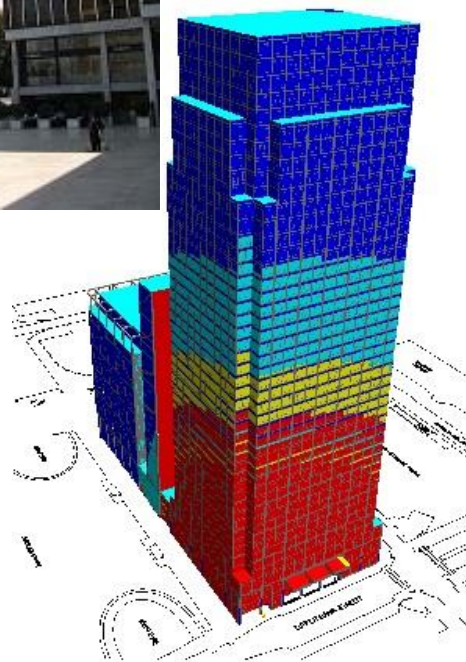
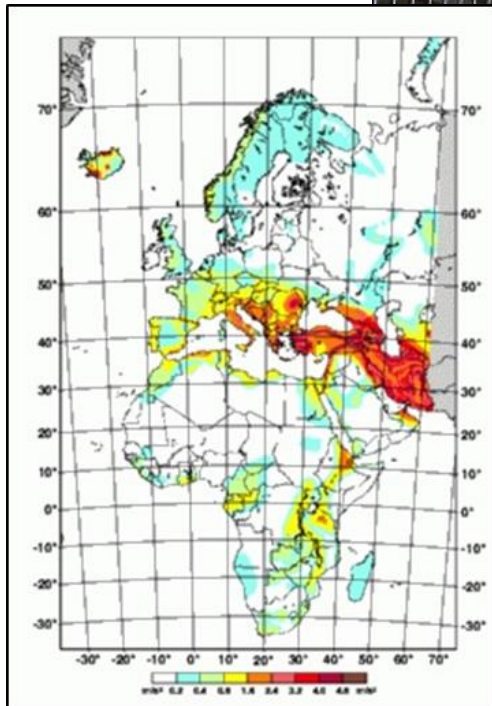




PATRICK MANN & ASSOCIATES
Extreme Loads & Structural Risk Engineers

Statement of Capability For Insurance & Business Risk Services



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1 INTRODUCTION

Patrick Mann & Associates Ltd (PMA) is a dynamic and growing consultancy. Its mission is to provide total risk management solutions underpinned by a solid foundation of engineering, science and technology.

PMA's strength is its ability to quantify business, operational and asset risks from natural and man-made hazards, and furnish rational solutions that are a blend of effective management controls, engineering and practical loss-control measures.

The hallmark of our approach is to identify the client's specific needs, and then to develop tailored services that specifically address the client's issues on an integrated basis. As a result we are providing services to a rapidly expanding client base, which includes the Insurance, Defence, Government, Nuclear, Oil & Gas and Transport sectors.

A selection of clients that PMA engineers have undertaken projects for includes:



2 INSURANCE & BUSINESS RISK SERVICES

PMA is able to provide a wide range of services to a wealth of clients. Table 1 summarises the range of risk management capabilities that PMA could provide, while the following section provides a description of many of the typical services that we perform within the Insurance & Business Risk sector.

Identify Risk Sources	Quantify Risk	Manage Risk
Earthquakes Windstorm Flood Tornado / Hail / Ice Sabotage Human Error Equipment Failures Process Failures Fire / Explosions HAZMAT Release Security / Terrorist Impact / Collisions	Physical assets Operational Business Interruption Technology Legal Financial Political Environmental Due Diligence	Securitisation Emergency planning Capital improvements Retrofit design Retention Recovery Planning Training Development

Table 1 Risk Management Capabilities

2.1 Portfolio Analysis

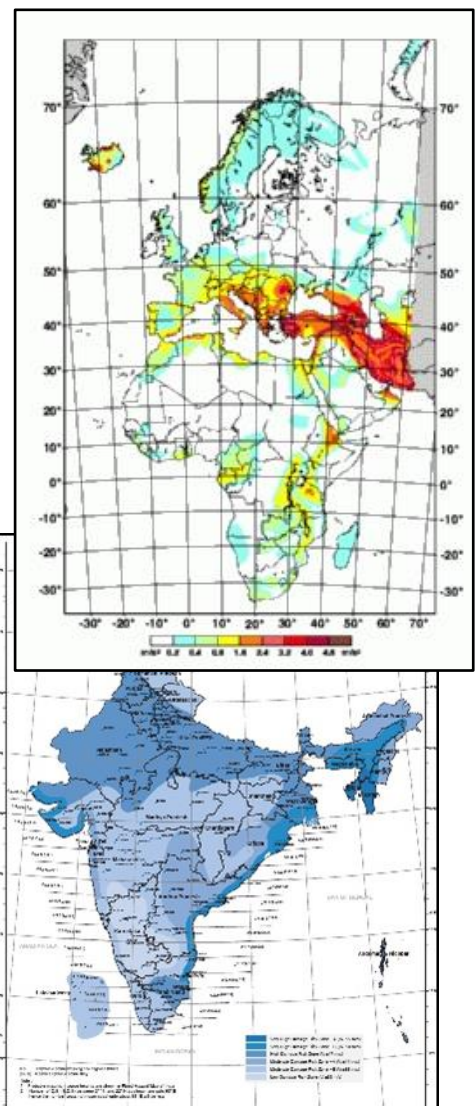
A portfolio assessment is a quick, cost-effective high-level risk-ranking tool for a wide range of hazards in isolation or in combination. The main use of this tool is to produce estimates of total portfolio exposure for insurance purposes. However, further to this it also allows the highest risks sites in a portfolio to be identified by comparison on a consistent basis so that risk managers, brokers and underwriters can identify and then investigate their catastrophic risk exposure in more detail.

Perils covered within our portfolio analyses may include:

- Earthquake
- Wind (hurricanes, typhoons, tornados, storms etc)
- Flood
- Hail/Ice
- Winter storm
- Terrorism

The reports produced by the studies are generally used for:

- Underwriting studies
- Total exposure studies
- Risk ranking
- Supply chain and distribution analysis
- Accumulation management



2.2 Probable Maximum Loss Assessment

Probable Maximum Loss (PML) studies are undertaken to evaluate the probable maximum loss from a specific event, e.g. a terrorist attack or earthquake. Maximum loss assessment variations include Normal Expected Loss (NLE), Estimated Maximum Loss (EML) and Maximum Foreseeable Loss (MFL) Assessment. In each case, they are more accurate than a Portfolio Study since they consider the specifics issues, strengths and vulnerabilities associated with the of the respective site/asset/operation.

Each study comprises either an on-site survey or desktop exercise and typically includes:

1. A hazard assessment to evaluate the credible hazards, their magnitude and likelihood.
2. A vulnerability assessment to in order to identify the site assets and operations that are vulnerable to the hazard event. The vulnerability assessment considers the available protection measures, and also the potential for secondary escalation issues.
3. A risk assessment to determine its loss potential for each hazard scenario. Tabulation of the different loss events enables the generation of the site's maximum loss potential, e.g. PML, in terms of Life Safety issues, Physical Asset Damage and Business Interruption.



Perils/hazard covered within our loss assessment may include:

- Earthquake
- Wind (hurricanes, typhoons, tornados, storms, etc.)
- Flood
- Hail/Ice
- Winter storm
- Terrorism
- Fire
- Explosion
- Toxic release/contamination



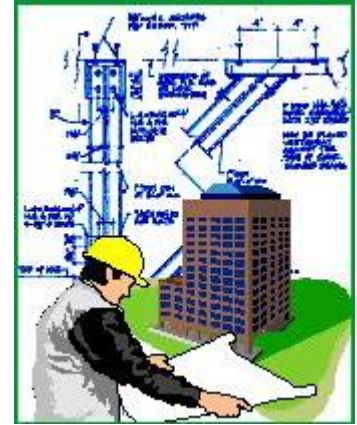
The reports produced by the studies are generally used for:

- Underwriting studies
- Risk identification, and identification of high risk building, systems and equipment
- Evaluation of Business Interruption potential
- Evacuation planning and crisis management
- Identification of risk mitigation options
- Supply chain and distribution analysis

2.3 Business Impact Analysis

The objective of a Business Impact Analysis (BIA) is to map the business functions and to assess the effect on the business for disruption to these functions. The typical process for completing the BIA study includes:

1. An onsite survey to identify, map and inspect the key business processes/systems, their components and dependencies.
2. An impact assessment to evaluate the consequences to the business from the loss of a key process/system, component or dependency. The impact assessment also audits the resilience of the key processes to the loss of key components and dependencies.
3. A hazard assessment in order to determine range of events that could lead to the loss of a critical component or dependency. The hazard assessment typically considers normal operational, fault conditions and external events. The assessment also estimates the event magnitude, and associated return frequency, that would be required to cause the disruption.



The reports produced by the studies are generally used for:

- Risk identification, and identification of high risk systems, equipment and dependencies
- Evaluation of Business Interruption potential
- Evaluation of Recovery Time Objectives
- Identification of risk mitigation priorities and options
- Supply chain and distribution analysis

2.4 Due Diligence Studies

As part of acquisition, mergers or general development, companies need to understand the potential liabilities they are considering taking on. PMA has considerable experience in performing due diligence studies for clients concerned about the risk exposures of potential new acquisitions to extreme hazard scenarios.

Typically the studies have included reviews of existing structures, systems and plant, and the examinations of design documentation to ensure that appropriate measures have been taken, or development of design specification. In some instances the studies have also considered the sensitivity of the company's key supply and distribution networks to these hazards.

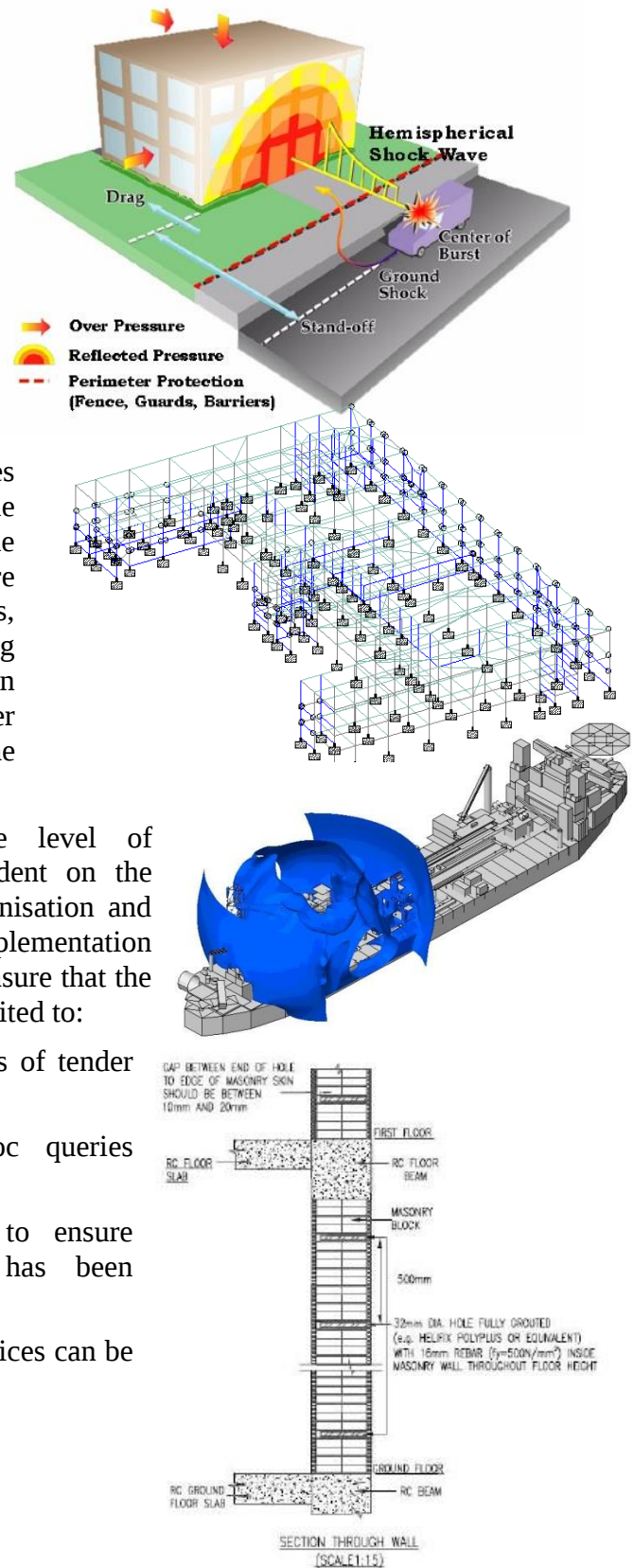


2.5 Risk Mitigation Activities

Where the risk is identified as unacceptable, PMA is able to provide a variety of more in-depth and specialist support services. Typical additional worksopes include:

- **Refinement Studies** – These studies are typically reserved for facilities that have an associated risk that is seen as sufficient to consider mitigation. The study initially involves more detailed investigations and assessments to remove of any unnecessary conservatism, the identification of potential risk mitigation options, and cost-benefit analysis to determine the optimum risk mitigation solution.
- **Risk Mitigation** – These studies comprise the detailed design of the chosen risk mitigation concept. The output of these work packages are fully design engineering solutions, including drawings and engineering specifications. The output is often used directly within the tender process for the selection of the implementation contractor.
- **Implementation Support** – The level of implementation support is dependent on the engineering capability of the organisation and their contractor. Typically implementation support is undertaken in order to ensure that the design intent is achieved, and is limited to:
 - Review of technical aspects of tender submissions
 - Resolution of any ad-hoc queries during installation
 - Confirmatory inspections to ensure that the design intent has been achieved.

Further details on our Risk Mitigation services can be provided on request.



3 CASE STUDIES

3.1 Study 1 – Portfolio Study

A major international Non-governmental organisation (NGO) had a number of offices distributed across the Middle East and North Africa. They requested a portfolio analysis be undertaken to assess the risk to their buildings, and occupants from earthquakes.



The study considered:

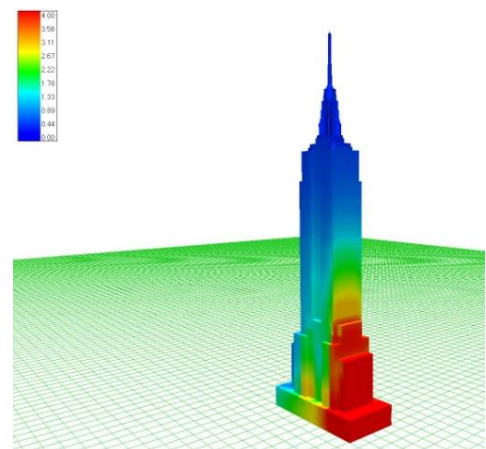
1. Hazard – the site specific hazard to each office location
2. Vulnerability – based on the nature of the office building, including age, building type, number of storeys, occupancy, value, and giving consideration to the local construction standards.

The output prioritised the risk to each site and was used to direct future risk management.

3.2 Study 2 – PML Study on Landmark Structure

As part of the underwriting process terrorism insurance, a Probable Maximum Loss (PML) evaluation was undertaken for a major landmark structures for credible terrorist attack scenarios. These credible scenarios included bomb and aeroplane impact scenarios.

The studies developed building models to assess the capability of the building with a high level of confidence. The models consider the damage response of both the external façade and the primary frame. The analysis also considered secondary escalation issues such as fire.



The output of the study was a PML damage prediction for asset damage and business interruption.

3.3 Study 3 – PML Study for Manufacturing Facility

As part of the corporate risk management process for a major international manufacturing company, a Probable Maximum Loss (PML) study was undertaken to determine the potential for Physical Damage and Business Interruption from earthquakes. The output of the study was used to support the purchase of insurance.

The study included the evaluation of the seismic hazard, and a detailed site survey to understand the plant, its processes and vulnerabilities. The survey findings were then combined with experience reports from post-event investigations

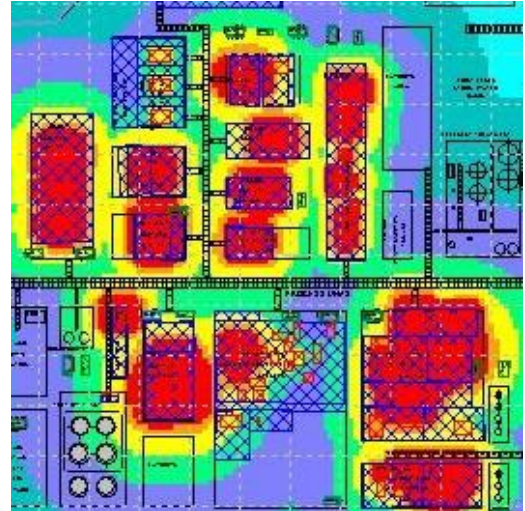


throughout the world to determine the PML. The reports also estimated the potential risk to the facility staff and outlined a forward action plan that could be used to help future risk mitigation activities, emergency planning and business continuity planning.

3.4 Study 4 – PML Study for Petrochemical Facility

In order to gain funding for the expansion of a petrochemical facility, the lenders insisted that a PML study was undertaken in order to evaluate the potential risk from terrorist bomb attacks. The focus of the study was to determine the potential for Physical Damage and Business Interruption considering the both primary and secondary escalation issues.

The study included the profiling of the site in order to identify the locations that could cause the greatest asset loss or business interruption. A detailed review of the site processes was also undertaken such that the assessment could also include the additional loss potential from secondary escalation events, e.g. fires, VCEs or BLEVEs, and also the benefit of the site's emergency response systems, e.g. fire fighting and emergency shutdown systems.



3.5 Study 5 – Due Diligence Study for New Premises

As part of the due diligence process for a major international NGO, PMA engineers were requested to survey a number of developments as potential new office premises. The studies specifically focused on the quality of the construction, the potential to resist terrorist bomb attacks and earthquakes, and the likelihood of being able to adequately secure the premises. The conclusions of the study ranked the different premises and were used as part of the select process.





4 CONTACT DETAILS

For more information on our engineering services, please contact PMA for further information. Contact details are:

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