Maze Fire Consulting

Prequalification Statement

MAZE
FIRE CONSULTING

www.mazefire.com

Introduction

- We make sense of complex legislative and international standard requirements to deliver completely bespoke fire engineering solutions for our clients.
- Our previous project involvement covers all corners of the globe; we have delivered solutions on almost every continent and continue to liaise with the international community both in person and remotely, thanks to our dedicated team of professionals based across the UK and Ireland.
- We have a detailed knowledge of territory-specific regulations as well as a network of international fire authority and construction industry contacts – so you can be sure that we have the skills and expertise to find the best and safest solution for your project.

Company Profile

At Maze Fire, we are driven by a clear vision, mission and unwavering values that shape our commitment to delivering exceptional fire safety solutions to our clients. These pillars form the foundation of our company culture, guiding our actions and inspiring us to exceed expectations.

Vision Statement

- To become a progressive leader in strategic and specialist fire consultancy services using innovative and sustainable solutions.

Mission Statement

- To deliver quality fire safety whilst meeting the new technological demands of building design.

Company Values

- **Safety** – Our focus is always on delivering safe outcomes.
- **Integrity** – We work transparently so that our outputs are trusted.
- **Innovation** – We keep up to date with new technologies and reassess efficiencies and quality.
- **Client Satisfaction** – We strive to provide a positive contribution, with clear communication in a timely manner.
- **Employee Loyalty** – We aim to be a compelling place to work so that we retain and attract valued team members.

Quality Assurance

- By adhering to the ISO 9001 Management System and being certified by Lloyd's Register Quality Assurance, Maze Fire demonstrates our dedication to meeting customer expectations and delivering reliable results.
- ISO 9001 is an internationally recognised standard for quality management systems. It provides a framework for organisations to establish processes and procedures that ensure consistent quality and continuous improvement. Achieving certification to this standard signifies that Maze Fire has implemented effective quality management practices and undergoes regular audits to maintain compliance.
- Emphasizing integrity as a core value is crucial in building and maintaining trust with customers. This trust forms the foundation for long-term relationships and customer satisfaction.
- By prioritizing quality, reliability, and integrity, Maze Fire sets itself apart as a trustworthy and reputable organisation in its field. These principles not only benefit the company but also contribute to customer satisfaction and overall success.

LRQA

Current issue date: 29 March 2023
Expiry date: 28 January 2024
Certificate identity number: 10514528

Original approval(s):
ISO 9001 - 6 August 2018

Certificate of Approval

This is to certify that the Management System of:

Maze Fire Consulting Holdings Limited

64 Bridge Street, Manchester, M3 3BN, United Kingdom

has been approved by LRQA to the following standards:

ISO 9001:2015

Approval number(s): ISO 9001 – 0009450

This certificate is valid only in association with the certificate schedule bearing the same number on which the locations applicable to this approval are listed.

The scope of this approval is applicable to:

The provision of strategic fire safety engineering advice and services from concept to occupation. This includes analysis of fire behaviour, structural performance, evacuation strategies and radiation modelling in compliance with international fire regulations, codes of practice and specific client requirements.

David Derrick

Area Operations Manager UK & Ireland

Issued by: LRQA Limited

LRQA

Certificate identity number: 10514528

Certificate Schedule

Location	Activities
Maze Fire Consulting Limited 64 Bridge Street, Manchester, M3 3BN, United Kingdom	**ISO 9001:2015** The provision of strategic fire safety engineering advice and services from concept to occupation. This includes analysis of fire behaviour, structural performance, evacuation strategies and radiation modelling in compliance with international fire regulations, codes of practice and specific client requirements.
Maze Fire Consulting Ireland Limited First Floor, The Diamond Centre, Donegal Town, F94 EFK2 Co. Donegal, Ireland	**ISO 9001:2015** The provision of strategic fire safety engineering advice and services from concept to occupation. This includes analysis of fire behaviour, structural performance, evacuation strategies and radiation modelling in compliance with international fire regulations, codes of practice and specific client requirements.

People

Andrew McCracken
Director

Dr Mark Jones
Associate

Brian Fagan
Director

Sophie Washington
Head of Digital Innovation

Lynn Smith
Administration Manager

David Harries
Director

Helen Turnock
Business Support Manager

Savannah Wright
BIM Manager & Innovation Specialist

Beth Dean
Senior Consultant

Chris Hughes
Director

Karl Appleton
Principal Consultant

Margaret Treanor
Administration

Paul McGrath
Director

Alex Manning
Associate

Ben Rogerson
Associate

Andrew Martyn
Principal Consultant

Gabriel Campbell
Principal Consultant

Neil Woods
Fire Risk Assessment & Health and Safety Manager

Dermot Gallagher
Principal Consultant

Mary Button
Senior Consultant

Asad Javed
Graduate Consultant

Amanda Ohlsson
Administrator

Antonio Tedesco
Senior Consultant

Abdulaziz Alhasan
Senior Consultant

Seamus McCabe
Senior Consultant

Matteo Meloni
Consultant

Junior Brown
Graduate Consultant

Services

- Evacuation Modelling
- Structural Fire Modelling
- Computational Fluid Dynamics
- Fire Strategy
- Expert Witness
- Fire Service Liaison
- Fire Risk Assessment
- PAS 9980 Assessment
- Construction Stage Services
- Thermal Radiation Analysis

IRELAND

- Fire Safety Certificate Application Services
- Disability Access Certificate Application Services
- BC(A)R Ancillary Assigned Certifier Services
- Technical Due Diligence Fire Safety Survey Services

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Evacuation Modelling

Most guidance documents on fire safety recommend standard simple methods for calculating exit capacity (such as standard stair capacity tables). These methods are simple to use, but do not give a real indication of the evacuation. More complex analysis allows for a more accurate picture of the evacuation to be determined. Comparing this with smoke flow modelling, the exits can then be sized to ensure that the occupants have sufficient time to evacuate before conditions become untenable. This can be used either to reduce the sizes of the exits that may be required (as appropriate) or to give more confidence that the exit capacity is sufficient. There are several ways to carry out means of escape analysis for buildings, ranging from relatively simple methods to detailed, computer-based simulations.

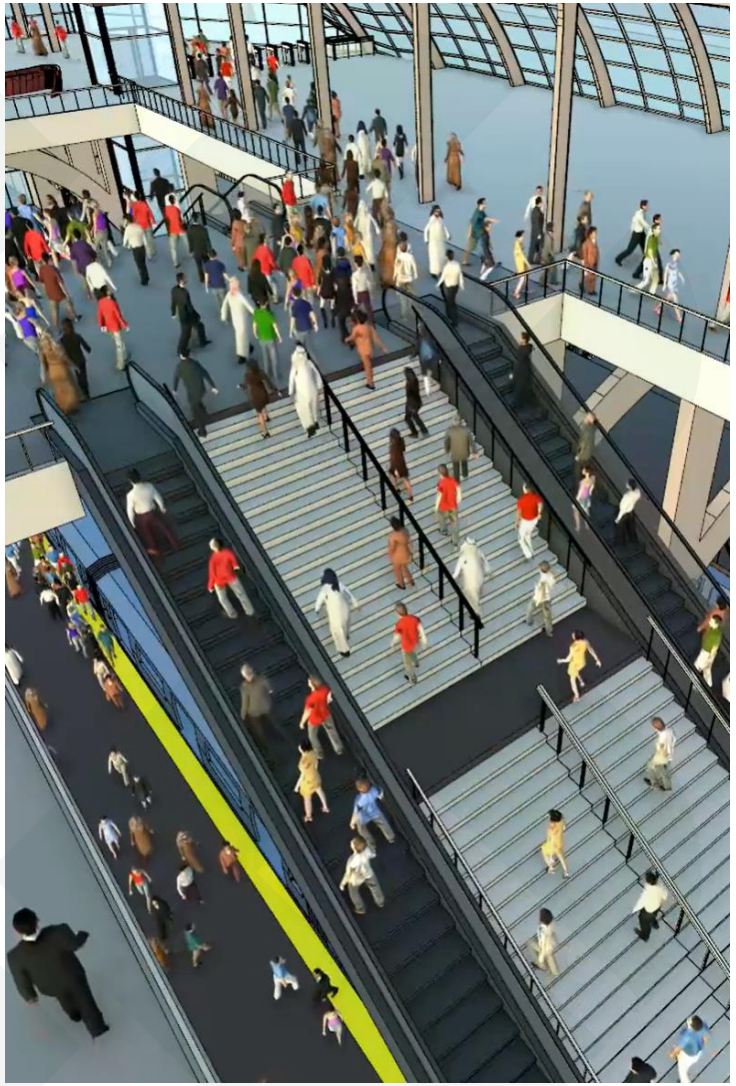
The main options are:

Calculation of Evacuation Times

- Maze Fire Consulting can carry out fire engineering analysis of the actual time taken to evacuate a building. The time required once the people start to move (known as the 'movement time') is only one component of this analysis because other factors such as the alarm time and the pre-movement time can significantly affect the overall evacuation time. This type of analysis may therefore contain a number of elements such as a calculation of the activation time of the smoke detection system.

Computer Simulations

- Maze Fire Consulting use a computer-based evacuation analysis program called Pathfinder to model evacuations from a wide range of building designs. One of the benefits of the model is that it provides a more visual demonstration of the predicted evacuation and that it can be used in conjunction with associated CFD models.



Pathfinder simulation

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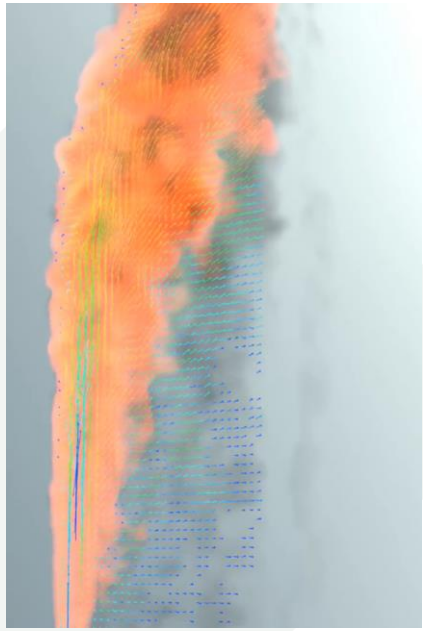
Structural Fire Modelling

Maze Fire Consulting can carry out analysis of the structural fire protection requirement using a wide variety of methods. The most appropriate method would be selected depending on the particular situation.

- ***Equivalent Fire Resistance Calculations*** – There are methods available to use the compartment size, fire load and ventilation sizes to determine the potential severity of a fire in terms of a period within the standard fire test.
- ***Prediction of Fire Conditions and Calculation of Heat Transfer to Structure*** – Maze Fire Consulting have calculation methods to predict the potential fire conditions that may occur in a fire within a particular space. From this, it is then possible to calculate the maximum temperature reached by the structure.
- ***Finite Element Modelling*** – Maze Fire Consulting can use a finite element model (Vulcan) to analyse heat transfer through insulating materials such as concrete or fire protection boarding.
- ***Full Frame Structural Fire Engineering*** – In typical buildings the structural engineers carry out detailed, computer-based analysis of the response of the structural frame to loads at ambient temperature. The response of the structure to a fire is then dealt with by providing insulation to the structure based on generic tables such as contained in Approved Document B. No analysis of the response of the fire to the elevated temperatures is carried out. Whilst this is the conventional approach, it leads to generic fire protection requirements, such as the need to provide the same level of fire protection to all structural elements, irrespective of their actual location. As such, a column in the middle of a low-risk space such as an atrium would have the same level of fire protection as a column in the middle of a storeroom.
- Maze Fire Consulting have separate computer software, and expert understanding of the response of structures to fires, so that we can carry out detailed analysis of the response of the structure to the elevated temperatures achieved in fires. As one simple example, it would be likely to identify that less fire protection is required in areas of low fire risk (such as in an atrium or in a reception area) compared to structure in other high-risk areas such as storerooms.
- The benefits are often not only in terms of direct cost saving due to reduced fire protection thickness (or in some cases elimination of fire protection requirement in certain areas), but also there can be a secondary cost saving due to the increased potential to use thin film intumescent, which can modify the construction method (e.g. allow cellular beams to permit services to pass through rather than under the beam). The reduction of the amount of products required also helps to reduce the environmental impact of the construction.

Computational Fluid Dynamics

Maze Fire personnel have extensive experience of the use of both zone and field models for smoke flow within buildings. We utilise a number of in-house and third-party computer programs that assist in both types of analysis.



PyroSim simulation

Zone Models

- Zone models are based on experimental data and give simple relationships between the amounts of smoke generated in certain smoke flow scenarios. Within their field of application zone models give very accurate results of smoke flow rates. However, as they are based on experimental data, they can only be used for situations where the layout is similar to that used in the experiments. Nonetheless they may remain suitable for informing the development of more detailed models at an early stage of design.

Field Models

- Field models are commonly referred to as computational fluid dynamics (CFD). These models break the space to be analysed into a large number of blocks and uses the fundamental equations of fluid and energy dynamics to model smoke flow within a space. As such they are not limited to any particular physical layout and so are more flexible than zone models. However, they can be computationally intensive. For cases where zone models are inappropriate, Maze Fire Consulting use a CFD program (Fire Dynamics Simulator – FDS) developed by the National Institute of Science and Technology (NIST) in the USA. This is a highly flexible model that can be used.
- To enhance development of such models Maze Fire Consulting also use the PyroSim program developed by Thunderhead Engineering. PyroSim allows CAD imports and advanced simulation management in order to automatically generate the text-only FDS input file. It streamlines the model build and can produce detailed 3D model graphics depicting results.

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Fire Strategy

A fire strategy is the way in which fire safety objectives for a new, altered, or existing building are defined and achieved. This can be through code compliance, where the fundamental objectives of the applicable fire safety codes/regulations are achieved, or using equivalency or following fire engineering principles which can be justified through performance-based design.

What Should Your Fire Strategy Include?

- The means of warning and escape
- Likely pathways of internal and external fire spread
- Access and facilities for the fire service
- The fire safety management requirements for the building

Maze Capabilities

- Our fire safety engineering capabilities enable us to perform engineering analysis throughout a building's design. These techniques include:
- Computational Fluid Dynamics Smoke Modelling
- Finite Element Structural Fire Engineering
- Finite Element Heat Transfer Analysis
- Radiation Analysis
- Complex Evacuation Modelling

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Expert Witness

Fire safety issues on projects can lead to significant claims against contractors, engineers, and architects. The most severe fire safety issues can also lead to prosecutions, injury, or loss of life. It is during these situations that an expert in fire safety engineering and regulatory fire safety compliance can be called as an expert witness to assist with identifying the root cause of an issue.

It is recommended that where an expert opinion is necessary, it is important to appoint experts with a thorough understanding of the legislation required to demonstrate regulatory compliance along with the testing of materials and fire safety provisions.

Maze has the experience and knowledge required to provide expert witness or expert advisory services. We can serve as an objective party in dispute cases where fire safety and compliance play a part. We can explain the complicated scientific and factual issues of the case to the required audience. Our main responsibility as an expert witness or expert advisor is to evaluate potential problems, defects, deficiencies, or errors and act as independent Part 35 experts to the court where necessary.

To develop our technical expertise in this field, all senior staff members who carry out expert witness services have completed the Legal Experience Training Advanced Professional Award in Expert Witness Evidence (LETAPAEWE).

Fire Service Liaison

Maze Fire employ a number of former fire service personnel who have an in depth understanding of the Fire Service and their requirements. We can act as an intermediary between the client and the Fire Service to smooth the often complex challenges associated with the regulatory process of building design and Fire Service consultation. Whether you are applying for Building Regulations approval or arranging remedial works following enforcement action, our team will strive to achieve the best outcome in a time efficient manner.

Fire Risk Assessment

Maze Fire Consulting has a dedicated team of fire risk assessors, all individual members of the Fire Risk Assessors Certification Scheme (FRACS), with experience of carrying out fire risk assessments of all building occupancy types.

Sectors

- Healthcare, including acute hospitals, community hospitals, health centres, specialist medical units etc.
- Residential apartment buildings
- Hotels, hostels, and other sleeping accommodation
- Educational buildings, including teaching, assembly, research and student residences
- Industrial – large scale manufacturing, waste recycling, power stations
- Logistics facilities
- Shopping centres, shops and offices

Team

- Our team of risk assessors have varied backgrounds, skillsets and knowledge which add to the overall capability of the team to tackle the most challenging and complex fire risk assessment requirements.
- Maze fire risk assessors adopt pragmatic and proportionate solutions to risks and can assist you in complying with current legislation using a structured risk-based programme.

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PAS 9980 Assessment

Maze undertakes external wall appraisals in accordance with PAS 9980:2022, Fire risk appraisal of external wall construction and cladding of existing blocks of flats – Code of practice. The PAS contains detailed guidance on a structured approach to evaluating external wall systems, described as a Fire Risk Appraisal of External Walls (FRAEW).

Why do you need a PAS 9980 FRAEW Appraisal?

- The PAS allows for the evaluation of risk and presents a possible alternative to external wall system remediation in line with the guidance to the Building Regulation.
- The PAS allows a structured risk-based decision to be made about the safe operation of the building, informing the fire risk assessment, and to determine the next steps.
- A PAS 9980 report is also a required in some circumstances to support an application to the Government's Building Safety Fund (BSF).

What type of buildings does the PAS apply to?

PAS 9980 is intended for use (as stated in the document itself) regarding the external wall construction and cladding of existing blocks of flats.

Types of PAS 9980 Appraisal

The PAS provides two routes for undertaking the appraisal:

- Section 13: Basic FRAEW Appraisal
- Section 14: Application of fire engineering analysis as part of further technical assessment

Section 13: Basic FRAEW Appraisal

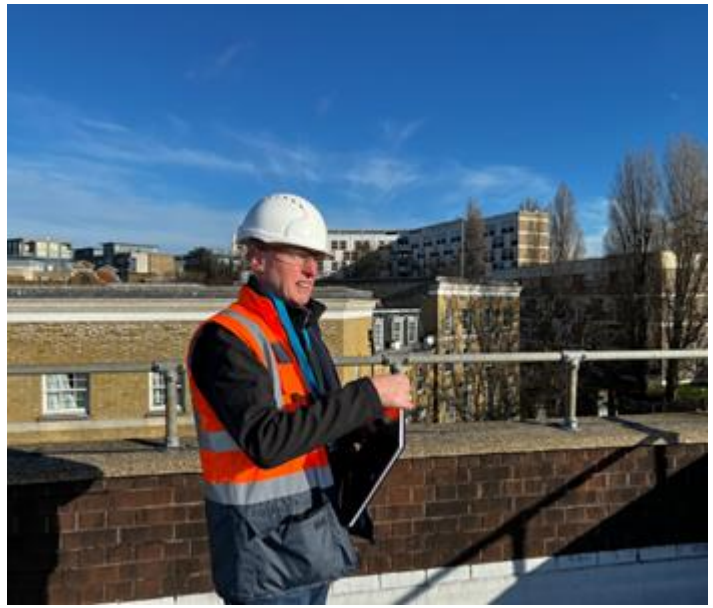
Most PAS FRAEWs will likely take the form of the basic Section 13 approach which follows a process of reviewing the existing external wall construction data against specified Risk Factors. The risk factors are contained in three annexes to the PAS and cover the following areas:

- Annex K – Façade performance factors
- Annex N – Façade configuration factors
- Annex F – Fire Strategy Factors / Fire Hazards

In total there are 35 risk factors, and these are evaluated and scored using an internal scoring methodology developed by Maze to arrive at an overall risk level. The risk level can be calculated for each external wall system, where more than one is present, and for the building overall to inform the:

- Risk level for each external wall system
- Overall risk level for the building; a combination of the individual external wall systems
- Requirement for further investigations, surveys or other data to allow a more informed picture to be formed
- Requirement for targeted or wide scale remedial activity
- Risk level for the occupants of the building and to inform the Fire Risk Assessment

Construction Stage Services



Maze Fire Consulting can provide a wide range of services in the Construction/Handover stages of work (RIBA stages 5-7). As experts in the intent of the fire strategy concept our work during these stages can give a 'level of confidence' that the installation of systems and standard of construction aligns with the fire strategy. This can reduce risk to the project by identifying flaws or incorrect application of fire safety components.

We are flexible in our approach to such work and can undertake ad hoc services either on a fixed fee or time-charge basis (to an agreed fee cap), being responsive to the needs of the client with regard to exacting time pressures and cost certainty.

Construction Phase

- Review of designs/specifications and method statements proposed by specialist fire installation contractors.
- Inspection of installed fire protection systems/products as part of the construction programme to verify the compliance of the installations with European/British/Industry standards, manufacturers' installation guides, test evidence and Building Regulations.
- Identification of snags for which remedial action may only take place post practical completion.
- Development of Construction Phase fire strategies to ensure site safety in the event of fire where this is not provided by the contractor (as this is a new development, this is not likely to be required).

Post Practical Completion

- Verification of remedial action to snags identified during construction phase.
- Witnessing of commissioning tests on active systems to ensure compliance with the specifications.
- Review of Operation and Maintenance Manuals for installed fire protection systems provided by specialist installation contractors.
- Review of proposed fire safety management arrangements including their further development as necessary.
- Preparation of a Preliminary Fire Risk Assessment to comply with Regulatory Reform (Fire Safety) Order 2005.
- Review of a proposed Building Fire Safety Plan (BFSP) and emergency procedures.
- Review of causes and effects for the fire alarm and interlocked fire systems including confirmation of compliance.
- Fire system design code and efficacy surveys in respect of active and passive fire systems.
- Preparation of Fire Risk Assessment as required by the Regulatory Reform (Fire Safety) Order 2005 with regular updates (frequency dependent on circumstances) to maintain currency.
- Fire safety audits including review of implementation of "significant findings" of Fire Risk Assessment.
- Review of management of fire safety in terms of documented procedures and actual their implementation.
- Fire safety training reviews.
- Review of testing, inspection, and maintenance of fire systems.

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Thermal Radiation Analysis

It is often necessary to prevent fire spread between certain areas, such as adjacent buildings. This can have implications on the amount of unprotected façade that can be permitted for buildings (to prevent fire spread to an adjacent building) or in other areas such as preventing fire spread between kiosks in shopping centres.

The calculation of radiative heat transfer between two surfaces is computationally intensive because it relies on the three-dimensional geometrical relationship between the two surfaces. Standard methods of analysis of this (such as the 'Enclosing Rectangles' method) therefore simplify the calculation into a tabular method. Within their range of application these methods therefore give good results, but they are inflexible, and when there is an unusual situation or complicated façade, the results will tend to be over-conservative.

Maze Fire Consulting has therefore developed an in-house computer program (MZ Rad) that can be used to calculate radiation between many surfaces. These therefore allow analysis of a wide range of geometrical configurations without requiring the over-conservative approach achieved by other methods.

In certain situations, this can give a significant advantage over other, more traditional methods, permitting larger amounts of unprotected façade than would otherwise be achieved.

Ireland Design Services

Fire Safety Certificate Application

- A fire safety certificate is the certification that the fire safety design plans for your project adhere to the fire safety part of the building regulations. A fire safety certificate is a legal requirement and needs to be sought before any building work commences, your application will be assessed, and it will be determined if your building will comply with Part B of the Second Schedule to the Building Regulations 1997.
- Maze Fire's fire safety certificate application services range from initial design review to achieving a granted fire safety certificate, this includes compilation of the Compliance Report and Fire Safety drawings and liaising with the Fire Department during the review and approvals stage.

The fire safety certificate application process

- The fire safety certificate application is usually made by a third party who has intimate knowledge of the Building Regulations and the application procedure. This is because the application needs to be completely comprehensive so the person applying has to have a good knowledge of construction and fire safety design.
- Maze Fire's experts are registered professionals and have a wealth of experience to assist you in this process.

Disability Access Certificate Application

Our Ireland office offer Disability Access Certificate (DAC) application services, from the initial design review to achieve a granted certification, including compilation of the Compliance Report and Disability Access drawings, as well as liaising with Building Control during the review and approvals stage.

What is a Disability Access Certificate?

A DAC is required under the Building Control (Amendment) Regulations and its function is to demonstrate compliance with Part M "Access and Use" of the Second Schedule of the Building Regulations.
In general, a DAC is required for new buildings and current buildings undergoing certain changes, which require a Fire Safety Certificate.
Maze Fire can provide a full service offering for the DAC application (which is similar to the services we offer for fire safety), including guidance through the approvals process in respect of disability access; from initial design review to compilation/submission of the DACs (where required), responding to any queries from the local authority during the approvals process.
Additionally, we also certify completed works in accordance with Part M (Access and Use) of the Building Regulations as required by the Building Control Regulations.

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Ireland Site Services

BC(A)R Ancillary Assigned Certifier Services

The Maze Fire Ireland team can offer BC(A)R Ancillary Assigned Certifier services.

Our BC(A)R Ancillary Assigned Certifier services for Part B and M of the Building Regulations, include addressing design queries and reviewing design details during the construction stage, undertaking on-going site inspections during construction and certification of the works upon completion in accordance with Part B and M.

Why do you need BC(A)R Ancillary Assigned Certifier services?

The Irish Building Control System looks to ensure the safety of all people and is based on the Building Control Acts 1990 – 2014. From this there is a set of legal requirements, The Building Regulations 1997-2017, formed for the design and construction of new buildings and alterations and change of use of existing buildings.

In 2014, new laws were implemented under The Building Control Amendments Regulation (BCAR). These laws included the use of a 'Builder' to carry out work under the regulations and the use of a competent person or 'Assigned Certifier' in conjunction with 'Ancillary Assigned Certifiers' to inspect the work to ensure compliance, as well as introducing a Certificate of Compliance upon project completion.

Maze Fire is able to use its expertise and offer the BC(A)R Ancillary Assigned Certifier service. As a Certifier for Parts B and M of the Building Regulations we will co-ordinate the design, inspection and certification of the relevant works from design to completion.

Technical Due Diligence Fire Safety Survey Services

Maze Fire's Ireland team can offer technical due diligence fire safety survey services. Technical due diligence fire safety surveys of existing buildings are used to confirm compliance with Parts B & M of the Building Regulations.

Our review services will include a detailed assessment of the existing compartmentation and fire doors, fire detection and alarm systems, emergency lighting systems, means of escape and circulation within and from the building, location, and provision of portable fire extinguishing equipment.

Why is a technical due diligence fire safety survey different?

A technical due diligence fire safety survey is an in-depth assessment of the existing fire safety products within your building. Our experts will look in as much detail as necessary to ensure that your building is compliant to the fire safety sections of the building regulations.

They will then produce a survey, highlighting any areas for improvements, for your records.

Projects

- AIRPORT
- ENTERTAINMENT
- EDUCATION
- RESIDENTIAL
- RETAIL
- HIGH RISE
- HOSPITAL
- TRANSPORTATION

A selection of projects are included within this prequalification document. Please visit our website for a full list.

www.mazefire/projects

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Airport

Aile-Est, Geneva Airport, *Switzerland*

Aile Est (East Wing) of Genève Aéroport is a new terminal replacing the previous 1970s building. The building is 520m long, 19m wide and 10m high. It comprises repeating 20m-long structural steel modules, supported every 20m on inclined steel columns that lift the whole structure 6m above the airfield roadway, allowing vehicles to pass underneath. Each departure gate is 80m long and consists of four structural modules. The steel structure is overtly expressed as an integral part of the design, giving the building a clean, unencumbered, contemporary aesthetic.

Maze Fire personnel worked closely with RSH+P in conjunction with Atelier Jacques Bugna SA to develop a comprehensive structural fire engineering study (drawing together analysis techniques such as radiative heat transfer, smoke temperatures, smoke movement, structural member size and fire limit state loading). The analysis was carried out to optimise the fire protection requirements for the steel structure and to carry this through successfully to completion it was necessary at all stages to engage closely with the local Regulatory Authorities and Fire Engineer to align the precepts of the analysis both to best practice and Swiss codes and ensure that the proposals were consistent with the holistic fire strategy design.

Queen Ali Airport, *Jordan*

Maze Fire Consulting personnel developed the detailed holistic fire strategy for the Queen Alia Airport terminal in conjunction with extensive consultation with the local Jordanian Civil Defence. Detailed fire engineering analysis was carried out to help optimise the design by determining the evacuation modelling characteristics, including comparison of Computational Fluid Dynamics (CFD) smoke modelling and zoned smoke model calculations. These analysis helped shape the smoke control strategy to be adopted within the terminal. The NFPA suite of international guidance documents was adopted on this project with reference to additional BRE and British Standards where appropriate.

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Entertainment

AMC Cinema – Garden Mall, *Saudi Arabia*

Strategic design of the internal fit-out arrangements of the AMC Cinema within the Garden Mall Development in Hail, Kingdom of Saudi Arabia.

The AMC cinema consisted of five auditoriums with a main entrance via the Garden Mall concourse. As with any entertainment area it was important to ensure egress was designed to meet the large occupant numbers internally with the auditorium style seating, to the exit capacity both direct to outside and into the mall.

The strategy was developed to meet the fire and life safety requirements of the SBC 201-CR and SBC-801-CR.

AMC Cinema – Tabouk Boulevard, *Saudi Arabia*

The cinema complex comprised of seven auditoriums spread across lower and upper ground levels, with a main entrance directly accessible from the outside.

Given the nature of an entertainment venue, it was crucial to design the egress routes to accommodate the high number of occupants within the auditoriums and ensure sufficient exit capacity.

The design strategy was developed to align with the fire and life safety requirements outlined in the SBC 201-CR and SBC-801-CR. These regulations likely specify the safety standards and guidelines set by the Saudi Building Code to address fire safety and protection measures in buildings.

By adhering to the fire and life safety requirements of the SBC 201-CR and SBC-801-CR, the strategic design of the internal fit-out arrangements aimed to ensure the safety of occupants in case of emergencies, particularly by providing appropriate egress routes and capacity.

Education

Lusail Towers Development, *Qatar*

The Lusail Towers Development is defined by four iconic towers providing both a focus for the Lusail District and to Lusail Plaza. The project comprised four plots; each containing a high-rise tower, podium building and basement and was designed to meet the requirements of QCDD and NFPA.
It is classified as a multi-use building featuring Office, Retail, Education as well as incidental accommodation.

As with any high-rise development there are complexities associated with egress, so within the towers, along with active fire safety systems and a high degree of structural fire resistance and compartmentation, a phased evacuation strategy and refuge floors were implemented.
CFD modelling was also carried out for the Podium buildings and Car Park.

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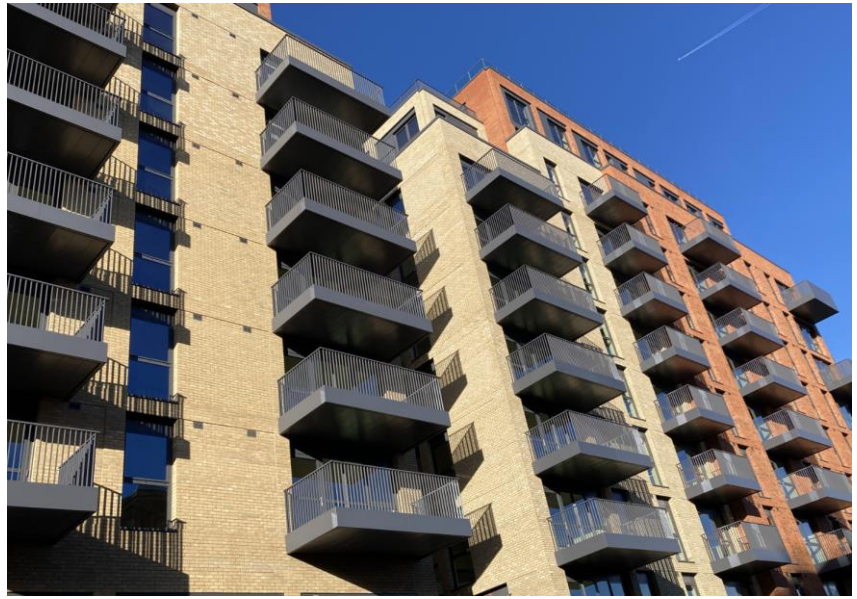
Residential

Ashley Gardens – Building 1



Ashley Gardens, Building 1 consists of four residential blocks of flats surrounding an open-air central courtyard on the 1st floor level, directly above a covered car park.

The development also includes commercial units at Ground and amenity spaces for the residents at 10th Floor. Maze Fire personnel provided the fire strategy for the whole development, as well as produced the CFD modelling for the smoke control systems in the residential corridors.

White Pines Central, *Ireland*

The project involved the construction of a residential complex in Rathfarnham, Dublin 16, consisting of one six-storey and five three-storey apartment blocks, with a total of over one hundred living units.

Maze Fire personnel played a crucial role in delivering the fire safety and disability access strategies for each block, also providing site inspections and on-going advice during construction works. Particular care was given to the fire safety provisions for the open plan layout of the apartments, as well as to the communal means of egress within each building.
The scope of services provided by Maze Fire personnel was comprehensive, ensuring compliance of the works in accordance with Part B and Part M of the Building Regulations.

Residential

Cookstown, *Ireland*

The project involved the construction of a mixed-use development in Cookstown, Tallaght. The development will include 204 apartments and retail and creche aspects and will range from five to eight storeys.

The scope of services provided by Maze Fire personnel was comprehensive, including site inspections and on-going advice during the construction works, to ensure the building was certified in accordance with the Building Control (Amendment) Regulations.

Northwood, *Ireland*

A mixed-use development is being constructed in Northwood, Finglas. This development encompasses two blocks and incorporates residential, retail, and creche elements. Maze Fire personnel are involved in providing various services for this project.

The services offered by Maze Fire personnel encompass site inspections and continuous guidance throughout the construction process. Their objective is to ensure that the building complies with the Building Control (Amendment) Regulations and qualifies for certification.
These regulations are typically established by the local building control authority to uphold safety, compliance, and quality standards in construction projects.
By conducting site inspections and offering ongoing guidance, Maze Fire personnel play a vital role in ensuring that the construction work meets the necessary criteria and regulations. Their involvement aims to guarantee that the completed building will be certified and deemed suitable for occupancy and usage.

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Retail

White Pines Superstore, *Ireland*

The project involved the construction of a grocery superstore building, as part of the new White Pines residential development in Rathfarnham, Dublin 16.

Maze Fire personnel played a key role in this project by providing expert fire safety and disability access consultancy, together with site inspections and on-going advice during the construction works. Close collaboration with the project team and a flexible approach to fire safety design contributed to the delivery of this state-of-the-art shopping facility in the Southside suburb of Dublin.

Lusail Towers Development, *Qatar*

The Lusail Towers Development is defined by four iconic towers providing both a focus for the Lusail District and to Lusail Plaza. The project comprised four plots; each containing a high-rise tower, podium building and basement and was designed to meet the requirements of QCDD and NFPA.

It is classified as a multi-use building featuring Office, Retail, Education as well as incidental accommodation.

As with any high-rise development there are complexities associated with egress, so within the towers, along with active fire safety systems and a high degree of structural fire resistance and compartmentation, a phased evacuation strategy and refuge floors were implemented.
CFD modelling was also carried out for the Podium buildings and Car Park.

High Rise

Two New Bailey Square, *Salford, UK*

Two New Bailey is a 10-storey purpose-built office building including basement car park and flexible use areas. A key architectural concept for the design was the external steel structure. Maze personnel developed the fire strategy design for the project including a detailed analysis of the potential influence of an internal fire on the external structure with the aim of evaluating the fire protection requirements for these structural elements.

The desktop analysis was based on the methodology in Annex B of EN 1991-1-2 (with due cognisance of the associated National Annex) and, following the QDR process of BS 7974 the analysis was discussed with the Regulatory Authorities both pre- and post-completion with the result being an optimised fire protection regime which assisted in realising the architectural intent.

122 Leadenhall, *London, UK*

The Leadenhall Building is located in Central London and includes 51 upper floors and 4 basement levels, totalling approximately 56,000m² (net) floor area. The multi-use building is used for retail, entertainment (i.e. restaurant) and 'trading' floors on the lower levels with the remaining being tenantable office spaces. Maze Fire personnel provided the overall fire strategy for the building, including the following:

- Localised structural fire engineering analysis of various parts of the structure supporting the building;
- A detailed external fire spread analysis due to the proximity of existing buildings in the locality;
- An evacuation analysis using Pathfinder; and
- Fit-out advice and fire strategies for particular floors over the years.

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Hospital

Royal Liverpool University Hospital, *Liverpool, UK*

Maze Fire personnel developed the fire strategy for the new Royal Liverpool University hospital and the adjacent support building, podium and under croft car park.
The hospital is a new 12-storey building providing a full range of hospital and patient care for the city. Maze Fire personnel involvement spanned the full design and construction phase and included CFD analysis of the main central atria to develop the criteria for the smoke extract system, development of the detailed fire strategy and ongoing assistance during construction.
The fire strategy for the hospital was developed in accordance with the Building Regulations, with reference to the relevant Health Technical Memorandum (HTM) guidance, along with detailed fire engineering principles for the CFD analysis, and other risk-based approaches in the development of the strategy.

The Diabetes Hospital, *Lusail, Qatar*

The project involved fire strategic design to a Detailed Design Stage for the Diabetes Hospital located in Lusail, Qatar. It comprised five stories above ground level used for hospital treatment and accommodation and two basement levels predominately used for car parking.
The design was developed to meet the requirements of QCDD and NFPA.
As with many healthcare buildings, the immediate and total evacuation of the building in the event of a fire may not be possible or desirable. Patients with restricted mobility, (i.e. wheelchair users or patients confined to bed), cannot negotiate escape routes, particularly stairways, unaided. Patients under medication may require staff assistance, and patients who are dependent on electrical or mechanical equipment for their survival cannot always be disconnected and moved rapidly without serious consequences.
A Progressive Horizontal Evacuation Strategy was therefore proposed, allowing dependent or very high dependency patients to move, to a safer area on the same floor.
The provision of active fire safety systems and a high degree of structural fire resistance and compartmentation was incorporated to support this strategy.

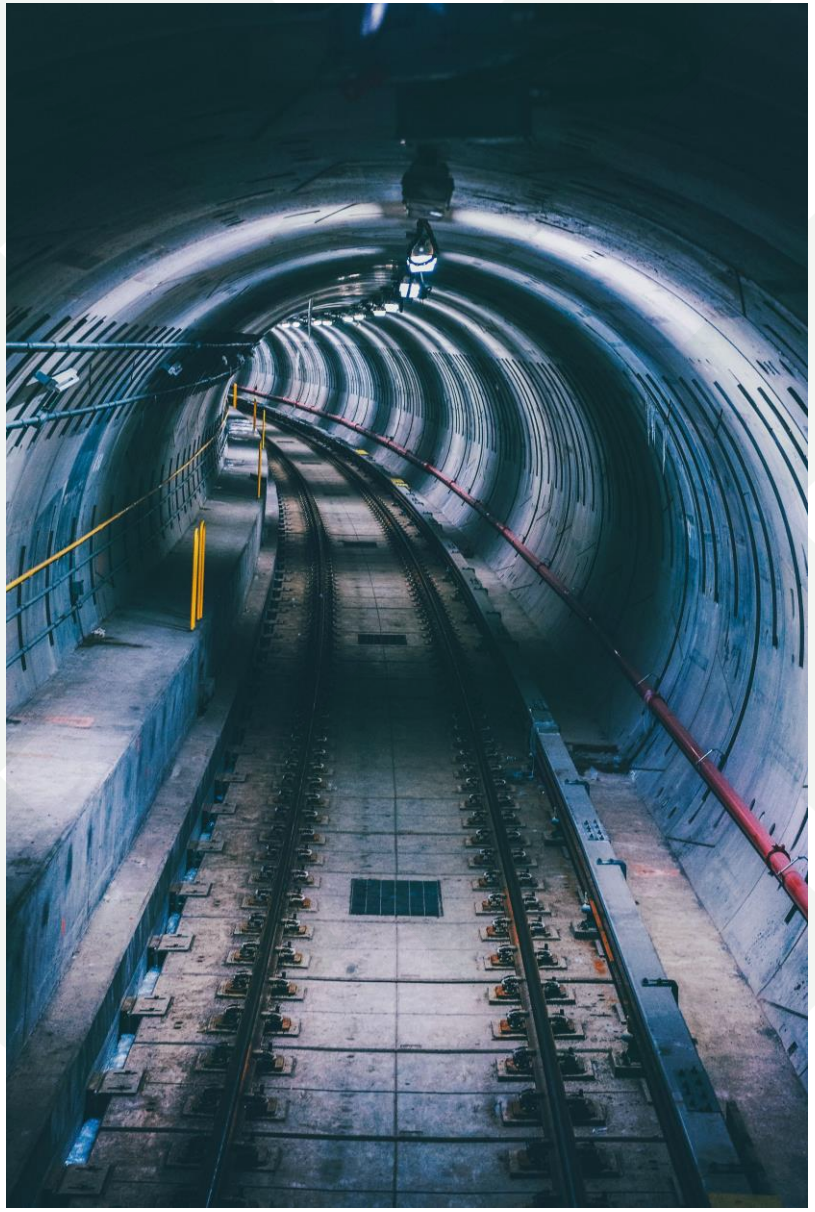
Transportation

Crossrail

The Cross London Rail Link (Crossrail) created a new route through London linking west to east, generating a new network of services now referred to as the Elizabeth Line. The project consisted of surface line stations leading from Maidenhead (west) to Shenfield (east) via central London. The central section of the Crossrail line is underground and new tunnels and platforms link with existing London Underground stations at Paddington, Bond Street, Tottenham Court Road, Farringdon, Liverpool Street and Whitechapel.

The interaction of Crossrail with existing London Underground stations resulted in highly complex station designs, and the fire safety of these stations is a crucial aspect of the design both in terms of providing life safety to passengers and staff as well as provisions for the fire brigade.

Maze Fire personnel were responsible for the fire safety design of two of the underground stations during various design phases of the project, which included the development of complex engineered fire strategies and various fire safety engineering such as CFD analysis to justify and validate the fire strategy for each station. The fire safety design of Whitechapel Underground station won an award at the Fire Excellence Awards 2011 for best fire safety engineering project.



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