



CROSS update

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Safety of structures

- Every day somewhere in the world buildings collapse or burn
- Every day there is news of more damage from the climate emergency
- Need to be sure that buildings and infrastructure are safe
- Learn so that we do better



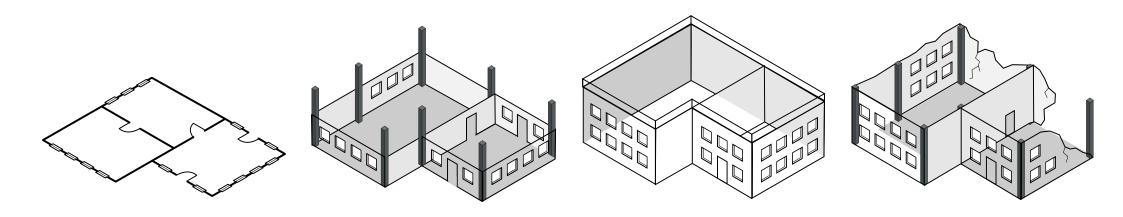


The reporting process

What to report

What can be reported?

Fire and structural safety





Safety Management Reporting System



- Unique web-based system
- Multiple stage process
- Involves Designated Persons, Analysts, Expert Panelists, and lawyers



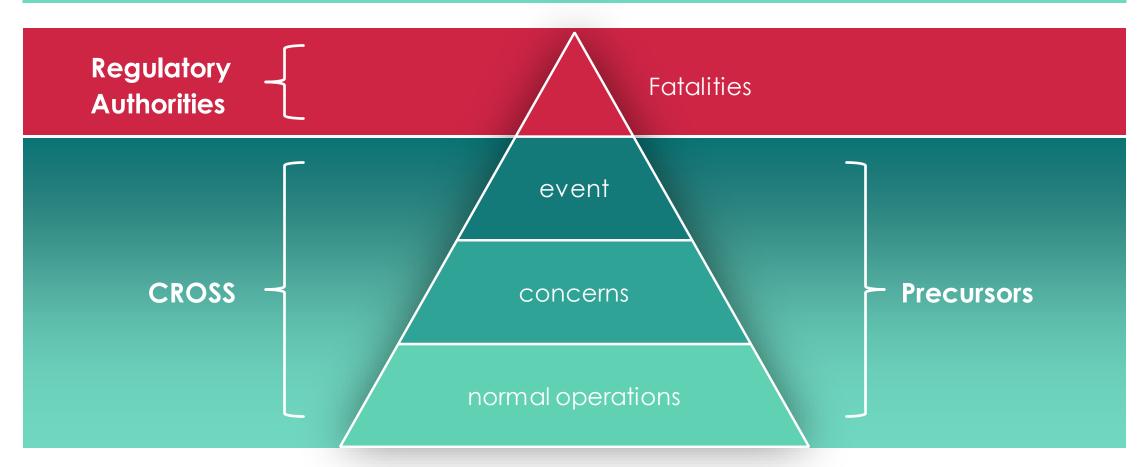
Expert Panel

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contractors

witness
control insurance
nuclear fire expert
resilience forensic
structural
blast highways
building
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Looking for pre-cursors





Developments in 2023

- Involvement with RAAC
- Recognition of precursor Alert to Luton Airport Car Park fire
- Winner of the Collaboration of the Year Award at the Excellence in Fire & Emergency Awards
- Raised awareness of Li-ion battery fires
- Operating the Voluntary Occurrence Reporting Scheme for the Building Safety Regulator
- Auto-enrolment of IStructE members to CROSS
- Member of NFCC Emergency Hazards Group





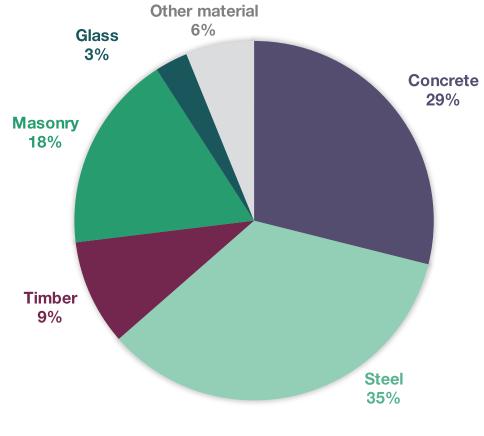
Case study: CROSS and RAAC

- RAAC report in 2018
- CROSS Alert in 2019
- Additional reports received
- IStructE specialist panel established
- Government departments investigate
- 2022-23 multiple issues discovered in schools and hospitals

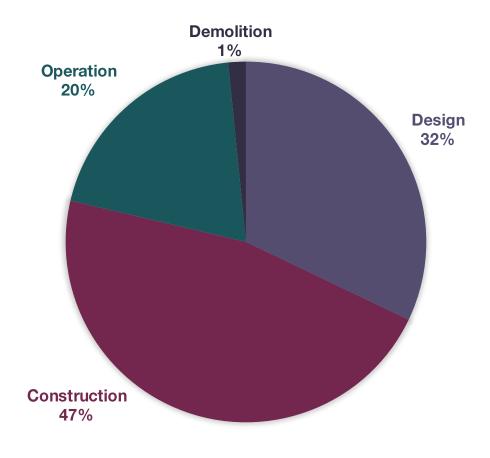




Safety Report Management System Analysis of Reports Received



Material



Project Stage





Bridges

Brief from Richard Fish

Bridge collapses around the world happen with alarming regularity. In the twenty-first century alone, there have been 130 reported fatal collapses claiming over 1,200 lives. What is not reported, however, are the near-misses or close calls.

In the UK, there is mandatory reporting with regards to railways and air accidents, respectively the Rail Accident, and Air Accident Investigation Branch. If a railway bridge collapses, therefore, the RAIB will investigate and report. Yet there is no such mechanism for a highway bridge collapse.

The UK Bridges Board has given a high priority to a research project to develop reporting procedures for failures of highway bridges. And not just related to catastrophic collapses but also to element failure and other pre-cursor events. This proposal has been accepted by the UK Road Leadership Group and is awaiting confirmation of research funding. It is endorsed by CROSS, the Institution of Civil Engineers, and the Bridge Owners Forum.



Strategy

Objective

Determine whetherthere are criticalsafety risks to the UKstock of bridges

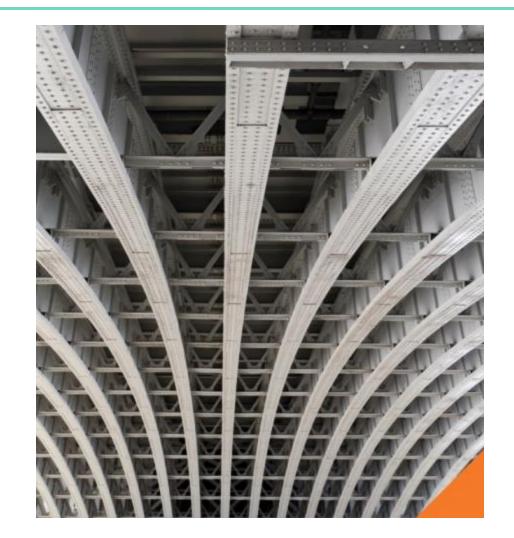
Action

Obtain reports on concerns about safety on existing bridges



ICE support

- ICE Hansford Report *In Plain*Sight 2018
- Work with professional bodies to review, comment on and disseminate lessons from concerns, near misses and catastrophic incidents, building on the work of CROSS





Some bridge reports (from 51)

- Inadequate bridge bearing pad installation
- Corrosion concerns on a pedestrian bridge
- Cantilever bridge parapet falsework failure
- Wrong length blind bolts lead to unsafe bridge structure
- Concerns over execution class categorisation of steel pedestrian bridge
- Corrosion of steel truss footbridge
- Corrosion of bridge girder beams
- Fatigue failure of bridge cross-girder
- Inspection and maintenance of Super-T bridge girders
- Dislodged finger plate on highway bridge
- Quality of design and construction of a major bridge structure



Example report topics

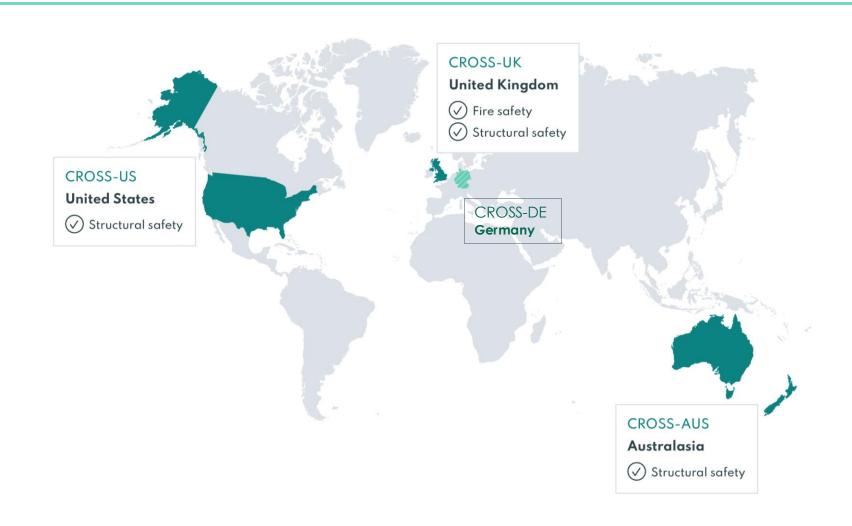
- Unexpected failure of bridge element
- Repaired crack which re-opens
- Unexplained distress symptom
- Severe corrosion or spalling
- Concerns about spaces or elements that cannot be inspected



CROSS International

CROSS international network



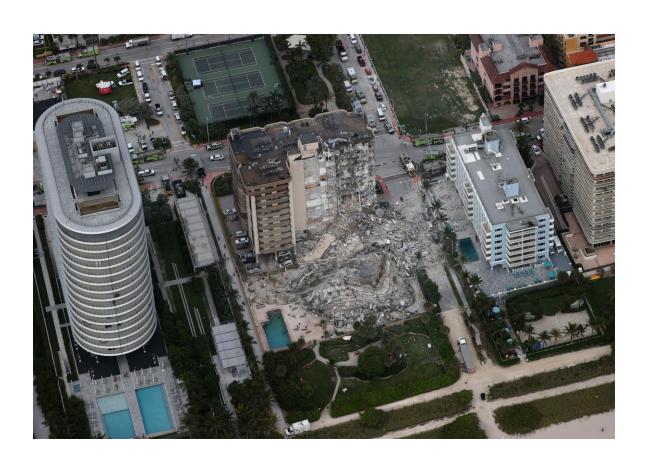








Champlain Towers Surfside

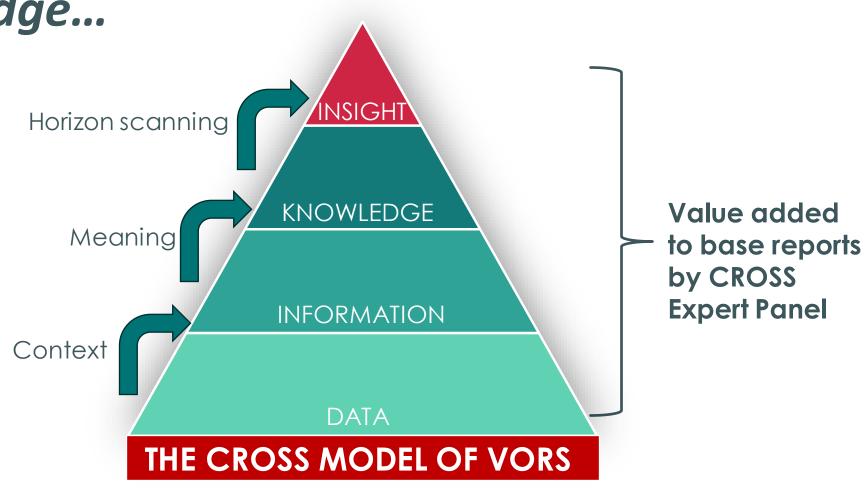


- Progressive collapse of 12 storey condominium in June 2021 with 98 fatalities
- Reinforced concrete structure 40 years old
- Investigations ongoing by NIST
- Recommendations will have a profound effect on thinking about ageing buildings (and bridges)



Bridge campaign

The unique CROSS Model of Voluntary Occurrence Reporting – adding value, turning *information* into *knowledge...*

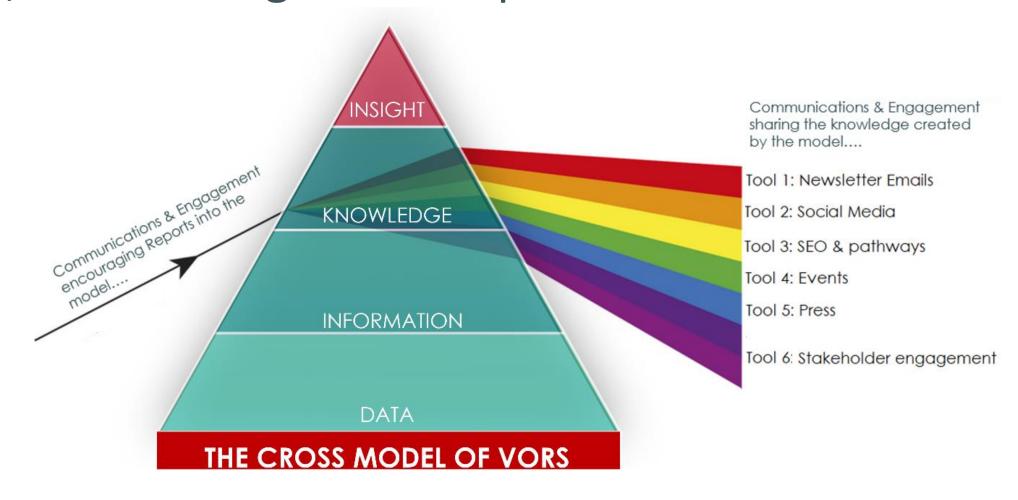




The unique CROSS Model can only function at its best when effectively supported by Communications & Engagement.



First, to encourage base Reports into the scheme...



... second, to push content *out* so the knowledge and insight reaches the right people

Communications Tool 1: Newsletter & other emails

50.5% average open rate last year, **23%** click through rate.

Current Outputs:

- 4 CROSS UK Newsletters per year
- Approx. 3 CROSS US/CROSS AUS NL
- 4 IStructE auto-enrolment emails
- 12 monthly articles submitted to the IStructE & NHIC Newsletter emails

In addition, for the proposed bridges campaign...





Bridges edition of Newsletter

Editorial

Since the last issue of the Newsletter you will have no doubt seen the extensive coverage in the media on Reinforced Autoclaved Aerated Concrete (RAAC) CROSS played a significant role in raising the alert on RAAC and helping the industry to prepare.

The first warning from CROSS (or SCOSS as it was back then) dates back to 1999 when the Standing Committee on Structural Safety recom that owners of buildings with RAAC roof planks have them inspected.

Since then, CROSS has received multiple reports connected to RAAC. The first of these> was published in 2007. In it, a reporter describes their experience during the construction of a building in the 1970s where a RAAC plank failed and fell to the ground. When the reporter investigated the failure, they found that the einforcement in the plank did not extend to the bearing ends; and that it had failed in shear. After further investigation, they condemned 30% of all the roof planks due to poor nanufacturing quality.

This is interesting, as poor manufacture is a significant contributing factor to the current concern regarding RAAC, with reinforcement not nece being located over the critical bearing

Fast forward to 2018 and the collapse of a RAAC plank at Singlewell Primary School in Kent. It was this event, together with previous CROSS Reports that triggered the release of our Safety Alert on RAAC planks in 2019.

The Safety Alert> was targeted from the 1960's to the 1980's and specifically mentioned government with responsibility for schools or similar buildings. It called for RAAC planks to be identified, inspected and, given to their replacement.

This really brought the problem to the attention of the construction sector. As a direct consequence of the Alert, the Institution of Structural Engineers (IStructE), following CROSS advice, set up a RAAC study group which led to the publication of their Investigation and Assessment guides>, which are now being used widely to assess the condition of RAAC planks across the public and private estate.

In many ways, RAAC is a great example of how the sharing of information can work well. CROSS can raise the alert and the Professio Engineering Institutions can prepare to advise on technical matters. Since 2019, CROSS has worked with the Department for Education, the NHS and the Cabinet Office discussing proposals for how estates can be best nvestigated to assess if they have any RAAC. We've also worked with the National Federation of Roofing Contractors in developing an alert for been few recorded incidents of RAAC plank collapses in comparison to the huge number that are out there, and uckily there is no record of anybody being injured. However, it is likely, that we do not have the full story and many planks will have previously been laced or strengthened.

The situation continues to develop There have been several incidents reported this year that led to the Department for Education's decision close a number of school buildings These closures were immensely worrying to many parents, teachers and headteachers and disrupted children's education

CPOSS has appendental evidence that neonle were concerned with the degradation of RAAC well before the 2018 collapse. Such concerns, however, did not translate into a significant number of reports submitted prior to 2018.

This shows the importance of people reporting safety concerns.

Contents Collapse of folded plate timber roof at a school fire protection smoke control Painted faying surfaces 20 leads to connections with insufficient load capacity Combination load cases in 23 Failure of Firefighters lift 25

If all the knowledge of RAAC planks out there had been shared earlier issued earlier?

Each year, CROSS receive more reports than the year before. There has been a growing awareness of us, and a growing trust. This issue of the newsletter contains a selection of our most recent fire and structural Safety Reports, a handful of the many reports CROSS has received, reviewed, and published since its creation. However, there is still a long way to go. We depend on industry ionals, people like you, to submit concerns to us.

experienced a fire safety or structural

As the events connected to RAAC have shown, reporting to CROSS can help to raise awareness of an issue. Your report will make a positive difference.

So please, if you have seen or

safety issue, submit a report



Paul Livesey Scheme Manager, CROSS

Help to improve safety by submitting a report

Find out more >

More from CROSS

CROSS Expert Panel Meeting at IStructE HQ on 15th November

Our Expert Panels> are at the Comprised of leading experts the volunteer members use the volunteer members use their expertise to help readers of CROSS safety information understand what can be learned from the reports we receive. The panels aim to identify the relevant publications that can be accessed and used.

CROSS win Collaboration of the Year award

The CROSS team were delighted to accept the award for Collaboration of the Year at FIRE Magazine's Excellence in Fire & Emergency Awards 2023. The ceremony was held at One Great George Street on 1st December. CROSS were finalists in two other categories - Resilience and Learning from Major Incidents, and International Best Practice.

NCE's The Engineer's Collective Podcast

October's episode of The Engineers Collective podcast> featured CROSS Scheme Listen to hear the two discuss the history of CROSS as a unique, confidential reporting scheme, our expansion into fire safety post-Grenfell and the input CROSS had on the RAAC crisis.

The stack effect and considerations for smoke control

CROSS Safety Report Report ID: 1250

Stack effect can significantly impact fire safety and smoke spread in the escape stairwells of tall buildings. The reporter states real world tests have demonstrated that existing smoke control systems, designed in accordance with standard industry design guidance and idealised conditions, may not suitably account for typical winter stack effect conditions.

Key Learning Outcomes

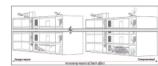
For designers and installers:

- When modelled, smoke control systems such as smoke extract shafts should account for realistic building and environmental conditions to competing air flows driven by the stack effect
- Testing and commissioning of smoke control systems should not be done in isolation, it should be carried out in realistic and suitably representative building conditions to capture the impacts of the stack effect

R Full Report

The stack effect is a natural phenomenon that occurs predominantly in tall buildings, where difference in air temperature results in pressure between the inside and outside of a building and causes air to flow through vertica spaces. In the event of a fire, the stack effect can promote smoke and hot gases to rise and accumulate in the upper floors of a building, while drawing fresh air from the lower floors. This can create a hazardous situation where smoke and heat are drawn into the stairwells, which are critical as escape routes for occupants of the building as well as for fire rescue service intervention

As illustrated in Figure 1, the stack effect can interfere with the operation of certain types of smoke control systems by encouraging a flow of air that is opposite to the desired direction of airflow



Flaure 1: Fire safety impact of stack effect

Design and commissioning

The internal and external temperature distributions and gradients before a fire are not always accurately represented by practitioners in design approaches that utilise Computational Fluid Dynamics (CFD) based fire nodelling, such as the widely used Fire Dynamics Simulato (FDS). Moreover, when these pre-fire temperature anditions are included in the model, the prevalent use of the default inert wall thermal boundary conditions in FDS may significantly influence the preservation of temperature gradients. This happens because these conditions model an infinite heat transfer to keep the wall temperature at a steady 20°C.

Stack effect is often overlooked in smoke control design with some guidance, such as EN12101-6-2006 Annex B (informative), even suggesting to intentionally reduce or remove the impact stack effect during the commissioning of smake control systems: "B. 2 Where stack effect is likely to be a significant factor, this may be minimized by operating the pressure differential system for a period o one hour before testing so that the external air and shaft temperatures can equalize.

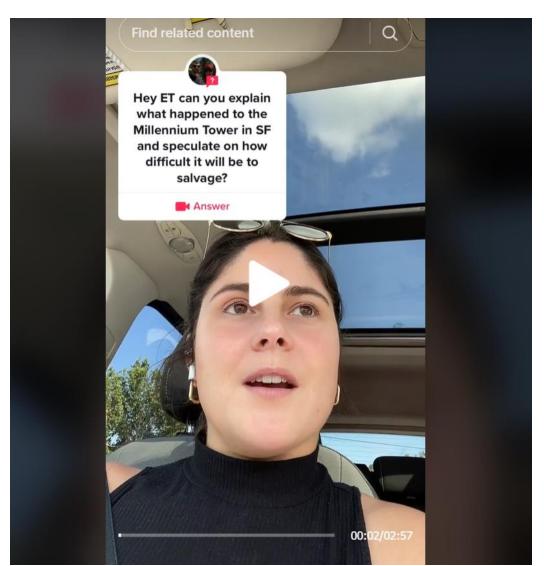
This report highlights alarming observations where the mpact of stack effect in tall buildings undermined the active smoke control systems and illustrates how, if not suitably designed for, means of escape and fire rescue operations may be compromised

Responding to reports of various fire system faults, recent investigations were carried out during winter and spring months at several tall buildings.



Communications Tool 2: Social Media

- LinkedIn: 20% increase in followers on the platform from 2022 to 2023.
- 346, 581 impressions per year.
- Finding missing Millennials with TikTok... video short series.





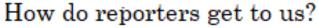
Bridges – LinkedIn

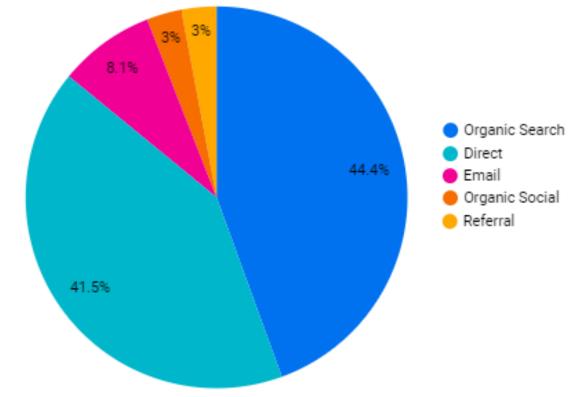
• Pay per follower/ pay per click Bridges campaign on LinkedIn (£500)

Co-ordination with Bridge Owners Forum & ICE LinkedIn accounts.



Communications Tool 3: Website & SEO





- Number 1 way people get to CROSS website is via a search engine.
- SEO (Search Engine Optimisation) is critical
- Improved by use of keywords, increasing citation use, enhanced link building.



Bridges takeover of CROSS website in July

- CROSS website take over with special bridges banner in July
- CROSS Theme page bridges
- SEO (search engine optimization, improving our position in Google searches) and keywords.

CROSS Theme Page

Safety of structures in the climate emergency

Region: CROSS-UK, CROSS-AUS, CROSS-US



In the current climate emergency and the race to achieve zero emissions, we must ensure our structures remain safe as we develop and implement any climate-motivated innovation or change of approach.

This Theme Page will be used to both collate content around this topic and to allow professionals to share safety issues for others to learn from.

In 2019, engineering consultancies around the world began to respond to government declarations of a climate emergency by declaring their own <u>Climate and Biodiversity Emergency</u>, which CROSS supports. One of the commitments of the organisations signed up to in the declarations is to share knowledge and research on an open source basis.



Share your experiences of climate emergency related safety issues

CROSS are seeking safety reports related to this topic to add to the knowledge hub below.

Our secure and confidential safety reporting system gives professionals



Share this page



* Bookmark this page

Categories this page belongs to

Follow the links below to see more content on the same category

Safety area

Fire safety
Structural safety

Design

Sustainability

Content type

CROSS Theme Page

CROSS regions

CROSS-UK CROSS-AUS

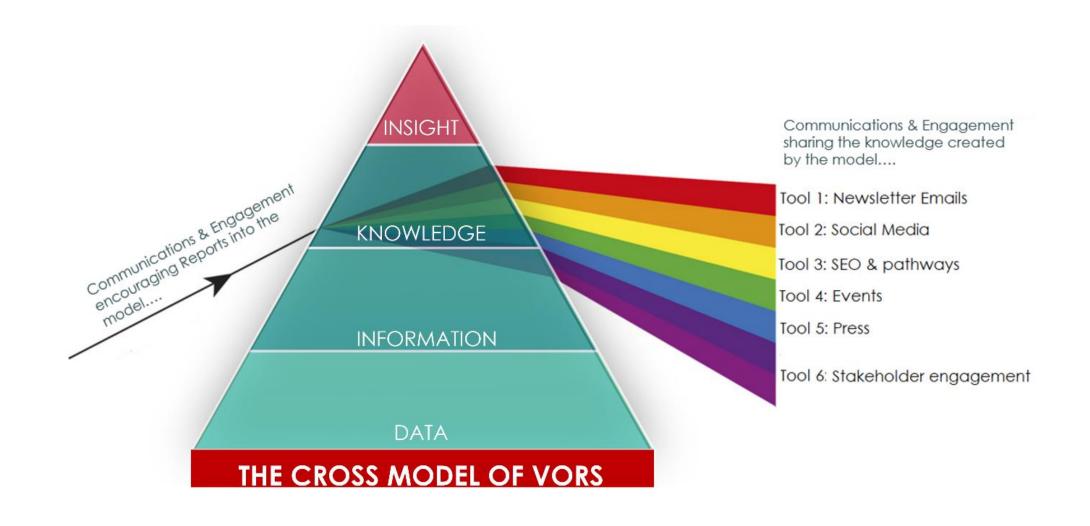
CROSS-US

Related resources

The Institution of Structural
Engineers (IStructE) - Climate
emergency

The climate emergency is the greatest threat to our planet.







Communications Tool 4: Events

- The CROSS team typically undertake 3 speaking engagements per month including presentations, webinars and similar events.
- Standard slide decks on bridges— on CROSS and how to report which can be dropped into your own presentations.





Bridges events



Welcome to Bridges 2024

Conference (13 March)
Round Table Discussion & Seminar Day (14 March)

14-25

Collaborative Reporting for Safer Structures (CROSS)

14:25 - 14:50

- · An introduction to confidential and voluntary safety reporting and CROSS.
- · A brief history of the development of CROSS and its mission.
- · Examples of CROSS Safety Reports and how lessons learned are shared.
- Examples of CROSS Safety Alerts, including, Reinforced Autoclaved Aerated Concrete (RAAC).
- · How to become involved and contribute.

Speakers



Paul Livesey
Scheme Manager
Collaborative Reporting for Safer Structures (CROSS)



Communications Tool 5: Press

- Engagement with trade and technical publications.
- Currently, CROSS submits monthly articles to International Fire Protection Magazine and The Structural Engineer. Safety Reports are also regularly reproduced in the Building Engineer and Fire & Risk Management Magazine.
- Last year Safety Reports also received coverage in NCE Magazine, Construction News, Construction Management, Building Design, Construction Index and Inside Housing.



Press campaign on Bridges

- NCE & The Structural Engineer in May for the launch (material will be needed by beginning of April)
- Joint statement 'partnership between the Bridge Owners Forum, the UK Bridges Board and CROSS promoting reporting to CROSS.'
- Engagement with ICE, ICE Proceedings and ICE Training, possible NCE Podcast.
- Send statement to trade publications and publish on CROSS, BOF, UKBB, and ICE websites.

Communications Tool 6: Stakeholder Engagement

Joint statement can also act as letter to be sent to all members of BOF. UKBB, key individuals, regulators and government departments.



11 October 2023

CROSS-UK PRESS STATEMENT ABOUT FIRE AND STRUCTURAL COLLAPSE AT LUTON AIRPORT MULTI-STOREY CAR PARK

Dr Alastair Soane, Principal Consultant for CROSS-UK (Collaborative Reporting for Safer Structures UK) comments:

"Fires in car parks are not uncommon, but a fire of this magnitude is rare.

"A full investigation will be required to understand what has happened. We do not yet know the reasons for this fire and structural damage to this multistorey car park.

"While we await further news from the site regarding the cause of this fire and the impact on the structure it is inappropriate to speculate.

"When details on the fire are available, we will help to disseminate lessons learned so that similar events can be prevented in future."

CROSS operates a confidential reporting system which allows professionals working in the built environment to report on fire and structural safety issues.

These are then published anonymously to share lessons learned, create positive change, and improve safety. Past CROSS reports have raised concerns around the standards of fire protection to the structure of car parks, and the impact of novel fuel sources, such as Lithium-ion batteries. These can be found on CROSS-UK website:

ALER'

Fire in multi-storey car parks | CROSS (cross-safety.org): 1 February 2018 – This examined the severe fire at the Liverpool Echo Arena MSCP on 31st December 2017 which gutted the seven-storey building and where up to 1,400 cars were destroyed. This fire was unprecedented in scale because, unusually, the initial fire in one car rapidly spread to other cars. This Alert drew attention to the fact that similar events could occur again, and all those in the car parking business must be aware of the risks.

REPORT

Fire risks in multi-storey car parks | CROSS (cross-safety.org): 14 October 2020 – This report examined the concerns by a reporter to CROSS who was concerned by the reluctance of the industry to voluntarily take on board and proactively react to the lessons learnt from the fire at the Echo Arena car park in Liverpool.

Fire resistance of multi-storey car parks | CROSS (cross-safety.org): 1 October 2019

– A reporter to CROSS had visited a recently constructed car park which contained

some of the same design issues discussed in the 1 February 2018 Alert on Fire in Multi-Storey Car Parks (see above). The reporter was concerned that the car park they visited could survive for significantly more than 15 minutes in a fire without collapsing.

Fire protection to car park steel frame | CROSS (cross-safety.org): 26 October 2022

 A reporter was concerned about the fire protection of a steel framed car park above a retail unit.

Related to these reports is the Institution of Structural Engineers recently published Car Park Guidance which addressed the risks associated with fire in care park design, ponstruction and maintenance.

https://www.istructe.org/resources/guidance/car-park-design/

- Ends

Please contact: Helen Thompson on 07930 34 55 43

About CROSS: https://www.cross-safety.org/uk

Collaborative Reporting for Safer Structures (CROSS) is a trusted provider of free safety information, helping built environment professionals to make structures safer. It is an independent, confidential, and voluntary scheme for reporting concerns about fire and structural safety. Voluntary submissions by built environment professionals are anonymised and deidentified, so learning can be shared within a no-blame outlure.

CROSS Expert Panel volunteers analyse and provide comments on anonymised | submissions. The resulting Safety Reports are published and made freely available to all interested parties.

In addition to Safety Reports, CROSS provides a range of independent, quality, and free safety information. Further details about CROSS content is available on its website.

CROSS operates internationally, currently in the UK, Australasia (since 2018) and the USA (since 2019).

It is an initiative by the Institution of Structural Engineers (IStructE) and the Institution of Civil Engineers (ICE). It is supported by the Institution of Fire Engineers (IFE) and the Health and Safety Executive (HSE).



Policy Position Paper

Embodied carbon regulation – alignment of industry policy recommendations

Around 1 in 10 tonnes of the UK's total greenhouse gas emissions are so-called "embodied carbon" emissions, related to the production and use of construction materials. They total 64 million tonnes CO₂e per year, more than the country's aviation and shipping emissions combined.

Despite their magnitude, embodied carbon emissions are unregulated in the UK. Similar legislation has already been implemented in several European Countries, the state of California, and is in the latter stages of debate for cross-EU introduction – all demonstrating the feasibility for the UK to do the same.

Several construction industry initiatives have been launched in recent years, calling on the government to move to reduce embodied carbon emissions in construction. Collectively, these initiatives are supported by hundreds of businesses, including a number of the largest UK housebuilders, developers, contractors and financial institutions. These organisations see such regulation as key to bringing consistency and accelerated action in this area – and many of their statements of support are shown at www.part-z.uk/industry-support.

These UK industry initiatives have all called for reforms to regulation, though dates and details have varied as collective industry knowledge around embodied carbon has evolved. Now, at the start of 2024, a general election year, these initiatives are joining together to call on the next government with one voice.

For more information, contact: Will Arnold, Head of Climate Action, The Institution of Structural Engineers, will.arnold@istructe.org The undersigned groups call on party leaders to make the following manifesto commitments:

Key ask:

 "Our government will move to reduce embodied carbon emissions in building construction within two years of taking office."

Specific steps:

- Within six months of taking office Policy signalled confirming the dates and interventions below.
- By 2026: Mandate the measurement and reporting of whole-life carbon emissions for all projects with a gross internal area of more than 1000m² or tha create more than 10 dwellings.
- By 2028: Introduce legal limits or the upfront embodied carbon emissions of such projects, with a view to future revision and tightening as required.

Signed by:



The Institution of StructuralEngineers





















Campaign Timeline – kick off engagement

March:

- Joint statement written + signed off
- Begin presenting at Bridges' events and conferences

April:

Bridge theme page goes live on CROSS website

May:

- Launch 'partnership/ campaign' in TSE themed edition
- Launch in NCE Magazine
- Joint statement sent to trade press
- Letter sent to key stakeholders



Campaign Timeline – kick off engagement

June

 Pay per click/pay per follower Bridges campaign on LinkedIn

July

- Special edition of the CROSS Newsletter on Bridges
- NCE podcast

August

- Bridges takeover of the CROSS website
- SEO optimisation for bridges



Communications
Goal 1:
Encourage
bridges sector to
submit reports

(Tell, Submit a Report)

Communication Goal 2: Publish & promote critical safety information on bridges

(Visit, read)

Communication Goal 3: Urge action after an Individual reads CROSS content

> (Subscribe, ollow, Share, Change)

	Communication Tool	Target Audience	Frequency	Deliverables
	Newsletter & Email	Existing CROSS network IStructE & ICE members Engineers and inspectors in the bridges sector	Quarterly	4 CROSS-UK subscriber Newsletter emails 3 CROSS-US or CROSS-AUS Newsletter emails 4 IStructE auto-enrolment Newsletter emails SPECIAL BRIDGES EDITION OF NEWSLETTER
	Social media	Engineers and inspectors in the bridges sector	Weekly	Pay-per-click/Pay-per-follow campaign on LinkedIn. Co-ordination of partners LinkedIn accounts
	Website & SEO	Wider audience of professionals and others involved in bridges who are not already aware of CROSS	Daily	Bridges Theme page Website takeover on bridges SEO refresh for bridge terms Joint statement on CROSS website, link to BOF, UKBB & ICE website website
	Events	Wider audience of professionals and others involved in bridges who are not already aware of CROSS	Monthly	CROSS presentations at Bridges Conferences and events Tailored slides on CROSS & Bridges
	Press	Engineers and inspectors in the bridges sector IStructE & ICE members General public	Monthly	 Continued engagement with trade and technical press on bridges Joint statement circulated to trade press Joint podcast Launch in special themed edition of TSE in May Launch in NCE in May
	Stakeholder Engagement	Industry, Our parent Institutions, Organisations, Regulators, Government	Quarterly	 Joint statement turned into a letter to be sent to all BOF and UKBB members Horizon scanning – any trends that emerge turned into CROSS Safety Alerts.

After kick off...

- Obtain funding for continuing operations
- Establish panel of bridge experts
- Continue programme to obtain reports
- Process reports
- BOF and UKBB to decide under which circumstances bridges can be identified and if so to whom
- Publish anonymised reports on CROSS website
- Analyse reports for trends
- Action taken by bridge community



Your report will make a difference

Submit a bridge report! Share your experiences to help others and create a safer built environment

www.cross-safety.org/uk/submit-a-report-uk

