making. This helps the CBS program to maintain a healthy balance of decentralized (oversight by projects for their specific needs) and centralized management.

• We heard many examples, across sites, about using behavioral science to fix a wide variety of problems. Encouraging people to continue to share these stories over time is a good idea; it gives lots of examples of how to apply the science of behavior.

• We heard examples at most sites of incentives paid to local charities rather than directly to the workforce. In most cases, the workforce was encouraged to select the charity. We were impressed that the sites were using incentives with great care; they were actively aware of the possibility that incentives can cause under-reporting of injuries. Sites discussed this issue with us and were engaged in testing out consequences directed at various leading measures and consequences delivered to work teams vs individuals vs charity organizations outside of Costain.
CBS Course

• The CBS courses are very well-run and trainers collect and respond to feedback from participants to continuously improve the course.
• The BIP homework assignments from CBS courses and the discussion in the modules are excellent ways to get the trainees to learn concepts not just vocabulary. Many begin to apply the training to their work or in some case to their home lives. As we visited different sites many of the managers and supervisors were able to describe their improvement plans and how important they found them to learning the concepts.
• People we interviewed had uniformly and resoundingly positive feedback about the CBS course. A number of people reported having taken the course as many as three times, on different project teams.

Safety Standards

• All of the sites that we visited treated workforce injuries under one CBS process whether the injured were directly employed or subcontractors. In all cases, we had to ask about the proportion of injuries to Costain employees to subcontractors. This is likely due to UK legal standards, which require reporting of injuries of subcontractors as if they are your own. However it still stands in stark contrast to many US based companies that segregate contractor data from their own.
• We were impressed that Costain’s safety standards are sometimes higher than those of the client. For example Magnox (at Trawsfynydd) does not require contractors to wear glasses and gloves but Costain does.
• We saw some very good examples of housekeeping on sites. All sites were at least ‘good’, but several sites were impressively orderly and tidy far beyond what minimum standards would dictate.

Recommendations

We recommend that Costain be accredited as a company with an exemplary safety program based on behavioral science. This is extended to Costain Joint Ventures in which CBS has been adopted and it explicitly excludes Costain projects and Joint Ventures in which CBS has not been adopted.

The accreditation is ongoing for a period of three years, beginning on January 1, 2012, and is conditional, requiring the organization to provide regular annual updates of their safety data, including descriptions of changes in conditions in the accredited PBBS program operations. Update reports might include AFR data by Division as well as leading measures for safety. For instance, changes or improvements in types of leading measures used, changes in the use of near misses and hazard reporting, etc.

Becoming accredited through the CCBS is an honor that puts Costain among the few top-performing organizations in the world, in the area of safety. Accredited sites are expected to continue to excel and to ‘push the envelop’ of what is considered possible in the area of safety improvement. At the end of the accreditation period, Costain may apply for reaccreditation. In a reaccreditation visit, CCBS auditors will hope to see the following improvements to the process:
• Demonstrate application of CBS including data-based decision making for safety in sectors and projects and Joint Ventures outside of those reported for this accreditation.

• Evidence that the supply chain is using CBS or is accredited by CCBS in order to become Costain-preferred vendors.

• Demonstrate that CBS has created honest leading indicators of safety performance across sites. One focus of CBS is improving reporting on near misses. However, providing rewards for the highest number of near misses might result in fraudulent reporting. We recommend that near misses be called ‘close calls’. However, near misses, hazards, and at-risk behavior sometimes become confused by the workforce – it will probably help to start to clarify distinctions between these and other forms of data that are to be captured. In addition, it is hard to know what level of near miss reporting is most appropriate, due to changes in the workforce, project lifecycle, and improvements made to the site. These issues raise questions such as how to encourage honest close call reporting and if close call reporting is the best activity on which to focus.

• Demonstrate that all sites are collecting and reporting data back to the workforce to help them solve safety problems. Although most sites seem to collect data to test their practices, some sites struggled with getting the data they need to evaluate if various initiatives are working. For example, one site described the struggle with getting the workforce to report hazards and near misses. They decided that the lack of hazards reported was because the workforce is not accustomed to writing things down. This may be true, but to assess impact of new solutions, some degree of data recording is necessary, whether it be verbal, written, or otherwise. Another site seemed to use near miss reporting more for management purposes and not for communicating the data back to the workforce. In the future all sites should assure that they have an accurate, reliable method of recording leading indicator data, and for reporting these data back to their workforce.

• Demonstrate that all sites are emphasizing positive reinforcement and assuring agreement among the workforce on what consequences should be applied for specific behaviors. Although all sites demonstrated outstanding safety results, there were differences in emphasis on positive reinforcement, and agreement among leaders on what consequences should be applied for specific behaviors.

Other Considerations

• Demonstrate application of CBS including data-based decision making, in sectors and business and management areas outside of those of safety. For example, we were impressed with discussions of the Costain Cares program and data regarding other areas of safety, health, and environment would be beneficial.

• Develop and test strategies for sharing effective use of behavioral science across the organization. We suggested the company consider having a user’s conference where sites can present some of their most effective ideas over the course of the project. CCBS would be interested in co-sponsoring such a conference.

• Find new and creative ways to build in and measure the effects of positive reinforcement (especially social reinforcement) for the workforces on the projects. Most projects rely in part on some form of a green-yellow-red card system wherein green cards are underutilized.

• Address what CBS will do next. At this point in time, the focus of CBS appears to be in training and to some degree, sustainability. What is next?
• We expect that Costain integrate any acquisitions and foreign business into the CBS program in a timely manner.

Conclusion

It was a pleasure to visit the sites and to interact with leaders at Costain, clients, and subcontractors on sites. It is clear that Costain has worked hard to create a highly flexible, durable, and effective safety process by teaching people at all levels of the organization how to use behavioral science in their everyday work and home lives. The result has been an extraordinary set of safety outcomes across a wide variety of working conditions and locations.

Accreditation was unanimously approved on December 14, 2011 by the Commission on Behavioral Accreditation of the Cambridge Center for Behavioral Studies. Costain, Ltd. is accredited for 3 years (January 1, 2012 – December 31, 2014).

Respectfully Submitted,

John Austin, Ph.D.
Trustee
Cambridge Center for Behavioral Studies
Chair of Accreditation Team

Philip N. Chase, Ph.D.
Executive Director
Cambridge Center for Behavioral Studies
Company Structure

Environment Management Structure

BE SAFE Because you want to
BE SAFE Because you want to

NB. You also met
Andy Grant   LUL (Client) Project Director
Richard Watts   LUL Asst. Project Manager
Helen Richardson   LUL SHE Manager
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APPENDIX B
SUPPLEMENTARY DATA DELIVERED
AFTER THE ACCREDITATION VISIT
BE SAFE Because you want to

Severn Trent Water

Cumulative Near Misses and Hazards
- R+ Contingency Introduced for Reporting Near Misses and Hazards
- BIP on Increasing Near Miss and Hazard Reporting

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Near Miss and Hazard Reporting for STW

Number Reported
- CBS Training Commenced
- RT Contingency Introduced for Reporting Near Misses & Hazards
- BIP on Increasing No. of Near Misses and Hazards Introduced
BE SAFE Because you want to
BE SAFE Because you want to
The results

![Bar chart showing data for different months with categories A through E.]

A = Manager Training, B = Train the Trainer, C = Frontline Supervisor Training, D = Operative Training, E = Combined feedback cards.

BE SAFE – BECAUSE YOU WANT TO

The results

![Scatter plot showing data for different months with categories A through E.]

A = Manager Training, B = Train the Trainer, C = Frontline Supervisor Training, D = Operative Training, E = Combined feedback cards.

BE SAFE – BECAUSE YOU WANT TO
### AFR

![Graph showing AFR data]

### BE SAFE Because you want to

**Projects Fully Engaged with CBS**

- **Brighton & Hove**
  - 2011 A/R: 0.92
  - No. of Reportable Accidents in 2011: 2
  - Other Information: Project has been running for 24 months, Focused upon 40 workers, Water Treatment Division has achieved zero reportable accidents since project began and over 1,000 hours.

- **Bedfordshire Station**
  - 2011 A/R: 0.2
  - No. of Reportable Accidents in 2011: 2
  - Other Information: Project has been running for approx. 12 months.

- **Truro (Trinity)**
  - 2011 A/R: 0
  - No. of Reportable Accidents in 2011: 0
  - Other Information: Over 20 months without a reportable accident.

- **Blundon (Trinity)**
  - 2011 A/R: 0
  - No. of Reportable Accidents in 2011: 0
  - Other Information: 35 months and over 1,200 hours, Zero reportable accidents since project commenced.

- **Welsh Water Framework**
  - 2011 A/R: 0
  - No. of Reportable Accidents in 2011: 0
  - Other Information: 38 months and over 2,000 hours since last reportable accident.

- **STW Framework**
  - 2011 A/R: 0
  - No. of Reportable Accidents in 2011: 0
  - Other Information: 20 months and over 600 hours, Zero reportable accidents since framework commenced.

- **4S Framework**
  - 2011 A/R: 0
  - No. of Reportable Accidents in 2011: 0
  - Other Information: 3 months and over 1,400 hours, 1 reportable accident in May 2011, more than this year for 740 hours without a reportable accident.

- **GCA Framework**
  - 2011 A/R: 0
  - No. of Reportable Accidents in 2011: 0
  - Other Information: 35 months and over 1,400 hours, Zero reportable accidents since Hazard barren scheme introduced (See GCCA Graph).

- **GMW**
  - 2011 A/R: 0
  - No. of Reportable Accidents in 2011: 0
  - Other Information: 12 months and over 1,200 hours.

### Projects not engaged with CBS

- **Hampshire**
  - 2011 A/R: 0.92
  - No. of Reportable Accidents in 2011: 4

- **MAC 7 Framework**
  - 2011 A/R: 0.2
  - No. of Reportable Accidents in 2011: 3

- **MAC 10 Framework**
  - 2011 A/R: 0.2
  - No. of Reportable Accidents in 2011: 3

- **MAC 12 Framework**
  - 2011 A/R: 0.2
  - No. of Reportable Accidents in 2011: 3

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**BE SAFE Because you want to**
No. of Reportable Accidents

- Be SAFE Because you want to
I have a voice on this Project

1. Yes
2. No

BE SAFE Because you want to

I have a voice on this Project

1. Yes
2. No

BE SAFE Because you want to
I would inform my supervisor if one of my workmates was behaving in an unsafe manner

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

Do you feel part of the Project Team?

1. Yes
2. No
Management seam to care about my safety

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

I know my co workers would have my back when it comes to ensuring my safety whilst working

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree
I would report near misses to management

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

BE SAFE Because you want to
What Must I Report?
Source: http://www.hse.gov.uk/riddor/what-must-i-report.htm

Deaths and injuries
If someone has died or has been injured because of a work-related accident this may have to be reported.

Work-related accidents
The accident that caused the death or injury must be connected to the work activity, Do I need to report...? provides further evidence.

Types of reportable injury
- Deaths
- Major injuries
- Over-three-day injuries

People not at work
- Where a member of the public or person who is not at work has died, or
- Injuries to members of the public or people not at work where they are taken from the scene of an accident to hospital for treatment.

Reportable major injuries are:
- fracture, other than to fingers, thumbs and toes;
- amputation;
- dislocation of the shoulder, hip, knee or spine;
- loss of sight (temporary or permanent);
- chemical or hot metal burn to the eye or any penetrating injury to the eye;
- injury resulting from an electric shock or electrical burn leading to unconsciousness, or requiring resuscitation or admittance to hospital for more than 24 hours;
- any other injury leading to hypothermia, heat-induced illness or unconsciousness, or requiring resuscitation, or requiring admittance to hospital for more than 24 hours;
- unconsciousness caused by asphyxia or exposure to a harmful substance or biological agent;
- acute illness requiring medical treatment, or loss of consciousness arising from absorption of any substance by inhalation, ingestion or through the skin;
- acute illness requiring medical treatment where there is reason to believe that this resulted from exposure to a biological agent or its toxins or infected material.

Over 3 day injuries
This is where an employee or self-employed person is away from work or unable to perform their normal work duties for more than three consecutive days (not counting the day of the accident).

Occupational diseases
Employers and the self-employed must report listed occupational diseases when they receive a written diagnosis from a doctor that they or their employee is suffering from these conditions and the sufferer has been doing the work activities listed.

Dangerous occurrences
Dangerous occurrences are certain listed near-miss events. Not every near-miss event must be reported. Here is a list of those that are reportable:
- collapse, overturning or failure of load-bearing parts of lifts and lifting equipment;
- explosion, collapse or bursting of any closed vessel or associated pipe work;
- failure of any freight container in any of its load-bearing parts;
- plant or equipment coming into contact with overhead power lines;
- electrical short circuit or overload causing fire or explosion;
- any unintentional explosion, misfire, failure of demolition to cause the intended collapse, projection of material beyond a site boundary, injury caused by an explosion;
- accidental release of a biological agent likely to cause severe human illness;
• failure of industrial radiography or irradiation equipment to de-energise or return to its safe position after the intended exposure period;
• malfunction of breathing apparatus while in use or during testing immediately before use;
• failure or endangering of diving equipment, the trapping of a diver, an explosion near a diver, or an uncontrolled ascent;
• collapse or partial collapse of a scaffold over five metres high, or erected near water where there could be a risk of drowning after a fall;
• unintended collision of a train with any vehicle;
• dangerous occurrence at a well (other than a water well);
• dangerous occurrence at a pipeline;
• failure of any load-bearing fairground equipment, or derailment or unintended collision of cars or trains;
• a road tanker carrying a dangerous substance overturns, suffers serious damage, catches fire or the substance is released;
• a dangerous substance being conveyed by road is involved in a fire or released.

The following dangerous occurrences are reportable except in relation to offshore workplaces:
• unintended collapse of:
  o any building or structure under construction, alteration or demolition where over five tonnes of material falls;
  o a wall or floor in a place of work;
  o any false work;
• explosion or fire causing suspension of normal work for over 24 hours;
• sudden, uncontrolled release in a building of:
  o 100 kg or more of flammable liquid;
  o 10 kg of flammable liquid above its boiling point;
  o 10 kg or more of flammable gas; or
  o of 500 kg of these substances if the release is in the open air;
• accidental release of any substance which may damage health.

Additional categories of dangerous occurrences apply to mines, quarries, relevant transport systems (railways, etc) and offshore workplaces. Detailed information is provided in the relevant schedules to the regulations and the Guide to RIDDOR.

**Gas incidents**
If you are a distributor, filler, importer or supplier of flammable gas and you learn, either directly or indirectly, that someone has died or suffered a ‘major injury’ in connection with the gas you distributed, filled, imported or supplied, then this must be reported online using form (F2508G1).
If you are a gas engineer registered with the Gas Safe Register, you must provide details of any gas appliances or fittings that you consider to be dangerous, to such an extent that people could die or suffer a ‘major injury’, because the design, construction, installation, modification or servicing could result in:
• an accidental leakage of gas;
• inadequate combustion of gas or;
• inadequate removal of products of the combustion of gas.